Document Title	System Template
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	063

Document Status	Final
Part of AUTOSAR Standard	Classic Platform
Part of Standard Release	4.3.1

Document Change History

Date	Release	Changed by	Description
2017-12-08	4.3.1	AUTOSAR Release Management	• Minor corrections / clarifications / editorial changes; For details please refer to the ChangeDocumentation
2016-11-30	4.3.0	AUTOSAR Release Management	• Added support for new E2E Profiles 7, 11 and 22 • Improved configuration of Ethernet Switch Ports • Introduced Security Profiles • Minor corrections / clarifications / editorial changes; For details please refer to the ChangeDocumentation
2015-07-31	4.2.2	AUTOSAR Release Management	• Minor corrections / clarifications / editorial changes; For details please refer to the ChangeDocumentation
2014-10-31	4.2.1	AUTOSAR Release Management	• Introduction of data transformation • Introduction of SecuredIPdu • Introduction of Switch Configuration • Introduction of Global Time Synchronization • Improved support for CanFD • Minor corrections / clarifications / editorial changes; For details please refer to the BWCStatement
2014-03-31	4.1.3	AUTOSAR Release Management	• Various fixes and clarifications

2013-10-31	4.1.2	AUTOSAR Release Management	• Set CanNmCluster.nmChannelActive, FlexrayArTpChannel.timeFrIf and FlexrayArTpChannel.maxFrIf to deprecated • Added SoAd Pdu Collection attributes to SocketConnection • Added SoAdRouting-Group.eventGroupControlType • Introduced SocketAddress.multicastConnector • Clarified usage of ISignal.dataTypePolicy • Described the handling of ComSpecs during flattening • Introduced new Pdu types: GeneralPurposePdu and GeneralPurposeIPdu
			• Made RootSwCompositionProto-type.calibrationParameterValueSet "atpSplitable" • Made RootSwCompositionProto-type.flatMap "atpSplitable" • Added new Ethernet addressing attributes to SocketConnection to help to derive the Ecu Configurations for the Server and the Clients

2013-03-15	4.1.1	AUTOSAR Administration	• Added support for remote activation of RunnableEntitys • Added support VLANs and Service Discovery • Reworked the SoAd configuration • Introduced SenderReceiverCompositeElementToSignalMapping and ClientServerToSignalMapping • Added support for CAN FD • Reworked the J1939 TP configuration • Clarification of the usage of swDataDefProps on ISignals and SystemSignals • Added support for Complex Drivers in the Topology • Updated IPduM to allow only static part reception • Added LinSlaveConfig class to the LinMaster • Clarified meaning of PduToFrameMapping.startPosition
2011-12-22	4.0.3	AUTOSAR Administration	• Added support for Partial Networking • Added support for Complex Drivers • Added support for new COM transfer properties • Added support for transmission mode switch via Com_SwitchIpduTxMode COM API • Added support for treating byte arrays with primitive type mapping • Added support for partial routing in signal gateways • Added support for FlexRay AUTOSAR TP • Added rules for creation of Pdu Triggerings and Pdu Ports • Explained the general approach of bit counting

2009-12-18	4.0.1	AUTOSAR Administration	• updated System class category names • Changed specification of PduLength parameter from bits to bytes • Made Flexray channel specific attributes optional • Clarified the usage of EcuPorts in System Extract/Ecu Extract • Allowed to define sending and receiving connections to EcuPorts for NmPdus, XcpPdus • Aligned FrTP model to AUTOSAR FrTp SWS • Replaced ComProcessingPeriod by three timebase parameters • Reworked E2E protection of selected I-PDUs • Corrected AssignFrameIdRange configuration in LIN model • Clarified the routing of ISignalGroups in the Signal Gateway • Extended the enumeration "TransferPropertyEnum" with the element "triggeredOnChange" • Added a subchapter to the appendix about special use cases that are supported by the System Template • Reworked SenderReceiverToSignal-GroupMapping and ClientServerToSignalGroupMapping • Changed multiplicity between System and SystemMapping from 1 to 0..1.

2010-02-02	3.1.4	AUTOSAR Administration	• Implemented support for LIN 2.1 • Implemented support for Network Management (FlexRayNm, CanNm, LinNm, UdpNm) • adapted IPdu Multiplexer model to ASAM Fibex 3.1 • Reworked "ECU Extract" chapter • Introduced "System Extract" • Introduced EndToEndProtection for ISignalIPdus • Reworked "Transport Layer" chapter • Implemented Variant Handling concept • Implemented Documentation support concept • Implemented support for J1939 communication • Implemented support for TTCan • Implemented support for for TCP/IP and DoIP. • Introduced Pdu Counter and Pdu Replication • Implemented VMM/AMM concept • Introduced low-level routing of NPdu's • Implemented support for dynamic signals • Introduced PdurIPduGroups
2009-02-04	3.1.2	AUTOSAR Administration	• Clarified semantics of Data Mappings • Added inheritance from Identifiable to PduToFrameMapping • Added "FlexRayChannelName" attribute to FlexRayPhysicalChannel element.

2008-08-13	3.1.1	AUTOSAR Administration	• Added the boolean attribute "payloadPreambleIndicator" to the "FlexrayFrameTriggering". • Added extension that allows the assignment of IPduGroups to ECUs. • Added missing reference from "ClientServerComposite-TypeMapping" to "ArgumentPrototype" • Alignment with AUTOSAR IPduM SWS
2008-02-01	3.0.2	AUTOSAR Administration	• Moved "canAddressingMode" attribute from "CanCluster" to the "CanFrameTriggering" element • Clarified the descriptions of several elements and attributes.
2007-12-21	3.0.1	AUTOSAR Administration	• Communication part reworked from scratch • Alignment with ECU Configuration • Added support for Transport Protocols • Major changes in Topology chapter after harmonisation with Fibex (removed complex Topologies) • Document meta information extended • Small layout adaptations made

2006-11-28	2.1	AUTOSAR Administration	• Support for Signal Groups added. • Rework of the Topology Description • Introduction of PDUs. Description of the PDU Multiplexer, PDU Gateway. • FlexRay: multiple transmission of a frame within one communication cycle is supported now. • Removed the concept of Variant Descriptions (Properties) and CompToECUMappingConstraints relying on the property concept. • Split SwCompToEcuMapping in two classes in order to allow separation of SWC-to-ECU mapping and Implementation-to-SWC mapping. • Removed preliminary chapter on MOST as it is not part of the standard. • For all Instance References in the System Template added diagrams to the meta-model containing detailed representations of these references.
2005-05-31	1.0	AUTOSAR Administration	Initial Release

Disclaimer

Table of Contents

Bibliography

[1] Requirements on System Template
AUTOSAR_RS_SystemTemplate

[2] Generic Structure Template
AUTOSAR_TPS_GenericStructureTemplate

[3] XML Schema Production Rules
AUTOSAR_TPS_XMLSchemaProductionRules

[4] Methodology
AUTOSAR_TR_Methodology

[5] Software Component Template
AUTOSAR_TPS_SoftwareComponentTemplate

[6] Specification of ECU Resource Template
AUTOSAR_TPS_ECUResourceTemplate

[7] Standardization Template
AUTOSAR_TPS_StandardizationTemplate

[8] Specification of Timing Extensions
AUTOSAR_TPS_TimingExtensions

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http://www.asam.net

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[11] CAN specifications
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[15] Layered Software Architecture
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[16] Specification of LIN Interface
AUTOSAR_SWS_LINInterface

[17] Specification of COM Based Transformer
AUTOSAR_SWS_COMBasedTransformer

[18] Basic Software Module Description Template
AUTOSAR_TPS_BSWModuleDescriptionTemplate

[19] Specification of SW-C End-to-End Communication Protection Library
AUTOSAR_SWS_E2ELibrary

[20] Specification of Communication
AUTOSAR_SWS_COM

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[27] Specification of CRC Routines
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[31] Software Process Engineering Meta-Model Specification
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1 Introduction

1.1 Abbreviations

a CAN	Controller Area Network
CAS	Collision Avoidance Symbol
CBV	Control Bit Vector
CC	Communication Controller
DoIp	Diagnostics over IP
DTD	Document Type Definition
ECU	Electrical Control Unit
FIBEX	Field Bus Exchange Format
I^2C	Inter-Integrated Circuit
ID	Identifier
IPDU	Interaction Layer Protocol Data Unit
ISG	Inter-slot Gap
LIN	Local Interconnect Network
LPDU	Data Link Layer Protocol Data Unit
MOST	Media Oriented Systems Transport
NAD	Node Address for Diagnostic
NID	NOde Identification
NIT	Network Idle Time
NM	Network Management
NPDU	Network Layer Protocol Data Unit
OBD	Onboard Diagnostic
PDU	Protocol Data Unit
POC	Protocol Operation Control
RTE	Runtime Environment
SDU	Service Data Unit
SID	Service Identifier
SPI	Serial Peripheral Interface
SWC	Software Component
SWC-T	Software Component Template
SYS-T	System Template
TP	Transport Protocol
TTCAN	Time Triggered Controller Area Network
UML	Unified Modeling Language
VFB	Virtual Functional Bus
XML	Extensible Markup Language
XSD	XML Schema Definition a

Table 1.1: Abbreviations used in the scope of this Document

1.2 Requirements Tracing

The following table references the requirements specified in [1] and links to the fulfillment of these.

Requirement	Description	Satisfied by
[RS_SYST_00001]	Mixed Systems (AUTOSAR/NON-AUTOSAR)	[TPS_SYST_01063] [TPS_SYST_05000]
[RS_SYST_00002]	Basic Software Resources and RTE Resources	[TPS_SYST_01126]
[RS_SYST_00003]	Iterative Development	[TPS_SYST_01000] [TPS_SYST_01002] [TPS_SYST_01003]
[RS_SYST_00006]	Compatibility between the AUTOSAR Templates	[TPS_SYST_01017] [TPS_SYST_01019]
[RS_SYST_00007]	Mapping of Software Components to ECUs	[TPS_SYST_01001] [TPS_SYST_01020] [TPS_SYST_01021] [TPS_SYST_01022] [TPS_SYST_02114]
[RS_SYST_00008]	SWC Cluster	[TPS_SYST_01024] [TPS_SYST_01025]
[RS_SYST_00009]	SWC Separation	[TPS_SYST_01026] [TPS_SYST_01045]
[RS_SYST_00013]	Topology	[TPS_SYST_01004] [TPS_SYST_01005] [TPS_SYST_01006] [TPS_SYST_01007] [TPS_SYST_01008] [TPS_SYST_01009] [TPS_SYST_01010] [TPS_SYST_01011] [TPS_SYST_01013] [TPS_SYST_01014] [TPS_SYST_01015]
[RS_SYST_00014]	Data Segmentation	[TPS_SYST_01099] [TPS_SYST_01100] [TPS_SYST_01101] [TPS_SYST_01102] [TPS_SYST_01103] [TPS_SYST_01104] [TPS_SYST_01105] [TPS_SYST_01106] [TPS_SYST_02156]
[RS_SYST_00016]	Dedicated physical connections	[TPS_SYST_01043]
[RS_SYST_00017]	Mapping of signals to the same physical line	[TPS_SYST_01041]
[RS_SYST_00018]	Mapping of signals to different physical lines	[TPS_SYST_01044]
[RS_SYST_00019]	Mapping of signals to a specific physical line	[TPS_SYST_01043]
[RS_SYST_00020]	Exclusion of signals from a specific physical line	[TPS_SYST_01042]
[RS_SYST_00021]	ECU Communication via CAN	[TPS_SYST_01130]
[RS_SYST_00022]	ECU Communication via LIN	[TPS_SYST_01012] [TPS_SYST_01129] [TPS_SYST_02101]
[RS_SYST_00024]	ECU Communication via Flex Ray	[TPS_SYST_01085] [TPS_SYST_01128]
[RS_SYST_00025]	Derivation of COM Stack Configuration Parameters from the System Template	[TPS_SYST_01030]
[RS_SYST_00027]	ECU Extract generation rules	[TPS_SYST_01000] [TPS_SYST_01002] [TPS_SYST_01003] [TPS_SYST_01016]
[RS_SYST_00028]	IPdu End-to-End Communication Protection support	[TPS_SYST_01070] [TPS_SYST_01071] [TPS_SYST_01072] [TPS_SYST_01073] [TPS_SYST_01074]
[RS_SYST_00029]	Dynamic length signals	[TPS_SYST_01049] [TPS_SYST_01065]
[RS_SYST_00030]	Dynamic length IPdus	[TPS_SYST_01049]

[RS_SYST_00031]	Distribution of Application and Vehicle Mode Requests	[TPS_SYST_01023]
[RS_SYST_00033]	Software-to-ECU mapping variants	[TPS_SYST_01001]
[RS_SYST_00037]	Timing properties	[TPS_SYST_01075] [TPS_SYST_01076] [TPS_SYST_01077]
[RS_SYST_00038]	Support of SAE J1939 Protocol Features	[TPS_SYST_01106] [TPS_SYST_01132] [TPS_SYST_02107] [TPS_SYST_02108] [TPS_SYST_02109]
[RS_SYST_00039]	ECU Communication via Ethernet	[TPS_SYST_01086] [TPS_SYST_01088] [TPS_SYST_01089] [TPS_SYST_01090] [TPS_SYST_01091] [TPS_SYST_01092] [TPS_SYST_01093] [TPS_SYST_01094] [TPS_SYST_01095] [TPS_SYST_01096] [TPS_SYST_01097] [TPS_SYST_01098] [TPS_SYST_01108] [TPS_SYST_01131] [TPS_SYST_02156]
[RS_SYST_00042]	Support for Partial Networking	[TPS_SYST_01133] [TPS_SYST_02165] [TPS_SYST_02166] [TPS_SYST_02167]
[RS_SYST_00043]	Communication via Complex Drivers	[TPS_SYST_01115]
[RS_SYST_00044]	Description of custom bus systems	[TPS_SYST_01127]
[RS_SYST_00045]	Co-existing System artifacts in the same model	[TPS_SYST_03000]
[RS_SYST_00047]	Network and physical representation on signal level	[TPS_SYST_01062] [TPS_SYST_01063]
[RS_SYST_00048]	CAN with Flexible Data-Rate	[TPS_SYST_01154]
[RS_SYST_00049]	Support of Efficient COM for large data configuration	[TPS_SYST_02015] [TPS_SYST_02016] [TPS_SYST_02017] [TPS_SYST_02018] [TPS_SYST_02019] [TPS_SYST_02020] [TPS_SYST_02021] [TPS_SYST_02022] [TPS_SYST_02023] [TPS_SYST_02024] [TPS_SYST_02025] [TPS_SYST_02026] [TPS_SYST_02027] [TPS_SYST_02028] [TPS_SYST_02164] [TPS_SYST_03001]
[RS_SYST_00050]	Data transformation of inter-ECU communication	[TPS_SYST_02030] [TPS_SYST_02031] [TPS_SYST_02032] [TPS_SYST_02033] [TPS_SYST_02034] [TPS_SYST_02035] [TPS_SYST_02036] [TPS_SYST_02037] [TPS_SYST_02038] [TPS_SYST_02039] [TPS_SYST_02040] [TPS_SYST_02041] [TPS_SYST_02042] [TPS_SYST_02043] [TPS_SYST_02044] [TPS_SYST_02045] [TPS_SYST_02046] [TPS_SYST_02047] [TPS_SYST_02048] [TPS_SYST_02049] [TPS_SYST_02050] [TPS_SYST_02051] [TPS_SYST_02052] [TPS_SYST_02053]

		[TPS_SYST_02054] [TPS_SYST_02055] [TPS_SYST_02056] [TPS_SYST_02057] [TPS_SYST_02074] [TPS_SYST_02075] [TPS_SYST_02080] [TPS_SYST_02092] [TPS_SYST_02093] [TPS_SYST_02094] [TPS_SYST_02121] [TPS_SYST_02123] [TPS_SYST_02124] [TPS_SYST_02125] [TPS_SYST_02126] [TPS_SYST_02127] [TPS_SYST_02128] [TPS_SYST_02129] [TPS_SYST_02130] [TPS_SYST_02131] [TPS_SYST_02132] [TPS_SYST_02156]
[RS_SYST_00051]	Support of COM Based Data Transformation	[TPS_SYST_02058]
[RS_SYST_00052]	Ethernet Switch Configuration	[TPS_SYST_03002] [TPS_SYST_03003] [TPS_SYST_03004] [TPS_SYST_03005] [TPS_SYST_03006] [TPS_SYST_03007] [TPS_SYST_03008] [TPS_SYST_03009] [TPS_SYST_03010] [TPS_SYST_03011] [TPS_SYST_03013]
[RS_SYST_00053]	The System Template shall provide the ability to define naming conventions for public symbols	[TPS_SYST_05015]
[RS_SYST_00054]	Support of Secured Pdus	[TPS_SYST_02059] [TPS_SYST_02060] [TPS_SYST_02148] [TPS_SYST_02149] [TPS_SYST_02152] [TPS_SYST_02153] [TPS_SYST_02154] [TPS_SYST_02171] [TPS_SYST_02172] [TPS_SYST_02173] [TPS_SYST_02189]
[RS_SYST_00055]	Support of Container Pdus	[TPS_SYST_01056] [TPS_SYST_02061] [TPS_SYST_02062] [TPS_SYST_02063] [TPS_SYST_02064] [TPS_SYST_02065] [TPS_SYST_02066] [TPS_SYST_02097] [TPS_SYST_02098] [TPS_SYST_02099] [TPS_SYST_02100] [TPS_SYST_03014]
[RS_SYST_00056]	E2E-protected communication	[TPS_SYST_02067] [TPS_SYST_02068] [TPS_SYST_02069] [TPS_SYST_02070] [TPS_SYST_02071] [TPS_SYST_02072] [TPS_SYST_02073] [TPS_SYST_02134] [TPS_SYST_02135] [TPS_SYST_02155]

Table 1.2: RequirementsTracing

1.3 Requirements not fulfilled by TPS requirements

This section contains a list of requirements that are not yet fulfilled by TPS requirements.

Requirement	Description	Satisfied by
[RS_SYST_00015] Bus bandwidth	The System Template shall support bandwidth calculation as a constraint for the definition of the Communication Matrix.	chapter Topology (3); Communication (chapter 6)

[RS_SYST_00023] ECU Communication via MOST	The System Template has to cover the system communication via MOST.	not covered
[RS_SYST_00025] Derivation of ECU Configuration Parameters from the System Template	The System Template shall enable the configuration of the Com Stack of the ECU. It handles those parameters that are necessary to describe the inter-ECU communication. Configuration parameters local to an ECU are not in the scope of the System Template.	Harmonization between Upstream Templates and ECU Configuration (chapter C)
[RS_SYST_00026] Fibex compatibility	Whenever there is a considerable overlap between the System Template and the ASAM FIBEX Standard, the System Template shall adopt the structures of the ASAM FIBEX Standard.	AUTOSAR System Template and ASAM FIBEX (chapter 1.8)
[RS_SYST_00032] Topology Variants	The System Template shall provide the means to describe topology variants with optional/alternative ECUs and communication clusters.	chapter Variant Handling 1.7.2 and chapter Topology 3.
[RS_SYST_00033] Software-to-ECU mapping variants	The System Template shall provide the means to describe alternative mappings of software components to ECUs.	chapter 1.7.2 Variant Handling and chapter 5.1 Software Component Mapping.
[RS_SYST_00034] Timing variants	The System Template shall provide the means to describe alternative timing properties (e.g. trigger type, period, priority) and timing constraints (e.g. latency, age).	chapter 1.7.2 Variant Handling and chapter 6 Communication.
[RS_SYST_00035] Data mapping variants	The System Template shall provide the means to describe data mapping Variants.	chapter 1.7.2 Variant Handling and chapter 5.2 Data Mapping.
[RS_SYST_00036] Communication variants	The System Template shall provide the means to describe communication variants, such as alternative signal-to-PDU mappings, alternative communication paths, and alternative signal and PDU properties (e.g. data type, data length).	chapter 1.7.2 Variant Handling and chapter 6 Communication.
[RS_SYST_00040] Timing constraints	The System Template shall provide the means to describe the timing constraints of a system's dynamics, which are determined by the consumption of computation, communication, and other hardware resources.	Timing Extensions (chapter 1.7.3)
[RS_SYST_00041] Variants in ECU Extract	The ECU Extract shall support variability of elements taken over or derived during the transformation from the System Description.	Variant Handling in ECU Extract (chapter 12.6)

1.4 Methodology for Defining Formal Template

Figure 1.1 illustrates the overall methodology used to define formal templates. As is explained in the "Generic Structure Template" [2], it is important to separate a precise and concise model of the information that needs to be captured from the concrete XML-DTDs, XML-Schemas or other technology that is used to define the actual templates.

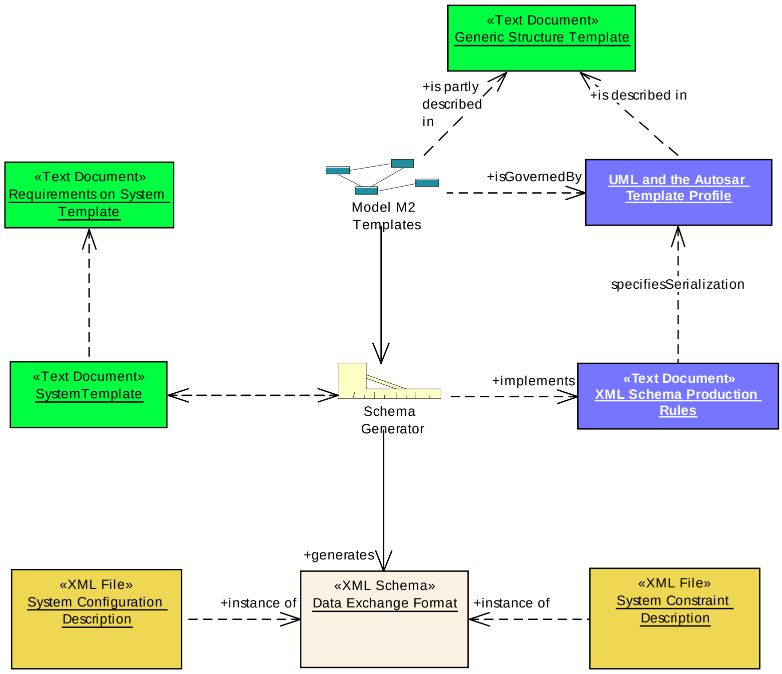


Figure 1.1: Methodology to define templates in AUTOSAR

The following documents describe the various aspects of the methodology:

1. The document called System Template (this document) describes the information that can be captured in the "system constraint" and "system configuration" description, independently from the mapping of this model on XML-technology. This document is based upon the AUTOSAR meta-model and contains an elaborate description of the semantics (the precise meaning) of all the information that can be captured within the relevant parts of this meta-model.

2. The UML and the AUTOSAR Template Profile [2] describes the basic concepts that should be used when creating content of the meta-model.

3. The document called "XML Schema Production Rules" [3] describes how XML is used and how the meta-model designed in the "System Template" should be translated by the "Schema Generator" (MMT) into XML-Schema (XSD) "Data Exchange Format". This "formalization strategy" is to be used for all data that is formally described in the meta-model. In particular this document is worth to read in order to understand the mapping of the meta-model and the XML based System template.

4. The "`Generic Structure Template`" [2] describes the top level structure which is common to all AUTOSAR templates and provides AUTOSAR standard mechanisms of modeling elements and patterns.

5. The concrete "Template", the "`Data Exchange Format`" is an XML schema which is generated out of the meta-model described in the "System Template" using the approach and the patterns defined in the "`XML Schema Production Rules`". This schema is typically used as input to tools. The M1-level system descriptions are XML files which can be validated against the schema. In that sense they are instances of the schema defining the XML representation of the template.

1.5 Scope

This document describes the system template and its use for the System Constraint Description and the System Configuration Description. In general a filled system template defines the relationship between the pure Software View on the System (represented by a top level SW Component Composition) and a Physical System Architecture with networked ECU instances. The system template is used in two stages of the "`AUTOSAR Methodology`" [4] (see Figure 1.2).

- As System Constraint Description it serves as input to the AUTOSAR system generator
- As System Configuration Description it defines the output of the AUTOSAR System Configuration Generator and serves as input to the AUTOSAR ECU Configuration Generator for the different ECUs defined in the description.
- As ECU Extract of the System Configuration Description it describes the ECU specific view on the System Description. It is individually generated for each of the System's ECU as the output of the AUTOSAR ECU Configuration Generator.

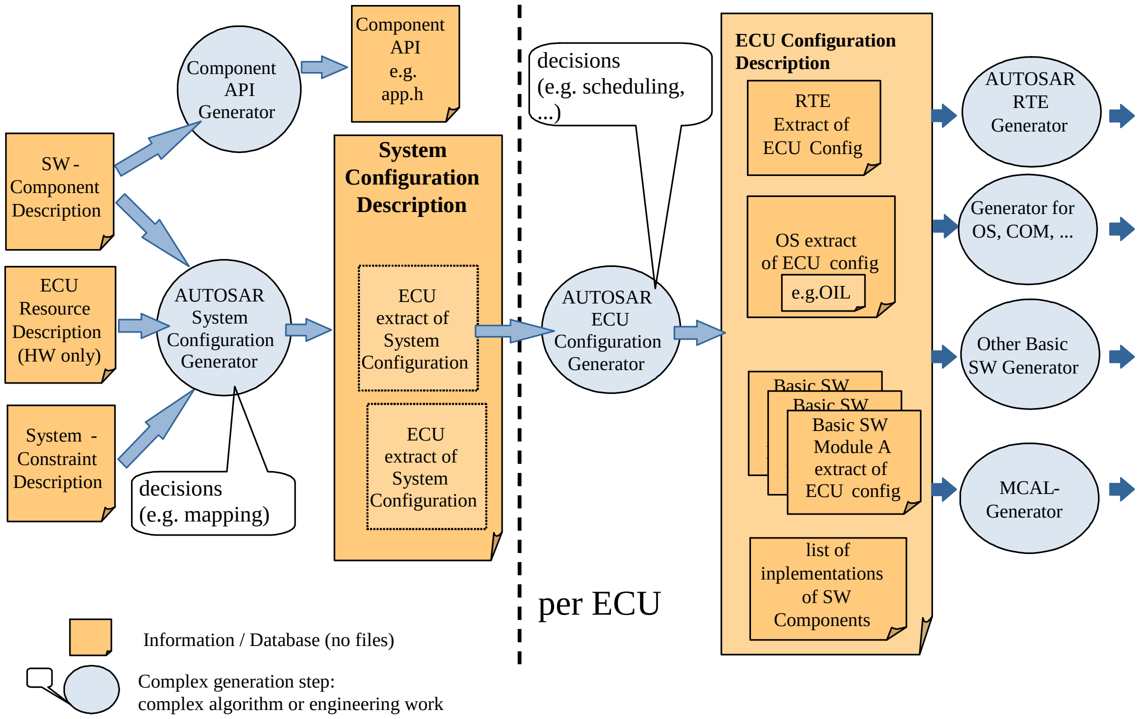


Figure 1.2: AUTOSAR Methodology

The System Template defines five major elements: Topology, Software, Communication, Mapping and Mapping Constraints, which will be defined in detail in the following chapters. Figure 1.3 gives an overview how these are used in the two different descriptions.

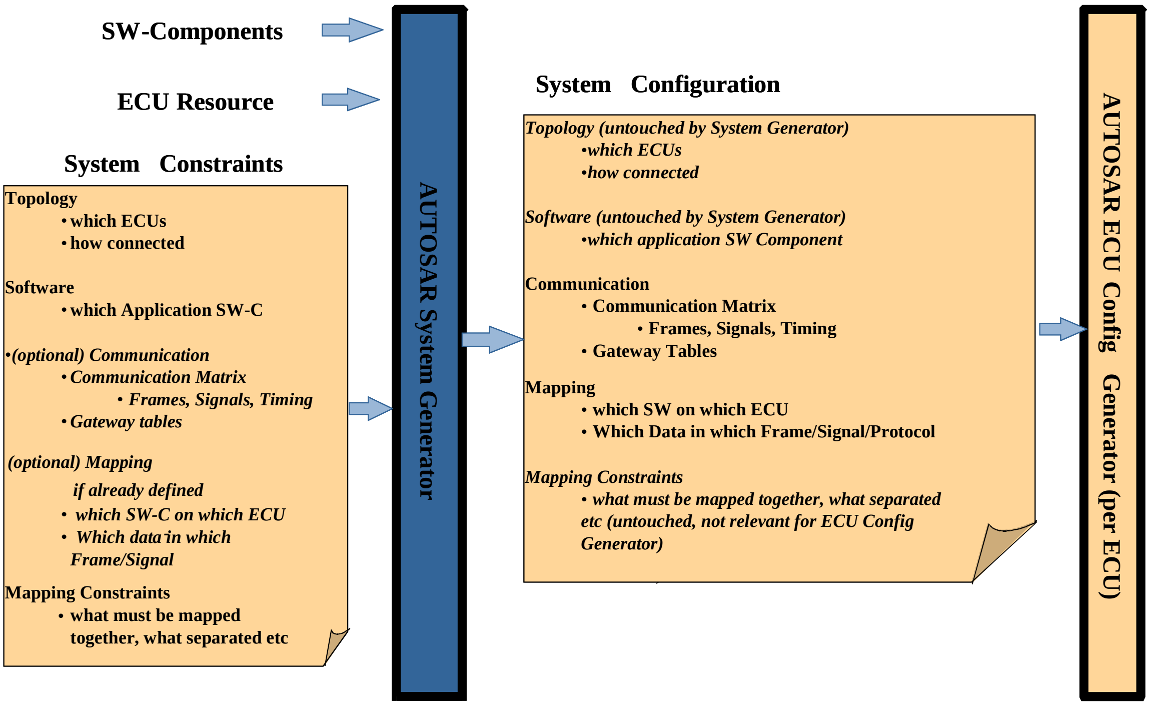


Figure 1.3: Scope of System Constraint Description and System Configuration Description

On Figure 1.3 some of the elements are marked `optional` for the System Constraint Description. If one starts with a new AUTOSAR project, these elements may not be present in the System Constraint Description. No (at least partial) functionality has been mapped yet, thus the communication matrix is not populated. But in most cases, many functional mappings are already predefined and contribute to the population of the communication matrix with their associated signals, thus being present in the System Constraint Description.

Reasons for such a predefinition are manifold. In some cases, hardware setup dictates where certain functionality resides, in some cases, a partial or complete communication matrix and/or completely configured ECUs (HW and SW) of another system (vehicle) has to be taken over. This approach is eased by the fact that System Configuration and System Constraint Description use the same format. That way it is possible to reuse parts of a System Configuration Description of the other system/vehicle in the actual System Constraint Description.

Furthermore, in the figure some of the elements are marked `untouched` for the System Configuration Description. This can have two reasons:

- The System Generator does not modify neither the Topology (networked ECUs) nor the Software, so these parts are just moved from System Constraint Description to System Configuration Description during the generation step.
- In a completed System Configuration Description, all SW components and all ECU-to-ECU communication have been mapped. Thus mapping constraints that limit the flexibility in the mapping phase of the system generator are obsolete

and will not be used in subsequent generator steps. They may however still be present for documentation and validation reasons.

Even if the communication matrix is determined as the result of the system configuration, the ECUs still have to be configured. This is done by the ECU configuration generator, which takes the System Configuration description as input and generates the ECU configuration description. The following guiding principles have been used to determine which information must be part of the System Configuration Description and which goes into the ECU Configuration Description:

- Information that is common for several ECUs and has to be agreed, must be part of the System Configuration Description and is thus covered by the System Template.
- Information, that only has ECU-local relevance is part of the ECU Configuration Description.

Thus the ECU Configuration Description will include the OS-schedule, the RTE-configuration and last but not least the configuration of the ECU basic software including the concrete communication drivers on that ECU.

1.6 UML Meta-Model

This chapter gives an overview of the AUTOSAR Unified Modeling Language (UML) meta-model. All AUTOSAR templates use a common meta-model. The templates describe software components, ECU resources, the Basic Software Modules, the ECU Configuration Parameters (ECU Configuration Description and ECU Configuration Parameter Definition) and the System.

The System Template defines all elements, their parameters and their relations, which are necessary for the System Constraint Description and the System Configuration Description.

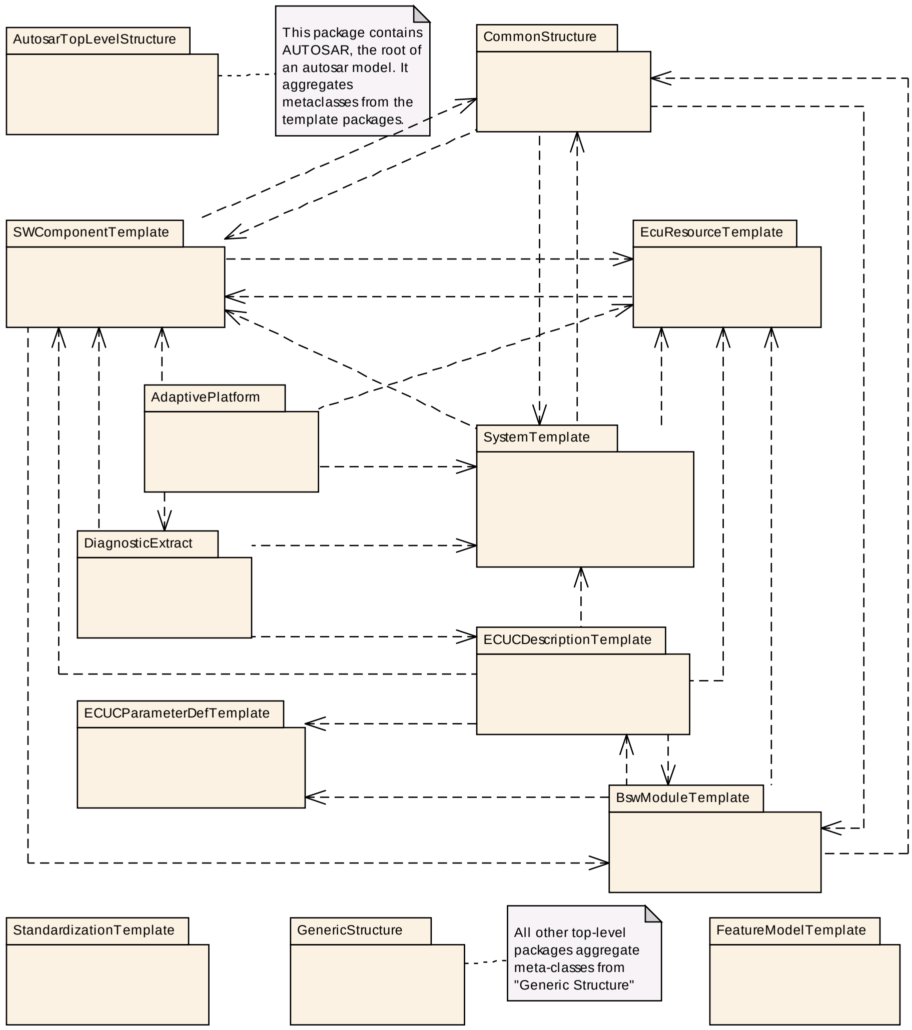


Figure 1.4: AUTOSAR Package Overview

Figure 1.4 shows the overall structure of the meta-model.

The dashed arrows in the diagram describe dependencies in terms of import-relationships between the packages within the meta-model. For example, the package `SystemTemplate` imports meta-classes defined in the packages `GenericStructure` [2], `SWComponentTemplate` [5] and `ECUResourceTemplate` [6].

For clarification, please note that the package `GenericStructure` contains some fundamental infrastructure meta-classes and common patterns that are described in [2]. As these are used by all other template specification the dependency associations are not depicted in the diagram for the sake of clarity.

Generic Structure provides details about

- Autosar Top level structure,
- Commonly used metaclasses and primitives
- Variant Handling

- Documentation

The ECU Resource Template deals with the description of the hardware resources of an ECU. The collection of all ECUs, which are integrated in the car, are described in the topology part of the System Configuration Description/System Constraint Description. Each of these ECUInstances uses the ECU Resource Template to describe the hardware resources. That's the reason, why the topology part has references to the ECU Resource Description.

The SW component description describes the SW components as well as their communication by data elements. The top-level software composition (RootSwCompositionPrototype) is part of the System Template (Software). This top-level software composition contains the functionality of the full system and describes the complete application software architecture of this system. The definition of the top level software composition uses the elements defined in the SW Component Template, like e.g. SwComponentType, PortInterface, AssemblySwConnector and DelegationSwConnector. That's why the System Description has references to the Software Component Description. The top level software composition is described in more detail in chapter 4.

Every template starts with an element AUTOSAR. While the models created in accordance to this guide are independent of the used formalization, it may still help the reader's understanding to note that AUTOSAR would also typically be the root element of a XML Schema generated from such a model. AUTOSAR can then contain one or more nested packages, simply allowing to further structure the contents of the M1 model[1].

1.7 Document Conventions

Technical terms are typeset in mono spaced font, e.g. PortPrototype. As a general rule, plural forms of technical terms are created by adding "s" to the singular form, e.g. PortPrototypes. By this means the document resembles terminology used in the AUTOSAR XML Schema.

This document contains constraints in textual form that are distinguished from the rest of the text by a unique numerical constraint ID, a headline, and the actual constraint text starting after the ⌈ character and terminated by the ⌋ character.

The purpose of these constraints is to literally constrain the interpretation of the AUTOSAR meta-model such that it is possible to detect violations of the standardized behavior implemented in an instance of the meta-model (i.e. on M1 level).

[1]A model and its meta-model are said to be on different meta levels (also referred to as abstraction levels). In AUTOSAR a five layer meta-model hierarchy is used, consisting of the five meta levels M0, M1, M2, M3 and M4 where entities in M0 are expressed in terms of M1 entities, M1 is expressed in terms of M2 entities and so on. The AUTOSAR meta-model hierarchy is described in more detail in the Autosar Template Modeling Guide [2].

Makers of AUTOSAR tools are encouraged to add the numerical ID of a constraint that corresponds to an M1 modeling issue as part of the diagnostic message issued by the tool.

The attributes of the classes introduced in this document are listed in form of class tables. They have the form shown in the example of the top-level element AUTOSAR:

Class	**AUTOSAR**			
Package	M2::AUTOSARTemplates::AutosarTopLevelStructure			
Note	Root element of an AUTOSAR description, also the root element in corresponding XML documents. **Tags:** xml.globalElement=true			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
adminData	AdminData	0..1	aggr	This represents the administrative data of an Autosar file. **Tags:** xml.sequenceOffset=10
arPackage	ARPackage	*	aggr	This is the top level package in an AUTOSAR model. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=30
fileInfoComment	FileInfoComment	0..1	aggr	This represents a possibility to provide a structured comment in an AUTOSAR file. **Tags:** xml.roleElement=true; xml.sequence Offset=-10; xml.typeElement=false
introduction	DocumentationBlock	0..1	aggr	This represents an introduction on the Autosar file. It is intended for example to rpresent disclaimers and legal notes. **Tags:** xml.sequenceOffset=20

Table 1.3: AUTOSAR

The first rows in the table have the following meaning:

Class: The name of the class as defined in the UML model.

Package: The UML package the class is defined in. This is only listed to help locating the class in the overall meta model.

Note: The comment the modeler gave for the class (class note). Stereotypes and UML tags of the class are also denoted here.

Base Classes: If applicable, the list of direct base classes.

The headers in the table have the following meaning:

Attribute: The name of an attribute of the class. Note that AUTOSAR does not distinguish between class attributes and owned association ends.

Type: The type of an attribute of the class.

Mul.: The assigned multiplicity of the attribute, i.e. how many instances of the given data type are associated with the attribute.

Kind: Specifies, whether the attribute is aggregated in the class (`aggr` aggregation), an UML attribute in the class (`attr` primitive attribute), or just referenced by it (`ref` reference). Instance references are also indicated (`iref` instance reference) in this field.

Note: The comment the modeler gave for the class attribute (role note). Stereotypes and UML tags of the class are also denoted here.

Please note that the chapters that start with a letter instead of a numerical value represent the appendix of the document. The purpose of the appendix is to support the explanation of certain aspects of the document and does not represent binding conventions of the standard.

The verbal forms for the expression of obligation specified in [TPS_STDT_00053] shall be used to indicate requirements, see Standardization Template, chapter Support for Traceability ([7]).

The representation of requirements in AUTOSAR documents follows the table specified in [TPS_STDT_00078], see Standardization Template, chapter Support for Traceability ([7]).

1.7.1 Detailed Representation of InstanceRef Associations

As a special type of association "instanceRef" refers to an exact instance of the referenced class, requiring additional information of the target and the context. This is explained in detail in the AUTOSAR Generic Structure Template [2]. Each "instanceRef" association can both be represented by the short form and by an detailed representation. For readability the diagrams in the main body of the specification use the short form. The detailed descriptions can be found in the Appendix B.

1.7.2 Variant Handling

The System Template supports the creation of Variants in many of its model elements. In the Metamodel all locations that may exhibit variability are marked with the stereotype `atpVariation`. This allows the definition of possible variation points. Tagged Values are used to specify additional informations.

There are four types of locations in the metamodel which may exhibit variability:

- Aggregations
- Associations
- Attribute Values
- Classes providing property sets

The reasons for the attachment of the stereotype `atpVariation` to certain model elements and the consequences for other model elements are explained in class tables in the following chapters. More details about the AUTOSAR Variant Handling Concept can be found in the AUTOSAR Generic Structure Template [2].

1.7.3 Timing Extensions

With AUTOSAR Release 4.0 a new set of concepts for the description and analysis of end-to-end timing constraints is introduced by the Specification of Timing Extensions. A subset of these extensions aims for the system level and can be used to enhance the descriptions that are already available in the System Template.

A dedicated description of the timing extensions that can be used at system level is given in chapter 3 (System timing) in the Specification of Timing Extensions [8].

1.7.4 Documentation Support

With AUTOSAR Release 4.0 the AUTOSAR XML schema provides support for integrated and well structured documentation. More details about the AUTOSAR Documentation Support concept can be found in the AUTOSAR Generic Structure Template [2]. An optional documentation block can be applied to any identifiable element. Furthermore, as shown in figure 1.5, the System Template provides the possibility of adding additional documentation to several non-identifiable elements. The documentation of a System is composed of several chapters.

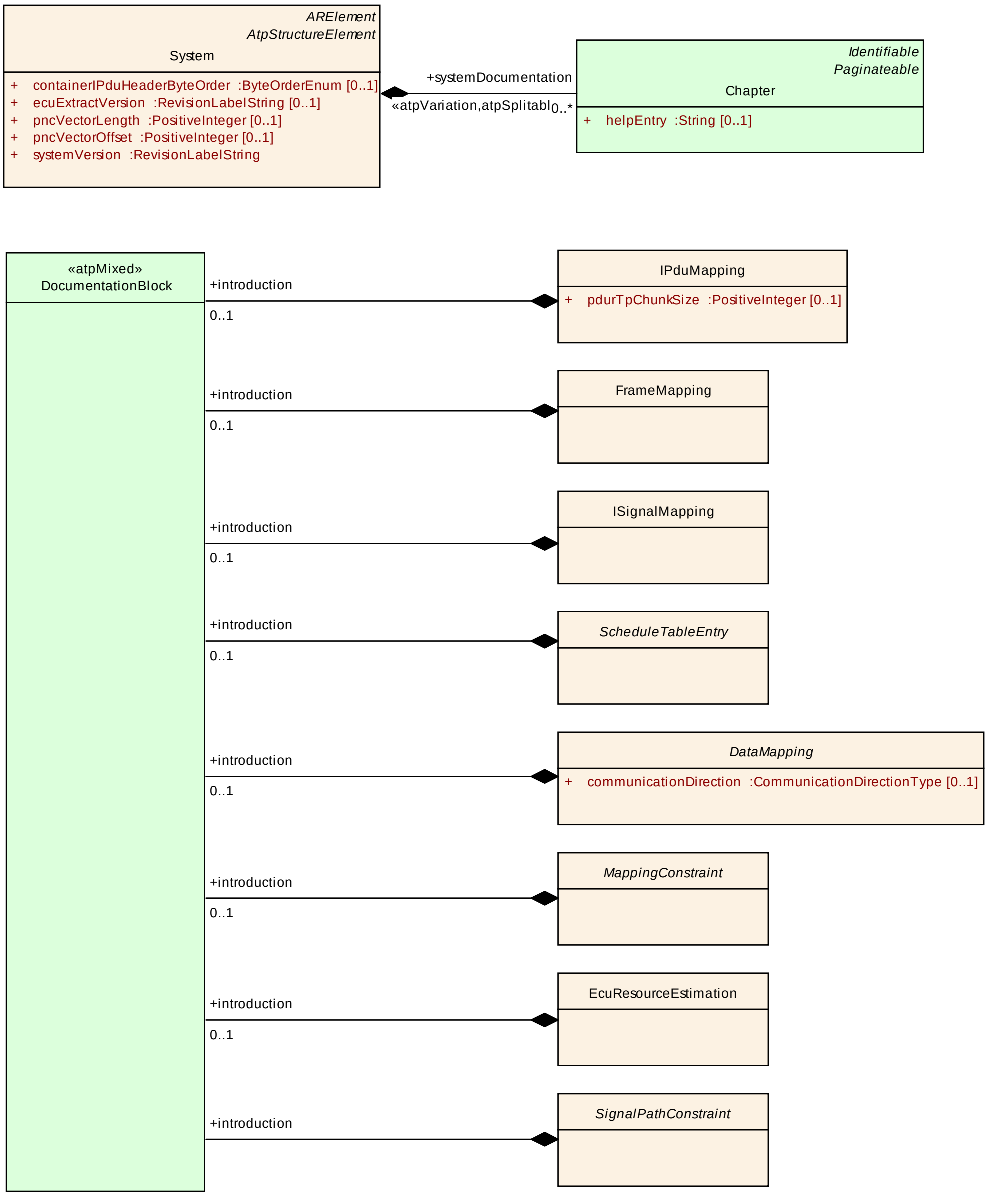


Figure 1.5: System Template Documentation Support

1.7.5 Stereotype atpSplitable in the System Template

The stereotype ≪atpSplitable≫ is used in the System Template to support stepwise processes, where the System Configuration Description is completed incrementally over a development process. Example:

1) Description of Communication only consists of interaction signals (ISignal). This is enough information to create an individual ECU's RTE, and even contains enough information to configure an ECU where the actual Frame/Pdu communication is being handled post-build.

2) In a second step, the communication matrix is being completed for a concrete vehicle. Pdus and Frames, along with their Triggerings are being added to the previous System Description. This model then contains the full information about an ECU's communication, especially containing the additional information to generate the post build information.

So, in this 2-step approach, an OEM could deliver the incomplete ECU extract from step (1) to the ECU integrator, who can then build a complete software image for the ECU. In the 2nd step, the ECU extract will be completed by the previously missing information, but as the first extract will still be valid due to the ≪atpSplitable≫ construct, the ECU including the flashed image from step (1) can be (re)used as it is, and just will be completed with the post build information, e.g. Frames and Pdus.

Further details about the ≪atpSplitable≫ stereotype can be found in the Generic Structure Template [2].

1.8 AUTOSAR System Template and ASAM FIBEX

FIBEX (Field Bus Exchange Format) [9] is an XML exchange format proposed for data exchange between tools that deal with bus communication Systems. The format supports the most common automotive data buses: LIN [10], CAN [11], MOST [12], FlexRay [13]. The covered areas of the exchange format are the functional network, system topology and the communication level. The functional network describes the software architecture of the system. In the system topology the logical layout of the system is described. This means it is documented which ECU is connected to which bus. The central purpose of a communication system is the exchange of frames with certain properties. The format is able to describe frames and their timing properties.

In future versions of the System Template a common subset between ASAM Fibex and Autosar will be harmonized. The current version of the System Template contains already the ASAM FIBEX description for communication and topology. Due to requirements of AUTOSAR some extensions were made to those descriptions. For instance the communication part is extended by a concept for PDUs (I-Pdus and N-Pdus). The harmonization between ASAM Fibex and AUTOSAR System Template is not finalized at this time.

In the UML Meta-Model the FIBEX contents are located in an own FIBEX UML Package. The top level `FibexElement` is referenced by the top level element `System` of the System Template. Similar to the usage of the `ARElement`, specializations of the `FibexElement` represent elementary building blocks within the FIBEX package. Each of this elements will be described in more detail in the following chapters.

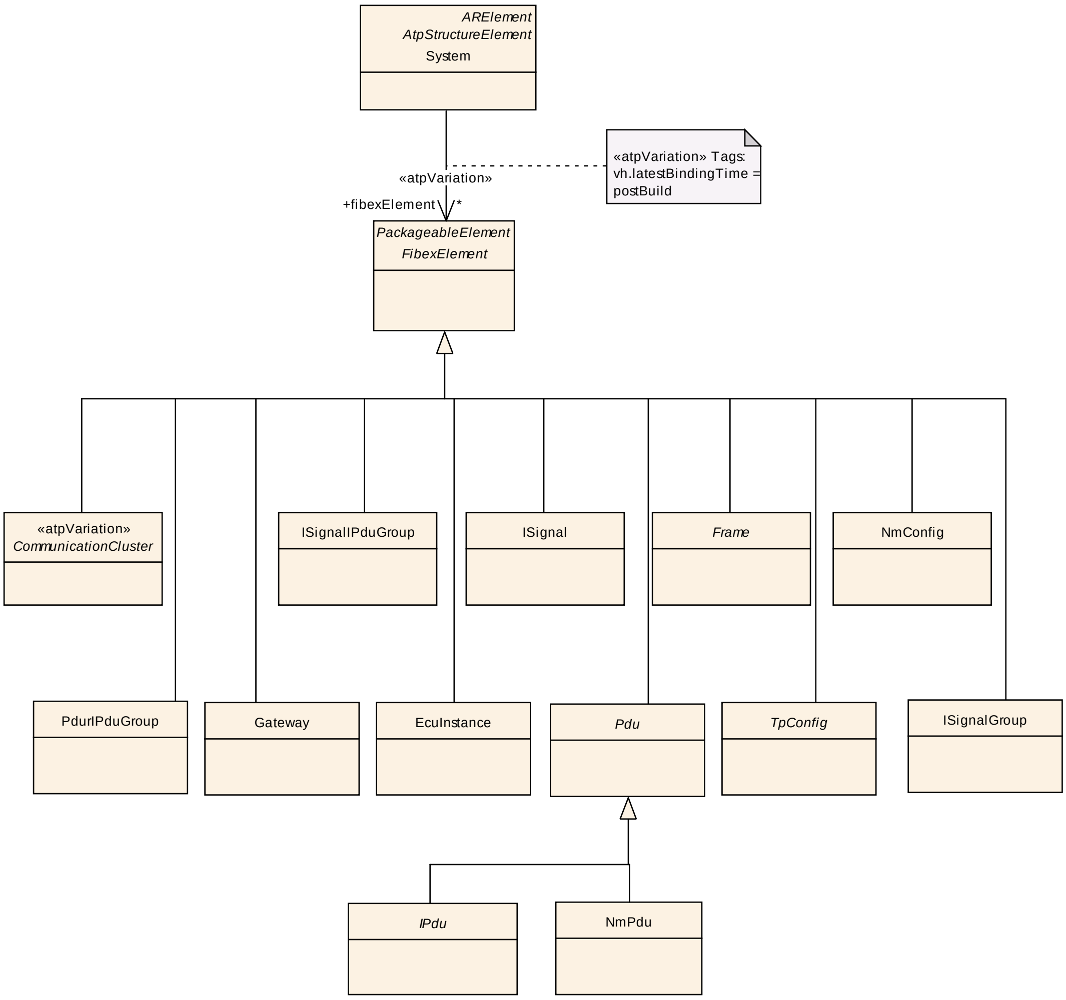


Figure 1.6: Fibex Elements

2 System

The top level element of the System Template is the class `System`, as shown in figure 2.1.

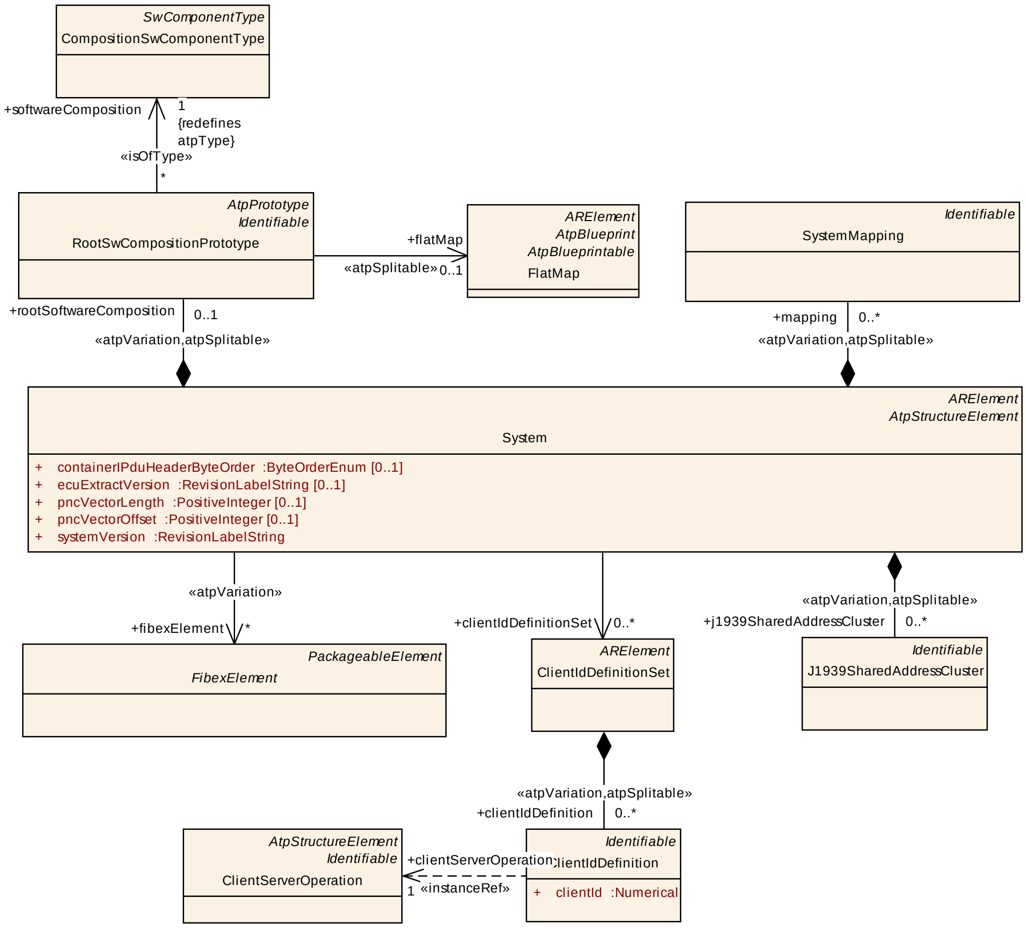


Figure 2.1: System Template Overview

Class	**System**			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	The top level element of the System Description. The System description defines five major elements: Topology, Software, Communication, Mapping and Mapping Constraints. The System element directly aggregates the elements describing the Software, Mapping and Mapping Constraints; it contains a reference to an ASAM FIBEX description specifying Communication and Topology. **Tags:** atp.recommendedPackage=Systems			
Base	ARElement, ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Collectable Element, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
clientIdDefi nitionSet	ClientIdDefinitio nSet	*	ref	Set of Client Identifiers that are used for inter-ECU client-server communication in the System.

Attribute	***Type***	***Mul.***	***Kind***	***Note***
containerIPduHeaderByteOrder	ByteOrderEnum	0..1	attr	Defines the byteOrder of the header in ContainerIPdus.
ecuExtractVersion	RevisionLabelString	0..1	attr	Version number of the Ecu Extract.
fibexElement	FibexElement	*	ref	Reference to ASAM FIBEX elements specifying Communication and Topology. All Fibex Elements used within a System Description shall be referenced from the System Element. atpVariation: In order to describe a product-line, all FibexElements can be optional. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
j1939SharedAddressCluster	J1939SharedAddressCluster	*	aggr	Collection of J1939Clusters that share a common address space for the routing of messages. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
mapping	SystemMapping	*	aggr	Aggregation of all mapping aspects (mapping of SW components to ECUs, mapping of data elements to signals, and mapping constraints). In order to support OEM / Tier 1 interaction and shared development for one common System this aggregation is atpSplitable and atpVariation. The content of SystemMapping can be provided by several parties using different names for the SystemMapping. This element is not required when the System description is used for a network-only use-case. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
pncVectorLength	PositiveInteger	0..1	attr	Length of the partial networking request release information vector (in bytes).
pncVectorOffset	PositiveInteger	0..1	attr	Absolute offset (with respect to the NM-PDU) of the partial networking request release information vector that is defined in bytes as an index starting with 0.

Attribute	Type	Mul.	Kind	Note
rootSoftwareComposition	RootSwCompositionPrototype	0..1	aggr	Aggregation of the root software composition, containing all software components in the System in a hierarchical structure. This element is not required when the System description is used for a network-only use-case. atpVariation: The RootSwCompositionPrototype can vary. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=systemDesignTime
systemDocumentation	Chapter	*	aggr	Possibility to provide additional documentation while defining the System. The System documentation can be composed of several chapters. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=systemDesignTime xml.sequenceOffset=-10
systemVersion	RevisionLabelString	1	attr	Version number of the System Description.

Table 2.1: System

System has relationships to all elements that define a system constraint description or system configuration description. It aggregates the SystemMapping and RootSwCompositionPrototype elements. SystemMapping deals with mapping of software components to ECUs as well as with the mapping of data elements that are to be exchanged between software components onto signals and frames. The RootSwCompositionPrototype element contains a reference to the top level software composition.

[constr_3028] **FibexElements** ⌈ Each FibexElement that is used in the System Description shall be referenced by the System element in the role FibexElement. ⌋ *()*

FibexElements can be defined in a stand alone and reusable way (hence they can simply be created in any package like ARElements), but on the other hand it shall be clear that a certain FibexElement actually belongs to a certain System Description. Thus, all FibexElements used within a System Description (i.e. contributing to the specification of the System communication and topology) shall be referenced from the System element. More details about the integration of FIBEX into the System Template will be given in chapter 1.8.

[TPS_SYST_01002] **System Category** ⌈ The System shall have a category element defined which indicates the role of this work product. ⌋ *(RS_SYST_00003, RS_SYST_00027)*

[TPS_SYST_01003] **`Standardized System Category Definitions`** ⌈ The standardized System category definitions are defined in Table 2.2. ⌋*(RS_SYST_00003, RS_SYST_00027)*

category	*Meaning*
SYSTEM_CONSTRAINTS	The `System` class is used to describe System Constraints. In this usage, it forms the core element of a System Constraints Description, serving as an input to the AUTOSAR System Generator.
SYSTEM_DESCRIPTION	The `System` class is used to describe the System Configuration of a complete AUTOSAR System. In this usage, it forms the core element of a System Description, the output of the AUTOSAR System Generator.
SYSTEM_EXTRACT	The `System` class is used to describe a subsystem specific view on the complete System Description. The System Extract is not fully decomposed and still contains compositions. The SYSTEM_EXTRACT is the basis for designing subsystems.
ECU_EXTRACT	The `System` class is used to describe the ECU specific view on the complete System Description. In this usage, it forms the core element of ECU Extract, the output of the AUTOSAR ECU Configuration Extractor. The ECU Extract is fully decomposed and contains only atomic software components. The ECU Extract is the basis for setting up the ECU Configuration.
ABSTRACT_SYSTEM_DESCRIPTION	This `System` is used to describe a functional (solution-independent/abstract) system design. It can be taken as basis for the development of the SYTEM_DESCRIPTION. No structural constrains are applied on the transformation of the ABSTRACT_SYSTEM_DESCRIPTION to the SYSTEM_DESCRIPTION.
ECU_SYSTEM_DESCRIPTION	This System is used to describe the closed view on one ECU (note that an AUTOSAR ECU is defined being one microprocessor running one AUTOSAR Stack). It can be derived from a SYSTEM_EXTRACT or it can be designed independently and mapped to a SYSTEM_EXTRACT. The ECU_SYSTEM_DESCRIPTION is not fully decomposed and still may contain compositions.
RPT_SYSTEM	System which describes the rapid prototyping algorithm in the format of AUTOSAR Software Components. For more details see the Software Component Template [5] and TR_Methodology [4].

Table 2.2: System class categories

Note: SYSTEM_EXTRACT does not prescribe the number of micro controllers / cores for one ECU from the OEM perspective.

- Supplier decides to design one AUTOSAR ECU with multicore support leads to one ECU_EXTRACT supporting one AUTOSAR stack
- Supplier decides to design two AUTOSAR ECUs (i.e., two micro-controllers) in one box leads to two ECU_EXTRACTs supporting two AUTOSAR stacks

[constr_3027] Existence of `ecuExtractVersion` ⌈ In case the category of the System is SYSTEM_EXTRACT or ECU_EXTRACT the `ecuExtractVersion` attribute shall be defined. ⌋*()*

2.1 ClientIdDefinitionSet

In the ClientIdDefinitionSet all Client Identifiers of the transaction handle used for a inter-ECU client server communication can be defined that belong to the System that refers the ClientIdDefinitionSet.

Class	**ClientIdDefinitionSet**			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	Set of Client Identifiers that are used for inter-ECU client-server communication in the System. **Tags:** atp.recommendedPackage=ClientIdDefinitionSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
clientIdDefinition	ClientIdDefinition	*	aggr	Definition of a Client Identifier that will be used by the RTE in a inter-ECU client-server communication. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild

Table 2.3: ClientIdDefinitionSet

Class	**ClientIdDefinition**			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	Several clients in one client-ECU can communicate via inter-ECU client-server communication with a server on a different ECU, if a client identifier is used to distinguish the different clients. The Client Identifier of the transaction handle that is used by the RTE can be defined by this element.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
clientId	Numerical	1	attr	The Client Identifier of the transaction handle used for a inter-ECU client server communication is defined by this attribute. If defined the RTE generator shall use this clientId.
clientServerOperation	ClientServerOperation	1	iref	Reference to the ClientServerOperation that is called by the client.

Table 2.4: ClientIdDefinition

[constr_3117] Allowed value of attribute clientId ⌈ Within the context of one ClientIdDefinition, the value of attribute clientId shall be in the range of ClientIdRange.lowerLimit and ClientIdRange.upperLimit for the ClientIdRange that is aggregated by the EcuInstance onto which the SwComponentPrototypes included in the ClientIdDefinition.clientServerOperation are mapped. ⌋*()*

Please note that the clientId is bound to the ClientServer relationship and does not represent a globally unique identifier of the Client call. ClientIds can be reused in the context of a different ClientServer relationship.

[constr_3118] Valid reference target for ClientIdDefinition.clientServerOperation.contextPort ⌈ In the context of the definition of a ClientIdDefinition, the reference clientServerOperation.contextPort shall only refer to an RPortPrototype. ⌋*()*

Rationale: the definition of a client ID does only make sense in the context of a client of a ClientServerOperation.

3 Topology

This chapter explains how a vehicle's physical System Topology is being modeled in AUTOSAR (Example: Figure 3.1). A topology is formed by a number of EcuInstances that are interconnected to each other in order to form ensembles of ECUs and CommunicationClusters, which are further detailed by providing information on bus-specific properties.

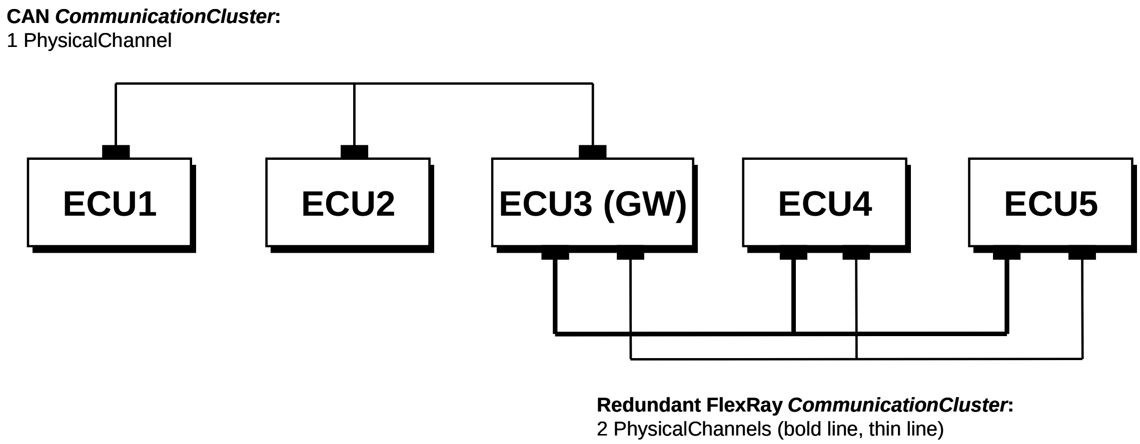


Figure 3.1: Example for a Communication Cluster within a physical network topology

In the AUTOSAR methodology [4] the topology description is one of the inputs for the System Generator. It serves as constraints for mapping the Software Components (see chapter 5.1) contained in the RootSwCompositionPrototype as well as for defining the System Communication matrix (see chapter 6). Gateways which allow the exchange of Signals between CommunicationClusters are covered in chapter 8.

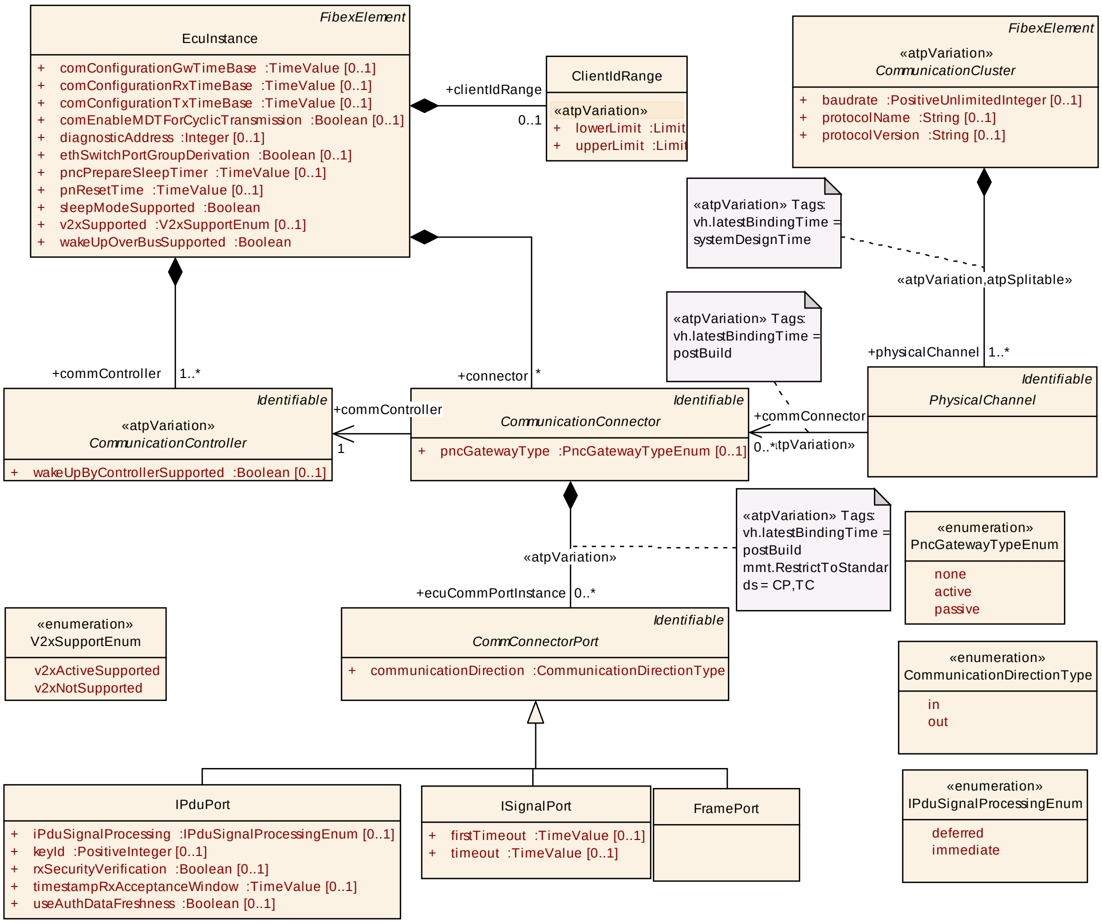


Figure 3.2: Topology elements (Topology)

3.1 ECUs and their communication capabilities

Within a System Topology, the ECUs actually being connected with each other are described in the form of `EcuInstance`s. An `EcuInstance` needs to have one or more `CommunicationController`, the actual hardware device by means of which devices send and receive frames from the communication medium. Furthermore, the `EcuInstance` has one or more `CommunicationConnector`s which describe the bus interfaces of the ECUs and to specify the sending/receiving behavior.

[TPS_SYST_01004] Definition of AUTOSAR ECU ⌈ In the AUTOSAR sense an ECU means a microcontroller plus peripherals and the according software/configuration. Therefore, each microcontroller requires its own ECU Configuration. ⌋ *(RS_SYST_00013)*

3.1.1 ECU Instance

[TPS_SYST_01005] Definition of EcuInstance ⌈ EcuInstance describes the presence of a microcontroller in the vehicle. Within an EcuInstance class only those properties are described that are subject to system configuration. ⌋*(RS_SYST_00013)*

The actual description of the ECU hardware resources is done by the means of the ECU Resource Template [6]: It uses the HwElement class and its aggregated hardware elements for defining a specific ECU type.

[TPS_SYST_01006] Assign ECU type to EcuInstance ⌈ The process of assigning an ECU type to EcuInstance is a mapping step (chapter 3.4.1) and performed latest in the System Generation step. ⌋*(RS_SYST_00013)*

An EcuInstance can serve as a gateway if it is connected to two or more different clusters by two or more of its CommunicationControllers.

Class	**EcuInstance**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	ECUInstances are used to define the ECUs used in the topology. The type of the ECU is defined by a reference to an ECU specified with the ECU resource description. **Tags:** atp.recommendedPackage=EcuInstances			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
associatedComIPduGroup	ISignalIPduGroup	*	ref	With this reference it is possible to identify which ISignalIPduGroups are applicable for which CommunicationConnector/ ECU. Only top level ISignalIPduGroups shall be referenced by an EcuInstance. If an ISignalIPduGroup contains other ISignalIPduGroups than these contained ISignalIPduGroups shall not be referenced by the EcuInstance. Contained ISignalIPduGroups are associated to an EcuInstance via the top level ISignalIPduGroup.
associatedPdurIPduGroup	PdurIPduGroup	*	ref	With this reference it is possible to identify which PduR IPdu Groups are applicable for which CommunicationConnector/ ECU.
clientIdRange	ClientIdRange	0..1	aggr	Restriction of the Client Identifier for this Ecu to an allowed range of numerical values. The Client Identifier of the transaction handle is generated by the client RTE for inter-Ecu Client/Server communication.
comConfigurationGwTimeBase	TimeValue	0..1	attr	The period between successive calls to Com_MainFunctionRouteSignals of the AUTOSAR COM module in seconds.
comConfigurationRxTimeBase	TimeValue	0..1	attr	The period between successive calls to Com_MainFunctionRx of the AUTOSAR COM module in seconds.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
comConfigurationTxTimeBase	TimeValue	0..1	attr	The period between successive calls to Com_MainFunctionTx of the AUTOSAR COM module in seconds.
comEnableMDTForCyclicTransmission	Boolean	0..1	attr	Enables for the Com module of this EcuInstance the minimum delay time monitoring for cyclic and repeated transmissions (TransmissionModeTiming has cyclicTiming assigned or eventControlledTiming with numberOfRepetitions > 0).
commController	CommunicationController	1..*	aggr	CommunicationControllers of the ECU.
connector	CommunicationConnector	*	aggr	All channels controlled by a single controller.
diagnosticAddress	Integer	0..1	attr	An ECU specific ID for responses of diagnostic routines.
diagnosticProps	DiagnosticEcuProps	0..1	aggr	This represents the diagnostic-related properties of an entire ECU. **Tags:** atp.Status=obsolete
ethSwitchPortGroupDerivation	Boolean	0..1	attr	Defines whether the derivation of SwitchPortGroups based on VLAN and/or CouplingPort.pncMapping shall be performed for this EcuInstance. If not defined the derivation shall not be done.
partition	EcuPartition	*	aggr	Optional definition of Partitions within an Ecu.
pnResetTime	TimeValue	0..1	attr	Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA.
pncPrepareSleepTimer	TimeValue	0..1	attr	Time in seconds the PNC state machine shall wait in PNC_PREPARE_SLEEP.
sleepModeSupported	Boolean	1	attr	Specifies whether the ECU instance may be put to a "low power mode" • true: sleep mode is supported • false: sleep mode is not supported Note: This flag may only be set to "true" if the feature is supported by both hardware and basic software.
v2xSupported	V2xSupportEnum	0..1	attr	This attribute is used to control the existence of the V2X stack on the given EcuInstance.
wakeUpOverBusSupported	Boolean	1	attr	Driver support for wakeup over Bus.

Table 3.1: EcuInstance

[constr_3008] EcuInstance subelements ⌈ The CommunicationConnector and the CommunicationController that is referenced by the CommunicationConnector must be owned by the same EcuInstance. ⌋*()*

Class	**ClientIdRange**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	With this element it is possible to restrict the Client Identifier of the transaction handle that is generated by the client RTE for inter-Ecu Client/Server communication to an allowed range of numerical values.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
lowerLimit	Limit	1	attr	This specifies the lower limit of the ClientIdRange. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
upperLimit	Limit	1	attr	This specifies the upper limit of the ClientIdRange. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 3.2: ClientIdRange

[constr_3116] Overlap of ClientIdRanges in the context of the enclosing System ⌈ The ClientIdRange defined for an EcuInstance shall not overlap with the ClientIdRange of any other EcuInstance in the context of the enclosing System. ⌋*()*

3.1.2 Communication Controller

[TPS_SYST_01007] Definition of CommunicationController ⌈ A CommunicationController is a dedicated hardware device by means of which hosts are sending frames to and receiving frames from the communication medium. ⌋*(RS_SYST_00013)*

[TPS_SYST_01008] Assign CommunicationController to the AUTOSAR Communication Peripheral ⌈ In order to illustrate the relationship of an CommunicationController to the HwElement with category CommunicationController defined in the ECU Resource Description, a mapping between these two classes may be specified using the CommunicationControllerMapping (see chapter 3.4.2). ⌋*(RS_SYST_00013)*

Class	≪atpVariation≫ **CommunicationController (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The communication controller is a dedicated hardware device by means of which hosts are sending frames to and receiving frames from the communication medium. **Tags:** vh.latestBindingTime=postBuild			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

Attribute	Type	Mul.	Kind	Note
wakeUpByControllerSupported	Boolean	0..1	attr	Defines whether the ECU shall be woken up by this CommunicationController. TRUE: wake up is possible FALSE: wake up is not supported Note: If wakeUpByControllerSupported is set to TRUE the feature shall be supported by both hardware and basic software.

Table 3.3: CommunicationController

3.1.3 Communication Connector

[TPS_SYST_01009] Definition of CommunicationConnector ⌈ An EcuInstance uses CommunicationConnector elements in order to describe its bus interfaces and to specify the sending/receiving behavior. ⌋*(RS_SYST_00013)*

The relationship between an EcuInstance, a CommunicationController, and a PhysicalChannel is expressed by letting a PhysicalChannel reference a CommunicationConnector (which in turn is aggregated by EcuInstance) and which also has the ability to reference a CommunicationController.

Class	**CommunicationConnector (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The connection between the referencing ECU and the referenced channel via the referenced controller. Connectors are used to describe the bus interfaces of the ECUs and to specify the sending/receiving behavior. Each CommunicationConnector has a reference to exactly one communicationController. Note: Several CommunicationConnectors can be assigned to one PhysicalChannel in the scope of one ECU Instance.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
commController	CommunicationController	1	ref	Reference to the communication controller. The CommunicationConnector and referenced CommunicationController must be aggregated by the same ECUInstance. The communicationController can be referenced by several CommunicationConnector elements. This is important for the FlexRay Bus. FlexRay communicates via two physical channels. But only one controller in an ECU is responsible for both channels. Thus, two connectors (for channel A and for channel B) must reference to the same controller.
ecuCommPortInstance	CommConnectorPort	*	aggr	An ECUs reception or send ports. atpVariation: If signals/PDUs/frames are variable, the corresponding ports must be variable, too. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
pncGatewayType	PncGatewayTypeEnum	0..1	attr	Defines if this EcuInstance shall implement the PncGateway functionality on this CommunicationConnector and its respective PhysicalChannel. Several EcuInstances on the same PhysicalChannel can have the PncGateway functionality enabled, but only one of them shall have the pncGatewayType "active".

Table 3.4: CommunicationConnector

Enumeration	**PncGatewayTypeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology
Note	Defines the PncGateway roles.
Literal	***Description***
active	The active PncGateway functionality shall be performed **Tags:** atp.EnumerationValue=0
none	No PncGateway functionality shall be performed **Tags:** atp.EnumerationValue=1
passive	The passive PncGateway functionality shall be performed **Tags:** atp.EnumerationValue=2

Table 3.5: PncGatewayTypeEnum

Note: Use-case for the relation of several CommunicationConnectors assigned to one PhysicalChannel in the scope of one EcuInstance: One safety measure for a safety relevant ECU can be to have two transceivers (and two controllers) connected to the same network (Bus). In case a safety violation is detected one transceiver can be disabled and the respective Frames are blocked. The other transceiver stays active and keeps the ECU alive for diagnostics.

3.2 Communication Clustering

3.2.1 Communication Cluster

[TPS_SYST_01010] Definition of CommunicationCluster ⌈ CommunicationCluster represents a formal way to express that a number of EcuInstances are linked by an arbitrary topology (bus, star, ring, tree). Depending on the communication standard, a CommunicationCluster may either have exactly one or more (redundant) PhysicalChannels. ⌋*(RS_SYST_00013)*

Note that all ECUs within a CommunicationCluster communicate within the same address range.

Note that the same ECU can participate in more than one CommunicationCluster if it has more than one CommunicationConnector being referenced by PhysicalChannels owned by different CommunicationClusters.

Class	≪atpVariation≫ **CommunicationCluster (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The CommunicationCluster is the main element to describe the topological connection of communicating ECUs. A cluster describes the ensemble of ECUs, which are linked by a communication medium of arbitrary topology (bus, star, ring, ...). The nodes within the cluster share the same communication protocol, which may be event-triggered, time-triggered or a combination of both. A CommunicationCluster aggregates one or more physical channels. **Tags:** vh.latestBindingTime=postBuild			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
baudrate	PositiveUnlimitedInteger	0..1	attr	Channels speed in bits/s.
physicalChannel	PhysicalChannel	1..*	aggr	This relationship defines which channel element belongs to which cluster. A channel must be assigned to exactly one cluster, whereas a cluster may have one or more channels. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=systemDesignTime
protocolName	String	0..1	attr	The name of the protocol used.
protocolVersion	String	0..1	attr	The version of the protocol used.

Table 3.6: CommunicationCluster

Some communication clusters need, additional to the general attributes which are valid for all communication clusters, specialized attributes to describe the individual communication cluster properties. The bustype-specific specializations of `CommunicationCluster` (Figure 3.3) are further detailed in chapter 3.3.

3.2.2 Physical Channel

[TPS_SYST_01011] Definition of `PhysicalChannel` ⌈ `PhysicalChannel` represents the communication medium that is used to send and receive information between communicating ECUs. Each `CommunicationCluster` has at least one `PhysicalChannel`. ⌋*(RS_SYST_00013)*

[constr_3373] Limitation on the number of `PhysicalChannel`s that are referencing a `CommunicationConnector` ⌈ A `CommunicationConnector` shall only be referenced by at most one `PhysicalChannel`. ⌋*()*

Class	**PhysicalChannel (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	A physical channel is the transmission medium that is used to send and receive information between communicating ECUs. Each CommunicationCluster has at least one physical channel. Bus systems like CAN and LIN only have exactly one PhysicalChannel. A FlexRay cluster may have more than one PhysicalChannels that may be used in parallel for redundant communication. An ECU is part of a cluster if it contains at least one controller that is connected to at least one channel of the cluster.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
commConnector	CommunicationConnector	*	ref	Reference to the ECUInstance via a CommunicationConnector to which the channel is connected. atpVariation: Variable assignment of Physical Channels to different CommunicationConnectors is expressed with this variation. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
frameTriggering	FrameTriggering	*	aggr	One frame triggering is defined for exactly one channel. Channels may have assigned an arbitrary number of frame triggerings. atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings must be variable, too. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
iSignalTriggering	ISignalTriggering	*	aggr	One ISignalTriggering is defined for exactly one channel. Channels may have assigned an arbitrary number of ISignaltriggerings. atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings must be variable, too. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild

Attribute	Type	Mul.	Kind	Note
pduTrigger ing	PduTriggering	*	aggr	One PduTriggering is defined for exactly one channel. Channels may have assigned an arbitrary number of I-Pdu triggerings. atpVariation: If signals/PDUs/frames are variable, the corresponding triggerings must be variable, too. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=postBuild

Table 3.7: PhysicalChannel

3.3 Specialized Attributes of the Topology Entities

According to their characteristic features, different communication standards like FlexRay, CAN, TTCAN, LIN, J1939 and Ethernet have individual attributes that need to be described additionally to the common topology classes. Figure 3.3 shows the specialization of the `CommunicationCluster` into the more specific `FlexrayCluster`, `CanCluster`, `TtcanCluster`, `J1939Cluster`, `LinCluster` and `EthernetCluster`.

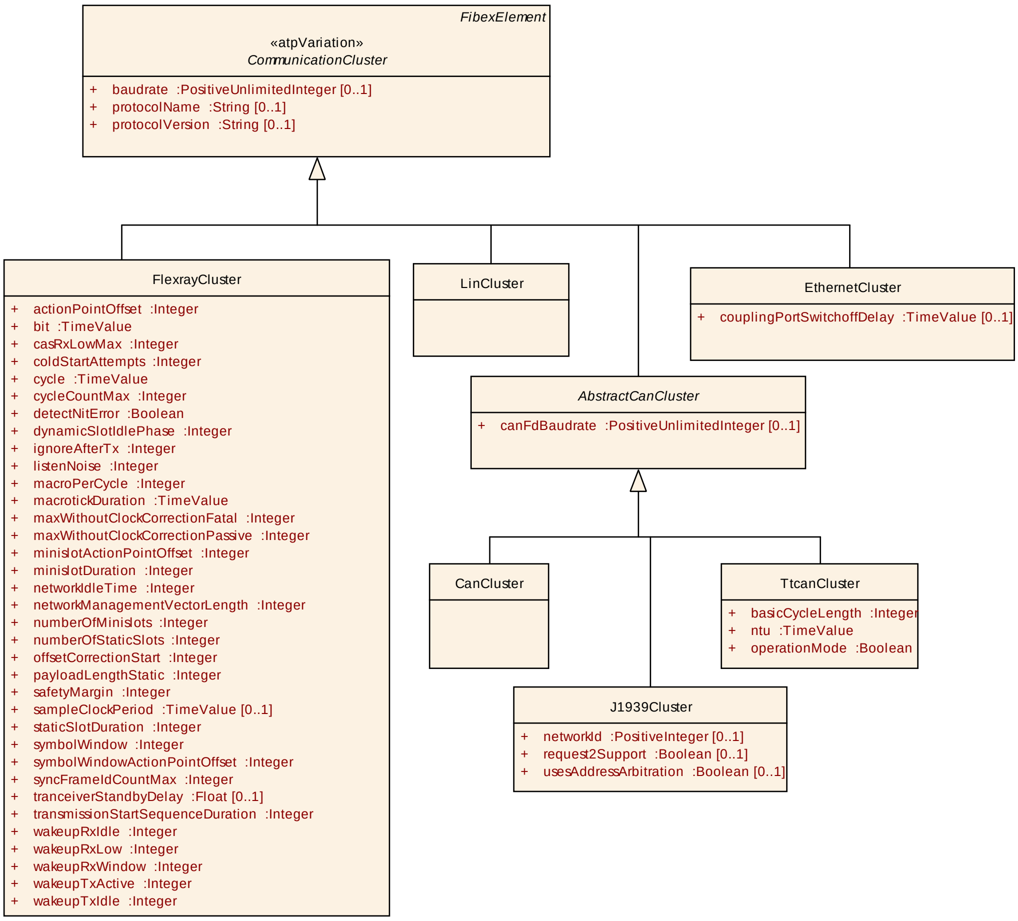


Figure 3.3: Specialized `CommunicationCluster` attributes (TopologyAttributeRefinement)

3.3.1 CAN

Modeling of the CAN bus is supported in the System Template by the means of four specialized meta-model classes: `CanCluster`, `CanCommunicationController`, `CanPhysicalChannel`, `CanCommunicationConnector` (Figure 3.4).

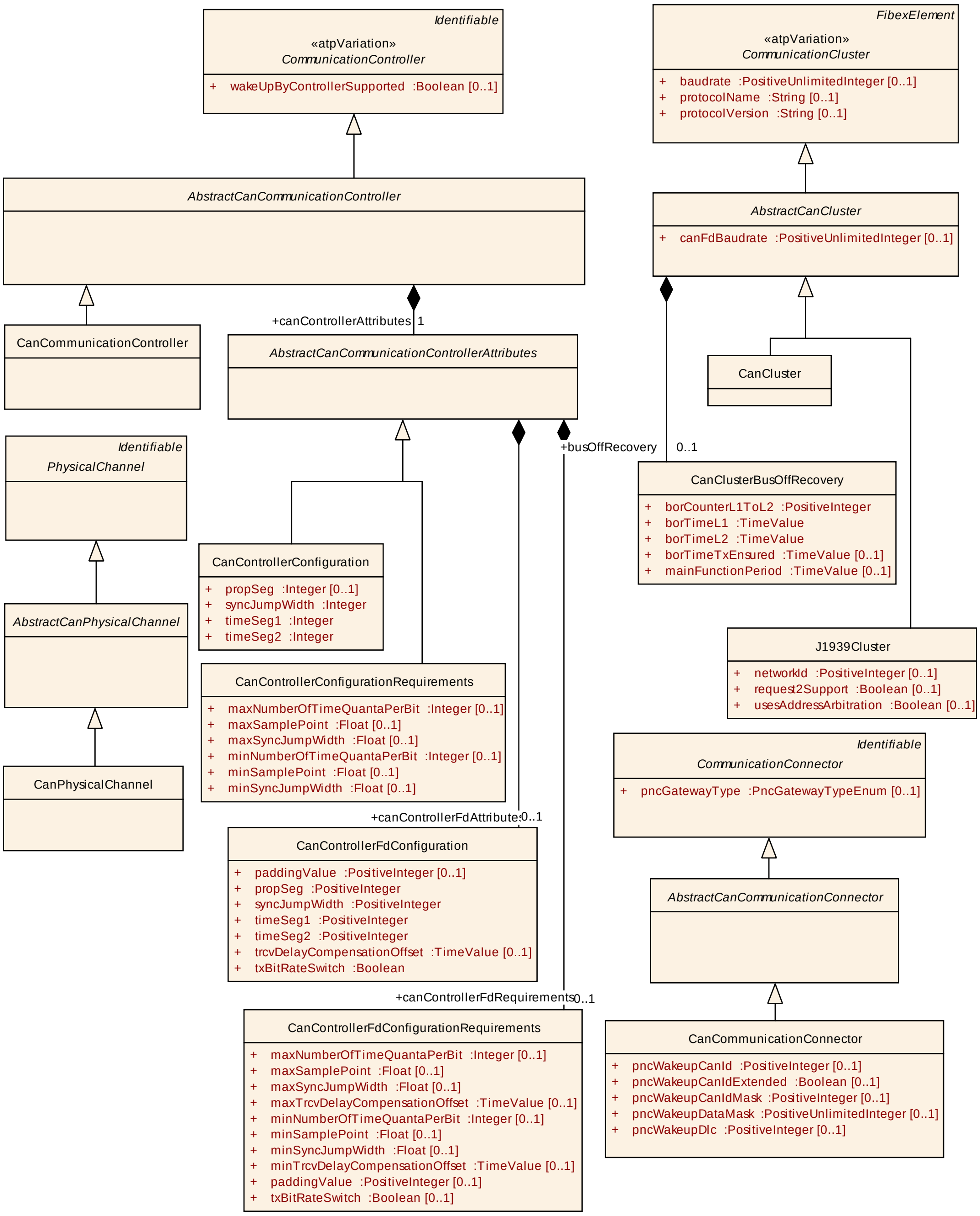


Figure 3.4: CAN bus elements (Fibex4Can_Topology)

3.3.1.1 CAN Cluster

CanCluster specifies the existence of a CAN cluster in the system's physical topology. It contains additional CAN-specific cluster-wide attributes. The common CAN and TTCAN attributes are collected in the AbstractCanCluster class.

Class	≪atpVariation≫ **AbstractCanCluster (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Abstract class that is used to collect the common TtCAN, J1939 and CAN Cluster attributes.			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
busOffRecovery	CanClusterBusOffRecovery	0..1	aggr	CAN bus off monitoring / recovery at system level.
canFdBaudrate	PositiveUnlimitedInteger	0..1	attr	Specifies the data segment baud rate of the controller in bits/s.

Table 3.8: AbstractCanCluster

Class	≪atpVariation≫ **CanCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	CAN bus specific cluster attributes. **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, AbstractCanCluster, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.9: CanCluster

Class	**CanClusterBusOffRecovery**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	This element contains the attributes that are used to configure the CAN bus off monitoring / recovery at system level.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
borCounterL1ToL2	PositiveInteger	1	attr	This threshold defines the count of bus-offs until the bus-off recovery switches from level 1 (short recovery time) to level 2 (long recovery time).
borTimeL1	TimeValue	1	attr	This attribute defines the duration of the bus-off recovery time in level 1 (short recovery time) in seconds.
borTimeL2	TimeValue	1	attr	This attribute defines the duration of the bus-off recovery time in level 2 (long recovery time) in seconds.
borTimeTxEnsured	TimeValue	0..1	attr	This attribute defines the duration of the bus-off event check in seconds.

Attribute	Type	Mul.	Kind	Note
mainFunctionPeriod	TimeValue	0..1	attr	This attribute defines the cycle time of the function CanSM_MainFunction in seconds.

Table 3.10: CanClusterBusOffRecovery

3.3.1.2 CAN Communication Controller

CanCommunicationController is a specialization of the abstract CommunicationController class. It contains the specific CAN controller attributes needed for configuring the CAN stack in an ECU connected to a certain CAN cluster. The common CAN and TTCAN attributes are collected in the AbstractCanCommunicationController class. It is possible to specify the CAN Controller configuration parameters as exact values or as requirements that have to be respected by the ECU developer. Therefore the two elements CanControllerConfiguration and CanControllerConfigurationRequirements were created.

Class	≪atpVariation≫ **CanCommunicationController**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	CAN bus specific communication port attributes.			
Base	ARObject, AbstractCanCommunicationController, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.11: CanCommunicationController

Class	≪atpVariation≫ **AbstractCanCommunicationController (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Abstract class that is used to collect the common TtCAN and CAN Controller attributes.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
canControllerAttributes	AbstractCanCommunicationControllerAttributes	1	aggr	CAN Bit Timing configuration

Table 3.12: AbstractCanCommunicationController

Class	**AbstractCanCommunicationControllerAttributes (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	For the configuration of the CanController parameters two different approaches can be used: 1. Providing exact values which are taken by the ECU developer (CanControllerConfiguration). 2. Providing ranges of values which are taken as requirements and have to be respected by the ECU developer (CanControllerConfigurationRequirements).			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
canControllerFdAttributes	CanControllerFdConfiguration	0..1	aggr	Bit timing related configuration of a CAN controller for payload and CRC of a CanFD frame. If this element exists the controller supports CanFD frames and the ECU developer shall take these values for the configuration of the CanFD controller.
canControllerFdRequirements	CanControllerFdConfigurationRequirements	0..1	aggr	Additional CanFD ranges of the bit timing related configuration of a CanFD controller. If this element exists the controller supports CanFD frames and the ECU developer shall take these ranges as requirements for the configuration of the CanFD controller.

Table 3.13: AbstractCanCommunicationControllerAttributes

Class	**CanControllerConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	This element is used for the specification of the exact CAN Bit Timing configuration parameter values.			
Base	ARObject, AbstractCanCommunicationControllerAttributes			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
propSeg	Integer	0..1	attr	Specifies propagation delay in time quantas.
syncJumpWidth	Integer	1	attr	The number of quanta in the Synchronization Jump Width, SJW. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
timeSeg1	Integer	1	attr	Specifies phase segment 1 in time quantas. timeSeg1 = Phase_Seg1
timeSeg2	Integer	1	attr	Specifies phase segment 2 in time quantas. timeSeg2 = Phase_Seg2

Table 3.14: CanControllerConfiguration

Class	CanControllerConfigurationRequirements			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	This element allows the specification of ranges for the CAN Bit Timing configuration parameters. These ranges are taken as requirements and have to be respected by the ECU developer.			
Base	ARObject, AbstractCanCommunicationControllerAttributes			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
maxNumberOfTimeQuantaPerBit	Integer	0..1	attr	Maximum number of time quanta in the bit time.
maxSamplePoint	Float	0..1	attr	The max. value of the sample point as a percentage of the total bit time.
maxSyncJumpWidth	Float	0..1	attr	The max. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
minNumberOfTimeQuantaPerBit	Integer	0..1	attr	Minimum number of time quanta in the bit time.
minSamplePoint	Float	0..1	attr	The min. value of the sample point as a percentage of the total bit time.
minSyncJumpWidth	Float	0..1	attr	The min. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.

Table 3.15: CanControllerConfigurationRequirements

[TPS_SYST_01154] CAN Controller support of CAN FD frames ⌈ The bit timing configuration of CAN controllers for CAN FD frames is supported by the `CanControllerFdConfiguration` element that is aggregated by `AbstractCanCommunicationControllerAttributes`. ⌋*(RS_SYST_00048)*

[constr_3095] canControllerFdAttributes and canControllerFdRequirements are mutually exclusive ⌈ The existence of `canControllerFdAttributes` and `canControllerFdRequirements` is mutually exclusive. ⌋*()*

[constr_3518] Range of CanControllerFdConfiguration.paddingValue and CanControllerFdConfigurationRequirements.paddingValue ⌈ The value given for `CanControllerFdConfiguration.paddingValue` and `CanControllerFdConfigurationRequirements.paddingValue` shall be in the range from 0 to 255. ⌋*()*

Class	**CanControllerFdConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Bit timing related configuration of a CAN controller for payload and CRC of a CAN FD frame.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
paddingValue	PositiveInteger	0..1	attr	Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD.
propSeg	PositiveInteger	1	attr	Specifies propagation delay in time quantas.
syncJumpWidth	PositiveInteger	1	attr	Specifies the synchronization jump width for the controller in time quantas.
timeSeg1	PositiveInteger	1	attr	Specifies phase segment 1 in time quantas.
timeSeg2	PositiveInteger	1	attr	Specifies phase segment 2 in time quantas.
trcvDelayCompensationOffset	TimeValue	0..1	attr	Specifies the Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.
txBitRateSwitch	Boolean	1	attr	Specifies if the bit rate switching shall be used for transmissions. TRUE: CAN FD frames shall be sent with bit rate switching. FALSE: CAN FD frames shall be sent without bit rate switching.

Table 3.16: CanControllerFdConfiguration

Class	**CanControllerFdConfigurationRequirements**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	This element allows the specification of ranges for the CanFD bit timing configuration parameters. These ranges are taken as requirements and shall be respected by the ECU developer.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
maxNumberOfTimeQuantaPerBit	Integer	0..1	attr	Maximum number of time quanta in the bit time.
maxSamplePoint	Float	0..1	attr	The max. value of the sample point as a percentage of the total bit time.
maxSyncJumpWidth	Float	0..1	attr	The max. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
maxTrcvDelayCompensationOffset	TimeValue	0..1	attr	Specifies the maximum Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
minNumberOfTimeQuantaPerBit	Integer	0..1	attr	Minimum number of time quanta in the bit time.
minSamplePoint	Float	0..1	attr	The min. value of the sample point as a percentage of the total bit time.
minSyncJumpWidth	Float	0..1	attr	The min. Synchronization Jump Width value as a percentage of the total bit time. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.
minTrcvDelayCompensationOffset	TimeValue	0..1	attr	Specifies the minimum Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.
paddingValue	PositiveInteger	0..1	attr	Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD.
txBitRateSwitch	Boolean	0..1	attr	Specifies if the bit rate switching shall be used for transmissions. TRUE: CAN FD frames shall be sent with bit rate switching. FALSE: CAN FD frames shall be sent without bit rate switching.

Table 3.17: CanControllerFdConfigurationRequirements

3.3.1.3 CAN Physical Channel

CanPhysicalChannel is a specialization of the abstract PhysicalChannel class. It contains the specific CAN PhysicalChannel attributes. The common CAN and TTCAN attributes are collected in the AbstractCanPhysicalChannel class.

Class	**AbstractCanPhysicalChannel (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Abstract class that is used to collect the common TtCAN and CAN PhysicalChannel attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 3.18: AbstractCanPhysicalChannel

Class	**CanPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	CAN bus specific physical channel attributes.			
Base	ARObject, AbstractCanPhysicalChannel, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 3.19: CanPhysicalChannel

[constr_3003] Number of CAN channels ⌈ CAN clusters shall aggregate exactly one PhysicalChannel. ⌋*()*

3.3.1.4 CAN Communication Connector

CanCommunicationConnector is a specialization of the abstract Communication-Connector class. It contains the specific CAN CommunicationConnector attributes. The common CAN and TTCAN attributes are collected in the Abstract-CanCommunicationConnector class.

Class	**AbstractCanCommunicationConnector (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	Abstract class that is used to collect the common TtCAN and CAN CommunicationConnector attributes.			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 3.20: AbstractCanCommunicationConnector

Class	**CanCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	CAN bus specific communication connector attributes.			
Base	ARObject, AbstractCanCommunicationConnector, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
pncWakeupCanId	PositiveInteger	0..1	attr	CAN Identifier used to configure the CAN Transceiver for partial network wakeup.
pncWakeupCanIdExtended	Boolean	0..1	attr	Defines whether pncWakeupCanId and pncWakeupCanIdMask shall be interpreted as extended or standard CAN ID.
pncWakeupCanIdMask	PositiveInteger	0..1	attr	Bit mask for CAN Identifier used to configure the CAN Transceiver for partial network wakeup.
pncWakeupDataMask	PositiveUnlimitedInteger	0..1	attr	Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.
pncWakeupDlc	PositiveInteger	0..1	attr	Data Length of the remote data frame used to configure the CAN Transceiver for partial network wakeup in Bytes.

Table 3.21: CanCommunicationConnector

[TPS_SYST_02165] Derivation of CanNmPnFilterMaskByte ⌈ The `pncWakeupDataMask` should not be computed from the `pncIdentifier` values in order to support future introduction of additional PNCs.

Note that for one `EcuInstance` all contributing `CanCommunicationConnector.pncWakeupDataMask` will be bitwise ORed to obtain the value of `CanNmPnFilterMaskByte`. Note that this data mask is calculated over the whole payload of the `NmPdu` ignoring the leading bytes which do not contain pncVector information. The number of leading bytes which shall be ignored is equivalent to the value of `System.pncVectorOffset`. ⌋*(RS_SYST_00042)*

Example: For pncWakeupDataMask = 2^{63} and pncVectorOffset = 2, pncIdentifier with number 63 in a NmPdu will be masked (see Figure 3.5).

NmPdu	Byte 0								Byte 1								Byte 2								Byte 3							
Absolute bit position	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24
PNC identifiers				N	O	T					U	S	E	D			23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24

NmPdu	Byte 4								Byte 5								Byte 6								Byte 7							
Absolute bit position	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40	55	54	53	52	51	50	49	48	63	62	61	60	59	58	57	56
PNC identifiers	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40	55	54	53	52	51	50	49	48	63	62	61	60	59	58	57	56

Figure 3.5: Example of masked pncIdentifiers in a NmPdu

3.3.2 TTCAN

Modeling of TTCAN clusters is supported in the System Template by the means of four specialized meta-model classes: `TtcanCluster`, `TtcanCommunication-`

Controller, TtcanCommunicationConnector, TtcanPhysicalChannel (figure 3.6).

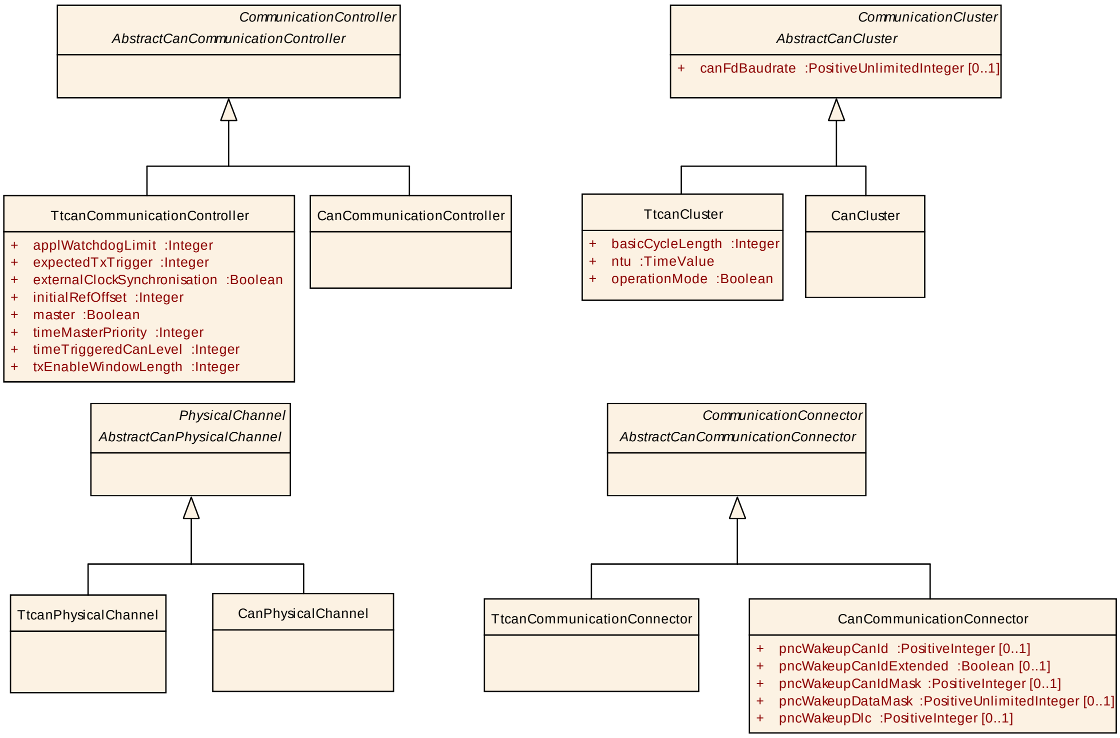


Figure 3.6: TTCAN bus elements (Fibex4Ttcan_Topology)

3.3.2.1 TTCAN Cluster

TtcanCluster specifies the existence of a TTCAN cluster in the system's physical topology. Additionally to the common CAN and TTCAN attributes it contains TTCAN-specific cluster-wide attributes.

Class	≪atpVariation≫ TtcanCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology			
Note	TTCAN bus specific cluster attributes. Tags: atp.recommendedPackage=CommunicationClusters			
Base	ARObject, AbstractCanCluster, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
basicCycleLength	Integer	1	attr	Length of a basic-cycle. Unit: NTUs
ntu	TimeValue	1	attr	Unit measuring all times and providing a constant of the whole network. For level 1, this is always the CAN bit time. Unit: seconds.
operationMode	Boolean	1	attr	Possible operation modes True: Time-Triggered False: Event-Synchronised-Time-Triggered

Table 3.22: TtcanCluster

3.3.2.2 TTCAN Communication Controller

TtcanCommunicationController is a specialization of the AbstractCanCommunicationController class. Additionally to the common CAN and TTCAN attributes it contains the specific TTCAN Controller attributes.

Class	≪atpVariation≫ TtcanCommunicationController			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology			
Note	TTCAN bus specific communication port attributes.			
Base	ARObject, AbstractCanCommunicationController, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applWatchdogLimit	Integer	1	attr	The Appl_Watchdog_Limit shall be an 8-bit value specifying the period for the application watchdog in Appl_Watchdog_Limit times 256 NTUs.
expectedTxTrigger	Integer	1	attr	The Expected_Tx_Trigger shall be an eight (8) bit value which limits the number of messages the FSE may try to transmit in one matrix cycle.
externalClockSynchronisation	Boolean	1	attr	One bit shall be used to configure whether or not external clock synchronisation will be allowed during runtime (only Level 2).
initialRefOffset	Integer	1	attr	The Initial_Ref_Offset shall be an eight (8) bit value for the initialisation of Ref_Trigger_Offset.
master	Boolean	1	attr	One bit shall be used to distinguish between (potential) time masters and time slaves. This can be derived from the frame-triggering's triggers.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
timeMasterPriority	Integer	1	attr	The time master priority shall contain a three bit value for the priority of the current time master (the last three bits of the identifier of the reference message). This can be derived from the frame-triggering's triggers.
timeTriggeredCanLevel	Integer	1	attr	One bit shall be used to distinguish between Level 1 and Level 2.
txEnableWindowLength	Integer	1	attr	The length of the Tx_Enable window shall be a four (4) bit value specifying the length of the time period (1-16 nominal CAN bit times) in which a transmission may be started.

Table 3.23: TtcanCommunicationController

3.3.2.3 TTCAN Physical Channel

TtcanPhysicalChannel is a specialization of the AbstractCanPhysicalChannel class. Additionally to the common CAN and TTCAN attributes it contains the specific TTCAN Physical Channel attributes.

Class	**TtcanPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology			
Note	TTCAN bus specific physical channel attributes.			
Base	ARObject, AbstractCanPhysicalChannel, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 3.24: TtcanPhysicalChannel

3.3.2.4 TTCAN Communication Connector

TtcanCommunicationConnector is a specialization of the AbstractCanCommunicationConnector class. Additionally to the common CAN and TTCAN attributes it contains the specific TTCAN CommunicationConnector attributes.

Class	**TtcanCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology			
Note	TTCAN bus specific communication connector attributes.			
Base	ARObject, AbstractCanCommunicationConnector, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 3.25: TtcanCommunicationConnector

3.3.3 SAE J1939

Modeling of J1939 Communication Clusters is supported in the System Template with the J1939Cluster element that is derived from AbstractCanCluster (see figure 3.4).

Class	≪atpVariation≫ **J1939Cluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanTopology			
Note	J1939 specific cluster attributes. **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, AbstractCanCluster, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
networkId	PositiveInteger	0..1	attr	This represents the network ID for the J1939 cluster.
request2Support	Boolean	0..1	attr	Enables support for the Request2 PGN (RQST2).
usesAddressArbitration	Boolean	0..1	attr	Defines whether the nodes attached to this channel use an initial address claim, and whether they react to contending address claims of other nodes. True: The initial address claim is sent, and the node reacts to address claims of other nodes. False: The node only sends an address claim upon request, and does not care for contending address claims.

Table 3.26: J1939Cluster

To describe the communication on a J1939Cluster CanFrameTriggerings are used that are aggregated by a CanPhysicalChannel.

[constr_3050] J1939Cluster uses exactly one CanPhysicalChannel ⌈ A J1939Cluster shall aggregate exactly one CanPhysicalChannel. ⌋*()*

[constr_1463] Applicable values for J1939Cluster.networkId ⌈ The values of the attribute J1939Cluster.networkId shall always be within the interval 1..4. ⌋*()*

Please note that AUTOSAR supports only the four mentioned bus types. Still, an implementation could e.g. support J1708 [14] by means of a complex driver and would then need to assign the corresponding bus type.

3.3.4 FlexRay

Modeling of FlexRay clusters is supported in the System Template by the means of four specialized meta-model classes: FlexrayCluster, FlexrayCommunicationConnector, FlexrayPhysicalChannel, FlexrayCommunicationController (Figure 3.7).

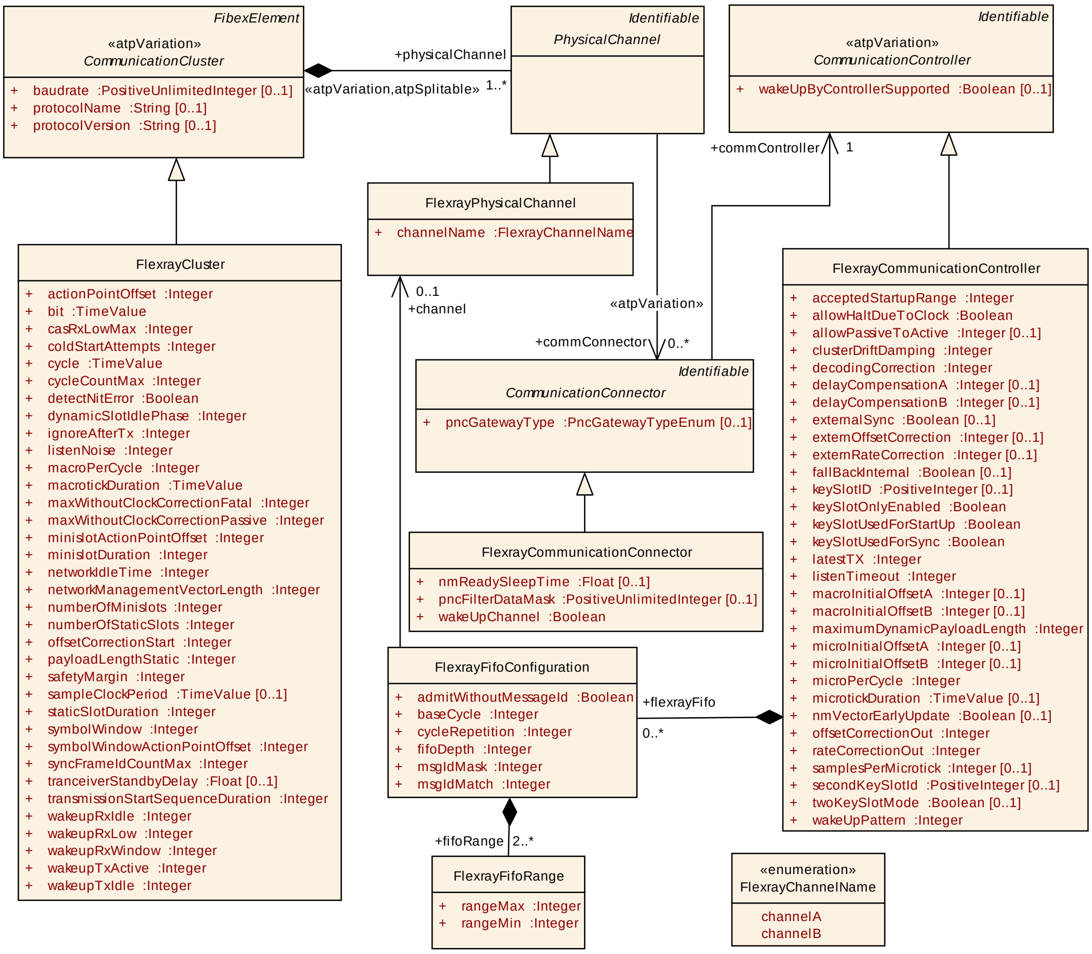


Figure 3.7: FlexRay cluster elements (Fibex4FlexRay_Topology)

3.3.4.1 FlexRay Cluster

FlexrayCluster specifies the existence of a FlexRay cluster in the system's physical topology. It contains additional FlexRay-specific cluster-wide attributes.

Class	≪atpVariation≫ **FlexrayCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FlexRay specific attributes to the physicalCluster **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
actionPointOffset	Integer	1	attr	The offset of the action point in networks
bit	TimeValue	1	attr	Nominal bit time (= 1 / fx:SPEED). gdBit = cSamplesPerBit * gdSampleClockPeriod. Unit: seconds (gdBit)
casRxLowMax	Integer	1	attr	Upper limit of the Collision Avoidance Symbol (CAS) acceptance window. Unit:bitDuration
coldStartAttempts	Integer	1	attr	The maximum number of times that a node in this cluster is permitted to attempt to start the cluster by initiating schedule synchronization
cycle	TimeValue	1	attr	Length of the cycle. Unit: seconds
cycleCountMax	Integer	1	attr	Maximum cycle counter value in a given cluster. Remark: Set to 63 for FlexRay Protocol 2.1 Rev. A compliance.
detectNitError	Boolean	1	attr	Indicates whether NIT error status of each cluster shall be detected or not.
dynamicSlotIdlePhase	Integer	1	attr	The duration of the dynamic slot idle phase in minislots.
ignoreAfterTx	Integer	1	attr	Duration for which the bitstrobing is paused after transmission [gdBit].
listenNoise	Integer	1	attr	Upper limit for the start up and wake up listen timeout in the presence of noise. Expressed as a multiple of the cluster constant pdListenTimeout. Unit microticks
macroPerCycle	Integer	1	attr	The number of macroticks in a communication cycle
macrotickDuration	TimeValue	1	attr	Duration of the cluster wide nominal macrotick, expressed in s.
maxWithoutClockCorrectionFatal	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active or POC:normal passive state into the POC:halt state.
maxWithoutClockCorrectionPassive	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active state to the POC:normal passive state.

Attribute	Type	Mul.	Kind	Note
minislotActionPointOffset	Integer	1	attr	The Offset of the action point within a minislot. Unit: macroticks
minislotDuration	Integer	1	attr	The duration of a minislot (dynamic segment). Unit: macroticks.
networkIdleTime	Integer	1	attr	The duration of the network idle time in macroticks
networkManagementVectorLength	Integer	1	attr	Length of the Network Management vector in a cluster [bytes]
numberOfMinislots	Integer	1	attr	Number of Minislots in the dynamic segment.
numberOfStaticSlots	Integer	1	attr	The number of static slots in the static segment.
offsetCorrectionStart	Integer	1	attr	Start of the offset correction phase within the Network Idle Time (NIT), expressed as the number of macroticks from the start of cycle. Unit: macroticks
payloadLengthStatic	Integer	1	attr	Globally configured payload length of a static frame. Unit: 16-bit WORDS.
safetyMargin	Integer	1	attr	Additional timespan in macroticks which takes jitter into account to be able to set the JobListPointer to the next possible job which can be executed in case the FlexRay Job List Execution Function has be resynchronized.
sampleClockPeriod	TimeValue	0..1	attr	Sample clock period. Unit: seconds
staticSlotDuration	Integer	1	attr	The duration of a slot in the static segment. Unit: macroticks
symbolWindow	Integer	1	attr	The duration of the symbol window. Unit: macroticks
symbolWindowActionPointOffset	Integer	1	attr	Number of macroticks the action point offset is from the beginning of the symbol window [Macroticks].
syncFrameIdCountMax	Integer	1	attr	Maximum number of distinct syncframe identifiers present in a given cluster. This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gSyncNodeMax.
tranceiverStandbyDelay	Float	0..1	attr	The duration of timer t_TrcvStdbyDelay in seconds. The granularity of this parameter shall be restricted to full FlexRay cycles (cycle). The transceiver status setting to STANDBY shall be delayed by this value. Not specifying a value or a value of 0 shall imply that the timer is not used.
transmissionStartSequenceDuration	Integer	1	attr	Number of bits in the Transmission Start Sequence [gdBits].

Attribute	Type	Mul.	Kind	Note
wakeupRxIdle	Integer	1	attr	Number of bits used by the node to test the duration of the 'idle' or HIGH phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxIdle.
wakeupRxLow	Integer	1	attr	Number of bits used by the node to test the duration of the LOW phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxLow.
wakeupRxWindow	Integer	1	attr	The size of the window used to detect wakeups [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxWindow.
wakeupTxActive	Integer	1	attr	Number of bits used by the node to transmit the LOW phase of awakeup symbol and the HIGH and LOW phases of a WUDOP. Unit:bitDuration
wakeupTxIdle	Integer	1	attr	Number of bits used by the node to transmit the 'idle' part of a wakeup symbol. Unit: gDbit

Table 3.27: FlexrayCluster

3.3.4.2 FlexRay Communication Controller

FlexrayCommunicationController is a specialization of the CommunicationController class. It contains the specific FlexRay controller attributes needed for configuring the FlexRay stack in an ECU connected to a certain FlexRay cluster.

Class	≪atpVariation≫ **FlexrayCommunicationController**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FlexRay bus specific communication port attributes.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
acceptedStartupRange	Integer	1	attr	Expanded range of measured clock deviation allowed for startup frames during integration. Unit:microtick
allowHaltDueToClock	Boolean	1	attr	Boolean flag that controls the transition to the POC:halt state due to a clock synchronization errors. If set to true, the Communication Controller is allowed to transition to POC:halt. If set to false, the Communication Controller will not transition to the POC:halt state but will enter or remain in the normal POC (passive State).

Attribute	***Type***	***Mul.***	***Kind***	***Note***
allowPassiveToActive	Integer	0..1	attr	Number of consecutive even/odd cycle pairs that must have valid clock correction terms before the Communication Controller will be allowed to transition from the POC:normal passive state to POC:normal active state. If set to 0, the Communication Controller is not allowed to transition from POC:norm
clusterDriftDamping	Integer	1	attr	The cluster drift damping factor used in clock synchronization rate correction in microticks
decodingCorrection	Integer	1	attr	Value used by the receiver to calculate the difference between primary time reference point and secondary time reference point. Unit: Microticks (pDecodingCorrection)
delayCompensationA	Integer	0..1	attr	Value used to compensate for reception delays on channel A Unit: Microticks. This optional parameter shall only be filled out if channel A is used.
delayCompensationB	Integer	0..1	attr	Value used to compensate for reception delays on channel B. Unit: Microticks. This optional parameter shall only be filled out if channel B is used.
externOffsetCorrection	Integer	0..1	attr	Fixed amount added or subtracted to the calculated offset correction term to facilitate external offset correction, expressed in node-local microticks.
externRateCorrection	Integer	0..1	attr	Fixed amount added or subtracted to the calculated rate correction term to facilitate external rate correction, expressed in node-local microticks.
externalSync	Boolean	0..1	attr	Flag indicating whether the node is externally synchronized (operating as Time Gateway Sink in an TT-E Time Triggered External Sync cluster) or locally synchronized.
fallBackInternal	Boolean	0..1	attr	Flag indicating whether a Time Gateway Sink node will switch to local clock operation when synchronization with the Time Gateway Source node is lost (pFallBackInternal = true) or will instead go to POC:ready (pFallBackInternal = false).
flexrayFifo	FlexrayFifoConfiguration	*	aggr	One First In First Out (FIFO) queued receive structure, defining the admittance criteria to the FIFO.
keySlotID	PositiveInteger	0..1	attr	ID of the slot used to transmit the startup frame, sync frame, or designated single slot frame. If the attributes keySlotUsedForStartUp, keySlotUsedForSync, or keySlotOnlyEnabled are set to true the key slot value is mandatory.
keySlotOnlyEnabled	Boolean	1	attr	Flag indicating whether or not the node shall enter key slot only mode following startup.
keySlotUsedForStartUp	Boolean	1	attr	Flag indicating whether the Key Slot is used to transmit a startup frame.

Attribute	Type	Mul.	Kind	Note
keySlotUsedForSync	Boolean	1	attr	Flag indicating whether the Key Slot is used to transmit a sync frame.
latestTX	Integer	1	attr	The number of the last minislot in which a transmission can start in the dynamic segment for the respective node
listenTimeout	Integer	1	attr	Value for the startup listen timeout and wakeup listen timeout. Although this is a node local parameter, the real time equivalent of this value should be the same for all nodes in the cluster. Unit: Microticks
macroInitialOffsetA	Integer	0..1	attr	Integer number of macroticks between the static slot boundary and the closest macrotick boundary of the secondary time reference point based on the nominal macrotick duration. (pMacroInitialOffset). This optional parameter shall only be filled out if channel A is used.
macroInitialOffsetB	Integer	0..1	attr	Integer number of macroticks between the static slot boundary and the closest macrotick boundary of the secondary time reference point based on the nominal macrotick duration. (pMacroInitialOffset). This optional parameter shall only be filled out if channel B is used.
maximumDynamicPayloadLength	Integer	1	attr	Maximum payload length for the dynamic channel of a frame in 16 bit WORDS.
microInitialOffsetA	Integer	0..1	attr	Number of microticks between the closest macrotick boundary described by gMacroInitialOffset and the secondary time reference point. The parameter depends on pDelayCompensationA and therefore it has to be set independently for each channel. This optional parameter shall only be filled out if channel A is used.
microInitialOffsetB	Integer	0..1	attr	Number of microticks between the closest macrotick boundary described by gMacroInitialOffset and the secondary time reference point. The parameter depends on pDelayCompensationB and therefore it has to be set independently for each channel. This optional parameter shall only be filled out if channel B is used.
microPerCycle	Integer	1	attr	The nominal number of microticks in a communication cycle
microtickDuration	TimeValue	0..1	attr	Duration of a microtick. This attribute can be derived from samplePerMicrotick and gdSampleClockPeriod. Unit: seconds
nmVectorEarlyUpdate	Boolean	0..1	attr	Flag indicating when the update of the Network Management Vector in the CHI shall take place. If set to false, the update shall take place after the NIT. If set to true, the update shall take place after the end of the static segment.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
offsetCorrectionOut	Integer	1	attr	Magnitude of the maximum permissible offset correction value. Unit:microtick (pOffsetCorrectionOut)
rateCorrectionOut	Integer	1	attr	Magnitude of the maximum permissible rate correction value and the maximum drift offset between two nodes operating with unsynchronized clocks for one communication cycle. Unit:Microticks (pRateCorrectionOut) Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter pdMaxDrift.
samplesPerMicrotick	Integer	0..1	attr	Number of samples per microtick
secondKeySlotId	PositiveInteger	0..1	attr	ID of the second Key slot, in which a second startup frame shall be sent in TT-L Time Triggered Local Master Sync or TT-E Time Triggered External Sync mode. If this parameter is set to zero the node does not have a second key slot.
twoKeySlotMode	Boolean	0..1	attr	Flag indicating whether node operates as a startup node in a TT-E Time Triggered External Sync or TT-L Time Triggered Local Master Sync cluster.
wakeUpPattern	Integer	1	attr	Number of repetitions of the Tx-wakeup symbol to be sent during the CC_WakeupSend state of this Node in the cluster

Table 3.28: FlexrayCommunicationController

Class	**FlexrayFifoConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	One First In First Out (FIFO) queued receive structure, defining the admittance criteria to the FIFO, and mandating the ability to admit messages into the FIFO based on Message Id filtering criteria.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
admitWithoutMessageId	Boolean	1	attr	Boolean configuration which determines whether or not frames received in the dynamic segment that don't contain a message ID will be admitted into the FIFO.
baseCycle	Integer	1	attr	FIFO cycle counter acceptance criteria.
channel	FlexrayPhysicalChannel	0..1	ref	Fifo channel admittance criteria.
cycleRepetition	Integer	1	attr	FIFO cycle counter acceptance criteria.
fifoDepth	Integer	1	attr	FrFifoDepth configures the maximum number of rx-frames which can be contained in the FIFO.
fifoRange	FlexrayFifoRange	2..*	aggr	FIFO Frame Id range acceptance criteria.
msgIdMask	Integer	1	attr	FIFO message identifier acceptance criteria (Mask filter).
msgIdMatch	Integer	1	attr	FIFO message identifier acceptance criteria (Match filter).

Table 3.29: FlexrayFifoConfiguration

Class	**FlexrayFifoRange**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FIFO Frame Id range acceptance criteria.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
rangeMax	Integer	1	attr	Max Range.
rangeMin	Integer	1	attr	Min Range.

Table 3.30: FlexrayFifoRange

3.3.4.3 FlexRay Communication Connector

FlexrayCommunicationConnector adds the FlexRay specific attributes to the CommunicationConnector.

Class	**FlexrayCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FlexRay specific attributes to the CommunicationConnector			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nmReadySleepTime	Float	0..1	attr	The value of this attribute influences the shutdown behavior of the FlexRay NM. FrNm switches to bus sleep mode nmReadySleepTime seconds after the completion of the last repetition cycle containing a NM vote.
pncFilterDataMask	PositiveUnlimitedInteger	0..1	attr	Bit mask for FlexRay Payload used to configure the FlexRay Transceiver for partial network wakeup.
wakeUpChannel	Boolean	1	attr	Referenced channel used by the node to send a wakeup pattern. (pWakeupChannel)

Table 3.31: FlexrayCommunicationConnector

[constr_3508] Value of nmReadySleepTime ⌈The nmReadySleepTime value shall be a multiple of cycle * nmRepetitionCycle. ⌋*()*

[TPS_SYST_02167] Derivation of FrNmPnFilterMaskByte ⌈The FrNmPnFilterMaskByte should not be computed from the pncIdentifier values in order to support future introduction of additional PNCs.

Note that for one EcuInstance all contributing FlexrayCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain the value of FrNmPnFilterMaskByte. Note that this data mask is calculated over the whole payload of the NmPdu ignoring the leading bytes which do not contain pncVector information. The number of leading bytes which shall be ignored is equivalent to the value of System.pncVectorOffset. ⌋*(RS_SYST_00042)*

The masking of pncIdentifiers in a NmPdu based on the pncFilterDataMask is done in the same way as for the CanCommunicationConnector (see Example in Figure 3.5).

3.3.4.4 FlexRay Physical Channel

FlexrayPhysicalChannel adds the FlexRay specific attributes to the PhysicalChannel.

Class	**FlexrayPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FlexRay specific attributes to the physicalChannel			
Base	ARObject, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
channelName	FlexrayChannelName	1	attr	Name of the channel (Channel A or Channel B).

Table 3.32: FlexrayPhysicalChannel

Enumeration	**FlexrayChannelName**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology
Note	Name of the channel.
Literal	***Description***
channelA	Channel A **Tags:** atp.EnumerationValue=0
channelB	Channel B **Tags:** atp.EnumerationValue=1

Table 3.33: FlexrayChannelName

[constr_3018] Number of FlexRay channels ⌈ A `FlexrayCluster` shall use either one `FlexrayPhysicalChannel` with `channelName` set to either `channelA` or `channelB` or else two `FlexrayPhysicalChannel`s with one `channelName` `channelA` and one `channelName` `channelB`. ⌋ *()*

3.3.5 LIN

A LinCluster consists of exactly one master node connected to several slave nodes. The master is responsible for providing the frame headers on the bus according to a predefined schedule, whereas the slaves send or receive the actual frame information ([10]).

[TPS_SYST_01012] Different Properties of LinMaster and LinSlave ⌈ In the System Template the different properties of master and slave nodes are handled by deriving the LIN-specific subclasses LinMaster and LinSlave as specializations of LinCommunicationController. ⌋*(RS_SYST_00022)*

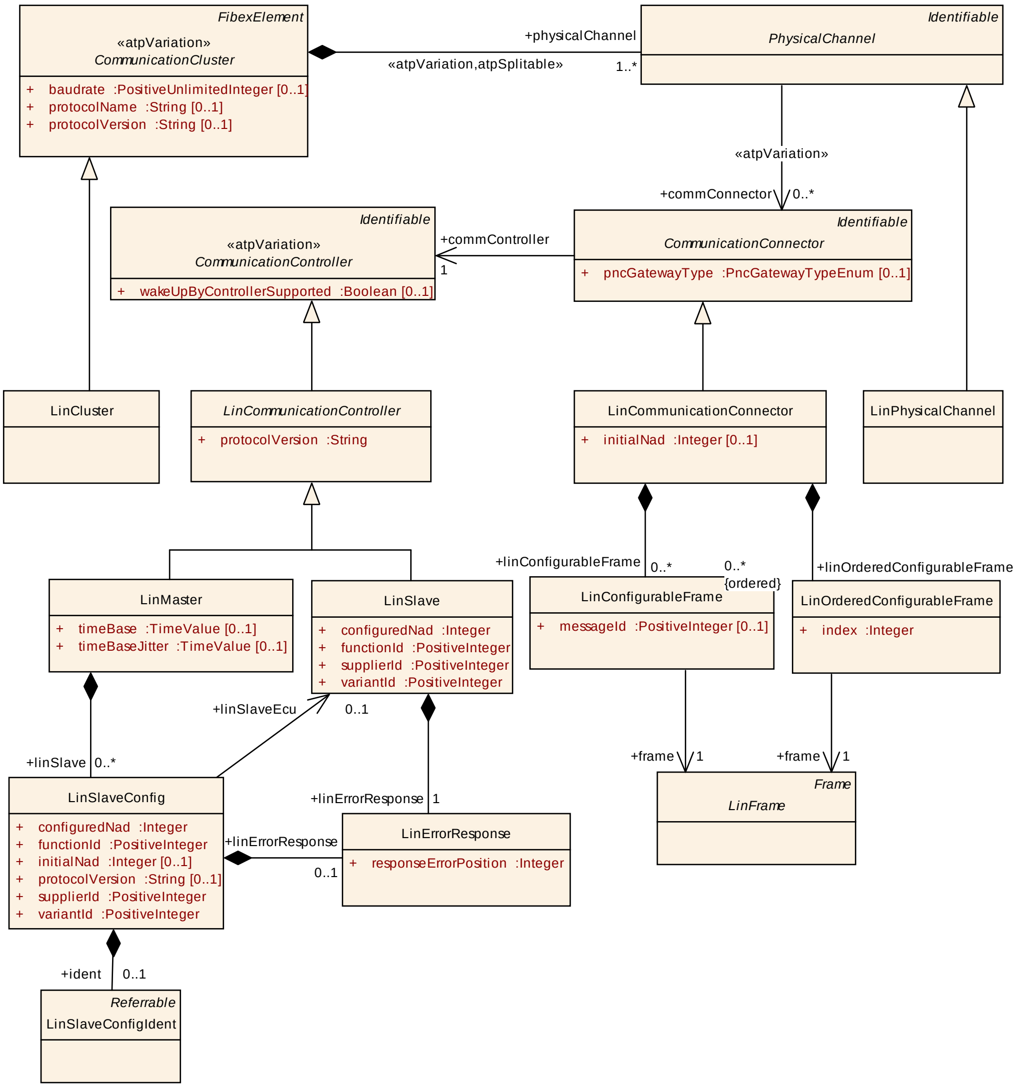


Figure 3.8: Specialized LinCommunicationController attributes (Fibex4Lin_Topology)

Note that the AUTOSAR BSW only supports LIN masters. LIN slaves are seen as non AUTOSAR ECUs. They can be described in the System Template in order to configure the LIN Interface for the master correctly, but AUTOSAR does not support the development of LIN slaves as of AUTOSAR release 4.0 ([15], [16]).

3.3.5.1 LIN Cluster

LinCluster specifies the existence of a LIN cluster in the system's physical topology.

Class	≪atpVariation≫ LinCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	LIN specific attributes Tags: atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 3.34: LinCluster

3.3.5.2 LIN Communication Controller

LinCommunicationController is a specialization of the CommunicationController class. It is an abstract class, to be further specialized by LinMaster and LinSlave.

Class	≪atpVariation≫ LinCommunicationController (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	LIN bus specific communication controller attributes.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
protocolVersion	String	1	attr	Version specifier for a communication protocol.

Table 3.35: LinCommunicationController

3.3.5.3 LIN Master

LinMaster describes the existence of a LIN master task in a LIN topology node. As such it contains the attributes specific to a LIN master task.

Class	≪atpVariation≫ LinMaster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	Describing the properties of the refering ecu as a LIN master.			
Base	ARObject, CommunicationController, Identifiable, LinCommunicationController, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
linSlave	LinSlaveConfig	*	aggr	LinSlaves that are handled by the LinMaster.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
timeBase	TimeValue	0..1	attr	Time base is mandatory for the master. It is not used for slaves. LIN 2.0 Spec states: "The time_base value specifies the used time base in the master node to generate the maximum allowed frame transfer time." The time base shall be specified AUTOSAR conform in seconds.
timeBaseJitter	TimeValue	0..1	attr	The attribute timeBaseJitter is a mandatory attribute for the master and not used for slaves. LIN 2.0 Spec states: "The jitter value specifies the differences between the maximum and minimum delay from time base start point to the frame header sending start point (falling edge of BREAK signal)." The jitter shall be specified AUTOSAR conform in seconds.

Table 3.36: LinMaster

Class	**LinSlaveConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	Node attributes of LIN slaves that are handled by the LinMaster. In the System Description LIN slaves may be described as non AUTOSAR ECUs (linSlaveEcu reference). But in an Ecu Extract of the LinMaster the LinSlaveEcus will not be available. The information that is described here is necessary in the ECU Extract for the configuration of the LinMaster. The values of attributes of LinSlaveConfig and LinSlave shall be identical for each LinSlaveConfig that points to a LinSlave. Please note that this causes redundancy which is intended to support flexible development methodology.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
configuredNad	Integer	1	attr	To distinguish LIN slaves that are used twice or more within the same cluster.
functionId	PositiveInteger	1	attr	LIN function ID.
ident	LinSlaveConfigIdent	0..1	aggr	This adds the ability to become referrable to LinSlaveConfig.
initialNad	Integer	0..1	attr	Initial NAD of the LIN slave.
linErrorResponse	LinErrorResponse	0..1	aggr	Each slave node shall publish one response error in one of its transmitted unconditional frames.
linSlaveEcu	LinSlave	0..1	ref	Reference to the LinSlaveEcu.
protocolVersion	String	0..1	attr	Version specifier for a communication protocol. Protocol version of the LinMaster and the LinSlaves may be different. **Tags:** atp.Status=shallBecomeMandatory
supplierId	PositiveInteger	1	attr	LIN Supplier ID.
variantId	PositiveInteger	1	attr	Specifies the Variant ID.

Table 3.37: LinSlaveConfig

Class	LinSlaveConfigIdent			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	This meta-class is created to add the ability to become the target of a reference to the non-Referrable LinSlaveConfig.			
Base	ARObject, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 3.38: LinSlaveConfigIdent

[constr_3219] The existence of LinSlaves in the LinMaster EcuExtract ⌈ LinSlaves shall not be part of the EcuExtract of the corresponding LinMaster. ⌋ *()*

[TPS_SYST_02101] Usage of LinSlaveConfig in Ecu Extract ⌈ In order to configure LinMaster in a System with category ECU_EXTRACT the LinSlaveConfig aggregated by the LinMaster shall be used. ⌋ *(RS_SYST_00022)*

[constr_3034] Values of LinSlaveConfig and LinSlave attributes ⌈ The values of attributes of LinSlaveConfig and LinSlave shall be identical for each LinSlaveConfig that points to a LinSlave. ⌋ *()*

Please note that this causes redundancy which is intended to support flexible development methodology.

[TPS_SYST_01046] ShortNames of LinSlaveConfig and LinSlave ⌈ The shortNames of a pair of LinSlaveConfig and LinSlave do not have to be identical. ⌋ *()*

3.3.5.4 LIN Slave

LinSlave describes the existence of a LIN slave task in a LIN topology node. It describes the attributes of a single LIN slave node.

Class	≪atpVariation≫ LinSlave			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	Describing the properties of the referring ecu as a LIN slave.			
Base	ARObject, CommunicationController, Identifiable, LinCommunicationController, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
configuredNad	Integer	1	attr	To distinguish LIN slaves that are used twice or more within the same cluster.
functionId	PositiveInteger	1	attr	LIN function ID
linErrorResponse	LinErrorResponse	1	aggr	Each slave node shall publish one response error in one of its transmitted unconditional frames.
supplierId	PositiveInteger	1	attr	LIN Supplier ID
variantId	PositiveInteger	1	attr	Specifies the Variant ID

Table 3.39: LinSlave

AUTOSAR doesn't support LIN slave functionality in an AUTOSAR ECU, thus not the full FIBEX description of a slave node, but rather the subset of attributes of a Node Capability File (ncf, see [10]) relevant as requirements for configuring the master are included in the System Template.

Class	**LinErrorResponse**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Each slave node shall publish a one bit signal, named response_error, to the master node in one of its transmitted unconditional frames. The response_error signal shall be set whenever a frame (except for event triggered frame responses) that is transmitted or received by the slave node contains an error in the frame response. The response_error signal shall be cleared when the unconditional frame containing the response_error signal is successfully transmitted.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
frameTriggering	LinFrameTriggering	1	ref	Reference to an unconditional frame that transmits the response error. The referenced LinFrameTriggering shall contain a reference to an unconditionalFrame.
responseErrorPosition	Integer	1	attr	Specifies the position of the ResponseError bit in the frame. Each slave node shall publish one response error in one of its transmitted unconditional frames.

Table 3.40: LinErrorResponse

3.3.5.5 LIN Communication Connector

LinCommunicationConnector is a specialization of the CommunicationConnector class. The LinCommunicationConnector element contains lists of frames processed by the slave node.

[constr_3029] Assign-Frame command usage ⌈ For the LIN 2.0 Assign-Frame command the LinConfigurableFrame list shall be used. For the LIN 2.1 Assign-Frame-PID-Range command the LinOrderedConfigurableFrame list shall be used. ⌋*()*

Class	**LinCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	LIN bus specific communication connector attributes.			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
initialNad	Integer	0..1	attr	Initial NAD of the LIN slave.
linConfigurableFrame	LinConfigurableFrame	*	aggr	LinConfigurableFrames shall list all frames (unconditional frames, event-triggered frames and sporadic frames) processed by the slave node. This element is necessary for the LIN 2.0 Assign-Frame command.

Attribute	Type	Mul.	Kind	Note
linOrderedConfigurableFrame (ordered)	LinOrderedConfigurableFrame	*	aggr	LinOrderedConfigurableFrames shall list all frames (unconditional frames, event-triggered frames and sporadic frames) processed by the slave node. This element is necessary for the LIN 2.1 Assign-Frame-PID-Range command.

Table 3.41: LinCommunicationConnector

Class	**LinConfigurableFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	Assignment of messageIds to Frames. This element shall be used for the LIN 2.0 Assign-Frame command.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
frame	LinFrame	1	ref	Reference to a Frame that is processed by the slave node.
messageId	PositiveInteger	0..1	attr	MessageId for the referenced frame

Table 3.42: LinConfigurableFrame

Class	**LinOrderedConfigurableFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	With the assignment of the index to a frame a mapping of Pids to Frames is possible. This element shall be used for the LIN 2.1 Assign-Frame-PID-Range command.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
frame	LinFrame	1	ref	Reference to a Frame that is processed by the slave node.
index	Integer	1	attr	This attribute is used to order the elements and allows an assignment of Pids to ConfigurableFrames that are defined in the slave.

Table 3.43: LinOrderedConfigurableFrame

3.3.5.6 LIN Physical Channel

`LinPhysicalChannel` is a specialization of the `PhysicalChannel` class. It contains additional Lin-specific `PhysicalChannel` attributes.

Class	**LinPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	LIN specific attributes to the physicalChannel			
Base	ARObject, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

Attribute	*Type*	*Mul.*	*Kind*	*Note*
scheduleTable	LinScheduleTable	*	aggr	Schedule tables organize the timings of the frames for LIN. atpVariation: If the transmitted frames are variable, the corresponding ScheduleTables must be variable, too. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 3.44: LinPhysicalChannel

[constr_3015] Number of LIN channels ⌈ LIN clusters shall aggregate exactly one `LinPhysicalChannel`. ⌋*()*

3.3.6 Ethernet

The EthernetCluster represents an Ethernet network which may consist of several ECUs connected.

An essential aspect of modern Ethernet is the possibility to introduce Ethernet switches in order to partition the EthernetCluster into segments which are used for point-to-point communication between the respective partners. It is possible to define the behavior of such Ethernet switches, this is described in chapter 3.3.6.6.

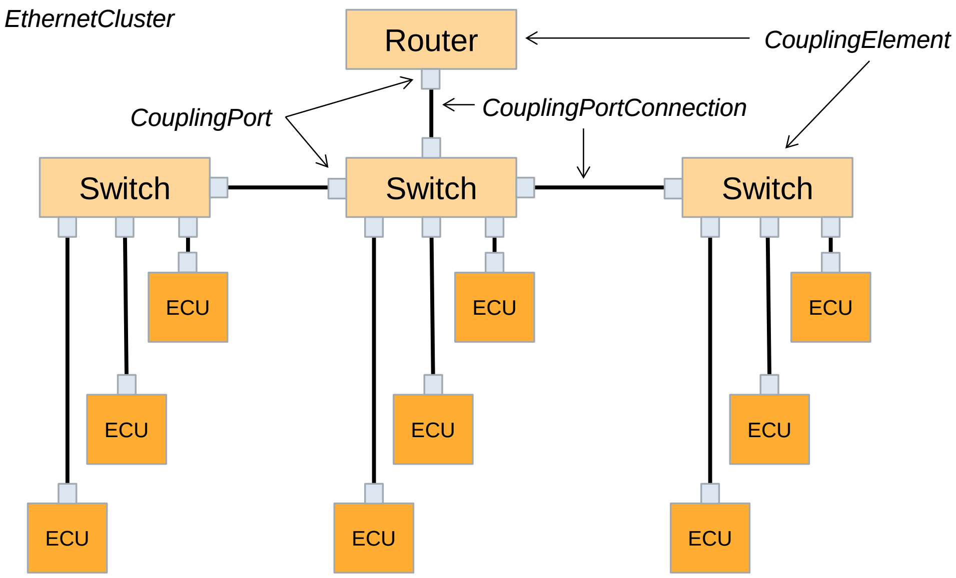


Figure 3.9: Example of an EthernetCluster

Figure 3.9 illustrates an example of an EthernetCluster. In this figure the focus is on the *Link Layer* and represents the wiring of ECUs, their communication connectors, switches, hubs, routers, and how these elements are connected electrically.

To describe the Ethernet at the data link- and physical layer the following System Template meta-model classes are used: EthernetCluster, EthernetCommunicationController, EthernetCommunicationConnector, EthernetPhysicalChannel, CouplingElement, CouplingPort and CouplingPortConnection (see Figure 3.10).

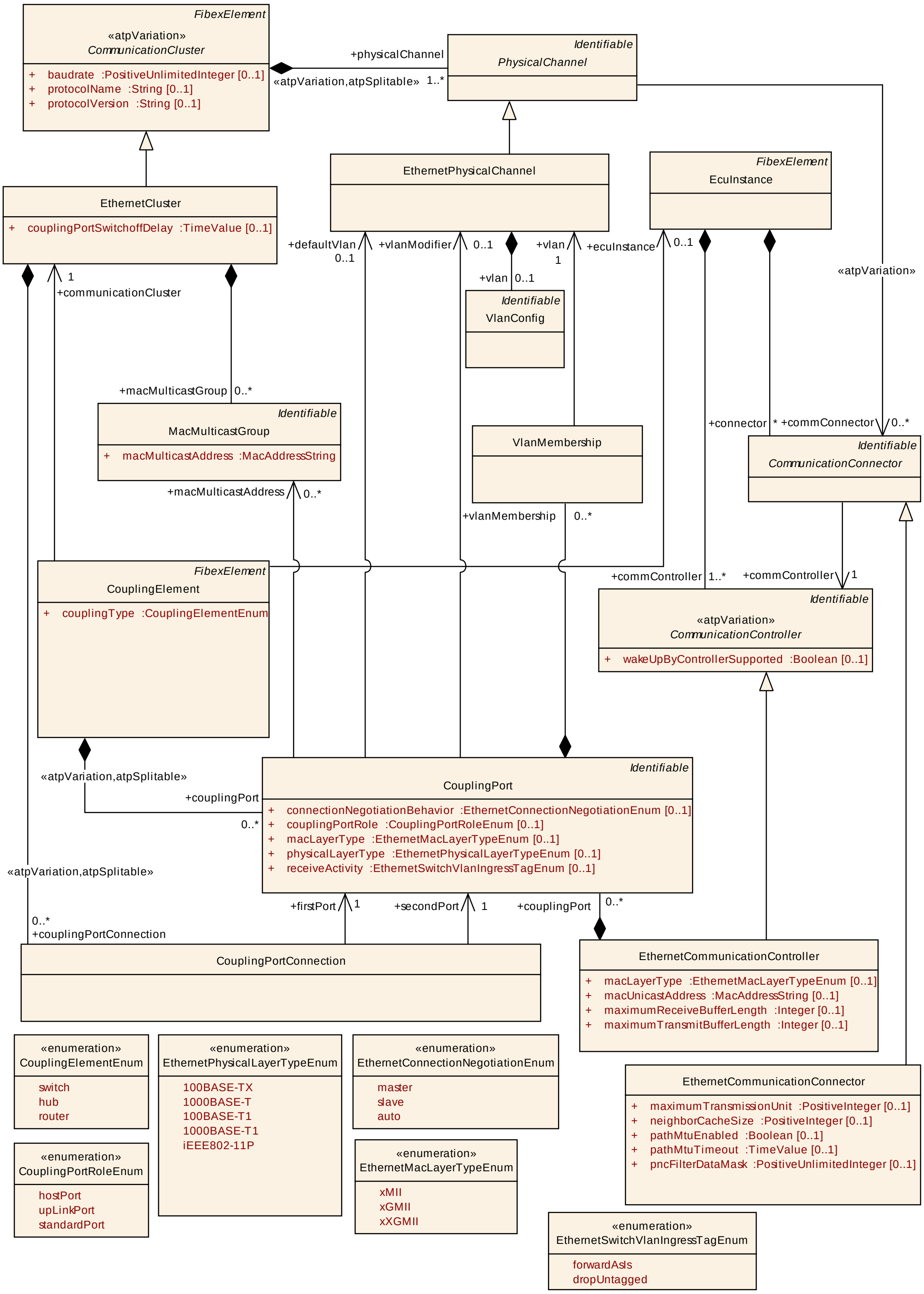


Figure 3.10: Ethernet topology elements (Fibex4Ethernet_Topology)

3.3.6.1 Ethernet Cluster

Each EthernetCluster may have globally defined MacMulticastGroups. MacMulticastGroups have a macMulticastAddress (for example 01:00:5E:7F:FF:FF). One sender can handle many receivers simultaneously, if the receivers have all the same macMulticastAddress.

[constr_3047] Uniqueness of macMulticastAddresses ⌈ A macMulticastAddress shall be unique in a particular EthernetCluster. ⌋*()*

Class	≪atpVariation≫ **EthernetCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Ethernet-specific cluster attributes. **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
couplingPortConnection	CouplingPortConnection	*	aggr	Specification of connections between CouplingElements and EcuInstances. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=couplingPortConnection, variationPoint.shortLabel vh.latestBindingTime=postBuild
couplingPortSwitchoffDelay	TimeValue	0..1	attr	Switch off delay for CouplingPorts in seconds. It denotes the delay of switching off couplingPorts after the request to switch off a couplingPort was issued. (e.g. switch off of Ethernet switch ports).
macMulticastGroup	MacMulticastGroup	*	aggr	MacMulticastGroup that is defined for the Subnet (EthernetCluster).

Table 3.45: EthernetCluster

Class	**MacMulticastGroup**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Per EthernetCluster globally defined MacMulticastGroup. One sender can handle many receivers simultaneously if the receivers have all the same macMulticastAddress. The addresses need to be unique for the particular EthernetCluster.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
macMulticastAddress	MacAddressString	1	attr	A multicast MAC address (Media Access Control address) is a identifier for a group of hosts in a network.

Table 3.46: MacMulticastGroup

3.3.6.2 Ethernet Physical Channel

The EthernetPhysicalChannel represents a VLAN. VLANs (IEEE 802.1q) divide physical Ethernet networks in logical subnets. Their realization requires switches with VLAN support. VLANs are defined on a switch on a port-by-port basis.

The term EthernetPhysicalChannel may be misleading because it actually does *not* defined the physical (electrical) attributes of the communication but the EthernetPhysicalChannel defines the VLANs as *logical* broadcast domains in which the communication partners can interact.

Regardless whether the Ethernet communication uses tagged [TPS_SYST_01095] or untagged [TPS_SYST_01096] VLANs all communication needs to be defined within respective EthernetPhysicalChannels as defined in chapter 6.1.

[TPS_SYST_01095] tagged VLANs ⌈ In the System Description a VLAN is represented by an EthernetPhysicalChannel and is identified by its vlanIdentifier. ⌋*(RS_SYST_00039)*

[TPS_SYST_01096] untagged VLANs ⌈ If the VlanConfig and the vlanIdentifier are not defined for an EthernetPhysicalChannel than the channel is called "untagged". ⌋*(RS_SYST_00039)*

Every Frame that is sent over a "tagged" VLAN is tagged with a VLAN Tag. With this tag every receiving switch has the information about the VLAN that the Frame belongs to. The VLAN Tag that is attached to a Frame contains the user priority for the Frame that is described with the defaultPriority and the vlanIdentifier.

Class	**EthernetPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	The EthernetPhysicalChannel represents a VLAN or an untagged channel. An untagged channel is modeled as an EthernetPhysicalChannel without an aggregated VLAN.			
Base	ARObject, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
networkEndpoint	NetworkEndpoint	*	aggr	Collection of NetworkEndpoints that are used in the VLan. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName
soAdConfig	SoAdConfig	0..1	aggr	SoAd Configuration for one specific Physical Channel.
vlan	VlanConfig	0..1	aggr	VLAN Configuration.

Table 3.47: EthernetPhysicalChannel

[constr_3333] Standardized values for the attribute category of meta-class EthernetPhysicalChannel ⌈ The following values of the attribute category of meta-class EthernetPhysicalChannel are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the EthernetPhysicalChannel in case of a wired ethernet connection
- WIRELESS: This represents the usage of the EthernetPhysicalChannel in case of a wireless ethernet connection

⌋()

[TPS_SYST_02159] Default value for the attribute category of meta-class EthernetPhysicalChannel ⌈ The default value for the category of an EthernetPhysicalChannel shall be *WIRED*. ⌋()

[constr_3334] Allowed references between EthernetPhysicalChannel and EthernetCommunicationConnector ⌈ An EthernetPhysicalChannel is only allowed to reference EthernetCommunicationConnectors in the role commConnector that have the same category value as the referencing EthernetPhysicalChannel. ⌋()

[constr_3365] EthernetPhysicalChannels with different category values are not allowed within an EthernetCluster ⌈ A mix of EthernetPhysicalChannels with different category values within an EthernetCluster is currently not supported by AUTOSAR. ⌋()

[constr_3336] EthernetPhysicalChannel.soAdConfig in case of WIRELESS EthernetPhysicalChannel ⌈ If EthernetPhysicalChannel has the category *WIRELESS* then the EthernetPhysicalChannel shall not aggregate the SoAdConfig. ⌋()

[TPS_SYST_01086] Number of Ethernet channels ⌈ Each EthernetCluster may aggregate up to 4096 EthernetPhysicalChannels. ⌋*(RS_SYST_00039)*

Class	**VlanConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	VLAN Configuration attributes			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
vlanIdentifier	PositiveInteger	1	attr	A VLAN is identified by this attribute according to IEEE 802.1Q. The allowed values range is from 0..4095.

Table 3.48: VlanConfig

[constr_3048] Range of vlanIdentifier ⌈ The allowed values of vlanIdentifier range from 0 to 4095. ⌋()

3.3.6.2.1 VLAN Priority

The Priority is a 3-bit field which refers to the IEEE 802.1Q priority. It indicates the frame priority level. Values are from 0 (best effort) to 7 (highest); 1 represents the lowest priority. These values can be used to prioritize different classes of traffic (voice, video, data, etc.). The priority is contained in the Ethernet Header together with the vlanIdentifier.

The defaultPriority can be overwritten on different levels:

1. NetworkEndpoint
2. ApplicationEndpoint
3. ProvidedServiceInstance or ConsumedEventGroup

If a priority on an ApplicationEndpoint is defined the priorities in the NetworkEndpoint and the defaultPriority in the VlanMembership would be ignored.

The following table shows two CouplingPorts. Both have two NetworkEndpoints and for each NetworkEndpoint two ApplicationEndpoints are defined. This means that per Port two IP Addresses and four Tcp-Ports are used. On each level a priority may be defined.

For NEP1.1 no priority is defined. This means that the Default-Priority from CouplingPort1 is valid. On CouplingPort1 all messages have the Priority 0 ("‘best effort"') except for messages that are going over ApplicationEndpoint AEP1.1.2 and AEP 1.2.2. These messages have the priority 1 (higher priority). On CouplingPort2 the priority is overwritten on several levels. Please note that AEP 2.2.1 and AEP 2.2.2 are reducing the priority that is defined on the NEP2.2.

Port (Default-Prio)	**NetworkEndpoint (e.g. IpAddress)**	**ApplicationEndpoint (e.g. Tcp Port)**
CouplingPort1: Prio.0	NEP1.1: Prio. —	AEP 1.1.1: Prio. —
		AEP 1.1.2: Prio. 1
	NEP1.2: Prio. 0	AEP 1.2.1: Prio. —
		AEP 1.2.2: Prio. 1
CouplingPort2: Prio.0	NEP2.1: Prio. 1	AEP 2.1.1: Prio. 2
		AEP 2.1.2: Prio. 3
	NEP2.2: Prio. 2	AEP 2.2.1: Prio. 1
		AEP 2.2.2: Prio. 0

Table 3.49: VLAN Priority Example

3.3.6.3 Ethernet Coupling Elements and Coupling Ports

A CouplingElement is used to connect EcuInstances via CouplingPorts to EthernetPhysicalChannels (VLANs) that are defined within an EthernetCluster.

CouplingElements can reach from a simple hub to a complex managed switch or even devices with functionalities in higher layers. A CouplingElement references the EthernetCluster and contains a collection of available CouplingPorts. The couplingType identifies the CouplingElement as a switch, hub or router.

Class	**CouplingElement**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	A CouplingElement is used to connect EcuInstances to the VLAN of an EthernetCluster. CouplingElements can reach from a simple hub to a complex managed switch or even devices with functionalities in higher layers. A CouplingElement that is not related to an EcuInstance occurs as a dedicated single device. **Tags:** atp.recommendedPackage=CouplingElements			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
communicationCluster	EthernetCluster	1	ref	This relationship defines to which cluster the CouplingElement belongs.
couplingPort	CouplingPort	*	aggr	Hardware Port of the CouplingElement that is used to connect this CouplingPort to EcuInstances or other CouplingElements. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
couplingType	CouplingElementEnum	1	attr	Describes the coupling type of this CouplingElement.
ecuInstance	EcuInstance	0..1	ref	Optional reference to the ECU where the CouplingElement is located.

Table 3.50: CouplingElement

Enumeration	**CouplingElementEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology
Note	Identifies the Coupling type.
Literal	***Description***
hub	A device that is used to connect segments of a LAN. In Hubs frames are "broadcasted" to every one of its ports. **Tags:** atp.EnumerationValue=0
router	A device that routes frames between different networks. **Tags:** atp.EnumerationValue=1
switch	A device that filters and forwards frames between different LAN segments. **Tags:** atp.EnumerationValue=2

Table 3.51: CouplingElementEnum

[constr_3062] The `EcuInstance` that is referenced from a specific `CouplingElement` shall be connected to the same `EthernetCluster` as the specific `CouplingElement` ⌈ The `EcuInstance` referenced from a specific `CouplingElement` in the role `ecuInstance` shall be connected via the `CommunicationConnector` and a `EthernetPhysicalChannel` that refers the `CommunicationConnector` to the `EthernetCluster` referenced by the specific `CouplingElement` in the role `communicationCluster`. ⌋*()*

Class	**CouplingPort**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	A CouplingPort is used to connect a CouplingElement with an EcuInstance or two CouplingElements with each other via a CouplingPortConnection. Optionally, the CouplingPort may also have a reference to a macMulticastGroup and a defaultVLAN.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
connectionNegotiationBehavior	EthernetConnectionNegotiationEnum	0..1	attr	Specifies the connection negotiation of the CouplingPort. **Tags:** atp.Status=shallBecomeMandatory
couplingPortDetails	CouplingPortDetails	0..1	aggr	Defines more details of a CouplingPort in case a more specific configuration is required.
couplingPortRole	CouplingPortRoleEnum	0..1	attr	Defines the role this CouplingPort takes in the context of the CouplingElement.

Attribute	Type	Mul.	Kind	Note
defaultVlan	EthernetPhysicalChannel	0..1	ref	The vLanIdentifier of the referenced VLAN is the Default-PVID (port VLAN ID). A Port VLAN ID is a default VLAN ID that is assigned to an access CouplingPort to designate the VLAN segment to which this port is connected. Also, if a CouplingPort has not been configured with any VLAN memberships, the virtual switch's Port VLAN ID (pvid) becomes the default VLAN ID for the ports connection. This identifier/tag is added for incoming untagged messages at the port (ingress tagging). For outgoing messages with this identifier, the tag is removed at the port (egress untagging, depending on the VlanMembership.sendActivity).
macLayerType	EthernetMacLayerTypeEnum	0..1	attr	Specifies the mac layer type of the CouplingPort.
macMulticastAddress	MacMulticastGroup	*	ref	Static MAC-Multicast-Address binding to a CouplingPort. This supports the sending of MAC-Multicast-Messages via the CouplingPort.
physicalLayerType	EthernetPhysicalLayerTypeEnum	0..1	attr	Specifies the physical layer type of the CouplingPort.
pncMapping	PncMappingIdent	*	ref	Reference to the partial networks this CouplingPort participates in.
receiveActivity	EthernetSwitchVlanIngressTagEnum	0..1	attr	Defines the handling of frames at the ingress port.
vlanMembership	VlanMembership	*	aggr	Messages of VLANs that are defined here can be communicated via the CouplingPort.
vlanModifier	EthernetPhysicalChannel	0..1	ref	All incoming messages at this CouplingPort shall be tagged with this VLAN Id. This tagging is performed regardless whether the message already has a VLAN tag or is untagged, an existing VLAN tag will be overwritten. This feature is XOR with CoupligPort.defaultVlan.

Table 3.52: CouplingPort

Enumeration	**EthernetConnectionNegotiationEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Specifies connection negotiation types of Ethernet transceiver links.
Literal	***Description***
auto	Automatic Negotiation **Tags:** atp.EnumerationValue=0
master	Master **Tags:** atp.EnumerationValue=1

slave	Slave **Tags:** atp.EnumerationValue=2

Table 3.53: EthernetConnectionNegotiationEnum

Enumeration	**EthernetMacLayerTypeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology
Note	Specifies MAC (Media Access Control) Layer types.
Literal	***Description***
xGMII	Mac layer interface (data) bandwith class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII) **Tags:** atp.EnumerationValue=1 xml.name=XG-MII
xMII	Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII) **Tags:** atp.EnumerationValue=0 xml.name=X-MII
xXGMII	Mac layer interface (data) bandwith class 10Gbit/s **Tags:** atp.EnumerationValue=2 xml.name=XXG-MII

Table 3.54: EthernetMacLayerTypeEnum

Enumeration	**EthernetPhysicalLayerTypeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology
Note	Specifies physical layer types of Ethernet transceiver links.
Literal	***Description***
_1000BASE_T	Ethernet Standard (IEEE 802.3ab) to support 1Gbit/s over 4 twisted pairs. **Tags:** atp.EnumerationValue=6 xml.name=1000BASE-T
_1000BASE_T1	Ethernet Standard (IEEE 802.3bp) to support 1Gbit/s over a single twisted pair cable. **Tags:** atp.EnumerationValue=8 xml.name=1000BASE-T1
_100BASE_T1	Ethernet Standard (IEEE 802.3bw) to support 100Mbit/s over a single twisted pair cable. 100BASE-T1 is the IEEE Standardized version of BroadRReach. **Tags:** atp.EnumerationValue=7 xml.name=100BASE-T1
_100BASE_TX	Ethernet Standard (IEEE 802.3u) to support 100Mbit/s over two twisted pairs. **Tags:** atp.EnumerationValue=5 xml.name=100BASE-TX

iEEE802_11P	Ethernet Standard (IEEE 802.11p) to support wireless communication in vehicular environments. **Tags:** atp.EnumerationValue=9 xml.name=IEEE802-11P

Table 3.55: EthernetPhysicalLayerTypeEnum

Enumeration	**EthernetSwitchVlanIngressTagEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines the possible tagging behavior at an ingress port.
Literal	***Description***
dropUntagged	Drop if untagged. **Tags:** atp.EnumerationValue=1
forwardAsIs	Forward with the same VLAN as received. Also untagged frames will be forwarded as untagged. **Tags:** atp.EnumerationValue=0

Table 3.56: EthernetSwitchVlanIngressTagEnum

Class	**VlanMembership**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Static logical channel or VLAN binding to a switch-port. The reference to an EthernetPhysicalChannel without a VLAN defined represents the handling of untagged frames.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
defaultPriority	PositiveInteger	1	attr	Standard output-priority outgoing Frames will be tagged with. This allows to assign different defaultPriorities to each VLAN. Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified.
dhcpAddressAssignment	DhcpServerConfiguration	0..1	aggr	Specifies the IP Address which will be assigned to a DHCP Client at this SwitchPort. If no dhcpAddressAssignment is provided all DHCP-Discover messages received at this Port will be discarded by the DHCP Server.
sendActivity	EthernetSwitchVlanEgressTaggingEnum	0..1	attr	Attribute denotes whether a VLAN tagged ethernet frame will be 1. sent with its VLAN tag (sentTagged) 2. sent without a VLAN tag (sentUntagged) 3. will be dropped at this port (notSent or VLAN not member of this list)

Attribute	Type	Mul.	Kind	Note
vlan	EthernetPhysicalChannel	1	ref	References a channel that represents a VLAN or an untagged channel.

Table 3.57: VlanMembership

Class	CouplingPortConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Connection between two CouplingPorts (firstPort and secondPort).			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
firstPort	CouplingPort	1	ref	Reference to the first CouplingPort that is connected via the CouplingPortConnection.
secondPort	CouplingPort	1	ref	Reference to the second CouplingPort that is connected via the CouplingPortConnection.

Table 3.58: CouplingPortConnection

CouplingPorts are hardware ports of CouplingElements and EcuInstances. Connections between CouplingPorts are realized through CouplingPortConnections.

Optionally the CouplingPort of a CouplingElement may also have one or several VlanMemberships, a defaultVlan reference and a reference to a MacMulticastGroup.

[constr_3521] defaultVlan and vlanMembership ⌈ If a CouplingPort refers to an EthernetPhysicalChannel in the role defaultVlan the CouplingPort shall also have a vlanMembership defined. This VlanMembership shall point to the same EthernetPhysicalChannel in the role vlan as the defaultVlan. ⌋*()*

[constr_3522] vlanModifier and vlanMembership ⌈ If a CouplingPort refers to an EthernetPhysicalChannel in the role vlanModifier the CouplingPort shall also have a vlanMembership defined. This VlanMembership shall point to the same EthernetPhysicalChannel in the role vlan as the vlanModifier. ⌋*()*

[constr_3133] physicalLayerType of connected CouplingPorts ⌈ The physicalLayerType of two CouplingPorts which are connected via a CouplingPortConnection shall be equal. ⌋*()*

[constr_3134] The connection of two CouplingPorts with connectionNegotiationBehavior set to master is forbidden ⌈ The connectionNegotiationBehavior of two CouplingPorts which are connected via a CouplingPortConnection shall not be both set to master. ⌋*()*

[constr_3135] The connection of two CouplingPorts with connectionNegotiationBehavior set to slave is forbidden ⌈ The connectionNegotiationBehavior of two CouplingPorts which are connected via a CouplingPortConnection shall not be both set to slave. ⌋*()*

[TPS_SYST_01097] Assignment of CouplingPorts to a VLAN ⌈ CouplingPorts of CouplingElements can be assigned to VLANs (EthernetPhysicalChannels) with the vlanMembership aggregation. ⌋*(RS_SYST_00039)*

[TPS_SYST_01098] Assignment of CouplingPorts to an "untagged" VLAN ⌈ A CouplingPort may be assigned to several VLANs, but only one of those assignments can be "untagged". ⌋*(RS_SYST_00039)*

Figure 3.11 shows a CouplingElement with two CouplingPorts.

In this example Port 0 is assigned to three VLANs and one "untagged" EthernetPhysicalChannel. VLAN3 is marked as the defaultVlan. With the combination of the defaultVlan and the VlanMembership to the "untagged" EthernetPhysicalChannel the Frames that are transmitted over Port 0 on VLAN3 are "untagged" on the wire in both directions (Tx and Rx). The switch adds the tag for incoming untagged messages at the port (ingress tagging) and for outgoing messages the tag is removed at the port (egress untagging).

Port 1 is assigned to three VLANs. But the VlanMembership to the "untagged" EthernetPhysicalChannel is not defined here. For this reason, Frames that are transmitted over Port 1 on VLAN3 are "tagged".

If a defaultVlan is defined for a CouplingPort but the defaultVlan is not referenced by the VlanMembership then "untagged" Frames can be received via the CouplingPort. But a response can not be send back.

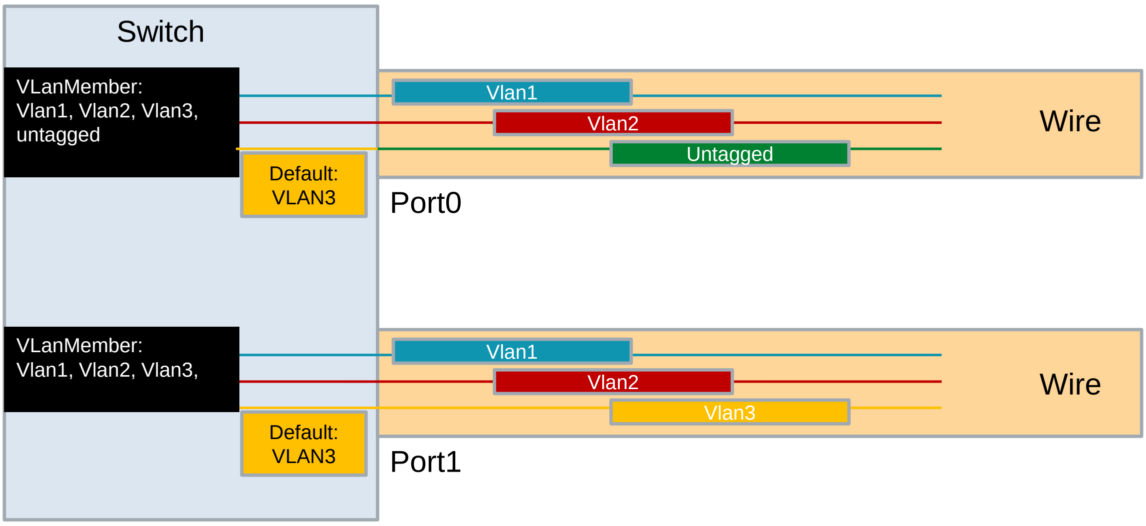


Figure 3.11: Default Vlan Example

3.3.6.4 Ethernet Communication Controller

EthernetCommunicationController is a specialization of the CommunicationController class. It contains the specific Ethernet controller attributes needed for configuring an EcuInstance connected to a certain Ethernet cluster.

Class	≪atpVariation≫ **EthernetCommunicationController**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Ethernet specific communication port attributes.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
couplingPort	CouplingPort	*	aggr	Optional CouplingPort that can be used to connect the ECU to a CouplingElement (e.g. a switch).
macLayerType	EthernetMacLayerTypeEnum	0..1	attr	Specifies the mac layer type of the ethernet controller.
macUnicastAddress	MacAddressString	0..1	attr	Media Access Control address (MAC address) that uniquely identifies each EthernetCommunicationController in the network.
maximumReceiveBufferLength	Integer	0..1	attr	Determines the maximum receive buffer length (frame length) in bytes.
maximumTransmitBufferLength	Integer	0..1	attr	Determines the maximum transmit buffer length (frame length) in bytes.

Table 3.59: EthernetCommunicationController

[constr_3332] Standardized values for the attribute `category` of meta-class `EthernetCommunicationController` ⌈ The following values of the attribute `category` of meta-class `EthernetCommunicationController` are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the `EthernetCommunicationController` in case of a wired ethernet connection
- WIRELESS: This represents the usage of the `EthernetCommunicationController` in case of a wireless ethernet connection

⌋*()*

[TPS_SYST_02158] Default value for the attribute `category` of meta-class `EthernetCommunicationController` ⌈ The default value for the `category` of an `EthernetCommunicationController` shall be *WIRED*. ⌋*()*

The `EthernetCommunicationController` has the additional information of a `macUnicastAddress`. This is a globally unique MAC-address for the `CommunicationController`.

3.3.6.5 Ethernet Communication Connector

`EthernetCommunicationConnector` adds the Ethernet specific attributes to the `CommunicationConnector`.

Class	**EthernetCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Ethernet specific attributes to the CommunicationConnector.			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
maximumTransmissionUnit	PositiveInteger	0..1	attr	This attribute specifies the maximum transmission unit in bytes.
neighborCacheSize	PositiveInteger	0..1	attr	This attribute specifies the size of neighbor cache or ARP table in units of entries.
networkEndpoint	NetworkEndpoint	*	ref	NetworkEndpoints
pathMtuEnabled	Boolean	0..1	attr	If enabled the IPv4/IPv6 processes incoming ICMP "Packet Too Big" messages and stores a MTU value for each destination address.
pathMtuTimeout	TimeValue	0..1	attr	If this value is >0 the IPv4/IPv6 will reset the MTU value stored for each destination after n seconds.
pncFilterDataMask	PositiveUnlimitedInteger	0..1	attr	Bit mask for Ethernet Payload used to configure the Ethernet Transceiver for partial network wakeup.

Table 3.60: EthernetCommunicationConnector

[TPS_SYST_02166] Derivation of UdpNmPnFilterMaskByte ⌈ The UdpNmPnFilterMaskByte should not be computed from the pncIdentifier values in order to support future introduction of additional PNCs.

Note that for one EcuInstance all contributing EthernetCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain the value of UdpNmPnFilterMaskByte. Note that this data mask is calculated over the whole payload of the NmPdu ignoring the leading bytes which do not contain pncVector information. The number of leading bytes which shall be ignored is equivalent to the value of System.pncVectorOffset. ⌋*(RS_SYST_00042)*

[constr_3331] Standardized values for the attribute category of meta-class EthernetCommunicationConnector ⌈ The following values of the attribute category of meta-class EthernetCommunicationConnector are reserved by the AUTOSAR standard:

- WIRED: This represents the usage of the EthernetCommunicationConnector in case of a wired ethernet connection
- WIRELESS: This represents the usage of the EthernetCommunicationConnector in case of a wireless ethernet connection

⌋*()*

[TPS_SYST_02157] Default value for the attribute category of meta-class EthernetCommunicationConnector ⌈The default value for the category of an EthernetCommunicationConnector shall be *WIRED*.⌋*()*

[constr_3335] Allowed references between EthernetCommunicationConnector and EthernetCommunicationController ⌈ An EthernetCommunicationConnector is only allowed to reference an EthernetCommunicationController in the role commController that has the same category value as the referencing EthernetCommunicationConnector.⌋*()*

3.3.6.6 Ethernet Switch Driver

Ethernet networks in an automotive environment consist basically of ECUs with a single port PHY and switch ECUs with several ports. Different to consumer networks, where switches are typically stand-alone devices, switches in automotive networks may be integrated and connected to a CPU via MII and other interfaces. The configuration of these switches does influence the communication behavior within the network.

3.3.6.6.1 Ethernet switch port structure

In order to describe switched Ethernet networks it is essential to describe some parts of an Ethernet switch. Examples are scheduling and forwarding mechanisms within a switch as well as the switch structure within its ports.

As shown in figure 3.12, the switch consists of a certain number of ports. Each port has its own set of egress FIFOs in which the incoming packets are buffered. How the messages in the FIFOs will be forwarded depends mainly on the shaping and port scheduling mechanisms. Thus, the parametrization of the egress port influences the latency of messages within the network.

Please note that the egress port structures in figure 3.12 are meant as an example. Other structures with different FIFO numbers are possible as well.

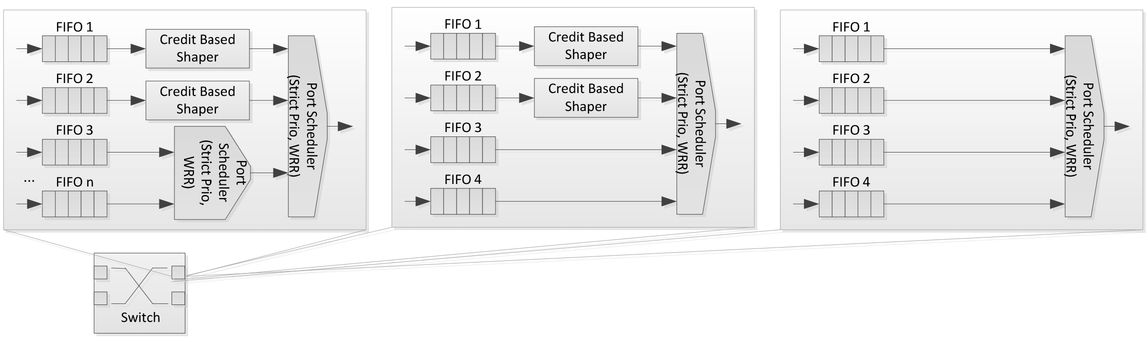


Figure 3.12: Example egress switch port configurations

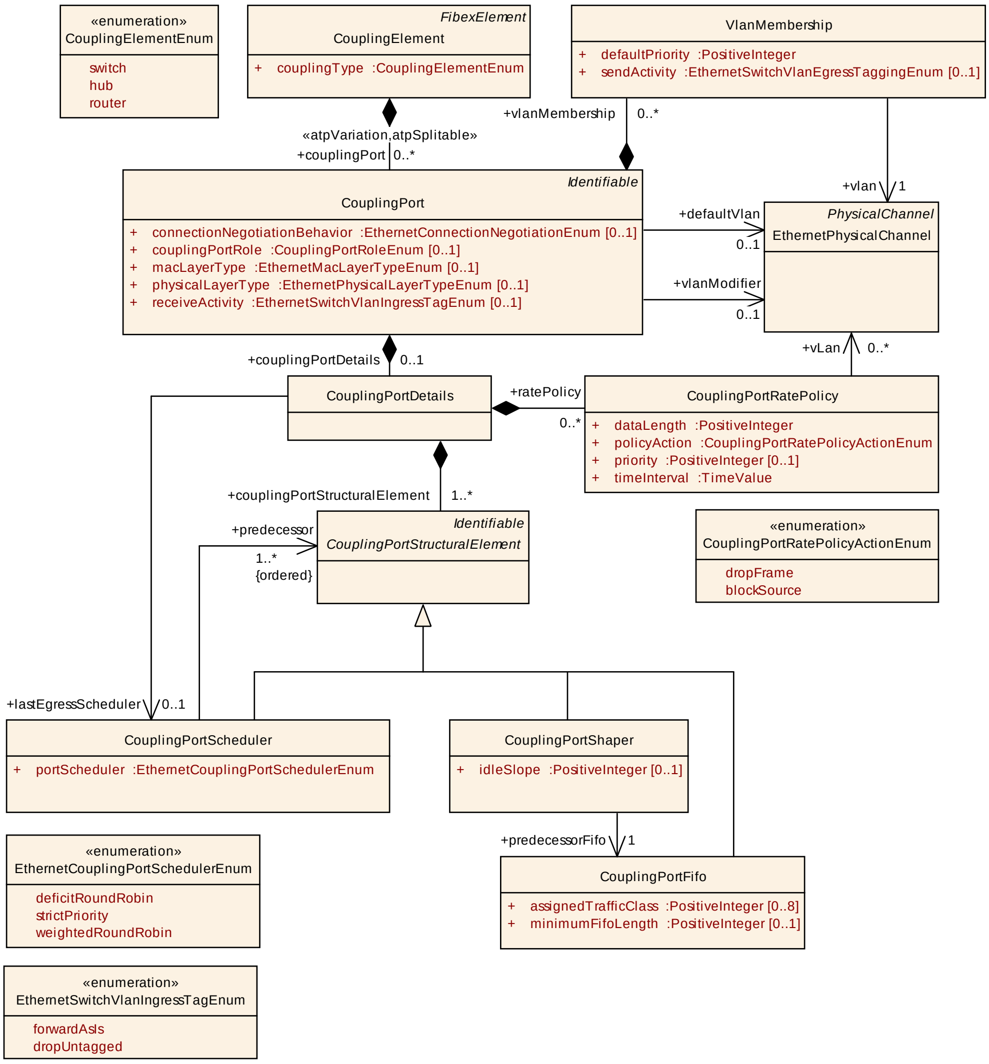


Figure 3.13: Egress switch port structure

The structural description of an Ethernet switch is based on the already existing CouplingElement in the System Template. Each CouplingElement can already have a set of CouplingPorts.

In case a detailed Switch configuration is required, there is the configuration option to add to the CouplingPort a CouplingPortDetails element which encapsulates the structural description of one switch port.

The elements which one switch port consists of are (egress side):

- CouplingPortFifo
- CouplingPortShaper
- CouplingPortScheduler

The model allows to collect the egress parts of one switch port in the CouplingPortDetails.couplingPortStructuralElements.

[TPS_SYST_03006] Ethernet switch egress port setup ⌈ Two setups can be defined at an egress port of a switch:

- The switch port has only one Fifo:
  - the CouplingPortFifo element is aggregated at the CouplingPortDetails.couplingPortStructuralElements
  - no CouplingPortDetails.lastEgressScheduler is defined.
- The switch port has at least one scheduler
  - the various switch port elements are all aggregated at the CouplingPortDetails.couplingPortStructuralElements
  - the CouplingPortScheduler which is the last scheduler in a chain of structural elements is additionally referenced in the role CouplingPortDetails.lastEgressScheduler

⌋ *(RS_SYST_00052)*

The modeling approach is based on a predecessor chain model where the chain is started by the last scheduler in the switch port and defines where the input to this scheduler comes from. The input to a scheduler can come from several predecessor elements which might be

- another CouplingPortScheduler
- a CouplingPortShaper
- a CouplingPortFifo.

[TPS_SYST_03007] Ethernet port scheduler algorithm ⌈ The scheduler performs a prioritization of the incoming frames based on the algorithm defined in the CouplingPortScheduler.portScheduler. ⌋ *(RS_SYST_00052)*

[TPS_SYST_03008] Ethernet port scheduler priority ⌈ The first element in CouplingPortScheduler.predecessor has the highest priority.Therefore, it is important to have the predecessor definition of the scheduler ordered. ⌋ *(RS_SYST_00052)*

Another restriction is that a CouplingPortShaper can only have a CouplingPortFifo as predecessorFifo, which is given by the model.

[TPS_SYST_03009] Ethernet port shaper idleSlope ⌈ The idleSlope is defined in the IEEE802.1Qav standard as a parameter for an increase of credit in bits per second. The idleSlope can never exceed the maximal transmit rate of a port, e.g. 100MBits for BroadR-Reach and 1GBits for RTPGE. The idleSlope determines the maximum fraction of the port transmit rate that is available for the queue associated with the shaper: bandwidthFraction = idleSlope/portTransmitRate. ⌋ *(RS_SYST_00052)*

Class	CouplingPortDetails			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines details of a CouplingPort. May be used to configure the structures of a switch.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
couplingPortStructuralElement	CouplingPortStructuralElement	1..*	aggr	Collects all the structural parts at which a CouplingPort may be configurable.
ethernetPriorityRegeneration	EthernetPriorityRegeneration	0..8	aggr	Defines a priority regeneration where the ingress priority is replaced by regenerated priority.
ethernetTrafficClassAssignment	CouplingPortTrafficClassAssignment	0..8	aggr	Defines the ingress port to EthernetTrafficClass assignment.
globalTimeProps	GlobalTimeCouplingPortProps	0..1	aggr	Specifies properties for the usage of the CouplingPort in the scope of Global Time Sync.
lastEgressScheduler	CouplingPortScheduler	0..1	ref	Defines which CouplingPortScheduler is the last in the egress port structure.
ratePolicy	CouplingPortRatePolicy	*	aggr	Rate policies to be applied for this CouplingPort.

Table 3.61: CouplingPortDetails

Class	CouplingPortStructuralElement (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	General class to define structural elements a CouplingPort may consist of.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 3.62: CouplingPortStructuralElement

Class	CouplingPortScheduler			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines a scheduler for the CouplingPort egress structure.			
Base	ARObject, CouplingPortStructuralElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
portScheduler	EthernetCouplingPortSchedulerEnum	1	attr	Defines the schedule algorithm to be used.
predecessor (ordered)	CouplingPortStructuralElement	1..*	ref	Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.

Table 3.63: CouplingPortScheduler

Enumeration	EthernetCouplingPortSchedulerEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines the schedule algorithm to be used.
Literal	Description
deficitRoundRobin	Schedule algorithm "deficit round robin" **Tags:** atp.EnumerationValue=0
strictPriority	Schedule algorithm "strict priority" **Tags:** atp.EnumerationValue=1
weightedRoundRobin	Schedule algorithm "weighted round robin" **Tags:** atp.EnumerationValue=2

Table 3.64: EthernetCouplingPortSchedulerEnum

Class	CouplingPortShaper			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines a shaper for the CouplingPort egress structure.			
Base	ARObject, CouplingPortStructuralElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
idleSlope	PositiveInteger	0..1	attr	Defines the increase of credit in bits per second for the AVB shaper.
predecessorFifo	CouplingPortFifo	1	ref	Defines the CouplingPortFifo which provides the input to this shaper.

Table 3.65: CouplingPortShaper

Class	**CouplingPortFifo**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines a Fifo for the CouplingPort egress structure.			
Base	ARObject, CouplingPortStructuralElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
assignedTrafficClass	PositiveInteger	0..8	attr	Defines a set of Traffic Classes which shall be handled by this Fifo. range: 0-7
minimumFifoLength	PositiveInteger	0..1	attr	FIFO minimum length in Byte. An actual configuration/hardware may use a bigger value.

Table 3.66: CouplingPortFifo

3.3.6.6.2 Ethernet switch rate policy

A `CouplingPort` may define a `CouplingPortRatePolicy` via the `CouplingPortDetails.ratePolicy`.

Class	**CouplingPortRatePolicy**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines a rate policy on a CouplingPort.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataLength	PositiveInteger	1	attr	Amount of data in bytes (excluding header information) that can be received to define the rate policy.
policyAction	CouplingPortRatePolicyActionEnum	1	attr	Defines the action to be performed when this rate policy is violated.
priority	PositiveInteger	0..1	attr	Defines the priority which this rate policy shall be limited on. If no priority is given this rate policy is not considering priority.
timeInterval	TimeValue	1	attr	Time interval used to define the base of the rate policy.
vLan	EthernetPhysicalChannel	*	ref	Defines the VLANs this rate policy shall be limited on. If no VLAN is given this rate policy is not considering VLAN tags.

Table 3.67: CouplingPortRatePolicy

Enumeration	**CouplingPortRatePolicyActionEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology
Note	Defines the action to be performed when a rate policy is violated.
Literal	***Description***

blockSource	If the rate policy is violated the CouplingPort this CouplingPortRatePolicy is defined on shall block all frames from the MAC-Address the violation was caused by. **Tags:** atp.EnumerationValue=1
dropFrame	If the rate policy is violated the frame shall be dropped. **Tags:** atp.EnumerationValue=0

Table 3.68: CouplingPortRatePolicyActionEnum

3.3.6.6.3 Ethernet packet forwarding

Besides the modeling of egress ports, it is necessary to specify how incoming packets are forwarded to the egress ports. For this purpose, different assignment policies of packets to egress port FIFOs are implemented in switches.

As an example, the Ethernet priority field can be evaluated and remapped into an regenerated priority: Within the VLAN-tag, the PCP-field (priority code point) is a parameter which can be modified at an ingress port of an Ethernet switch. For this purpose a priority regeneration table can be defined.

The CouplingPortDetails.ethernetPriorityRegeneration is optional in case the feature of priority regeneration is not be used.

[TPS_SYST_03003] Ethernet priority regeneration ⌈ The CouplingPortDetails.ethernetPriorityRegeneration specifies which ingressPriority is mapped to which regeneratedPriority. ⌋*(RS_SYST_00052)*

[constr_3515] Fully filled EthernetPriorityRegeneration table ⌈ In case the CouplingPortDetails.ethernetPriorityRegeneration is defined it shall contain exactly 8 elements of EthernetPriorityRegeneration, one for each value of ingressPriority (0-7). ⌋*()*

The (potentially remapped) Ethernet priority field can be evaluated and mapped to a traffic class. Such a traffic class is again mapped to an egress FIFO. Other header information of the Ethernet frame can be also used for the assignment of Ethernet frames to egress FIFOs. For the mapping to a certain traffic class, the following tables are necessary.

PORT-based Mapping	Traffic Class
Port2, Port3, Port4	7
Port1	6
–	5
–	4
–	3
–	2
–	1
–	0

Table 3.69: Port to Traffic Class mapping

PCP-based Mapping	Traffic Class
Prio 0	7
Prio 1	6
Prio 2-7	5
–	4
–	3
–	2
–	1
–	0

Table 3.70: PCP-field to Traffic Class mapping

While the first table shows the mapping of ingress-ports to traffic classes, the second table shows the priority-based mapping which can be defined per ingress port. Both tables are in conflict with each other, i.e. it has to be decided which mapping is applied.

Also the mapping of a traffic class to a FIFO shall be done on a per port basis. An example is shown in the following table.

Traffic Class	FIFO (if 4 FIFOs available)
7	3
6	2
0-5	1
–	0

Table 3.71: Traffic Class to FIFO mapping

In order to model the relationship between the ingress port and the egress port, the `CouplingPortTrafficClassAssignment` elements are used.

[TPS_SYST_03010] Ethernet switch packet to traffic class assignment ⌈ First the ingress packets are assigned to traffic classes. The two use-cases from above are both supported by this model:

- Port to traffic class mapping (only one traffic class per port possible) from table 3.69
  - `CouplingPortDetails` has exactly one `ethernetTrafficClassAssignment` defined
  - the `CouplingPortTrafficClassAssignment` has no `priority` defined
- PCP-field to Traffic Class Mapping from table 3.70
  - for each traffic class the `CouplingPortDetails` aggregate one `ethernetTrafficClassAssignment`
  - each `CouplingPortTrafficClassAssignment` element has a set of `priority`s defined which shall be mapped to the given `trafficClass`

⌋*(RS_SYST_00052)*

[TPS_SYST_03011] Ethernet switch traffic class to FIFO assignment ⌈ Second, the traffic classes are assigned to the switch egress FIFOs. The `CouplingPortFifo` has a set of `assignedTrafficClass` elements. These defined traffic classes shall be forwarded to this FIFO. ⌋*(RS_SYST_00052)*

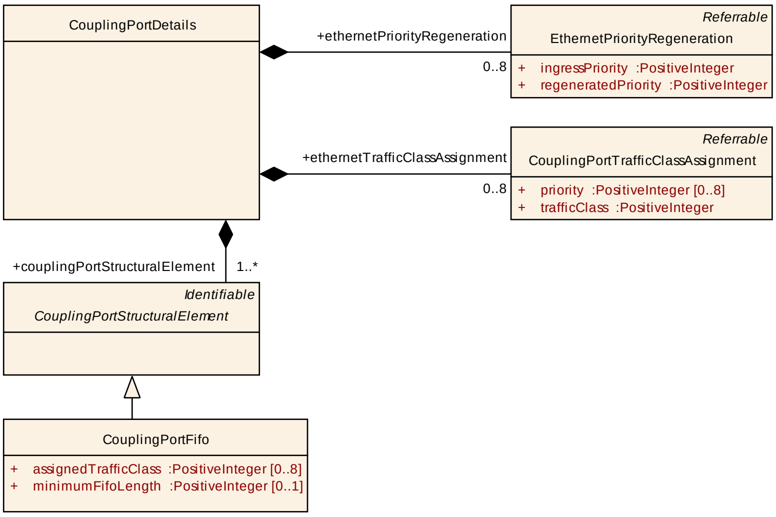


Figure 3.14: Ethernet Priority Regeneration and Ethernet Traffic Class Assignment

Class	**EthernetPriorityRegeneration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines a priority regeneration where the ingressPriority is replaced by regeneratedPriority. The ethernetPriorityRegeneration is optional in case no priority regeneration shall be performed. In case a ethernetPriorityRegeneration is defined it shall have 8 mappings, one for each priority.			
Base	ARObject, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
ingressPriority	PositiveInteger	1	attr	Message priority of the incoming message. range: 0-7
regeneratedPriority	PositiveInteger	1	attr	Regenerated message priority. range: 0-7

Table 3.72: EthernetPriorityRegeneration

Class	**CouplingPortTrafficClassAssignment**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines the assignment of Traffic Class to a frame. Two use-cases are supported: 1. Only one ethernetTrafficClassAssignment is defined and NO priority is given: • – > all frames on this ingress port get assigned the trafficClass. 2. for each ethernetTrafficClass WITH a priority the frames which are coming in with this priority get assigned the trafficClass. Constraint: 1 and 2 can not be combined for one CouplingPortDetails.			
Base	ARObject, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
priority	PositiveInteger	0..8	attr	Defines a priority which is mapped onto a Traffic Class.
trafficClass	PositiveInteger	1	attr	Defines the Traffic Class which is assigned. range: 0-7

Table 3.73: CouplingPortTrafficClassAssignment

3.3.6.6.4 Ethernet VLAN Configuration

For each VLAN identifier a table is necessary which stores at which egress port the corresponding VLAN is tagged or untagged. For an 8-port switch, this table could look like the following example where T stands for tagging and U for untagging:

	Port number							
VLAN-Id	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	T	T	-	U	-	-	-	T
2	T	U	-	T	-	-	-	T
...								
4094								

Table 3.74: VLAN Forwarding table

Incoming packets which contain a VLAN-ID of e.g. 1 can be forwarded to the ports 1, 2, 4, and 8. At ports 1, 2, and 8 these packets will be transmitted with the VLAN tag and at port 4 the tag will be removed. If a broadcast message with e.g. VLAN-ID 2 will be received at port 2 it will be forwarded to port 1, 4, and 8. The other ports 3, 5, 6, and 7 are not in the same VLAN. Thus, the packet will not be forwarded to these egress ports. The table considers only messages which contain a VLAN-ID within the switch.

`CouplingPort.vlanMembership` defines specific attributes to the behavior a packet with a specific VLAN-ID shall have on this `CouplingPort`.

[TPS_SYST_03004] VLAN specific sending behavior ⌈ The VlanMembership.sendActivity defines for a CouplingPort and VLAN the sending behavior:

- sentTagged: packet is sent at this CouplingPort with the defined VLAN-ID
- sentUntagged: packet is sent at this CouplingPort but the VLAN-ID is removed before sending
- notSent: packet is not sent at this CouplingPort

⌋*(RS_SYST_00052)*

Another table specifies a port-based modification of the VLAN-ID or an insertion of the VLAN-ID into the Ethernet message:

Port number	1	2	3	4	5	6	7	8
VLAN-Id	2	-	-	6	-	-	-	-

Table 3.75: Ingress VLAN Modification/Insertion Table

In this example, all incoming messages at port one will get the VLAN-Id 2 no matter whether they already had one before. At port 4, all incoming messages will get a 6 as their VLAN-Id. At the remaining ports, no VLAN-Ids will be inserted and an existing VLAN-Id in the Ethernet-message will remain without modification.

[TPS_SYST_03005] VLAN re-tagging ⌈ All incoming messages at a CouplingPort where the CouplingPort.vlanModifier is defined shall be tagged with the VLAN-Id defined in CouplingPort.vlanModifier. This tagging is performed regardless whether the message already has a VLAN tag or is untagged, an existing VLAN tag shall be overwritten. ⌋*(RS_SYST_00052)*

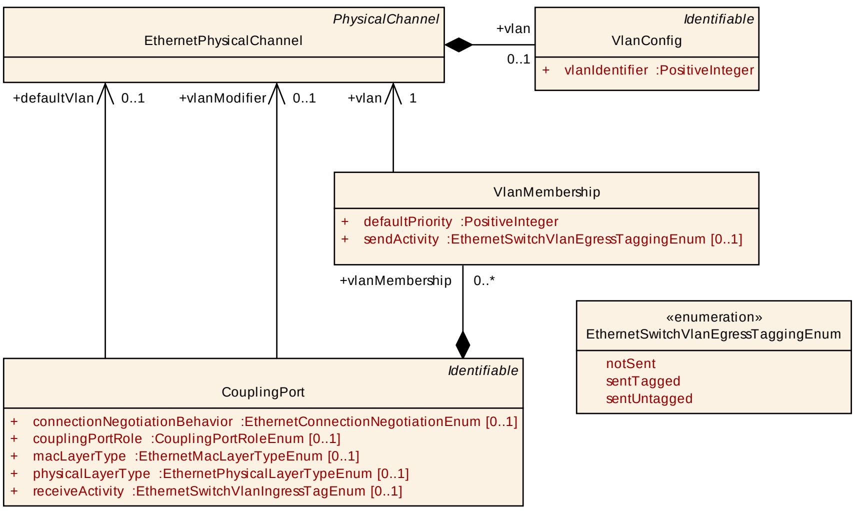


Figure 3.15: VLAN Modification

Enumeration	**EthernetSwitchVlanEgressTaggingEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology

Note	Defines the VLAN tag sending behavior.
Literal	***Description***
notSent	will not be sent **Tags:** atp.EnumerationValue=0
sentTagged	sent with its VLAN tag **Tags:** atp.EnumerationValue=1
sentUn-tagged	sent without a VLAN tag **Tags:** atp.EnumerationValue=2

Table 3.76: EthernetSwitchVlanEgressTaggingEnum

3.3.6.6.5 Semi-static DHCP server configuration

The ECU which manages the Ethernet switch may run a semi-static DHCP server.

[TPS_SYST_03013] Semi-static DHCP server configuration ⌈ In order to be able to assign always the same IP-address to a dedicated DHCP client, the DHCP server needs the information at which switch port the DHCP request with the specific MAC address has been received. With this switch port information the DHCP server will assign the IP-address according to the `VlanMembership`.`dhcpAddressAssignment`.

This allows the assignment of MAC addresses by the Tier 1 and assignment of IP addresses by the OEM. With this mechanism it is also possible to assign different IP addresses to several VLANs at the same port. ⌋*(RS_SYST_00052)*

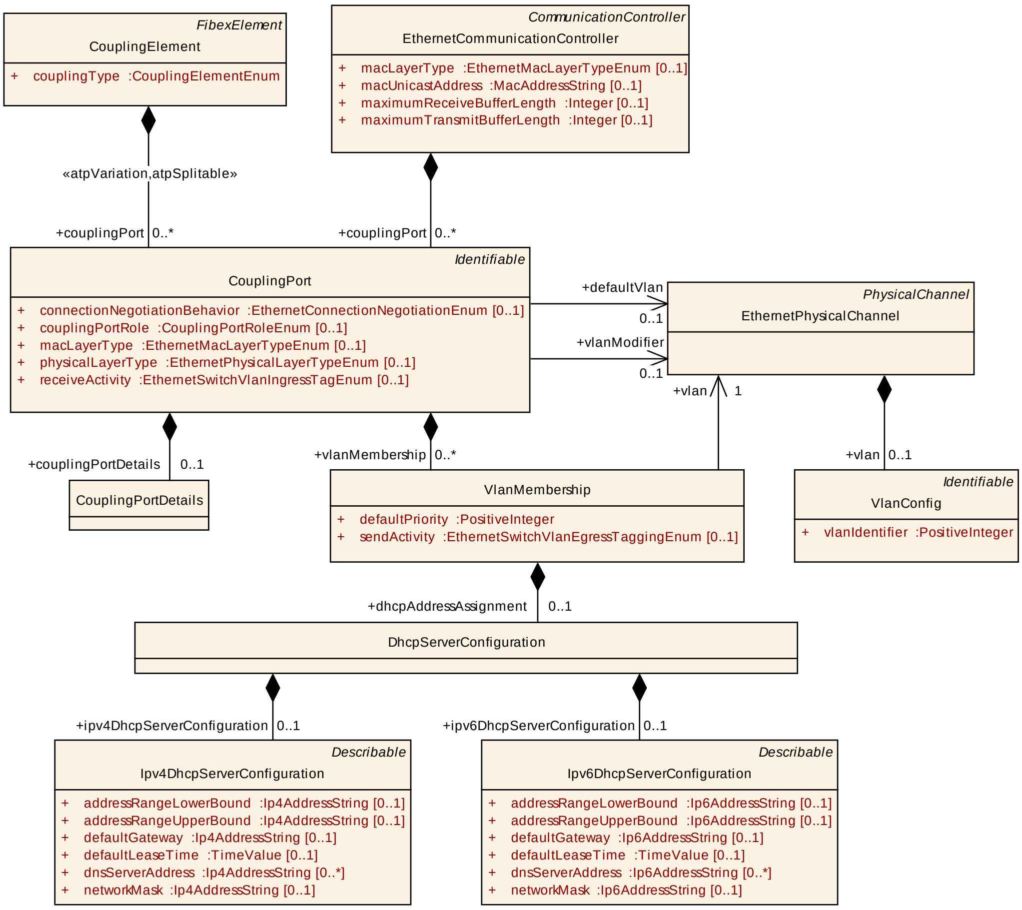


Figure 3.16: Semi-static DHCP configuration

3.3.7 CDD

The System Template allows the integration of custom bus systems on the topology level.

[TPS_SYST_01127] CDD Topology support ⌈ The elements UserDefinedCluster, UserDefinedPhysicalChannel, UserDefinedCommunicationConnector and UserDefinedCommunicationController can be used to describe alternative communication technologies (e.g. I2C, USB, serial line) that are integrated in AUTOSAR as Complex Drivers. ⌋*(RS_SYST_00044)*

The Pdu-based communication via Complex Drivers is described in chapter 6.11.

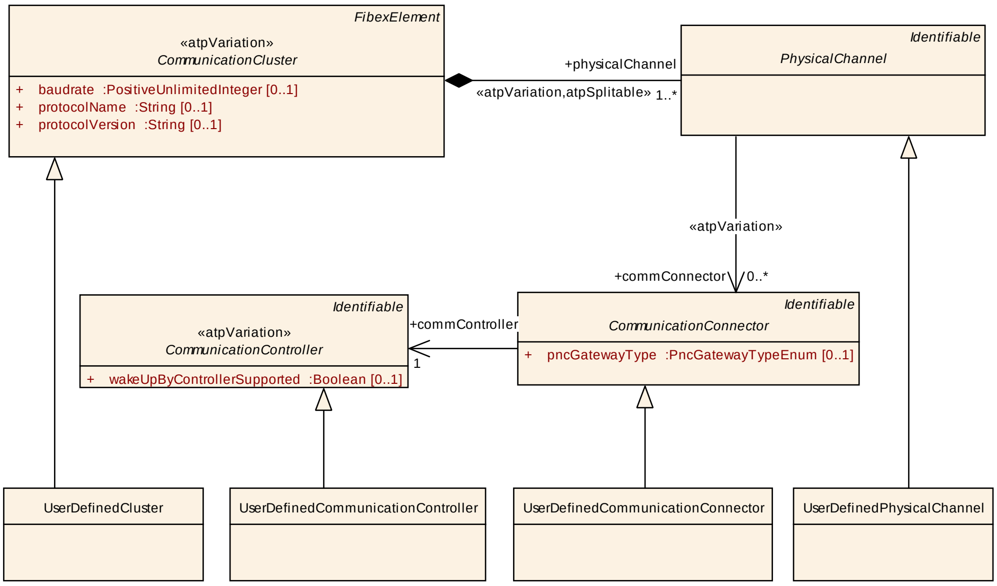


Figure 3.17: User defined topology elements

Class	≪atpVariation≫ **UserDefinedCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::CddSupport			
Note	This element allows the modeling of arbitrary Communication Clusters (e.g. bus systems that are not supported by AUTOSAR). **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.77: UserDefinedCluster

Class	**UserDefinedPhysicalChannel**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::CddSupport			
Note	This element allows the modeling of arbitrary Physical Channels.			
Base	ARObject, Identifiable, MultilanguageReferrable, PhysicalChannel, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.78: UserDefinedPhysicalChannel

Class	**UserDefinedCommunicationConnector**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::CddSupport			
Note	This element allows the modeling of arbitrary Communication Connectors.			
Base	ARObject, CommunicationConnector, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.79: UserDefinedCommunicationConnector

Class	≪atpVariation≫ **UserDefinedCommunicationController**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::CddSupport			
Note	This element allows the modeling of arbitrary Communication Controllers.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 3.80: UserDefinedCommunicationController

3.4 Mapping of Topology Entities onto Hardware Elements

As explained in the previous sections, the System Template contains all classes necessary to describe the physical topology in an AUTOSAR system. Based on this description, the communication matrix can be realized as explained in chapter 6.

[TPS_SYST_01019] Mapping of topology elements to elements of the ECU Resource Template ⌈ It is possible to map the hardware related topology elements onto their counterpart definitions in the ECU Resource Template (Figure 3.18). ⌋ *(RS_SYST_00006)*

It can be specified which `HwElement` is realizing each given `EcuInstance`, providing the means for algorithms to map software components onto the systems `EcuInstance`. By specifying which `hwCommunicationPort`[1] on a `hwCommunicationController`[2] implements the topology's `CommunicationConnector` on a `Com-`

[1] `HwPinGroup` which is of category Communication Port
[2] `HwElement` which is of category Communication Controller

municationController, the hardware-oriented parameters in the Communication-drivers may be derived in ECU configuration phase.

Please note that this is a rather specific type of mapping, optionally binding ECU-local topology elements to specific hardware resources. It should not be confused with the System Mapping part of the System Description, where system-wide mapping decisions are described, like e.g. the the mapping of Software Components onto ECUs or the mapping of Data Element Prototypes onto System Signals (for the System Mapping, see chapter 5).

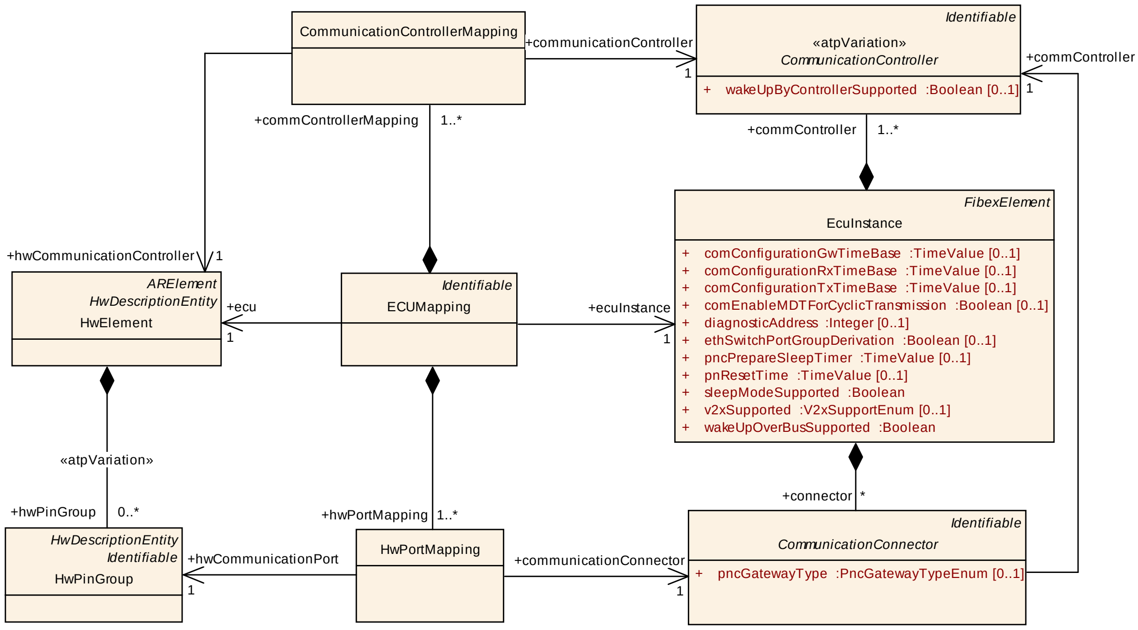


Figure 3.18: Mapping of topology description elements in the System Template onto hardware elements defined in the ECU Resource Template (ECUResourceMapping)

[constr_3006] valid EcuMapping ⌈ The referenced hwCommunicationController and hwCommunicationPort shall be part of the referenced ecu.

ECUMapping.ecu.nestedElement contains ECUMapping.commControllerMapping.hwCommunicationController

ECUMapping.ecu.nestedElement contains ECUMapping.hwPortMapping.hwCommunicationPort ⌋*()*

3.4.1 ECU Mapping

ECUMapping allows to assign a HwElement to an EcuInstance used in a physical topology.

[TPS_SYST_01013] EcuInstance stands for its own ⌈ An EcuInstance can be defined in a stand alone and reusable way without a need to have an ECUMapping. ⌋ *(RS_SYST_00013)*

[constr_3030] valid relationship between ECUMapping and EcuInstance ⌈ If an EcuInstance is assigned to a HwElement the EcuInstance shall belong to the same System as the ECUMapping. ⌋*()*

[constr_3248] Category of HwElement for ECUMapping ⌈ The HwElement which is referenced from ECUMapping in the role ecu shall be of category MicroController ⌋*()*

There exists an inconsistency between the System Template and the ECU Resource Template concerning the usage of the term "Ecu". In the System Template "Ecu" is used to determine one instance of an AUTOSAR Stack (e.g. like in EcuInstance). In the Ecu Resource Template "Ecu" is used to describe the physical box (HwElement of category Ecu) containing the electronics which may contain several processing units with several AUTOSAR Stack instances running.

Class	**ECUMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
Note	ECUMapping allows to assign an ECU hardware type (defined in the ECU Resource Template) to an ECUInstance used in a physical topology.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
commControllerMapping	CommunicationControllerMapping	1..*	aggr	The ECUMapping contains the mapping of all CommunicationControllers of the ECU.
ecu	HwElement	1	ref	Reference to a HwElement of category ECU in the ECU Resource Template.
ecuInstance	EcuInstance	1	ref	Reference to the EcuInstance in the System Template
hwPortMapping	HwPortMapping	1..*	aggr	The ECUMapping contains the mapping of all HW Communication Ports of the ECU.

Table 3.81: ECUMapping

3.4.2 Communication Controller Mapping

[TPS_SYST_01014] Semantics of CommunicationControllerMapping ⌈ CommunicationControllerMapping specifies the HwElement to realize the specified CommunicationController in a physical topology. The information may e.g. be used during ECU configuration for configuring the hardware related parameters in the communication drivers. ⌋*(RS_SYST_00013)*

Class	**CommunicationControllerMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
Note	CommunicationControllerMapping specifies the CommunicationPeripheral hardware (defined in the ECU Resource Template) to realize the specified CommunicationController in a physical topology.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationController	CommunicationController	1	ref	Reference to the CommunicationController in the System Template
hwCommunicationController	HwElement	1	ref	Reference to a HwElement of category CommunicationController in the ECU Resource Template.

Table 3.82: CommunicationControllerMapping

3.4.3 HW-Port Mapping

[TPS_SYST_01015] Semantics of `HwPortMapping` ⌈ `HwPortMapping` specifies the hardware to realize the specified `CommunicationConnector` in a physical topology. The information may e.g. be used during ECU configuration for configuring the hardware related parameters in the communication drivers. ⌋*(RS_SYST_00013)*

Class	**HwPortMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
Note	HWPortMapping specifies the hwCommunicationPort (defined in the ECU Resource Template) to realize the specified CommunicationConnector in a physical topology.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationConnector	CommunicationConnector	1	ref	Reference to the CommunicationConnector in the System Template
hwCommunicationPort	HwPinGroup	1	ref	Reference to the HwPinPortGroup of category CommunicationPort. The connection to the HwCommunicationController is described in the Ecu Resource Description.

Table 3.83: HwPortMapping

4 Top-level Software Composition

One of the most important inputs for the System Generator is the knowledge about the Application Software Components, their communication capabilities and the connections between them: Each SystemSignal (chapter 6.2) that is going to be exchanged between mapped Software Components onto different ECUs is a consequence of a connection between such application Software Components.

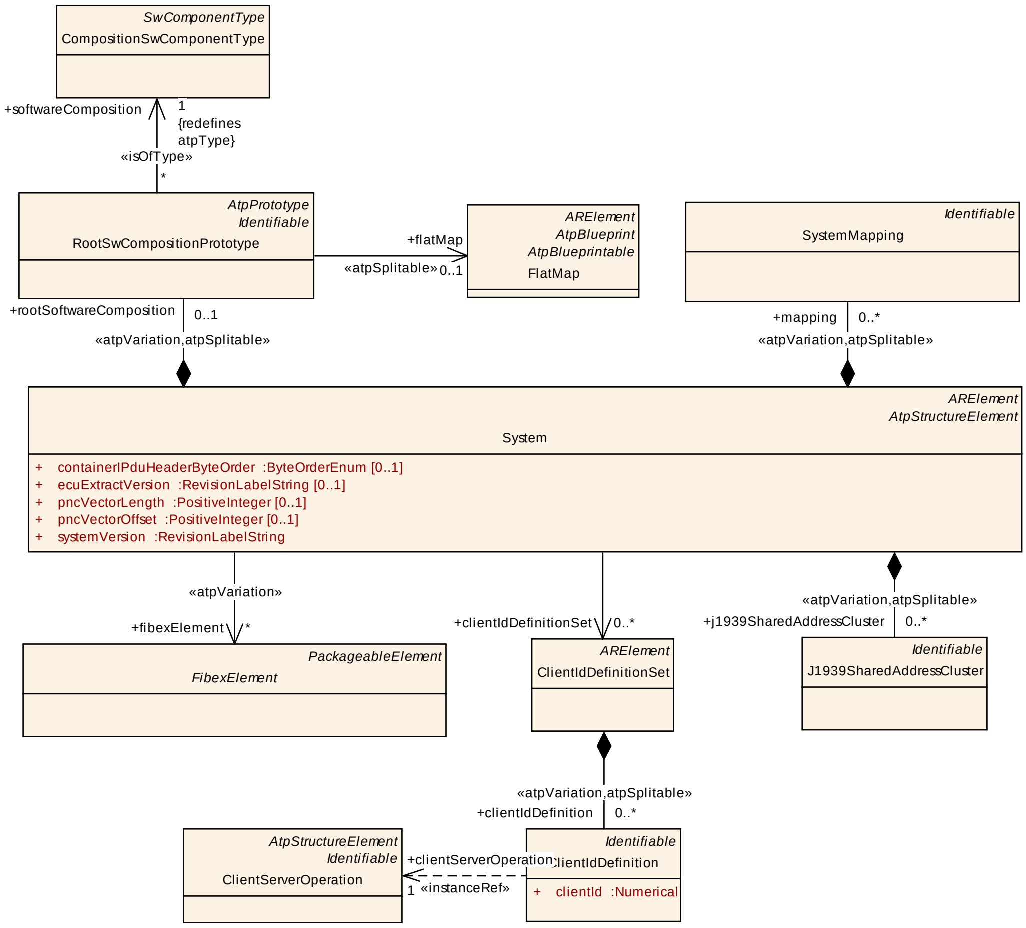


Figure 4.1: Inclusion of a (top-level) Software Composition into an AUTOSAR system (SystemTemplate)

In AUTOSAR, Software Components can either be atomic (AtomicSwComponentType) or may consist of a composition of other Software Components CompositionSwComponentType [5]. In order to assemble non-trivial applications from AUTOSAR components, such compositions can be built up hierarchically, until the outermost CompositionSwComponentType forms a kind of top-level composition.

[constr_3031] Complete System Description does not have ports on the outermost composition ⌈ In a complete System with category ABSTRACT_SYSTEM_DESCRIPTION or System with category SYSTEM_DESCRIPTION this outermost CompositionSwComponentType has the unique feature that it doesn't have any outside ports, but all the SWC contained in it are connected to each other and fully specified by their SwComponentTypes, PortPrototypes, PortInterfaces, VariableDataPrototypes, InternalBehavior etc. ⌋()

[TPS_SYST_01016] System Extract, Ecu System Description and Ecu Extract may have ports ⌈ In a System with category SYSTEM_EXTRACT and a System with category ECU_SYSTEM_DESCRIPTION and a System with category ECU_EXTRACT outside ports for the outermost composition are allowed. ⌋ *(RS_SYST_00027)*

Since the System/Ecu Extract represents the view on one Ecu, there may be the need to define the communication of this extract with the outside world.

Two approaches are available how the external communication of an ECU in the System Extract is described. In section 11.2 the communication mapping is performed in the hierarchical structure of software components. In section 11.3 external communication delegation ports are added to the System extract outermost composition. Each delegated port is connected via a DelegationSwConnector with ports of the included components that are used for the external communication.

A System considers such a top-level CompositionSwComponentType as its application software system input by owning exactly one RootSwCompositionPrototype class, which points to the CompositionSwComponentType forming the input via its ≪isOfType≫ relationship as shown in Figure 4.1.

[TPS_SYST_01017] The role of the top-level software composition ⌈ An AUTOSAR System uses the specialized prototype class RootSwCompositionPrototype in order to designate the referenced CompositionSwComponentType as the top-level software composition. ⌋ *(RS_SYST_00006)*

Class	**RootSwCompositionPrototype**			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	The RootSwCompositionPrototype represents the top-level-composition of software components within a given System. According to the use case of the System, this may for example be the a more or less complete VFB description, the software of a System Extract or the software of a flat ECU Extract with only atomic SWCs. Therefore the RootSwComposition will only occasionally contain all atomic software components that are used in a complete VFB System. The OEM is primarily interested in the required functionality and the interfaces defining the integration of the Software Component into the System. The internal structure of such a component contains often substantial intellectual property of a supplier. Therefore a top-level software composition will often contain empty compositions which represent subsystems. The contained SwComponentPrototypes are fully specified by their SwComponentTypes (including PortPrototypes, PortInterfaces, VariableDataPrototypes, SwcInternalBehavior etc.), and their ports are interconnected using SwConnectorPrototypes.			
Base	ARObject, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	Type	Mul.	Kind	Note
calibrationParameterValueSet	CalibrationParameterValueSet	*	ref	Used CalibrationParameterValueSet for instance specific initialization of calibration parameters. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=calibrationParameterValueSet
flatMap	FlatMap	0..1	ref	The FlatMap used in the scope of this RootSwCompositionPrototype. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=flatMap
softwareComposition	CompositionSwComponentType	1	tref	We assume that there is exactly one top-level composition that includes all Component instances of the system **Stereotypes:** isOfType

Table 4.1: RootSwCompositionPrototype

5 Mapping

A central part of the system generation process is the mapping of software components (SwComponentPrototypes) to ECUs, and the subsequent mapping of the communication between these software components to bus frames. Input to the software component mapping is the RootSwCompositionPrototype, which describes which software components have to be mapped, and the System Topology, which defines the ECU instances that are available as mapping targets. Once this mapping is done, also the communication matrix has to be taken into account for the next mapping step, the mapping of data elements exchanged between software components to bus frames. This communication matrix may either be predefined, or may be generated as part of this second mapping step. In the metamodel, different aspects of these mapping are aggregated by the meta class SystemMapping, as shown in Figure 5.1.

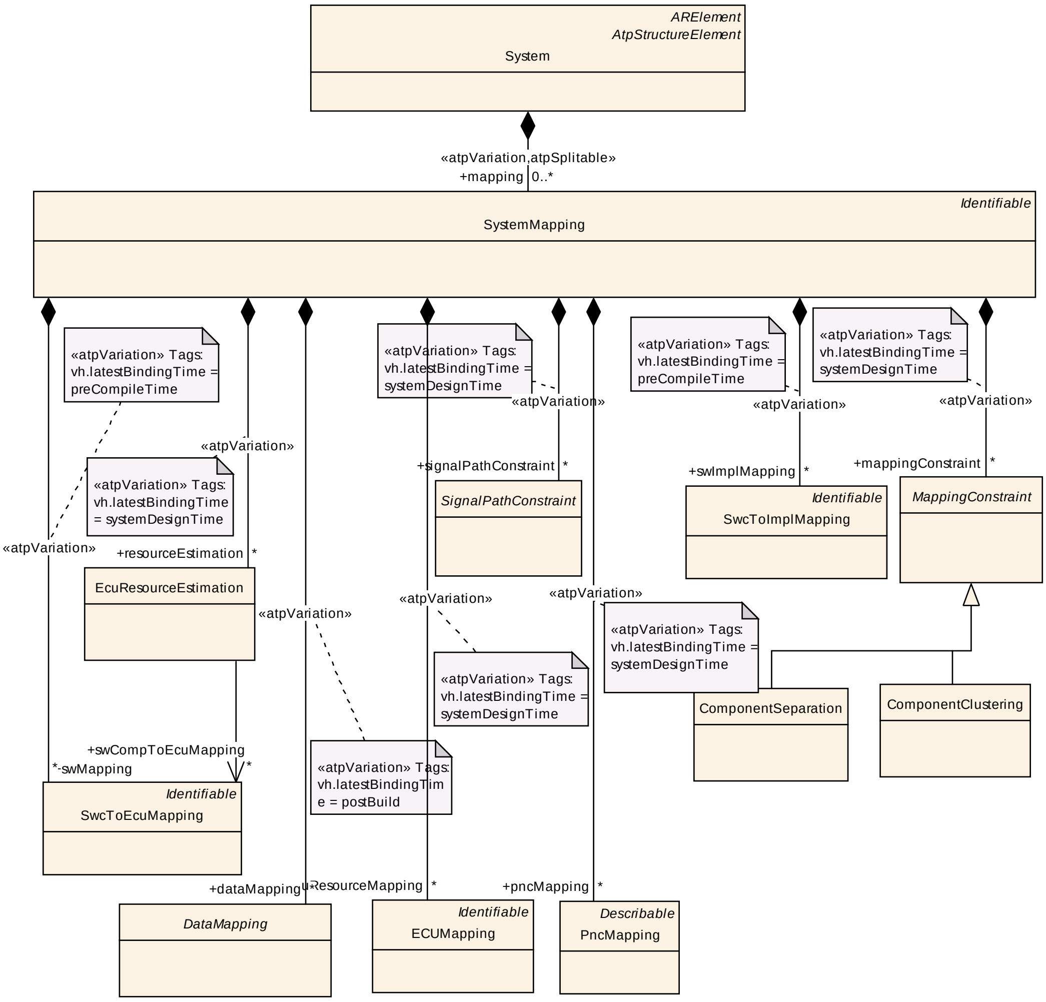


Figure 5.1: Mapping Overview (Mapping)

The following mappings are defined:

- The SwcToEcuMapping meta-class maps one or several SwComponentPrototypes to ECUs. In the System Constraint Description it is possible to predefine the mapping of SwComponentPrototypes to ECUs. The predefinition limits the system architect's freedom to map software components to arbitrary ECUs. After the system generation in the System Configuration Description, all atomic software components that are directly or indirectly part of the top level composition must be mapped with this mapping rule. Software component mapping is described in detail in chapter 5.1.
- The SwcToImplMapping meta-class is used to assign one Implementation to one or more SwComponentPrototypes (see chapter 5.1.2).
- The MappingConstraint meta-class is used to define constraints that constrain the mapping of software components. It's sub-classes allow to constraint which SwComponentPrototypes must be mapped together on the same ECU (ComponentClustering) and which must not be mapped to the same ECU (ComponentSeparation). The mapping constraints are described in detail in chapter 5.1.4.
- The DataMapping meta-class is used to map VariableDataPrototypes and ClientServerOperations in software component ports (i.e. the data exchanges between software components) to signals. The data mapping is described in detail in chapter 5.2.
- The SignalPathConstraint meta-class is used to define which specific way a signal (data element or client server operation arguments) between two Software Components should take in the network without defining in which frame and with which timing it is transmitted. This Signal Path Constraint is introduced in chapter 5.2.2.
- The ECUMapping meta-class is used to map the hardware related topology elements onto their counterpart definitions in the ECU Resource Template (see chapter 3.4).
- The PncMapping defines the Partial Network behavior (see chapter 5.4).
- The J1939ControllerApplicationToJ1939NmNodeMapping maps a Software Component to which a standardized function id is assigned to a J1939NmNode (see chapter 5.1.5)
- Finally, meta-class EcuResourceEstimation specifies the resource estimation for RTE and basic software (see chapter 5.3).

Class	SystemMapping			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	The system mapping aggregates all mapping aspects (mapping of SW components to ECUs, mapping of data elements to signals, and mapping constraints).			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
applicationPartitionToEcuPartitionMapping	ApplicationPartitionToEcuPartitionMapping	*	aggr	Mapping of ApplicationPartitions to EcuPartitions **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
dataMapping	DataMapping	*	aggr	The data mappings defined. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
ecuResourceMapping	ECUMapping	*	aggr	Mapping of hardware related topology elements onto their counterpart definitions in the ECU Resource Template. atpVariation: The ECU Resource type might be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime
j1939ControllerApplicationToJ1939NmNodeMapping	J1939ControllerApplicationToJ1939NmNodeMapping	*	aggr	Mapping of a J1939ControllerApplication to a J1939NmNode.
mappingConstraint	MappingConstraint	*	aggr	Constraints that limit the mapping freedom for the mapping of SW components to ECUs. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime
pncMapping	PncMapping	*	aggr	Mappings between Virtual Function Clusters and Partial Network Clusters. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime
resourceEstimation	EcuResourceEstimation	*	aggr	Resource estimations for this set of mappings, zero or one per ECU instance. atpVariation: Used ECUs are variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime
signalPathConstraint	SignalPathConstraint	*	aggr	Constraints that limit the mapping freedom for the mapping of data elements to signals. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime

Attribute	*Type*	*Mul.*	*Kind*	*Note*
swImplMapping	SwcToImplMapping	*	aggr	The mappings of AtomicSoftwareComponent Instances to Implementations. atpVariation: Derived, because SwcToEcuMapping is variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
swMapping	SwcToEcuMapping	*	aggr	The mappings of SW components to ECUs. atpVariation: SWC shall be mapped to other ECUs. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
swcToApplicationPartitionMapping	SwcToApplicationPartitionMapping	*	aggr	Allows to map a given SwComponentPrototype to a formally defined partition at a point in time when the corresponding EcuInstance is not yet known or defined. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild

Table 5.1: SystemMapping

5.1 Software Component Mapping

A fundamental concept of AUTOSAR is that SW components may be developed independently of a specific ECU hardware, and can be mapped to an ECU in the AUTOSAR System Generation Process. The System Constraint Description acts as an input to this System Generation Phase. Nevertheless, there may be some SW components which are already mapped due to previous iterations of the system generation step, and there may be system constraints that limit the system architect's freedom to map SW components to arbitrary ECUs. In the following, the individual elements are described in more detail.

5.1.1 SW Component to ECU Mapping

[TPS_SYST_01001] Definition of `SwcToEcuMapping` ⌈ With the `SwcToEcuMapping` element it is possible to express the mapping of `SwComponentPrototype`s to one `EcuInstance` or optional to individual `HwElement`s with `category` `Processing Unit` residing in this ECU. An optional assignment of Sensor/Actuator `SwComponentPrototype`s to Sensor/Actuator `HwElement`s is also possible. ⌋ *(RS_SYST_00007, RS_SYST_00033)*

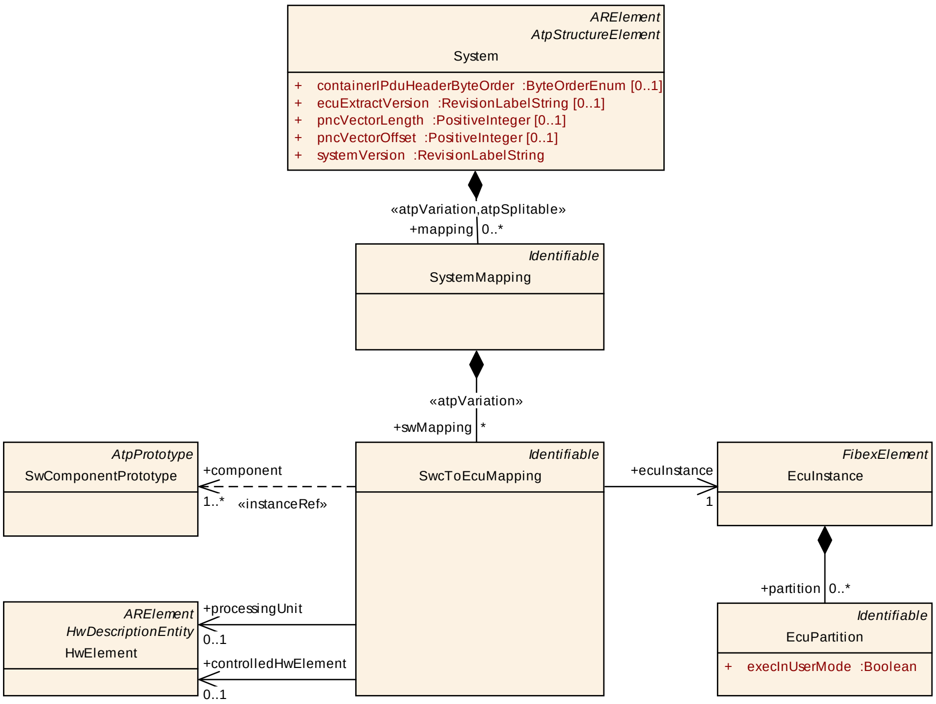


Figure 5.2: SW component to ECU mapping (SwcToEcuMapping)

The SwcToEcuMapping collects a list of all SwComponentPrototypes that shall be deployed onto the associated SwcToEcuMapping targets.

[TPS_SYST_02114] Mapping of SwComponentPrototypes onto SwcToEcuMapping targets ⌈ The SwcToEcuMapping of SwComponentPrototypes to

- EcuInstance
- processingUnit
- controlledHwElement

is arbitrary.

It is equivalent to either

- have several SwcToEcuMappings which map a set of SwcToEcuMapping.components to a SwcToEcuMapping.ecuInstance, SwcToEcuMapping.processingUnit, SwcToEcuMapping.controlledHwElement,
- or one SwcToEcuMapping which maps the set of SwcToEcuMapping.components at once.

⌋ *(RS_SYST_00007)*

[constr_3263] Restriction of usage of SwcToEcuMapping in a System ⌈ For all SwcToEcuMappings in a System the following restriction applies: No two SwcToEcuMappings shall have the exact same reference to

- SwComponentPrototype

- EcuInstance
- processingUnit
- controlledHwElement

⌋()

SwcToEcuMapping may map either prototypes of AtomicSwComponentType or those of CompositionSwComponentType.

[TPS_SYST_01020] Unconditional mapping of atomic Software Components ⌈ In case a prototype of an atomic Software Components is mapped, the mapping is unconditional. ⌋*(RS_SYST_00007)*

[TPS_SYST_01021] Mapping of CompositionSwComponentType ⌈ In case a mapped SwComponentPrototype refers to a CompositionSwComponentType, the mapping is applied to any inner SwComponentPrototype recursively; however, it may be overwritten by additional SwcToEcuMapping mapping inner SwComponentPrototype to different EcuInstances. ⌋*(RS_SYST_00007)*

Usually a particular component prototype can be mapped explicitly to at most one ECU in a given system (leaving aside variant handling and the implicit mapping of "inner" prototypes mentioned above) but there are two exceptions:

- **[TPS_SYST_01022] Prototype of a ParameterSwComponentType can be mapped to more than one ECU** ⌈ A prototype of a ParameterSwComponentType can be mapped to more than one ECU. This is required, because this special component does not communicate over the network, so that a copy of the prototype has to be created on each ECU were it is required. ⌋*(RS_SYST_00007)*
- **[TPS_SYST_01023] Prototype of an ServiceProxySwComponentType can be mapped to more than one ECU** ⌈ A prototype of an ServiceProxySwComponentType can be mapped to more than one ECU even if it appears only once in the VFB system, because a prototype of this special component is required on each ECU, for which local Services are addressed via the proxy. ⌋*(RS_SYST_00031)*

[constr_3021] Mapping of SensorActuatorSwComponents to SensorActuator HwElements ⌈ Only SwComponentPrototypes that are typed by SensorActuatorSwComponentType shall be mapped to a HwElement with category SensorActuator via the controlledHwElement relation. ⌋()

[constr_3249] Category of HwElement for SwcToEcuMapping ⌈ The HwElement which is referenced from SwcToEcuMapping in the role processingUnit shall be of category "ProcessingUnit". ⌋()

The following table describes the SwcToEcuMapping in detail.

Class	**SwcToEcuMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Map software components to a specific ECU Instance and optionally to a processing unit and to an EcuPartition. For each combination of ECUInstance and the optional ProcessingUnit and the optional EcuPartition and the optional SensorActuator only one SwcToEcuMapping shall be used.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
component	SwComponentPrototype	1..*	iref	References to the software component instances that are mapped to the referenced ECUInstance. If the component prototype referenced is a composition, this indicates that all atomic software components within the composition are mapped to the ECU. If there is aditionally a mapping of some SwComponentPrototype INSIDE the Composition to another ECU Instance the inner mapping overrides the outer mapping.
controlledHwElement	HwElement	0..1	ref	Optional mapping of SwComponentPrototypes that are typed by SensorActuatorSwComponentType to a HwElement with category SensorActuator.
ecuInstance	EcuInstance	1	ref	Reference to a specific ECU Instance description.
processingUnit	HwElement	0..1	ref	Optional mapping of software components to individual microcontroller cores residing in one ECU. A microcontroller core is described in the ECU Resource Template by the HwElement of HwCategory ProcessingUnit.

Table 5.2: SwcToEcuMapping

5.1.2 Software Component to Implementation Mapping

As several implementations may exist for the same AtomicSwComponentType, it needs to be decided on and specified which instances of a given AtomicSwComponentType are mapped to which Implementation. According to the AUTOSAR Methodology this information can either be added within the Configure System activity, or later when the RTE part is configured during Configure ECU phase. If the mapping is done in System Configuration, a SwcToImplMapping is being used for assigning one Implementation to one or more instances of SwComponentPrototype relating to the same AtomicSwComponentType. This is illustrated in Figure 5.3.

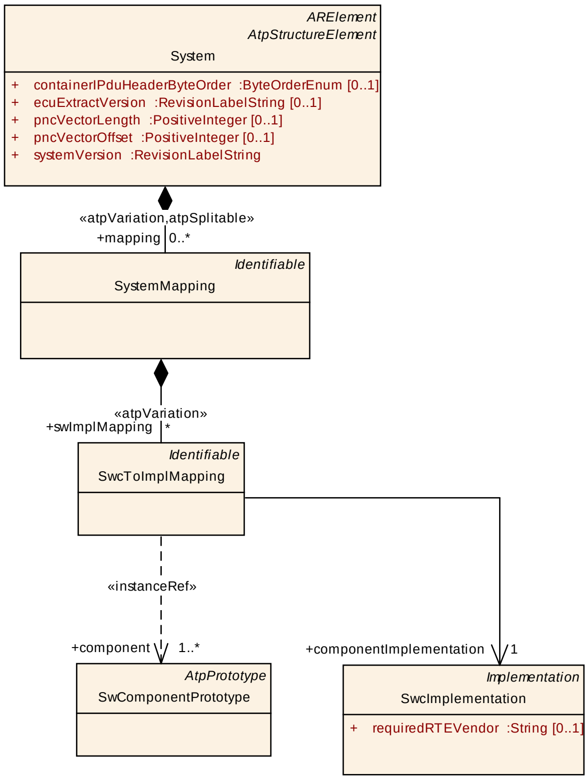


Figure 5.3: SW Component to Implementation mapping (SwcToImplMapping)

[constr_3002] valid swcToImplMapping ⌈ The referenced SwcImplementation refers to a SwcInternalBehavior that is part of a AtomicSwComponentType. The same AtomicSwComponentType shall be the type of the referenced SwComponentPrototype.

SwcToImplMapping.componentImplementation.behavior.component == SwcToImplMapping.component.type ⌋ *()*

The following table contains the detailed description of SwcToImplMapping:

Class	**SwcToImplMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Map instances of an AtomicSwComponentType to a specific Implementation.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
component	SwComponentPrototype	1..*	iref	Reference to the software component instances that are being mapped to the specified Implementation. The targeted SwComponentPrototype needs be of the AtomicSwComponentType being implemented by the referenced Implementation.
componentImplementation	SwcImplementation	1	ref	Reference to a specific Implementation description. Implementation to be used by the specified SW component instance. This allows to achieve more precise estimates for the resource consumption that results from mapping the instance of an atomic SW component onto an ECU.

Table 5.3: SwcToImplMapping

5.1.3 SW Component to Partition Mapping

With the SwcToApplicationPartitionMapping and the ApplicationPartitionToEcuPartitionMapping an OEM has the option to predefine an allocation to memory partitions in the System Design phase. The final and complete assignment is described in the OS Configuration. The SwcToApplicationPartitionMapping defines a mapping to ApplicationPartitions that allows an allocation to a formally defined partition at a point in time when the EcuInstance is not yet known or defined. In a later methodology step this assignment can be refined with the ApplicationPartitionToEcuPartitionMapping to an EcuPartition defined in the context of an EcuInstance.

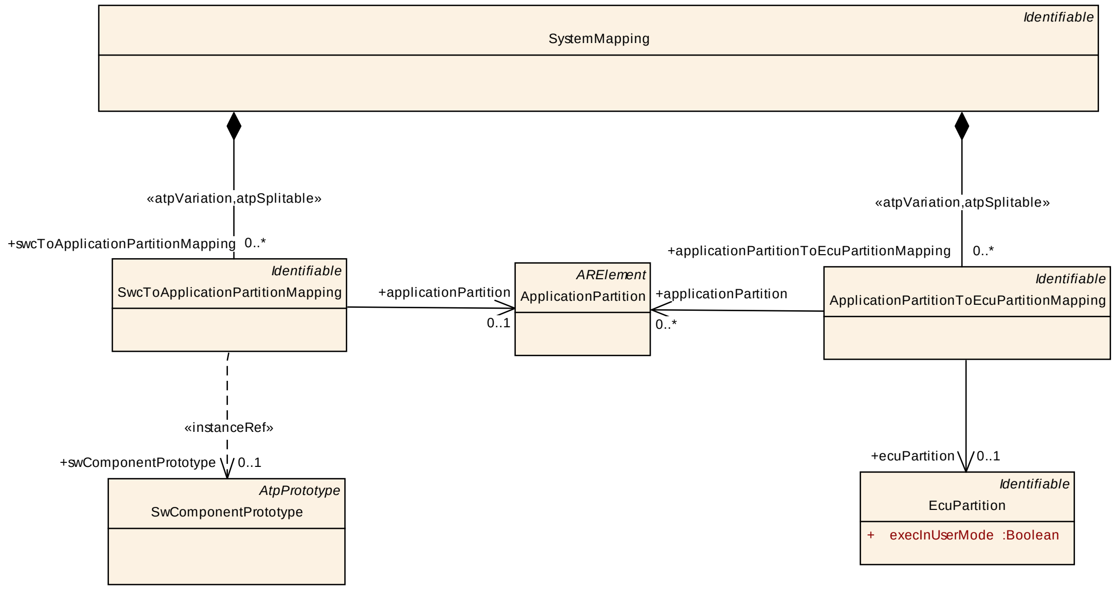


Figure 5.4: SW Component to Application Partition mapping

Class	**SwcToApplicationPartitionMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Allows to map a given SwComponentPrototype to a formally defined partition at a point in time when the corresponding EcuInstance is not yet known or defined.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
applicationPartition	ApplicationPartition	0..1	ref	Reference to an ApplicationPartition to which a SwComponentPrototype is mapped.
swComponentPrototype	SwComponentPrototype	0..1	iref	References to the software component instances that are mapped to the referenced ApplicationPartition. If the component prototype referenced is a composition, this indicates that all atomic software components within the composition are mapped to the ApplicationPartition. If there is additionally a mapping of some SwComponentPrototype INSIDE the Composition to another ApplicationPartition the inner mapping overrides the outer mapping.

Table 5.4: SwcToApplicationPartitionMapping

Class	**ApplicationPartition**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	ApplicationPartition to which SwComponentPrototypes are mapped at a point in time when the corresponding EcuInstance is not yet known or defined. In a later methodology step the ApplicationPartition can be assigned to an EcuPartition. **Tags:** atp.recommendedPackage=ApplicationPartitions			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 5.5: ApplicationPartition

Class	**ApplicationPartitionToEcuPartitionMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Maps ApplicationPartitions to EcuPartitions. With this mapping an OEM has the option to predefine an allocation of Software Components to EcuPartitions in the System Design phase. The final and complete assignment is described in the OS Configuration.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applicationPartition	ApplicationPartition	*	ref	Reference to ApplicationPartitions that are mapped to an EcuPartition.
ecuPartition	EcuPartition	0..1	ref	Reference to EcuPartition to which the ApplicationPartitions are assigned.

Table 5.6: ApplicationPartitionToEcuPartitionMapping

Class	**EcuPartition**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Partitions are used as error containment regions. They permit the grouping of SWCs and resources and allow to describe recovery policies individually for each partition. Partitions can be terminated or restarted during run-time as a result of a detected error.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
execInUserMode	Boolean	1	attr	A partition can execute either in CPU user mode (execInUserMode = TRUE) or supervisor mode (execInUserMode = FALSE). In user mode, the partition has a limited access to memory, to memory mapped hardware and to CPU. In user mode, the partition is mapped to a non-trusted OS-Application.

Table 5.7: EcuPartition

[constr_3232] `ApplicationPartition` is allowed to be mapped to only one `EcuPartition` ⌈ Each `ApplicationPartition` shall be mapped at most once to

an EcuPartition via the ApplicationPartitionToEcuPartitionMapping. ⌋
()

[constr_3229] SwComponentPrototype mapped to an ApplicationPartition and EcuInstance ⌈ If the SwcToEcuMapping.ecuInstance exists then a SwComponentPrototype that is mapped to an ApplicationPartition via the SwcToApplicationPartitionMapping shall only be mapped by an ApplicationPartitionToEcuPartitionMapping to an EcuPartition that is aggregated by the EcuInstance referenced by means of SwcToEcuMapping.ecuInstance. ⌋*()*

5.1.4 Software Component Mapping Constraints

In contrast to the mapping description described in the previous chapters, mapping constraints allow to define invariants that have to be fulfilled by a valid mapping. They are aggregated in the MappingConstraint element as introduced in chapter 5 and depicted Figure 5.1. This chapter describes which mapping constraints can be described in the System Constraint Description. The description of this meta-class can be found in the following table:

Class	**MappingConstraint (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Different constraints that may be used to limit the mapping of SW components to applicable ECUs, Partitions or Cores depending on the mappingScope attribute.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the mapping constraint.

Table 5.8: MappingConstraint

The two constraints (ComponentClustering and ComponentSeparation) shown in Figure 5.5 express the restrictions that Software Components impose on each other when performing the mapping onto the ECUs, Cores or Partitions. In fact, before the mapping process begins, it can be useful to impose the allocation of a predefined set of SW components onto the same ECU, especially if such a set is tightly linked from a functional point of view. In the same way, two critical SW components, performing some kind of redundancy, may be not suitable to run both on the same ECU. Thus, we call these two kinds of mapping constraints, respectively, ComponentClustering and ComponentSeparation.

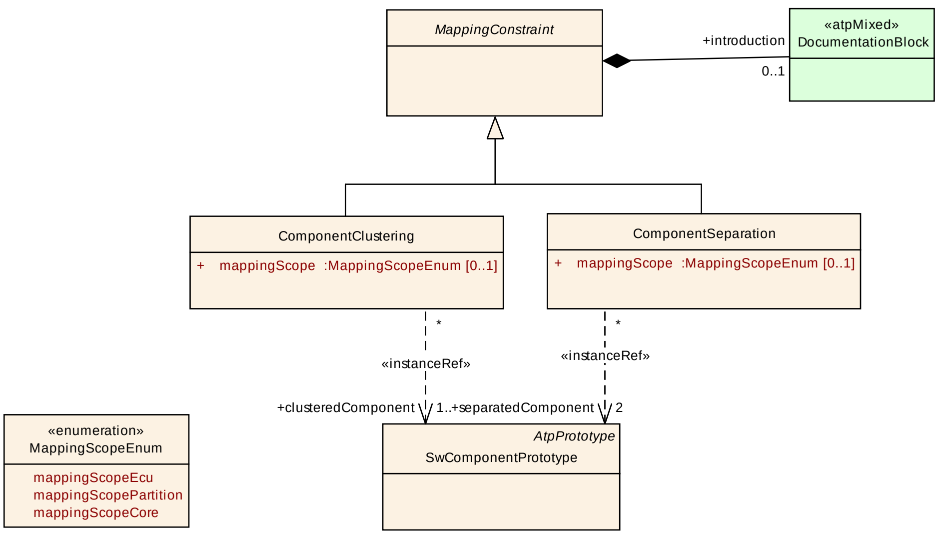


Figure 5.5: Details on ComponentClustering and ComponentSeparation (SwcClustering)

5.1.4.1 ComponentClustering

[TPS_SYST_01024] Component Clustering ⌈ The ComponentClustering constraint (also, *clustering*) is to be used for expressing that a certain set of SW components (atomic or not) shall be mapped (allocated) onto the same ECU, Core, Partition depending on the defined mappingScope attribute. ⌋*(RS_SYST_00008)*

This is some kind of "execute together on same ECU" constraint.

The semantic of the clustering constraint is straightforward if all referenced SW components are atomic. Otherwise, it shall be interpreted as follows:

[TPS_SYST_01025] Clustering of Compositions ⌈ All of the atomic SW components making up the composition shall be mapped onto the same ECU, Core, Partition depending on the defined mappingScope attribute together with all other SW components (atomic or not) referenced by the constraint. ⌋*(RS_SYST_00008)*

This also means that a *clustering* constraint can also refer to only a single composition.

A *clustering* constraint is part of a MappingConstraint element and it must refer to one or more SwComponentPrototype elements, representing the instances of the SW component(s) that must be mapped together.

Class	**ComponentClustering**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Constraint that forces the mapping of all referenced SW component instances to the same ECU, Core, Partition depending on the defined mappingScope attribute. If mappingScope is not specified then mappingScopeEcu shall be assumed.			
Base	ARObject, MappingConstraint			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
clusteredComponent	SwComponentPrototype	1..*	iref	Reference to the components that have to be mapped together.
mappingScope	MappingScopeEnum	0..1	attr	This attribute indicates whether the ComponentClustering mapping constraint applies to different ECUs, partitions or cores. If this attribute is not specified then mappingScopeEcu shall be assumed. **Tags:** atp.Status=shallBecomeMandatory

Table 5.9: ComponentClustering

Enumeration	**MappingScopeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping
Note	Defines the scope for the mapping constraints.
Literal	***Description***
mappingScopeCore	The mapping constraint applies to different Cores. **Tags:** atp.EnumerationValue=0

mapping ScopeEcu	The mapping constraint applies to different Ecus. **Tags:** atp.EnumerationValue=1
mapping ScopePartition	The mapping constraint applies to different Partitions. **Tags:** atp.EnumerationValue=2

Table 5.10: MappingScopeEnum

5.1.4.2 ComponentSeparation

[TPS_SYST_01045] Component Seperation ⌈ The ComponentSeparation constraint (also, *separation*) is to be used for expressing that two SW components (atomic or not) shall not be mapped (allocated) onto the same ECU, Core, Partition depending on the defined mappingScope attribute. ⌋*(RS_SYST_00009)*

This is some kind of “do not execute together on same ECU” constraint.

The semantic of the separation constraint is straightforward if one or both SW components are atomic. Otherwise, it shall be interpreted as follows:

[TPS_SYST_01026] Separation of Compositions ⌈ Any of the atomic SW components making up the first composition, shall not be mapped onto the same ECU, Core, Partition depending on the defined mappingScope attribute with any atomic SW component from the second composition. ⌋*(RS_SYST_00009)*

As a consequence, and to preserve consistency, an atomic SW component instance cannot be part of two compositions concerned by the same separation constraint, i.e. the two compositions have to be disjoint with regards to component instances[1].

A *separation* constraint is part of a MappingConstraint element and it must refer to two SwComponentPrototype elements, representing the two SW component instances that must not be allocated together.

[1]The only case where a component instance could be in both sets is if the ComponentSeparation refers to two elements where one of them is a substructure of the other. Consider the case that Atomic SW Component A is aggregated by composition B, which in turn is aggregated by composition C. Then instance A is both in B and C. It is not a good idea to formulate a separation constraint stating that B and C should not be on the same ECU.

Class	**ComponentSeparation**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Constraint that forces the two referenced SW components (called A and B in the following) not to be mapped to the same ECU, Core, Partition depending on the defined mappingScope attribute. If mappingScope is not specified then mappingScopeEcu shall be assumed. If a SW component (e.g. A) is a composition, none of the atomic SW components making up the A composition must be mapped together with any of the atomic SW components making up the B composition. Furthermore, A and B must be disjoint.			
Base	ARObject, MappingConstraint			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
mappingScope	MappingScopeEnum	0..1	attr	This attribute indicates whether the ComponentSeparation mapping constraint applies to different ECUs, partitions or cores. If this attribute is not specified then mappingScopeEcu shall be assumed. **Tags:** atp.Status=shallBecomeMandatory
separatedComponent	SwComponentPrototype	2	iref	The two components that have to be mapped to different ECUs

Table 5.11: ComponentSeparation

[constr_3004] Clustering and separation must be exclusive ⌈ Clustering and separation must be exclusive, i.e. it SHALL NOT be possible that two `SwComponentPrototype`s A and B are associated by a `ComponentClustering` and by a `ComponentSeparation`. ⌋*()*

5.1.5 J1939 Controller Application Mapping

J1939 is not restricted to mere communication protocols. It also specifies the communication of software functions (a.k.a. J1939 Controller Applications) and thus has a very dedicated view on the software of an automotive ECU. The approach taken by J1939 with respect to software is very similar to the way AUTOSAR specifies software-components.

However, J1939 uses a different terminology and associates such a software-component with a predefined function. In addition, every function in J1939 has a standardized id. This function id is distributed by the Controller Application to the network as part of the so-called "name" which is a unique identifier representing a Controller Application within the J1939 network management.

Controller Applications, to some extent, fulfill the role of a "virtual ECU" since they are visible as independent entities on a J1939 network. In terms of AUTOSAR modeling, the role of a "virtual ECU" for J1939 Controller Applications is fulfilled by the meta-class `J1939NmNode`.

In order to make use of the AUTOSAR modeling approach for J1939 it is very helpful to associate a standardized function id with a software-component during an early phase of a development project. This function id shall later be mapped to a `J1939NmNode` with the identical `J1939NmNode.nodeName.function`.

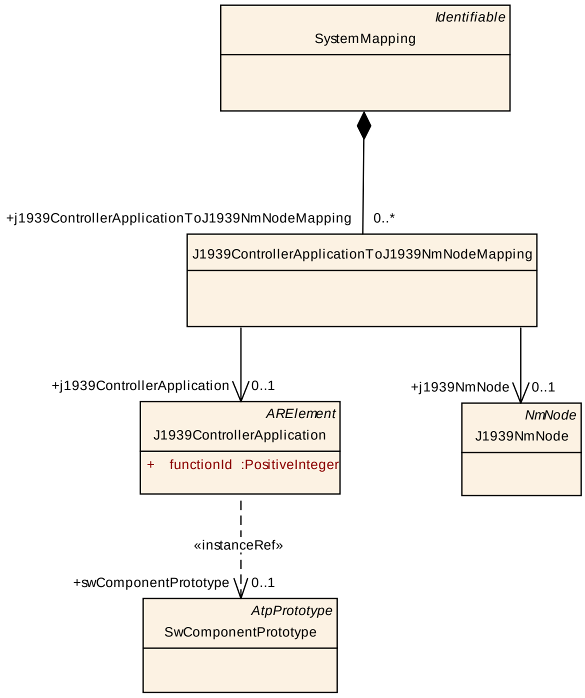


Figure 5.6: J1939 Controller Application to J1939NmNode Mapping

Class	J1939ControllerApplicationToJ1939NmNodeMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	This meta-class represents the ability to map a J1939ControllerApplication to a J1939NmNode. Note that this is similar but not identical to the mapping of SwComponentPrototypes to EcuInstances; for J1939 the semantics of an EcuInstance itself is basically replaced by a J1939NmNode.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
j1939ControllerApplication	J1939ControllerApplication	0..1	ref	Reference to the J1939 Controller Application that is mapped to the referenced J1939NmNode.
j1939NmNode	J1939NmNode	0..1	ref	J1939NmNode that is the target of the J1939ControllerApplicationTo1939NmNodeMapping.

Table 5.12: J1939ControllerApplicationToJ1939NmNodeMapping

Class	J1939ControllerApplication			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	This element represents a J1939 controller application. **Tags:** atp.recommendedPackage=J1939ControllerApplications			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
functionId	PositiveInteger	1	attr	This attribute represents the numerical function id of the J1939 controller application.
swComponentPrototype	SwComponentPrototype	0..1	iref	This represents the SwComponentPrototype (which is typically typed by a CompositionSwComponentType) that corresponds to the J1939ControllerApplication.

Table 5.13: J1939ControllerApplication

[constr_3239] Consistent mapping of software-component to `J1939NmNode` ⌈ The value of attribute `J1939NmNode.nodeName.function` of a `J1939NmNode` referenced by `J1939ControllerApplicationToJ1939NmNodeMapping` in the role `j1939NmNode` shall be identical to the value of `J1939ControllerApplication.functionId`. ⌋ *()*

[constr_3240] Consistent mapping of `J1939ControllerApplication` to `EcuInstance` ⌈ A `SwComponentPrototype` that is referenced by a `J1939ControllerApplication` mapped to a specific `J1939NmNode` shall only be mapped to an `EcuInstance` that in turn owns the same `J1939NmNode`. ⌋ *()*

5.2 Data Mapping

The data mapping description may either be mapping of client server communication or sender receiver communication (see Figure 5.7). It is used to map `VariableDat-`

aPrototypes or ClientServerOperations of SW Component Ports to SystemSignals.

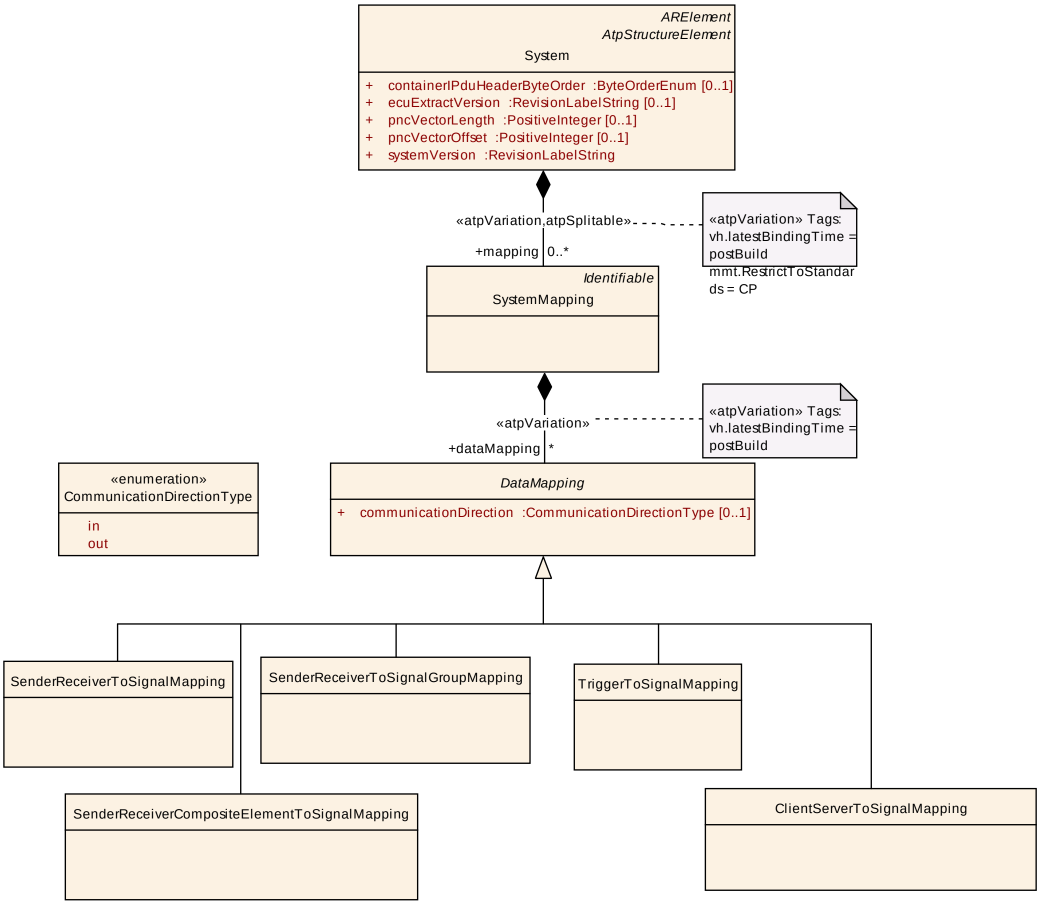


Figure 5.7: Overview: Data Mapping Description (DataMappingOverview)

[TPS_SYST_01030] Representation of VariableDataPrototypes and ClientServerOperations in System Description ⌈ SystemSignals represent VariableDataPrototypes and ClientServerOperations in the communication description. ⌋ *(RS_SYST_00025)*

[TPS_SYST_01032] Independence of SystemSignals from CommunicationClusters ⌈ The SystemSignals can be defined independently of CommunicationClusters. ⌋ *()*

This chapter describes how the VariableDataPrototypes and ClientServerOperations are mapped onto SystemSignals. The Communication chapter (6) describes how the SystemSignals are mapped into Pdus and Frames, implementing the actual inter-ECU communication.

Class	**DataMapping (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of port elements (data elements and parameters) to frames and signals.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationDirection	CommunicationDirectionType	0..1	attr	This attribute controls the direction into which the mapped SystemSignal is communicated with respect to the kind of PortPrototype used as the context element of the DataMapping.
eventGroup	ConsumedEventGroup	*	ref	Via this reference a connection between the VFB View and the Ethernet EventGroups can be created.
eventHandler	EventHandler	*	ref	Via this reference a connection between the VFB View and the Ethernet EventHandlers can be created.
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the data mapping.
serviceInstance	AbstractServiceInstance	*	ref	Via this reference a connection between the VFB View and the Ethernet Services can be created.

Table 5.14: DataMapping

[constr_3064] Usage of `serviceInstance`, `eventHandler` and `eventGroup` references ⌈ The `serviceInstance`, `eventHandler` and `eventGroup` references shall only be used to describe a service based communication over the Internet Protocol. More details are described in chapter 6.7.5. ⌋*()*

Class	**SystemSignal**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The system signal represents the communication system's view of data exchanged between SW components which reside on different ECUs. The system signals allow to represent this communication in a flattened structure, with exactly one system signal defined for each data element prototype sent and received by connected SW component instances. **Tags:** atp.recommendedPackage=SystemSignals			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
dynamicLength	Boolean	1	attr	The length of dynamic length signals is variable in run-time. Only a maximum length of such a signal is specified in the configuration (attribute length in ISignal element).
physicalProps	SwDataDefProps	0..1	aggr	Specification of the physical representation.

Table 5.15: SystemSignal

A `SystemSignal` is used to represent `VariableDataPrototype`s for network transport.

[TPS_SYST_01144] Physical properties of a `SystemSignal` ⌈ With the aggregation of `SwDataDefProps` in the role `physicalProps` the physical properties of the `SystemSignal` can be specified. ⌋*()*

[TPS_SYST_05000] System Description doesn't use a complete Software Component Description ⌈ If the System Description doesn't use a complete Software Component Description (VFB View) the data mapping of VariableDataPrototypes or ArgumentDataPrototypes owned by ClientServerOperations on SystemSignals does not need to be defined. This supports the inclusion of legacy signals. ⌋ *(RS_SYST_00001)*

[constr_3501] Role of SystemSignal in 1:n communication ⌈ In case of 1:n communication the VariableDataPrototype in the PPortPrototype of the SwComponentPrototype shall be mapped to only one SystemSignal. ⌋*()*

[constr_3086] Role of SystemSignal in n:1 sender-receiver communication ⌈ In case of n:1 communications each sender needs to be represented by the same SystemSignal. ⌋*()*

[constr_3049] Role of SystemSignal in inter-ECU client server communication with clients located on different ECUs in case of networks other than Ethernet ⌈ In case of a n:1 inter-ECU client server communication with clients located on different ECUs different SystemSignals shall be used for each Ecu. ⌋*()*

[TPS_SYST_02150] Role of SystemSignal in inter-ECU client server communication over Ethernet with clients located on different ECUs in case that LdCom is used ⌈ In case of a n:1 inter-ECU client server communication over Ethernet with clients located on different ECUs and in the case that the LdCom module is used on these ECUs one SystemSignal per communication direction may be used to define the client server interaction. ⌋*()*

[TPS_SYST_02151] MetaData support required for inter-ECU client server communication over Ethernet with clients located on different ECUs if one SystemSignal per communication direction is used ⌈ The modeling of client server interaction over Ethernet with clients located on different ECUs and if one SystemSignal per communication direction is used requires the support of COM Stack MetaData. The relationship between the call and return is achieved by means of meta data items attached to the Pdus by the Socket Adapter. ⌋*()*

Please note that the MetaData handling is currently only supported for LdCom. When using Com still one dedicated SystemSignal has to be used for each calling ECU as described in [TPS_SYST_02161].

[TPS_SYST_02161] Role of SystemSignal in inter-ECU client server communication over Ethernet with clients located on different ECUs in case that Com is used ⌈ In case of a n:1 inter-ECU client server communication over Ethernet with clients located on different ECUs and in the case that the Com module is used on these ECUs one SystemSignal per communication direction shall be used to define the client server interaction. ⌋*()*

[TPS_SYST_01087] Role of SystemSignal in inter-ECU client server communication with clients located on the same ECU ⌈ In case of n:1 inter-ECU client server communication it is allowed to use the same SystemSignal for several clients on the same Ecu, if the client identifier is used to distinguish the different clients. ⌋*()*

[TPS_SYST_02011] initValues of receivers that are mapped to the same Ecu ⌈
All receivers of a given SystemSignal on the same EcuInstance shall have identical initValues. ⌋*()*

[constr_3112] Invalidation support for partial mapping of a data element typed by composite data type ⌈ If a VariableDataPrototype with a composite data type in a PPortPrototype is mapped to a SystemSignalGroup and only a subset of elements of the composite data type that are primitives is mapped to separate SystemSignals of the SystemSignalGroup then at least one mapped primitive shall have an invalidValue defined. ⌋*()*

[constr_3074] No TransmissionAcknowledgementRequest for multiple senders ⌈ If more than one SenderComSpec exist (in different PortPrototypes on atomic level) that refer to data elements effectively mapped to the same SystemSignal it is not allowed that any SenderComSpec aggregates transmissionAcknowledge. ⌋*()*

Please note that the term "effectively mapped" refers to the fact that the DataMapping can refer to a dataElement in a "delegation" PortPrototype on the surface of a rootSoftwareComposition of an Ecu Extract OR to PortPrototypes inside the rootSoftwareComposition. Both ways shall be considered.

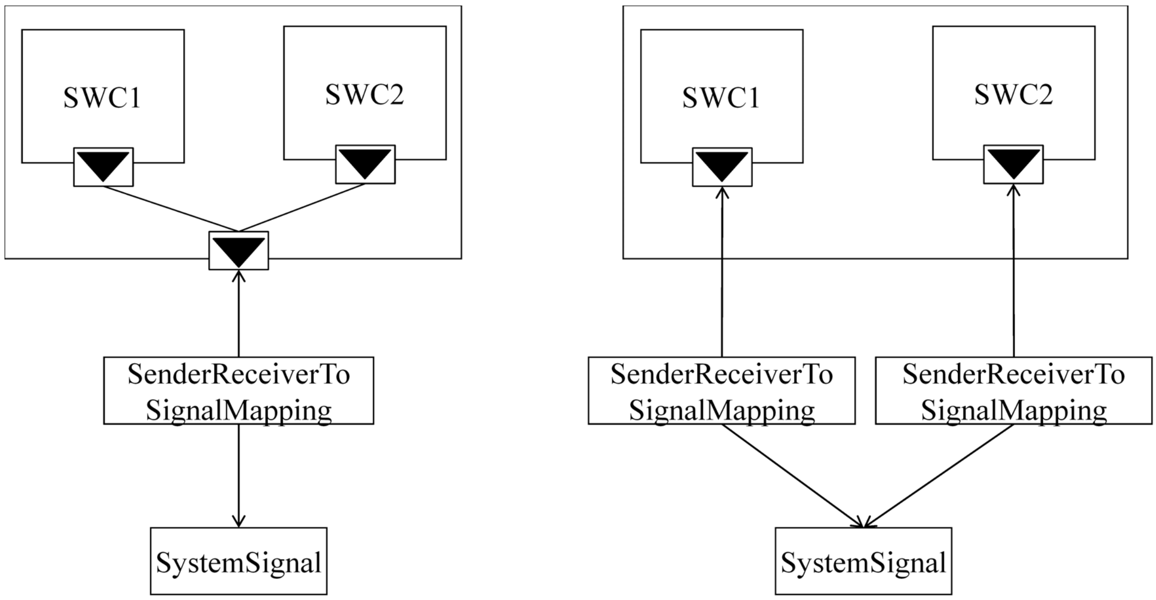


Figure 5.8: Example for data elements that are effectively mapped to the same SystemSignal

The different kinds of data mapping are described in the following sections in detail.

Please note that the usage of ImplementationDataTypes within an AnyInstanceRef is described in detail in [2].

5.2.1 Mapping of Variable Data Prototypes on System Signals

This section describes how VariableDataPrototypes are mapped onto SystemSignals. For a detailed description of the interconnection of software components refer to [5].

It is the task of system configuration to map VariableDataPrototype, ClientServerOperation, or Trigger contained in PortPrototypes referenced by the SwConnector onto a SystemSignal.

[TPS_SYST_01033] DataMapping and SwConnector ⌈ For the purpose of creating DataMappings PortPrototypes may or may not be connected by SwConnectors. ⌋*()*

The same SystemSignal may satisfy more than one SwConnector (1:n communication), and one SwConnector may be implemented by several SystemSignals (e.g. one per VariableDataPrototype in the PortInterface being connected), so there is no 1:1 mapping between SwConnectors and SystemSignals.

In the following sections, each reference to a VariableDataPrototype, ArgumentDataPrototype, or Trigger is of type AtpInstanceRef [2]. This means it not only references the actual VariableDataPrototype, but additionally contains contextual references to the PortPrototype and the hierarchy of SwComponentPrototypes forming the individual instance context of the VariableDataPrototype.

The following rules are valid for the mapping of VariableDataPrototypes, ClientServerOperations, or Triggers on SystemSignals:

[constr_3088] SystemSignal that is not part of a SystemSignalGroup in a complete System Description ⌈ For each SystemSignal that is not part of a SystemSignalGroup in a complete System with category SYSTEM_DESCRIPTION exactly one DataMapping per communicationDirection shall be defined (PPortPrototype, RPortPrototype, PRPortPrototype). Preference: AbstractProvidedPortPrototype ⌋*()*

[constr_3089] SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System Description ⌈ For each SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System with category SYSTEM_DESCRIPTION exactly one DataMapping per communicationDirection shall be defined (PPortPrototype, RPortPrototype, PRPortPrototype). Preference: AbstractProvidedPortPrototype ⌋ *()*

Please note that for DataMappings the following use cases are supported:

- Sending: one DataMapping that point to the DataPrototype and to the SystemSignal with communicationDirection out.
- Receiving: one DataMapping that point to the DataPrototype and to the SystemSignal with communicationDirection in.
- Sending and Receiving: two DataMappings that point to the DataPrototype and to the SystemSignal, one with communicationDirection in and one with communicationDirection out.

[constr_3055] SystemSignalGroup in a complete System Description ⌈ For each SystemSignalGroup in a complete System with category SYSTEM_DESCRIPTION exactly one DataMapping shall be defined (PPortPrototype or RPortPrototype). Preference: PPortPrototype ⌋ *()*

In a complete System with category SYSTEM_DESCRIPTION, it is sufficient to refer to the VariableDataPrototype in the PPortPrototype or the RPortPrototype to define the mapping of the communication between a provider and its receivers.

This is possible since the connectors implicitly define which RPortPrototype are connected to which PPortPrototype. In case the System with category SYSTEM_DESCRIPTION does not use a complete Software Component Description (VFB View) the data mapping needs not to be defined. This supports the inclusion of legacy signals.

[TPS_SYST_01137] Several DataMappings may be defined for the same SystemSignal ⌈ For a SystemSignal which is

- part in several SystemSignalGroups
- part in at least one SystemSignalGroup and at the same time is transmitted additionally as standalone SystemSignal

several DataMappings may be defined. ⌋ *()*

[TPS_SYST_01050] SystemSignal in the System Extract and ECU Extract ⌈ In the System with category SYSTEM_EXTRACT or ECU_EXTRACT the missing DataMappings on the complementary Sender/Receiver side needs to be supplemented. ⌋ *()*

In the System with category SYSTEM_EXTRACT or ECU_EXTRACT, where only the relevant parts of the rootSoftwareComposition are defined, it is necessary to utilize the information from the complementary PortPrototype if the corresponding PortPrototype is located on another ECU and thus is not part of the extract. This is described in more detail in chapter 11.2 and chapter 12.2.3.

Therefore in a System with category ECU_EXTRACT the DataMappings are provided on both, PPortPrototypes and RPortPrototypes.

[TPS_SYST_01034] Data Mappings can be applied to compositions and atomic software components ⌈ DataMappings can be applied to CompositionSwComponentTypes and on AtomicSwComponentTypes. ⌋ *()*

[TPS_SYST_01035] Transformation of Data Mappings during flattening ⌈ During the creation of the System with category ECU_EXTRACT (flattening) the existing DataMappings that refer to CompositionSwComponentTypes shall be transformed to refer to AtomicSwComponentTypes instead. ⌋*()*

[TPS_SYST_01036] No additional Data Mappings in composition substructure ⌈ When a CompositionSwComponentType is refined by a supplier the already existing DataMappings that refer to the CompositionSwComponentType shall not be copied to the internal substructure. ⌋*()*

Suppliers who add substructure to a CompositionSwComponentType by adding SwComponentPrototypes and SwConnectors shall respect the predefined DataMappings on the CompositionSwComponentType.

The OEM/Supplier Collaboration Scenario is described in chapter 11.1.

[constr_3087] DataMapping to PRPortPrototype ⌈ For inter-ECU communication between SwComponentPrototypes which involves PRPortPrototypes for each DataPrototype there shall be one SystemSignal and at most two DataMappings, one for each direction. ⌋*()*

Please note that for DataMappings the following use cases are supported:

- Sending: one DataMapping that point to the DataPrototype and to the SystemSignal with communicationDirection out.
- Receiving: one DataMapping that point to the DataPrototype and to the SystemSignal with communicationDirection in.
- Sending and Receiving: two DataMappings that point to the DataPrototype and to the SystemSignal, one with communicationDirection in and one with communicationDirection out.

[constr_1207] Existence of the attribute DataMapping.communicationDirection in the context of a SenderReceiverInterface or TriggerInterface ⌈ The following condition shall be fulfilled regarding the existence and values of the attribute DataMapping.communicationDirection that refers to a PortPrototype typed by a SenderReceiverInterface or TriggerInterface as the context PortPrototype:

- If the DataMapping refers to a PRPortPrototype as the context PortPrototype the attribute DataMapping.communicationDirection shall exist.
- If the DataMapping refers to a PPortPrototype as the context PortPrototype the attribute DataMapping.communicationDirection may exist. If the attribute exists its value shall be set to out.
- If the DataMapping refers to an RPortPrototype as the context PortPrototype the attribute DataMapping.communicationDirection may exist. If the attribute exists its value shall be set to in.

⌋*()*

5.2.1.1 Mapping of Variable Data Prototypes with primitive datatypes on System Signals (Sender-Receiver Communication)

This section describes the relation between the VariableDataPrototype with primitive datatypes and the SystemSignal (see Figure 5.9).

[TPS_SYST_02082] SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category VALUE or BOOLEAN and a DataTypeMap exists ⌈ If a SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category VALUE or BOOLEAN and a DataTypeMap exists that points to the ApplicationPrimitiveDataType and an ImplementationDataType of category VALUE or TYPE_REFERENCE that eventually references (via the SwDataDefProps.implementationDataType) an ImplementationDataType of category VALUE, then this SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02083] SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and a DataTypeMap exists ⌈ If a SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and a DataTypeMap exists that points to the ApplicationPrimitiveDataType and an ImplementationDataType of category ARRAY or TYPE_REFERENCE that eventually references (via the SwDataDefProps.implementationDataType) an ImplementationDataType of category ARRAY with a subElement that either

- represents the platform type uint8 or
- references a SwBaseType with a SwBaseType.baseTypeDefinition.baseTypeSize set to the value 8 and the SwBaseType.baseTypeDefinition.baseTypeEncoding set to NONE,

then this SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02084] SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and a DataTypeMap exists ⌈ If a SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and a DataTypeMap exists that points to the ApplicationArrayDataType and an ImplementationDataType of category ARRAY or TYPE_REFERENCE that eventually references (via the SwDataDefProps.implementationDataType) an ImplementationDataType of category ARRAY with a subElement that either

- represents the platform type uint8 or
- references a SwBaseType with a SwBaseType.baseTypeDefinition.baseTypeSize set to the value 8 and the SwBaseType.baseTypeDefinition.baseTypeEncoding set to NONE,

then this SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02085] SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category ARRAY ⌈ If a SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category ARRAY with a subElement that either

- represents the platform type uint8 or
- references a SwBaseType with a SwBaseType.baseTypeDefinition.baseTypeSize set to the value 8 and the SwBaseType.baseTypeDefinition.baseTypeEncoding set to NONE,

then this SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02086] SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category VALUE or TYPE_REFERENCE ⌈ If a SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category VALUE or TYPE_REFERENCE that eventually references (via the SwDataDefProps.implementationDataType) an ImplementationDataType of category VALUE then this SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02087] SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category BOOLEAN and no DataTypeMap exists ⌈ The SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02088] SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and no DataTypeMap exists ⌈ If a SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and no DataTypeMap exists and the ApplicationArrayDataType fulfills the following conditions:

- ApplicationPrimitiveDataType.swDataDefProps.dataConstr exists and refers to a PhysConstrs.
- ApplicationPrimitiveDataType.swDataDefProps.compuMethod exists and refers to a CompuMethod of category TEXTTABLE and CompuMethod.compuPhysToInternal exists.
- Application of ApplicationPrimitiveDataType.swDataDefProps.compuMethod to ApplicationPrimitiveDataType.swDataDefProps.dataConstr yields a numerical range in [0 .. 255]

then the SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02089] SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and no DataTypeMap exists ⌈ If a SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and no DataTypeMap exists and the ApplicationPrimitiveDataType fulfills the following conditions:

- ApplicationPrimitiveDataType.swDataDefProps.swRecordLayout exists and values of SwRecordLayout.swRecordLayoutGroup.swRecordLayoutGroupFrom and SwRecordLayout.swRecordLayoutGroup.swRecordLayoutGroupTo are both set to 1.
- AApplicationPrimitiveDataType.swDataDefProps.swTextProps exists and refers to an SwBaseType where the SwBaseType.baseTypeDefinition.baseTypeEncoding is set to NONE and the value of SwBaseType.baseTypeDefinition.baseTypeSize is set to 8.

then the SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_02090] SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category VALUE and no DataTypeMap exists ⌈ There is no clear indication that the SenderReceiverInterface.dataElement is a candidate for a primitive Data Mapping. ⌋*()*

[TPS_SYST_01037] primitive Data Mapping of UINT8-Arrays ⌈ The primitive Data Mapping may also be used for the Data Mapping of UINT8-Arrays. This supports an optimized definition of the Data Mapping. ⌋*()*

In other words it is allowed to map an array VariableDataPrototype consisting of UINT8 elements to exactly one SystemSignal in the context of one SenderReceiverToSignalMapping. A UINT8 element may be a String or an array that contains array elements of Integer type with range 0..255.

Background: In the ECU Configuration of the AUTOSAR COM module such a SystemSignal will be mapped to a COM Signal with the ComSignalType UINT8_N.

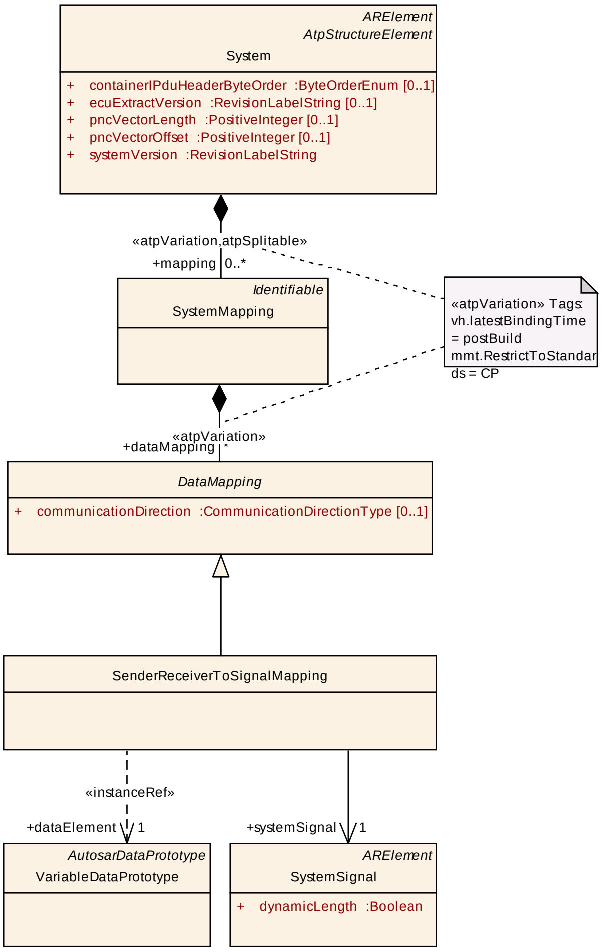


Figure 5.9: Mapping of data elements with primitive datatypes (SenderRecPrimitiveTypeMapping)

Class	SenderReceiverToSignalMapping			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of a sender receiver communication data element to a signal.			
Base	ARObject, DataMapping			
Attribute	Type	Mul.	Kind	Note
dataElement	VariableDataPrototype	1	iref	Reference to the data element.
systemSignal	SystemSignal	1	ref	Reference to the system signal used to carry the data element.

Table 5.16: SenderReceiverToSignalMapping

5.2.1.2 Mapping of Variable Data Prototypes with composite datatypes (Sender-Receiver Communication)

This section describes the mapping of VariableDataPrototypes typed by composite data types to SystemSignals.

It is not possible to map a VariableDataPrototype typed by composite data type directly (without any additional mechanisms) to one SystemSignal because The RTE is required to treat AUTOSAR signals transmitted using sender-receiver communication consistently. For this purpose, data transformation or SystemSignalGroups is used.

There are two ways to map a VariableDataPrototype typed by composite data type to SystemSignals/SystemSignalGroups:

1. Use data transformation and map it directly to a SystemSignal.
2. Map it to a SystemSignalGroup with SenderReceiverToSignalGroupMapping

[constr_3506] Mapping of composite data type to SystemSignals in SystemSignalGroup ⌈ The elements of a composite data type shall be mapped to single SystemSignals which shall be members of one SystemSignalGroup if no data transformation (except COM Based Transformer) is used.

There are two exceptions to this rule:

- it is allowed to map an array VariableDataPrototype consisting of UINT8 elements to exactly one SystemSignal in the context of one SenderReceiverToSignalMapping (see section 5.2.1.1).
- in case the COM Based Transformer [17] is used it is the integral part of the approach to have a fixed mapping of the individual elements of composite data types to SystemSignals in a SystemSignalGroup ([TPS_SYST_02058]).

⌋()

5.2.1.2.1 Data Transformation

If data transformation is used, the consistency of the composite data is assured by the transformation.

A VariableDataPrototype typed by composite data type can be mapped to one SystemSignal without any SystemSignalGroup if data transformation is used.

In that case any required mapping between the ApplicationCompositeElementDataPrototypes of the VariableDataPrototype of the connected PortPrototypes needs to be expressed by means of a PortInterfaceMapping attached to the SwConnector connecting the two PortPrototypes and not by means of two separated DataMappings (one referencing the VariableDataPrototype at the PPortPrototype and the other one referencing the VariableDataPrototype at the RPortPrototype).

During creation of a System Extract of the System Configuration Description or the creation of an ECU Extract of the System Configuration Description, this PortInterfaceMapping needs to be preserved in order to support proper deserializing transformation at the receiver side (see chapter 11.4 and 12.2).

See chapter 7 for details how to enable data transformation.

In case the COM Based Transformer [17] is used the mapping from section 7.3.3 is required.

5.2.1.2.2 Mapping via SystemSignalGroups

The VariableDataPrototype that is referenced by dataElement can be typed by an ApplicationDataType or by an ImplementationDataType. This type decides which reference is used within the SenderRecRecordElementMapping and SenderRecArrayElementMapping.

Composite VariableDataPrototypes may nest within other composite VariableDataPrototypes. Each element typed by a primitive data type of such nested composite VariableDataPrototypes shall be mapped to one SystemSignal.

The mapping between the SystemSignal and the VariableDataPrototype is provided in the SenderReceiverToSignalGroupMapping (see Figure 5.10).

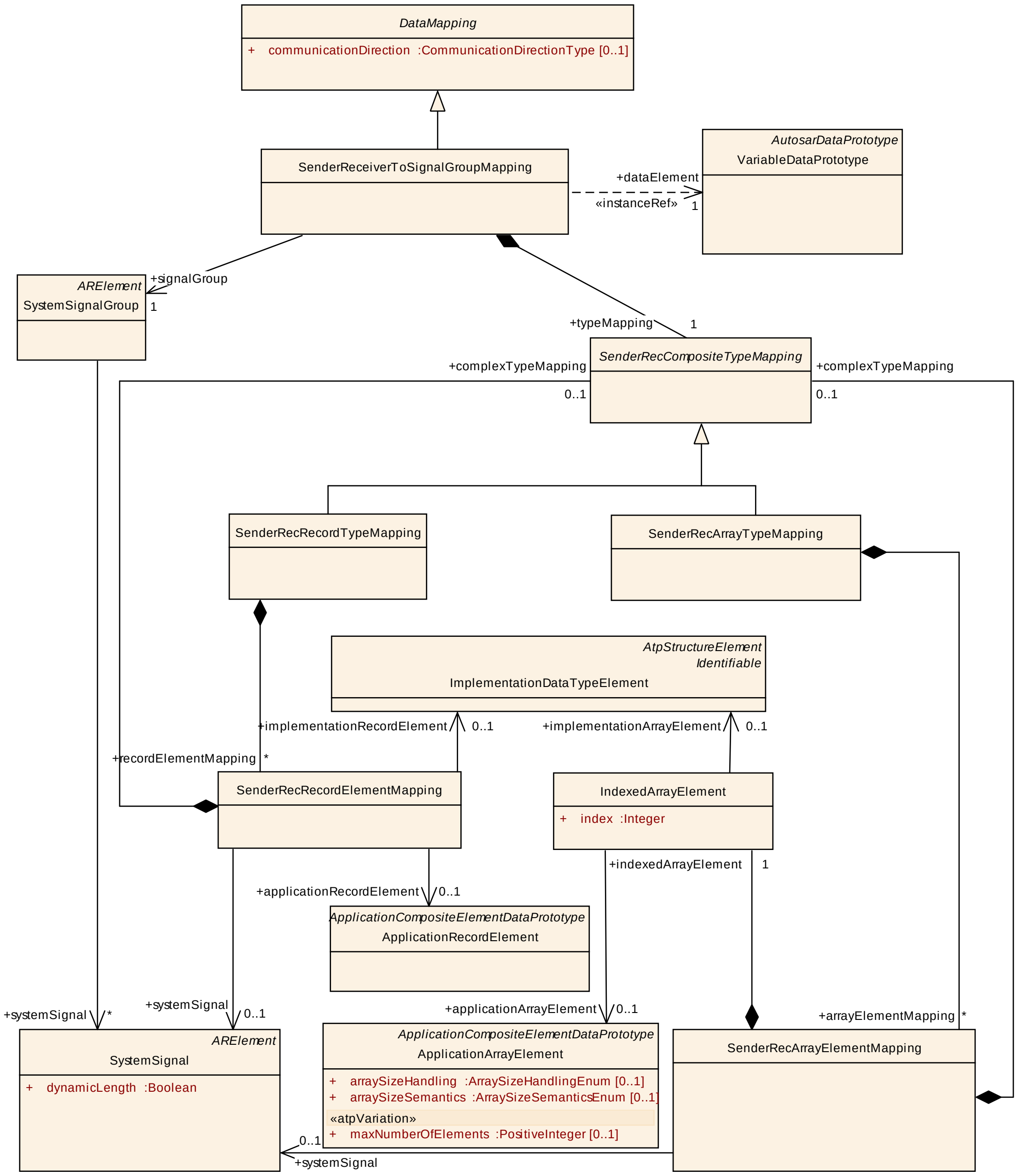


Figure 5.10: Mapping of data elements with composite data types (SenderRecCompositeTypeMapping)

[constr_3000] valid SenderRecCompositeTypeMappings ⌈SenderReceiverToSignalGroupMapping.signalGroup.systemSignal shall point to each SystemSignal being mapped within the context of SenderReceiverToSignalGroupMapping.

In other words: For each SystemSignal referenced in the role SenderReceiverToSignalGroupMapping.signalGroup.systemSignal there shall be either a reference in the role SenderRecRecordElementMapping.systemSignal or a reference in the role SenderRecArrayElementMapping.systemSignal aggregated by the same SenderReceiverToSignalGroupMapping that refers to this System-Signal. ⌋()

Class	**SenderReceiverToSignalGroupMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of a sender receiver communication data element with a composite datatype to a signal group.			
Base	ARObject, DataMapping			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
dataElement	VariableDataPrototype	1	iref	Reference to a data element with a composite datatype which is mapped to a signal group.
signalGroup	SystemSignalGroup	1	ref	Reference to the signal group, which contain all primitive datatypes of the composite type
typeMapping	SenderRecCompositeTypeMapping	1	aggr	The CompositeTypeMapping maps the the ApplicationArrayElements and ApplicationRecordElements to Signals of the SignalGroup.

Table 5.17: SenderReceiverToSignalGroupMapping

Class	**SenderRecCompositeTypeMapping (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Two mappings exist for the composite data types: "ArrayTypeMapping" and "RecordTypeMapping". In both, a primitive datatype will be mapped to a system signal. But it is also possible to combine the arrays and the records, so that an "array" could be an element of a "record" and in the same manner a "record" could be an element of an "array". Nesting these data types is also possible. If an element of a composite data type is again a composite one, the "CompositeTypeMapping" element will be used one more time (aggregation between the ArrayElementMapping and CompositeTypeMapping or aggregation between the RecordElementMapping and CompositeTypeMapping).			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 5.18: SenderRecCompositeTypeMapping

Class	**SenderRecArrayTypeMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	If the ApplicationCompositeDataType is an Array, the "ArrayTypeMapping" will be used.			
Base	ARObject, SenderRecCompositeTypeMapping			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
arrayElementMapping	SenderRecArrayElementMapping	*	aggr	Each ApplicationArrayElement must be mapped on a SystemSignal.

Table 5.19: SenderRecArrayTypeMapping

Class	**SenderRecRecordTypeMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	If the ApplicationCompositeDataType is a Record, the "RecordTypeMapping" will be used.			
Base	ARObject, SenderRecCompositeTypeMapping			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
recordElementMapping	SenderRecRecordElementMapping	*	aggr	Each ApplicationRecordElement must be mapped on a SystemSignal.

Table 5.20: SenderRecRecordTypeMapping

Class	**SenderRecRecordElementMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of a primitive record element to a SystemSignal. If the VariableDataPrototype that is referenced by SenderReceiverToSignalGroupMapping is typed by an ApplicationDataType the reference applicationRecordElement shall be used. If the VariableDataPrototype is typed by the ImplementationDataType the reference implementationRecordElement shall be used. Either the implementationRecordElement or applicationRecordElement reference shall be used. If the element is composite, there will be no mapping to the SystemSignal (multiplicity 0). In this case the RecordElementMapping element will aggregate the complexTypeMapping element. In that way also the composite datatypes can be mapped to SystemSignals.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applicationRecordElement	ApplicationRecordElement	0..1	ref	Reference to an ApplicationRecordElement in the context of the dataElement or in the context of a composite element.
complexTypeMapping	SenderRecCompositeTypeMapping	0..1	aggr	This aggregation will be used if the element is composite.
implementationRecordElement	ImplementationDataTypeElement	0..1	ref	Reference to an ImplementationRecordElement in the context of the dataElement or in the context of a composite element.

Attribute	Type	Mul.	Kind	Note
systemSignal	SystemSignal	0..1	ref	Reference to the system signal used to carry the primitive ApplicationRecordElement.

Table 5.21: SenderRecRecordElementMapping

[constr_3230] Usage of SenderRecRecordElementMapping.applicationRecordElement ⌈ SenderRecRecordElementMapping.applicationRecordElement shall only be used if the referenced context element (VariableDataPrototype that is referenced by the SenderReceiverToSignalGroupMapping.dataElement) is typed by an ApplicationDataType. ⌋*()*

[constr_3244] Usage of SenderRecRecordElementMapping.implementationRecordElement ⌈ SenderRecRecordElementMapping.implementationRecordElement shall only be used if the referenced context element (VariableDataPrototype that is referenced by the SenderReceiverToSignalGroupMapping.dataElement) is typed by an ImplementationDataType. ⌋*()*

Class	**SenderRecArrayElementMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	The SenderRecArrayElement may be a primitive one or a composite one. If the element is primitive, it will be mapped to the SystemSignal (multiplicity 1). If the VariableDataPrototype that is referenced by SenderReceiverToSignalGroupMapping is typed by an ApplicationDataType the reference to the ApplicationArrayElement shall be used. If the VariableDataPrototype is typed by the ImplementationDataType the reference to the ImplementationArrayElement shall be used. If the element is composite, there will be no mapping to the SystemSignal (multiplicity 0). In this case the ArrayElementMapping element will aggregate the TypeMapping element. In that way also the composite datatypes can be mapped to SystemSignals. Regardless whether composite or primitive array element is mapped the indexed element always needs to be specified.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
complexTypeMapping	SenderRecCompositeTypeMapping	0..1	aggr	This aggregation will be used if the element is composite.
indexedArrayElement	IndexedArrayElement	1	aggr	Reference to an indexed array element in the context of the dataElement or in the context of a composite element.
systemSignal	SystemSignal	0..1	ref	Reference to the system signal used to carry the primitive ApplicationArrayElement.

Table 5.22: SenderRecArrayElementMapping

Class	IndexedArrayElement			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	This element represents exactly one indexed element in the array. Either the applicationArrayElement or implementationArrayElement reference shall be used.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
applicationArrayElement	ApplicationArrayElement	0..1	ref	Reference to an ApplicationArrayElement in an array.
implementationArrayElement	ImplementationDataTypeElement	0..1	ref	Reference to an ImplementationDataTypeElement in an array.
index	Integer	1	attr	Position of an element in an array. Starting position is 0.

Table 5.23: IndexedArrayElement

[constr_3231] Usage of IndexedArrayElement.applicationArrayElement ⌈ IndexedArrayElement.applicationArrayElement shall only be used if the referenced context element (VariableDataPrototype that is referenced by the SenderReceiverToSignalGroupMapping.dataElement) is typed by an ApplicationDataType. ⌋*()*

[constr_3245] Usage of IndexedArrayElement.implementationArrayElement ⌈ IndexedArrayElement.implementationArrayElement shall only be used if the referenced context element (VariableDataPrototype that is referenced by the SenderReceiverToSignalGroupMapping.dataElement) is typed by an ImplementationDataType. ⌋*()*

Figure 5.11 shows a mapping example for nested composite data types.

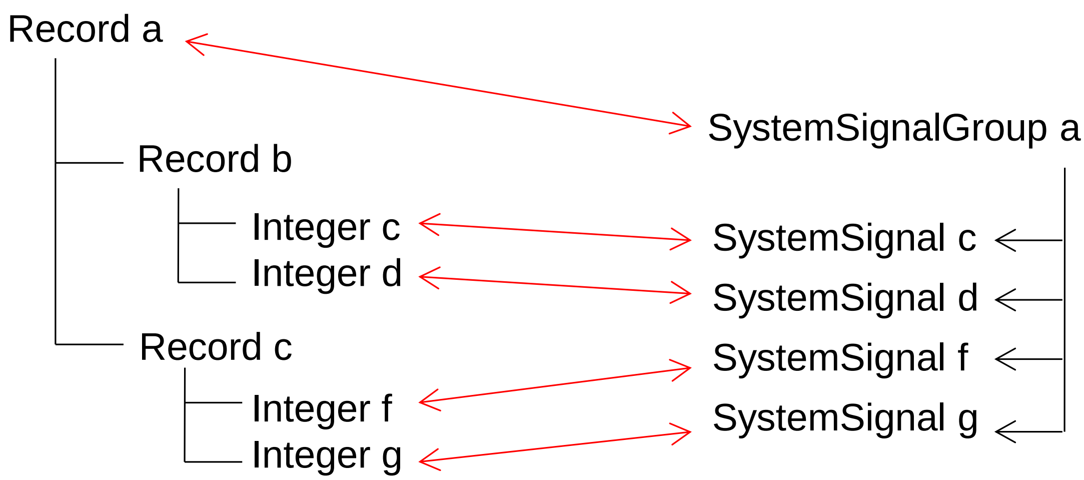


Figure 5.11: Mapping example for nested composite data types

Record a is mapped with SenderReceiverToSignalGroupMapping to a SystemSignalGroup. The content of Record a is mapped with the SenderRecRecordTypeMapping. Since the first element of *Record a* is *Record b* the Sender-

RecRecordElementMapping does not contain a reference to a SystemSignal because signals apply only to atomic data items. Instead it contains a complexTypeMapping with two SenderRecRecordElementMappings for *Integer c* and *Integer d*. These two elements are mapped to SystemSignals.

Please note that a partial mapping of a data element typed by composite data type in a PPortPrototype is also supported. If a VariableDataPrototype with a composite data type in a PPortPrototype is mapped to a SystemSignalGroup then it is allowed to map only a subset of elements of the composite data type that are primitives to separate SystemSignals of the SystemSignalGroup. This means that it is possible to transmit a subset of a composite data element in a ISignalGroup over the network. Figure 5.12 shows a partial mapping example for nested composite data types.

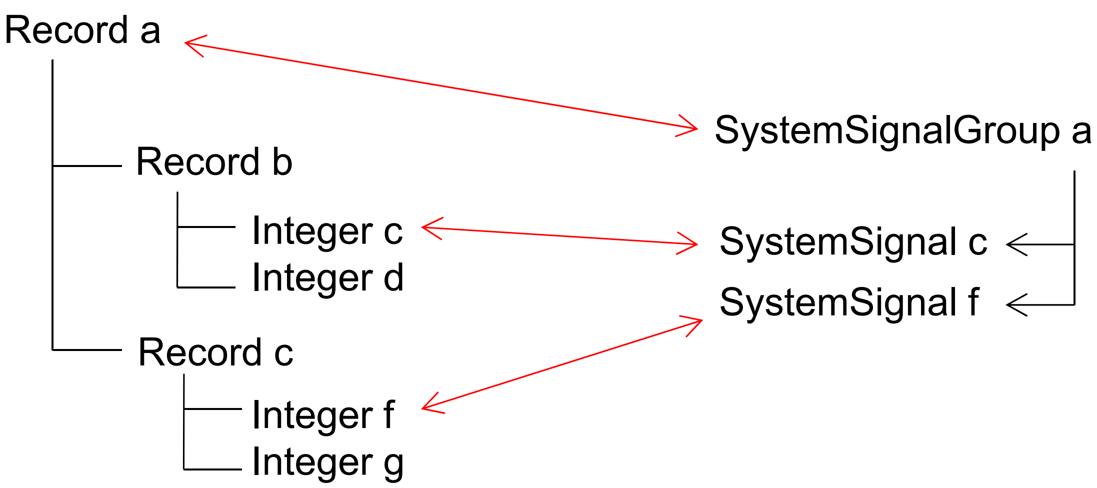


Figure 5.12: Partial mapping example for nested composite data types

5.2.1.3 Mapping of Client Server Operations to System Signals

This section describes the mapping of ClientServerOperations to SystemSignals (see Figure 5.13).

[TPS_SYST_01148] Mapping of IN and INOUT ArgumentDataPrototypes to callSignals ⌈ The ArgumentDataPrototypes that are passed to the operation (i.e. the direction is "in") and the ArgumentDataPrototypes that are passed to and returned from the operation (i.e. the direction is "inout") are expected to be mapped to the callSignal by the serializer. ⌋*()*

[TPS_SYST_01149] Mapping of OUT and INOUT ArgumentDataPrototypes to returnSignals ⌈ The ArgumentDataPrototypes that are returned from the operation (i.e. the direction is "out") and the ArgumentDataPrototypes that are passed to and returned from the operation (i.e. the direction is “inout”) are expected to be mapped to the returnSignal by the serializer. ⌋()

[TPS_SYST_01150] Mapping of returnSignal and callSignal to COM Signal ⌈ In the ECU Configuration of the AUTOSAR COM module the returnSignal and the callSignal are expected to be mapped to COM Signals with the ComSignalType UINT8_N or UINT8_DYN. ⌋()

The ClientServerToSignalMapping can only map transformed data to System-Signals because it contains no information how data shall be serialized, it only references the primitive SystemSignal which shall contain the serialized data. How to define the necessary information which serialization algorithm shall be applied can be found in chapter 7. The implementation of this algorithm is provided via a BSW module.

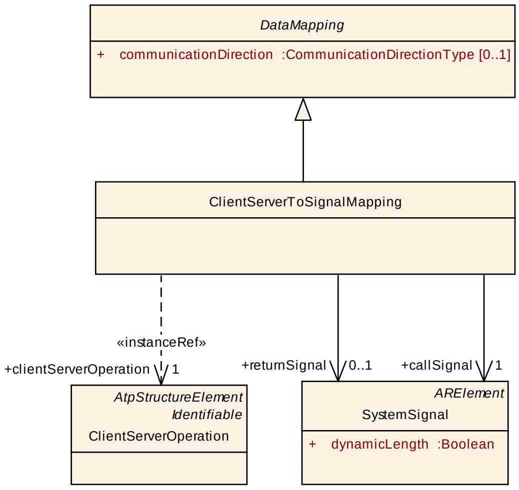


Figure 5.13: Mapping of a ClientServerOperation to a callSignal and a returnSignal

Class	**ClientServerToSignalMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	This element maps the ClientServerOperation to call- and return-SystemSignals.			
Base	ARObject, DataMapping			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
callSignal	SystemSignal	1	ref	Reference to the callSignal to which the IN and INOUT ArgumentDataPrototypes are mapped.
clientServerOperation	ClientServerOperation	1	iref	Reference to a ClientServerOperation, which is mapped to a call SystemSignal and a return SystemSignal.
returnSignal	SystemSignal	0..1	ref	Reference to the returnSignal to which the OUT and INOUT ArgumentDataPrototypes are mapped. **Tags:** atp.Status=shallBecomeMandatory

Table 5.24: ClientServerToSignalMapping

[constr_3111] returnSignal in ClientServerToSignalMapping is mandatory
⌈A ClientServerToSignalMapping shall always have a returnSignal defined.
⌋*()*

[constr_3215] TransformationTechnology.version and TransformationTechnology.protocol settings for request and response of a client/server communication ⌈ TransformationTechnology.version and TransformationTechnology.protocol shall be identical for ISignals that are derived from the same ClientServerOperation. This means that all ISignals that refer to ClientServerToSignalMapping.callSignal or to ClientServerToSignalMapping.returnSignal of the same ClientServerToSignalMapping shall have the same TransformationTechnology.protocol and TransformationTechnology.version defined. ⌋*()*

5.2.1.4 Mapping of a ApplicationCompositeElementDataPrototype within a composite application data type on a System Signal (Sender-Receiver Communication)

SenderReceiverCompositeElementToSignalMapping is used to map a ApplicationCompositeElementDataPrototype that is aggregated within a composite data type (record element or an array element) to a SystemSignal.

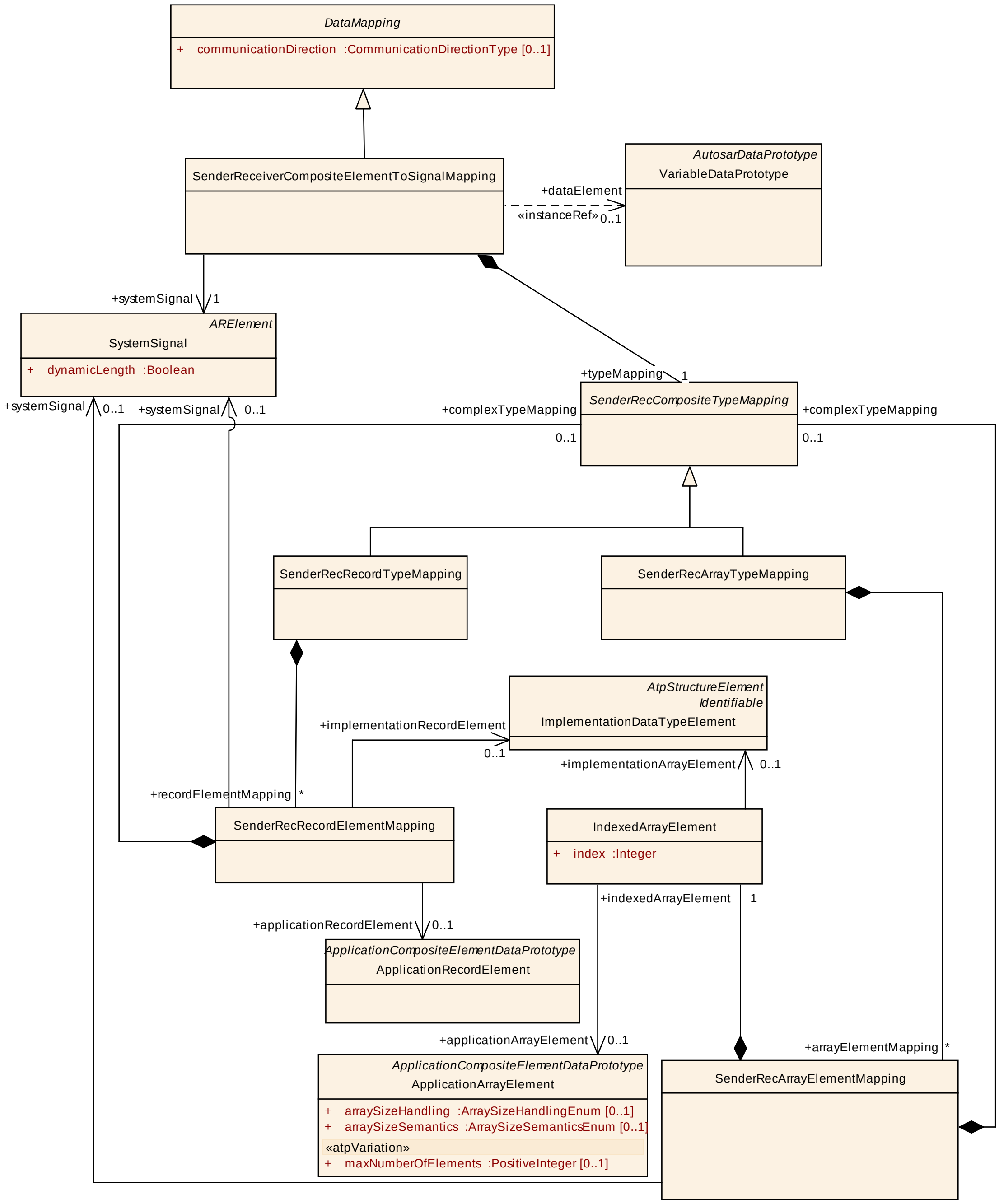


Figure 5.14: Mapping of a Variable Data Prototype which is aggregated within a composite data type on a System Signal

[constr_3058] References from `SenderRecArrayElementMapping` and from `SenderRecRecordElementMapping` to `SystemSignal`s are not allowed within a `SenderReceiverCompositeElementToSignalMapping` ⌈ The reference from `SenderRecArrayElementMapping` to `SystemSignal` and from `SenderRecRecordElementMapping` to `SystemSignal` shall not exist if the enclosing `SenderRecCompositeTypeMapping` is owned by a `SenderReceiverCompositeElementToSignalMapping`. ⌋*()*

[constr_3059] Mandatory DataMapping on the receiver side for elements of a composite data type ⌈ On the receiver side, it is required that for every ApplicationCompositeElementDataPrototype of an ApplicationCompositeDataType (ApplicationArrayDataType.element resp. ApplicationRecordDataType.element) that types a dataElement in a RPortPrototype or PRPortPrototype in its receiver role a DataMapping exists. ⌋*()*

[TPS_SYST_01143] DataMapping on the sender side for elements of a composite data type ⌈ On the sender side, it is possible that only a subset of elements of a ApplicationCompositeElementDataPrototypes a dataElement in a PPortPrototype or a PRPortPrototype in its sender role is referenced by a DataMapping. ⌋*()*

Class	**SenderReceiverCompositeElementToSignalMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	Mapping of an Variable Data Prototype which is aggregated within a composite datatype to a SystemSignal (only one element of the composite data type is mapped).			
Base	ARObject, DataMapping			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataElement	VariableDataPrototype	0..1	iref	Reference to a data element with a composite datatype from which one element is mapped to a SystemSignal.
systemSignal	SystemSignal	1	ref	Reference to the SystemSignal to which one primitive of the composite type is mapped.
typeMapping	SenderRecCompositeTypeMapping	1	aggr	The CompositeTypeMapping maps one VariableDataPrototype of the composite data type to a SystemSignal.

Table 5.25: SenderReceiverCompositeElementToSignalMapping

SenderRecCompositeTypeMapping and all subclasses are described in section 5.2.1.2

5.2.1.5 Mapping of Trigger to SystemSignal

[TPS_SYST_05001] Send a Trigger across a network ⌈ In order to be able to send a Trigger across a network to trigger a RunnableEntity deployed to a different EcuInstance it is possible to define a TriggerToSignalMapping that maps a Trigger to a SystemSignal in the role systemSignal. ⌋*()*

[constr_1198] TriggerToSignalMapping.systemSignals eligible for a TriggerToSignalMapping ⌈ In the context of a TriggerToSignalMapping, it is only possible to refer to a TriggerToSignalMapping.systemSignal that in turn is referenced by an ISignal with attribute length set to 0. ⌋*()*

[constr_1199] ISignals relating to systemSignals eligible for a TriggerToSignalMapping ⌈ An ISignal used to reference a systemSignal that in turn is referenced by a TriggerToSignalMapping shall also be referenced by an

ISignalToIPduMapping where the attribute updateIndicationBitPosition is defined. ⌋()

[TPS_SYST_05002] The value of startPosition is irrelevant ⌈ The value of startPosition shall not be considered inside an ISignalToIPduMapping that references an ISignal used to reference a TriggerToSignalMapping.systemSignal that in turn is referenced by a TriggerToSignalMapping. ⌋()

[constr_3065] Mapping of queued Triggers to SystemSignals is prohibited ⌈ A TriggerToSignalMapping of a Trigger with swImplPolicy set to queued is prohibited. ⌋()

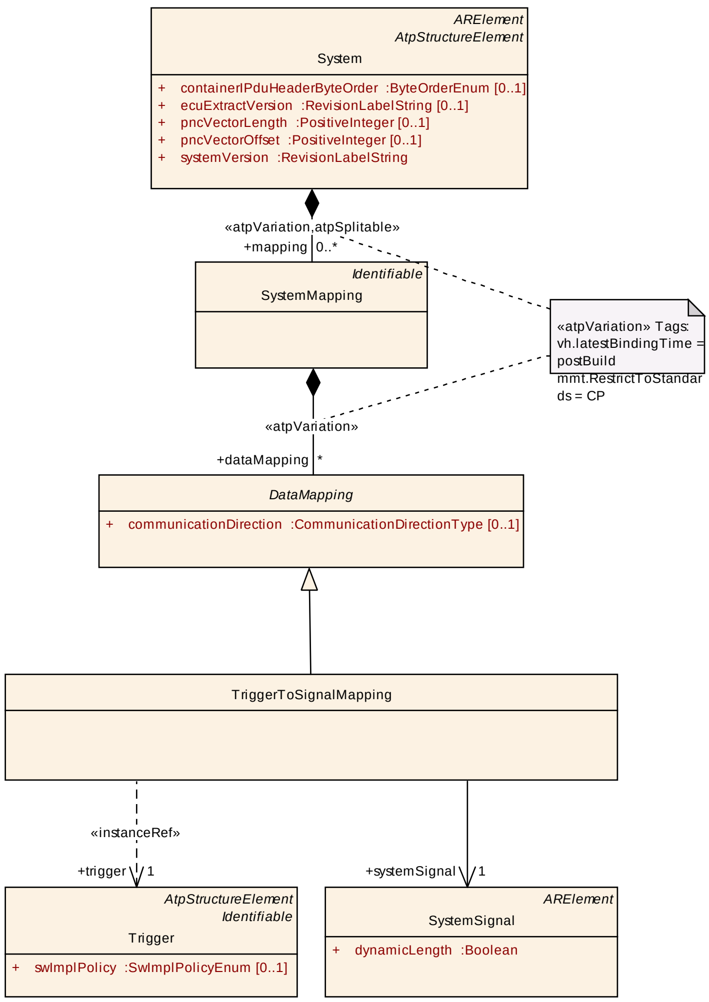


Figure 5.15: Structure of a TriggerToSignalMapping

Class	**TriggerToSignalMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping			
Note	This meta-class represents the ability to map a trigger to a SystemSignal of size 0. The Trigger does not transport any other information than its existence, therefore the limitation in terms of signal length.			
Base	ARObject, DataMapping			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	Type	Mul.	Kind	Note
systemSignal	SystemSignal	1	ref	This is the SystemSignal taken to transport the Trigger over the network. **Tags:** xml.sequenceOffset=20
trigger	Trigger	1	iref	This represents the Trigger that shall be used to trigger RunnableEntities deployed to a remote ECU. **Tags:** xml.sequenceOffset=10

Table 5.26: TriggerToSignalMapping

5.2.2 Signal Path Constraint

One task of the System Generator is to define the needed communication infrastructure (e.g. ISignals, Pdus, Frames) between ECUs. The System Generator often has the choice between alternative paths through the topology. In the example shown in Figure 5.16 the System Generator would have the choice between two paths (Path1: CAN3 or Path2: CAN1-GW-CAN2) for a signal that is send by ECU2 and is received by ECU4. If no further information is given the decision will be made e.g. by means of boundary conditions like busload, transmissions speed, etc.

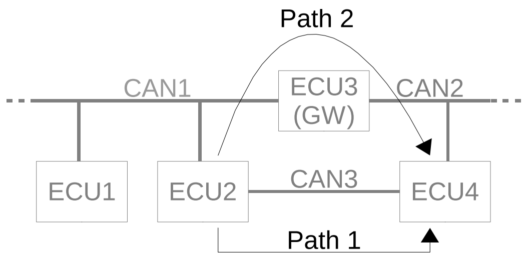


Figure 5.16: Example for a Communication Path

Signal Mapping Constraints allow to further restrict or specify the path(s) a signal is allowed to be transmitted over. A path is specified by an list of PhysicalChannels.

There exist four different constraints for signals regarding the signal path (see Figure 5.17):

[TPS_SYST_01041] CommonSignalPath definition ⌈ The CommonSignalPath describes that two or more signals shall take the same path in the topology. ⌋ *(RS_SYST_00017)*

[TPS_SYST_01042] ForbiddenSignalPath definition ⌈ The ForbiddenSignalPath describes the path that one or more signals shall not take in the topology, e.g. in case of safety critical transmission. ⌋ *(RS_SYST_00020)*

[TPS_SYST_01043] PermissibleSignalPath definition ⌈ The PermissibleSignalPath describes the path one or more signals may take in the topology. If more than one PermissibleSignalPath is defined for the same signal/operation attributes, any of them may be chosen. ⌋*(RS_SYST_00019, RS_SYST_00016)*

[TPS_SYST_01044] SeparateSignalPath definition ⌈ The SeparateSignalPath describes that two or more signals shall take separate paths in the topology e.g. in case of redundant transmission. ⌋*(RS_SYST_00018)*

It is also possible that the same signal is aggregated two times by the SeparateSignalPath element to indicate that this signal should be transmitted redundantly over two different paths.

The meta-model part, which describes the Communication Path constraints, will be explained in the following sections.

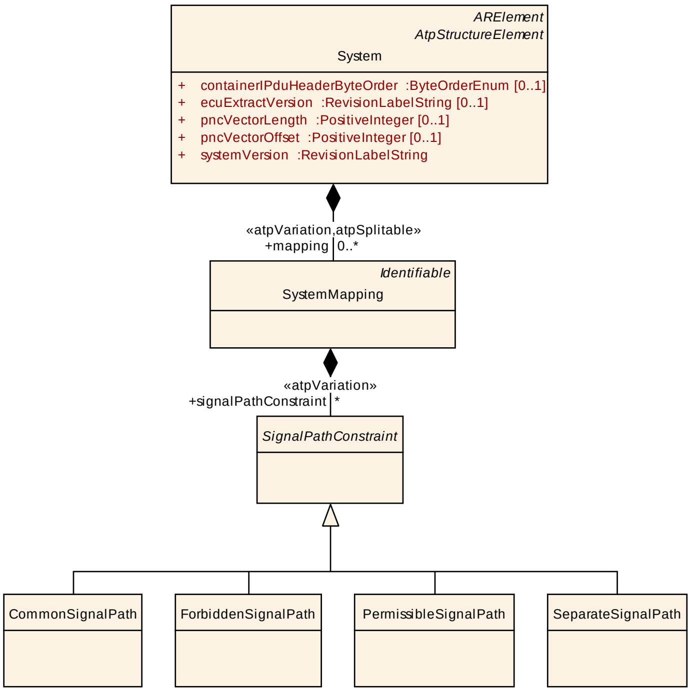


Figure 5.17: Communication Path Description (SignalPathConstraints)

5.2.2.1 CommonSignalPath

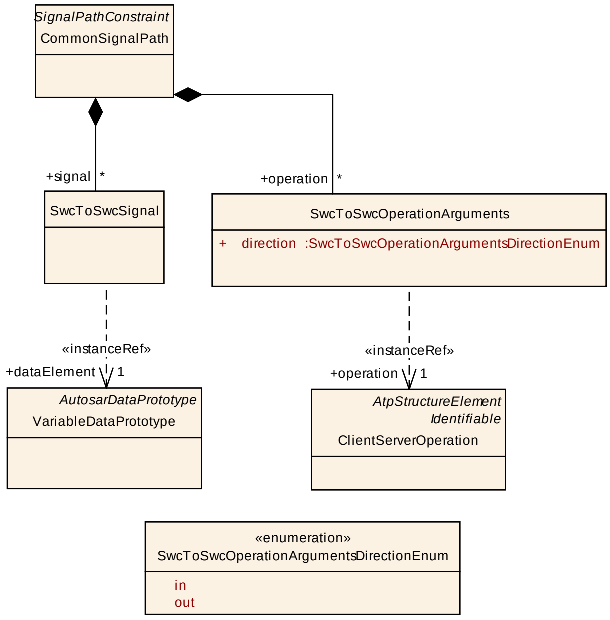


Figure 5.18: Description of signals that must take the same way in the topology (CommonSignalPath)

Class	CommonSignalPath			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The CommonSignalPath describes that two or more SwcToSwcSignals and/or SwcToSwcOperationArguments must take the same way (Signal Path) in the topology.			
Base	ARObject, SignalPathConstraint			
Attribute	Type	Mul.	Kind	Note
operation	SwcToSwcOperationArguments	*	aggr	The arguments sent in one direction (either from client to server or server to client) of the operations that must take the same signal path.
signal	SwcToSwcSignal	*	aggr	The SwcToSwcSignals that must take the same way (Signal Path) in the topology.

Table 5.27: CommonSignalPath

Class	SwcToSwcSignal			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The SwcToSwcSignal describes the information (data element) that is exchanged between two SW Components. On the SWC Level it is possible that a SW Component sends one data element from one P-Port to two different SW Components (1:n Communication). The SwcToSwcSignal describes exactly the information which is exchanged between one P-Port of a SW Component and one R-Port of another SW Component.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
dataElement	VariableDataPrototype	2	iref	Reference to a data element on the PPortPrototype and to the same data element on the RPortPrototype.

Table 5.28: SwcToSwcSignal

Class	**SwcToSwcOperationArguments**			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The SwcToSwcOperationArguments describes the information (client server operation arguments, plus the operation identification, if required) that are exchanged between two SW Components from exactly one client to one server, or from one server back to one client. The direction attribute defines which direction is described. If direction == IN, all arguments sent from the client to the server are described by the SwcToSwcOperationArguments, in direction == OUT, it's the arguments sent back from server to client.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
direction	SwcToSwcOperationArgumentsDirectionEnum	1	attr	Direction addressed by this SwcToSwcClientServerOperation element.
operation	ClientServerOperation	2	iref	Reference to the operation at the client and at the server side whose arguments are described by SwcToSwcOperationArguments. The two ports referenced must be connected by a connector in the software component description.

Table 5.29: SwcToSwcOperationArguments

Enumeration	**SwcToSwcOperationArgumentsDirectionEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths
Note	Direction addressed by this element.
Literal	**Description**
in	IN (all IN and INOUT arguments) **Tags:** atp.EnumerationValue=0
out	OUT (all OUT and INOUT arguments) . **Tags:** atp.EnumerationValue=1

Table 5.30: SwcToSwcOperationArgumentsDirectionEnum

5.2.2.2 ForbiddenSignalPath

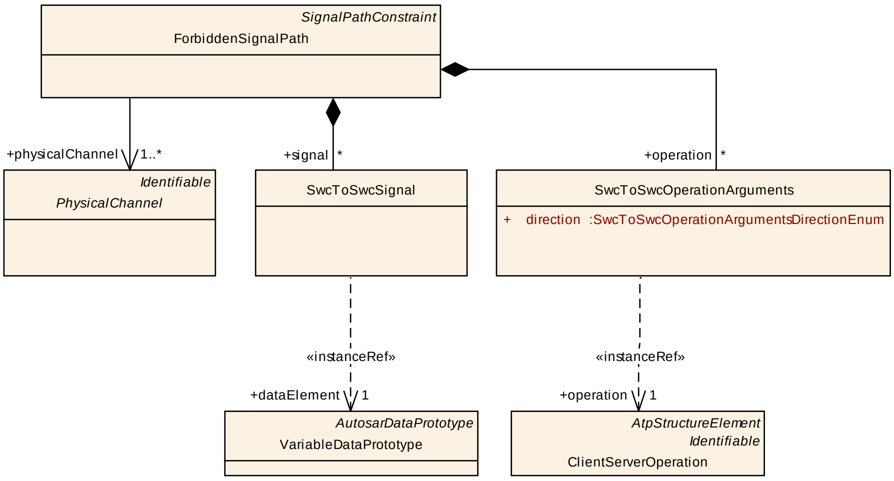


Figure 5.19: Description of the signal path that a signal must not take in the topology (ForbiddenSignalPath)

Class	**ForbiddenSignalPath**			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The ForbiddenSignalPath describes the physical channels which an element must not take in the topology. Such a signal path can be a constraint for the communication matrix, because such a path has an effect on the frame generation and the frame path.			
Base	ARObject, SignalPathConstraint			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
operation	SwcToSwcOperationArguments	*	aggr	Reference to the operation arguments of one operation which must not take the predefined way in the topology.
physicalChannel	PhysicalChannel	1..*	ref	The SwcToSwcSignal must not be transmitted on one of these physical channels.
signal	SwcToSwcSignal	*	aggr	The data element which must not take the predefined way in the topology.

Table 5.31: ForbiddenSignalPath

5.2.2.3 PermissibleSignalPath

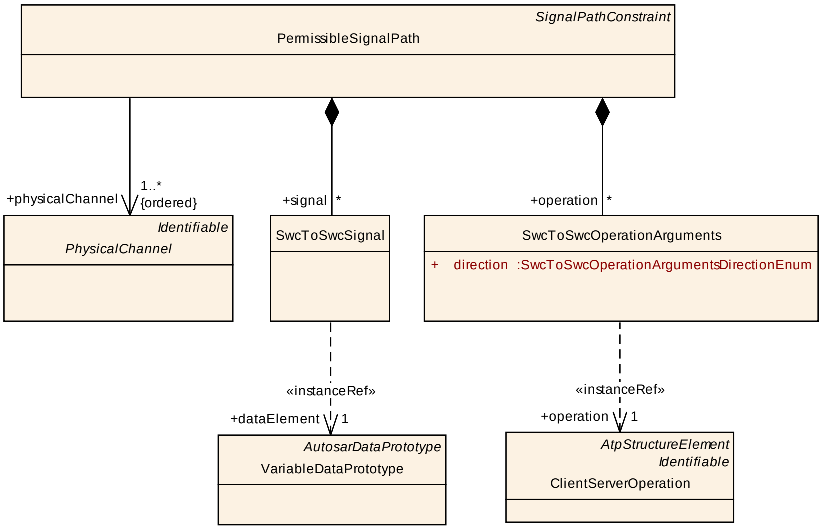


Figure 5.20: Description of the signal path that a signal must take in the topology (PermissibleSignalPath)

Class	**PermissibleSignalPath**			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The PermissibleSignalPath describes the way a data element shall take in the topology. The path is described by ordered references to PhysicalChannels. If more than one PermissibleSignalPath is defined for the same signal/operation attributes, any of them can be chosen. Such a signal path can be a constraint for the communication matrix . This path describes that one data element should take path A (e.g. 1. CAN channel, 2. LIN channel) and not path B (1. CAN channel, FlexRay channel A). This has an effect on the frame generation and the frame path.			
Base	ARObject, SignalPathConstraint			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
operation	SwcToSwcOperationArguments	*	aggr	The arguments of an operation that can take the predefined way in the topology.
physicalChannel (ordered)	PhysicalChannel	1..*	ref	The SwcToSwcSignal can be transmitted on one of these physical channels.
signal	SwcToSwcSignal	*	aggr	The data element which can take the predefined way in the topology.

Table 5.32: PermissibleSignalPath

5.2.2.4 SeparateSignalPath

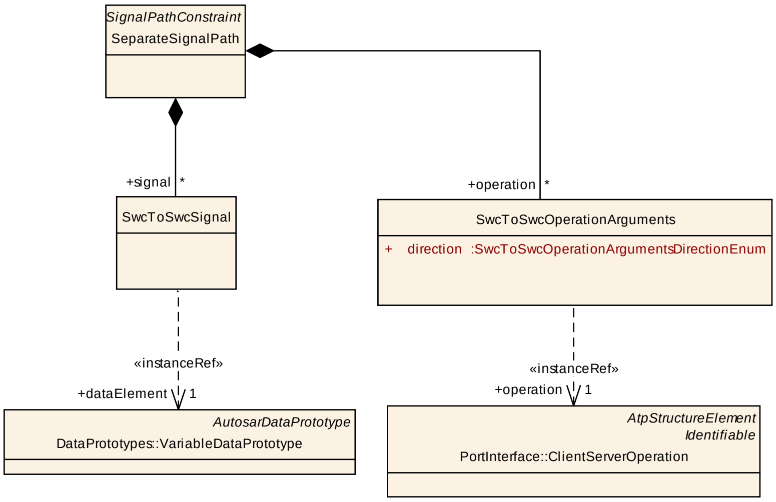


Figure 5.21: Description of signals that must not take the same way in the topology (SeparateSignalPath)

Class	**SeparateSignalPath**			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	The SeparateSignalPath describes that two SwcToSwcSignals and/or SwcToSwcOperationArguments must not take the same way (Signal Path) in the topology (e.g. Redundancy). This means that the signals are not allowed to share even a single physical channel in their path.			
Base	ARObject, SignalPathConstraint			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
operation	SwcToSwcOperationArguments	*	aggr	The SwcToSwcOperationArguments that must not take the same way (Signal Path) in the topology.
signal	SwcToSwcSignal	*	aggr	The SwcToSwcSignals that must not take the same way (Signal Path) in the topology.

Table 5.33: SeparateSignalPath

5.3 RTE and basic software resource estimations

Important constraints for system partitioning are the available resources on the ECUs in the system. For SW components, the resource estimations can be stated in SW component descriptions. It is however not only SW components that require resources. AUTOSAR RTE and basic software running on the ECU have resource needs as well.

The realization of the RTE and the kind of basic software to be run on a certain ECU depend on the implicit and explicit usage of all basic software by the software components. The software components need to communicate internally and with software components on other ECUs. Furthermore, they have different needs with respect to scheduling. This results in implicit use of e.g. communication and operating system software. In addition, the software components make explicit use of basic software when they e.g. utilize system services (e.g. diagnostics) and access sensors/actuators via the I/O abstraction layer or the Complex Driver abstraction layer. Thus, the resource consumption of the RTE and the basic software depend on the SW Components mapped to the ECU, since this determines the exact configuration of the RTE and the basic software.

[TPS_SYST_01126] Resource Consumption for RTE and basic software ⌈ The resource consumption for RTE and basic software may be specified using class EcuResourceEstimation. Each estimation is performed for a specific ECU and for a specific set of SW mapped to that ECU (reference from EcuResourceEstimation to EcuInstance and SwcToEcuMapping). ⌋ *(RS_SYST_00002)*

Different resource estimations for a specific ECU, but with different mappings may exist, e.g. for different variants of the system, or to show the difference of resource needs for different mappings. The EcuResourceEstimation aggregates the meta-class ResourceConsumption from the GenericStructure package each for RTE and basic software, which specifies stack and heap usage and execution time.

ExecutionTime and StackUsage are used to provide information on the implementation specific resource usage of the ExecutableEntity defined in the InternalBehavior of SW-Component respectively in the BswInternalBehavior of BSW Module. MemorySection documents the resources needed to load the object file containing the implementation on the ECU. HeapUsage describes the dynamic memory usage of the software.

Figure 5.22 shows the meta-model for resource estimations for RTE and basic SW.

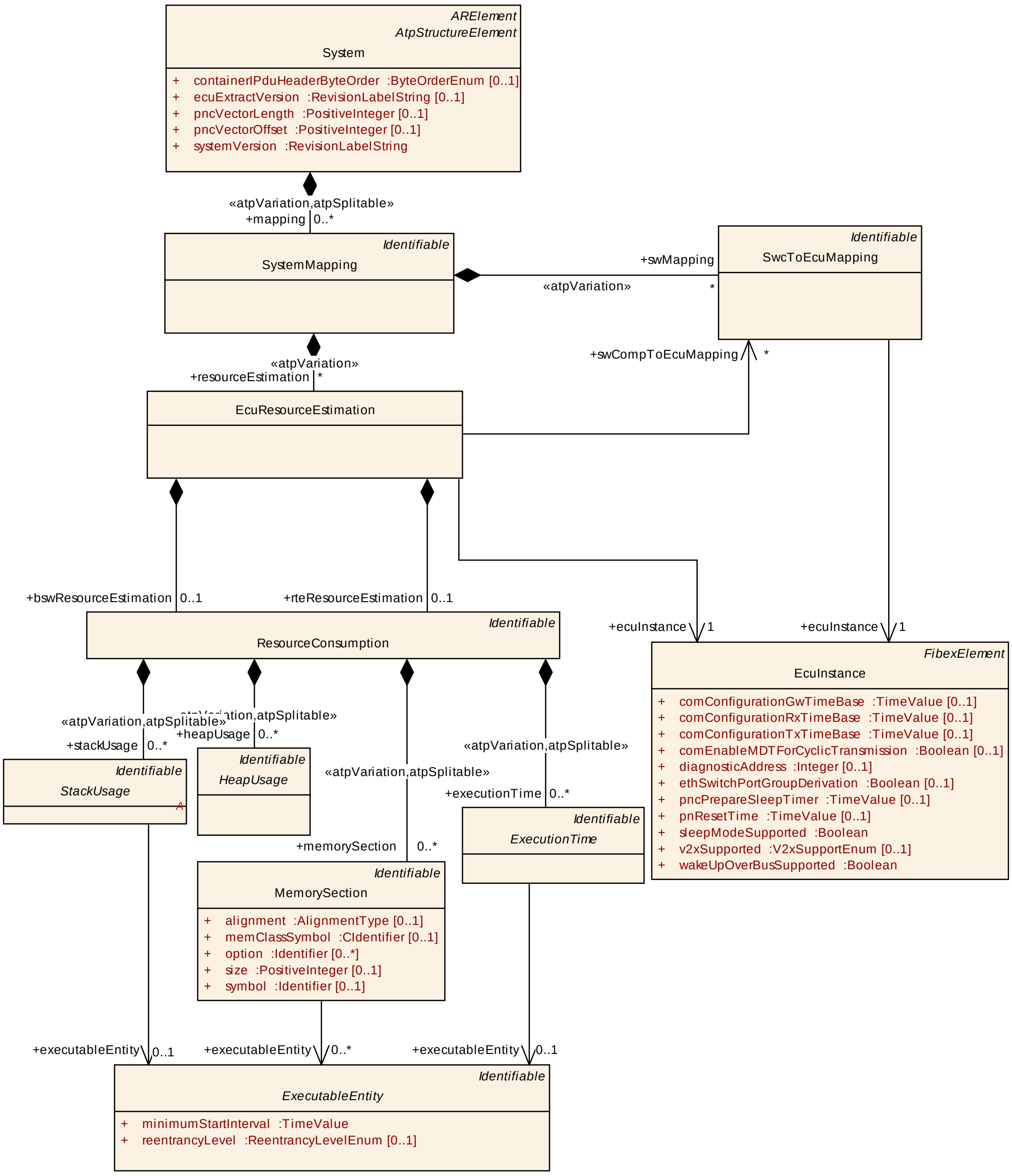


Figure 5.22: ECU resource estimations (ResourceEstimation)

[constr_3005] valid EcuResourceEstimation ⌈ The same EcuInstance shall be referenced directly from the EcuResourceEstimation and from the SwcToEcuMapping:

EcuResourceEstimation.swCompToEcuMapping.ecuInstance == EcuResourceEstimation.ecuInstance ⌋ *()*

Class	**EcuResourceEstimation**			
Package	M2::AUTOSARTemplates::SystemTemplate::SWmapping			
Note	Resource estimations for RTE and BSW of a single ECU instance.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	Type	Mul.	Kind	Note
bswResourceEstimation	ResourceConsumption	0..1	aggr	Estimation for the resource consumption of the basic software.
ecuInstance	EcuInstance	1	ref	Reference to the ECU this estimation is done for.
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the ecu resource estimation **Tags:** xml.sequenceOffset=-10
rteResourceEstimation	ResourceConsumption	0..1	aggr	Estimation for the resource consumption of the run time environment.
swCompToEcuMapping	SwcToEcuMapping	*	ref	References to SwcToEcuMappings that have been taken into account for the resource estimations. This way it is possible to define dfferent EcuResourceEstimations with diifferent mappings, e.g. before and after mapping an additional SW component.

Table 5.34: EcuResourceEstimation

Class	ResourceConsumption			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption			
Note	Description of consumed resources by one implementation of a software.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
accessCountSet	AccessCountSet	*	aggr	Set of access count values **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
executionTime	ExecutionTime	*	aggr	Collection of the execution time descriptions for this implementation. The aggregation of executionTime is subject to variability with the purpose to support the conditional existence of runnable entities. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
heapUsage	HeapUsage	*	aggr	Collection of the heap memory allocated by this implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

Attribute	*Type*	*Mul.*	*Kind*	*Note*
memorySection	MemorySection	*	aggr	An abstract memory section required by this Implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
sectionNamePrefix	SectionNamePrefix	*	aggr	A prefix to be used for the memory section symbol in the code. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
stackUsage	StackUsage	*	aggr	Collection of the stack memory usage for each runnable entity of this implementation. The aggregation of StackUsage is subject to variability with the purpose to support the conditional existence of runnable entities. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

Table 5.35: ResourceConsumption

The element ResourceConsumption and the subelements HeapUsage, MemorySection, StackUsage and ExecutionTime are described in more detail in the BSW Module Description [18].

5.4 Partial Networking

The AUTOSAR BSW stack supports power saving during vehicle operation time with the partial networking mechanism. This mechanism allows to shut down and startup the bus communication interfaces of groups of ECUs (Partial Network Cluster) during normal bus communication.

On the VFB Level Partial Networks are represented by Virtual Function Clusters and are described with PortGroups. The Virtual Function Cluster groups the communication necessary to realize one or more vehicle functions that can become activated/deactivated during normal vehicle operation. Virtual Function Clusters are described in more detail in [5]. The Virtual Function Clusters are mapped onto Partial Network Clusters.

[TPS_SYST_01133] Partial Network Clusters ⌈ Partial Network Clusters are realized with ISignalIPduGroups using PncMapping. ⌋ *(RS_SYST_00042)*

PncMapping is Describable.

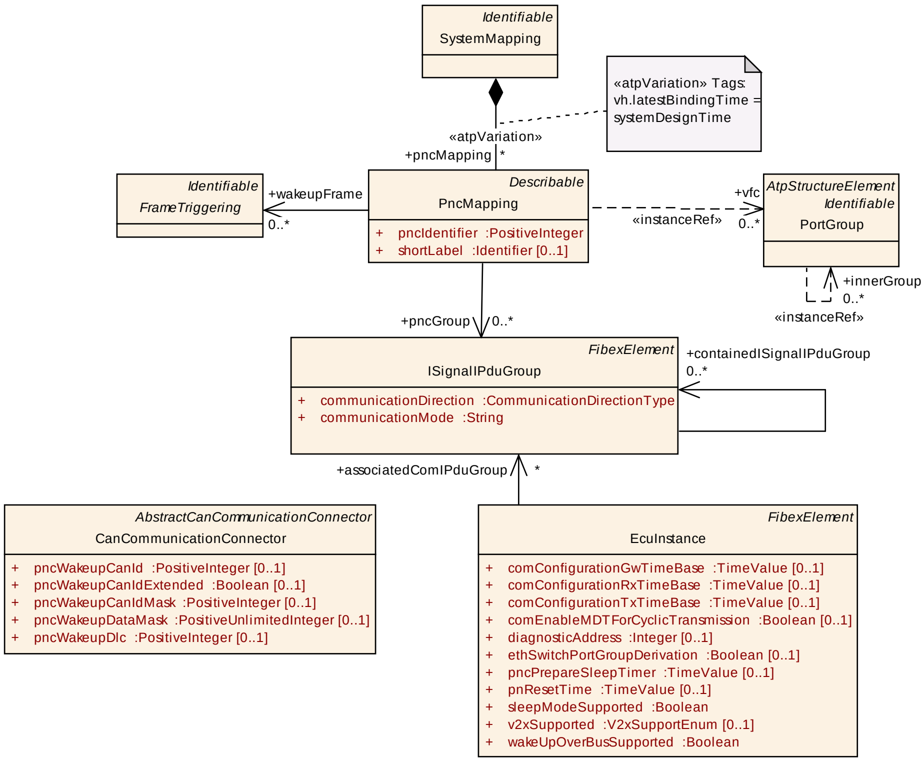


Figure 5.23: Mapping of Virtual Function Clusters onto Partial Network Clusters

Class	**PncMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::PncMapping			
Note	Describes a mapping between one or several Virtual Function Clusters onto Partial Network Clusters. A Virtual Function Cluster is realized by a PortGroup. A Partial Network Cluster is realized by one or more IPduGroups.			
Base	ARObject, Describable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ident	PncMappingIdent	0..1	aggr	This adds the ability to become referrable to PncMapping.
pncGroup	ISignalIPduGroup	*	ref	IPduGroup participating in a Partial Network Cluster. This reference is optional in case an ecu extract has only indirect pnc access, i.e. ecu is not directly conntected to a network which supports partial network.
pncIdentifier	PositiveInteger	1	attr	Identifer of the Partial Network Cluster. This number represents the absolute bit position of this Partial Network Cluster in the NM Pdu.
shortLabel	Identifier	0..1	attr	This attribute specifies an identifying shortName for the PncMapping. It shall be unique in the System scope.
vfc	PortGroup	*	iref	Virtual Function Cluster to be mapped onto a Partial Network Cluster. This reference is optional in case that the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy systems.

Attribute	Type	Mul.	Kind	Note
wakeupFrame	FrameTriggering	*	ref	Reference to collection of FrameTriggerings that are used for the wakeup of this PNC (Application Frames or Nm Frames can be used). This reference is optional in case an ecu extract has only indirect pnc access, i.e. ecu is not directly conntected to a network which supports partial network.

Table 5.36: PncMapping

[constr_3039] pncIdentifier range ⌈ The pncIdentifier value shall be in the range of 8..63. ⌋*()*

[constr_3198] Uniqueness of PncMapping.shortLabel ⌈ If the optional shortLabel attribute is used it shall be unique in the System scope. ⌋*()*

The runtime information that is used to coordinate the request/release information of all partial networks is called pncVector. The size and position of the pncVector inside the network management user data (NmPdu.iSignalToIPduMapping) is globally defined in the System class in chapter 1.6.

In the system description the NmPdus are described based on the actual network interaction (i.e. an ECU sends one NmPdu per network and receives a set of NmPdus).

NmPdus that define the existence of NM user data via the existence of the attribute iSignalToIPduMapping shall be referenced by corresponding PduTriggerings where the attribute iPduPort exists accordingly. This is also reflected by [TPS_SYST_01057].

NmPdus that define the existence of NM user data via the definition of NmPdu.nmDataInformation shall not be referenced by PduTriggerings because neither Com nor PduR are involved in the transmission (which lets the Nm module talk to the bus interface directly).

The NmPdus contributing to partial networking also have the Nm user data layout specified to contain the pncVector according to [constr_3043].

Those Pdus which are used to perform the ECU internal communication between the basic software modules (like *EIRA*, *ERA*) are not described in the system description and need to be introduced to the ECU Configuration.

[constr_3040] Restriction of pncIdentifier values ⌈ The pncIdentifier value shall be within the range described by pncVectorOffset and pncVectorLength. ⌋*()*

[constr_3041] pncVectorOffset range ⌈ The pncVectorOffset value shall be in the range of 1..7. ⌋*()*

[constr_3042] pncVectorLength range ⌈ The pncVectorLength value shall be in the range of 1..7. ⌋*()*

[constr_3043] `pncVector` configuration in AUTOSAR Com ⌈ The `pncVector` shall be configured as UINT8_N signal in AUTOSAR Com. ⌋*()*

[constr_3146] Partial Networking timing constraint ⌈ For Partial Networking the following timing constraints shall be ensured:

- CAN / Ethernet: (pnResetTime + pncPrepareSleepTimer) < nmNetworkTimeout
- FlexRay: (pnResetTime + pncPrepareSleepTimer) < nmReadySleepTime

⌋*()*

[TPS_SYST_02145] Default behavior for not defined nmPncParticipation ⌈ When NmCluster.nmPncParticipation is set to *true* or is not defined this NmCluster shall contribute to the partial network mechanism. ⌋*()*

[constr_3323] Relation between NmCluster.nmPncParticipation and PncMapping.pncGroup ⌈ If a PncMapping references an ISignalIPduGroup in role pncGroup which in turn contains (either directly or via one of its subordinate ISignalIPduGroups referenced in role containedISignalIPduGroup) ISignalIPdus that are referenced by a PduTriggering in role iPdu which in turn is composed by a PhysicalChannel in role pduTriggering which in turn is composed by CommunicationCluster in role physicalChannel which in turn is referenced by an NmCluster in role communicationCluster, then this NmCluster shall have its nmPncParticipation attribute set to TRUE. ⌋*()*

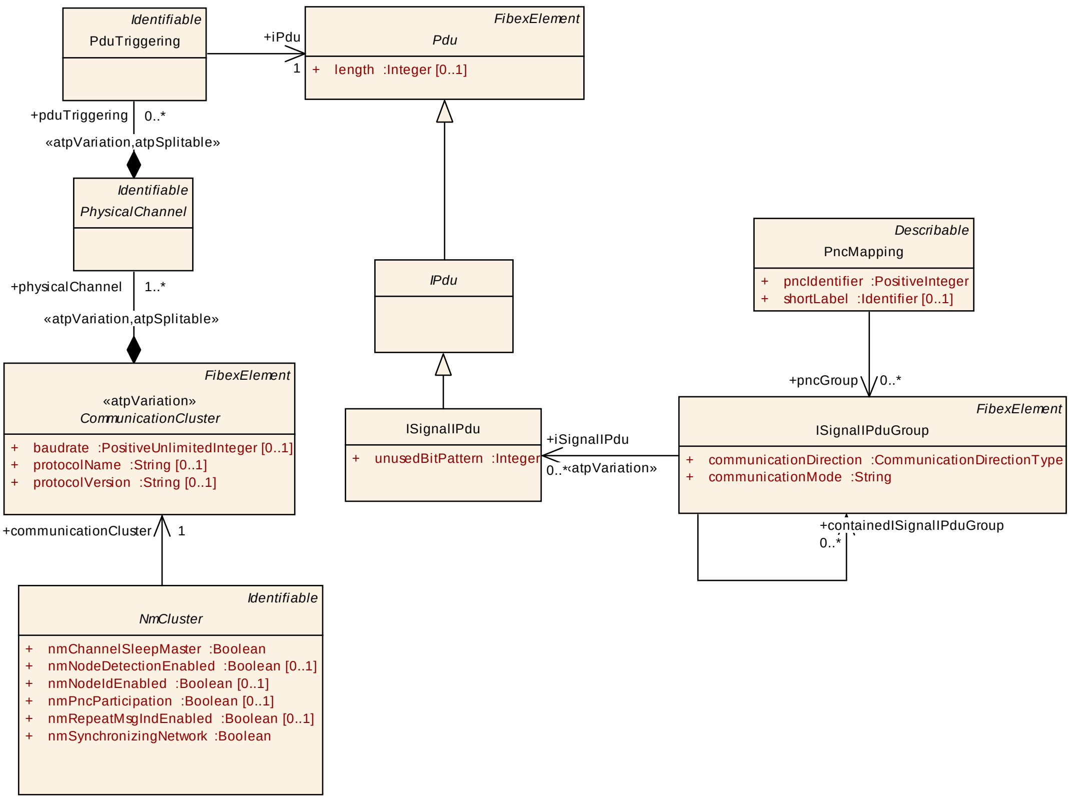


Figure 5.24: Relation between NmCluster.nmPncParticipation and PncMapping.pncGroup

[TPS_SYST_02146] Explicit definition of pncVector at NmPdu ⌈ If there is an ISignalToIPduMapping aggregated by NmPdu that fully matches the interval defined by pncVectorOffset and pncVectorLength then the corresponding ISignal represents the pncVector. ⌋*()*

[TPS_SYST_02147] Implicit definition of pncVector at NmPdu ⌈ If there is no ISignalToIPduMapping aggregated by NmPdu that fully matches the interval defined by pncVectorOffset and pncVectorLength and the respective NmCluster.nmPncParticipation has the value *true* or is not defined then the ComSignal in the COM configuration shall be derived locally in the Ecu Configuration according to the following rules: ComBitPosition and ComSignalLength shall be derived from pncVectorOffset and pncVectorLength respectively. Since ComSignalType is UINT8_N, ComSignalEndianness shall be OPAQUE (see SWS_Com_00553). ComTransferProperty shall be set to PENDING and ComSignalInitValue shall be set to 0. ⌋*()*

Attributes used to configure the Partial Network Wakeup of one specific Ecu are described in chapter 3.3.1.4.

5.4.1 Partial Networking and managed Ethernet switch

On switched Ethernet networks it is possible to let the Ethernet switch be managed by an AUTOSAR Ecu. In this case the configuration and the behavior of the CouplingElement with couplingType=switch are controlled by the management Ecu.

For the usage of Partial Networking on switched Ethernet networks with managed CouplingElements an additional application arises: Depending on the requested Partial Networks it shall be possible to switch off Ethernet switch ports which are not involved in any communication currently active.

In order to describe the relationships between Partial Networks and Ethernet switch ports an optional reference from CouplingPort to a PncMappingIdent in the role pncMapping is defined.

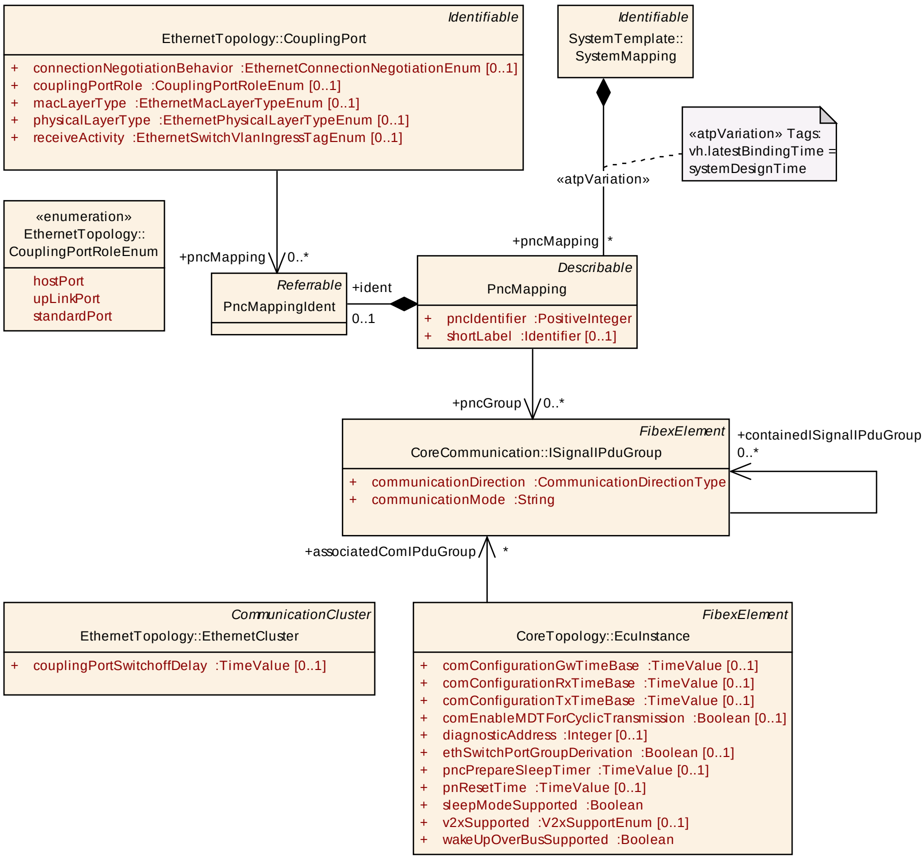


Figure 5.25: Partial Networking and managed Ethernet switch

The example in figure 5.26 illustrates the setup of an management ECU which manages 2 Ethernet switches.

The port `1` of `Switch 1` is a `hostPort`.

The port `5` of `Switch 1` and port `1` of `Switch 2` are `upLinkPort`s.

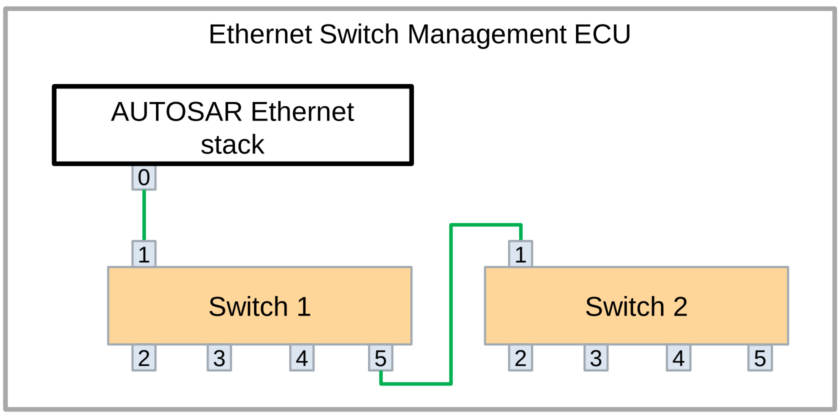


Figure 5.26: Example of managed Ethernet switches

[constr_3523] **`CouplingPort` and `PncMapping` in the scope of an `EthernetPhysicalChannel`** ⌈ If

- a CouplingPort referring to an EthernetPhysicalChannel – via a VlanMembership – references at least one PncMapping
- and that PncMapping contains PDUs – via the assignment of PncMapping.pncGroup – that are transported on this EthernetPhysicalChannel

then every CouplingPort referring to that EthernetPhysicalChannel shall reference at least one PncMapping as well. ⌋()

If a CouplingPort referring to an EthernetPhysicalChannel – via a VlanMembership – references no PncMapping then any other CouplingPort referring to that EthernetPhysicalChannel is allowed to either reference PncMappings or not.

[TPS_SYST_03018] Aggregation of PNCs at the hostPort ⌈ A CouplingPort with couplingPortRole set to hostPort shall reference all PncMappings that are referenced by any CouplingPorts of the same CouplingElement and all CouplingElements connected to this CouplingElement. ⌋()

[constr_3524] Definition of couplingPortRole on CouplingPort for managed CouplingElement ⌈ A managed CouplingElement shall have either

- at most one CouplingPort with couplingPortRole set to hostPort or
- at least one CouplingPort with couplingPortRole set to upLinkPort.

⌋()

[constr_3525] Connection of CouplingPort with couplingPortRole set to upLinkPort ⌈ A CouplingPort with couplingPortRole set to upLinkPort shall be connected to exactly one other CouplingPort with couplingPortRole set to upLinkPort. ⌋()

[TPS_SYST_03020] Default value for CouplingPort.couplingPortRole if not defined ⌈ If no value for the attribute CouplingPort.couplingPortRole is defined then standardPort shall be assumed. ⌋()

[TPS_SYST_03019] Modeling of CouplingPorts for managed CouplingElement ⌈ Only CouplingPorts that participate in the communication of a managed CouplingElement shall be modeled in the System Description. ⌋()

All other ports of an Ethernet switch are not modeled. The expected behavior of unmodeled Ethernet switch ports on runtime:

1. the Ethernet switch driver switches off this Ethernet switch ports during its initialization
2. unmodeled Ethernet switch ports shall never be switched on.

6 Communication

This chapter describes all topics that deal with constraints or configurations that describe the information exchange between the ECUs. The description of communication matrices in the System Template is based on the description in ASAM FIBEX [9]. Because of the requirements of AUTOSAR some extensions were made to the original FIBEX model.

The main elements to describe communication in the System Template are SystemSignals, ISignals, Pdus and Frames, as it can be seen on Figure 6.1.

Frames can be defined independently of communication clusters. On the communication channel the Frame is represented by the referencing FrameTriggering.

A Frame has a payload section of a certain length in bytes, which contains an arbitrary number of non-overlapping Pdus. In AUTOSAR only FlexRay supports the packing and unpacking of multiple Pdus into/out of one FlexRay Frame. The AUTOSAR CanIf and LinIf are not capable of packing multiple Pdus into one Frame.

[constr_3036] Pdus in CAN and LIN Frames ⌈ CAN Frames and LIN Frames shall only contain one Pdu. ⌋*()*

Note that via the ContainerIPdu it is possible to transport several IPdus in one ContainerIPdu in order to support CAN FD.

A Pdu (Protocol Data Unit) is the information delivered through a network layer. For the network to understand which layer is being discussed, a single-letter prefix is added to the PDU.

- IPdu - Interaction Layer Protocol Data Unit (assembled and disassembled in Com). In the case of external communication the Interaction Layer packs one or more signals into assigned IPdus and passes them to the underlying layer for transfer between nodes in a network.
- NPdu - Network Layer Protocol Data Unit (assembled and disassembled in a Transport Protocol module). The TP module's main purpose is the segmentation and reassembly of IPdus that do not fit in one of the assigned NPdus.
- LPdu - Data Link Layer Protocol Data Unit (assembled and disassembled in AUTOSAR Hardware Abstraction layer). The element Frame in the System Template represents the Autosar Layered Architectures LSdu. Sdu is the abbreviation of "Service Data Unit". The Data Link Layers LPdu contains the LSdu and PCI (Protocol Control Information). The LPdu is not described in the System Template.

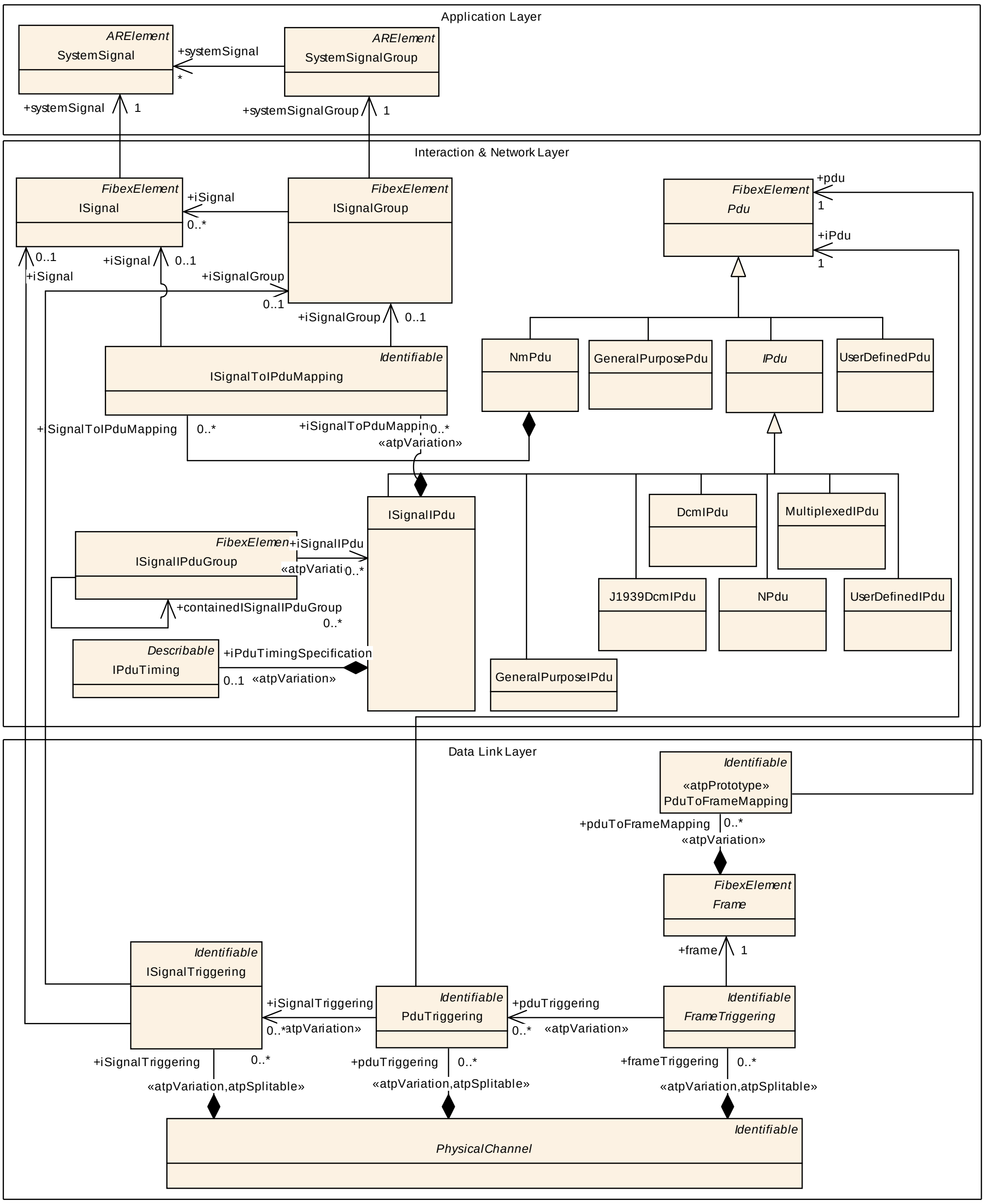


Figure 6.1: Communication Overview (FibexCore: Communication)

In case no multiplexing is performed the IPdus of Com that fit into one frame can be passed directly via the PDU Router to the communication interfaces.

[constr_3037] maximum Frame frameLength for CAN and LIN ⌈ For CAN and LIN the maximum frameLength is 8 bytes and 64 bytes in case of CAN FD. ⌋*()*

[constr_3038] maximum Frame frameLength for FlexRay ⌈ For FlexRay the maximum frameLength is 254 bytes. ⌋*()*

[TPS_SYST_01048] Handling of large IPdus ⌈ Large IPdus that are too long to fit into one Frame of the respective subclass of CommunicationCluster shall be routed via a Transport Protocol to the communication interfaces. ⌋*()*

For example an IPdu with the length of 10 bytes needs to be routed via a Transport Protocol on CAN but on FlexRay this is not required.

[TPS_SYST_01049] Handling of IPdus with dynamic signals ⌈ IPdus which contain dynamic signals shall be routed via a Transport Protocol to the communication interfaces. ⌋*(RS_SYST_00029, RS_SYST_00030)*

The Transport Protocols are described in more detail in chapter 6.8.

If multiplexing is performed an IPdu is routed between the IPdu Multiplexer and the Interface Layer or Transport Layer. To distinguish these two different cases two specializations ISignalIPdu and MultiplexedIPdu are introduced. A ISignalIPdu represents an IPdu handled by AUTOSAR Com. The AUTOSAR IPduM is responsible to combine Com ISignalIPdus to MultiplexedIPdus. On receiver-side the IPduM is responsible to interpret the content of MultiplexedIPdus and provide Com separated ISignalIPdus by taking into account the value of the selector field. The IPdu Multiplexer is described in more detail in chapter 6.5.

AUTOSAR Com provides the possibility to define Transmission Modes for each Com ISignalIPdu. For this reason the ISignalIPdu aggregates the IPduTiming. The Transmission Modes are described in more detail in chapter 6.4.

6.1 Triggerings and Ports

The elements FrameTriggering, PduTriggering and ISignalTriggering are describing the usage of Frames, IPdus and ISignals on a PhysicalChannel.

A FrameTriggering need to fulfill requirements for contained Pdus that are defined by the corresponding PduTriggerings. And the PduTriggering need to fulfill requirements for contained ISignals that are defined by the corresponding ISignalTriggerings. The references between the Triggering elements can be used to describe these relationships. More details can be found in class tables of FrameTriggering, PduTriggering and ISignalTriggering.

In AUTOSAR the timing of bus messages can be controlled by send requests of the Application layer in combination with the Com Transmission Modes and Transfer Properties (esp. CAN). On the other hand it can be controlled by the FlexRay or LIN Interface. In this case the Bus Interface only requests IPdus that have to be provided by Com.

In the System Template the Com controlled timing is described with the aggregation between the ISignalIPdu and the IPduTiming. The LIN and FlexRay Scheduling Tables are described in the FrameTriggering.

Timing requirements for FlexRay, TTCAN and LIN Pdus can be specified with the Timing Extension model. More details are described in chapter 1.7.3.

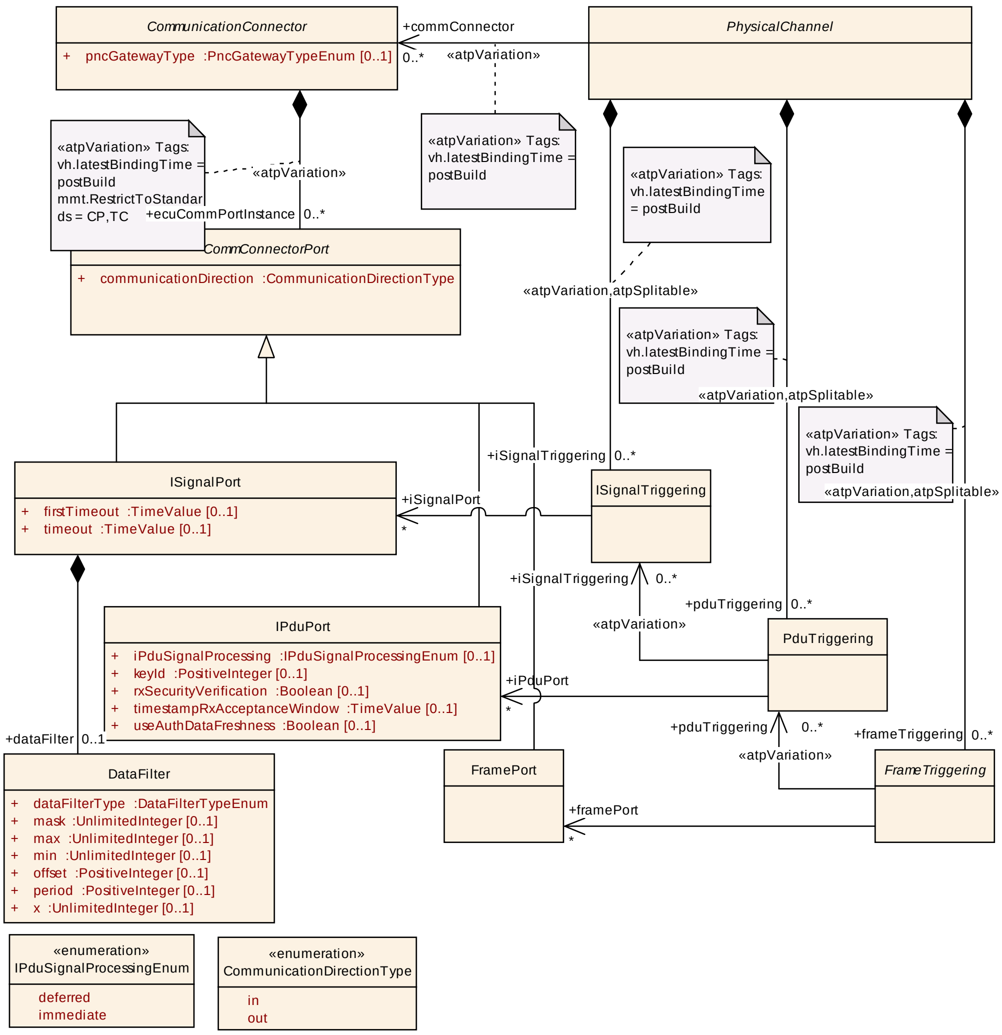


Figure 6.2: Communication Matrix (FibexCore: CommunicationMatrix)

Figure 6.2 shows the relationship between the `CommConnectorPort` and the `FrameTriggering`, `PduTriggering` and `ISignalTriggering`. This relationship allows to specify explicitly which `Frame`s, `Pdu`s, `ISignal`s are received/sent by the connected ECU on the connected channel.

[constr_3243] `FrameTriggering.pduTriggering` condition ⌈ A `FrameTriggering` shall reference a `PduTriggering` if the `PduTriggering` references a `Pdu` that is referenced by a `PduToFrameMapping` which in turn is aggregated by the `Frame` that is referenced by that `FrameTriggering`. ⌋*()*

[constr_3250] `PduTriggering.iSignalTriggering` condition ⌈ A `PduTriggering` shall reference an `ISignalTriggering` if the `ISignalTriggering` references an `ISignal` or an `ISignalGroup` that is referenced by an `ISignalToIPduMapping` which in turn is aggregated by the `Pdu` that is referenced by that `PduTriggering`. ⌋*()*

[TPS_SYST_02102] FrameTriggering.pduTriggering references that shall be ignored ⌈ References from FrameTriggering to PduTriggering which are not covered by [constr_3243] shall be ignored. ⌋ *()*

As a consequence of [constr_3243] the following implications can be derived:

- The PduTriggering of the ContainerIPdu is referenced from the FrameTriggering but the PduTriggerings of the contained IPdus are not referenced from the FrameTriggering.
- The PduTriggering of the MultiplexedIPdu is referenced from the FrameTriggering but the PduTriggerings of the multiplexed Part Pdus are not referenced from the FrameTriggering.

[TPS_SYST_02104] Triggerings on PhysicalChannel ⌈ The following modeling creates a "membership" of ISignals, ISignalGroups, Pdus, and Frames in a given PhysicalChannel:

- PhysicalChannel aggregates
  - ISignalTriggering that in turn references ISignal in the role iSignal
  - ISignalTriggering that in turn references an ISignalGroup in the role iSignalGroup ([TPS_SYST_02105] applies).
- PhysicalChannel aggregates PduTriggering that in turn references a Pdu in the role iPdu.
- PhysicalChannel aggregates FrameTriggering that in turn references a Frame in the role frame.

⌋ *()*

[TPS_SYST_02105] ISignalGroup and ISignal referenced from ISignalTriggering ⌈ Either an ISignalGroup and all ISignals referenced from the ISignalGroup are also referenced from ISignalTriggerings aggregated at the same PhysicalChannel or neither the ISignalGroup nor any of the ISignals referenced by the ISignalGroup shall be referenced from ISignalTriggerings. ⌋ *()*

[TPS_SYST_01142] Rules for the creation of references to Ports (ecuCommPortInstance) with communicationDirection out on sending Ecu ⌈

- Application sends ISignal or ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup members that are sent by the Application.

  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- COM Signal Gateway
  - Reference from ISignalTriggering to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup
  - Reference from ISignalTriggering to ISignalPort for a subset of ISignals inside the ISignalGroup shall be created (in case not all members of the ISignalGroup participate in the target Signal Gateway relation).
  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- ISignal or ISignalGroup is mapped to ISignalIPdu but NOT sent by Application or Signal Gateway
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for any ISignal that is part of an ISignalGroup
  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- Neither ISignal, ISignalGroup, Pdu, nor Frame sent by the ECU
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for any ISignal that is part of an ISignalGroup
  - No PduTriggering reference to IPduPort shall be created
  - No FrameTriggering reference to FramePort shall be created

⌋*()*

[TPS_SYST_02106] Rules for the creation of references to Ports (ecuCommPortInstance) with communicationDirection in on receiving Ecu ⌈

- Application receives ISignal or ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup members that are received by the Application.
  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- COM Signal Gateway
  - Reference from ISignalTriggering to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - Reference from ISignalTriggering to ISignalPort shall be created for the ISignalGroup
  - Reference from ISignalTriggering to ISignalPort for a subset of ISignals inside the ISignalGroup shall be created (in case not all members of the ISignalGroup participate in the source Signal Gateway relation).
  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- ISignal or ISignalGroup is mapped to ISignalIPdu but NOT received by Application or Signal Gateway
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for any ISignal that is part of an ISignalGroup
  - PduTriggering reference to IPduPort shall be created
  - FrameTriggering reference to FramePort shall be created
- Neither ISignal, ISignalGroup, Pdu, nor Frame received by the ECU
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignal that is not part of an ISignalGroup
  - No ISignalTriggering reference to ISignalPort shall be created for an ISignalGroup

– No ISignalTriggering reference to ISignalPort shall be created for any ISignal that is part of an ISignalGroup
– No PduTriggering reference to IPduPort shall be created
– No FrameTriggering reference to FramePort shall be created

⌋()

[constr_3252] ISignalTriggering.iSignalPort reference condition ⌈ An ISignalTriggering shall only reference an ISignalPort if the CommunicationConnector aggregating that ISignalPort is referenced by the PhysicalChannel which in turn aggregates that ISignalTriggering. ⌋()

[constr_3253] PduTriggering.iPduPort reference condition ⌈ A PduTriggering shall only reference an IPduPort if the CommunicationConnector aggregating that IPduPort is referenced by the PhysicalChannel which in turn aggregates that PduTriggering. ⌋()

[constr_3254] FrameTriggering.framePort reference condition ⌈ A FrameTriggering shall only reference a FramePort if the CommunicationConnector aggregating that FramePort is referenced by the PhysicalChannel which in turn aggregates that FrameTriggering. ⌋()

[constr_3255] FrameTriggering.pduTriggering reference condition with regard to the PhysicalChannel ⌈ A FrameTriggering shall only reference a PduTriggering in the role pduTriggering if both the FrameTriggering and PduTriggering are aggregated by the same PhysicalChannel. ⌋()

[constr_3256] PduTriggering.iSignalTriggering reference condition with regard to the PhysicalChannel ⌈ A PduTriggering shall only reference an ISignalTriggering in the role iSignalTriggering if both the PduTriggering and ISignalTriggering are aggregated by the same PhysicalChannel. ⌋()

The following rules apply for the creation of PduTriggerings and IPduPorts:

- **[TPS_SYST_01052] Routing of UserDefinedPdus, NmPdus, NPdus** ⌈ UserDefinedPdus, NmPdus, NPdus which are not going through the Pdu Router get their triggering information via the containing FrameTriggering and FramePort (no PduTriggering is defined for these Pdus). ⌋()
- **[TPS_SYST_03021] Routing of GeneralPurposePdus with category GLOBAL_TIME** ⌈ GeneralPurposePdus with category GLOBAL_TIME shall have PduTriggering and IPduPorts defined. ⌋()
- **[TPS_SYST_02091] Routing of GeneralPurposePdus with category SD and GeneralPurposePdus with category DoIP** ⌈ GeneralPurposePdus with category SD and GeneralPurposePdus with category DoIP shall have PduTriggering and IPduPorts defined since no Frames and FrameTriggerings are defined for Pdus that are handled by the SoAd. ⌋()

- **[TPS_SYST_01053] Low-level routing of NPdus** ⌈ In case of a low-level routing of NPdus the Pdus are handled like IPdus and the PduTriggering and IPduPort shall be defined. ⌋*()*
- **[TPS_SYST_01138] Low-level routing of XcpPdus** ⌈ Low-level routing of GeneralPurposeIPdus with category XCP: In case of a low-level routing of GeneralPurposeIPdus with category XCP the Pdus are handled like IPdus and the PduTriggering and IPduPort shall be defined. ⌋*()*
- **[TPS_SYST_01054] Routing of DcmIPdus** ⌈ DcmIPdus shall have PduTriggering and IPduPorts since they are handled by the PduR (connection to the Dcm and/or DcmIPdu-routing). ⌋*()*
- **[TPS_SYST_01055] Routing of ISignalIPdus that are part of a MultiplexedIPdu** ⌈ ISignalIPdus that are part of a MultiplexedIPdu (static or dynamic) and are also handled by the Com module shall have a PduTriggering and IPduPorts since they are handled by the PduR (and Com). Especially it is allowed to ignore certain received parts of a MultiplexedIPdu in a specific ECU. ⌋*()*
- **[TPS_SYST_01056] Routing of ISignalIPdus, UserDefinedIPdus, MultiplexedIPdus, GeneralPurposeIPdus, ContainerIPdus** ⌈ ISignalIPdus (not part of MultiplexedIPdus), UserDefinedIPdus, MultiplexedIPdus, GeneralPurposeIPdus and ContainerIPdus shall have a PduTriggering and IPduPort if they are handled by the PduR. Especially it is allowed to ignore a certain IPdu out of a Flexray frame if it is not considered in a specific ECU. ⌋*(RS_SYST_00055)*
- **[TPS_SYST_01057] Routing of NmPdus** ⌈ If an NmPdu contains user data defined via the existence of NmPdu.iSignalToIPduMapping and is consequently handled via the PduR and Com the NmPdu shall also be referenced by a corresponding PduTriggering where attribute iPduPort exists accordingly. ⌋*()*
- **[TPS_SYST_02059] Routing of SecuredIPdus** ⌈ SecuredIPdus shall have a PduTriggering and IPduPort defined since they are handled by the PduR. Pdus that are part of a SecuredIPdu and are also handled by the Com module shall have a PduTriggering and IPduPorts since they are handled by the PduR (and Com). ⌋*(RS_SYST_00054)*
- **[TPS_SYST_02061] Routing of IPdus that are part of a ContainerIPdu** ⌈ IPdus that are part of a ContainerIPdu shall have a PduTriggering and IPduPorts since they are handled by the PduR. ⌋*(RS_SYST_00055)*

The following rule applies to the creation of ISignalTriggering and ISignalPort:

[TPS_SYST_01058] Pdu Gateway where an Ecu only routes a PduTriggering without being interested in the content ⌈ In case of a Pdu Gateway where an Ecu only routes a PduTriggering without being interested in the content, the reference between the ISignalTriggerings (that are referred to by the PduTriggering in the role `iSignalTriggering`) and the respective `ISignalPort`s shall not be created. ⌋*()*

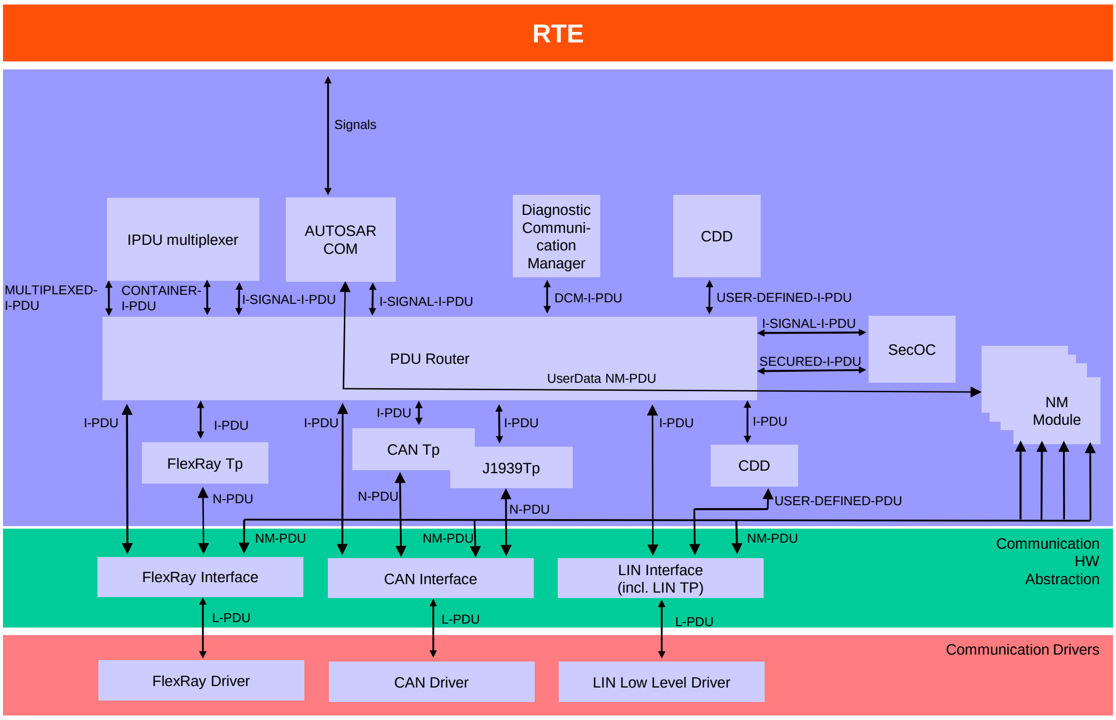


Figure 6.3: AUTOSAR Layered Architecture

Class	**CommConnectorPort (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The Ecu communication relationship defines which signals, Pdus and frames are actually received and transmitted by this ECU. For each signal, Pdu or Frame that is transmitted or received and used by the Ecu an association between an ISignalPort, IPduPort or FramePort with the corresponding Triggering shall be created. An ISignalPort shall be created only if the corresponding signal is handled by COM (RTE or Signal Gateway). If a Pdu Gateway ECU only routes the Pdu without being interested in the content only a FramePort and an IPduPort needs to be created.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
communicationDirection	CommunicationDirectionType	1	attr	Communication Direction of the Connector Port (input or output Port).

Table 6.1: CommConnectorPort

Class	**FramePort**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Connectors reception or send port on the referenced channel referenced by a FrameTriggering.			
Base	ARObject, CommConnectorPort, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 6.2: FramePort

Class	**IPduPort**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Connectors reception or send port on the referenced channel referenced by a PduTriggering.			
Base	ARObject, CommConnectorPort, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
iPduSignalProcessing	IPduSignalProcessingEnum	0..1	attr	Definition of the two signal processing modes Immediate and Deferred for both Tx and Rx IPdus.
keyId	PositiveInteger	0..1	attr	This attribute specifies the local Key identifier of the stored Key used to generate or verify a MAC. The keyId shall be unique per Ecu.
rxSecurityVerification	Boolean	0..1	attr	This attribute defines the bypassing of signature authentication or MAC verification in the receiving ECU. If not defined or set to true the signature authentication or MAC verification shall be performed for the SecuredIPdu. If set to false the signature authentication or MAC verification shall not be performed for the SecuredIPdu.
timestampRxAcceptanceWindow	TimeValue	0..1	attr	This attribute is used to define the maximum allowed deviation in seconds from the expected timestamp for which a SecuredIPdu is still deemed authentic. Please note that this attribute is for documentation only to allow the configuration of required freshness value manager and no upstream mapping is defined for it.
useAuthDataFreshness	Boolean	0..1	attr	This attribute describes whether a part of AuthenticPdu contained in a SecuredIPdu shall be passed on to the SWC that verifies and generates the Freshness. The part of the Authentic-PDU is defined by the authDataFreshnessStartPosition and authDataFreshnessLength.

Table 6.3: IPduPort

[constr_3137] `IPduPort.rxSecurityVerification` is configurable on the receiver side ⌈ The `IPduPort.rxSecurityVerification` attribute shall only be used in `IPduPort`s with the `communicationDirection` = in. ⌋()

[constr_3138] `IPduPort.rxSecurityVerification` validness ⌈ The `IPduPort.rxSecurityVerification` information is only valid for `SecuredIPdu`s. ⌋()

[constr_3337] `IPduPort.useAuthDataFreshness` is configurable on the receiver side ⌈ The `IPduPort.useAuthDataFreshness` attribute shall only be used in `IPduPort`s with the `communicationDirection` = in. ⌋*()*

[constr_3338] `IPduPort.useAuthDataFreshness` validness ⌈ The `IPduPort.useAuthDataFreshness` information is only valid for `SecuredIPdu`s. ⌋*()*

Enumeration	**IPduSignalProcessingEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	Definition of signal processing modes.
Literal	*Description*
deferred	The signal indications / confirmations are deferred. **Tags:** atp.EnumerationValue=0
immediate	The signal indications / confirmations are performed. **Tags:** atp.EnumerationValue=1

Table 6.4: IPduSignalProcessingEnum

Class	**ISignalPort**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Connectors reception or send port on the referenced channel referenced by an ISignalTriggering. If different timeouts or DataFilters for ISignals need to be specified several ISignalPorts may be created.			
Base	ARObject, CommConnectorPort, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
dataFilter	DataFilter	0..1	aggr	Optional specification of a signal COM filter at the receiver side in case that the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. If a full DataMapping exist for the SystemSignal this information may be available from a configured ReceiverComSpec. In this case the ReceiverComSpec overrides this optional specification.
firstTimeout	TimeValue	0..1	attr	Optional first timeout value in seconds for the reception of the ISignal.
timeout	TimeValue	0..1	attr	Optional timeout value in seconds for the reception of the ISignal. In case the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. If a full DataMapping exist for the SystemSignal this information may be available from a configured ReceiverComSpec, in this case the timeout value in ReceiverComSpec override this optional timeout specification.

Table 6.5: ISignalPort

[TPS_SYST_01059] Relationship between `FrameTriggering` and `CommConnectorPort` ⌈ For the reference between `FrameTriggering` and `FramePort` two approaches are supported:

- One to One relationship between FrameTriggering and FramePort per EcuInstance
- One FramePort per communicationDirection per EcuInstance exists and is referenced by all applicable FrameTriggerings (n to 1).

⌋()

[TPS_SYST_01060] Relationship between PduTriggering and CommConnectorPort ⌈ For the reference between PduTriggering and IPduPort two approaches are supported:

- One to One relationship between PduTriggering and IPduPort per EcuInstance
- One IPduPort per communicationDirection per EcuInstance exists and is referenced by all applicable PduTriggerings (n to 1).

⌋()

[TPS_SYST_01061] Relationship between ISignalTriggering and CommConnectorPort ⌈ For the reference between ISignalTriggering and ISignalPort two approaches are supported:

- One to One relationship between ISignalTriggering and ISignalPort per EcuInstance
- One ISignalPort per communicationDirection per timeout per EcuInstance exists and is referenced by all applicable PduTriggerings (n to 1).

⌋()

6.2 ISignals

SystemSignals can be defined independently of CommunicationClusters and are representing the VariableDataPrototypes, ArgumentDataPrototypes, Triggers and ModeDeclarationGroupPrototypes in the communication description.

The RTE supports a "signal fan-out" where the same signal (System Signal) is sent in different IPdus to multiple receivers. The Pdu Router supports the "PDU fan-out" where the same IPdu is sent to multiple destinations.

To support the "signal fan-out" ISignals and ISignalGroups are introduced. An ISignal(ISignalGroup) represents the SystemSignal(SystemSignalGroup) of the Interaction Layer.

In case of "signal fan-out", several ISignals in different IPdus refer to the same SystemSignal. The "Signal fan-out" will be executed by the RTE. ISignals describe the Interface between the precompile configured RTE and the potentially postbuild configured Com Stack.

The ISignalToIPduMapping element describes the mapping of ISignals to ISignalIPdus and defines the position of an ISignal within an ISignalIPdu.

[constr_3009] Overlapping of ISignals is prohibited ⌈ ISignals mapped to an ISignalIPdu shall not overlap. ⌋*()*

[constr_3010] ISignalIPdu length shall not be exceeded ⌈ The combined length of all ISignals and updateIndicationBitPositions that are mapped into an ISignalIPdu shall not exceed the defined Pdu length. ⌋*()*

[constr_3011] Overlapping of updateIndicationBits of ISignals is prohibited ⌈ The updateIndicationBitPosition for an ISignal in an ISignalIPdu shall not overlap with other updateIndicationBitPositions or ISignal locations. ⌋*()*

[TPS_SYST_01062] Network representation of an ISignal ⌈ With the aggregation of SwDataDefProps in the role networkRepresentationProps the actual representation of the ISignal on the network can be specified. ⌋*(RS_SYST_00047)*

[TPS_SYST_01063] Context of network representation of an ISignal ⌈ The dataTypePolicy defines from which context the network representation specification shall be taken. ⌋*(RS_SYST_00001, RS_SYST_00047)*

For an alternative network representation it is important to define an alternative SwDataDefProps especially SwBaseType defining alternative encoding (e.g. from float in PortInterface to integer on bus).

[constr_3060] Usage of networkRepresentationProps and physicalProps ⌈ Usage of networkRepresentationProps and physicalProps shall follow the restrictions given in table 6.6. ⌋*()*

	Element	
Attributes of SwDataDefProps	**SystemSignal.physicalProps**	**ISignal.networkProps**
additionalNativeTypeQualifier	NA	NA
annotation	NA	NA
baseType	NA	D
compuMethod	D	I
dataConstr	D	M
displayFormat	D	M
implementationDataType	NA	NA
invalidValue	NA	D
swAddrMethod	NA	NA
swAlignment	NA	NA
swBitRepresentation	NA	NA
swCalibrationAccess	NA	NA
swCalprmAxisSet	NA	NA
swCalprmAxisSet. swCalprmAxis /SwAxisGrouped. swCalprmRef	NA	NA
swCalprmAxisSet. swCalprmAxis /SwAxisIndividual. swVariableRef	NA	NA
swCalprmAxisSet. swCalprmAxis /SwAxisGrouped. sharedAxisType	NA	NA
swCalprmAxisSet. swCalprmAxis /SwAxisIndividual. inputVariableType	NA	NA
swCalprmAxisSet/ AxisIndividual/ Unit	NA	NA
swCalprmAxisSet/ BaseType	NA	NA
swComparisonVariable	NA	NA
swDataDependency	NA	NA
swHostVariable	NA	NA
swImplPolicy	NA	NA
swIntendedResolution	NA	NA
swInterpolationMethod	NA	NA
swIsVirtual	NA	NA
swPointerTargetProps	NA	NA
swRecordLayout	NA	NA
swRefreshTiming	NA	NA
swTextProps	NA	NA
swValueBlockSize	NA	NA
unit	D	M
valueAxisDataType	NA	NA

Table 6.6: Allowed SwDataDefProps Attributes for the ISignal and SystemSignal

The following settings apply in table 6.6:

D Define the attribute independent from settings to the left.

I Inherit the definition from the left for usage in the scope of this element. This means that the information is taken over in the respective context without further ARXML configuration. The attribute of the SwDataDefProps shall not exist on the right side.

NA Attribute is **not applicable** for usage in the scope of this element.

M Attribute is **meaningless** in the scope of this element. As it was allowed in previous versions, declaring it as Not Applicable (NA) would break compatibility. Tools shall ignore such an attribute without a warning.

In case that the System Description doesn't use a complete Software Component Description (VFB View) the physicalProps and networkRepresentationProps are used to configure the Data Semantics.

The networkRepresentationProps contains a reference to the SwBaseType. This reference can be used for the derivation of the ComSignalType in the AUTOSAR Com Configuration.

[TPS_SYST_02001] networkRepresentationProps are mandatory in case the dataTypePolicy is set to override or legacy ⌈If the dataTypePolicy of an ISignal is set to override or legacy, the networkRepresentationProps for the respective ISignal have to be specified.⌋*()*

[TPS_SYST_02006] Usage of networkRepresentationFromComSpec ⌈If the networkRepresentationFromComSpec is used either the SwDataDefProps in the role networkRepresentation aggregated by the SenderComSpec or ReceiverComSpec shall exist or the ImplementationDataType shall exist.⌋*()*

[TPS_SYST_02079] Identification of ImplementationDataType for a given ISignal in an Ecu Extract ⌈

1. From the ISignal go to the referenced SystemSignal
2. Find all DataMappings that refer to the SystemSignal
3. For all VariableDataPrototypes referenced by the applicable DataMappings
   (a) If the VariableDataPrototype is typed by an ApplicationDataType and belongs to a CompositionSwComponentType then for all DataTypeMappingSets referenced by the CompositionSwComponentType find the DataTypeMap that refers to this ApplicationDataType. The DataTypeMap also refers to the wanted ImplementationDataType.
   (b) If the VariableDataPrototype is typed by an ApplicationDataType and belongs to an AtomicSwComponentType then for all DataTypeMappingSets referenced by the InternalBehavior of the AtomicSwComponentType find the DataTypeMap that refers to this ApplicationDataType. The DataTypeMap also refers to the wanted ImplementationDataType.
   (c) If the VariableDataPrototype is typed by an ImplementationDataType then the ImplementationDataType is the wanted one.

⌋*()*

[TPS_SYST_02076] networkRepresentationProps in case the dataTypePolicy is set to transformingISignal ⌈ If the value of ISignal.dataTypePolicy is set to transformingISignal then ISignal.networkRepresentationProps shall be ignored. ⌋*()*

[constr_3199] ISignal that has dataTypePolicy set to transformingISignal shall reference a DataTransformation ⌈ In a complete model every ISignal that has dataTypePolicy set to transformingISignal shall reference a DataTransformation. ⌋*()*

[TPS_SYST_01065] Mapping onto the ComSignalType enumeration ⌈ The mapping of baseTypeSize, baseTypeEncoding, ISignal.iSignalType and SystemSignal.dynamicLength onto the ComSignalType enumeration is described in Table 6.7. ⌋*(RS_SYST_00029)*

In other words Table 6.7 focuses only on the derivation of the ComSignalType. This table shall not be taken as a source to derive requirements on the modeling of SwBaseTypes used on the level of the RTE.

BaseTypeEncoding	*BaseTypeSize*	*ISignal.iSignalType*	*SystemSignal.dynamicLength*	*ComSignalType*
2C	8 Bits	primitive	not applicable	SINT8, ComBitSize derived from ISignal.length
2C	16 Bits	primitive	not applicable	SINT16, ComBitSize derived from ISignal.length
2C	32 Bits	primitive	not applicable	SINT32, ComBitSize derived from ISignal.length
2C	64 Bits	primitive	not applicable	SINT64, ComBitSize derived from ISignal.length
NONE	8 Bits	primitive	not applicable	UINT8, ComBitSize derived from ISignal.length
NONE	16 Bits	primitive	not applicable	UINT16, ComBitSize derived from ISignal.length
NONE	32 Bits	primitive	not applicable	UINT32, ComBitSize derived from ISignal.length
NONE	64 Bits	primitive	not applicable	UINT64, ComBitSize derived from ISignal.length

BaseTypeEncoding	*BaseTypeSize*	*ISignal.iSignalType*	*SystemSignal.dynamicLength*	*ComSignalType*
IEEE754	32 Bits	primitive	not applicable	FLOAT32, ComBitSize derived from ISignal.length
IEEE754	64 Bits	primitive	not applicable	FLOAT64, ComBitSize derived from ISignal.length
NONE, ISO-8859-1, ISO-8859-2, WINDOWS-1252, UTF-8, UTF-16, UCS-2	8 Bits	array	false	UINT8_N, ComSignalLength derived from ISignal.length
NONE, ISO-8859-1, ISO-8859-2, WINDOWS-1252, UTF-8, UTF-16, UCS-2	8 Bits	array	true	UINT8_DYN, ComSignalLength derived from ISignal.length
BOOLEAN	ignored	primitive	not applicable	BOOLEAN

Table 6.7: SwBaseType to ComSignalType Mapping

The setting "not applicable" for an Attribute in Table 6.7 means that no value shall be set for this Attribute. The setting "ignored" for an Attribute in Table 6.7 means than any value is accepted for this Attribute, but the value will be ignored in creation of the ECU configuration value file.

[constr_3258] Restriction on ISignal.length in case iSignalType is set to array ⌈ If ISignal.iSignalType is set to array then ISignal.length shall be a multiple of 8. ⌋*()*

[TPS_SYST_02111] VariableDataPrototype in case ISignal.iSignalType is set to array ⌈ If ISignal.iSignalType is set to array the corresponding VariableDataPrototype shall boil down to an Array according to [TPS_SYST_02083], [TPS_SYST_02084], [TPS_SYST_02085] and [TPS_SYST_02089]. ⌋*()*

The invalidValue is aggregated by the SwDataDefProps element. The SwDataDefProps and the SwBaseType classes are described in more detail in the Software Component Template [5].

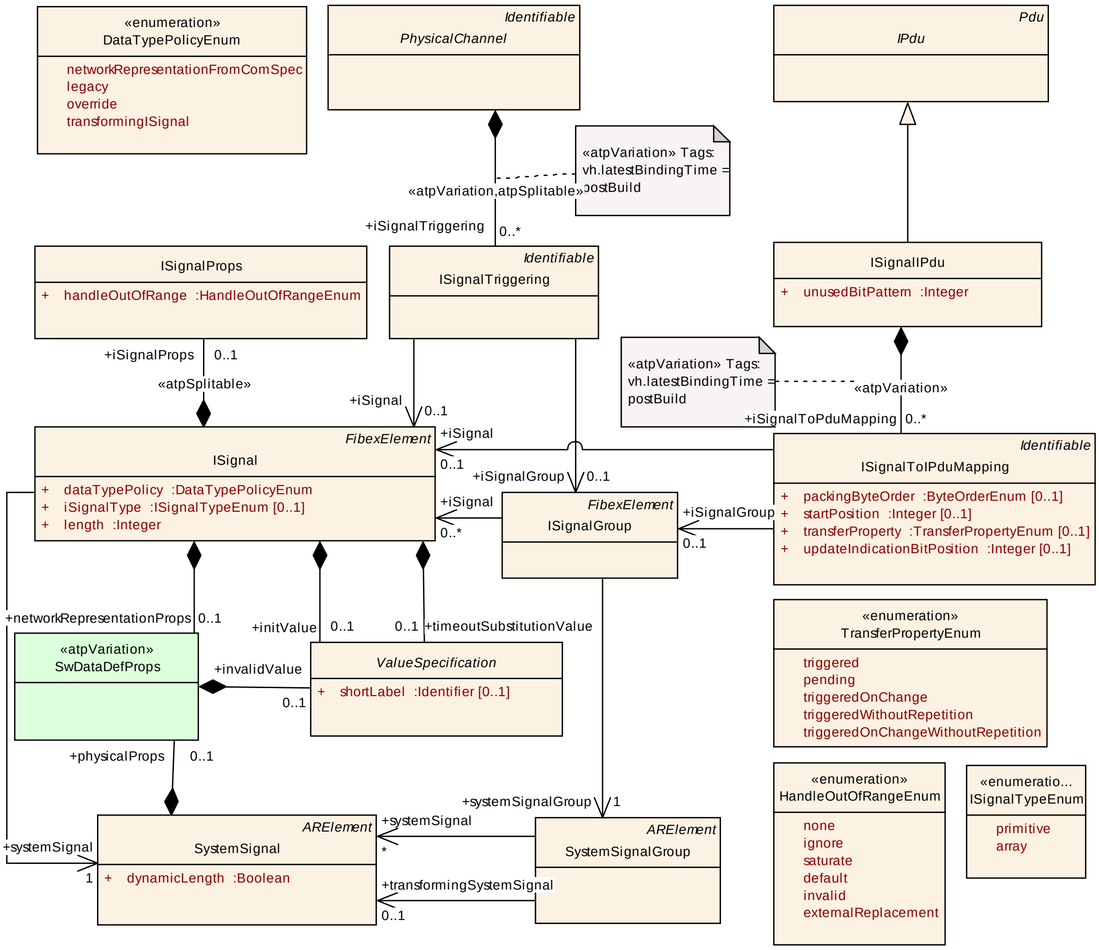


Figure 6.4: ISignals and the mapping into IPdus (FibexCore: SignalOverview)

The configuration of the COM Module for atomic signals can largely be derived from the System Template.

[TPS_SYST_01066] Derivation of Tx COM Signals ⌈ A ComSignal shall be defined in the COM module configuration for each ISignalToIPduMapping that is aggregated by ISignalIPdu that in turn is referenced by a PduTriggering that in turn references an IPduPort where the communicationDirection is set to out of the regarded ECU.

Exception: If the ISignal is part of a Signal Gateway relation (ISignalMapping.targetSignal pointing to an ISignalTriggering referencing this ISignal) the creation of a ComSignal is not mandated if

- the ISignal does not point to a SystemSignal that is referenced by a DataMapping (application does not send the gatewayed signal content) or
- the ISignal points to a SystemSignal that is referenced by a DataMapping where communicationDirection equals in and destination ISignalTriggering.iSignalPort.communicationDirection equals out (application sends the gatewayed signal content) or

- the ISignalToIPduMapping.iSignal.dataTypePolicy is set to legacy.

In these cases the configuration of ComGwMapping can be done by means of ComGwSourceDescription and ComGwDestinationDescription. However it is possible to create ComSignals for the ComGwSignal approach as well (i.e., even if the application does not require access to the respective SystemSignal). ⌋()

[TPS_SYST_01067] Derivation of Rx COM Signals ⌈ A ComSignal shall be defined in the COM module configuration for each ISignalToIPduMapping that is aggregated by ISignalIPdu that in turn is referenced by a PduTriggering that in turn references an IPduPort where the communicationDirection is set to in in the regarded ECU.

Exception: If the ISignal is part of a Signal Gateway relation (ISignalMapping.sourceSignal pointing to an ISignalTriggering referencing this ISignal) the creation of a ComSignal is not mandated if

- the ISignal does not point to a SystemSignal that is referenced by a DataMapping (application is not interested in the gatewayed signal content) or
- the ISignal points to a SystemSignal that is referenced by a DataMapping where communicationDirection equals out and source ISignalTriggering.iSignalPort.communicationDirection equals in (application is not interested in the gatewayed signal content) or
- the ISignalToIPduMapping.iSignal.dataTypePolicy is set to legacy.

In these cases the configuration of ComGwMapping can be done by means of ComGwSourceDescription and ComGwDestinationDescription. However it is possible to create ComSignals for the ComGwSignal approach as well (i.e., even if the application does not require access to the respective SystemSignal). ⌋()

To support the AUTOSAR concept of composite data types the AUTOSAR COM layer provides signal groups. Every record or array element of a composite data type requires a SystemSignal for the transmission. But the RTE has to guarantee the consistent transmission of data.

[TPS_SYST_01153] Atomic transport of SystemSignalGroups ⌈ A SystemSignalGroup shall be transmitted and received consistently; therefore it provides data consistency for composite data types. ⌋()

A SystemSignalGroup refers to a set of SystemSignals that shall always be kept together in a common IPdu. An ISignalGroup represents a SystemSignalGroup of the Interaction Layer. In the case of "signal fan-out", several ISignalGroups refer to the same SystemSignalGroup.

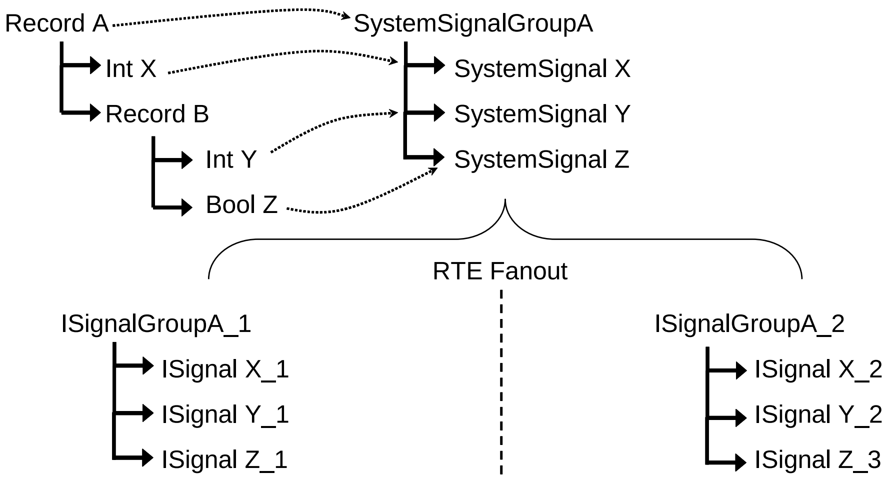


Figure 6.5: ISignal example

The example in Figure 6.5 shows the usage of ISignalGroups and ISignals. In this example a record is mapped to a SystemSignalGroup. All ApplicationRecordElements with ApplicationPrimitiveDataType are mapped to individual SystemSignals. If the same SystemSignalGroup is sent to different receivers (RTE Fanout) then two different ISignalGroups are created. For each SystemSignal within the SystemSignalGroup an ISignal is created. The different ISignals of the same SystemSignal can have different network representations.

[TPS_SYST_01156] Definition of ISignalTriggerings is allowed for ISignalGroups and for GroupSignals ⌈ If an ISignalGroup is referenced by an ISignalTriggering then the ISignals that are contained in the ISignalGroup (GroupSignals) may be referenced as well by ISignalTriggerings. ⌋*()*

[constr_3094] Consistent ISignalPort.communicationDirection for ISignalTriggerings of ISignalGroups and contained ISignals ⌈ In case the ISignals contained in an ISignalGroup are referenced by an ISignalTriggering, the communicationDirection of the ISignalPort referenced by the ISignal's ISignalTriggering shall be identical to the communicationDirection of the ISignalPort referenced by the containing ISignalGroup's ISignalTriggering. ⌋*()*

[TPS_SYST_01157] Allowed usage of attributes for ISignals, ISignalGroups and GroupSignals ⌈ Table 6.8 shows attributes that may be used to configure ISignals in different roles (ISignals that are not part of an ISignalGroup and ISignals that are part of an ISignalGroup) and ISignalGroups. ⌋*()*

	Element		
Attributes	**ISignal**	**ISignalGroup**	**GroupSignal**
startPosition	1	NA	1
updateIndicationBitPosition	0..1	0..1	NA
transferProperty	0..1	0..1	0..1
packingByteOrder	1	NA	1
dataFilter	0..1	NA	0..1

	Element		
Attributes	**ISignal**	**ISignalGroup**	**GroupSignal**

Table 6.8: Allowed usage of attributes for ISignals, ISignalGroups and GroupSignals

[constr_3067] initValue defined in the context of ISignal ⌈ The definition of an initValue in the context of an ISignal can only be a primitive NumericalValueSpecification or TextValueSpecification. ⌋*()*

[TPS_SYST_02012] initValue and invalidValue represent internal values ⌈ The initValue and invalidValue aggregated by the networkRepresentationProps shall represent the internal values. ⌋*()*

[TPS_SYST_02110] Default behavior for ISignal.iSignalType ⌈ In case ISignal.iSignalType is not defined the value "primitive" shall be assumed. ⌋*()*

[TPS_SYST_02144] ComTimeoutSubstitution does not apply for signal gateway operation ⌈ The specification of ComTimeoutSubstitution by defining the ISignal.timeoutSubstitutionValue does not apply for signal gateway operation. Only when the ISignal is processed for an upper layer the ComTimeoutSubstitution is actually performed. ⌋*()*

Note: Since an ISignal may be candidate for both - local reception and gateway operation - a definition of ISignal.timeoutSubstitutionValue is valid on ISignals which are defined for gateway operation.

Class	**ISignal**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Signal of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal is sent in different SignalIPdus to multiple receivers. To support the RTE "signal fan-out" each SignalIPdu contains ISignals. If the same System Signal is to be mapped into several SignalIPdus there is one ISignal needed for each ISignalToIPduMapping. ISignals describe the Interface between the Precompile configured RTE and the potentially Postbuild configured Com Stack (see ECUC Parameter Mapping). In case of the SystemSignalGroup an ISignal must be created for each SystemSignal contained in the SystemSignalGroup. **Tags:** atp.recommendedPackage=ISignals			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	*Type*	*Mul.*	*Kind*	*Note*
dataTransformation	DataTransformation	0..1	ref	Optional reference to a DataTransformation which represents the transformer chain that is used to transform the data that shall be placed inside this ISignal. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=dataTransformation, variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime
dataTypePolicy	DataTypePolicyEnum	1	attr	With the aggregation of SwDataDefProps an ISignal specifies how it is represented on the network. This representation follows a particular policy. Note that this causes some redundancy which is intended and can be used to support flexible development methodology as well as subsequent integrity checks. If the policy "networkRepresentationFromComSpec" is chosen the network representation from the ComSpec that is aggregated by the PortPrototype shall be used. If the "override" policy is chosen the requirements specified in the PortInterface and in the ComSpec are not fulfilled by the networkRepresentationProps. In case the System Description doesn't use a complete Software Component Description (VFB View) the "legacy" policy can be chosen.
iSignalProps	ISignalProps	0..1	aggr	Additional optional ISignal properties that may be stored in different files. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=iSignalProps
iSignalType	ISignalTypeEnum	0..1	attr	This attribute defines whether this iSignal is an array that results in a UINT8_N / UINT8_DYN ComSignalType in the COM configuration or a primitive type.
initValue	ValueSpecification	0..1	aggr	Optional definition of a ISignal's initValue in case the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. This value can be used to configure the Signal's "InitValue". If a full DataMapping exist for the SystemSignal this information may be available from a configured SenderComSpec and ReceiverComSpec. In this case the initvalues in SenderComSpec and/or ReceiverComSpec override this optional value specification. Further restrictions apply from the RTE specification.

Attribute	Type	Mul.	Kind	Note
length	Integer	1	attr	Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals. The ISignal length of zero bits is allowed.
networkRepresentationProps	SwDataDefProps	0..1	aggr	Specification of the actual network representation. The usage of SwDataDefProps for this purpose is restricted to the attributes compuMethod and baseType. The optional baseType attributes "memAllignment" and "byteOrder" shall not be used. The attribute "dataTypePolicy" in the SystemTemplate element defines whether this network representation shall be ignored and the information shall be taken over from the network representation of the ComSpec. If "override" is chosen by the system integrator the network representation can violate against the requirements defined in the PortInterface and in the network representation of the ComSpec. In case that the System Description doesn't use a complete Software Component Description (VFB View) this element is used to configure "ComSignalDataInvalidValue" and the Data Semantics.
systemSignal	SystemSignal	1	ref	Reference to the System Signal that is supposed to be transmitted in the ISignal.
timeoutSubstitutionValue	ValueSpecification	0..1	aggr	Defines and enables the ComTimeoutSubstituition for this ISignal.
transformationISignalProps	TransformationISignalProps	*	aggr	A transformer chain consists of an ordered list of transformers. The ISignal specific configuration properties for each transformer are defined in the TransformationISignalProps class. The transformer configuration properties that are common for all ISignals are described in the TransformationTechnology class.

Table 6.9: ISignal

Enumeration	**DataTypePolicyEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::DataMapping
Note	This class lists the supported DataTypePolicies.
Literal	*Description*

legacy	In case the System Description doesn't use a complete Software Component Description (VFB View) this value can be chosen. This supports the inclusion of legacy signals. The aggregation of SwDataDefProps shall be used to configure the "ComSignalDataInvalidValue" and the Data Semantics. **Tags:** atp.EnumerationValue=0
networkRep-resentation FromCom Spec	Ignore any networkRepresentationProps of this ISignal and use the networkRepresentation from the ComSpec. Please note that the usage does not imply the existence of the SwDataDefProps in the role networkRepresentation aggregated by the SenderComSpec or ReceiverComSpec if an ImplementationDataType is defined. **Tags:** atp.EnumerationValue=1
override	If this value is chosen the requirements specified in the ComSpec (networkRepresentationFromComSpec) are not fullfilled by the aggregated SwDataDefProps. In this case the networkRepresentation is specified by the aggregated swDataDefProps. **Tags:** atp.EnumerationValue=2
transformingI Signal	This literal indicates that a transformer chain shall be used to communicate the ISignal as UINT8_N over the bus. **Tags:** atp.EnumerationValue=4

Table 6.10: DataTypePolicyEnum

Enumeration	**ISignalTypeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	This enumeration defines ISignal types that are used for derivation of the ComSignalType in the COM configuration.
Literal	***Description***
array	ISignal shall be interpreted as an array (UINT8_N, UINT8_DYN) **Tags:** atp.EnumerationValue=0
primitive	ISignal shall be interpreted as a primitive type (e.g. UINT_8, SINT_32) **Tags:** atp.EnumerationValue=1

Table 6.11: ISignalTypeEnum

Class	**ISignalProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Additional ISignal properties that may be stored in different files.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	Type	Mul.	Kind	Note
handleOutOfRange	HandleOutOfRangeEnum	1	attr	This attribute defines the outOfRangeHandling for received and sent signals.

Table 6.12: ISignalProps

Enumeration	HandleOutOfRangeEnum
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication
Note	A value of this type is taken for controlling the range checking behavior of the AUTOSAR RTE.
Literal	Description
default	The RTE will use the initValue if the actual value is out of the specified bounds. **Tags:** atp.EnumerationValue=0
externalReplacement	This indicates that the value replacement is sourced from the attribute replaceWith. **Tags:** atp.EnumerationValue=1
ignore	The RTE will ignore any attempt to send or receive the corresponding dataElement if the value is out of the specified range. **Tags:** atp.EnumerationValue=2
invalid	The RTE will use the invalidValue if the value is out of the specified bounds. **Tags:** atp.EnumerationValue=3
none	A range check is not required. **Tags:** atp.EnumerationValue=4
saturate	The RTE will saturate the value of the dataElement such that it is limited to the applicable upper bound if it is greater than the upper bound. Consequently, it is limited to the applicable lower bound if the value is less than the lower bound. **Tags:** atp.EnumerationValue=5

Table 6.13: HandleOutOfRangeEnum

Class	ISignalGroup			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	SignalGroup of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal Group is sent in different SignalIPdus to multiple receivers. An ISignalGroup refers to a set of ISignals that shall always be kept together. A ISignalGroup represents a COM Signal Group. Therefore it is recommended to put the ISignalGroup in the same Package as ISignals (see atp.recommendedPackage) **Tags:** atp.recommendedPackage=ISignalGroup			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note

Attribute	Type	Mul.	Kind	Note
comBasedSignalGroupTransformation	DataTransformation	0..1	ref	Optional reference to a DataTransformation which represents the transformer chain that is used to transform the data that shall be placed inside this ISignalGroup based on the COMBasedTransformer approach. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=comBasedSignalGroupTransformation, variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime
iSignal	ISignal	*	ref	Reference to a set of ISignals that shall always be kept together.
systemSignalGroup	SystemSignalGroup	1	ref	Reference to the SystemSignalGroup that is defined on VFB level and that is supposed to be transmitted in the ISignalGroup.
transformationISignalProps	TransformationISignalProps	*	aggr	A transformer chain consists of an ordered list of transformers. The ISignalGroup specific configuration properties for each transformer are defined in the TransformationISignalProps class. The transformer configuration properties that are common for all ISignalGroups are described in the TransformationTechnology class.

Table 6.14: ISignalGroup

Class	SystemSignalGroup			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A signal group refers to a set of signals that must always be kept together. A signal group is used to guarantee the atomic transfer of AUTOSAR composite data types. The SystemSignalGroup defines a signal grouping on VFB level. On cluster level the Signal grouping is described by the ISignalGroup element. **Tags:** atp.recommendedPackage=SystemSignalGroups			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
systemSignal	SystemSignal	*	ref	Reference to a set of SystemSignals that must always be kept together.
transformingSystemSignal	SystemSignal	0..1	ref	Optional reference to the SystemSignal which shall contain the transformed (linear) data.

Table 6.15: SystemSignalGroup

Class	**ISignalToIPduMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
iSignal	ISignal	0..1	ref	Reference to a ISignal that is mapped into the ISignalIPdu. Each ISignal contained in the ISignalGroup shall be mapped into an IPdu by an own ISignalToIPduMapping. The references to the ISignal and to the ISignalGroup in an ISignalToIPduMapping are mutually exclusive.
iSignalGroup	ISignalGroup	0..1	ref	Reference to an ISignalGroup that is mapped into the SignalIPdu. If an ISignalToIPduMapping for an ISignalGroup is defined, only the UpdateIndicationBitPosition and the transferProperty is relevant. The startPosition and the packingByteOrder shall be ignored. Each ISignal contained in the ISignalGroup shall be mapped into an IPdu by an own ISignalToIPduMapping. The references to the ISignal and to the ISignalGroup in an ISignalToIPduMapping are mutually exclusive.
packingByteOrder	ByteOrderEnum	0..1	attr	This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description). For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
startPosition	Integer	0..1	attr	This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array. If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.
transferProperty	TransferPropertyEnum	0..1	attr	The triggered or triggeredOnChange, triggeredWithoutRepetition and triggeredOnChangeWithoutRepetition transferProperty causes immediate transmission of the IPdu, except if transmission mode Periodic or transmission mode NONE is defined for the IPdu. The Pending transfer property does not cause transmission of an I-PDU. The immediate transmission of the IPdu is caused even if only one Signal of an IPdu has the transferProperty triggered or triggeredWithoutRepetition or triggeredOnChange or triggeredOnChangeWithoutRepetition and all other Signals have the transferProperty pending. Also for ISignals of an ISignalGroup (GroupSignals) this attribute is relevant and shall be evaluated: • If none of the ISignals belonging to the ISignalGroup have a transferProperty defined the transferProperty of the ISignalToPduMapping referring to the ISignalGroup is considered. • If at least one of the ISignals belonging to the ISignalGroup has a transferProperty defined all other ISignals belonging to the same ISignalGroup shall have a transferProperty defined as well. All of the transferProperties of the GroupSignals are considered.

Attribute	Type	Mul.	Kind	Note
updateIndicationBitPosition	Integer	0..1	attr	The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.

Table 6.16: ISignalToIPduMapping

[constr_3514] No two `ISignalToIPduMapping`s shall reference the identical `ISignal` ⌈No two `ISignalToIPduMapping`s shall reference the identical `ISignal` in the role `iSignal` in the scope of one System. ⌋*()*

Enumeration	TransferPropertyEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Transfer Properties of a Signal.
Literal	**Description**
pending	If the signal has the TransferProperty pending, then the function Com_SendSignal shall not perform a transmission of the IPdu associated with the signal. **Tags:** atp.EnumerationValue=0
triggered	The signal in the assigned IPdu is updated and a request for the IPdu's transmission is made. **Tags:** atp.EnumerationValue=1

triggeredOn Change	The signal in the assigned IPdu is updated and a request for the IPdus transmission is made only if the signal value is different from the already stored signal value. **Tags:** atp.EnumerationValue=2
triggeredOn ChangeWith-outRepetition	The signal in the assigned IPdu is updated and a request for the IPdus transmission is made only if the signal value is different from the already stored signal value. In the DIRECT/N-TIMES or MIXED transmission mode (EventControlledTiming) the IPdu will be transmitted just once without a repetition, independent of the defined NumberOfRepeats. **Tags:** atp.EnumerationValue=3
triggered Without Repetition	The signal in the assigned IPdu is updated and a request for the IPdu's transmission is made. In the DIRECT/N-TIMES or MIXED transmission mode (EventControlledTiming) the IPdu will be transmitted just once without a repetition, independent of the defined NumberOfRepeats. **Tags:** atp.EnumerationValue=4

Table 6.17: TransferPropertyEnum

[constr_3024] Usage of `triggeredWithoutRepetition` and `triggeredOnChangeWithoutRepetition` is not allowed for signal groups and group signals. ⌈ The values `triggeredWithoutRepetition` and `triggeredOnChangeWithoutRepetition` shall not be used if the `ISignalToIPduMapping` refers to an `ISignalGroup` or an `ISignal` which is part of an `ISignalGroup` (group signal). ⌋ *()*

Class	**ISignalTriggering**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A ISignalTriggering allows an assignment of ISignals to physical channels.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
iSignal	ISignal	0..1	ref	This reference shall be used if an ISignal is transported on the PhysicalChannel. This reference forms an XOR relationship with the ISignalTriggering-ISignalGroup reference.
iSignalGroup	ISignalGroup	0..1	ref	This reference shall be used if an ISignalGroup is transported on the PhysicalChannel. This reference forms an XOR relationship with the ISignalTriggering-ISignal reference.
iSignalPort	ISignalPort	*	ref	References to the ISignalPort on every ECU of the system which sends and/or receives the ISignal. References for both the sender and the receiver side shall be included when the system is completely defined.

Table 6.18: ISignalTriggering

6.2.1 Efficient COM for large data

AUTOSAR defines an alternative communication path between the RTE and the Communication Stack called Efficient COM for large data module (LdCom). The System Template does not define specific attributes which would distinguish whether the traditional Com or the LdCom shall be used. The idea behind this feature is rather that

- IF the LdCom module is integrated in an Ecu
- AND the specific interaction fulfills certain properties
- THEN LdCom shall be used.

Thus the usage of LdCom inside an ECU is project specific and is not derived from system description properties.

Note: even when all requirements for usage of LdCom are fulfilled it is not necessarily required to actually have an LdCom module inside the respective Ecu. It is rather a project specific decision whether LdCom module is integrated.

All of the following requirements need to be fulfilled in order to allow the usage of LdCom for the specific ISignal / ISignalIPdu combination.

[TPS_SYST_02015] LdCom: only one ISignal mapped to the ISignalIPdu ⌈ Only if exactly one ISignal is mapped into an ISignalIPdu and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02016] LdCom: only Transformer output and UINT8_N or UINT8_DYN supported ⌈ Only if

- the data type of the ISignal is either UINT8_N or UINT8_DYN
- or the ISignal has a reference to the DataTransformation in the role dataTransformation

and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02017] LdCom: Opaque ISignalToIPduMapping.packingByteOrder ⌈ Only if packingByteOrder has the value "Opaque" and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02018] LdCom: ISignalToIPduMapping.startPosition shall be 0 ⌈ Only if ISignalToIPduMapping.startPosition equals 0 (zero) and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02019] LdCom: ISignalToIPduMapping.transferProperty shall be triggered or triggeredWithoutRepetition ⌈ Only if ISignalToIPduMapping.transferProperty equals triggered or triggeredWithoutRepetition and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02020] LdCom: No IPduTiming.minimumDelay defined ⌈ The ISignal is mapped into an ISignalIPdu. Only if this ISignalIPdu has an ISignalIPdu.iPduTimingSpecification with no IPduTiming.minimumDelay defined and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02021] LdCom: ISignalToIPduMapping.updateIndicationBitPosition shall not be defined ⌈ Only if ISignalToIPduMapping.updateIndicationBitPosition is not defined and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02022] LdCom: Only the transmissionModeTrueTiming defined ⌈ The ISignal is mapped into an ISignalIPdu. Only if this ISignalIPdu has exactly the TransmissionModeDeclaration.transmissionModeTrueTiming defined (via ISignalIPdu.iPduTimingSpecification) and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02023] LdCom: DataFilter "always" if TransmissionModeCondition defined ⌈ The ISignal is mapped into an ISignalIPdu. If this ISignalIPdu has either

- no TransmissionModeDeclaration.transmissionModeCondition defined (via ISignalIPdu.iPduTimingSpecification) or
- DataFilter.dataFilterType is set to "always" for the TransmissionModeCondition of this ISignalIPdu.

and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02024] LdCom: No ModeDrivenTransmissionModeCondition defined ⌈ The ISignal is mapped into an ISignalIPdu. Only if this ISignalIPdu has no TransmissionModeDeclaration.modeDrivenTrueCondition and modeDrivenFalseCondition and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02025] LdCom: Only EventControlledTiming defined ⌈ The ISignal is mapped into an ISignalIPdu. Only if this ISignalIPdu has an EventControlledTiming (via TransmissionModeTiming.eventControlledTiming) and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02026] LdCom: Only EventControlledTiming with no repetition defined ⌈ The ISignal is mapped into an ISignalIPdu. Only if this ISignalIPdu has an EventControlledTiming (via TransmissionModeTiming.eventControlledTiming) with EventControlledTiming.numberOfRepetitions = 0 defined and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

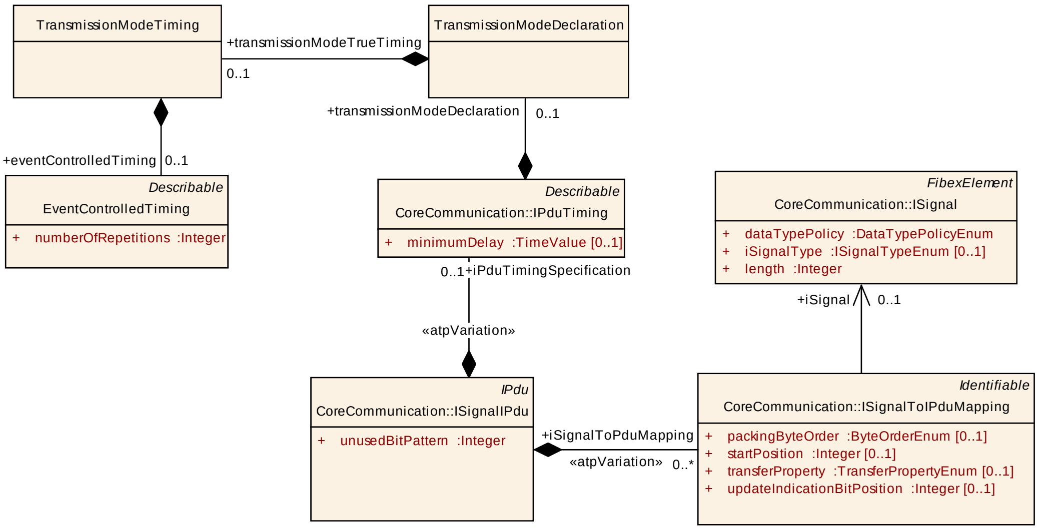


Figure 6.6: Pdu Timing excerpt that may be used to configure LdCom

[TPS_SYST_02027] LdCom: No ISignalPort.timeout reception timeout defined ⌈ Only if the ISignalPort which the ISignalTriggering is referring to has no ISignalPort.timeout defined and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02164] LdCom: No ISignalPort.firstTimeout reception timeout defined ⌈ Only if the ISignalPort which the ISignalTriggering is referring to has no ISignalPort.firstTimeout defined and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_02028] LdCom: No ISignalPort.dataFilter defined ⌈ Only if the ISignalPort which the ISignalTriggering is referring to has either

- no ISignalPort.dataFilter defined
- or the DataFilter.dataFilterType = always

and the LdCom module is present, this ISignal shall be handled by LdCom. ⌋*(RS_SYST_00049)*

[TPS_SYST_03001] LdCom: ISignalIPdu not part of any ISignalIPduGroup ⌈ Only if the ISignalIPdu is not referenced by any ISignalIPduGroup in the role iSignalIPdu and the LdCom module is present, this ISignalIPdu shall be handled by LdCom. ⌋*(RS_SYST_00049)*

6.2.2 Big Endian and Little Endian memory layout of Pdus and Frames

The AUTOSAR system description provide means to specify how the memory layout looks like when signals are packed into Pdus and Pdus are packed into Frames. The layout of Pdus and Frames on different communication systems is out of scope of AUTOSAR. The specification of attributes Bit counting (monotone or sawtooth) and Bit order (decreasing or increasing)[1] is not supported by AUTOSAR. In AUTOSAR these attributes are fixed.

[TPS_SYST_01068] Bit Counting in AUTOSAR ⌈ The Bit counting shall always be considered as "sawtooth". ⌋*()*

[TPS_SYST_01069] Bit Order in AUTOSAR ⌈ The bit order shall always be considered as "Decreasing". ⌋*()*

When a signal is mapped into a `Pdu` only the `packingByteOrder` affects the memory layout of the signal inside the `Pdu` beginning with it´s start bit position.

Little endian stores the least significant byte first and begins with the least significant bit, i.e. loworder bit in the sequence (the least significant bit serves as start bit).

Big endian stores the most significant byte first and begins with the most significant bit, i.e. the bit with the greatest numerical value (the most significant bit serves as start bit).

In both cases the bit positions in the mapped signals increase with the bit positions in the `ISignalIPdu` such that the bit 2^0 is mapped to position n in the `ISignalIPdu` and bit 2^1 is mapped to position n+1 and so on.

Example 6.7 shows the memory layout for Little Endian and Big Endian if an `ISignal` with a length of 10 bits is mappped into a `Pdu`. The start bit position is 5.

Little Endian byte order:

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
Signal	2^2	2^1	2^0	-	-	-	-	-	-	2^9	2^8	2^7	2^6	2^5	2^4	2^3

Big Endian byte order:

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
Signal	-	-	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	-	-	-	-

Figure 6.7: PackingByteOrder Example

The following examples are showing the mapping of Pdus into Frames.

The first example in Figure 6.8 for little endian shows a `Frame` with four bytes that contains a single `Pdu` that is two bytes long. The `PduToFrameMapping.startPosition` is defined with 8 and since the `packingByteOrder` is set to `mostSignificantByteLast` the `startPosition` denotes the least significant bit of the `Pdu` in the `Frame`. The bit position of the mapped `Pdu` increases with the bit positions in the `Frame` such that the bit 2^0 is mapped to position n in the `ISignalIPdu` and bit 2^1 is mapped to position n+1 and so on.

[1]More details about Bit counting and Bit order can be found in ASAM FIBEX [9].

Please note that the Pdus are byte aligned in a Frame and only the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) for PduToFrameMapping.startPosition are allowed.

Figure 6.8 also shows that the Pdu contains three ISignals. The first ISignal has the ISignalToIPduMapping.startPosition defined as 0 and is 5 bits long. The bitposition of the second signal is 5 and the length is 10 bits. And the third signal has the bitposition 15 and is only 1 bit long. Since the ISignalToIPduMapping.packingByteOrder is defined with mostSignificantByteLast as well the startPosition of the ISignals denotes the least significant bit of the ISignal in the Pdu.

Little Endian byte order:

Signal layout in Pdu:

Byte	1								2							
Bit	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16
Signal	2^2	2^1	2^0	2^4	2^3	2^2	2^1	2^0	2^0	2^9	2^8	2^7	2^6	2^5	2^4	2^3
Pdu bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8

Pdu layout in Frame:

Byte	0								1								2								3							
Bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24
Pdu	-	-	-	-	-	-	-	-	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	-	-	-	-	-	-	-	-

Figure 6.8: PackingByteOrder Example

The second example in Figure 6.9 for big endian shows again a Frame with four bytes that contains a single Pdu that is two bytes long. The PduToFrameMapping.startPosition is defined with 15 and since the packingByteOrder is set to mostSignificantByteFirst the startPosition denotes the most significant bit of the Pdu in the Frame.

Figure 6.9 also shows that the Pdu contains three ISignals. The first ISignal has the ISignalToIPduMapping.startPosition defined as 7 and is 5 bits long. The bitposition of the second signal is 2 and the length is 10 bits. And the third signal has the bitposition 8 and is only 1 bit long. Since the ISignalToIPduMapping.packingByteOrder is defined with mostSignificantByteFirst as well the startPosition of the ISignals denotes the most significant bit of the ISignal in the Pdu.

Big Endian byte order:

Signal layout in Pdu:

Byte	1								2							
Frame bit	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16
Signal	2^4	2^3	2^2	2^1	2^0	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^0
Pdu bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8

Pdu layout in Frame:

Byte	0								1								2								3							
Bit	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24
Pdu	-	-	-	-	-	-	-	-	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	-	-	-	-	-	-	-	-

Figure 6.9: PackingByteOrder Example

Please note that the positioning of SegmentPositions in a MultiplexedIPdu works in the exact same way. The examples in Figure 6.8 and Figure 6.9 can be taken as well as an example for a MultiplexedIPdu where the 1 bit signal defines the selectorField and the other two signals represent segments defined for the DynamicPart.

6.3 PDUs

The chapter introduces the different Pdu types that are supported in the AUTOSAR Architecture and by the AUTOSAR Meta-Model.

The PDU Router is responsible only for the routing of IPdus. Other Pdus that are direct specializations of the Pdu meta-class are not routed by the PDU Router.

UserDefinedPdus and UserDefinedIPdus are used to describe PDU-based communication over Complex Drivers. Chapter 6.11 provides a more detailed description of CDDs.

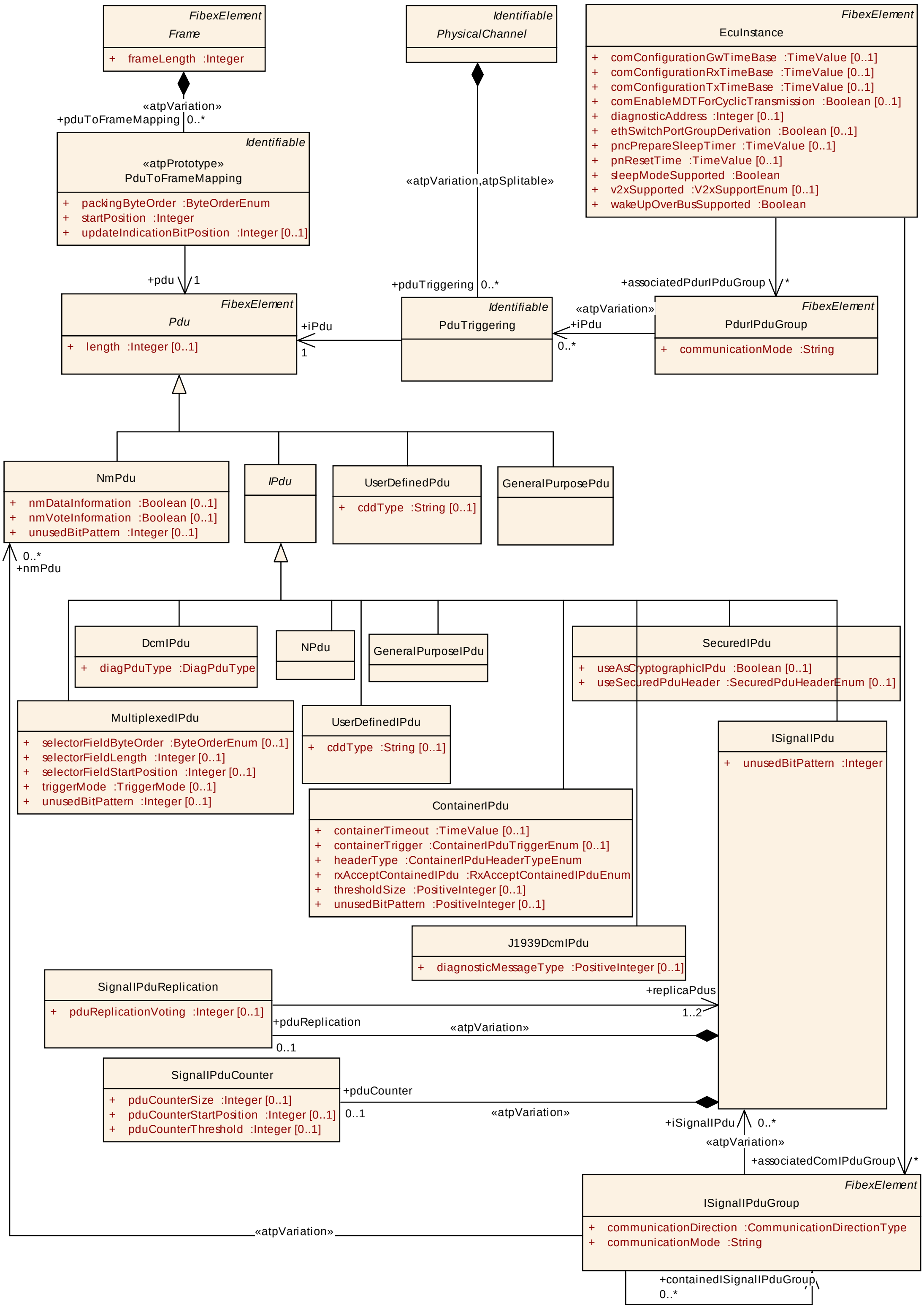


Figure 6.10: Pdus and the mapping into Frames (FibexCore: PDUOverview)

The `PduToFrameMapping` element describes the mapping of `Pdu`s to `Frame`s and defines the position of a `Pdu` within a `Frame`. By using different `PduToFrameMappings` it is possible to use the same `Pdu` in different `Frame`s.

[constr_3516] limitation of Pdu.length for CAN L-PDUs ⌈The Pdu.length of CAN PDUs shall be restricted to 0..8 for classic CAN L-PDUs and 0..8, 12, 16, 20, 24, 32, 48, 64 for CAN FD L-PDUs. ⌋*()*

A timing description IPduTiming can be aggregated directly by the ISignalIPdu. This timing description can be used for the Configuration of COM Transmission Modes. The PduTriggering describes on which channel the Pdu is transmitted. Timing requirements may be specified with the Timing Extension model. More details are described in chapter 1.7.3. Such Pdu timing requirements needs to be fulfilled by the timing specification on the Frame.

Class	**Pdu (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Collection of all Pdus that can be routed through a bus interface.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
length	Integer	0..1	attr	Pdu length in bytes. In case of dynamic length IPdus (containing a dynamical length signal), this value indicates the maximum data length. It should be noted that in former AUTOSAR releases (Rel 2.1, Rel 3.0, Rel 3.1, Rel 4.0 Rev. 1) this parameter was defined in bits. The Pdu length of zero bytes is allowed.

Table 6.19: Pdu

Class	**IPdu (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The IPdu (Interaction Layer Protocol Data Unit) element is used to sum up all Pdus that are routed by the PduR.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
containedIPduProps	ContainedIPduProps	0..1	aggr	Defines whether this IPdu may be collected inside a ContainerIPdu.

Table 6.20: IPdu

Class	**ISignalIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer. A maximum of one dynamic length signal per IPdu is allowed. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
iPduTiming Specification	IPduTiming	0..1	aggr	Timing specification for Com IPdus (Transmission Modes). This information is mandatory for the sender in a System Extract. This information may be omitted on receivers in a System Extract. atpVariation: The timing of a Pdu can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
iSignalToPduMapping	ISignalToIPduMapping	*	aggr	Definition of SignalToIPduMappings included in the SignalIPdu. atpVariation: The content of a PDU can be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
pduCounter	SignalIPduCounter	0..1	aggr	An included Pdu counter is used to ensure that a sequence of Pdus is maintained. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
pduReplication	SignalIPduReplication	0..1	aggr	Pdu Replication is a form of redundancy where the data content of one ISignalIPdu (source) is transmitted inside a set of replica ISignalIPdus. These ISignalIPdus (copies) have different Pdu IDs, identical PduCounters, identical data content and are transmitted with the same frequency. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
unusedBit Pattern	Integer	1	attr	AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPDU with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu.

Table 6.21: ISignalIPdu

Class	**ISignalIPduCounter**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A PduCounter is included in a predefined set of Pdus and used to ensure that a sequence of Pdus is maintained. The counter is incremented when a Pdu is transmitted. The receivers check if the received Pdu is the next one in sequence.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
pduCounterSize	Integer	0..1	attr	Size of PduCounter expressed in bits. Range: 1..8
pduCounterStartPosition	Integer	0..1	attr	Position of PduCounter expressed in bits. Note that PduCounter is not allowed to cross a byte border.
pduCounterThreshold	Integer	0..1	attr	Threshold value of IPduCounter algorithm. See AUTOSAR COM Spec for more details.

Table 6.22: ISignalIPduCounter

Class	**ISignalIPduReplication**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	PduReplication is a form of redundancy where the data content of one ISignalIPdu (source) is transmitted inside a set of replica ISignalIPdus. These ISignalIPdus (copies) have different Pdu IDs, identical PduCounters, identical data content and are transmitted with the same frequency.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
pduReplicationVoting	Integer	0..1	attr	Number of identical IPdus needed for successful voting (1-3).
replicaPdus	ISignalIPdu	1..2	ref	Reference to replica Pdus of this IPdu.

Table 6.23: ISignalIPduReplication

Class	**NmPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Network Management Pdu **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
iSignalToIPduMapping	ISignalToIPduMapping	*	aggr	This optional aggregation is used to describe NmUserData that is transmitted in the NmPdu. The counting of the startPosition starts at the beginning of the NmPdu regardless whether Cbv or Nid are used.

Attribute	Type	Mul.	Kind	Note
nmDataInformation	Boolean	0..1	attr	Defines if the Pdu contains NM Data. If the NmPdu does not aggregate any ISignalToIPduMappings it still may contain UserData that is set via Nm_SetUserData(). If the ISignalToIPduMapping exists then the nmDataInformation attribute shall be ignored.
nmVoteInformation	Boolean	0..1	attr	Defines if the Pdu contains NM Vote information.
unusedBitPattern	Integer	0..1	attr	AUTOSAR COM is filling not used areas of an Pdu with this bit-pattern. This attribute can only be used if the nmDataInformation attribute is set to true.

Table 6.24: NmPdu

Please note that in AUTOSAR only FrNm is able to send out NmPdus with and without voting information:

[constr_3073] `nmVoteInformation` only valid for FrNm ⌈ The `nmVoteInformation` attribute is only valid for FrNm. ⌋ *()*

Class	**NPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This is a Pdu of the Transport Layer. The main purpose of the TP Layer is to segment and reassemble IPdus. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.25: NPdu

Class	**DcmIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Represents the IPdus handled by Dcm. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
diagPduType	DiagPduType	1	attr	Attribute is used to distinguish a request from a response.

Table 6.26: DcmIPdu

Enumeration	**DiagPduType**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	Used to distinguish a diagnostic request from a response.
Literal	**Description**
diagRequest	Diagnostic Request **Tags:** atp.EnumerationValue=0
diagRe-sponse	Diagnostic Response **Tags:** atp.EnumerationValue=1

Table 6.27: DiagPduType

Class	**J1939DcmIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Represents the IPdus handled by J1939Dcm. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
diagnostic MessageT ype	PositiveInteger	0..1	attr	This attribute is used to identify the actual DMx message, e.g 1 means DM01, etc.

Table 6.28: J1939DcmIPdu

[constr_3096] Allowed values for `diagnosticMessageType` ⌈ The allowed values of `diagnosticMessageType` range from 1..57. ⌋*()*

Class	**GeneralPurposePdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This element is used for AUTOSAR Pdus without additional attributes that are routed by a bus interface. Please note that the category name of such Pdus is standardized in the AUTOSAR System Template. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.29: GeneralPurposePdu

[constr_3081] Value of category in GeneralPurposePdu ⌈ The attribute category of GeneralPurposePdu can have the following values:

- SD (Service Discovery)
- GLOBAL_TIME
- DoIP

⌋*()*

Class	**GeneralPurposeIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This element is used for AUTOSAR Pdus without attributes that are routed by the PduR. Please note that the category name of such Pdus is standardized in the AUTOSAR System Template. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.30: GeneralPurposeIPdu

[constr_3082] Value of category in GeneralPurposeIPdu ⌈ The attribute category of GeneralPurposeIPdu can have the following values:

- XCP
- SOMEIP_SEGMENTED_IPDU
- DLT

⌋*()*

Class	**UserDefinedPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	UserDefinedPdu allows to describe PDU-based communication over Complex Drivers. If a new BSW module is added above the BusIf (e.g. a new Nm module) then this Pdu element shall be used to describe the communication. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
cddType	String	0..1	attr	This attribute defines the CDD that transmits or receives the UserDefinedIPdu. If several CDDs are defined this attribute is used to distinguish between them.

Table 6.31: UserDefinedPdu

Class	**UserDefinedIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	UserDefinedIPdu allows to describe PDU-based communication over Complex Drivers. If a new BSW module is added above the PduR (e.g. a Diagnostic Service) then this IPdu element shall be used to describe the communication. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
cddType	String	0..1	attr	This attribute defines the CDD that transmits or receives the UserDefinedPdu. If several CDDs are defined this attribute is used to distinguish between them.

Table 6.32: UserDefinedIPdu

Class	≪atpPrototype≫ **PduToFrameMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A PduToFrameMapping defines the composition of Pdus in each frame.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
packingByteOrder	ByteOrderEnum	1	attr	This attribute defines the order of the bytes of the Pdu and the packing into the Frame. Please consider that [constr_3246] and [constr_3222] are restricting the usage of this attribute.
pdu	Pdu	1	ref	Reference to a I-Pdu, N-Pdu or NmPdu that is transmitted in the Frame.
startPosition	Integer	1	attr	This attribute describes the bitposition of a Pdu within a Frame. Please note that the absolute position of the Pdu in the Frame is determined by the definition of the packingByteOrder attribute. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the Frame. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the Frame. The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. The Pdus are byte aligned in a Frame and only the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) are allowed.

Attribute	***Type***	***Mul.***	***Kind***	***Note***
updateIndicationBitPosition	Integer	0..1	attr	Indication to the receivers that the corresponding Pdu was updated by the sender. This attribute describes the position of the update bit in the frame that aggregates this PDUToFrameMapping. Length is always one bit. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing Frame still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.

Table 6.33: PduToFrameMapping

[constr_3246] `Frame.packingByteOrder` mix within a `Frame` is not allowed ⌈
All `PduToFrameMapping`s within a `Frame` shall have the same `packingByteOrder` value. ⌋*()*

Please note that the absolute position (bit-position) of the `Pdu` in the `Frame` is determined by the definition of the `packingByteOrder` attribute. The `Pdu`s are byte aligned in a `Frame` and the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) are allowed. For reasons of simplicity a mix of the `packingByteOrder` is not allowed.

[constr_3222] No `ByteOrderEnum.opaque` allowed for `PduToFrameMapping.packingByteOrder` ⌈ The values of `PduToFrameMapping.packingByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed. ⌋*()*

Class	IPduTiming			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	AUTOSAR COM provides the possibility to define two different TRANSMISSION MODES for each IPdu. The Transmission Mode of an IPdu that is valid at a specific point in time is selected using the values of the signals that are mapped to this IPdu. For each IPdu a Transmission Mode Selector is defined. The Transmission Mode Selector is calculated by evaluating the conditions for a subset of signals (class TransmissionModeCondition in the System Template). The Transmission Mode Selector is defined to be true, if at least one Condition evaluates to true and is defined to be false, if all Conditions evaluate to false.			
Base	ARObject, Describable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
minimumDelay	TimeValue	0..1	attr	Minimum Delay in seconds between successive transmissions of this I-PDU, independent of the Transmission Mode.
transmissionModeDeclaration	TransmissionModeDeclaration	0..1	aggr	AUTOSAR COM allows configuring statically two different transmission modes for each I-PDU (True and False). The Transmission Mode Selector evaluates the conditions for a subset of signals and decides the transmission mode. It is possible to switch between the transmission modes during runtime.

Table 6.34: IPduTiming

Class	PduTriggering			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The PduTriggering describes on which channel the IPdu is transmitted. The Pdu routing by the PduR is only allowed for subclasses of IPdu. Depending on its relation to entities such channels and clusters it can be unambiguously deduced whether a fan-out is handled by the Pdu router or the Bus Interface. If the fan-out is specified between different clusters it shall be handled by the Pdu Router. If the fan-out is specified between different channels of the same cluster it shall be handled by the Bus Interface.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
iPdu	Pdu	1	ref	Reference to the Pdu for which the PduTriggering is defined. One I-Pdu can be triggered on different channels (PduR fan-out). The Pdu routing by the PduR is only allowed for subclasses of IPdu. Nevertheless is the reference to the Pdu element necessary since the PduTriggering element is also used to specify the sending and receiving connections to EcuPorts.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
iPduPort	IPduPort	*	ref	References to the IPduPort on every ECU of the system which sends and/or receives the I-PDU. References for both the sender and the receiver side shall be included when the system is completely defined.
iSignalTriggering	ISignalTriggering	*	ref	This reference provides the relationship to the ISignalTriggerings that are implemented by the PduTriggering. The reference is optional since no ISignalTriggering can be defined for DCM and Multiplexed Pdus. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
triggerIPduSendCondition	TriggerIPduSendCondition	*	aggr	Defines the trigger for the Com_TriggerIPDUSend API call. Only if all defined TriggerIPduSendConditions evaluate to true (AND associated) the Com_TriggerIPDUSend API shall be called.

Table 6.35: PduTriggering

AUTOSAR COM provides a mechanism of starting/stopping COM PDU groups (`ISignalIPduGroup`).

Class	**ISignalIPduGroup**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The AUTOSAR COM Layer is able to start and to stop sending and receiving configurable groups of I-Pdus during runtime. An ISignalIPduGroup contains either ISignalIPdus or ISignalIPduGroups. **Tags:** atp.recommendedPackage=ISignaliPduGroup			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationDirection	CommunicationDirectionType	1	attr	This attribute determines in which direction IPdus that are contained in this IPduGroup will be transmitted (communication direction can be either In or Out).
communicationMode	String	1	attr	This attribute defines the use-case for this ISignalIPduGroup (e.g. diagnostic, debugging etc.). For example, in a diagnostic mode all IPdus - which are not involved in diagnostic - are disabled. The use cases are not limited to a fixed enumeration and can be specified as a string.
containedISignalIPduGroup	ISignalIPduGroup	*	ref	An I-Pdu group can be included in other I-Pdu groups. Contained I-Pdu groups shall not be referenced by the EcuInstance.

Attribute	Type	Mul.	Kind	Note
iSignalIPdu	ISignalIPdu	*	ref	Reference to a set of Signal I-Pdus, which are contained in the ISignal I-Pdu Group. atpVariation: The content of a ISignal I-Pdu group can vary (->vehicle modes). **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
nmPdu	NmPdu	*	ref	Reference to a set of NmPdus with NmUserData, which are contained in the ISignalIPduGroup. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.36: ISignalIPduGroup

Enumeration	**CommunicationDirectionType**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	Describes the communication direction.
Literal	*Description*
in	Reception (Input) **Tags:** atp.EnumerationValue=0
out	Transmission (Output) **Tags:** atp.EnumerationValue=1

Table 6.37: CommunicationDirectionType

[constr_3020] `communicationDirection` of `containedISignalIPduGroups` ⌈
The value of the attribute `communicationDirection` of `containedISignalIPduGroup` must be identical to the value of the attribute `communicationDirection` of the enclosing `ISignalIPduGroup`. ⌋*()*

The AUTOSAR Pdu Router provides a mechanism of enabling/disabling of routing path groups (`PdurIPduGroup`).

Class	**PdurIPduGroup**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The AUTOSAR PduR will enable and disable the sending of configurable groups of IPdus during runtime according to the AUTOSAR PduR specification. **Tags:** atp.recommendedPackage=PdurIPduGroups			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationMode	String	1	attr	This attribute defines the use-case for this PduRIPduGroup. For example, in a diagnostic mode all IPdus - which are not involved in diagnostic - are disabled. The use cases are not limited to a fixed enumeration and can be specified as a string.
iPdu	PduTriggering	*	ref	Reference to a set of IPdus, which are contained in the PduR I-Pdu Group. If an IPdu is routed by the PduR to different destinations (PduR fan-out) than an PduTriggering for each destination is created in the System Template. To enable/disable a specific destination the PdurIPduGroup refers to the PduTriggering. atpVariation: The content of a PduR I-Pdu group can vary (->vehicle modes). **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.38: PdurIPduGroup

[constr_3275] PduTriggering containment in different PdurIPduGroups of the same EcuInstance is not allowed ⌈ A PduTriggering shall not be referenced by more than one PdurIPduGroup in the role iPdu where each of these PdurIPduGroups are referenced by the same EcuInstance. ⌋*()*

6.3.1 ContainerIPdu

IPdu collection is used to transport several (smaller) IPdus in one (large) ContainerIPdu. A possible use case for example is the extended payload size for Ethernet and CanFd in combination with the limited payload of Can and Lin, where Pdus from a Can network shall be routed onto an Ethernet network and then back to a Can again.

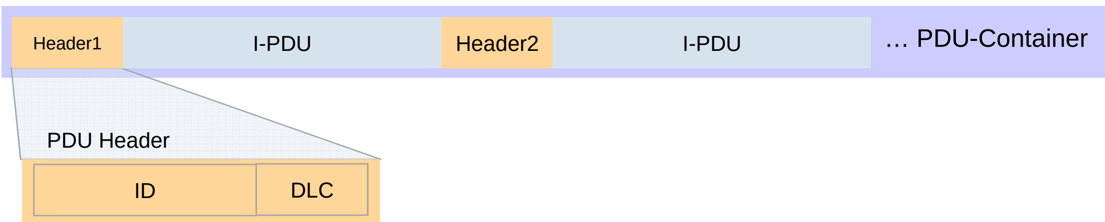


Figure 6.11: Layout of a ContainerIPdu if HeaderMode is used

For each IPdu which is put inside a ContainerIPdu, a header may be provided which determines which IPdu is contained (ContainedIPduProps.headerIdLongHeader or headerIdShortHeader) and what the size of that IPdu is

(DLC during runtime). With this header mode the receivers are able to extract the individual contained IPdus again. As an alternative option to the usage of headers a statically configured layout of IPdus in the ContainerIPdu is supported.

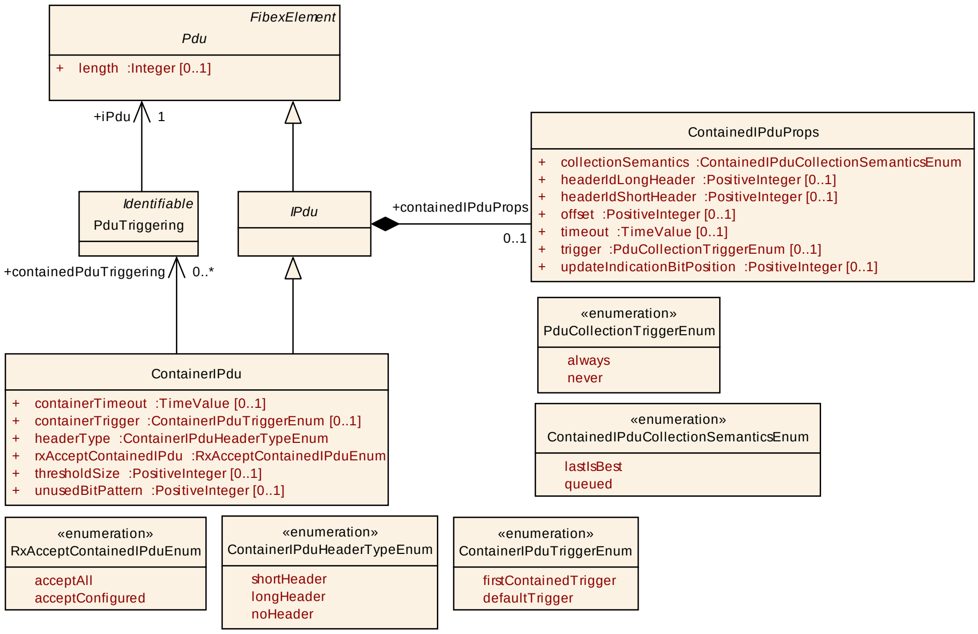


Figure 6.12: ContainerIPdu with ContainedIPduProps

Class	**ContainerIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Allows to collect several IPdus in one ContainerIPdu based on the headerType. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
containedPduTriggering	PduTriggering	*	ref	This PduTriggering shall be collected inside the ContainerIPdu.
containerTimeout	TimeValue	0..1	attr	When this timeout expires the ContainerIPdu is sent out. The respective timer is started when the first Ipdu is put into the ContainerIPdu. This attribute is ignored on receiver side.
containerTrigger	ContainerIPduTriggerEnum	0..1	attr	Defines if the transmission of the ContainerIPdu shall be requested right after the first ContainedIPdu was put into it. This attribute shall be ignored on receiver side.
headerType	ContainerIPduHeaderTypeEnum	1	attr	Defines whether and which header type is used (header id and length).
rxAcceptContainedIPdu	RxAcceptContainedIPduEnum	1	attr	Defines whether this ContainerIPdu has a fixed set of containedIPdus assigned for reception.

Attribute	Type	Mul.	Kind	Note
thresholdSize	PositiveInteger	0..1	attr	Defines the size threshold which, when exceeded, triggers the sending of the ContainerIPdu although the maxium Pdu size has not been reached yet. Unit: byte.
unusedBitPattern	PositiveInteger	0..1	attr	IPduM fills not updated areas of the ContainerPdu with this byte-pattern. **Tags:** atp.Status=draft

Table 6.39: ContainerIPdu

Enumeration	ContainerIPduTriggerEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Defines when the transmission of the ContainerIPdu shall be requested.
Literal	**Description**
defaultTrigger	Defines that the transmission of the ContainerIPdu shall be requested when the default trigger conditions apply (e.g. timeout of threshold). **Tags:** atp.EnumerationValue=0
firstContainedTrigger	Defines that the transmission of the ContainerIPdu shall be requested right after the first ContainedIPdu was put into the ContainerIPdu. **Tags:** atp.EnumerationValue=1

Table 6.40: ContainerIPduTriggerEnum

Enumeration	ContainerIPduHeaderTypeEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Is used to define the header type and size of ContainerIPdus. The header size includes the header id and the length information.
Literal	**Description**
longHeader	Header size is 64 bit: • Header Id 32 bit • Dlc 32 bit **Tags:** atp.EnumerationValue=0
noHeader	No Header is used and the the location of each containedPdu in the ContainerPdu is statically configured. **Tags:** atp.EnumerationValue=2; atp.Status=draft

shortHeader	Header size is 32 bit: • Header Id 24 bit • Dlc 8 bit. **Tags:** atp.EnumerationValue=1

Table 6.41: ContainerIPduHeaderTypeEnum

Enumeration	**RxAcceptContainedIPduEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	Defines whether this ContainerIPdu has a fixed set of containedIPdus assigned for reception.
Literal	***Description***
acceptAll	No fixed set of containedIPdus is defined, any known containedIPdu (based on headerId) shall be expected within this ContainerIPdu. **Tags:** atp.EnumerationValue=0
acceptCon-figured	A fixed set of containedIPdus is defined. Only these assigned containedIPdus are expected in this ContainerIPdu. If a not assigned containedIPdu is received within this ContainerIPdu this containedIPdu is discarded. **Tags:** atp.EnumerationValue=1

Table 6.42: RxAcceptContainedIPduEnum

Class	**ContainedIPduProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Defines the aspects of an IPdu which can be collected inside a ContainerIPdu.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
collectionSemantics	ContainedIPduCollectionSemanticsEnum	1	attr	Defines whether this ContainedIPdu shall be collected using a last-is-best or queued semantics.
headerIdLongHeader	PositiveInteger	0..1	attr	Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = longHeader.
headerIdShortHeader	PositiveInteger	0..1	attr	Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = shortHeader.
offset	PositiveInteger	0..1	attr	Byte offset that describes the location of the ContainedPdu in the ContainerPdu if no header is used. **Tags:** atp.Status=draft

Attribute	*Type*	*Mul.*	*Kind*	*Note*
timeout	TimeValue	0..1	attr	Defines a IPdu specific sender timeout which can reduce the ContainerIPdu timer when this containedIPdu is put inside the ContainerIPdu. This attribute is ignored on receiver side.
trigger	PduCollectionTriggerEnum	0..1	attr	Defines whether this IPdu does trigger the sending of the ContainerIPdu. This attribute is ignored on receiver side.
updateIndicationBitPosition	PositiveInteger	0..1	attr	The updateIndicationBit specifies the bit location of ContainedIPdu Update-Bit in the Container PDU. It indicates to the receivers that the ContainedIPdu in the ContainerIPdu was updated. **Tags:** atp.Status=draft

Table 6.43: ContainedIPduProps

Enumeration	**ContainedIPduCollectionSemanticsEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Defines the collection semantics for ContainedIPdus.
Literal	***Description***
lastIsBest	The ContainedIPdu data will be fetched via TriggerTransmit just before the transmission executes. **Tags:** atp.EnumerationValue=0
queued	The ContainedIPdu data will instantly be stored to the ContainerIPdu in the context of the Transmit API. **Tags:** atp.EnumerationValue=1

Table 6.44: ContainedIPduCollectionSemanticsEnum

Enumeration	**PduCollectionTriggerEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication
Note	Defines whether a Pdu contributes to the triggering of the data transmission if Pdu collection is enabled.
Literal	***Description***
always	Pdu will trigger the transmission of the data. **Tags:** atp.EnumerationValue=0
never	Pdu will be buffered and will not trigger the transmission of the data. **Tags:** atp.EnumerationValue=1

Table 6.45: PduCollectionTriggerEnum

[TPS_SYST_02062] Allowed `ContainedIPduProps.headerIdLongHeader` and `ContainedIPduProps.headerIdShortHeader` values ⌈ ContainedIPduProps.headerIdLongHeader and ContainedIPduProps.headerIdShortHeader shall be restricted to values different from 0 (all bits of the value set to 0). ⌋*(RS_SYST_00055)*

Since the header information is larger than 8 bit the byte ordering of the header inside the ContainerIPdu needs to be defined. This is done at System level. Thus all ContainerIPdus have the header information in the same byte order within one System.

[TPS_SYST_02063] Byte order of ContainerIPdu header information ⌈ The System.containerIPduHeaderByteOrder defines in which byte order the header information shall be put into the ContainerIPdu. ⌋*(RS_SYST_00055)*

[constr_3140] No ByteOrderEnum.opaque allowed for System.containerIPduHeaderByteOrder ⌈ The values of System.containerIPduHeaderByteOrder are restricted to ByteOrderEnum.mostSignificantByteFirst and ByteOrderEnum.mostSignificantByteLast. I.e. the value ByteOrderEnum.opaque is not allowed. ⌋*()*

The following assumptions lead to the modeling of the ContainerIPdu structure:

- **[TPS_SYST_02097] Basic definition of contained IPdus** ⌈ Every IPdu with IPdu.containedIPduProps defined can be collected inside a ContainerIPdu. ⌋*(RS_SYST_00055)*
- **[TPS_SYST_02098] Header id and header type of a contained IPdu** ⌈ A contained IPdu shall always have the same headerId per header type (long or short header), regardless in which ContainerIPdu it is collected. If noHeader is set then the contained IPdu does not need to have a headerId. ⌋*(RS_SYST_00055)*
- **[TPS_SYST_02099] Relation between ContainerIPdu and contained IPdus on sender side** ⌈ For each sending ECU a contained IPdu shall be assigned to exactly one ContainerIPdu. ⌋*(RS_SYST_00055)*
- **[TPS_SYST_02100] Relation between ContainerIPdu and contained IPdus on receiver side** ⌈ On receiver side, it is not necessarily required to statically define which IPdus may be contained inside a ContainerIPdu if the header mode is used. Thus it would be possible to update the senders of ContainerIPdus and put different or additional IPdus inside. ⌋*(RS_SYST_00055)*

The ContainerIPdu defines which IPdus may be collected inside that ContainerIPdu (ContainerIPdu.containedPduTriggering). Dynamic assignment of a contained IPdu to different ContainerIPdus during run-time is not supported by the IPdu multiplexer. Nevertheless it is allowed to collect an IPdu in several ContainerIPdus if each of those ContainerIPdus is transmitted by a different ECU (on the same or on a different PhysicalChannel).

Since it is possible to define a fan-out in the PduR by the means of PduTriggerings, it is required for the ContainerIPdu to refer to PduTriggerings in order to unambiguously identify the fan-out IPdu.

[constr_3141] Only IPdus shall be part of a ContainerIPdu ⌈ The PduTriggering which is referenced in the role ContainerIPdu.containedPduTriggering shall refer to a subclass of an IPdu in the role PduTriggering.iPdu. ⌋*()*

Only subclasses of IPdus are handled by the PduR and therefore are available for the ContainerIPdu.

For the sender side this assignment defines which IPdus may be collected inside this ContainerIPdu. For the receiver side this assignment may be omitted if ContainerIPdu.rxAcceptContainedIPdu is set to RxAcceptContainedIPduEnum.acceptAll.

[TPS_SYST_02064] Reception acceptance of contained IPdus ⌈ ContainerIPdu.rxAcceptContainedIPdu defines for the receiver side whether the list of ContainerIPdu.containedPduTriggering is a closed set. If ContainerIPdu.rxAcceptContainedIPdu = RxAcceptContainedIPduEnum.acceptConfigured only those IPdus which are referenced by this ContainerIPdu in the role ContainerIPdu.containedPduTriggering are extracted from this ContainerIPdu. For the receiver side this assignment may be omitted if ContainerIPdu.rxAcceptContainedIPdu is set to RxAcceptContainedIPduEnum.acceptAll.

If ContainerIPdu.rxAcceptContainedIPdu = RxAcceptContainedIPduEnum.acceptAll the IPdus which are referenced by this ContainerIPdu in the role ContainerIPdu.containedPduTriggering are expected inside this ContainerIPdu but there may also occur other IPdus inside this ContainerIPdu as well. This also supports the case where no IPdus are specified in ContainerIPdu.containedPduTriggering. ⌋*(RS_SYST_00055)*

[constr_3403] Usage of ContainerIPdu.rxAcceptContainedIPdu if noHeader is used ⌈ If the ContainerIPdu.headerType is set to noHeader then the ContainerIPdu.rxAcceptContainedIPdu attribute value shall be set to acceptConfigured. ⌋*()*

[TPS_SYST_03014] Transmission triggering by the first contained IPdu put into a ContainerIPdu ⌈ The attribute ContainerIPdu.containerTrigger determines whether the transmission of a ContainerIPdu shall be requested when the first contained IPdu was put into the ContainerIPdu.

In case containerTrigger equals firstContainedTrigger the transmission of the ContainerIPdu shall be requested when the first contained IPdu is put into the ContainerIPdu.

In case containerTrigger equals defaultTrigger the transmission of the ContainerIPdu shall be requested when the other trigger conditions defined by the ContainerIPdu are fulfilled (e.g. containerTimeout, thresholdSize). ⌋*(RS_SYST_00055)*

Note: This trigger condition is independent from PduCollectionTriggerEnum.always which is defined for specific IPdus. With the attribute ContainerIPdu.containerTrigger = firstContainedTrigger on the other hand, any contained IPdu will trigger the ContainerIPdu transmission.

Rationale for this trigger condition is the efficient usage (allow the ContainerIPdus to reach a certain fill level) of triggered transmission on time- (containerTrigger typically set to firstContainedTrigger) and event-driven (containerTrigger typically set to defaultTrigger) buses.

Each IPdu which shall be collected inside a ContainerIPdu shall provide the IPdu.containedIPduProps. This ContainedIPduProps defines a unique header Id per ContainerIPdu.headerType which shall be used in the Pdu header of the ContainerIPdu in case that the headerType is set to shortHeader or longHeader. In case that the headerType is set to noHeader the layout of IPdus in the ContainerIPdu is statically configured.

[constr_3142] Mandatory headerIdLongHeader for longHeader ⌈ For each IPdu which is assigned to a ContainerIPdu in the role ContainerIPdu.containedPduTriggering with ContainerIPdu.headerType = longHeader the IPdu.containedIPduProps.headerIdLongHeader shall be defined. ⌋*()*

[constr_3143] Mandatory headerIdShortHeader for shortHeader ⌈ For each IPdu which is assigned to a ContainerIPdu in the role ContainerIPdu.containedPduTriggering with ContainerIPdu.headerType = shortHeader the IPdu.containedIPduProps.headerIdShortHeader shall be defined. ⌋*()*

[constr_3402] Mandatory offset if noHeader is used ⌈ For each IPdu which is assigned to a ContainerIPdu in the role containedPduTriggering with ContainerIPdu.headerType = noHeader the IPdu.containedIPduProps.offset shall be defined. ⌋*()*

[constr_3404] Usage of ContainedIPduProps.updateIndicationBitPosition ⌈ ContainedIPduProps.updateIndicationBitPosition is only allowed to be set to a value if the headerType of the ContainerIPdu that contains the IPdu with containedIPduProps is set to noHeader. ⌋*()*

[constr_3405] Dynamic Length IPdu inside of a static configured ContainerIPdu ⌈ Only the last contained IPdu (according to the ContainedIPduProps.offset) of a ContainerIPdu with static container layout (i.e., a ContainerIPdu with headerType set to noHeader) is allowed to be a dynamic length IPdu (i.e, a contained IPdu that at runtime may exhibit a length different from the one statically configured via Pdu.length of the respective Pdu). All other contained IPdus of a ContainerIPdu with static container layout have to be static length IPdus. ⌋*()*

[TPS_SYST_02065] Contained IPdu specific transmission timeout ⌈ The IPdu specific transmission timeout can be specified at ContainedIPduProps.timeout. If no ContainedIPduProps.timeout is provided the timeout from the ContainerIPdu shall be used (ContainerIPdu.containerTimeout). ⌋*(RS_SYST_00055)*

The case where neither the ContainerIPdu.containerTimeout nor the ContainedIPduProps.timeout is provided, will result in no time-based triggering of ContainerIPdus which might lead to long delays or no transmission at all if no other sending condition for this ContainerIPdu does occur (e.g. no further IPdu is collected inside this ContainerIPdu).

[TPS_SYST_02066] ContainerIPdu.thresholdSize ⌈ The attribute ContainerIPdu.thresholdSize defines the threshold when a ContainerIPdu shall be triggered for transmission. If the payload size of the ContainerIPdu exceeds the value of thresholdSize this ContainerIPdu shall be transmitted. ⌋*(RS_SYST_00055)*

Note: The ContainerIPdu.thresholdSize supports the definition of a transmission threshold which takes the data transmission model of the communication into account. Especially when operating with variable length IPdus, only the maximum length of these IPdus is defined in the System Description. Only having the maximumLength information it is not possible to derive a sensible threshold for the ContainerIPdu this variable length IPdu is collected in. Thus a ContainerIPdu would wait for further contained IPdus. Using a transmission model it can be calculated that the average size contained IPdu will not fit into that ContainerIPdu anymore and provide this as a requirement in ContainerIPdu.thresholdSize.

Another use case for the ContainedIPduProps is to support the usage of optimized trigger transmit collection of IPdus in ContainerIPdus. Therefore it is necessary to distinguish between contained IPdus with lastIsBest (will be fetched via trigger transmit just before the transmission executes) and those with queued semantics (will instantly be stored in the context of the transmit API). This distinction is possible on the level of single contained IPdus with the attribute collectionSemantics.

For all intents and purposes, the different handling of contained IPdus depending on the semantics is supported by the attribute ContainedIPduProps.collectionSemantics that allows the individual setting of the intended semantics per contained IPdu.

[constr_3517] Consistent setting of ContainedIPduProps.collectionSemantics in the context of one ContainerIPdu ⌈ The value of the attribute ContainedIPduProps.collectionSemantics shall be identical for all contained IPdus within the context of a given ContainerIPdu. ⌋*()*

[constr_3144] Mandatory IPdu.containedIPduProps for contained IPdus ⌈ For each IPdu which is assigned to a ContainerIPdu in the role ContainerIPdu.containedPduTriggering the IPdu.containedIPduProps shall be defined. ⌋*()*

ContainedIPduProps is optional and may be ignored in case the IPdu is not mapped into a ContainerIPdu. A use-case is that an IPdu is fan-out in the PduR and one PduTriggering is part of a ContainerIPdu while the other PduTriggering is directly transported via a bus interface.

6.3.2 SecuredIPdu

AUTOSAR supports an authentication mechanism for critical data on the level of Pdus.

[TPS_SYST_02060] SecuredIPdus ⌈ SecuredIPdu shall be used to describe an IPdu that is protected against unauthorized manipulation and replay attacks. ⌋ *(RS_SYST_00054)*

[TPS_SYST_02148] Meaning of useAsCryptographicIPdu that is not set or set to false ⌈ If useAsCryptographicIPdu is not set or set to false the SecuredIPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information (Freshness Counter and an Authenticator). ⌋*(RS_SYST_00054)*

[TPS_SYST_02149] Meaning of useAsCryptographicIPdu that is set to true ⌈ If useAsCryptographicIPdu is set to true the SecuredIPdu contains the Authenticator for a payload that is transported in a separate message. The separate Authentic IPdu is described by the PduTriggering that is referenced with the payload reference. ⌋*(RS_SYST_00054)*

The attribute useAsCryptographicIPdu decides whether one single Pdu or two Pdus are transferred on the communication bus. In either case always two IPdus shall be modeled:

- SecuredIPdu with a PduTriggering
- payload IPdu with a PduTriggering

[TPS_SYST_02172] Modeling of SecuredIPdu in case useAsCryptographicIPdu is set to false ⌈ If the useAsCryptographicIPdu is set to false only the SecuredIPdu shall be

- mapped into a Frame by the PduToFrameMapping or
- assigned to SocketConnectionBundle or SocketConnection or
- assigned to ContainerIPdu

⌋*(RS_SYST_00054)*

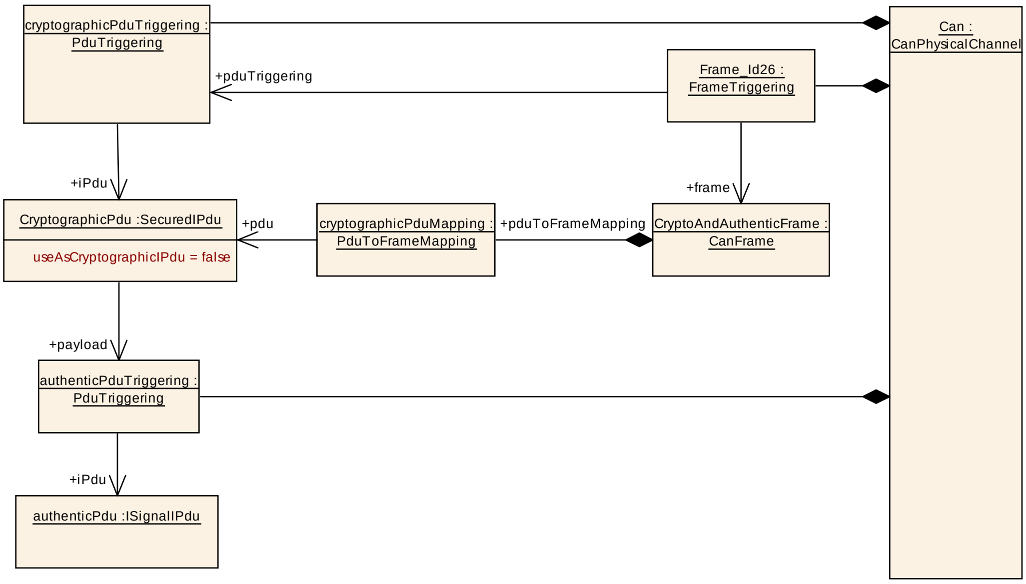


Figure 6.13: Example for the modeling of SecuredIPdu with useAsCryptographicIPdu set to false

[TPS_SYST_02173] Modeling of SecuredIPdu in case useAsCryptographicIPdu is set to true ⌈ If the useAsCryptographicIPdu is set to true then the SecuredIPdu and the payload IPdu shall be

- mapped into a Frame by the PduToFrameMapping or
- assigned to SocketConnectionBundle or SocketConnection or
- assigned to ContainerIPdu

⌋ *(RS_SYST_00054)*

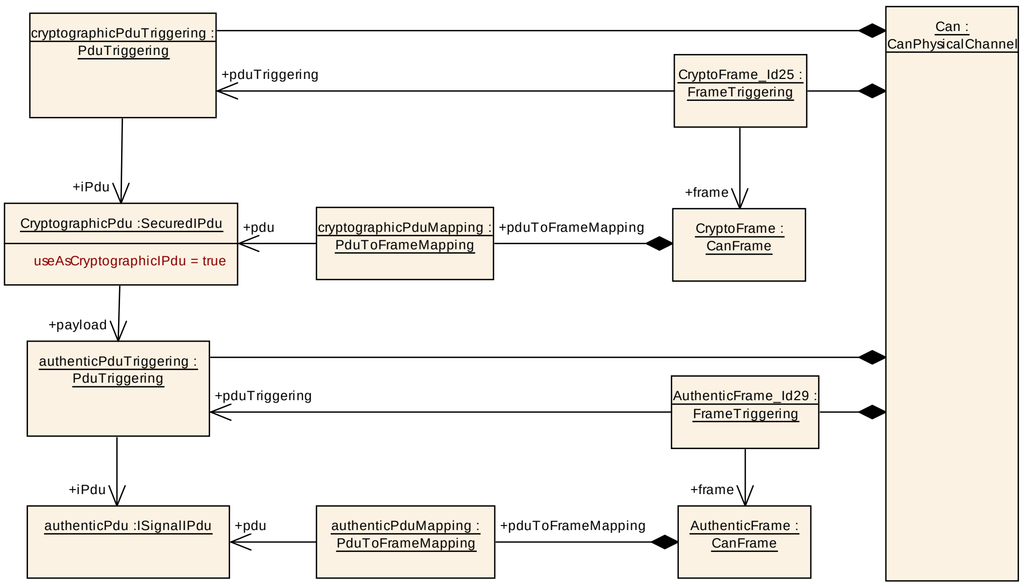


Figure 6.14: Example for the modeling of SecuredIPdu with useAsCryptographicIPdu set to true

Please note that [TPS_SYST_02059] defines that the PduTriggerings of the SecuredIPdu and PduTriggerings of the payload IPdu shall both reference IPduPorts.

A SecuredIPdu defines freshness properties by referencing the reusable SecureCommunicationFreshnessProps in the role freshnessProps. The authentication properties are defined by reusable SecureCommunicationAuthenticationProps that are referenced in the role authenticationProps. Configuration settings that are specific to the SecuredIPdu are defined in SecureCommunicationProps.

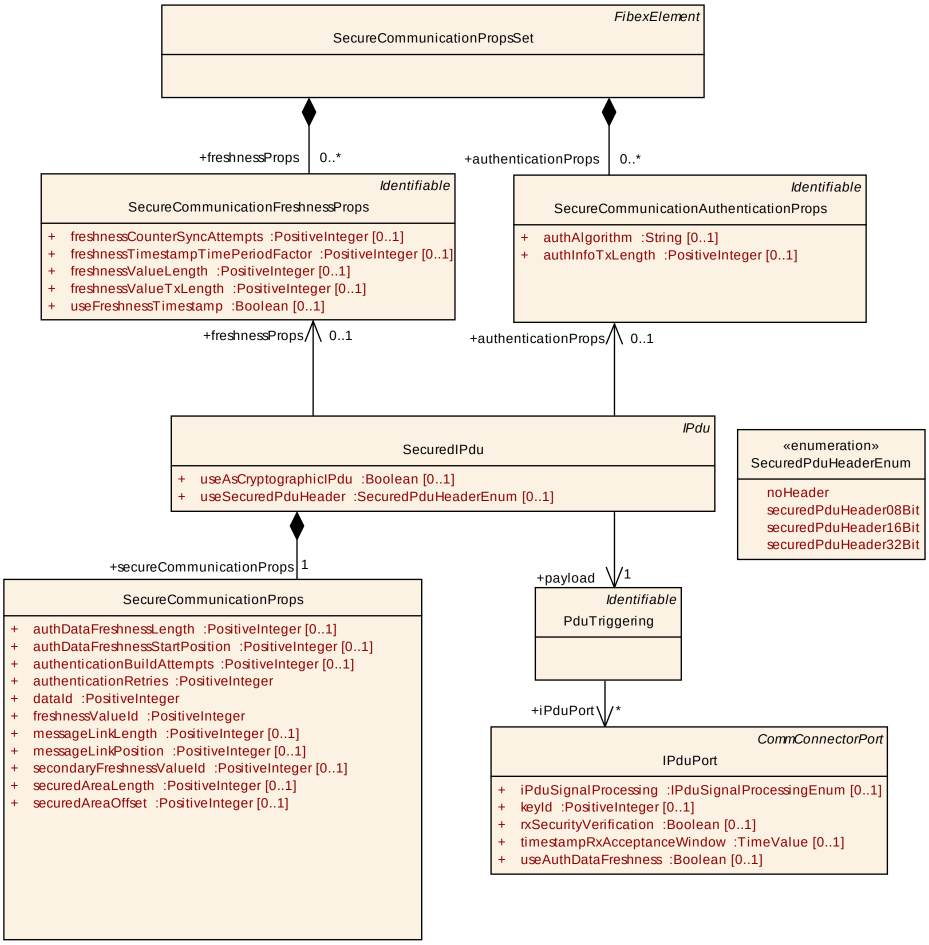


Figure 6.15: SecuredIPdu with SecureCommunicationProps

Class	SecuredIPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	If useAsCryptographicPdu is not set or set to false this IPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information (Freshness Counter and an Authenticator). If useAsCryptographicPdu is set to true this IPdu contains the Authenticator for a payload that is transported in a separate message. The separate Authentic IPdu is described by the Pdu that is referenced with the payload reference from this SecuredIPdu. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
authenticationProps	SecureCommunicationAuthenticationProps	0..1	ref	Reference to authentication properties that are valid for this SecuredIPdu.
freshnessProps	SecureCommunicationFreshnessProps	0..1	ref	Reference to freshness properties that are valid for this SecuredIPdu.
payload	PduTriggering	1	ref	Reference to a Pdu that will be protected against unauthorized manipulation and replay attacks.
secureCommunicationProps	SecureCommunicationProps	1	aggr	Specific configuration properties for this SecuredIPdu.
useAsCryptographicIPdu	Boolean	0..1	attr	If this attribute is set to true the SecuredIPdu contains the Authentication Information for an AuthenticIPdu that is transmitted in a separate message. The AuthenticIPdu contains the original payload, i.e. the secured data. If this attribute is set to false this SecuredIPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information.
useSecuredPduHeader	SecuredPduHeaderEnum	0..1	attr	This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.

Table 6.46: SecuredIPdu

Enumeration	SecuredPduHeaderEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Defines the header which will be inserted into the SecuredIPdu.
Literal	**Description**

noHeader	No header included in the SecuredPdu. **Tags:** atp.EnumerationValue=0
securedPdu Header08Bit	8 Bit Secured I-PDU Header included in the Secured I-PDU. **Tags:** atp.EnumerationValue=1
securedPdu Header16Bit	16 Bit Secured I-PDU Header included in the Secured I-PDU. **Tags:** atp.EnumerationValue=2
securedPdu Header32Bit	32 Bit Secured I-PDU Header included in the Secured I-PDU. **Tags:** atp.EnumerationValue=3

Table 6.47: SecuredPduHeaderEnum

Class	**SecureCommunicationProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This meta-class contains configuration settings that are specific for an individual SecuredIPdu.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
authDataFreshnessLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the authentic PDU data that is passed to the SWC that verifies and generates the Freshness.
authDataFreshnessStartPosition	PositiveInteger	0..1	attr	This value determines the start position in bits of the Authentic PDU that shall be passed on to the SWC that verifies and generates the Freshness.. The bit position starts counting from the MSB of the first byte of the PDU.
authenticationBuildAttempts	PositiveInteger	0..1	attr	This attribute specifies the number of authentication build attempts.
authenticationRetries	PositiveInteger	1	attr	This attribute defines the additional number of authentication attempts that are to be carried out when the generation of the authentication information failed for a given SecuredIPdu. If zero is set than only one authentication attempt is done.
dataId	PositiveInteger	1	attr	This attribute defines a unique numerical identifier for the Secured I-PDU.
freshnessValueId	PositiveInteger	1	attr	This attribute defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.
messageLinkLength	PositiveInteger	0..1	attr	SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the length in bits of the messageLinker.

Attribute	Type	Mul.	Kind	Note
messageLinkPosition	PositiveInteger	0..1	attr	SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the startPosition in bits of the messageLinker.
secondaryFreshnessValueId	PositiveInteger	0..1	attr	This attribute defines the Id of the Secondary Freshness Value. The Secondary Freshness Value might be a normal counter or a time value. Please note that this attribute is for documentation only to allow the configuration of required freshness value manager and no upstream mapping is defined for it.
securedAreaLength	PositiveInteger	0..1	attr	This attribute defines the length in bytes of the area within the payload Pdu which will be secured.
securedAreaOffset	PositiveInteger	0..1	attr	This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.

Table 6.48: SecureCommunicationProps

Class	SecureCommunicationPropsSet			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Collection of properties used to configure SecuredIPdus. **Tags:** atp.recommendedPackage=SecureCommunicationPropsSet			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
authenticationProps	SecureCommunicationAuthenticationProps	*	aggr	Authentication properties used to configure SecuredIPdus.
freshnessProps	SecureCommunicationFreshnessProps	*	aggr	Freshness properties used to configure SecuredIPdus.

Table 6.49: SecureCommunicationPropsSet

Class	SecureCommunicationFreshnessProps			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Freshness properties used to configure SecuredIPdus.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

Attribute	***Type***	***Mul.***	***Kind***	***Note***
freshnessCounterSyncAttempts	PositiveInteger	0..1	attr	This attribute defines the number of Freshness Counter re-synchronization attempts when a verification failed for a Secured I-PDU. If the value is zero, there will be no additional verification attempt to synchronize with a potentially better fitting Freshness Counter value. This attribute is only applicable if useFreshnessTimestamp is FALSE.
freshnessTimestampTimePeriodFactor	PositiveInteger	0..1	attr	This attribute defines a factor that specifies the time period for the Freshness Timestamp. It holds a multiplication factor that specifies the concrete meaning of a Freshness Timestamp increment by one on basis of microseconds.
freshnessValueLength	PositiveInteger	0..1	attr	This attribute defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.
freshnessValueTxLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the attribute is 0 no Freshness Value is included in the Secured I-PDU.
useFreshnessTimestamp	Boolean	0..1	attr	This attribute specifies whether the Freshness Value is generated through individual Freshness Counters or by a Timestamps. The value is set to TRUE when Timestamps are used.

Table 6.50: SecureCommunicationFreshnessProps

Class	**SecureCommunicationAuthenticationProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Authentication properties used to configure SecuredIPdus.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
authAlgorithm	String	0..1	attr	This attribute defines the authentication algorithm used for MAC generation and verification.
authInfoTxLength	PositiveInteger	0..1	attr	This attribute defines the length in bits of the authentication code to be included in the payload of the authenticated Pdu.

Table 6.51: SecureCommunicationAuthenticationProps

[constr_3136] Allowed payload of `SecuredIPdus` ⌈ `SecuredIPdu`s are allowed to reference `PduTriggering`s of `ISignalIPdu`s, `ContainerIPdu`s, `DcmIPdu`s, `MultiplexedIPdu`s, `GeneralPurposeIPdu`s with `category` SOMEIP_SEGMENTED_IPDU and `UserDefinedIPdu`s. ⌋*()*

Please note that it is currently not supported to secure multiplexed part IPdus individually because it is not possible to reference a SecuredIPdu via MultiplexedIPdu.dynamicPart.dynamicPartAlternative or MultiplexedIPdu.staticPart in the role iPdu.

[TPS_SYST_02171] Secured Area in payload Pdu ⌈ The area within the payload Pdu that is secured is specified by the securedAreaOffset and securedAreaLength. In case that these two attributes are not configured the complete payload Pdu is secured. ⌋*(RS_SYST_00054)*

[constr_3399] Existence of securedAreaOffset and securedAreaLength ⌈ If the securedAreaOffset is defined then the securedAreaLength shall be defined as well and vice versa. ⌋*()*

[TPS_SYST_02152] Security profile ⌈ The Security profile is defined by SecureCommunicationFreshnessProps.category and by SecureCommunicationAuthenticationProps.category. ⌋*(RS_SYST_00054)*

[constr_3324] Category of SecureCommunicationFreshnessProps and SecureCommunicationAuthenticationProps ⌈ SecureCommunicationFreshnessProps that is referenced by a SecuredIPdu in the role freshnessProps shall have the same category value as the SecureCommunicationAuthenticationProps that is referenced by the same SecuredIPdu in the role authenticationProps. ⌋*()*

[TPS_SYST_02153] Standardized values for the attribute category of meta-class SecureCommunicationFreshnessProps ⌈ The following values of the attribute category of meta-class SecureCommunicationFreshnessProps are reserved by the AUTOSAR standard: PROFILE_01, PROFILE_02, PROFILE_03. ⌋*(RS_SYST_00054)*

[TPS_SYST_02154] Standardized values for the attribute category of meta-class SecureCommunicationAuthenticationProps ⌈ The following values of the attribute category of meta-class SecureCommunicationAuthenticationProps are reserved by the AUTOSAR standard: PROFILE_01, PROFILE_02, PROFILE_03. ⌋*(RS_SYST_00054)*

[constr_3325] SecureCommunicationFreshnessProps and SecureCommunicationAuthenticationProps attribute values for predefined categories ⌈ Table Table 6.52 defines applicable attribute values for security profiles that are standardized by AUTOSAR. ⌋*()*

	PROFILE		
Attributes	**PROFILE_01**	**PROFILE_02**	**PROFILE_03**
authAlgorithm	CMAC/AES-128	CMAC/AES-128	CMAC/AES-128
authInfoTxLength	24 bits	24 bits	28 bits
freshnessValueLength	Not Specified	0 bits	64 bits
freshnessValueTxLength	8 bits	0 bits	4 bits

Table 6.52: Security Profiles that are standardized by AUTOSAR

[constr_3339] Relation between authDataFreshnessStartPosition, authDataFreshnessLength and useAuthDataFreshness ⌈ If authDataFreshnessStartPosition and authDataFreshnessLength are set to a value for a SecuredIPdu then the useAuthDataFreshness shall be set as well to a value on all IPduPorts with communicationDirection = in that are referenced by a PduTriggering of the SecuredIPdu. ⌋*()*

[TPS_SYST_02189] Setting of useSecuredPduHeader attribute ⌈ The useSecuredPduHeader shall be set to a value other than noHeader if the length of the payload Pdu is dynamic and is transmitted over a network which may insert padding bytes depending on the length (e.g. CANFD, Flexray). ⌋*(RS_SYST_00054)*

Please note that the dynamic-length Pdu can be an ISignalIPdu that contains a SystemSignal with dynamicLength set to true. In general it is not possible to run diagnostics on fixed-length Pdus. Therefore, there is a probability that at least a subset of DcmIPdus and UserDefinedIPdus can have dynamic length.

[constr_3406] All signals before authDataFreshnessStartPosition shall have a static length ⌈ In case that

- an ISignalIPdu is referenced by the SecuredIPdu with the payload reference via the PduTriggering and
- the authDataFreshnessStartPosition and authDataFreshnessLength define the area in the ISignalIPdu that is taken to verify and generate the Freshness then

all ISignals that are mapped into the ISignalIPdu in front of the configured authDataFreshnessStartPosition shall have a static length. ⌋*()*

Please note that parts of the Authentic IPdu can be used as freshness when authDataFreshnessStartPosition and authDataFreshnessLength are defined. But therefore the part of the Authentic IPdu to be used as the freshness has to be always available at same position in the Authentic IPdu.

[constr_3407] Freshness Value in Authentic IPdu is not allowed to be used in case of ContainerIPdu with a dynamic layout ⌈ If a ContainerIPdu that is referenced by the SecuredIPdu with the payload reference via the PduTriggering contains a dynamic layout (i.e. ContainerIPdu.headerType is set to longHeader or shortHeader) and multiple contained IPdus then each IPduPort that is referenced by the PduTriggering of the SecuredIPdu shall have the attribute useAuthDataFreshness set to false. ⌋*()*

Please note that for ContainerIPdus with a dynamic layout it cannot be ensured which contained IPdu will be put in which position (depends on various timing and trigger conditions). Therefore [constr_3407] applies.

6.3.3 EndToEndProtection for ISignalIPduGroups

[TPS_SYST_01070] E2E Protection of ISignalGroups ⌈ It is possible to protect the inter-ECU data exchange of safety-related ISignalGroups which are mapped into ISignalIPdus using protection mechanisms provided by E2E Library. ⌋ *(RS_SYST_00028)*

[TPS_SYST_01071] E2E Protection of several ISignalGroups in one ISignalIPdu ⌈ It is possible to protect several ISignalGroups in one ISignalIPdu using several EndToEndProtectionISignalIPdu elements. ⌋ *(RS_SYST_00028)*

The EndToEndProtectionISignalIPdu element refers to the ISignalGroup that is to be protected and to the ISignalIPdu that transmits the protected ISignalGroup. The dataOffset in the EndToEndProtectionISignalIPdu element defines the starting position of the Array representation of the ISignalGroup.

The information how the referenced ISignalGroup shall be protected (through which E2E Profile and with which E2E settings) is defined in the EndToEndDescription element.

[TPS_SYST_01072] Offset attributes of EndToEndDescription ⌈ All offset attributes of EndToEndDescription are relative to the dataOffset with respect to the ISignalIPdu (absolute position of the CRC = dataOffset + crcOffset). ⌋ *(RS_SYST_00028)*

For more details, see End to End Library [19].

[TPS_SYST_01073] E2E Protection via COM Callouts ⌈ If the E2E Protection is done via COM Callouts then the EndToEndProtectionISignalIPdu shall be defined. ⌋ *(RS_SYST_00028)*

[TPS_SYST_01074] E2E Protection in the E2E Wrapper ⌈ If the E2E Protection is done in the E2E Wrapper then both EndToEndProtectionISignalIPdu and EndToEndProtectionVariablePrototype shall be defined. ⌋ *(RS_SYST_00028)*

For more details, see Software Component Template specification [5].

[constr_1002] End-to-end protection does not support n:1 communication ⌈ As the n:1 communication scenario implies that probably not all senders use the same dataId this scenario is explicitly not supported. ⌋ *()*

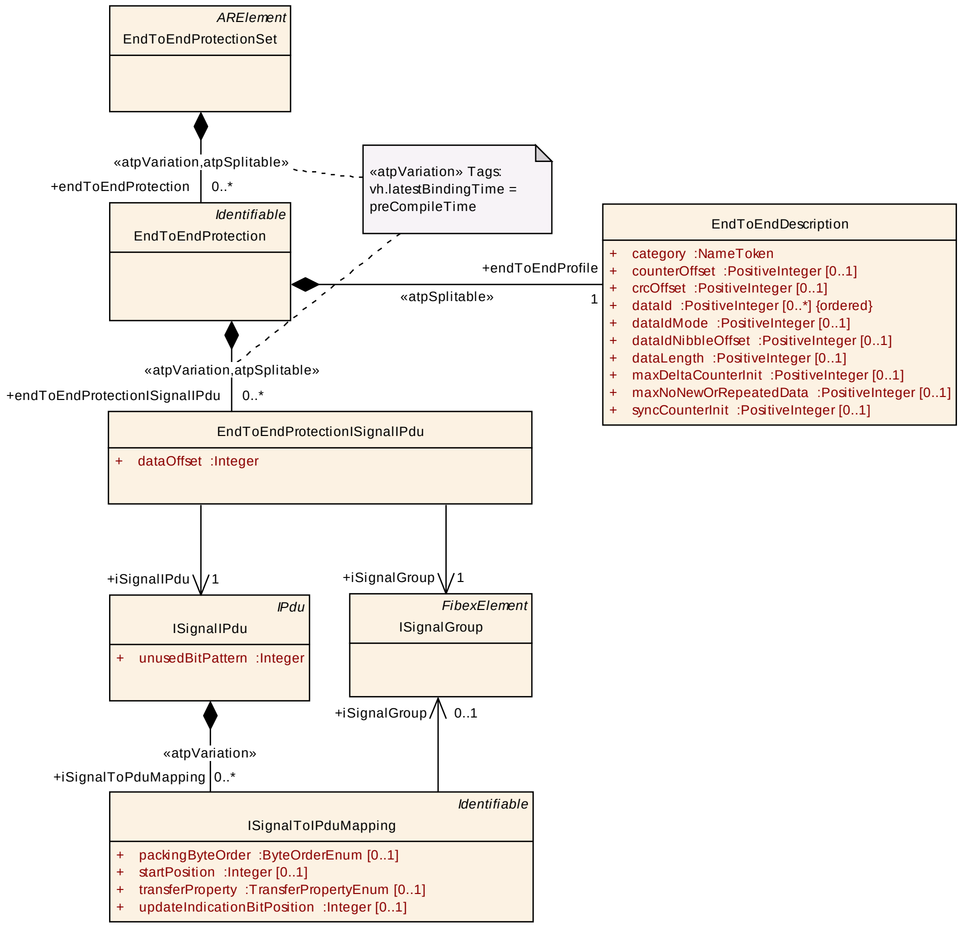


Figure 6.16: EndToEndProtection for COM IPdus

Class	**EndToEndProtectionSet**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	This represents a container for collection EndToEndProtectionInformation. **Tags:** atp.recommendedPackage=EndToEndProtectionSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
endToEnd Protection	EndToEndProte ction	*	aggr	This is one particular EndToEndProtection. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime

Table 6.53: EndToEndProtectionSet

Class	EndToEndProtection			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	This meta-class represents the ability to describe a particular end to end protection.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
endToEndProfile	EndToEndDescription	1	aggr	This represents the particular EndToEndDescription. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=endToEndProfile
endToEndProtectionISignalIPdu	EndToEndProtectionISignalIPdu	*	aggr	Defines to which ISignalIPdu - ISignalGroup pair this EndToEndProtection shall apply. In case several ISignalGroups are used to transport the data (e.g. fan-out in the RTE) there may exist several EndToEndProtectionISignalIPdu definitions. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=variationPoint.shortLabel vh.latestBindingTime=preCompileTime
endToEndProtectionVariablePrototype	EndToEndProtectionVariablePrototype	*	aggr	Defines to which VariableDataPrototypes in the roles of one sender and one or more receivers this EndToEndprotection applies. It shall be possible to aggregate several EndToEndProtectionVariablePrototype in case additional hierarchical decompositions are introduced subsequently. In this case one particular PortPrototype is split into multiple PortPrototypes and connectors, all representing the same data entity. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortLabel, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

Table 6.54: EndToEndProtection

Class	**EndToEndProtectionISignalIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::EndToEndProtection			
Note	It is possible to protect the inter-ECU data exchange of safety-related ISignalGroups at the level of COM IPdus using protection mechanisms provided by E2E Library. For each ISignalGroup to be protected, a separate EndToEndProtectionISignalIPdu element shall be created within the EndToEndProtectionSet. The EndToEndProtectionISignalIPdu element refers to the ISignalGroup that is to be protected and to the ISignalIPdu that transmits the protected ISignalGroup. The information how the referenced ISignalGroup shall be protected (through which E2E Profile and with which E2E settings) is defined in the EndToEndDescription element.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
dataOffset	Integer	1	attr	This attribute defines the beginning offset (in bits) of the Array representation of the Signal Group (including CRC, counter and application signal group) in the IPdu. This attribute is mandatory and the dataOffset shall always be defined.
iSignalGroup	ISignalGroup	1	ref	Reference to the ISignalGroup that is to be protected.
iSignalIPdu	ISignalIPdu	1	ref	Reference to the ISignalIPdu that transmits the protected ISignalGroup.

Table 6.55: EndToEndProtectionISignalIPdu

Class	**EndToEndDescription**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	This meta-class contains information about end-to-end protection. The set of applicable attributes depends on the actual value of the category attribute of EndToEndProtection.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
category	NameToken	1	attr	The category represents the identification of the concrete E2E profile. The applicable values are specified in a semantic constraint and determine the applicable attributes of EndToEndDescription. **Tags:** xml.sequenceOffset=-100
counterOffset	PositiveInteger	0..1	attr	Bit offset of Counter from the beginning of the Array representation of the Signal Group/VariableDataPrototype (MSB order, bit numbering: bit 0 is the least important). The offset shall be a multiplicity of 4 and it should be 8 whenever possible. For example, offset 8 means that the counter will take the low nibble of the byte 1, i.e. bits 8 .. 11. If counterOffset is not present the value is defined by the selected profile. **Tags:** xml.sequenceOffset=-50

Attribute	*Type*	*Mul.*	*Kind*	*Note*
crcOffset	PositiveInteger	0..1	attr	Bit offset of CRC from the beginning of the Array representation of the Signal Group/VariableDataPrototype (MSB order, bit numbering: bit 0 is the least important). The offset shall be a multiplicity of 8 and it should be 0 whenever possible. For example, offset 8 means that the CRC will take the byte 1, i.e. bits 8..15. If crcOffset is not present the value is defined by the selected profile. **Tags:** xml.sequenceOffset=-60
dataId (ordered)	PositiveInteger	*	attr	This represents a unique numerical identifier. Note: ID is used for protection against masquerading. The details concerning the maximum number of values (this information is specific for each E2E profile) applicable for this attribute are controlled by a semantic constraint that depends on the category of the EndToEndProtection. **Tags:** xml.sequenceOffset=-90
dataIdMode	PositiveInteger	0..1	attr	There are three inclusion modes how the implicit two-byte Data ID is included in the one-byte CRC: • dataIDMode = 0: Two bytes are included in the CRC (double ID configuration) This is used in variant 1A. • dataIDMode = 1: One of the two bytes byte is included, alternating high and low byte, depending on parity of the counter (alternating ID configuration). For even counter low byte is included; For odd counters the high byte is included. This is used in variant 1B. • dataIDMode = 2: Only low byte is included, high byte is never used. This is applicable if the IDs in a particular system are 8 bits. • dataIdMode = 3: The low byte is included in the implicit CRC calculation, the low nibble of the high byte is transmitted along with the data (i.e. it is explicitly included), the high nibble of the high byte is not used. This is applicable for the IDs up to 12 bits. **Tags:** xml.sequenceOffset=-85
dataIdNibbleOffset	PositiveInteger	0..1	attr	Bit offset of the low nibble of the high byte of Data ID. The applicability of this attribute is controlled by [constr_1261]. **Tags:** xml.sequenceOffset=-25

Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataLength	PositiveInteger	0..1	attr	This attribute represents the length of the Array representation of the Signal Group/VariableDataPrototype including CRC and Counter in bits. **Tags:** xml.sequenceOffset=-80
maxDeltaCounterInit	PositiveInteger	0..1	attr	Initial maximum allowed gap between two counter values of two consecutively received valid Data, i.e. how many subsequent lost data is accepted. For example, if the receiver gets Data with counter 1 and MaxDeltaCounterInit is 1, then at the next reception the receiver can accept Counters with values 2 and 3, but not 4. Note that if the receiver does not receive new Data at a consecutive read, then the receiver increments the tolerance by 1. **Tags:** xml.sequenceOffset=-70
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	The maximum amount of missing or repeated Data which the receiver does not expect to exceed under normal communication conditions. **Tags:** xml.sequenceOffset=-40
syncCounterInit	PositiveInteger	0..1	attr	Number of Data required for validating the consistency of the counter that shall be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter. **Tags:** xml.sequenceOffset=-30

Table 6.56: EndToEndDescription

The maxDeltaCounterInit, maxNoNewOrRepeatedData and syncCounterInit values can also be specified in the ReceiverComSpec. This allows the definition of receiver specific values. Values for maxDeltaCounterInit, maxNoNewOrRepeatedData and syncCounterInit that are defined in the ReceiverComSpec override the possible values in the EndToEndDescription class. More details can be found in the Software Component Template specification [5].

The supported E2E profiles (possible values of category in EndToEndDescription) are described in the Software Component Template [5] and the End to End Library [19].

6.3.4 GeneralPurposeConnection

In some cases it is important to describe a relation between different PduTriggerings that are defined on the same PhysicalChannel, e.g. to create a link between a Rx-Pdu and a Tx-Pdu. The GeneralPurposeConnection meta-class is able to reference a number of PduTriggerings and thereby to set the referenced PduTriggerings into a relationship that is defined by the GeneralPurposeConnection.

[TPS_SYST_02170] category of the GeneralPurposeConnection ⌈ The category of the GeneralPurposeConnection is used to define the purpose of the relationship between the referenced PduTriggerings. ⌋()

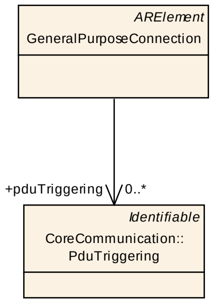


Figure 6.17: GeneralPurposeConnection

Class	**GeneralPurposeConnection**			
Package	M2::AUTOSARTemplates::SystemTemplate::GeneralPurposeConnection			
Note	This meta-class allows to describe the relationship between several PduTriggerings that are defined on the same PhysicalChannel, e.g. to create a link between Rx and Tx Pdu that are used for request/response. **Tags:** atp.recommendedPackage=GeneralPurposeConnections			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
pduTriggering	PduTriggering	*	ref	Reference to PduTriggerings that are connected to each other by a GeneralPurposeConnection.

Table 6.57: GeneralPurposeConnection

[constr_3384] PduTriggerings referenced by GeneralPurposeConnection shall be defined on the same PhysicalChannel ⌈ The PduTriggerings that are referenced by the GeneralPurposeConnection in the role pduTriggering shall be defined on the same PhysicalChannel. ⌋()

[constr_3383] Standardized values for the attribute category of meta-class GeneralPurposeConnection ⌈ The following values of the attribute category of meta-class GeneralPurposeConnection are reserved by the AUTOSAR standard:

- XcpChannel

⌋()

The XcpChannel creates a link between one Tx-Pdu and one Rx-Pdu that are used for request/response from one master.

[constr_3385] XcpChannel is allowed to reference exactly two PduTriggerings ⌈ In case that the category of meta-class GeneralPurposeConnection is set to the value *XcpChannel* the GeneralPurposeConnection is allowed to reference exactly two PduTriggerings in the role pduTriggering. ⌋*()*

[constr_3386] XcpChannel is only allowed to reference PduTriggerings of GeneralPurposeIPdus with category XCP ⌈ In case that the category of meta-class GeneralPurposeConnection is set to the value *XcpChannel* the GeneralPurposeConnection is allowed to reference PduTriggerings of GeneralPurposeIPdus with category XCP. ⌋*()*

6.4 IPdu Timing

AUTOSAR COM allows configuring statically two different transmission modes for each IPdu (True and False). TransmissionModeDeclaration uses a transmission mode selector, calculated from a number of individual TransmissionModeConditions or ModeDrivenTransmissionModeConditions to decide which of the two modes is selected. It is possible to switch between the transmission modes during runtime.

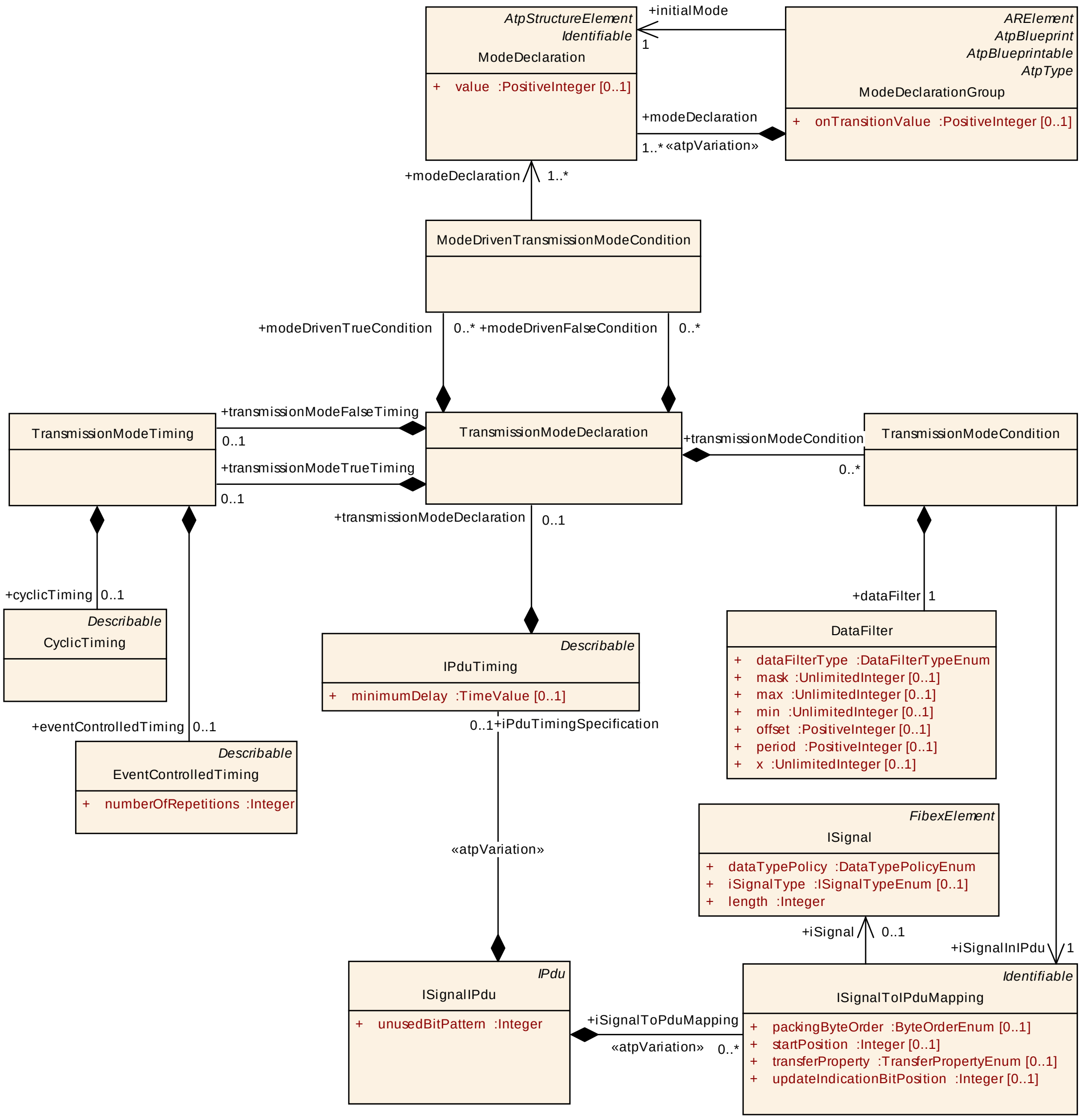


Figure 6.18: IPdu Timing

[TPS_SYST_01075] Signal content evaluation via TransmissionModeCondition ⌈ The signal content can be evaluated as the transmission mode selector via the TransmissionModeConditions. ⌋*(RS_SYST_00037)*

[TPS_SYST_01076] Mode evaluation via modeDrivenTrueCondition or modeDrivenFalseCondition ⌈ Mode conditions can be evaluated as the transmission mode selector via the modeDrivenTrueConditions or modeDrivenFalseConditions. ⌋*(RS_SYST_00037)*

[constr_3045] Signal content evaluation vs. Mode evaluation ⌈ The mode evaluation and the signal content evaluation shall not be used in the same IPdu. A mix of these two types is not allowed. ⌋*()*

To use the signal content evaluation a TransmissionModeCondition can be attached to each signal within an IPdu. Each TransmissionModeCondition contains a reference to a signal and to an assigned filter. The filter condition is used for the selection of the transmission mode. If at least one condition in the signal content evaluation is true, Transmission Mode "TRUE" shall be used for this IPdu. In all other cases, the Transmission Mode "FALSE" shall be used. More details can be found in the COM Specification [20].

[constr_3046] Consistency of TransmissionModeCondition.iSignalInIPdu ⌈ The ISignalToIPduMapping referenced by the TransmissionModeCondition in the role iSignalInIPdu shall belong to the same ISignalIPdu as the TransmissionModeCondition. ⌋*()*

In the mode driven evaluation ModeDeclarations are evaluated. The transmissionModeFalseTiming is activated if all defined modeDrivenFalseConditions evaluate to true and the transmissionModeTrueTiming is activated if all defined modeDrivenTrueConditions evaluate to true. Each condition that is defined by ModeDrivenTransmissionModeCondition evaluates to true if one of the referenced ModeDeclarations is active.

The TransmissionModeDeclaration element aggregates the TransmissionModeTiming in two different roles: transmissionModeTrueTiming and transmissionModeFalseTiming. The available COM Transmission Mode Timings can be described by the CyclicTiming and EventControlledTiming elements (see Table 6.58) that are aggregated by the TransmissionModeTiming class.

[TPS_SYST_01077] Mapping of Com Transmission Modes to System Template elements ⌈ The mapping of COM Transmission Modes to System Template elements is described in Table 6.58. ⌋*(RS_SYST_00037)*

COM Transmission Modes	*Description*	*realization in System Template*
Periodic	Transmissions occur indefinitely with a fixed period between them	CyclicTiming
Direct/n-times	Event driven transmission with n-1 repetitions	EventControlledTiming
Mixed	Periodic transmission with direct/n-times transmissions in between	EventControlledTiming and CyclicTiming
None	No transmission	no timing assigned

Table 6.58: COM Transmission Modes

Class	**TransmissionModeDeclaration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	AUTOSAR COM provides the possibility to define two different TRANSMISSION MODES (True and False) for each I-PDU. As TransmissionMode selector the signal content can be evaluated via transmissionModeCondition (implemented directly in the COM module) or mode conditions can be defined with the modeDrivenTrueCondition or modeDrivenFalseCondition (evaluated by BswM and invoking Com_SwitchIpduTxMode COM API). If modeDrivenTrueCondition and modeDrivenFalseCondition are defined they shall never evaluate to true both at the same time. The mixing of Transmission Mode Switch via API and signal value is not allowed.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
modeDrivenFalseCondition	ModeDrivenTransmissionModeCondition	*	aggr	Defines the trigger for the Com_SwitchIpduTxMode Transmission Mode switch. Only if all defined modeDrivenFalseConditions evaluate to true (AND associated) the transmissionModeFalseTiming shall be activated. modeDrivenTrueCondition and modeDrivenFalseCondition shall never evaluate to true both at the same time.
modeDrivenTrueCondition	ModeDrivenTransmissionModeCondition	*	aggr	Defines the trigger for the Com_SwitchIpduTxMode Transmission Mode switch. Only if all defined modeDrivenTrueConditions evaluate to true (AND associated) the transmissionModeTrueTiming shall be activated. modeDrivenTrueCondition and modeDrivenFalseCondition shall never evaluate to true both at the same time.
transmissionModeCondition	TransmissionModeCondition	*	aggr	The Transmission Mode Selector evaluates the conditions for a subset of signals and decides which transmission mode should be used. In case only one transmission mode is used there is no need for the "TransmissionModeCondition" and its sub-structure. In case the transmission mode shall be switched using the COM-API "Com_SwitchIpduTxMode" there is no need for the "TransmissionModeCondition" and its sub-structure.
transmissionModeFalseTiming	TransmissionModeTiming	0..1	aggr	Timing Specification if the COM Transmission Mode is false. The Transmission Mode Selector is defined to be false, if all Conditions evaluate to false.
transmissionModeTrueTiming	TransmissionModeTiming	0..1	aggr	Timing Specification if the COM Transmission Mode is true. The Transmission Mode Selector is defined to be true, if at least one Condition evaluates to true.

Table 6.59: TransmissionModeDeclaration

Class	**TransmissionModeCondition**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	Possibility to attach a condition to each signal within an I-PDU. If at least one condition evaluates to true, TRANSMISSION MODE True shall be used for this I-Pdu. In all other cases, the TRANSMISSION MODE FALSE shall be used.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
dataFilter	DataFilter	1	aggr	Possibilities to define conditions
iSignalInIPdu	ISignalToIPduMapping	1	ref	Reference to a signal to which a condition is attached.

Table 6.60: TransmissionModeCondition

Class	**ModeDrivenTransmissionModeCondition**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	The condition defined by this class evaluates to true if one of the referenced modeDeclarations (OR associated) is active. All referenced modeDeclarations shall be from the same ModeDeclarationGroup. The condition is used to define which TransmissionMode shall be activated using Com_SwitchIpduTxMode.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
modeDeclaration	ModeDeclaration	1..*	ref	Reference to one modeDeclaration which is OR associated in the context of the ModeDrivenTransmissionModeCondition.

Table 6.61: ModeDrivenTransmissionModeCondition

The `ModeDeclaration` and the `ModeDeclarationGroup` is described in more detail in the Software Component Template Specification [5].

Class	**TransmissionModeTiming**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	If the COM Transmission Mode is false the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeFalseTiming. If the COM Transmission Mode is true the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeTrueTiming. COM supports the following Transmission Modes: Periodic (Cyclic Timing) Direct /n-times (EventControlledTiming) Mixed (Cyclic and EventControlledTiming are assigned) None (no timing is assigned)			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
cyclicTiming	CyclicTiming	0..1	aggr	Periodic Transmission Mode.
eventControlledTiming	EventControlledTiming	0..1	aggr	Direct Transmission Mode.

Table 6.62: TransmissionModeTiming

6.4.1 Data Filter configuration

Data Filters are used on sender side to configure Transmission Mode Conditions (TMC). On receiver side Data Filters can be used as filtering mechanisms for signals (see ISignalPort element). More details about the usage of DataFilters can be found in the Software Component Template Specification [5].

[TPS_SYST_02013] Usage of dataFilters on GroupSignals on receiver side ⌈ If the dataFilter of one GroupSignal evaluates to false the whole ISignalGroup in which the GroupSignal is contained shall be discarded. ⌋*()*

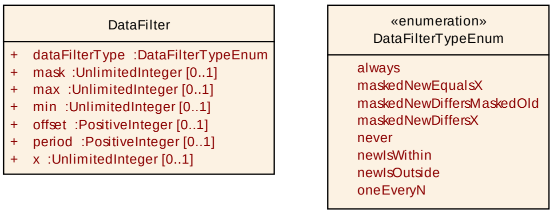


Figure 6.19: Data Filter

Class	**DataFilter**			
Package	M2::AUTOSARTemplates::CommonStructure::Filter			
Note	Base class for data filters. The type of the filter is specified in attribute dataFilterType. Some of the filter types require additional arguments which are specified as attributes of this class.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataFilterType	DataFilterTypeEnum	1	attr	This attribute specifies the type of the filter.
mask	UnlimitedInteger	0..1	attr	Mask for old and new value.
max	UnlimitedInteger	0..1	attr	Value to specify the upper boundary
min	UnlimitedInteger	0..1	attr	Value to specify the lower boundary
offset	PositiveInteger	0..1	attr	Specifies the initial number of messages to occur before the first message is passed
period	PositiveInteger	0..1	attr	Specifies number of messages to occur before the message is passed again
x	UnlimitedInteger	0..1	attr	Value to compare with

Table 6.63: DataFilter

Enumeration	**DataFilterTypeEnum**
Package	M2::AUTOSARTemplates::CommonStructure::Filter
Note	This enum specifies the supported DataFilterTypes.
Literal	***Description***
always	No filtering is performed so that the message always passes. **Tags:** atp.EnumerationValue=0

masked NewDiffers MaskedOld	Pass messages where the masked value has changed. (new_value&mask) !=(old_value&mask) new_value: current value of the message old_value: last value of the message (initialized with the initial value of the message, updated with new_value if the new message value is not filtered out) **Tags:** atp.EnumerationValue=1
maskedNew DiffersX	Pass messages whose masked value is not equal to a specific value x (new_value&mask) != x new_value: current value of the message **Tags:** atp.EnumerationValue=2
maskedNew EqualsX	Pass messages whose masked value is equal to a specific value x (new_value&mask) == x new_value: current value of the message **Tags:** atp.EnumerationValue=3
never	The filter removes all messages. **Tags:** atp.EnumerationValue=4
newIsOutside	Pass a message if its value is outside a predefined boundary. (min > new_value) OR (new_value > max) **Tags:** atp.EnumerationValue=5
newIsWithin	Pass a message if its value is within a predefined boundary. min <= new_value <= max **Tags:** atp.EnumerationValue=6
oneEveryN	Pass a message once every N message occurrences. Algorithm: occurrence % period == offset Start: occurrence = 0. Each time the message is received or transmitted, occurrence is incremented by 1 after filtering. Length of occurrence is 8 bit (minimum). **Tags:** atp.EnumerationValue=7

Table 6.64: DataFilterTypeEnum

6.4.2 Cyclic Timing

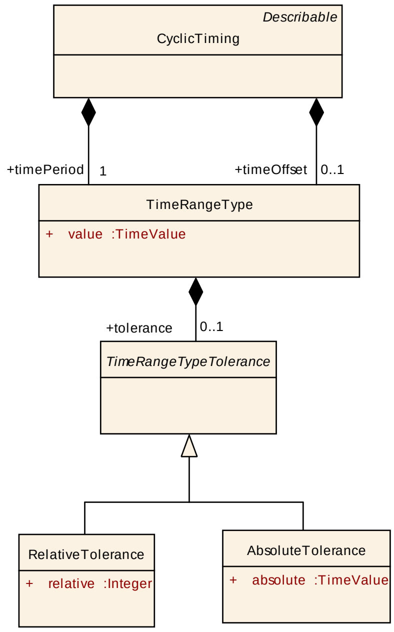


Figure 6.20: Cyclic Timing

Class	**CyclicTiming**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	Specification of a cyclic sending behavior.			
Base	ARObject, Describable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
timeOffset	TimeRangeType	0..1	aggr	This attribute specifies the time until first transmission of this I-PDU. This attribute defines the time between Com_IpduGroupStart and the first transmission of the cyclic part of this transmission request for this I-PDU.
timePeriod	TimeRangeType	1	aggr	Period of the repetition of cyclic transmissions.

Table 6.65: CyclicTiming

6.4.3 EventControlled Timing

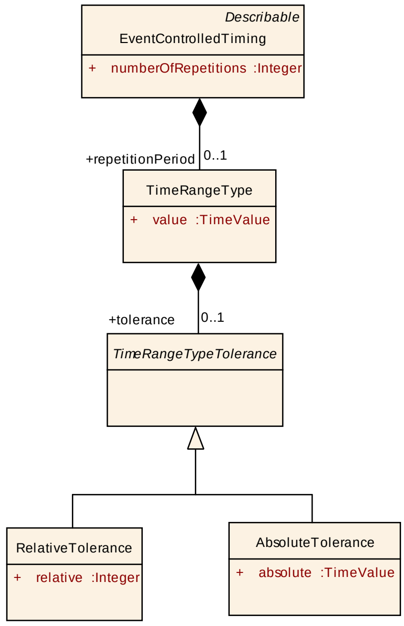


Figure 6.21: EventControlled Timing

Class	**EventControlledTiming**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	Specification of a event driven sending behavior. The PDU is sent n (numberOfRepeat + 1) times separated by the repetitionPeriod. If numberOfRepeats = 0, then the Pdu is sent just once.			
Base	ARObject, Describable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
numberOfRepetitions	Integer	1	attr	Defines the number of repetitions for the Direct/N-Times transmission mode and the event driven part of Mixed transmission mode.
repetitionPeriod	TimeRangeType	0..1	aggr	The repetitionPeriod specifies the time in seconds that elapses before the pdu can be sent the next time (Minimum repeat gap between two pdus). The repetitionPeriod is optional in case that no repetitions are configured.

Table 6.66: EventControlledTiming

Class	**TimeRangeType**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	The timeRange can be specified with the value attribute. Optionally a tolerance can be defined.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	*Type*	*Mul.*	*Kind*	*Note*
tolerance	TimeRangeTypeTolerance	0..1	aggr	Optional specification of a tolerance.
value	TimeValue	1	attr	Average value of a date (in seconds)

Table 6.67: TimeRangeType

Class	**RelativeTolerance**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	Maximum allowable deviation			
Base	ARObject, TimeRangeTypeTolerance			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
relative	Integer	1	attr	Maximum allowable deviation in percent (percent of the corresponding TimeValue).

Table 6.68: RelativeTolerance

Class	**AbsoluteTolerance**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	Maximum allowable deviation			
Base	ARObject, TimeRangeTypeTolerance			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
absolute	TimeValue	1	attr	Maximum allowable deviation in duration (in seconds)

Table 6.69: AbsoluteTolerance

6.4.4 Configuration of a trigger for COM_TriggerIPduSend API call

In the AUTOSAR BswM module a `BswMAction` with `BswMTriggerIPduSend` may be defined. The COM API `Com_TriggerIPDUSend` is called when this action is configured. By the call of `Com_TriggerIPDUSend` an IPdu with a given ID is triggered for transmission.

With such a configuration a single transmission of an IPdu can be configured that is independent of the configured COM transmission modes, e.g. in case of a vehicle mode change.

In a System Description the usage of the `Com_TriggerIPDUSend` API is defined with the `TriggerIPduSendCondition` that is aggregated by the `PduTriggering` in the role `triggerIPduSendCondition`. The `TriggerIPduSendCondition` defines the trigger for the `Com_TriggerIPDUSend` API call.

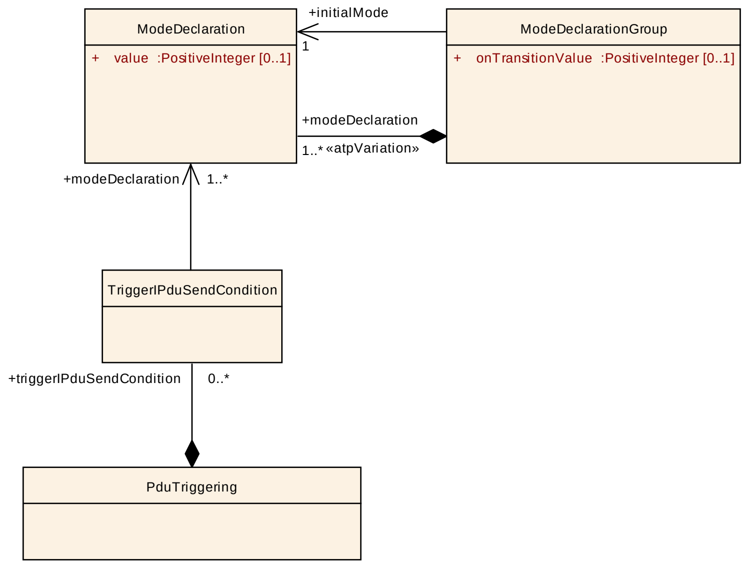


Figure 6.22: TriggerIPduSendCondition

Class	**TriggerIPduSendCondition**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing			
Note	The condition defined by this class evaluates to true if one of the referenced modeDeclarations (OR associated) is active. All referenced modeDeclarations shall be from the same ModeDeclarationGroup. The condition is used to define when the Pdu is triggered with the Com_TriggerIPDUSend API call.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
modeDeclaration	ModeDeclaration	1..*	ref	Reference to one modeDeclaration which is OR associated in the context of the TriggerIPduSendCondition.

Table 6.70: TriggerIPduSendCondition

Only if all defined TriggerIPduSendConditions evaluate to true (AND associated) the Com_TriggerIPDUSend API shall be called.

[constr_3211] PduTriggerings with triggerIPduSendCondition ⌈ Only PduTriggerings with references to ISignalIPdus are allowed to contain a triggerIPduSendCondition. ⌋*()*

Please note that OR Conditions defined by the TriggerIPduSendCondition.modeDeclaration are evaluated first. The AND Conditions defined by PduTriggering.triggerIPduSendConditions are evaluated after the OR Conditions.

6.5 I-Pdu Multiplexer

Multiplexing is used to transport varying Com IPdus at the same position in a single multiplexed IPdu. A multiplexed IPdu consists of a dynamic part, a selector field and an optional static part. According to the value of the selector field the dynamic part can have a different layout.

[TPS_SYST_01078] Dynamic Part of a MultiplexedIPdu ⌈ For each alternative of a MultiplexedIPdu there is exactly one Com IPdu that is transmitted in the dynamic part. ⌋ *()*

[TPS_SYST_01079] Static Part of a MultiplexedIPdu ⌈ The static part of a MultiplexedIPdu is the same regardless of the selector field and consists of exactly one Com IPdu. ⌋ *()*

The MultiplexedIPdu element contains attributes that describe the position and the length of a selector within an IPdu. A selector is a bitfield of certain length, by the value of which the corresponding data region of the dynamic part must be interpreted dynamically, i.e. at run-time.

[constr_3007] selectorFieldCodes for dynamic part alternatives ⌈ The selectorFieldCodes for the dynamic part alternatives within one MultiplexedIPdu shall differ from each other. ⌋ *()*

[constr_3097] Overlapping of segments of one MultiplexedIPdu is not allowed ⌈ The segments defined by the SegmentPosition elements of one and the same MultiplexedIPdu - aggregated via StaticPart and DynamicPart - shall not overlap. ⌋ *()*

[constr_3098] Defined segments of one MultiplexedIPdu shall not exceed the length of the MultiplexedIPdu ⌈ The segments defined by the SegmentPosition elements of one and the same MultiplexedIPdu - aggregated via StaticPart and DynamicPart - shall not exceed the length of the MultiplexedIPdu. ⌋ *()*

[constr_3099] Defined segments in a DynamicPart shall not exceed the length of any DynamicPartAlternative.iPdu ⌈ The segments defined by the SegmentPosition elements aggregated in the DynamicPart of a MultiplexedIPdu shall not exceed the length of any DynamicPartAlternative.iPdu. ⌋ *()*

[constr_3100] Defined segments in a StaticPart shall not exceed the length of the StaticPart.iPdu ⌈ The segments defined by the SegmentPosition elements aggregated in the StaticPart of a MultiplexedIPdu shall not exceed the length of the StaticPart.iPdu ⌋ *()*

[constr_3101] Signal representation of selector field for DynamicPartAlternative ⌈ Every ISignalIPdu that is referenced by the DynamicPartAlternative shall contain an ISignal that represents the selector field. The selector field signal shall be located at the position that is described by the selectorFieldLength and selectorFieldStartPosition. ⌋ *()*

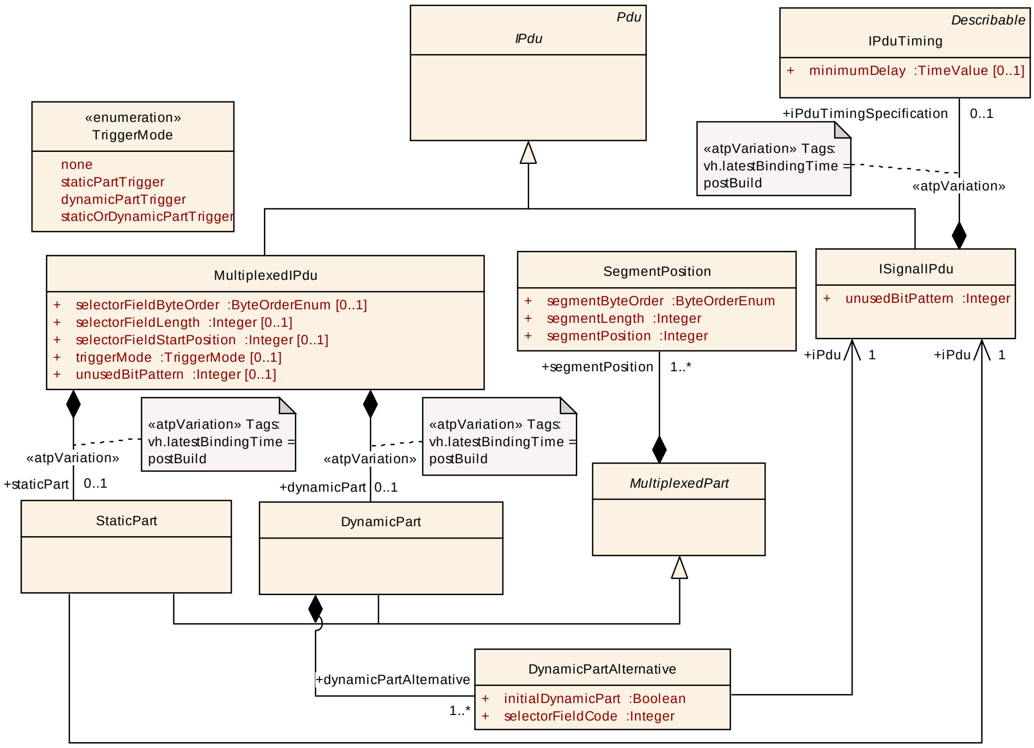


Figure 6.23: I-Pdu Multiplexer (FibexCore: IPDUMultiplexerOverview)

Enumeration	**TriggerMode**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::Core Communication
Note	IPduM can be configured to send a transmission request for the new multiplexed I-PDU to the PDU-Router because of conditions/ modes.
Literal	*Description*
dynamicPart Trigger	IPduM sends a transmission request to the PduR if a dynamic part is received. **Tags:** atp.EnumerationValue=0
none	IPduM does not trigger transmission because of receiving anything of this IPdu in case of TriggerTransmit. **Tags:** atp.EnumerationValue=1
staticOrDy-namicPart Trigger	IPduM sends a transmission request to the PduR if a static or dynamic part is received. **Tags:** atp.EnumerationValue=2
staticPart Trigger	IPduM sends a transmission request to the PduR if a static part is received. **Tags:** atp.EnumerationValue=3

Table 6.71: TriggerMode

Class	**MultiplexedIPdu**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selectorField. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer. A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, Multilanguage Referrable, PackageableElement, Pdu, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

Attribute	*Type*	*Mul.*	*Kind*	*Note*
dynamicPart	DynamicPart	0..1	aggr	According to the value of the selector field some parts of the IPdu have a different layout. In a complete System Description a MultiplexedIPdu shall contain a DynamicPart. The following use cases support the multiplicity to be 0..1: • If a MultiplexedIPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedIPdu doesn't need to be described in the System Extract/Ecu Extract. • If a MultiplexedIPdu is received by an ECU which is only interested in the static part of the MultiplexedIPdu then the dynamicPart does not need to be described in the System Extract/Ecu Extract. atpVariation: Content of a multiplexed PDU can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
selectorFieldByteOrder	ByteOrderEnum	0..1	attr	This attribute defines the order of the bytes of the selectorField and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3223] are restricting the usage of this attribute. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.
selectorFieldLength	Integer	0..1	attr	The size in bits of the selector field shall be configurable in a range of 1-16 bits. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
selectorFieldStartPosition	Integer	0..1	attr	This parameter is necessary to describe the position of the selector field within the IPdu. Note that the absolute position of the selectorField in the MultiplexedIPdu is determined by the definition of the selectorFieldByteOrder attribute of the Multiplexed Pdu. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.
staticPart	StaticPart	0..1	aggr	The static part of the multiplexed IPdu is the same regardless of the selector field. The static part is optional. atpVariation: Content of a multiplexed PDU can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
triggerMode	TriggerMode	0..1	attr	IPduM can be configured to send a transmission request for the new multiplexed IPdu to the PDU-Router because of the trigger conditions/ modes that are described in the TriggerMode enumeration. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.

Attribute	Type	Mul.	Kind	Note
unusedBit Pattern	Integer	0..1	attr	AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPdu with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.

Table 6.72: MultiplexedIPdu

Class	StaticPart			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Some parts/signals of the I-PDU may be the same regardless of the selector field. Such a part is called static part. The static part is optional.			
Base	ARObject, MultiplexedPart			
Attribute	Type	Mul.	Kind	Note
iPdu	ISignalIPdu	1	ref	Reference to a Com IPdu which is routed to the IPduM module and is combined to a multiplexedPdu.

Table 6.73: StaticPart

Class	DynamicPart			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Dynamic part of a multiplexed I-Pdu. Reserved space which is used to transport varying SignalIPdus at the same position, controlled by the corresponding selectorFieldCode.			
Base	ARObject, MultiplexedPart			
Attribute	Type	Mul.	Kind	Note
dynamicPartAlternative	DynamicPartAlternative	1..*	aggr	Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu.

Table 6.74: DynamicPart

Class	DynamicPartAlternative			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	One of the Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu. The selectorFieldCode specifies which Com IPdu is contained in the DynamicPart within a certain transmission of a multiplexed PDU.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note

Attribute	***Type***	***Mul.***	***Kind***	***Note***
iPdu	ISignalIPdu	1	ref	Reference to a Com IPdu which is routed to the IPduM module and is combined to a multiplexedPdu.
initialDynamicPart	Boolean	1	attr	Dynamic part that shall be used to initialize this multiplexed IPdu. Constraint: Only one "DynamicPartAlternative" in a "DynamicPart" shall be the initialDynamicPart.
selectorFieldCode	Integer	1	attr	The selector field is part of a multiplexed IPdu. It consists of contiguous bits. The value of the selector field selects the layout of the multiplexed part of the IPdu.

Table 6.75: DynamicPartAlternative

Class	**MultiplexedPart (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The StaticPart and the DynamicPart have common properties. Both can be separated in multiple segments within the multiplexed PDU.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
segmentPosition	SegmentPosition	1..*	aggr	The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. Therefore the StaticPart and the DynamicPart can contain multiple SegmentPositions.

Table 6.76: MultiplexedPart

Class	SegmentPosition			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
segmentByteOrder	ByteOrderEnum	1	attr	This attribute defines the order of the bytes of the segment and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3224] are restricting the usage of this attribute.
segmentLength	Integer	1	attr	Data Length of the segment in bits.
segmentPosition	Integer	1	attr	Segments bit position relatively to the beginning of a multiplexed IPdu. Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.

Table 6.77: SegmentPosition

[constr_3247] Byte order mix within a `MultiplexedIPdu` is not allowed ⌈ The `segmentByteOrder` of all `SegmentPosition`s and the `selectorFieldByteOrder` shall have the same value in the `MultiplexedIPdu`. ⌋*()*

[constr_3223] No `ByteOrderEnum.opaque` allowed for `MultiplexedIPdu.selectorFieldByteOrder` ⌈ The values of `MultiplexedIPdu.selectorFieldByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed. ⌋*()*

[constr_3224] No `ByteOrderEnum.opaque` allowed for `SegmentPosition.segmentByteOrder`. ⌈ The values of `SegmentPosition.segmentByteOrder` are restricted to `ByteOrderEnum.mostSignificantByteFirst` and `ByteOrderEnum.mostSignificantByteLast`. I.e. the value `ByteOrderEnum.opaque` is not allowed. ⌋*()*

Figure 6.24 shows an example of an IPdu Multiplexer. The static part of the multiplexed IPdu contains ComIPduA. The value of the selector field in the dynamic part decides which content is transmitted. ComIPduB is transmitted if the selector field value is "0". ComIPduC is transmitted if the selector field value is "1".

The static and the dynamic part can consist of more than one element. These sub parts of the static or dynamic parts are called segments. In Figure 6.24 the dynamic Part is segmented into two parts. More details can be found in [21].

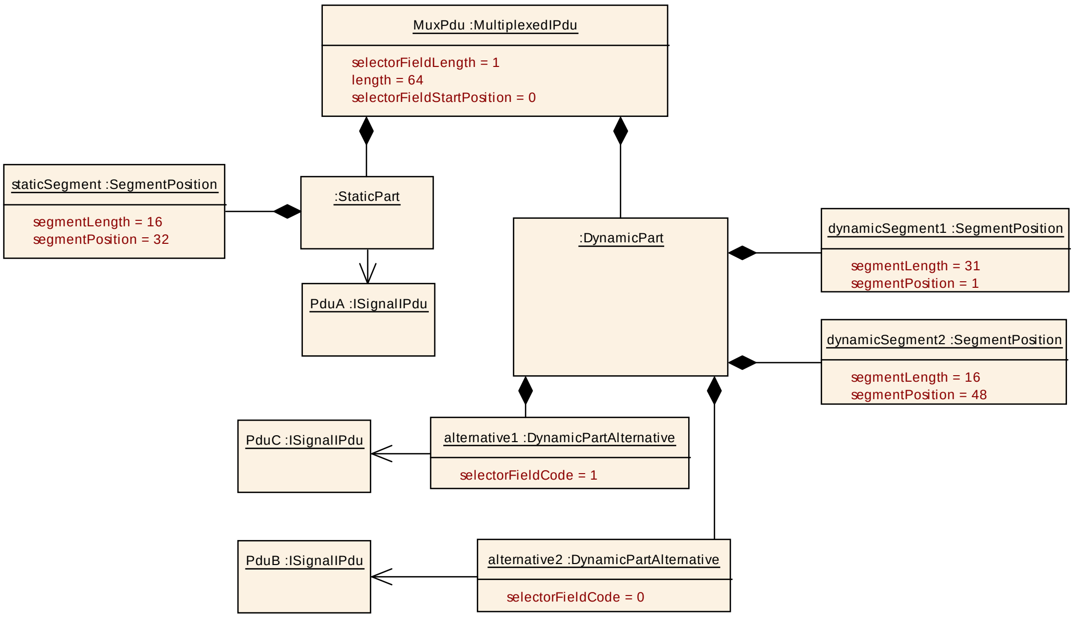


Figure 6.24: I-Pdu Multiplexer Example

Each of the following figures shows an example with an allowed IPduM configuration. Please note that the AUTOSAR IPduM module does not shift any part (static or dynamic) IPdu and just merges the payload. `ISignalIPdu`s that are referenced by the different `DynamicPartAlternative`s in one `MultiplexedIPdu` shall always have the same length. A configuration may be optimized with respect to unused data at end of a `StaticPart` `ISignalIPdu`. This is shown in figure 6.25 where the `ISignalIPdu` that is referenced by the `StaticPart` is shorter than the `MultiplexedIPdu`. An optimization with respect to unused data at end of `DynamicPartAlternative` `ISignalIPdu`s is shown in figure 6.26.

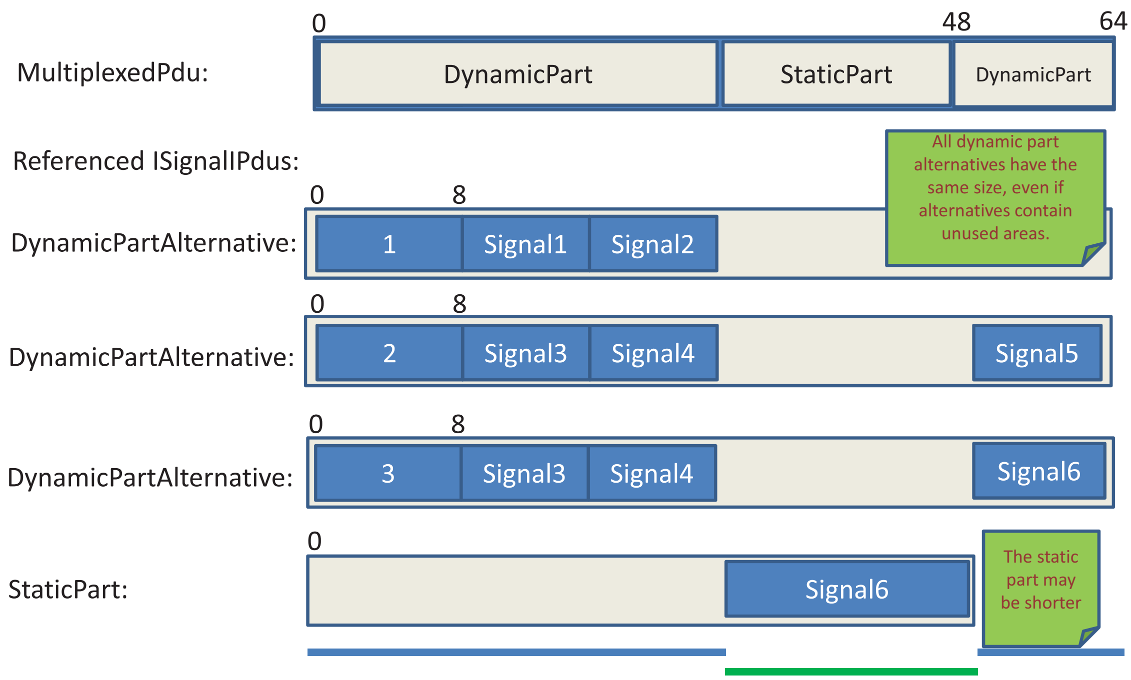


Figure 6.25: Multiplexer configuration example optimized with respect to unused data at end of static part Pdu

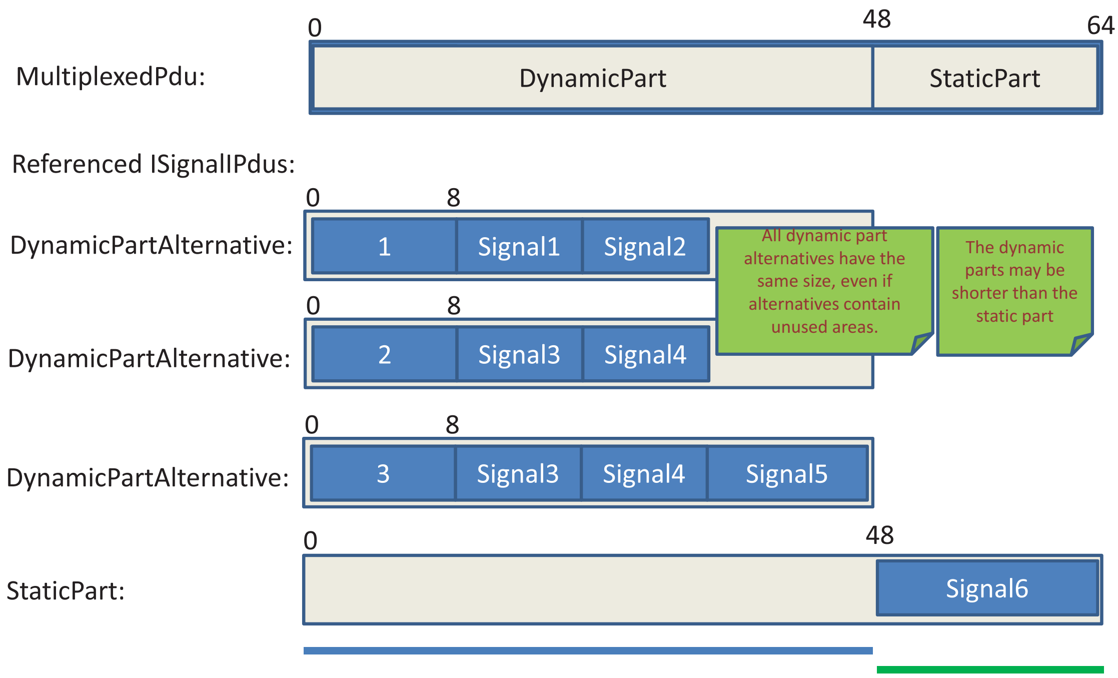


Figure 6.26: Multiplexer configuration example optimized with respect to unused data at end of dynamic part Pdus

6.5.1 I-Pdu Multiplexer in System Extract/ECU Extract

The processing in the ECU determines the description of MultiplexedIPdus in the System Extract/Ecu Extract. In case that a Gateway ECU only routes a MultiplexedIPdu without being interested in the content leads to a reduced description in the System Extract/ECU Extract. The following items describe the different scenarios and the consequences for the System Extract/ECU Extract description. A complete System Description contains all information.

[TPS_SYST_01080] Sending or receiving of a MultiplexedIPdu in System Extract/ECU Extract ⌈

- all attributes of the MultiplexedIPdu are mandatory
- aggregated DynamicPart with associated ISignalIPdus is mandatory in case
  - of sending
  - of receiving if at least one DynamicPartAlternative is received by one Ecu of the Extract.
- a PduTriggering shall be defined for the MultiplexedIPdu
- a PduTriggering shall be defined for all included ISignalIPdus in the DynamicPart and StaticPart

⌋*()*

The initial ECU Configuration Generator configures COM, PduR, IpduM and lower layers with the information from the System Extract/ECU Extract.

[TPS_SYST_01081] Gatewaying of a MultiplexedIPdu in System Extract/ECU Extract ⌈

- StaticPart and DynamicPart definitions shall be omitted, thus no ISignalIPdu description shall be included
- all attributes of the MultiplexedIPdu shall be omitted.
- a PduTriggering shall be defined only for the gatewayed MultiplexedIPdu
- an IPduMapping between the source and the target PduTriggerings shall be defined

⌋*()*

The initial ECU Configuration Generator configures PduR and lower layers with the information from the System Extract/ECU Extract.

[TPS_SYST_01082] Receiving and gatewaying of a MultiplexedIPdu in System Extract/ECU Extract ⌈

- all attributes of the MultiplexedIPdu are mandatory

- aggregated DynamicPart with associated ISignalIPdus is mandatory in case at least one DynamicPartAlternative is received by one Ecu of the Extract.
- a PduTriggering shall be defined for the MultiplexedIPdu
- an IPduMapping between the source and the target PduTriggerings shall be defined
- a PduTriggering shall be defined for all included ISignalIPdus in the DynamicPart and StaticPart

⌋()

The initial ECU Configuration Generator configures Com, PduR, IpduM and lower layers with the information from the System Extract/ECU Extract.

6.6 Frames

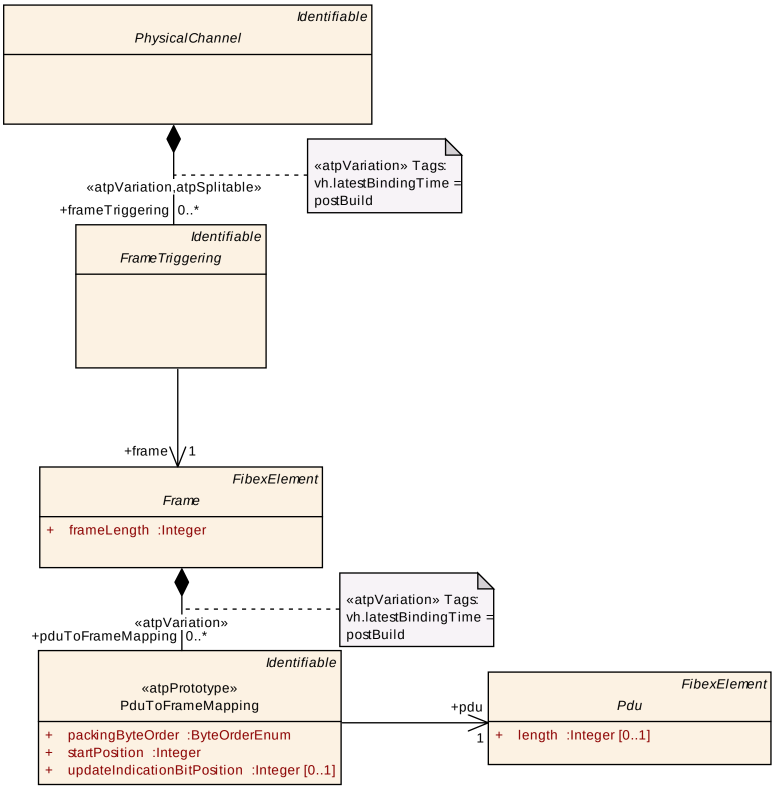


Figure 6.27: Frame Overview (FibexCore: FrameOverview)

[TPS_SYST_01083] `Frame` ⌈ A `Frame` represents a general design object that is used to describe the layout of the included `Pdu`s as a reusable asset. ⌋*()*

[TPS_SYST_01084] `FrameTriggering` ⌈ The `FrameTriggering` implements the reusable definition of a `Frame` within a concrete context and thus defines a `Frame`'s send behavior and identification on a certain `PhysicalChannel`. ⌋*()*

[constr_3012] Overlapping of `Pdu`s is prohibited ⌈ `Pdu`s mapped to a `Frame` shall NOT overlap. ⌋*()*

[constr_3013] Frame length shall not be exceeded ⌈ The combined length of all `Pdu`s that are mapped into a `Frame` shall not exceed the defined `Frame` length. ⌋*()*

[constr_3014] Overlapping of updateIndicationBits for `Pdu`s is prohibited ⌈ The `updateIndicationBitPosition` for a `Pdu` in a `Frame` shall NOT overlap with other `updateIndicationBitPosition`s and `Pdu` locations. ⌋*()*

Class	Frame (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Data frame which is sent over a communication medium. This element describes the pure Layout of a frame sent on a channel.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
frameLength	Integer	1	attr	The used length (in bytes) of the referencing frame. Should not be confused with a static byte length reserved for each frame by some platforms (e.g. FlexRay). The frameLength of zero bytes is allowed.
pduToFrameMapping	PduToFrameMapping	*	aggr	A frames layout as a sequence of Pdus. atpVariation: The content of a frame can be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.78: Frame

Class	FrameTriggering (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The FrameTriggering describes the instance of a frame sent on a channel and defines the manner of triggering (timing information) and identification of a frame on the channel, on which it is sent. For the same frame, if FrameTriggerings exist on more than one channel of the same cluster the fan-out/in is handled by the Bus interface.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
frame	Frame	1	ref	One frame can be triggered several times, e.g. on different channels. If a frame has no frame triggering, it won't be sent at all. A frame triggering has assigned exactly one frame, which it triggers.
framePort	FramePort	*	ref	References to the FramePort on every ECU of the system which sends and/or receives the frame. References for both the sender and the receiver side shall be included when the system is completely defined.
pduTriggering	PduTriggering	*	ref	This reference provides the relationship to the PduTriggerings that are implemented by the FrameTriggering. The reference is optional since no PduTriggering can be defined for NmPdus and XCP Pdus. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.79: FrameTriggering

6.7 Specialized Attributes of the Communication Entities

In the Basic Software the timing of bus frames can be controlled by send requests of the RTE in combination with the Transmission Mode and Transfer Property parameters in COM. On the other hand the timing can be controlled by the FlexRay Interface and LIN Interface.

This chapter describes the protocol specific extensions to the communication elements.

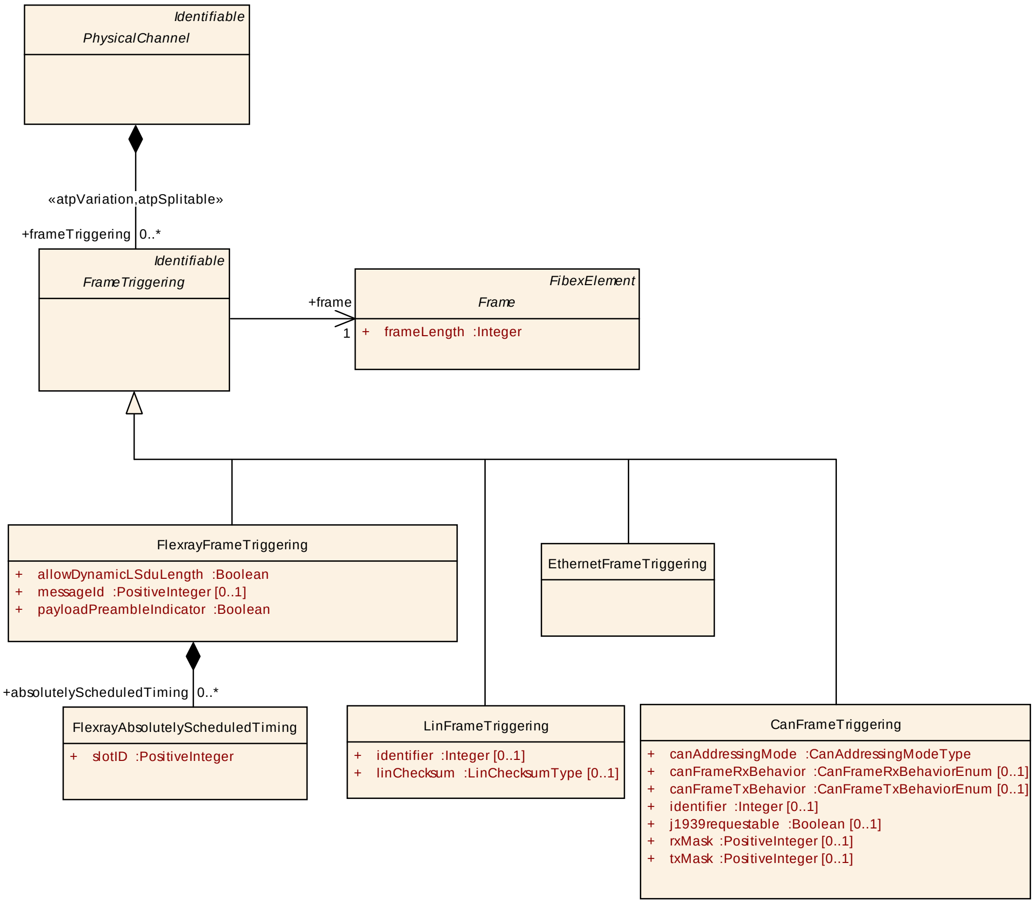


Figure 6.28: Frame Triggering

6.7.1 FlexRay specific description

[TPS_SYST_01128] Communication over FlexRay ⌈ The System Template supports the description of communication over FlexRay. ⌋ *(RS_SYST_00024)*

In the following, the elements necessary to describe the FlexRay communication are specified.

FlexRay static segment parameters: Each `FlexrayFrameTriggering` is identified by its `slotID` and `communicationCycle`. In the static segment all communication slots are of identical, statically configured duration and all FrameTriggerings are of identical, statically configured length.

The sending behavior where the exact time for the FlexrayFrameTriggerings transmission is guaranteed is provided in the System Template by the usage of FlexrayAbsolutelyScheduledTiming.

In the cycle counter field of every frame, the current value of the cycle counter is transmitted (see FlexRay frame format). This value is incremented at the beginning of each new cycle, ranging from 0 to 63, and is reset to 0 after a sequence of 64 cycles.

[TPS_SYST_01085] Transmission of a FrameTriggering multiple times within one communication cycle ⌈ In the static segment FlexrayFrameTriggerings can be sent multiple times within one communication cycle. For describing this case multiple FlexrayAbsolutelyScheduledTimings shall be used. ⌋ *(RS_SYST_00024)*

FlexRay dynamic segment parameters: In the dynamic segment the duration of communication slots may vary in order to accommodate frames of varying length. Furthermore, in the dynamic part, the slotID is equivalent to a priority. The higher the number the lower is the priority.

The frames in the static and in the dynamic segment are described in the same way. Each FlexrayFrameTriggering is identified by its slotID and communicationCycle. A description is provided by the usage of FlexrayAbsolutelyScheduledTiming.

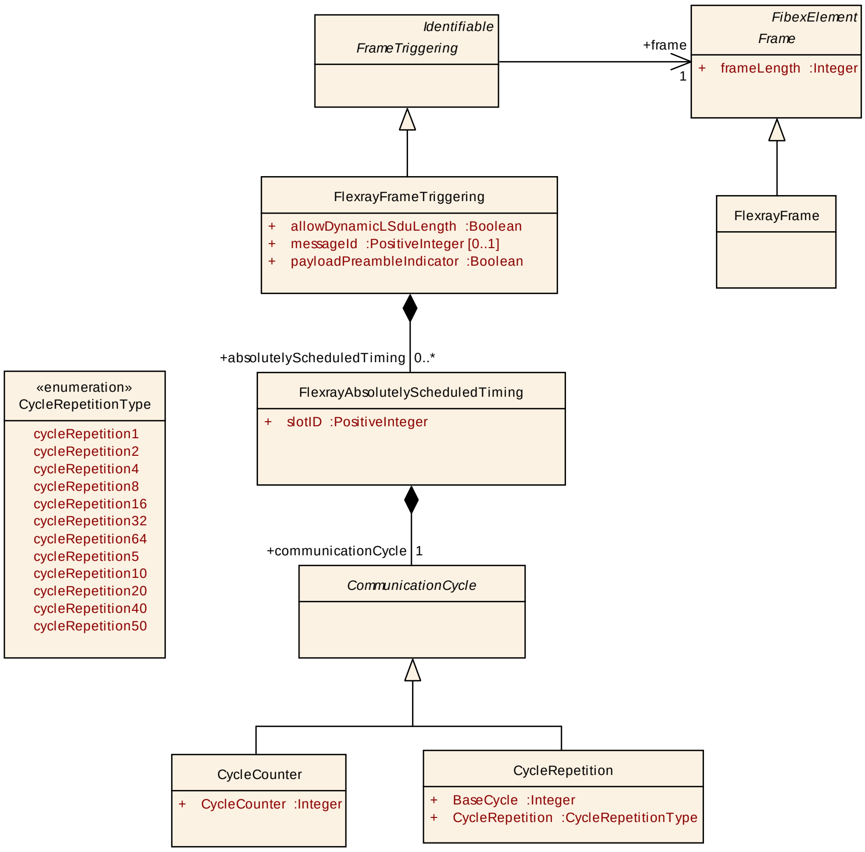


Figure 6.29: FlexRay Absolutely Scheduled Timing (Fibex4FlexRay:FlexrayAbsolutelyScheduledTiming)

Class	**FlexrayFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::Flexray Communication			
Note	FlexRay specific Frame element. **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, Multilanguage Referrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 6.80: FlexrayFrame

Class	**FlexrayFrameTriggering**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::Flexray Communication			
Note	FlexRay specific attributes to the FrameTriggering			
Base	ARObject, FrameTriggering, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
absolutely Scheduled Timing	FlexrayAbsolute lyScheduledTim ing	*	aggr	Specification of a sending behaviour where the exact time for the frames transmission is guaranteed.

Attribute	Type	Mul.	Kind	Note
allowDynamicLSduLength	Boolean	1	attr	Allows L-PDU length reduction and indicates that the related CC buffer has to be reconfigured for the actual length and Header-CRC before transmission of the L-PDU. If this attribute is set to true than the referenced Frame length attribute defines the max. length.
messageId	PositiveInteger	0..1	attr	The first two bytes of the payload segment of the FlexRay frame format for frames transmitted in the dynamic segment can be used as receiver filterable data called the message ID.
payloadPreambleIndicator	Boolean	1	attr	Switching the Payload Preamble bit.

Table 6.81: FlexrayFrameTriggering

Class	FlexrayAbsolutelyScheduledTiming			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication			
Note	Each frame in FlexRay is identified by its slot id and communication cycle. A description is provided by the usage of AbsolutelyScheduledTiming. In the static segment a frame can be sent multiple times within one communication cycle. For describing this case multiple AbsolutelyScheduledTimings have to be used. The main use case would be that a frame is sent twice within one communication cycle.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
communicationCycle	CommunicationCycle	1	aggr	The communication cycle where the frame is sent.
slotID	PositiveInteger	1	attr	In the static part the SlotID defines the slot in which the frame is transmitted. The SlotID also determines, in combination with FlexrayCluster::numberOfStaticSlots, whether the frame is sent in static or dynamic segment. In the dynamic part, the slot id is equivalent to a priority. Lower dynamic slot ids are all sent until the end of the dynamic segment. Higher numbers, which were ignored that time, have to wait one cycle and then must try again. minValue: 1 maxValue: 2047

Table 6.82: FlexrayAbsolutelyScheduledTiming

Class	CommunicationCycle (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The communication cycle where the frame is sent.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.83: CommunicationCycle

The communication cycle can be described by the CycleCounter or by the CycleRepetition:

Class	CycleCounter			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The communication cycle where the frame is send is described by the attribute "cycleCounter".			
Base	ARObject, CommunicationCycle			
Attribute	Type	Mul.	Kind	Note
CycleCounter	Integer	1	attr	The communication cycle where the frame described by this timing is sent. If a timing is given in this way the referencing FlexrayCluster shall specify the cycleCountMax as upper bound and point of total repetition. This value is incremented at the beginning of each new cycle, ranging from 0 to cycleCountMax, and is reset to 0 after a sequence of cycleCountMax+1 cycles.

Table 6.84: CycleCounter

Class	CycleRepetition			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology			
Note	The communication cycle where the frame is send is described by the attributes baseCycle and cycleRepetition.			
Base	ARObject, CommunicationCycle			
Attribute	Type	Mul.	Kind	Note
BaseCycle	Integer	1	attr	The first communication cycle where the frame is sent. This value is incremented at the beginning of each new cycle, ranging from 0 to 63, and is reset to 0 after a sequence of 64 cycles.
CycleRepetition	CycleRepetitionType	1	attr	The number of communication cycles (after the first cycle) whenever the frame described by this timing is sent again.

Table 6.85: CycleRepetition

Enumeration	**CycleRepetitionType**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreTopology
Note	The number of communication cycles (after the first cycle) whenever the frame is sent again. The FlexRay communication controller allows only determined values.
Literal	***Description***
cycleRepetition1	Attribute cycleRepetition value="1" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=0
cycleRepetition10	Attribute cycleRepetition value="10" to support FlexRay 3.0 **Tags:** atp.EnumerationValue=1
cycleRepetition16	Attribute cycleRepetition value="16" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=2
cycleRepetition2	Attribute cycleRepetition value="2" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=3
cycleRepetition20	Attribute cycleRepetition value="20" to support FlexRay 3.0 **Tags:** atp.EnumerationValue=4
cycleRepetition32	Attribute cycleRepetition value="32" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=5
cycleRepetition4	Attribute cycleRepetition value="4" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=6
cycleRepetition40	Attribute cycleRepetition value="40" to support FlexRay 3.0 **Tags:** atp.EnumerationValue=7
cycleRepetition5	Attribute cycleRepetition value="5" to support FlexRay 3.0 **Tags:** atp.EnumerationValue=8

cycleRepetition50	Attribute cycleRepetition value="50" to support FlexRay 3.0 **Tags:** atp.EnumerationValue=9
cycleRepetition64	Attribute cycleRepetition value="64" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=10
cycleRepetition8	Attribute cycleRepetition value="8" valid only for FlexRay Protocol 2.1 Rev A **Tags:** atp.EnumerationValue=11

Table 6.86: CycleRepetitionType

6.7.2 LIN specific description

LIN is a protocol that is based on a single master - multiple slave principle. In the following, the parameters will be specified, which are necessary to describe the LIN Schedule Tables and the LIN Frames.

[TPS_SYST_01129] Communication over LIN ⌈ The System Template supports the description of communication over LIN. ⌋ *(RS_SYST_00022)*

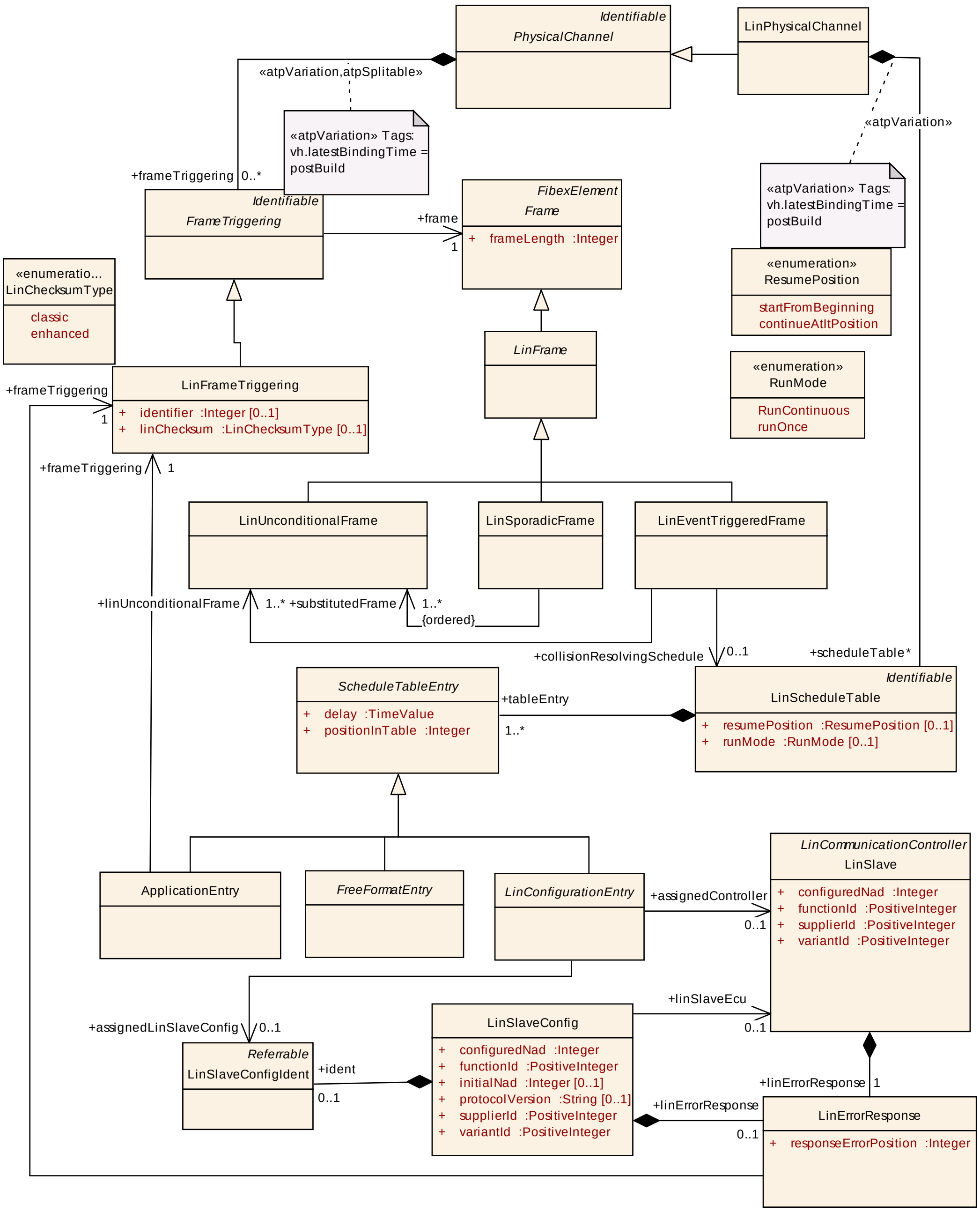


Figure 6.30: LIN Schedule Table (Fibex4Lin:LinScheduleTable)

6.7.2.1 LIN Frames

One LIN Frame consists of two parts: header and response. The header is always sent by a LinMaster, while the response is sent by only one dedicated LinSlave. There are three different ways of transmitting frames on the bus: unconditional, event triggered, and sporadic frames.

Class	**LinFrame (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Lin specific Frame element.			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, Multilanguage Referrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.87: LinFrame

Class	**LinFrameTriggering**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	LIN specific attributes to the FrameTriggering			
Base	ARObject, FrameTriggering, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
identifier	Integer	0..1	attr	To describe a frames identifier on the communication system, usually with a fixed identifierValue. For LinSporadicFrames the attribute shall be ignored.
linChecksum	LinChecksumType	0..1	attr	Type of checksum that the frame is using. This attribute is optional because in case of sporadic frames it should not be set.

Table 6.88: LinFrameTriggering

Enumeration	**LinChecksumType**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication
Note	Use of classic or enhanced checksum is managed by the master node and it is determined per frame identifier;
Literal	**Description**
classic	Classic in communication with LIN 1.3 slave nodes **Tags:** atp.EnumerationValue=0
enhanced	Enhanced in communication with LIN 2.0 slave nodes. **Tags:** atp.EnumerationValue=1

Table 6.89: LinChecksumType

[TPS_SYST_02095] LinFrameTriggering.linChecksum for LinUnconditionalFrames ⌈ The linChecksum attribute of a LinFrameTriggering that references a LinUnconditionalFrame shall be set. ⌋ *()*

Class	**LinUnconditionalFrame**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication
Note	Unconditional frames carry signals. The master sends a frame header in a scheduled frame slot and the designated slave node fills the frame with data. **Tags:** atp.recommendedPackage=Frames
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, LinFrame, MultilanguageReferrable, PackageableElement, Referrable

Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.90: LinUnconditionalFrame

[constr_3225] LinFrameTriggering.linChecksum not allowed for LinSporadicFrames ⌈ The linChecksum attribute of a LinFrameTriggering that references a LinSporadicFrame shall not be set. ⌋ *()*

[constr_3226] LinFrameTriggering.linChecksum for LinEventTriggeredFrames ⌈ Within a PhysicalChannel the linChecksum attribute of a LinFrameTriggering that references a LinEventTriggeredFrame shall have the same value as the linChecksum attribute of each LinFrameTriggering that references a LinUnconditionalFrame that in turn is referenced by that LinEventTriggeredFrame. ⌋ *()*

[constr_3203] LinFrameTriggering to LinSporadicFrame reference restriction in LinSporadicFrame context ⌈ Within a PhysicalChannel a LinUnconditionalFrame shall be referenced by only one LinFrameTriggering to allow a derivation of the identifier of a substituted Frame if the LinUnconditionalFrame is referenced by a LinSporadicFrame in the role substitutedFrame. ⌋ *()*

Class	**LinSporadicFrame**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication
Note	A sporadic frame is a group of unconditional frames that share the same frame slot. The sporadic frame shall not contain any Pdus. **Tags:** atp.recommendedPackage=Frames
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, LinFrame, MultilanguageReferrable, PackageableElement, Referrable

Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	Type	Mul.	Kind	Note
substitutedFrame (ordered)	LinUnconditionalFrame	1..*	ref	Reference to a group of unconditional frames that share the same frame slot. In case that more than one of the declared frames needs to be transferred, the one first listed shall be chosen. Within a channel a LIN Frame shall be referenced by only one FrameTriggering. This allows a derivation of the identifier of a substituted Frame. The identifier is specified in FrameTriggering element. A LinUnconditionalFrame associated with a LinSporadicFrame may not be allocated in the same LinScheduleTable as the sporadic frame.

Table 6.91: LinSporadicFrame

[constr_3204] `LinUnconditionalFrame`s associated with a `LinSporadicFrame` ⌈ A `LinUnconditionalFrame` associated with a `LinSporadicFrame` shall not be allocated in the same `LinScheduleTable` as the `LinSporadicFrame`. ⌋ *()*

[constr_3205] Existence of `FramePort` for a `FrameTriggering` that references a `LinSporadicFrame` ⌈ A `FrameTriggering` that references a `LinSporadicFrame` shall not have a reference to a `FramePort`. ⌋ *()*

Instead of the `LinSporadicFrame` a `LinUnconditionalFrame` is sent in the timeslot on the bus and therefore the `FrameTriggering` that references a `LinSporadicFrame` does not need to have a reference to a `FramePort`.

Class	LinEventTriggeredFrame			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	An event triggered frame is used as a placeholder to allow multiple slave nodes to provide its response. The header of an event triggered frame is transmitted when a frame slot allocated to the event triggered frame is processed. The publisher of an associated unconditional frame shall only transmit the response if at least one of the signals carried in its unconditional frame is updated. The LIN Master discovers and purges collisions with the collisionResolvingScheduleTable. The event controlled frame shall not contain any Pdus. **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, LinFrame, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
collisionResolvingSchedule	LinScheduleTable	0..1	ref	Reference to the schedule table, which resolves a collision.

Attribute	Type	Mul.	Kind	Note
linUnconditionalFrame	LinUnconditionalFrame	1..*	ref	A list of slaves can respond to the master request if at least one of the signals carried in its unconditional frame is updated. For each response a LinFrameTriggering and a LinUnconditionalFrame shall be defined. Within a channel a LIN Frame shall be referenced by only one FrameTriggering. This allows a derivation of the identifier of a substituted Frame. The identifier is specified in FrameTriggering element. The Unconditional frames associated with an event triggered frame shall: • have equal length. • use the same checksum model (i.e. mixing LIN 1.x and LIN 2.x frames is not allowed). • reserve the first data field to its protected identifier (even if the associated unconditional frame is scheduled as a unconditional frame in the same or another schedule table). • be published by different slave nodes. • shall not be included directly in the same schedule table as the event triggered frame is scheduled.

Table 6.92: LinEventTriggeredFrame

[TPS_SYST_02077] Subscribers of a LinEventTriggeredFrame ⌈ For each subscriber of a LinEventTriggeredFrame a LinUnconditionalFrame and a LinFrameTriggering that points to this LinUnconditionalFrame shall be defined. ⌋ *()*

[constr_3202] LinFrameTriggering to LinUnconditionalFrame reference restriction in LinEventTriggeredFrame context ⌈ Within a PhysicalChannel a LinUnconditionalFrame shall be referenced by only one LinFrameTriggering to allow a derivation of the identifier of a substituted Frame if the LinUnconditionalFrame is referenced by a LinEventTriggeredFrame in the role linUnconditionalFrame. ⌋ *()*

[constr_3206] Existence of FramePort for a FrameTriggering that references a LinEventTriggeredFrame ⌈ A FrameTriggering that references a LinEventTriggeredFrame shall not have a reference to a FramePort. ⌋ *()*

A LinUnconditionalFrame is sent as the response of a LinEventTriggeredFrame on the bus instead and therefore the FrameTriggering that references a LinEventTriggeredFrame does not need to have a reference to a FramePort.

[TPS_SYST_02078] LinUnconditionalFrames associated with a LinEventTriggeredFrame ⌈ The LinUnconditionalFrames associated with a LinEventTriggeredFrame shall:

- have equal length
- use the same checksum model (i.e. mixing LIN 1.x and LIN 2.x frames is not allowed)
- reserve the first data field to its protected identifier (even if the associated LinUnconditionalFrame is scheduled as a LinUnconditionalFrame in the same or another schedule table)
- be published by different slave nodes
- not be included directly in the same LinScheduleTable as the associated LinEventTriggeredFrame.

⌋ *()*

6.7.2.2 LIN Schedule Table

The LinMaster uses one or more predefined scheduling tables to start the sending and receiving to the LIN bus. These scheduling tables contain at least the relative timing that defines the message sending.

Class	**LinScheduleTable**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	The master task (in the master node) transmits frame headers based on a schedule table. The schedule table specifies the identifiers for each header and the interval between the start of a frame and the start of the following frame.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
resumePosition	ResumePosition	0..1	attr	Defines, where a schedule table shall be proceeded in case if it has been interrupted by a run-once table or MRF/SRF.
runMode	RunMode	0..1	attr	The schedule table can be executed in two different modes.
tableEntry	ScheduleTableEntry	1..*	aggr	The scheduling table consists of table entries, which contain Frame slots.

Table 6.93: LinScheduleTable

Enumeration	**RunMode**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication
Note	The schedule table can be executed in two different modes.
Literal	***Description***
RunContinu-ous	RUN_CONTINUOUS run mode **Tags:** atp.EnumerationValue=0
runOnce	RUN_ONCE run mode **Tags:** atp.EnumerationValue=1

Table 6.94: RunMode

Enumeration	**ResumePosition**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication
Note	Defines, where a schedule table shall be proceeded in case if it has been interrupted by a run-once table or MRF/SRF.
Literal	***Description***
continueAtIt Position	Continue at IT Point. **Tags:** atp.EnumerationValue=0
startFrom Beginning	Start from the beginning **Tags:** atp.EnumerationValue=1

Table 6.95: ResumePosition

Class	ScheduleTableEntry (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Table entry in a LinScheduleTable. Specifies what will be done in the frame slot.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
delay	TimeValue	1	attr	Relative delay between this tableEntry and the start of the successor in the schedule table in seconds.
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the schedule table entry. **Tags:** xml.sequenceOffset=-10
positionInTable	Integer	1	attr	Relative position in the schedule table. The first entry index in the schedule table is 0.

Table 6.96: ScheduleTableEntry

Class	ApplicationEntry			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Schedule table entry for application messages.			
Base	ARObject, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
frameTriggering	LinFrameTriggering	1	ref	Specifies the LinFrame that will be transmitted in this frame slot.

Table 6.97: ApplicationEntry

Class	FreeFormatEntry (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	FreeFormat transmits a fixed master request frame with the eight data bytes provided. This may for instance be used to issue user specific fixed frames.			
Base	ARObject, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.98: FreeFormatEntry

Class	LinConfigurationEntry (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	A ScheduleTableEntry which contains LIN specific assignments.			
Base	ARObject, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
assignedController	LinSlave	0..1	ref	The LIN slaves controller who is target of this assignment. Optional in case LinConfigurationEntry.assignedLinSlaveConfig exists.

Attribute	Type	Mul.	Kind	Note
assignedLinSlaveConfig	LinSlaveConfigIdent	0..1	ref	The LIN slave that is target of this assignment. Please note that this reference is redundant to the assignedController reference. In a System Description LIN slaves may be described as non AUTOSAR ECUs (linSlaveEcu reference). But in an Ecu Extract of the LinMaster the LinSlaveEcus will not be available. The information that is described here is necessary in the ECU Extract for the configuration of the LinMaster.

Table 6.99: LinConfigurationEntry

6.7.2.3 Configuration Services

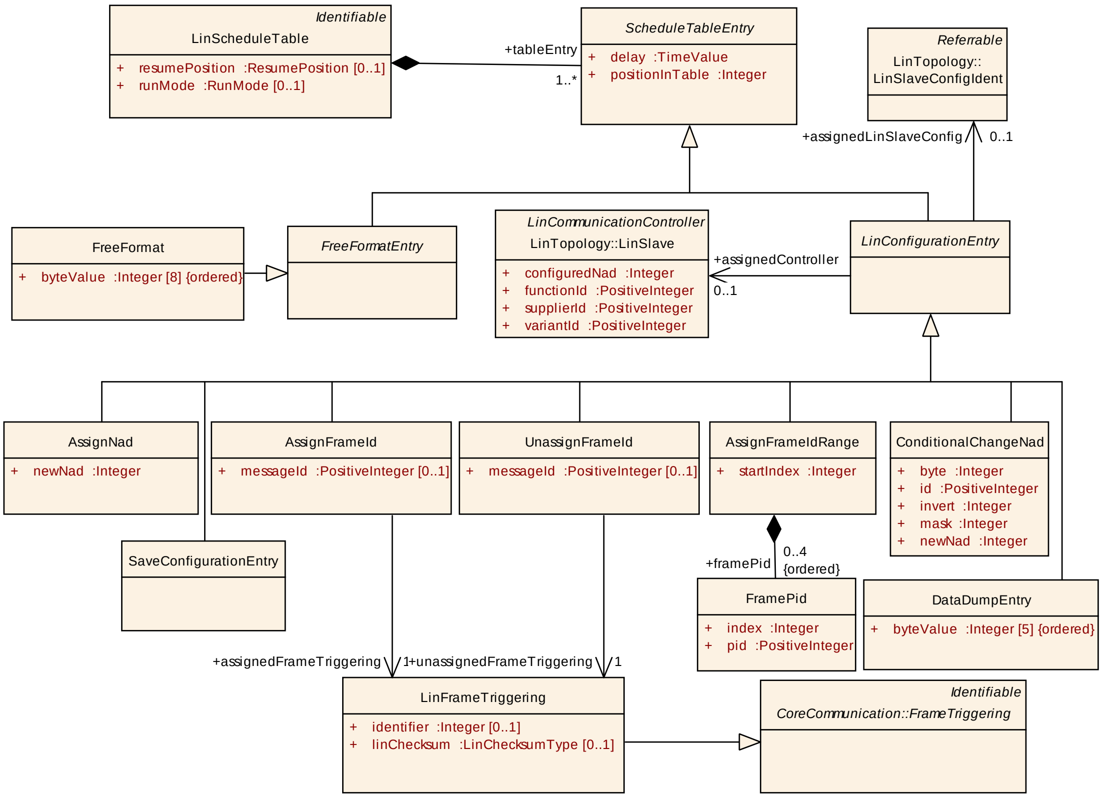


Figure 6.31: LIN Configuration Entries (Fibex4Lin:LinConfigurationEntries)

LIN only supports 64 identifiers. That creates the need for extending the address space. Hence the frames are identified by message ids from a much larger address space that is additionally separated by supplier ids. During runtime the master assigns a LinId to the frame. In case of identical parts within a cluster the initial node ID (oldNad) is used to differentiate such nodes.

To support that in System Template the AssignFrameId is introduced as a LIN specific extension. For the assignment a relation to the LinSlave is used. The LinSlave element is referenced by a LinCommunicationConnector element that contains a list of frames processed by the slave node. More details can be found in chapter 6.7.2.3.

Class	AssignFrameId			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Schedule entry for an Assign Frame Id master request.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	Type	Mul.	Kind	Note
assignedFrameTriggering	LinFrameTriggering	1	ref	The frame whose identifier is set by this assignment.
messageId	PositiveInteger	0..1	attr	MessageId of the referenced frame.

Table 6.100: AssignFrameId

Class	UnassignFrameId			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Schedule entry for an Unassign Frame Id master request where the protected identifier is assigned the value 0x40. This will disable reception/transmission of a previously dynamically assigned frame identifier.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	Type	Mul.	Kind	Note
messageId	PositiveInteger	0..1	attr	MessageId of the referenced frame.
unassignedFrameTriggering	LinFrameTriggering	1	ref	The frame whose identifier is reset by this assignment.

Table 6.101: UnassignFrameId

[constr_3241] Usage of AssignFrameId.messageId ⌈ The value of AssignFrameId.messageId for the AssignFrameId that refers to a LinSlave in the role assignedController shall be equal to the messageId of the LinConfigurableFrame aggregated by LinCommunicationConnector in role linConfigurableFrame that points to this LinSlave in the role commController. ⌋*()*

[constr_3242] Usage of UnassignFrameId.messageId ⌈ The value of UnassignFrameId.messageId for the UnassignFrameId that refers to a LinSlave in the role assignedController shall be equal to the messageId of the LinConfigurableFrame aggregated by LinCommunicationConnector in role linConfigurableFrame that points to this LinSlave in the role commController. ⌋*()*

The Assign frame ID configuration service is replaced in LIN 2.1 by the Assign frame ID range configuration service. AssignFrameIdRange is used to set or disable Protected Identifiers up to four frames. For the assignment a relation to the LinSlave is used. The LinSlave element is referenced by a LinCommunicationConnector element that contains a list of frames processed by the slave node. More details can be found in chapter 6.7.2.3.

Class	**AssignFrameIdRange**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	AssignFrameIdRange generates an assign frame PID range request.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
framePid (ordered)	FramePid	0..4	aggr	Optional assignment of frame_PID values that are included in the request. The frame_PIDs are ordered.
startIndex	Integer	1	attr	The startIndex sets the index to the first frame to assign a PID.

Table 6.102: AssignFrameIdRange

Class	**FramePid**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Frame_PIDs that are included in the request. The "pid" attribute describes the value and the "index" attribute the position of the frame_PID in the request.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
index	Integer	1	attr	This attribute is used to order the frame_PIDs. The values of index shall be unique within one AssignFrameIdRange.
pid	PositiveInteger	1	attr	Frame_PID value.

Table 6.103: FramePid

Assign NAD is used to resolve conflicting NADs in LIN clusters built using off-the-shelves slave nodes or reused slave nodes. This request uses the initial NAD. The NAD used for the response shall be the same as in the request, i.e. the initial NAD.

Class	**AssignNad**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Schedule entry for an Assign NAD master request.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
newNad	Integer	1	attr	The newly assigned NAD value.

Table 6.104: AssignNad

The conditional change NAD is used to detect unknown slave nodes in a cluster and to separate their NADs.

Class	**ConditionalChangeNad**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Generates an conditional change NAD request. See LIN 2.1 protocol specification for more information.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
byte	Integer	1	attr	Byte Position of Data Byte that should be used for the bitwise XOR with Invert and the bitwise AND with Mask.
id	PositiveInteger	1	attr	Byte Position of Id.
invert	Integer	1	attr	Byte Position of Invert.
mask	Integer	1	attr	Byte Position of Mask.
newNad	Integer	1	attr	The newly assigned NAD value (Byte Position).

Table 6.105: ConditionalChangeNad

The Save Configuration service tells the slave node that the slave application shall save the current configuration.

Class	**SaveConfigurationEntry**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	This service is used to notify a slave node to store its configuration.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.106: SaveConfigurationEntry

The Data Dump service is reserved for initial configuration of a slave node by the slave node supplier and the format of this message is supplier specific.

Class	**DataDumpEntry**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	This service is reserved for initial configuration of a slave node by the slave node supplier and the format of this message is supplier specific.			
Base	ARObject, LinConfigurationEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
byteValue (ordered)	Integer	5	attr	Supplier specific format.

Table 6.107: DataDumpEntry

With the FreeFormat a scheduling of fixed data content within a diagnostic frame is defined. For that specification `FreeFormat` is introduced.

Class	**FreeFormat**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinCommunication			
Note	Representing freely defined data.			
Base	ARObject, FreeFormatEntry, ScheduleTableEntry			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
byteValue (ordered)	Integer	8	attr	The integer Value of a freely defined data byte.

Table 6.108: FreeFormat

In order to be consistent with the rest of the communication configuration, it is required that the diagnostic LIN Frames (Master Request Frame, Slave Response Frame) are explicitly modeled as `Frame` elements. `LinFrameTriggering`s dealing with diagnostic Frames thus reference this diagnostic frames.

6.7.3 CAN specific description

This chapter describes additions to the CAN definition of `FrameTriggering`s.

[TPS_SYST_01130] Communication over CAN ⌈ The System Template supports the description of communication over CAN. ⌋*(RS_SYST_00021)*

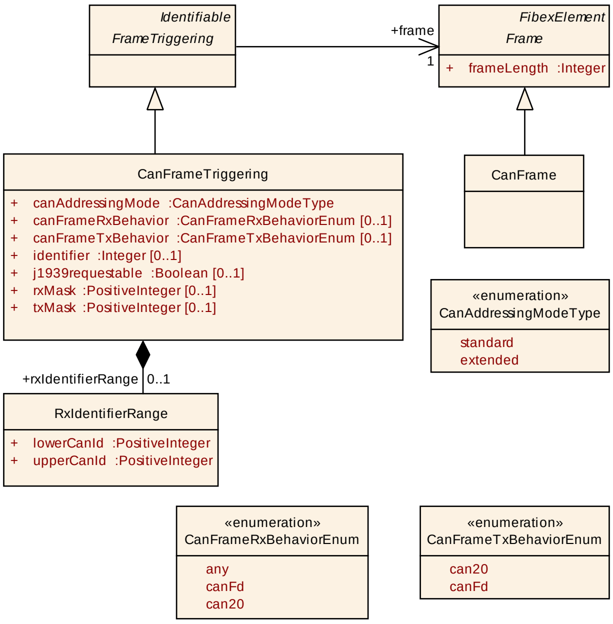


Figure 6.32: CanFrameTriggering (Fibex4Can:CanCommunication)

Class	**CanFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication			
Note	CAN specific Frame element. This element shall also be used for TTCan. **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, Multilanguage Referrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.109: CanFrame

Class	CanFrameTriggering			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication			
Note	CAN specific attributes to the FrameTriggering			
Base	ARObject, FrameTriggering, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
absolutelyScheduledTiming	TtcanAbsolutelyScheduledTiming	*	aggr	Each frame in TTCAN is identified by its slot id and communication cycle. A description is provided by the usage of AbsolutelyScheduledTiming.
canAddressingMode	CanAddressingModeType	1	attr	The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B.
canFrameRxBehavior	CanFrameRxBehaviorEnum	0..1	attr	Defines which CAN protocol shall be expected for frame reception.
canFrameTxBehavior	CanFrameTxBehaviorEnum	0..1	attr	Defines which CAN protocol shall be used for frame transmission.
identifier	Integer	0..1	attr	To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined.
j1939requestable	Boolean	0..1	attr	Frame can be triggered by the J1939 request message.
rxIdentifierRange	RxIdentifierRange	0..1	aggr	Optional definition of a CanId range.
rxMask	PositiveInteger	0..1	attr	Identifier mask which denotes the relevant bits in the CAN Identifier. Together with the identifier, this parameter defines a CAN identifier range.
txMask	PositiveInteger	0..1	attr	Identifier mask which denotes static bits in the CAN identifier. The other bits can be set dynamically.

Table 6.110: CanFrameTriggering

Enumeration	CanAddressingModeType
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication
Note	Indicates whether standard or extended CAN identifiers are used
Literal	Description
extended	Extended 29-bit-identifiers are used (CAN 2.0B) **Tags:** atp.EnumerationValue=0

standard	Standard 11-bit-identifiers are used (CAN 2.0A) **Tags:** atp.EnumerationValue=1

Table 6.111: CanAddressingModeType

Class	**RxIdentifierRange**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication			
Note	Optional definition of a CanId range to reduce the effort of specifying every possible FrameTriggering within the defined Id range during reception. All frames received within a range are mapped to the same Pdu that is passed to a upper layer module (e.g. Nm, CDD, PduR).			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
lowerCanId	PositiveInteger	1	attr	This attribute can be used together with the upperCanId attribute to define a range of CanIds.
upperCanId	PositiveInteger	1	attr	This attribute can be used together with the lowerCanId attribute to define a range of CanIds.

Table 6.112: RxIdentifierRange

Enumeration	**CanFrameRxBehaviorEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication
Note	Defines different CAN protocols for frame reception behavior.
Literal	***Description***
any	This CAN frame may be received as both, CAN 2.0 and CAN FD. **Tags:** atp.EnumerationValue=0
can20	This CAN frame shall be received as CAN 2.0 only. In case the CAN frame is received as CAN FD it is discarded during reception. **Tags:** atp.EnumerationValue=1
canFd	This CAN frame shall be received as CAN FD only. In case the CAN frame is received as CAN 2.0 it is discarded during reception. **Tags:** atp.EnumerationValue=2

Table 6.113: CanFrameRxBehaviorEnum

The `CanFrameTriggering.canFrameRxBehavior` allows to define a tolerant CAN FD reception strategy. With the setting `any` the respective CAN frame is accepted for reception, regardless whether it is received with CAN FD or CAN 2.0 protocol.

Enumeration	**CanFrameTxBehaviorEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Can::CanCommunication
Note	Defines different CAN protocols for frame transmission behavior.

Literal	*Description*
can20	This CAN frame shall be sent as CAN 2.0 only. **Tags:** atp.EnumerationValue=0
canFd	This CAN frame shall be sent as CAN FD. **Tags:** atp.EnumerationValue=1

Table 6.114: CanFrameTxBehaviorEnum

Note that the transmission behavior of CanFrameTriggering.canFrameTxBehavior may still be redefined in the communication stack on driver level.

[TPS_SYST_02168] MetaData support required if CanFrameTriggering.txMask is used ⌈ The usage of CanFrameTriggering.txMask requires the support of COM Stack MetaData. ⌋ *()*

Please note that the MetaData support in [TPS_SYST_02168] is required to calculate CAN-Ids at run-time.

[TPS_SYST_02169] MetaData support may be required if CanFrameTriggering.rxMask is used ⌈ The usage of CanFrameTriggering.rxMask may require the support of COM Stack MetaData. ⌋ *()*

Please note that the MetaData support in [TPS_SYST_02169] is required if the upper layer is interested in the masked part of CAN-Id, e.g. J1939. In some cases the upper layer is not interested in the masked part of CAN-Id, e.g. for CanNm the MetaData is not required.

6.7.3.1 SAE J1939 Protocol specific description

J1939 is a protocol and application layer standard of the SAE (Society of Automotive Engineers) based on the CAN technology. It defines parameters uniquely identified by the SPN (Suspect Parameter Number). These are mapped to parameter groups that are uniquely identified by a PGN (Parameter Group Number). Parameters are simply handled as `SystemSignal`s which have a name derived from the name of the SPNs. A Parameter Group (PG) corresponds to an `IPdu`.

J1939 uses extended 29 bit CAN identifiers to encode a priority, the source address of the frame, and a frame ID which is based on the PGN (Parameter Group Number) and may contain the destination address.

J1939 supports `IPdu`s with more than 8 bytes, and `IPdu`s with variable length that may exceed 8 bytes. As soon as an `IPdu` has more than 8 bytes, it does not fit in a single CAN frame and a transport protocol must be used. Variable length `IPdu`s will always be handled by the J1939 TP, regardless of the actual length. The J1939 Transport Protocol is described in chapter 6.8.7.

[TPS_SYST_01132] Communication over SAE J1939 ⌈ The System Template supports the description of communication over SAE J1939. ⌋ *(RS_SYST_00038)*

[constr_3209] `CanFrameTriggering`s with identical PGN ⌈ For all `CanFrameTriggering`s where the attribute `identifier` contains the identical PGN (as defined in section 5.2 Protocol Data Unit in [22]) the attribute `j1939requestable` shall also have an identical value. ⌋ *()*

6.7.4 TTCAN specific description

This chapter describes additions to the TTCAN definition of FrameTriggerings.

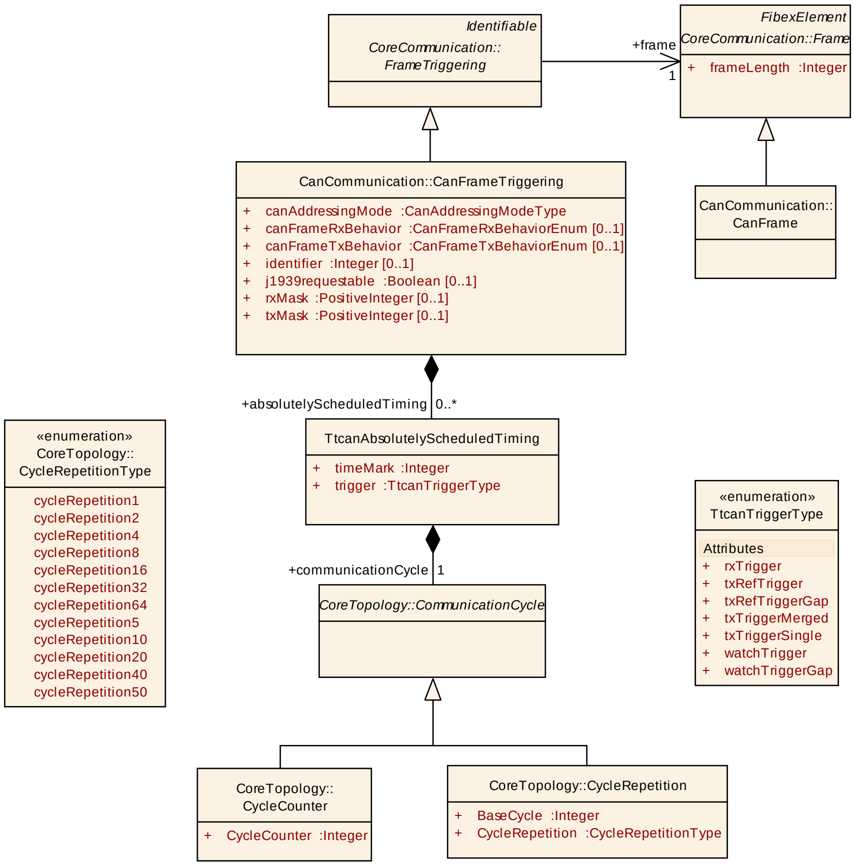


Figure 6.33: TtcanAbsolutelyScheduledTiming (Fibex4Ttcan:TtcanCommunication)

Class	TtcanAbsolutelyScheduledTiming			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::Ttcan Communication			
Note	Each frame in TTCAN is identified by its slot id and communication cycle. A description is provided by the usage of AbsolutelyScheduledTiming. A frame can be sent multiple times within one communication cycle. For describing this case multiple AbsolutelyScheduledTimings have to be used. The main use case would be that a frame is sent twice within one communication cycle.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
communicationCycle	CommunicationCycle	1	aggr	The communication cycle where the frame is sent.
timeMark	Integer	1	attr	Where FlexRay counts the slots in the static segment, TTCAN requires explicit Tx and Rx time marks.
trigger	TtcanTriggerType	1	attr	Trigger type for this time window.

Table 6.115: TtcanAbsolutelyScheduledTiming

Enumeration	TtcanTriggerType
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ttcan::Ttcan Communication
Note	This type lists all trigger types for a time window.
Literal	Description
rxTrigger	Check for message reception **Tags:** atp.EnumerationValue=0
txRefTrigger	Send reference message in periodic case **Tags:** atp.EnumerationValue=1
txRefTriggerGap	Send reference message in event-synchronised case **Tags:** atp.EnumerationValue=2
txTriggerMerged	Send message in a merged arbitration window **Tags:** atp.EnumerationValue=3
txTriggerSingle	Send message in an exclusive time window **Tags:** atp.EnumerationValue=4
watchTrigger	Check for missing reference message in periodic case **Tags:** atp.EnumerationValue=5
watchTriggerGap	Check for missing reference message in event-synchronised case **Tags:** atp.EnumerationValue=6

Table 6.116: TtcanTriggerType

6.7.5 Ethernet specific description

[TPS_SYST_01131] TCP/IP and UDP/IP communication over Ethernet ⌈ The System Template supports the description of TCP/IP and UDP/IP communication over Ethernet. ⌋*(RS_SYST_00039)*

This section specifies the information of the AUTOSAR Basic Software modules Socket Adaptor (SoAd), Service Discovery and Tcp/Ip that is common for several `EcuInstance`s and therefore is part of the System Configuration Description.

The main purpose of the SoAd module is to create an interface between the PDU Router and a socket based TCP/IP stack. The AUTOSAR Service Discovery module offers functionality to detect and announce available services within the vehicle network.

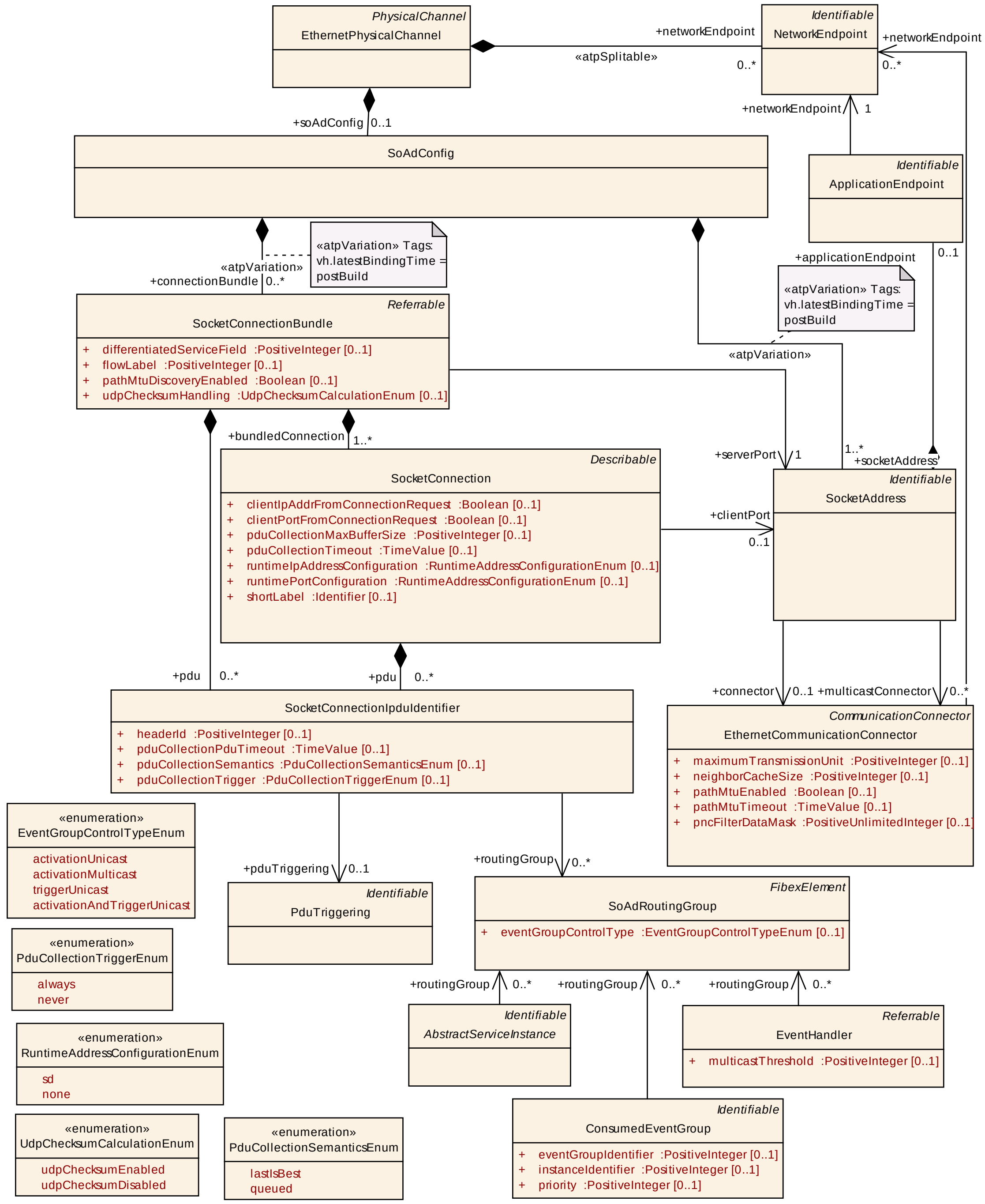


Figure 6.34: Ethernet Communication (Fibex4Ethernet:EthernetCommunication)

The SoAd serves as a (De)Multiplexer between different Pdu sources/suppliers and the TCP/IP stack. The `SocketConnection` maps TCP/UDP Ports (configured by the `ApplicationEndpoint`) as well as IP addresses (configured by the `NetworkEndpoint`) to the `IPdu` and adds this information during transmit. On receive it needs to reverse this process and create the `IPdu` from the TCP/IP information received.

The `SocketConnectionBundle` groups `SocketConnection`s and describes properties like `serverPort`s which are common for all `SocketConnection`s in the `SocketConnectionBundle`.

[TPS_SYST_01091] Definition of SoAdConfig ⌈ The SoAdConfig in the System Template is defined per EthernetPhysicalChannel which represents a VLAN. ⌋ *(RS_SYST_00039)*

[TPS_SYST_01092] Transmission of multiple Pdus over the same SocketConnection ⌈ If multiple Pdus are transmitted over the same SocketConnection a headerId information shall be used to distinguish between the different Pdus. ⌋ *(RS_SYST_00039)*

[TPS_SYST_01093] Activation/Deactivation of SoAdRoutingGroups ⌈ The routing of Pdus to and from a socket may be activated or deactivated with a SoAdRoutingGroup depending on the availability of services, EventHandlers or ConsumedEventGroups that send or receive the data. ⌋ *(RS_SYST_00039)*

The Routing Group Activation Table is controlled by the Service Discovery module.

[TPS_SYST_02002] SoAdRoutingGroup for Services with Methods ⌈ For Services that contain Methods a SoAdRoutingGroup shall be created that is referenced by the ProvidedServiceInstance and by all clients in form of ConsumedServiceInstances. ⌋ *()*

[TPS_SYST_02003] SoAdRoutingGroups for Services with event groups ⌈ For event groups of a Service a SoAdRoutingGroup with eventGroupControlType set to activationUnicast or activationMulticast) shall be created that is referenced by the EventHandler and by all ConsumedEventGroups that are subscribed to this event group. ⌋ *()*

[TPS_SYST_02004] SoAdRoutingGroups for Services with event groups that contain triggered events ⌈ A SoAdRoutingGroup with eventGroupControlType set to triggerUnicast shall be created for event groups that contain triggered events [2]. Such a SoAdRoutingGroup shall be referenced by the EventHandler that provides the triggered events. ⌋ *()*

The Methods and Events that are provided or consumed by an EcuInstance are described by the ApplicationEndpoint.

Class	**SoAdConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	SoAd Configuration for one specific Physical Channel.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
connection Bundle	SocketConnectionBundle	*	aggr	Collection of SocketConnectionBundles. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

[2]initial events that are send out by the server after a client got subscribed

Attribute	Type	Mul.	Kind	Note
socketAddress	SocketAddress	1..*	aggr	Collection of SoAdAddresses. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.117: SoAdConfig

Class	**SocketConnectionBundle**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	This elements groups SocketConnections, i.e. specifies socket connections belonging to the bundle and describes properties which are common for all socket connections in the bundle.			
Base	ARObject, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
bundledConnection	SocketConnection	1..*	aggr	Collection of SocketConnections in the connectionGroup.
differentiatedServiceField	PositiveInteger	0..1	attr	The 6-bit Differentiated Service Field in the IP headers may be used for classifying network traffic. If not set a value of zero is used to indicate packets that have not been classified.
flowLabel	PositiveInteger	0..1	attr	The 20-bit Flow Label field in the IPv6 header may be used by a source to label sequences of packets for which it requests special handling by the IPv6 routers, such as non-default quality of service. If not set a Flow Label of zero is used to indicate packets that have not been labeled.
pathMtuDiscoveryEnabled	Boolean	0..1	attr	Defines whether the Path MTU Discovery shall be performed for the related socket.
pdu	SocketConnectionIpduIdentifier	*	aggr	With this aggregation SocketConnectionIpduIdentifier elements are assigned to all SocketConnections that are available in this SocketConnetionBundle.
serverPort	SocketAddress	1	ref	Server Port for TCP/UDP connection in an abstract communication sense. The server is the major provider of the communication. Please note that the server may also consume data.
udpChecksumHandling	UdpChecksumCalculationEnum	0..1	attr	Specifies if UDP checksum handling shall be enabled (udpChecksumEnabled) or skipped (udpChecksumDisabled) on the related socket connection.

Table 6.118: SocketConnectionBundle

Enumeration	**UdpChecksumCalculationEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication
Note	This enumeration defines the UDP checksum calculation.
Literal	***Description***

udpCheck-sumDisabled	Udp checksum handling shall be disabled **Tags:** atp.EnumerationValue=1
udpCheck-sumEnabled	Udp checksum handling shall be enabled **Tags:** atp.EnumerationValue=0

Table 6.119: UdpChecksumCalculationEnum

[constr_3299] SocketConnectionBundle.pathMtuDiscoveryEnabled setting dependency ⌈ SocketConnectionBundle.pathMtuDiscoveryEnabled shall only be set to TRUE if EthernetCommunicationConnector.pathMtuEnabled == TRUE. ⌋*()*

[constr_3311] Usage of SocketConnectionBundle.flowLabel ⌈ SocketConnectionBundle.flowLabel shall only be used if the SocketConnectionBundle points to a SocketAddress in the role serverPort with an ApplicationEndpoint that refers to a NetworkEndpoint with an Ipv6Configuration. ⌋*()*

[TPS_SYST_02140] SocketConnectionBundle.udpChecksumHandling default value ⌈ If SocketConnectionBundle.udpChecksumHandling is not used the value udpChecksumEnabled shall be assumed. ⌋*()*

[TPS_SYST_02141] Semantics of udpChecksumHandling ⌈ The semantics of udpChecksumHandling is different for the sending and the receiving side:

TX - calculation of UDP checksum:

- udpChecksumEnabled means that the UDP checksum is calculated on the transmission side.
- udpChecksumDisabled means that the UDP checksum is not calculated but set to zero on the transmission side.

RX - handling of UDP checksum of zero:

- udpChecksumEnabled means that the UDP checksum of zero is treated as invalid checksum on receiver side (causing the UDP datagram to be dropped by the receiver). A valid non-zero checksum is accepted and the UDP datagram is forwarded to the upper layer.
- udpChecksumDisabled means the the UDP checksum of zero is treated as valid checksum on the receiver side (causing the UDP datagram to be forwarded to the upper layer). A valid non-zero checksum is accepted and the UDP datagram is forwarded to the upper layer as well.

⌋*()*

[TPS_SYST_02142] Reception of invalid checksum ⌈ On Rx side an invalid checksum should always cause the related UDP datagram to be discarded independent of the udpChecksumHandling value. ⌋*()*

Class	**SocketConnection**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	The SoAd serves as a (De)Multiplexer between different PDU sources and the TCP/IP stack.			
Base	ARObject, Describable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
allowedIPv6ExtHeaders	IPv6ExtHeaderFilterList	0..1	ref	Reference to a list of IPv6 Extension Headers allowed for this SocketConnection. If no list is referenced all IPv6 Extension Headers are allowed and processed.
allowedTcpOptions	TcpOptionFilterList	0..1	ref	Reference to a list of TCP options allowed for this SocketConnection.
clientIpAddrFromConnectionRequest	Boolean	0..1	attr	If set to true the Server "learns" the client IP address on connection request. This means that the statically configured IP Address of the related client shall be ignored. If set to false the Server only accepts statically configured IP address, e.g. 192.168.1.2. This means that the statically configured IP Address of the Client shall be used.
clientPort	SocketAddress	0..1	ref	Client Port for TCP/UDP connection in an abstract communication sense. The client is the major requester of the communication. Please note that the client may also produce data.
clientPortFromConnectionRequest	Boolean	0..1	attr	If set to true the Server "learns" the client Port on connection request. This means that the statically configured Port of the related client shall be ignored. If set to false the Server only accepts statically configured Port. This means that the statically configured Port of the Client shall be used.
pdu	SocketConnectionIpduIdentifier	*	aggr	PDUs handed over by the PDU Router (Transmission over the Ethernet) or PDUs handed over by SoAd (Reception over Ethernet). Multiple IPdus can be transmitted over one socket connection.
pduCollectionMaxBufferSize	PositiveInteger	0..1	attr	Defines the maximum buffer size in Byte which shall be filled before a socket with Pdu collection enabled shall be transmitted to the lower layer.
pduCollectionTimeout	TimeValue	0..1	attr	Defines the time in seconds which shall pass before a socket with Pdu collection enabled shall be transmitted to the lower layer after the first Pdu has been put into the socket buffer.
runtimeIpAddressConfiguration	RuntimeAddressConfigurationEnum	0..1	attr	This attribute determines which protocol is used by the client to obtain the IP Address information. If this attribute is not set to none the value determines the service used by the client to obtain the IP Address information for the SocketConnection. If this attribute is set to none the client used the statically configured IP Address information.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
runtimePortConfiguration	RuntimeAddressConfigurationEnum	0..1	attr	This attribute determines which protocol is used by the client to obtain the Port information. If this attribute is not set to none the value determines the service used by the client to obtain the Port information for the SocketConnection. If this attribute is set to none the client uses the statically configured Port information.
shortLabel	Identifier	0..1	attr	This attribute specifies an identifying shortName for the SocketConnection. It shall be unique within its context.

Table 6.120: SocketConnection

Figure 6.35 shows an example with a `SocketConnectionBundle` that contains three `SocketConnection`s. `Client1Connection` and `Client2Connection` are pointing to static unicast addresses. `MulticastConnection` is pointing to a multicast IP Address.

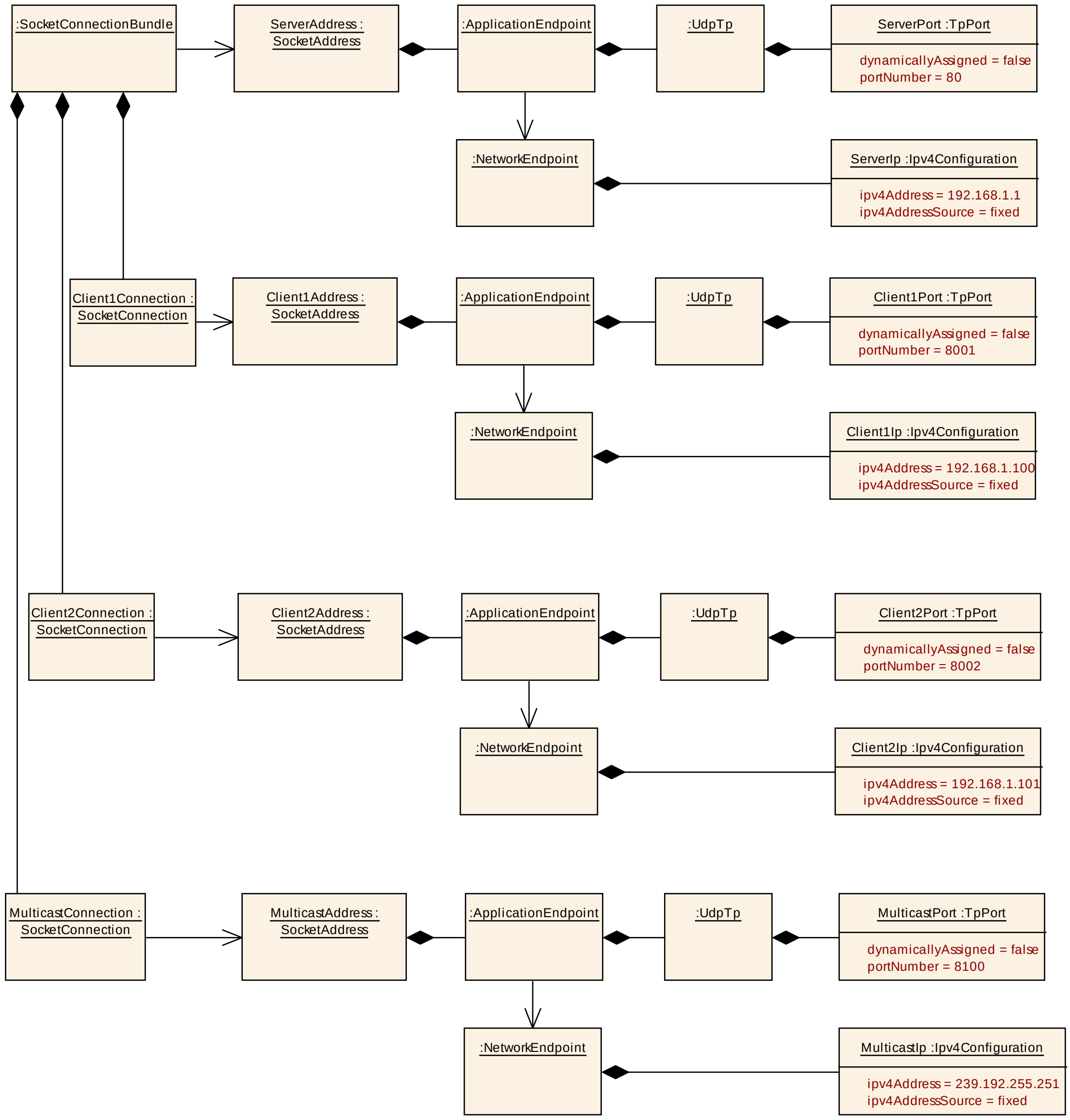


Figure 6.35: Base Addressing Example

Enumeration	**RuntimeAddressConfigurationEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication
Note	This enumeration defines the protocol to be used to obtain the address information.
Literal	***Description***
none	Static configuration is used to obtain the address information. **Tags:** atp.EnumerationValue=0
sd	AUTOSAR Service Discovery is used to obtain the address information. **Tags:** atp.EnumerationValue=1

Table 6.121: RuntimeAddressConfigurationEnum

Class	SocketConnectionIpduIdentifier			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	An Identifier is required in case of one port per ECU communication where multiple Pdus are transmitted over the same connection. If only one IPdu is transmitted over the connetion this attribute can be ignored.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
headerId	PositiveInteger	0..1	attr	If multiple Pdus are transmitted over the same connection this headerId can be used to distinguish between the different Pdus.
pduCollectionPduTimeout	TimeValue	0..1	attr	Defines the timeout in seconds the PDU collection shall be transmitted at the latest after this PDU has been put into the buffer.
pduCollectionSemantics	PduCollectionSemanticsEnum	0..1	attr	Specifies if the referenced PduTriggering shall be collected using a queued (i.e. all PDU instances) or last-is-best (i.e. only the last PDU instance) semantics. If this attribute is not present the behavior of "queued" is assumed.
pduCollectionTrigger	PduCollectionTriggerEnum	0..1	attr	Defines whether the referenced Pdu contributes to the triggering of the socket transmission if Pdu collection is enabled for this socket.
pduTriggering	PduTriggering	0..1	ref	Reference to a Pdu that is mapped to a socket connection.
routingGroup	SoAdRoutingGroup	*	ref	Reference to RoutingGroups that can be enabled or disabled.

Table 6.122: SocketConnectionIpduIdentifier

Enumeration	PduCollectionTriggerEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication
Note	Defines whether a Pdu contributes to the triggering of the data transmission if Pdu collection is enabled.
Literal	Description
always	Pdu will trigger the transmission of the data. **Tags:** atp.EnumerationValue=0
never	Pdu will be buffered and will not trigger the transmission of the data. **Tags:** atp.EnumerationValue=1

Table 6.123: PduCollectionTriggerEnum

Class	**SocketAddress**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	This meta-class represents the ability represent a socket address towards the rest of the meta-model. The actual semantics of the represented socket address, however, is contributed by aggregation of ApplicationEndpoint.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applicationEndpoint	ApplicationEndpoint	0..1	aggr	Application addressing
connector	EthernetCommunicationConnector	0..1	ref	Association to a CommunicationConnector in the topology description. This reference shall be used if the SocketAddress describes an IP unicast address. In a System Description this reference is mandatory if an IP unicast address is described. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided). Please note that in the SystemExtract or EcuExtract the type of the reference shall not change from unicast connectorRef to multicastConnectorRef.
multicastConnector	EthernetCommunicationConnector	*	ref	Association to a CommunicationConnector in the topology description. This reference shall be used if the SocketAddress describes an IP mutlicast address. This multicast SocketAddress shall contain references to all ECUs that want to receive the multicast messages. In a System Description this reference is mandatory if an IP multicast address is described. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided). Please note that in the SystemExtract or EcuExtract the type of the reference shall not change from multicastConnectorRef to unicast connectorRef.

Table 6.124: SocketAddress

Class	**SoAdRoutingGroup**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	Routing of Pdus in the SoAd can be activated or deactivated. The ShortName of this element shall contain the RoutingGroupId. **Tags:** atp.recommendedPackage=SoAdRoutingGroups			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

Attribute	Type	Mul.	Kind	Note
eventGroupControlType	EventGroupControlTypeEnum	0..1	attr	This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.

Table 6.125: SoAdRoutingGroup

Enumeration	EventGroupControlTypeEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication
Note	Types of a RoutingGroups for the event communication.
Literal	Description
activationAndTriggerUnicast	Activate the data path for unicast events and triggered unicast events that are sent out after a client got subscribed. **Tags:** atp.EnumerationValue=0
activationMulticast	Activate the data path for multicast events of an EventGroup. **Tags:** atp.EnumerationValue=1
activationUnicast	Activate the data path for unicast events of an EventGroup. **Tags:** atp.EnumerationValue=2
triggerUnicast	Activate the data path for triggered unicast events that are sent out after a client got subscribed. **Tags:** atp.EnumerationValue=3

Table 6.126: EventGroupControlTypeEnum

Enumeration	PduCollectionSemanticsEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication
Note	Defines the collection semantics for the PDU collection feature.
Literal	Description
lastIsBest	Only the latest PDU instances are transmitted. **Tags:** atp.EnumerationValue=0
queued	All instances of PDUs are transmitted. **Tags:** atp.EnumerationValue=1

Table 6.127: PduCollectionSemanticsEnum

[constr_3322] Consistent setting of SocketConnectionIpduIdentifier.pduCollectionSemantics in the context of one SocketConnectionBundle ⌈ The value of the attribute SocketConnectionIpduIdentifier.pduCollectionSemantics shall be identical for all referenced SocketConnectionIpduIdentifiers within the context of a given SocketConnectionBundle. ⌋ *()*

To enable the IPv6 packet filtering the attribute allowedIPv6ExtHeaders allows to define a white list of IPv6 Extension Headers that are allowed for a SocketConnection. Lists of IPv6 Extension Headers can be defined with the IPv6ExtHeaderFilterList element and can be collected in IPv6ExtHeaderFilterSets.

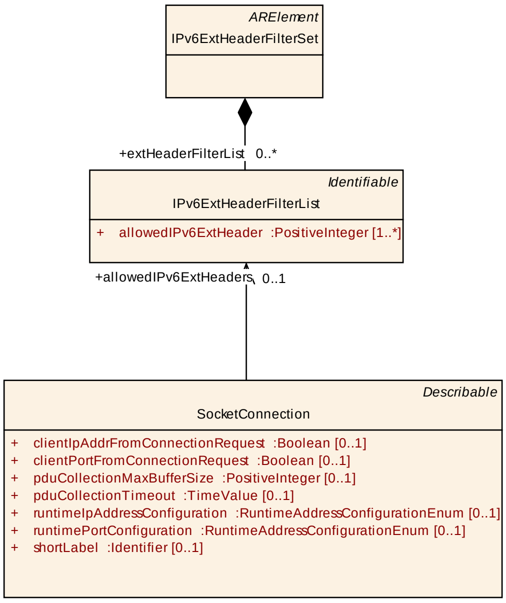


Figure 6.36: IPv6 Extension Header Filter Set

Class	**IPv6ExtHeaderFilterSet**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	Set of IPv6 Extension Header Filters. **Tags:** atp.recommendedPackage=IPv6ExtHeaderFilterSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
extHeader FilterList	IPv6ExtHeader FilterList	*	aggr	In order to permit or deny certain types of IPv6 extension headers a white list of IPv6 extension headers can be configured.

Table 6.128: IPv6ExtHeaderFilterSet

Class	**IPv6ExtHeaderFilterList**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	White list for the filtering of IPv6 extension headers.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
allowedIPv6ExtHeader	PositiveInteger	1..*	attr	IPv6 Extension Header type allowed by this filter.

Table 6.129: IPv6ExtHeaderFilterList

[constr_3276] Prohibition of usage of allowedIPv6ExtHeaders in IPv4 SocketConnections ⌈ IPv4 SocketConnections shall not define allowedIPv6ExtHeaders. An IPv4 SocketConnection points to a SocketAddress in the role clientPort and relates to an ApplicationEndpoint that refers to a NetworkEndpoint that has an Ipv4Configuration as networkEndpointAddress. ⌋ *()*

[constr_3277] Restriction of usage of IPv6ExtHeaderFilterLists in IPv6 SocketConnections ⌈ All SocketConnections related to the same IPv6 NetworkEndpoint shall all reference either no or exactly the same IPv6ExtHeaderFilterList with the allowedIPv6ExtHeaders attribute. ⌋ *()*

To enable the filtering of Tcp options the attribute allowedTcpOptions defines a white list of Tcp options that are allowed for a SocketConnection. Lists of Tcp Option filters can be defined with the TcpOptionFilterList element and can be collected in TcpOptionFilterSets.

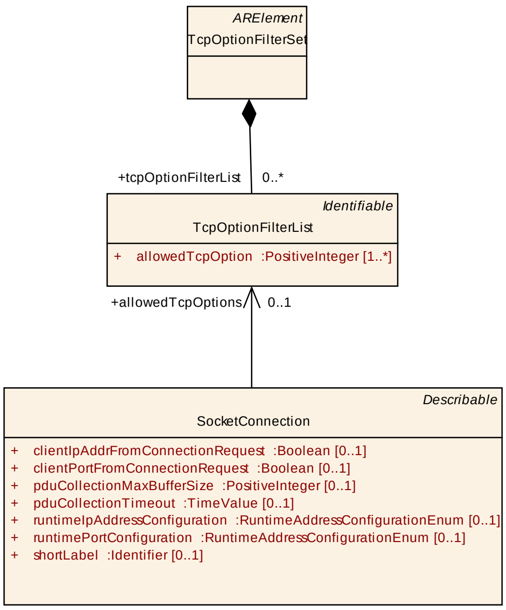


Figure 6.37: Tcp Option Filter Set

Class	**TcpOptionFilterSet**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	Set of TcpOptionFilterLists. **Tags:** atp.recommendedPackage=TcpOptionFilterSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
tcpOptionFilterList	TcpOptionFilterList	*	aggr	Collection of white lists for the filtering of TCP options.

Table 6.130: TcpOptionFilterSet

Class	**TcpOptionFilterList**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	White list for the filtering of TCP options.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
allowedTcpOption	PositiveInteger	1..*	attr	TCP option kind allowed by this filter.

Table 6.131: TcpOptionFilterList

[constr_3297] Prohibition of usage of allowedTcpOptions in Udp SocketConnections ⌈ Udp SocketConnections shall not define allowedTcpOptions. A Udp SocketConnection points to a SocketAddress in the role clientPort and relates to an ApplicationEndpoint that has a UdpTp defined as tpConfiguration. ⌋*()*

6.7.5.1 Example for usage of SocketConnectionBundles and SocketConnections

Figure 6.38 shows a setup with a Service that contains two Events (Event1 and Event2) and one Method. In AUTOSAR an Event is described as a VariableDataPrototype in a SenderReceiverInterface. A ClientServerOperation in a ClientServerInterface is used for the description of the Method.

The Service is provided on Ecu1 by the ApplicationEndpoint with Udp Port 30490. Two unicast ApplicationEndpoints with ConsumedServiceInstances exist for the service. TpPort.dynamicallyAssigned is set to true for both these ApplicationEndpoints. With the ConsumedEventGroup on Ecu2 a subscription to EventGroup1 that contains Event1 is described. With the ConsumedEventGroup on Ecu3 a subscription to EventGroup2 that contains Event1 and Event2 is described.

In addition a multicast ApplicationEndpoint is defined. The ConsumedServiceInstance on Ecu3 contains a second ConsumedEventGroup that refers to the multicast ApplicationEndpoint to allow Ecu3 to receive Event1 also via multicast.

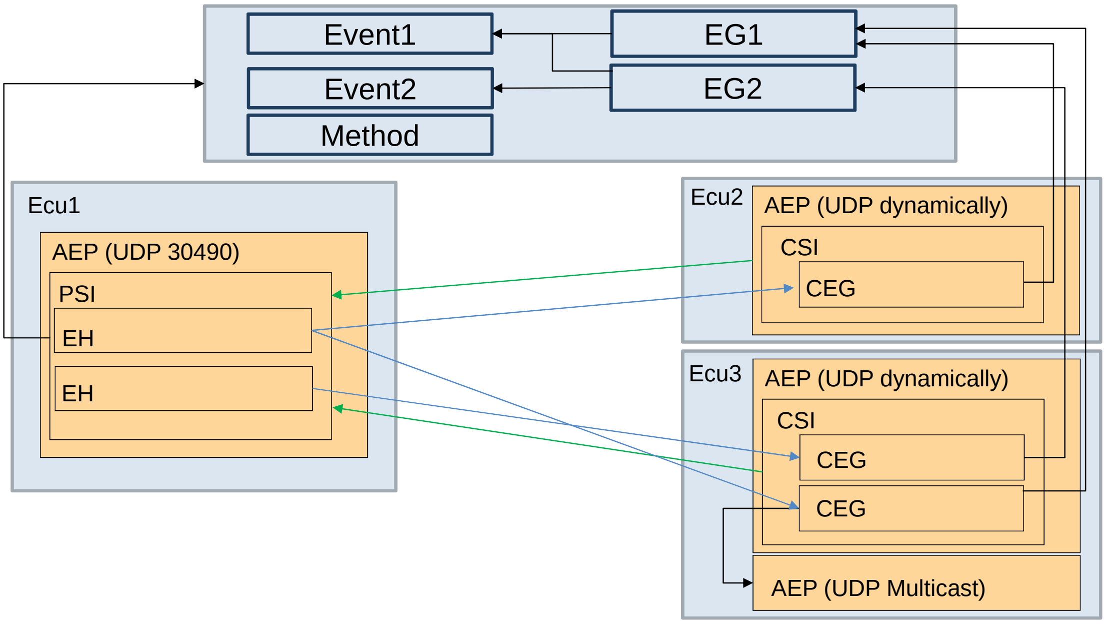


Figure 6.38: Example for a communication with dynamic configured clients

Figure 6.39 shows the resulting description with one SocketConnectionBundle and three SocketConnections. According to the settings of the attributes clientPortFromConnectionRequest, runtimePortConfiguration, clientIpAddrFromConnectionRequest and runtimeIpAddressConfiguration the superset of all available Events is distributed to all available clients. This allows the movement of ConsumedServiceInstances between client Ecus without any changes in the configuration. Therefore the SocketConnectionIpduIdentifiers resulting from the Events are assigned directly to the SocketConnectionBundle.

SocketConnectionIpduIdentifiers resulting from the Method (Call and Return) can be assigned to the SocketConnectionBundle in case that the LdCom module is used as defined by [TPS_SYST_02150]. It means that every client is able to call methods that are provided by the ProvidedServiceInstance. Please note that the relationship between the call and return is achieved by means of COM Stack meta data items attached to the Pdus by the Socket Adapter. With this meta data information it is possible to assign the call Pdu and the corresponding return Pdu to the applicable SocketConnection. Please also see [TPS_SYST_02151].

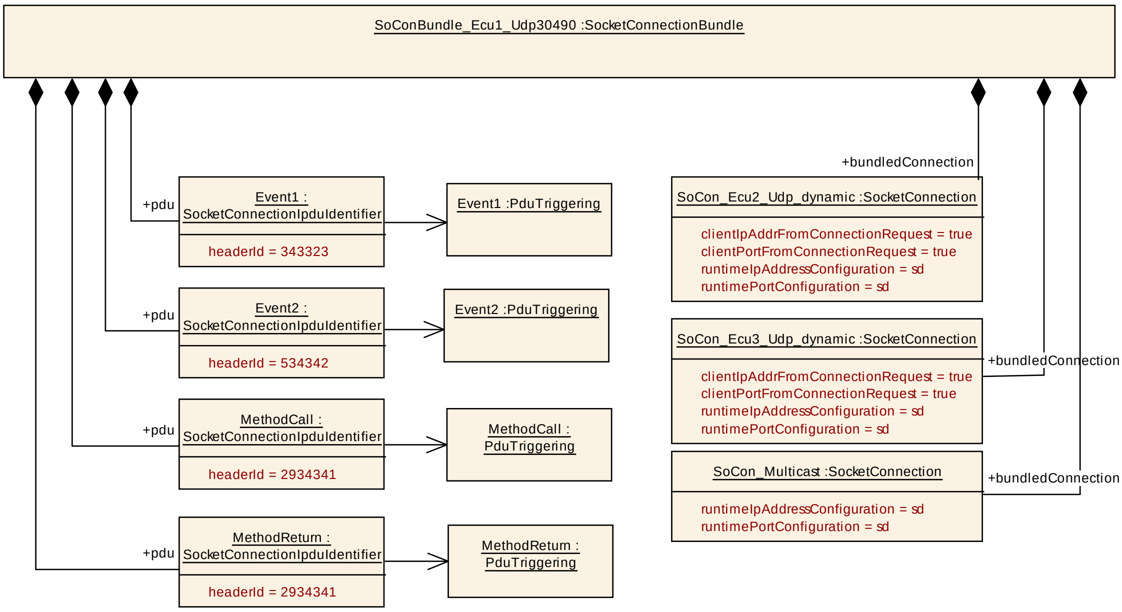


Figure 6.39: Assignment of SocketConnectionIpduIdentifiers to SocketConnectionBundles

In case that the Com module is used the SocketConnectionIpduIdentifiers resulting from the Method (Call and Return) shall be assigned to the SocketConnection as [TPS_SYST_02161] defines. This is shown in example 6.40.

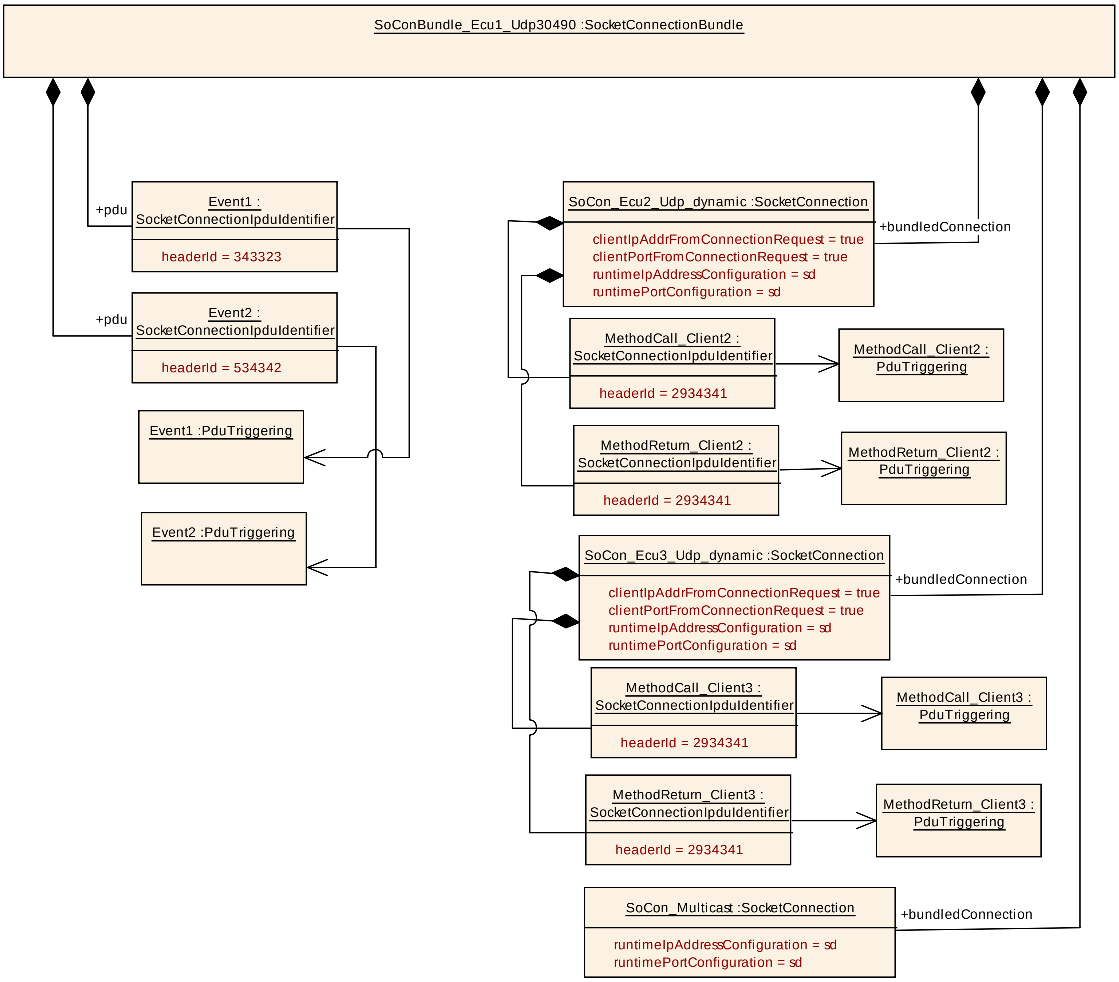


Figure 6.40: Assignment of SocketConnectionIpduIdentifiers to SocketConnectionBundles and SocketConnections

[TPS_SYST_02081] PduTriggering that is used for ClientServer Communication ⌈ A PduTriggering that points to an ISignalIPdu that aggregates an ISignalToIPduMapping that in turn references an ISignal that refers to a ClientServerToSignalMapping.callSignal or to ClientServerToSignalMapping.returnSignal is designated as PduTriggering that is used for ClientServer Communication. ⌋*()*

Figure 6.41 shows a similar setup as figure 6.38. The difference is that the TpPorts of the clients are configured statically and multicast is not used in the example. Due to the static configuration the SocketConnectionIpduIdentifiers resulting from the Events are assigned to the SocketConnections. The client on Ecu2 gets the SocketConnectionIpduIdentifier from Event1 since the client is subscribed to EventGroup1. The client on Ecu3 gets the SocketConnectionIpduIdentifiers from Event1 and Event2.

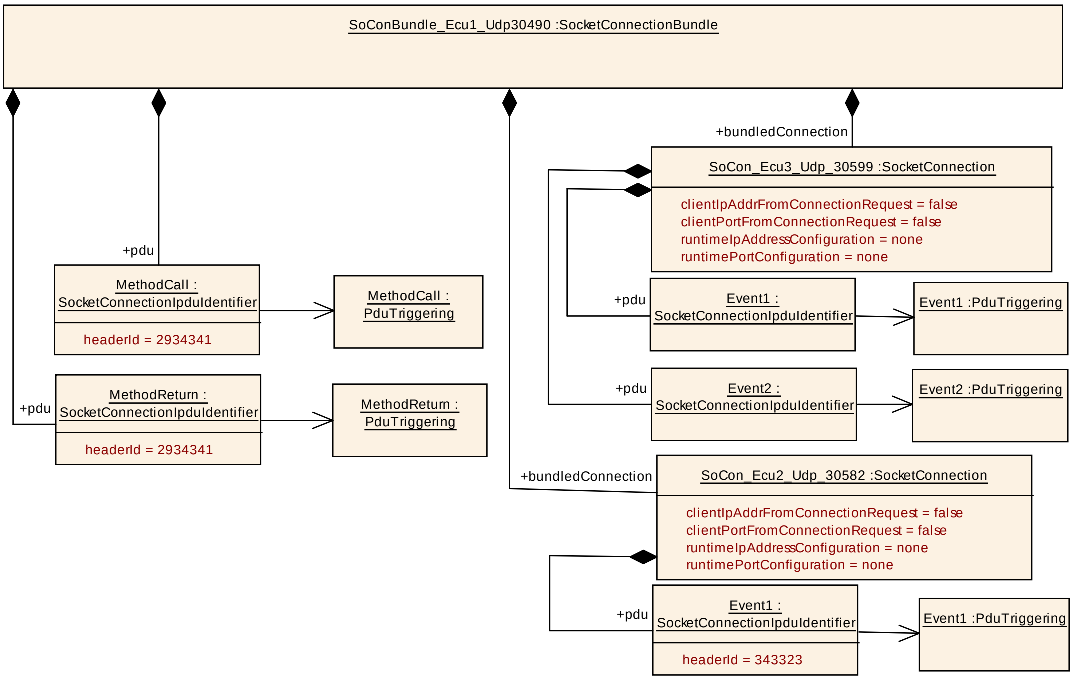


Figure 6.41: Assignment of SocketConnectionIpduIdentifiers to SocketConnections

6.7.5.2 EthernetFrameType based communication

Please note that with the introduction of the TcpIp Bsw module the description of AbstractEthernetFrames is no longer necessary for configuration of the AUTOSAR TcpIp Stack.

Nevertheless it may be useful to describe the Ethernet FrameType based communication in some cases, e.g. if a new basic software module like Ieee1722Tp is used that is located above the EthDrv and parallel to the TcpIp Stack. The Ethernet FrameType based communication shall be described without Pdus.

[constr_3113] AbstractEthernetFrame shall not have a PduToFrameMapping
⌈ It is not allowed to map Pdus into AbstractEthernetFrames. ⌋*()*

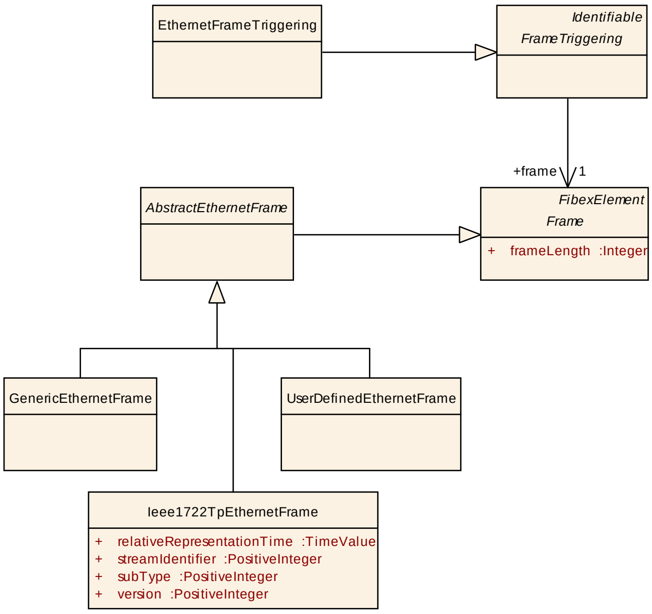


Figure 6.42: EthernetFrameType based communication

Class	**AbstractEthernetFrame (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	Ethernet specific attributes to the Frame.			
Base	ARObject, CollectableElement, FibexElement, Frame, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.132: AbstractEthernetFrame

Class	**EthernetFrameTriggering**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication			
Note	Ethernet specific Frame element.			
Base	ARObject, FrameTriggering, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.133: EthernetFrameTriggering

Class	**GenericEthernetFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	This element is used for EthernetFrames without additional attributes that are routed by the EthIf. **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, AbstractEthernetFrame, CollectableElement, FibexElement, Frame, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.134: GenericEthernetFrame

Class	**UserDefinedEthernetFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	UserDefinedEthernetFrame allows the description of a frame-based communication to Complex Drivers that are located above the EthDrv. **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, AbstractEthernetFrame, CollectableElement, FibexElement, Frame, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.135: UserDefinedEthernetFrame

Class	**Ieee1722TpEthernetFrame**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Communication			
Note	Ieee1722Tp Ethernet Frame **Tags:** atp.recommendedPackage=Frames			
Base	ARObject, AbstractEthernetFrame, CollectableElement, FibexElement, Frame, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
relativeRepresentationTime	TimeValue	1	attr	Defines the time when content shall be presented (in seconds). The actual absolute time is creation time plus relative presentation time
streamIdentifier	PositiveInteger	1	attr	IEEE 1722 stream identifier.
subType	PositiveInteger	1	attr	Protocol type.
version	PositiveInteger	1	attr	Revision of Ieee1722 standard.

Table 6.136: Ieee1722TpEthernetFrame

6.7.5.3 Ethernet Addressing examples

This chapter describes how the attributes clientPortFromConnectionRequest, runtimePortConfiguration, clientIpAddrFromConnectionRequest and runtimeIpAddressConfiguration are used. Please note that the System with category SYSTEM_EXTRACT is a subset of a System with category SYSTEM_DESCRIPTION and that no data shall be altered during the creation of the System Extract. This is also true for the values of attributes that are described in this chapter.

For more details about the System with category SYSTEM_EXTRACT see chapter 11.

[TPS_SYST_02007] Usage of SocketConnection attributes in the unicast server view ⌈ In the unicast server view the following rules apply:

- If the clientPortFromConnectionRequest is set to false the Server obtains the client Port from the static configuration.
- If the clientPortFromConnectionRequest is set to true the Server obtains the client Port from the information contained in the connection request at runtime.
- If the clientIpAddrFromConnectionRequest is set to false the Server obtains the client IpAddress from the static configuration.
- If the clientIpAddrFromConnectionRequest is set to true the Server obtains the client IpAddress from the information contained in the connection request at runtime.

⌋*()*

[TPS_SYST_02008] Usage of SocketConnection attributes in the unicast client view ⌈
In the unicast client view the following rules apply:

- If the runtimePortConfiguration attribute is set to none the client obtains the server port from the static configuration.
- If the runtimePortConfiguration attribute is set to other than none the client uses the respective protocol to retrieve the port information at runtime.
- If the runtimeIpAddressConfiguration attribute is set to none the client obtains the server IpAddress from the static configuration.
- If the runtimeIpAddressConfiguration attribute is set to other than none the client uses the respective protocol to retrieve the IpAddress information at runtime.

⌋*()*

Figure 6.43 shows two unicast use cases. In the first one (Client1Connection) both client and server configure port number and IP address of the remote partner at configuration time. In the second use case (Client2Connection) both client and server configure port number and IP address of the remote partner at runtime. The server obtains the clients IP address and port number when a connection request from any client arrives. The client obtains the server port number and IP address at runtime via the Sd service.

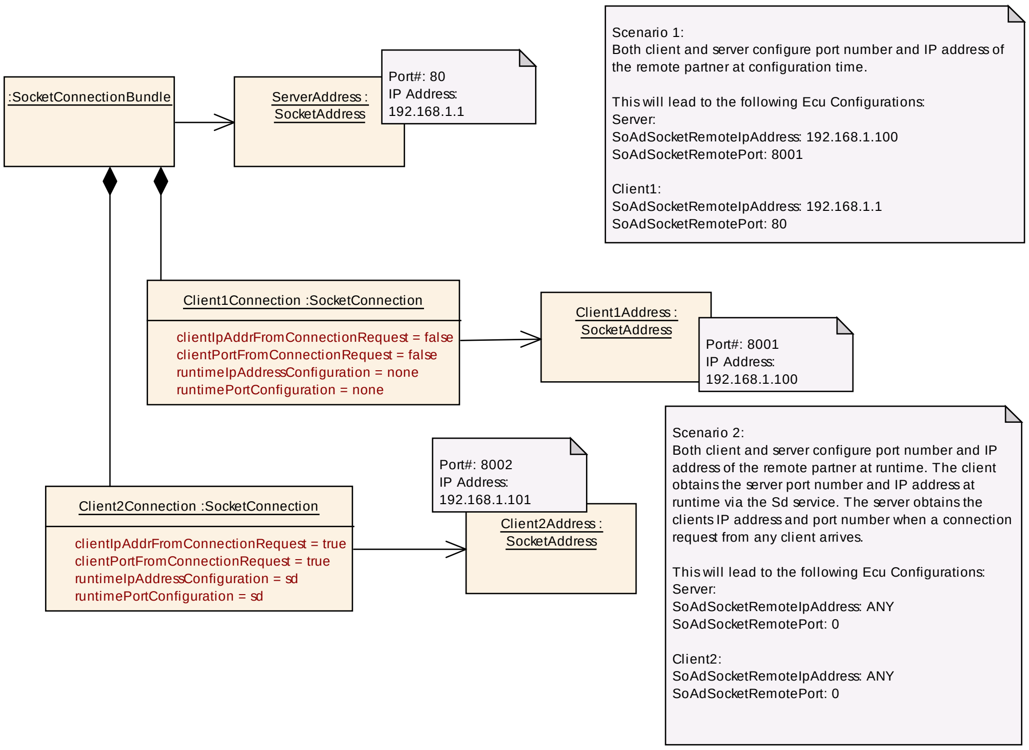


Figure 6.43: Unicast use cases 1 and 2

Figure 6.44 shows two additional unicast use cases. In the first one the server obtains the clients IP address and port number when a connection request from any client arrives. The client configures port number and IP address of the server at configuration time. In use case 4 the server obtains the clients IP address and port number at configuration time. The client obtains the server port number and IP address at runtime via the Sd service.

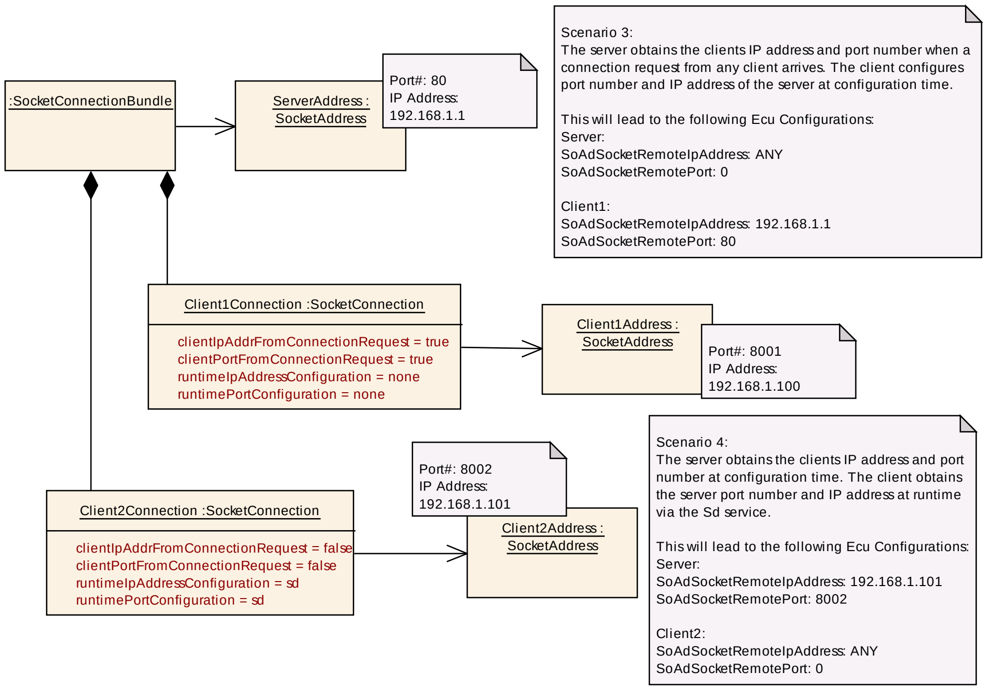


Figure 6.44: Unicast use cases 3 and 4

[TPS_SYST_02009] Usage of SocketConnection attributes in the multicast server view ⌈ In the multicast server view the following rules apply:

- The clientPortFromConnectionRequest attribute is ignored. The server always configures the remote port information based on the associated ApplicationEndpoint of the clientPort.
- The clientIpAddrFromConnectionRequest attribute is ignored. The server always configures the remote IpAddress information based on the associated networkEndpoint of the clientPort.

⌋()

[TPS_SYST_02010] Usage of SocketConnection attributes in the multicast client view ⌈ In the multicast client view the following rules apply:

- If the runtimePortConfiguration attribute is set to none the client obtains its own port information from the static configuration based on the associated ApplicationEndpoint of the clientPort.
- If the runtimePortConfiguration attribute is set to other than none the client uses the respective protocol to retrieve its own port information at runtime.
- If the runtimeIpAddressConfiguration attribute is set to none the client obtains its own port information from the static configuration based on the associated networkEndpoint of the clientPort.

- If the runtimeIpAddressConfiguration attribute is set to other than none the client uses the respective protocol to retrieve its own port information at runtime.

⌋()

Figure 6.45 shows two multicast use cases. In the first one the Multicast address is known at configuration time: The server configures the remote port number and IP address statically. Every addressed client adds a local address entry to its TcpIp configuration and configures the local port number statically.

The second use case shows a dynamic assignment of a Multicast address: The Server announces the Multicast address and port number it uses via Sd. Interested clients reconfigure the appropriate entries in their local configuration tables at runtime.

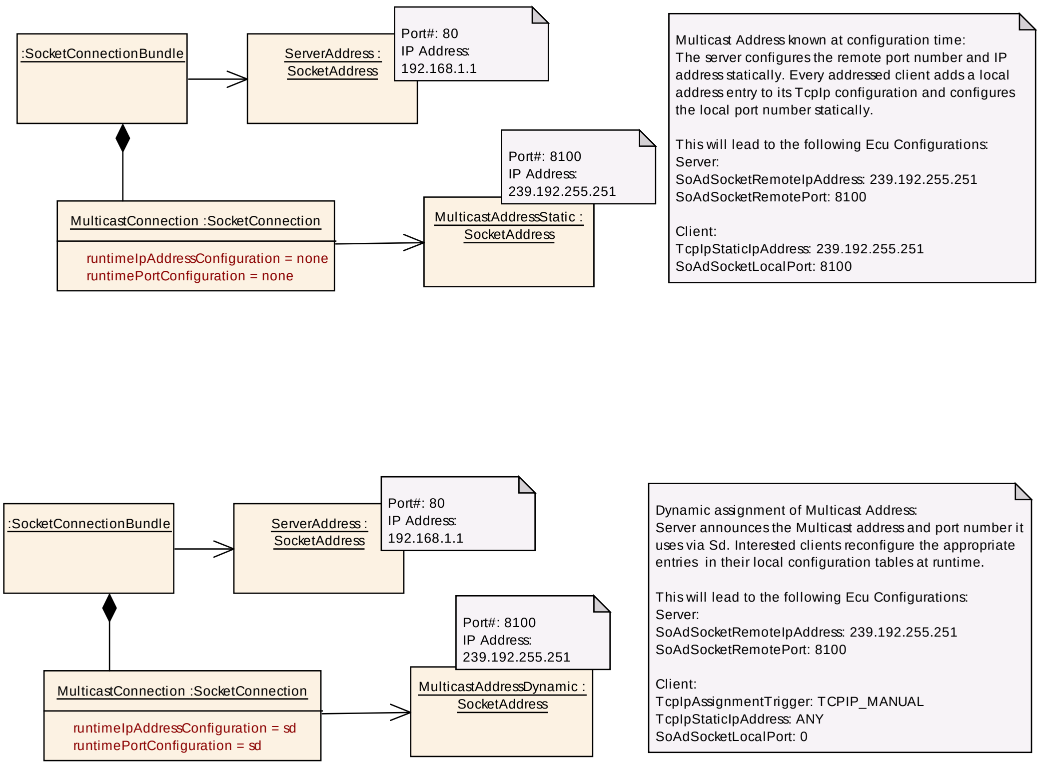


Figure 6.45: Multicast Example

6.7.5.4 Network Endpoint

The NetworkEndpoint defines the network addressing. The network endpoint may have a priority and a FQDN (Fully Qualified Domain Name) that is used for the Service Discovery (e.g. some.example.host.). A NetworkEndpoint may be referenced by several EthernetCommunicationConnectors in the role networkEndpoint.

[TPS_SYST_01090] valid NetworkEndpoint ⌈ To build a valid NetworkEndpoint a MacMulticastConfiguration with a reference to a MacMulticastGroup or an IP configuration (Ipv4Configuration or Ipv6Configuration) needs to be defined. ⌋*(RS_SYST_00039)*

The reference to the MacMulticastGroup is needed for the mapping of IP multicast to MAC multicast.

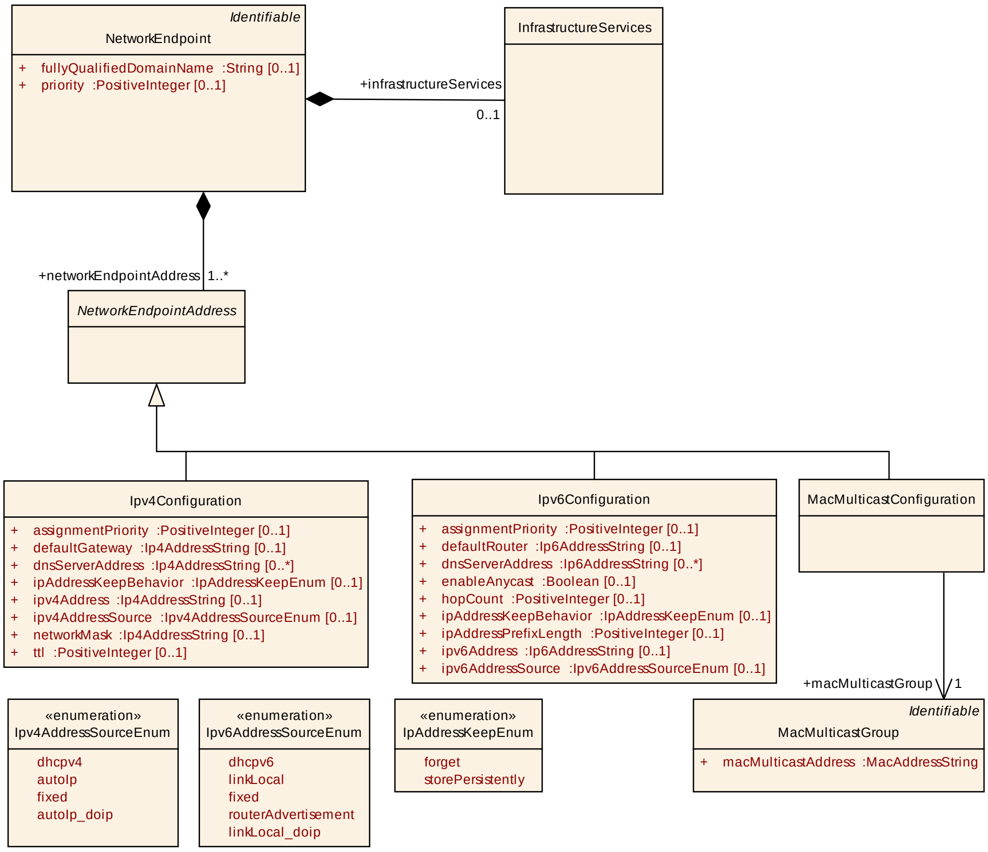


Figure 6.46: Network Endpoint

[TPS_SYST_01088] NetworkEndpoint priority ⌈ The priority at the NetworkEndpoint shall be used as Ethernet Header information together with the vlanIdentifier. If defined the priority overwrites the defaultPriority that is defined in the VlanMembership. ⌋*(RS_SYST_00039)*

The attribute NetworkEndpoint.networkEndpointAddress defines whether an **IPv4**, **IPv6** or **MAC multicast** address is assigned to the NetworkEndpoint.

[TPS_SYST_03002] Keep behavior of DHCP clients ⌈ The attribute IpAddressKeepEnum defines for the DHCP client to either

- persistently store an assigned IP address (storePersistently) after it has been fetched, or
- learn it after each start-up (forget).

⌋*(RS_SYST_00052)*

Class	**NetworkEndpoint**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	The network endpoint defines the network addressing (e.g. IP-Address or MAC multicast address).			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
fullyQualifiedDomainName	String	0..1	attr	Defines the fully qualified domain name (FQDN) e.g. some.example.host.
infrastructureServices	InfrastructureServices	0..1	aggr	Defines the network infrastructure services provided or consumed.
networkEndpointAddress	NetworkEndpointAddress	1..*	aggr	Definition of a Network Address. **Tags:** xml.namePlural=NETWORK-ENDPOINT-ADDRESSES
priority	PositiveInteger	0..1	attr	Priority of this Network-Endpoint.

Table 6.137: NetworkEndpoint

Class	**NetworkEndpointAddress (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 6.138: NetworkEndpointAddress

Class	**Ipv4Configuration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Internet Protocol version 4 (IPv4) configuration.			
Base	ARObject, NetworkEndpointAddress			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
assignmentPriority	PositiveInteger	0..1	attr	Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.
defaultGateway	Ip4AddressString	0..1	attr	IP address of the default gateway.
dnsServerAddress	Ip4AddressString	*	attr	IP addresses of preconfigured DNS servers. **Tags:** xml.namePlural=DNS-SERVER-ADDRESSES

Attribute	Type	Mul.	Kind	Note
ipAddressKeepBehavior	IpAddressKeepEnum	0..1	attr	Defines the lifetime of a dynamically fetched IP address.
ipv4Address	Ip4AddressString	0..1	attr	IPv4 Address. Notation: 255.255.255.255. The IP Address shall be declared in case the ipv4AddressSource is FIXED and thus no auto-configuration mechanism is used.
ipv4AddressSource	Ipv4AddressSourceEnum	0..1	attr	Defines how the node obtains its IP address.
networkMask	Ip4AddressString	0..1	attr	Network mask. Notation 255.255.255.255
ttl	PositiveInteger	0..1	attr	Lifespan of data (0..255). The purpose of the TimeToLive field is to avoid a situation in which an undeliverable datagram keeps circulating on a system.

Table 6.139: Ipv4Configuration

Enumeration	Ipv4AddressSourceEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines how the node obtains its IPv4-Address.
Literal	Description
autoIp	AutoIP is used to dynamically assign IP addresses at device startup. **Tags:** atp.EnumerationValue=0
autoIp_doip	Linklocal IPv4 Address Assignment using DoIP Parameters **Tags:** atp.EnumerationValue=2
dhcpv4	DHCP is a service for the automatic IP configuration of a client. **Tags:** atp.EnumerationValue=3
fixed	The IP Address shall be declared manually. **Tags:** atp.EnumerationValue=4

Table 6.140: Ipv4AddressSourceEnum

Enumeration	**IpAddressKeepEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines the behavior after a dynamic IP address has been assigned.
Literal	***Description***
forget	After a dynamic IP address has been assigned just use it for this session. **Tags:** atp.EnumerationValue=0
storePersistently	After a dynamic IP address has been assigned store the address persistently. **Tags:** atp.EnumerationValue=1

Table 6.141: IpAddressKeepEnum

Class	**Ipv6Configuration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Internet Protocol version 6 (IPv6) configuration.			
Base	ARObject, NetworkEndpointAddress			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
assignmentPriority	PositiveInteger	0..1	attr	Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.
defaultRouter	Ip6AddressString	0..1	attr	IP address of the default router.
dnsServerAddress	Ip6AddressString	*	attr	IP addresses of pre configured DNS servers. **Tags:** xml.namePlural=DNS-SERVER-ADDRESSES
enableAnycast	Boolean	0..1	attr	This attribute is used to enable anycast addressing (i.e. to one of multiple receivers).
hopCount	PositiveInteger	0..1	attr	The distance between two hosts. The hop count n means that n gateways separate the source host from the destination host (Range 0..255)
ipAddressKeepBehavior	IpAddressKeepEnum	0..1	attr	Defines the lifetime of a dynamically fetched IP address.
ipAddressPrefixLength	PositiveInteger	0..1	attr	IPv6 prefix length defines the part of the IPv6 address that is the network prefix.
ipv6Address	Ip6AddressString	0..1	attr	IPv6 Address. Notation: FFFF:...:FFFF. The IP Address shall be declared in case the ipv6AddressSource is FIXED and thus no auto-configuration mechanism is used.
ipv6AddressSource	Ipv6AddressSourceEnum	0..1	attr	Defines how the node obtains its IP address.

Table 6.142: Ipv6Configuration

[constr_3298] Ipv6Configuration.ipv6Address range in case of enableAnycast ⌈ If Ipv6Configuration.enableAnycast is set to true then the Ipv6Configuration.ipv6Address needs to be in the unicast addressing range. ⌋*()*

Enumeration	**Ipv6AddressSourceEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology
Note	Defines how the node obtains its IPv6-Address.
Literal	***Description***
dhcpv6	DHCP is a service for the automatic IP configuration of a client. **Tags:** atp.EnumerationValue=0
fixed	The IP Address shall be declared manually. **Tags:** atp.EnumerationValue=1
linkLocal	LinkLocal is intended only for communications within the segment of a local network (a link) or a point-to-point connection that a host is connected to. **Tags:** atp.EnumerationValue=2
linkLocal_doip	Linklocal IPv6 Address Assignment using DoIP Parameters **Tags:** atp.EnumerationValue=3
routerAdvertisement	IPv6 Stateless Autoconfiguration. **Tags:** atp.EnumerationValue=4

Table 6.143: Ipv6AddressSourceEnum

Class	**MacMulticastConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	References a per cluster globally defined MAC-Multicast-Group.			
Base	ARObject, NetworkEndpointAddress			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
macMulticastGroup	MacMulticastGroup	1	ref	Reference to a macMulticastGroup.

Table 6.144: MacMulticastConfiguration

Primitive	**Ip4AddressString**
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Primitive Types
Note	This is used to specify an IP4 address. Notation: 255.255.255.255 **Tags:** xml.xsd.customType=IP4-ADDRESS-STRING; xml.xsd.pattern=(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)|ANY; xml.xsd.type=string

Table 6.145: Ip4AddressString

Primitive	**Ip6AddressString**
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Primitive Types
Note	This is used to specify an IP6 address. Notation: FFFF:FFFF;FFFF;FFFF;FFFF;FFFF;FFFF;FFFF **Tags:** xml.xsd.customType=IP6-ADDRESS-STRING; xml.xsd.pattern=[0-9A-Fa-f]{1,4}(:[0-9A-Fa-f]{1,4}){7,7}|ANY; xml.xsd.type=string

Table 6.146: Ip6AddressString

In addition infrastructure services may be provided or consumed by the NetworkEndpoints.

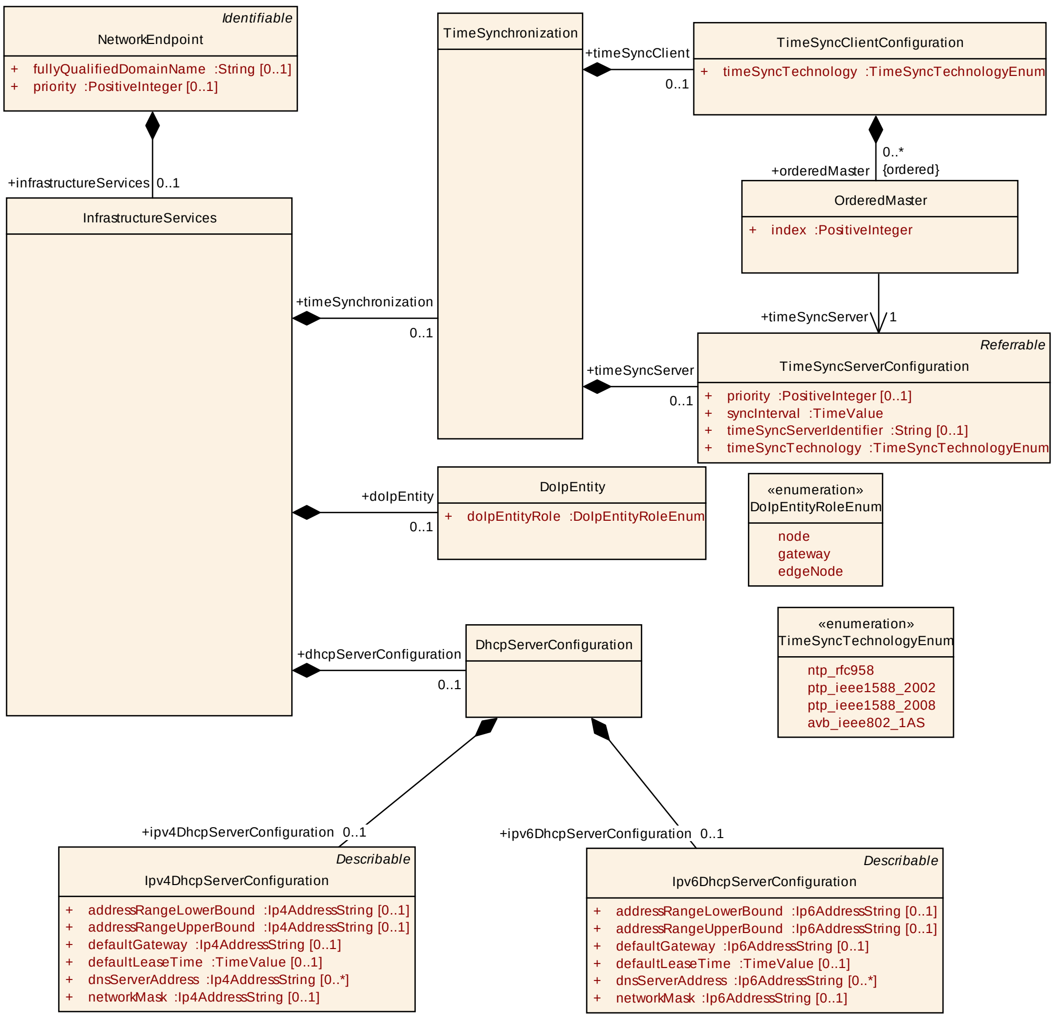


Figure 6.47: Network Endpoint Infrastructure Services

Class	**InfrastructureServices**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines the network infrastructure services provided or consumed.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
dhcpServerConfiguration	DhcpServerConfiguration	0..1	aggr	Defines the configuration of DHCP servers that are running on the network endpoint. **Tags:** atp.Status=obsolete; atp.StatusRevisionBegin=4.3.1
doIpEntity	DoIpEntity	0..1	aggr	Defines whether a infrastructure service that runs on the network endpoint is a DoIP-Entity.
timeSynchronization	TimeSynchronization	0..1	aggr	Defines the servers / clients in a time synchronised network.

Table 6.147: InfrastructureServices

One of these services is a DHCP Server. The DHCP Server offers a service for the automatic IP-configuration of a client. This service is consumed by all DHCP clients in a subnet which have set the address source attribute in the IP Configuration to dhcpv4 or dhcpv6.

Class	**DhcpServerConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines the configuration of DHCP servers that are running on the network endpoint. It is possible that an Ipv4DhcpServer and an Ipv6DhcpServer run on the same Ecu.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ipv4DhcpServerConfiguration	Ipv4DhcpServerConfiguration	0..1	aggr	Configuration of a IPv4 DHCP server that runs on the network endpoint.
ipv6DhcpServerConfiguration	Ipv6DhcpServerConfiguration	0..1	aggr	Configuration of a IPv6 DHCP server that runs on the network endpoint.

Table 6.148: DhcpServerConfiguration

Class	**Ipv4DhcpServerConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Defines the configuration of a IPv4 DHCP server that runs on the network endpoint.			
Base	ARObject, Describable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
addressRangeLowerBound	Ip4AddressString	0..1	attr	Lower range of IP addresses to be issued to DHCP clients. IPv4 Address. Notation: 255.255.255.255.

Attribute	Type	Mul.	Kind	Note
addressRangeUpperBound	Ip4AddressString	0..1	attr	Upper range of IP addresses to be issued to DHCP clients. Pv4 Address. Notation: 255.255.255.255.
defaultGateway	Ip4AddressString	0..1	attr	IP address of the default gateway. Notation 255.255.255.255
defaultLeaseTime	TimeValue	0..1	attr	Amount of time in seconds that a client may keep the IP address.
dnsServerAddress	Ip4AddressString	*	attr	IP addresses of preconfigured DNS servers. Notation 255.255.255.255 **Tags:** xml.namePlural=DNS-SERVER-ADDRESSES
networkMask	Ip4AddressString	0..1	attr	Default network mask to be used by DHCP clients. Notation 255.255.255.255

Table 6.149: Ipv4DhcpServerConfiguration

Class	Ipv6DhcpServerConfiguration			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines the configuration of a IPv6 DHCP server that runs on the network endpoint.			
Base	ARObject, Describable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
addressRangeLowerBound	Ip6AddressString	0..1	attr	Lower range of IP addresses to be issued to DHCP clients. IPv6 Address. Notation: FFFF:...:FFFF.
addressRangeUpperBound	Ip6AddressString	0..1	attr	Upper range of IP addresses to be issued to DHCP clients. IPv6 Address. Notation: FFFF:...:FFFF.
defaultGateway	Ip6AddressString	0..1	attr	IP address of the default gateway. Notation 255.255.255.255
defaultLeaseTime	TimeValue	0..1	attr	Amount of time in seconds that a client may keep the IP address.
dnsServerAddress	Ip6AddressString	*	attr	IP addresses of preconfigured DNS servers. Notation: FFFF:...:FFFF. **Tags:** xml.namePlural=DNS-SERVER-ADDRESSES
networkMask	Ip6AddressString	0..1	attr	Default network mask to be used by DHCP clients. Notation 255.255.255.255

Table 6.150: Ipv6DhcpServerConfiguration

The `TimeSyncServerConfiguration` provides a time synchronization service.

[constr_3257] TimeSyncTechnology of servers and clients in a time synchronized network. ⌈ `TimeSyncClientConfiguration.timeSyncTechnology` shall have the same value as the `TimeSyncServerConfiguration.timeSyncTech-`

nology that is referenced in the TimeSyncClientConfiguration.orderedMaster list. ⌋()

Please note that there may be several timeSyncServers defined in the TimeSyncClientConfiguration.orderedMaster list, but only one is accepted at runtime. In case that a master is not available any more a master transition will be processed according to the defined TimeSyncClientConfiguration.orderedMaster list. The next defined timeSyncServer in the OrderedMaster list will take over the master functionality.

Class	**TimeSynchronization**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines the servers / clients in a time synchronised network.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
timeSyncClient	TimeSyncClientConfiguration	0..1	aggr	Configuration of the time synchronisation client.
timeSyncServer	TimeSyncServerConfiguration	0..1	aggr	Configuration of the time synchronisation server.

Table 6.151: TimeSynchronization

Class	**TimeSyncClientConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines the configuration of the time synchronisation client.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
orderedMaster (ordered)	OrderedMaster	*	aggr	Defines a list of ordered NetworkEndpoints. **Tags:** xml.namePlural=ORDERED-MASTER-LIST
timeSyncTechnology	TimeSyncTechnologyEnum	1	attr	Defines the time synchronisation technology used.

Table 6.152: TimeSyncClientConfiguration

Class	**TimeSyncServerConfiguration**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines the configuration of the time synchronisation server.			
Base	ARObject, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
priority	PositiveInteger	0..1	attr	Server Priority.
syncInterval	TimeValue	1	attr	Synchronisation interval used by the time synchronisation server (in seconds).

Attribute	Type	Mul.	Kind	Note
timeSyncServerIdentifier	String	0..1	attr	Identifier of the TimeSyncServer.
timeSyncTechnology	TimeSyncTechnologyEnum	1	attr	Defines the time synchronisation technology used. Possible values are: NTP_RFC958, PTP_IEEE1588_2002, PTP_IEEE1588_2008, AVB_IEEE802_1AS and others.

Table 6.153: TimeSyncServerConfiguration

Class	OrderedMaster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Element in the network endpoint list.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
index	PositiveInteger	1	attr	Defines the order of the network endpoint list (e.g. 0, 1, 2, ...).
timeSyncServer	TimeSyncServerConfiguration	1	ref	Reference to a master (Time Sync Server).

Table 6.154: OrderedMaster

Enumeration	TimeSyncTechnologyEnum
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Timesynchronization. Server/Client configuration.
Literal	Description
avb_ieee802_1AS	Ethernet AVB compliant IEEE802.1AS Precision Time Protocol **Tags:** atp.EnumerationValue=0
ntp_rfc958	Network Time Protocol (NTP) **Tags:** atp.EnumerationValue=1
ptp_ieee1588_2002	Precision Time Protocol (PTP) IEEE 1588-2002 **Tags:** atp.EnumerationValue=2
ptp_ieee1588_2008	Precision Time Protocol (PTP) IEEE 1588-2008 **Tags:** atp.EnumerationValue=3

Table 6.155: TimeSyncTechnologyEnum

The `DoIpEntity` (Diagnostics over Internet Protocol, ISO 13400) defines the DoIp role this `NetworkEndpoint` has.

Class	**DoIpEntity**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	ECU providing this infrastructure service is a DoIP-Entity.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
doIpEntityRole	DoIpEntityRoleEnum	1	attr	Identifies the role in terms of DoIP this network-node has.

Table 6.156: DoIpEntity

Enumeration	**DoIpEntityRoleEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	DoIP role a network-node has.
Literal	**Description**
edgeNode	Network node is a DoIP gateway that accepts external connections. **Tags:** atp.EnumerationValue=0
gateway	Network node is a Gateway between the DoIP network and other networks. **Tags:** atp.EnumerationValue=1
node	Network node is a DoIp node. **Tags:** atp.EnumerationValue=2

Table 6.157: DoIpEntityRoleEnum

6.7.5.5 Application Endpoint

An `ApplicationEndpoint` is the endpoint on an `EcuInstance` in terms of application addressing. The `NetworkEndpoint` that is related to the application address shall be derived from the aggregating `SocketAddress`. The `SocketAddress` connects the IP-address with the transport layer.

[TPS_SYST_01089] **`ApplicationEndpoint` priority** ⌈ The `priority` at the `ApplicationEndpoint` shall be used as Ethernet Header information together with the `vlanIdentifier`. If defined the `priority` overwrites the `defaultPriority` that is defined in the `VlanMembership` and the `priority` that is defined at the `NetworkEndpoint`. ⌋*(RS_SYST_00039)*

Class	**ApplicationEndpoint**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
consumedServiceInstance	ConsumedServiceInstance	*	aggr	Consumed service instances.
networkEndpoint	NetworkEndpoint	1	ref	Reference to the network address.
priority	PositiveInteger	0..1	attr	Priority defined per application endpoint
providedServiceInstance	ProvidedServiceInstance	*	aggr	Provided service instances.
tpConfiguration	TransportProtocolConfiguration	0..1	aggr	Configuration of the used transport protocol.

Table 6.158: ApplicationEndpoint

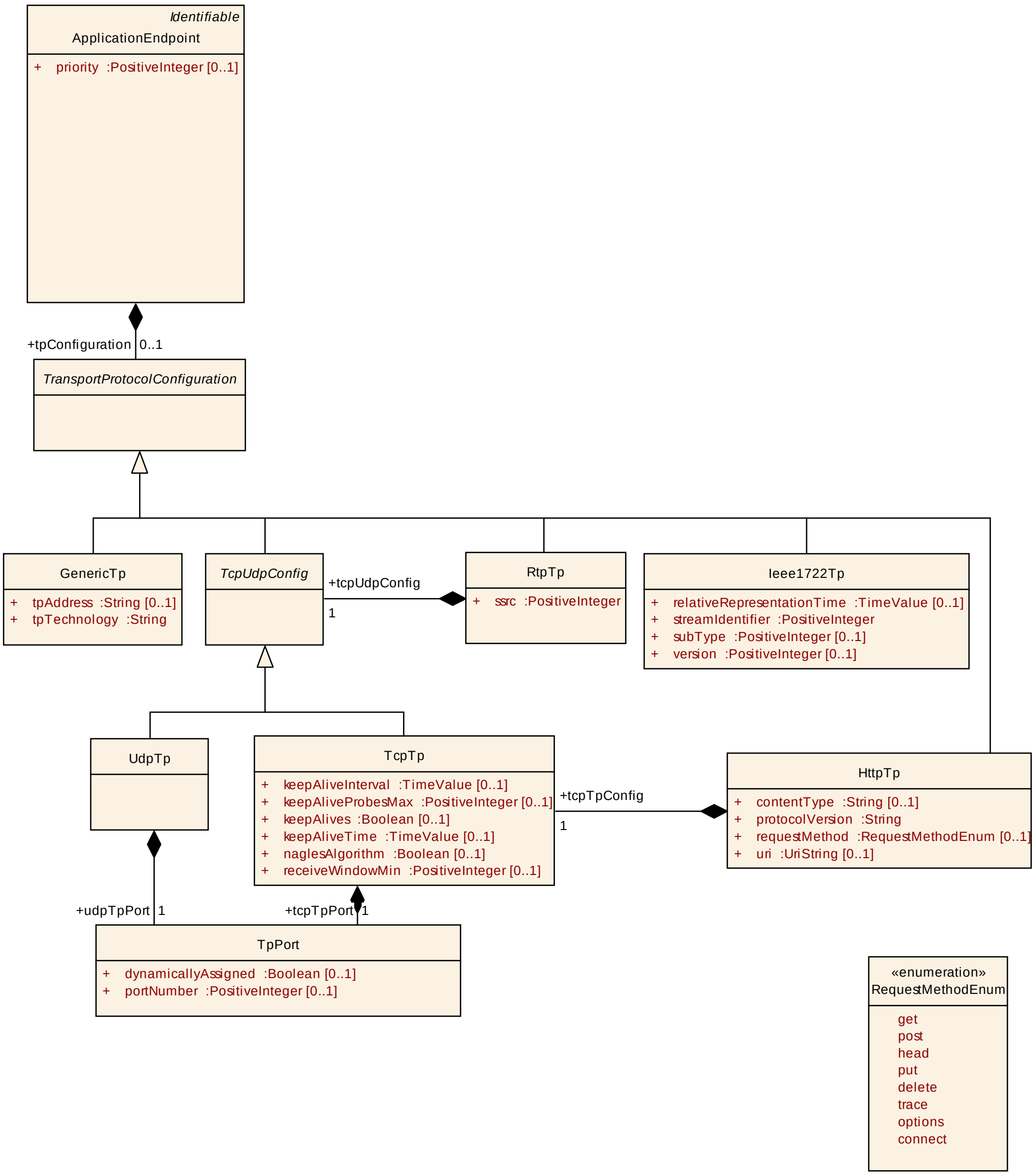


Figure 6.48: Application Endpoint

Class	**TransportProtocolConfiguration (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Transport Protocol configuration.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.159: TransportProtocolConfiguration

The following Transport Protocols are supported by the System Template:

Class	GenericTp			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Content Model for a generic transport protocol.			
Base	ARObject, TransportProtocolConfiguration			
Attribute	Type	Mul.	Kind	Note
tpAddress	String	0..1	attr	Transport Protocol dependent Address.
tpTechnology	String	1	attr	Name of the used Transport Protocol.

Table 6.160: GenericTp

Class	TcpUdpConfig (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Tcp or Udp Transport Protocol Configuration.			
Base	ARObject, TransportProtocolConfiguration			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.161: TcpUdpConfig

Class	UdpTp			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Content Model for UDP configuration.			
Base	ARObject, TcpUdpConfig, TransportProtocolConfiguration			
Attribute	Type	Mul.	Kind	Note
udpTpPort	TpPort	1	aggr	Udp Port configuration.

Table 6.162: UdpTp

Class	TcpTp			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Content Model for TCP configuration.			
Base	ARObject, TcpUdpConfig, TransportProtocolConfiguration			
Attribute	Type	Mul.	Kind	Note
keepAliveInterval	TimeValue	0..1	attr	Specifies the interval in seconds between subsequent keepalive probes.
keepAliveProbesMax	PositiveInteger	0..1	attr	Maximum number of times that TCP retransmits an individual data segment before aborting the connection.
keepAliveTime	TimeValue	0..1	attr	Specifies the time in seconds between the last data packet sent and the first keepalive probe.
keepAlives	Boolean	0..1	attr	Indicates if Keep-Alive messages are send.

Attribute	**Type**	**Mul.**	**Kind**	**Note**
naglesAlgorithm	Boolean	0..1	attr	Indicates if Nagle's Algorithm is used.
receiveWindowMin	PositiveInteger	0..1	attr	Minimum size of the TCP receive window in byte.
tcpTpPort	TpPort	1	aggr	TCP Port configuration.

Table 6.163: TcpTp

Class	**RtpTp**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	RTP over UDP or over TCP as transport protocol.			
Base	ARObject, TransportProtocolConfiguration			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ssrc	PositiveInteger	1	attr	Synchronization source identifier uniquely identifies the source of a stream. The synchronization sources within the same RTP session will be unique.
tcpUdpConfig	TcpUdpConfig	1	aggr	Tcp or Udp Configuration.

Table 6.164: RtpTp

Class	**Ieee1722Tp**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Content Model for IEEE 1722 configuration.			
Base	ARObject, TransportProtocolConfiguration			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
relativeRepresentationTime	TimeValue	0..1	attr	Defines the time when content shall be presented (in seconds). The actual absolute time is creation time plus relative presentation time.
streamIdentifier	PositiveInteger	1	attr	IEEE 1722 stream identifier
subType	PositiveInteger	0..1	attr	Protocol type.
version	PositiveInteger	0..1	attr	Revision of Ieee1722 standard

Table 6.165: Ieee1722Tp

Class	**HttpTp**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Http over TCP as transport protocol.			
Base	ARObject, TransportProtocolConfiguration			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
contentType	String	0..1	attr	Descriptor for the transported content.
protocolVersion	String	1	attr	HTTP Protocol version (e.g. 1.1)
requestMethod	RequestMethodEnum	0..1	attr	HTTP request method to be used.
tcpTpConfig	TcpTp	1	aggr	TcpTp Configuration.
uri	UriString	0..1	attr	URI to be called.

Table 6.166: HttpTp

Class	**TpPort**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Dynamic or direct assignment of a PortNumber.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
dynamicallyAssigned	Boolean	0..1	attr	Indicates whether the source port is dynamically assigned.
portNumber	PositiveInteger	0..1	attr	Port Number.

Table 6.167: TpPort

[constr_3063] Usage of portNumber and dynamicallyAssigned with value "true" is mutually exclusive ⌈ Usage of portNumber and dynamicallyAssigned with value "true" is mutually exclusive. ⌋*()*

In addition the ApplicationEndpoint may operate as a provider (ProvidedServiceInstance) or a consumer (ConsumedServiceInstance) of a service instance. A service represents a functional entity that offers an interface. This interface can be provided by multiple Software Components within an AUTOSAR ECU. To create the connection to the VFB View the service instances in the System Template may be referenced by one or several different DataMappings.

A ProvidedServiceInstance may receive requests from the ConsumedServiceInstance and respond to them. This is realized by ClientServerOperations.

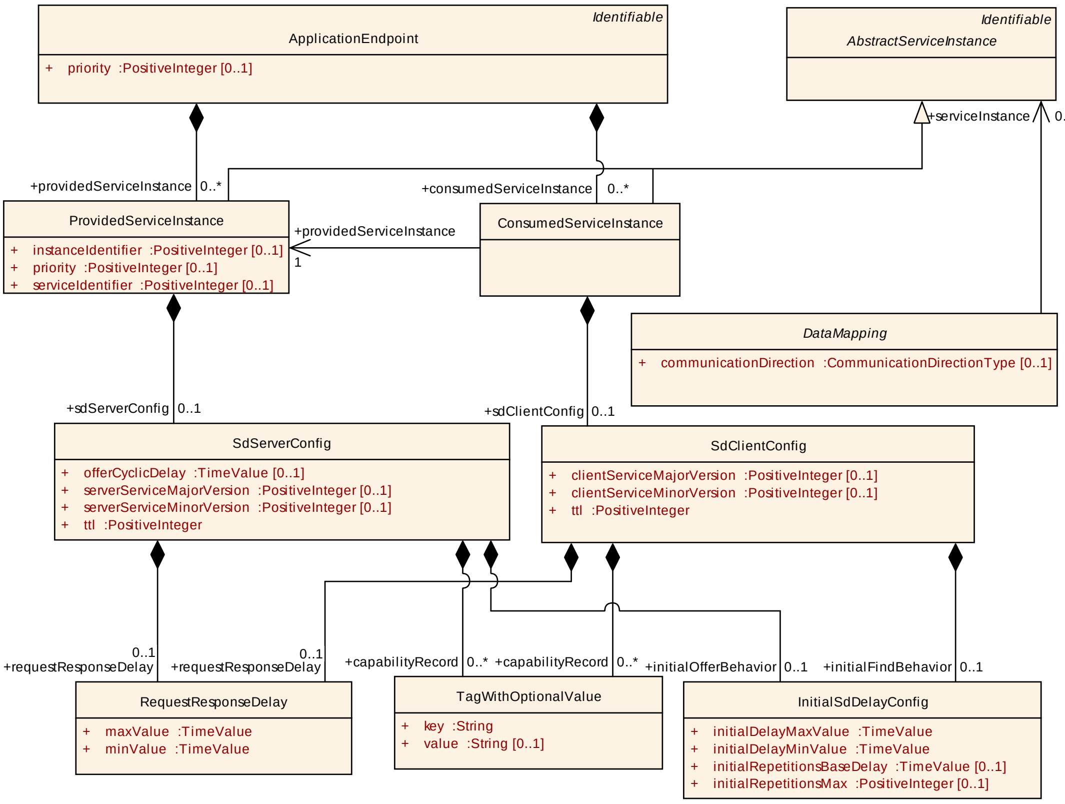


Figure 6.49: Service Instances

Class	**AbstractServiceInstance (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Provided and Consumed Ethernet Service Instances that are available at the ApplicationEndpoint.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
routingGroup	SoAdRoutingGroup	*	ref	The ServiceDiscovery module is able to activate and deactivate the PDU routing from and to TCP/IP-sockets.

Table 6.168: AbstractServiceInstance

Class	**ProvidedServiceInstance**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Service instances that are provided by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.			
Base	ARObject, AbstractServiceInstance, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
EventHandler	EventHandler	*	aggr	Collection of event callback configurations.
instanceIdentifier	PositiveInteger	0..1	attr	Instance identifier. Can be used for e.g. service discovery to identify the instance of the service.
priority	PositiveInteger	0..1	attr	Priority defined per provided ServiceInstance.
sdServerConfig	SdServerConfig	0..1	aggr	Service Discovery Server configuration.
serviceIdentifier	PositiveInteger	0..1	attr	Service ID. Shall be unique within one system to allow service discovery.

Table 6.169: ProvidedServiceInstance

Class	**ConsumedServiceInstance**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Service instances that are consumed by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.			
Base	ARObject, AbstractServiceInstance, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
consumedEventGroup	ConsumedEventGroup	*	aggr	Selection of event-groups the consumer wants to subscribe for.
providedServiceInstance	ProvidedServiceInstance	1	ref	Reference to a providedServiceInstance to get the instanceIdentifier information from the ProvidedServiceInstance.
sdClientConfig	SdClientConfig	0..1	aggr	Service Discovery Client configuration.

Table 6.170: ConsumedServiceInstance

[constr_3379] Multiple SocketAddress entries with the same IP Address, Protocol and Port in the context of a given EcuInstance ⌈ If there are two or more SocketAddress entities within the scope of one SoAdConfig in the scope of one EcuInstance that have the same static (fixed at configuration time) IP Address, Protocol and Port in the aggregated ApplicationEndpoint and NetworkEndpoint, (e.g., 192.168.1.1, Tcp and 10000, respectively), ProvidedServiceInstance/ConsumedServiceInstance may only be defined in the ApplicationEndpoint aggregated by one of these SocketAddress entries. ⌋*()*

Rationale for [constr_3379]: There can be only one representation of the ProvidedServiceInstance/ConsumedServiceInstance using the given IP Address, Protocol and Port in the Sd module configuration in the context of a given EcuInstance.

Therefore, defining ProvidedServiceInstance/ConsumedServiceInstance in more than one ApplicationEndpoint would in this case require a merge of potentially different attribute values of the ProvidedServiceInstances and/or ConsumedServiceInstances in the System Description and such situation is avoided by this constraint.

[TPS_SYST_01108] ProvidedServiceInstance priority ⌈ The priority in the ProvidedServiceInstance shall be used as Ethernet Header information together with the vlanIdentifier. If defined the priority overwrites the defaultPriority that is defined in the VlanMembership, the priority that is defined at the NetworkEndpoint and the priority that is defined at the ApplicationEndpoint. ⌋ *(RS_SYST_00039)*

The AUTOSAR BswM is used to aggregate the availability of all entities which make up a service instance. When all entities are available, the service instance as such is available. When a service instance becomes available the SD Module will usually send an announcement message in order for other ECUs to learn about the availability and the location (IP address and UDP or TCP Port) of that service instance.

The Service Discovery configuration in the System Template is described by the two elements SdServerConfig and SdClientConfig:

Class	**SdServerConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Server configuration for Service-Discovery.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
capabilityRecord	TagWithOptionalValue	*	aggr	A sequence of records to store arbitrary name/value pairs conveying additional information about the named service. Capability records shall only be existing if the respective SdServerConfig is composed by a ProvidedServiceInstance (see constr_3259).
initialOfferBehavior	InitialSdDelayConfig	0..1	aggr	Controls offer behavior of the server.
offerCyclicDelay	TimeValue	0..1	attr	Optional attribute to define cyclic offers. Cyclic offer is active, if the delay is set (in seconds).
requestResponseDelay	RequestResponseDelay	0..1	aggr	Maximum/Minimum allowable response delay to entries received by multicast in seconds.
serverServiceMajorVersion	PositiveInteger	0..1	attr	Major version number of the Service.
serverServiceMinorVersion	PositiveInteger	0..1	attr	Minor version number of the Service.
ttl	PositiveInteger	1	attr	Time to live. Shall be a positive value (sInt32).

Table 6.171: SdServerConfig

Class	SdClientConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Client configuration for Service-Discovery.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
capabilityRecord	TagWithOptionalValue	*	aggr	A sequence of records to store arbitrary name/value pairs conveying additional information about the named service. Capability records shall only be existing if the respective SdClientConfig is composed by a ConsumedServiceInstance (see constr_3260).
clientServiceMajorVersion	PositiveInteger	0..1	attr	Major version number of the Service.
clientServiceMinorVersion	PositiveInteger	0..1	attr	Minor version number of the Service.
initialFindBehavior	InitialSdDelayConfig	0..1	aggr	Controls initial find behavior of clients.
requestResponseDelay	RequestResponseDelay	0..1	aggr	Maximum/Minimum allowable response delay to entries received by multicast in seconds.
ttl	PositiveInteger	1	attr	TTL for Request and Subscribe messages.

Table 6.172: SdClientConfig

[TPS_SYST_02096] Sending of ANY finds for minor version ⌈ AUTOSAR SD is only able to **send** ANY finds for Minor Version. This is done by using the value 0xffffffff (any) for `SdClientConfig.clientServiceMinorVersion`. ⌋*()*

Class	TagWithOptionalValue			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::TagWithOptionalValue			
Note	A tagged value is a combination of a tag (key) and a value that gives supplementary information that is attached to a model element. Please note that keys without a value are allowed.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
key	String	1	attr	Defines a key.
value	String	0..1	attr	Defines the corresponding value.

Table 6.173: TagWithOptionalValue

[TPS_SYST_01094] allowed `key`/`value` `TagWithOptionalValue` combinations
⌈ The following `key`/`value` combinations are supported:

- `key` present, with no `value` (e.g. "passreq" -> password required for this service)

- key present, with empty value (e.g. "PlugIns=" -> server supports plugins, but none are presently installed)
- key present, with non-empty value (e.g. "PlugIns=JPEG,MPEG2,MPEG4")

⌋(RS_SYST_00039)

[constr_3259] Allowed use of SdServerConfig.capabilityRecord ⌈ A TagWithOptionalValue element may only be composed (in role capabilityRecord) by a SdServerConfig element if the respective SdServerConfig element is directly composed by a ProvidedServiceInstance element in role sdServerConfig. A TagWithOptionalValue element must not be composed (in role capabilityRecord) by an SdServerConfig element if the respective SdServerConfig element is composed by an EventHandler element in role sdServerConfig. ⌋()

[constr_3260] Allowed use of SdClientConfig.capabilityRecord ⌈ A TagWithOptionalValue element may only be composed (in role capabilityRecord) by a SdClientConfig element if the respective SdClientConfig element is directly composed by a ConsumedServiceInstance element in role sdClientConfig. A TagWithOptionalValue element must not be composed (in role capabilityRecord) by an SdClientConfig element if the respective SdClientConfig element is composed by a ConsumedEventGroup element in role sdClientConfig. ⌋()

Class	**RequestResponseDelay**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Time to wait before answering the query.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
maxValue	TimeValue	1	attr	Maximum allowable response delay to entries received by multicast in seconds.
minValue	TimeValue	1	attr	Minimum allowable response delay to entries received by multicast in seconds.

Table 6.174: RequestResponseDelay

Class	**InitialSdDelayConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	This element is used to configure the offer behavior of the server and the find behavior on the client.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
initialDelayMaxValue	TimeValue	1	attr	Max Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).

Attribute	***Type***	***Mul.***	***Kind***	***Note***
initialDelay MinValue	TimeValue	1	attr	Min Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).
initialRepet itionsBase Delay	TimeValue	0..1	attr	The base delay for offer repetitions (if aggregated by SdServerConfig) or find repetitions (if aggregated by SdClientConfig. Successive find messages have an exponential back off delay.
initialRepet itionsMax	PositiveInteger	0..1	attr	Describes the maximum amount of offer repetitions (if aggregated by SdServerConfig) or the maximum amount of find repetitions (if aggregated by SdClientConfig).

Table 6.175: InitialSdDelayConfig

There are use cases where the client wants to be notified about events that occur at the server without the need to make an explicit request. A ConsumedService-Instance can subscribe to event groups that are modeled as ConsumedEvent-Groups. All event/notification consumers (ConsumedEventGroups) are referenced by the EventHandler.

[constr_3201] eventGroupIdentifier in ConsumedEventGroups that are referenced by the same EventHandler ⌈ In case that an EventHandler refers to several ConsumedEventGroups all these ConsumedEventGroups shall have the same eventGroupIdentifier. ⌋*()*

The notification is described in the VFB view with VariableDataPrototypes that are sent via a sender/receiver interface from the ProvidedServiceInstance to all event/notification consumers. At the ConsumedServiceInstance the event-callback is processed and has normally a void return.

The availability of a consumer to receive events is configured with the SdClient-Config. The configuration of the EventHandler with the Service Discovery server attributes (SdServerConfig) ensures that the EventHandler knows which consumers are available and to which consumer the notification can be sent.

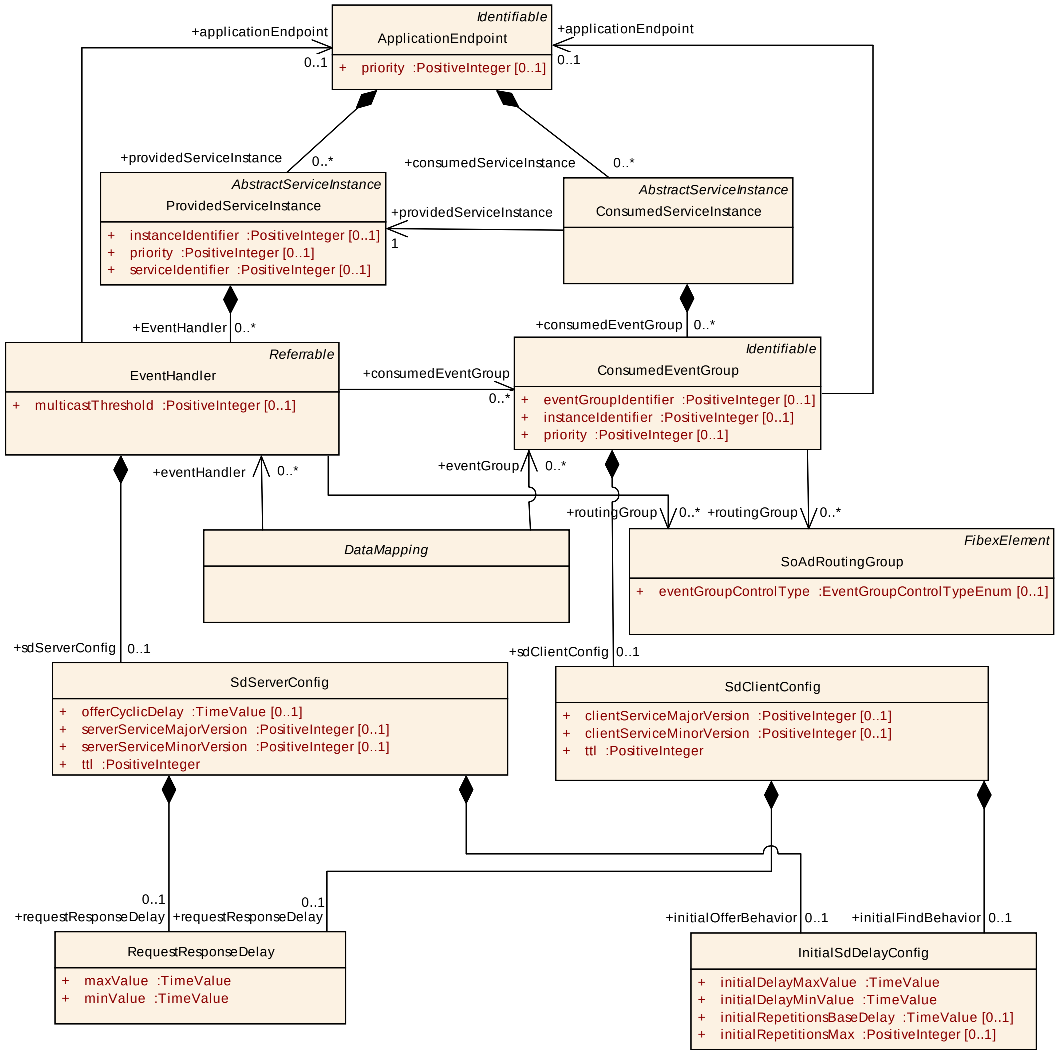


Figure 6.50: Event Handler

Class	**EventHandler**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::Ethernet Topology			
Note	Configures the outbound application endpoint a server uses to call a clients callback. Only required if the source TpPort is not dynamically assigned. If a consumed event group is referenced the configuration is only valid for this relation.			
Base	ARObject, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applicationEndpoint	ApplicationEndpoint	0..1	ref	Defines the local application endpoint used to submit an event to a subscriber. For the submission of events the service provider may use a different TpPort address (ApplicationEndpoint) then for the response of requests.
consumedEventGroup	ConsumedEventGroup	*	ref	All consumers of the event are referenced here.

Attribute	Type	Mul.	Kind	Note
multicastThreshold	PositiveInteger	0..1	attr	Specifies the number of subscribed clients that trigger the server to change the transmission of events to multicast. If configured to 0 only unicast will be used. If configured to 1 the first client will be already served by multicast. If configured to 2 the first client will be server with unicast and as soon as the second client arrives both will be served by multicast. This does not influence the handling of initial events, which are served using unicast only.
routingGroup	SoAdRoutingGroup	*	ref	The ServiceDiscovery module is able to activate and deactivate the PDU routing for events.
sdServerConfig	SdServerConfig	0..1	aggr	Server configuration parameter for Service-Discovery.

Table 6.176: EventHandler

Class	ConsumedEventGroup			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	A Service may have event groups which can be consumed. A service consumer has to subscribe to the corresponding event-group. After the subscription the event consumer takes the role of a server and the event provider that of a client.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applicationEndpoint	ApplicationEndpoint	0..1	ref	Defines the application endpoint where the events of the event group are received. This may be a different TpPort address (ApplicationEndpoint) then that which is used for the sending of requests.
eventGroupIdentifier	PositiveInteger	0..1	attr	EventGroup ID. Shall be unique within one system to allow service discovery.
instanceIdentifier	PositiveInteger	0..1	attr	Instance identifier. Can be used for e.g. service discovery to identify the instance of the event group.
priority	PositiveInteger	0..1	attr	Priority defined per consumed Event-Group
routingGroup	SoAdRoutingGroup	*	ref	The ServiceDiscovery module is able to activate and deactivate the PDU routing for receiving events.
sdClientConfig	SdClientConfig	0..1	aggr	The readiness to receive events is defined by the ServiceDiscovery of the ConsumedEventGroup. The EventHandler shall know about this announcement to decide about the submission of events. Therefore the EventHandler may be configured with Service-Discovery Client attributes.

Table 6.177: ConsumedEventGroup

[TPS_SYST_02112] Usage of EventHandler.applicationEndpoint reference ⌈ EventHandler.applicationEndpoint shall only be used if the EventHandler is provided on a different ApplicationEndpoint (TP Port) than the aggregating ApplicationEndpoint that contains the ProvidedServiceInstance. In all other cases this reference can be ignored. ⌋*()*

[TPS_SYST_02113] Usage of ConsumedEventGroup.applicationEndpoint reference ⌈ ConsumedEventGroup.applicationEndpoint shall only be used

- if the client subscribes to an eventGroup over a different ApplicationEndpoint (TP Port) that the aggregating ApplicationEndpoint that contains the ConsumedServiceInstance.
- if the eventGroup is consumed via IP multicast

In all other cases this reference can be ignored. ⌋*()*

[constr_3262] ConsumedEventGroup.eventGroupIdentifier is mandatory ⌈ The ConsumedEventGroup.eventGroupIdentifier is mandatory. ⌋*()*

[TPS_SYST_01151] DataMapping reference to an EventHandler ⌈ If the DataMapping references an EventHandler in the role eventHandler the serviceInstance reference to the ProvidedServiceInstance or ConsumedServiceInstance that aggregates this specific EventHandler could be skipped. ⌋*()*

[TPS_SYST_01152] DataMapping reference to a ConsumedEventGroup ⌈ If the DataMapping references a ConsumedEventGroup in the role eventGroup the serviceInstance reference to the ProvidedServiceInstance or ConsumedServiceInstance that aggregates this specific ConsumedEventGroup could be skipped. ⌋*()*

[TPS_SYST_02014] ConsumedEventGroup priority ⌈ The priority in the ConsumedEventGroup shall be used as Ethernet Header information together with the vlanIdentifier. If defined the priority overwrites the defaultPriority that is defined in the VlanMembership, the priority that is defined at the NetworkEndpoint and the priority that is defined at the ApplicationEndpoint. ⌋*()*

6.7.5.6 Service Discovery Server Configuration

For every ProvidedServiceInstance on a Server different phases are existing where a suitable Service Discovery Message sending behavior is configurable:

- Down
- Available
  - Initial Wait Phase
  - Repetition Phase
  - Main Phase

[TPS_SYST_02174] Initial Wait Phase configuration for a ProvidedServiceInstance ⌈ The Initial Wait Phase for a ProvidedServiceInstance is configured with the initialOfferBehavior and the two attributes initialDelayMinValue and initialDelayMaxValue. ⌋()

When a calculated random timer based on these min and max values expires, the first OfferService message will be sent out.

[TPS_SYST_02175] Repetition Wait Phase configuration for a ProvidedServiceInstance ⌈ The Repetition Wait Phase for a ProvidedServiceInstance is configured with the initialOfferBehavior and the two attributes initialRepetitionsMax and initialRepetitionsBaseDelay. ⌋()

If the Repetition Phase is entered the Service Discovery waits for the initialRepetitionsBaseDelay and transmits an OfferService entry. If the amount of sent OfferService entries reaches initialRepetitionsMax the Main Phase will be entered.

If initialRepetitionsMax is configured to 0 the Repetition Phase will be skipped and the Main Phase will be entered.

[TPS_SYST_02176] Main Phase configuration for a ProvidedServiceInstance ⌈ The Main Phase for a ProvidedServiceInstance is configured with the offerCyclicDelay attribute of SdServerConfig. ⌋()

The OfferService entry will be sent cyclically with an interval that is defined by the value of attribute offerCyclicDelay.

[TPS_SYST_02177] TTL for Offer Service Entries ⌈ The lifetime of a ProvidedServiceInstance is configurable with the ttl attribute of SdServerConfig. ⌋()

If the time that is configured by ttl expires the ProvidedServiceInstance will no longer be offered.

[TPS_SYST_02178] Servers RequestResponseDelay for received FindService entries ⌈ The Server will delay the OfferService answer to a received multicast FindService entry by the configured SdServerConfig.requestResponseDelay.

The actual delay will be randomly chosen between the maxValue and minValue. ⌋()

SOME/IP allows to specify additional information about the ProvidedServiceInstance with the Configuration Option that allows to transport arbitrary configuration strings (key/value pairs). This allows to encode additional information like the name of a service or its configuration.

[TPS_SYST_02179] Server Capability Records ⌈ A Capability Record (key/value pair) on the Server side is configurable with the capabilityRecord and the two attributes key and value. ⌋()

[TPS_SYST_02180] Usage of EventHandler.multicastThreshold ⌈ The switching between IP-Unicast and IP-Multicast is guided by the server with the EventHandler.multicastThreshold attribute and by the number of subscribed clients to the EventHandler.

The Server will change the transmission of events to Multicast if the multicastThreshold of the corresponding EventHandler is reached by the number of subscribed clients. If the number of subscribed clients is smaller then the configured multicastThreshold, the transmission of events takes place via unicast communication. ⌋()

[TPS_SYST_02181] TTL for SubscribeEventGroupAck Entries ⌈ The lifetime of an event subscription acknowledge message is configurable with the ttl attribute of SdServerConfig that is aggregated by an EventHandler in the role sdServerConfig.

If the time that is configured by ttl expires the event subscription acknowledge is canceled. ⌋()

[TPS_SYST_02182] Servers RequestResponseDelay for received SubscribeEventGroup entries ⌈ The Server will delay the SubscribeEventGroupAck answer to a received SubscribeEventGroup message that was triggered by a multicast ServiceOffer by the configured SdServerConfig.requestResponseDelay that is aggregated by the EventHandler in the role sdServerConfig.

The actual delay will be randomly chosen between the maxValue and minValue. ⌋()

[constr_3401] Usage of SdServerConfig attributes in ProvidedServiceInstance and EventHandler ⌈ Usage of SdServerConfig attributes in ProvidedServiceInstance and EventHandler shall follow the restrictions given in Table 6.178. ⌋()

	Element	
Attributes	**ProvidedServiceInstance**	**EventHandler**
serverServiceMinorVersion	1	0
serverServiceMajorVersion	1	0
initialOfferBehavior.initialDelayMinValue	1	0
initialOfferBehavior.initialDelayMaxValue	1	0
initialOfferBehavior.initialRepetitionsBaseDelay	0..1	0
initialOfferBehavior.initialRepetitionsMax	1	0
offerCyclicDelay	0..1	0
requestResponseDelay.maxValue	1	1
requestResponseDelay.minValue	1	1
ttl	1	1
capabilityRecord.key	0..1	0
capabilityRecord.value	0..1	0

Table 6.178: Allowed usage of SdServerConfig attributes in ProvidedServiceInstance and EventHandler

6.7.5.7 Service Discovery Client Configuration

For every ConsumedServiceInstance on a Client different phases are existing:

- Down
- Requested
  - Initial Wait Phase
  - Repetition Phase
  - Main Phase

[TPS_SYST_02183] Initial Wait Phase configuration for a ConsumedServiceInstance ⌈ The Initial Wait Phase for a ConsumedServiceInstance is configured with the initialFindBehavior and the two attributes initialDelayMinValue and initialDelayMaxValue. ⌋*()*

If a calculated random timer based on these min and max values expires the first FindService entry will be sent out. When the calculated random timer expires and no OfferService is received the Repetition Phase will be entered.

[TPS_SYST_02184] Repetition Wait Phase configuration for a ConsumedServiceInstance ⌈ The Repetition Wait Phase for a ConsumedServiceInstance is configured with the initialFindBehavior and the two attributes initialRepetitionsMax and initialRepetitionsBaseDelay. ⌋*()*

If the Repetition Phase is entered, the Service Discovery waits the initialRepetitionsBaseDelay and sends an FindService entry.

If the amount of sent FindService entries reaches initialRepetitionsMax and no OfferService is received the Main Phase will be entered. In the Main Phase no further FindService entries are sent by the client.

[TPS_SYST_02185] TTL for Find Service Entries ⌈ The lifetime of a ConsumedServiceInstance is configurable with the ttl attribute of SdClientConfig. ⌋*()*

If the time that is configured by ttl expires the FindService entry shall be considered not existing.

SOME/IP allows to specify additional information about the ConsumedServiceInstance with the Capability Record that allows to transport arbitrary configuration strings (key/value pairs).

This allows to encode additional information like the name of a service or its configuration.

[TPS_SYST_02186] Client Capability Records ⌈ A Capability Record (key/value pair) on the Client side is configurable with the capabilityRecord and the two attributes key and value. ⌋*()*

The ConsumedServiceInstance aggregates a ConsumedEventGroup in the role consumedEventGroup that allows to define service instance specific configuration settings for a SOME/IP EventGroup.

[TPS_SYST_02187] SdClientConfig.ttl for SubscribeEventGroup Entries ⌈ The lifetime of an event subscription is configurable with the ttl attribute of SdClientConfig that is aggregated by an ConsumedEventGroup in the role sdClientConfig.

If the time that is configured by ttl expires the event subscription is canceled. ⌋*()*

[TPS_SYST_02188] Clients RequestResponseDelay for received ServiceOffer entries ⌈ The Client will delay the SubscribeEventGroup answer to a received ServiceOffer message by the configured SdClientConfig.requestResponseDelay that is aggregated by the ConsumedEventGroup in the role sdClientConfig.

The actual delay will be randomly chosen between the maxValue and minValue. ⌋*()*

[constr_3400] Usage of SdClientConfig attributes in ConsumedServiceInstance and ConsumedEventGroup ⌈ Usage of SdClientConfig attributes in ConsumedServiceInstance and ConsumedEventGroup shall follow the restrictions given in Table 6.179. ⌋*()*

	Element	
Attributes	**ConsumedServiceInstance**	**ConsumedEventGroup**
clientServiceMinorVersion	1	0
clientServiceMajorVersion	1	0
initialFindBehavior.initialDelayMinValue	1	0
initialFindBehavior.initialDelayMaxValue	1	0
initialFindBehavior.initialRepetitionsBaseDelay	0..1	0
initialFindBehavior.initialRepetitionsMax	1	0
requestResponseDelay.maxValue	0	1
requestResponseDelay.minValue	0	1
ttl	1	1
capabilityRecord.key	0..1	0
capabilityRecord.value	0..1	0

Table 6.179: Allowed usage of SdClientConfig attributes in ConsumedServiceInstance and ConsumedEventGroup

6.7.5.8 Service Discovery Message Configuration

If Service Discovery is used a Service Discovery instance is configurable on an EcuInstance for a certain VLAN using the respecting ApplicationEndpoint.

[TPS_SYST_02116] Modeling of Service Discovery Pdus ⌈ A Service Discovery Instance configuration requires:

- one Tx Pdu that is modeled as GeneralPurposePdu with category = SD
- one Rx Pdu (unicast reception) that is modeled as GeneralPurposePdu with category = SD
- one Rx Pdu (multicast reception) that is modeled as GeneralPurposePdu with category = SD

⌋()

[TPS_SYST_02117] Length of GeneralPurposePdu with category SD ⌈ The length attribute for GeneralPurposePdus with category = SD shall be set to at most EthernetCommunicationConnector.maximumTransmissionUnit - 36 Byte. ⌋()

[TPS_SYST_02118] Rules for the creation of references to IPduPorts from PduTriggerings related to GeneralPurposePdus with category SD ⌈ For each GeneralPurposePdu with category SD a PduTriggering needs to be defined on the EthernetPhysicalChannel (VLAN) that is referenced from the CommunicationConnector of the EcuInstance on which the Service Discovery Instance is configured:

- the PduTriggering for the Tx GeneralPurposePdu references the OUT IPduPort of the EcuInstance
- the PduTriggering for the Rx GeneralPurposePdu (unicast reception) references the IN IPduPort of the EcuInstance
- the PduTriggering for the Rx GeneralPurposePdu (multicast reception) references the IN IPduPort of the EcuInstance

⌋()

[TPS_SYST_02119] SocketConnectionBundles for GeneralPurposePdus with category SD ⌈ UDP Sockets are used for the transmission of SD messages and the following SocketConnectionBundles shall be created:

- SocketConnectionBundle A with one SocketConnection for all Tx and unicast Rx GeneralPurposePdus
- SocketConnectionBundle B with one SocketConnection for multicast Rx GeneralPurposePdu

The PduTriggering for the Tx GeneralPurposePdu and the PduTriggering for the Rx GeneralPurposePdu (unicast reception) are assigned to the SocketConnectionBundle A. The PduTriggering for Rx Multicast GeneralPurposePdu is assigned to the SocketConnectionBundle B. ⌋()

[constr_3267] PduTriggerings in Service Discovery SocketConnectionBundles ⌈ SD SocketConnectionBundles defined in [TPS_SYST_02119] shall only refer to PduTriggerings which point to GeneralPurposePdus of category SD. ⌋()

[constr_3268] Service Discovery SocketConnectionBundle serverPort reference to a TpPort ⌈ Each SD SocketConnectionBundle defined in [TPS_SYST_02119] shall refer with the serverPort reference to an ApplicationEndpoint (via SocketAddress) with a Udp Port. ⌋*()*

[constr_3269] Service Discovery SocketConnection clientPort reference to a TpPort ⌈ Each SD SocketConnection defined in [TPS_SYST_02119] shall refer with the clientPort reference to an ApplicationEndpoint (via SocketAddress) with Udp Port dynamicallyAssigned set to true. ⌋*()*

[constr_3270] Service Discovery SocketConnection clientPort reference to an IP Address ⌈ Each SD SocketConnection defined in [TPS_SYST_02119] shall refer with the clientPort reference to a NetworkEndpoint (via SocketAddress.applicationEndpoint) with IP Address ANY (IPv4 or IPv6). ⌋*()*

[constr_3271] clientIpAddrFromConnectionRequest and clientPortFromConnectionRequest settings for SD SocketConnections ⌈ SD SocketConnections defined in [TPS_SYST_02119] shall define clientIpAddrFromConnectionRequest set to true and clientPortFromConnectionRequest set to true. ⌋*()*

[constr_3272] SocketConnectionIpduIdentifier.headerId setting for SD SocketConnectionBundles ⌈ The SocketConnectionIpduIdentifier.headerId of SD SocketConnectionBundles defined in [TPS_SYST_02119] shall always be set to 0xFFFF8100 for SD messages. ⌋*()*

[constr_3273] Service Discovery multicast SocketConnectionBundle's serverPort reference to an IP Address ⌈ The SD SocketConnectionBundle for multicast defined in [TPS_SYST_02119] (SocketConnectionBundle B) shall refer via the serverPort to a SocketAddress representing a Multicast Address. ⌋*()*

[constr_3274] Service Discovery unicast SocketConnectionBundle's serverPort reference to an IP Address ⌈ The SD SocketConnectionBundle for unicast defined in [TPS_SYST_02119] (SocketConnectionBundle A) shall refer via the serverPort to a SocketAddress representing a Unicast Address. ⌋*()*

[TPS_SYST_02120] runtimeIpAddressConfiguration and runtimePortConfiguration settings for SD SocketConnections ⌈ For SD SocketConnections defined in [TPS_SYST_02119] the values of runtimeIpAddressConfiguration and runtimePortConfiguration can be omitted and, if exist, shall be ignored. ⌋*()*

6.7.5.9 Diagnostics over IP

DoIpTpConnection describes a unidirectional connection between a doIpSourceAddress and a doIpTargetAddress and the exchange of DcmIPdus between the PduR and DoIP. The DiagnosticConnection with references to DoIpTpConnections defines the related request and response messages.

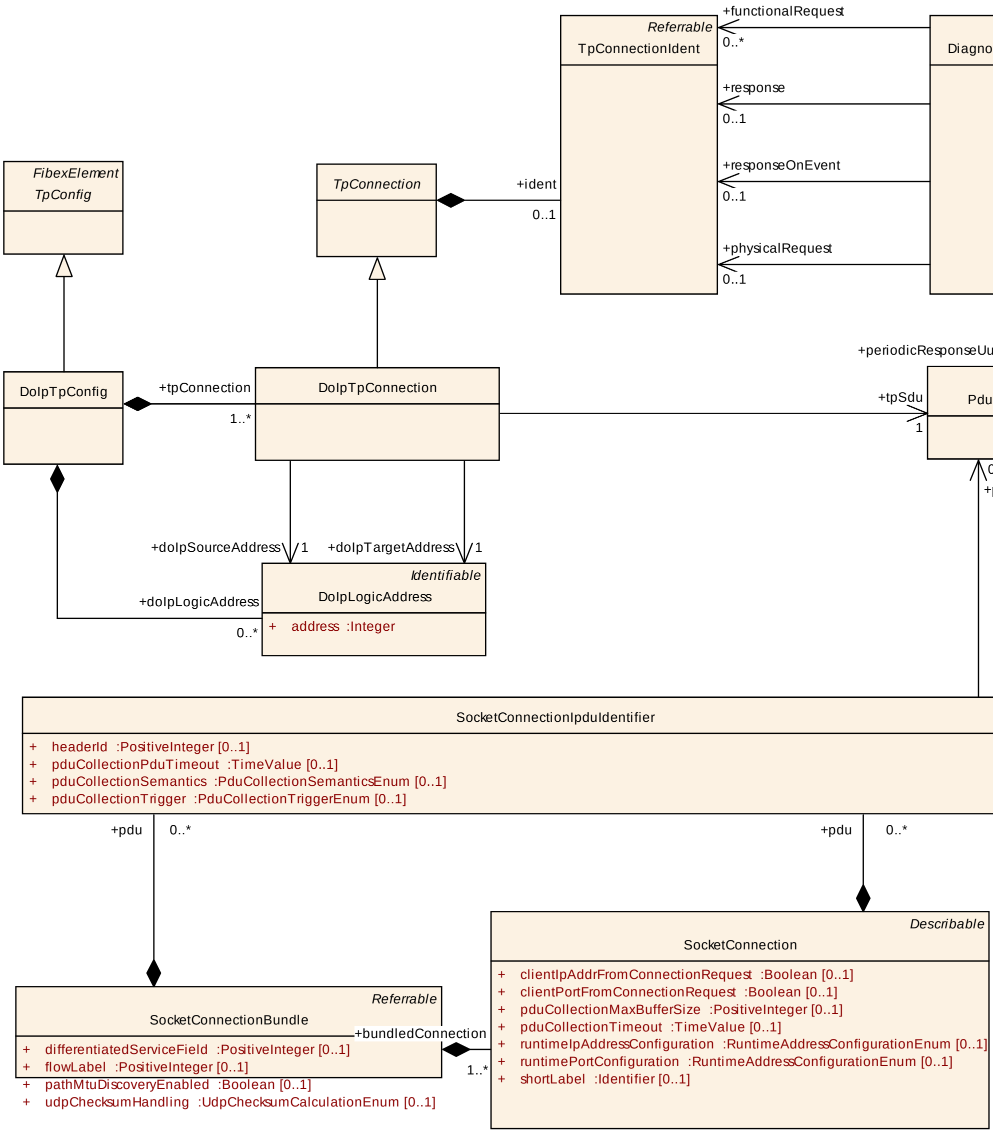


Figure 6.51: DoIP

Class	**DoIpTpConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one DoIp Configuration. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
doIpLogicAddress	DoIpLogicAddress	*	aggr	Collection of logical DoIP Addresses.
tpConnection	DoIpTpConnection	1..*	aggr	Collection of unidirectional connections between a source address and a target address.

Table 6.180: DoIpTpConfig

Class	DoIpTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
Note	A connection identifies the sender and the receiver of this particular communication. The DoIp module routes a tpSdu through this connection.			
Base	ARObject, TpConnection			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
doIpSourceAddress	DoIpLogicAddress	1	ref	Reference to the address of the sender of the tpSdu.
doIpTargetAddress	DoIpLogicAddress	1	ref	Reference to the address of the receiver of the tpSdu.
tpSdu	PduTriggering	1	ref	This reference is used to describe the data exchange between DoIp and the PduR. Only PduTriggerings of DcmIPdus shall be referenced here.

Table 6.181: DoIpTpConnection

Class	DoIpLogicAddress			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	The logical DoIP address.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
address	Integer	1	attr	The logical DoIP address.

Table 6.182: DoIpLogicAddress

[constr_3212] Limitation of DoIpTpConnection.tpSdu ⌈ DoIpTpConnection shall only reference PduTriggerings of DcmIPdus in the role tpSdu. ⌋*()*

The diagnostic data is routed from the DoIP module to SoAd and back. The communication of diagnostic data via TCP/UDP is described with SocketConnectionBundles and SocketConnections that contain SocketConnectionIpduIdentifiers with references to PduTriggerings of GeneralPurposePdus of category DoIP. Please note that there is no connection between GeneralPurposePdus of category DoIP and the DoIpTpConnection in the System Description. The DoIP module evaluates the header of an incoming GeneralPurposePdu and knows from the included information the further processing.

6.8 Transport Layer

In AUTOSAR, the Transport Layer has two main purposes: The segmentation and re-assembly of messages that are too long to fit into one frame on the underlying communication cluster, and the re-use of fixed frame identifiers for different message content.

According to the AUTOSAR Layered Software Architecture [15], each type of communication cluster has its own definition of the Transport Layer. Consequently, the peculiarities of the cluster types are addressed in the System Template by having different detailed models for FlexRay, CAN, LIN and J1939. However, all models are embedded into the communication model: They use specialized classes of TpConfig as a root element into the TP configuration.

[TPS_SYST_01099] Context of TpConfig ⌈ A TpConfig element is existing always in the context of exactly one CommunicationCluster. ⌋*(RS_SYST_00014)*

All Transport Layers will take IPdus as input elements, which will be transferred in the form of one or more NPdus. A TpConnection (FlexrayTpConnection, CanTpConnection, LinTpConnection, J1939TpConnection) identifies a connection link between different communication nodes and routes the Pdus between them.

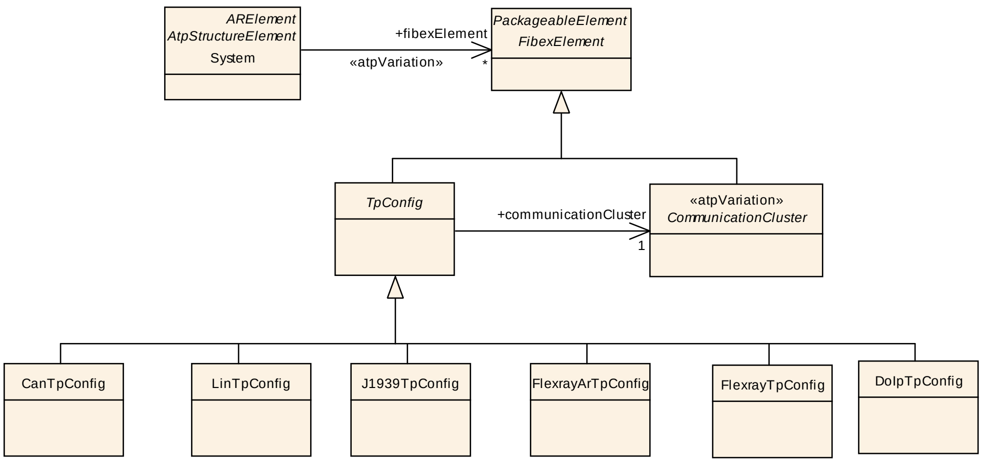


Figure 6.52: Transport Layer Overview

Examples in chapter 6.8.8 and chapter 6.8.9 illustrate the usage of the TP model.

Class	**TpConfig (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	Contains all configuration elements for AUTOSAR TP.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
communicationCluster	CommunicationCluster	1	ref	A TpConfig is existing always in the context of exactly one CommunicationCluster.

Table 6.183: TpConfig

Class	NPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	This is a Pdu of the Transport Layer. The main purpose of the TP Layer is to segment and reassemble IPdus. **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, IPdu, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.184: NPdu

Class	TpAddress			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	An ECUs TP address on the referenced channel. This represents the diagnostic Address.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
tpAddress	Integer	1	attr	An ECUs TP address on the referenced channel. This represents the diagnostic Address.

Table 6.185: TpAddress

[constr_3025] Usage of NPdus in TpConnections ⌈ In case several TpConnections use the same Frame ID for their communication needs only one NPdu element per Frame Id shall exist. This constraint applies for all supported AUTOSAR transport protocols (CanTp, LinTp, FrTp, FrArTp and J1939Tp). ⌋*()*

Note: Depending on the capabilities of the Basic Software implementations of Tp and Interface the ECU Configuration of the respective BSW Modules may utilize more communication elements (NPdus).

Example for an allowed System Template description where the same FrameId is used by two different TpConnections:

```
TpConnection1 --(dataPdu)--> NPdu1 ----> FrameId1
TpConnection1 --(flowControl)--> NPdu2 ----> FrameId2
TpConnection2 --(dataPdu)--> NPdu2 ----> FrameId2
TpConnection2 --(flowControl)--> NPdu1 ----> FrameId1
```

The following Ecu configuration with additional NPdus can still be derived from the above system description:

```
TpConnection1 --(dataPdu)--> NPdu1 ----> FrameId1
TpConnection1 --(flowControl)--> NPdu2 ----> FrameId2
TpConnection2 --(dataPdu)--> NPdu3 ----> FrameId2
TpConnection2 --(flowControl)--> NPdu4 ----> FrameId1
```

[constr_3090] TpSdu transmission on a PhysicalChannel ⌈ The IPdu that is referenced by a TpConnection in the role tpSdu shall be referenced by exactly one PduTriggering aggregated on the PhysicalChannel of the TpConnection. ⌋*()*

The corresponding PduTriggering for the IPdu referenced from the TpConnection in the role tpSdu is aggregated by the PhysicalChannel which points to the same CommunicationConnector which is referenced by TpNode that this TpConnection points to.

Please note that with [constr_3090] the multiple transmission of the same TpSdu over a specific channel using TP is only possible if several IPdus and TpConnections are created.

6.8.1 Transport Layer Routing

Pdu routing is only supported for IPdus. The transformations in the TP modules take a significant amount of time and resources.

[TPS_SYST_01100] TP routing using the same transport protocol (low-level routing) ⌈ The behavior can be optimized if source and target use the same transport protocol (e.g. CanTp-to-CanTp routing). In this case the inbound NPdu can be directly forwarded to the PduR and then sent on the outbound bus without any (resource consuming) TP module involvement. ⌋*(RS_SYST_00014)*

To support such a “low-level” TP routing in the System Template the NPdu element is a specialization of the IPdu element. This allows the PDU-routing of NPdus.

[TPS_SYST_01101] TP routing using different transport protocols ⌈ In case of a gateway between different transport protocols every incoming NPdu needs to be:

- forwarded to corresponding inbound TP module and transformed into an IPdu
- the IPdu needs to be forwarded to the PduR
- the PduR routes the IPdu to the outgoing TP module
- the outbound TP module transforms the IPdu into a NPdu which is then sent on the target bus.

⌋*(RS_SYST_00014)*

6.8.2 FlexRay ISO Transport Layer

The FlexRay ISO 10681-2 Transport Layer supports multiple sessions, i.e. multiple segmented transfers can be handled at the same time. Thus, multiple FlexrayTpConnections can be defined on the same ECU. Each FlexrayTpConnection is controlled by configuration parameters defined in FlexrayTpConnectionControl.

[TPS_SYST_01102] FlexrayTpConnectionControl reuse ⌈ The same FlexrayTpConnectionControl may be reused for an arbitrary number of FlexrayTpConnections. ⌋*(RS_SYST_00014)*

A FlexrayTpConnection defines the way of communication between a sender and a receiver and uses a FlexrayTpPduPool of NPdus to transmit data to the FlexRay Interface.

[TPS_SYST_01103] FlexrayTpConnection shall specify one txPduPool ⌈ Each FlexrayTpConnection shall specify one txPduPool with at least one nPdu. ⌋ *(RS_SYST_00014)*

In order to achieve a higher bandwidth a txPduPool may contain more than one transmit NPdu, e.g. if all referenced NPdus are transmitted in different FlexrayFrames in the same cycle.

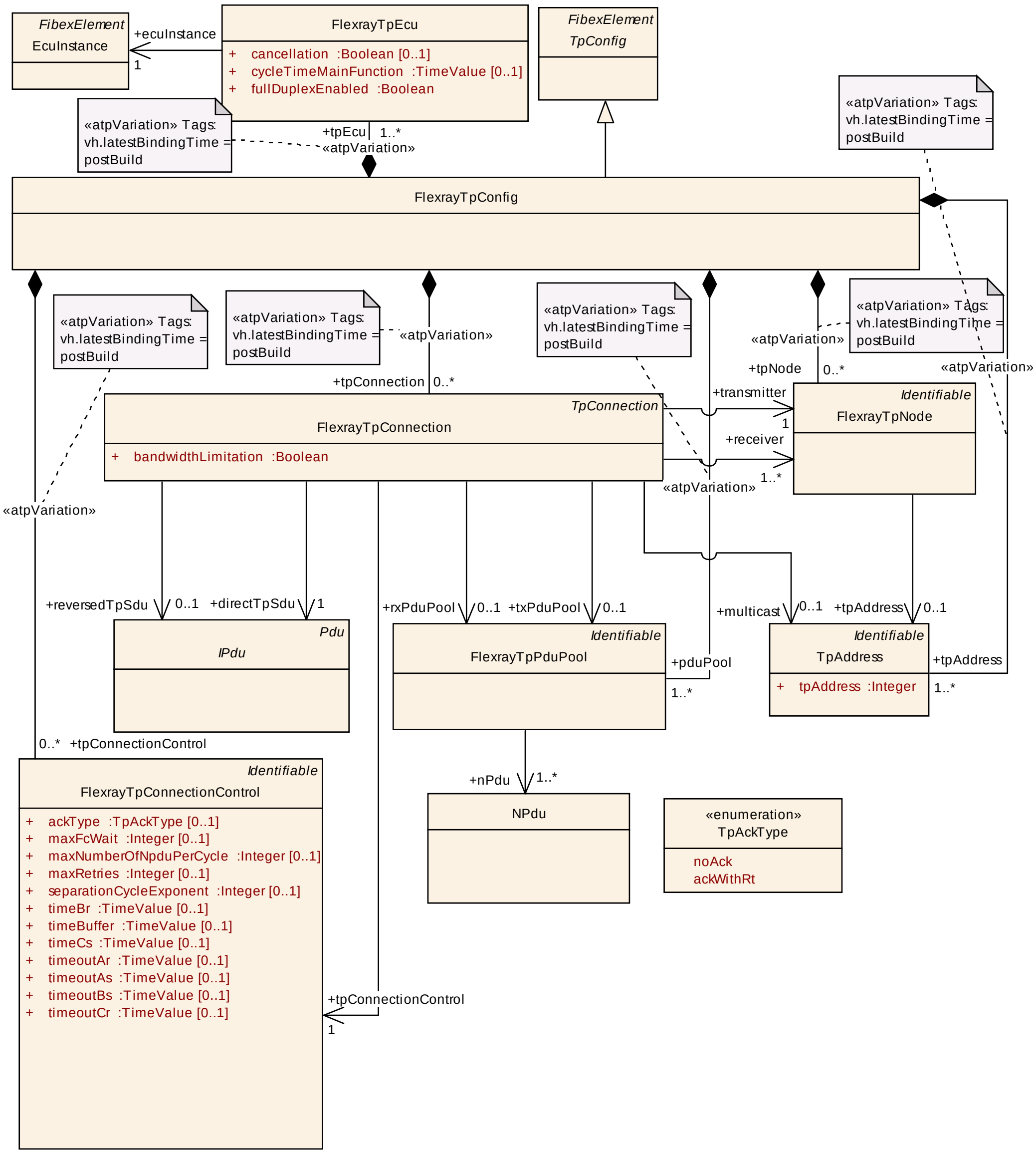


Figure 6.53: FlexRay ISO Transport Layer Configuration (TransportProtocols: FlexRayIsoTransportProtocol)

FlexrayTpConnections are specifically used for communication between one source and one or several target devices. These communication partners are specified using the transmitter and receiver associations to FlexrayTpNodes, providing the diagnostic tpAddress and the connection to the topology.

[TPS_SYST_01104] FlexrayTpConnection with several receivers ⌈ In case of several receivers a multicast tpAddress shall be used. ⌋*(RS_SYST_00014)*

The actual payload to be transported by the FlexrayTpConnection is specified by using either one or two references to IPdus, depending on whether the connection shall be used unidirectional (one reference) or bidirectional (two references).

Class	**FlexrayTpConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one FlexRay ISO TP Configuration. One FlexRayTpConfig element shall be created for each FlexRay Network in the System that uses FlexRay Iso Tp. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
pduPool	FlexrayTpPduPool	1..*	aggr	Configuration of FlexRay TP Pdu Pools. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpAddress	TpAddress	1..*	aggr	Collection of TpAddresses. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnection	FlexrayTpConnection	*	aggr	Configuration of FlexRay TP Connections. atpVariation: Derived, because TpNode can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnectionControl	FlexrayTpConnectionControl	*	aggr	Configuration of FlexRay TP Connection Controls. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpEcu	FlexrayTpEcu	1..*	aggr	Collection of TP Ecus atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Attribute	Type	Mul.	Kind	Note
tpNode	FlexrayTpNode	*	aggr	Senders and receivers of FlexRay TP messages. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.186: FlexrayTpConfig

Class	**FlexrayTpConnectionControl**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	Configuration parameters to control a FlexRay TP connection.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
ackType	TpAckType	0..1	attr	This parameter defines the type of acknowledgement which is used for the specific channel.
maxFcWait	Integer	0..1	attr	This attribute defines the maximum number of FlowControl N-PDUs with FlowState "WAIT".
maxNumberOfNpduPerCycle	Integer	0..1	attr	This parameter limits the number of N-Pdus the sender is allowed to transmit within a FlexRay cycle.
maxRetries	Integer	0..1	attr	This parameter defines the maximum number of retries (if retry is configured for the particular channel).
separationCycleExponent	Integer	0..1	attr	Exponent to calculate the minimum number of "Separation Cycles" the sender has to wait for the next transmission of an FrTp N-Pdu.
timeBr	TimeValue	0..1	attr	Time (in seconds) until transmission of the next FlowControl N-PDU.
timeBuffer	TimeValue	0..1	attr	This parameter defines the time of waiting for the next try to get a Tx or Rx buffer. This parameter is equivalent to the temporal distance between two FC.WT N-Pdus in case the buffer request returns busy. Specified in seconds.
timeCs	TimeValue	0..1	attr	Time (in seconds) until transmission of the next ConsecutiveFrame NPdu / LastFrame NPdu.
timeoutAr	TimeValue	0..1	attr	This parameter states the timeout between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF). Specified in seconds.

Attribute	Type	Mul.	Kind	Note
timeoutAs	TimeValue	0..1	attr	This attribute states the timeout between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF or FC (in case of Transmit Cancellation)). Specified in seconds.
timeoutBs	TimeValue	0..1	attr	This parameter defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.
timeoutCr	TimeValue	0..1	attr	This parameter defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.

Table 6.187: FlexrayTpConnectionControl

Class	**FlexrayTpConnection**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection identifies the sender and the receiver of this particular communication. The FlexRayTp module routes a Pdu through this connection. In a System Description the references to the PduPools are mandatory. In an ECU Extract these references can be optional: On unicast connections these references are always mandatory. On multicast the txPduPool is mandatory on the sender side. The rxPduPool is mandatory on the receiver side. On Gateway ECUs both references are mandatory.			
Base	ARObject, TpConnection			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
bandwidthLimitation	Boolean	1	attr	Specifies whether the connection requires a bandwidth limitation or not.
directTpSdu	IPdu	1	ref	Reference to the IPdu that is segmented by the Transport Protocol.
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
receiver	FlexrayTpNode	1..*	ref	The target of the TP connection.
reversedTpSdu	IPdu	0..1	ref	Reference to the IPdu that is segmented by the Transport Protocol. If support of both sending and receiving is used, this association references the IPdu used for the additional second direction.

Attribute	Type	Mul.	Kind	Note
rxPduPool	FlexrayTpPduPool	0..1	ref	A connection has a reference to a set of NPdus (FrTpRxPduPool) which are defined for receiving data via this particular connection. The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the rxPduPool holds the actually received NPdus. In case this connection is applied to the receiver the rxPduPool holds the actually sent NPdus.
tpConnectionControl	FlexrayTpConnectionControl	1	ref	Reference to the connection control.
transmitter	FlexrayTpNode	1	ref	The source of the TP connection.
txPduPool	FlexrayTpPduPool	0..1	ref	A connection has a reference to a set of NPdus (FrTpTxPduPool) which are defined for sending data via this particular connection. The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the txPduPool holds the actually sent NPdus. In case this connection is applied to the receiver the txPduPool holds the actually received NPdus.

Table 6.188: FlexrayTpConnection

The `FlexrayTpConnection` refers to the `FlexrayTpPduPool` in two roles: `rxPduPool` and `txPduPool`.

[TPS_SYST_01064] Transmit/Receive Semantics of Pdu Pools ⌈ The transmit/receive semantics of Pdu Pools depends on the role of the regarded ECU:

- If the ECU is the transmitter then the `txPduPool` holds the sent `NPdu`s and the `rxPduPool` holds the received `NPdu`s.
- If the ECU is the receiver then the the `txPduPool` holds the received `NPdu`s and the `rxPduPool` holds the sent `NPdu`s.

⌋*()*

The following example shows how this differentiation may be used:

System Description:
SENDER = A
RECEIVER = B
TxPool = PDU_1
RxPool = PDU_2

ECU Extract of A:
SENDER = A
TxPool = PDU_1 -> sent Pdus

RxPool = PDU_2 -> received Pdus

Since on receiver side the PDU_1 is received and PDU_2 is sent (from a local point of view) the export shall look like this:
ECU Extract of B:
RECEIVER = B
TxPool = PDU_1 -> received Pdus
RxPool = PDU_2 -> sent Pdus

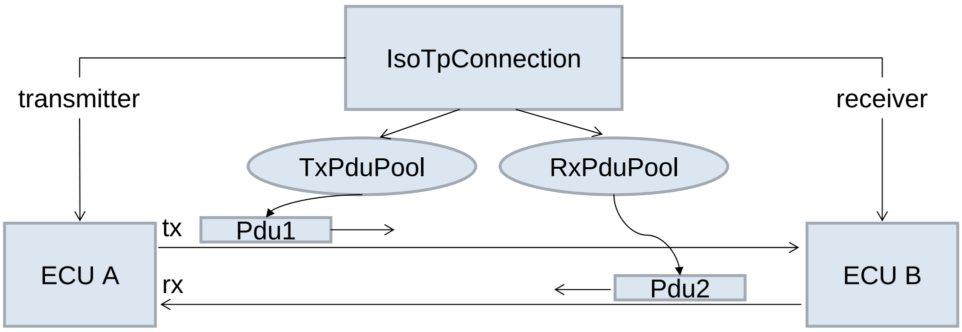


Figure 6.54: IsoTp Example

Class	**FlexrayTpPduPool**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	FlexrayTpPduPool is a set of N-PDUs which are defined for FrTp sending or receiving purpose.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
nPdu	NPdu	1..*	ref	Reference to NPdus that are part of the PduPool.

Table 6.189: FlexrayTpPduPool

Class	**FlexrayTpNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
connector	Communication Connector	*	ref	Asscociation to one or more physical connectors (max number of connectors for FlexRay: 2). In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

Attribute	Type	Mul.	Kind	Note

Table 6.190: FlexrayTpNode

Class	FlexrayTpEcu			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	ECU specific TP configuration parameters. Each TpEcu element has a reference to exactly one ECUInstance in the topology.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
cancellation	Boolean	0..1	attr	With this switch Tx and Rx Cancellation can be turned on or off.
cycleTimeMainFunction	TimeValue	0..1	attr	The period between successive calls to the Main Function of the AUTOSAR TP. Specified in seconds.
ecuInstance	EcuInstance	1	ref	Connection to the ECUInstance in the Topology
fullDuplexEnabled	Boolean	1	attr	The full duplex mechanisms is enabled if this attribute is set to true. Otherwise half duplex is enabled.

Table 6.191: FlexrayTpEcu

6.8.3 FlexRay AUTOSAR Transport Layer

This section describes a Non-ISO FlexRay TP protocol that is supported by AUTOSAR in addition to the FlexRay ISO 10681-2 TP (see section 6.8.2). The Non-ISO FlexRay Transport Layer supports multiple sessions, i.e. multiple segmented transfers can be handled at the same time.

A FlexrayArTpChannel provides a Tx and an Rx pool of NPdus which are used by the associated FlexrayArTpConnections.

FlexrayArTpConnections are used for communication between one source and one or more target device(s). These communication partners are specified by the source and target associations to FlexrayArTpNodes, providing the diagnostic TpAddresses and the connection to the topology description. The actual payload to be transported by the FlexrayArTpConnection is identified by the references directTpSdu and reversedTpSdu to IPdus. When one of the two SDUs is omitted, the connection shall be used unidirectional.

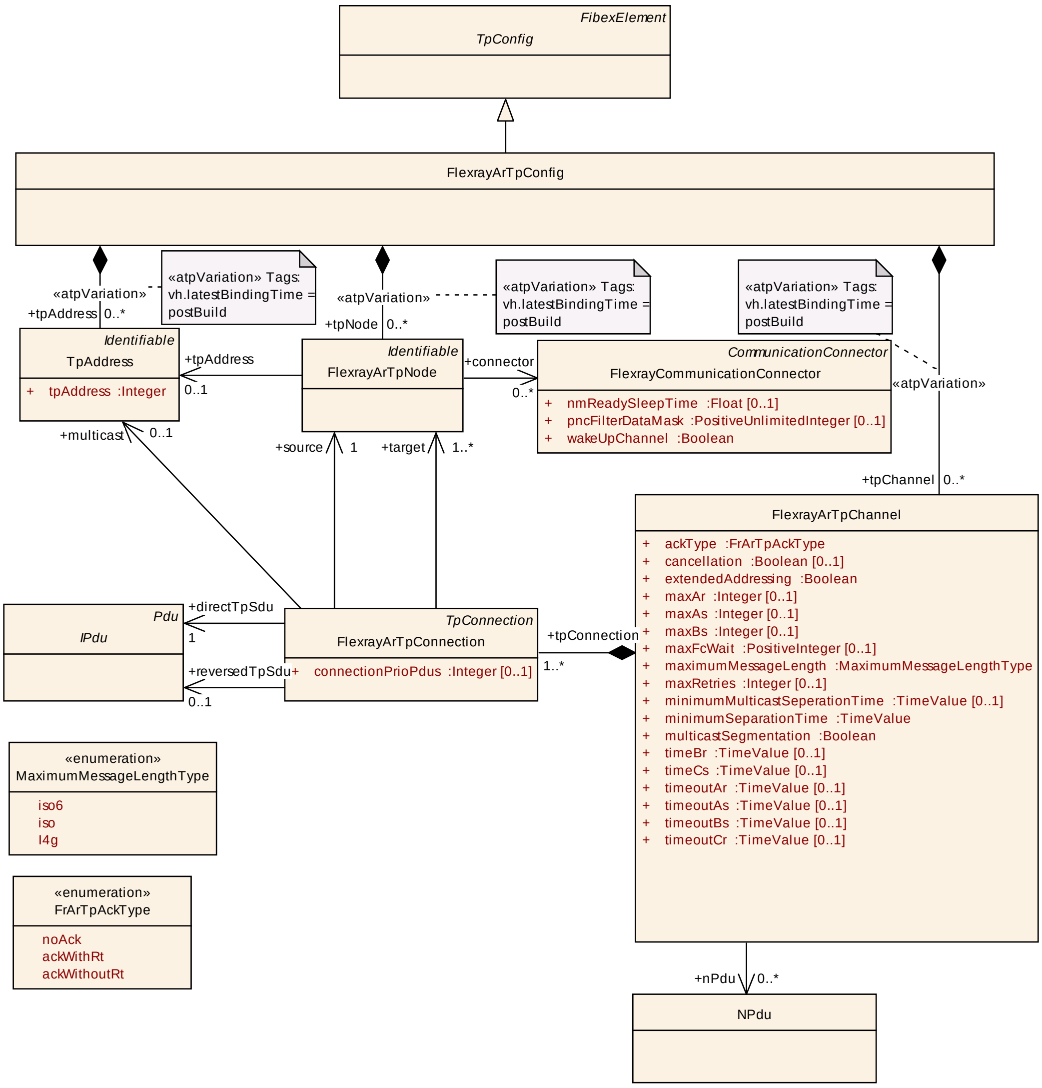


Figure 6.55: FlexRay Autosar Transport Layer Configuration (TransportProtocols: FlexRayAutosarTransportProtocol)

Class	FlexrayArTpConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one FlexRay Autosar TP Configuration. One FlexrayArTpConfig element shall be created for each FlexRay Network in the System that uses FlexRay Autosar TP. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
tpAddress	TpAddress	*	aggr	Collection of TpAddresses. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpChannel	FlexrayArTpChannel	*	aggr	Configuration of FlexRay Autosar Transport Protocol channels. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpNode	FlexrayArTpNode	*	aggr	Senders and receivers of TP messages. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.192: FlexrayArTpConfig

Class	FlexrayArTpChannel			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A channel is a group of connections sharing several properties. The FlexRay AutosarTransport Layer supports several channels. These channels can work concurrently, thus each of them requires its own state machine and management data structures and its own PDU-IDs.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ackType	FrArTpAckType	1	attr	Type of Acknowledgement.
cancellation	Boolean	0..1	attr	With this switch Tx and Rx Cancellation can be turned on or off.
extendedAddressing	Boolean	1	attr	Adressing Type of this connection: true: Two Bytes false: One Byte
maxAr	Integer	0..1	attr	This attribute defines the maximum number of trying to send a frame when a TIMEOUT AR occurs (depending on whether retry is configured).
maxAs	Integer	0..1	attr	This attribute defines the maximum number of trying to send a frame when a TIMEOUT AS occurs (depending on whether retry is configured).
maxBs	Integer	0..1	attr	This attribute defines the number of consecutive CFs between two FCs (block size). Valid values are 1 .. 16 when retry is activated, and 0 .. 255 otherwise.

Attribute	***Type***	***Mul.***	***Kind***	***Note***
maxFcWait	PositiveInteger	0..1	attr	This attribute defines the maximal number of wait frames to be sent for a pending connection. Range is 0..255.
maxRetries	Integer	0..1	attr	This attribute defines the maximum number of retries (if retry is configured for the particular channel).
maximumMessageLength	MaximumMessageLengthType	1	attr	This specifies the maximum message length for the particular channel.
minimumMulticastSeparationTime	TimeValue	0..1	attr	This attribute defines the minimum amount of time between two succeeding CFs of a 1:n segmented transmission in seconds. Valid values are 0, 100μs, 200μs ... 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. minimumMulticastSeparationTime must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. minimumMulticastSeparationTime = n * cycle * m, where n is an integer >= 0, cycle is FlexrayCluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrTp, minimumMulticastSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle. Range: 0 .. 0.127
minimumSeparationTime	TimeValue	1	attr	This attribute defines the minimum amount of time between two succeeding CFs of a 1:1 segmented transmission in seconds. Valid values are 0, 100μs, 200μs .. 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. The minimumSeparationTime must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. minimumSeparationTime = n * cycle * m, where n is an integer >=0, cycle is FlexrayCluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrTp, minimumSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle. Range: 0 .. 0.127

Attribute	Type	Mul.	Kind	Note
multicastSegmentation	Boolean	1	attr	This attribute defines whether segmentation within a 1:n connection is allowed or not.
nPdu	NPdu	*	ref	A FlexRayTpChannel references a set of NPdus. These NPdus are logically assembled into a pool of Rx NPdus and another pool of Tx NPdus. It must be ensured that a second channel either references all NPdus of such a pool, or none.
timeBr	TimeValue	0..1	attr	This attribute defines the time in seconds between receiving the last CF of a block or an FF-x (or SF-x) and sending out an FC or AF.
timeCs	TimeValue	0..1	attr	This attribute defines the time in seconds between the sending of two consecutive frames or between a consecutive frame and a flow control (for Transmit Cancellation) or between reception of an flow control or Acknowledgement Frame and sending of the next consecutive frame or a flow control (for Transmit Cancellation).
timeoutAr	TimeValue	0..1	attr	This attribute states the timeout in seconds between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF).
timeoutAs	TimeValue	0..1	attr	This attribute states the timeout in seconds between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF).
timeoutBs	TimeValue	0..1	attr	This attribute defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.
timeoutCr	TimeValue	0..1	attr	This attribute defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side.
tpConnection	FlexrayArTpConnection	1..*	aggr	Group of connections that can be used in this channel.

Table 6.193: FlexrayArTpChannel

Class	**FlexrayArTpNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

Attribute	Type	Mul.	Kind	Note
connector	FlexrayCommunicationConnector	*	ref	Association to one or more physical connectors (max number of connectors for FlexRay: 2). In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

Table 6.194: FlexrayArTpNode

Class	FlexrayArTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection within a channel identifies the sender and the receiver of this particular communication. The FlexRay Autosar Tp module routes a Pdu through this connection.			
Base	ARObject, TpConnection			
Attribute	Type	Mul.	Kind	Note
connectionPrioPdus	Integer	0..1	attr	This parameter defines the number of PDUs that shall be reserved for this connection when it is active. The range is 1-255.
directTpSdu	IPdu	1	ref	Reference to the IPdu that is segmented by the Transport Protocol. The source address of the transmitted NPdu is determined by the configured source CommunicationConnector. The target address of the transmitted NPdu is determined by the configured target CommunicationConnector.
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
reversedTpSdu	IPdu	0..1	ref	Reference to the IPdu that is segmented by the Transport Protocol. If support of both sending and receiving is used, this association references the IPdu used for the additional second direction. The source address of the transmitted NPdu is determined by the configured target CommunicationConnector. The target address of the transmitted NPdu is determined by the configured source CommunicationConnector.
source	FlexrayArTpNode	1	ref	The source of the TP connection.
target	FlexrayArTpNode	1..*	ref	The target of the TP connection.

Table 6.195: FlexrayArTpConnection

Enumeration	**FrArTpAckType**
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	Type of Acknowledgement.
Literal	***Description***
ackWithRt	Acknowledgement with retry. **Tags:** atp.EnumerationValue=1
ackWithoutRt	Acknowledgement without retry. **Tags:** atp.EnumerationValue=0
noAck	No acknowledgement. **Tags:** atp.EnumerationValue=2

Table 6.196: FrArTpAckType

Enumeration	**MaximumMessageLengthType**
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	Type of Acknowledgement.
Literal	***Description***
I4g	SF-E allowed (SF of arbitrary length depending on FrTpPduLength), up to (2**32)-1 byte message length (all FF-x allowed). **Tags:** atp.EnumerationValue=0
iso	Up to (2**12)-1 Byte message length (No FF-Ex or SF-E or AF shall be used and recognized). **Tags:** atp.EnumerationValue=1
iso6	As ISO, but the maximum payload length is limited to 6 byte (SF-I, FF-I, CF). This is necessary to route TP on CAN when using Extended Addressing or Mixed Addressing on CAN. **Tags:** atp.EnumerationValue=2

Table 6.197: MaximumMessageLengthType

6.8.4 CAN Transport Layer

The CAN Transport Layer supports multiple sessions by means of CanTpChannels: Each CanTpChannel uses its own resources, such as internal buffer, timer, state machine and thus can operate independently and simultaneously to other CanTpChannels. The same session can be reused for an arbitrary number of CanTpConnections.

Each CanTpConnection uses its own pair of NPdus: One NPdu, the dataPdu is mandatory for each CanTpConnection, the flowControlPdu is optional depending whether only Single Frames are transferred over the connection.

A CanTpConnection is specifically used for communication between source and target devices. These communication partners are specified using the transmitter and receiver associations to CanTpNode, providing the diagnostic tpAddress and the connection to the topology.

[TPS_SYST_01146] Generic CanTpConnections ⌈ If the transmitter or the receiver of a CanTpConnection is not specified then the CanTpConnection is a generic one (address information is not determined). ⌋*()*

[TPS_SYST_01105] CanTpConnection with several receivers ⌈ In case of several receivers a multicast tpAddress shall be used. ⌋*(RS_SYST_00014)*

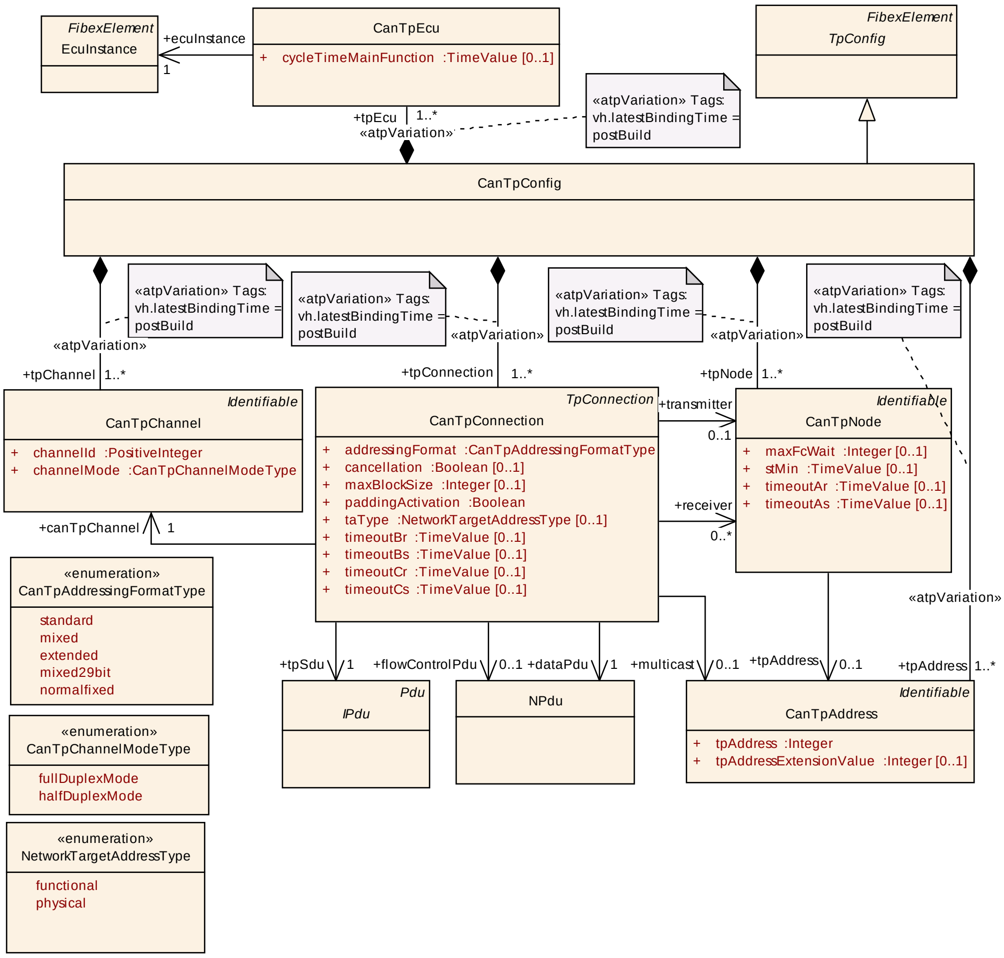


Figure 6.56: CAN Transport Layer Configuration (TransportProtocols: CanTransportProtocol)

The actual payload to be transported by the `CanTpConnection` is specified by the reference `tpSdu` to `IPdu`.

The `N_TAtype` communication models as defined in ISO 15765-2 [23] can be expressed using a combination of the attributes `addressingFormat` (`CanTpAddressingFormatType`) and `taType` (`NetworkTargetAddressType`).

Class	**CanTpConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one CAN TP Configuration. One CanTpConfig element shall be created for each CAN Network in the System. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
tpAddress	CanTpAddress	1..*	aggr	Collection of TP Adresses. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpChannel	CanTpChannel	1..*	aggr	Configuration of CAN TP channels. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnection	CanTpConnection	1..*	aggr	Senders and receivers of CAN TP messages. atpVariation: Derived, because TpNode can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpEcu	CanTpEcu	1..*	aggr	Collection of TP Ecus atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpNode	CanTpNode	1..*	aggr	Senders and receivers of Can TP messages. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.198: CanTpConfig

Class	CanTpChannel			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	Configuration parameters of the CanTp channel.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
channelId	PositiveInteger	1	attr	The id of the channel. The value shall be unique for each channel.
channelMode	CanTpChannelModeType	1	attr	The CAN Transport Layer supports half and full duplex channel modes.

Table 6.199: CanTpChannel

Enumeration	CanTpChannelModeType
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	The CAN Transport Layer supports half and full duplex channel modes.
Literal	Description
fullDuplexMode	full duplex channel mode **Tags:** atp.EnumerationValue=0
halfDuplexMode	half duplex channel mode **Tags:** atp.EnumerationValue=1

Table 6.200: CanTpChannelModeType

Class	CanTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection identifies the sender and the receiver of this particular communication. The CanTp module routes a Pdu through this connection. atpVariation: Derived, because TpNode can vary.			
Base	ARObject, TpConnection			
Attribute	Type	Mul.	Kind	Note
addressingFormat	CanTpAddressingFormatType	1	attr	Declares which communication addressing mode is supported.
canTpChannel	CanTpChannel	1	ref	Reference to the CanTpChannel on which this CanTpConnection is realized.
cancellation	Boolean	0..1	attr	With this switch Tx Cancellation can be turned on or off. Please note that the Rx Cancellation is always enabled.
dataPdu	NPdu	1	ref	Reference to an Data NPdu.
flowControlPdu	NPdu	0..1	ref	Reference to the Flow Control NPdu.

Attribute	Type	Mul.	Kind	Note
maxBlockSize	Integer	0..1	attr	The maximum number of N-PDUs the CanTp receiver allows the sender to send, before waiting for an authorization to continue transmission of the following N-PDUs. For further details on this parameter value see ISO 15765-2 specification. Note: For reasons of buffer length, the CAN Transport Layer can adapt the BS value within the limit of this maximum BS
multicast	CanTpAddress	0..1	ref	TP address for 1:n connections.
paddingActivation	Boolean	1	attr	This specifies wheter or not Sfs, FCs and the last CF shall be padded to 8 bytes length in case it contains less payload. true: The N-PDU received uses padding for SF, FC and the last CF. (N-PDU length is always 8 bytes) false: The N-PDU received does not use padding for SF, CF and the last CF. (N-PDU length is dynamic)
receiver	CanTpNode	*	ref	The target of the TP connection.
taType	NetworkTargetAddressType	0..1	attr	Network Target Address type.
timeoutBr	TimeValue	0..1	attr	Value in seconds of the performance requirement for (N_Br + N_Ar). N_Br is the elapsed time between the receiving indication of a FF or CF or the transmit confirmation of a FC, until the transmit request of the next FC.
timeoutBs	TimeValue	0..1	attr	This parameter defines the timout for waiting for an FC or AF on the sender side in an 1:1 connection. Specified in seconds.
timeoutCr	TimeValue	0..1	attr	This parameter defines the timeout value for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.
timeoutCs	TimeValue	0..1	attr	The attribute timeoutCs represents the time (in seconds) which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.
tpSdu	IPdu	1	ref	Reference to an IPdu that is segmented by the Transport Protocol.
transmitter	CanTpNode	0..1	ref	The source of the TP connection.

Table 6.201: CanTpConnection

Enumeration	**CanTpAddressingFormatType**
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	Declares which communication addressing mode is supported.
Literal	**Description**
extended	To use extended addressing format. **Tags:** atp.EnumerationValue=0
mixed	To use mixed 11bit addressing format. **Tags:** atp.EnumerationValue=1
mixed29bit	To use mixed 29bit addressing format **Tags:** atp.EnumerationValue=2
normalfixed	To use normal fixed addressing format **Tags:** atp.EnumerationValue=3
standard	To use normal addressing format. **Tags:** atp.EnumerationValue=4

Table 6.202: CanTpAddressingFormatType

Class	**CanTpAddress**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	An ECUs TP address on the referenced channel. This represents the diagnostic Address.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
tpAddress	Integer	1	attr	An ECUs TP address on the referenced channel. This represents the diagnostic Address.
tpAddressExtensionValue	Integer	0..1	attr	If the mixed addressing format is used, this parameter contains the transport protocol address extension value.

Table 6.203: CanTpAddress

Class	**CanTpEcu**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	ECU specific TP configuration parameters. Each TpEcu element has a reference to exactly one ECUInstance in the topology.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
cycleTimeMainFunction	TimeValue	0..1	attr	The period between successive calls to the Main Function of the AUTOSAR TP. Specified in seconds.
ecuInstance	EcuInstance	1	ref	Connection to the ECUInstance in the Topology

Table 6.204: CanTpEcu

Class	**CanTpNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
connector	CommunicationConnector	0..1	ref	Asscociation to a CommunicationConnector in the topology description. In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
maxFcWait	Integer	0..1	attr	This attribute defines the maximum number of flow control PDUs that can be consecutively be transmitted by a receiver.
stMin	TimeValue	0..1	attr	Sets the duration of the minimum time the CanTp sender shall wait between the transmissions of two CF N-PDUs.
timeoutAr	TimeValue	0..1	attr	This attribute states the timeout between the PDU transmit request of the Transport Layer to the Can Interface and the corresponding confirmation of the Can Interface on the receiver side (for FC or AF). Specified in seconds.
timeoutAs	TimeValue	0..1	attr	This attribute states the timeout between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the Can Interface and the corresponding confirmation of the Can Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF or FC (in case of Transmit Cancellation)). Specified in seconds.
tpAddress	CanTpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

Table 6.205: CanTpNode

Enumeration	**NetworkTargetAddressType**
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols
Note	Network Target Address type (see ISO 15765-2).
Literal	**Description**
functional	Functional request type **Tags:** atp.EnumerationValue=0
physical	Physical request type **Tags:** atp.EnumerationValue=2

Table 6.206: NetworkTargetAddressType

6.8.5 LIN Transport Layer

LinTpConnection is used for modeling communication resources required for using the LIN Transport Layer. Contrary to the FlexRay and CAN Transport Layers, LIN TP only supports one session per PhysicalChannel.

An arbitrary number of LinTpConnections per LinTpConfig can be defined since the transmission of data from master to slave, using the MasterRequest frame, and the transmission of data from slave to master, using the SlaveResponse frame, needs to be described per NAD the LinMaster uses to address one or more of its LinSlaves.

LinTpConnection uses the dataPdu reference for specifying exactly one NPdu which is to be used for transmitting the data, and it optionally references a flowControl NPdu in order to handle Flow Control Frames if required.

One LinTpConnection is specifically used for communication between one source and one or several target devices. These communication partners are specified using the transmitter and receiver associations to LinTpNode, providing the diagnostic tpAddress and the connection to the topology. In case of several receivers a multicast tpAddress shall be used.

The actual payload to be transported by the LinTpConnection is specified by the reference linTpNSdu to IPdu.

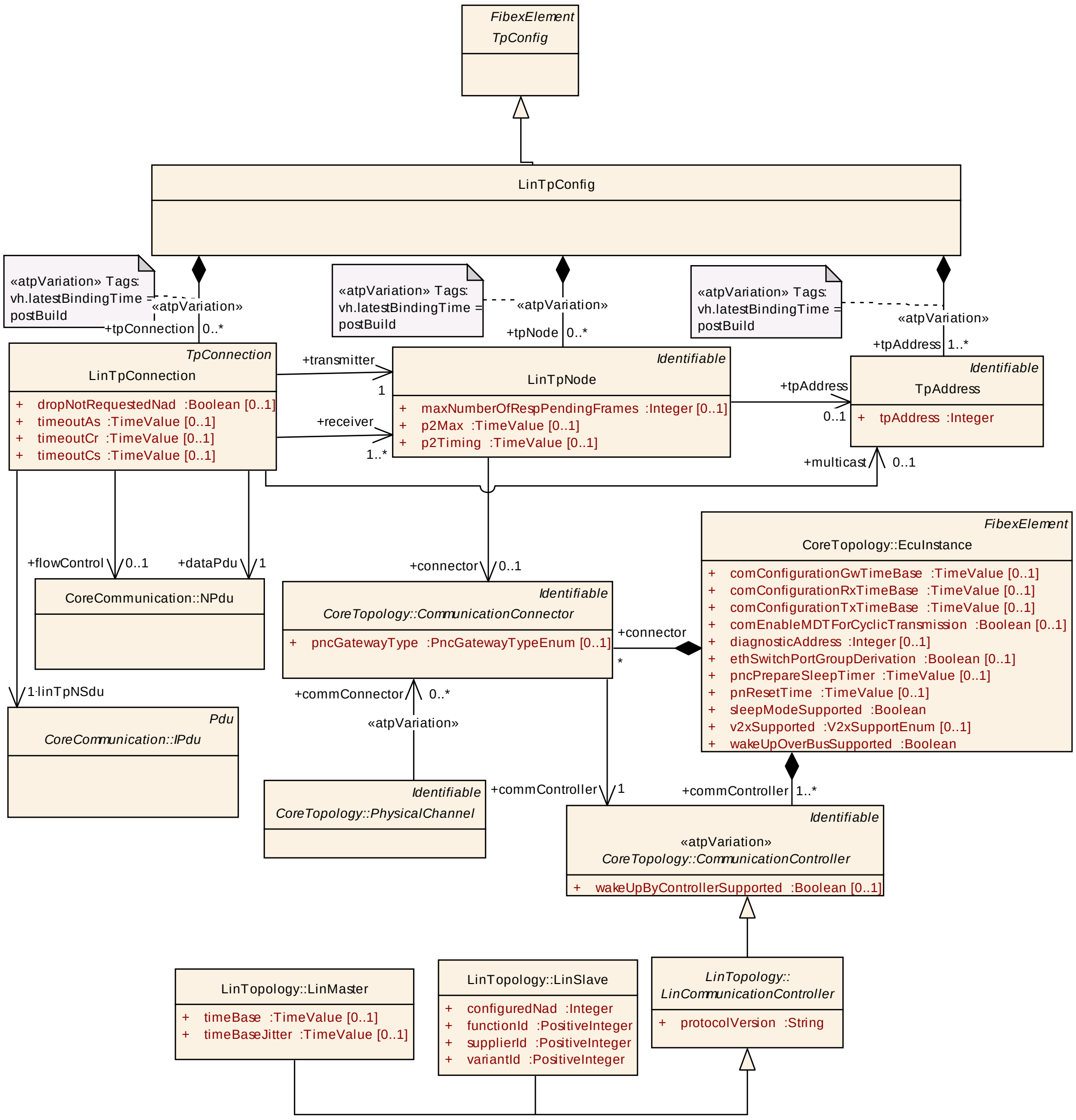


Figure 6.57: LIN Transport Layer Configuration

Class	LinTpConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one Lin TP Configuration. One LinTpConfig element shall be created for each Lin Network in the System. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	Type	Mul.	Kind	Note
tpAddress	TpAddress	1..*	aggr	Collection of TpAddresses. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnection	LinTpConnection	*	aggr	Configuration of LIN TP channels. atpVariation: Derived, because TpNode can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpNode	LinTpNode	*	aggr	Senders and receivers of LIN TP messages. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.207: LinTpConfig

Class	LinTpNode			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
connector	CommunicationConnector	0..1	ref	Asscociation to a CommunicationConnector in the topology description. In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
maxNumberOfRespPendingFrames	Integer	0..1	attr	Configures the maximum number of allowed response pending frames.

Attribute	Type	Mul.	Kind	Note
p2Max	TimeValue	0..1	attr	After reception of a response pending frame the P2 timeout counter is reloaded with the timeout time P2max.
p2Timing	TimeValue	0..1	attr	P2 timeout observation parameter.
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

Table 6.208: LinTpNode

Class	LinTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A LinTP channel represents an internal path for the transmission or reception of a Pdu via LinTp and describes the the sender and the receiver of this particular communication. LinTp supports (per Lin Cluster) the configuration of one Rx Tp-SDU and one Tx Tp-SDU per NAD the LinMaster uses to address one or more of its Lin Slaves. To support this an arbitrary number of LinTpConnections shall be described.			
Base	ARObject, TpConnection			
Attribute	Type	Mul.	Kind	Note
dataPdu	NPdu	1	ref	Reference to an NPdu (Single Frame, First Frame or Consecutive Frame). The Single Frame network protocol data unit (SF N_PDU) shall be sent out by the sending network entity and can be received by one or multiple receiving network entities. The Single Frame (SF N_PDU) shall be sent out to transfer a service data unit that can be transferred via a single service request to the data link layer. This network protocol data unit shall be sent to transfer unsegmented messages. The First Frame network protocol data unit (FF N_PDU) identifies the first network protocol data unit (N_PDU) of a segmented message transmitted by a network sending entity and received by a receiving network entity. The Consecutive Frame network protocol data unit (CF N_PDU) transfers segments (N_Data) of the service data unit message data (<MessageData>). All network protocol data units (N_PDUs) transmitted by the sending entity after the First Frame network protocol data unit (FF N_PDU) shall be encoded as Consecutive Frames network protocol data units (CF N_PDUs).
dropNotRequestedNad	Boolean	0..1	attr	Configures if TP Frames of not requested LIN-Slaves are dropped or not.

Attribute	Type	Mul.	Kind	Note
flowControl	NPdu	0..1	ref	Reference to the Flow Control NPdu. The Flow Control network protocol data unit (FC N_PDU) is identified by the Flow Control protocol control information (FC N_PCI). The Flow Control network protocol data unit (FC N_PDU) instructs a sending network entity to start, stop or resume transmission of CF N_PDUs. The Flow Control network protocol data unit shall be sent by the receiving network layer entity to the sending network layer entity, when ready to receive more data, after correct reception of: a) First Frame network protocol data unit (FF N_PDU) b) the last Consecutive Frame network protocol data unit (CF N_PDU) of a block of Consecutive Frames (CF N_PDU) if further Consecutive Frame network protocol data unit (CF N_PDU) need(s) to be sent.
linTpNSdu	IPdu	1	ref	Reference to the IPdu that is segmented by the Transport Protocol.
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
receiver	LinTpNode	1..*	ref	The target of the TP connection.
timeoutAs	TimeValue	0..1	attr	Time for transmission of the LIN frame (any N-PDU) on the sender side. Specified in seconds.
timeoutCr	TimeValue	0..1	attr	This attribute defines the timeout value for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.
timeoutCs	TimeValue	0..1	attr	The attribute timeoutCs represents the time (in seconds) which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.
transmitter	LinTpNode	1	ref	The source of the TP connection.

Table 6.209: LinTpConnection

6.8.6 SOME/IP segmenter

On the transmission side SOME/IP TP segments an incoming SOME/IP IPdu that does not fit into a single UDP Package into smaller GeneralPurposeIPdus with category SOMEIP_SEGMENTED_IPDU and allows to transport SOME/IP messages over UDP that are greater than 128KB. On the reception side the large IPdu is reassembled again. The Message Type field of the SOME/IP header contains a bit, which marks the SOME/IP message as a segment of an original SOME/IP message. Every segmented SOME/IP message adds SOME/IP TP specific fields to the SOME/IP header. These fields contain control information for the segmentation and the reassembly of original, large SOME/IP messages.

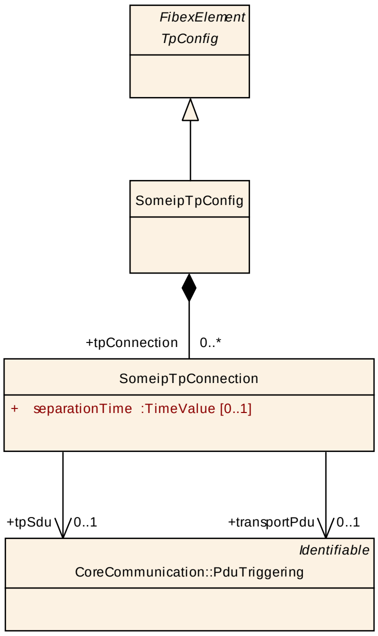


Figure 6.58: SOME/IP Segmenter

Class	**SomeipTpConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one SOME/IP TP Configuration. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
tpConnection	SomeipTpConnection	*	aggr	Senders and receivers of SOME/IP TP messages.

Table 6.210: SomeipTpConfig

Class	SomeipTpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection identifies the sender and the receiver of this particular communication. The SOME/IP TP module routes a Pdu through this connection.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
separationTime	TimeValue	0..1	attr	Sets the duration of the minimum time in seconds the SOME/IP TP module shall wait between the transmissions of NPdus.
tpSdu	PduTriggering	0..1	ref	Reference to an IPdu that is segmented by the Transport Protocol.
transportPdu	PduTriggering	0..1	ref	Reference to the segmented IPdu.

Table 6.211: SomeipTpConnection

[constr_3328] SomeipTpConnection.transportPdu reference restriction ⌈ A PduTriggering that is referenced by a SomeipTpConnection in the role transportPdu shall reference a GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU in the role iPdu. ⌋*()*

[constr_3329] SomeipTpConnection.tpSdu reference restriction ⌈ A PduTriggering that is referenced by a SomeipTpConnection in the role tpSdu shall reference an IPdu in the role iPdu. ⌋*()*

[TPS_SYST_02156] Length of GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU ⌈ The length of GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU that is referenced by a PduTriggering in the role iPdu that in turn is referenced by a SomeipTpConnection in the role transportPdu defines the maximum size in bytes of a segment. ⌋*(RS_SYST_00050, RS_SYST_00039, RS_SYST_00014)*

Please note that the length of a GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU covers 8 bytes of the SOME/IP header, 4 bytes of the TP header, and the segment itself.

[constr_3330] Same transportPdu shall not be used in different SomeipTpConnections ⌈ A PduTriggering that is referencing a GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU in the role iPdu shall be referenced at most once by a SomeipTpConnection in the role transportPdu. ⌋*()*

6.8.7 SAE J1939 Transport Layer

There are two transport protocol variants defined by J1939: BAM (Broadcast Announce Message), which is a broadcast protocol that does not use any flow control, and CMDT (Connection Mode Data Transfer), which is a point-to-point protocol with flow control and acknowledgment.

BAM uses two NPdus for transport, TP.CM (Transport Protocol Command, flowControlPdu) and TP.DT (Transport Protocol Data, dataPdu). CMDT uses three NPdus, because an additional TP.CM (flowControlPdu) in reverse direction is needed for flow control. The length of TP.CM and TP.DT NPdus is fixed to 8 bytes.

[TPS_SYST_01106] Usage of additional directPdu in case of variable length sdu
⌈ In case of variable length sdu (with system signals of variable length) an additional directPdu is required:

- it is used if the current length of this sdu is up to 8 bytes.
- if the current length of this sdu is higher than 8 bytes the sdu will be transported via the dataPdu.

⌋*(RS_SYST_00014, RS_SYST_00038)*

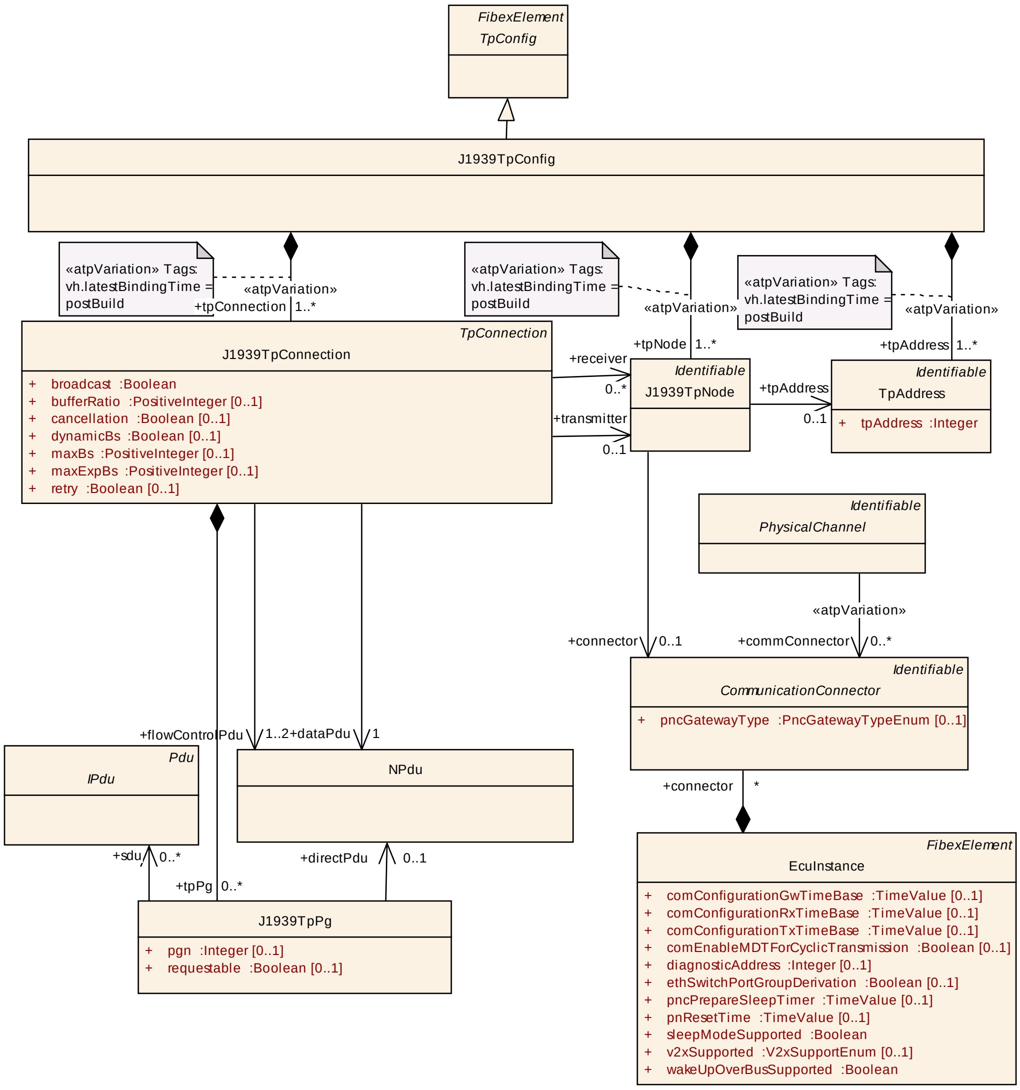


Figure 6.59: J1939 Transport Layer Configuration

A `J1939TpConnection` is specifically used for communication between source and target devices. These communication partners are specified using the `transmitter` and `receiver` associations to `J1939TpNode`, providing the diagnostic `tpAddress` and the connection to the topology. BAM (Broadcast Announce Message), is always directed at the target address 0xff, so there is no target address reference necessary for the broadcast situation.

The Parameter Group (PG) to be transported by the `J1939TpConnection` is specified by the `tpPg` aggregation.

[TPS_SYST_01147] Generic `J1939TpConnections` ⌈ If the `transmitter` or the `receiver` of a `J1939TpConnection` is not specified then the `J1939TpConnection` is a generic one (address information is not determined). ⌋*()*

Class	J1939TpConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one J1939 TP Configuration. One J1939TpConfig element shall be created for each J1939 Network in the System. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
tpAddress	TpAddress	1..*	aggr	Collection of TP Adresses. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnection	J1939TpConnection	1..*	aggr	Configuration of J1939 TP connections. atpVariation: Derived, because TpNode can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpNode	J1939TpNode	1..*	aggr	Senders and receivers of J1939 TP messages. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 6.212: J1939TpConfig

Class	J1939TpConnection			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A J1939TpConnection represents an internal path for the transmission or reception of a Pdu via J1939Tp and describes the the sender and the receiver of this particular communication. The J1939Tp module routes a Pdu (J1939 PGN) through the connection.			
Base	ARObject, TpConnection			
Attribute	Type	Mul.	Kind	Note
broadcast	Boolean	1	attr	BAM (Broadcast Announce Message) is a broadcast protocol. If this attribute is set to true broadcast is used. Since address FF is the only broadcast address, there's no reason to configure it.
bufferRatio	PositiveInteger	0..1	attr	Defines usage of available data for dynamic block size calculation when protocol retry is enabled. This attribute describes in percent of available buffer that shall be used for retry.
cancellation	Boolean	0..1	attr	Enable support for Tx/Rx cancellation.
dataPdu	NPdu	1	ref	Data Message (TP.DT) used by CMDT and BAM. The DataNPdu has a fixed length of 8 bytes.
dynamicBs	Boolean	0..1	attr	Enable support for dynamic block size calculation.
flowControlPdu	NPdu	1..2	ref	Reference to the Command NPdus (TP.CM) that are used in the CMDT (Connection Mode Data Transfer) in both directions. BAM uses one TP.CM (Transport Protocol Command). The flowControlNPdu has a fixed length of 8 bytes. Please note that the role name "flowControlIPdu" is misleading and is kept for backward compatibilty reasons.
maxBs	PositiveInteger	0..1	attr	Set maximum block size (number of packets in TP.CM_CTS).
maxExpBs	PositiveInteger	0..1	attr	Set maximum for expected block size (maximum number of packets in TP.CM_RTS).
receiver	J1939TpNode	*	ref	The target of the TP connection.
retry	Boolean	0..1	attr	Enable support for protocol retry.
tpPg	J1939TpPg	*	aggr	J1939 messages (parameter groups, PGs) that can be transferred via this connection.
transmitter	J1939TpNode	0..1	ref	The source of the TP connection.

Table 6.213: J1939TpConnection

Class	**J1939TpPg**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A J1939TpPg represents one J1939 message (parameter group, PG) identified by the PGN (parameter group number) that can be received or transmitted via J1939Tp.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
directPdu	NPdu	0..1	ref	In case of variable length IPdus (with system signals of variable length), an additional NPdu (with the PGN in the CAN ID) is used for messages with up to 8 bytes.
pgn	Integer	0..1	attr	Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.
requestable	Boolean	0..1	attr	Parameter Group can be triggered by the J1939 request message.
sdu	IPdu	*	ref	Reference to IPdus that are segmented by the Transport Protocol. If more than one IPdu is referenced, the IPdus are used when the same PGN is received in parallel via different transport protocols (BAM, CMDT, direct) on the same J1939TpConnection.

Table 6.214: J1939TpPg

Class	**J1939TpNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
connector	CommunicationConnector	0..1	ref	Asscociation to a CommunicationConnector in the topology description. In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional only when no TP is sent and only BAM is received.

Table 6.215: J1939TpNode

[constr_3210] `J1939TpPg`s with identical `pgn` value ⌈ For all `J1939TpPg`s where the attribute `pgn` has an identical value the attribute `requestable` shall also have an identical value. ⌋*()*

6.8.8 Unicast TP Example

The example in Figure 6.60 illustrate the usage of the System Template TP model. In this example the Sender ECU communicates with the Receiver ECU via two Gateways (GW1 and GW2).

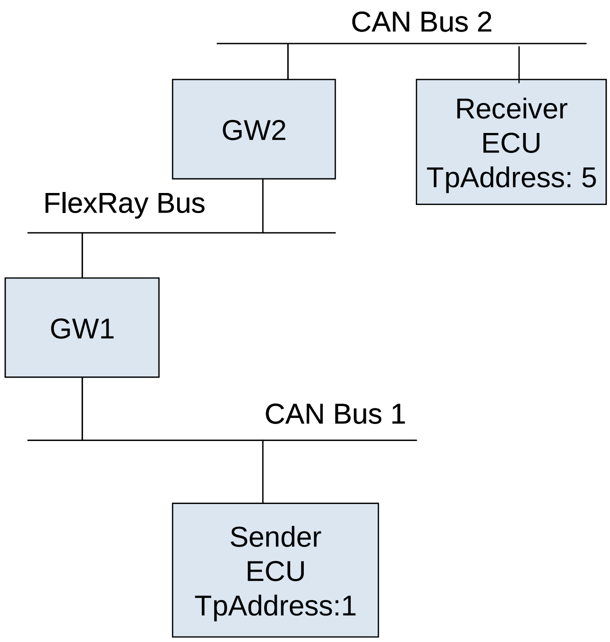


Figure 6.60: TP unicast Example

Modeling in the System Description:

```
CAN Bus 1 (CanTpConfig 1):
CanTpConnection
  transmitter TpNode: Sender ECU, TpAddress: 1
  receiver TpNode: GW1, TpAddress: 5

FlexRay Bus (FlexRayTpConfig):
FlexRayTpConnection
  transmitter TpNode: GW1, TpAddress: 1
  receiver TpNode: GW2, TpAddress: 5

CAN Bus 2 (CanTpConfig 2):
CanTpConnection
  transmitter TpNode: GW2, TpAddress: 1
  receiver TpNode: Receiver ECU, TpAddress: 5
```

Please note that two different `CanTpConfig` elements are created for the two CAN networks. The `TpAddress` of the transmitter `TpNode` is always 1 and the `TpAddress` of the receiver `TpNode` ais always 5, even in the `FlexrayTpConfig` where Gateway ECU1 communicates with Gateway ECU2. The original transmitter and the final receiver are addressed in each connection.

6.8.9 Multicast TP Example

A second example illustrates the usage of the multicast reference.

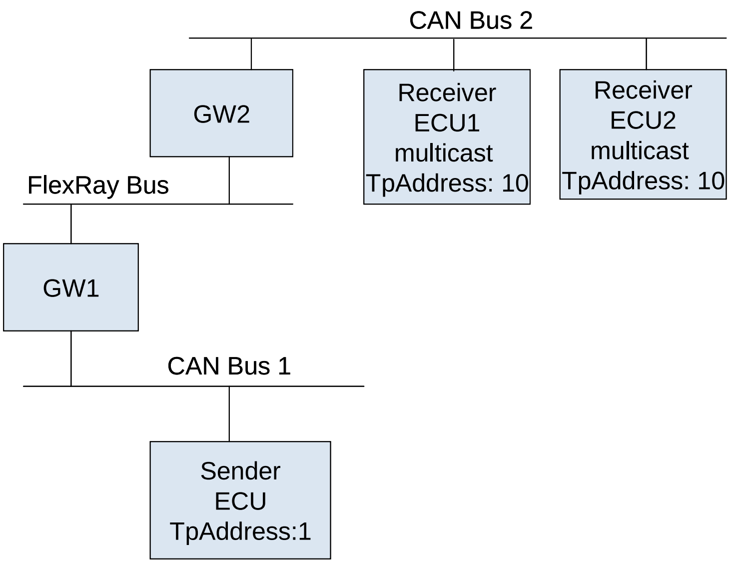


Figure 6.61: TP multicast Example

```
Can Bus 1 (CanTpConfig1):
CanTpConnection
  source TpNode: Sender ECU, TpAddress: 1
  target TpNode: GW1
  multicast TpAddress: 10

FlexRay Bus  (FlexRayTpConfig):
FlexRayTpConnection
  source TpNode: GW1, TpAddress: 1
  target TpNode: GW2
  multicast TpAddress: 10

CAN Bus 2 (CanTpConfig 2):
CanTpConnectionChannel
  source TpNode: GW2, TpAddress: 1
  target TpNode: Receiver ECU1
  target TpNode: Receiver ECU2
  multicast TpAddress: 10
```

Please note that the target `TpNode` does not contain a reference to the `TpAddress`. The multicast `TpAddress` is described by a direct reference from the connection.

6.8.10 Diagnostic Connection

A prominent use of the TP in automotive systems is the implementation of diagnostic communication. Data send from and to the tester frequently exceeds the native size of a communication package on typical bus systems used for this purpose.

However, the mere usage of TP channels for diagnostic purposes is missing one important aspect: TP channels, as defined by the AUTOSAR standard, are unidirectional by nature.

For diagnostic communication, it is very important to be able to define pairs of TP connections that can be taken to send related *request* and *response* messages.

In order to support this use case the meta-class DiagnosticConnection has been introduced.

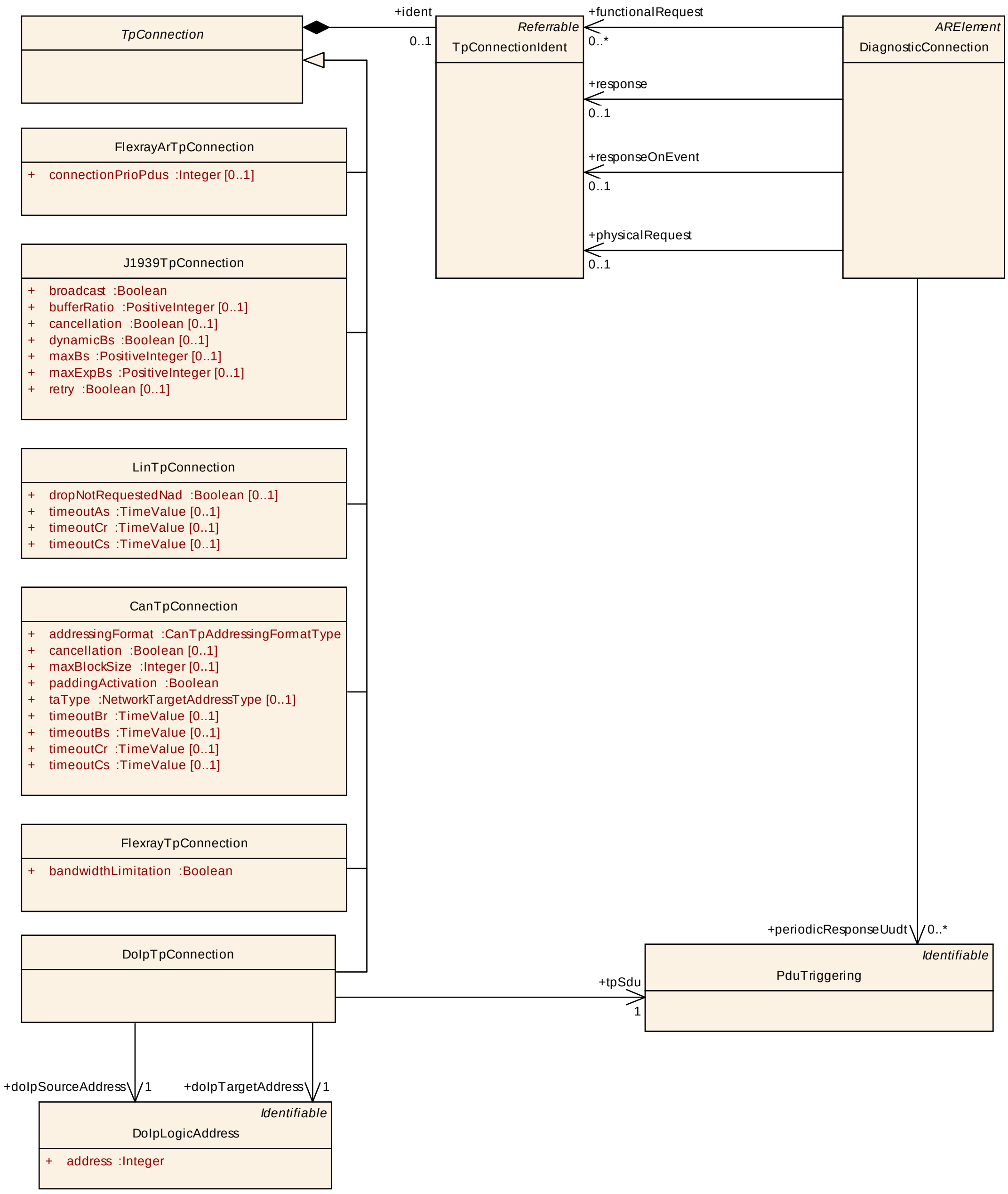


Figure 6.62: Modeling of DiagnosticConnection

[TPS_SYST_05003] Usage of DiagnosticConnection in combination with a TP ⌈ DiagnosticConnection allows for the dedicated identification of TP connections used for the various diagnostic message sending use cases:

- functionalRequest
- physicalRequest
- responseOnEvent
- response

⌋*()*

[TPS_SYST_05004] Usage of DiagnosticConnection in combination with UUDT ⌈ In addition to the usage of TP connections, the DiagnosticConnection foresees the transmission of UUDT message for **periodic response**. For this purpose, the role periodicResponseUudt is supported. ⌋*()*

[constr_1367] periodicResponseUudt.periodicResponseUudt shall only refer to a DcmIPdu ⌈ If the role periodicResponseUudt exists then every PduTriggering referenced in the role periodicResponseUudt shall only refer to a DcmIPdu. ⌋*()*

Please note that the meta-class TpConnectionIdent (derived from Referrable) has been introduced for the purpose of allowing sub-classes of TpConnection to become the target of a reference while preserving full backwards-compatibility to the previous modeling.

This means in particular that the existence of a shortName is only required if the sub-class of TpConnection shall actually represent the target of a reference in the context of the definition of a DiagnosticConnection.

This, however, is kind of self-evident (because the reference would not work without the existence of a shortName at the reference target) and therefore it is not necessary to formulate an explicit constraint that clarifies this issue.

[constr_1368] Limitation of the target of references from DiagnosticConnection ⌈ DiagnosticConnection shall only reference (via the indirection created by TpConnectionIdent) the following sub-classes of the meta-class TpConnection:

- CanTpConnection
- FlexrayTpConnection
- FlexrayArTpConnection
- DoIpTpConnection

⌋*()*

Class	**DiagnosticConnection**			
Package	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
Note	DiagnosticConncection that is used to describe the relationship between several TP connections. **Tags:** atp.recommendedPackage=DiagnosticConnections			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
functionalRequest	TpConnectionIdent	*	ref	Reference to functional request messages.
periodicResponseUudt	PduTriggering	*	ref	Reference to UUDT responses.

Attribute	**Type**	**Mul.**	**Kind**	**Note**
physicalRequest	TpConnectionIdent	0..1	ref	Reference to a physical request message.
response	TpConnectionIdent	0..1	ref	In the vast majority of cases a response is required. However, there are also cases where providing the response is not possible and/or not allowed.
responseOnEvent	TpConnectionIdent	0..1	ref	Reference to a ROE message.

Table 6.216: DiagnosticConnection

Class	**TpConnection (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
Note	TpConnection Base Class.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ident	TpConnectionIdent	0..1	aggr	This adds the ability to become referrable to TpConnection.

Table 6.217: TpConnection

Class	**TpConnectionIdent**			
Package	M2::AUTOSARTemplates::SystemTemplate::DiagnosticConnection			
Note	This meta-class is created to add the ability to become the target of a reference to the non-Referrable TpConnection.			
Base	ARObject, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 6.218: TpConnectionIdent

6.9 Network Management

The NM specification of AUTOSAR consist of a Generic Network Management Interface Module and of bus specific Network management adaptation layers (CanNm, FrNm, UdpNm, J1939Nm). The AUTOSAR Generic NM Interface module acts as a bus-independent adaptation layer between the bus-specific Network Management modules and the AUTOSAR basic software module Communication Manager. The AUTOSAR Generic NM Interface module is represented by NmCluster, NmEcu, NmCoordinator and NmNode. The bus-specific Network Management attributes are represented by BusspecificNmEcu. See also figure 6.63.

[constr_3057] Maximal one BusspecificNmEcu per NmEcu and bus system is allowed to be defined ⌈ For each NmEcu at most one BusspecificNmEcu per bus system (FlexRay/Can/Udp/J1939) is allowed to be defined. ⌋*()*

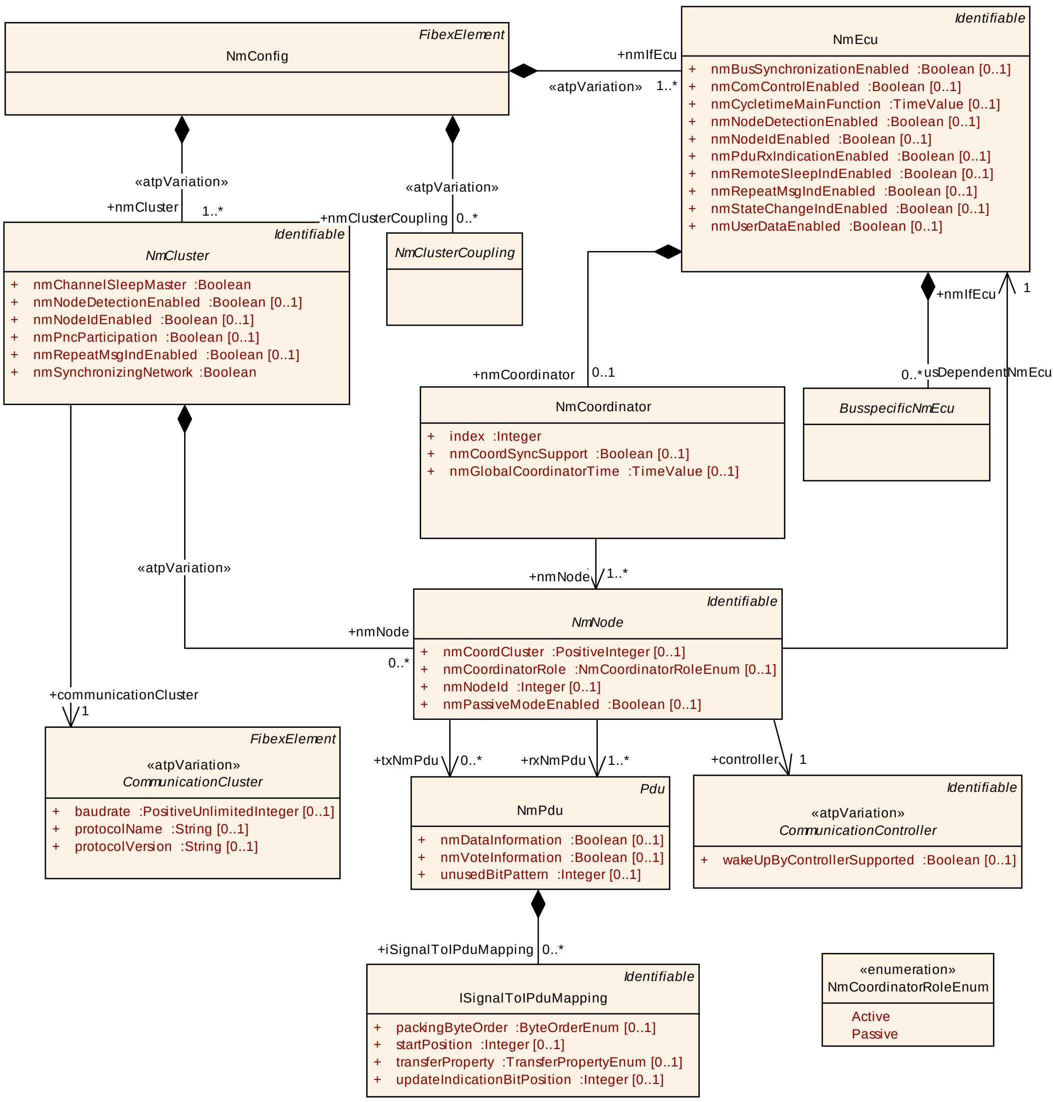


Figure 6.63: Generic Nm elements

The NmCluster contains a set of NmNodes.

The NmNodes are associated with the CommunicationController in the topology and belong to exactly one NmEcu. The reception and transmission of NmPdus is specified with the rxNmPdu and txNmPdu associations to NmPdus.

[TPS_SYST_01107] Definition of NmCoordinator ⌈ An nmCoordinator is connected to two or more CommunicationClusters (via NmNodes) out of which at least two contain the requirement to shutdown synchronously. ⌋ *()*

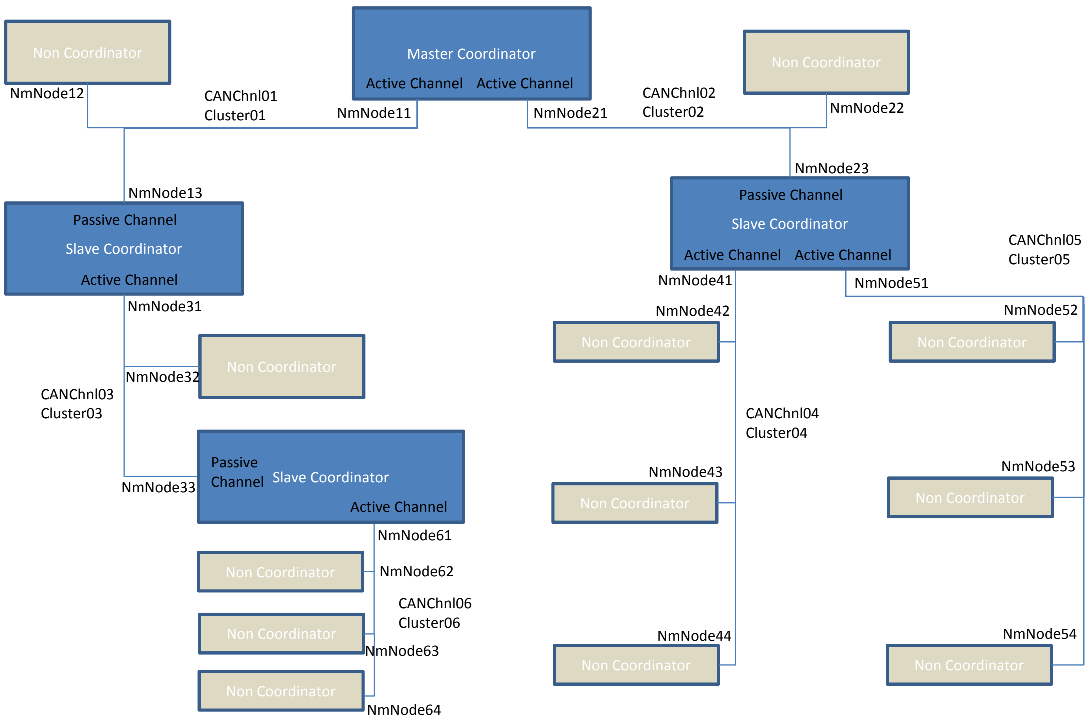


Figure 6.64: Nm Example

Figure 6.64 shows an example and the following section shows how the model shall be used:

NmCluster: Cluster01

- NmNodes:
  - NmNode11 (NmEcu1)
  - NmNode12 (NmEcu2)
  - NmNode13 (NmEcu3)

NmCluster: Cluster02

- NmNodes:
  - NmNode21 (NmEcu1)
  - NmNode22 (NmEcu4)
  - NmNode23 (NmEcu5)

NmCluster: Cluster03

- NmNodes:
  - NmNode31 (NmEcu3)
  - NmNode32 (NmEcu6)
  - NmNode33 (NmEcu7)

...

NmEcu1: NmCoordinator (MasterCoordinator)

- NmNode11 (nmCoordinatorRole: Active)
- NmNode21 (nmCoordinatorRole: Active)

NmEcu3: NmCoordinator (SlaveCoordinator)

- NmNode13 (nmCoordinatorRole: Passive)
- NmNode31 (nmCoordinatorRole: Active)

...

Class	NmConfig			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Contains the all configuration elements for AUTOSAR Nm. **Tags:** atp.recommendedPackage=NmConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
nmCluster	NmCluster	1..*	aggr	Collection of NM Clusters atpVariation: Derived, because cluster can be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
nmClusterCoupling	NmClusterCoupling	*	aggr	Collection of NmClusterCouplings atpVariation: Derived, because NmCluster can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
nmIfEcu	NmEcu	1..*	aggr	Collection of NM ECUs atpVariation: Derived, because EcuInstance can be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table 6.219: NmConfig

Class	NmCluster (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Set of NM nodes coordinated with use of the NM algorithm.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
communicationCluster	CommunicationCluster	1	ref	Asscociation to a CommunicationCluster in the topology description.
nmChannelSleepMaster	Boolean	1	attr	This parameter shall be set to indicate if the sleep of this network can be absolutely decided by the local node only and that no other nodes can oppose that decision.
nmNode	NmNode	*	aggr	Collection of NmNodes of the NmCluster. atpVariation: Derived, because NmNode can be variable. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Attribute	Type	Mul.	Kind	Note
nmNodeDetectionEnabled	Boolean	0..1	attr	Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.
nmNodeIdEnabled	Boolean	0..1	attr	Enables the source node identifier.
nmPncParticipation	Boolean	0..1	attr	Defines whether this NmCluster contributes to the partial network mechanism.
nmRepeatMsgIndEnabled	Boolean	0..1	attr	Switch for enabling the Repeat Message Bit Indication.
nmSynchronizingNetwork	Boolean	1	attr	If this parameter is true, then this network is a synchronizing network for the NM coordination cluster which it belongs to. The network is expected to call Nm_SynchronizationPoint() at regular intervals.

Table 6.220: NmCluster

[constr_3035] CanNm user data configuration in case NID/CBV are enabled ⌈If NID/CBV are enabled (nmCbvPosition and nmNidPosition are configured), there shall not be any user data configured at the position of the respective NID/CBV bytes. ⌋*()*

[constr_3044] CBV configuration in case partial network is used ⌈ In case a partial network is used the control bit vector (CBV) shall be defined in Byte 0 of the NmPdu (nmCbvPosition = 0). ⌋*()*

[constr_3227] NmNode.nmPassiveModeEnabled setting ⌈ NmNode.nmPassiveModeEnabled shall be set to the same value in all NmClusters with the same bus protocol in the scope of one NmEcu. ⌋*()*

Class	NmEcu			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	ECU on which NM is running.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
busDependentNmEcu	BusspecificNmEcu	*	aggr	Cluster specific NmEcu attributes
ecuInstance	EcuInstance	1	ref	Asscociation to an ECUInstance in the topology description.
nmBusSynchronizationEnabled	Boolean	0..1	attr	Enables bus synchronization support.
nmComControlEnabled	Boolean	0..1	attr	Enables the Communication Control support.
nmCoordinator	NmCoordinator	0..1	aggr	Nm ECU may coordinate different clusters.

Attribute	Type	Mul.	Kind	Note
nmCycletimeMainFunction	TimeValue	0..1	attr	The period between successive calls to the Main Function of the NM Interface in seconds.
nmNodeDetectionEnabled	Boolean	0..1	attr	Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster. **Tags:** atp.Status=obsolete; atp.StatusRevisionBegin=4.3.1
nmNodeIdEnabled	Boolean	0..1	attr	Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster. **Tags:** atp.Status=obsolete; atp.StatusRevisionBegin=4.3.1
nmPduRxIndicationEnabled	Boolean	0..1	attr	Switch for enabling the PDU Rx Indication.
nmRemoteSleepIndEnabled	Boolean	0..1	attr	Switch for enabling remote sleep indication support.
nmRepeatMsgIndEnabled	Boolean	0..1	attr	Switch for enabling the Repeat Message Bit Indication. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster. **Tags:** atp.Status=obsolete; atp.StatusRevisionBegin=4.3.1
nmStateChangeIndEnabled	Boolean	0..1	attr	Enables the CAN Network Management state change notification.
nmUserDataEnabled	Boolean	0..1	attr	Switch for enabling user data support.

Table 6.221: NmEcu

Class	BusspecificNmEcu (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Busspecific NmEcu attributes.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.222: BusspecificNmEcu

Class	**NmCoordinator**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	A NM coordinator is an ECU, which is connected to at least two busses, and where the requirement exists that shutdown of NM of at least two of these busses (also referred to as coordinated busses) has to be performed synchronously.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
index	Integer	1	attr	Identification of the NMCoordinator.
nmCoordSyncSupport	Boolean	0..1	attr	Switch for enabling NmCoordinatorSync (coordination of nested busses) support.
nmGlobalCoordinatorTime	TimeValue	0..1	attr	This attribute defines the maximum shutdown time (in seconds) of a connected and coordinated NM-Cluster.
nmNode	NmNode	1..*	ref	reference to busses (via NmNodes) that are coordinated by the NmCoordinator.

Table 6.223: NmCoordinator

Class	**NmNode (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	The linking of NmEcus to NmClusters is realized via the NmNodes.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
controller	CommunicationController	1	ref	Asscociation to an CommunicationController in the topology description.
nmCoordCluster	PositiveInteger	0..1	attr	NmCoordinationCluster identification number.
nmCoordinatorRole	NmCoordinatorRoleEnum	0..1	attr	This attribute indicates the role the NM Coordinator will have on this channel.
nmIfEcu	NmEcu	1	ref	Reference to the NmEcu that contains this NmNode. (CommunicationController that is referenced by the NmNode shall be contained in the EcuInstance that is referenced by the NmEcu).
nmNodeId	Integer	0..1	attr	Node identifier of local NmNode. Must be unique in the NmCluster.
nmPassiveModeEnabled	Boolean	0..1	attr	Enables support of the Passive Mode. The passive mode is configurable per channel.
rxNmPdu	NmPdu	1..*	ref	receive NM Pdu.
txNmPdu	NmPdu	*	ref	transmit NM Pdu

Table 6.224: NmNode

Enumeration	**NmCoordinatorRoleEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement
Note	Supported NmCoordinator roles.
Literal	***Description***

Active	Coordinator which "actively" performs NmCoordinator functionality at this channel **Tags:** atp.EnumerationValue=0
Passive	Coordinator which "passively" performs NmCoordinator functionality at this channel - used at NmCoordinatorSync use case. **Tags:** atp.EnumerationValue=1

Table 6.225: NmCoordinatorRoleEnum

Class	**NmClusterCoupling (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Attributes that are valid for each of the referenced (coupled) clusters.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.226: NmClusterCoupling

6.9.1 FlexRay Network Management

The following class tables specify the configuration parameters of FlexRay Nm.

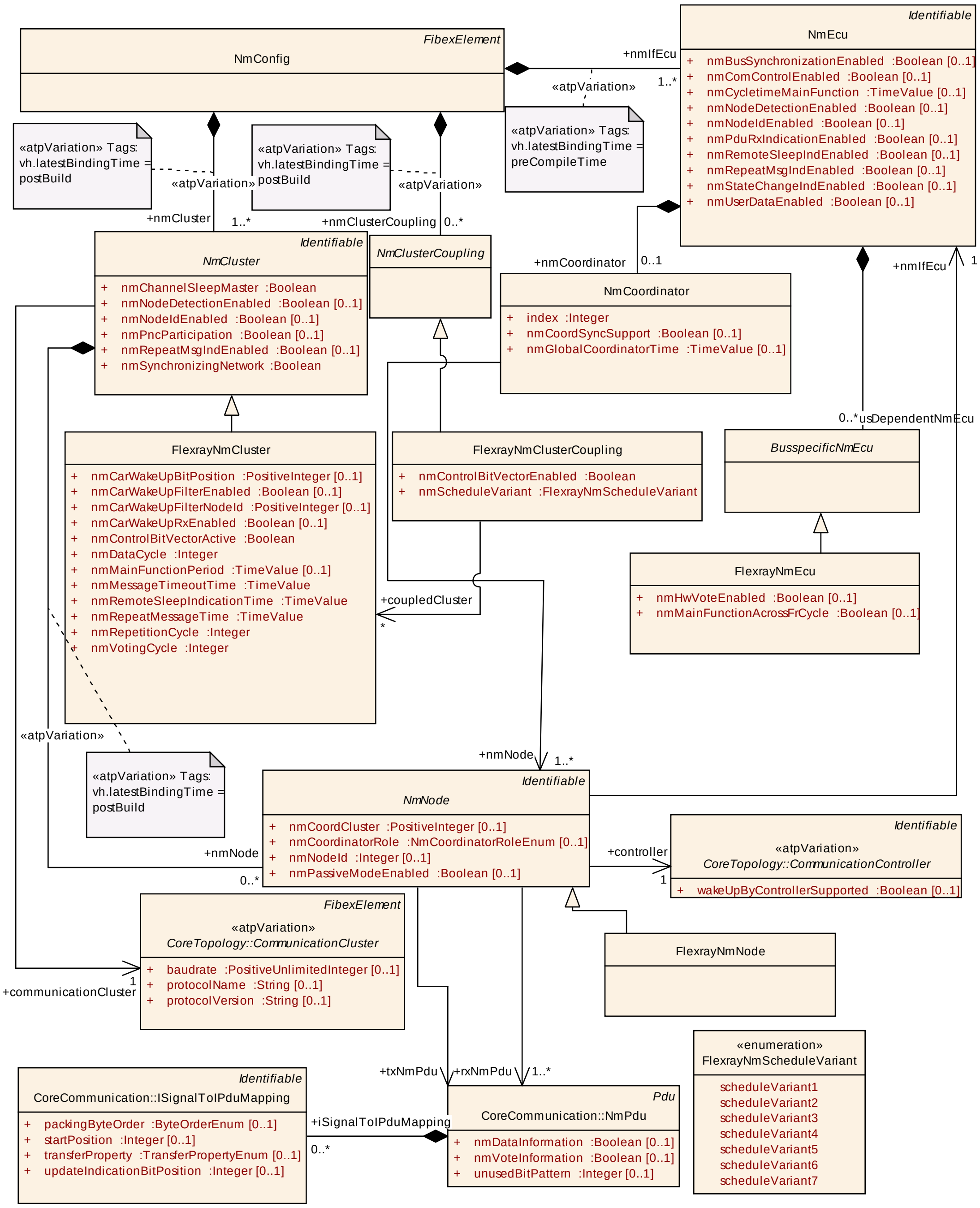


Figure 6.65: FlexRay Network Management Configuration (TransportProtocols: NmFlexRayConfiguration)

Class	**FlexrayNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	FlexRay specific NM cluster attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nmCarWakeUpBitPosition	PositiveInteger	0..1	attr	Specifies the bit position of the CarWakeUp within the NmPdu.
nmCarWakeUpFilterEnabled	Boolean	0..1	attr	If this attribute is set to true the CareWakeUp filtering is supported. In this case only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.
nmCarWakeUpFilterNodeId	PositiveInteger	0..1	attr	Source node identifier for CarWakeUp filtering. If CarWakeUp filtering is supported (nmCarWakeUpFilterEnabled), only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.
nmCarWakeUpRxEnabled	Boolean	0..1	attr	If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.
nmControlBitVectorActive	Boolean	1	attr	Used to activate or deactivate the control bit vector support for a Fr Nm Channel.
nmDataCycle	Integer	1	attr	Number of FlexRay Communication Cycles needed to transmit the Nm Data PDUs of all FlexRay Nm Ecus of this FlexRayNmCluster.
nmMainFunctionPeriod	TimeValue	0..1	attr	Defines the processing cycle of the main function of FrNm module.
nmMessageTimeoutTime	TimeValue	1	attr	Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.
nmRemoteSleepIndicationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmRepetitionCycle	Integer	1	attr	Number of FlexRay Communication Cycles used to repeat the transmission of the Nm vote Pdus of all FlexRay NmEcus of this FlexRayNmCluster. This value must be an integral multiple of nmVotingCycle.
nmVotingCycle	Integer	1	attr	Number of FlexRay CommunicationCycles needed to transmit the Nm vote of Pdus of all FlexRay NmEcus of this FlexRayNmCluster.

Table 6.227: FlexrayNmCluster

Class	FlexrayNmEcu			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	FlexRay specific attributes.			
Base	ARObject, BusspecificNmEcu			
Attribute	Type	Mul.	Kind	Note
nmHwVoteEnabled	Boolean	0..1	attr	Switch for enabling the processing of FlexRay Hardware aggregated NM-Votes.
nmMainFunctionAcrossFrCycle	Boolean	0..1	attr	Parameter describing if the execution of the FrNm_Main function crosses theFlexRay cycle boundary or not.

Table 6.228: FlexrayNmEcu

Class	FlexrayNmClusterCoupling			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	FlexRay attributes that are valid for each of the referenced (coupled) FlexRay clusters.			
Base	ARObject, NmClusterCoupling			
Attribute	Type	Mul.	Kind	Note
coupledCluster	FlexrayNmCluster	*	ref	Reference to coupled FlexRay Clusters.
nmControlBitVectorEnabled	Boolean	1	attr	Enables control bit vector support.
nmScheduleVariant	FlexrayNmScheduleVariant	1	attr	FrNm schedule variant according to FrNm SWS.

Table 6.229: FlexrayNmClusterCoupling

Class	FlexrayNmNode			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	FlexRay specific NM Node attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmNode, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.230: FlexrayNmNode

Enumeration	FlexrayNmScheduleVariant
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement
Note	FrNm schedule variant according to FrNm SWS.
Literal	Description
scheduleVariant1	NM-Vote and NM Data transmitted within one PDU in static segment. The NM-Vote has to be realized as separate bit within the PDU. **Tags:** atp.EnumerationValue=0

schedule Variant2	NM-Vote and NM-Data transmitted within one PDU in dynamic segment. The presence (or non-presence) of the PDU corresponds to the NM-Vote **Tags:** atp.EnumerationValue=1
schedule Variant3	NM-Vote and NM-Data are transmitted in the static segment in separate PDUs. This alternative is not recommended => Alternative 1 should be used instead. **Tags:** atp.EnumerationValue=2
schedule Variant4	NM-Vote transmitted in static and NM-Data transmitted in dynamic segment. **Tags:** atp.EnumerationValue=3
schedule Variant5	NM-Vote is transmitted in dynamic and NM-Data is transmitted in static segment. This alternative is not recommended => Variants 2 or 6 should be used instead. **Tags:** atp.EnumerationValue=4
schedule Variant6	NM-Vote and NM-Data are transmitted in dynamic segment in separate PDUs. **Tags:** atp.EnumerationValue=5
schedule Variant7	NM-Vote and a copy of the CBV are transmitted in the static segment (using the FlexRay NM Vector support) and NM-Data is transmitted in the dynamic segment **Tags:** atp.EnumerationValue=6

Table 6.231: FlexrayNmScheduleVariant

6.9.2 CAN Network Management

The following class tables specify the configuration parameters of CAN Nm.

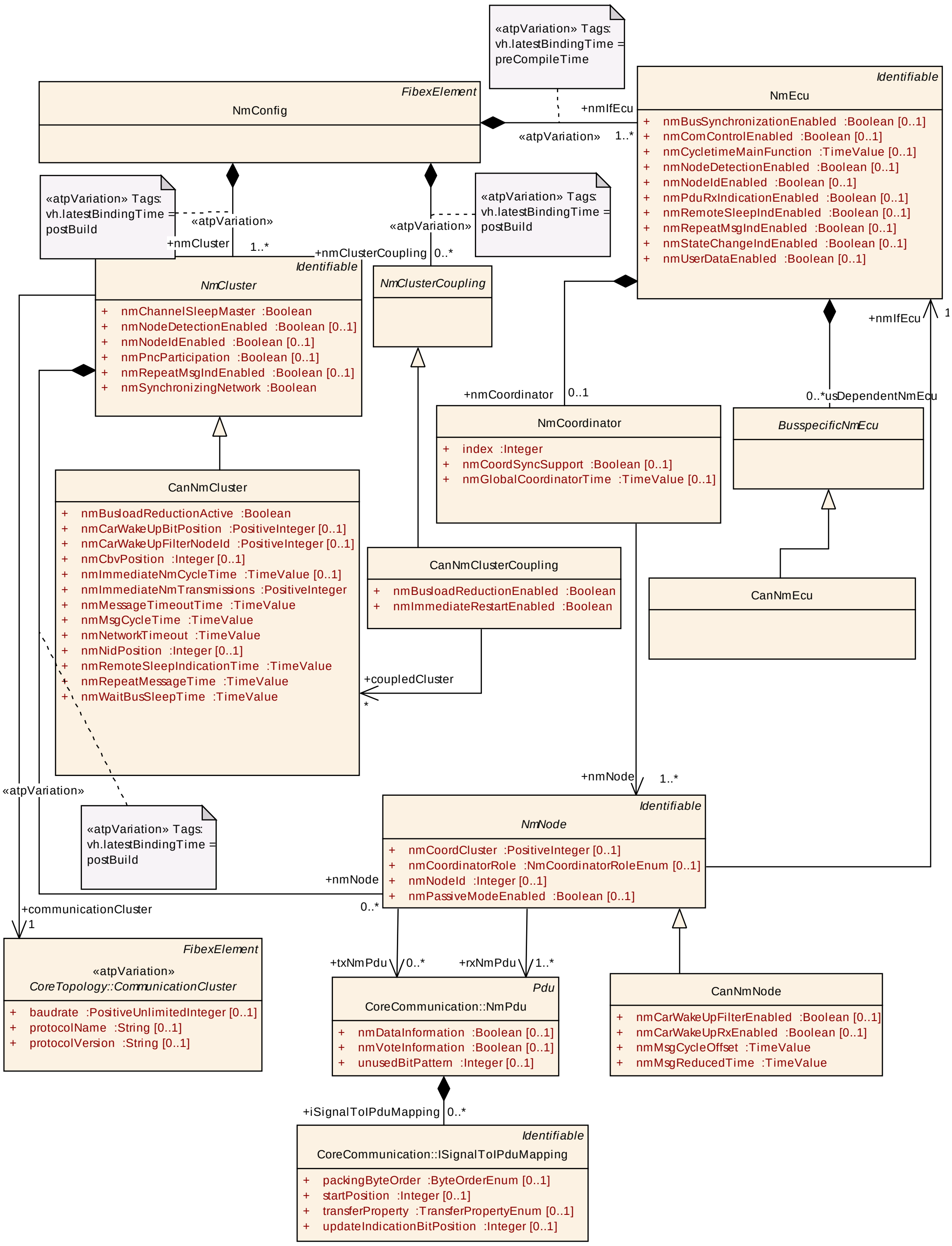


Figure 6.66: CAN Network Management Configuration (TransportProtocols: NmCanConfiguration)

Class	**CanNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Can specific NmCluster attributes			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
nmBusload Reduction Active	Boolean	1	attr	It determines if bus load reduction for the respective CanNm channel is active or not.
nmCarWak eUpBitPosi tion	PositiveInteger	0..1	attr	Specifies the bit position of the CarWakeUp within the NmPdu.
nmCarWak eUpFilterN odeId	PositiveInteger	0..1	attr	Source node identifier for CarWakeUp filtering.
nmCbvPos ition	Integer	0..1	attr	Defines the position of the control bit vector within the NmPdu (Byte position). If this attribute is not configured, the Control Bit Vector is not used.
nmImmedi ateNmCycl eTime	TimeValue	0..1	attr	Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This parameter is only valid if CanNmImmediateNmTransmissions is greater one.
nmImmedi ateNmTran smissions	PositiveInteger	1	attr	Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immeditate NmPdus is defined by nmImmediateNmCycleTime.
nmMessag eTimeoutTi me	TimeValue	1	attr	Timeout of an NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.
nmMsgCyc leTime	TimeValue	1	attr	Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.
nmNetwor kTimeout	TimeValue	1	attr	Network Timeout for NmPdus in seconds It denotes the time how long the CanNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.
nmNidPosi tion	Integer	0..1	attr	Defines the byte position of the source node identifier within the NmPdu. If this attribute is not configured, the Node Identification is not used.
nmRemote SleepIndic ationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeat MessageTi me	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.

Attribute	Type	Mul.	Kind	Note
nmWaitBusSleepTime	TimeValue	1	attr	Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.

Table 6.232: CanNmCluster

[constr_3069] Allowed CanNmCluster.nmNidPosition values ⌈ The value of CanNmCluster.nmNidPosition shall only be set to either 0 or 1. ⌋*()*

[constr_3070] Allowed CanNmCluster.nmCbvPosition values ⌈ The value of CanNmCluster.nmCbvPosition shall only be set to either 0 or 1. ⌋*()*

[constr_3071] CanNmCluster.nmCbvPosition and CanNmCluster.nmNidPosition shall never have the same value ⌈ CanNmCluster.nmCbvPosition and CanNmCluster.nmNidPosition shall never have the same value. ⌋*()*

Class	CanNmEcu			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	CAN specific attributes.			
Base	ARObject, BusspecificNmEcu			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 6.233: CanNmEcu

Class	CanNmClusterCoupling			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	CAN attributes that are valid for each of the referenced (coupled) CAN clusters.			
Base	ARObject, NmClusterCoupling			
Attribute	Type	Mul.	Kind	Note
coupledCluster	CanNmCluster	*	ref	Reference to coupled CAN Clusters.
nmBusloadReductionEnabled	Boolean	1	attr	Enables busload reduction support
nmImmediateRestartEnabled	Boolean	1	attr	Enables the asynchronous transmission of a CanNm PDU upon bus-communication request in Prepare-Bus-Sleep mode.

Table 6.234: CanNmClusterCoupling

Class	CanNmNode			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	CAN specific NM Node attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmNode, Referrable			
Attribute	Type	Mul.	Kind	Note

Attribute	Type	Mul.	Kind	Note
nmCarWakeUpFilterEnabled	Boolean	0..1	attr	If this attribute is set to true the CareWakeUp filtering is supported.
nmCarWakeUpRxEnabled	Boolean	0..1	attr	If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.
nmMsgCycleOffset	TimeValue	1	attr	Node specific time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.
nmMsgReducedTime	TimeValue	1	attr	Node specific bus cycle time in the periodic transmission mode with bus load reduction. Specified in seconds.

Table 6.235: CanNmNode

6.9.3 LIN Network Management

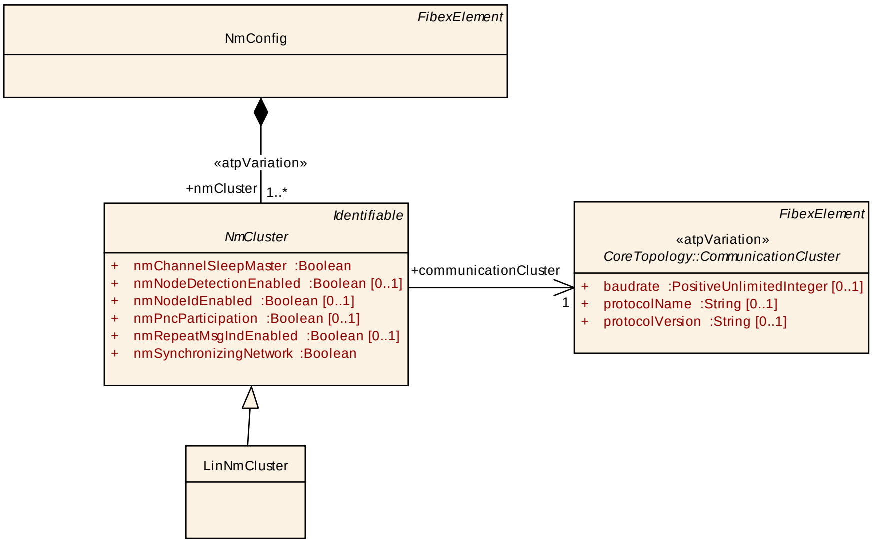


Figure 6.67: LIN Network Management Configuration

A LinNmCluster can be defined to describe on which channels LinNm needs to be configured. In AUTOSAR there is no communication defined between LinNm and LinIf. Therefore there is no need to describe NmNodes and corresponding NmPdus on the LinNmCluster.

Class	**LinNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Lin specific NmCluster attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.236: LinNmCluster

6.9.4 UDP Network Management

The UPD Nm model is similar to the Nm models of the other communication buses but there are some specific characteristics due to the modeling of EthernetCluster and EthernetPhysicalChannel (see also chapter 3.3.6).

The UdpNmCluster corresponds to one EthernetPhysicalChannel (VLAN). Therefore it is required that for each EthernetPhysicalChannel on one EthernetCluster a respective UdpNmCluster with a reference to the EthernetPhysicalChannel is created. All of these UdpNmClusters point to the same EthernetCluster which the EthernetPhysicalChannels are contained in.

Thus, additionally to the reference from NmCluster to the CommunicationCluster (which applies to all Nm models), there is need for an Ethernet specific reference from the UdpNmCluster to the EthernetPhysicalChannel. This allows to specify for which VLAN this UdpNmCluster applies.

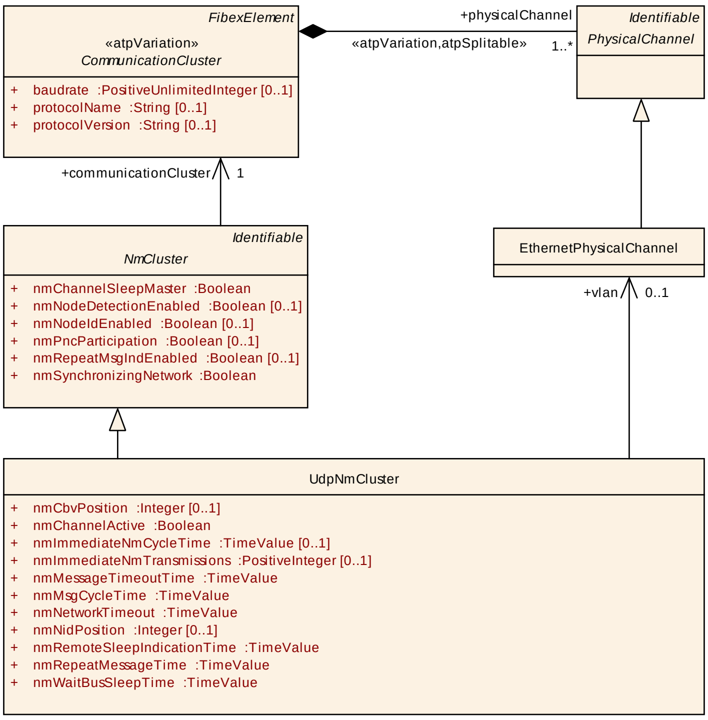


Figure 6.68: UdpNmCluster structure

The following class tables specify the configuration parameters of UDP Nm.

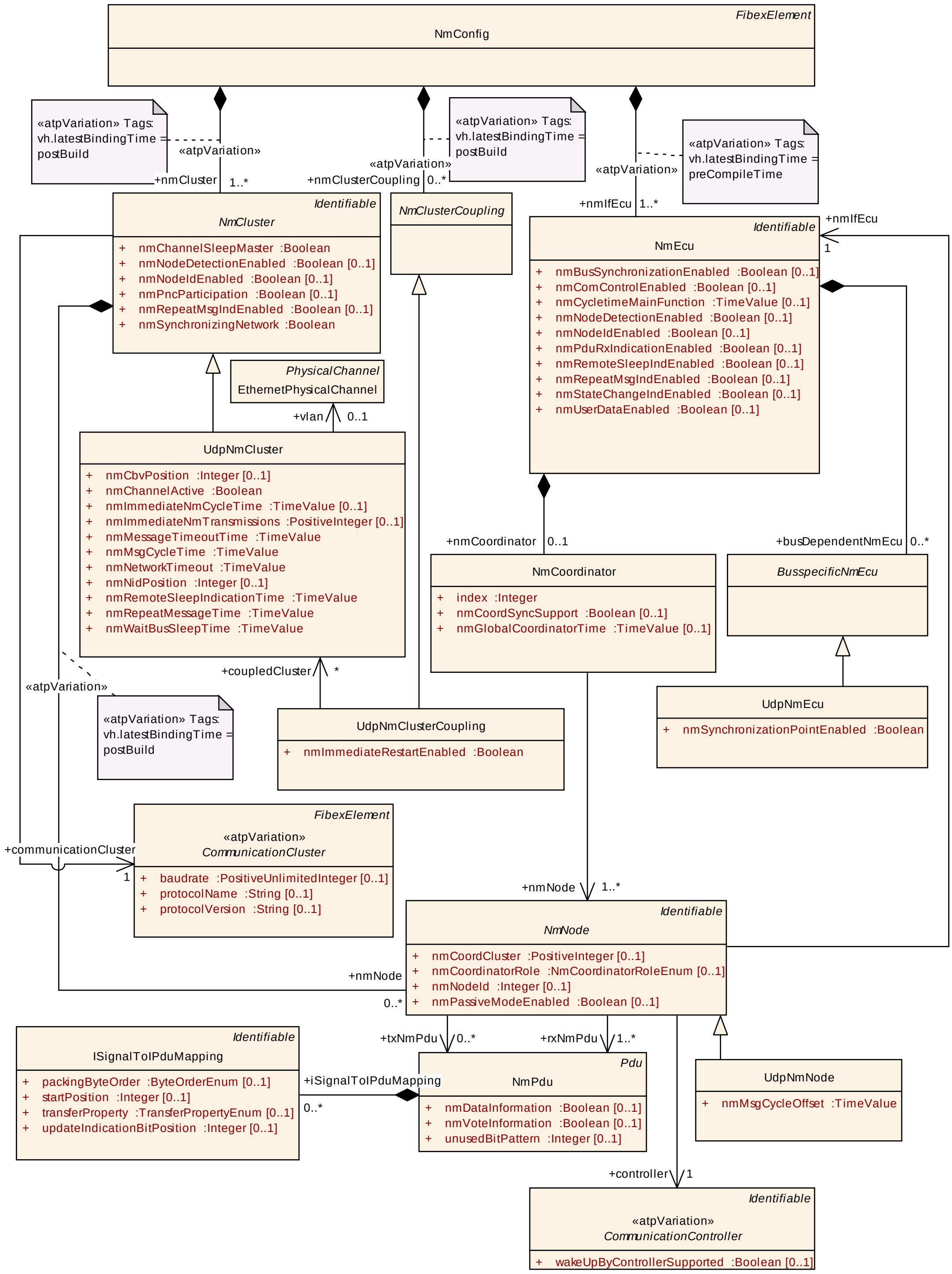


Figure 6.69: UDP Network Management Configuration (TransportProtocols: NmUdpConfiguration)

Class	**UdpNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp specific NmCluster attributes			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
nmCbvPosition	Integer	0..1	attr	Defines the position of the control bit vector within the NmPdu (Byte positon).
nmChannelActive	Boolean	1	attr	This switch determines if the respective UdpNm channel is active or not. Indicates whether a particular UdpNm channel shall be initialized (TRUE) or not (FALSE). If this parameter is set to FALSE the respective NM instance shall not be used during runtime.
nmImmediateNmCycleTime	TimeValue	0..1	attr	Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This attribute is only valid if nmImmediateNmTransmissions is greater one.
nmImmediateNmTransmissions	PositiveInteger	0..1	attr	Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immediate NmPdus is defined by nmImmediateNmCycleTime.
nmMessageTimeoutTime	TimeValue	1	attr	Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.
nmMsgCycleTime	TimeValue	1	attr	Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.
nmNetworkTimeout	TimeValue	1	attr	Network Timeout for NmPdus in seconds. It denotes the time how long the UdpNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.
nmNidPosition	Integer	0..1	attr	Defines the byte position of the source node identifier within the NmPdu.
nmRemoteSleepIndicationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmWaitBusSleepTime	TimeValue	1	attr	Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.
vlan	EthernetPhysicalChannel	0..1	ref	Reference to the vlan (represented by the EthernetPhysicalChannel) this UdpNmCluster shall apply to.

Table 6.237: UdpNmCluster

[constr_3078] Allowed UdpNmCluster.nmNidPosition values ⌈ The value of UdpNmCluster.nmNidPosition shall only be set to either 0 or 1. ⌋()

[constr_3079] Allowed UdpNmCluster.nmCbvPosition values ⌈ The value of UdpNmCluster.nmCbvPosition shall only be set to either 0 or 1. ⌋()

[constr_3080] UdpNmCluster.nmCbvPosition and UdpNmCluster.nmNidPosition shall never have the same value ⌈ UdpNmCluster.nmCbvPosition and UdpNmCluster.nmNidPosition shall never have the same value. ⌋()

Class	**UdpNmEcu**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp NM specific ECU attributes.			
Base	ARObject, BusspecificNmEcu			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nmSynchronizationPointEnabled	Boolean	1	attr	Enable/disable the NM Coordination algorithm to being able to initiate the synchronization algorithm.

Table 6.238: UdpNmEcu

Class	**UdpNmClusterCoupling**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp attributes that are valid for each of the referenced (coupled) UdpNm clusters.			
Base	ARObject, NmClusterCoupling			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
coupledCluster	UdpNmCluster	*	ref	Reference to coupled UdpNm Clusters.
nmImmediateRestartEnabled	Boolean	1	attr	Enables the asynchronous transmission of a CanNm PDU upon bus-communication request in Prepare-Bus-Sleep mode.

Table 6.239: UdpNmClusterCoupling

Class	**UdpNmNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Udp specific NM Node attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmNode, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nmMsgCycleOffset	TimeValue	1	attr	Node specific time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.

Table 6.240: UdpNmNode

6.9.5 J1939 Network Management

The following class tables specify the configuration parameters of J1939 Nm.

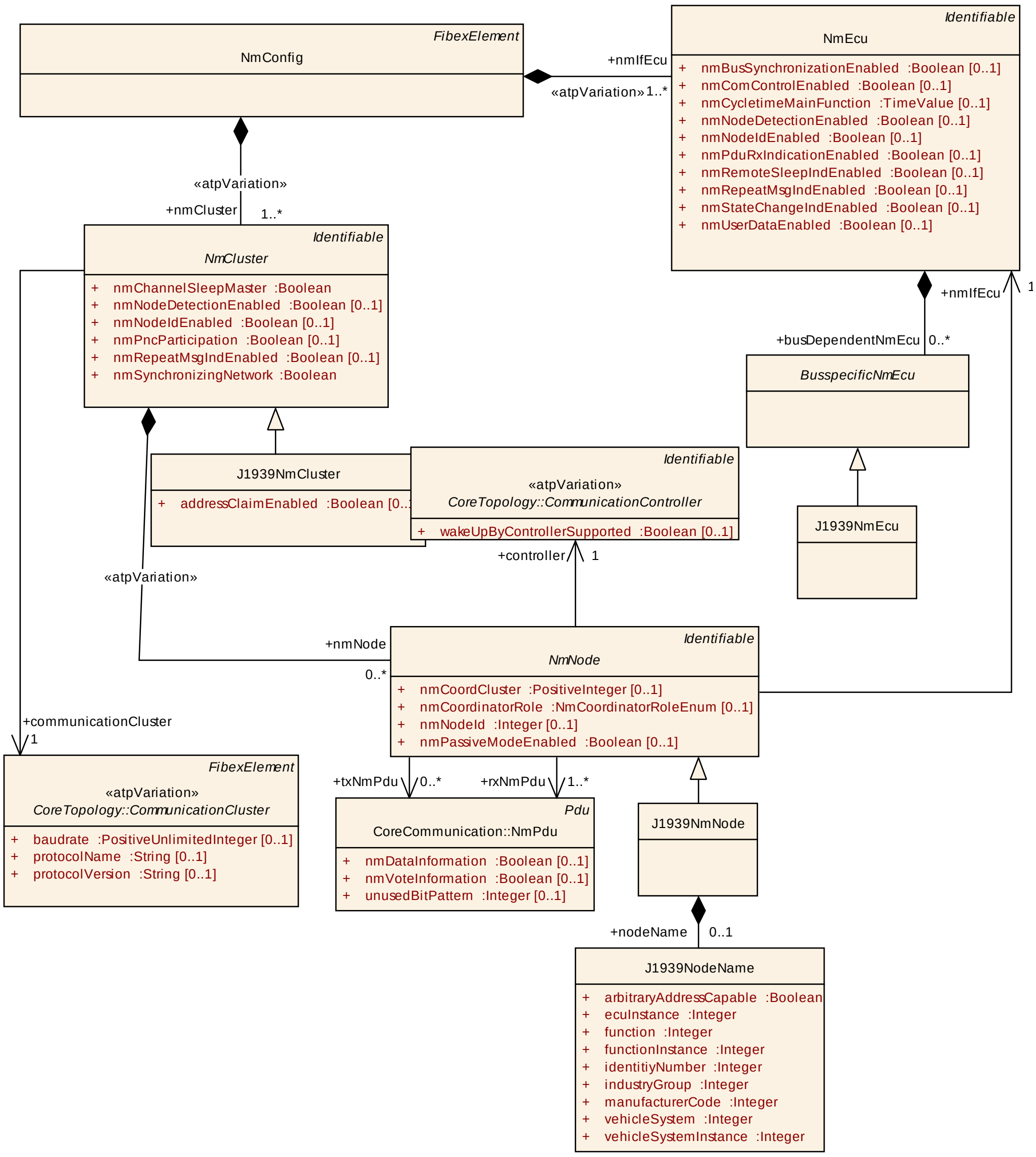


Figure 6.70: J1939 Network Management Configuration (TransportProtocols: NmJ1939Configuration)

Class	J1939NmCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	J1939 specific NmCluster attributes			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	Type	Mul.	Kind	Note
addressClaimEnabled	Boolean	0..1	attr	This attribute specifies whether the J1939Nm Bsw module is used or not. If this attribute is set to false then the J1939Nm configuration shall not be derived from the system description. But even in this case the nmNodeId might still be necessary for the J1939Rm and J1939Tp.

Table 6.241: J1939NmCluster

Class	J1939NmNode			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	J1939 specific NM Node attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmNode, Referrable			
Attribute	Type	Mul.	Kind	Note
nodeName	J1939NodeName	0..1	aggr	NodeName configuration

Table 6.242: J1939NmNode

Class	J1939NodeName			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	This element contains attributes to configure the J1939NmNode NAME.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
arbitraryAddressCapable	Boolean	1	attr	Arbitrary Address Capable field of the NAME of this node.
ecuInstance	Integer	1	attr	ECU Instance field of the NAME of this node.
function	Integer	1	attr	Function field of the NAME of this node.
functionInstance	Integer	1	attr	Function Instance field of the NAME of this node.
identitiyNumber	Integer	1	attr	Identity Number field of the NAME of this node.
industryGroup	Integer	1	attr	Industry Group field of the NAME of this node.
manufacturerCode	Integer	1	attr	Manufacturer Code field of the NAME of this node.
vehicleSystem	Integer	1	attr	Vehicle System field of the NAME of this node.
vehicleSystemInstance	Integer	1	attr	Vehicle System Instance field of the NAME of this node.

Table 6.243: J1939NodeName

[constr_3102] Restriction on usage of J1939NodeName attributes ⌈ A J1939NmCluster shall not aggregate two J1939NmNodes with identical J1939NodeName attributes. ⌋*()*

[constr_3103] Range of ecuInstance ⌈ The allowed values of ecuInstance range from 0 to 7. ⌋*()*

[constr_3104] Range of function ⌈ The allowed values of function range from 0 to 255. ⌋*()*

[constr_3105] Range of functionInstance ⌈ The allowed values of functionInstance range from 0 to 31. ⌋*()*

[constr_3106] Range of identitiyNumber ⌈ The allowed values of identitiyNumber range from 0 to 2097151. ⌋*()*

[constr_3107] Range of industryGroup ⌈ The allowed values of industryGroup range from 0 to 7. ⌋*()*

[constr_3108] Range of manufacturerCode ⌈ The allowed values of manufacturerCode range from 0 to 2047. ⌋*()*

[constr_3109] Range of vehicleSystem ⌈ The allowed values of vehicleSystem range from 0 to 127. ⌋*()*

[constr_3110] Range of vehicleSystemInstance ⌈ The allowed values of vehicleSystemInstance range from 0 to 15. ⌋*()*

Class	**J1939NmEcu**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	J1939 NmEcu specific attributes.			
Base	ARObject, BusspecificNmEcu			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 6.244: J1939NmEcu

6.9.5.1 J1939SharedAddressCluster

There are two ways of identifying source and target nodes in routing relations in J1939 networks (see [TPS_SYST_02107] and [TPS_SYST_02108]).

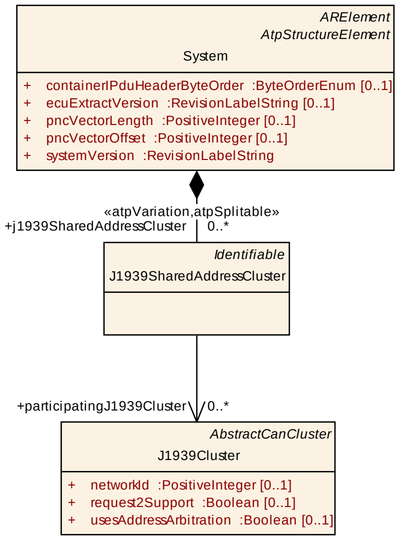


Figure 6.71: J1939SharedAddressCluster

Class	**J1939SharedAddressCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate			
Note	This meta-class represents the ability to identify several J1939Clusters that share a common address space for the routing of messages			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
participatingJ1939Cluster	J1939Cluster	*	ref	This identifies the J1939Clusters that share a common address space

Table 6.245: J1939SharedAddressCluster

[TPS_SYST_02107] Shared address space for J1939 routing relations ⌈ Address claims are routed between several `CommunicationCluster`s independent of whether there are actual routings between individual nodes on respective `CommunicationCluster`s. This means that the overall number of nodes in the shared `CommunicationCluster` cannot exceed 254, independently of the routing relations. ⌋ *(RS_SYST_00038)*

[TPS_SYST_02108] Address proxying for J1939 routing relations ⌈ The gateway claims all addresses used in routed messages on those `CommunicationCluster`s to which the actual nodes are not connected. Thereby the address spaces are separate and only the nodes participating in a routing appear on more than one `CommunicationCluster`. The total number of nodes in the participating `CommunicationCluster`s can be higher than 254, and the address arbitration is faster with less conflicts. ⌋ *(RS_SYST_00038)*

[TPS_SYST_02109] Absence of J1939SharedAddressCluster.participatingJ1939Cluster to a J1939Cluster ⌈ If `J1939Cluster`s exist that participate in a routing relation but are not referenced in the role `J1939SharedAddressCluster.participatingJ1939Cluster` by the same `J1939SharedAddressCluster` then

gateway shall apply the address proxying according to [TPS_SYST_02108]. ⌋
(RS_SYST_00038)

6.10 Fan-out

AUTOSAR supports three different fan-outs:

- Signal fan-out
- Pdu fan-out
- Frame fan-out

6.10.1 Signal fan-out

A Signal fan-out can either be RTE fan-out or COM Signal Gateway fan-out. The details are explained in the following subchapters.

6.10.1.1 RTE fan-out

The RTE supports a "signal fan-out" where one SystemSignal is sent in several IPdus.

[TPS_SYST_01109] RTE fan-out support ⌈ The RTE fan-out (signal fan-out) is described by the relation between SystemSignal and ISignal.

In the case of a "signal fan-out", several ISignals refer to the same SystemSignal (see example in Figure 6.72). ⌋ *()*

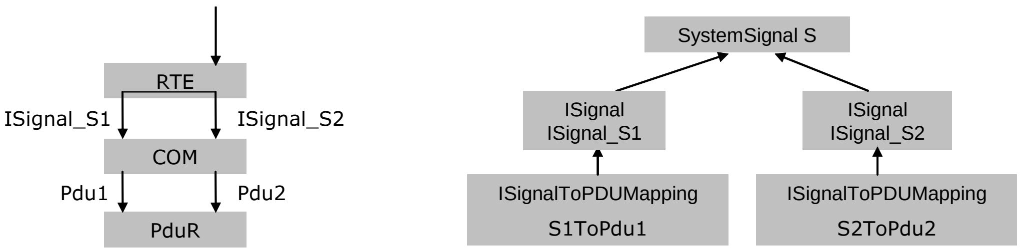


Figure 6.72: RTE fan-out

6.10.1.2 COM Signal Gateway fan-out

In Com [20] the Signal Gateway supports a fan-out where an incoming signal is routed to several destinations.

[TPS_SYST_01110] Com Signal Gateway fan-out support ⌈ A Signal Gateway fan-out (1:n routing) is described with the definition of several ISignalMappings in the Gateway description, which all refer to the same source ISignalTriggering. ⌋ *()*

Note that [constr_3514] applies for the relation between ISignalToIPduMapping to ISignal.

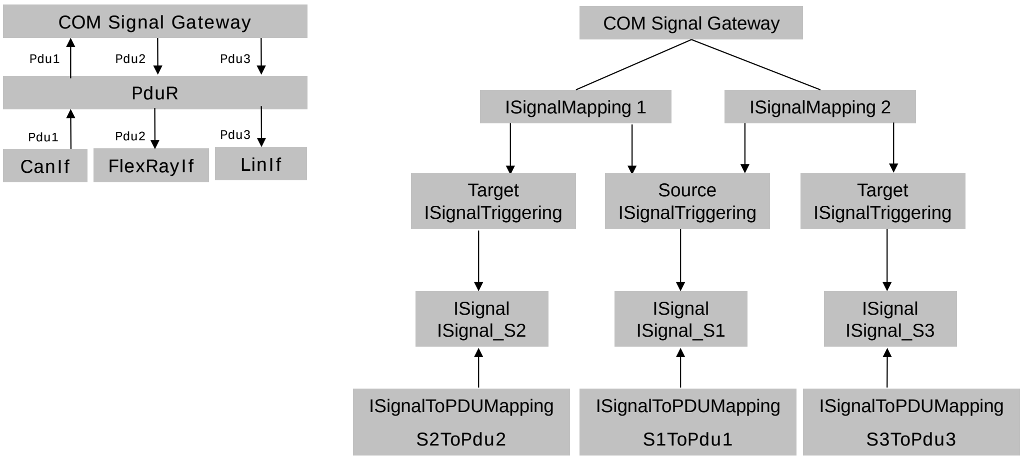


Figure 6.73: Com Gateway fan-out

6.10.2 Pdu fan-out

6.10.2.1 Pdu Router fan-out

The Pdu Router supports the "PDU fan-out" where one IPdu is sent to multiple destinations.

[TPS_SYST_01111] Pdu Router fan-out support ⌈ The Pdu Router fan-out is described by several PduTriggering elements pointing to the same Pdu[3].

The sending ECU/PDU router has an output IPduPort that has the value of communicationDirection set to out and is referenced by the PduTriggering. According to the Cluster/Channel aggregation, the Pdu Router determines the clusters to use in its routing. ⌋ *()*

[TPS_SYST_01112] FlexrayCluster Pdu Router interaction ⌈ The following condition applies only in case of FlexRay on the same FlexrayCluster if two PduTriggerings refer to the same Pdu: this Pdu shall only be sent once to the FlexRay Interface. In other words the Pdu Router sends only one Pdu Transmission request to the FlexRay Interface. ⌋ *()*

[3] Chapter 6.1 defines which Pdu types are routed by the Pdu Router

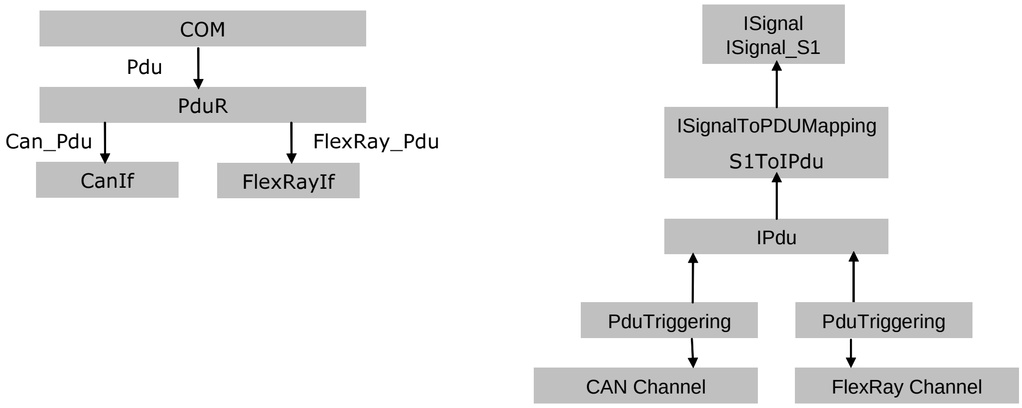


Figure 6.74: Pdu Router fan-out

6.10.2.2 Flexray Interface fan-out

The Flexray interface supports a fan-out where one Pdu is mapped into more than one frame on the same CommunicationCluster.

[TPS_SYST_01113] FlexRay Interface fan-out support ⌈ The redundant transmission in the FlexRay Interface in the static segment is described by

- one FlexrayFrameTriggering on each PhysicalChannel
- both FlexrayFrameTriggerings refer to the same FlexrayFrame with the same Pdu
- each FlexrayFrameTriggering aggregates the same number of FlexrayAbsolutelyScheduledTimings
- for every FlexrayAbsolutelyScheduledTiming on one PhysicalChannel a corresponding FlexrayAbsolutelyScheduledTiming with identical values shall be defined on the other PhysicalChannel

⌋()

If the fan-out is specified between different FlexRay channels of the same cluster it shall be handled by the FlexRay Interface.

The Flexray Interface does NOT handle fan-out/in between different clusters.

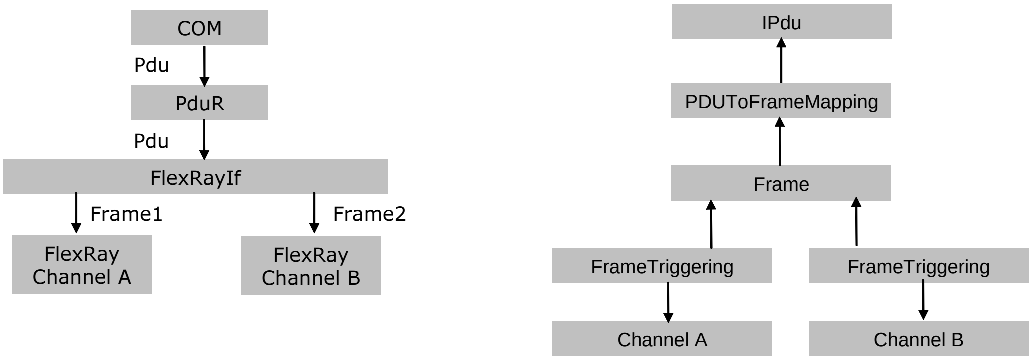


Figure 6.75: Bus Interface fan-out

6.10.3 Frame fan-out

[TPS_SYST_01114] Frame fan-out support ⌈ For the same `Frame`, if several `FrameTriggering`s with the same direction exist on more than one `PhysicalChannel` of the same `CommunicationCluster` the fan-out/in is handled by the interface. ⌋*()*

6.11 Support of Complex Drivers

The System Template allows the integration of custom communication means into AUTOSAR `EcuInstance`s.

[TPS_SYST_01115] CDD communication support ⌈ The elements `UserDefinedPdu` and `UserDefinedIPdu` shall be used to describe the Pdu-based communication via Complex Drivers. ⌋*(RS_SYST_00043)*

The `UserDefinedPdu` and `UserDefinedIPdu` elements are described in chapter 6.3 in more detail.

The `UserDefinedIPdu` can be used to describe the communication if a new BSW module was added above the PduR, e.g a Diagnostic Service.

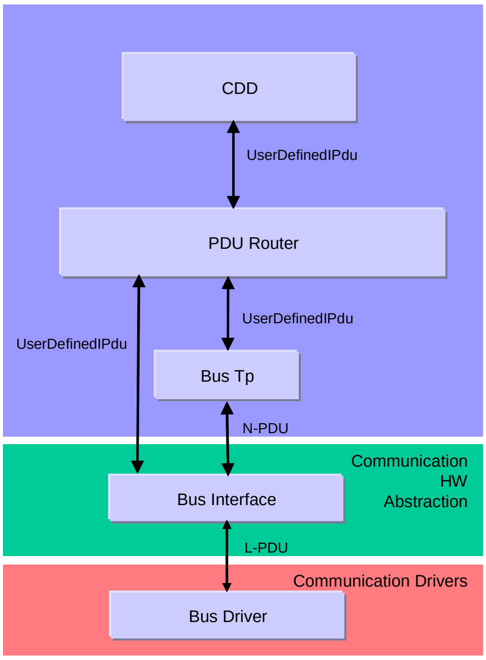


Figure 6.76: CDD over PduR

The UserDefinedPdu can be used to describe the communication if a new BSW module was added above an Interface, e.g. a new Nm module or XCP.

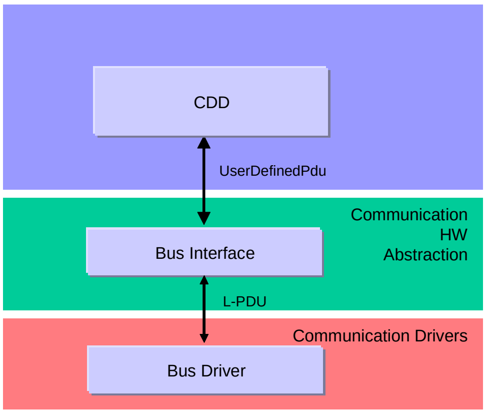


Figure 6.77: CDD over Bus Interface

7 Data Transformation

7.1 Outline

The transmission of data over a communication bus requires some effort to convey the information about the nature of the transmitted data from the sender to the receiver. Both sides need to agree on this part or else the communication will fail.

This aspect is complicated by the fact that in most cases it is uncommon to transmit information in an atomic manner piece by piece. For the sake of properly utilizing the available communication resources, pieces of data that may or may not have any semantic relationship with each other are packed into a single transmission unit.

In this case, the receiver does not only have to be informed about the nature of the individual pieces of information but also about the packing of these pieces into the transmission unit.

There are different approaches of how this goal can be achieved, these are described in the following sub-chapters.

7.1.1 Configuration of the Communication Layout

Use a configurable software package on both the sender and the receiver side that can adapt to virtually any possible packing of data. In this case the packing must be described in machine-readable form on a very detailed level in order to allow for the communication software to adapt to it.

For the sake of this argument, it doesn't really matter whether the adaption to the configuration is done at run-time or whether the configuration ends up in dedicated source code. The point is that the very detailed machine-readable configuration description is required to exist.

This approach used to be one of the pillars of the AUTOSAR standard as it entitled the players in the business with a maximum amount of flexibility and especially the OEMs are able to develop specific patterns for the design of their communication matrices that can, despite the diversity, be expressed with this approach.

This approach also facilitates the monitoring of transmission during development and deployment of the automotive software because monitoring tools can use the same configuration information to set themselves up for the task. This aspect is very important for debugging and quality assurance.

The downside, however, is that the act of laying out pieces of information in a limited number of transmission units becomes cumbersome and time-consuming. This effect becomes even more prominent with the advent of more advanced communication technologies that allow for a much bigger payload in single transmission units.

7.1.2 Data Transformation by Software

Don't care about the individual layout of information on the bus and let a piece of software take care of marshaling data onto the communication bus on the sender side and the reverse process on the receiver side.

This approach gains attractiveness in an environment where large and complicated pieces of information need to be transmitted.

Of course, in order to make this approach work it is necessary to standardize the behavior of the marshaling software to the necessary extent such that sender and receiver agree on how data needs to be processed.

With this approach, the amount of configuration can be reduced dramatically at the potential expense of efficiency and code size.

But this is not the end of the story as the idea of letting software take care of data "manipulation" can **following pretty much the same pattern** be utilized for further use cases:

End-to-end Protection Data is wrapped into a harness of meta-data that allows for checking data integrity at the receiver side.

Data Security Data is cryptographically processed such that it shall become impossible for unauthorized parties to intercept the communication process.

In other words, the approach is not limited to marshaling of data but can in the same way also be used for an array of other useful data transformations. This is why the terminology in this regard is not limited to the marshaling but to data transformation in general, hence the term **`Data Transformer`** is coined.

`Data Transformer`s can be chained such that, on the sender side, one `Data Transformer` picks up the result of the transformation of another `Data Transformer` and applies a specific transformation to the already processed data.

The receiver then is required to apply the `Data Transformer`s in reverse order in order to finally yield the actual data and provide it to the consumer (e.g. an `ApplicationSwComponentType`).

A basic principle of the `Data Transformer` approach, however, is that the `Data Transformer` is only responsible for the actual data transformation but **not** concerned about the communication of data. This can be taken care of by other software modules.

In total, the second approach provides a sufficient level of utility that it becomes part of the AUTOSAR standard. This chapter lays out the details of how `Data Transformer`s can be used in the context of this document.

Further information can also be found in the SWS RTE [24].

7.2 Use Cases

This chapter describes Transformer use cases that are supported by AUTOSAR.

7.2.1 Transmission of large composite data types over networks with large PDUs (e.g Ethernet)

With a serializing transformer, it is not necessary any more to map the atomic sub-elements of composite data types to individual signals in the RTE. The sending application SWC sends the composite data element using Sender/Receiver communication and hands the data over to the RTE. Then the complex data get transformed to a linear byte array and handed over to Com which sends the data to the receiving ECU. There, the Com stack receives the serialized data and notifies the RTE. The Rte reads the data and calls the deserializing transformer. The deserializing transformer transforms them back into the composite data element and gives the result to the RTE. The receiving SWC can now read the data and access it in the same form the sending SWC has sent them.

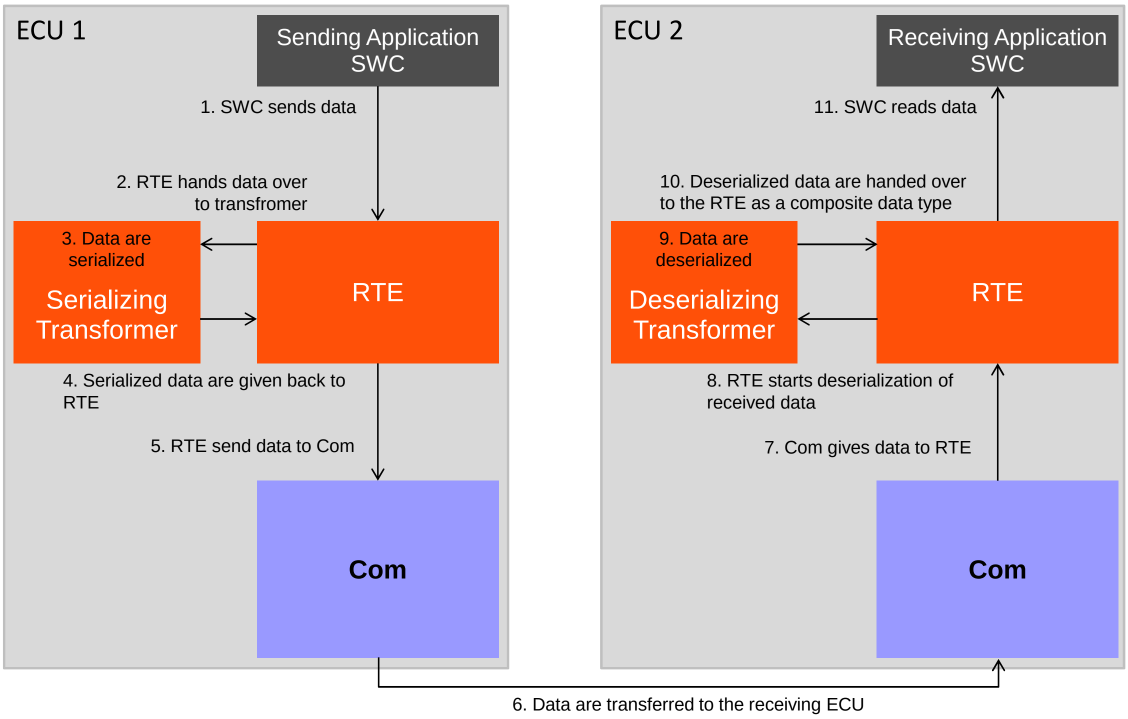


Figure 7.1: Transformer Use Case: Transmission of large composite data types over networks with large PDUs (e.g Ethernet)

7.2.2 Support of transmission from one sender to multiple receivers with Signal Fan-out

If a signal fan-out is configured in the System Description, the RTE has to hand over the data which should be transmitted multiple times to the Com stack. This is the case if multiple ISignals reference the same SystemSignal in the System Description.

For each ISignal the following steps have to be performed individually:

- transform the data
- hand it over to COM

Every receiver has to deserialize the ISignal in its transformer independently.

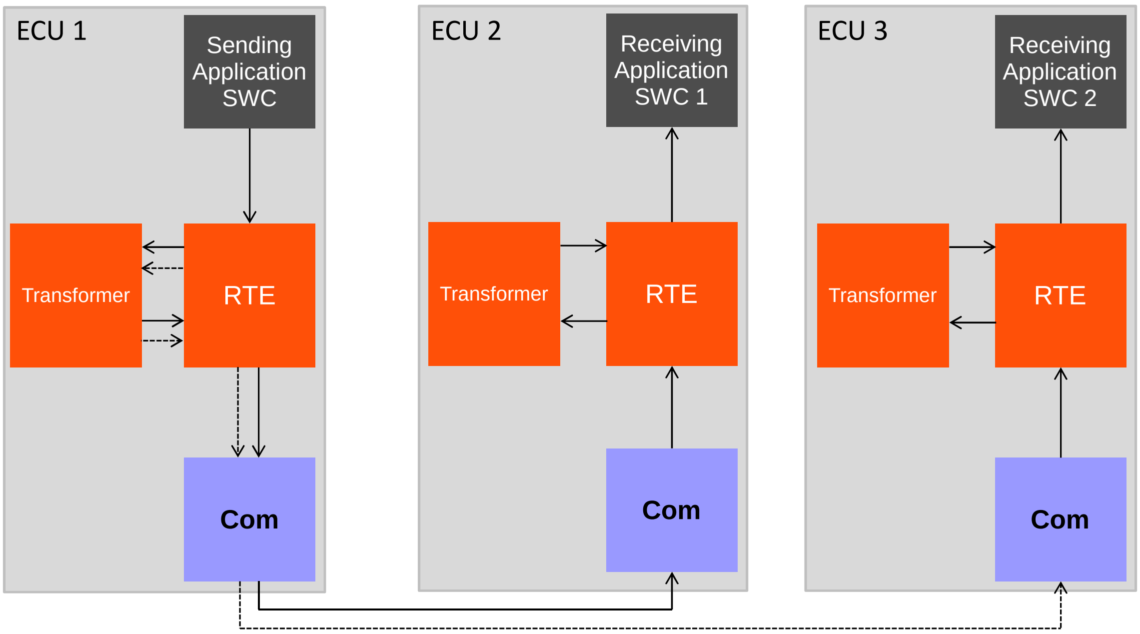


Figure 7.2: Transformer Use Case: RTE Fanout

7.2.3 Support of transmission from one sender to multiple receivers with PDU Fan-out

The transformation of inter-ECU Sender/Receiver communication should also work together with configurations that include Pdu fan-outs inside the COM stack (PduR fan-out). This is the case if multiple PduTriggerings reference the same Pdu in the System Description. In that scenario the data are sent by the sending application SWC to the RTE and transformed by the data transformer which is called by the RTE. Then the RTE hands the data over the Com. This happens only once. Due to the Pdu fan-out, the PduR sends the data multiple times to the Bus Interfaces using different Pdus.

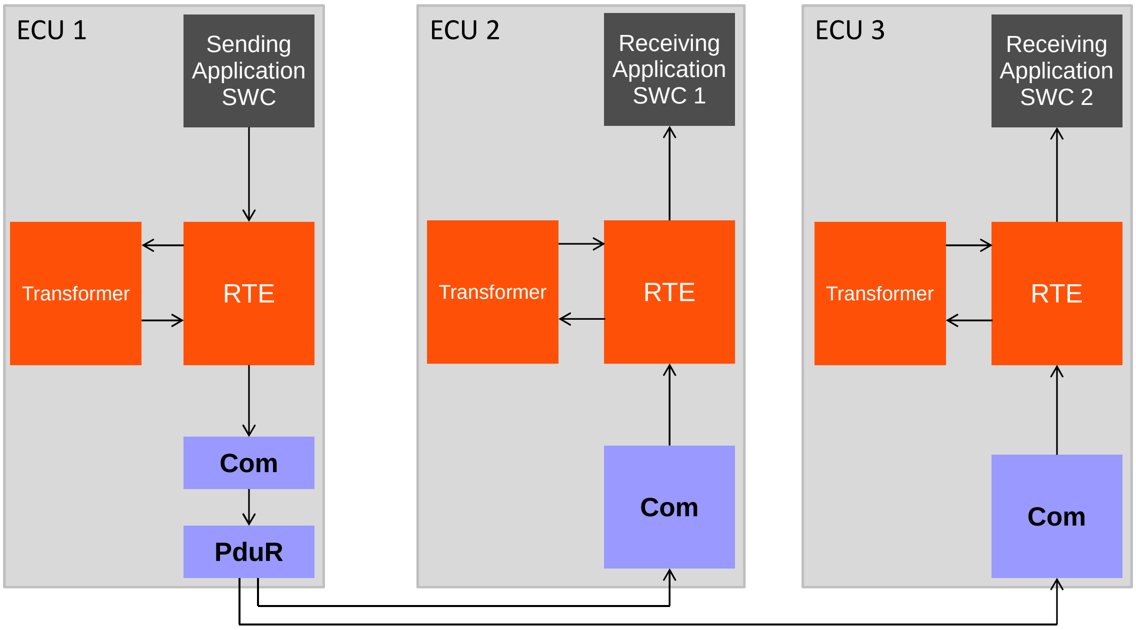


Figure 7.3: Transformer Use Case: PduR Fanout

7.2.4 Transformer Chaining

It is possible to chain multiple transformers. The output of one transformer then will be the input of the next transformer in the chain. Transformer for serialization data, for encrypting, digitally signing or compressing data can be implemented and used together. Such architecture could be used to assemble a system, where you can flexibly add functionality like compression or encryption to a serialized stream. In AUTOSAR the E2E-protection is implemented by an additional serializer which is appended to the chain.

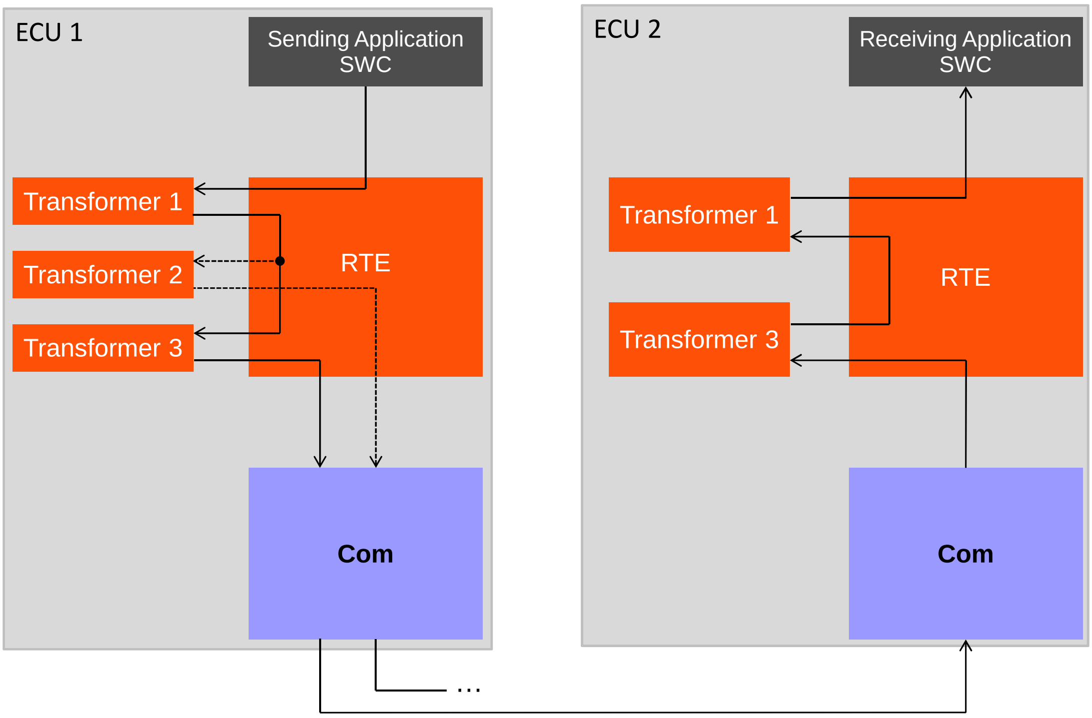


Figure 7.4: Transformer Use Case: Transformer Chain

7.2.5 Signal Group Based interaction of the transformer with the Com module

An initial transformer (serializer) performs the serialization according to the ISignal-ToIPduMapping from the system description. For each application data element the corresponding mapping to an ISignalIPdu position is respected. After the transformation chain is processed the serialized data is provided to the Com module. The Com module can have a signal based transmission mode selection defined and determines the respective transmission mode to be applied.

7.3 Transformer configuration

As a transformer provides well defined function signatures per each communication relation (ISignal based), which is marked for transformation, the function signature is NOT dependent from the transformation technology used, but only from the transmitted data elements (Client/Server operation signature or Sender/Receiver interface signature). The output of a transformer will be always a linear byte array.

Configuration of data transformation consists of three parts:

1. definition of the transformer chains with their transformers
2. configuration which communication is subject to transformation

3. configuration of the transformer properties for the transformed communication

The configuration of single transformers and whole transformer chains is shown in figure 7.5.

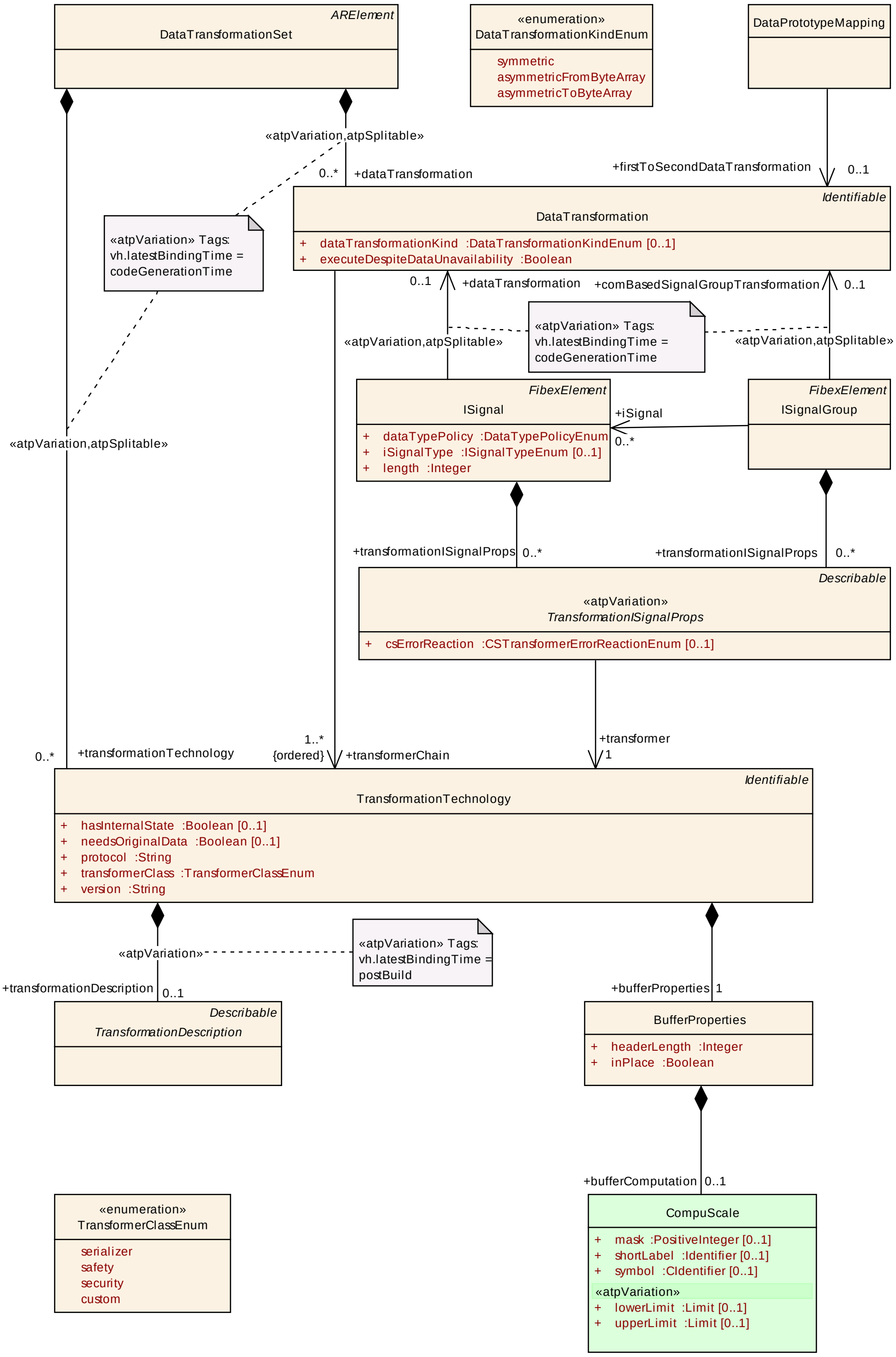


Figure 7.5: Configuration of transformers and transformer chains

The DataTransformationSet acts as a central container for the configuration of data transformation.

Class	DataTransformationSet			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This element is the system wide container of DataTransformations which represent transformer chains. **Tags:** atp.recommendedPackage=DataTransformationSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataTransformation	DataTransformation	*	aggr	This container consists of all transformer chains which can be used for transformation of data communication. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime
transformationTechnology	TransformationTechnology	*	aggr	Transformer that is used in a transformer chain for transformation of data communication. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime

Table 7.1: DataTransformationSet

Class	DataTransformation			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	A DataTransformation represents a transformer chain. It is an ordered list of transformers.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataTransformationKind	DataTransformationKindEnum	0..1	attr	This attribute controls the kind of DataTransformation to be applied.
executeDespiteDataUnavailability	Boolean	1	attr	Specifies whether the transformer chain is executed even if no input data are available.
transformerChain (ordered)	TransformationTechnology	1..*	ref	This attribute represents the definition of a chain of transformers that are supposed to be executed according to the order of being referenced from DataTransformation.

Table 7.2: DataTransformation

[TPS_SYST_02030] The DataTransformationSet contains all transformer chains ⌈ The DataTransformationSet contains transformer chains represented by DataTransformation elements. ⌋*(RS_SYST_00050)*

For each transformer chain it can be decided via the attribute executeDespiteDataUnavailability whether the RTE should try to execute the transformers of the transformer chain, even when no data are available as input. e.g. the queue is empty or there was an error in the COM stack. This is needed when no data are available but a transformer has to be executed anyway because it maintains an internal state which has to be updated to consider that data was expected but not available. This might be used in transformers which maintain an internal state. Of course the specifications and implementations of all transformers in the chain have to be able to cope with execution without valid input data.

[constr_3208] executeDespiteDataUnavailability usage restriction ⌈ In the set of more than one ISignal which reference the same SystemSignal in the role systemSignal, there shall be no ISignal which references a DataTransformation where executeDespiteDataUnavailability is set to true. ⌋*()*

In other words: There shall be no transformer chain which "belong" to the same SystemSignal due to signal fan-in where the attribute executeDespiteDataUnavailability is set to true.

[TPS_SYST_02031] A transformer is represented by a TransformationTechnology ⌈ A transformer is represented by a TransformationTechnology. ⌋ *(RS_SYST_00050)*

Class	**TransformationTechnology**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	A TransformationTechnology is a transformer inside a transformer chain. **Tags:** xml.namePlural=TRANSFORMATION-TECHNOLOGIES			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
bufferProperties	BufferProperties	1	aggr	Aggregation of the mandatory BufferProperties.
hasInternalState	Boolean	0..1	attr	This attribute defines whether the Transformer has an internal state or not.
needsOriginalData	Boolean	0..1	attr	Specifies whether this transformer gets access to the SWC's original data.
protocol	String	1	attr	Specifies the protocol that is implemented by this transformer.
transformationDescription	TransformationDescription	0..1	aggr	A transformer can be configured with transformer specific parameters which are represented by the TransformerDescription. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
transformerClass	TransformerClassEnum	1	attr	Specifies to which transformer class this transformer belongs.

Attribute	***Type***	***Mul.***	***Kind***	***Note***
version	String	1	attr	Version of the implemented protocol.

Table 7.3: TransformationTechnology

Enumeration	**TransformerClassEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Specifies the transformer class of a transformer.
Literal	***Description***
custom	The transformer is a custom transformer. **Tags:** atp.EnumerationValue=0
safety	The transformer is a safety transformer. **Tags:** atp.EnumerationValue=1
security	The transformer is a security transformer. **Tags:** atp.EnumerationValue=2
serializer	The transformer is a serializing transformer. **Tags:** atp.EnumerationValue=3

Table 7.4: TransformerClassEnum

[constr_3265] `TransformationTechnology.hasInternalState` setting for an E2E transformer ⌈ The value of `hasInternalState` shall be set to true for a `TransformationTechnology` with `transformerClass` set to `safety`. ⌋*()*

[constr_3266] `TransformationTechnology.hasInternalState` setting for a SOME/IP Transformer ⌈ The value of `hasInternalState` shall be set to true for a SOME/IP Transformer if `SOMEIPTransformationISignalProps.sessionHandlingSR` for the `ISignal` is set to active. ⌋*()*

[TPS_SYST_02032] Transformer chains are ordered list of transformers ⌈ A transformer chain consists of an ordered list of `TransformationTechnology`s (transformers). ⌋*(RS_SYST_00050)*

[constr_3121] The length of transformer chains is limited to 255 transformers ⌈ The maximum number of `DataTransformation.transformerChain` references in the context of one `DataTransformation` shall be limited to 255. ⌋*()*

[constr_3122] At most one transformer of each transformer class inside a transformer chain ⌈ If the value of a `transformerClass` of a `TransformationTechnology` referenced by a `DataTransformation` does not equal `custom`, it shall be different from all other `transformerClass` values of `TransformationTechnology`s referenced by the same `DataTransformation`. ⌋*()*

Only for `custom` transformers it is possible to specify more than one transformer of the same class in the same transformer chain. For all other transformer classes, at most one transformer of a transformer class is allowed to exist in the same transformer chain.

[constr_3123] Serializer transformer shall be the first in a chain ⌈ A serializer transformer (TransformationTechnology with attribute transformerClass set to serializer) shall be the first transformer in a transformer chain. ⌋*()*

[TPS_SYST_02033] Order of the transformerChain references in the configuration represents the order on the sending side ⌈ The order of DataTransformation.transformerChain references in the context of one DataTransformation represents the transformation order on the sending side. ⌋*(RS_SYST_00050)*

[TPS_SYST_02034] Order of the transformers on the receiving side is the reverse of the sending side ⌈ The order of the transformers on the receiving side of the data shall be the inverse order of the order of the sending side. ⌋*(RS_SYST_00050)*

[TPS_SYST_02035] protocol contains the human readable protocol identifier ⌈ The attribute protocol of a TransformationTechnology contains the protocol name as a String which this transformer implements. ⌋*(RS_SYST_00050)* This attribute is used to distinguish transformers in a human readable way.

[TPS_SYST_02036] version contains the version of the protocol ⌈ The attribute version of a TransformationTechnology contains the version of the protocol as a String implemented by this transformer. ⌋*(RS_SYST_00050)* This attribute is used to distinguish transformers.

[TPS_SYST_02037] The attribute needsOriginalData configures a transformer's access to the original data ⌈ The attribute needsOriginalData of a TransformationTechnology specifies whether transformer needs access to the original data. ⌋*(RS_SYST_00050)*

If it is set to true, the transformer will gain access to the original data. If it is set to false, the transformer will not gain access to the original data.

[constr_3124] Applicability of needsOriginalData ⌈ The attribute needsOriginalData of a TransformationTechnology shall only be used for the non-first transformers in the transformer chain. ⌋*()*

This will only influence the signatures of the transformer on the sender or client side, not on the receiver or server side of a communication.

[TPS_SYST_02038] Specification of transformer class ⌈ The transformer class to which this transformer belongs to is specified in the attribute transformerClass of a TransformationTechnology ⌋*(RS_SYST_00050)*

[TPS_SYST_02039] Specification of transformer specific properties ⌈ Further transformer specific properties can be stated inside the TransformationDescription in the role transformationDescription of a TransformationTechnology ⌋*(RS_SYST_00050)*

Note:
This is an abstract class without any specified content. If AUTOSAR specifies a trans-

former and this transformer need configuration possibilities, this class can be inherited to hold those as some kind of container.

[TPS_SYST_02040] Specification of transformer buffer handling ⌈ The BufferProperties in the role bufferProperties of a TransformationTechnology specify the buffer handling which shall be executed by the RTE for this transformer. ⌋ *(RS_SYST_00050)*

Class	**BufferProperties**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	Configuration of the buffer properties the transformer needs to work.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
bufferComputation	CompuScale	0..1	aggr	If the transformer changes the size of the data, the CompuScale can be used to specify a rule to derive the size of the output data based on the size of the input data.
headerLength	Integer	1	attr	Defines the length of the header (in bits) this transformer will add in front of the data.
inPlace	Boolean	1	attr	If set, the transformer uses the input buffer as output buffer.

Table 7.5: BufferProperties

[TPS_SYST_02041] In-place buffer handling of transformers ⌈ The attribute inPlace of BufferProperties specifies whether the transformation happens in-place. ⌋ *(RS_SYST_00050)*

[constr_3125] Value of attribute inPlace for the first transformer in a chain ⌈ The attribute inPlace shall be set to false if the TransformationTechnology of the BufferProperties is referenced as first reference in the ordered list of references transformerChain from a DataTransformation. ⌋ *()*

[TPS_SYST_02042] Header length to be considered by transformers ⌈ The attribute headerLength of BufferProperties specifies the length of the header (in bits) which the transformer adds. ⌋ *(RS_SYST_00050)*

[constr_3126] headerLength shall be less or equal output buffer size ⌈ The headerLength shall be less or equal of the worst case output buffer size which is specified in bufferComputation in BufferProperties. ⌋ *()*

[constr_3364] headerLength shall be a multiple of 8 ⌈ The header length in bits specified by headerLength shall be a multiple of 8. ⌋ *()*

[TPS_SYST_02043] Buffer computation of transformer ⌈ The CompuScale aggregated as bufferComputation in BufferProperties specifies the computation formula how the transformer changes the buffer length between input and output. This enables the calculation of a safe worst case output size. ⌋ *(RS_SYST_00050)*

[constr_3314] BufferProperties.bufferComputation is mandatory ⌈ The BufferProperties that is aggregated by TransformationTechnology in the role bufferProperties shall always define the bufferComputation. ⌋*()*

[TPS_SYST_02044] Buffer computation of transformer ⌈ The bufferComputation in BufferProperties shall specify the formula:
$OutputBufferLength = CompuScale(InputBufferLength)$, where InputBufferLength is computed according to [SWS_Rte_03867]. ⌋*(RS_SYST_00050)*

The CompuScale in the role bufferComputation defines the list of polynomial factors. The first factor represents the power of zero. Please note that the headerLength does NOT separately affect the size of the output buffer.

The following series of XML fragments exemplifies how the CompuScale in the role bufferComputation can be used to describe the buffer needs of a transformer.

The following XML in Listing 7.1 shows the buffer properties of transformer which extends the input data length by adding a header with the length of 8 bytes and a tail of 4 bytes. Therefore the buffer needs to grow by 12 bytes.

$OutputBufferSize = 8Bytes + 1 * InputDataLength + 4Bytes$

Listing 7.1: Example for a CompuScale which specifies a buffer that grows by 12

```xml
<TRANSFORMATION-TECHNOLOGY>
  <SHORT-NAME>Transformer1</SHORT-NAME>
  <BUFFER-PROPERTIES>
    <BUFFER-COMPUTATION>
      <COMPU-RATIONAL-COEFFS>
        <COMPU-NUMERATOR>
          <V>12</V>
          <V>1</V>
        </COMPU-NUMERATOR>
        <COMPU-DENOMINATOR>
          <V>1</V>
        </COMPU-DENOMINATOR>
      </COMPU-RATIONAL-COEFFS>
    </BUFFER-COMPUTATION>
    <HEADER-LENGTH>64</HEADER-LENGTH>
    <IN-PLACE>false</IN-PLACE>
  </BUFFER-PROPERTIES>
  <PROTOCOL>Serializer</PROTOCOL>
  <TRANSFORMER-CLASS>SERIALIZER</TRANSFORMER-CLASS>
  <VERSION>1.0.0</VERSION>
</TRANSFORMATION-TECHNOLOGY>
```

The following XML in Listing 7.2 shows the buffer properties of transformer which doubles the length of the data in the transformer and adds additional 8 bytes as header.

$OutputBufferSize = 8Bytes + 2 * InputDataLength$

Listing 7.2: Example for a CompuScale which specifies where the data size double and additionally grows by 8

```xml
<TRANSFORMATION-TECHNOLOGY>
  <SHORT-NAME>Transformer1</SHORT-NAME>
```

```
      <BUFFER-PROPERTIES>
        <BUFFER-COMPUTATION>
          <COMPU-RATIONAL-COEFFS>
            <COMPU-NUMERATOR>
              <V>8</V>
              <V>2</V>
            </COMPU-NUMERATOR>
            <COMPU-DENOMINATOR>
              <V>1</V>
            </COMPU-DENOMINATOR>
          </COMPU-RATIONAL-COEFFS>
        </BUFFER-COMPUTATION>
        <HEADER-LENGTH>64</HEADER-LENGTH>
        <IN-PLACE>false</IN-PLACE>
      </BUFFER-PROPERTIES>
      <PROTOCOL>Serializer</PROTOCOL>
      <TRANSFORMER-CLASS>SERIALIZER</TRANSFORMER-CLASS>
      <VERSION>1.0.0</VERSION>
    </TRANSFORMATION-TECHNOLOGY>
```

Note: Listing 7.1 and Listing 7.2 deliberately leave out any TransformationTechnology specific attributes, since both listings are about BufferProperties.bufferComputation only.

[constr_3286] ISignal.length shall be consistent to transformer configuration
⌈ For ISignals that are used for transformed data, the value ISignal.length shall be greater or equal to the maximum possible size of the transformed data (including alignment). This size can be calculated by using the formulas specified in the TransformationTechnology.bufferProperties.bufferComputation of all TransformationTechnologies in the ordered list DataTransformation.transformerChain for the length that is determined from the mapped VariableDataPrototype. ⌋*()*

The following examples are showing the calculation of the length of an ISignal that transports a VariableDataPrototype of ImplementationDataType of category STRUCTURE via a SOME/IP Transformer.

The example struct consists of five members:

Member1: UINT16

Member2: Struct with a UINT16 length field and a one-dimensional variableSize Array with UINT8 elements and arraySize = 8

Member3: UINT32

Member4: UINT64

Member5: Struct with a UINT16 length field and a one-dimensional variableSize Array with UINT8 elements and arraySize = 8

The SOME/IP Transformer takes the InputData and adds additional 8 bytes as header. In case of SOME/IP the signal based SOMEIPTransformationISignalProps and the DataPrototype based SOMEIPTransformationProps need to be considered as well for the calculation of the ISignal.length (see chapter 7.3.2.2 for more details). In our example the following SOMEIPTransformationProps settings are valid for the variableSize Array:

- SOMEIPTransformationProps.alignment = 64

All these settings lead to the ISignal.length of 368 bits as shown in figure Figure 7.6. A padding element is inserted after the first variable size array as described in [PRS_SOMEIP_00611]. The second variable size array is the last element in the serialized data stream and therefore no padding element is inserted afterwards. The automatic padding in SOME/IP after variable size data is described in more detail in [25].

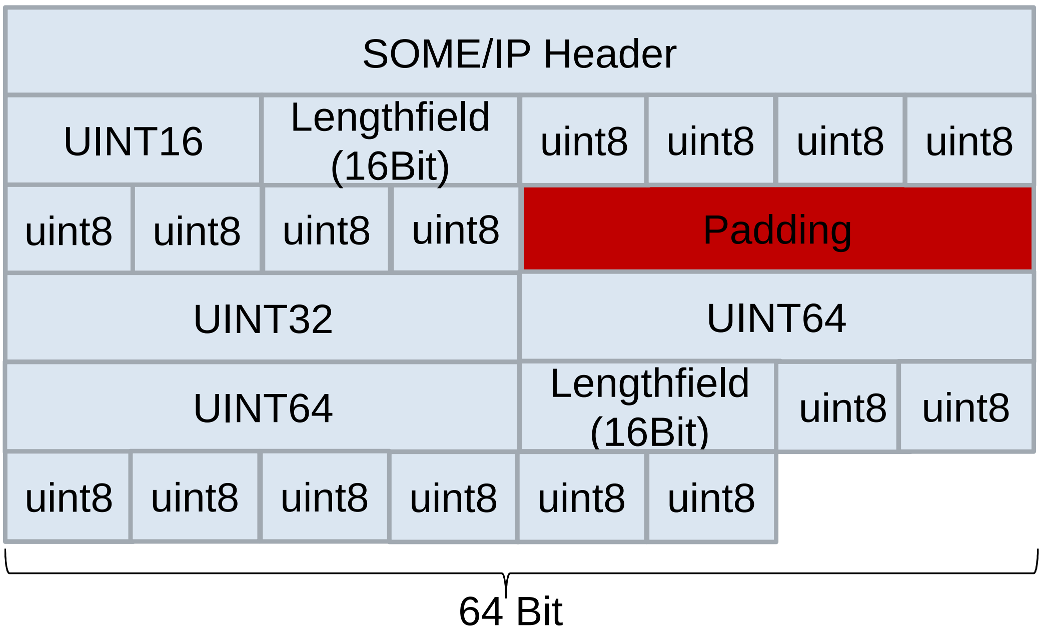


Figure 7.6: Example for calculation of the ISignal.length

Please note that the padding in the SOME/IP data stream depends on the actual number of elements that are transmitted in the variable data. Figure Figure 7.7 shows an example where only three elements are transmitted in the first variable size array and therefore the padding is restricted to 1 byte.

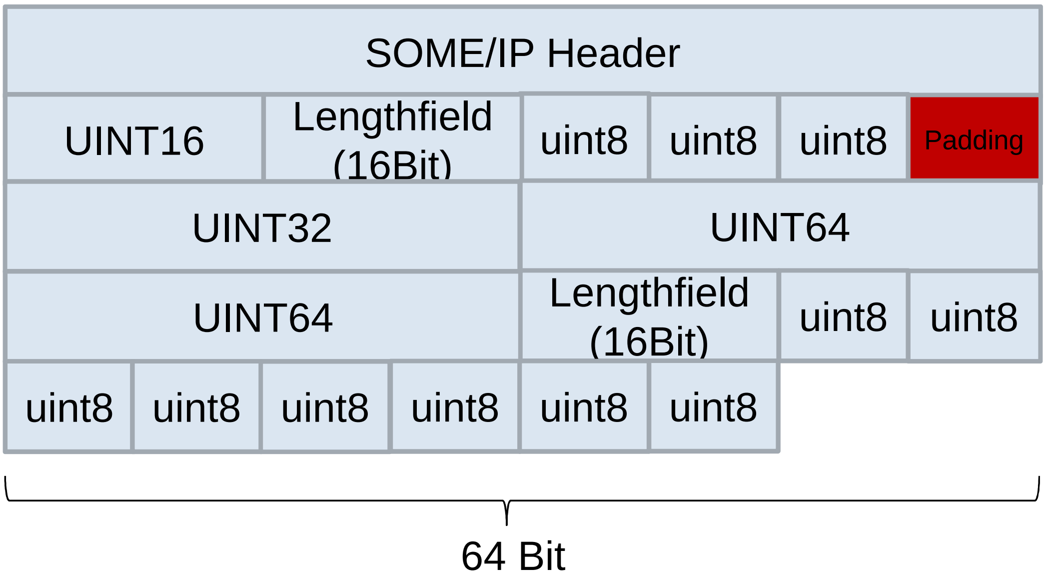


Figure 7.7: SOME/IP Padding Example

Transformer specific configuration can be done in the `TransformationDescription`.

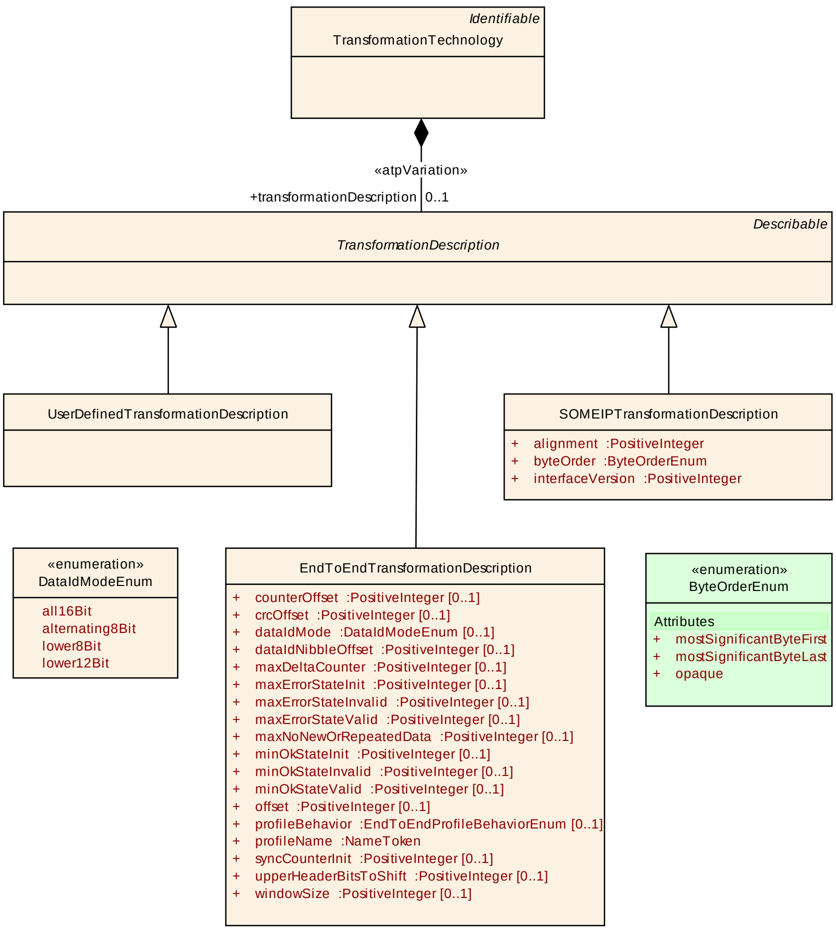


Figure 7.8: Configuration of transformers using `TransformationDescription`

Class	**TransformationDescription (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The TransformationDescription is the abstract class that can be used by specific transformers to add transformer specific properties.			
Base	ARObject, Describable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 7.6: TransformationDescription

Class	**UserDefinedTransformationDescription**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The UserDefinedTransformationDescription is used to specify details and documentation for custom transformers.			
Base	ARObject, Describable, TransformationDescription			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 7.7: UserDefinedTransformationDescription

[TPS_SYST_02045] SOME/IP Transformer configuration ⌈ SOME/IP Transformer shall be configured using `SOMEIPTransformationDescription`. ⌋ *(RS_SYST_00050)*

[TPS_SYST_02046] E2E Transformer configuration ⌈ E2E Transformer shall be configured using `EndToEndTransformationDescription`. ⌋ *(RS_SYST_00050)*

For details how to configure those transformers please see chapter 7.3.2 and chapter 7.3.4.

[TPS_SYST_02047] Custom transformer configuration ⌈ For custom transformers the specific configuration options shall be placed inside `UserDefinedTransformationDescription`. ⌋ *(RS_SYST_00050)*

To place the custom data in `UserDefinedTransformationDescription` the `AdminData` could be used for example.

The configuration in `TransformationDescription` is valid for the transformer (`TransformationTechnology`) and all associated `ISignal`s. If `ISignal` specific configuration shall be realized which is only valid for the transformation of a specific `ISignal`, the `TransformationISignalProps` shall be used.

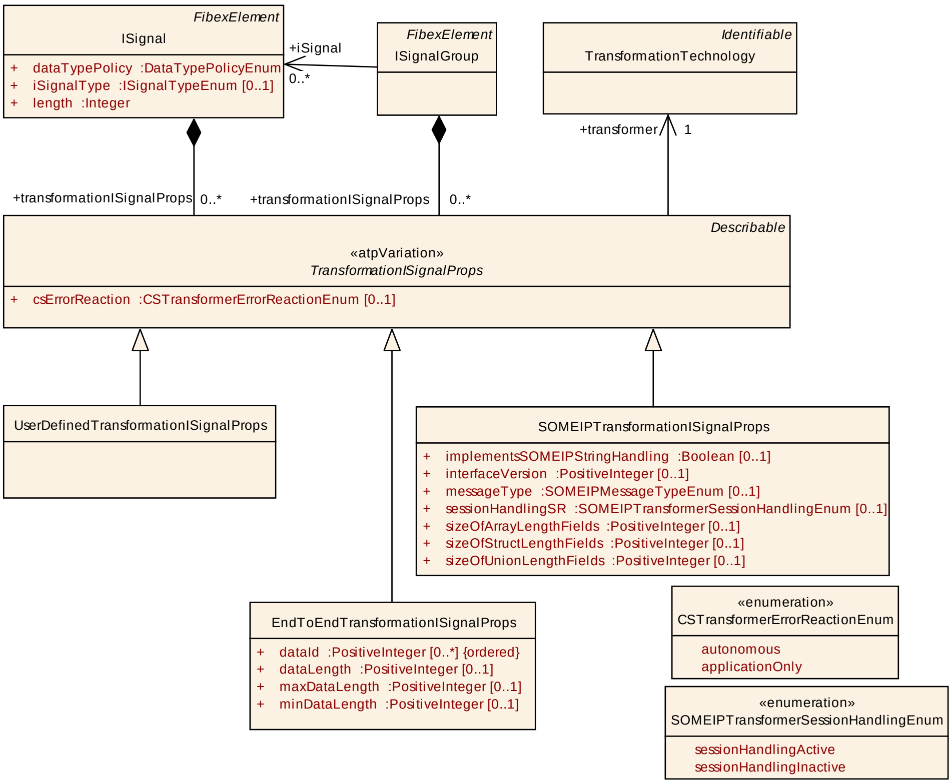


Figure 7.9: Configuration of transformers using TransformationISignalProps

Class	≪atpVariation≫ **TransformationISignalProps (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	TransformationISignalProps holds all the attributes for the different TransformationTechnologies that are ISignal specific. **Tags:** vh.latestBindingTime=postBuild			
Base	ARObject, Describable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
csErrorReaction	CSTransformerErrorReactionEnum	0..1	attr	Defines whether the transformer chain of client/server communication coordinates an autonomous error reaction together with the RTE or whether any error reaction is the responsibility of the application.
dataPrototypeTransformationProps	DataPrototypeTransformationProps	*	aggr	Fine granular modeling of TransfromationProps on the level of DataPrototypes.
transformer	TransformationTechnology	1	ref	Reference to the TransformationTechnology description that contains transformer specific and ISignal independent configuration properties.

Table 7.8: TransformationISignalProps

Enumeration	**CSTransformerErrorReactionEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer

Note	Possible kinds of error reaction in case of a hard transformer error.
Literal	***Description***
applicationOnly	The application is responsible for any error reaction. No autonomous error reaction of RTE and transformer. **Tags:** atp.EnumerationValue=0
autonomous	RTE and Transformer coordinate an autonomous error reaction on their own. **Tags:** atp.EnumerationValue=1

Table 7.9: CSTransformerErrorReactionEnum

[TPS_SYST_02048] ISignal specific transformation configuration ⌈ If an ISignal references a TransformationTechnology in the role dataTransformation and this transformation shall be configured ISignal specific, the ISignal shall aggregate a TransformationISignalProps element. ⌋*(RS_SYST_00050)*

[TPS_SYST_02049] Transformer specific TransformationISignalProps ⌈ The attribute transformer of TransformationISignalProps shall reference the TransformationTechnology in the transformer chain (DataTransformation) for which the ISignal specific configuration shall be given. ⌋*(RS_SYST_00050)*

[constr_3213] TransformationISignalProps.csErrorReaction setting in case that the serializer transformerClass and Client/Server communication is used ⌈ In TransformationISignalProps the attribute csErrorReaction shall be set if the TransformationISignalProps specifies the details for a TransformationTechnology with transformerClass equal to serializer and the ISignal that aggregates the TransformationISignalProps transports a client/server communication. ⌋*()*

[constr_3214] TransformationISignalProps.csErrorReaction setting in case that a transformerClass different from serializer is used or the Client/Server communication is not used ⌈ In TransformationISignalProps the attribute csErrorReaction shall not be used if the TransformationISignalProps specifies the details for a TransformationTechnology with transformerClass not equal to serializer or the ISignal that aggregates the TransformationISignalProps does not transport a client/server communication. ⌋*()*

[TPS_SYST_02074] Precedence of transformer configuration settings ⌈ The same transformer configuration settings may exist in the TransformationDescription, TransformationISignalProps and TransformationComSpecProps elements. The following precedence is valid for such settings:

- TransformationDescription: configuration valid for several ISignals (in case the SOME/IP Transformer or Custom Transformer is used) or ISignalGroups (in case the ComBasedTransformer is used).

- TransformationISignalProps: defines the configuration options valid for a specific referenced ISignal or ISignalGroup. This settings override possible settings in the TransformationDescription.
- TransformationComSpecProps: defines the configuration settings valid for the port to which the ReceiverComSpec belongs (for more details see [5]). This settings override possible settings in the TransformationDescription and TransformationISignalProps.

⌋*(RS_SYST_00050)*

[TPS_SYST_02075] Mandatory attributes in transformer configuration elements ⌈ If a transformer configuration attribute is mandatory due to a particular constraint it means that it shall be defined in at least one of the three possible locations: TransformationDescription, TransformationISignalProps or TransformationComSpecProps. ⌋*(RS_SYST_00050)*

[TPS_SYST_02050] ISignal specific configuration of the SOME/IP Transformer ⌈ The ISignal specific configuration of the SOME/IP Transformer shall be configured using SOMEIPTransformationISignalProps. ⌋*(RS_SYST_00050)*

[TPS_SYST_02051] ISignal specific configuration of the E2E Transformer ⌈ The ISignal specific configuration of the E2E Transformer shall be configured using EndToEndTransformationISignalProps. ⌋*(RS_SYST_00050)*

For details how to configure those transformers ISignal specific please see chapter 7.3.2 and chapter 7.3.4.

[TPS_SYST_02052] ISignal specific configuration of custom transformers ⌈ The ISignal specific configuration of custom transformers shall be configured using UserDefinedTransformationISignalProps. ⌋*(RS_SYST_00050)*

To place the custom data in UserDefinedTransformationDescription the AdminData could be used for example.

To configure which communication shall be subject to transformation is done via references from ISignals and ISignalGroups to DataTransformations. An overview is shown in figure 7.10.

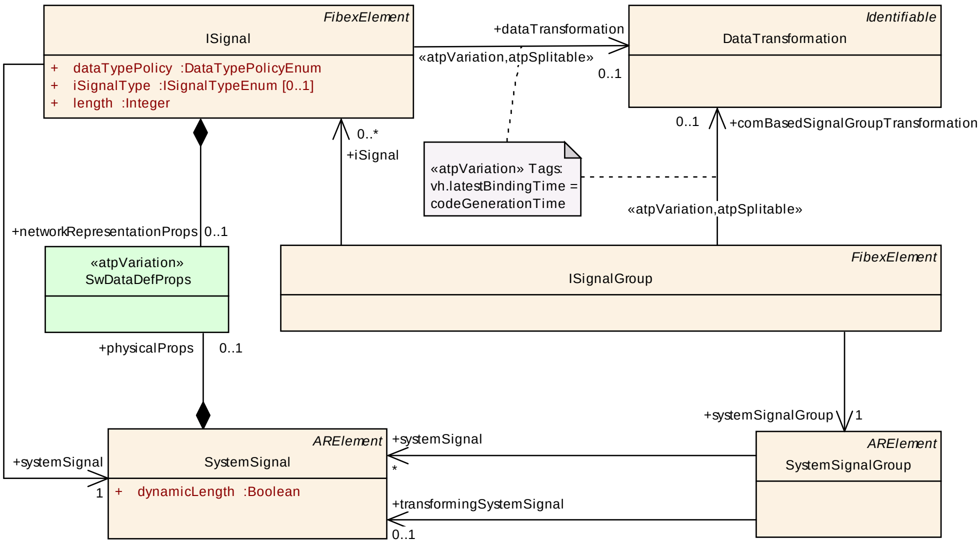


Figure 7.10: Configuration which communication shall be transformed

The DataTransformation element (which represents a transformer chain) is

- either referenced by the ISignal in the role dataTransformation which holds the transformed representation of the data
- referenced by the ISignalGroup in the role comBasedSignalGroupTransformation which holds the custom mapping of the data to the transformed representation or
- referenced by a DataPrototypeMapping in the role firstToSecondDataTransformation,

as defined in [constr_1400] in [5].

A VariableDataPrototype can either become a part of a DataPrototypeMapping based data transformation or of an ISignal-based data transformation as defined in [constr_1401] in [5].

[constr_1387] Transmission of Variable-Size Array Data Types by means of a Transformer ⌈ If a Transformer is used for the transmission of a Variable-Size Array Data Types then the Variable-Size Array Data Type shall be a "new-world" variable-size array data type according to [TPS_SWCT_01644] and [TPS_SWCT_01645]. "Old-world" dynamic-size array data types according to [TPS_SWCT_01642] and [TPS_SWCT_01643] are not supported. ⌋*()*

7.3.1 Generic Transformer

[TPS_SYST_02053] A reference from ISignal to DataTransformation in the role dataTransformation enables data transformation ⌈ To enable the transformation of data, the ISignal which shall hold the transformed data shall reference a DataTransformation in the role dataTransformation. ⌋*(RS_SYST_00050)*

[TPS_SYST_02054] Definition of data which shall be transformed ⌈ If

1. an ISignal references a DataTransformation and
2. this ISignal references a SystemSignal and
3. the referenced SystemSignal is referenced by a SenderReceiverToSignalMapping in the role systemSignal or referenced by a ClientServerToSignalMapping in the role returnSignal and in the role callSignal

then the VariableDataPrototype referenced by the SenderReceiverToSignalMapping or the ClientServerOperation referenced by the ClientServerToSignalMapping shall be transformed. ⌋*(RS_SYST_00050)*

Using this configuration the result of the transformation will be put into the ISignal even if the data type is a composite type.

Furthermore, another SystemSignal can be added to a SystemSignalGroup in the role transformingSystemSignal to support the configuration where a complex data element is transferred via Sender/Receiver communication both using transformation and traditional mapping of RTE and COM.
The ISignal which references the SystemSignal which is referenced by a SystemSignalGroup in the role transformingSystemSignal shall reference a DataTransformation to transport the transformed data.
In parallel, the traditional mapping of RTE and COM maps all other SystemSignals of the SystemSignalGroup which are referenced in the role systemSignal.

[constr_3127] Certain ISignals always need a reference to DataTransformation ⌈ An ISignal which references a SystemSignal which is referenced by a SystemSignalGroup in the role transformingSystemSignal shall always reference a DataTransformation. ⌋*()*

7.3.2 SOME/IP Transformer

The specific configuration for SOME/IP transformers takes place in SOMEIPTransformationDescription and SOMEIPTransformationISignalProps shown in Figure 7.11.

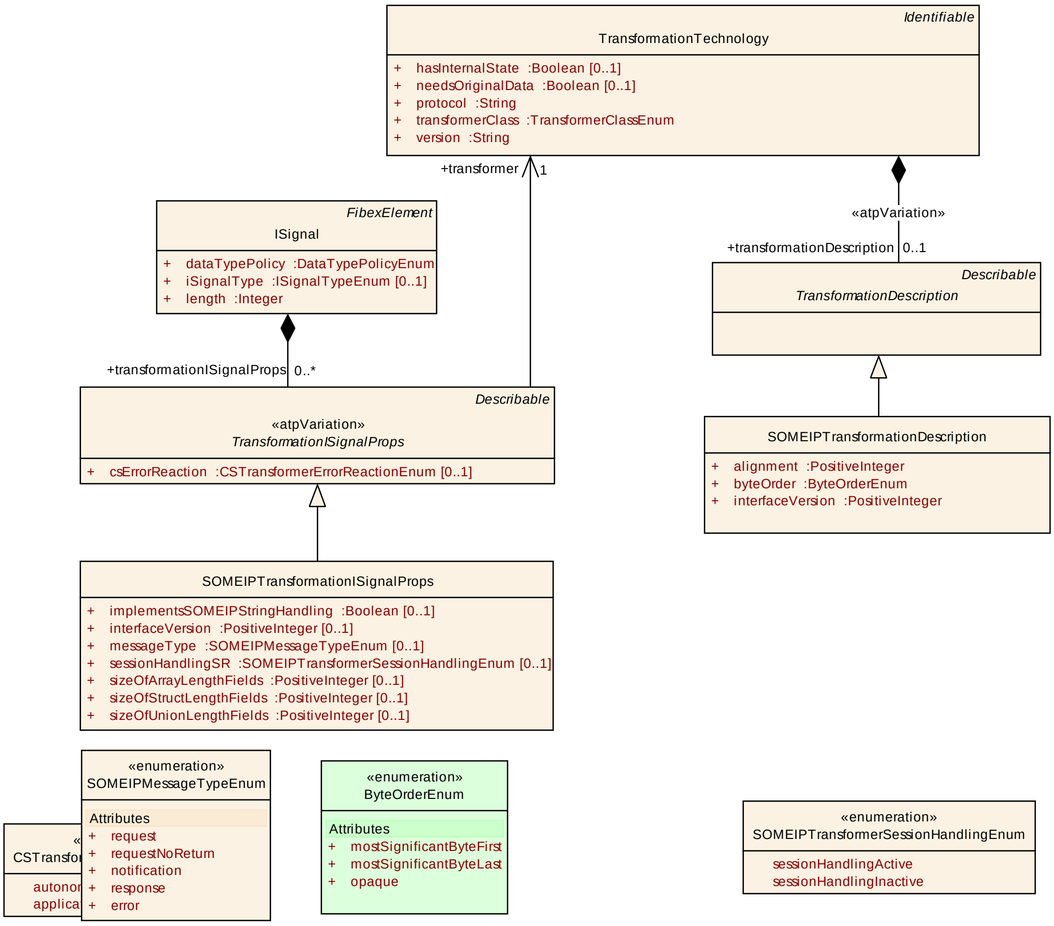


Figure 7.11: SOME/IP specific configuration

Class	**SOMEIPTransformationDescription**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The SOMEIPTransformationDescription is used to specify SOME/IP transformer specific attributes.			
Base	ARObject, Describable, TransformationDescription			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
alignment	PositiveInteger	1	attr	Specifies the alignment of dynamic data in the serialized data stream. The alignment shall be specified in Bits.
byteOrder	ByteOrderEnum	1	attr	Defines which byte order shall be serialized by the SOME/IP transformer
interfaceVersion	PositiveInteger	1	attr	The interface version the SOME/IP transformer shall use.

Table 7.10: SOMEIPTransformationDescription

Class	≪atpVariation≫ **SOMEIPTransformationISignalProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The class SOMEIPTransformationISignalProps specifies ISignal specific configuration properties for SOME/IP transformer attributes.			
Base	ARObject, Describable, TransformationISignalProps			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
implementsSOMEIPStringHandling	Boolean	0..1	attr	This attribute indicates whether Strings in the SOME/IP message shall be processed according to the SOME/IP specification for Strings. This attribute has been introduced due to compatibility reasons for AUTOSAR before R4.3. If this attribute is set to true Strings in the payload shall be handled according to the SOME/IP specification on Strings. If this attribute is set to false (or not set) no special handling for Strings in the payload shall be performed.
interfaceVersion	PositiveInteger	0..1	attr	The interface version the SOME/IP transformer shall use.
messageType	SOMEIPMessageTypeEnum	0..1	attr	The Message Type which shall be placed into the SOME/IP header.
sessionHandlingSR	SOMEIPTransformerSessionHandlingEnum	0..1	attr	Defines whether the SOME/IP transformer shall use session handling for Sender/Receiver communication.
sizeOfArrayLengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of fixed-size arrays in the SOME/IP message. This attribute is valid for all available occurrences of fixed-size arrays in the SOME/IP message. For a more fine granular modeling on the level of DataPrototypes the DataPrototypeTransformationProps shall be used.
sizeOfStructLengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of structs in the SOME/IP message. This attribute is valid for all available occurrences of structures in the SOME/IP message. For a more fine granular modeling on the level of DataPrototypes the DataPrototypeTransformationProps shall be used.
sizeOfUnionLengthFields	PositiveInteger	0..1	attr	The size of all length fields (in Bytes) of unions in the SOME/IP message. This attribute is valid for all available occurrences of Unions in the SOME/IP message. For a more fine granular modeling on the level of DataPrototypes the DataPrototypeTransformationProps shall be used.

Table 7.11: SOMEIPTransformationISignalProps

Enumeration	**ByteOrderEnum**
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::PrimitiveTypes

Note	When more than one byte is stored in the memory the order of those bytes may differ depending on the architecture of the processing unit. If the least significant byte is stored at the lowest address, this architecture is called little endian and otherwise it is called big endian. ByteOrder is very important in case of communication between different PUs or ECUs.
Literal	***Description***
mostSignificantByteFirst	Most significant byte shall come at the lowest address (also known as BigEndian or as Motorola-Format) **Tags:** atp.EnumerationValue=0
mostSignificantByteLast	Most significant byte shall come highest address (also known as LittleEndian or as Intel-Format) **Tags:** atp.EnumerationValue=1
opaque	For opaque data endianness conversion has to be configured to Opaque. See AUTOSAR COM Specification for more details. **Tags:** atp.EnumerationValue=2

Table 7.12: ByteOrderEnum

Enumeration	**SOMEIPMessageTypeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Depending on the style of the communication different message types shall be set in the header of a SOME/IP message.
Literal	***Description***
error	The response containing an error. **Tags:** atp.EnumerationValue=0
notification	A request of a notification expecting no response. **Tags:** atp.EnumerationValue=1
request	A request expecting a response. **Tags:** atp.EnumerationValue=2
requestNoReturn	A fire&forget request. **Tags:** atp.EnumerationValue=3
response	The response message. **Tags:** atp.EnumerationValue=4

Table 7.13: SOMEIPMessageTypeEnum

Enumeration	**SOMEIPTransformerSessionHandlingEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Enables or disable session handling for SOME/IP transformer
Literal	***Description***

sessionHandlingActive	The SOME/IP Transformer shall use session handling **Tags:** atp.EnumerationValue=0
sessionHandlingInactive	The SOME/IP Transformer doesn't use session handling **Tags:** atp.EnumerationValue=1

Table 7.14: SOMEIPTransformerSessionHandlingEnum

[constr_3128] SOME/IP transformer configuration ⌈ For each TransformationDescription variant that is a SOMEIPTransformationDescription

- attribute protocol of TransformationTechnology shall be set to SOMEIP
- attribute version of TransformationTechnology shall be set to 1.0.0
- attribute transformerClass of TransformationTechnology shall be set to serializer
- attribute headerLength of BufferProperties shall be set to 64 (bits).

⌋*()*

The SOMEIPTransformationDescription contains the configuration for the transformer which shall be applied to all transformations. ISignal specific transformer configuration (which "override" the general ones) shall be done in SOMEIPTransformationISignalProps.

[TPS_SYST_02055] Alignment of SOME/IP ⌈ The attribute alignment defines the alignment used in the SOME/IP transformer in Bits. ⌋*(RS_SYST_00050)*

[TPS_SYST_02056] Byte Order of SOME/IP ⌈ The attribute byteOrder defines the byte order used in the SOME/IP transformer for creating the on wire format. ⌋*(RS_SYST_00050)*

[constr_3129] Byte Order of SOME/IP transformer ⌈ The attribute byteOrder of SOMEIPTransformationDescription shall be different from opaque. ⌋*()*

[TPS_SYST_02057] Interface Version of SOME/IP ⌈ The attribute interfaceVersion of SOMEIPTransformationDescription as well as interfaceVersion of SOMEIPTransformationISignalProps defines the interface version used by the SOME/IP transformer. ⌋*(RS_SYST_00050)*

[constr_3130] Range of Interface Version ⌈ The value of the attribute interfaceVersion shall be in the range $[0; 255]$ ⌋*()*

[TPS_SYST_02092] Size of Fixed-size Array Length Fields ⌈ The attribute sizeOfArrayLengthFields of SOMEIPTransformationISignalProps defines the size of an length field generated by the SOME/IP transformer in front of all available fixed-size arrays in the ISignal. See also [constr_3282]. ⌋*(RS_SYST_00050)*

[TPS_SYST_02093] Size of Structure Length Fields ⌈ The attribute sizeOfStructLengthFields of SOMEIPTransformationISignalProps defines the size of an length field generated by the SOME/IP transformer in front of all available structures in the ISignal. See also [constr_3283]. ⌋*(RS_SYST_00050)*

[constr_1441] In AUTOSAR, the transmission of union data types over the network is only supported by the SOME/IP Transformer ⌈ If an ImplementationDataType according to [TPS_SWCT_01700], i.e. of category STRUCT that encloses an ImplementationDataTypeElement of category UNION, is used to directly or (via a DataTypeMap) indirectly type an AutosarDataPrototype and the latter is mapped to a SystemSignal then the ISignal that references that SystemSignal shall aggregate transformationISignalProps. ⌋*()*

[TPS_SYST_02094] Size of Union Length Fields ⌈ The attribute sizeOfUnionLengthFields of SOMEIPTransformationISignalProps defines the size of an length field generated by the SOME/IP transformer in front of all available unions in the ISignal. See also [constr_3284]. ⌋*(RS_SYST_00050)*

In principle there is no need to define a size of the length indicator because the size can be computed from the data structure itself. However there is a use case to extend on the sender side while keeping the receiver side as it is. This means that there is the need to express the size of the length indicator because the extended data structure may reach a length that exceeds the capacity of the original computed size indicator.

[constr_3218] Range of Size of Fixed-size Array Length Fields ⌈ The value of attribute sizeOfArrayLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4. ⌋*()*

[constr_3220] Range of Size of Structure Length Fields ⌈ The value of attribute sizeOfStructLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4. ⌋*()*

[constr_3221] Range of Size of Union Length Fields ⌈ The value of attribute sizeOfUnionLengthFields of SOMEIPTransformationISignalProps shall be either 0, 1, 2 or 4. ⌋*()*

[TPS_SYST_02080] Message type of SOME/IP ⌈ The attribute messageType of SOMEIPTransformationISignalProps defines the message type used by the SOME/IP transformer for the serialized ISignal. ⌋*(RS_SYST_00050)*

[constr_3216] Usage of SOMEIPTransformationISignalProps.sessionHandlingSR ⌈ The attribute sessionHandlingSR of SOMEIPTransformationISignalProps shall only be used for ISignals which reference SystemSignals which are mapped via a SenderReceiverToSignalMapping. ⌋*()*

Note: This means that sessionHandlingSR shall only be used for transformed Sender/Receiver communication.

7.3.2.1 Handling of Strings

Prior to AUTOSAR Release 4.3 the SOME/IP Transformer did not specify any special handling for how String data types shall be serialized. This leads to the situation that no BOM is introduced. The SOME/IP standard however does expect a BOM for String data type, this is also how AUTOSAR Release 4.3 defines the serialization of Strings.

The attribute SOMEIPTransformationISignalProps.implementsSOMEIPStringHandling enables the compatibility of string handling between AUTOSAR pre Release 4.3 and standard SOME/IP serializers. An AUTOSAR ECU according to Release 4.2 would not define any String specific behavior, thus it is possible to enforce this for Release 4.3 implementations as well by simply omitting the attribute or by setting the attribute to false.

7.3.2.2 SOME/IP Transformation Properties on the level of DataPrototypes

The serialization of SOME/IP is based on the interface specification. For certain datatypes like structures, unions and arrays SOME/IP supports the configuration of length fields that will be put in front of the serialized data. AUTOSAR supports the configuration of such SOME/IP settings on two different levels:

- modeling on ISignal level that is valid for all available occurrences of a datatype in the SOME/IP message (see [TPS_SYST_02092], [TPS_SYST_02093] and [TPS_SYST_02094])
- fine granular modeling on the level of DataPrototypes (see [TPS_SYST_02121])

To allow such a fine granular modeling SOMEIPTransformationProps are defined and collected in TransformationPropsSets.

Class	**TransformationPropsSet**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	Collection of TransformationProps. **Tags:** atp.recommendedPackage=TransformationPropsSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
transformationProps	TransformationProps	*	aggr	Transformer specific configuration properties.

Table 7.15: TransformationPropsSet

Class	**TransformationProps (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This meta-class represents a abstract base class for transformation settings.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 7.16: TransformationProps

Class	**SOMEIPTransformationProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The class SOMEIPTransformationProps specifies SOME/IP specific configuration properties.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable, TransformationProps			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
alignment	PositiveInteger	0..1	attr	Specifies the alignment of dynamic data in the serialized data stream. The alignment is specified in Bits.
sizeOfArrayLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of a static size Array in the SOME/IP message.
sizeOfStructLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of a Structure in the SOME/IP message.
sizeOfUnionLengthField	PositiveInteger	0..1	attr	This attribute describes the size of the length field (in Bytes) that will be put in front of a Union in the SOME/IP message.

Table 7.17: SOMEIPTransformationProps

The relation between SOMEIPTransformationProps and a DataPrototype is created with DataPrototypeTransformationProps in the context of an ISignal.

[TPS_SYST_02127] Usage of DataPrototypeTransformationProps in case of a VariableDataPrototype ⌈ If a VariableDataPrototype is transported in the ISignal the DataPrototypeTransformationProps can be used to assign SOMEIPTransformationProps to a DataPrototype that is or is part of the VariableDataPrototype. ⌋*(RS_SYST_00050)*

[TPS_SYST_02128] Usage of DataPrototypeTransformationProps in case of a ClientServerOperation ⌈ If a ClientServerOperation is transported in the ISignal (callSignal or returnSignal) the DataPrototypeTransformationProps can be used to assign SOMEIPTransformationProps to a DataPrototype that is or is part of an ArgumentDataPrototype of the ClientServerOperation. ⌋*(RS_SYST_00050)*

[TPS_SYST_02129] Assignment of SOMEIPTransformationProps to a root AutosarDataPrototype typed by an ApplicationDataType ⌈ To assign the SOMEIPTransformationProps to a root AutosarDataPrototype that is typed by an ApplicationDataType the ApplicationDataPrototypeInSystemInstanceRef shall reference the AutosarDataPrototype with the targetDataPrototype reference. The rootDataPrototype and contextDataPrototype references shall not be used. ⌋(RS_SYST_00050)

[TPS_SYST_02130] Assignment of SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype typed by an ApplicationDataType ⌈ To assign the SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype that is typed by an ApplicationDataType the ApplicationDataPrototypeInSystemInstanceRef shall reference the subElement with the targetDataPrototype reference. In addition the rootDataPrototype shall be set to define the context. Optionally it may be necessary to use contextDataPrototype references because the target subElement may be arbitrarily nested within the root AutosarDataPrototype. ⌋(RS_SYST_00050)

[TPS_SYST_02131] Assignment of SOMEIPTransformationProps to a root AutosarDataPrototype typed by an ImplementationDataType ⌈ To assign the SOMEIPTransformationProps to a root AutosarDataPrototype that is typed by an ImplementationDataType the ImplementationDataTypeElementInSystemRef shall reference the AutosarDataPrototype with the rootDataPrototype reference. The targetImplementationDataTypeElement and contextImplementationDataElement references shall not be used. ⌋(RS_SYST_00050)

[TPS_SYST_02132] Assignment of SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype typed by an ImplementationDataType ⌈ To assign the SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype that is typed by an ImplementationDataType the ImplementationDataTypeElementInSystemRef shall reference the targetImplementationDataTypeElement. In addition the rootDataPrototype shall be set to define the context. Optionally it may be necessary to use contextImplementationDataElement references because the target subElement may be arbitrarily nested within the root AutosarDataPrototype. ⌋(RS_SYST_00050)

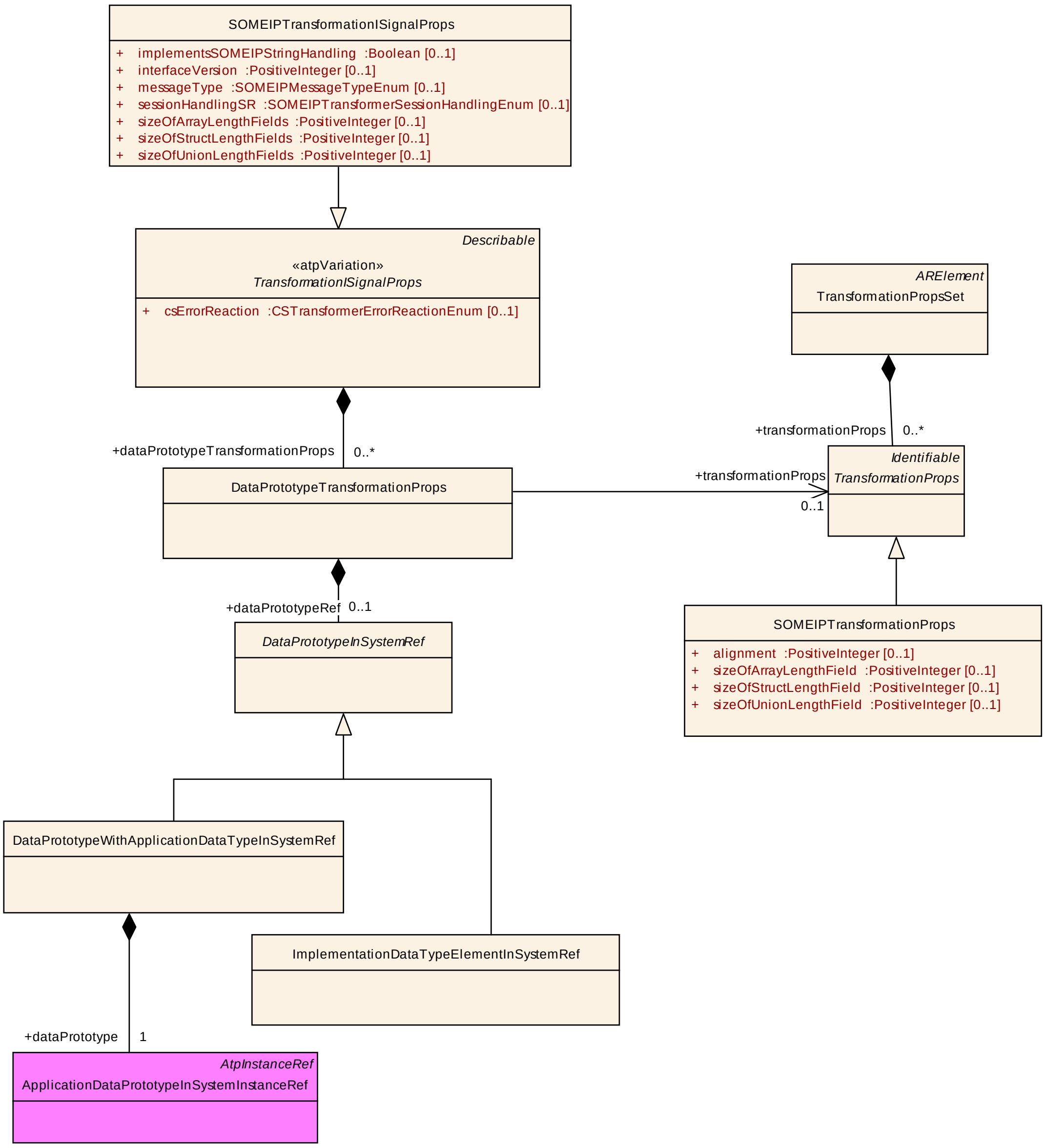


Figure 7.12: Transformation Properties on the level of DataPrototypes

Class	**DataPrototypeTransformationProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	DataPrototypeTransformationProps allows to set the attributes for the different TransformationTechnologies that are DataPrototype specific.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataPrototypeRef	DataPrototypeInSystemRef	0..1	aggr	Reference to a DataPrototype that is transported in the serialized ISignal.
networkRepresentationProps	SwDataDefProps	0..1	aggr	Specification of the actual network representation for the referenced primitive DataPrototype. If a network representation is provided then the baseType shall be used by the Transformer as input for the serialization/deserilaization.

Attribute	Type	Mul.	Kind	Note
transformationProps	TransformationProps	0..1	ref	Collection of AutosarDataPrototype related configuration settings for a transformer.

Table 7.18: DataPrototypeTransformationProps

Class	DataPrototypeInSystemRef (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This meta-class provides the ability to reference a DataPrototype.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table 7.19: DataPrototypeInSystemRef

Class	DataPrototypeWithApplicationDataTypeInSystemRef			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This class represents a DataPrototype that is typed by an ApplicationDataType and may be aggregated within a composite application data type (record or array).			
Base	ARObject, DataPrototypeInSystemRef			
Attribute	Type	Mul.	Kind	Note
dataPrototype	DataPrototype	1	iref	This represents the referenced ApplicationCompositeDataPrototype.

Table 7.20: DataPrototypeWithApplicationDataTypeInSystemRef

Class	ImplementationDataTypeElementInSystemRef			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	This class represents the ability to reference an ImplementationDataTypeElement in the context of a System.			
Base	ARObject, DataPrototypeInSystemRef			
Attribute	Type	Mul.	Kind	Note
base	System	0..1	ref	System that defines the context in which the ImplementationDataTypeElement is defined. **Tags:** atp.Status=obsolete
contextImplementationDataElement (ordered)	ImplementationDataTypeElement	*	ref	This is a context in case there are subelements with explicit types. The reference has to be ordered to properly reflect the nested structure. **Tags:** xml.sequenceOffset=40
contextPortPrototype	PortPrototype	0..1	ref	This is the port providing/receiving the referenced DataPrototype. **Tags:** xml.sequenceOffset=20
contextSwcPrototype (ordered)	SwComponentPrototype	*	ref	This is the Software Component Prototype providing/receiving the referenced DataPrototype. **Tags:** xml.sequenceOffset=10

Attribute	Type	Mul.	Kind	Note
rootDataPrototype	AutosarDataPrototype	0..1	ref	This refers to the AutosarDataPrototype which is typed by the implementationDatatype that may be: • the target of the ImplementationCompositeDataTypeSubElementInSwcRef in case that no targetImplementationDataTypeElement is used. • the context of the ImplementationCompositeDataTypeSubElementInSwcRef in which the target can be found in case that the targetImplementationDataTypeElement is used. **Tags:** xml.sequenceOffset=30
targetImplementationDataTypeElement	ImplementationDataTypeElement	0..1	ref	This is a target ImplementationDataTypeElement in case that the rootDataPrototype is composite and the target of ImplementationCompositeDataTypeSubElementInSwcRef is a subElement of the rootDataPrototype. **Tags:** xml.sequenceOffset=50

Table 7.21: ImplementationDataTypeElementInSystemRef

[TPS_SYST_02121] Scope of DataPrototypeTransformationProps ⌈ DataPrototypeTransformationProps is defined either

- for the root DataPrototype that is transmitted in the serialized ISignal
- for each of the composite subElements of the composite root DataPrototype

⌋*(RS_SYST_00050)*

[TPS_SYST_02123] Size of a length field for a chosen fixed-size array ⌈ The attribute sizeOfArrayLengthField of SOMEIPTransformationProps defines the size of a length field generated by the SOME/IP transformer in front of the fixed-size array for which the DataPrototypeTransformationProps is defined according to [TPS_SYST_02121]. ⌋*(RS_SYST_00050)*

[TPS_SYST_02124] Size of a length field for a chosen structure ⌈ The attribute sizeOfStructLengthField of SOMEIPTransformationProps defines the size of a length field generated by the SOME/IP transformer in front of the structure for which the DataPrototypeTransformationProps is defined according to [TPS_SYST_02121]. ⌋*(RS_SYST_00050)*

[TPS_SYST_02125] Size of a length field for a chosen union ⌈ The attribute sizeOfUnionLengthField of SOMEIPTransformationProps defines the size of a length field generated by the SOME/IP transformer in front of the union for which the DataPrototypeTransformationProps is defined according to [TPS_SYST_02121]. ⌋*(RS_SYST_00050)*

[TPS_SYST_02126] Alignment of a dynamic DataPrototype ⌈ The attribute alignment of SOMEIPTransformationProps defines the padding for alignment purposes that will be added by the SOME/IP transformer after the serialized data of the variable data length data element for which the DataPrototypeTransformationProps is defined according to [TPS_SYST_02121]. ⌋*(RS_SYST_00050)*

[constr_3278] Usage of SOMEIPTransformationProps.sizeOfArrayLengthField ⌈ The attribute sizeOfArrayLengthField of SOMEIPTransformationProps shall only be defined if the DataPrototypeTransformationProps is defined for a static size array according to [TPS_SYST_02121]. ⌋*()*

[constr_3279] Usage of SOMEIPTransformationProps.sizeOfStructLengthField ⌈ The attribute sizeOfStructLengthField of SOMEIPTransformationProps shall only be defined if the DataPrototypeTransformationProps is defined for a structure according to [TPS_SYST_02121]. ⌋*()*

[constr_3280] Usage of SOMEIPTransformationProps.sizeOfUnionLengthField ⌈ The attribute sizeOfUnionLengthField of SOMEIPTransformationProps shall only be defined if the DataPrototypeTransformationProps is defined for a union according to [TPS_SYST_02121]. ⌋*()*

[constr_3281] Usage of SOMEIPTransformationProps.alignment ⌈ The attribute alignment of SOMEIPTransformationProps shall only be defined if the DataPrototypeTransformationProps is defined for a variable data length data element according to [TPS_SYST_02121]. ⌋*()*

[constr_3282] SOME/IP Transformation settings for static size arrays in the context of an ISignal ⌈ In the context of an ISignal the usage of DataPrototypeTransformationProps.transformationProps.sizeOfArrayLengthField is only allowed if the SOMEIPTransformationISignalProps.sizeOfArrayLengthFields is not defined. ⌋*()*

[constr_3283] SOME/IP Transformation settings for structures in the context of an ISignal ⌈ In the context of an ISignal the usage of DataPrototypeTransformationProps.transformationProps.sizeOfStructLengthField is only allowed if the SOMEIPTransformationISignalProps.sizeOfStructLengthFields is not defined. ⌋*()*

[constr_3284] SOME/IP Transformation settings for unions in the context of an ISignal ⌈ In the context of an ISignal the usage of DataPrototypeTransformationProps.transformationProps.sizeOfUnionLengthField is only allowed if the SOMEIPTransformationISignalProps.sizeOfUnionLengthFields is not defined. ⌋*()*

[constr_3285] Alignment of variable data length data elements in the context of an ISignal ⌈ The definition of DataPrototypeTransformationProps.transformationProps.alignment is only allowed if the SOMEIPTransformationDescription.alignment is not defined. ⌋*()*

7.3.2.3 Network Representation

In order to assure that the serialization of the transported data on the sender side and its deserialization on the receiver side(s) is done correctly, system designers need to assure that the same datatypes (i.e., SwBaseTypes) are used for the serialization/deserialization on both sides. However, this agreement does not imply the use or equality of the SwBaseTypes defined by the ImplementationDataType used by the application software on the sender and (possibly multiple) receiver sides. This means that each EcuInstance, regardless if it belongs to a sender or receiver, can use one datatype for the serialization/deserialization (e.g., UInt16 in the actual SOME/IP transformer code) and another datatype in the application software (e.g., Float32 in the actual application software component code).

In order to define the commonly agreed datatypes for the serialization/deserialization of the transported data by the sender and possibly multiple receivers, AUTOSAR defines the following two approaches:

- serialization based on the network representation ([TPS_SYST_02136])
- serialization based on the ImplementationDataTypes ([TPS_SYST_02137])

[TPS_SYST_02136] Serialization based on the network representation ⌈ If a network representation that defines a SwBaseType and optionally a CompuMethod is provided for each DataPrototype typed by a primitive data type that is part of the serialized ISignal (ISignal.transformationISignalProps.dataPrototypeTransformationProps.networkRepresentationProps), these SwBaseTypes shall be used for the serialization/deserialization. ⌋*()*

[TPS_SYST_02137] Serialization based on the ImplementationDataTypes ⌈ For primitive DataPrototypes that are part of the serialized ISignal where no network representation is provided (ISignal.transformationISignalProps.dataPrototypeTransformationProps.networkRepresentationProps), SwBaseType shall be provided by the ImplementationDataTypes that either types the corresponding PortPrototypes on the top level Software Composition that represents the communicating EcuInstances, or it is mapped to the ApplicationDataType that types it. ⌋*()*

[constr_3317] Assuring the same data interpretation on the sender and receiver sides in case of serialization based on the ImplementationDataTypes ⌈ In order to assure the same interpretation of the serialized data by the SOME/IP transformers on the sender and receiver sides in case of serialization based on either a primitive or a composite ImplementationDataType, the same SwBaseType shall be defined

- for this primitive DataPrototype or
- for each primitive DataPrototype of the leaf elements of the composite DataPrototype starting from the first element until and including the last element that is requested by the receiver,

by the ImplementationDataTypes that either types the corresponding PortPrototypes on the top level Software Composition of the communicating EcuInstances, or it is mapped to the ApplicationDataType that types it. ⌋()

If the serialization is based on the ImplementationDataTypes, the same data has to be transmitted on all buses, i.e., it is not possible to transmit different precision (i.e., number of bits) on different buses, as with the serialization based on the network representation on the ISignal level.

ImplementationDataTypes used by the actual application for the transported data shall be defined by the corresponding PortPrototypes on the AtomicSwComponentTypes of the communicating EcuInstances. The RTE is responsible for the possible type conversion and scaling in case of different ImplementationDataTypes used for the serialization/deserialization and in the application.

[TPS_SYST_02138] Definition of the network representation ⌈ The network representation for each DataPrototype typed by a primitive data type in the serialized data shall be defined by the SwDataDefProps that is aggregated by the DataPrototypeTransformationProps in the role networkRepresentationProps. ⌋()

In other words: If a DataPrototype is transported in the ISignal the DataPrototypeTransformationProps can be used to assign a network representation to each primitive DataPrototype that is part of the enclosing DataPrototype.

[TPS_SYST_02139] Applicability of the SwDataDefProps attributes for the network representation of the serialized data ⌈ Usage of DataPrototypeTransformationProps.networkRepresentationProps shall follow the restrictions given in table Table 7.22. ⌋()

Attributes of SwDataDefProps	networkRepresentationProps
additionalNativeTypeQualifier	NA
annotation	NA
baseType	D
compuMethod	D
dataConstr	D
displayFormat	D
implementationDataType	NA
invalidValue	NA
swAddrMethod	NA
swAlignment	NA
swBitRepresentation	NA
swCalibrationAccess	NA
swCalprmAxisSet	NA
swCalprmAxisSet. swCalprmAxis /SwAxisGrouped. swCalprmRef	NA
swCalprmAxisSet. swCalprmAxis /SwAxisIndividual. swVariableRef	NA
swCalprmAxisSet. swCalprmAxis /SwAxisGrouped. sharedAxisType	NA
swCalprmAxisSet. swCalprmAxis /SwAxisIndividual. inputVariableType	NA
swCalprmAxisSet/ AxisIndividual/ Unit	NA

Attributes of SwDataDefProps	networkRepresentationProps
swCalprmAxisSet/ BaseType	NA
swComparisonVariable	NA
swDataDependency	NA
swHostVariable	NA
swImplPolicy	NA
swIntendedResolution	NA
swInterpolationMethod	NA
swIsVirtual	NA
swPointerTargetProps	NA
swRecordLayout	NA
swRefreshTiming	NA
swTextProps	NA
swValueBlockSize	NA
unit	D
valueAxisDataType	NA

Table 7.22: Allowed SwDataDefProps Attributes on DataPrototypeTransformationProps

The following settings apply in table 7.22:

D Attribute can be **defined** in the scope of this element.

NA Attribute is **not applicable** for usage in the scope of this element.

[constr_3318] Allowed use of ISignal.networkRepresentationProps ⌈ If a reference from ISignal to DataTransformation in the role dataTransformation exists, this ISignal SHALL NOT aggregate SwDataDefProps in the role networkRepresentationProps. ⌋*()*

This means that aggregating SwDataDefProps by an ISignal is applicable only if this ISignal is not transformed.

[constr_3319] Existence of DataPrototypeTransformationProps.networkRepresentationProps ⌈ ISignal.transformationISignalProps.dataPrototypeTransformationProps.networkRepresentationProps shall either

- not exist at all or
- shall be defined for all leaf elements of the root DataPrototype transmitted in the ISignal

⌋*()*

This means that either all leaf elements of the transformed ISignal shall have a network representation, or none.

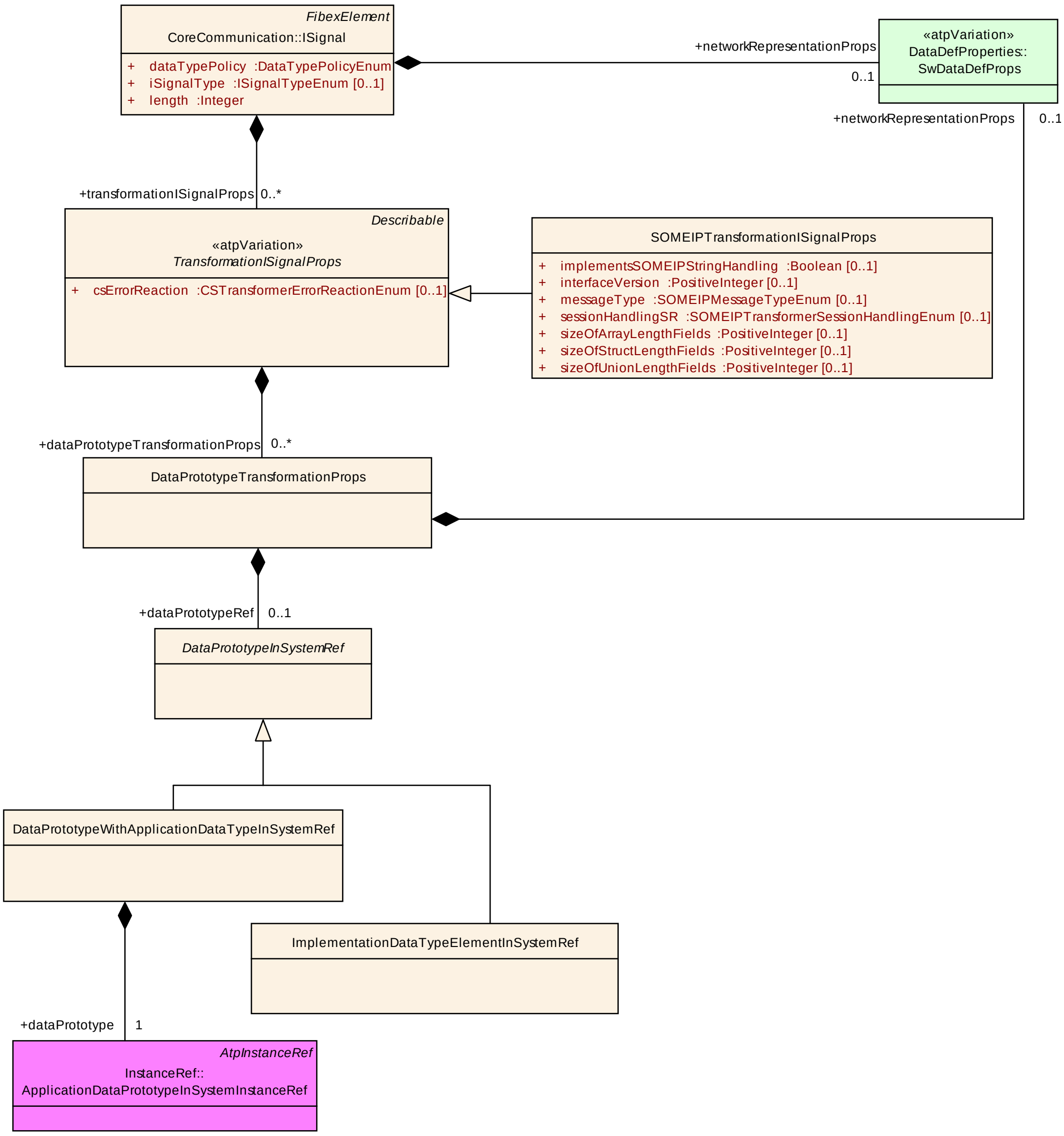


Figure 7.13: Transformer Network Representation

7.3.2.3.1 Example - Serialization based on the network representation

An example with concrete methodological steps in a common OEM-Tier 1 development process for the serialization based on the network representation is presented in Figure 7.14. The steps are as follows:

1. OEM decides on a common `SwBaseType` and `CompuMethod` for each bus, as part of the network representation, used for serialization/deserialization of one concrete complex data type.
2. OEM provides an `ImplementationDataType`, with `SwBaseType` and optional `CompuMethod`, on the `PortPrototype`s on the `RootSwComposition`s of the communicating `EcuInstance`s (sender and possibly multiple receivers). The

step is optional and PortPrototypes can also be typed by an ApplicationDataType that has a mapping to an ImplementationDataType.

3. Tier 1s are free to define arbitrary ImplementationDataType (with SwBaseType and optional CompuMethod) in the application software components. If this SwBaseType is different than the one used for the serialization/deserialization, RTE is responsible for the type conversion together with possible scaling defined by the CompuMethods, as part of the network representation and PortPrototypes on the RootSwComposition and SwComponentPrototype that is typed by ApplicationSwComponentType. Please note that on the receiver side it is possible that the SwComponentPrototype that is typed by ApplicationSwComponentType receives only a subset of data defined on the RootSwComposition. In this case, this needs be described by the PortInterfaceMapping.

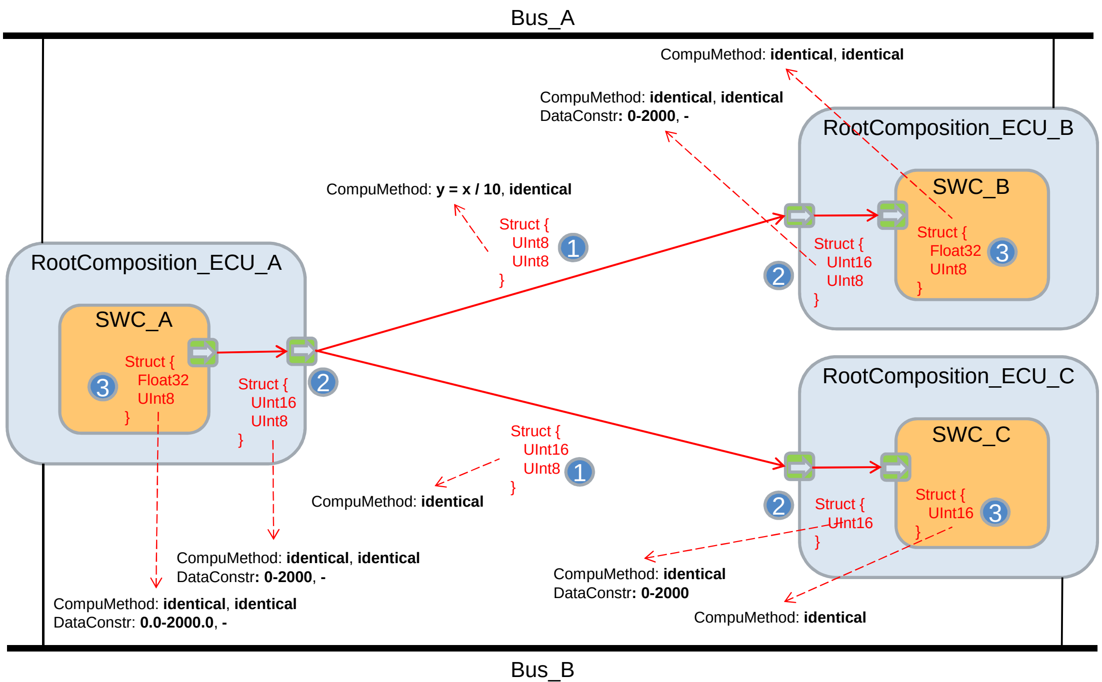


Figure 7.14: Serialization based on the network representation

The actual steps that need to be performed at runtime are presented in Figure 7.15 and they are as follows:

1. Application of the sending software component provides the data to be transmitted to the RTE and stores it in SWC internal buffer.

2. If SwBaseType defined by the ImplementationDataType on the PortPrototype of the ApplicationSwComponentType is different then the one optionally defined by the ImplementationDataType on the PortPrototype of the RootSwComposition, the RTE performs type conversion, and scaling if CompuMethods are also defined on these PortPrototypes, and stores the values internally in the RTE.

3. If network representation defines a SwBaseType that is different from the one optionally defined by the ImplementationDataType on the PortPrototype on the RootSwComposition, the RTE performs another type conversion, and scaling if CompuMethod is also defined as part of the network representation, and stores the value internally in the RTE. This internal value is used for the serialization.

4. On the receiver side, the RTE stores the serialized data in the RTE internal buffer. When the receiver SWC wants to read the data, the RTE first de-serializes the values received from the bus whose type is specified by the SwBaseType that is part of the network representation. If the SwBaseType is different then the one optionally defined by the ImplementationDataType on the PortPrototype of the RootSwComposition, the RTE performs type conversion, and scaling if CompuMethods are also defined on the PortPrototype and in the network representation, and stores the values internally in the RTE.

5. If SwBaseType defined by the ImplementationDataType on the PortPrototype of the SwComponentPrototype that is typed by ApplicationSwComponentType is different then the one defined by the ImplementationDataType on the PortPrototype of the RootSwComposition, the RTE performs another type conversion, and scaling if CompuMethods are also defined on these PortPrototype, and stores the final values internally in the buffer of the application. The RTE is also able to deliver only a subset of data to the SwComponentPrototype that is typed by ApplicationSwComponentType, if that is required by the description of the PortInterfaceMapping.

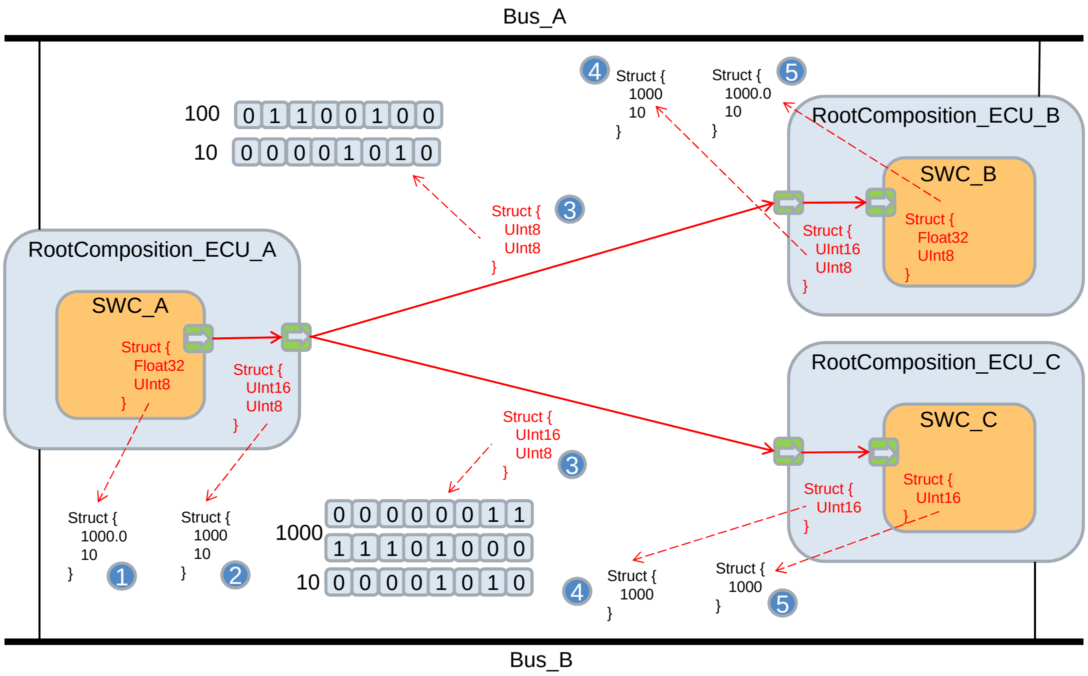


Figure 7.15: Serialization based on the network representation

7.3.2.3.2 Example - Serialization based on the ImplementationDataTypes

An example with concrete methodological steps in a common OEM-Tier 1 development process for the serialization based on the ImplementationDataTypes is presented in Figure 7.16. The steps are as follows:

1. OEM provides the same ImplementationDataType, with SwBaseType and optional CompuMethod, on the PortPrototypes on the RootSwCompositions of the communicating EcuInstances (sender and possibly multiple receivers). The PortPrototypes can also be typed by an ApplicationDataType that has a mapping to an ImplementationDataType.

2. Tier 1s are free to define arbitrary ImplementationDataType (with SwBaseType and optional CompuMethod) in the application software components. If this SwBaseType is different than the one used for the serialization/deserialization, RTE is responsible for the type conversion together with possible scaling defined by the CompuMethods, as part of PortPrototypes on the RootSwComposition and AtomicSwComponentTypes. Please note that on the receiver side it is possible that the SwComponentPrototype that is typed by ApplicationSwComponentTypereceives only a subset of data defined on the RootSwComposition. In this case, this needs be described by the PortInterfaceMapping.

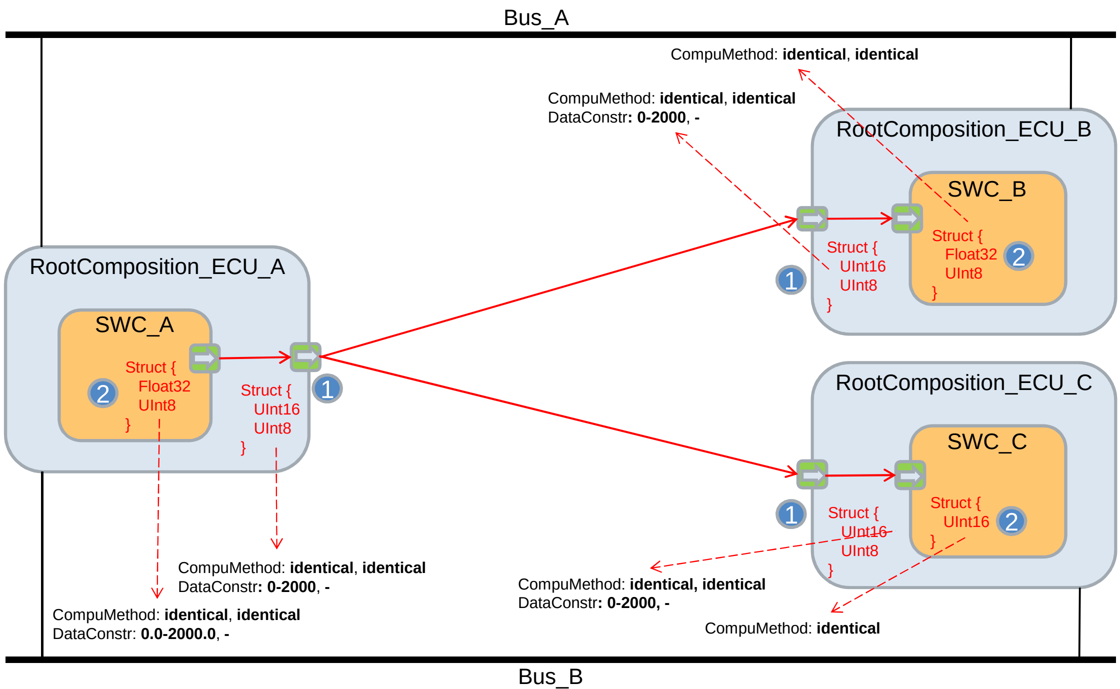


Figure 7.16: Serialization based on the ImplementationDataTypes

The actual steps that need to be performed at runtime are presented in Figure 7.17 and they are as follows:

1. Application of the sending software component provides the data to be transmitted to the RTE and stores it in SWC internal buffer.

2. If SwBaseType defined by the ImplementationDataType on the PortPrototype of the SwComponentPrototype that is typed by ApplicationSwComponentType is different then the one defined by the ImplementationDataType on the PortPrototype of the RootSwComposition, the RTE performs type conversion, and scaling if CompuMethods are also defined on these PortPrototypes, and stores the values internally in the RTE.

3. As no network representation is provided, the internal value from step 2 is used for the serialization and transmission on the bus.

4. On the receiver side, the RTE stores the serialized data received from the bus in the RTE internal buffer. When the receiver SWC wants to read the data, the RTE de-serializes these values as defined by the ImplementationDataType on the PortPrototype of the RootSwComposition.

5. If SwBaseType defined by the ImplementationDataType on the PortPrototype of the SwComponentPrototype that is typed by ApplicationSwComponentType is different then the one defined by the ImplementationDataType on the PortPrototype of the RootSwComposition, the RTE performs another type conversion, and scaling if CompuMethods are also defined on these PortPrototype, and stores the final values internally in the buffer of the application. The RTE is also able to deliver only a subset of data to the SwComponentPrototype that is typed by ApplicationSwComponentType, if that is required by the description of the PortInterfaceMapping.

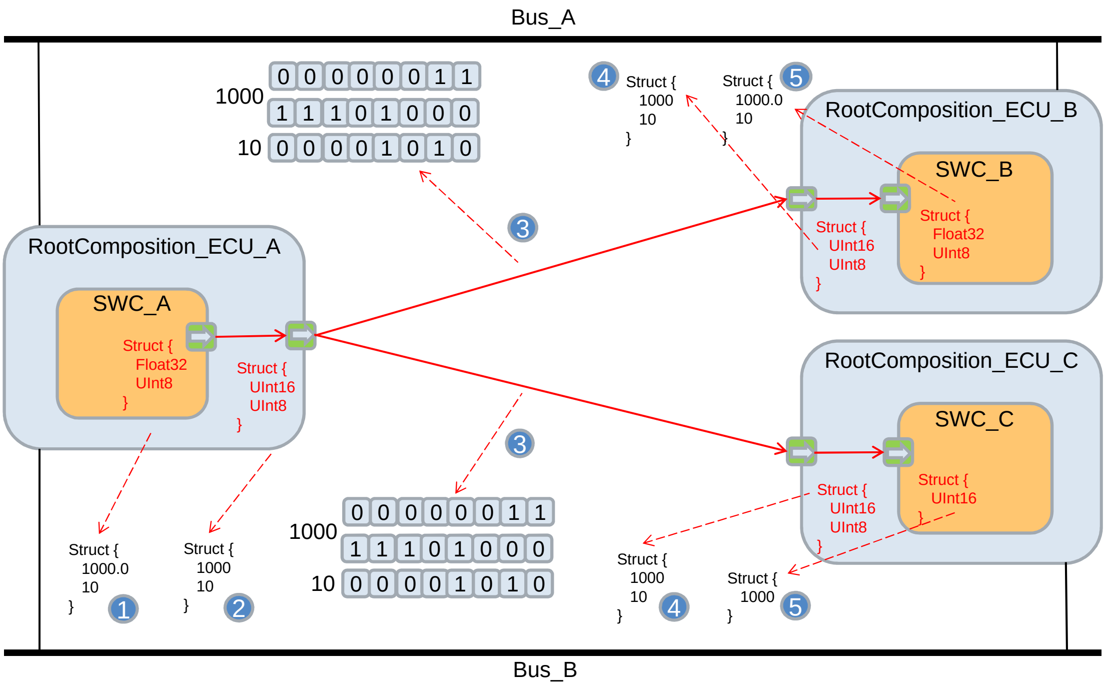


Figure 7.17: Serialization based on the ImplementationDataTypes

7.3.3 COM Based Transformer

In order to support the signal group based interaction of the transformer with the COM module as defined in the COM Based Transformer specification [17] a further modeling is supported:
In case the array based signal group API of Com shall be used the ISignalGroup has a reference to the DataTransformation element in the role comBasedSignalGroupTransformation. This defines that the RTE shall use the array based signal group API of Com [20] in order to transport the transformed data.

[TPS_SYST_02058] Usage of COM Based Transformer ⌈ If

1. an ISignalGroup references a DataTransformation in the role comBasedSignalGroupTransformation and
2. this ISignalGroup references a SystemSignalGroup and
3. the referenced SystemSignalGroup is referenced by a SenderReceiverToSignalGroupMapping in the role signalGroup

then the VariableDataPrototype referenced by the SenderReceiverToSignalGroupMapping shall be transformed using the COM Based Transformer [17]. ⌋
(RS_SYST_00051)

[TPS_SYST_02133] BufferProperties.bufferComputation setting for a COM Based transformer ⌈ The BufferProperties.bufferComputation of a COM Based transformer shall be configured in the following way:

```
<BUFFER-COMPUTATION>
 <COMPU-RATIONAL-COEFFS>
  <COMPU-NUMERATOR>
   <V>{ISignalIPdu.length}</V>
   <V>1</V>
  </COMPU-NUMERATOR>
  <COMPU-DENOMINATOR>
   <V>1</V>
  </COMPU-DENOMINATOR>
 </COMPU-RATIONAL-COEFFS>
</BUFFER-COMPUTATION>
```

where ISignalIPdu.length shall be the value derived from ISignalIPdu.length. ⌋*()*

[constr_3315] The value of V0 in BufferProperties.bufferComputation setting for a COM Based transformer ⌈ The value of V0 of bufferComputation of a TransformationTechnology which has the protocol attribute set to COMBased shall have the same value as the length attribute of the ISignalIPdu to which the ISignalGroup is mapped. The ISignalGroup refers to the DataTransformation in the role comBasedSignalGroupTransformation which refers to a TransformationTechnology in the transformerChain. ⌋*()*

[constr_3132] Required COM Based Transformation for comBasedSignalGroupTransformation ⌈ If a ISignalGroup has a reference to the DataTransformation element in the role comBasedSignalGroupTransformation then this DataTransformation shall be the handled by the COM Based Transformer [17]. ⌋()

Note that the SystemSignalGroup in this case not only contains the application data element signals mapped by the SenderReceiverToSignalGroupMapping but also the data which has been added by the transformers (e.g. crc, sequence counter, ...).

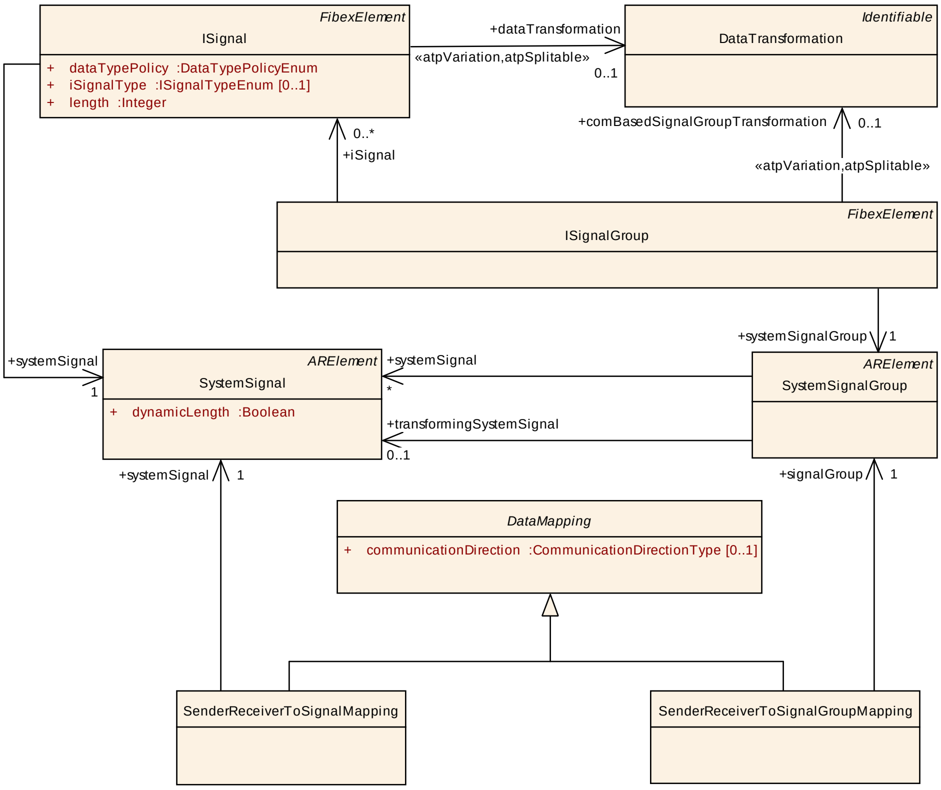


Figure 7.18: Transformer Data Mapping

[constr_3183] **ISignalGroup with transformationISignalProps** ⌈ An ISignalGroup that aggregates transformationISignalProps shall reference the DataTransformation in the role comBasedSignalGroupTransformation. ⌋()

7.3.4 E2E Transformer

This section specifies the configuration of the E2E protection that is invoked "out-of-box" by RTE and realized by E2E Transformer [26], E2E Library [19] and CRC Library [27].

The specific configuration for an E2E transformer takes place in `EndToEndTransformationDescription` and `EndToEndTransformationISignalProps` shown in Figure 7.19 and in `EndToEndTransformationComSpecProps` (see more details in [5])

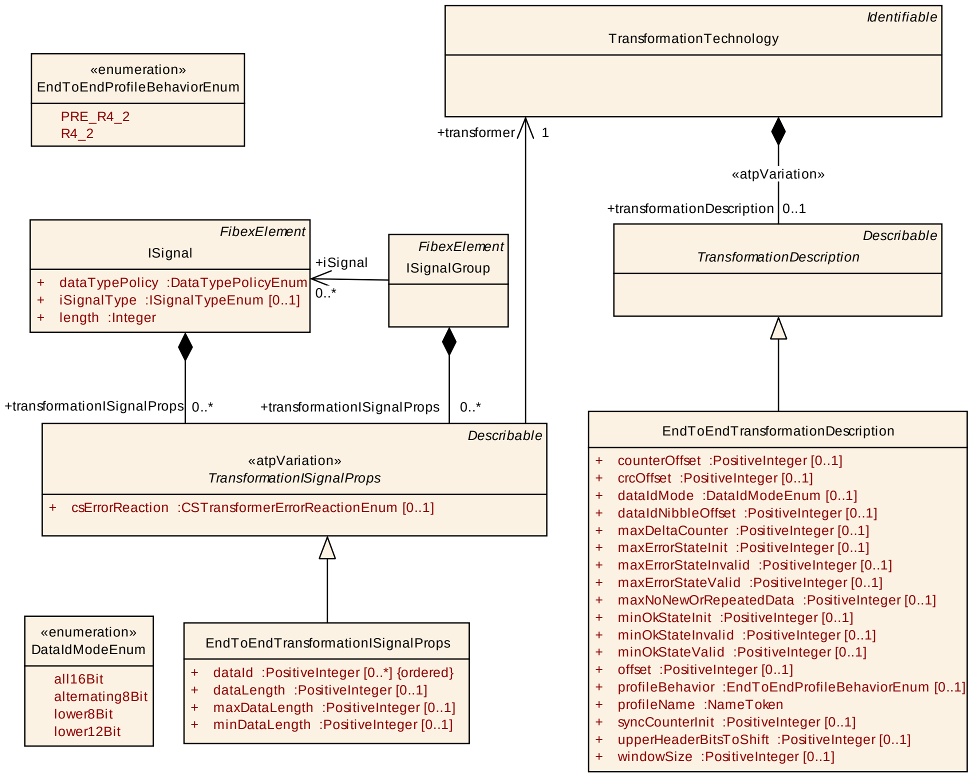


Figure 7.19: E2E Transformer Configuration

Class	**EndToEndTransformationDescription**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.			
Base	ARObject, Describable, TransformationDescription			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
counterOffset	PositiveInteger	0..1	attr	Offset of the counter in the Data[] array in bits.
crcOffset	PositiveInteger	0..1	attr	Offset of the CRC in the Data[] array in bits.
dataIdMode	DataIdModeEnum	0..1	attr	This attribute describes the inclusion mode that is used to include the implicit two-byte Data ID in the one-byte CRC.
dataIdNibbleOffset	PositiveInteger	0..1	attr	Offset of the Data ID nibble in the Data[] array in bits.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
maxDeltaCounter	PositiveInteger	0..1	attr	Maximum allowed difference between two counter values of two consecutively received valid messages. For example, if the receiver gets data with counter 1 and MaxDeltaCounter is 3, then at the next reception the receiver can accept Counters with values 2, 3 or 4.
maxErrorStateInit	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_INIT.
maxErrorStateInvalid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_INVALID.
maxErrorStateValid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_VALID.
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	The maximum allowed amount of consecutive failed counter checks.
minOkStateInit	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INIT.
minOkStateInvalid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INVALID.
minOkStateValid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_VALID.
offset	PositiveInteger	0..1	attr	Offset of the E2E header in the Data[] array in bits.
profileBehavior	EndToEndProfileBehaviorEnum	0..1	attr	Behavior of the check functionality
profileName	NameToken	1	attr	Definition of the E2E profile.
syncCounterInit	PositiveInteger	0..1	attr	Number of checks required for validating the consistency of the counter that must be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter.

Attribute	*Type*	*Mul.*	*Kind*	*Note*
upperHeaderBitsToShift	PositiveInteger	0..1	attr	This attribute describes the number of upper-header bits to be shifted. value = 0 or not present: shift of upper header is NOT performed. value > 0: the E2E Transformer on the protect-side, takes the first upperHeaderBitsToShift bits from the upper buffer (e.g. SOME/IP header part generated by SOME/IP transformer) and shifts them towards the lower bytes and bits within the Data[] for the length of the E2E header (e.g. 12 bytes in case of E2E Profile 4). This means the shift distance is fixed - it depends on the E2E header size - what is configured here is the number of bits that are to be shifted. This option is defined because the Some/IP header generated by SOME/IP transformer must be, due to compatibility between non-protected and E2E-protected communication, at the same position, which is before E2E header.
windowSize	PositiveInteger	0..1	attr	Size of the monitoring window for the E2E state machine.

Table 7.23: EndToEndTransformationDescription

Enumeration	**DataIdModeEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Supported inclusion modes to include the implicit two-byte Data ID in the one-byte CRC.
Literal	***Description***
all16Bit	Two bytes are included in the CRC (double ID configuration). **Tags:** atp.EnumerationValue=0
alternating8Bit	One of the two bytes byte is included, alternating high and low byte, depending on parity of the counter (alternating ID configuration). For even counter low byte is included; For odd counters the high byte is included. **Tags:** atp.EnumerationValue=1
lower12Bit	The low byte is included in the implicit CRC calculation, the low nibble of the high byte is transmitted along with the data (i.e. it is explicitly included), the high nibble of the high byte is not used. This is applicable for the IDs up to 12 bits. **Tags:** atp.EnumerationValue=2
lower8Bit	Only low byte is included, high byte is never used. This is applicable if the IDs in a particular system are 8 bits. **Tags:** atp.EnumerationValue=3

Table 7.24: DataIdModeEnum

Enumeration	**EndToEndProfileBehaviorEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer
Note	Behavior of the check functionality
Literal	*Description*
PRE_R4_2	Check has the legacy behavior, before AUTOSAR Release 4.2. **Tags:** atp.EnumerationValue=0
R4_2	Check behaves like new P4/P5/P6 profiles introduced in AUTOSAR Release 4.2. **Tags:** atp.EnumerationValue=1

Table 7.25: EndToEndProfileBehaviorEnum

Class	≪atpVariation≫ **EndToEndTransformationISignalProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	Holds all the ISignal specific attributes for the EndToEndTransformer.			
Base	ARObject, Describable, TransformationISignalProps			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
dataId (ordered)	PositiveInteger	*	attr	This represents a unique numerical identifier. Note: ID is used for protection against masquerading. The details concerning the maximum number of values (this information is specific for each E2E profile) applicable for this attribute are controlled by a semantic constraint that depends on the category of the EndToEndProtection.
dataLength	PositiveInteger	0..1	attr	Length of Data in bits.
maxDataLength	PositiveInteger	0..1	attr	Maximum length of Data in bits.
minDataLength	PositiveInteger	0..1	attr	Minimum length of Data in bits.

Table 7.26: EndToEndTransformationISignalProps

[constr_3313] E2E transformer configuration ⌈ For each `TransformationDescription` variant that is a `EndToEndTransformationDescription`

- attribute `protocol` of `TransformationTechnology` shall be set to `E2E`
- attribute `version` of `TransformationTechnology` shall be set to `1.0.0`
- attribute `transformerClass` of `TransformationTechnology` shall be set to `safety`

⌋*()*

[TPS_SYST_02067] E2E profile ⌈ The E2E profile is defined by `EndToEndTransformationDescription.profileName`. ⌋*(RS_SYST_00056)*

[TPS_SYST_02073] EndToEndTransformationDescription.profileName ⌈ EndToEndTransformationDescription.profileName can have the following values: PROFILE_01, PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_11, PROFILE_22. ⌋*(RS_SYST_00056)*

[TPS_SYST_02072] profileName of EndToEndTransformationDescription ⌈ The values for the profileName of EndToEndTransformationDescription mentioned in [TPS_SYST_02073] are standardized and reserved for being used in the way the AUTOSAR standard foresees. In addition, it is positively possible to use other than the standardized values for the profileName. ⌋*(RS_SYST_00056)*

The setting of the EndToEndTransformationDescription.profileName has an influence on the upper- and lower multiplicities of certain attributes of EndToEndTransformationDescription and EndToEndTransformationISignalProps.

[constr_3185] Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to PROFILE_01 or PROFILE_11 then the multiplicity of the EndToEndTransformationDescription.dataIdMode attribute shall be 1. ⌋*()*

[constr_3186] Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to a value of PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, or PROFILE_22 then the multiplicity of the EndToEndTransformationDescription.dataIdMode attribute shall be 0. ⌋*()*

[constr_3326] Allowed values for EndToEndTransformationISignalProps.dataIdMode in PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_11 then the value of the EndToEndTransformationDescription.dataIdMode attribute shall be set to all16Bit or lower12Bit. ⌋*()*

[constr_3187] Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to PROFILE_01 or PROFILE_11 then the multiplicity of the EndToEndTransformationDescription.counterOffset attribute shall be 1. ⌋*()*

[constr_3188] Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to a value of PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, or PROFILE_22 then the multiplicity of the EndToEndTransformationDescription.counterOffset attribute shall be 0. ⌋*()*

[constr_3189] Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to PROFILE_01 or PROFILE_11 then the multiplicity of the EndToEndTransformationDescription.crcOffset attribute shall be 1. ⌋()

[constr_3190] Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to a value of PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, or PROFILE_22 then the multiplicity of the EndToEndTransformationDescription.crcOffset attribute shall be 0. ⌋()

[constr_3193] Multiplicity of EndToEndTransformationDescription.offset in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to PROFILE_01 or PROFILE_11 then the multiplicity of the EndToEndTransformationDescription.offset attribute shall be 0. ⌋()

[constr_3194] Multiplicity of EndToEndTransformationDescription.offset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute is set to a value PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, or PROFILE_22 then the multiplicity of the EndToEndTransformationDescription.offset attribute shall be 1. ⌋()

[constr_3191] Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_01, PROFILE_11 and dataIdMode equal to lower12Bit ⌈ If the EndToEndTransformationDescription.profileName attribute is set to PROFILE_01 or PROFILE_11 and the value of the EndToEndTransformationDescription.dataIdMode attribute is set to lower12Bit then the multiplicity of the EndToEndTransformationDescription.dataIdNibbleOffset attribute shall be 1. ⌋()

[constr_3192] Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 or dataIdMode different from lower12Bit ⌈ If the EndToEndTransformationDescription.profileName attribute is set to a value of PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, or PROFILE_22 or the EndToEndTransformationDescription.dataIdMode attribute is set to value different from lower12Bit then the multiplicity of the EndToEndTransformationDescription.dataIdNibbleOffset attribute shall be 0. ⌋()

[constr_3148] executeDespiteDataUnavailability setting in case an E2E Transformer is used ⌈ A transformer chain using E2E shall be configured with DataTransformation.executeDespiteDataUnavailability = TRUE. ⌋()

[constr_3149] TransformationTechnology.needsOriginalData settings for E2E Transformer ⌈ The TransformationTechnology.needsOriginalData attribute of a TransformationTechnology element of an E2E transformer shall be set to FALSE. ⌋()

[constr_3150] Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01 and PROFILE_11 in case it is 0 ⌈ If in PROFILE_01 or PROFILE_11 the EndToEndTransformationDescription.upperHeaderBitsToShift is equal 0 the E2E transformer used in a transformer chain with a SOME/IP transformer shall be configured with the following values:

1. EndToEndTransformationDescription.crcOffset = 0
2. EndToEndTransformationDescription.counterOffset = 8
3. For dataIdMode == lower12Bit: EndToEndTransformationDescription.dataIdNibbleOffset = 12

⌋*()*

This means that the E2E header of profile 1 and profile 11, when used with SOME/IP transformer, is not spread across application data, but is a consecutive block of bytes. Profiles other than 1 have a non-configurable header layout.

[constr_3151] BufferProperties.headerLength settings for an E2E transformer used in combination with a SOME/IP transformer ⌈ The BufferProperties.headerLength for an E2E transformer located in a transformer chain with a SOME/IP transformer shall be configured with the following values depending on the value of the EndToEndTransformationDescription.profileName attribute:

1. PROFILE_01: BufferProperties.headerLength = 16 bits
2. PROFILE_02: BufferProperties.headerLength = 16 bits
3. PROFILE_04: BufferProperties.headerLength = 96 bits
4. PROFILE_05: BufferProperties.headerLength = 24 bits
5. PROFILE_06: BufferProperties.headerLength = 40 bits
6. PROFILE_07: BufferProperties.headerLength = 160 bits
7. PROFILE_11: BufferProperties.headerLength = 16 bits
8. PROFILE_22: BufferProperties.headerLength = 16 bits

⌋*()*

This means that the E2E header in profiles 1 and 2 use 2 bytes when using SOME/IP transformer. This yields four unused bits in case of some recommended configuration settings of Profile 1 and 2. Those unused bits are set to 0xF by the E2E transformer on the sender side.

[constr_3152] BufferProperties.headerLength settings for an E2E transformer used in combination with a COM Based transformer ⌈ An E2E transformer used in a transformer chain with a COM Based transformer shall be configured with the following values:

- BufferProperties.headerLength = 0

⌋*()*

This is because the space for the E2E header needs to be allocated by a proper ISignalGroup layout according to [TPS_SYST_02068].

[constr_3153] E2E header field reservation required by COM Based transformer ⌈
A COM Based transformer that is used in a transformer chain with an E2E transformer requires that the following amount of space is allocated for the E2E header fields using a proper ISignalGroup layout according to [TPS_SYST_02068]:

PROFILE_1: if dataIdMode == lower12Bit: 16 bits

PROFILE_1: if dataIdMode != lower12Bit: 12 bits

PROFILE_2: 16 bits

PROFILE_4: 96 bits

PROFILE_5: 24 bits

PROFILE_6: 40 bits

PROFILE_7: 160 bits

PROFILE_11: if dataIdMode == lower12Bit: 16 bits

PROFILE_11: if dataIdMode == all16Bit: 12 bits

PROFILE_22: 16 bits

⌋*()*

[TPS_SYST_02068] E2E header field representation in an ISignalGroup ⌈ In case a COM Based transformer is used in a transformer chain together with an E2E transformer space for the E2E header shall be allocated by:

- Defining ISignals for each E2E header field that are part of the ISignalGroup that contains the comBasedSignalGroupTransformation reference.
- Defining just empty space in the ISignalGroup that contains the comBasedSignalGroupTransformation reference.

⌋*(RS_SYST_00056)*

[constr_3154] BufferProperties.bufferComputation setting for an E2E transformer when used together with a Com-based transformer ⌈ The BufferProperties.bufferComputation of an E2E transformer used in a transformer chain with a COM Based transformer shall be configured in the following way:

```
<BUFFER-COMPUTATION>
  <COMPU-RATIONAL-COEFFS>
    <COMPU-NUMERATOR>
       <V>0</V>
       <V>1</V>
    </COMPU-NUMERATOR>
    <COMPU-DENOMINATOR>
```

```
      <V>1</V>
    </COMPU-DENOMINATOR>
  </COMPU-RATIONAL-COEFFS>
</BUFFER-COMPUTATION>
```

⌋()

[constr_3184] Only one EndToEndTransformationISignalProps.dataId element in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 or PROFILE_11 then the multiplicity of the EndToEndTransformationISignalProps.dataId attribute shall be 1. ⌋()

[constr_3156] Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 or PROFILE_11 then the value of the EndToEndTransformationISignalProps.dataId attribute shall be in the range of 0-65535. ⌋()

[constr_3157] Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01 and PROFILE_11 in case dataIdMode is set to lower12Bit ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 or PROFILE_11 and the value of EndToEndTransformationDescription.dataIdMode attribute has a value of lower12Bit then the value of the EndToEndTransformationISignalProps.dataId attribute shall be in the range of 256-65535. ⌋()

[constr_3158] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_01 and PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 or PROFILE_11 then the attribute maxDeltaCounter shall be in the range 1-14. ⌋()

[constr_3195] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_02 and PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_02 or PROFILE_22 then the attribute maxDeltaCounter shall be in the range 1-15. ⌋()

[constr_3159] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_04 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04 the value of maxDeltaCounter attribute shall be in the range 1-65535. ⌋()

[constr_3196] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_05 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_05 then the attribute maxDeltaCounter shall be in the range 1-255. ⌋()

[constr_3197] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_06 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_06 then the attribute maxDeltaCounter shall be in the range 1-255. ⌋*()*

[constr_3316] Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_07 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_07 the value of maxDeltaCounter attribute shall be in the range 1-4‘294‘967‘295. ⌋*()*

[constr_3160] EndToEndTransformationISignalProps.dataId in PROFILE_02 and PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_02 or PROFILE_22 then the multiplicity of the dataId attribute shall be 16 and the value of each instance shall be in the range 0..255. ⌋*()*

[constr_3161] EndToEndTransformationISignalProps.dataLength in PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, or PROFILE_22 then the multiplicity of the EndToEndTransformationISignalProps.dataLength attribute shall be 1. ⌋*()*

[constr_3162] EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, or PROFILE_22 then the multiplicity of the attributes EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength shall be 0. ⌋*()*

[constr_3163] EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_04, PROFILE_06, PROFILE_07 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04, PROFILE_06, or PROFILE_07 then the multiplicity of the attributes EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength shall be 1. ⌋*()*

[constr_3164] EndToEndTransformationISignalProps.dataLength in PROFILE_04, PROFILE_06, PROFILE_07 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04, PROFILE_06, or PROFILE_07 then the multiplicity of the attribute EndToEndTransformationISignalProps.dataLength shall be 0. ⌋*()*

[constr_3155] Allowed values for EndToEndTransformationDescription.upperHeaderBitsToShift ⌈ The value of of the EndToEndTransformationDescription.upperHeaderBitsToShift attribute depends on the used serializing transformer:

COM based transformer: 0 (no bits are shifted)

SOME/IP transformer: 64 (to support the header shift of SOME/IP).

Custom transformer: no restriction (depends on header length and placement of custom transformer)

⌋()

[constr_3165] Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01, PROFILE_11 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 or PROFILE_11 then:

1. EndToEndTransformationDescription.crcOffset shall be set to the same value of upperHeaderBitsToShift.
2. EndToEndTransformationDescription.counterOffset shall be set to the value of upperHeaderBitsToShift + 8.
3. (if used) EndToEndTransformationDescription.dataIdNibbleOffset shall be set to the value of upperHeaderBitsToShift + 12.

⌋()

[constr_3327] Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_22, then EndToEndTransformationDescription.offset shall be set to the same value of upperHeaderBitsToShift. ⌋()

[constr_3166] EndToEndTransformationDescription.upperHeaderBitsToShift in PROFILE_02 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_02 then the value of the upperHeaderBitsToShift attribute shall be 0. ⌋()

[constr_3169] Attribute multiplicities and values in PROFILE_02 and PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_02 or PROFILE_22 then:

1. the multiplicity of the EndToEndTransformationDescription.crcOffset attribute shall be 0.
2. the multiplicity of the EndToEndTransformationDescription.counterOffset attribute shall be 0.
3. the multiplicity of the EndToEndTransformationDescription.dataIdNibbleOffset attribute shall be 0.
4. the value of the EndToEndTransformationDescription.offset attribute shall be 0.

⌋()

[constr_3167] Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04, PROFILE_05, PROFILE_06, or PROFILE_07 the value of the EndToEndTransformationDescription.offset attribute shall be equal to the value of the EndToEndTransformationDescription.upperHeaderBitsToShift attribute. ⌋*()*

[constr_3171] Value of EndToEndTransformationISignalProps.dataId shall be unique in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04, PROFILE_05, PROFILE_06, or PROFILE_07 then the value of the EndToEndTransformationISignalProps.dataId attribute shall be unique within the scope of the System. ⌋*()*

[constr_3172] Effect of EndToEndTransformationDescription.profileBehavior value in PROFILE_01 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_01 and the value of the profileBehavior attribute is R4_2 then:

- the value of the EndToEndTransformationDescription.maxNoNewOrRepeatedData attribute shall be 14.
- the value of the EndToEndTransformationDescription.syncCounterInit attribute shall be 1.

⌋*()*

[constr_3173] Effect of EndToEndTransformationDescription.profileBehavior value in PROFILE_02 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_02 and the value of the profileBehavior attribute is R4_2 then:

- the value of the EndToEndTransformationDescription.maxNoNewOrRepeatedData attribute shall be 15.
- the value of the EndToEndTransformationDescription.syncCounterInit attribute shall be 1.

⌋*()*

[constr_3174] EndToEndTransformationDescription settings not allowed in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_11, PROFILE_22 ⌈ If the EndToEndTransformationDescription.profileName attribute has a value of PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_11, or PROFILE_22 then:

1. the multiplicity of the EndToEndTransformationDescription.maxNoNewOrRepeatedData attribute shall be 0.
2. the multiplicity of the EndToEndTransformationDescription.syncCounterInit attribute shall be 0.

3. the multiplicity of the EndToEndTransformationDescription.profileBehavior attribute shall be 0.

⌋()

The EndToEndTransformationDescription may be differently chosen for a given ISignal or ISignalGroup depending on selected variant, with the following exceptions:

[constr_3182] Restriction on TransformationTechnology.transformationDescription VariationPoint ⌈ The EndToEndTransformationDescription.profileName attribute shall not be subject to variability for a given ISignal / ISignalGroup, i.e., the value of the EndToEndTransformationDescription.profileName attribute shall be the same in all different variants. ⌋()

In other words, it is not possible that in one variant PROFILE_04 is used, and in another variant PROFILE_05 is used for the same ISignal or ISignalGroup.

7.3.4.1 E2E state machine settings

E2E state machine settings are set in EndToEndTransformationDescription and a subset of them can be overridden in EndToEndTransformationComSpecProps. The E2E state machine is described in more detail in the E2E Library [19].

[constr_3176] Value range of windowSize ⌈ The value of the windowSize attribute shall be greater or equal to 1. ⌋()

[constr_3177] Dependency between maxErrorStateValid, maxErrorStateInit and maxErrorStateInvalid ⌈ The following restriction shall be respected:
maxErrorStateValid >= maxErrorStateInit >= maxErrorStateInvalid >= 0 ⌋()

[constr_3178] Dependency between minOkStateValid, minOkStateInit and minOkStateInvalid ⌈ The following restriction shall be respected:
1 <= minOkStateValid <= minOkStateInit <= minOkStateInvalid ⌋()

[constr_3179] Dependency between minOkStateInit, maxErrorStateInit and windowSize ⌈ The following restriction shall be respected:
minOkStateInit + maxErrorStateInit <= windowSize ⌋()

[constr_3180] Dependency between minOkStateValid, maxErrorStateValid and windowSize ⌈ The following restriction shall be respected:
minOkStateValid + maxErrorStateValid <= windowSize ⌋()

[constr_3181] Dependency between minOkStateInvalid, maxErrorStateInvalid and windowSize ⌈ The following restriction shall be respected: minOkStateInvalid + maxErrorStateInvalid <= windowSize ⌋()

7.3.4.2 E2E recommended configuration settings

This chapter provides different configuration settings for particular E2E Profiles. Please note that in future additional recommended configuration settings might be added.

7.3.4.2.1 E2E Profile 1 configuration setting C

The E2E Profile 1 configuration setting C is foreseen for CAN/FlexRay messages that are serialized by the COM based transformer and should be used with RTE event-based communication, i.e. queued communication with queue size = 1, using Rte_Send / Rte_Receive.

[TPS_SYST_02069] Recommended configuration settings for E2E Profile 1 configuration setting C ⌈ The recommended configuration settings for E2E Profile 1 configuration setting C are defined in Table 7.27. ⌋ *(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_01	Profile 1
EndToEndTransformationDescription.crcOffset	0	CRC offset
EndToEndTransformationDescription.counterOffset	8	Counter offset
EndToEndTransformationDescription.dataIdNibbleOffset	12	Data Id high nibble offset
EndToEndTransformationDescription.maxDeltaCounter	2	Maximum jump considered to be OK is 2, i.e. one lost message.
EndToEndTransformationDescription.minOkStateInit	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateInit	1	One error allowed
EndToEndTransformationDescription.windowSize	3	Last 3 messages are considered
EndToEndTransformationDescription.minOkStateValid	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateValid	1	One error allowed
EndToEndTransformationDescription.minOkStateInvalid	2	At least two OK messages
EndToEndTransformationDescription.maxErrorStateInvalid	1	One error allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	0	no bits are shifted
BufferProperties.headerLength	16	16 bits is the length of E2E profile 1C header.
EndToEndTransformationDescription.profileBehavior	R4_2	Behavior of Profile P1 adjusted for the state machine.
EndToEndTransformationDescription.maxNoNewOrRepeatedData	14	Behavior of Profile P1 adjusted for the state machine.
EndToEndTransformationDescription.syncCounterInit	1	Behavior of Profile P1 adjusted for the state machine.

Table 7.27: Configuration of E2E Profile 1 configuration setting C

7.3.4.2.2 E2E Profile 4 configuration setting A

The E2E Profile 4 configuration setting A is foreseen for long messages that are serialized by the SOME/IP transformer. The configuration setting 4A should be used with RTE event-based communication, i.e. queued communication with queue size = 1, using Rte_Send / Rte_Receive.

This configuration setting is quite strict as it does not allow any errors, i.e.:

1. Repetitions
2. Counter jumps bigger than 1.
3. Errors not related to counters (e.g. CRC, data ID, length)

As soon as any error is detected, there is a transition to invalid state.

[TPS_SYST_02070] Recommended configuration settings for E2E Profile 4 configuration setting A ⌈ The recommended configuration settings for E2E Profile 4 configuration setting A are defined in Table 7.28. ⌋ *(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_04	Profile 4
EndToEndTransformationDescription.offset	64	To support the fixed location of Some/IP header
EndToEndTransformationDescription.maxDeltaCounter	1	Maximum jump considered to be OK is 1
EndToEndTransformationDescription.minOkStateInit	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateInit	0	No errors allowed
EndToEndTransformationDescription.windowSize	1	Only the last message is considered
EndToEndTransformationDescription.minOkStateValid	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateValid	0	No errors allowed
EndToEndTransformationDescription.minOkStateInvalid	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateInvalid	0	No errors allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	64	64 bits from Some/IP header to be shifted
BufferProperties.headerLength	96	96 bits is the length of E2E profile 4 header.

Table 7.28: Configuration of E2E configuration setting 4A

7.3.4.2.3 E2E Profile 4 configuration setting B

The E2E Profile 4 configuration setting B is foreseen for long messages that are serialized by the SOME/IP transformer. The configuration setting 4B should be used with RTE event-based communication, i.e. queued communication with queue size = 1, using Rte_Send / Rte_Receive.

This configuration setting requires having within the monitoring window the following properties:

1. At least one OK message
2. At most one error not related to counters (e.g. CRC, data ID, length)
3. the remaining data in the monitoring window may be
   - repetitions or
   - jumps above 1.

As soon as any error is detected, there is a transition to invalid state.

[TPS_SYST_02071] Recommended configuration settings for E2E Profile 4 configuration setting B ⌈ The recommended configuration settings for E2E Profile 4 configuration setting B are defined in Table 7.29. ⌋*(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_04	Profile 4
EndToEndTransformationDescription.offset	64	To support the fixed location of Some/IP header
EndToEndTransformationDescription.maxDeltaCounter	2	Maximum jump considered to be OK is 2, i.e. one lost message
EndToEndTransformationDescription.minOkStateInit	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateInit	1	One error allowed
EndToEndTransformationDescription.windowSize	3	Last 3 messages are considered
EndToEndTransformationDescription.minOkStateValid	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateValid	1	One error allowed
EndToEndTransformationDescription.minOkStateInvalid	2	At least two OK messages
EndToEndTransformationDescription.maxErrorStateInvalid	1	One error allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	64	64 bits from Some/IP header to be shifted
BufferProperties.headerLength	96	96 bits is the length of E2E profile 4 header.

Table 7.29: Configuration of E2E Profile 4 configuration setting B

7.3.4.2.4 E2E Profile 7 configuration setting A

The E2E Profile 7 configuration setting A is foreseen for long messages (up to 4 MB) that are serialized by the SOME/IP transformer.

This configuration setting is quite strict as it does not allow any errors, i.e.:

1. Repetitions
2. Counter jumps bigger than 1.

3. Errors not related to counters (e.g. CRC, data ID, length)

As soon as any error is detected, there is a transition to invalid state.

[TPS_SYST_02134] Recommended configuration settings for E2E Profile 7 configuration setting A ⌈ The recommended configuration settings for E2E Profile 7 configuration setting A are defined in Table 7.30. ⌋ *(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_07	Profile 7
EndToEndTransformationDescription.offset	64	To support the fixed location of Some/IP header
EndToEndTransformationDescription.maxDeltaCounter	1	Maximum jump considered to be OK is 1
EndToEndTransformationDescription.minOkStateInit	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateInit	0	No errors allowed
EndToEndTransformationDescription.windowSize	1	Only the last message is considered
EndToEndTransformationDescription.minOkStateValid	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateValid	0	No errors allowed
EndToEndTransformationDescription.minOkStateInvalid	1	received message shall be OK.
EndToEndTransformationDescription.maxErrorStateInvalid	0	No errors allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	64	64 bits from Some/IP header to be shifted
BufferProperties.headerLength	160	160 bits is the length of E2E profile 7 header.

Table 7.30: Configuration of E2E Profile 7 configuration setting A

7.3.4.2.5 E2E Profile 7 configuration setting B

The E2E Profile 7 configuration setting B is foreseen for long messages (up to 4 MB) that are serialized by the SOME/IP transformer.

This configuration setting requires having within the monitoring window the following properties:

1. At least one OK message
2. At most one error not related to counters (e.g. CRC, data ID, length)
3. the remaining data in the monitoring window may be
    - repetitions or
    - jumps above 1.

As soon as any error is detected, there is a transition to invalid state.

[TPS_SYST_02135] Recommended configuration settings for E2E Profile 7 configuration setting B ⌈ The recommended configuration settings for E2E Profile 7 configuration setting B are defined in Table 7.31. ⌋*(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_07	Profile 7
EndToEndTransformationDescription.offset	64	To support the fixed location of Some/IP header
EndToEndTransformationDescription.maxDeltaCounter	2	Maximum jump considered to be OK is 2, i.e. one lost message
EndToEndTransformationDescription.minOkStateInit	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateInit	1	One error allowed
EndToEndTransformationDescription.windowSize	3	Last 3 messages are considered
EndToEndTransformationDescription.minOkStateValid	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateValid	1	One error allowed
EndToEndTransformationDescription.minOkStateInvalid	2	At least two OK messages
EndToEndTransformationDescription.maxErrorStateInvalid	1	One error allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	64	64 bits from Some/IP header to be shifted
BufferProperties.headerLength	160	160 bits is the length of E2E profile 7 header.

Table 7.31: Configuration of E2E Profile 7 configuration setting B

7.3.4.2.6 E2E Profile 11 configuration setting C

The E2E Profile 11 configuration setting C is foreseen for CAN/FlexRay messages that are serialized by the COM based transformer and should be used with RTE event-based communication, i.e. queued communication with queue size = 1, using Rte_Send / Rte_Receive.

[TPS_SYST_02155] Recommended configuration settings for E2E Profile 11 configuration setting C ⌈ The recommended configuration settings for E2E Profile 11 configuration setting C are defined in Table 7.32. ⌋*(RS_SYST_00056)*

Attribute	Allowed value	Comment
EndToEndTransformationDescription.profileName	PROFILE_11	Profile 11
EndToEndTransformationDescription.crcOffset	0	CRC offset
EndToEndTransformationDescription.counterOffset	8	Counter offset
EndToEndTransformationDescription.dataIdNibbleOffset	12	Data Id high nibble offset
EndToEndTransformationDescription.maxDeltaCounter	2	Maximum jump considered to be OK is 2, i.e. one lost message.
EndToEndTransformationDescription.minOkStateInit	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateInit	1	One error allowed
EndToEndTransformationDescription.windowSize	3	Last 3 messages are considered

Attribute	Allowed value	Comment
EndToEndTransformationDescription.minOkStateValid	1	At least one OK message
EndToEndTransformationDescription.maxErrorStateValid	1	One error allowed
EndToEndTransformationDescription.minOkStateInvalid	2	At least two OK messages
EndToEndTransformationDescription.maxErrorStateInvalid	1	One error allowed
EndToEndTransformationDescription.upperHeaderBitsToShift	0	no bits are shifted
BufferProperties.headerLength	16	16 bits is the length of E2E profile 1C header.

Table 7.32: Configuration of E2E Profile 11 configuration setting C

7.3.5 UserDefined Transformer

Autosar allows to describe custom Transformers that are not standardized by AUTOSAR. This is done by the usage of the following elements:

- UserDefinedTransformationDescription
- UserDefinedTransformationISignalProps
- UserDefinedTransformationProps

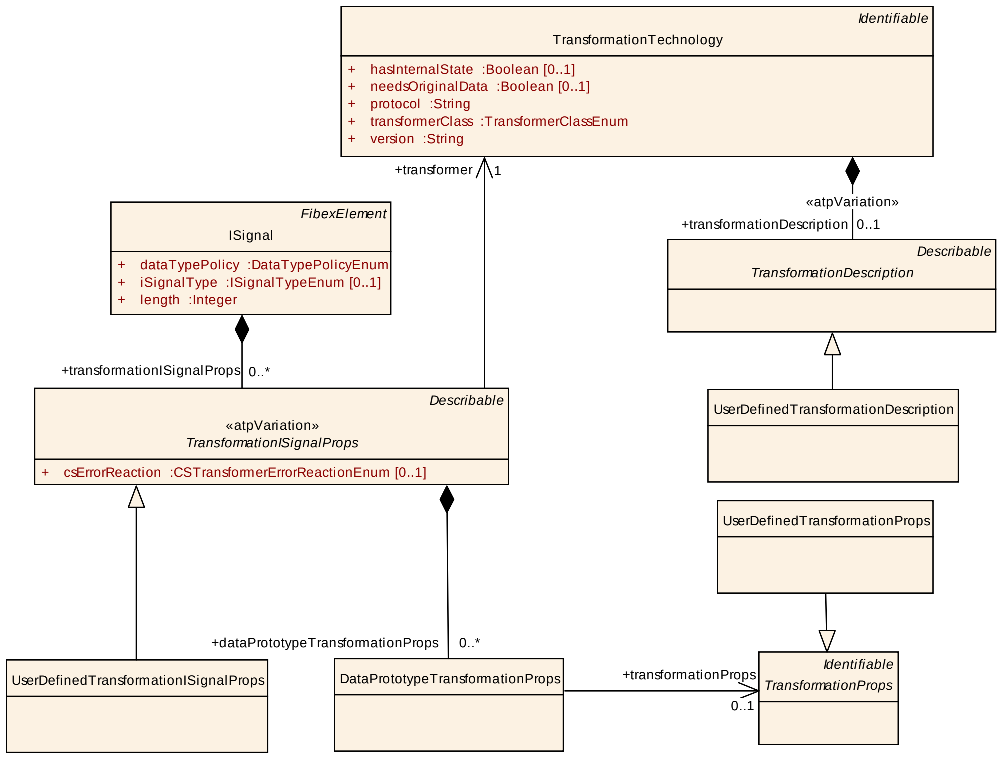


Figure 7.20: User Defined Transformation configuration

Please note that all these UserDefined classes are Identifiable or Describable and therefore are able to describe special data (sdg) which is not represented by the standard model.

Class	**UserDefinedTransformationDescription**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The UserDefinedTransformationDescription is used to specify details and documentation for custom transformers.			
Base	ARObject, Describable, TransformationDescription			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 7.33: UserDefinedTransformationDescription

Class	≪atpVariation≫ **UserDefinedTransformationISignalProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The UserDefinedTransformationISignalProps is used to specify ISignal specific configuration properties for custom transformers.			
Base	ARObject, Describable, TransformationISignalProps			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 7.34: UserDefinedTransformationISignalProps

Class	**UserDefinedTransformationProps**			
Package	M2::AUTOSARTemplates::AdaptivePlatform::TransformationConfiguration			
Note	The class UserDefinedTransformationProps specifies specific configuration properties of a user defined serializer.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable, TransformationProps			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table 7.35: UserDefinedTransformationProps

8 Gateways

A gateway is a function within an EcuInstance that performs as a FrameMapping, IPduMapping or ISignalMapping function between two or more CommunicationClusters.

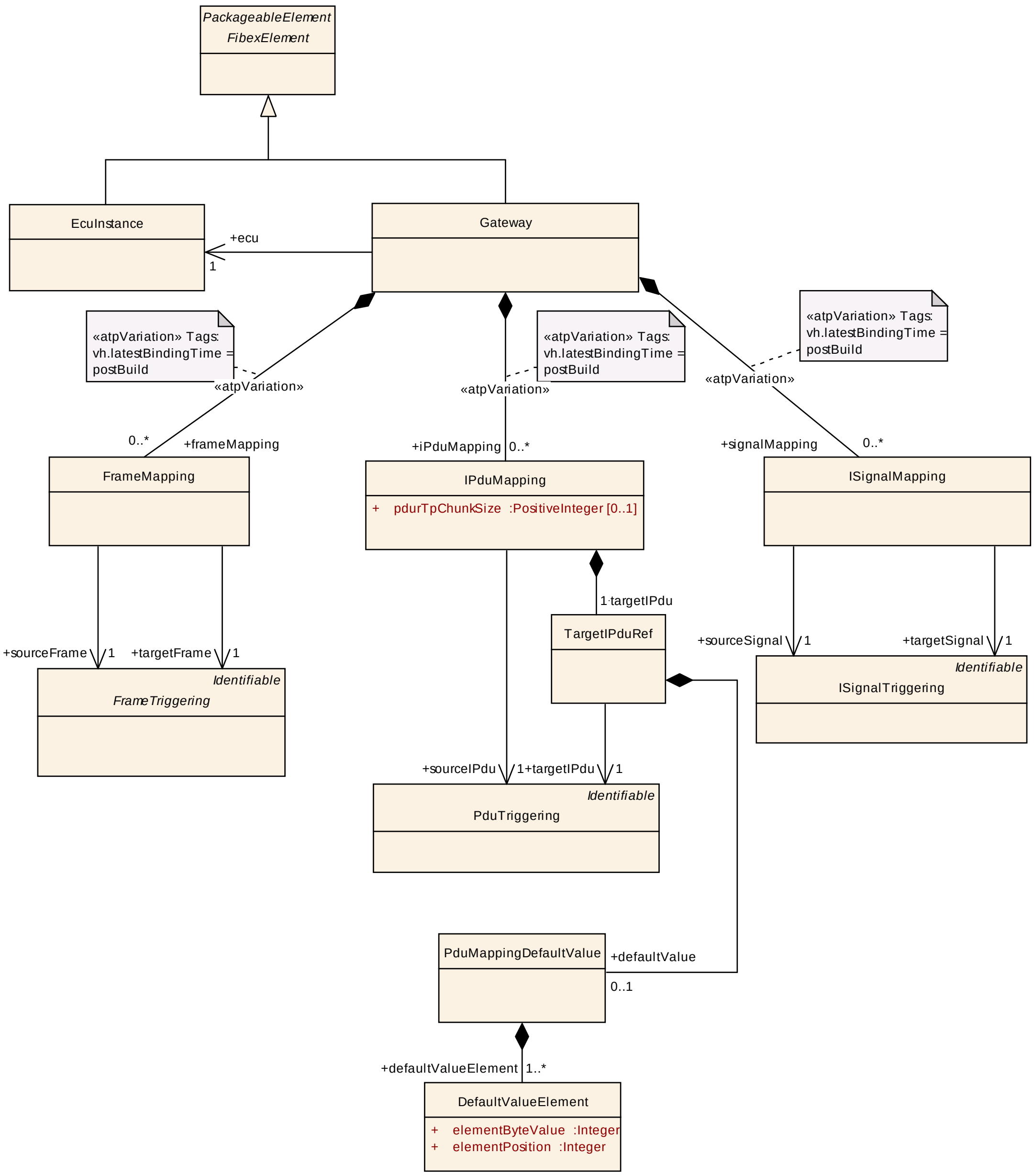


Figure 8.1: Communication Overview (Fibex4Multiplatform: Gateway)

Figure 8.1 shows the meta-model for the Gateway description in the System Template.

Class	**Gateway**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	A gateway is an ECU that is connected to two or more clusters (channels, but not redundant), and performs a frame, Pdu or signal mapping between them. **Tags:** atp.recommendedPackage=Gateways			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ecu	EcuInstance	1	ref	Reference to one ECU instance that implements the gateway.
frameMapping	FrameMapping	*	aggr	Frame Gateway: The entire source frame is mapped as it is onto the target frame (what in general is only possible inside of a common platform). In this case source and target frame should be the identical object. atpVariation: If frames are variable in clusters, the gateway frame mapping needs to be variable, too. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
iPduMapping	IPduMapping	*	aggr	IPdu Gateway: Arranges those IPdus that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. atpVariation: If PDUs are variable in clusters, the gateway PDU mapping needs to be variable, too. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
signalMapping	ISignalMapping	*	aggr	Signal Gateway: Arranges those signals that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. atpVariation: If signals are variable in clusters, the gateway signal mapping needs to be variable, too. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table 8.1: Gateway

8.1 Frame Mapping

The FrameMapping arranges those FrameTriggerings that are transferred by the Gateway from one PhysicalChannel to the other in pairs and defines the mapping between them. Each pair consists of a sourceFrame and a targetFrame referencing to a FrameTriggering.

[TPS_SYST_01116] Frame Mapping is not supported by the AUTOSAR BSW ⌈
The FrameMapping is not supported by the AUTOSAR BSW. ⌋*()*

The existence is optional and has been incorporated into the System Template mainly for compatibility in order to allow interchange between FIBEX and AUTOSAR descriptions.

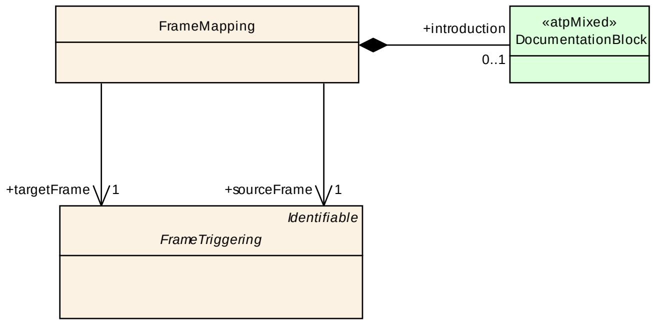


Figure 8.2: Frame Mapping (Fibex4Multiplatform: FrameMapping)

Class	**FrameMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	The entire source frame is mapped as it is onto the target frame (what in general is only possible inside of a common platform). In this case source and target frame should be the identical object. Each pair consists in a SOURCE and a TARGET referencing to a FrameTriggering. The Frame Mapping is not supported by the Autosar BSW. The existence is optional and has been incorporated into the System Template mainly for compatibility in order to allow interchange between FIBEX and AUTOSAR descriptions.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the frame mapping.
sourceFrame	FrameTriggering	1	ref	Source destination of the referencing mapping.
targetFrame	FrameTriggering	1	ref	Target destination of the referencing mapping.

Table 8.2: FrameMapping

8.2 IPdu Mapping

[TPS_SYST_01117] Pdu Gateway support ⌈ The IPduMapping arranges those IPdus that are transferred by the Gateway from one PhysicalChannel to the other (or the same) PhysicalChannel in pairs and defines the mapping between them. Each pair consist of a sourceIPdu and a targetIPdu referencing to a PduTriggering. ⌋*()*

For FlexRay: If a Pdu is gatewayed to more than one PhysicalChannel of the same CommunicationCluster, all of this gateway relationships shall be specified. Therefore, all affected PduTriggerings shall be referenced in the gateway mappings.

[TPS_SYST_01118] Support of Multicast Pdu routing ⌈ The 1:n multicast routing is supported with the definition of several IPduMappings where the sourceIPdu refers to the same PduTriggering. ⌋*()*

[TPS_SYST_02143] Support of Multisource Pdu routing ⌈ The n:1 routing is supported with the definition of several IPduMappings where the targetIPdu refers to the same PduTriggering. ⌋*()*

Please note that in case of n:1 routing by a local module (e.g. COM, Dcm) it must be enforced at run-time that *at most one* routing path is active (i.e., enabled via PduR_EnableRouting()). In case of n:1 routing by a pure gateway routing (either TP or IF) all routing paths can be active at run time.

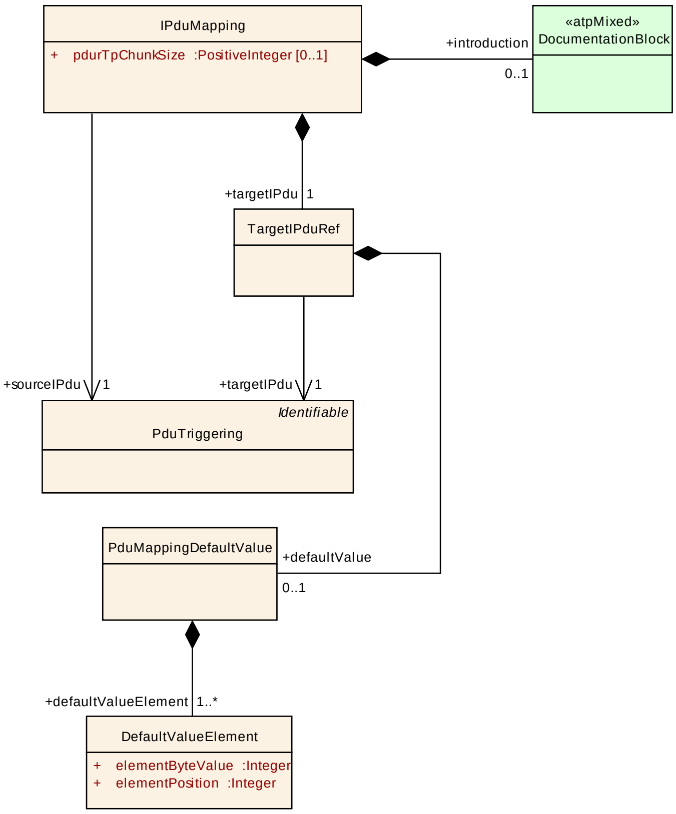


Figure 8.3: I-Pdu Mapping (Fibex4Multiplatform: IPduMapping)

Class	**IPduMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	Arranges those IPdus that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the IPdu mapping.
pdurTpChunkSize	PositiveInteger	0..1	attr	Optionally defines the to be configured Pdu Router TpChunkSize for this routing relation.
sourceIPdu	PduTriggering	1	ref	Source destination of the referencing mapping.
targetIPdu	TargetIPduRef	1	aggr	Target destination of the referencing mapping.

Table 8.3: IPduMapping

Class	**TargetIPduRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	Target destination of the referencing mapping.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
defaultValue	PduMappingDefaultValue	0..1	aggr	If no I-Pdu has been received a default value will be distributed.
targetIPdu	PduTriggering	1	ref	IPdu Reference

Table 8.4: TargetIPduRef

Class	**PduMappingDefaultValue**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	Default Value which will be distributed if no I-Pdu has been received since last sending.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
defaultValueElement	DefaultValueElement	1..*	aggr	The default value consists of a number of elements. Each default value element is represented by the element and the position in an array.

Table 8.5: PduMappingDefaultValue

Class	**DefaultValueElement**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	The default value consists of a number of elements. Each element is one byte long and the number of elements is specified by SduLength.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
elementByteValue	Integer	1	attr	The integer value of a freely defined data byte.
elementPosition	Integer	1	attr	This attribute specifies the byte position of the element within the default value

Table 8.6: DefaultValueElement

8.2.1 Routing and processing of Diagnostics Pdus

An EcuInstance routes a source DcmIPdu to a destination DcmIPdu if there is an IPduMapping in place that is configured according to [TPS_SYST_01117]. The EcuInstance also processes the DcmIPdu locally if the source DcmIPdu is assigned a functional destination address.

8.3 Signal Mapping

[TPS_SYST_01119] Signal Gateway support ⌈ The ISignalMapping defines the mapping between ISignals and ISignalGroups that are transferred by the Gateway from one PhysicalChannel to the other (or the same) PhysicalChannel. Each mapping pair consists of a sourceSignal and a targetSignal referencing an ISignalTriggering. Each ISignalTriggering points to either an ISignal or an ISignalGroup. The ISignal refers to the to be routed SystemSignal, the ISignalGroup refers to the to be routed SystemSignalGroup. ⌋*()*

[constr_3051] Restriction of ISignalMapping references ⌈ If the sourceSignal references an ISignal then the targetSignal shall also reference an ISignal. ⌋ *()*

[TPS_SYST_01155] Routing of ISignalGroups ⌈ If the sourceSignal references an ISignalGroup then the targetSignal can reference either an ISignalGroup or an ISignal. ⌋*()*

[constr_3052] Complete ISignalMapping of ISignalGroup signals ⌈ If an ISignalMapping to an ISignal that is a member of a ISignalGroup exists then (see [TPS_SYST_01120]) an ISignalMapping to the enclosing ISignalGroup shall exist as well. ⌋*()*

[TPS_SYST_02162] Routing of ISignals of ISignalGroups ⌈ When performing a signal group routing two approaches are supported for the pairing of the included ISignals:

- implicit mapping: the ISignalMapping points in the sourceSignal role to an ISignalTriggering of an ISignalGroup and no ISignalMappings are defined for the included ISignals. Identical shortNames of ISignal elements identify correlating ISignals between the source and the target in the scope of the ISignalMapping.
- explicit mapping: the ISignalMapping points in the sourceSignal role to an ISignalTriggering of an ISignalGroup and in addition explicitly specified ISignalMappings define which ISignals correlate to each other.

⌋*()*

[TPS_SYST_01120] Precedence of ISignalMappings ⌈ If a dedicated ISignalMapping for at least one ISignal within an ISignalGroup exists the implicit mapping on the basis of shortNames is no longer applicable for any ISignal within that ISignalGroup. ⌋*()*

[TPS_SYST_01121] Support of Mulicast signal routing ⌈ The 1:n multicast routing is supported with the definition of several ISignalMappings. See also the COM Signal Gateway fan-out description in section 6.10.1.2. ⌋*()*

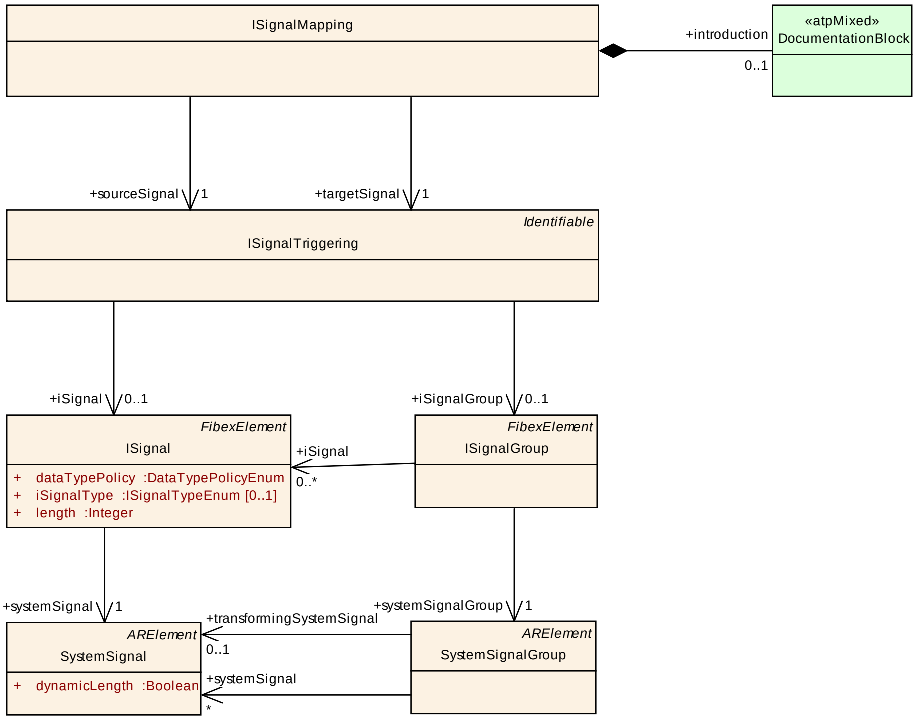


Figure 8.4: Signal Mapping (Fibex4Multiplatform: Signal Mapping)

Class	**ISignalMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Multiplatform			
Note	Arranges those signals (or SignalGroups) that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. Each pair consists in a source and a target referencing to a ISignalTriggering.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
introduction	DocumentationBlock	0..1	aggr	This represents introductory documentation about the ISignal mapping.
sourceSignal	ISignalTriggering	1	ref	Source destination of the referencing mapping.
targetSignal	ISignalTriggering	1	ref	Target destination of the referencing mapping.

Table 8.7: ISignalMapping

8.3.1 Partial Signal Group Mapping

[TPS_SYST_01122] partial routing between `ISignalGroup`s ⌈ The `ISignalMapping` supports partial routing between `ISignalGroup`s which have not identical set of `ISignal`s within an `ISignalGroup`. ⌋*()*

[constr_3053] Complete `ISignalMapping` of target `ISignalGroup` ⌈ If an `ISignalGroup` is referenced by a `targetSignal` then [TPS_SYST_02162] applies for each of the contained `ISignal` of that `ISignalGroup`. ⌋*()*

Figure 8.5 shows an example for a partial signal group mapping with explicit mappings for the `GroupSignal`s.

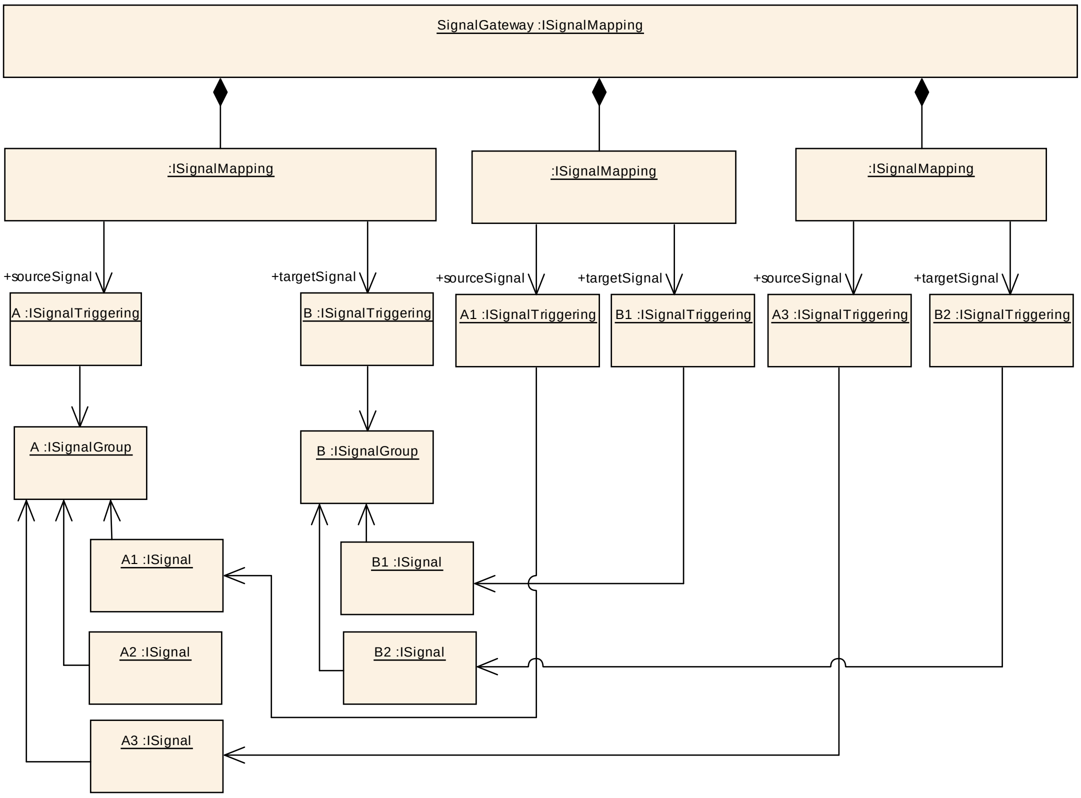


Figure 8.5: Partial Signal Group Mapping Example

9 Global Time Synchronization

9.1 Introduction

This chapter describes the modeling of how a global time synchronization in an AUTOSAR system can be achieved. There are two kinds of time bases: synchronized time base and offset time base. This manifests in two possible values for the attribute category (see [constr_3519]).

[constr_3519] Value of category of GlobalTimeDomain ⌈The attribute category of GlobalTimeDomain can have the following values:

- SYNCHRONIZED: this time base does not depend on the existence of another time base
- OFFSET: this time base depends on the existence of another time base. It delivers a value that represents an offset relative to the referenced (GlobalTimeDomain.offsetTimeDomain) synchronized time base.

⌋*()*

There are several use cases for implementing a system-wide global time in an vehicle:

- In case of an accident it may be necessary to post-mortem analyze whether the vehicle ECUs performed according to specification. This implies that it shall be possible to unambiguously determine the sequence of activities before a crash. This sequence can only be determined if all components in the distributed system depend on a reliable global time basis.
- It may be necessary that several ECUs in the distributed system need to act in concert with respect to the time that a specific activity is executed. A very trivial example for this requirement is the activation of turn indicators in a car. These are rarely connected to a single ECU (which could take care of synchronously flashing the turn indicators) but their synchronized execution is still very essential for the vehicle operation.
- The distribution of several global time bases shall be possible (e.g. a vehicle local time based on the runtime of the car and a GPS-based time).
- It shall be possible to define offset time bases which have the property that they are based on a synchronized time base and distribute the offset time value as difference to the synchronized time base.

It is obvious that the distribution of global time within a vehicle requires a system-wide context and therefore, the AUTOSAR System Template defines relevant meta-classes and their relations for this purpose.

Of course, the actual implementation of global time distribution is done in a couple of basic-software modules that need to be configured in the context of integrating a particular ECU. The purpose of the meta-model described in chapter 9 is to support the configuration of these basic-software modules.

The modeling of how the distribution of global time is supposed to work can roughly be distributed into two parts, the discussion of the *big picture* (see 9.2) and the description of the details that eventually will support the configuration of the corresponding basic-software modules. The latter can be found in chapter 9.3.

9.2 The big Picture

The central part of the formalization of global time synchronization is the existence of a *global time domain*, formalized as GlobalTimeDomain.

However, the fragment *global* in *global time domain* primarily stresses the fact that it is supposed to support the distribution of a *global* time rather than implying an information about the scope or visibility of a GlobalTimeDomain[1].

In other words, there is typically more than a single GlobalTimeDomain available in the System.

[TPS_SYST_05005] Relation of GlobalTimeDomain to CommunicationCluster
⌈ The concept of the GlobalTimeDomain roughly corresponds to the existence of a CommunicationCluster, i.e. it takes at least one CommunicationCluster to implement a *global time domain*. ⌋*()*

[TPS_SYST_05006] Chaining of GlobalTimeDomains ⌈ It is possible to extend the *global time domain* to several CommunicationClusters that are interconnected by means of a Gateway.

In other words, the global time base is routed from one CommunicationCluster to another, whereas the Time Slave resp. Time Slave Port updates its local time base by using the received global time base and takes into account, whether a time base correction has to be considered or not.

There are certainly use-cases for implementing a GlobalTimeDomain that extends to several CommunicationClusters, but in many (if not in the majority of) cases it will be necessary to update the time information for the sake of precision.

In this case, however, two separate GlobalTimeDomains rather than a single GlobalTimeDomain exist. The GlobalTimeDomain relate to each other such that one GlobalTimeDomain refers to the other in the role subDomain. ⌋*()*

In order to understand the way how GlobalTimeDomains refer to each other, it is important to understand that the concept of a *global time domain* has an underlying asymmetric approach of how the time information is distributed.

That is, not all participants in the communication of global time information are able and/or entitled to update the time information and send it around for others to consume.

[1]For the intents and purposes of this chapter, always make sure to read **global-time domain** rather than **global time-domain**.

[TPS_SYST_02103] Semantics of GlobalTimeDomain.domainId ⌈ GlobalTimeDomain.domainId represents a specific time source, e.g. GPS time. ⌋*()*

The modeling of GlobalTimeDomains and SubDomains describes the propagation of time values of a time source through the networks. Since the specific time source corresponds to the value of GlobalTimeDomain.domainId [constr_3251] is formulated.

[constr_3251] Value of GlobalTimeDomain.domainId in subDomain chains ⌈ In a chain of GlobalTimeDomain.subDomain the value of the attribute GlobalTimeDomain.domainId shall be identical. ⌋*()*

[TPS_SYST_05007] separation of roles within a GlobalTimeDomain ⌈ Within a single *global time domain*, There is a strict separation of roles into a single *global time master* (formalized by the meta-class GlobalTimeMaster) and a collection of so-called *global time slaves* (formalized by means of the meta-class GlobalTimeSlave).

The role of the GlobalTimeMaster is to provide the global time information and the role of the collection of GlobalTimeSlaves is to consume the information. The chaining of GlobalTimeDomains needs to be understood as the intention to implement the following information flow:

1. from the GlobalTimeMaster of one GlobalTimeDomain to the GlobalTimeSlaves of the same GlobalTimeDomain
2. via the GlobalTimeMaster of the GlobalTimeDomain referenced in the role subDomain to the GlobalTimeSlaves of the subDomain

⌋*()*

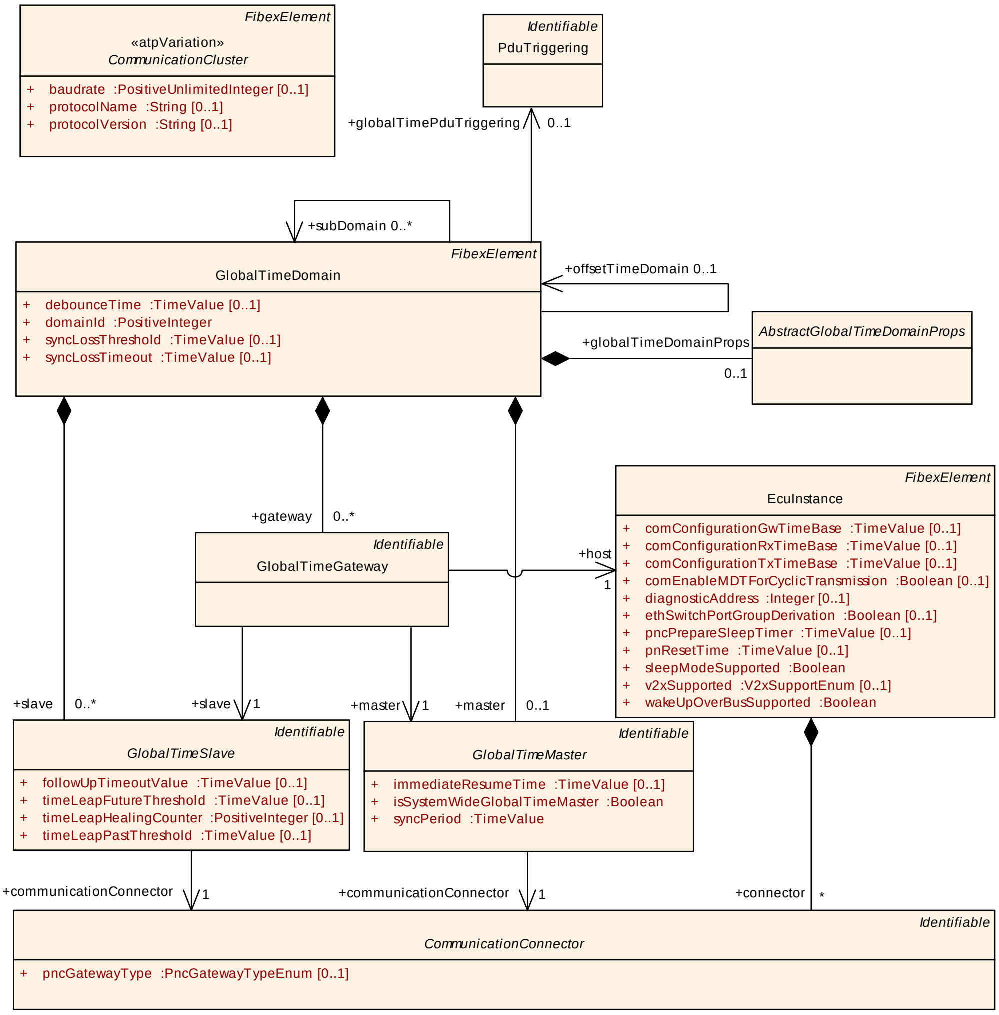


Figure 9.1: Big Picture of AUTOSAR global time synchronization

[TPS_SYST_05008] Semantics of a GlobalTimeGateway ⌈ In order to achieve the flow of information between a GlobalTimeSlave of a given GlobalTimeDomain to the GlobalTimeMaster of another GlobalTimeDomain, it is necessary to establish the existence of a so-called GlobalTimeGateway.

In terms of functionality, a GlobalTimeGateway complements the functionality of the underlying Gateway such that, on top of the mere routing from one Communication-Cluster to another, the time information is actively updated in the process of passing it from one GlobalTimeDomain to the other. ⌋*()*

[TPS_SYST_05009] GlobalTimeDomain.globalTimePduTriggering for transmitting global time information ⌈ The flow of global time information is unidirectional, i.e. the GlobalTimeSlaves consume the information without providing any form of feedback to the corresponding GlobalTimeMaster.

Thanks to this conceptual detail, there is only the need for **one** dedicated Pdu for the transmission of the actual global time information in the context of one GlobalTime-Domain.

The characteristics of accessing the information contained in this Pdu do make any requirements on the nature of the Pdu. Therefore, it is sufficient and applicable to use the GeneralPurposePdu for this use case.

To make this possible, it is necessary to include the global time use case in the set of standardized values of the attribute GeneralPurposePdu.category. In other words, [constr_3081] applies. ⌋()

[constr_3261] GlobalTimeDomain.globalTimePduTriggering category ⌈ The Pdu that is referenced by the PduTriggering that in turn is referenced by GlobalTimeDomain in the role globalTimePduTriggering shall be a GeneralPurposePdu of category GLOBAL_TIME. ⌋()

[TPS_SYST_05010] GlobalTimeDomain.globalTimePduTriggering is not required on Ethernet ⌈ The Pdu for transmitting global time information is not required on the Ethernet bus. Here, the information is accessed directly from the Ethernet Interfaces, i.e. the hardware already keeps track of the global time. ⌋()

[constr_1369] CommunicationConnectors shall be attached to the same CommunicationCluster ⌈ All CommunicationConnectors referenced from GlobalTimeMaster and GlobalTimeSlaves aggregated in one GlobalTimeDomain shall be referenced in the role commConnector by the same PhysicalChannel aggregated by the same CommunicationCluster. ⌋()

[constr_1370] Consistency of GlobalTimeDomain ⌈ The GlobalTimeSlave referenced in the role GlobalTimeGateway.slave and the GlobalTimeMaster referenced in the role GlobalTimeGateway.master shall **not** be aggregated by the same GlobalTimeDomain. ⌋()

The background of [constr_1370] is that the GlobalTimeGateway is supposed to connect two GlobalTimeDomains it is hardly possible that the GlobalTimeGateway.slave and the GlobalTimeMaster can be aggregated by the same GlobalTimeDomain.

[TPS_SYST_05011] Ownership of GlobalTimeGateway ⌈ Since the existence of a GlobalTimeGateway is only justified if a GlobalTimeDomain exists that is referenced by a GlobalTimeDomain in the role subDomain it seems appropriate to aggregate the GlobalTimeGateway at the GlobalTimeDomain referenced in the role subDomain. ⌋()

In other words, the GlobalTimeGateway shall be aggregated at the GlobalTimeDomain that also aggregates the master.

Please note that GlobalTimeDomain.gateway effectively has a 0..1 multiplicity since no more than one master is allowed per GlobalTimeDomain.

[constr_1371] Consistency of attribute host ⌈ Within the context of an aggregating GlobalTimeDomain, the CommunicationConnectors referenced in the role GlobalTimeGateway.master.communicationConnector and GlobalTimeGateway.slave.communicationConnector shall be aggregated by the same EcuInstance that is referenced in the role GlobalTimeGateway.host. ⌋()

[constr_1372] Consistency of attribute globalTimePduTriggering ⌈ Within the context of an aggregating GlobalTimeDomain, the globalTimePduTriggering shall be owned by PhysicalChannel that is also referencing the Communication-Connectors referenced in the roles GlobalTimeSlave.communicationConnector and GlobalTimeMaster.communicationConnector. ⌋*()*

[TPS_SYST_05013] Semantics of GlobalTimeMaster.isSystemWideGlobalTimeMaster ⌈ The attribute GlobalTimeMaster.isSystemWideGlobalTimeMaster indicates whether a given GlobalTimeMaster is considered an independent (i.e. [constr_1373] applies) source of global time information. ⌋*()*

[constr_1373] GlobalTimeMaster with attribute isSystemWideGlobalTimeMaster set to TRUE ⌈ GlobalTimeMaster with attribute isSystemWideGlobalTimeMaster set to TRUE shall not be referenced in the role GlobalTimeGateway.master. ⌋*()*

[TPS_SYST_05014] GlobalTimeMaster.isSystemWideGlobalTimeMaster ⌈ There is no limitation regarding the number of GlobalTimeMasters that have attribute isSystemWideGlobalTimeMaster set to TRUE. The attribute does not imply that there can only be one GlobalTimeMaster within the context of a System. ⌋*()*

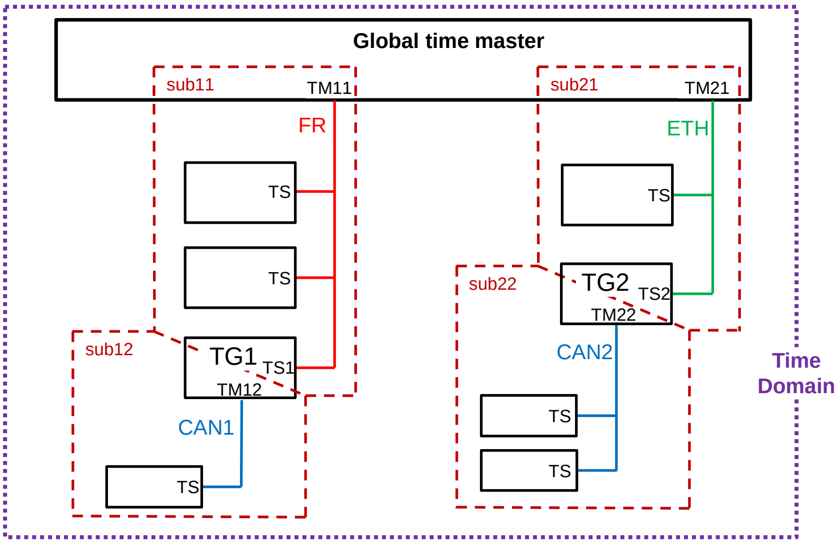
[constr_1374] Only fan-out possible for GlobalTimeGateway ⌈ For all GlobalTimeGateways that refer to the same EcuInstance the condition applies that no two GlobalTimeGateways shall refer to the same GlobalTimeMaster. ⌋*()*

In other words, a fan-in of time information such that time information is received from several sources is not supported.

In figure 9.2 an example of a Global Time Sync setup is shown. The *Global time master* ECU creates the *TimeDomain* and provides it to several subDomains. The GlobalTimeMasters for the subDomains take the *TimeDomain* and distribute it to their networks.

The time for the GlobalTimeMasters *TM11* and *TM21* is based on the *TimeDomain* and therefore they have the attribute isSystemWideGlobalTimeMaster set to *true*.

The time for the GlobalTimeMasters *TM12* and *TM22* are based on a GlobalTimeGateway and therefore they have the attribute isSystemWideGlobalTimeMaster set to *false*.



TS: GlobalTime slave
TM: GlobalTime master
TG: GlobalTime gateway

Figure 9.2: Example Global Time Sync topology

A partial outline of the example system description structure is shown in figure 9.3.

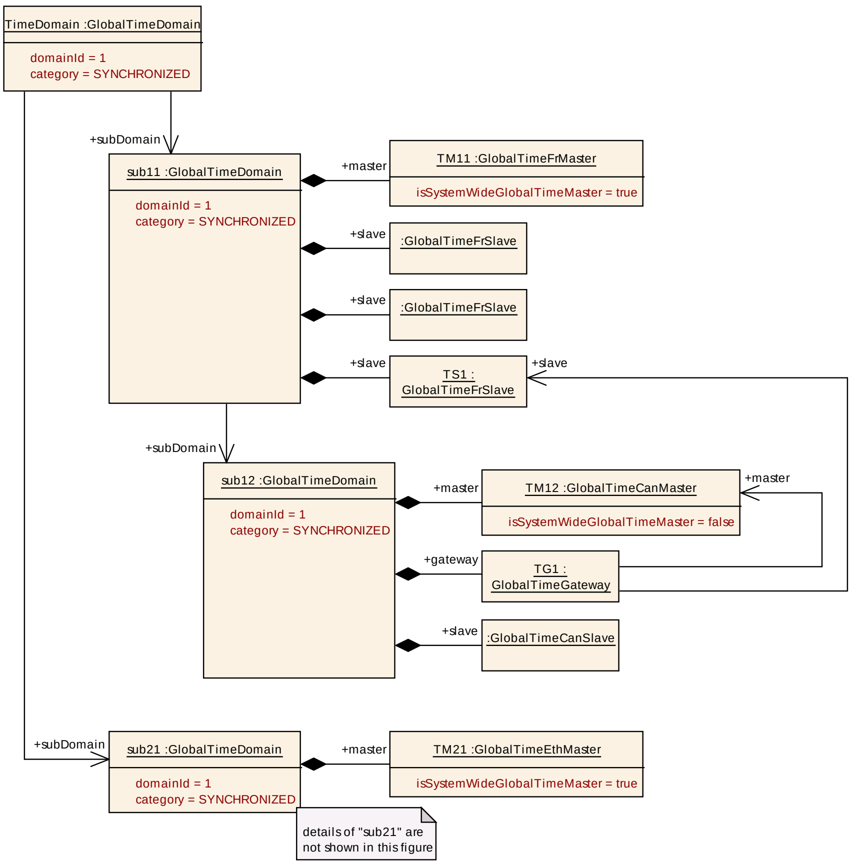


Figure 9.3: System Description of Global Time Sync example

An offset time domain is defined by an reference from a GlobalTimeDomain to another GlobalTimeDomain in the role GlobalTimeDomain.offsetTimeDomain. This makes the reference source the offset time domain and the reference target the synchronized time domain.

[constr_3520] Offset time domain shall be based on a synchronized time domain ⌈ If a GlobalTimeDomain has a reference with the role GlobalTimeDomain.offsetTimeDomain the reference source shall have a GlobalTimeDomain.domainId in the range of 16-31 and the reference target shall have a GlobalTimeDomain.domainId in the range of 0-15. ⌋*()*

Rationale: In the [28] Specification the ranges are fixed for synchronized and offset time domains.

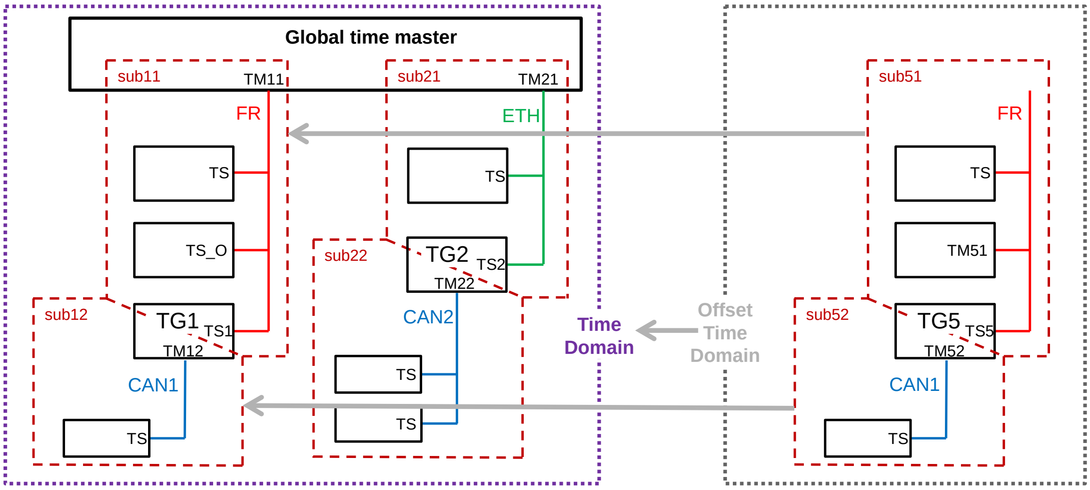
Note that the same synchronized time domain can be referenced by several different offset time domains.

[TPS_SYST_03015] Offset time domain requires synchronized time domain ⌈ Since the calculation of the actual offset time domain time requires the presence of the synchronized time domain as well as the offset time domain it is required that every ECU which receives an offset time domain also receives the respective synchronized time domain. ⌋*()*

In figure 9.4, an example of a Offset Time Sync setup is shown. The example is based on the setup shown in figure 9.2 and extends this with the definition of an offset time domain.

The *Global time master* ECU creates the synchronized *TimeDomain* and provides it to several subDomains. The figure needs to be interpreted in the way that the *OffsetTimeDomain* is based on the *TimeDomain* and is sort of overlaid, although drawn side by side.

The time slave *TS_O* receives the *TimeDomain* as a GlobalTimeSlave and also provides the *OffsetTimeDomain* as *TM51* in the role of a GlobalTimeMaster on the same network *FR*.



TS: GlobalTime slave
TM: GlobalTime master
TG: GlobalTime gateway

Figure 9.4: Example Offset Time Sync topology

A partial outline of the example system description structure is shown in figure 9.5.

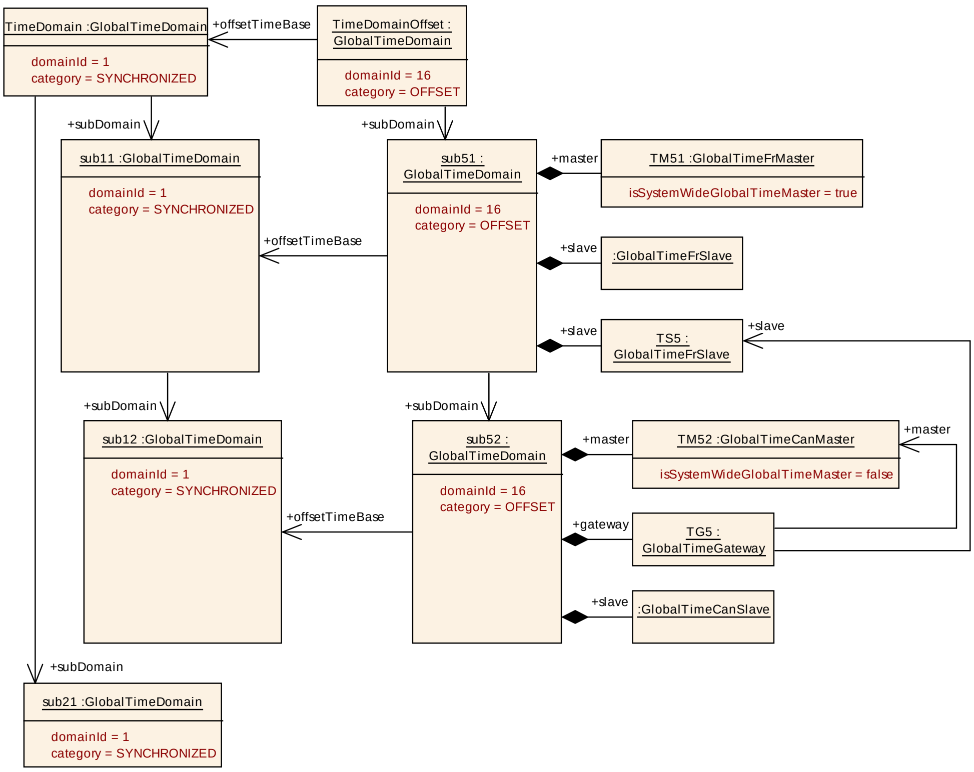


Figure 9.5: System Description of Offset Time Sync example

Class	**GlobalTimeDomain**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the ability to define a global time domain. **Tags:** atp.recommendedPackage=GlobalTimeDomains			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
debounceTime	TimeValue	0..1	attr	Defines the minimum amount of time between two time sync messages are transmitted.
domainId	PositiveInteger	1	attr	This represents the ID of the GlobalTimeDomain used in the network messages sent on behalf of global time management.
gateway	GlobalTimeGateway	*	aggr	A GlobalTimeGateway may exist in the context of a GlobalTimeDomain to actively update the global time information as it is routed from one GlobalTimeDomain to another.
globalTimeDomainProps	AbstractGlobalTimeDomainProps	0..1	aggr	Additional properties of the GlobalTimeDomain
globalTimePduTriggering	PduTriggering	0..1	ref	This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves.
master	GlobalTimeMaster	0..1	aggr	This represents the single master of a GlobalTimeDomain. A GlobalTimeDomain may have no GlobalTimeDomain.master, e.g. when it gets its time from a GPS receiver.
offsetTimeDomain	GlobalTimeDomain	0..1	ref	Reference to a synchronized time domain this offset time domain is based on. The reference source is the offset time domain. The reference target is the synchronized time domain.
slave	GlobalTimeSlave	*	aggr	This represents the collections of slaves of the GlobalTimeDomain. A GlobalTimeDomain may have no GlobalTimeDomain.slaves, e.g. when it propagates its time directly to sub domains.
subDomain	GlobalTimeDomain	*	ref	By this means it is possible to create a hierarchy of subDomains where one global time domain can declare one or more other global time domains as its subDomains.
syncLossThreshold	TimeValue	0..1	attr	This represents the minimum delta between the time value in two sync messages for which the sync loss flag is set. **Tags:** atp.Status=obsolete; atp.StatusRevisionBegin=4.3.1
syncLossTimeout	TimeValue	0..1	attr	This attribute describes the timeout for the situation that the time synchronization gets lost in the scope of the time domain.

Table 9.1: GlobalTimeDomain

Class	**AbstractGlobalTimeDomainProps (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This abstract class enables a GlobalTimeDomain to specify additional properties.			
Base	ARObject			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table 9.2: AbstractGlobalTimeDomainProps

Class	**GlobalTimeMaster (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the generic concept of a global time master.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationConnector	CommunicationConnector	1	ref	The GlobalTimeMaster is bound to the CommunicationConnector.
immediateResumeTime	TimeValue	0..1	attr	Defines the minimum time between an "immediate" message and the next periodic message.
isSystemWideGlobalTimeMaster	Boolean	1	attr	If set to TRUE, the GlobalTimeMaster is supposed to act as the root of global time information.
syncPeriod	TimeValue	1	attr	This represents the period. Unit: seconds

Table 9.3: GlobalTimeMaster

Class	**GlobalTimeSlave (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the generic concept of a global time slave.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
communicationConnector	CommunicationConnector	1	ref	The GlobalTimeSlave is bound to the CommunicationConnector.
followUpTimeoutValue	TimeValue	0..1	attr	Rx timeout for the follow-up message.
timeLeapFutureThreshold	TimeValue	0..1	attr	Defines the maximum allowed positive difference between the current Local Time Base value and a newly received Global Time Base value.
timeLeapHealingCounter	PositiveInteger	0..1	attr	Defines the required number of updates to the Time Base where the time difference to the previous received value has to remain within the bounds of timeLeapFutureThreshold and timeLeapPastThreshold until that Time Base is considered healed.

Attribute	Type	Mul.	Kind	Note
timeLeapPastThreshold	TimeValue	0..1	attr	Defines the maximum allowed negative difference between the current Local Time Base value and a newly received Global Time Base value.

Table 9.4: GlobalTimeSlave

Class	GlobalTimeGateway			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime			
Note	This represents the ability to define a time gateway for establishing a global time domain over several communication clusters.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
host	EcuInstance	1	ref	The GlobalTimeGateway is hosted by the referenced EcuInstance.
master	GlobalTimeMaster	1	ref	This represents the master of the global time gateway.
slave	GlobalTimeSlave	1	ref	This represents the slave of the GlobalTimeGateway.

Table 9.5: GlobalTimeGateway

[TPS_SYST_02115] Applicability of `GlobalTimeDomain.globalTimeDomainProps` ⌈ The defined properties at `GlobalTimeDomain.globalTimeDomainProps` may be defined individually per `GlobalTimeDomain`. This allows to define different value sets for each `GlobalTimeDomain` and any of the sub-domains. ⌋ *()*

[TPS_SYST_02163] Applicability of `syncLossTimeout` ⌈ `GlobalTimeDomain.syncLossTimeout` shall be specified for `GlobalTimeDomain`s that have an aggregated slave and for all other cases this attribute is not applicable. ⌋ *()*

9.3 Detailed Description of Global Time Synchronization

This chapter describes how the concept of *global time synchronization* is applied to various communication bus systems.

Although the characteristics of the supported bus systems differ widely in terms of their communication behavior, the modeling is actually quite similar for all of the supported bus systems.

9.3.1 Time Synchronization over CAN

This chapter described the detailing of how the concept of *global time synchronization* is applied to the CAN bus in particular.

The implementation of *global time synchronization* on the CAN bus is modeled by means of GlobalTimeCanMaster, a concrete subclass of GlobalTimeMaster. A similar approach applies for the GlobalTimeCanSlave, which is derived from GlobalTimeSlave.

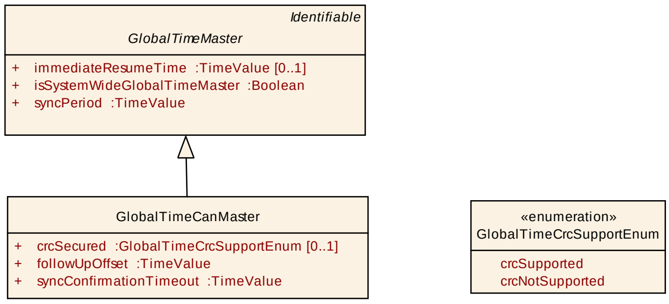


Figure 9.6: Modeling of the GlobalTimeCanMaster

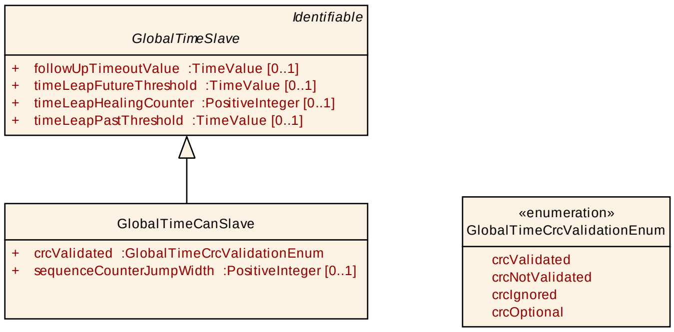


Figure 9.7: Modeling of the GlobalTimeCanSlave

In addition to the CAN specific Master and Slave properties CAN specific CanGlobalTimeDomainProps can be described.

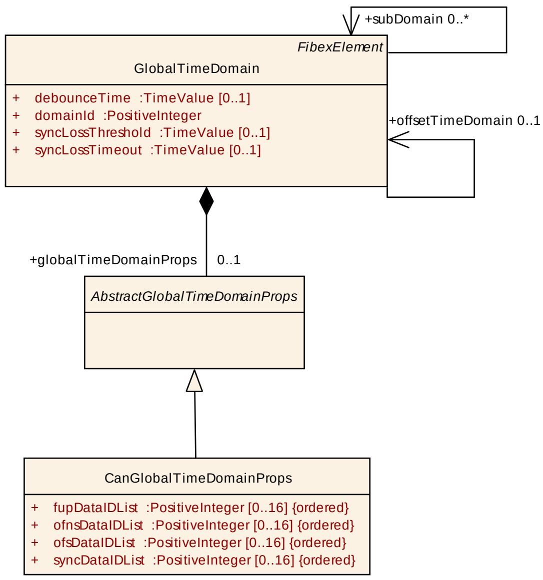


Figure 9.8: Modeling of the CAN specific CanGlobalTimeDomainProps

Class	GlobalTimeCanMaster			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::CAN			
Note	This represents the specialization of the GlobalTimeMaster for the CAN communication.			
Base	ARObject, GlobalTimeMaster, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
crcSecured	GlobalTimeCrcSupportEnum	0..1	attr	Definition of whether or not CRC is supported. This is only relevant for selected bus systems.
followUpOffset	TimeValue	1	attr	This represents the offset of the Follow-Up message with respect to the SYNC message
syncConfirmationTimeout	TimeValue	1	attr	This represents the value for the confirmation timeout. Unit: seconds.

Table 9.6: GlobalTimeCanMaster

Class	GlobalTimeCanSlave			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::CAN			
Note	This represents the specialization of the GlobalTimeSlave for the CAN communication.			
Base	ARObject, GlobalTimeSlave, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
crcValidated	GlobalTimeCrcValidationEnum	1	attr	Definition of whether or not validation of the CRC is supported.
sequenceCounterJumpWidth	PositiveInteger	0..1	attr	Specifies the maximum allowed gap of the sequence counter between two SYNC resp. two OFS messages.

Table 9.7: GlobalTimeCanSlave

Class	CanGlobalTimeDomainProps			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::CAN			
Note	Enables the definition of Can Global Time specific properties.			
Base	ARObject, AbstractGlobalTimeDomainProps			
Attribute	Type	Mul.	Kind	Note
fupDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for FUP messages to calculate CRC.
ofnsDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for OFNS messages to calculate CRC.
ofsDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for OFS messages to calculate CRC.
syncDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for SYNC messages to calculate CRC.

Table 9.8: CanGlobalTimeDomainProps

9.3.2 Time Synchronization over Ethernet

This chapter described the detailing of how the concept of *global time synchronization* is applied to the Ethernet bus in particular. For details concerning the functional behavior please refer to [29].

The implementation of *global time synchronization* on the Ethernet bus is modeled by means of `GlobalTimeEthMaster`, a concrete subclass of `GlobalTimeMaster`. A similar approach applies for the `GlobalTimeEthSlave`, which is derived from `GlobalTimeSlave`.

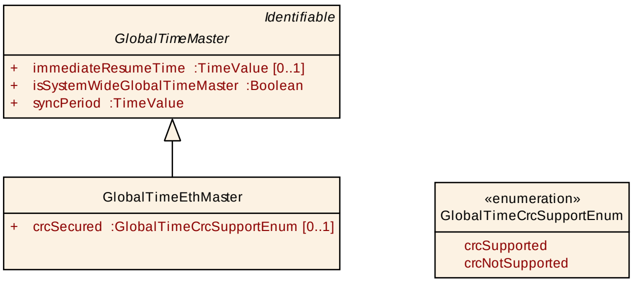


Figure 9.9: Modeling of the `GlobalTimeEthMaster`

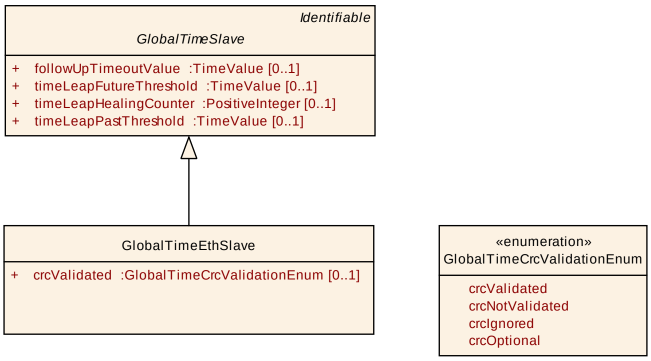


Figure 9.10: Modeling of the `GlobalTimeEthSlave`

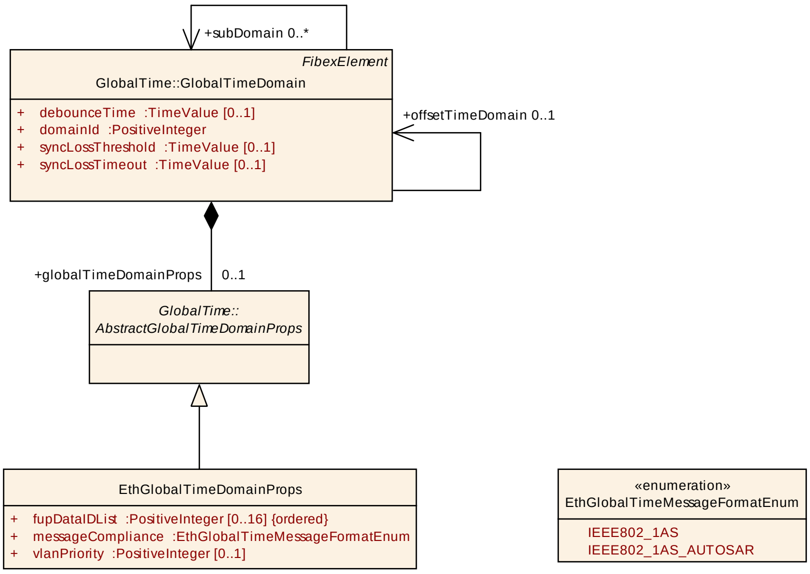


Figure 9.11: Modeling of the EthGlobalTimeDomainProps

Class	**GlobalTimeEthMaster**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	This represents the specialization of the GlobalTimeMaster for Ethernet communication.			
Base	ARObject, GlobalTimeMaster, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
crcSecured	GlobalTimeCrcSupportEnum	0..1	attr	Definition of whether or not CRC is supported. This is only relevant for selected bus systems.

Table 9.9: GlobalTimeEthMaster

Class	**GlobalTimeEthSlave**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	This represents the specialization of the GlobalTimeSlave for Ethernet communication.			
Base	ARObject, GlobalTimeSlave, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
crcValidated	GlobalTimeCrcValidationEnum	0..1	attr	Definition of whether or not validation of the CRC is supported.

Table 9.10: GlobalTimeEthSlave

Class	**EthGlobalTimeDomainProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	Enables the definition of Ethernet Global Time specific properties.			
Base	ARObject, AbstractGlobalTimeDomainProps			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

Attribute	Type	Mul.	Kind	Note
fupDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for FUP messages to calculate CRC.
managedCouplingPort	EthGlobalTimeManagedCouplingPort	*	aggr	Collection of CouplingPorts which are managed in the scope of this Ethernet GlobalTimeDomain.
messageCompliance	EthGlobalTimeMessageFormatEnum	1	attr	Defines the compliance of the Ethernet time sync messages to specific standards.
vlanPriority	PositiveInteger	0..1	attr	Defines which VLAN priority shall be assigned to a time sync message in case the message is sent using a VLAN tag.

Table 9.11: EthGlobalTimeDomainProps

Enumeration	EthGlobalTimeMessageFormatEnum
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH
Note	Specifies which message formats are available to for the Ethernet time sync protocol.
Literal	**Description**
IEEE802_1AS	Message format according to IEEE 802.1AS standard. **Tags:** atp.EnumerationValue=0 xml.name=IEEE802-1AS
IEEE802_1AS_AUTOSAR	Message format according to IEEE 802.1AS standard with AUTOSAR extensions. **Tags:** atp.EnumerationValue=1 xml.name=IEEE802-1AS-AUTOSAR

Table 9.12: EthGlobalTimeMessageFormatEnum

[constr_3312] Consistency of vlanPriority and EthernetCommunicationConnector ⌈ A GlobalTimeEthMaster refers to an EthernetCommunicationConnector in the role communicationConnector. If that EthernetCommunicationConnector is referenced by an EthernetPhysicalChannel in the role commConnector and the EthernetPhysicalChannel has a vLan tag defined via the VlanConfig then the GlobalTimeEthMaster shall have a vlanPriority defined. ⌋ *()*

In Ethernet networks the usage of Ethernet switches introduces another layer of delay in the transportation of data. This of course also applies to the global time synchronization messages and there are means to compensate these delays available in AUTOSAR.

In order to cope with delays on global time sync of Ethernet transport technology two use-cases are supported:

- an ECU is connected to an Ethernet switch but does not manage the switch (see section 9.3.2.2)

- an ECU is connected to an Ethernet switch and also manages this switch (see section 9.3.2.3)

The CouplingPort is used in either use-case to describe the connection of the ECU to the Ethernet network / switch. Thus there are some attributes related to the CouplingPort which apply to both use-cases.

9.3.2.1 Time Synchronization and Ethernet propagation delay

The propagation delay measurement is applicable to the CouplingPort in scope of the global time synchronization.

The default propagation delay time (which is used if propagation delay measurement is disabled or is not yet measured) is defined at the GlobalTimeCouplingPortProps with the attribute propagationDelay. The GlobalTimeCouplingPortProps are aggregated at the CouplingPortDetails in the role globalTimeProps.

Whether an ECU shall initiate a propagation delay measurement at a certain CouplingPort and on a specific GlobalTimeDomain is defined by the attribute pdelayRequestPeriod at the EthGlobalTimeManagedCouplingPort.

[TPS_SYST_03016] Applicability of EthGlobalTimeManagedCouplingPort.pdelayRequestPeriod ⌈ When EthGlobalTimeManagedCouplingPort.pdelayRequestPeriod is not defined or has the value 0 then initiation of propagation delay measurement is disabled for the CouplingPort referenced by couplingPort and the GlobalTimeDomain the EthGlobalTimeManagedCouplingPort belongs to. ⌋*()*

Whether an ECU shall respond to propagation delay measurement at a certain CouplingPort and on a specific GlobalTimeDomain is defined by the attribute pdelayResponseEnabled at the EthGlobalTimeManagedCouplingPort.

9.3.2.2 Time Synchronization and Ethernet connection

In case the ECU is directly connected to the Ethernet network and does not manage an Ethernet switch (of course there may be Ethernet switches used in the topology, but for this use-case these switches are not visible to the description of this ECU) the Ethernet time synchronization only needs to cope with the connection of this ECU to the Ethernet network. Considering the example in figure 9.13 this applies to the ECUs TS1, TS2, TS3, and TM which are just connected to the Ethernet switches but do not manage any Ethernet switch.

[TPS_SYST_03017] Reference to CouplingPort in the context of a GlobalTimeDomain ⌈ In case a GlobalTimeDomain is communicated via a CouplingPort and the respective ECU does not manage an Ethernet switch then the reference EthGlobalTimeManagedCouplingPort.couplingPort shall reference a CouplingPort which is aggregated by the EthernetCommunicationController in the role couplingPort. The EthernetCommunicationController itself shall be referenced by a GlobalTimeMaster or GlobalTimeEthSlave (via the CommunicationConnector) and that GlobalTimeMaster or GlobalTimeEthSlave shall be aggregated by the GlobalTimeDomain initially mentioned. ⌋()

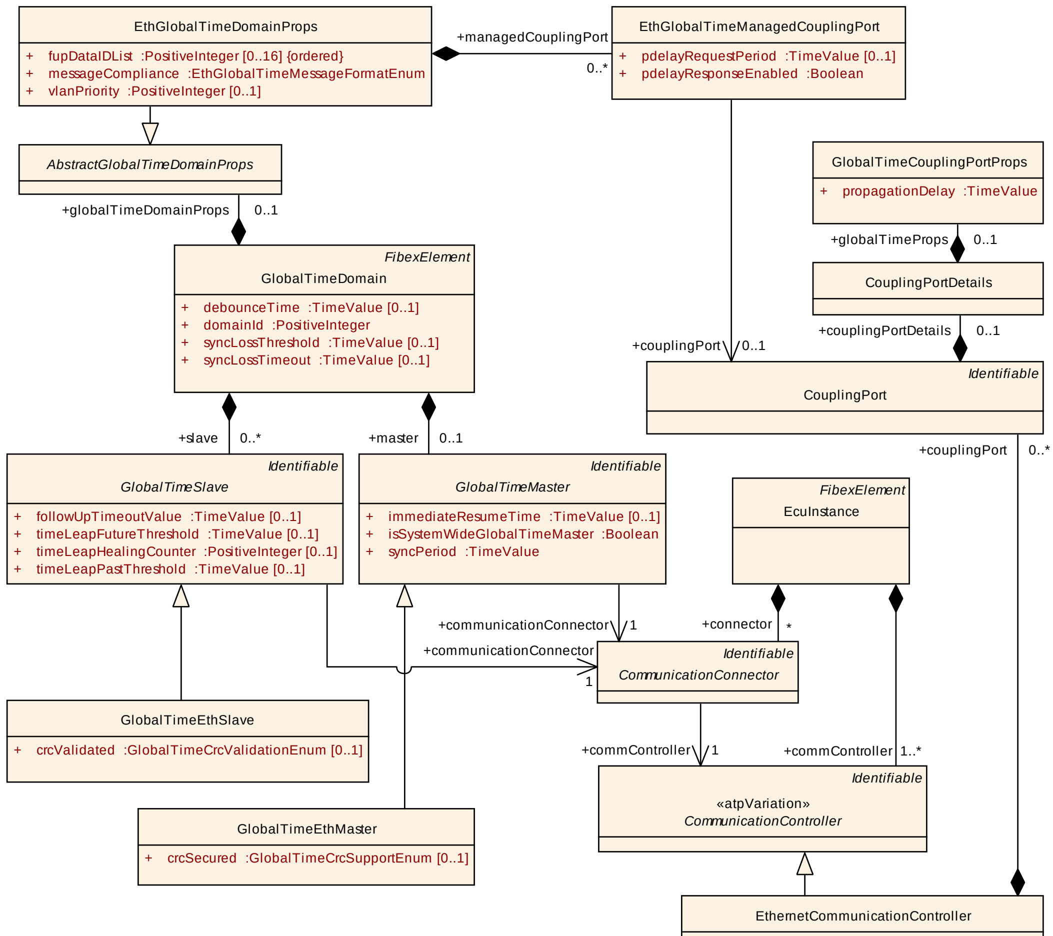


Figure 9.12: Overview of the Ethernet time sync in relation with a CouplingPort of an ECU

9.3.2.3 Time Synchronization and managed Ethernet switch

In case an ECU manages an Ethernet switch then that management ECU can basically be the GlobalTimeEthMaster or the GlobalTimeEthSlave located (see also figure 9.13). For the description of the time delay compensation on System Template level this does not matter.

It is essential to configure all possible time synchronization communication paths between the involved entities.

In case of ECU A in figure 9.13 the GlobalTimeEthMaster shall

- refer to the CouplingPort 0 since this is where

  - all time sync messages will be sent out by the GlobalTimeEthMaster
  - all adjusted follow up messages will be sent out by the GlobalTimeEthMaster
- refer to the CouplingPort 1 because this is where the Ethernet switch is connected to the management ECU A
- refer to the CouplingPorts 2, 3, and 4 since this is where the time sync messages will be forwarded by the switch
- not refer to the CouplingPort 5 because this one is not involved in that GlobalTimeDomains communication

In case of ECU B in figure 9.13 the GlobalTimeEthSlave shall

- refer to the CouplingPort 0 since this is where
  - the time sync messages will be received by the GlobalTimeEthSlave
  - all adjusted follow up messages will be sent out by the GlobalTimeEthSlave
- refer to the CouplingPort 1 because this is where the Ethernet switch is connected to the management ECU B
- refer to the CouplingPort 3 because this is where the time sync messages will be received from the GlobalTimeEthMaster on ECU TM
- refer to the CouplingPorts 2 and 4 since this is where the time sync messages will be forwarded by the switch
- not refer to the CouplingPort 5 because this one is not involved in that GlobalTimeDomains communication

Please note that the non-involvement of the CouplingPort 5 is used for illustration purposes. It would also be possible to involve CouplingPort 5 in that GlobalTimeDomain definition although currently there is no ECU as an GlobalTimeEthSlave defined. In that case the CouplingPort 5 is prepared to be connected to an ECU with an GlobalTimeEthSlave later.

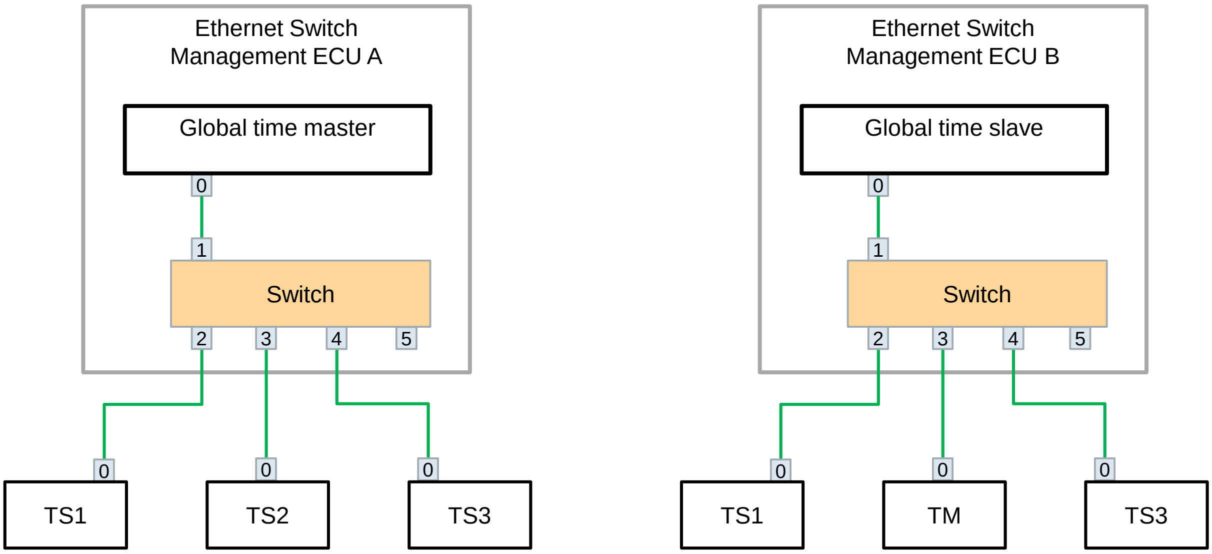


Figure 9.13: Example of a managed Ethernet Switch

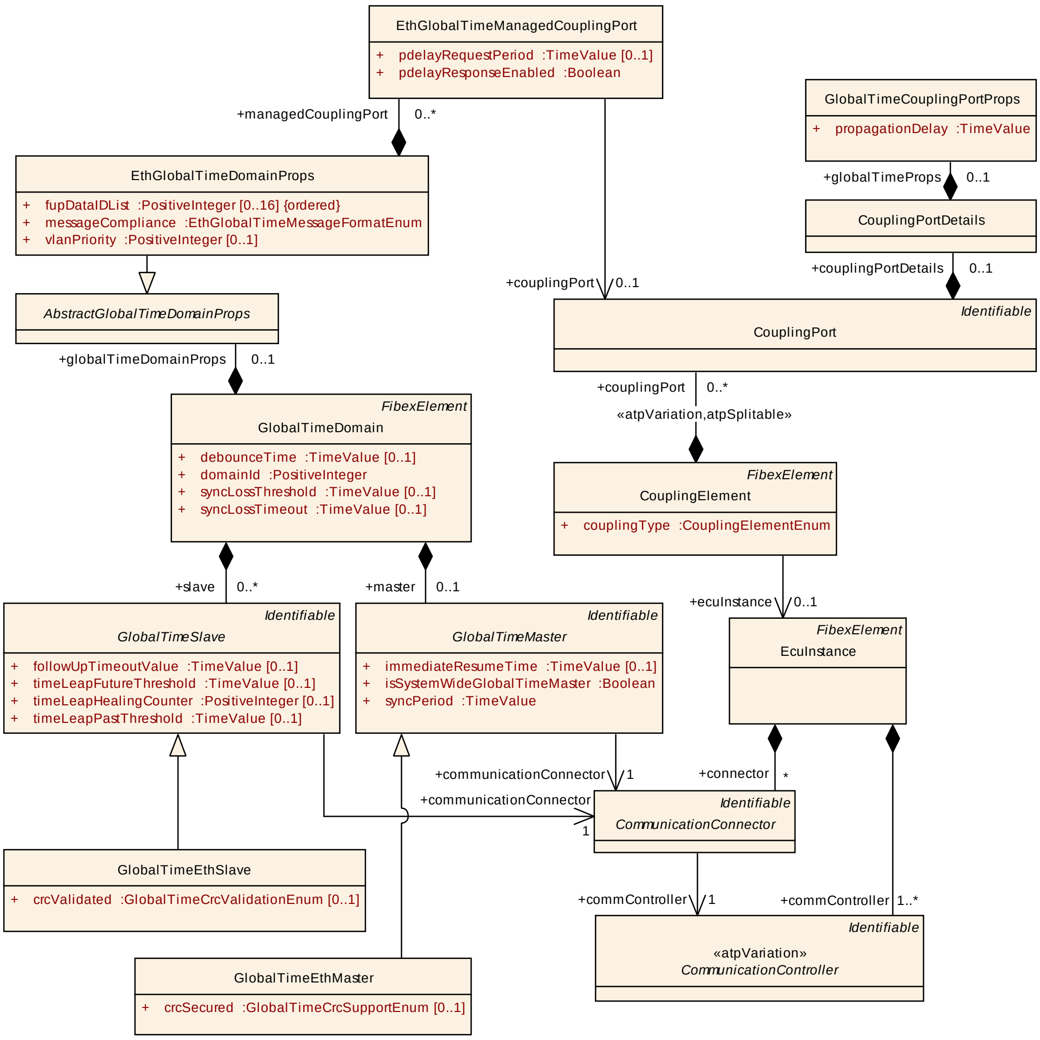


Figure 9.14: Overview of the Ethernet time sync in relation with a `CouplingPort` of an Ethernet switch

Class	**EthGlobalTimeManagedCouplingPort**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::ETH			
Note	Specifies a CouplingPort which is managed by an Ethernet Global Time Domain.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
couplingPort	CouplingPort	0..1	ref	Defines which CouplingPort is managed by this EthGlobalTimeManagedCouplingPort.
pdelayRequestPeriod	TimeValue	0..1	attr	Defines the period for the pdelay request messages.
pdelayResponseEnabled	Boolean	1	attr	Defines whether PDELAY RESPONSE and PDELAY RESPONSE FOLLOW UP shall be sent on this CouplingPort.

Table 9.13: EthGlobalTimeManagedCouplingPort

Class	**GlobalTimeCouplingPortProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology			
Note	Defines properties for the usage of the CouplingPort in the scope of Global Time Sync.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
propagationDelay	TimeValue	1	attr	If cyclic propagation delay measurement is enabled, this parameter represents the default value of the propagation delay until the first actually measured propagation delay is available. If cyclic propagation delay measurement is disabled, this parameter defines a fixed value for the propagation delay.

Table 9.14: GlobalTimeCouplingPortProps

9.3.3 Time Synchronization over FlexRay

This chapter described the detailing of how the concept of *global time synchronization* is applied to the Flexray bus in particular.

The implementation of *global time synchronization* on the Flexray bus is modeled by means of `GlobalTimeFrMaster`, a concrete subclass of `GlobalTimeMaster`. A similar approach applies for the `GlobalTimeFrSlave`, which is derived from `GlobalTimeSlave`.

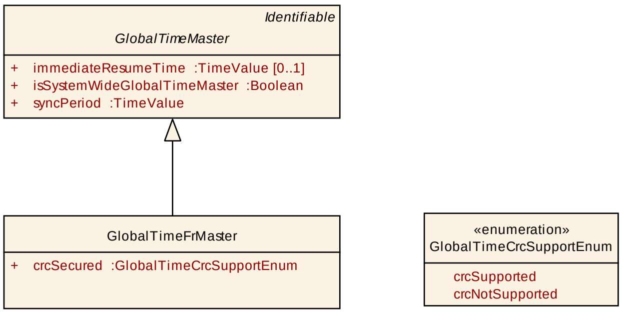


Figure 9.15: Modeling of the GlobalTimeFrMaster

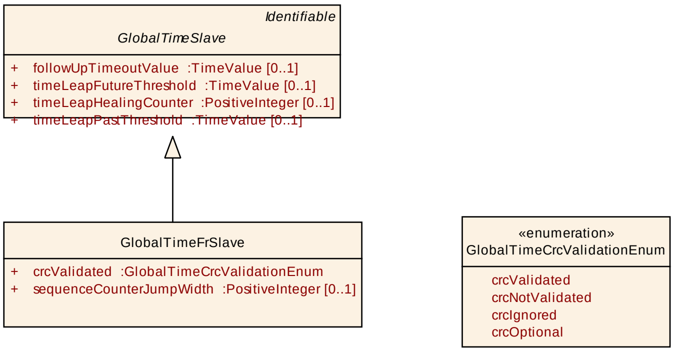


Figure 9.16: Modeling of the GlobalTimeFrSlave

In addition to the FlexRay specific Master and Slave properties FlexRay specific FrGlobalTimeDomainProps can be described.

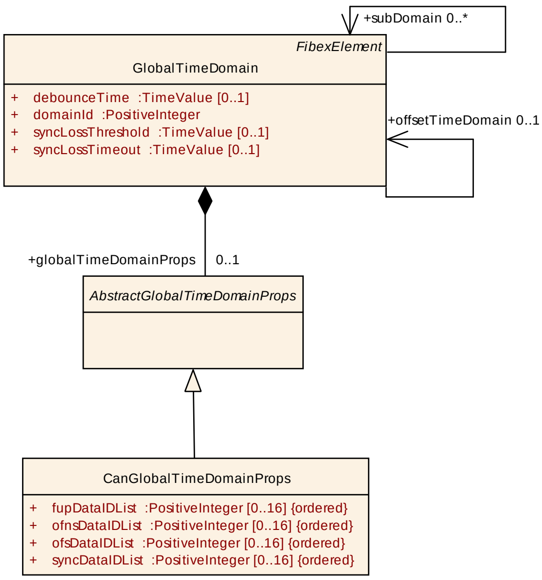


Figure 9.17: Modeling of the FlexRay specific FrGlobalTimeDomainProps

Class	GlobalTimeFrMaster			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::FR			
Note	This represents the specialization of the GlobalTimeMaster for Flexray communication.			
Base	ARObject, GlobalTimeMaster, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
crcSecured	GlobalTimeCrcSupportEnum	1	attr	Definition of whether or not CRC is supported. This is only relevant for selected bus systems.

Table 9.15: GlobalTimeFrMaster

Class	GlobalTimeFrSlave			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::FR			
Note	This represents the specialization of the GlobalTimeSlave for Flexray communication.			
Base	ARObject, GlobalTimeSlave, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
crcValidated	GlobalTimeCrcValidationEnum	1	attr	Definition of whether or not validation of the CRC is supported.
sequenceCounterJumpWidth	PositiveInteger	0..1	attr	Specifies the maximum allowed gap of the sequence counter between two SYNC resp. two OFS messages.

Table 9.16: GlobalTimeFrSlave

Class	FrGlobalTimeDomainProps			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::FR			
Note	Enables the definition of Flexray GlobalTime specific properties.			
Base	ARObject, AbstractGlobalTimeDomainProps			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
ofsDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for OFS messages to calculate CRC.
syncDataIDList (ordered)	PositiveInteger	0..16	attr	The DataIDList for SYNC messages to calculate CRC.

Table 9.17: FrGlobalTimeDomainProps

9.3.4 Time Synchronization by user defined Timebase Provider

This chapter describes the details of how the concept of global time synchronization is applied to user defined Timebase Providers. The implementation of global time synchronization by user defined timebase providers is modeled by means of `UserDefinedGlobalTimeMaster`, a concrete subclass of `GlobalTimeMaster`. A similar approach applies for the `UserDefinedGlobalTimeSlave`, which is derived from `GlobalTimeSlave`.

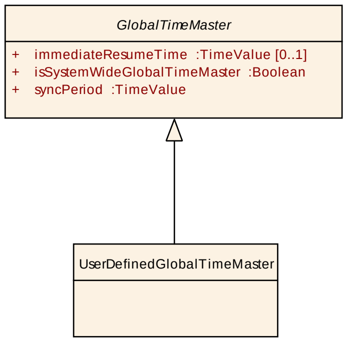


Figure 9.18: Modeling of the UserDefinedGlobalTimeMaster

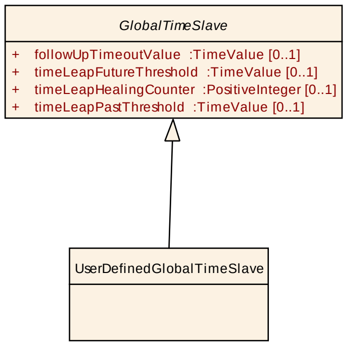


Figure 9.19: Modeling of the UserDefinedGlobalTimeSlave

Class	**UserDefinedGlobalTimeMaster**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::UserDefined			
Note	This represents the specialization of the GlobalTimeMaster for user defined communication.			
Base	ARObject, GlobalTimeMaster, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 9.18: UserDefinedGlobalTimeMaster

Class	**UserDefinedGlobalTimeSlave**			
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime::UserDefined			
Note	This represents the specialization of the GlobalTimeSlave for user defined communication.			
Base	ARObject, GlobalTimeSlave, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table 9.19: UserDefinedGlobalTimeSlave

9.3.5 Time Synchronization Common Properties

The purpose of this chapter is basically to provide the class tables of meta-classes taken to implement configuration properties in the context of *global time synchronization*. The specifics about how these meta-classes are used is explained in the bus-specific chapters (i.e. chapters 9.3.1, 9.3.2, and 9.3.3).

Enumeration	**GlobalTimeCrcSupportEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime
Note	This enumeration is used to define whether and how CRC on the TX side shall be utilized.
Literal	***Description***
crcNotSupported	This indicates that CRC is not supported **Tags:** atp.EnumerationValue=0
crcSupported	This indicates that CRC is supported **Tags:** atp.EnumerationValue=1

Table 9.20: GlobalTimeCrcSupportEnum

Enumeration	**GlobalTimeCrcValidationEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::GlobalTime
Note	This enumeration provides values for the evaluation of the CRC
Literal	***Description***
crcIgnored	The CRC is supposed to be ignored **Tags:** atp.EnumerationValue=0
crcNotValidated	The CRC is supposed to be present but not supposed to be validated. **Tags:** atp.EnumerationValue=1
crcOptional	Either the CRC is present and then shall be validated or the CRC is not present and no CRC check is done. **Tags:** atp.EnumerationValue=3
crcValidated	This CRC is supposed to be validated. **Tags:** atp.EnumerationValue=2

Table 9.21: GlobalTimeCrcValidationEnum

10 Usage of the System Template

As introduced in [TPS_SYST_01003] the System Template is used to describe a System with category SYSTEM_CONSTRAINT_DESCRIPTION, a System with category ABSTRACT_SYSTEM_DESCRIPTION and a System with category SYSTEM_DESCRIPTION. System with category SYSTEM_EXTRACT is described in more detail in chapter 11. System with category ECU_EXTRACT is described in more detail in chapter 12.

Certain elements of the System Template may have a different meaning at the different stages of the AUTOSAR Methodology. The following sections describe the differences.

10.1 System Constraint Description

Meta-classes, Chapters	Usage to describe the System Contraints	Usage to describe the System Configuration
CommunicationCluster, EcuInstance (chapter 3)	The Topology is completely described in the System Constraint Description.	The Topology description will be unchanged copied to the System Configuration description. The Topology may only be changed during another iteration development step of the whole system.
FrameTriggering, PduTriggering, ISignalTriggering (chapter 6)	The System with category SYSTEM_CONSTRAINT_DESCRIPTION describes all FrameTriggerings that are predefined on all CommunicationClusters of a vehicle. The predefinition of the communication matrix forces the system generator to use the given FrameTriggerings. Constraints for the system generator arise here e.g. from the used bus bandwidth, used identifiers as well as from the timing and at which position in a Frame a Pdu is transmitted on a PhysicalChannel on a CommunicationCluster. Such a manual definition of the communication can be made for any reason where it is necessary to restrict the system generator. One example is the usage of legacy EcuInstances in an AUTOSAR System. The FrameTriggerings that are transmitted or received by these legacy EcuInstances are constraints for the system generator because they cannot be changed, if the compatibility is supposed to be achieved without any changes at the legacy EcuInstances.	In contrary to the System with category SYSTEM_CONSTRAINT_DESCRIPTION the final System with category SYSTEM_DESCRIPTION contains all FrameTriggerings, PduTriggerings, ISignalTriggerings that will be sent by any EcuInstance in the car. No matter if they were predefined (system constraint) or if they were generated by the system generator. The available information, in addition to the information, which is inserted by the AUTOSAR Ecu configuration generator step, will be used as input to configure the Basic SW for the communication.
Gateway (chapter 8)	The System with category SYSTEM_CONSTRAINT_DESCRIPTION describes all Gateways in the system including their IPduMappings and ISignalMappings that are predefined. The reasons for such predefinitions are quite the same as for the predefinitions of the FrameTriggerings.	In contrary to the System with category SYSTEM_CONSTRAINT_DESCRIPTION the final System with category SYSTEM_DESCRIPTION describes all Gateways with all their IPduMappings and ISignalMappings. No matter if they were predefined (System Constraint) or if they were generated by the System Generator.

Meta-classes, Chapters (cont.)	Usage to describe the System Contraints (cont.)	Usage to describe the System Configuration (cont.)
SwcToEcuMapping (chapter 5.1.1)	The mapping of Software Components to EcuInstances may be predefined. The predefinition will force the system generator to use the specified mapping. Thus, with the SwcToEcuMapping element it is possible to describe that one or more Software Components must be mapped to a specific EcuInstance.	In a complete System with category SYSTEM_DESCRIPTION, all Software Components are mapped to EcuInstances.
MappingConstraint (chapter 5.1.4) ComponentClustering (chapter 5.1.4.1) ComponentSeparation (chapter 5.1.4.2)	There may be system constraints that limit the system generators freedom to map Software Components to arbitrary EcuInstances. These system constraints can be necessary e.g. for optimization and safety reasons to make additional guidelines for the System Generator.	After the mapping has been completed, the System with category SYSTEM_DESCRIPTION will contain mapping descriptions for all elements, and the mapping constraints are obsolete. But that does not mean that mapping constraints have to be deleted after the system generation step. By deleting the mapping constraints you would lose the information why a mapping of a Software Component to an EcuInstance is chosen.
DataMapping (chapter 5.2) SenderReceiverToSignalMapping (chapter 5.2.1.1) SenderReceiverToSignalGroupMapping (chapter 5.2.1.2) ClientServerToSignalMapping (chapter 5.2.1.3)	The System with category SYSTEM_CONSTRAINT_DESCRIPTION may describe the predefined mapping of Software Components to certain EcuInstances (see chapter 5.1.1). Only if such a mapping exists, it is reasonable to define the DataMapping of the data exchanged between the Software Components.	In contrary to the System with category SYSTEM_CONSTRAINT_DESCRIPTION the final System with category SYSTEM_DESCRIPTION shall contain all DataMapping definitions. No matter if they were predefined (system constraint) or if they were generated by the System-Generator.

Meta-classes, Chapters (cont.)	Usage to describe the System Contraints (cont.)	Usage to describe the System Configuration (cont.)
SignalPathConstraint (chapter 5.2.2) CommonSignalPath (chapter 5.2.2.1) ForbiddenSignalPath (chapter 5.2.2.2) PermissibleSignalPath (chapter 5.2.2.3) SeparateSignalPath (5.2.2.4)	It can be necessary e.g. for optimization and safety reasons to make additional guidelines for the System Generator, which specific way a VariableDataPrototype or ClientServerOperation should take in the network without defining in which Pdu and Frame it is transmitted.	SignalPathConstraints are not an obligatory part of the System with category SYSTEM_DESCRIPTION. In the final System with category SYSTEM_DESCRIPTION every ISignal is assigned to a Pdu and every Pdu is assigned to a Frame. Thereby the paths of VariableDataPrototypes or ClientServerOperations on the network are implicitly described. But that does not mean that the SignalPathConstraints have to be deleted after the system generation step. By deleting the SignalPathConstraints you would lose the information why you have chosen e.g. a specific mapping of an ISignal into a Pdu. If you extend or change the system at a later stage the missing SignalPathConstraints could lead to not wanted signal mappings by the System Generator.

Table 10.1: Usage of the System Template

10.2 Abstract System Description

[TPS_SYST_01134] Abstract System Description ⌈ Due to the fact that the functional view on vehicle system can differ from the actual technical definition of the software-architectures of individual EcuInstances the System Template optionally allows to define a System with category ABSTRACT_SYSTEM_DESCRIPTION. ⌋*()*

[TPS_SYST_01135] Refactoring of an Abstract System Description into a project specific technical view of the software architecture ⌈ The System with category ABSTRACT_SYSTEM_DESCRIPTION concentrates on the functional aspects of the system design and provides an own abstract VFB. During the further activities this abstract view shall be refactored into a more project specific technical view of the software architecture.

It is important to note that during the refactoring of the System with category ABSTRACT_SYSTEM_DESCRIPTION into the System with category SYSTEM_DESCRIPTION no restrictions to the allowed actions apply (This is in contrast to the activity of deriving the System with category SYSTEM_EXTRACT from the System with category SYSTEM_DESCRIPTION, see section 11). ⌋*()*

[TPS_SYST_01136] ViewMapSet and ViewMap are used to trace the transformations between different models ⌈ The ViewMapSet and ViewMap elements are used to trace the transformations between different models within the AUTOSAR environment. ⌋ *()*

These classes are described in more detail in the Generic Structure Template [2].

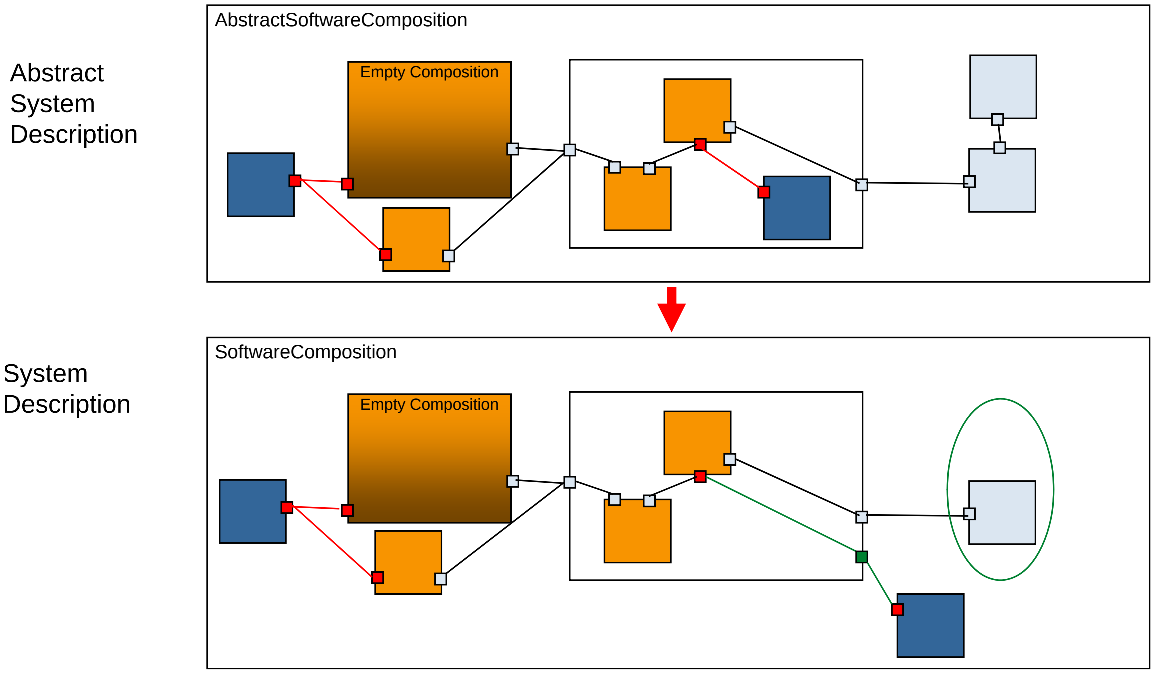


Figure 10.1: Abstract System Description refactoring to a System Description

11 System Extract of the System Configuration Description

This chapter describes contents and creation of the AUTOSAR work product System with category SYSTEM_EXTRACT, based on Meta Model elements contained in the System Template and Software Component Template.

The System with category SYSTEM_EXTRACT is introduced to allow a collaboration between an OEM and a Supplier.[1] The OEM/Supplier Collaboration scenario is described in more detail in chapter 11.1.

The OEM is often only interested in the required functionality and the integration of the functionality into the System. Thus the OEM provides a basis for designing a subsystem, which is developed by the supplier. One difference to the System with category ECU_EXTRACT is that the System with category SYSTEM_EXTRACT is not fully decomposed and still needs to be refined before it forms the basis for the ECU configuration. Another difference is that a System with category SYSTEM_EXTRACT is not fixed to an EcuInstance.

[TPS_SYST_01123] System Extract may cover one or many EcuInstances ⌈ The System with category SYSTEM_EXTRACT may cover one or many EcuInstances. ⌋ *()*

The System with category SYSTEM_EXTRACT is using the same meta model elements as the System with category SYSTEM_DESCRIPTION. The System with category SYSTEM_DESCRIPTION is a special case of a System with category SYSTEM_EXTRACT. From the technical point of view there is no difference. The distinction is only made for the sake of Methodology [4].

In the System with category SYSTEM_EXTRACT the OEM strips all information from the System with category SYSTEM_DESCRIPTION that is not needed for the definition of the subsystem. There is one exception to this simple "remove" rule: the communication mapping may need to be extended, which will be described in more detail in chapter 11.2.

[TPS_SYST_03000] Co-existing System with category SYSTEM_DESCRIPTION and System with category SYSTEM_EXTRACT ⌈ In order to be able to handle one System with category SYSTEM_DESCRIPTION and one or several Systems with category SYSTEM_EXTRACT within the same workspace it shall be possible to provide different full qualified names to the elements of System with category SYSTEM_EXTRACT. ⌋ *(RS_SYST_00045)*

When different Systems with various categories co-exist it is possible to define ViewMap and ViewMapSet between their elements according to [TPS_SYST_01136].

[1] Collaboration scenarios between different departments of an OEM are also supported by the System with category SYSTEM_EXTRACT. For the sake of simplicity such scenarios are not addressed here.

In contrast to the System with category ECU_EXTRACT the System with category SYSTEM_EXTRACT may contain CompositionSwComponentTypes. Empty CompositionSwComponentTypes in the System with category SYSTEM_EXTRACT represent subsystems that need to be refined by a Supplier. Figure 11.1 shows an example where a System with category SYSTEM_DESCRIPTION is stripped down to a subsystem.

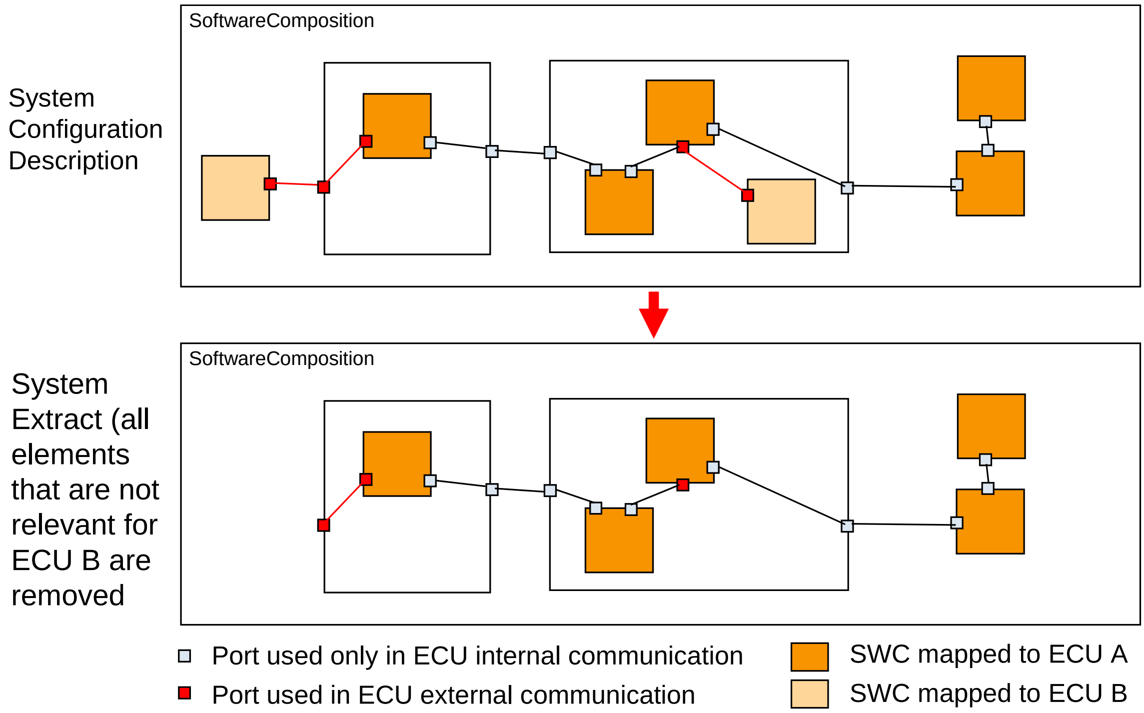


Figure 11.1: System Extract creation: irrelevant elements are removed from the System Description

11.1 OEM/Supplier Collaboration Scenario

In an important collaboration scenario, an OEM commissions a supplier to provide implementations of one or more functionalities to be integrated into an AUTOSAR system in the form of Application Components. The OEM is primarily interested in the required functionality and the interfaces defining the integration of the Software Component into the System VFB rather than the internal structure of such a component. On the other hand, the supplier, delivering both the component implementation in combination with the ECU it is destined to run on, may claim the internal structure of such a higher-level component contains substantial intellectual property, and hence may not want to disclose its internal works to the OEM.

Effectively, the use case can be described in the following manner:

- The OEM generates a System with category SYSTEM_EXTRACT from the System with category SYSTEM_DESCRIPTION. From the System with category

SYSTEM_DESCRIPTION all elements are removed that are not relevant for the design of the subsystem, such as SW components or topology elements.

- The OEM can deliver a sub-structure of Software Compositions or even Atomic Software Components in the System with category SYSTEM_EXTRACT. But the System with category SYSTEM_EXTRACT can also contain empty Software Compositions. The OEM shall have the possibility to define only the outer shell of a Software Composition that is to implement a certain functionality. Such an empty CompositionSwComponentType does contain all the provided and required ports with the included ReceiverComSpecs and SenderComSpecs describing the requested component's outside communication needs. But it does not need to contain SwComponentPrototypes or SwConnectors at this stage.
- Such empty components are added to a System's VFB, the outside ports are connected with other components in the VFB. However, at this stage the inner structure of such CompositionSwComponentType can still be left empty.
- The System with category SYSTEM_EXTRACT contains the mapping of components to the target EcuInstances, including the empty compositions. Signal mappings affecting the empty compositions are targeting the CompositionSwComponentType's ports.
- The OEM delivers the System with category SYSTEM_EXTRACT to the Supplier.
- The Supplier adds the substructure to the empty CompositionSwComponentTypes by adding SwComponentPrototypes and SwConnectors. This once more leads to a hierarchical VFB, effectively the Supplier creates a local System Description for his subsystem.
- The Supplier adjusts the Signal mappings to the actual ports of the inner AtomicSwComponentType prototype.
- The Supplier generates the System with category ECU_EXTRACT from his ECU-local system description. The resulting System with category ECU_EXTRACT does not include prototypes of type CompositionSwComponentType any longer.
- Based on this System with category ECU_EXTRACT the actual ECU configuration is done.

When the supplier receives the System with category SYSTEM_EXTRACT from the OEM he has basically two choices how to proceed:

1. The Supplier takes the System with category SYSTEM_EXTRACT of the OEM as the structural basis for the ECU development. In this case the following steps may follow:
   - The Supplier adds the substructure to the empty CompositionSwComponentTypes by adding SwComponentPrototypes and SwConnectors. This once more leads to a hierarchical VFB, effectively the Supplier cre-

ates a local System Description for his subsystem (System with category ECU_SYSTEM_DESCRIPTION).

- The Supplier adjusts the Signal mappings to the actual ports of the inner AtomicSwComponentType prototype.

2. The Supplier creates an own structure to base the ECU development on System with category ECU_SYSTEM_DESCRIPTION and perform a view mapping between the OEM's System with category SYSTEM_EXTRACT and the System with category ECU_SYSTEM_DESCRIPTION. In this case the following steps may follow:

    - The Supplier develops an own structure how the ECU shall be designed but needs to respect the required outer boundary of the OEM's required communication behavior (ReceiverComSpecs and SenderComSpecs).

    - The Supplier adjusts the Signal mappings to the actual ports of the inner AtomicSwComponentType prototype.

When the design of the System with category ECU_SYSTEM_DESCRIPTION is complete the following steps follow:

- The Supplier generates the System with category ECU_EXTRACT from his System with category ECU_SYSTEM_DESCRIPTION. The resulting System with category ECU_EXTRACT does not include prototypes of type CompositionSwComponentType any longer.

- Based on this System with category ECU_EXTRACT the actual ECU configuration is done.

11.2 Data Mapping in the System Extract

As mentioned before, there is a slight complication to the simple "remove" rule. This can be shown best with an example.

Example: Assume a simple topology with two EcuInstances A and B and three Pdus X (sent from A to B), Y (sent from B to A) and Z (sent from B to A) as shown in Figure 11.2.

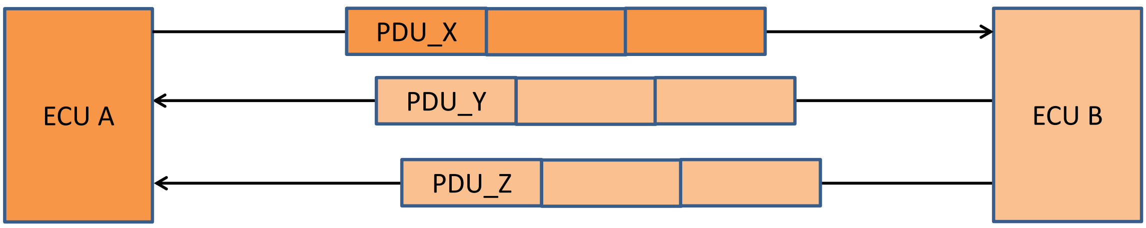


Figure 11.2: Example topology with two EcuInstances and three Pdus exchanged between them

Furthermore assume a composition of software-components realized by the meta-class CompositionSwComponentType as shown in Figure 11.3. It consists of six SwComponentPrototypes 'A1' to 'A3' (aggregated in composition 'SwCompA'), 'B1' / 'B2' (aggregated in composition 'SWCompB'), 'C1' (aggregated in composition 'SWCompAplusBplusC') and an empty composition 'SWCompC'.

The overall composition 'SWCompAplusBplusC' aggregates 'SwCompA', 'SWCompB', the empty 'SWCompC' and the SwComponentPrototype 'C1'.

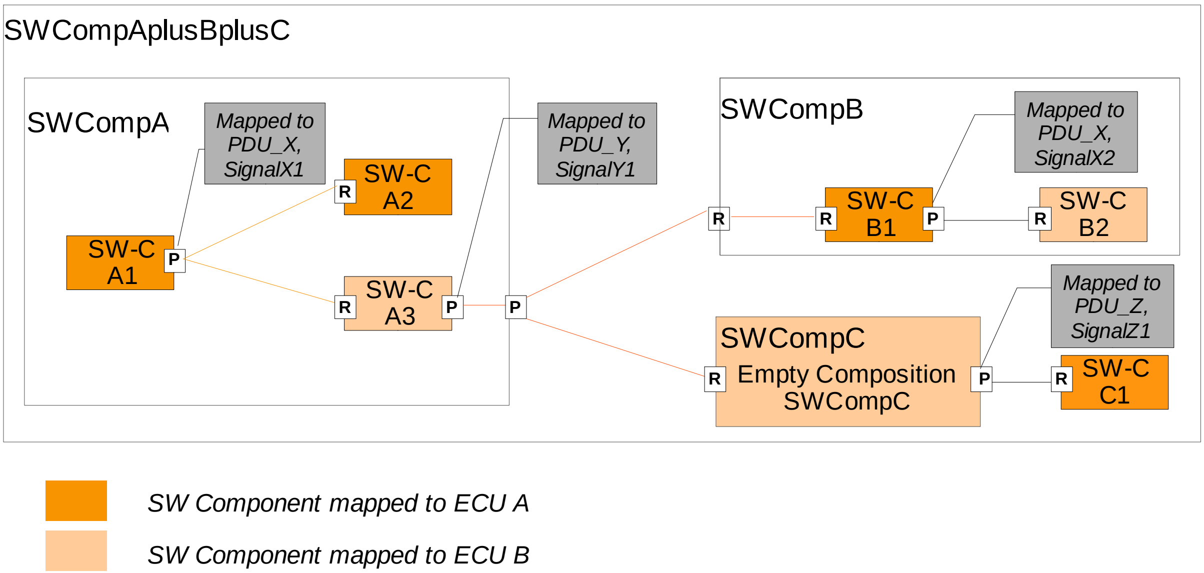


Figure 11.3: Example SW composition with mapping information

The atomic SwComponentPrototypes 'A1', 'A2', 'B1' and 'C1' are mapped to 'ECU A'. The atomic SwComponentPrototypes 'A3', 'B2' and the empty composition 'SWCompC' are mapped to 'ECU B'. The data sent from

- 'A1' to 'A3' is mapped to 'PDU_X', 'SignalX1',
- 'B1' to 'B2' is mapped to 'PDU_X', 'SignalX2' and
- 'A3' to 'B1' and 'A3' to 'SWCompC' is mapped to 'PDU_Y', 'SignalY1'
- 'SWCompC' to 'C1' is mapped to 'PDU_Z', 'SignalZ1'

As usual, the data mapping rules refer to the VariableDataPrototype in the PPortPrototype of the sending SW component. Note that DataMappings can be performed on compositions and on atomic SwComponentPrototypes as described in chapter 5.2.1. [2]

Figure 11.4 shows how the System extract for ECU A and for ECU B of this SW composition would look like: Only those elements are included that are relevant for the subsystem.

[2]Data mapping is allowed on empty compositions and on compositions that contain atomic SwComponentPrototypes.

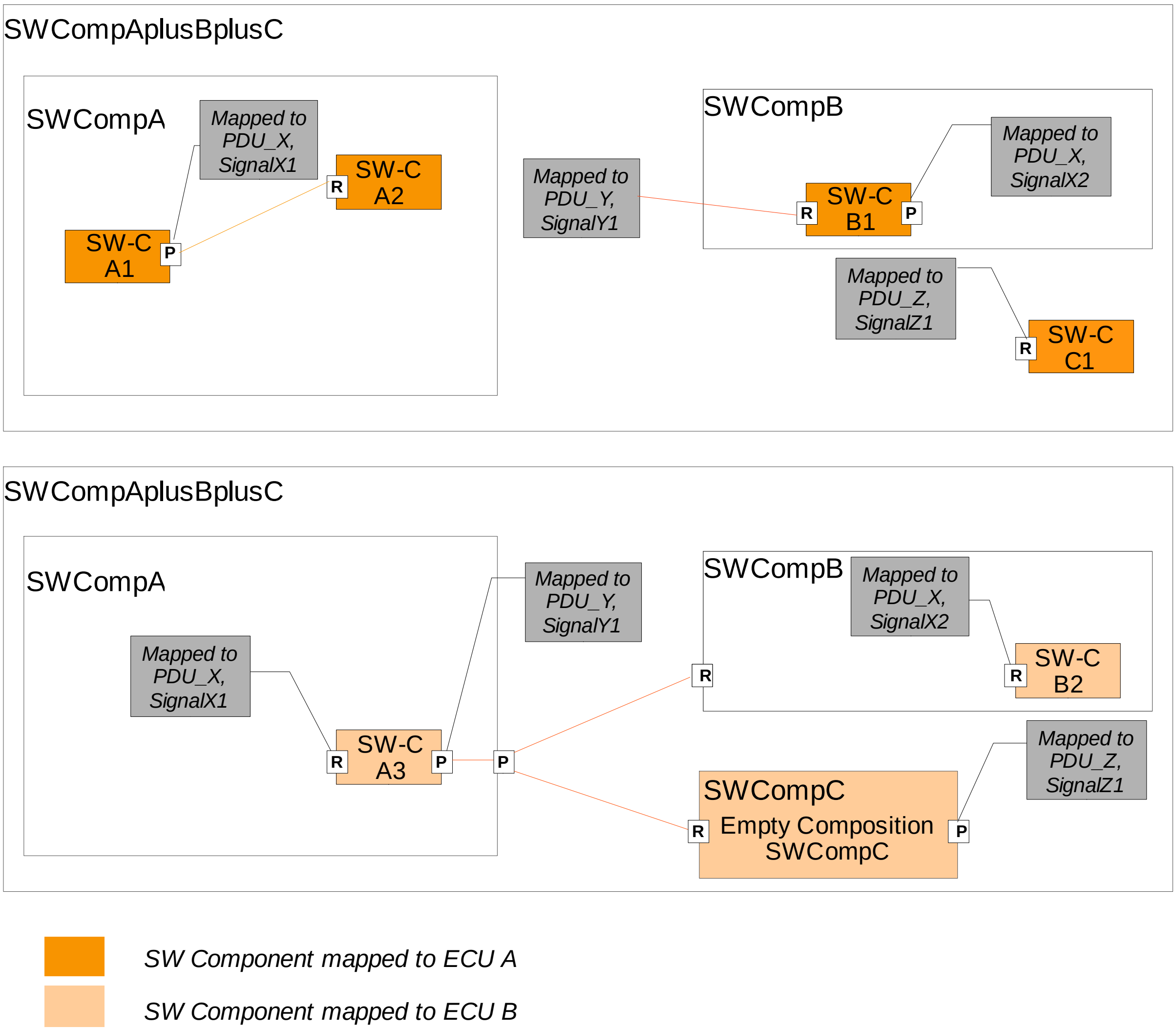


Figure 11.4: Example System extract for ECU A (upper figure) and ECU B (lower figure) of above introduced composition

In both figures all SwComponentPrototypes and compositions that are mapped onto the EcuInstance are included. The SwConnector between these SwComponentPrototypes are also included. Furthermore, the relevant topology information and communication matrix have to be included, but they are out of scope of this example.

SwConnectors that were used to connect to SW components that are not included in the System Extract are not included. Instead, the mapping to an ISignal in a Pdu is used to identify the source/destination of that data.

The problem that new mapping rules have to be added arises for example in the System Extract for ‘ECU A’ with the mapping to ‘PDU Y’, ‘SignalY1’: Since SW component ‘A3’, which was referenced in the original mapping, is no longer included, the data mapping needs a new data element in a port to reference to. In the example, it is the required port of ‘B1’, so that the Supplier has the information that B1 receives the data via ‘PDU Y’.

11.3 SW component inclusion and top level data mapping

In section 11.2 the approach is to provide the DataMapping on the PortPrototypes of the SwComponentPrototypes which are mapped to one EcuInstance. Since the granularity of mapping SwComponentPrototypes to EcuInstances is possible for individual atomic SwComponentPrototypes this approach may result in many DataMappings from different software component PortPrototypes to the same SystemSignal (depending where in the hierarchical structure they are located).

An alternative approach is to provide the complete communication information of the whole System Extract on the RootSwCompositionPrototype and perform the DataMapping on the PortPrototypes of the RootSwCompositionPrototype only. This approach is illustrated in figure 11.5.

PortPrototypes are created on the RootSwCompositionPrototype representing the external communication of this EcuInstance. DelegationSwConnectors are created to establish the communication of the external software components with the software components inside the local EcuInstance.

In figure 11.5 the software components X, Y and Z are mapped to remote EcuInstances. Their communication needs are collected in PortPrototypes on the RootSwCompositionPrototype and the communication is delegated via SwConnectors inside the hierarchical software component structure.

In this example the approach for X and Y is trivial since there are only some DelegationSwConnectors required to connect the PortPrototypes of the RootSwCompositionPrototype with the PortPrototypes of the respective SwComponentPrototypes.

But for SwComponentPrototype Z the approach needs to be extended, because the communication on system level is designed to happen inside the composition V. In this case the communication needs to be delegated out of the composition (creation of DelegationSwConnectors inside the composition V) to be visible in the RootSwCompositionPrototype. Then again the approach of connection to the RootSwCompositionPrototype can be applied.

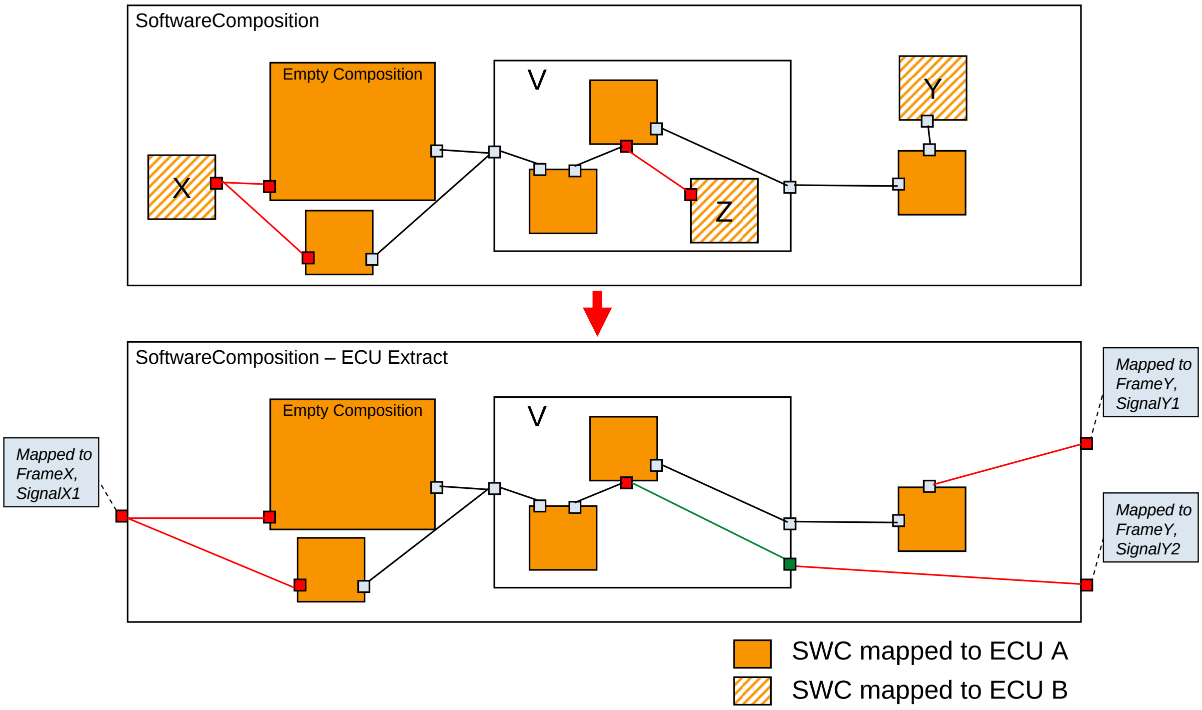


Figure 11.5: Example with software components mapped to two ECUs

11.4 Port-Interface Mapping in the System Extract

A similar problem as the one with DataMappings described in chapter 11.2 and chapter 11.3 exists for the PortInterfaceMappings as well. To illustrate this Figure 11.6 depicts an example with software components mapped to two different ECUs.

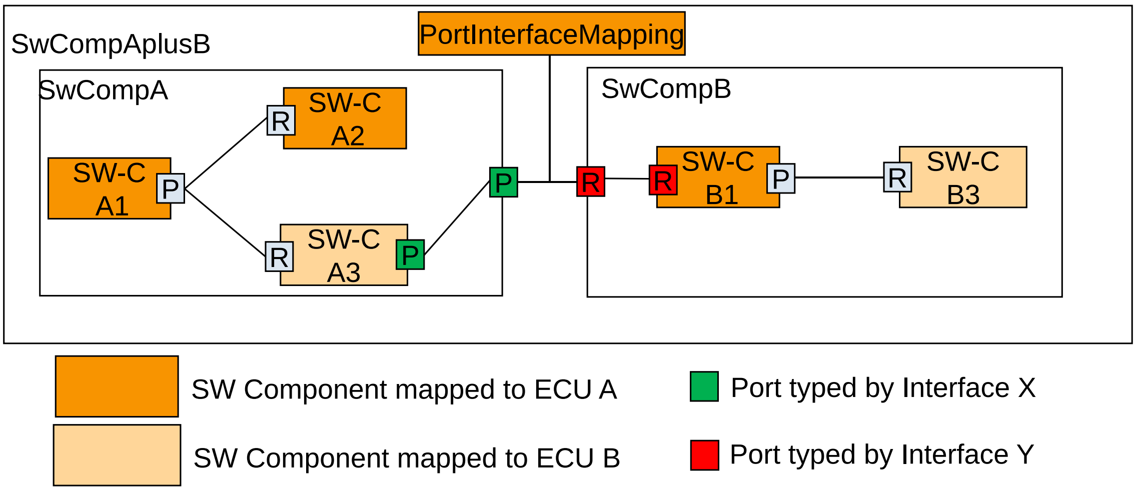


Figure 11.6: Example with software components mapped to two ECUs

Hereby the PPortPrototype typed with PortInterface *X* of *SWCompA* is connected with the RPortPrototype typed with PortInterface *Y* of *SWCompB* by means of an AssemblySwConnector. This AssemblySwConnector has an attached PortInterfaceMapping to perform a mapping between the elements (see chapter 4.3.1.5 of [5]) of the two otherwise incompatible PortInterfaces *X* and *Y*.

A System Extract for ECU *A* is now created by applying the approach described in chapter 11.3, i.e., by providing the complete communication information of the whole System Extract on the RootSwCompositionPrototype and performing the DataMapping on the PortPrototypes of the RootSwCompositionPrototype only.

When doing this however the following two additional things have to be considered:

- The PortInterfaceMapping shall be preserved during this process
- The information about the PortInterfaces referenced by the PortPrototypes connected by the AssemblySwConnector referencing the PortInterfaceMapping shall be preserved during this process

Just as in the approach described in chapter 11.3 PortPrototypes are created on the RootSwCompositionPrototype representing the external communication of this EcuInstance. The RPortPrototypes however are not typed by the PortInterface *X* of the RPortPrototypes of the SwComponentPrototypes inside *ECU A* (*SWCompB* in the example) but by the PortInterface *Y* of the PPortPrototype which was connected to the RPortPrototypes by means of the AssemblySwConnector. Afterwards the just like in the approach described in chapter 11.3 DelegationSwConnectors are created to connect the PortPrototypes of the RootSwCompositionPrototype with the corresponding RPortPrototypes of the SwComponentPrototypes inside *ECU A*.

This however yields a DelegationSwConnector between RPortPrototype typed by PortInterface *Y* (which has been created on the RootSwCompositionPrototype) and the RPortPrototype typed by PortInterface *X* of *SWCompB*. In order to perform a mapping between the elements of these otherwise incompatible interfaces, the PortInterfaceMapping which has initially been referred to by the AssemblySwConnector needs to be referenced by the DelegationSwConnector.

The final result of this process in depicted in Figure 11.7

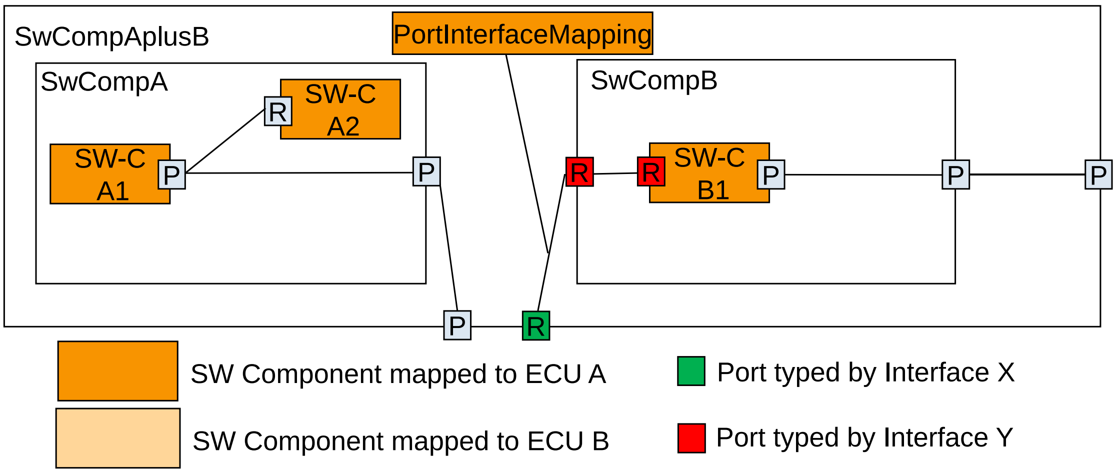


Figure 11.7: Example with software components mapped to two ECUs

12 ECU Extract of the System Configuration Description

This chapter describes contents and creation of the AUTOSAR System with category ECU_EXTRACT, based on Meta Model elements contained in the System Template and Software Component Template.

The System with category ECU_EXTRACT represents the view of one specific EcuInstance onto the overall System with category SYSTEM_DESCRIPTION. The System with category ECU_EXTRACT forms the basis for configuring that particular EcuInstance in focus.

For instance, RTE configuration fundamentally depends on the number and types of SwComponentPrototypes deployed onto the EcuInstance; Services are configured according to those Software Components' ServiceNeeds; the COM-stack BSW modules will be configured considering the EcuInstance's participation in the overall System Network Topology and Communication.

[TPS_SYST_01139] Ecu Extract covers exactly one EcuInstance ⌈ The System with category ECU_EXTRACT shall only contain the subset of information derived from the System with category SYSTEM_DESCRIPTION or System with category SYSTEM_EXTRACT relevant for configuring the targeted EcuInstance. ⌋*()*

In order to keep ECU configuration focused and manageable despite the complexity of a full System Configuration, all other information shall be stripped from the System with category SYSTEM_DESCRIPTION or from the System with category SYSTEM_EXTRACT when creating the System with category ECU_EXTRACT.

AUTOSAR VFB Descriptions naturally form hierarchies of CompositionSwComponentTypes. Consequently, in the System Configuration the SWC-related information for different EcuInstances is not separated but in general is intermingled. In contrast, for the task of ECU configuration (RTE configuration, Service Configuration, Measurement and Calibration) a hierarchically "flat view" on the SwComponentPrototypes running on the EcuInstances is preferable over a hierarchical view, which is more favored by application-software development. Thus, deriving an System with category ECU_EXTRACT actually is a model transformation, following a set of rules described in the following sections.

As System- and ECU development typically happens in iterations, the use case of repeatedly extracting the information from an incrementally changing System Configuration needs to be considered. In particular, it must be possible to detect changes between consecutively generated ECU extracts in order to selectively update the existing ECU configuration (12.5).

AUTOSAR supports the definition and consequently the handling of Variability in the System Configuration. According to the specified binding time associated with a particular VariationPoint, typically some of these variants will already be resolved at the time of a System with category ECU_EXTRACT. If however the binding time occurs in a later stage of the AUTOSAR methodology, i.e. during ECU Configuration or later, the variability needs to be carried over to the System with category ECU_EXTRACT. This also holds true for Variation points that ultimately are resolved at system configuration time but affect post-build configuration parameters. (12.6)

The System with category ECU_EXTRACT logically forms one entity. Therefore, for ease of readability the rest of the chapter assumes just one file, "the XML file". However, it explicitly is allowed to split the System with category ECU_EXTRACT over several files.

12.1 Topology

Only those Topology elements relevant for the EcuInstance in scope are taken over from the System with category SYSTEM_DESCRIPTION into the System with category ECU_EXTRACT.

- The System with category ECU_EXTRACT is always associated with exactly one EcuInstance. Therefore exactly one EcuInstance is included along with all classes included in EcuInstance by composition: CommunicationControllers and CommunicationConnectors with all their CommConnectorPorts.
- A CommunicationCluster is included along with all its PhysicalChannels if at least one PhysicalChannel is used by the EcuInstance. In other words, if at least one of the included CommunicationConnectors is referenced by any of a CommunicationCluster's PhysicalChannels, the whole CommunicationCluster and all its PhysicalChannels are included.
- From the used PhysicalChannels, only those FrameTriggerings, PduTriggerings, ISignalTriggerings shall be included that are used by the EcuInstance, e.g. they are associated with a FramePort, IPduPort, ISignalPort belonging to one of the EcuInstance's CommunicationConnectors. *Note:* Including just a subset of a PhysicalChannel's FrameTriggerings, PduTriggerings, ISignalTriggerings is possible without changing the PhysicalChannel itself because of the ≪splitable≫ stereotype applied on the PhysicalChannel / FrameTriggering, PduTriggering, ISignalTriggering composition.

As the Topology elements are not modified when taken over into the System with category ECU_EXTRACT, their package structure and short names are not touched (see section 12.4.1).

12.2 Top-level Software Composition

In the System with category SYSTEM_DESCRIPTION the application software composition is hierarchic by nature as described in chapter 4. When mapping SwComponentPrototypes onto concrete EcuInstances using the SwcToEcuMapping class (section 5.1.1), either SwComponentPrototypes of type AtomicSwComponentType, or SwComponentPrototypes of type CompositionSwComponentType are deployed onto one specified EcuInstance.

In order to obtain this ECU-centric view, the hierarchical structure of the System with category SYSTEM_DESCRIPTION needs to be transformed into a 1-layer representation, where one distinguished CompositionSwComponentType hosts all SwComponentPrototypes of type AtomicSwComponentType to run on the EcuInstance. In the System with category ECU_EXTRACT the resulting RootSwCompositionPrototype is a flat structure where the included SwComponentPrototypes become real SWC instances, reflecting the actual resource needs on the targeted EcuInstance.

[TPS_SYST_01140] Ecu Extract contains only SwComponentPrototypes of type AtomicSwComponentType in the RootSwCompositionPrototype ⌈ The System with category ECU_EXTRACT only contains SwComponentPrototypes of type

AtomicSwComponentType in the RootSwCompositionPrototype which are effectively mapped onto the EcuInstance in focus. ⌋()

The transformation from hierarchical to flat Software Component structure includes a number of steps, to be performed per ECU. The list below outlining this process assumes that the extraction is done for the first time; if an System with category ECU_EXTRACT already exists from a previous development cycle, the extract shall merely be updated instead of created; for more details on iterative development see section 12.5.

- Create the one CompositionSwComponentType which will represent the ECU's SW subsystem (in further steps referred to as ECU flat view)
- To this ECU flat view, add a SwComponentPrototype for each instance of any AtomicSwComponentType mapped onto the EcuInstance. Copy all the identifiable information from the originating SwComponentPrototype, but assign an unique short name to the new element. The newly created SwComponentPrototypes are typed by the original AtomicSwComponentType.
- Unroll the connector paths leading to and from the included components:
  - For ECU internal communication, use AssemblySwConnector to connect PortPrototypes.
  - For ECU external communication, add delegated PortPrototypes to the ECU flat view CompositionSwComponentType. The delegated PPortPrototypes shall be typed with the PortInterface of the corresponding PPortPrototype of the included SwComponentPrototypes that are used for the external communication. If the original AssemblySwConnector references a PortInterfaceMapping then the delegated RPortPrototypes shall be typed with the PortInterface of the PPortPrototype initially connected (possibly by a chain of multiple original DelegationSwConnectors and the one original AssemblySwConnector referencing the PortInterfaceMapping) to this PPortPrototype of the included SwComponentPrototypes that are used for the external communication. Each delegated PortPrototype shall be connected via a DelegationSwConnector with PortPrototypes of the included SwComponentPrototypes that are used for the external communication.
  - VariableDataPrototypes and ClientServerOperations of the delegated PortPrototypes are mapped to SystemSignals.
- If the System with category SYSTEM_DESCRIPTION prescribes an Implementation for a SwComponentPrototype by using SwcToImplMapping, a corresponding constraint needs to be created in the System with category ECU_EXTRACT of the targeted EcuInstance. The SwcToImplMapping's component reference needs to be adjusted to the flat representation, while maintaining the original reference to the Implementation.

- ComSpecs on the PortPrototypes of the FlatView composition shall be taken over from the PortPrototypes of the top-most composition during flattening. Rationale: This is an approach to avoid the existence of multiple ComSpecs for a dataElement/clientServerOperation. Please note that this approach is a short term solution for specific use-cases. A harmonized solution for the usage of ComSpecs will be provided in future.

Figure 12.1 illustrates the process of flattening the hierarchical Software Composition into an ECU Flat View representation, as outlined in the previous paragraphs. The following sections explain the concrete transformation steps in more detail.

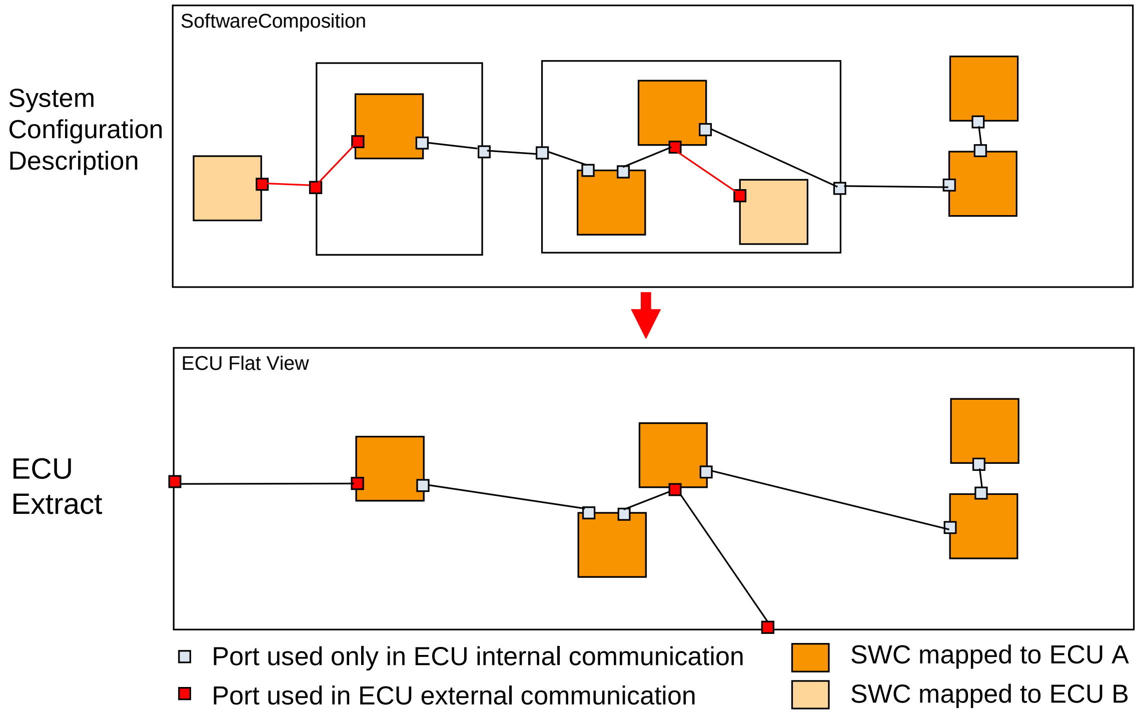


Figure 12.1: Flattening of a hierarchic Software Composition into an ECU Flat View, and the distinction between ports used in internal and those used in external communication.

Please note that instantiation specific scheduling of runnables shall be maintained when generating a System with category ECU_EXTRACT. This maintenance covers the rewrite of the instanceRef to the RTEEvent respectively the aggregation of the instantiationRTEEventProps to the next CompositionSwComponentType.

12.2.1 ECU Flat view

The first step of extracting the ECU specific Software View is the creation of a new CompositionSwComponentType (further referred to as ECU flat view). This new element serves as a container for collecting all SwComponentPrototypes of type AtomicSwComponentType deployed on the EcuInstance. In order to include the

ECU flat view into the actual System with category ECU_EXTRACT, the System must have its child class RootSwCompositionPrototype pointing to this ECU flat view.

Next, all SwcToEcuMappings present in the System with category SYSTEM_DESCRIPTION need to be analyzed according to the precedence rules (Section 5.1.1) in order to establish the exact set of AtomicSwComponentType instances to be included on this EcuInstance.

For each of these component instances, regardless of their order of depth in the System Configuration Description's Component hierarchy, exactly one SwComponentPrototype shall be created in the ECU flat view CompositionSwComponentType. The new element's description and type information shall be taken over from the original SwComponentPrototype as present in the System with category SYSTEM_DESCRIPTION. As an important exception to this rule, the SwComponentPrototype's shortName must be unique in the name space formed by the ECU flat view.

The special case of prototypes of ParameterSwComponentTypes and ServiceProxySwComponentTypes is treated in almost the same way. The only difference is that these component types can be instantiated at most once per EcuInstance and that for a given prototype in the System, instances on several EcuInstances can be created. The replication of ParameterSwComponentTypes and ServiceProxySwComponentTypes on several EcuInstances does not require any special treatment of their communication properties. For ParameterSwComponentTypes there are SwConnectors defined but no communication is involved. For more details see [TPS_SWCT_01422] in the SwComponentTemplate [5].

12.2.2 Internal Communication

When flattening the RootSwCompositionPrototype for the System with category ECU_EXTRACT, not only all of the ECU's Software Components are to be collected in the ECU flat view, but also any connection existing between PortPrototypes of the included SwComponentPrototypes needs to be projected onto the same RootSwCompositionPrototype.

In the hierarchical RootSwCompositionPrototype, communication between Software Components is specified by a combination of AssemblySwConnectors and DelegationSwConnectors. Several DelegationSwConnectors may be combined in case of a multiple-level delegation, however there will always be exactly one AssemblySwConnector on the outermost CompositionSwComponentType the port is delegated to.

In the ECU flat view, any such number of stringed together SwConnectors effectively connecting two PortPrototypes of SwComponentPrototypes mapped to the same EcuInstance are resolved to exactly one AssemblySwConnector per connected port pair. As there are no additional levels of "inner SwComponentPrototypes". DelegationSwConnectors are only used to display the outside communication of an ECU in the ECU flat view.

[constr_3019] In the flat ECU extract each required interface must be satisfied by connected provided interfaces ⌈ In case of the flat System with category ECU_EXTRACT all VariableDataPrototypes specified by the SenderReceiverInterface of the RPortPrototype need to be supplied by some of the PPortPrototypes being connected with SwConnectors. ⌋*()*

For the System with category SYSTEM_DESCRIPTION, the Software Component Template Specification [5] allows a CompositionSwComponentType's outer PortPrototype to be connected to more than one inner port, observing a set of compatibility rules between the outer and the inner port's SenderReceiverInterfaces. Such a "merge" and "split" functionality for mixing VariableDataPrototypes is used to limit the number of SwConnectors required to connect PortPrototypes on higher VFB levels and thus reduce complexity in the wiring of such higher-level CompositionSwComponentTypes. On the other hand this means that an AssemblySwConnector in a hierarchical VFB may expand to more than one Port-Port pair. Naturally, in the ECU flat view such "hidden" additional connections need to be made explicit by unrolling them into concrete AssemblySwConnectors.

Additionally PassThroughSwConnector may be used to map PortInterface elements between require and provide outer ports of CompositionSwComponentTypes in order to use RTE features for mapping or conversion instead of real software components. The following paragraph suggests a way how such an unrolling of SwConnectors may be accomplished.

Starting with the top-level RootSwCompositionPrototype indicating the outermost CompositionSwComponentType, the hierarchical software model of SwComponentPrototypes is recursively iterated; for each prototype of CompositionSwComponentType, all its AssemblySwConnectors are being iterated. For each such found AssemblySwConnector both connector ends are evaluated for DelegationSwConnectors further delegating the connection: In order to consider the use cases of signal "merge" and "split", all possible communication partners need to be identified, recursively following DelegationSwConnectors in both directions. For each identified pair of PPortPrototypes and RPortPrototypes *actually exchanging* Information one AssemblySwConnector will be created in the ECU flat view.

In case that a string of SwConnectors started by AssemblySwConnector connects - directly or via DelegationSwConnectors - to a PassThroughSwConnector the SwConnector string is conjunct with the SwConnector string of the other end of the PassThroughSwConnector. Please note that the "merge" and "split" capability of DelegationSwConnectors and PassThroughSwConnectors requires an individual treatment of the single PortInterface elements for the evaluation of the SwConnector string.

The following rules must be followed when PortInterfaceMappings are converted for the flat view. PortInterfaceMappings supports the connection of Ports typed by two different PortInterfaces with unequal named PortInterface elements. More details can be found in [5].

- When unrolling a string of SwConnectors into a single SwConnectors all compatibility rules and PortInterfaceMappings of the individual SwConnector need to be considered for determining which VariableDataPrototypes are being transferred between provider and requester. If VariableDataPrototypes are to be filtered out a PortInterfaceMapping shall be provided to the flatten connector such that only the transfered VariableDataPrototypes are included in the mapping.
- When unrolling a string of SwConnectors into a single SwConnector all of the PortInterfaceMappings of the individual SwConnectors need to be considered for combining them into a single PortInterfaceMapping to be associated with a new SwConnector.

12.2.3 External Communication

In a System with category SYSTEM_DESCRIPTION , whenever two SwComponentPrototypes are specified to communicate across EcuInstances, the details of this communication need to be fully specified: VariableDataPrototypes of SenderReceiverInterfaces and ClientServerOperations of ClientServerInterfaces are mapped onto SystemSignals as carriers of information transported across the network. According to 5.2, each instance of a AutosarDataPrototype that is to be sent over AUTOSAR COM shall be mapped exactly once onto its individual SystemSignal, regardless of how many components receive the information or over how many PhysicalChannels the SystemSignal is transported.

As described above, deriving the System with category ECU_EXTRACT from System with category SYSTEM_DESCRIPTION or from System with category SYSTEM_EXTRACT means that all SwComponentPrototypes to be included in the Ecu extract are recreated in an ECU flat view. Consequently, each DataMapping concerning a SwComponentPrototype to be mapped onto the EcuInstance requires that a corresponding DataMapping be created in the System with category ECU_EXTRACT.

The ECU flat view contains delegated PortPrototypes to display the outside communication of an EcuInstance. VariableDataPrototypes and ClientServerOperations of these delegated PortPrototypes are mapped to SystemSignals. The original instance references indicating the mapped AutosarDataPrototype need to be adjusted to the new “flat” location in the ECU flat view.

While for the System with category SYSTEM_DESCRIPTION it is sufficient to describe DataMappings only on the provider side, the System with category ECU_EXTRACT additionally requires such DataMappings on the requiring side’s ports. In this case, a new DataMapping maps to the existing SystemSignal, previously defined in the System with category SYSTEM_DESCRIPTION on the provider side. This is explained in more detail in figure 12.6, that is a continuation of the example from figure 11.3 in chapter 11.2.

To derive an ECU_EXTRACT from a System with category SYSTEM_DESCRIPTION or SYSTEM_EXTRACT unambiguous ClientServerToSignalMappings are required for inter-ECU n:1 client-server communication. In particular the communication path from the server to each client must be uniquely mapped.

In this context, "communication path" encompasses the set of delegation/assembly connectors that connect the server (provide-port on SWC) through to the client (require-port on SWC).

[constr_3264] Server side ClientServerToSignalMappings in case of a n:1 inter-ECU client-server communication ⌈ If within the System with category SYSTEM_DESCRIPTION or SYSTEM_EXTRACT the ClientServerToSignalMappings for inter-ECU n:1 client-server communication are placed on the provider (server) side, then each of these ClientServerToSignalMappings shall (in the hierarchy of SwComponentPrototypes) refer to a "unique communication path" w.r.t. the EcuInstances the client SwComponentPrototypes are mapped to. ⌋*()*

Note: A "unique communication path" has the property that, starting from the ClientServerOperation of a PortPrototype, a sequence of DelegationSwConnectors and AssemblySwConnectors leads to the client side and terminates at either at most one PortPrototype that is owned by the AtomicSwComponentType of the client's SwComponentPrototype or, if the path terminates at more than one PortPrototype, then the following must hold: The clients' SwComponentPrototypes typed by AtomicSwComponentTypes owning these PortPrototypes must be mapped to the same EcuInstance and the client identifier is used to distinguish the different clients (see [TPS_SYST_01087]).

The following example scenarios will show at which PortPrototypes the ClientServerToSignalMappings are allowed to be specified in a System with category SYSTEM_DESCRIPTION or SYSTEM_EXTRACT to derive an ECU_EXTRACT.

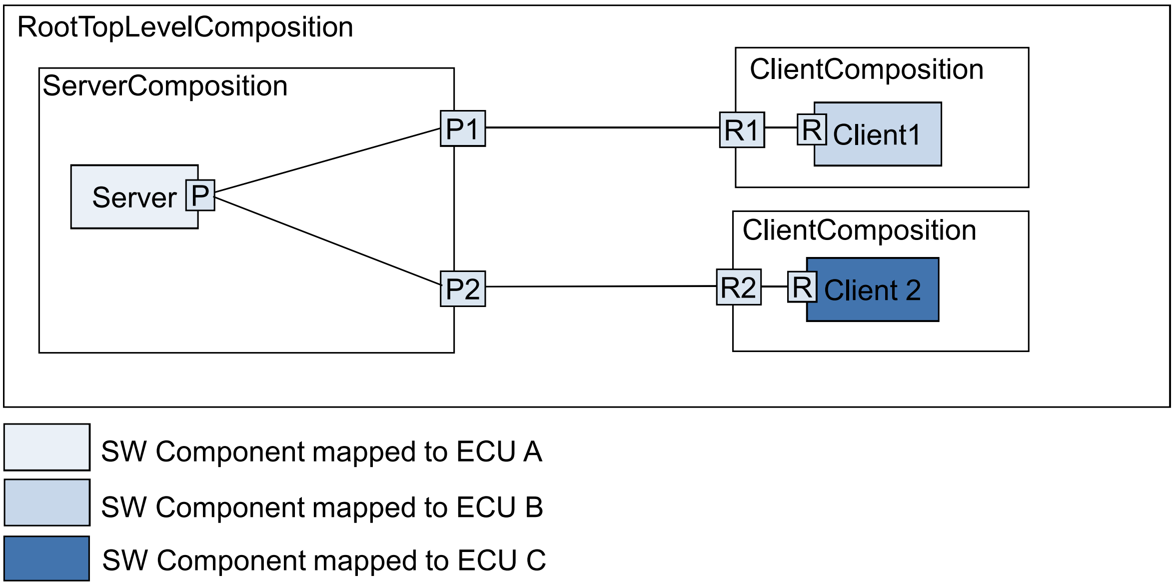


Figure 12.2: Client Server Scenario 1

For the scenario described in figure 12.2 the following statements apply:

- `ClientServerToSignalMapping`s for the provide-port Server.P are ambiguous and thus [constr_3243] exists to forbid this situation.
- `ClientServerToSignalMapping`s are permitted for ClientComposition.R1/ClientComponsition.R2 and Client1.R/Client2.R (client-side) or for ServerComposition.P1/ServerComposition.P2 (provider-side) since there is no ambiguity.

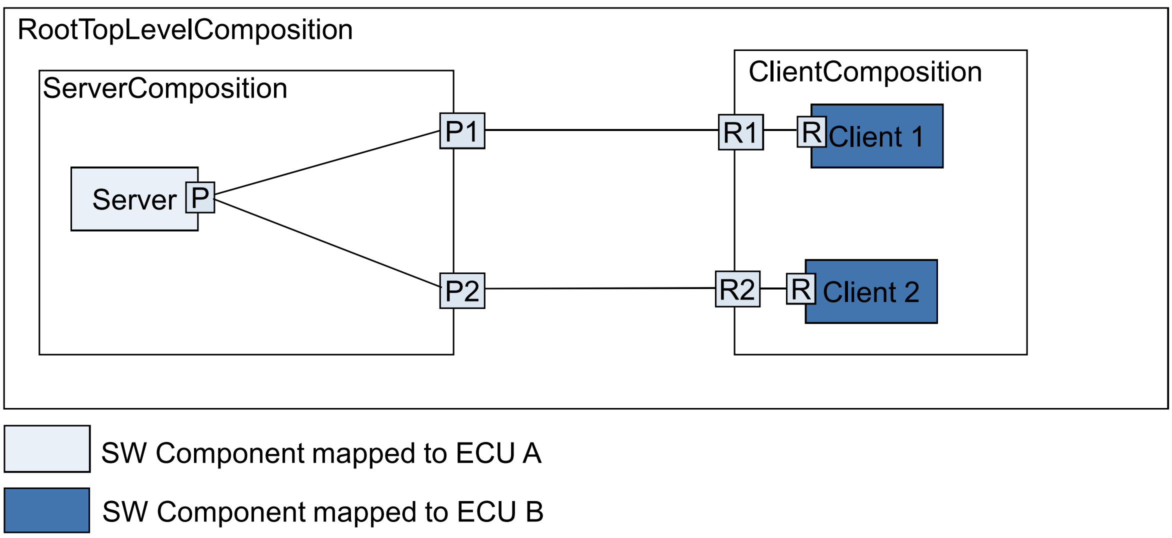


Figure 12.3: Client Server Scenario 2

For the scenario described in figure 12.3 the following statements apply:

- ClientServerToSignalMappings for the provide-port Server.P are not ambiguous (since although there is fork in the communication path, both sub-paths end up at the same ECU).
- ClientServerToSignalMappings are permitted for ClientComposition.R1/ClientComponsition.R2 and Client1.R/Client2.R (client-side) or for ServerComposition.P1/ServerComposition.P2 (provider-side) since there is no ambiguity.

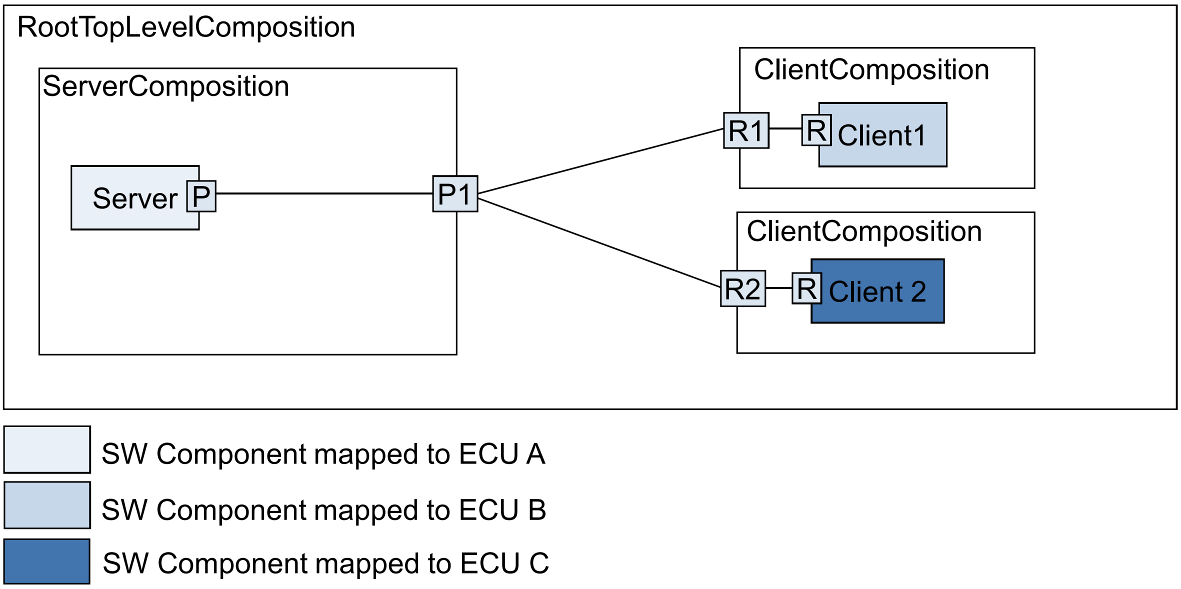


Figure 12.4: Client Server Scenario 3

For the scenario described in figure 12.4 the following statements apply:

- ClientServerToSignalMappings for the provide-ports Server.P and ServerComposition.P1 are ambiguous and thus [constr_3243] exists to forbid this situation.
- ClientServerToSignalMappings are permitted for ClientComposition.R1/ClientComposition.R2 and Client1.R/Client2.R (client-side) since there is no ambiguity.

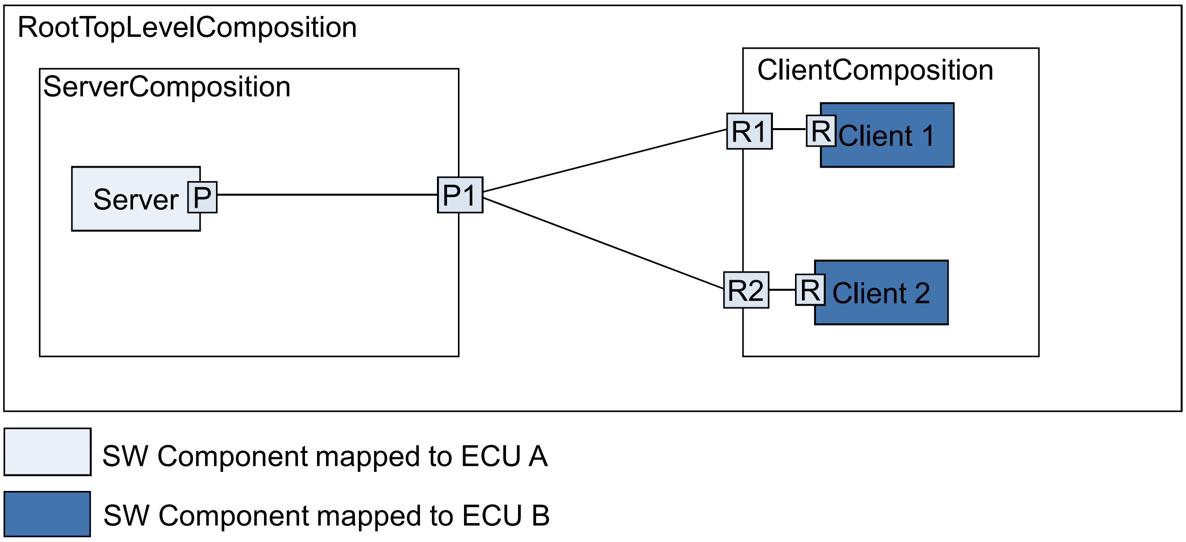


Figure 12.5: Client Server Scenario 4

For the scenario described in figure 12.5 the following statements apply:

- ClientServerToSignalMappings for the provide-ports Server.P and ServerComposition.P1 are not ambiguous (since although there is fork in the communication path, both sub-paths end up at the same ECU).
- ClientServerToSignalMappings are permitted for ClientComposition.R1/ClientConponsition.R2 and Client1.R/Client2.R (client-side) or for ServerComposition.P1/ServerComposition.P2 (provider-side) since there is no ambiguity.

[TPS_SYST_01145] PortInterfaceMappings in the ECU Extract ⌈ In the System with category ECU_EXTRACT the missing PortInterfaceMappings on the complementary side needs to be supplemented to DelegationSwConnectors. ⌋*()*

Figure 12.6 shows how the System with category ECU_EXTRACT for ECU A of the SW composition that is defined in figure 11.3 would look like: Only those SwComponentPrototypes are included that are mapped to ECU A. The hierarchy present in the System with category SYSTEM_DESCRIPTION has been flattened into CompositionSwComponentType 'EcuAFlatView', including newly created SwComponentPrototype 'A1E', 'A2E', 'B1E' and 'C1E' for the component instances mapped to ECU A.

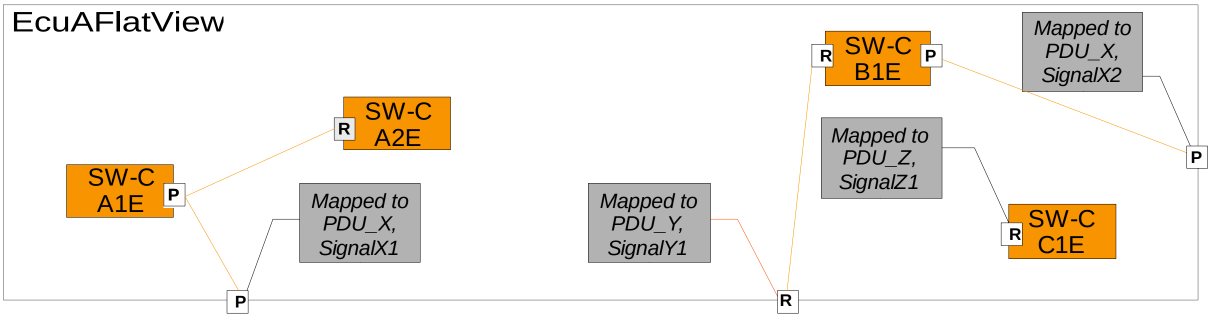


Figure 12.6: Example ECU extract for ECU A of above introduced composition

The SwConnectors to the outside ports (ECUFlatView composition ports) and SwConnectors that represent intra-ECU communication (in our example, only 'A1E' to 'A2E') are included. The VariableDataPrototypes and ClientServerOperations in the outside ports are mapped to SystemSignals. This DataMapping and the communication description is used to identify the source/destination of that data.

Furthermore, the relevant topology information and communication matrix have to be included, but they are out of scope of this example.

The problem that new mapping rules have to be added arises with the mapping to 'PDU_Y', 'SignalY1': Since SW component 'A3', which was referenced in the original mapping, is no longer included, the DataMapping needs a new VariableDataPrototype in a PortPrototype to reference to. In the example, the data of the required port of 'B1E' is referenced, so that the ECU generator has the information that 'B1E' receives the data via 'PDU_Y'.

12.2.4 Port Groups

A SwComponentType can optionally define PortGroups which allow to group PortPrototypes according to logical criteria, e.g. according to shared communication resources (see [5]). A PortGroup of a CompositionSwComponentType can be linked to "inner" PortGroups of the aggregated SwComponentPrototypes. Since the main purpose of this grouping is to configure the behavior of mode managers on an EcuInstance, this information must be preserved and broken down into the System with category ECU_EXTRACT.

The resulting CompositionSwComponentType in the ECU flat view will contain a set of PortGroups which refer to the linked inner port groups of the SwComponentPrototypes with AtomicSwComponentType. To get to this result, the following steps must be applied in the extraction process:

- Recursively ignore all PortGroups in CompositionSwComponentTypes in the hierarchical structure, which are not linked to any inner groups to be mapped on this EcuInstance.

- In the remaining structure of linked PortGroups find out the top level PortGroups (i.e. which are not referred by any higher level PortGroup on this EcuInstance) and put an element representing each top level PortGroup into the CompositionSwComponentType of the ECU flat view. This can result in name conflicts, which should be resolved by a suitable algorithm.
- Link these top level PortGroups to the inner PortGroups of the atomic component instances of the flat view according to the links found in the hierarchical structure. Naturally, the top level PortGroups in the ECU flat view are not directly referring any PortPrototypes and due to the first step they should be linked to at least one inner PortGroup.
- The PortGroups in SwComponentPrototypes with an AtomicSwComponentType on the EcuInstance should be unchanged.

12.2.5 Service Needs

Each software component might need services which are provided by the ECU Basic Software through AUTOSAR Services. ServiceNeeds are used to provide detailed information what the software component expects from the AUTOSAR Services when integrated on an actual ECU (see SWComponentTemplate [5] for more details). If an ECU Extract is created the following rules apply to the existing ServiceNeeds:

[constr_3068] DoIpPowerModeStatusNeeds in the category ECU_EXTRACT ⌈ If and only if DoIP (i.e. any of the subclasses of DoIpServiceNeeds are present) is used on an Ecu then the DoIpPowerModeStatusNeeds shall exist exactly once in a System of category ECU_EXTRACT. ⌋*()*

[constr_1265] DoIpGidSynchronizationNeeds can only exist once per ECU_EXTRACT ⌈ Within the context of one System of category ECU_EXTRACT, there can only be at most one DoIpGidSynchronizationNeeds. ⌋*()*

[constr_1266] DoIpGidNeeds can only exist once per ECU_EXTRACT ⌈ Within the context of one System of category ECU_EXTRACT, there can only be at most one DoIpGidNeeds. ⌋*()*

[constr_1267] DoIpActivationLineNeeds can only exist once per ECU_EXTRACT ⌈ Within the context of one System of category ECU_EXTRACT, there can only be at most one DoIpActivationLineNeeds. ⌋*()*

[constr_3083] Exactly one AtomicSwComponentType on an EcuInstance may use GeneralCallbackEventDataChanged / GeneralCallbackEventStatusChange ⌈ The Dem only supports exactly one AtomicSwComponentType using GeneralCallbackEventDataChanged / GeneralCallbackEventStatusChange on one EcuInstance. ⌋*()*

[constr_3084] Service port in the role PowerTakeOff ⌈ Within the context of one EcuInstance, there can only be one service port that uses the role PowerTakeOff in the RoleBasedPortAssignment.role. ⌋*()*

[constr_3085] Service port in the role CallbackDCMRequestServices ⌈ Within the context of one EcuInstance, there can only be one service port that uses the role CallbackDCMRequestServices in the RoleBasedPortAssignment.role. ⌋*()*

12.3 Communication

In explaining how SystemSignals are handled in the System with category ECU_EXTRACT, Section 12.2.3 touched on the topic of inter-ECU Communication. However, in order to enable the ECU Configuration of the COM-Stack, the relevant information of all layers of the AUTOSAR COM-Stack needs to be present in the System with category ECU_EXTRACT, including the central Communication classes ISignal, Pdu and Frame.

The above mentioned Communication elements have dependencies on each other, for ordinary COM-communication this means:

- Frames are assembled from one or more Pdus.
- ISignalIPdus carry their information in form of ISignals.
- ISignals as interaction points between RTE and COM refer to SystemSignals.

Note that the above list is not complete; TP and NM require additional elements. However, for the sake of clarity the following paragraphs describes the standard use case of a direct Signal-based communication between two EcuInstances. Once the handling of this case is understood, the additional model elements as NPdu, NmPdu, SystemSignalGroup etc. can be handled following the same basic principles.

For the System with category ECU_EXTRACT only the ECU-relevant subset of information present in the system-wide communication is to be considered. In order to establish this set of information, the dependencies in the list above are being followed.

12.3.1 Frame

In a complete System with category SYSTEM_DESCRIPTION, every outside communication of an EcuInstance will either be associated with an outgoing or and incoming Frame. The exact number and types of Frames to be received or sent by an EcuInstance is determined by the Communication Matrix (Chapter 6).

According to the selection rules for the Topology (12.1), the System with category ECU_EXTRACT contains all FrameTriggerings associated with Frames that are of any interest to the EcuInstance: If a particular FrameTriggering refers to a FramePort of type 'out' the associated Frame is to be sent by the EcuInstance, if it refers to an 'in' port the Frame is to be received. Therefore, the following selection rule applies:

- The System with category ECU_EXTRACT shall contain all Frame elements which are referenced by any included FrameTriggering.

12.3.2 PDU

Frames are assembled from one or more Pdus. In order to include all required Pdu elements, the following selection criteria apply:

- The System with category ECU_EXTRACT shall contain all Pdu elements which are referenced by any included Frame's PduToFrameMapping.
- The System with category ECU_EXTRACT shall contain all Pdu elements which are referenced by any included PduTriggering.
- For multiplexed Pdus, additionally all ISignalIPdus referenced by the MultiplexedIPdu's static and dynamic parts need to be included.

The second criterion is e.g. required in a pure post-build configuration scenario, where the frame-layout may not be completed at the time of System with category ECU_EXTRACT creation.

12.3.3 ISignals and ISignalGroups

ISignalIPdus carry their information in form of ISignals or ISignalGroups. In order to include all required ISignal and ISignalGroup elements, the following selection criteria apply:

- The System with category ECU_EXTRACT shall contain ISignal elements which are referenced by included ISignalIPdu's ISignalToIPduMapping. One exception are Pdu Gateways. Signal definitions that are not directly relevant for Gateways in case that the Pdu is routed as a whole (Pdu Routing) shall be omitted. See Section 12.3.5 for more details.
- The System with category ECU_EXTRACT shall contain all ISignal elements which are referenced by any included ISignalTriggering.
- The System with category ECU_EXTRACT shall contain ISignalGroup elements which are referenced by included ISignalIPdu's ISignalToIPduMapping. One exception are Pdu Gateways. Signal Group definitions that are not directly relevant for Gateways in case that the Pdu is routed as a whole (Pdu Routing) shall be omitted. See Section 12.3.5 for more details.
- The System with category ECU_EXTRACT shall contain all ISignalGroup elements which are referenced by any included ISignalTriggering.

Like in the case of the Pdu inclusion rules, the second and fourth criterion is required in scenarios with incomplete Pdu modeling due to post-build configurability of the communication matrix.

12.3.4 SystemSignal and SystemSignalGroup

Whereas the rules specified in Section 12.2.3 for the inclusion of SystemSignal comprise all SystemSignals that are being used by the Software Components in the ECU, the inclusion rules above stated for ISignalIPdus and ISignals may require the inclusion of additional SystemSignals. Also, strictly speaking both SystemSignals and SystemSignalGroup need to be considered. The complete inclusion rules for SystemSignals and SystemSignalGroups are:

- The System with category ECU_EXTRACT shall contain all SystemSignals and SystemSignalGroup elements which are referenced by any included DataMapping.
- The System with category ECU_EXTRACT shall contain all SystemSignal elements which are referenced by any included ISignal.
- The System with category ECU_EXTRACT shall contain all SystemSignalGroup elements which are referenced by any included ISignalGroup.

In addition on the receiving EcuInstance the following cases exist:

- only one SystemSignal out of the transmitted SystemSignalGroup is received: no SystemSignalGroup is required in the Ecu Extract of the receiving EcuInstance.
- more than one but not all SystemSignals out of the transmitted SystemSignalGroup are received: new SystemSignalGroup shall be created in the System with category ECU_EXTRACT of the receiving EcuInstance containing the received SystemSignals.
- all SystemSignals out of the transmitted SystemSignalGroup are received: the original SystemSignalGroup shall be the taken over to the System with category ECU_EXTRACT of the receiving EcuInstance.

12.3.5 Gateways

Gateways that refer the EcuInstance shall be included in the System with category ECU_EXTRACT. The complete inclusion rules for Gateways are:

- The System with category ECU_EXTRACT shall contain all FrameMapping elements that are aggregated by the Gateway element.
- The System with category ECU_EXTRACT shall contain all IPduMapping elements that are aggregated by the Gateway element.
- The System with category ECU_EXTRACT shall contain all ISignalMapping elements that are aggregated by the Gateway element.

- ISignal definitions that are not directly relevant for the Gateway in case that the Pdu containing these ISignals is routed as a whole (Pdu Routing) shall be omitted .
- ISignalGroup definitions that are not directly relevant for the Gateways in case that the Pdu containing these ISignalGroups is routed as a whole (Pdu Routing) shall be omitted .

12.3.6 TP configuration

The TP-configuration element TpConfig and all its associated elements shall be included into the System with category ECU_EXTRACT if the EcuInstance has an TpAddress configured in this TpConfig.

12.3.7 NM configuration

The Nm configuration part of the System with category ECU_EXTRACT shall include the NmEcu that references the included EcuInstance. In addition a NmCoordinator composed by this NmEcu shall be included. Furthermore any NmNode referenced by the NmCoordinator shall be included. For each included NmNode the composing NmCluster shall be included. For each included NmCluster the composing NmConfig shall be included.

12.4 Naming Issues

[TPS_SYST_05015] Naming conventions ⌈ The definition of naming conventions may facilitate the avoidance of name clashes to the further degree. However, these naming conventions can only be defined on the model level and the System Template does not define any specific naming conventions. ⌋*(RS_SYST_00053)*

Please note that a detailed information about mechanisms to resolve naming conflicts is given in [4]: [TR_METH_03005], [TR_METH_03006], [TR_METH_03007], [TR_METH_03008], [TR_METH_03009], [TR_METH_03010].

12.4.1 Package Structure

As detailed in the sections above, extracting information from the System with category SYSTEM_DESCRIPTION into an System with category ECU_EXTRACT is a non-trivial transformation: While some of the model elements are simply copied verbatim into the System with category ECU_EXTRACT, it is additionally necessary to create new elements reducing parts of system-wide structures, most noticeably in flattening of the hierarchical VFB view to the ECU Flat View.

All such elements being created or modified in the process of generating the System with category ECU_EXTRACT shall reside in the same ARPackage. In order to avoid namespace conflicts with existing elements, the package shall exclusively be used for this purpose.

By creating derivation elements from elements originally contained in the System with category SYSTEM_DESCRIPTION package structure, duplications of names may occur. This kind of name clashes shall be resolved by a suitable naming algorithm (see section 12.4.3).

All Elements that are taken over from the System with category SYSTEM_DESCRIPTION unchanged (e.g. AtomicSwComponentType, PortInterface, ApplicationDataType, EcuInstance, CommunicationCluster) shall remain in their original packages.

ARElements not used in the System with category ECU_EXTRACT shall not be copied to the ECU Extract XML file.

In more detail, ARPackages taken over from System with category SYSTEM_DESCRIPTION will not be altered by the ECU extraction process, except that some ARElements will not be included in the actual XML file of the extract: ARElements which exist in the System with category SYSTEM_DESCRIPTION but have been stripped for the System with category ECU_EXTRACT are not actually deleted from their ARPackage, but merely are skipped in the XML file forming the extract. Note that having such a partial view on an ARPackage doesn't break the original ARPackage definition because the composition of PackageableElement, responsible for adding ARElements to ARPackage, is stereotyped ≪splitable≫; this means several XML files can contribute to an ARPackage, or in case of the ECU Extract an AUTOSAR description file may contain only a subset of the complete ARPackage.

12.4.2 Naming of Measurement and Calibration Data

The software component descriptions provide several means to declare data prototypes which have to be available for measurement and calibration (MCD) tools on the EcuInstance. Together with the System with category ECU_EXTRACT it is required to provide a list of references to the description of these data for further processing in the scope of the EcuInstance. In addition, the MCD tools need a unique name for each instance of such a data prototype. Since the data descriptions are part of the nested composition structure and are contained in reusable types (components or port interfaces), the system description itself does in general not provide unique names for those.

This means, providing such a list with references and unique names for MCD data is also a task of the ECU extractor tool. This list is part of the artifact ECU Flat Map, which is further explained below.

12.4.3 Naming of Derived Elements

When performing the extract process, name clashes may occur, necessitating a naming scheme for elements derived in ECU generation: By flattening the Software Composition hierarchy all component instances present on the considered EcuInstance are put in one ECU-wide software composition. Name clashes may occur for the following reasons:

1. SwComponentPrototypes taken from different Software Compositions are allowed to have identical short names in the hierarchical structure. As all SwComponentPrototypes will be located in the same ECU Flat View, the original name spaces separation no longer exists.
2. Multiple instances of the same CompositionSwComponentType are mapped to an EcuInstance: In this case, duplicates of all contained SwComponentPrototypes will be placed next to each other in the ECU flat composition.
3. The two mechanisms just mentioned may also lead to name clashes in AutosarDataPrototypes if their names shall be used as MCD data names. In addition, reuse of a PortInterface can also lead to name clashes if it provides data elements to be used by MCD.
4. The setup of PortGroups in the ECU flat view can result in name clashes, because two port groups originating from different component types (i.e. different name spaces) may be aggregated within the flat view.

Therefore the System with category ECU_EXTRACT generator shall take care that all elements derived or created during the extraction process have unique short names. These unique names shall be created in an initial step of the extraction process which leads to the creation of an initial ECU Flat Map. Some ways to satisfy this requirement may be:

- Use globally unique identifiers (GUID) for generating short names.
- Add a number to the original name; if done consistently the flat map approach makes this reproducable.
- Expand the name recursively by the names of the containing elements (e.g. compositions) until is is unique.
- Allow human interaction (this may be combined with an initially proposed name expansion).

The creation of a new short name is compulsory only if otherwise a clash would occur.

[constr_2025] Uniqueness of symbol attributes ⌈ With the exception of RunnableEntities that are subject to [constr_1234] (RunnableEntities owned by NvBlockSwComponentTypes), in the context of a single EcuInstance the values of the RunnableEntity.symbol in combination with the attribute symbol of the meta-class SymbolProps owned by AtomicSwComponentType of all deployed RunnableEntities shall be unique such that no two (or more) combinations of

RunnableEntity.symbol and the symbol of the meta-class SymbolProps owned by AtomicSwComponentType in the role symbolProps share the same value. ⌋()

12.4.4 Re-use of short names assigned in previous iterations

As described in the previous section, potential name clashes during ECU extraction must be avoided by assigning unique names to the elements specifically created for the System with category ECU_EXTRACT and for the list of MCD data per EcuInstance. Considering the use case of iterative development (also see Section 12.5), the same names shall be assigned to existing elements in consecutive iterations. Elements which have been modified or newly introduced between two ECU extract iterations shall not use an existing short name. Additionally, the ECU extractor tool shall not re-use any short name used in any iteration from previous development phases if the meaning of the element is not exactly the same (i.e. the element's back reference into the System Configuration Description is not the same.)

12.5 ECU Extract in subsequent Cycles of Iterative Development

12.5.1 Traceability of model elements created in ECU Extract

For development scenarios in real life projects iterative development must be supported.

The following use case shall be considered:

Changes in the System with category SYSTEM_DESCRIPTION require the recreation of an System with category ECU_EXTRACT. In the successive re-run of ECU configuration, ECU configuration parameters which were configured based on the previous System with category ECU_EXTRACT need to be maintained for those parts in the System with category ECU_EXTRACT that didn't change between iterations.

Consequently, there are two requirements on the extraction process:

- Elements that are present in both versions of the System with category SYSTEM_DESCRIPTION must not change their short names between the two ECU Extracts either.
- If changes between the two versions of the System with category SYSTEM_DESCRIPTION lead to the creation of new model elements in the System with category ECU_EXTRACT, then these newly created elements must have new names that have not been used in previous iterations of the System with category ECU_EXTRACT. (See also Section 12.4.4).

In order to fulfill these requirements, a back-tracing of the relevant model elements in the System with category ECU_EXTRACT to their counterparts in the System with category SYSTEM_DESCRIPTION shall be established. Based on these back references, short names shall consistently be re-used in iterations. Relevant elements are all those which potentially have been modified in the extraction process.

All back-tracing references are collected in one central table per System with category ECU_EXTRACT based on the meta-class FlatMap. This table collects "instance" entries for each Ecu Extract element that is being created in the System with category ECU_EXTRACT transformation and for each MCD data object that has to be available in the EcuInstance. These entries are called FlatInstanceDescriptor.

Each mapping entry owns two references per mapped element, one reference pointing to the target element in the System with category ECU_EXTRACT, the other one pointing to the origin in the System with category SYSTEM_DESCRIPTION. Both of these references are deep "instance" references, requiring a tuple of context/target description.

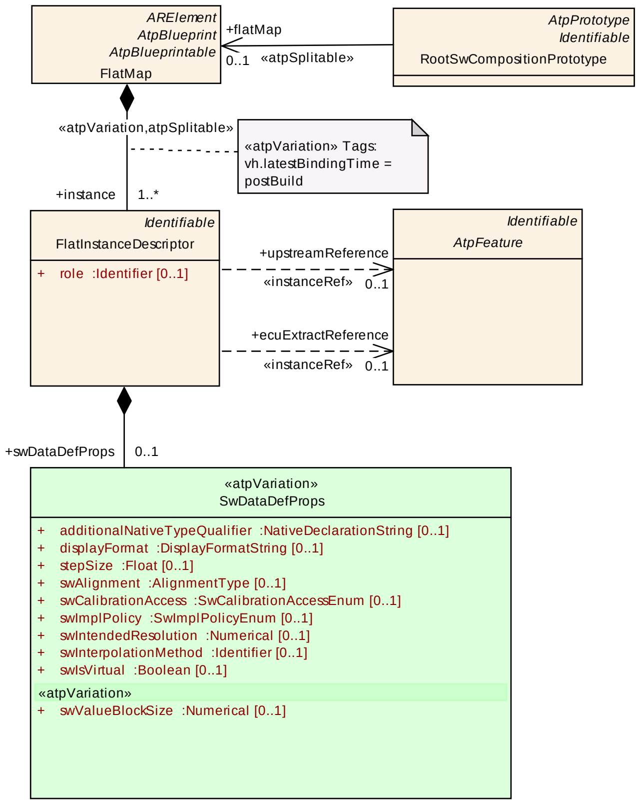


Figure 12.7: Flat Map (CommonStrucure: FlatMap)

Class	FlatMap			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	Contains a flat list of references to software objects. This list is used to identify instances and to resolve name conflicts. The scope is given by the RootSwCompositionPrototype for which it is used, i.e. it can be applied to a system, system extract or ECU-extract. An instance of FlatMap may also be used in a preliminary context, e.g. in the scope of a software component before integration into a system. In this case it is not referred by a RootSwCompositionPrototype. **Tags:** atp.recommendedPackage=FlatMaps			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
instance	FlatInstanceDescriptor	1..*	aggr	A descriptor instance aggregated in the flat map. The variation point accounts for the fact, that the system in scope can be subject to variability, and thus the existence of some instances is variable. The aggregation has been made splitable because the content might be contributed by different stakeholders at different times in the workflow. Plus, the overall size might be so big that eventually it becomes more manageable if it is distributed over several files. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild

Table 12.1: FlatMap

Class	**FlatInstanceDescriptor**			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	Represents exactly one node (e.g. a component instance or data element) of the instance tree of a software system. The purpose of this element is to map the various nested representations of this instance to a flat representation and assign a unique name (shortName) to it. Use cases: • Specify unique names of measurable data to be used by MCD tools • Specify unique names of calibration data to be used by MCD tool • Specify a unique name for an instance of a component prototype in the ECU extract of the system description Note that in addition it is possible to assign alias names via AliasNameAssignment.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
ecuExtractReference	AtpFeature	0..1	iref	Refers to the instance in the ECU extract. This is valid only, if the FlatMap is used in the context of an ECU extract. The reference shall be such that it uniquely defines the object instance. For example, if a data prototype is declared as a role within an SwcInternalBehavior, it is not enough to state the SwcInternalBehavior as context and the aggregated data prototype as target. In addition, the reference shall also include the complete path identifying instance of the component prototype and the AtomicSoftwareComponentType, which is refered by the particular SwcInternalBehavior. **Tags:** xml.sequenceOffset=40
role	Identifier	0..1	attr	The role denotes the particular role of the downstream memory location described by this FlatInstanceDescriptor. It applies to use case where one upstream object results in multiple downstream objects, e.g. ModeDeclarationGroupPrototypes which are measurable. In this case the RTE will provide locations for current mode, previous mode and next mode.
swDataDefProps	SwDataDefProps	0..1	aggr	The properties of this FlatInstanceDescriptor.

Attribute	Type	Mul.	Kind	Note
upstreamReference	AtpFeature	0..1	iref	Refers to the instance in the context of an "upstream" descriptions, wich could be the system or system extract description, the basic software module description or (if a flat map is used in preliminary context) a description of an atomic component or composition. This reference is optional in case the flat map is used in ECU context. The reference shall be such that it uniquely defines the object instance in the given context. For example, if a data prototype is declared as a role within an SwcInternalBehavior, it is not enough to state the SwcInternalBehavior as context and the aggregated data prototype as target. In addition, the reference shall also include the complete path identifying the instance of the component prototype that contains the particular instance of SwcInternalBehavior. **Tags:** xml.sequenceOffset=20

Table 12.2: FlatInstanceDescriptor

[TPS_SYST_01000] FlatInstanceDescriptor roles ⌈ If a ModeDeclarationGroupPrototype is measurable the FlatMap shall contain three entries where the particular roles are set to

- CURRENT_MODE specifies the FlatInstanceDescriptor applicable for current mode value of the ModeDeclarationGroupPrototype
- PREVIOUS_MODE specifies the FlatInstanceDescriptor applicable for previous mode value of the ModeDeclarationGroupPrototype
- NEXT_MODE specifies the FlatInstanceDescriptor applicable for next mode value of the ModeDeclarationGroupPrototype

Please note that these entries may exist in a FlatMap even if the ModeDeclarationGroupPrototype is not measurable. ⌋*(RS_SYST_00003, RS_SYST_00027)*

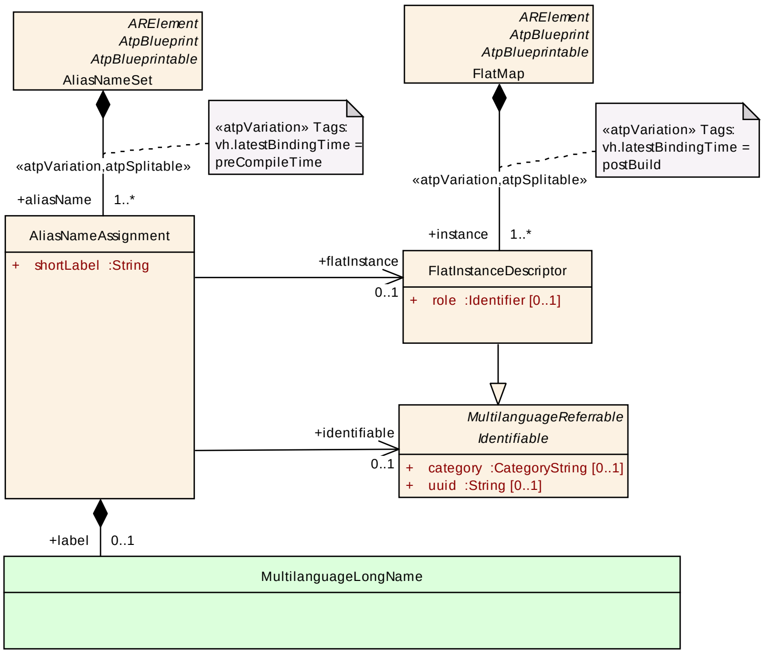


Figure 12.8: Alias Name Assignment (CommonStrucure: AliasNameAssignment)

Class	**AliasNameSet**			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	This meta-class represents a set of AliasNames. The AliasNameSet can for example be an input to the A2L-Generator. **Tags:** atp.recommendedPackage=AliasNameSets			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
aliasName	AliasNameAssignment	1..*	aggr	AliasNames contained in the AliasNameSet. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortLabel vh.latestBindingTime=preCompileTime

Table 12.3: AliasNameSet

Class	**AliasNameAssignment**			
Package	M2::AUTOSARTemplates::CommonStructure::FlatMap			
Note	This meta-class represents the ability to associate an alternative name to a flat representations or an Identifiable. The usage of this name is defined outside of AUTOSAR. For example this name can be used by MCD tools or as a name for component instances in the ECU extract. Note that flatInstance and identifiable are mutually exclusive.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

Attribute	*Type*	*Mul.*	*Kind*	*Note*
flatInstance	FlatInstanceDescriptor	0..1	ref	Assignment of a unique name to a flat representation. **Tags:** xml.sequenceOffset=60
identifiable	Identifiable	0..1	ref	Assignment of a unique name to an Identifiable. **Tags:** xml.sequenceOffset=50
label	MultilanguageLongName	0..1	aggr	This represents an "Alias LongName". **Tags:** xml.sequenceOffset=20
shortLabel	String	1	attr	This attribute represents the alias name. It is modeled as string because the alias name is used outside of AUTOSAR and therefore no naming conventions can be applied within AUTOSAR. **Tags:** xml.sequenceOffset=10

Table 12.4: AliasNameAssignment

During the ECU extraction process, the ECU FlatMap will be processed in the following steps:

1. Create the entries shortName and upstreamReference of the FlatMap or, if a previous version exists, try to reuse them. Resolve name conflicts.
2. Generate the ECU Software Composition.
3. Create the entries ecuExtractReference of the ECU FlatMap.

More details are define be the AUTOSAR methodology, see [4]. The methodology also allows to have a FlatMap for the whole system. This System FlatMap can be created and maintained independently from the ECU extraction process, but can be used as an input for the creation of the ECU FlatMap.

[constr_3378] Maximal one AliasNameAssignment allowed per FlatInstanceDescriptor ⌈ In a given instance of AliasNameSet in the bound system there shall be at most one aliasName per FlatInstanceDescriptor. ⌋*()*

12.5.2 Mapping of AUTOSAR attributes to ASAM ASAP2

With the MC Support information AUTOSAR builds a bridge to tools processing ASAM ASAP2 files. In order to support the interoperability of converter tools the following mapping of AUTOSAR attributes to ASAM ASAP2 [30] (also known as "A2l" respectively "ASAM MCD 2MC") is recommended:

- If the FlatInstanceDescriptor references DataPrototypes:

FlatInstanceDescriptor.shortName ->
MEASUREMENT Name
CHARACTERISTIC Name

FlatInstanceDescriptor.(longName + desc |upstreamReference.desc) ->
MEASUREMENT LongIdentifier
CHARACTERISTIC LongIdentifier

AliasNameAssignment.shortLabel ->
MEASUREMENT [-> DISPLAY_IDENTIFIER]
CHARACTERISTIC [-> DISPLAY_IDENTIFIER]

AliasNameAssignment.label(if provided) +
FlatInstanceDescriptor.(desc |upstreamReference.desc) ->
MEASUREMENT LongIdentifier
CHARACTERISTIC LongIdentifier

- If AliasNameAssignment references a SwSystemconstant:

  AliasNameAssignment.shortLabel ->
  SYSTEM_CONSTANT -> Name for SwSystemconstants

- If AliasNameAssignment references a Unit:

  AliasNameAssignment.shortLabel ->
  UNIT -> Name for Units

12.6 Variant Handling in ECU Extract

The System Template supports the creation of variants in many of its model elements. Depending on the binding time, some of this variability may have been already resolved within the System with category SYSTEM_DESCRIPTION at the time of creating the System with category ECU_EXTRACT, and a cleanup step may have removed some of the complexity by removing the out-configured variability.

If however binding of a concrete variation condition happens in a later stage of the AUTOSAR methodology (e.g. during ECU Configuration or even post build), or if for other process reasons such a cleanup step is not applicable, the variability needs to be carried over to the System with category ECU_EXTRACT.

12.6.1 System Constants

In the AUTOSAR variant handling concept, SwSystemconst represents a variant selector which needs to have its value assigned latest at binding time of any expression which refers to it. Such a value assignment may be done literally using a fixed value, or by specifying a formula, depending on the values of other variant selectors. The elements to do this are collected in a SwSystemconstantValueSet, aggregating individual value assignment expressions in the form of SwSystemconstValue.

In the System with category ECU_EXTRACT, all SwSystemconst elements are included that influence its variable content. In detail the following rules for the inclusion of SwSystemconst apply:

- System with category ECU_EXTRACT shall contain all SwSystemconst elements that are being referenced directly by variable elements contained in the System with category ECU_EXTRACT.
- Additionally, whenever a SwSystemconst's value is assigned indirectly using an SwSystemconstValue's ConditionByFormula expression, each SwSystemconstValue referred to in the assignment formula needs to be included, too. As such assignments may be nested in multiple levels, the whole directed acyclic graph of SwSystemconst elements influencing the System with category ECU_EXTRACT variability need to be included.

Additionally to the SwSystemconst elements also all relevant SwSystemconstValue assignments need to be included. As they are aggregated by SwSystemconstantValueSet, the whole Value Set is included whenever one of its SwSystemconstValue assignments is relevant for the System with category ECU_EXTRACT.

Note: Typically, the assignment of Variants ("Binding´´) will be done in a Variant Configuration work product, separate from the actual System with category ECU_EXTRACT. In this case, the relevant information from the Variant Configuration also needs to be extracted and delivered in combination with the System with category ECU_EXTRACT. From the model point of view it doesn't matter whether System with category ECU_EXTRACT and Variant Configuration are contained in the same file or in separate files.

12.6.2 Nested Whole/Part class variants

In case of flattening the hierarchical VFB view to the ECU flat view representation, the case may appear that one conditional SwComponentPrototype is nested within another SwComponentPrototype depending on another variance condition. As the resulting ECU flat view only has a flat representation of SwComponentPrototypes, such a double condition needs to be resolved to a single condition in the resulting SwComponentPrototypes.

In this case, the variation condition formula needs to be altered such that the two (or more) individual conditions are combined in a boolean AND function.

12.6.3 Multiple instances of calibration parameters in system scope

Use case: In complex systems the problem occurs that parameter values may depend on the configuration of the vehicle due to functional side effects. E.g. the calibration of a lambda sensor depends from the kind of transmission due to mechanical impacts (e.g due to additional / different curvatures in the exhaust pipe)

The difficulty is that those dependencies are typically detected after design of the software components and shall not change the software component design. Furthermore this is typical use case for post build variability since the ECU SW should not change due to environmental variability.

[TPS_SYST_02029] Multiple ParameterDataPrototype instances in an EcuExtract ⌈ It shall be possible to instruct the RTE Generator to provide various instances for a ParameterDataPrototype in the System with category ECU_EXTRACT. Therefore one FlatInstanceDescriptor per expected data instance has to point to the ParameterDataPrototype as an atpTarget. ⌋ *()*

[constr_3114] FlatInstanceDescriptors pointing to the same ParameterDataPrototype shall have different postBuildVariantConditions ⌈ FlatInstanceDescriptors that are pointing as an atpTarget to the same ParameterDataPrototype instance shall have different postBuildVariantConditions. ⌋ *()*

Note: When several instances of a ParameterDataPrototype are created it shall be ensured that at most one parameter instance is active in a post build variant.

[constr_3115] FlatInstanceDescriptors pointing to the same ParameterDataPrototype instance ⌈ When several FlatInstanceDescriptors point to the same ParameterDataPrototype instance as an atpTarget in the context of a ParameterInterface the different FlatInstanceDescriptors shall point to the PPortPrototype of the owning ParameterSwComponentType. In this case the PPortPrototype typed by the ParameterInterface is part of the context of the according AnyInstanceRef. ⌋ *()*

Please note that the individual FlatInstanceDescriptors are utilized to provide unique names for the MCD tool as well as individual CalibrationParameterValues typically refer to the FlatInstanceDescriptors to provide instance specific initialization values.

13 Supported special use-cases

The description means of the communication matrix in the System Template potentially support a variety of use-cases. Some combinations of description means are explicitly ruled-out by semantical constraints. But the remaining space for the possible descriptions is so huge, that certain use-cases are actually not supported by tool-vendors because they did not consider them. This chapter describes special use-cases that can be specified in the System Template in order to get a harmonized support by tools.

13.1 Support of sending / receiving same Can/Flexray Frame on same channel (Pdu Gateway Use-Case)

Description: The System Template supports the definition of a communication where the same Can/Flexray FrameTriggering is sent and received on the same PhysicalChannel of one Pdu Gateway EcuInstance.

Rationale: This use-case occurs in gateway EcuInstances which are used in several vehicle platforms.

Implementation: This usage shall be supported by defining one Frame and one FrameTriggering with different directions on the referenced FramePorts for the same PhysicalChannel. Also one Pdu and one PduTriggering with different directions on the referenced IPduPorts for the same PhysicalChannel shall be used.

Example: In figure 13.1 a sample network setup is shown. The ECU1 is designed to send the Frame_X on the PhysicalChannel. The ECU2, ECU3 and ECU4 do receive the information. But since ECU1 is optional, ECU4 is also designed to send the Frame_X on the network (in case ECU1 is not present). Please note that in in this example ECU4 is a gateway EcuInstance that is connected to an additional channel.

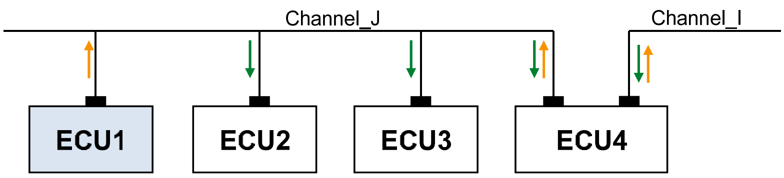


Figure 13.1: Example of network setup with one Frame being received and sent on the same ECU and channel

In the system description there exists one definition for the Frame_X and one FrameTriggering for the PhysicalChannel (figure 13.2). Each EcuInstance sending or receiving the FrameTriggering does define one FramePort per direction, thus for ECU4 there are two FramePorts defined.

For each Pdu mapped to the Frame there exists one definition for the Pdu_X and one PduTriggering for the PhysicalChannel. Each EcuInstance sending or receiving the Pdu does define one IPduPort per direction, thus for ECU4 there are two IPduPorts defined.

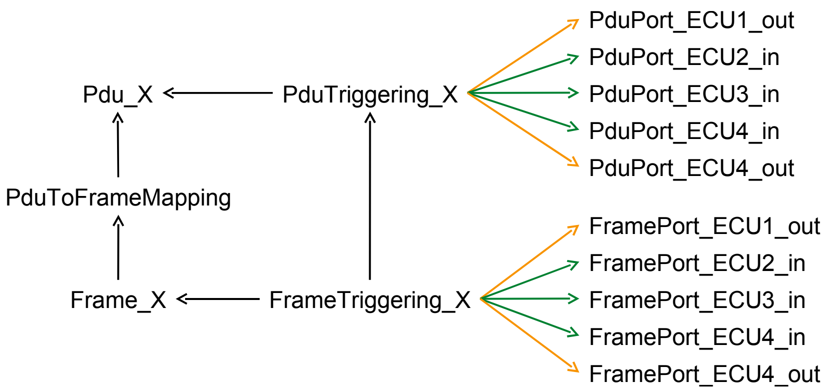


Figure 13.2: Structure to reflect the frame- and pdu-triggering setup of one Frame being received and sent by the same Gateway ECU

In case a System Extract / ECU Extract is build, only the relevant FramePorts and IPduPorts for the corresponding EcuInstance are extracted. Especially in case an additional EcuInstance is designed to send and receive the same Frame all the other ECU extracts will not be affected by this change.

13.2 Support of sending / receiving same Can/Flexray Frame on same channel (bidirectional routing in COM)

Description: The System Template supports the definition of a communication where the same Can/Flexray FrameTriggering is sent and received on the same PhysicalChannel of one EcuInstance and the content of this Frame is processed by an Application.

Rationale: This use-case occurs in case of runtime variation where the same data is transmitted or received by the same ECU.

Implementation in a System Description: This use-case is supported with the following modelling:

- One Frame and one FrameTriggering with different directions on the referenced FramePorts for the same PhysicalChannel shall be defined.
- One Pdu and one PduTriggering with different directions on the referenced IPduPorts for the same PhysicalChannel shall be defined.
- One ISignal and one ISignalTriggering with different directions on the referenced ISignalPorts for the same PhysicalChannel shall be defined.

Please note that in case of a bidirectional routing on the ISignal level the COM Configuration (ComIPdus) needs to be derived from the PduTriggering and from IPduPorts.

Example: In figure 13.3 a sample network setup is shown. The same data (Frame_X) is transmitted by Ecu4 and by Ecu1 (runtime variation). Ecu4 is designed to send and to receive the Frame_X on the network. For Ecu2 and Ecu3 it is transparent from which sender (Ecu1 or Ecu4) the data is transmitted.

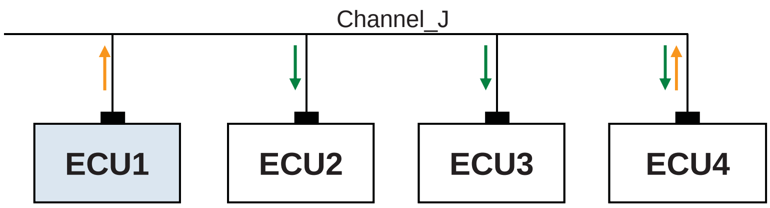


Figure 13.3: Example of network setup with one Frame being received and sent on the same ECU and channel

In the system description there exists one definition for the Frame_X and one FrameTriggering for the PhysicalChannel (figure 13.4). Each EcuInstance sending or receiving the FrameTriggering does define one FramePort per direction, thus for ECU4 there are two FramePorts defined.

For each Pdu mapped to the Frame there exists one definition for the Pdu_X and one PduTriggering for the PhysicalChannel. Each EcuInstance sending or receiving the Pdu does define one IPduPort per direction, thus for ECU4 there are two IPduPorts defined.

For each ISignal mapped to the Pdu there exists one definition for the Signal_X and one ISignalTriggering for the PhysicalChannel. Each EcuInstance sending or receiving the ISignal does define one ISignalPort per direction, thus for ECU4 there are two ISignalPorts defined.

Example 13.4 shows a System Description where only the DataMapping for the PPorts is defined. Please note that in the COM configuration a ComIPdu has a ComIPduDirection. Therefore two ComIPdus (Tx and Rx) need to be created from such a System Description.

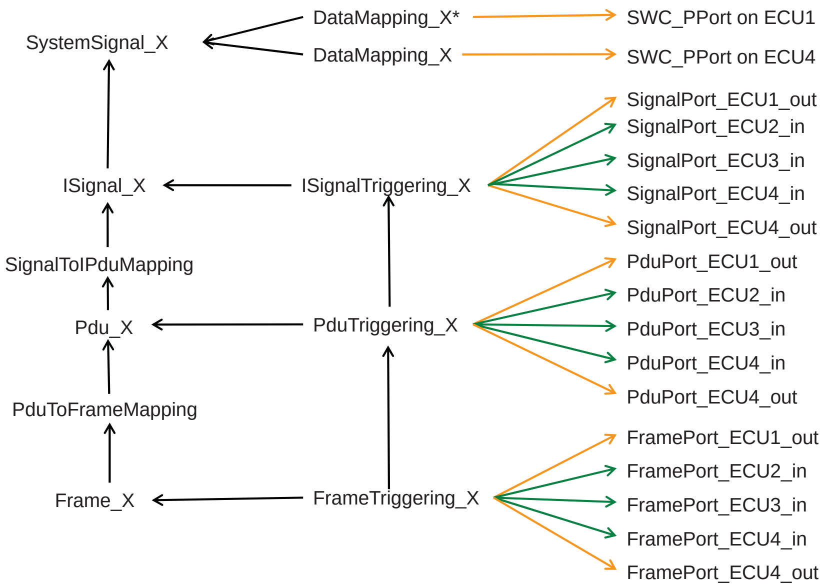


Figure 13.4: Structure to reflect the frame- and pdu-triggering setup of one Frame being received and sent on the same ECU and channel (System Description with ECU1, ECU2, ECU3 and ECU4)

In case a System Extract / ECU Extract is build, only the relevant FramePorts, IPduPorts and ISignalPorts for the corresponding EcuInstance are extracted. Especially in case an additional EcuInstance is designed to send and receive the same Frame all the other ECU extracts will not be affected by this change. Figure 13.5 shows a System Extract where only the description for ECU4 is available. Please note that in this example the VariableDataPrototype in the PPort and the VariableDataPrototype in the RPort of the Software Component are mapped to the same SystemSignal.

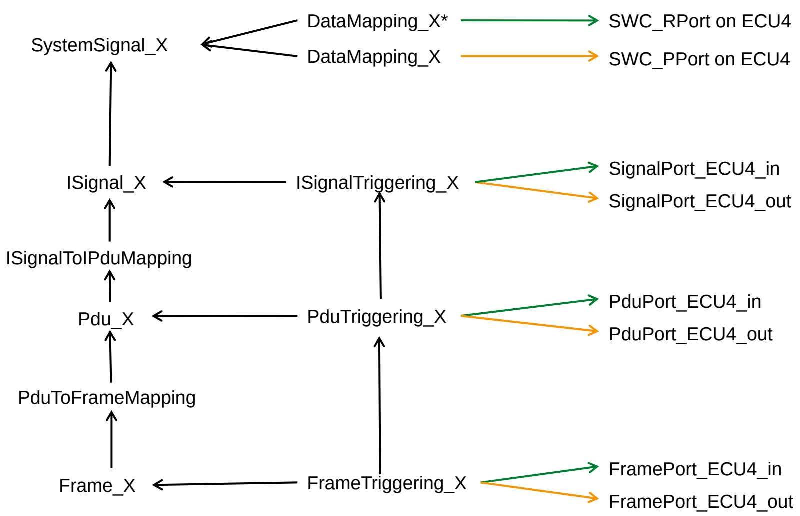


Figure 13.5: Structure to reflect the frame- and pdu-triggering setup of one Frame being received and sent on the same ECU and channel (System Extract with ECU4 only)

13.3 Support of dynamic CAN IDs

To support efficient diagnostics with on-board clients, efficient routing, and efficient SAE J1939 transport protocol and request handling, AUTOSAR provides access to dynamic CAN identifier parts in upper layers of the COM stack. This is achieved by appending parts of the identifier (or the complete identifier) as MetaData to the Pdu payload. The usage of MetaData is an Ecu Configuration decision. A System Description does not define whether MetaData shall be used or not.

The System Template uses the following attributes for the configuration of dynamic CAN IDs:

- The rxMask of a CanFrameTriggering defines the relevant bits in a CAN identifier and thus defines a range of CAN identifiers that match these bits and may vary in the other bits.
- The txMask of a CanFrameTriggering defines the static bits in a CAN identifier and thus allows to set the other bits using the data appended to the payload.

These parameters are sufficient to support the following scenarios:

- A Pdu is transmitted from one AUTOSAR node to another with variable ID parts. In this case, rxMask and txMask will be identical, and the variable identifier parts placed in the Pdu MetaData by the sender will be routed transparently and received in the same way.
- A Pdu is transmitted by one node with a static identifier and received using the rxMask. In this case, the MetaData is not used, and the receiver is tolerant regarding dynamic address parts.
- J1939 Pdu is sent with fixed priority, but priority is ignored by the receiver. Here, the MetaData may or may not be used, and the rxMask differs from the txMask just in the three priority bits.

13.4 N:1 Sender Receiver communication description in a System Extract over one PhysicalChannel

Description: The System Template supports a System Extract description of a n:1 sender-receiver communication over one PhysicalChannel where each sender and the receiver are located on different Ecus. Each sender Ecu sends the same data marked with a different frame identifier (e.g. CAN Identifier) to the receiver Ecu over the PhysicalChannel.

Implementation: This usage shall be supported by defining one Frame and several FrameTriggerings on the same PhysicalChannel. Each defined FrameTriggering refers to the same Frame. The senders and receivers of a specific FrameTriggering are defined with references to FramePorts.

For every defined Pdu that is contained in the Frame exactly one PduTriggering is defined. This also means that all defined FrameTriggerings refer to the same PduTriggerings with the FrameTriggering.pduTriggering reference.

The communication direction of the Pdu is defined by PduTriggering references to IPduPorts. All sender IPduPorts and receiver IPduPorts are referenced by the same PduTriggering.

The description of ISignals and ISignalTriggerings shall be defined accordingly. Please also note that in case of n:1 sender-receiver communication each sender shall be represented by the same SystemSignal according to [constr_3086].

Example: In figure 13.6 a small example is shown. Three different Ecus (Ecu1, Ecu2, Ecu3) are sending the same Frame to Ecu4.

- Ecu1 sends the Frame with CanId = 3 as described with FrameTriggering3.
- Ecu2 sends the Frame with CanId = 2 as described with FrameTriggering2.
- Ecu3 sends the Frame with CanId = 1 as described with FrameTriggering1.

The Frame contains one single Pdu. Only one PduTriggering is defined here that refers to three IPduPorts with communicationDirection "out" (Ecu1OutPort, Ecu2OutPort and Ecu3OutPort) and to one IPduPort with communicationDirection "in" (Ecu4InPort). Please note that the references between the Triggering elements (FrameTriggering.pduTriggering and PduTriggering.iSignalTriggering) are not visible in figure 13.6 for the sake of clarity.

The description of the ISignal that is included in the Pdu and the ISignalTriggering is defined accordingly.

Upstream Mapping: In the basic Ecu configuration for the receiving Ecu that is derived from such a System Extract all FrameTriggerings shall be mapped to the same Pdu that is passed to a upper layer module (e.g. Nm, PduR). This corresponds to the upstream mapping rules for COM Signals defined in [TPS_SYST_01066] and [TPS_SYST_01067].

- CanIf: several CanIfRxPduCfg containers need to be created with different CanIfRxPduCanIds that all point to the same Pdu (CanIfRxPduRef).
- FrIf: several FrIfFrameTriggering containers need to be created that all point to the same Pdu (FrIfFrameStructure/FrIfPdusInFrame/FrIfPduRef)

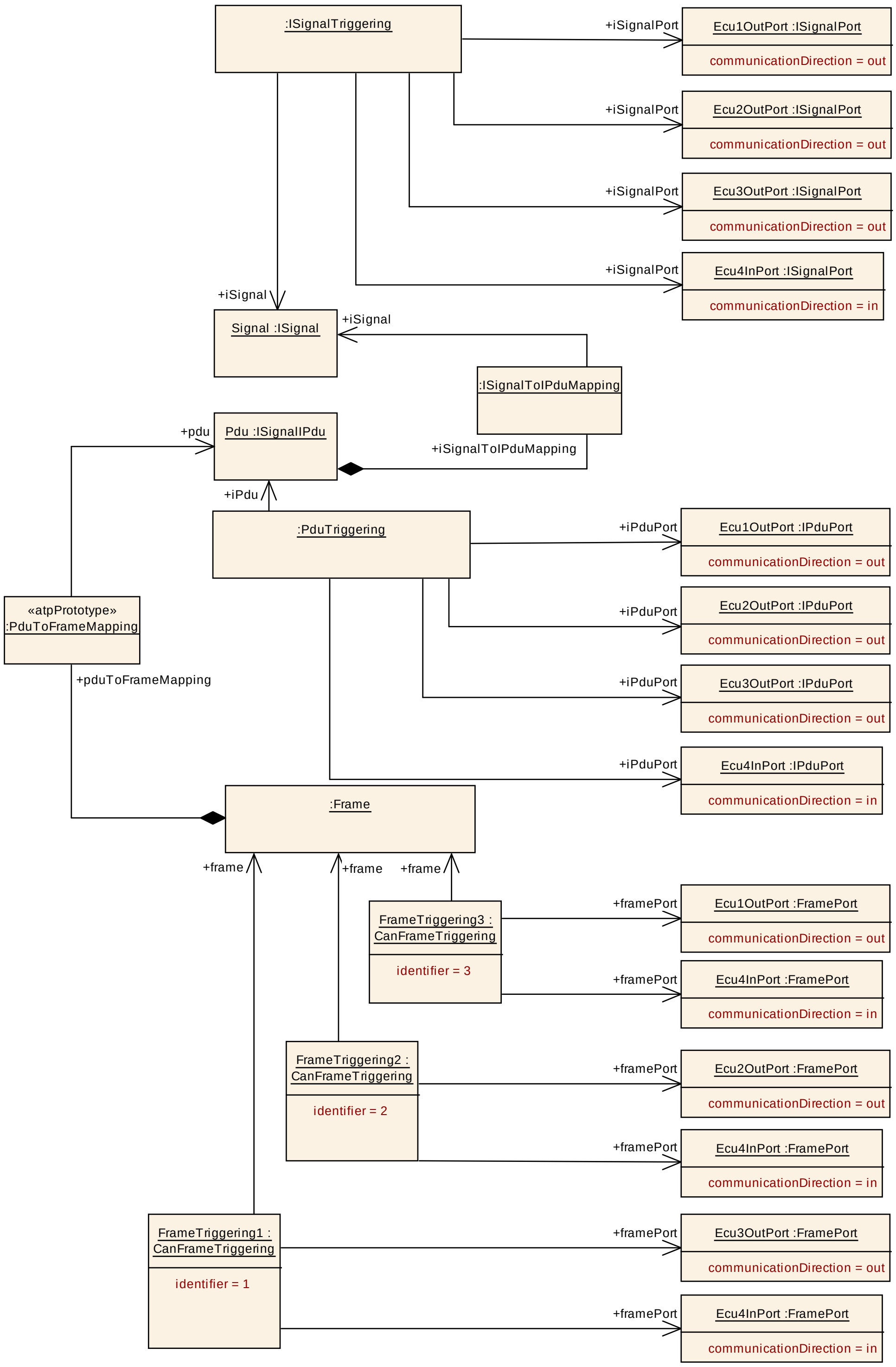


Figure 13.6: Example for a N:1 Sender Receiver communication description in a System Extract

13.5 Description of MOST Functions

The MOST communication protocol is not supported by the AUTOSAR Basic Software but it is possible to convert FIBEX [9] descriptions with MOST content to an AUTOSAR description. This chapter describes how MOST Functions may be described with the means of the Software Component Template [5].

FIBEX supports the description of SW-PACKAGES (represents a bundle of FBlocks and implemented MOST functions), MOST-FUNCTION-BLOCKs (contain functions with operation types and finally parameters, e.g. CD Player), MOST-FUNCTIONs (e.g. a CD player possesses functions such as Play, Stop, Eject, and Time Played) and OP-TYPEs (operations that are applied to the respective function, e.g. Play.Set(tracknumber)). The following table shows how the FIBEX elements may be converted into an AUTOSAR description.

MOST FIBEX Element	**Description**	**AUTOSAR Element**	**Mapping Rule**
FUNCTION-BLOCK	A MOST device contains multiple components that are called function blocks, for example, tuner, amplifier, or CD player.	SwComponentType	Each FunctionBlock shall be described as a SwComponentType
FUNCTION-BLOCK-INSTANCE	There may be several Instances with the same FBlockID in the system (two CD changers, four active speakers, several diagnosis blocks)	SwComponentPrototype	Each FunctionBlockInstance shall be described as a SwComponentPrototype
MOST-FUNCTION	Methods and Properties of a Function Block (e.g. Play, Stop...)	ClientServerInterface	Methods and Properties shall be described as ClientServerInterfaces
OP-TYPE	The OPType indicates which operation must be applied to the property or method (e.g. Play.Start, Property.Get)	ClientServerOperation	Methods and Properties shall be described as ClientServerOperations.
OP-TYPE Parameter	Parameters of OP-TYPE (e.g. tracknumber)	ArgumentDataPrototype	OP-TYPE Parameters shall be described as ArgumentDataPrototypes of ClientServerOperations.

MOST FIBEX Element	Description	AUTOSAR Element	Mapping Rule
CLUSTER (MOST-Cluster)	MOST CommunicationCluster	UserDefinedCluster	A MOST CommunicationCluster shall be described as UserDefinedCluster that allows the modeling of arbitrary Communication Clusters. A MOST-Cluster may aggregate several PhysicalChannels
CHANNEL	The CHANNEL object is used to specify the communications channel used by individual OPTypes.	UserDefinedPhysicalChannel	A UserDefinedPhysicalChannel shall be described for each CHANNEL (Control Channel and/or a MOST High Protocol) that is used by the MOST CommunicationCluster.
PDU TRIGGERING	The PDU-TRIGGERING is created for every OP-TYPE that is transported on this CHANNEL.	PduTriggering	A PduTriggering shall be created for every Pdu that contains ClientServerOperations that correspond to a OP-Type and shall be transported on the PhysicalChannel that aggregates this PduTriggering.
PDU	In FIBEX the OP-TYPE corresponds to a PDU in the communication description	Pdu	In AUTOSAR the ClientServerOperation representing the OP-TYPE shall be mapped with the ClientServer-ToSignalMapping to a SystemSignal. For the SystemSignal an ISignal shall be created. The ISignal is mapped into an ISignalIPdu.

Table 13.1: Mapping of MOST FIBEX elements to AUTOSAR elements

A Glossary

Artifact This is a Work Product Definition that provides a description and definition for tangible work product types. Artifacts may be composed of other artifacts ([31]).

At a high level, an artifact is represented as a single conceptual file.

AUTOSAR Tool This is a software tool which supports one or more tasks defined as AUTOSAR tasks in the methodology. Depending on the supported tasks, an AUTOSAR tool can act as an authoring tool, a converter tool, a processor tool or as a combination of those (see separate definitions).

AUTOSAR Authoring Tool An AUTOSAR Tool used to create and modify AUTOSAR XML Descriptions. Example: System Description Editor.

AUTOSAR Converter Tool An AUTOSAR Tool used to create AUTOSAR XML files by converting information from other AUTOSAR XML files. Example: ECU Flattener

AUTOSAR Definition This is the definition of parameters which can have values. One could say that the parameter values are Instances of the definitions. But in the meta model hierarchy of AUTOSAR, definitions are also instances of the meta model and therefore considered as a description. Examples for AUTOSAR definitions are: `EcucParameterDef`, `PostBuildVariantCriterion`, `SwSystemconst`.

AUTOSAR XML Description In AUTOSAR this means "filled Template". In fact an AUTOSAR XML description is the XML representation of an AUTOSAR model.

The AUTOSAR XML description can consist of several files. Each individual file represents an AUTOSAR partial model and shall validate successfully against the AUTOSAR XML schema.

AUTOSAR Meta-Model This is an UML2.0 model that defines the language for describing AUTOSAR systems. The AUTOSAR meta-model is an UML representation of the AUTOSAR templates. UML2.0 class diagrams are used to describe the attributes and their interrelationships. Stereotypes, UML tags and OCL expressions (object constraint language) are used for defining specific semantics and constraints.

AUTOSAR Meta-Model Tool The AUTOSAR Meta-Model Tool is the tool that generates different views (class tables, list of constraints, diagrams, XML Schema etc.) on the AUTOSAR meta-model.

AUTOSAR Model This is a representation of an AUTOSAR product. The AUTOSAR model represents aspects suitable to the intended use according to the AUTOSAR methodology.

Strictly speaking, this is an instance of the AUTOSAR meta-model. The information contained in the AUTOSAR model can be anything that is representable according to the AUTOSAR meta-model.

AUTOSAR Partial Model In AUTOSAR, the possible partitioning of models is marked in the meta-model by ≪atpSplitable≫. One partial model is represented in an AUTOSAR XML description by one file. The partial model does not need to fulfill all semantic constraints applicable to an AUTOSAR model.

AUTOSAR Processor Tool An AUTOSAR Tool used to create non-AUTOSAR files by processing information from AUTOSAR XML files. Example: RTE Generator

AUTOSAR Specification Element An AUTOSAR Specification Element is a named element that is part of an AUTOSAR specification. Examples: requirement, constraint, specification item, class or attribute in the meta model, methodology, deliverable, methodology activity, model element, bsw module etc.

AUTOSAR Template The term "Template" is used in AUTOSAR to describe the format different kinds of descriptions. The term template comes from the idea, that AUTOSAR defines a kind of form which shall be filled out in order to describe a model. The filled form is then called the description.

In fact the AUTOSAR templates are now defined as a meta-model.

AUTOSAR Validation Tool A specialized `AUTOSAR Tool` which is able to check an AUTOSAR model against the rules defined by a profile.

AUTOSAR XML Schema This is a W3C XML schema that defines the language for exchanging AUTOSAR models. This Schema is derived from the AUTOSAR meta-model. The AUTOSAR XML Schema defines the AUTOSAR data exchange format.

Blueprint This is a model from which other models can be derived by copy and refinement. Note that in contrast to meta model resp. types, this process is *not* an instantiation.

Instance Generally this is a particular exemplar of a model or of a type.

Life Cycle Life Cycle is the course of development/evolutionary stages of a model element during its life time.

Meta-Model This defines the building blocks of a model. In that sense, a Meta-Model represents the language for building models.

Meta-Data This includes pertinent information about data, including information about the authorship, versioning, access-rights, timestamps etc.

Model A Model is an simplified representation of reality. The model represents the aspects suitable for an intended purpose.

Partial Model This is a part of a model which is intended to be persisted in one particular artifact.

Pattern in GST : This is an approach to simplify the definition of the meta model by applying a model transformation. This transformation creates an enhanced model out of an annotated model.

Profile Authoring Support Data Data that is used for efficient authoring of a profile. E.g. list of referable constraints, meta-classes, meta-attributes or other reusable model assets (blueprints)

Profile Authoring Tool A specialized `AUTOSAR Tool` which focuses on the authoring of profiles for data exchange points. It e.g. provides support for the creation of profiles from scratch, modification of existing profiles or composition of existing profiles.

Profile Compatibility Checker Tool A specialized `AUTOSAR Tool` which focuses on checking the compatibility of profiles for data exchange. Note that this compatibility check includes manual compatibility checks by engineers and automated assistance using more formal algorithms.

Profile Consistency Checker Tool A specialized `AUTOSAR Tool` which focuses on checking the consistency of profiles.

Property A property is a structural feature of an object. As an example a “connector” has the properties “receive port” and “send port”

Properties are made variant by the ≪`atpVariation`≫.

Prototype This is the implementation of a role of a type within the definition of another type. In other words a type may contain Prototypes that in turn are typed by "Types". Each one of these prototypes becomes an instance when this type is instantiated.

Type A type provides features that can appear in various roles of this type.

Value This is a particular value assigned to a “Definition”.

Variability Variability of a system is its quality to describe a set of variants. These variants are characterized by variant specific property settings and / or selections. As an example, such a system property selection manifests itself in a particular “receive port” for a connection.

This is implemented using the ≪`atpVariation`≫.

Variant A system variant is a concrete realization of a system, so that all its properties have been set respectively selected. The software system has no variability anymore with respect to the binding time.

This is implemented using `EvaluatedVariantSet`.

Variation Binding A variant is the result of a variation binding process that resolves the variability of the system by assigning particular values/selections to all the system’s properties.

This is implemented by `VariationPoint`.

Variation Binding Time The variation binding time determines the step in the methodology at which the variability given by a set of variable properties is resolved.

This is implemented by `vh.LatestBindingtime` at the related properties .

Variation Definition Time The variation definition time determines the step in the methodology at which the variation points are defined.

Variation Point A variation point indicates that a property is subject to variation. Furthermore, it is associated with a condition and a binding time which define the system context for the selection / setting of a concrete variant.

This is implemented by `VariationPoint`.

B Detailed Representation of InstanceRef Associations in the System Template

As a special type of association "instanceRef" refers to an exact instance of the referenced class, requiring additional information of the target and the context. This is explained in detail in the AUTOSAR Generic Structure Template [2]. This chapter contains the detailed InstanceRef Diagrams.

B.1 Usage of InstanceRefs in Data Mapping diagrams

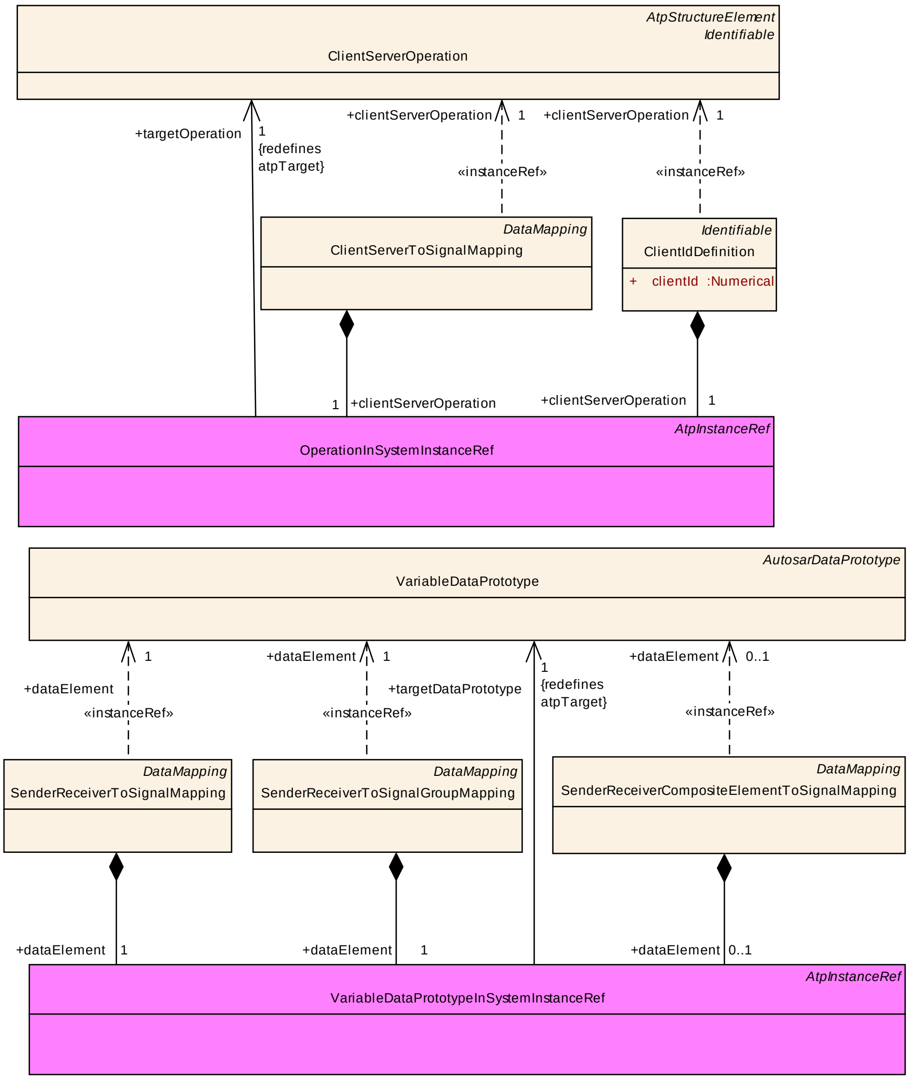


Figure B.1: Data Mapping Instance Ref Usage

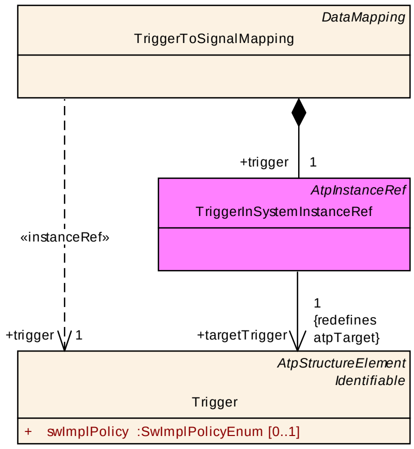


Figure B.2: Modeling of InstanceRef usage for `TriggerInSystemInstanceRef`

B.2 Usage of InstanceRefs in SW Mapping diagrams

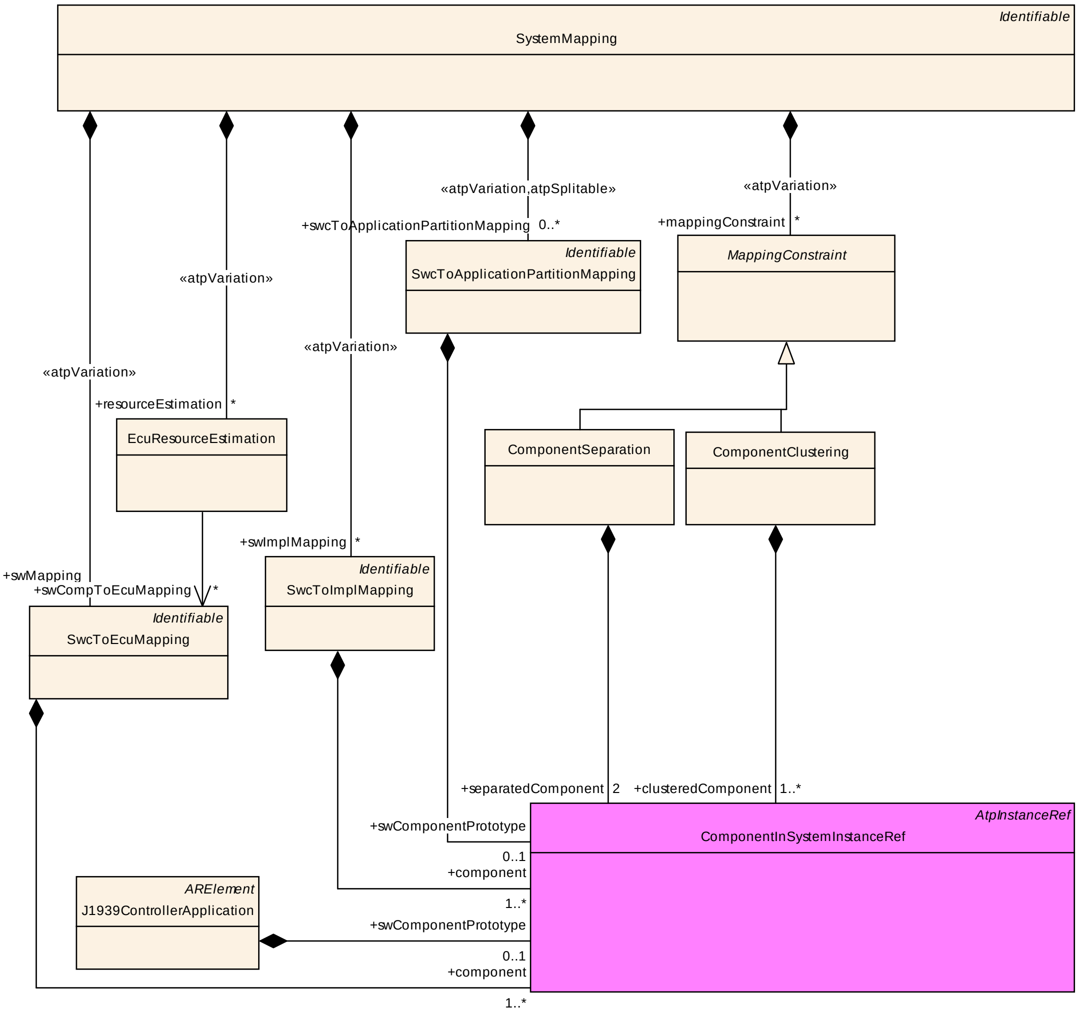


Figure B.3: SW Mapping Instance Ref Usage

B.3 Usage of InstanceRefs in Signal Path Constraint diagrams

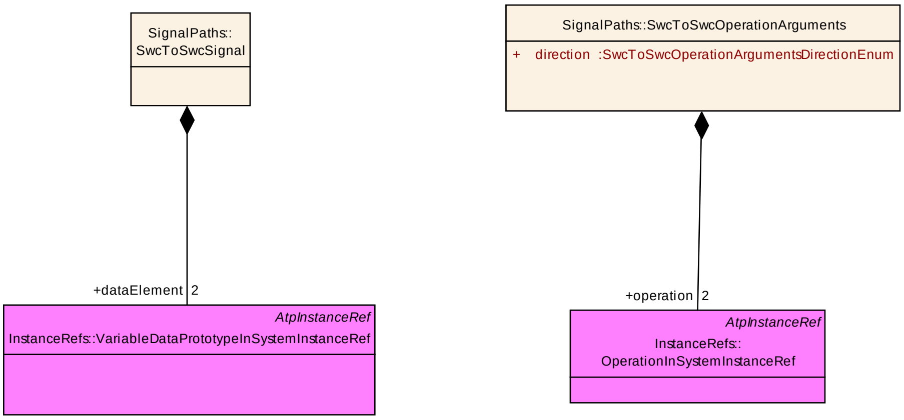


Figure B.4: SW Mapping Instance Ref Usage

B.4 Usage of InstanceRefs in PncMapping

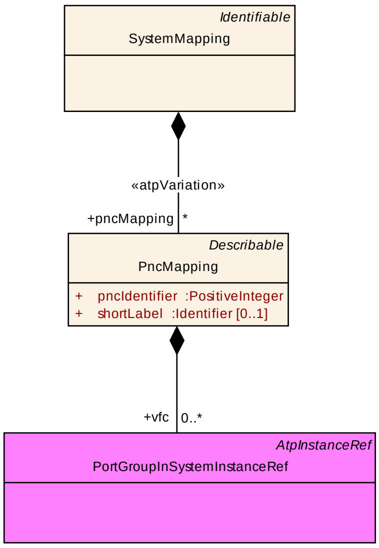


Figure B.5: Partial Network Mapping Instance Ref Usage

B.5 "SWC in System" InstanceRef

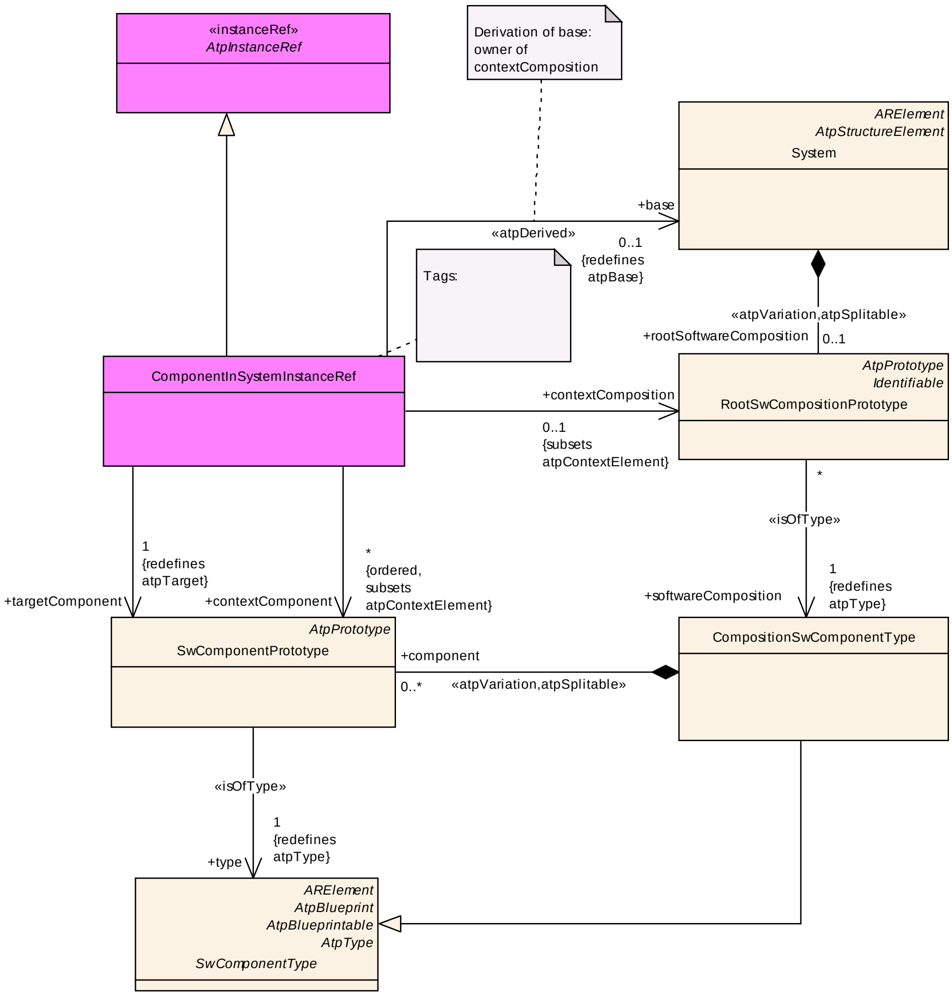


Figure B.6: ComponentInSystem InstanceRef

Class	**ComponentInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject,AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	System	0..1	ref	**Stereotypes:** atpDerived **Tags:** xml.sequenceOffset=10
contextComponent (ordered)	SwComponentPrototype	*	ref	**Tags:** xml.sequenceOffset=30
contextComposition	RootSwCompositionPrototype	0..1	ref	**Tags:** xml.sequenceOffset=20
targetComponent	SwComponentPrototype	1	ref	**Tags:** xml.sequenceOffset=40

Table B.1: ComponentInSystemInstanceRef

If the referenced SwComponentPrototype is located within the RootSwCompositionPrototype of a System then the contextComposition to the RootSwCompositionPrototype shall be provided. In this scenario we have a System Extract where the RootSwComposition may contain other compositions. If the referenced SwComponentPrototype is the RootSwCompositionPrototype itself then contextComposition reference to the RootSwCompositionPrototype shall be skipped and only the targetComponent to the RootSwCompositionPrototype shall be used. In this scenario we have an Ecu Extract where the RootSwComposition contains PortPrototypes that describe the external communication.

B.6 "Operation in System" InstanceRef

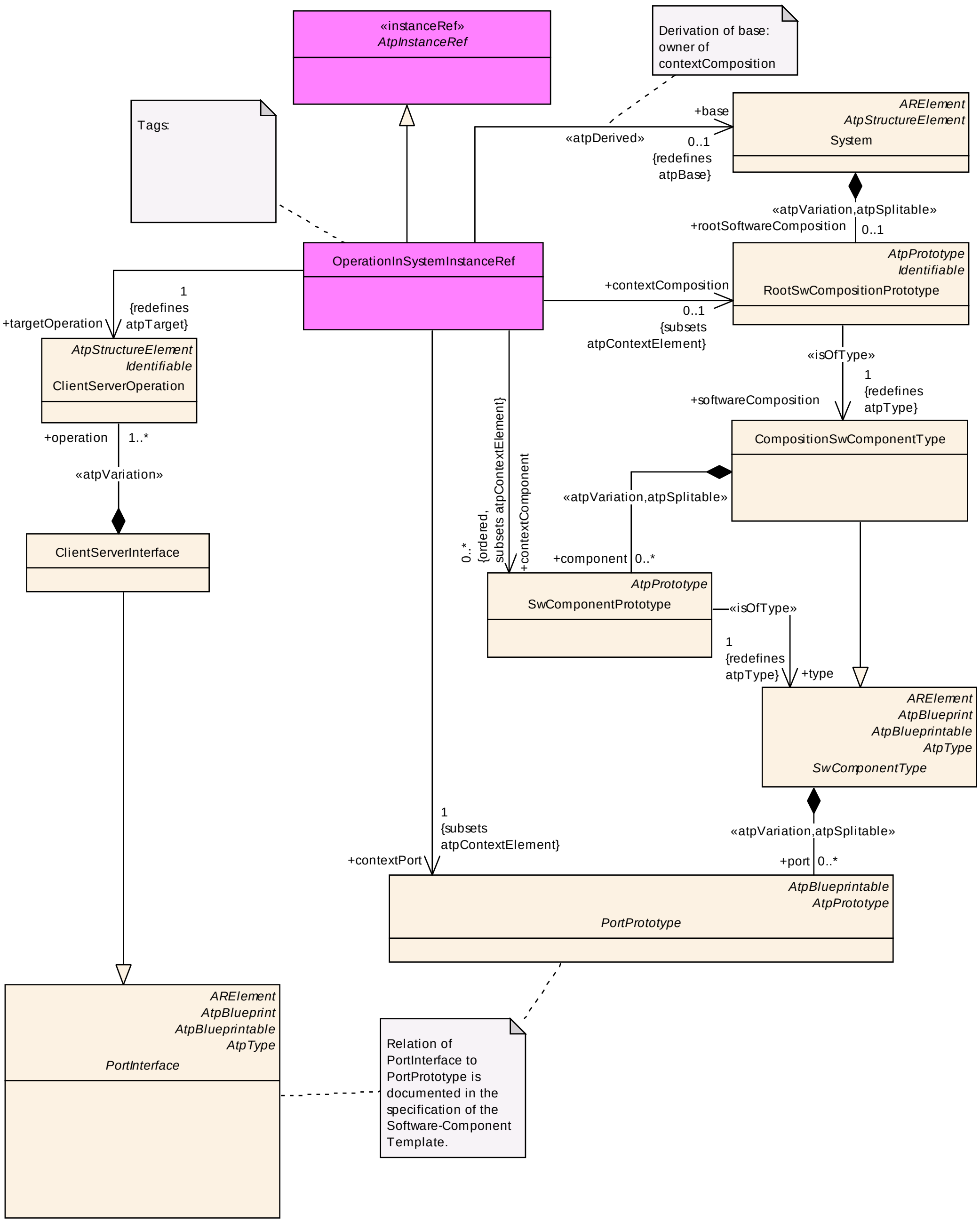


Figure B.7: OperationInSystem InstanceRef

Class	**OperationInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject, AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	System	0..1	ref	**Stereotypes:** atpDerived **Tags:** xml.sequenceOffset=10

Attribute	Type	Mul.	Kind	Note
contextComponent (ordered)	SwComponentPrototype	*	ref	**Tags:** xml.sequenceOffset=30
contextComposition	RootSwCompositionPrototype	0..1	ref	**Tags:** xml.sequenceOffset=20
contextPort	PortPrototype	1	ref	**Tags:** xml.sequenceOffset=40
targetOperation	ClientServerOperation	1	ref	**Tags:** xml.sequenceOffset=50

Table B.2: OperationInSystemInstanceRef

If the referenced ClientServerOperation is part of a PortInterface of a SwComponentPrototype that is located within the RootSwCompositionPrototype then the contextComposition reference to the RootSwCompositionPrototype shall be provided. In this scenario we have a System Extract where the RootSwComposition may contain other compositions. If the referenced ClientServerOperation is part of a PortInterface of the RootSwCompositionPrototype itself then the contextComposition reference to the RootSwCompositionPrototype shall be skipped and the RootSwCompositionPrototype shall be referenced as contextComponent. In this scenario we have an Ecu Extract where the RootSwComposition contains PortPrototypes that describe the external communication.

B.7 "VariableDataPrototype" InstanceRef

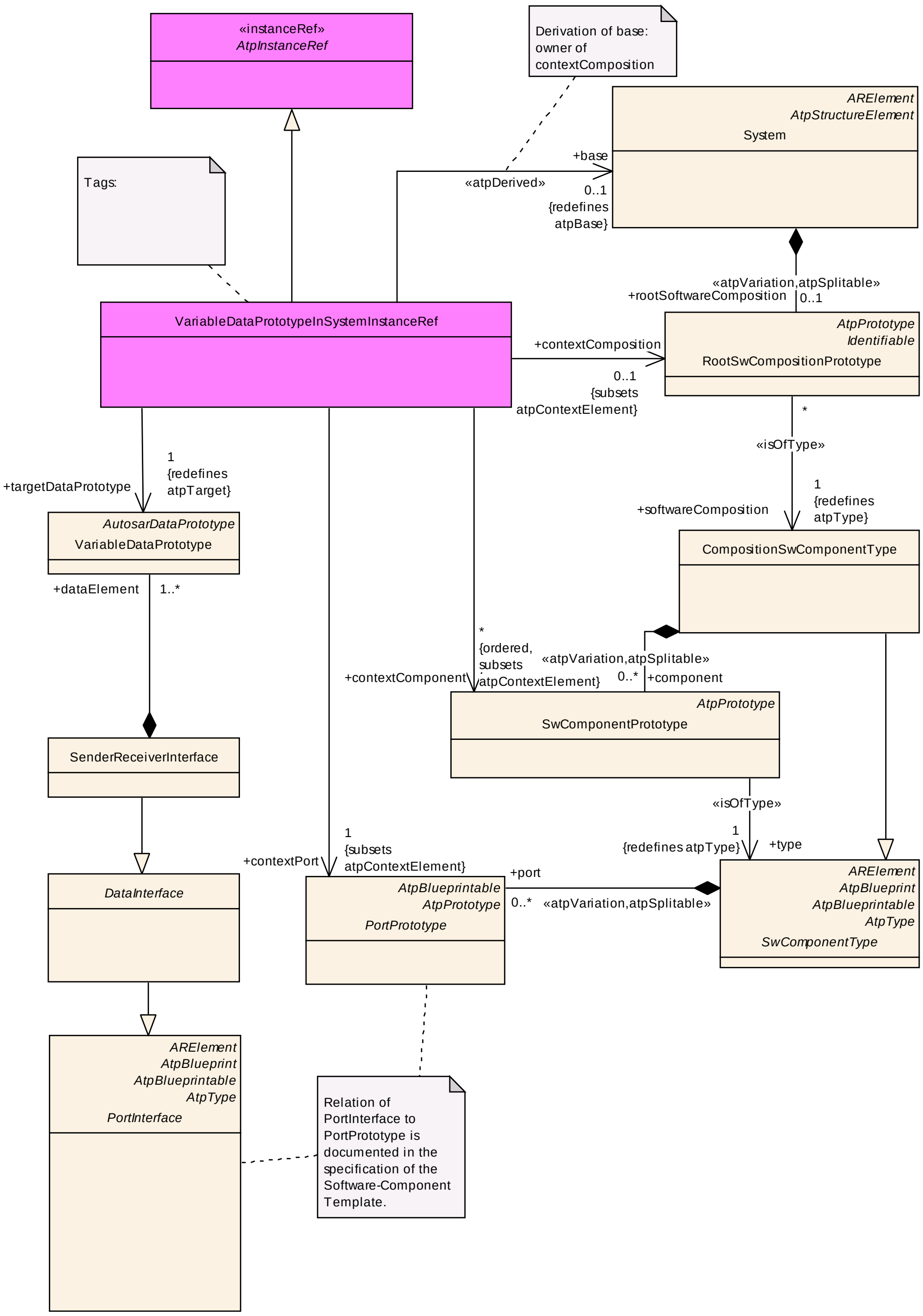


Figure B.8: VariableDataPrototypeInSystem InstanceRef

Class	**VariableDataPrototypeInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject,AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	System	0..1	ref	**Stereotypes:** atpDerived

Attribute	Type	Mul.	Kind	Note
contextComponent (ordered)	SwComponentPrototype	*	ref	
contextComposition	RootSwCompositionPrototype	0..1	ref	
contextPort	PortPrototype	1	ref	
targetDataPrototype	VariableDataPrototype	1	ref	

Table B.3: VariableDataPrototypeInSystemInstanceRef

If the referenced VariableDataPrototype is part of a PortInterface of a SwComponentPrototype that is located within the RootSwCompositionPrototype then the contextComposition reference to the RootSwCompositionPrototype shall be provided. In this scenario we have a System Extract where the RootSwComposition may contain other compositions. If the referenced VariableDataPrototype is part of a PortInterface of the RootSwCompositionPrototype itself then the contextComposition reference to the RootSwCompositionPrototype shall be skipped and the RootSwCompositionPrototype shall be referenced as contextComponent. In this scenario we have an Ecu Extract where the RootSwComposition contains PortPrototypes that describe the external communication.

Please note that the xml.sequenceOffset is not set for this InstanceRef and therefore the properties are serialized in an alphabetical order.

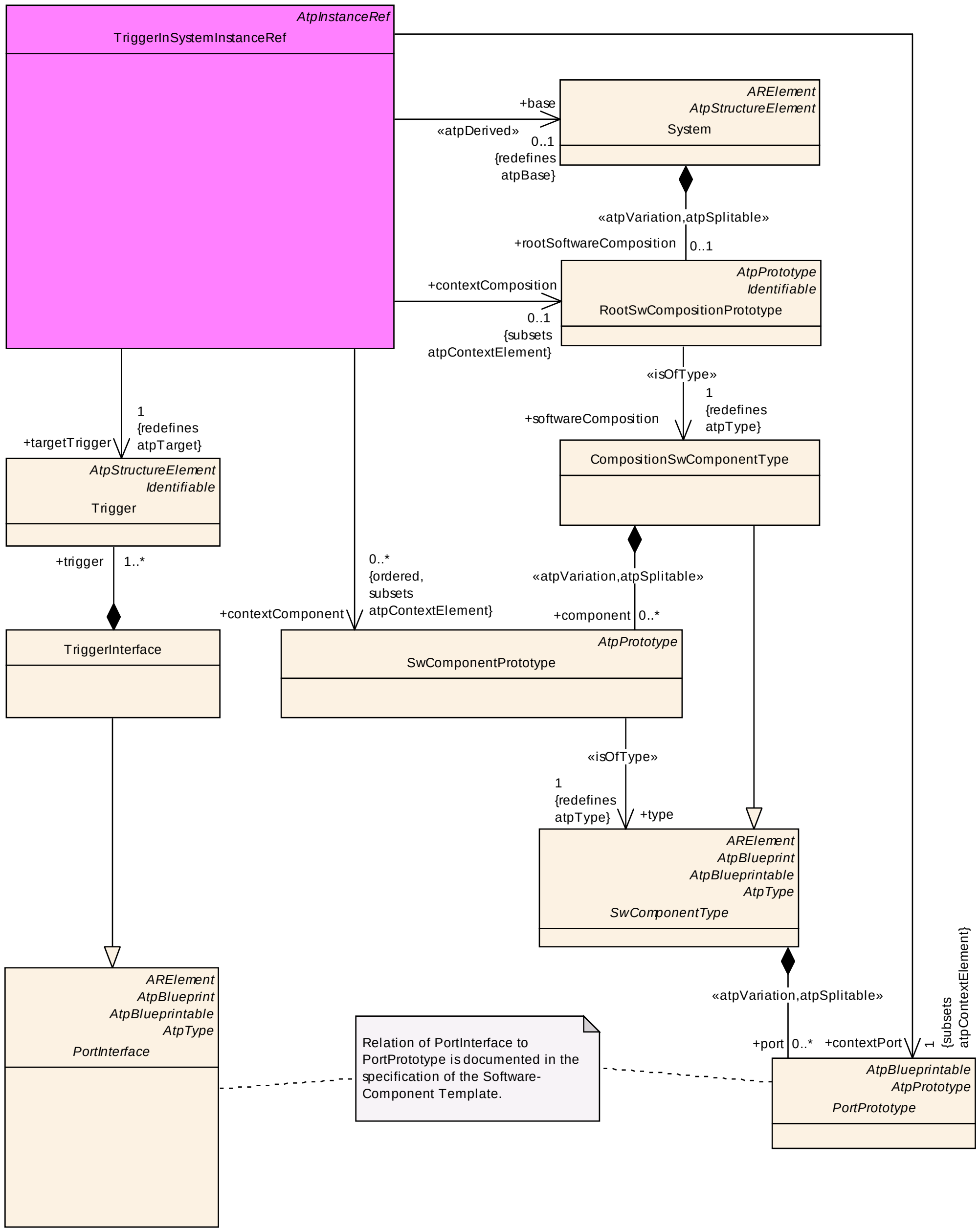


Figure B.9: TriggerInSystemInstanceRef

Class	**TriggerInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject,AtpInstanceRef			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
base	System	0..1	ref	This represents that base of the InstanceRef **Stereotypes:** atpDerived **Tags:** xml.sequenceOffset=10

Attribute	Type	Mul.	Kind	Note
contextComponent (ordered)	SwComponentPrototype	*	ref	This represents the set of context components. The association is ordered because it needs to respect the nesting order. **Tags:** xml.sequenceOffset=30
contextComposition	RootSwCompositionPrototype	0..1	ref	This represents tha reference to the RootSwCompositiontype representing a context of the InstanceRef. **Tags:** xml.sequenceOffset=20
contextPort	PortPrototype	1	ref	This represents the PortPrototype in which the target Trigger is located. **Tags:** xml.sequenceOffset=40
targetTrigger	Trigger	1	ref	This represents the target Trigger. **Tags:** xml.sequenceOffset=50

Table B.4: TriggerInSystemInstanceRef

If the referenced `Trigger` is part of a `PortInterface` of a `SwComponentPrototype` that is located within the `RootSwCompositionPrototype` then the `base` reference and the `contextComposition` reference to the `RootSwCompositionPrototype` shall be provided. If the referenced `Trigger` is part of a `PortInterface` of the `RootSwCompositionPrototype` itself then the `base` reference and the `contextComposition` reference to the `RootSwCompositionPrototype` shall be skipped and the `RootSwCompositionPrototype` shall be referenced as `contextComponent`.

B.8 "PortGroup in System" InstanceRef

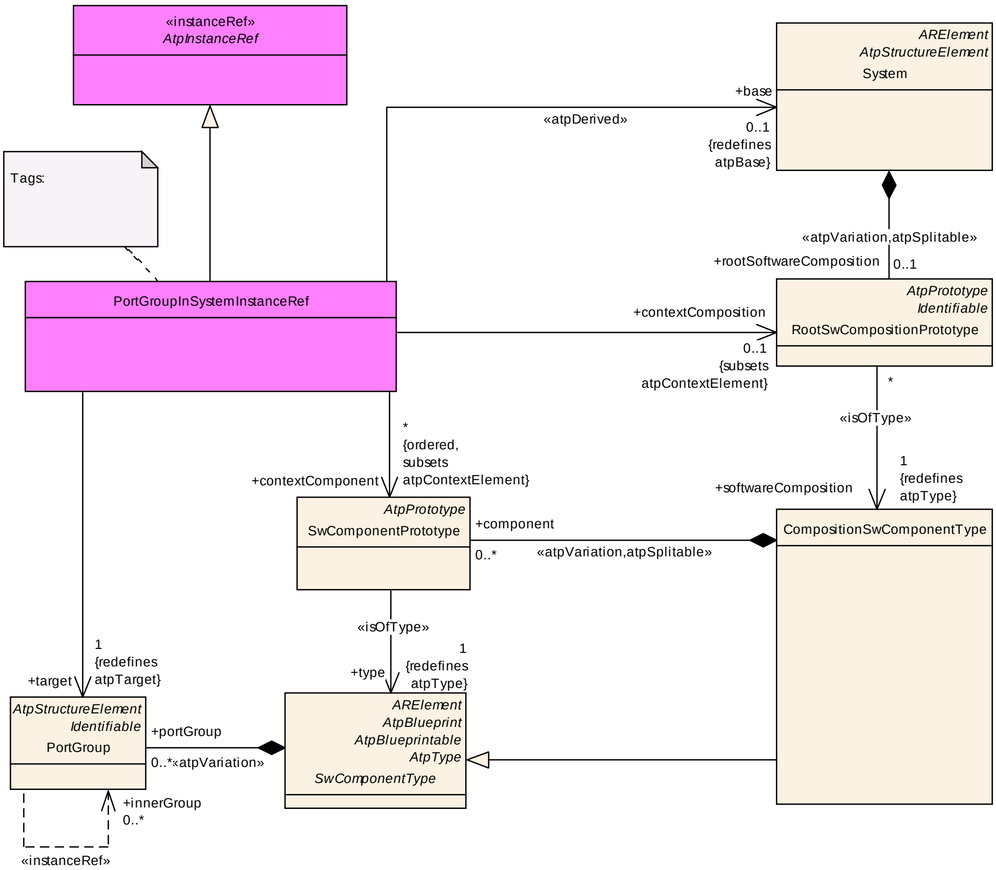


Figure B.10: PortGroupInSystem InstanceRef

Class	**PortGroupInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::InstanceRefs			
Note				
Base	ARObject,AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	System	0..1	ref	**Stereotypes:** atpDerived **Tags:** xml.sequenceOffset=10
contextComponent (ordered)	SwComponentPrototype	*	ref	**Tags:** xml.sequenceOffset=30
contextComposition	RootSwCompositionPrototype	0..1	ref	**Tags:** xml.sequenceOffset=20
target	PortGroup	1	ref	Link to a PortGroup that is defined in a component which is part of this CompositionSwComponentType. **Tags:** xml.sequenceOffset=40

Table B.5: PortGroupInSystemInstanceRef

If the referenced PortGroup is part of a SwComponentPrototype that is located within the RootSwCompositionPrototype then the contextComposition reference to the RootSwCompositionPrototype shall be provided. In this scenario we have a System Extract where the RootSwComposition may contain other compositions. If the referenced PortGroup is part of the RootSwCompositionPrototype itself then the contextComposition reference to the RootSwCompositionPrototype shall be skipped and the RootSwCompositionPrototype shall be referenced as contextComponent. In this scenario we have an Ecu Extract where the RootSwComposition contains PortPrototypes that describe the external communication.

B.9 "DataPrototype with ApplicationDataType in System" InstanceRef

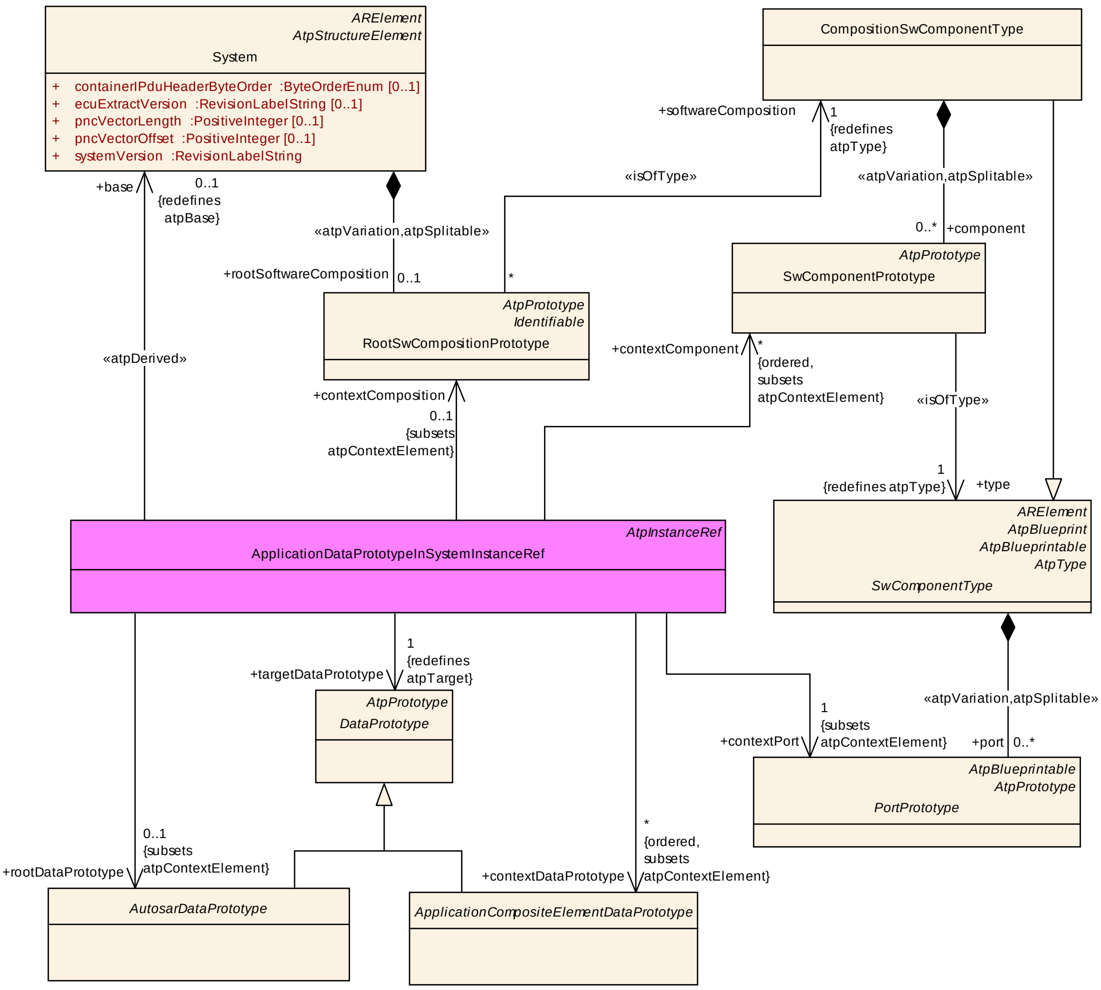


Figure B.11: ApplicationDataPrototypeInSystemInstanceRef InstanceRef

Class	**ApplicationDataPrototypeInSystemInstanceRef**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer::InstanceRef			
Note				
Base	ARObject,AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	System	0..1	ref	**Stereotypes:** atpDerived **Tags:** xml.sequenceOffset=10
contextComponent (ordered)	SwComponentPrototype	*	ref	**Tags:** xml.sequenceOffset=30
contextComposition	RootSwCompositionPrototype	0..1	ref	**Tags:** xml.sequenceOffset=20
contextDataPrototype (ordered)	ApplicationCompositeElementDataPrototype	*	ref	**Tags:** xml.sequenceOffset=60

Attribute	Type	Mul.	Kind	Note
contextPort	PortPrototype	1	ref	**Tags:** xml.sequenceOffset=40
rootDataPrototype	AutosarDataPrototype	0..1	ref	**Tags:** xml.sequenceOffset=50
targetDataPrototype	DataPrototype	1	ref	**Tags:** xml.sequenceOffset=70

Table B.6: ApplicationDataPrototypeInSystemInstanceRef

If the referenced target DataPrototype is the root AutosarDataPrototype that is part of a PortInterface in a SwComponentPrototype then the contextComponent reference and the contextPort reference shall be provided.

If the referenced DataPrototype is part of a root AutosarDataPrototype that is part of a PortInterface in a SwComponentPrototype then the contextComponent reference, the contextPort reference and the rootDataPrototype shall be provided. The referenced ApplicationCompositeElementDataPrototype can be arbitrarily nested within a DataPrototype. In such a case additional contextDataPrototype references shall be provided.

C Harmonisation between Upstream Templates and ECU Configuration

This chapter describes the mapping of the ECU Configuration parameters (M1 model) onto the meta-classes and attributes of the AUTOSAR upstream templates (System Template, SW Component Template and ECU Resource Template).

The relationships between upstream templates and ECU Configuration are described in order to answer typical questions like:

- How shall a supplier use the information in a System Description in order to fulfill the needs defined by the systems engineer?
- How is a tool vendor supposed to generate an ECU Configuration Description out of ECU Extract of System Description?

In addition to adhering to the mapping rules defined in this appendix an automated generation of an ECU Configuration Description out of ECU Extract of System Description should apply a certain implementation-specific name mangling when deriving the `shortName` of the `EcucContainerValue` elements to ensure that the resulting ECU Configuration Description is valid with respect to constr_2508 of [2].

Please note that the tables contain the following columns:

bsw module: Name of BSW module

bsw context: Reference to parameter container

bsw type: Type of parameter

bsw param: Name of the BSW parameter

bsw desc: Description from the configuration document

m2 template: System Template, SW Component Template, ECU Resource Template

m2 param: Name of the upstream template parameter

m2 description: Description from the upstream template definition

mapping rule: Textual description on how to transform between M2 and BSW domains

mapping type:

- local: no mapping needed since parameter local to BSW
- partial: some data can be automatically mapped but not all
- full: all data can be automatically mapped

C.1 ComStack

C.1.1 Com Mapping

BSW Module	BSW Context		
Com	Com		
BSW Parameter		**BSW Type**	
ComConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters and sub containers of the AUTOSAR COM module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComConfig		
BSW Parameter		**BSW Type**	
ComDataMemSize		EcucIntegerParamDef	
BSW Description			
Size of internal Com data in units of bytes (static memory allocation) - memory required by post-build configuration must be smaller than this constant. This parameter is needed only in case of post-build loadable implementation using static memory allocation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComConfig		
BSW Parameter		**BSW Type**	
ComGwMapping		EcucParamConfContainerDef	
BSW Description			
Each instance of this container defines one mapping of the integrated Signal Gateway.			
Template Description			
Arranges those signals (or SignalGroups) that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. Each pair consists in a source and a target referencing to a ISignalTriggering.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Multiplatform::ISignalMapping			
Mapping Rule			**Mapping Type**
Create Container for each ISignalMapping that is defined in the ECU Extract.			full

Mapping Status	Mapping ID
valid	up_Com_00003

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping	
BSW Parameter		**BSW Type**
ComGwDestination		EcucChoiceContainerDef
BSW Description		
Each instance of this choice container allows to define one routing destination either by reference to an already configured COM signal / signal group or by a destination description container.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::ISignalMapping.targetSignal		
Mapping Rule		**Mapping Type**
Create Container for each targetSignal reference that is defined in the ISignal Mapping.		full
Mapping Status		**Mapping ID**
valid		up_Com_00004

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination	
BSW Parameter		**BSW Type**
ComGwDestinationDescription		EcucParamConfContainerDef
BSW Description		
Description of a gateway destination. This container allows defining a gateway destination without the configuration of a complete COM signal. This allows adding / changing gateway relations post build without the configuration of new signals.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
Informations can be derived from ISignalToIPduMapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00005

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description	
BSW Parameter		**BSW Type**
ComBitPosition		EcucIntegerParamDef
BSW Description		
Starting position within the I-PDU. This parameter refers to the position in the I-PDU and not in the shadow buffer. If the endianness conversion is configured to Opaque the parameter ComBitPosition shall define the bit0 of the first byte like in little endian byte order		
Template Description		

This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array. If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.startPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00062

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description	
BSW Parameter		**BSW Type**
ComFilter		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the AUTOSAR COM module's Filters. Note: On sender side the container is used to specify the transmission mode conditions.		
Template Description		
Base class for data filters. The type of the filter is specified in attribute dataFilterType. Some of the filter types require additional arguments which are specified as attributes of this class.		
M2 Parameter		
CommonStructure::Filter::DataFilter		
Mapping Rule		**Mapping Type**
Create container on the receiver side if the NonqueuedReceiverComSpec contains a DataFilter. Create Container on the sender side if the TransmissionMode Condition element contains a reference to this signal.		full
Mapping Status		**Mapping ID**
valid		up_Com_00073

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterAlgorithm		EcucEnumerationParamDef
BSW Description		
The range of values is specified in the [17] specification, chapter 2.2.2, Reception Filtering.		
Template Description		
This attribute specifies the type of the filter.		
M2 Parameter		
CommonStructure::Filter::DataFilter.dataFilterType		
Mapping Rule		**Mapping Type**
Mapping between DataFilterTypeEnum and ComFilterAlgorithm Enum is necessary.		full

Mapping Status	Mapping ID
valid	up_Com_00075

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMask		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Mask for old and new value.		
M2 Parameter		
CommonStructure::Filter::DataFilter.mask		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00078

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMax		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to specify the upper boundary		
M2 Parameter		
CommonStructure::Filter::DataFilter.max		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00077

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMin		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to specify the lower boundary		
M2 Parameter		
CommonStructure::Filter::DataFilter.min		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00080

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterOffset		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering. Range = 0..(ComFilterPeriod-1)		
Template Description		
Specifies the initial number of messages to occur before the first message is passed		
M2 Parameter		
CommonStructure::Filter::DataFilter.offset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00076

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterPeriod		EcucIntegerParamDef
BSW Description		
This parameter defines the period of the ComFilterAlgorithm ONE_EVERY_N.		
Template Description		
Specifies number of messages to occur before the message is passed again		
M2 Parameter		
CommonStructure::Filter::DataFilter.period		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00079

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description/ComFilter	
BSW Parameter		**BSW Type**
ComFilterX		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to compare with		
M2 Parameter		

CommonStructure::Filter::DataFilter.x	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00074

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description
BSW Parameter	**BSW Type**
ComGwIPduRef	EcucReferenceDef
BSW Description	
Reference to an I-PDU of a Signal Gateway source or destination description.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
Create reference for each existing ISignalToIPduMapping that is referenced from the regarded Signal Gateway.	full
Mapping Status	**Mapping ID**
valid	up_Com_00026

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description
BSW Parameter	**BSW Type**
ComSignalEndianness	EcucEnumerationParamDef
BSW Description	
Defines the endianness of the signal's network representation.	
Template Description	
This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description). For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.packingByte Order	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00061

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description
BSW Parameter	**BSW Type**

ComSignalInitValue		EcucStringParamDef
BSW Description		
Initial value for this signal. In case of UINT8_N the default value is a string of length ComSignalLength with all bytes set to 0x00. In case of UINT8_DYN the initial size shall be 0. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Initial value to be sent if sender component is not yet fully initialized, but receiver needs data already.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.initValue,SWComponentTemplate::Communication::NonqueuedSenderComSpec.initValue		
Mapping Rule		**Mapping Type**
It is possible to aggregate an initValue at the level of a ComSpec in the SW C Template. in case the System Description doesn't use a complete Software Component Description (VFB View) the initValue is defined in the System Template.		full
Mapping Status		**Mapping ID**
valid		up_Com_00081

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestinationDescription	
BSW Parameter		**BSW Type**
ComTransferProperty		EcucEnumerationParamDef
BSW Description		
Defines if a write access to this signal can trigger the transmission of the corresponding I-PDU. If the I-PDU is triggered, depends also on the transmission mode of the corresponding I-PDU.		
Template Description		

The triggered or triggeredOnChange, triggeredWithoutRepetition and triggeredOnChangeWithoutRepetition transferProperty causes immediate transmission of the IPdu, except if transmission mode Periodic or transmission mode NONE is defined for the IPdu. The Pending transfer property does not cause transmission of an I-PDU. The immediate transmission of the IPdu is caused even if only one Signal of an IPdu has the transferProperty triggered or triggeredWithoutRepetition or triggeredOnChange or triggeredOnChangeWithoutRepetition and all other Signals have the transferProperty pending. Also for ISignals of an ISignalGroup (GroupSignals) this attribute is relevant and shall be evaluated: - If none of the ISignals belonging to the ISignalGroup have a transferProperty defined the transferProperty of the ISignalToPduMapping referring to the ISignalGroup is considered. - If at least one of the ISignals belonging to the ISignalGroup has a transferProperty defined all other ISignals belonging to the same ISignalGroup shall have a transferProperty defined as well. All of the transferProperties of the GroupSignals are considered.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.transferProperty	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00069

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwDestination Description
BSW Parameter	**BSW Type**
ComUpdateBitPosition	EcucIntegerParamDef
BSW Description	
Bit position of update-bit inside I-PDU. If this attribute is omitted then there is no update-bit. This setting must be consistently on sender and on receiver side. Range: 0..63 for CAN and LIN, 0..511 for CAN FD, 0..2031 for FlexRay, 0..4294967295 for TP.	
Template Description	
The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.	

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.updateIndicationBitPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00064

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination	
BSW Parameter		**BSW Type**
ComGwSignal		EcucParamConfContainerDef
BSW Description		
This container allows specifying a gateway source or destination respectively with a reference to a ComSignal, a ComGroupSignal or a ComSignalGroup.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalTriggering.iSignal		
Mapping Rule		**Mapping Type**
Create Container if ISignal is referenced from Gateway::SignalMapping::ISignalTriggering.		full
Mapping Status		**Mapping ID**
valid		up_Com_00023

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping/ComGwDestination/ComGwSignal	
BSW Parameter		**BSW Type**
ComGwSignalRef		EcucChoiceReferenceDef
BSW Description		
Reference to an object of a gateway relation. Either to a ComSignal, ComGroupSignal or to a SignalGroup.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
System Template element ISingalToIPduMapping represents the ComSignal, ComSignalGroup or ComGroupSignal.		full
Mapping Status		**Mapping ID**
valid		up_Com_00024

BSW Module	BSW Context	
Com	Com/ComConfig/ComGwMapping	
BSW Parameter		**BSW Type**
ComGwSource		EcucChoiceContainerDef
BSW Description		
This choice container allows the definition of the gateway source signal either by reference to an already configured COM signal / signal group or by a source description container.		

Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Multiplatform::ISignalMapping.sourceSignal	
Mapping Rule	**Mapping Type**
Create Container for sourceSignal reference that is defined in the ISignalMapping.	full
Mapping Status	**Mapping ID**
valid	up_Com_00022

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource	
BSW Parameter		**BSW Type**
ComGwSignal		EcucParamConfContainerDef
BSW Description		
This container allows specifying a gateway source or destination respectively with a reference to a ComSignal, a ComGroupSignal or a ComSignalGroup.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalTriggering.iSignal		
Mapping Rule		**Mapping Type**
Create Container if ISignal is referenced from Gateway::SignalMapping::ISignal Triggering.		full
Mapping Status		**Mapping ID**
valid		up_Com_00023

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSignal	
BSW Parameter		**BSW Type**
ComGwSignalRef		EcucChoiceReferenceDef
BSW Description		
Reference to an object of a gateway relation. Either to a ComSignal, ComGroupSignal or to a SignalGroup.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
System Template element ISingalToIPduMapping represents the ComSignal, ComSignalGroup or ComGroupSignal.		full
Mapping Status		**Mapping ID**
valid		up_Com_00024

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource	
BSW Parameter		**BSW Type**
ComGwSourceDescription		EcucParamConfContainerDef
BSW Description		

Description of a gateway source. This container allows defining a gateway source without the configuration of a complete COM signal. This allows adding / changing gateway relations post build without the configuration of new signals.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
Informations can be derived from ISignalToIPduMapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00025

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription	
BSW Parameter		**BSW Type**
ComBitPosition		EcucIntegerParamDef
BSW Description		
Starting position within the I-PDU. This parameter refers to the position in the I-PDU and not in the shadow buffer. If the endianness conversion is configured to Opaque the parameter ComBitPosition shall define the bit0 of the first byte like in little endian byte order		
Template Description		
This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array. If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.startPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00062

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription	
BSW Parameter		**BSW Type**
ComBitSize		EcucIntegerParamDef
BSW Description		
Size in bits, for integer signal types. For ComSignalType UINT8_N and UINT8_DYN the size shall be configured by ComSignalLength. For ComSignalTypes FLOAT32 and FLOAT64 the size is already defined by the signal type and therefore may be omitted.		
Template Description		

Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals. The ISignal length of zero bits is allowed.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00072

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription
BSW Parameter	**BSW Type**
ComGwIPduRef	EcucReferenceDef
BSW Description	
Reference to an I-PDU of a Signal Gateway source or destination description.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
Create reference for each existing ISignalToIPduMapping that is referenced from the regarded Signal Gateway.	full
Mapping Status	**Mapping ID**
valid	up_Com_00026

BSW Module	**BSW Context**
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription
BSW Parameter	**BSW Type**
ComSignalEndianness	EcucEnumerationParamDef
BSW Description	
Defines the endianness of the signal's network representation.	
Template Description	
This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description). For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.packingByteOrder	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00061

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription	
BSW Parameter		**BSW Type**
ComSignalLength		EcucIntegerParamDef
BSW Description		
Description: For ComSignalType UINT8_N this parameter specifies the length n in bytes. For ComSignalType UINT8_DYN it specifies the maximum length in bytes. For all other types this parameter shall be ignored. The supported maximum length is restricted by the used transportation system. For non TP-PDUs the maximum size of a PDU, and therefore also of any included signal, is limited by the concrete bus characteristic. For example, the limit is 8 bytes for CAN and LIN, 64 bytes for CAN FD and 254 for FlexRay.		
Template Description		
Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals. The ISignal length of zero bits is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length		
Mapping Rule		**Mapping Type**
ComSignalLength = ISignal.length / 8 (i.e. value of baseTypeSize)		full
Mapping Status		**Mapping ID**
valid		up_Com_00065

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription	
BSW Parameter		**BSW Type**
ComSignalType		EcucEnumerationParamDef
BSW Description		
The AUTOSAR type of the signal. Whether or not the signal is signed or unsigned can be found by examining the value of this attribute. This type could also be used to reserved appropriate storage in AUTOSAR COM.		
Template Description		
With the aggregation of SwDataDefProps an ISignal specifies how it is represented on the network. This representation follows a particular policy. Note that this causes some redundancy which is intended and can be used to support flexible development methodology as well as subsequent integrity checks. If the policy "networkRepresentationFromComSpec" is chosen the network representation from the ComSpec that is aggregated by the PortPrototype shall be used. If the "override" policy is chosen the requirements specified in the PortInterface and in the ComSpec are not fulfilled by the networkRepresentationProps. In case the System Description doesn't use a complete Software Component Description (VFB View) the "legacy" policy can be chosen.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.dataTypePolicy		
Mapping Rule		**Mapping Type**

The mapping depends from the setting in the ISignal.dataTypePolicy:
 	
- ISignal.dataTypePolicy = override or legacy:
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.networkRepresentationProps.swBaseType
 	
- ISignal.dataTypePolicy = networkRepresentationFromComSpec:
if defined on ComSpec:
SWComponentTemplate::Communication::SenderComSpec.networkRepresentation.swBaseType
SWComponentTemplate::Communication::SenderComSpec.compositeNetworkRepresentation.networkRepresentation.swBaseType
 	
SWComponentTemplate::Communication::ReceiverComSpec.networkRepresentation.swBaseType SWComponentTemplate::Communication::Receiver ComSpec.compositeNetworkRepresentation.networkRepresentation.swBase Type
 	
if not defined on ComSpec:
CommonStructure::ImplementationDataTypes::ImplementationDataType.sw DataDefProps.swBaseType
Find the ImplementationDataType according to TPS_SYST_02079 and access SwDataDefProps.swBaseType.
 	
Consequence: If two SenderReceiverToSignalMappings that point to the same SystemSignal result in incompatible BaseTypes (see constr_1220 in SoftwareComponentTemplate) => ComSignalType should not be configured.
 	
- ISignal.dataTypePolicy = portInterfaceDefinition --> option has atpStatus "removed", in consequence no mapping is available."
 	
- ISignal.dataTypePolicy = transformingISignal
Hardcoded to UINT8_N or UINT8_DYN.
Datatype can be derived from SystemSignal.dynamicLength:
UINT8_N should be used if SystemSignal.dynamicLength = false
UINT8_DYN should be used if SystemSignal.dynamicLength = true
	full

Mapping Status	**Mapping ID**
valid	up_Com_00070

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComGwMapping/ComGwSource/ComGwSourceDescription	
BSW Parameter		**BSW Type**
ComUpdateBitPosition		EcucIntegerParamDef
BSW Description		
Bit position of update-bit inside I-PDU. If this attribute is omitted then there is no update-bit. This setting must be consistently on sender and on receiver side. Range: 0..63 for CAN and LIN, 0..511 for CAN FD, 0..2031 for FlexRay, 0..4294967295 for TP.		
Template Description		

The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.updateIndicationBitPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00064

BSW Module	**BSW Context**	
Com	Com/ComConfig	
BSW Parameter		**BSW Type**
ComIPdu		EcucParamConfContainerDef
BSW Description		
Contains the configuration parameters of the AUTOSAR COM module's I-PDUs.		
Template Description		
Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer. A maximum of one dynamic length signal per IPdu is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu		
Mapping Rule		**Mapping Type**
create container for each SignalIPdu that is transmitted by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_Com_00082

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduCallout		EcucFunctionNameDef
BSW Description		
This parameter defines the existence and the name of a callout function for the corresponding I-PDU. If this parameter is omitted no I-PDU callout shall take place for the corresponding I-PDU.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduCancellationSupport		EcucBooleanParamDef
BSW Description		
Defines for I-PDUs with ComIPduType NORMAL: If the underlying IF-modul supports cancellation of transmit requests. Defines for I-PDUs with ComIPduType TP: If the underlying TP-module supports RX and TX cancellation of ongoing requests.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduCounter		EcucParamConfContainerDef
BSW Description		
This optional container contains the configuration parameters of PDU Counter.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu.pduCounter		
Mapping Rule		**Mapping Type**
If pduCounter is aggregated by ISignalIPdu then create this container		full
Mapping Status		**Mapping ID**
valid		up_Com_00084

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu/ComIPduCounter	
BSW Parameter		**BSW Type**
ComIPduCounterErrorNotification		EcucFunctionNameDef
BSW Description		
Name of Com_CbkCounterErr callback function to be called. If this parameter is omitted no I-PDU counter mismatch notification shall take place.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComIPduCounter	
BSW Parameter		**BSW Type**
ComIPduCounterSize		EcucIntegerParamDef
BSW Description		
Size of PDU Counter expressed in bits		
Template Description		
Size of PduCounter expressed in bits. Range: 1..8		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SignalIPduCounter.pduCounterSize		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00086

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComIPduCounter	
BSW Parameter		**BSW Type**
ComIPduCounterStartPosition		EcucIntegerParamDef
BSW Description		
Position of PDU counter expressed in bits from start position of data content of I-PDU (SDU). Note that PDU counter is not allowed to cross a byte border. The parameter ComIPduCounterStartPosition shall define the bit0 of the first byte like in little endian byte order.		
Template Description		
Position of PduCounter expressed in bits. Note that PduCounter is not allowed to cross a byte border.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SignalIPduCounter.pduCounterStartPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00087

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComIPduCounter	
BSW Parameter		**BSW Type**
ComIPduCounterThreshold		EcucIntegerParamDef
BSW Description		
Threshold value of I-PDU counter algorithm, see ECUC_Com_00590.		
Template Description		
Threshold value of IPduCounter algorithm. See AUTOSAR COM Spec for more details.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SignalIPduCounter.pduCounterThreshold	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00085

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduDirection		EcucEnumerationParamDef
BSW Description		
The direction defines if this I-PDU, and therefore the contributing signals and signal groups, shall be sent or received.		
Template Description		
Communication Direction of the Connector Port (input or output Port).		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommConnectorPort.communicationDirection		
Mapping Rule		**Mapping Type**
Find IPduTriggering of the regarded SignalIPdu. The IPduTriggering contains a reference to an IPduPort that is aggegated by the regarded ECU. If the communicationDirection of the CommConnectorPort is "in" than the IPdu is received.		full
Mapping Status		**Mapping ID**
valid		up_Com_00088

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduGroupRef		EcucReferenceDef
BSW Description		
Reference to the I-PDU groups this I-PDU belongs to.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPduGroup.iSignalIPdu		
Mapping Rule		**Mapping Type**
Find IPduGroup that points to this SignalIPdu and create the reference.		full
Mapping Status		**Mapping ID**
valid		up_Com_00093

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduHandleId		EcucIntegerParamDef
BSW Description		

The numerical value used as the ID of this I-PDU. The ComIPduHandleId is required by the API calls Com_RxIndication, Com_TpRxIndication, Com_StartOfReception and Com_CopyRxData to receive I-PDUs from the PduR (ComIP-duDirection: Receive), as well as the PduId passed to an Rx-I-PDU-callout. For Tx-I-PDUs (ComIPduDirection: Send), this handle Id is used for the APIs calls Com_TxConfirmation, Com_TriggerTransmit, Com_TriggerIPDUSend or Com_TriggerIPDUSendWithMetaData, Com_CopyTxData and Com_TpTxConfirmation to transmit respectively confirm transmissions of I-PDUs, as well as the PduId passed to the Tx-I-PDU-callout configured with ComIPduCallout and/or ComIPduTriggerTransmitCallout.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduReplication		EcucParamConfContainerDef
BSW Description		
This optional container contains the information needed for each I-PDU replicated.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu.pduReplication		
Mapping Rule		**Mapping Type**
If pduReplication is defined for the SignalIPdu then create this container		full
Mapping Status		**Mapping ID**
valid		up_Com_00090

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComIPduReplication	
BSW Parameter		**BSW Type**
ComIPduReplicaRef		EcucReferenceDef
BSW Description		
Reference to replicas PduR PDUs of this IPDU.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SignalIPduReplication.replicaPdus		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00092

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComIPduReplication	
BSW Parameter		**BSW Type**

ComIPduReplicationQuorum		EcucIntegerParamDef	
BSW Description			
The number of identical I-PDUs needed for successful voting.			
Template Description			
Number of identical IPdus needed for successful voting (1-3).			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SignalIPduReplication.pduReplication Voting			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00091

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComIPdu		
BSW Parameter		**BSW Type**	
ComIPduSignalGroupRef		EcucReferenceDef	
BSW Description			
References to all signal groups contained in this I-Pdu			
Template Description			
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping			
Mapping Rule			**Mapping Type**
Find ISignal in the ISignalIPdu that refers to a ISignalGroup and create reference to this Group			full
Mapping Status			**Mapping ID**
valid			up_Com_00089

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComIPdu		
BSW Parameter		**BSW Type**	
ComIPduSignalProcessing		EcucEnumerationParamDef	
BSW Description			
For the definition of the two modes Immediate and Deferred.			
Template Description			
Definition of the two signal processing modes Immediate and Deferred for both Tx and Rx IPdus.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::IPduPort.iPduSignalProcessing			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00094

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduSignalRef		EcucReferenceDef
BSW Description		

References to all signals contained in this I-PDU.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
Find ISignal in the IPdu which refers to a SystemSignal and create reference to this Signal.	full
Mapping Status	**Mapping ID**
valid	up_Com_00083

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduTriggerTransmitCallout		EcucFunctionNameDef
BSW Description		
If there is a trigger transmit callout defined for this I-PDU this parameter contains the name of the callout function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComIPduType		EcucEnumerationParamDef
BSW Description		
Defines if this I-PDU is a normal I-PDU that can be sent unfragmented or if this is a large I-PDU that shall be sent via the Transport Protocol of the underlying bus.		
Template Description		
Contains all configuration elements for AUTOSAR TP.		
M2 Parameter		
SystemTemplate::TransportProtocols::TpConfig		
Mapping Rule		**Mapping Type**
If this IPdu is mapped in the System Description by a TpConnection to NPdus than set this EnumerationLiteral to TP.		full
Mapping Status		**Mapping ID**
valid		up_Com_00112

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComPduIdRef		EcucReferenceDef
BSW Description		

Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu	
BSW Parameter		**BSW Type**
ComTxIPdu		EcucParamConfContainerDef
BSW Description		
This container contains additional transmission related configuration parameters of the AUTOSAR COM module's I-PDUs.		
Template Description		
Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer. A maximum of one dynamic length signal per IPdu is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu		
Mapping Rule		**Mapping Type**
create container if an ISignalIPdu is transmitted by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_Com_00095

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu	
BSW Parameter		**BSW Type**
ComMetaDataDefault		EcucStringParamDef
BSW Description		
In case an I-PDU refers to a globally configured MetaDataType and no explicit meta data is given for a send request (e.g. by using Com_TriggerIPDUSendWithMetaData), the AUTOSAR COM module uses this configured default meta data for sending. The configured string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

Com	Com/ComConfig/ComIPdu/ComTxIPdu		
BSW Parameter		**BSW Type**	
ComMinimumDelayTime		EcucFloatParamDef	
BSW Description			
Defines the Minimum Delay Time (MDT) between successive transmissions of this I-PDU in seconds. The MDT is independent of the possible different transmission modes. There is only one minimum delay time parameter for one I-PDU. The minimum delay timer is not reset by changing the transmission mode. Hence, it is not allowed to violate the minimum delay time by transmission mode changes. It is not possible to monitor the minimum delay time for I-PDUs that are requested using the Com_TriggerTransmit API.			
Template Description			
Minimum Delay in seconds between successive transmissions of this I-PDU, independent of the Transmission Mode.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::IPduTiming.minimumDelay			
Mapping Rule			**Mapping Type**
Find IPduTiming for the transmitted IPdu and use the specified value.			full
Mapping Status			**Mapping ID**
valid			up_Com_00111

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComIPdu/ComTxIPdu		
BSW Parameter		**BSW Type**	
ComTxIPduClearUpdateBit		EcucEnumerationParamDef	
BSW Description			
Defines when the update-bits of signals or signal groups, contained in this I-PDU, will be cleared.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComIPdu/ComTxIPdu		
BSW Parameter		**BSW Type**	
ComTxIPduUnusedAreasDefault		EcucIntegerParamDef	
BSW Description			
The AUTOSAR COM module fills not used areas of an I-PDU with this byte pattern. This attribute is mandatory to avoid undefined behaviour. This byte-pattern will be repeated throughout the I-PDU before any init-values or update-bits were set.			
Template Description			
AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPDU with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu.unusedBitPattern			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**

valid	up_Com_00103

BSW Module	**BSW Context**
Com	Com/ComConfig/ComIPdu/ComTxIPdu
BSW Parameter	**BSW Type**
ComTxModeFalse	EcucParamConfContainerDef
BSW Description	
This container contains the configuration parameters of the AUTOSAR COM module's transmission modes in the case the ComFilter evaluates to false.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeDeclaration.transmissionModeFalseTiming	
Mapping Rule	**Mapping Type**
Create Container if a timing specification is defined for this IPdu.	full
Mapping Status	**Mapping ID**
valid	up_Com_00104

BSW Module	**BSW Context**
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse
BSW Parameter	**BSW Type**
ComTxMode	EcucParamConfContainerDef
BSW Description	
This container contains the configuration parameters of the AUTOSAR COM module's transmission modes.	
Template Description	
If the COM Transmission Mode is false the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeFalseTiming. If the COM Transmission Mode is true the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeTrueTiming. COM supports the following Transmission Modes: Periodic (Cyclic Timing) Direct /n-times (EventControlledTiming) Mixed (Cyclic and EventControlledTiming are assigned) None (no timing is assigned)	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeTiming	
Mapping Rule	**Mapping Type**
Create Container if a timing specification is defined for this IPdu.	full
Mapping Status	**Mapping ID**
valid	up_Com_00105

BSW Module	**BSW Context**
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse/ComTxMode
BSW Parameter	**BSW Type**
ComTxModeMode	EcucEnumerationParamDef
BSW Description	

The available transmission modes described in [18] shall be extended by the additional mode None. The transmission mode None shall not have any further sub-attributes in the ComTxMode object.	
Template Description	
If the COM Transmission Mode is false the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeFalseTiming. If the COM Transmission Mode is true the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeTrueTiming. COM supports the following Transmission Modes: Periodic (Cyclic Timing) Direct /n-times (EventControlledTiming) Mixed (Cyclic and EventControlledTiming are assigned) None (no timing is assigned)	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeTiming	
Mapping Rule	**Mapping Type**
Periodic Mode is described by CyclicTiming. Direct /n-times Mode is described by EventControlledTiming. Mixed Mode is described if Cyclic and EventControlledTimings are assigned. None is described if no timing is assigned.	full
Mapping Status	**Mapping ID**
valid	up_Com_00109

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeNumberOfRepetitions		EcucIntegerParamDef
BSW Description		
Defines the number of repetitions for the transmission mode DIRECT and the event driven part of transmission mode MIXED.		
Template Description		
Defines the number of repetitions for the Direct/N-Times transmission mode and the event driven part of Mixed transmission mode.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::EventControlledTiming.numberOfRepetitions		
Mapping Rule		**Mapping Type**
ComTxModeNumberOfRepetitions = EventControlledTiming.numberOfRepetitions		full
Mapping Status		**Mapping ID**
valid		up_Com_00107

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeRepetitionPeriod		EcucFloatParamDef
BSW Description		
Defines the repetition period in seconds of the multiple transmissions in case ComTxModeNumberOfRepetitions is configured greater than or equal to 1 and ComTxModeMode is configured to DIRECT or MIXED. In case of the mixed transmission mode only the event driven part is affected.		
Template Description		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::EventControlledTiming.repetitionPeriod	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00110

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeTimeOffset		EcucFloatParamDef
BSW Description		
Defines the period in seconds between the start of the I-PDU by Com_IpduGroupStart and the first transmission request in case ComTxModeMode is configured to PERIODIC or MIXED. In case of the mixed transmission mode only the periodic part is affected. In case ComTxModeTimeOffset is omitted or configured to 0, the first periodic transmission shall be transmitted within the next invocation of Com_MainFunctionTx.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::CyclicTiming.timeOffset		
Mapping Rule		**Mapping Type**
The value for the True and the False Transmission Mode can be derived from IPduTiming.TransmissionModeDeclaration.TransmissionModeTiming element		full
Mapping Status		**Mapping ID**
valid		up_Com_00108

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeFalse/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeTimePeriod		EcucFloatParamDef
BSW Description		
Defines the repetition period in seconds of the periodic transmission requests in case ComTxModeMode is configured to PERIODIC or MIXED. In case of the mixed transmission mode only the periodic part is affected.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::CyclicTiming.timePeriod		
Mapping Rule		**Mapping Type**
The value for the True and the False Transmission Mode can be derived from IPduTiming.TransmissionModeDeclaration.TransmissionModeTiming element		full
Mapping Status		**Mapping ID**
valid		up_Com_00106

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu	
BSW Parameter		**BSW Type**
ComTxModeTrue		EcucParamConfContainerDef

BSW Description	
This container contains the configuration parameters of the AUTOSAR COM module's transmission modes in the case the ComFilter evaluates to true.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeDeclaration.transmissionModeTrueTiming	
Mapping Rule	**Mapping Type**
Create Container if a timing specification is defined for this IPdu.	full
Mapping Status	**Mapping ID**
valid	up_Com_00096

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue	
BSW Parameter		**BSW Type**
ComTxMode		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the AUTOSAR COM module's transmission modes.		
Template Description		
If the COM Transmission Mode is false the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeFalseTiming. If the COM Transmission Mode is true the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeTrueTiming. COM supports the following Transmission Modes: Periodic (Cyclic Timing) Direct /n-times (EventControlledTiming) Mixed (Cyclic and EventControlledTiming are assigned) None (no timing is assigned)		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeTiming		
Mapping Rule		**Mapping Type**
Create Container if a timing specification is defined for this IPdu.		full
Mapping Status		**Mapping ID**
valid		up_Com_00105

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeMode		EcucEnumerationParamDef
BSW Description		
The available transmission modes described in [18] shall be extended by the additional mode None. The transmission mode None shall not have any further sub-attributes in the ComTxMode object.		
Template Description		

If the COM Transmission Mode is false the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeFalseTiming. If the COM Transmission Mode is true the timing is aggregated by the TransmissionModeTiming element in the role of transmissionModeTrueTiming. COM supports the following Transmission Modes: Periodic (Cyclic Timing) Direct /n-times (EventControlledTiming) Mixed (Cyclic and EventControlledTiming are assigned) None (no timing is assigned)	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::TransmissionModeTiming	
Mapping Rule	**Mapping Type**
Periodic Mode is described by CyclicTiming. Direct /n-times Mode is described by EventControlledTiming. Mixed Mode is described if Cyclic and EventControlledTimings are assigned. None is described if no timing is assigned.	full
Mapping Status	**Mapping ID**
valid	up_Com_00109

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeNumberOfRepetitions		EcucIntegerParamDef
BSW Description		
Defines the number of repetitions for the transmission mode DIRECT and the event driven part of transmission mode MIXED.		
Template Description		
Defines the number of repetitions for the Direct/N-Times transmission mode and the event driven part of Mixed transmission mode.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::EventControlledTiming.numberOfRepetitions		
Mapping Rule		**Mapping Type**
ComTxModeNumberOfRepetitions = EventControlledTiming.numberOfRepetitions		full
Mapping Status		**Mapping ID**
valid		up_Com_00107

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeRepetitionPeriod		EcucFloatParamDef
BSW Description		
Defines the repetition period in seconds of the multiple transmissions in case ComTxModeNumberOfRepetitions is configured greater than or equal to 1 and ComTxModeMode is configured to DIRECT or MIXED. In case of the mixed transmission mode only the event driven part is affected.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::EventControlledTiming.repetitionPeriod		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_Com_00110

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeTimeOffset		EcucFloatParamDef
BSW Description		
Defines the period in seconds between the start of the I-PDU by Com_IpduGroupStart and the first transmission request in case ComTxModeMode is configured to PERIODIC or MIXED. In case of the mixed transmission mode only the periodic part is affected. In case ComTxModeTimeOffset is omitted or configured to 0, the first periodic transmission shall be transmitted within the next invocation of Com_MainFunctionTx.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::CyclicTiming.timeOffset		
Mapping Rule		**Mapping Type**
The value for the True and the False Transmission Mode can be derived from I PduTiming.TransmissionModeDeclaration.TransmissionModeTiming element		full
Mapping Status		**Mapping ID**
valid		up_Com_00108

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPdu/ComTxIPdu/ComTxModeTrue/ComTxMode	
BSW Parameter		**BSW Type**
ComTxModeTimePeriod		EcucFloatParamDef
BSW Description		
Defines the repetition period in seconds of the periodic transmission requests in case ComTxModeMode is configured to PERIODIC or MIXED. In case of the mixed transmission mode only the periodic part is affected.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Timing::CyclicTiming.timePeriod		
Mapping Rule		**Mapping Type**
The value for the True and the False Transmission Mode can be derived from I PduTiming.TransmissionModeDeclaration.TransmissionModeTiming element		full
Mapping Status		**Mapping ID**
valid		up_Com_00106

BSW Module	BSW Context	
Com	Com/ComConfig	
BSW Parameter		**BSW Type**
ComIPduGroup		EcucParamConfContainerDef
BSW Description		
Contains the configuration parameters of the AUTOSAR COM module's I-PDU groups.		
Template Description		
The AUTOSAR COM Layer is able to start and to stop sending and receiving configurable groups of I-Pdus during runtime. An ISignalIPduGroup contains either ISignalIPdus or ISignalIPduGroups.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPduGroup	
Mapping Rule	**Mapping Type**
Create container for each CoreCommunication::ISignalIPduGroup that is contained in the ECU Extract.	full
Mapping Status	**Mapping ID**
valid	up_Com_00001

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPduGroup	
BSW Parameter		**BSW Type**
ComIPduGroupGroupRef		EcucReferenceDef
BSW Description		
References to all I-PDU groups that includes this I-PDU group. If this reference is omitted this I-PDU group does not belong to another I-PDU group.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPduGroup.containedISignalIPduGroup		
Mapping Rule		**Mapping Type**
If the IPduGroup has a reference to a contained IPduGroup then create this reference.		full
Mapping Status		**Mapping ID**
valid		up_Com_00002

BSW Module	BSW Context	
Com	Com/ComConfig/ComIPduGroup	
BSW Parameter		**BSW Type**
ComIPduGroupHandleId		EcucIntegerParamDef
BSW Description		
The numerical value used as the ID of this I-PDU Group . The ComIPduGroupHandleId is required by the API calls to start and stop I-PDU Groups. Range: 0 .. (ComSupportedIPduGroups-1)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComConfig	
BSW Parameter		**BSW Type**
ComMaxIPduCnt		EcucIntegerParamDef
BSW Description		
Maximum number of IPdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig	
BSW Parameter		**BSW Type**
ComSignal		EcucParamConfContainerDef
BSW Description		
Contains the configuration parameters of the AUTOSAR COM module's signals.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
Tx: If an ISignal has no ISignalPort assigned a ComSignal shall always be created in the transmitting ECUs in order to send the init value. Rx: If an ISignal has no ISignalPort assigned there is no need for the existence of a ComSignal in receiving ECU		full
Mapping Status		**Mapping ID**
valid		up_Com_00060

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComBitPosition		EcucIntegerParamDef
BSW Description		
Starting position within the I-PDU. This parameter refers to the position in the I-PDU and not in the shadow buffer. If the endianness conversion is configured to Opaque the parameter ComBitPosition shall define the bit0 of the first byte like in little endian byte order		
Template Description		
This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array. If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.startPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_Com_00062

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComBitSize		EcucIntegerParamDef
BSW Description		
Size in bits, for integer signal types. For ComSignalType UINT8_N and UINT8_DYN the size shall be configured by ComSignalLength. For ComSignalTypes FLOAT32 and FLOAT64 the size is already defined by the signal type and therefore may be omitted.		
Template Description		
Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals. The ISignal length of zero bits is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00072

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComDataInvalidAction		EcucEnumerationParamDef
BSW Description		
This parameter defines the action performed upon reception of an invalid signal. Relating to signal groups the action in case if one of the included signals is an invalid signal. If Replace is used the ComSignalInitValue will be used for the replacement.		
Template Description		
Specifies whether the component can actively invalidate a particular dataElement. If no invalidationPolicy points to a dataElement this is considered to yield the identical result as if the handleInvalid attribute was set to dontInvalidate.		
M2 Parameter		
SWComponentTemplate::PortInterface::InvalidationPolicy		
Mapping Rule		**Mapping Type**
If strategy HandleInvalidEnum.keep is defined then set parameter to notify. If strategy HandleInvalidEnum.replace is defined then set parameter to replace. If the parameter does not exist this corresponds to the value HandleInvalid Enum.dontInvalidate.		full
Mapping Status		**Mapping ID**
valid		up_Com_00071

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComErrorNotification		EcucFunctionNameDef
BSW Description		

Only valid on sender side: Name of Com_CbkTxErr callback function to be called. If this parameter is omitted no error notification shall take place.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComFilter		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the AUTOSAR COM module's Filters. Note: On sender side the container is used to specify the transmission mode conditions.		
Template Description		
Base class for data filters. The type of the filter is specified in attribute dataFilterType. Some of the filter types require additional arguments which are specified as attributes of this class.		
M2 Parameter		
CommonStructure::Filter::DataFilter		
Mapping Rule		**Mapping Type**
Create container on the receiver side if the NonqueuedReceiverComSpec contains a DataFilter. Create Container on the sender side if the TransmissionMode Condition element contains a reference to this signal.		full
Mapping Status		**Mapping ID**
valid		up_Com_00073

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterAlgorithm		EcucEnumerationParamDef
BSW Description		
The range of values is specified in the [17] specification, chapter 2.2.2, Reception Filtering.		
Template Description		
This attribute specifies the type of the filter.		
M2 Parameter		
CommonStructure::Filter::DataFilter.dataFilterType		
Mapping Rule		**Mapping Type**
Mapping between DataFilterTypeEnum and ComFilterAlgorithm Enum is necessary.		full
Mapping Status		**Mapping ID**
valid		up_Com_00075

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal/ComFilter	
BSW Parameter		**BSW Type**

ComFilterMask		EcucIntegerParamDef	
BSW Description			
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.			
Template Description			
Mask for old and new value.			
M2 Parameter			
CommonStructure::Filter::DataFilter.mask			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00078

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComSignal/ComFilter		
BSW Parameter		**BSW Type**	
ComFilterMax		EcucIntegerParamDef	
BSW Description			
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.			
Template Description			
Value to specify the upper boundary			
M2 Parameter			
CommonStructure::Filter::DataFilter.max			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00077

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComSignal/ComFilter		
BSW Parameter		**BSW Type**	
ComFilterMin		EcucIntegerParamDef	
BSW Description			
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.			
Template Description			
Value to specify the lower boundary			
M2 Parameter			
CommonStructure::Filter::DataFilter.min			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00080

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterOffset		EcucIntegerParamDef
BSW Description		

The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering. Range = 0..(ComFilterPeriod-1)	
Template Description	
Specifies the initial number of messages to occur before the first message is passed	
M2 Parameter	
CommonStructure::Filter::DataFilter.offset	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00076

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterPeriod		EcucIntegerParamDef
BSW Description		
This parameter defines the period of the ComFilterAlgorithm ONE_EVERY_N.		
Template Description		
Specifies number of messages to occur before the message is passed again		
M2 Parameter		
CommonStructure::Filter::DataFilter.period		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00079

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterX		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to compare with		
M2 Parameter		
CommonStructure::Filter::DataFilter.x		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00074

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComFirstTimeout		EcucFloatParamDef
BSW Description		

Defines the length of the first deadline monitoring timeout period in seconds. This timeout is used immediately after start (or restart) of the deadline monitoring service. The timeout period of the successive periods is configured by ECUC_Com_00263.	
Template Description	
Optional first timeout value in seconds for the reception of the ISignal.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalPort.firstTimeout	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00114

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComHandleId		EcucIntegerParamDef
BSW Description		
The numerical value used as the ID. This ID identifies signals and signal groups in the COM APIs using Com_SignalIdType or Com_SignalGroupIdType parameter respectively.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComInitialValueOnly		EcucBooleanParamDef
BSW Description		
This parameter defines that the respective signal's initial value shall be put into the respective PDU but there will not be any update of the value through the RTE. Thus the Com implementation does not need to expect any API calls for this signal (group).		
Template Description		
Connectors reception or send port on the referenced channel referenced by an ISignalTriggering. If different timeouts or DataFilters for ISignals need to be specified several ISignalPorts may be created.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalPort		
Mapping Rule		**Mapping Type**
Tx: If an ISignal has no ISignalPort assigned a ComSignal shall always be created in the transmitting ECUs in order to send the init value. Rx: If an ISignal has no ISignalPort assigned there is no need for the existence of a ComSignal in the rec. Ecu		full
Mapping Status		**Mapping ID**
valid		up_Com_00066

BSW Module	BSW Context		
Com	Com/ComConfig/ComSignal		
BSW Parameter		**BSW Type**	
ComInvalidNotification		EcucFunctionNameDef	
BSW Description			
Only valid on receiver side: Name of Com_CbkInv callback function to be called. Name of the function which notifies the RTE about the reception of an invalidated signal/ signal group. Only applicable if ComDataInvalidAction is configured to NOTIFY.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComConfig/ComSignal		
BSW Parameter		**BSW Type**	
ComNotification		EcucFunctionNameDef	
BSW Description			
On sender side: Name of Com_CbkTxAck callback function to be called. On receiver side: Name of Com_CbkRxAck callback function to be called. If this parameter is omitted no notification shall take place.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComConfig/ComSignal		
BSW Parameter		**BSW Type**	
ComRxDataTimeoutAction		EcucEnumerationParamDef	
BSW Description			
This parameter defines the action performed upon expiration of the reception deadline monitoring timer.			
Template Description			
This attribute controls the behavior with respect to the handling of timeouts.			
M2 Parameter			
SWComponentTemplate::Communication::NonqueuedReceiverComSpec.handleTimeoutType			
Mapping Rule			**Mapping Type**

If a full DataMapping exists for the SystemSignal and there is a single receiver on this ECU then this information shall be configured in accordance with the configured NonqueuedReceiverComSpec. If a full DataMapping exists for the SystemSignal and there are multiple receivers on this ECU then this information is available in the Nonqueued ReceiverComSpecs. In this case the attribute ComRxDataTimeoutAction of the related ComSignal/ComSignalGroup shall be configured to NONE to ensure that the RTE always has access to the last received value. Please note that the SWS_RTE defines an algorithm to implement the applicable timeout action.	full
Mapping Status	**Mapping ID**
valid	up_Com_00063

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComSignalDataInvalidValue		EcucStringParamDef
BSW Description		
Defines the data invalid value of the signal. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Optional value to express invalidity of the actual data element.		
M2 Parameter		
DataDictionary::DataDefProperties::SwDataDefProps.invalidValue		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00067

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComSignalEndianness		EcucEnumerationParamDef
BSW Description		
Defines the endianness of the signal's network representation.		
Template Description		

This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description). For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.packingByte Order	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00061

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignal
BSW Parameter	**BSW Type**
ComSignalInitValue	EcucStringParamDef
BSW Description	
Initial value for this signal. In case of UINT8_N the default value is a string of length ComSignal-Length with all bytes set to 0x00. In case of UINT8_DYN the initial size shall be 0. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.	
Template Description	
Initial value to be sent if sender component is not yet fully initialized, but receiver needs data already.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.initValue,SWComponentTemplate::Communication::NonqueuedSenderComSpec.initValue	
Mapping Rule	**Mapping Type**
It is possible to aggregate an initValue at the level of a ComSpec in the SW C Template. in case the System Description doesn't use a complete Software Component Description (VFB View) the initValue is defined in the System Template.	full
Mapping Status	**Mapping ID**
valid	up_Com_00081

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignal
BSW Parameter	**BSW Type**
ComSignalLength	EcucIntegerParamDef

<table>
<tr><th colspan="2">BSW Description</th></tr>
<tr><td colspan="2">Description:
For ComSignalType UINT8_N this parameter specifies the length n in bytes. For ComSignalType UINT8_DYN it specifies the maximum length in bytes. For all other types this parameter shall be ignored.

The supported maximum length is restricted by the used transportation system. For non TP-PDUs the maximum size of a PDU, and therefore also of any included signal, is limited by the concrete bus characteristic. For example, the limit is 8 bytes for CAN and LIN, 64 bytes for CAN FD and 254 for FlexRay.</td></tr>
<tr><th colspan="2">Template Description</th></tr>
<tr><td colspan="2">Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE.
Indicates maximum size for dynamic length signals.

The ISignal length of zero bits is allowed.</td></tr>
<tr><th colspan="2">M2 Parameter</th></tr>
<tr><td colspan="2">SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length</td></tr>
<tr><th>Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td>ComSignalLength = ISignal.length / 8 (i.e. value of baseTypeSize)</td><td>full</td></tr>
<tr><th>Mapping Status</th><th>Mapping ID</th></tr>
<tr><td>valid</td><td>up_Com_00065</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>Com</td><td colspan="2">Com/ComConfig/ComSignal</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">ComSignalType</td><td>EcucEnumerationParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">The AUTOSAR type of the signal. Whether or not the signal is signed or unsigned can be found by examining the value of this attribute.
This type could also be used to reserved appropriate storage in AUTOSAR COM.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">With the aggregation of SwDataDefProps an ISignal specifies how it is represented on the network. This representation follows a particular policy. Note that this causes some redundancy which is intended and can be used to support flexible development methodology as well as subsequent integrity checks.

If the policy "networkRepresentationFromComSpec" is chosen the network representation from the ComSpec that is aggregated by the PortPrototype shall be used.
If the "override" policy is chosen the requirements specified in the PortInterface and in the ComSpec are not fulfilled by the networkRepresentationProps.
In case the System Description doesn't use a complete Software Component Description (VFB View) the "legacy" policy can be chosen.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.dataTypePolicy</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
</table>

The mapping depends from the setting in the ISignal.dataTypePolicy:
 	
- ISignal.dataTypePolicy = override or legacy:
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.networkRepresentationProps.swBaseType
 	
- ISignal.dataTypePolicy = networkRepresentationFromComSpec:
if defined on ComSpec:
SWComponentTemplate::Communication::SenderComSpec.networkRepresentation.swBaseType
SWComponentTemplate::Communication::SenderComSpec.compositeNetworkRepresentation.networkRepresentation.swBaseType
 	
SWComponentTemplate::Communication::ReceiverComSpec.networkRepresentation.swBaseType SWComponentTemplate::Communication::Receiver ComSpec.compositeNetworkRepresentation.networkRepresentation.swBase Type
 	
if not defined on ComSpec:
CommonStructure::ImplementationDataTypes::ImplementationDataType.sw DataDefProps.swBaseType
Find the ImplementationDataType according to TPS_SYST_02079 and access SwDataDefProps.swBaseType.
 	
Consequence: If two SenderReceiverToSignalMappings that point to the same SystemSignal result in incompatible BaseTypes (see constr_1220 in SoftwareComponentTemplate) => ComSignalType should not be configured.
 	
- ISignal.dataTypePolicy = portInterfaceDefinition --> option has atpStatus "removed", in consequence no mapping is available."
 	
- ISignal.dataTypePolicy = transformingISignal
Hardcoded to UINT8_N or UINT8_DYN.
Datatype can be derived from SystemSignal.dynamicLength:
UINT8_N should be used if SystemSignal.dynamicLength = false
UINT8_DYN should be used if SystemSignal.dynamicLength = true
	full

Mapping Status	**Mapping ID**
valid	up_Com_00070

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignal
BSW Parameter	**BSW Type**
ComSystemTemplateSystemSignalRef	EcucForeignReferenceDef
BSW Description	
Reference to the ISignalToIPduMapping that contains a reference to the ISignal (System Template) which this ComSignal (or ComGroupSignal) represents.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**

valid	

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComTimeout		EcucFloatParamDef
BSW Description		
Defines the length of the deadline monitoring timeout period in seconds. The period for the first timeout period can be configured separately by ECUC_Com_00183.		
Template Description		
NonqueuedReceiverComSpec.aliveTimeout: Specify the amount of time (in seconds) after which the software component (via the RTE) needs to be notified if the corresponding data item have not been received according to the specified timing description. If the aliveTimeout attribute is 0 no timeout monitoring shall be performed. **ISignalPort.timeout**: Optional timeout value in seconds for the reception of the ISignal. In case the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. If a full DataMapping exist for the SystemSignal this information may be available from a configured ReceiverComSpec, in this case the timeout value in ReceiverComSpec override this optional timeout specification.		
M2 Parameter		
SWComponentTemplate::Communication::NonqueuedReceiverComSpec.aliveTimeout,System Template::Fibex::FibexCore::CoreCommunication::ISignalPort.timeout		
Mapping Rule		**Mapping Type**
If a full DataMapping exist for the SystemSignal this information may be available from a configured NonqueuedReceiverComSpec. In this case the timeout value in ReceiverComSpec overrides the optional timeout specification in the System Template. Please note that the SWS_RTE defines an algorithm to finally set the applicable timeout value.		full
Mapping Status		**Mapping ID**
valid		up_Com_00068

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComTimeoutNotification		EcucFunctionNameDef
BSW Description		
On sender side: Name of Com_CbkTxTOut callback function to be called. On receiver side: Name of Com_CbkRxTOut callback function to be called.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComTimeoutSubstitutionValue		EcucStringParamDef
BSW Description		
The signal substitution value will be used in case of a timeout and ComRxDataTimeoutAction is set to SUBSTITUTE. In case of UINT8_N the default value is a string of length ComSignalLength with all bytes set to 0x00. In case ofUINT8_DYN the initial size shall be 0. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Defines and enables the ComTimeoutSubstituition for this ISignal.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.timeoutSubstitutionValue		
Mapping Rule		**Mapping Type**
The mapping of ComTimeoutSubstitutionValue depends on the setting in the I Signal.dataTypePolicy: - ISignal.dataTypePolicy = override or legacy: SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.timeoutSubstitutionValue - ISignal.dataTypePolicy = networkRepresentationFromComSpec: SWComponentTemplate::Communication::NonequeuedReceiverCom Spec.timeoutSubstitutionValue - ISignal.dataTypePolicy = transformingISignal this is not supported.		full
Mapping Status		**Mapping ID**
valid		up_Com_00115

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComTransferProperty		EcucEnumerationParamDef

BSW Description	
Defines if a write access to this signal can trigger the transmission of the corresponding I-PDU. If the I-PDU is triggered, depends also on the transmission mode of the corresponding I-PDU.	
Template Description	
The triggered or triggeredOnChange, triggeredWithoutRepetition and triggeredOnChangeWithoutRepetition transferProperty causes immediate transmission of the IPdu, except if transmission mode Periodic or transmission mode NONE is defined for the IPdu. The Pending transfer property does not cause transmission of an I-PDU. The immediate transmission of the IPdu is caused even if only one Signal of an IPdu has the transferProperty triggered or triggeredWithoutRepetition or triggeredOnChange or triggeredOnChangeWithoutRepetition and all other Signals have the transferProperty pending. Also for ISignals of an ISignalGroup (GroupSignals) this attribute is relevant and shall be evaluated: - If none of the ISignals belonging to the ISignalGroup have a transferProperty defined the transferProperty of the ISignalToPduMapping referring to the ISignalGroup is considered. - If at least one of the ISignals belonging to the ISignalGroup has a transferProperty defined all other ISignals belonging to the same ISignalGroup shall have a transferProperty defined as well. All of the transferProperties of the GroupSignals are considered.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.transferProperty	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00069

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignal	
BSW Parameter		**BSW Type**
ComUpdateBitPosition		EcucIntegerParamDef
BSW Description		
Bit position of update-bit inside I-PDU. If this attribute is omitted then there is no update-bit. This setting must be consistently on sender and on receiver side. Range: 0..63 for CAN and LIN, 0..511 for CAN FD, 0..2031 for FlexRay, 0..4294967295 for TP.		
Template Description		

The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.
M2 Parameter
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.updateIndicationBitPosition

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00064

BSW Module	**BSW Context**
Com	Com/ComConfig

BSW Parameter	**BSW Type**
ComSignalGroup	EcucParamConfContainerDef

BSW Description
Contains the configuration parameters of the AUTOSAR COM module's signal groups.
Template Description
SignalGroup of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal Group is sent in different SignalIPdus to multiple receivers. An ISignalGroup refers to a set of ISignals that shall always be kept together. A ISignalGroup represents a COM Signal Group. Therefore it is recommended to put the ISignalGroup in the same Package as ISignals (see atp.recommendedPackage)
M2 Parameter
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalGroup

Mapping Rule	**Mapping Type**
Create this container for each ISignalGroup that exist in the ECU Extract.	full
Mapping Status	**Mapping ID**
valid	up_Com_00036

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignalGroup

BSW Parameter	**BSW Type**
ComDataInvalidAction	EcucEnumerationParamDef

BSW Description

This parameter defines the action performed upon reception of an invalid signal. Relating to signal groups the action in case if one of the included signals is an invalid signal. If Replace is used the ComSignalInitValue will be used for the replacement.	
Template Description	
Specifies whether the component can actively invalidate a particular dataElement. If no invalidationPolicy points to a dataElement this is considered to yield the identical result as if the handleInvalid attribute was set to dontInvalidate.	
M2 Parameter	
SWComponentTemplate::PortInterface::InvalidationPolicy	
Mapping Rule	**Mapping Type**
If strategy HandleInvalidEnum.keep is defined then set parameter to notify. If strategy HandleInvalidEnum.replace is defined then set parameter to replace. If the parameter does not exist this corresponds to the value HandleInvalid Enum.dontInvalidate.	full
Mapping Status	**Mapping ID**
valid	up_Com_00071

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComErrorNotification		EcucFunctionNameDef
BSW Description		
Only valid on sender side: Name of Com_CbkTxErr callback function to be called. If this parameter is omitted no error notification shall take place.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComFirstTimeout		EcucFloatParamDef
BSW Description		
Defines the length of the first deadline monitoring timeout period in seconds. This timeout is used immediately after start (or restart) of the deadline monitoring service. The timeout period of the successive periods is configured by ECUC_Com_00263.		
Template Description		
Optional first timeout value in seconds for the reception of the ISignal.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalPort.firstTimeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00114

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComGroupSignal		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of group signals. I.e. signals that are included within a signal group.		
Template Description		
Signal of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal is sent in different SignalIPdus to multiple receivers. To support the RTE "signal fan-out" each SignalIPdu contains ISignals. If the same System Signal is to be mapped into several SignalIPdus there is one ISignal needed for each ISignalToIPduMapping. ISignals describe the Interface between the Precompile configured RTE and the potentially Postbuild configured Com Stack (see ECUC Parameter Mapping). In case of the SystemSignalGroup an ISignal must be created for each SystemSignal contained in the SystemSignalGroup.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal		
Mapping Rule		**Mapping Type**
Create Container for each ISignal that is contained in the ISignalGroup.		full
Mapping Status		**Mapping ID**
valid		up_Com_00040

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComBitPosition		EcucIntegerParamDef
BSW Description		
Starting position within the I-PDU. This parameter refers to the position in the I-PDU and not in the shadow buffer. If the endianness conversion is configured to Opaque the parameter ComBitPosition shall define the bit0 of the first byte like in little endian byte order		
Template Description		
This parameter is necessary to describe the bitposition of a signal within an SignalIPdu. It denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. Please note that the way the bytes will be actually sent on the bus does not impact this representation: they will always be seen by the software as a byte array. If a mapping for the ISignalGroup is defined, this attribute is irrelevant and shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.startPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00062

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal		
BSW Parameter		**BSW Type**	
ComBitSize		EcucIntegerParamDef	
BSW Description			
Size in bits, for integer signal types. For ComSignalType UINT8_N and UINT8_DYN the size shall be configured by ComSignalLength. For ComSignalTypes FLOAT32 and FLOAT64 the size is already defined by the signal type and therefore may be omitted.			
Template Description			
Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE. Indicates maximum size for dynamic length signals. The ISignal length of zero bits is allowed.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Com_00072

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal		
BSW Parameter		**BSW Type**	
ComFilter		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters of the AUTOSAR COM module's Filters. Note: On sender side the container is used to specify the transmission mode conditions.			
Template Description			
Base class for data filters. The type of the filter is specified in attribute dataFilterType. Some of the filter types require additional arguments which are specified as attributes of this class.			
M2 Parameter			
CommonStructure::Filter::DataFilter			
Mapping Rule			**Mapping Type**
Create container on the receiver side if the NonqueuedReceiverComSpec contains a DataFilter. Create Container on the sender side if the TransmissionMode Condition element contains a reference to this signal.			full
Mapping Status			**Mapping ID**
valid			up_Com_00073

BSW Module	**BSW Context**		
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter		
BSW Parameter		**BSW Type**	
ComFilterAlgorithm		EcucEnumerationParamDef	
BSW Description			
The range of values is specified in the [17] specification, chapter 2.2.2, Reception Filtering.			
Template Description			
This attribute specifies the type of the filter.			
M2 Parameter			
CommonStructure::Filter::DataFilter.dataFilterType			
Mapping Rule			**Mapping Type**

Mapping between DataFilterTypeEnum and ComFilterAlgorithm Enum is necessary.	full
Mapping Status	**Mapping ID**
valid	up_Com_00075

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMask		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Mask for old and new value.		
M2 Parameter		
CommonStructure::Filter::DataFilter.mask		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00078

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMax		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to specify the upper boundary		
M2 Parameter		
CommonStructure::Filter::DataFilter.max		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00077

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterMin		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to specify the lower boundary		
M2 Parameter		
CommonStructure::Filter::DataFilter.min		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_Com_00080

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterOffset		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering. Range = 0..(ComFilterPeriod-1)		
Template Description		
Specifies the initial number of messages to occur before the first message is passed		
M2 Parameter		
CommonStructure::Filter::DataFilter.offset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00076

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterPeriod		EcucIntegerParamDef
BSW Description		
This parameter defines the period of the ComFilterAlgorithm ONE_EVERY_N.		
Template Description		
Specifies number of messages to occur before the message is passed again		
M2 Parameter		
CommonStructure::Filter::DataFilter.period		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00079

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal/ComFilter	
BSW Parameter		**BSW Type**
ComFilterX		EcucIntegerParamDef
BSW Description		
The name of this attribute corresponds to the parameter name in the [17] specification of Reception Filtering.		
Template Description		
Value to compare with		
M2 Parameter		
CommonStructure::Filter::DataFilter.x		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_Com_00074

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComHandleId		EcucIntegerParamDef
BSW Description		
The numerical value used as the ID. This ID identifies signals and signal groups in the COM APIs using Com_SignalIdType or Com_SignalGroupIdType parameter respectively.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComSignalDataInvalidValue		EcucStringParamDef
BSW Description		
Defines the data invalid value of the signal. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Optional value to express invalidity of the actual data element.		
M2 Parameter		
DataDictionary::DataDefProperties::SwDataDefProps.invalidValue		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00067

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**

ComSignalEndianness		EcucEnumerationParamDef
BSW Description		
Defines the endianness of the signal's network representation.		
Template Description		
This parameter defines the order of the bytes of the signal and the packing into the SignalIPdu. The byte ordering "Little Endian" (MostSignificantByteLast), "Big Endian" (MostSignificantByteFirst) and "Opaque" can be selected. For opaque data endianness conversion shall be configured to Opaque. The value of this attribute impacts the absolute position of the signal into the SignalIPdu (see the startPosition attribute description). For an ISignalGroup the packingByteOrder is irrelevant and shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.packingByte Order		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00061

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComSignalInitValue		EcucStringParamDef
BSW Description		
Initial value for this signal. In case of UINT8_N the default value is a string of length ComSignal-Length with all bytes set to 0x00. In case of UINT8_DYN the initial size shall be 0. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Initial value to be sent if sender component is not yet fully initialized, but receiver needs data already.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.initValue,SWComponentTem-plate::Communication::NonqueuedSenderComSpec.initValue		
Mapping Rule		**Mapping Type**
It is possible to aggregate an initValue at the level of a ComSpec in the SW C Template. in case the System Description doesn't use a complete Software Component Description (VFB View) the initValue is defined in the System Tem-plate.		full
Mapping Status		**Mapping ID**
valid		up_Com_00081

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>Com</td><td colspan="3">Com/ComConfig/ComSignalGroup/ComGroupSignal</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">ComSignalLength</td><td colspan="2">EcucIntegerParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Description:
For ComSignalType UINT8_N this parameter specifies the length n in bytes. For ComSignalType UINT8_DYN it specifies the maximum length in bytes. For all other types this parameter shall be ignored.

The supported maximum length is restricted by the used transportation system. For non TP-PDUs the maximum size of a PDU, and therefore also of any included signal, is limited by the concrete bus characteristic. For example, the limit is 8 bytes for CAN and LIN, 64 bytes for CAN FD and 254 for FlexRay.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">Size of the signal in bits. The size needs to be derived from the mapped VariableDataPrototype according to the mapping of primitive DataTypes to BaseTypes as used in the RTE.
Indicates maximum size for dynamic length signals.

The ISignal length of zero bits is allowed.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.length</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">ComSignalLength = ISignal.length / 8 (i.e. value of baseTypeSize)</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td>up_Com_00065</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>Com</td><td colspan="3">Com/ComConfig/ComSignalGroup/ComGroupSignal</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">ComSignalType</td><td colspan="2">EcucEnumerationParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">The AUTOSAR type of the signal. Whether or not the signal is signed or unsigned can be found by examining the value of this attribute.
This type could also be used to reserved appropriate storage in AUTOSAR COM.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">With the aggregation of SwDataDefProps an ISignal specifies how it is represented on the network. This representation follows a particular policy. Note that this causes some redundancy which is intended and can be used to support flexible development methodology as well as subsequent integrity checks.

If the policy "networkRepresentationFromComSpec" is chosen the network representation from the ComSpec that is aggregated by the PortPrototype shall be used.
If the "override" policy is chosen the requirements specified in the PortInterface and in the ComSpec are not fulfilled by the networkRepresentationProps.
In case the System Description doesn't use a complete Software Component Description (VFB View) the "legacy" policy can be chosen.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.dataTypePolicy</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
</table>

The mapping depends from the setting in the ISignal.dataTypePolicy:
 	
- ISignal.dataTypePolicy = override or legacy:
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.networkRepresentationProps.swBaseType
 	
- ISignal.dataTypePolicy = networkRepresentationFromComSpec:
if defined on ComSpec:
SWComponentTemplate::Communication::SenderComSpec.networkRepresentation.swBaseType
SWComponentTemplate::Communication::SenderComSpec.compositeNetworkRepresentation.networkRepresentation.swBaseType
 	
SWComponentTemplate::Communication::ReceiverComSpec.networkRepresentation.swBaseType SWComponentTemplate::Communication::Receiver ComSpec.compositeNetworkRepresentation.networkRepresentation.swBase Type
 	
if not defined on ComSpec:
CommonStructure::ImplementationDataTypes::ImplementationDataType.sw DataDefProps.swBaseType
Find the ImplementationDataType according to TPS_SYST_02079 and access SwDataDefProps.swBaseType.
 	
Consequence: If two SenderReceiverToSignalMappings that point to the same SystemSignal result in incompatible BaseTypes (see constr_1220 in SoftwareComponentTemplate) => ComSignalType should not be configured.
 	
- ISignal.dataTypePolicy = portInterfaceDefinition --> option has atpStatus "removed", in consequence no mapping is available."
 	
- ISignal.dataTypePolicy = transformingISignal
Hardcoded to UINT8_N or UINT8_DYN.
Datatype can be derived from SystemSignal.dynamicLength:
UINT8_N should be used if SystemSignal.dynamicLength = false
UINT8_DYN should be used if SystemSignal.dynamicLength = true
	full

Mapping Status	**Mapping ID**
valid	up_Com_00070

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComSystemTemplateSystemSignalRef		EcucForeignReferenceDef
BSW Description		
Reference to the ISignalToIPduMapping that contains a reference to the ISignal (System Template) which this ComSignal (or ComGroupSignal) represents.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComTimeoutSubstitutionValue		EcucStringParamDef
BSW Description		
The signal substitution value will be used in case of a timeout and ComRxDataTimeoutAction is set to SUBSTITUTE. In case of UINT8_N the default value is a string of length ComSignalLength with all bytes set to 0x00. In case ofUINT8_DYN the initial size shall be 0. In case the ComSignalType is UINT8, UINT16, UINT32, UINT64, SINT8, SINT16, SINT32, SINT64 the string shall be interpreted as defined in the chapter Integer Type in the AUTOSAR EcuC specification. In case the ComSignalType is FLOAT32, FLOAT64 the string shall be interpreted as defined in the chapter Float Type in the AUTOSAR EcuC specification. In case the ComSignalType is BOOLEAN the string shall be interpreted as defined in the chapter Boolean Type in the AUTOSAR EcuC specification. In case the ComSignal is a UINT8_N, UINT8_DYN the string shall be interpreted as a decimal representation of the characters separated by blanks, e.g. "97 98 100" means a string "abd", where the char "a" is in byte 0(lowest address), "b" is in byte 1, and "d" is in byte 2 and (highest address). For the ComSignalType UINT8_DYN the dynamic length shall be set to the number of configured characters. An empty string "" shall be interpreted as 0-sized dynamic signal.		
Template Description		
Defines and enables the ComTimeoutSubstituition for this ISignal.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.timeoutSubstitutionValue		
Mapping Rule		**Mapping Type**
The mapping of ComTimeoutSubstitutionValue depends on the setting in the ISignal.dataTypePolicy: - ISignal.dataTypePolicy = override or legacy: SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal.timeoutSubstitutionValue - ISignal.dataTypePolicy = networkRepresentationFromComSpec: SWComponentTemplate::Communication::NonequeuedReceiverComSpec.timeoutSubstitutionValue - ISignal.dataTypePolicy = transformingISignal this is not supported.		full
Mapping Status		**Mapping ID**
valid		up_Com_00115

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup/ComGroupSignal	
BSW Parameter		**BSW Type**
ComTransferProperty		EcucEnumerationParamDef

BSW Description	
Optionally defines whether this group signal shall contribute to the TRIGGERED_ON_CHANGE transfer property of the signal group. If at least one group signal of a signal group has the "ComTransferProperty" configured all other group signals of that signal group shall have the attribute configured as well.	
Template Description	
The triggered or triggeredOnChange, triggeredWithoutRepetition and triggeredOnChangeWithoutRepetition transferProperty causes immediate transmission of the IPdu, except if transmission mode Periodic or transmission mode NONE is defined for the IPdu. The Pending transfer property does not cause transmission of an I-PDU. The immediate transmission of the IPdu is caused even if only one Signal of an IPdu has the transferProperty triggered or triggeredWithoutRepetition or triggeredOnChange or triggeredOnChangeWithoutRepetition and all other Signals have the transferProperty pending. Also for ISignals of an ISignalGroup (GroupSignals) this attribute is relevant and shall be evaluated: - If none of the ISignals belonging to the ISignalGroup have a transferProperty defined the transferProperty of the ISignalToPduMapping referring to the ISignalGroup is considered. - If at least one of the ISignals belonging to the ISignalGroup has a transferProperty defined all other ISignals belonging to the same ISignalGroup shall have a transferProperty defined as well. All of the transferProperties of the GroupSignals are considered.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.transferProperty	
Mapping Rule	**Mapping Type**
ISignalToIPduMapping element contains a reference to the ISignalGroup and contains the attribute "transferProperty"	full
Mapping Status	**Mapping ID**
valid	up_Com_00055

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComHandleId		EcucIntegerParamDef
BSW Description		
The numerical value used as the ID. This ID identifies signals and signal groups in the COM APIs using Com_SignalIdType or Com_SignalGroupIdType parameter respectively.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComInitialValueOnly		EcucBooleanParamDef

BSW Description	
This parameter defines that the respective signal's initial value shall be put into the respective PDU but there will not be any update of the value through the RTE. Thus the Com implementation does not need to expect any API calls for this signal (group).	
Template Description	
Connectors reception or send port on the referenced channel referenced by an ISignalTriggering. If different timeouts or DataFilters for ISignals need to be specified several ISignalPorts may be created.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalPort	
Mapping Rule	**Mapping Type**
Tx: If an ISignal has no ISignalPort assigned a ComSignal shall always be created in the transmitting ECUs in order to send the init value. Rx: If an ISignal has no ISignalPort assigned there is no need for the existence of a ComSignal in the rec. Ecu	full
Mapping Status	**Mapping ID**
valid	up_Com_00066

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComInvalidNotification		EcucFunctionNameDef
BSW Description		
Only valid on receiver side: Name of Com_CbkInv callback function to be called. Name of the function which notifies the RTE about the reception of an invalidated signal/ signal group. Only applicable if ComDataInvalidAction is configured to NOTIFY.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComNotification		EcucFunctionNameDef
BSW Description		
On sender side: Name of Com_CbkTxAck callback function to be called. On receiver side: Name of Com_CbkRxAck callback function to be called. If this parameter is omitted no notification shall take place.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignalGroup
BSW Parameter	**BSW Type**
ComRxDataTimeoutAction	EcucEnumerationParamDef
BSW Description	
This parameter defines the action performed upon expiration of the reception deadline monitoring timer.	
Template Description	
This attribute controls the behavior with respect to the handling of timeouts.	
M2 Parameter	
SWComponentTemplate::Communication::NonqueuedReceiverComSpec.handleTimeoutType	
Mapping Rule	**Mapping Type**
If a full DataMapping exists for the SystemSignal and there is a single receiver on this ECU then this information shall be configured in accordance with the configured NonqueuedReceiverComSpec. If a full DataMapping exists for the SystemSignal and there are multiple receivers on this ECU then this information is available in the Nonqueued ReceiverComSpecs. In this case the attribute ComRxDataTimeoutAction of the related ComSignal/ComSignalGroup shall be configured to NONE to ensure that the RTE always has access to the last received value. Please note that the SWS_RTE defines an algorithm to implement the applicable timeout action.	full
Mapping Status	**Mapping ID**
valid	up_Com_00063

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignalGroup
BSW Parameter	**BSW Type**
ComSignalGroupArrayAccess	EcucBooleanParamDef
BSW Description	
Defines whether the uint8-array based access shall be used for this ComSignalGroup.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalGroup.comBasedSignalGroup Transformation	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Com	Com/ComConfig/ComSignalGroup
BSW Parameter	**BSW Type**
ComSystemTemplateSignalGroupRef	EcucForeignReferenceDef
BSW Description	
Reference to the ISignalToIPduMapping that contains a reference to the ISignalGroup (SystemTemplate) which this ComSignalGroup represents.	
Template Description	
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.	
M2 Parameter	

SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComTimeout		EcucFloatParamDef
BSW Description		
Defines the length of the deadline monitoring timeout period in seconds. The period for the first timeout period can be configured separately by ECUC_Com_00183.		
Template Description		
NonqueuedReceiverComSpec.aliveTimeout: Specify the amount of time (in seconds) after which the software component (via the RTE) needs to be notified if the corresponding data item have not been received according to the specified timing description. If the aliveTimeout attribute is 0 no timeout monitoring shall be performed. **ISignalPort.timeout**: Optional timeout value in seconds for the reception of the ISignal. In case the System Description doesn't use a complete Software Component Description (VFB View). This supports the inclusion of legacy system signals. If a full DataMapping exist for the SystemSignal this information may be available from a configured ReceiverComSpec, in this case the timeout value in ReceiverComSpec override this optional timeout specification.		
M2 Parameter		
SWComponentTemplate::Communication::NonqueuedReceiverComSpec.aliveTimeout,System Template::Fibex::FibexCore::CoreCommunication::ISignalPort.timeout		
Mapping Rule		**Mapping Type**
If a full DataMapping exist for the SystemSignal this information may be available from a configured NonqueuedReceiverComSpec. In this case the timeout value in ReceiverComSpec overrides the optional timeout specification in the System Template. Please note that the SWS_RTE defines an algorithm to finally set the applicable timeout value.		full
Mapping Status		**Mapping ID**
valid		up_Com_00068

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComTimeoutNotification		EcucFunctionNameDef
BSW Description		
On sender side: Name of Com_CbkTxTOut callback function to be called. On receiver side: Name of Com_CbkRxTOut callback function to be called.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComTransferProperty		EcucEnumerationParamDef
BSW Description		
Defines if a write access to this signal can trigger the transmission of the corresponding I-PDU. If the I-PDU is triggered, depends also on the transmission mode of the corresponding I-PDU.		
Template Description		
The triggered or triggeredOnChange, triggeredWithoutRepetition and triggeredOnChangeWithoutRepetition transferProperty causes immediate transmission of the IPdu, except if transmission mode Periodic or transmission mode NONE is defined for the IPdu. The Pending transfer property does not cause transmission of an I-PDU. The immediate transmission of the IPdu is caused even if only one Signal of an IPdu has the transferProperty triggered or triggeredWithoutRepetition or triggeredOnChange or triggeredOnChangeWithoutRepetition and all other Signals have the transferProperty pending. Also for ISignals of an ISignalGroup (GroupSignals) this attribute is relevant and shall be evaluated: - If none of the ISignals belonging to the ISignalGroup have a transferProperty defined the transferProperty of the ISignalToPduMapping referring to the ISignalGroup is considered. - If at least one of the ISignals belonging to the ISignalGroup has a transferProperty defined all other ISignals belonging to the same ISignalGroup shall have a transferProperty defined as well. All of the transferProperties of the GroupSignals are considered.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.transferProperty		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00069

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComSignalGroup	
BSW Parameter		**BSW Type**
ComUpdateBitPosition		EcucIntegerParamDef
BSW Description		
Bit position of update-bit inside I-PDU. If this attribute is omitted then there is no update-bit. This setting must be consistently on sender and on receiver side. Range: 0..63 for CAN and LIN, 0..511 for CAN FD, 0..2031 for FlexRay, 0..4294967295 for TP.		
Template Description		

The UpdateIndicationBit indicates to the receivers that the signal (or the signal group) was updated by the sender. Length is always one bit. The UpdateIndicationBitPosition attribute describes the position of the update bit within the SignalIPdu. For Signals of a ISignalGroup this attribute is irrelevant and shall be ignored. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing ISignalIPdu still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping.updateIndicationBitPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00064

BSW Module	**BSW Context**	
Com	Com/ComConfig	
BSW Parameter		**BSW Type**
ComTimeBase		EcucParamConfContainerDef
BSW Description		
Contains the timebase parameters for Tx, Rx and routing.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComTimeBase	
BSW Parameter		**BSW Type**
ComGwTimeBase		EcucFloatParamDef
BSW Description		
The period between successive calls to Com_MainFunctionRouteSignals in seconds. This parameter may be used by the COM generator to transform the values of the signal gateway related timing configuration parameters of the COM module to internal implementation specific counter or tick values. The COM module's internal timing handling is implementation specific. The COM module (generator) might rely on the fact that Com_MainFunctionRouteSignals is scheduled according to the value configured here.		
Template Description		

The period between successive calls to Com_MainFunctionRouteSignals of the AUTOSAR COM module in seconds.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.comConfigurationGwTimeBase	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00035

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComTimeBase	
BSW Parameter		**BSW Type**
ComRxTimeBase		EcucFloatParamDef
BSW Description		
The period between successive calls to Com_MainFunctionRx in seconds. This parameter may be used by the COM generator to transform the values of the reception related timing configuration parameters of the COM module to internal implementation specific counter or tick values. The COM module's internal timing handling is implementation specific. The COM module (generator) may rely on the fact that Com_MainFunctionRx is scheduled according to the value configured here.		
Template Description		
The period between successive calls to Com_MainFunctionRx of the AUTOSAR COM module in seconds.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.comConfigurationRxTimeBase		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00034

BSW Module	**BSW Context**	
Com	Com/ComConfig/ComTimeBase	
BSW Parameter		**BSW Type**
ComTxTimeBase		EcucFloatParamDef
BSW Description		
The period between successive calls to Com_MainFunctionTx in seconds. This parameter may be used by the COM generator to transform the values of the transmission related timing configuration parameters of the COM module to internal implementation specific counter or tick values. The COM module's internal timing handling is implementation specific. The COM module (generator) may rely on the fact that Com_MainFunctionTx is scheduled according to the value configured here.		
Template Description		
The period between successive calls to Com_MainFunctionTx of the AUTOSAR COM module in seconds.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.comConfigurationTxTimeBase		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Com_00033

BSW Module	BSW Context		
Com	Com		
BSW Parameter		**BSW Type**	
ComGeneral		EcucParamConfContainerDef	
BSW Description			
Contains the general configuration parameters of the module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComGeneral		
BSW Parameter		**BSW Type**	
ComCancellationSupport		EcucBooleanParamDef	
BSW Description			
This parameter enables/disables the cancellation feature: true: enabled false: disabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Com	Com/ComGeneral		
BSW Parameter		**BSW Type**	
ComConfigurationUseDet		EcucBooleanParamDef	
BSW Description			
The error hook shall contain code to call the Det. If this parameter is configured COM_DEV_ERROR_DETECT shall be set to ON as output of the configuration tool. (as input for the source code).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

Com	Com/ComGeneral
BSW Parameter	**BSW Type**
ComEnableMDTForCyclicTransmission	EcucBooleanParamDef
BSW Description	
Enables globally for the whole Com module the minimum delay time monitoring for cyclic and repeated transmissions (ComTxModeMode=PERIODIC or ComTxModeMode=MIXED for the cyclic transmissions, ComTxModeNumberOfRepetitions > 0 for repeated transmissions).	
Template Description	
Enables for the Com module of this EcuInstance the minimum delay time monitoring for cyclic and repeated transmissions (TransmissionModeTiming has cyclicTiming assigned or eventControlledTiming with numberOfRepetitions > 0).	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.comEnableMDTForCyclicTransmission	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Com_00113

BSW Module	**BSW Context**
Com	Com/ComGeneral
BSW Parameter	**BSW Type**
ComEnableSignalGroupArrayApi	EcucBooleanParamDef
BSW Description	
Activate/Deactivate the signal group array access APIs (Com_SendSignalGroupArray, Com_ReceiveSignalGroupArray). true: signal group array access APIs activated false: signal group array access APIs deactivated	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Com	Com/ComGeneral
BSW Parameter	**BSW Type**
ComMetaDataSupport	EcucBooleanParamDef
BSW Description	
This parameter enables/disables the support of meta-data feature including the API Com_TriggerIPDUSendWithMetaData. true: enabled false: disabled	
Template Description	
M2 Parameter	

Mapping Rule	Mapping Type
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Com	Com/ComGeneral	
BSW Parameter		**BSW Type**
ComRetryFailedTransmitRequests		EcucBooleanParamDef
BSW Description		
If this Parameter is set to true, retry of failed transmission requests is enabled. If this Parameter is not present, the default value is assumed.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComGeneral	
BSW Parameter		**BSW Type**
ComSupportedIPduGroups		EcucIntegerParamDef
BSW Description		
Defines the maximum number of supported I-PDU groups.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Com	Com/ComGeneral	
BSW Parameter		**BSW Type**
ComUserCbkHeaderFile		EcucStringParamDef
BSW Description		
Defines the header files for callback functions which shall be included by the COM module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Com	Com/ComGeneral		
BSW Parameter		**BSW Type**	
ComVersionInfoApi		EcucBooleanParamDef	
BSW Description			
Activate/Deactivate the version information API (Com_GetVersionInfo). True: version information API activated False: version information API deactivated			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.1.2 LdCom Mapping

BSW Module	BSW Context		
LdCom	LdCom		
BSW Parameter		**BSW Type**	
LdComConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters and sub containers of the AUTOSAR LdCom module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LdCom	LdCom/LdComConfig		
BSW Parameter		**BSW Type**	
LdComIPdu		EcucParamConfContainerDef	
BSW Description			
Contains the configuration parameters of the IPdu inside LdCom.			
Template Description			
Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer. A maximum of one dynamic length signal per IPdu is allowed.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu			
Mapping Rule			**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_LdCom_00001

BSW Module	**BSW Context**		
LdCom	LdCom/LdComConfig/LdComIPdu		
BSW Parameter		**BSW Type**	
LdComApiType		EcucEnumerationParamDef	
BSW Description			
Defines if this I-PDU is a normal I-PDU that shall be sent unfragmented or if this is a large I-PDU that shall be sent via the Transport Protocol of the underlying bus. This setting is used by RTE to invoke the proper API.			
Template Description			
Contains all configuration elements for AUTOSAR TP.			
M2 Parameter			
SystemTemplate::TransportProtocols::TpConfig			
Mapping Rule			**Mapping Type**
If this LdComIPdu is mapped in the System Description by a TpConnection to NPdus then set LdComApiType to TP. Otherwise set LdComApiType to IF.			full
Mapping Status			**Mapping ID**
valid			up_LdCom_00002

BSW Module	**BSW Context**		
LdCom	LdCom/LdComConfig/LdComIPdu		
BSW Parameter		**BSW Type**	
LdComHandleId		EcucIntegerParamDef	
BSW Description			
This is the ID used by RTE to invoke LdCom. A corresponding shortName is created, which is used for the invocations of the RTE. The same ID is used for invocations by PduR.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComIPduDirection		EcucEnumerationParamDef
BSW Description		
The direction defines if this IPdu, and therefore the contributing signal, shall be sent or received.		
Template Description		
Communication Direction of the Connector Port (input or output Port).		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommConnectorPort.communicationDirection		

Mapping Rule	Mapping Type
Find IPduTriggering of the regarded SignalIPdu. The IPduTriggering contains a reference to an IPduPort that is aggegated by the regarded ECU. If the communicationDirection of the CommConnectorPort is "in" than the IPdu is received.	full
Mapping Status	**Mapping ID**
valid	up_LdCom_00003

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComRxCopyRxData		EcucFunctionNameDef
BSW Description		
Only on receiver side: Name of Rte_LdComCbkCopyRxData callback function to be called.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComRxIndication		EcucFunctionNameDef
BSW Description		
Only on receiver side: Name of Rte_LdComCbkRxIndication callback function to be called.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComRxStartOfReception		EcucFunctionNameDef
BSW Description		
Only on receiver side: Name of Rte_LdComCbkStartOfReception callback function to be called.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComSystemTemplateSignalRef		EcucForeignReferenceDef
BSW Description		
Reference to the ISignalToIPduMapping that contains a reference to the ISignal (System Template).		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComTpRxIndication		EcucFunctionNameDef
BSW Description		
Only on receiver side: Name of Rte_LdComCbkTpRxIndication callback function to be called.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

LdCom	LdCom/LdComConfig/LdComIPdu		
BSW Parameter		**BSW Type**	
LdComTpTxConfirmation		EcucFunctionNameDef	
BSW Description			
Only on sender side: Name of Rte_LdComCbkTpTxConfirmation callback function to be called.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
LdCom	LdCom/LdComConfig/LdComIPdu		
BSW Parameter		**BSW Type**	
LdComTxConfirmation		EcucFunctionNameDef	
BSW Description			
Only on sender side: Name of Rte_LdComCbkTxConfirmation callback function to be called.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
LdCom	LdCom/LdComConfig/LdComIPdu		
BSW Parameter		**BSW Type**	
LdComTxCopyTxData		EcucFunctionNameDef	
BSW Description			
Only on sender side: Name of Rte_LdComCbkCopyTxData callback function to be called.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
LdCom	LdCom/LdComConfig/LdComIPdu	
BSW Parameter		**BSW Type**
LdComTxTriggerTransmit		EcucFunctionNameDef
BSW Description		

Only on sender side: Name of Rte_LdComCbkTriggerTransmit callback function to be called. If defined TriggerTransmit has to be supported for this signal.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LdCom	LdCom	
BSW Parameter		**BSW Type**
LdComGeneral		EcucParamConfContainerDef
BSW Description		
Contains the general configuration parameters of the LdCom module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LdCom	LdCom/LdComGeneral	
BSW Parameter		**BSW Type**
LdComDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LdCom	LdCom/LdComGeneral	
BSW Parameter		**BSW Type**
LdComVersionInfoApi		EcucBooleanParamDef
BSW Description		

Activate/Deactivate the version information API (LdCom_GetVersionInfo). * True: version information API activated * False: version information API deactivated	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.1.3 IPduM Mapping

BSW Module	**BSW Context**		
IpduM	IpduM		
BSW Parameter		**BSW Type**	
IpduMConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the sub containers of the IpduM module. * The IpduMTxPathway subcontainer includes information about sent I-PDUs. * The IpduMRxPathway includes information about received I-PDUs. * The IpduMContainerTxPdu and IpduMContainedTxPdu include information about the sending of ContainerPdus. * The IpduMContainerRxPdu and IpduMContainedRxPdu include information about the reception of ContainerPdus.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
IpduM	IpduM/IpduMConfig		
BSW Parameter		**BSW Type**	
IpduMContainedRxPdu		EcucParamConfContainerDef	
BSW Description			
Configuration of a received contained Pdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		BSW Type	
IpduMContainedPduOffset		EcucIntegerParamDef	
BSW Description			
Static offset (in bytes) of the ContainedPdu.			
Template Description			
Byte offset that describes the location of the ContainedPdu in the ContainerPdu if no header is used.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.offset			
Mapping Rule			Mapping Type
1:1 mapping			full
Mapping Status			Mapping ID
valid			up_IpduM_00068

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		BSW Type	
IpduMContainedRxInContainerPduRef		EcucReferenceDef	
BSW Description			
Optional reference to a container Pdu this contained Pdu may be transported in. The reference may be omitted in case IpduMContainerRxAcceptContained-Pdu=IPDUM_ACCEPT_ALL.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.containedPduTriggering			
Mapping Rule			Mapping Type
In the SysT the ContainerPdu references all PduTriggerings which can be put inside this container. In the EcuC each Pdu refers to the containers it can be transported in.			partial
Mapping Status			Mapping ID
valid			up_IpduM_00059

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		BSW Type	
IpduMContainedRxPduLongHeaderId		EcucIntegerParamDef	
BSW Description			
LongHeader Id which is part of the ContainerPdu when this ContainedPdu is inside.			
Template Description			
Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = longHeader.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.headerIdLongHeader			
Mapping Rule			Mapping Type
1:1 mapping			full
Mapping Status			Mapping ID
valid			up_IpduM_00067

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		**BSW Type**	
IpduMContainedRxPduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu which represents this ContainedPdu and is used for reception indication.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		**BSW Type**	
IpduMContainedRxPduShortHeaderId		EcucIntegerParamDef	
BSW Description			
ShortHeader Id which is part of the ContainerPdu when this ContainedPdu is inside.			
Template Description			
Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = shortHeader.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.headerIdShort Header			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00066

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainedRxPdu		
BSW Parameter		**BSW Type**	
IpduMPduUpdateBitPosition		EcucIntegerParamDef	
BSW Description			
This value specifies where the PDU's Update-Bit is stored in the Container PDU (bit location of PDU's Update-Bit in the Container PDU).			
Template Description			
The updateIndicationBit specifies the bit location of ContainedIPdu Update-Bit in the Container PDU. It indicates to the receivers that the ContainedIPdu in the ContainerIPdu was updated.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.updateIndicationBit Position			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00069

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>IpduM</td><td colspan="3">IpduM/IpduMConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">IpduMContainedTxPdu</td><td colspan="2">EcucParamConfContainerDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Configuration of a sender ContainedPdu.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td>local</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>IpduM</td><td colspan="3">IpduM/IpduMConfig/IpduMContainedTxPdu</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">IpduMContainedPduHeaderId</td><td colspan="2">EcucIntegerParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Header Id which is part of the ContainerPdu when this ContainedPdu is inside.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">ContainedIPduProps.headerIdLongHeader:
Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = longHeader.

ContainedIPduProps.headerIdShortHeader:
Defines the header id this IPdu shall have in case this IPdu is put inside a ContainerIPdu with headerType = shortHeader.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.headerIdLongHeader,SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.headerIdShortHeader</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">If IpduMContainerHeaderSize = LONG the IPduMContainedPduHeaderId is taken from headerIdLongHeader.
If IpduMContainerHeaderSize = SHORT the IPduMContainedPduHeaderId is taken from headerIdShortHeader.</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td>up_IpduM_00051</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>IpduM</td><td colspan="3">IpduM/IpduMConfig/IpduMContainedTxPdu</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">IpduMContainedPduOffset</td><td colspan="2">EcucIntegerParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Static offset (in bytes) of the ContainedPdu.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">Byte offset that describes the location of the ContainedPdu in the ContainerPdu if no header is used.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.offset</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
</table>

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00068

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxInContainerPduRef		EcucReferenceDef
BSW Description		
Reference to the container Pdu which this contained Pdu shall be collected in.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.containedPduTriggering		
Mapping Rule		**Mapping Type**
In the SysT the ContainerPdu references all PduTriggerings which can be put inside this container. In the EcuC each Pdu refers to the containers it can be transported in.		partial
Mapping Status		**Mapping ID**
valid		up_IpduM_00050

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduCollectionSemantics		EcucEnumerationParamDef
BSW Description		
Defines whether this IpduMContainedTxPdu shall be collected using a last-is-best or queued semantics.		
Template Description		
Defines whether this ContainedIPdu shall be collected using a last-is-best or queued semantics.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.collectionSemantics		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00062

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu/IpduMContainedTxPduCollectionSemantics	
BSW Parameter		**BSW Type**
IPDUM_COLLECT_LAST_IS_BEST		EcucEnumerationLiteralDef
BSW Description		
The IpduMContainedTxPdu data will be fetched via TriggerTransmit just before the transmission executes.		
Template Description		
The ContainedIPdu data will be fetched via TriggerTransmit just before the transmission executes.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduCollectionSemanticsEnum.lastIsBest		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00064

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu/IpduMContainedTxPduCollectionSemantics	
BSW Parameter		**BSW Type**
IPDUM_COLLECT_QUEUED		EcucEnumerationLiteralDef
BSW Description		
The IpduMContainedTxPdu data will instantly be stored to the IpduMContainerTxPdu in the context of the Transmit API.		
Template Description		
The ContainedIPdu data will instantly be stored to the ContainerIPdu in the context of the Transmit API.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduCollectionSemanticsEnum.queued		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00063

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduConfirmation		EcucBooleanParamDef
BSW Description		
This Parameter determines whether for this contained I-PDU a TxConfirmation shall be provided. If set to TRUE a TxConfirmation is issued. It is not used when an I-PDU is requested using the trigger transmit API. If this Parameter is omitted, the default value shall be used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduHandleId		EcucIntegerParamDef
BSW Description		
Handle Id of the ContainedPdu.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu which represents this ContainedPdu and is used for transmission.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduSendTimeout		EcucFloatParamDef
BSW Description		
Defines a ContainedPdu specific sender timeout which can reduce the ContainerPdu timer when this ContainedPdu is put inside the ContainerPdu. Defined in seconds.		
Template Description		
Defines a IPdu specific sender timeout which can reduce the ContainerIPdu timer when this containedIPdu is put inside the ContainerIPdu. This attribute is ignored on receiver side.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.timeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00052

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu	
BSW Parameter		**BSW Type**
IpduMContainedTxPduTrigger		EcucEnumerationParamDef
BSW Description		
Defines whether this Pdu triggers the sending of the ContainerPdu.		
Template Description		
Defines whether this IPdu does trigger the sending of the ContainerIPdu. This attribute is ignored on receiver side.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.trigger	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00053

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu/IpduMContainedTxPduTrigger
BSW Parameter	**BSW Type**
IPDUM_TRIGGER_ALWAYS	EcucEnumerationLiteralDef
BSW Description	
This Pdu directly triggers the sending of the ContainerPdu.	
Template Description	
Pdu will trigger the transmission of the data.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::PduCollectionTriggerEnum.always	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00055

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu/IpduMContainedTxPduTrigger
BSW Parameter	**BSW Type**
IPDUM_TRIGGER_NEVER	EcucEnumerationLiteralDef
BSW Description	
This Pdu does not triggers the sending of the ContainerPdu (other trigger criteria might still trigger sending of the ContainerPdu).	
Template Description	
Pdu will be buffered and will not trigger the transmission of the data.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::PduCollectionTriggerEnum.never	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00054

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMContainedTxPdu
BSW Parameter	**BSW Type**
IpduMPduUpdateBitPosition	EcucIntegerParamDef
BSW Description	
This value specifies where the PDU's Update-Bit is stored in the Container PDU (bit location of PDU's Update-Bit in the Container PDU).	
Template Description	
The updateIndicationBit specifies the bit location of ContainedIPdu Update-Bit in the Container PDU. It indicates to the receivers that the ContainedIPdu in the ContainerIPdu was updated.	

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainedIPduProps.updateIndicationBitPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00069

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig	
BSW Parameter		**BSW Type**
IpduMContainerRxPdu		EcucParamConfContainerDef
BSW Description		
Configuration of a receiver ContainerPdu which may collect several ContainedPdus.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu	
BSW Parameter		**BSW Type**
IpduMContainerHeaderSize		EcucEnumerationParamDef
BSW Description		
Defines the layout of the header information (header id and length).		
Template Description		
Defines whether and which header type is used (header id and length).		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.headerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00045

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu/IpduMContainerHeaderSize	
BSW Parameter		**BSW Type**
IPDUM_HEADERTYPE_LONG		EcucEnumerationLiteralDef
BSW Description		
Header size is 64 bit: * Header Id 32 bit * Dlc 32 bit		
Template Description		
Header size is 64 bit: * Header Id 32 bit * Dlc 32 bit		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.longHeader	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00046

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu/IpduMContainerHeaderSize	
BSW Parameter		**BSW Type**
IPDUM_HEADERTYPE_NONE		EcucEnumerationLiteralDef
BSW Description		
Static Container Layout		
Template Description		
No Header is used and the the location of each containedPdu in the ContainerPdu is statically configured.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.noHeader		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00071

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu/IpduMContainerHeaderSize	
BSW Parameter		**BSW Type**
IPDUM_HEADERTYPE_SHORT		EcucEnumerationLiteralDef
BSW Description		
Header size is 32 bit: * Header Id 24 bit * Dlc 8 bit		
Template Description		
Header size is 32 bit: * Header Id 24 bit * Dlc 8 bit.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.shortHeader		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00047

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu	
BSW Parameter		**BSW Type**
IpduMContainerPduProcessing		EcucEnumerationParamDef
BSW Description		

Defines whether the handling of this ContainerPdu shall be done in the context of the caller (IMMEDIATE) or in the next call to IpduM_MainFunctionRx or IpduM_MainFunctionTx respectively (DEFERRED).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu	
BSW Parameter		**BSW Type**
IpduMContainerQueueSize		EcucIntegerParamDef
BSW Description		
Defines a local queue for handling of each ContainerPdu. Defined in number of instances of this ContainerPdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu	
BSW Parameter		**BSW Type**
IpduMContainerRxAcceptContainedPdu		EcucEnumerationParamDef
BSW Description		
Defines for the received IpduMContainerRxPdu whether the list of referencing IpduMContainedRxPdus (via the reference IpduMContainedPduContainerRefRx) is a closed set.		
Template Description		
Defines whether this ContainerIPdu has a fixed set of containedIPdus assigned for reception.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.rxAcceptContainedIPdu		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00056

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu/IpduMContainerRxAcceptContainedPdu	
BSW Parameter		**BSW Type**
IPDUM_ACCEPT_ALL		EcucEnumerationLiteralDef
BSW Description		

The IpduMContainedRxPdus which are referencing this IpduMContainerRxPdu are expected inside this IpduMContainerRxPdu, but there may also occur other Pdus inside this IpduMContainerRxPdu as well. This also supports the case where no IpduMContainedRxPdu references the IpduMContainerRxPdu.	
Template Description	
No fixed set of containedIPdus is defined, any known containedIPdu (based on headerId) shall be expected within this ContainerIPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::RxAcceptContainedIPduEnum.acceptAll	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00058

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu/IpduMContainerRxAcceptContainedPdu	
BSW Parameter		**BSW Type**
IPDUM_ACCEPT_CONFIGURED		EcucEnumerationLiteralDef
BSW Description		
Only the IpduMContainedRxPdus which are referencing this IpduMContainerRxPdu are expected inside this IpduMContainerRxPdu.		
Template Description		
A fixed set of containedIPdus is defined. Only these assigned containedIPdus are expected in this ContainerIPdu. If a not assigned containedIPdu is received within this ContainerIPdu this containedIPdu is discarded.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::RxAcceptContainedIPduEnum.accept Configured		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00057

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu	
BSW Parameter		**BSW Type**
IpduMContainerRxHandleId		EcucIntegerParamDef
BSW Description		
Handle Id used by the PduR for RxIndication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMContainerRxPdu

BSW Parameter		**BSW Type**
IpduMContainerRxPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu which represents the container and is used for reception.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig	
BSW Parameter		**BSW Type**
IpduMContainerTxPdu		EcucParamConfContainerDef
BSW Description		
Configuration of a transmitted container Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu	
BSW Parameter		**BSW Type**
IpduMContainerHeaderSize		EcucEnumerationParamDef
BSW Description		
Defines the layout of the header information (header id and length).		
Template Description		
Defines whether and which header type is used (header id and length).		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.headerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00045

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu/IpduMContainerHeaderSize	
BSW Parameter		**BSW Type**
IPDUM_HEADERTYPE_LONG		EcucEnumerationLiteralDef
BSW Description		

Header size is 64 bit: * Header Id 32 bit * Dlc 32 bit	
Template Description	
Header size is 64 bit: * Header Id 32 bit * Dlc 32 bit	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.long Header	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00046

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu/IpduMContainerHeaderSize
BSW Parameter	**BSW Type**
IPDUM_HEADERTYPE_NONE	EcucEnumerationLiteralDef
BSW Description	
Static Container Layout	
Template Description	
No Header is used and the the location of each containedPdu in the ContainerPdu is statically configured.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.no Header	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00071

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu/IpduMContainerHeaderSize
BSW Parameter	**BSW Type**
IPDUM_HEADERTYPE_SHORT	EcucEnumerationLiteralDef
BSW Description	
Header size is 32 bit: * Header Id 24 bit * Dlc 8 bit	
Template Description	
Header size is 32 bit: * Header Id 24 bit * Dlc 8 bit.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPduHeaderTypeEnum.short Header	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00047

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu		
BSW Parameter		**BSW Type**	
IpduMContainerQueueSize		EcucIntegerParamDef	
BSW Description			
Defines a local queue for handling of each ContainerPdu. Defined in number of instances of this ContainerPdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu		
BSW Parameter		**BSW Type**	
IpduMContainerTxFirstContainedPduTrigger		EcucBooleanParamDef	
BSW Description			
Defines if the transmission of this IpduMContainerTxPdu shall be requested right after the first IpduMContainedTxPdu was put into it.			
Template Description			
Defines if the transmission of the ContainerIPdu shall be requested right after the first ContainedIPdu was put into it. This attribute shall be ignored on receiver side.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.containerTrigger			
Mapping Rule			**Mapping Type**
TRUE if ContainerIPdu.containerTrigger = firstContainedTrigger, else FALSE.			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00065

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu		
BSW Parameter		**BSW Type**	
IpduMContainerTxHandleId		EcucIntegerParamDef	
BSW Description			
Handle Id used by the PduR for TxConfirmation and for TriggerTransmit of the ContainerPdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu

BSW Parameter	**BSW Type**
IpduMContainerTxPduRef	EcucReferenceDef
BSW Description	
Reference to the Pdu which represents the container and is used for transmission.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu
BSW Parameter	**BSW Type**
IpduMContainerTxSendTimeout	EcucFloatParamDef
BSW Description	
When this timeout expires the ContainerPdu is triggered for sending. The respective timer is started when the first Pdu is put into the ContainerPdu. Defined in seconds.	
Template Description	
When this timeout expires the ContainerIPdu is sent out. The respective timer is started when the first Ipdu is put into the ContainerIPdu. This attribute is ignored on receiver side.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.containerTimeout	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00049

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu
BSW Parameter	**BSW Type**
IpduMContainerTxSizeThreshold	EcucIntegerParamDef
BSW Description	
Defines the size threshold in bytes which, when exceeded, triggers the sending of the ContainerPdu although the maxium Pdu size (PduLength parameter of Pdu object) has not been reached yet.	
Template Description	
Defines the size threshold which, when exceeded, triggers the sending of the ContainerIPdu although the maxium Pdu size has not been reached yet. Unit: byte.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.thresholdSize	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00048

BSW Module	**BSW Context**

IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu	
BSW Parameter		**BSW Type**
IpduMContainerTxTriggerMode		EcucEnumerationParamDef
BSW Description		
Defines whether this ContainerPdu is fetched via trigger transmit.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMContainerTxPdu	
BSW Parameter		**BSW Type**
IpduMUnusedAreasDefault		EcucIntegerParamDef
BSW Description		
IpduM fills not updated areas of the Container PDU with this byte-pattern.		
Template Description		
IPduM fills not updated areas of the ContainerPdu with this byte-pattern.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ContainerIPdu.unusedBitPattern		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00070

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig	
BSW Parameter		**BSW Type**
IpduMMaxTxBufferSize		EcucIntegerParamDef
BSW Description		
Maximum total size of all Tx buffers. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig	
BSW Parameter		**BSW Type**
IpduMMaxTxPathwayCnt		EcucIntegerParamDef
BSW Description		

Maximum number of transmitted IPdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig	
BSW Parameter		**BSW Type**
IpduMRxPathway		EcucParamConfContainerDef
BSW Description		
Contains the configuration parameters received I-PDUs by the IpduM module.		
Template Description		
A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selectorField. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer. A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu		
Mapping Rule		**Mapping Type**
Create container for each received multiplexed Ipdu (IPduTriggering that references the MultiplexedIPdu contains a reference to an "In" Pdu Port.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00024

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMRxPathway	
BSW Parameter		**BSW Type**
IpduMRxIndication		EcucParamConfContainerDef
BSW Description		
Contains the configuration for incoming RxIndication calls.		
Template Description		
A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selectorField. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer. A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu		
Mapping Rule		**Mapping Type**
Create container for each received multiplexed Ipdu (IPduTriggering that references the MultiplexedIPdu contains a reference to an "In" Pdu Port		full

Mapping Status	Mapping ID
valid	up_IpduM_00025

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication	
BSW Parameter		**BSW Type**
IpduMByteOrder		EcucEnumerationParamDef
BSW Description		
This parameter defines the ByteOrder for all segments (static and dynamic part) and for the selectorField within the MultiplexedPdu. The absolute position of a segment in the MultiplexedIPdu is determined by the definition of the ByteOrder parameter: If BIG_ENDIAN is specified, the SegmentPosition indicates the bit position of the most significant bit in an IPDU. If LITTLE_ENDIAN is specified, the SegmentPosition indicates the bit position of the least significant bit in an IPDU.		
Template Description		
MultiplexedIPdu.selectorFieldByteOrder: This attribute defines the order of the bytes of the selectorField and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3223] are restricting the usage of this attribute. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1. **SegmentPosition.segmentByteOrder**: This attribute defines the order of the bytes of the segment and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3224] are restricting the usage of this attribute.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldByteOrder, SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentByteOrder		
Mapping Rule		**Mapping Type**
A mix between Little Endian and Big Endian within a MultiplexedIPdu is not allowed.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00037

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication	
BSW Parameter		**BSW Type**
IpduMRxDynamicPart		EcucParamConfContainerDef
BSW Description		

This container contains the configuration for the dynamic part of incoming RxIndication calls. When an incoming received I-PDU's selector field matches the IpduMRxSelectorValue, the new outgoing I-PDU for the dynamic part is constructed as defined by the segments (defined in the IpduMDynamicSegment container) and sent out with the I-PDU ID referenced by IpduMOutgoingDynamicPduRef. In case no dynamic part shall be extracted from this received I-PDU this container does not exist. This use-case can occur in case a MultiplexedIPdu is received by an ECU which is only interested in the static part of the MultiplexedIPdu.	
Template Description	
One of the Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu. The selectorFieldCode specifies which Com IPdu is contained in the DynamicPart within a certain transmission of a multiplexed PDU.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::DynamicPartAlternative	
Mapping Rule	**Mapping Type**
Create container for each DynamicPartAlternative of the MultiplexedIPdu.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00032

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxDynamicPart
BSW Parameter	**BSW Type**
IpduMOutgoingDynamicPduRef	EcucReferenceDef
BSW Description	
When the new I-PDU is sent out it is sent with this I-PDU ID. Reference to the sent PDU representation in the ECU Configuration Description exchange file.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxDynamicPart
BSW Parameter	**BSW Type**
IpduMRxSelectorValue	EcucIntegerParamDef
BSW Description	
This is the selector value that this container refers to.	
Template Description	
The selector field is part of a multiplexed IPdu. It consists of contiguous bits. The value of the selector field selects the layout of the multiplexed part of the IPdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::DynamicPartAlternative.selectorFieldCode	
Mapping Rule	**Mapping Type**
1:1 mapping	full

Mapping Status	Mapping ID
valid	up_IpduM_00033

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication
BSW Parameter	**BSW Type**
IpduMRxDynamicSegment	EcucParamConfContainerDef
BSW Description	
The dynamic part of the multiplexed incoming I-Pdu (referenced by IpduMRxIndicationPduRef) can be separated into several segments. For each segment one IpduMRxDynamicSegment container shall be created that contains the location and the length of the segment. Please note that each configured segment will be copied into the destination I-Pdu that is referenced in the IpduMRxDynamicPart container and will be copied from the same location in the multiplexed incoming I-Pdu. The segment layout for all dynamic Parts is always identical.	
Template Description	
The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition	
Mapping Rule	**Mapping Type**
Shall be derived from segmentPosition elements that are aggregated by the DynamicPart.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00026

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxDynamicSegment
BSW Parameter	**BSW Type**
IpduMSegmentLength	EcucIntegerParamDef
BSW Description	
Length of the segment in bits.	
Template Description	
Data Length of the segment in bits.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00044

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxDynamicSegment
BSW Parameter	**BSW Type**

IpduMSegmentPosition	EcucIntegerParamDef
BSW Description	
Segments bit position in the multiplexed Pdu.	
Template Description	
Segments bit position relatively to the beginning of a multiplexed IPdu. Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00043

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication
BSW Parameter	**BSW Type**
IpduMRxHandleId	EcucIntegerParamDef
BSW Description	
This is the I-PDU ID of the incoming I-PDU. If an incoming RxIndication's I-PDU ID matches this value then it is unpacked according to the specification in this container.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication
BSW Parameter	**BSW Type**
IpduMRxIndicationPduRef	EcucReferenceDef
BSW Description	
Reference to the received Pdu representation in the ECU Configuration Description exchange file.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication	
BSW Parameter		**BSW Type**
IpduMRxStaticPart		EcucParamConfContainerDef
BSW Description		
This container contains the configuration for the static part of incoming RxIndication calls. On reception, the new outgoing I-PDU for the static part is constructed as defined by the segments (defined in the IpduMStaticSegment container) and sent out with the I-PDU ID referenced by IpduMOutgoingStaticPduRef.		
Template Description		
Some parts/signals of the I-PDU may be the same regardless of the selector field. Such a part is called static part. The static part is optional.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::StaticPart		
Mapping Rule		**Mapping Type**
Create container if StaticPart exists in the MultiplexedIPdu.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00041

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxStaticPart	
BSW Parameter		**BSW Type**
IpduMOutgoingStaticPduRef		EcucReferenceDef
BSW Description		
When the new I-PDU is sent out it is sent with this I-PDU ID. Reference to the sent Pdu representation in the ECU Configuration Description exchange file.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication	
BSW Parameter		**BSW Type**
IpduMRxStaticSegment		EcucParamConfContainerDef
BSW Description		
The static part of the multiplexed incoming I-Pdu (referenced by IpduMRxIndicationPduRef) can be separated into several segments. For each segment one IpduMRxStaticSegment container shall be created that contains the location and the length of the segment. Please note that each configured segment will be copied into the destination I-Pdu that is referenced in the IpduMRxStaticPart container and will be copied from the same location in the multiplexed incoming I-Pdu.		
Template Description		

The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition	
Mapping Rule	**Mapping Type**
Shall be derived from segmentPosition elements that are aggregated by the StaticPart.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00029

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxStaticSegment
BSW Parameter	**BSW Type**
IpduMSegmentLength	EcucIntegerParamDef
BSW Description	
Length of the segment in bits.	
Template Description	
Data Length of the segment in bits.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00044

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMRxStaticSegment
BSW Parameter	**BSW Type**
IpduMSegmentPosition	EcucIntegerParamDef
BSW Description	
Segments bit position in the multiplexed Pdu.	
Template Description	
Segments bit position relatively to the beginning of a multiplexed IPdu. Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00043

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication		
BSW Parameter		**BSW Type**	
IpduMSelectorField		EcucParamConfContainerDef	
BSW Description			
This contains the location and the length of the selector field.			
Template Description			
The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition			
Mapping Rule			**Mapping Type**
Can be derived from the segmentPosition.			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00038

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMSelectorField		
BSW Parameter		**BSW Type**	
IpduMSelectorFieldLength		EcucIntegerParamDef	
BSW Description			
Length of the selector field in bits.			
Template Description			
The size in bits of the selector field shall be configurable in a range of 1-16 bits. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldLength			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00039

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMRxPathway/IpduMRxIndication/IpduMSelectorField	
BSW Parameter		**BSW Type**
IpduMSelectorFieldPosition		EcucIntegerParamDef
BSW Description		
Selector field bit position in the multiplexed Pdu. Range: 0..63 for CAN/ LIN I-PDUs, 0..511 for CAN FD I-PDUs, 0..2031 for FlexRay I-PDUs.		
Template Description		

This parameter is necessary to describe the position of the selector field within the IPdu. Note that the absolute position of the selectorField in the MultiplexedIPdu is determined by the definition of the selectorFieldByteOrder attribute of the Multiplexed Pdu. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.
M2 Parameter
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldStartPosition

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00040

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig
BSW Parameter	**BSW Type**
IpduMTxPathway	EcucParamConfContainerDef
BSW Description	
Contains the configuration parameters transmitted I-PDUs by the IpduM module.	
Template Description	
A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selectorField. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer. A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu	
Mapping Rule	**Mapping Type**
Create container for each transmitted multiplexed Ipdu (IPduTriggering that references the MultiplexedIPdu contains a reference to an "Out" Pdu Port.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00001

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMTxPathway
BSW Parameter	**BSW Type**
IpduMTxRequest	EcucParamConfContainerDef
BSW Description	
This container is used to specify the configuration for Transmit requests. There will be one instance of this container for each I-PDU that can be requested for transmission (the outgoing I-PDUs) by the IpduM.	

Template Description	
A MultiplexedPdu (i.e. NOT a COM I-PDU) contains a DynamicPart, an optional StaticPart and a selectorField. In case of multiplexing this IPdu is routed between the Pdu Multiplexer and the Interface Layer. A multiplexer is used to define variable parts within an IPdu that may carry different signals. The receivers of such a IPdu can determine which signalPdus are transmitted by evaluating the selector field, which carries a unique selector code for each sub-part.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu	
Mapping Rule	**Mapping Type**
Create container for each transmitted multiplexed Ipdu	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00002

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMByteOrder		EcucEnumerationParamDef
BSW Description		
This parameter defines the ByteOrder for all segments (static and dynamic part) and for the selectorField within the MultiplexedPdu. The absolute position of a segment in the MultiplexedIPdu is determined by the definition of the ByteOrder parameter: If BIG_ENDIAN is specified, the SegmentPosition indicates the bit position of the most significant bit in an IPDU. If LITTLE_ENDIAN is specified, the SegmentPosition indicates the bit position of the least significant bit in an IPDU.		
Template Description		
MultiplexedIPdu.selectorFieldByteOrder: This attribute defines the order of the bytes of the selectorField and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3223] are restricting the usage of this attribute. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1. **SegmentPosition.segmentByteOrder**: This attribute defines the order of the bytes of the segment and the packing into the MultiplexedIPdu. Please consider that [constr_3247] and [constr_3224] are restricting the usage of this attribute.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldByteOrder, SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentByteOrder		
Mapping Rule		**Mapping Type**
A mix between Little Endian and Big Endian within a MultiplexedIPdu is not allowed.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00037

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest		
BSW Parameter		**BSW Type**	
IpduMIPduUnusedAreasDefault		EcucIntegerParamDef	
BSW Description			
IpduM module fills not used areas of an I-PDU with this bit-pattern If this attribute is omitted the IpduM module does not fill the I-PDU.			
Template Description			
AUTOSAR COM and AUTOSAR IPDUM are filling not used areas of an IPdu with this bit-pattern. This attribute is mandatory to avoid undefined behavior. This byte-pattern will be repeated throughout the IPdu. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.unusedBitPattern			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00023

BSW Module	BSW Context		
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest		
BSW Parameter		**BSW Type**	
IpduMInitialDynamicPart		EcucReferenceDef	
BSW Description			
Reference to the dynamic part that shall be used to initialize this multiplexed TX-I-PDU.			
Template Description			
Dynamic part that shall be used to initialize this multiplexed IPdu. Constraint: Only one "DynamicPartAlternative" in a "DynamicPart" shall be the initialDynamicPart.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::DynamicPartAlternative.initialDynamicPart			
Mapping Rule			**Mapping Type**
If the attribute initialDynamicPart is set to true then create this reference.			full
Mapping Status			**Mapping ID**
valid			up_IpduM_00022

BSW Module	BSW Context	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMOutgoingPduRef		EcucReferenceDef
BSW Description		
Reference to the PDU defining the outgoing I-PDU. When the outgoing I-PDU is sent this is the I-PDU ID to give it. It is the IpduM I-PDU ID of the assembled I-PDU.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMSelectorField		EcucParamConfContainerDef
BSW Description		
This contains the location and the length of the selector field.		
Template Description		
The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition		
Mapping Rule		**Mapping Type**
Can be derived from the segmentPosition.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00038

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMSelectorField	
BSW Parameter		**BSW Type**
IpduMSelectorFieldLength		EcucIntegerParamDef
BSW Description		
Length of the selector field in bits.		
Template Description		
The size in bits of the selector field shall be configurable in a range of 1-16 bits. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00039

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMSelectorField	
BSW Parameter		**BSW Type**
IpduMSelectorFieldPosition		EcucIntegerParamDef
BSW Description		

Selector field bit position in the multiplexed Pdu. Range: 0..63 for CAN/ LIN I-PDUs, 0..511 for CAN FD I-PDUs, 0..2031 for FlexRay I-PDUs.	
Template Description	
This parameter is necessary to describe the position of the selector field within the IPdu. Note that the absolute position of the selectorField in the MultiplexedIPdu is determined by the definition of the selectorFieldByteOrder attribute of the Multiplexed Pdu. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.selectorFieldStartPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00040

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest
BSW Parameter	**BSW Type**
IpduMTxConfirmationPduId	EcucIntegerParamDef
BSW Description	
Handle Id used by the PduR for confirmation (IpduM_TxConfirmation) and for TriggerTransmit (IpduM_TriggerTransmit). The existence of this parameter is essential for the PduR generation tool to actually find a symbolicNameValue for the OutgoingPdu.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest
BSW Parameter	**BSW Type**
IpduMTxDynamicPart	EcucParamConfContainerDef
BSW Description	

Configuration parameters for an instance of a TxRequest call into the IpduM. When a Tx Request with the IpduMTxDynamicHandleId is received by the IpduM, all segments (defined in the IpduMDynamicSegment container) are copied from the incoming I-PDU into the outgoing I-PDU buffer and then the send mode honored. This container is used by the dynamic part of a TxRequest configuration. Therefore, for each outgoing I-PDU there will be one instance of this container for the dynamic part.	
Template Description	
One of the Com IPdu alternatives that are transmitted in the Dynamic Part of the MultiplexedIPdu. The selectorFieldCode specifies which Com IPdu is contained in the DynamicPart within a certain transmission of a multiplexed PDU.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::DynamicPartAlternative	
Mapping Rule	**Mapping Type**
Create container for each DynamicPartAlternative of the MultiplexedIPdu.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00003

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicPart	
BSW Parameter		**BSW Type**
IpduMJitUpdate		EcucBooleanParamDef
BSW Description		
If configured to true fetch the data of this part Just-In-Time via the triggerTransmit API of the PduR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicPart	
BSW Parameter		**BSW Type**
IpduMTxDynamicConfirmation		EcucBooleanParamDef
BSW Description		
A transmit request can be confirmed by the lower layer. If this parameter is set to true a confirmation of the I-PDU in COM representing the dynamic part is generated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicPart

BSW Parameter	BSW Type
IpduMTxDynamicHandleId	EcucIntegerParamDef
BSW Description	
This defines an incoming handle id. When the handle of an incoming Tx Request matches this id, the configured dynamic segments are copied and the IpduMTxTriggerMode is honored.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicPart
BSW Parameter	**BSW Type**
IpduMTxDynamicPduRef	EcucReferenceDef
BSW Description	
Reference to the Pdu representation in the ECU Configuration Description exchange file to be transmitted.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest
BSW Parameter	**BSW Type**
IpduMTxDynamicSegment	EcucParamConfContainerDef
BSW Description	
The dynamic part of the multiplexed outgoing I-Pdu (referenced by IpduMOutgoingPduRef) can be separated into several segments. For each segment one IpduMTxDynamicSegment container shall be created that contains the location and the length of the segment. Please note that each configured segment will be copied out of the source I-Pdu that is referenced in the IpduMTxDynamicPart container and will be copied to the same location in the multiplexed outgoing I-Pdu. The segment layout for all dynamic Parts is always identical.	
Template Description	
The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition	

Mapping Rule	**Mapping Type**
Shall be derived from segmentPosition elements that are aggregated by the DynamicPart.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00013

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicSegment	
BSW Parameter		**BSW Type**
IpduMSegmentLength		EcucIntegerParamDef
BSW Description		
Length of the segment in bits.		
Template Description		
Data Length of the segment in bits.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00044

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxDynamicSegment	
BSW Parameter		**BSW Type**
IpduMSegmentPosition		EcucIntegerParamDef
BSW Description		
Segments bit position in the multiplexed Pdu.		
Template Description		
Segments bit position relatively to the beginning of a multiplexed IPdu. Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00043

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMTxStaticPart		EcucParamConfContainerDef
BSW Description		

Configuration parameters for an instance of a Tx_Request call into the IpduM. When a Tx Request with the IpduMTxStaticHandleId is received by the IpduM, all segments (defined in the IpduMStaticSegment container) are copied from the incoming I-PDU into the outgoing I-PDU buffer and then the send mode honored. This container is used for the static part of a TxRequest configuration. Therefore, for each outgoing I-PDU there will be one instance of this container for the static part if it exists.		
Template Description		
Some parts/signals of the I-PDU may be the same regardless of the selector field. Such a part is called static part. The static part is optional.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::StaticPart		
Mapping Rule		**Mapping Type**
Create container if StaticPart exists in the MultiplexedIPdu.		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00009

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticPart	
BSW Parameter		**BSW Type**
IpduMJitUpdate		EcucBooleanParamDef
BSW Description		
If configured to true fetch the data of this part Just-In-Time via the triggerTransmit API of the PduR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticPart	
BSW Parameter		**BSW Type**
IpduMTxStaticConfirmation		EcucBooleanParamDef
BSW Description		
A transmit request can be confirmed by the lower layer. If this parameter is set to true a confirmation of the I-PDU in COM representing the static part is generated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticPart	
BSW Parameter		**BSW Type**

IpduMTxStaticHandleId	EcucIntegerParamDef
BSW Description	
This defines an incoming handle id. When the handle of an incoming Tx Request matches this id, the configured static segments are copied and the IpduMTxTriggerMode is honored.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticPart	
BSW Parameter		**BSW Type**
IpduMTxStaticPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu representation in the ECU Configuration Description exchange file to be transmitted.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMTxStaticSegment		EcucParamConfContainerDef
BSW Description		
The static part of the multiplexed outgoing I-Pdu (referenced by IpduMOutgoingPduRef) can be separated into several segments. For each segment one IpduMTxStaticSegment container shall be created that contains the location and the length of the segment. Please note that each segment in the source I-Pdu that is referenced in the IpduMTxStaticPart container will be copied to the same location in the multiplexed outgoing I-Pdu.		
Template Description		
The StaticPart and the DynamicPart can be separated in multiple segments within the multiplexed PDU. The ISignalIPdus are copied bit by bit into the MultiplexedIPdu. If the space of the first segment is 5 bits large than the first 5 bits of the ISignalIPdu are copied into this first segment and so on.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition		
Mapping Rule		**Mapping Type**

Shall be derived from segmentPosition elements that are aggregated by the StaticPart.	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00016

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticSegment	
BSW Parameter		**BSW Type**
IpduMSegmentLength		EcucIntegerParamDef
BSW Description		
Length of the segment in bits.		
Template Description		
Data Length of the segment in bits.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00044

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest/IpduMTxStaticSegment	
BSW Parameter		**BSW Type**
IpduMSegmentPosition		EcucIntegerParamDef
BSW Description		
Segments bit position in the multiplexed Pdu.		
Template Description		
Segments bit position relatively to the beginning of a multiplexed IPdu. Note that the absolute position of the segment in the MultiplexedIPdu is determined by the definition of the segmentByteOrder attribute of the SegmentPosition. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the IPdu. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the IPdu. In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SegmentPosition.segmentPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00043

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMConfig/IpduMTxPathway/IpduMTxRequest	
BSW Parameter		**BSW Type**
IpduMTxTriggerMode		EcucEnumerationParamDef
BSW Description		
Selects whether to send the multiplexed I-PDU immediately or at some later date.		
Template Description		

IPduM can be configured to send a transmission request for the new multiplexed IPdu to the PDU-Router because of the trigger conditions/ modes that are described in the TriggerMode enumeration. In a complete System Description this attribute is mandatory. If a MultiplexedPdu is received by a Pdu Gateway and is not delivered to the IPduM but routed directly to a bus interface then the content of the MulitplexedPdu doesn't need to be described in the System Extract/Ecu Extract. To support this use case the multiplicity is set to 0..1.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::MultiplexedIPdu.triggerMode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_IpduM_00007

BSW Module	**BSW Context**	
IpduM	IpduM	
BSW Parameter		**BSW Type**
IpduMGeneral		EcucParamConfContainerDef
BSW Description		
Contains the general configuration parameters of IpduM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMHeaderByteOrder		EcucEnumerationParamDef

BSW Description	
This parameter defines the ByteOrder of the headers inside a Container I-PDU.	
Template Description	
Defines the byteOrder of the header in ContainerIPdus.	
M2 Parameter	
SystemTemplate::System.containerIPduHeaderByteOrder	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
IpduM	IpduM/IpduMGeneral/IpduMHeaderByteOrder	
BSW Parameter		**BSW Type**
IPDUM_BIG_ENDIAN		EcucEnumerationLiteralDef
BSW Description		
Headers inside a Container I-PDU shall be ordered big endian.		
Template Description		
Most significant byte shall come at the lowest address (also known as BigEndian or as Motorola-Format)		
M2 Parameter		
GenericStructure::GeneralTemplateClasses::PrimitiveTypes::ByteOrderEnum.mostSignificantByteFirst		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00060

BSW Module	BSW Context	
IpduM	IpduM/IpduMGeneral/IpduMHeaderByteOrder	
BSW Parameter		**BSW Type**
IPDUM_LITTLE_ENDIAN		EcucEnumerationLiteralDef
BSW Description		
Headers inside a Container I-PDU shall be ordered little endian.		
Template Description		
Most significant byte shall come highest address (also known as LittleEndian or as Intel-Format)		
M2 Parameter		
GenericStructure::GeneralTemplateClasses::PrimitiveTypes::ByteOrderEnum.mostSignificantByteLast		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_IpduM_00061

BSW Module	BSW Context	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMMetaDataSupport		EcucBooleanParamDef
BSW Description		

This parameter enables/disables the support of meta-data feature. true: enabled false: disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMRxTimeBase		EcucFloatParamDef
BSW Description		
The period between successive calls to IpduM_MainFunctionRx in seconds. This parameter may be used by the IpduM generator to transform the values of the reception related timing configuration parameters of the IpduM module to internal implementation specific counter or tick values. The IpduM module's internal timing handling is implementation specific. The IpduM module (generator) may rely on the fact that IpduM_MainFunctionRx is scheduled according to the value configured here.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMStaticPartExists		EcucBooleanParamDef
BSW Description		
This is to allow optimizations in the case the IpduM will never be used with a static part. Note that this is a pre-compile option. If this is set to False then it will not be possible to add static parts after compilation. True: A static part may exist. False: A static part will never exist.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMTxTimeBase		EcucFloatParamDef
BSW Description		
The period between successive calls to IpduM_MainFunctionTx in seconds. This parameter may be used by the IpduM generator to transform the values of the reception related timing configuration parameters of the IpduM module to internal implementation specific counter or tick values. The IpduM module's internal timing handling is implementation specific. The IpduM module (generator) may rely on the fact that IpduM_MainFunctionTx is scheduled according to the value configured here.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
IpduM	IpduM/IpduMGeneral	
BSW Parameter		**BSW Type**
IpduMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Active/Deactivate the version information API. true: version information activated false: version information deactivated		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
IpduM	IpduM	
BSW Parameter		**BSW Type**
IpduMPublishedInformation		EcucParamConfContainerDef
BSW Description		
Additional published parameters not covered by CommonPublishedInformation container. Note that these parameters do not have any configuration class setting, since they are published information.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
IpduM	IpduM/IpduMPublishedInformation	
BSW Parameter		**BSW Type**
IpduMRxDirectComInvocation		EcucBooleanParamDef
BSW Description		
If set to TRUE the COM invocation optimization as defined in IPDUM140 is implemented.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

C.1.4 SecOc Mapping

BSW Module	**BSW Context**	
SecOC	SecOC	
BSW Parameter		**BSW Type**
SecOCGeneral		EcucParamConfContainerDef
BSW Description		
Contains the general configuration parameters of the SecOC module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCGeneral	
BSW Parameter		**BSW Type**
SecOCDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCGeneral	
BSW Parameter		**BSW Type**
SecOCEnableForcedPassOverride		EcucBooleanParamDef
BSW Description		
When this configuration option is set to TRUE then the functionality inside the function SecOC_VerifyStatusOverride to forcibly override the VerifyStatus to "Pass" is enabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCGeneral	
BSW Parameter		**BSW Type**
SecOCMainFunctionPeriodRx		EcucFloatParamDef
BSW Description		
Allows to configure the time for the MainFunction of the Rx path (as float in seconds).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCGeneral	
BSW Parameter		**BSW Type**
SecOCMainFunctionPeriodTx		EcucFloatParamDef
BSW Description		
Allows to configure the time for the MainFunction of the Tx path (as float in seconds).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SecOC	SecOC/SecOCGeneral		
BSW Parameter		**BSW Type**	
SecOCMaxAlignScalarType		EcucStringParamDef	
BSW Description			
The scalar type which has the maximum alignment restrictions on the given platform. This type can be e.g. uint8, uint16 or uint32.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCGeneral		
BSW Parameter		**BSW Type**	
SecOCQueryFreshnessValue		EcucEnumerationParamDef	
BSW Description			
This parameter specifies if the freshness value shall be determined through a C-function (CD) or a software component (SW-C).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCGeneral		
BSW Parameter		**BSW Type**	
SecOCVerificationStatusCallout		EcucFunctionNameDef	
BSW Description			
Entry address of the customer specific call out routine which shall be invoked in case of a verification attempt.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
SecOC	SecOC/SecOCGeneral

BSW Parameter		BSW Type
SecOCVersionInfoApi		EcucBooleanParamDef
BSW Description		
If true the SecOC_GetVersionInfo API is available.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCGeneral	
BSW Parameter		**BSW Type**
SecOcIgnoreVerificationResult		EcucBooleanParamDef
BSW Description		
The result of the authentication process (e.g. MAC Verify) is ignored after the first try and the SecOC proceeds like the result was a success. The calculation of the authenticator is still done, only its result will be ignored. - true: enabled (verification result is ignored). - false: disabled (verification result is NOT ignored).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC	
BSW Parameter		**BSW Type**
SecOCRxPduProcessing		EcucParamConfContainerDef
BSW Description		
Contains the parameters to configure the RxPdus to be verified by the SecOC module.		
Template Description		
If useAsCryptographicPdu is not set or set to false this IPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information (Freshness Counter and an Authenticator). If useAsCryptographicPdu is set to true this IPdu contains the Authenticator for a payload that is transported in a separate message. The separate Authentic IPdu is described by the Pdu that is referenced with the payload reference from this SecuredIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu		
Mapping Rule		**Mapping Type**

This container shall be created for every SecuredIPdu that is received by the regarded Ecu. The information whether the SecuredIPdu is transmitted or received by the Ecu shall be derived from PduTriggering.iPduPort reference. If an IPduPort of the Ecu with the communicationDirection = out is referenced then the SecuredIPdu is transmitted. If an IPduPort of the Ecu with the communicationDirection = in is referenced then the SecuredIPdu is received.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCAuthDataFreshnessLen		EcucIntegerParamDef
BSW Description		
The length of the external authentic PDU data in bits (uint16).		
Template Description		
This attribute defines the length in bits of the authentic PDU data that is passed to the SWC that verifies and generates the Freshness.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.authDataFreshnessLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00005

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCAuthDataFreshnessStartPosition		EcucIntegerParamDef
BSW Description		
This value determines the start position in bits (uint16) of the Authentic PDU that shall be passed on to the Freshness SWC. The bit position starts counting from the MSB of the first byte of the PDU.		
Template Description		
This value determines the start position in bits of the Authentic PDU that shall be passed on to the SWC that verifies and generates the Freshness.. The bit position starts counting from the MSB of the first byte of the PDU.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.authDataFreshnessStartPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00003

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCAuthInfoTxLength		EcucIntegerParamDef
BSW Description		

This parameter defines the length in bits of the authentication code to be included in the payload of the Secured I-PDU.	
Template Description	
This attribute defines the length in bits of the authentication code to be included in the payload of the authenticated Pdu.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationAuthenticationProps.authInfoTxLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCAuthenticationBuildAttempts		EcucIntegerParamDef
BSW Description		
This parameter specifies the number of authentication build attempts.		
Template Description		
This attribute specifies the number of authentication build attempts.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.authenticationBuildAttempts		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00001

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCAuthenticationVerifyAttempts		EcucIntegerParamDef
BSW Description		
This parameter specifies the number of authentication verify attempts that are to be carried out when the verification of the authentication information failed for a given Secured I-PDU. If zero is set, then only one authentication verification attempt is done.		
Template Description		
This attribute defines the additional number of authentication attempts that are to be carried out when the generation of the authentication information failed for a given SecuredIPdu. If zero is set than only one authentication attempt is done.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.authenticationRetries		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00002

BSW Module	**BSW Context**
SecOC	SecOC/SecOCRxPduProcessing

BSW Parameter		BSW Type
SecOCDataId		EcucIntegerParamDef
BSW Description		
This parameter defines a unique numerical identifier for the Secured I-PDU.		
Template Description		
This attribute defines a unique numerical identifier for the Secured I-PDU.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.dataId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCFreshnessValueId		EcucIntegerParamDef
BSW Description		
This parameter defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.		
Template Description		
This attribute defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.freshnessValueId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCFreshnessValueLength		EcucIntegerParamDef
BSW Description		
This parameter defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.		
Template Description		
This attribute defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationFreshnessProps.freshnessValueLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCFreshnessValueTxLength		EcucIntegerParamDef	
BSW Description			
This parameter defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the parameter is 0 no Freshness Value is included in the Secured I-PDU.			
Template Description			
This attribute defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the attribute is 0 no Freshness Value is included in the Secured I-PDU.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationFreshnessProps.freshnessValueTxLength			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCReceptionOverflowStrategy		EcucEnumerationParamDef	
BSW Description			
This parameter defines the overflow strategy for receiving PDUs			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCReceptionQueueSize		EcucIntegerParamDef	
BSW Description			
This parameter defines the queue size in case the overflow strategy for receiving PDUs is set to QUEUE.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCRxAuthServiceConfigRef		EcucSymbolicNameReferenceDef	
BSW Description			
This reference is used to define which crypto service function is called for authentication.			
Template Description			
This attribute defines the authentication algorithm used for MAC generation and verification.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationAuthenticationProps.authAlgorithm			
Mapping Rule			**Mapping Type**
The attribute authAlgorithm value shall be used as input to decide which choice reference shall be used in the Ecuc.			partial
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCRxAuthenticPduLayer		EcucParamConfContainerDef	
BSW Description			
This container specifies the Pdu that is transmitted by the SecOC module to the PduR after the Mac was verified.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxAuthenticPduLayer		
BSW Parameter		**BSW Type**	
SecOCPduType		EcucEnumerationParamDef	
BSW Description			
This parameter defines API Type to use for communication with PduR.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxAuthenticPduLayer

BSW Parameter		**BSW Type**
SecOCRxAuthenticLayerPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCRxPduSecuredArea		EcucParamConfContainerDef
BSW Description		
This container specifies an area in the Authentic I-Pdu that will be the input to the Authenticator verification algorithm. If this container does not exist in the configuration the complete Authentic I-Pdu will be the input to the Authenticator verification algorithm.		
Template Description		
This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaOffset		
Mapping Rule		**Mapping Type**
Create container if the securedAreaOffset and securedAreaLength is defined for the SecuredIPdu in the System Description.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00015

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxPduSecuredArea	
BSW Parameter		**BSW Type**
SecOCSecuredRxPduLength		EcucIntegerParamDef
BSW Description		
This parameter defines the length (in bytes) of the area within the Pdu which is secured		
Template Description		
This attribute defines the length in bytes of the area within the payload Pdu which will be secured.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00014

BSW Module	**BSW Context**

SecOC	SecOC/SecOCRxPduProcessing/SecOCRxPduSecuredArea		
BSW Parameter		**BSW Type**	
SecOCSecuredRxPduOffset		EcucIntegerParamDef	
BSW Description			
This parameter defines the start position (offset in bytes) of the area within the Pdu which is secured			
Template Description			
This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaOffset			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_SecOC_00013

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCRxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCRxSecuredPduLayer		EcucChoiceContainerDef	
BSW Description			
This container specifies the Pdu that is received by the SecOC module from the PduR. For this Pdu the Mac verification is provided.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer		
BSW Parameter		**BSW Type**	
SecOCRxSecuredPdu		EcucParamConfContainerDef	
BSW Description			
This container specifies the Pdu that is received by the SecOC module from the PduR. For this Pdu the Mac verification is provided.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPdu

BSW Parameter		BSW Type
SecOCAuthPduHeaderLength		EcucIntegerParamDef
BSW Description		
This parameter indicates the length (in bytes) of the Secured I-PDU Header in the Secured I-PDU. The length of zero means there's no header in the PDU.		
Template Description		
This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu.useSecuredPduHeader		
Mapping Rule		**Mapping Type**
The SecOCAuthPduHeaderLength value shall be derived from useSecuredPdu Header in the following way: If useSecuredIPduHeader is set to "noHeader" the value shall be 0. If useSecuredIPduHeader is set to "securedPduHeader08Bit" the value shall be 1. If useSecuredIPduHeader is set to "securedPduHeader16Bit" the value shall be 2. If useSecuredIPduHeader is set to "securedPduHeader32Bit" the value shall be 4.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00009

BSW Module	BSW Context	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPdu	
BSW Parameter		**BSW Type**
SecOCRxSecuredLayerPduId		EcucIntegerParamDef
BSW Description		
PDU identifier assigned by SecOC module. Used by PduR for SecOC_PduRRxIndication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPdu	
BSW Parameter		**BSW Type**
SecOCRxSecuredLayerPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPdu	
BSW Parameter		**BSW Type**
SecOCSecuredRxPduVerification		EcucBooleanParamDef
BSW Description		
This parameter defines whether the signature authentication or MAC verification shall be performed on this Secured I-PDU. If set to false, the SecOC module extracts the Authentic I-PDU from the Secured I-PDU without verification.		
Template Description		
This attribute defines the bypassing of signature authentication or MAC verification in the receiving ECU. If not defined or set to true the signature authentication or MAC verification shall be performed for the SecuredIPdu. If set to false the signature authentication or MAC verification shall not be performed for the SecuredIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::IPduPort.rxSecurityVerification		
Mapping Rule		**Mapping Type**
SecOCSecuredRxPduVerification is true if rxSecurityVerification is not defined, otherwise SecOCSecuredRxPduVerification = rxSecurityVerification.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00004

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer	
BSW Parameter		**BSW Type**
SecOCRxSecuredPduCollection		EcucParamConfContainerDef
BSW Description		
This container specifies two Pdus that are received by the SecOC module from the PduR and a message linking between them. SecOCRxAuthenticPdu contains the original Authentic I-PDU, i.e. the secured data, and the SecOCRxCryptographicPdu contains the Authenticator, i.e. the actual Authentication Information.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection	
BSW Parameter		**BSW Type**

SecOCRxAuthenticPdu	EcucParamConfContainerDef
BSW Description	
This container specifies the PDU (that is received by the SecOC module from the PduR) which contains the Secured I-PDU Header and the Authentic I-PDU.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCRxAuthenticPdu	
BSW Parameter		**BSW Type**
SecOCAuthPduHeaderLength		EcucIntegerParamDef
BSW Description		
This parameter indicates the length (in bytes) of the Secured I-PDU Header in the Secured I-PDU. The length of zero means there's no header in the PDU.		
Template Description		
This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu.useSecuredPduHeader		
Mapping Rule		**Mapping Type**
The SecOCAuthPduHeaderLength value shall be derived from useSecuredPdu Header in the following way: If useSecuredIPduHeader is set to "noHeader" the value shall be 0. If useSecuredIPduHeader is set to "securedPduHeader08Bit" the value shall be 1. If useSecuredIPduHeader is set to "securedPduHeader16Bit" the value shall be 2. If useSecuredIPduHeader is set to "securedPduHeader32Bit" the value shall be 4.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00009

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCRxAuthenticPdu	
BSW Parameter		**BSW Type**
SecOCRxAuthenticPduId		EcucIntegerParamDef
BSW Description		
PDU identifier of the Authentic I-PDU assigned by SecOC module. Used by PduR for SecOC_PduRRxIndication.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCRxAuthenticPdu	
BSW Parameter		**BSW Type**
SecOCRxAuthenticPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection	
BSW Parameter		**BSW Type**
SecOCRxCryptographicPdu		EcucParamConfContainerDef
BSW Description		
This container specifies the Cryptographic Pdu that is received by the SecOC module from the PduR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCRxCryptographicPdu	
BSW Parameter		**BSW Type**
SecOCRxCryptographicPduId		EcucIntegerParamDef
BSW Description		
PDU identifier of the Cryptographic I-PDU assigned by SecOC module. Used by PduR for SecOC_PduRRxIndication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCRxCryptographicPdu	
BSW Parameter		**BSW Type**
SecOCRxCryptographicPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection	
BSW Parameter		**BSW Type**
SecOCSecuredRxPduVerification		EcucBooleanParamDef
BSW Description		
This parameter defines whether the signature authentication or MAC verification shall be performed on this Secured I-PDU. If set to false, the SecOC module extracts the Authentic I-PDU from the Secured I-PDU without verification.		
Template Description		
This attribute defines the bypassing of signature authentication or MAC verification in the receiving ECU. If not defined or set to true the signature authentication or MAC verification shall be performed for the SecuredIPdu. If set to false the signature authentication or MAC verification shall not be performed for the SecuredIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::IPduPort.rxSecurityVerification		
Mapping Rule		**Mapping Type**
SecOCSecuredRxPduVerification is true if rxSecurityVerification is not defined, otherwise SecOCSecuredRxPduVerification = rxSecurityVerification.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00004

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection	
BSW Parameter		**BSW Type**
SecOCUseMessageLink		EcucParamConfContainerDef
BSW Description		

SecOC links an Authentic I-PDU and Cryptographic I-PDU together by repeating a specific part (Message Linker) of the Authentic I-PDU in the Cryptographic I-PDU.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCUseMessageLink
BSW Parameter	**BSW Type**
SecOCMessageLinkLen	EcucIntegerParamDef
BSW Description	
Length of the Message Linker inside the Authentic I-PDU in bits.	
Template Description	
SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the length in bits of the messageLinker.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.messageLinkLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SecOC_00007

BSW Module	**BSW Context**
SecOC	SecOC/SecOCRxPduProcessing/SecOCRxSecuredPduLayer/SecOCRxSecuredPduCollection/SecOCUseMessageLink
BSW Parameter	**BSW Type**
SecOCMessageLinkPos	EcucIntegerParamDef
BSW Description	
The position of the Message Linker inside the Authentic I-PDU in bits.	
Template Description	
SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the startPosition in bits of the messageLinker.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.messageLinkPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SecOC_00008

BSW Module	**BSW Context**
SecOC	SecOC/SecOCRxPduProcessing

BSW Parameter		**BSW Type**
SecOCSameBufferPduRef		EcucReferenceDef
BSW Description		
This reference is used to collect Pdus that are using the same SecOC buffer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCUseAuthDataFreshness		EcucBooleanParamDef
BSW Description		
A Boolean value that indicates if a part of the Authentic-PDU shall be passed on to the SWC that verifies and generates the Freshness. If it is set to TRUE, the values SecOCAuthDataFreshnessStartPosition and SecOCAuthDataFreshnessLen must be set to specify the bit position and length within the Authentic-PDU.		
Template Description		
This attribute describes whether a part of AuthenticPdu contained in a SecuredIPdu shall be passed on to the SWC that verifies and generates the Freshness. The part of the Authentic-PDU is defined by the authDataFreshnessStartPosition and authDataFreshnessLength.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::IPduPort.useAuthDataFreshness		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00004

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCRxPduProcessing	
BSW Parameter		**BSW Type**
SecOCVerificationStatusPropagationMode		EcucEnumerationParamDef
BSW Description		
This parameter is used to describe the propagation of the status of each verification attempt from the SecOC module to SWCs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

SecOC	SecOC		
BSW Parameter		**BSW Type**	
SecOCSameBufferPduCollection		EcucParamConfContainerDef	
BSW Description			
SecOCBuffer configuration that may be used by a collection of Pdus.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCSameBufferPduCollection		
BSW Parameter		**BSW Type**	
SecOCBufferLength		EcucIntegerParamDef	
BSW Description			
This parameter defines the Buffer in bytes that is used by the SecOC module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SecOC	SecOC		
BSW Parameter		**BSW Type**	
SecOCTxPduProcessing		EcucParamConfContainerDef	
BSW Description			
Contains the parameters to configure the TxPdus to be secured by the SecOC module.			
Template Description			
If useAsCryptographicPdu is not set or set to false this IPdu contains the payload of an Authentic IPdu supplemented by additional Authentication Information (Freshness Counter and an Authenticator). If useAsCryptographicPdu is set to true this IPdu contains the Authenticator for a payload that is transported in a separate message. The separate Authentic IPdu is described by the Pdu that is referenced with the payload reference from this SecuredIPdu.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu			
Mapping Rule			**Mapping Type**

This container shall be created for every SecuredIPdu that is transmitted by the regarded Ecu. The information whether the SecuredIPdu is transmitted or received by the Ecu shall be derived from PduTriggering.iPduPort reference. If an IPduPort of the Ecu with the communicationDirection = out is referenced then the SecuredIPdu is transmitted. If an IPduPort of the Ecu with the communicationDirection = in is referenced then the SecuredIPdu is received.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCTxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCAuthInfoTxLength		EcucIntegerParamDef	
BSW Description			
This parameter defines the length in bits of the authentication code to be included in the payload of the Secured I-PDU.			
Template Description			
This attribute defines the length in bits of the authentication code to be included in the payload of the authenticated Pdu.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationAuthenticationProps.authInfoTxLength			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCTxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCAuthenticationBuildAttempts		EcucIntegerParamDef	
BSW Description			
This parameter specifies the number of authentication build attempts.			
Template Description			
This attribute specifies the number of authentication build attempts.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.authenticationBuildAttempts			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_SecOC_00001

BSW Module	**BSW Context**		
SecOC	SecOC/SecOCTxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCDataId		EcucIntegerParamDef	
BSW Description			
This parameter defines a unique numerical identifier for the Secured I-PDU.			
Template Description			

This attribute defines a unique numerical identifier for the Secured I-PDU.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.dataId	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCFreshnessValueId		EcucIntegerParamDef
BSW Description		
This parameter defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.		
Template Description		
This attribute defines the Id of the Freshness Value. The Freshness Value might be a normal counter or a time value.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.freshnessValueId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCFreshnessValueLength		EcucIntegerParamDef
BSW Description		
This parameter defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.		
Template Description		
This attribute defines the complete length in bits of the Freshness Value. As long as the key doesn't change the counter shall not overflow. The length of the counter shall be determined based on the expected life time of the corresponding key and frequency of usage of the counter.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationFreshnessProps.freshnessValueLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCFreshnessValueTxLength		EcucIntegerParamDef

BSW Description	
This parameter defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the parameter is 0 no Freshness Value is included in the Secured I-PDU.	
Template Description	
This attribute defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the attribute is 0 no Freshness Value is included in the Secured I-PDU.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationFreshnessProps.freshnessValueTxLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
SecOC	SecOC/SecOCTxPduProcessing
BSW Parameter	**BSW Type**
SecOCProvideTxTruncatedFreshnessValue	EcucBooleanParamDef
BSW Description	
This parameter specifies if the Tx query freshness function provides the truncated freshness info instead of generating this by SecOC In this case, SecOC shall add this data to the Authentic PDU instead of truncating the freshness value.	
Template Description	
This attribute defines the length in bits of the Freshness Value to be included in the payload of the Secured I-PDU. This length is specific to the least significant bits of the complete Freshness Counter. If the attribute is 0 no Freshness Value is included in the Secured I-PDU.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationFreshnessProps.freshnessValueTxLength	
Mapping Rule	**Mapping Type**
This parameter shall be set to true if SecureCommunicationFreshnessProps.freshnessValueTxLength is set to a value that is smaller compared to the SecureCommunicationFreshnessProps.freshnessValueLength of the regarded Pdu.	full
Mapping Status	**Mapping ID**
valid	up_SecOC_00006

BSW Module	BSW Context
SecOC	SecOC/SecOCTxPduProcessing
BSW Parameter	**BSW Type**
SecOCSameBufferPduRef	EcucReferenceDef
BSW Description	
This reference is used to collect Pdus that are using the same SecOC buffer.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**

valid	

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCTxAuthServiceConfigRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference is used to define which crypto service function is called for authentication.		
Template Description		
This attribute defines the authentication algorithm used for MAC generation and verification.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationAuthenticationProps.authAlgorithm		
Mapping Rule		**Mapping Type**
The attribute authAlgorithm value shall be used as input to decide which choice reference shall be used in the Ecuc.		partial
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCTxAuthenticPduLayer		EcucParamConfContainerDef
BSW Description		
This container specifies the Pdu that is received by the SecOC module from the PduR. For this Pdu the Mac generation is provided.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxAuthenticPduLayer	
BSW Parameter		**BSW Type**
SecOCPduType		EcucEnumerationParamDef
BSW Description		
This parameter defines API Type to use for communication with PduR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxAuthenticPduLayer		
BSW Parameter		**BSW Type**	
SecOCTxAuthenticLayerPduId		EcucIntegerParamDef	
BSW Description			
PDU identifier assigned by SecOC module. Used by PduR for SecOC_PduRTransmit.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxAuthenticPduLayer		
BSW Parameter		**BSW Type**	
SecOCTxAuthenticLayerPduRef		EcucReferenceDef	
BSW Description			
Reference to the global Pdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing		
BSW Parameter		**BSW Type**	
SecOCTxPduSecuredArea		EcucParamConfContainerDef	
BSW Description			
This container specifies an area in the Authentic I-Pdu that will be the input to the Authenticator generation algorithm. If this container does not exist in the configuration the complete Authentic I-Pdu will be the input to the Authenticator generation algorithm.			
Template Description			
This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaOffset			
Mapping Rule			**Mapping Type**
Create container if the securedAreaOffset and securedAreaLength is defined for the SecuredIPdu in the System Description.			full
Mapping Status			**Mapping ID**
valid			up_SecOC_00012

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxPduSecuredArea	
BSW Parameter		**BSW Type**
SecOCSecuredTxPduLength		EcucIntegerParamDef
BSW Description		
This parameter defines the length (in bytes) of the area within the Pdu which shall be secured		
Template Description		
This attribute defines the length in bytes of the area within the payload Pdu which will be secured.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00011

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxPduSecuredArea	
BSW Parameter		**BSW Type**
SecOCSecuredTxPduOffset		EcucIntegerParamDef
BSW Description		
This parameter defines the start position (offset in bytes) of the area within the Pdu which shall be secured		
Template Description		
This attribute defines the start position (offset in byte) of the area within the payload Pdu which will be secured.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.securedAreaOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00010

BSW Module	BSW Context	
SecOC	SecOC/SecOCTxPduProcessing	
BSW Parameter		**BSW Type**
SecOCTxSecuredPduLayer		EcucChoiceContainerDef
BSW Description		
This container specifies the Pdu that is transmitted by the SecOC module to the PduR after the Mac was generated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer		
BSW Parameter		**BSW Type**	
SecOCTxSecuredPdu		EcucParamConfContainerDef	
BSW Description			
This container specifies one Pdu that is transmitted by the SecOC module to the PduR after the Mac was generated. This Pdu contains the cryptographic information.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPdu		
BSW Parameter		**BSW Type**	
SecOCAuthPduHeaderLength		EcucIntegerParamDef	
BSW Description			
This parameter indicates the length (in bytes) of the Secured I-PDU Header in the Secured I-PDU. The length of zero means there's no header in the PDU.			
Template Description			
This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu.useSecuredPduHeader			
Mapping Rule			**Mapping Type**
The SecOCAuthPduHeaderLength value shall be derived from useSecuredPduHeader in the following way: If useSecuredIPduHeader is set to "noHeader" the value shall be 0. If useSecuredIPduHeader is set to "securedPduHeader08Bit" the value shall be 1. If useSecuredIPduHeader is set to "securedPduHeader16Bit" the value shall be 2. If useSecuredIPduHeader is set to "securedPduHeader32Bit" the value shall be 4.			full
Mapping Status			**Mapping ID**
valid			up_SecOC_00009

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPdu		
BSW Parameter		**BSW Type**	
SecOCTxSecuredLayerPduId		EcucIntegerParamDef	
BSW Description			
PDU identifier assigned by SecOC module. Used by PduR for confirmation (SecOC_PduRTxConfirmation) and for TriggerTransmit.			
Template Description			

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPdu	
BSW Parameter		**BSW Type**
SecOCTxSecuredLayerPduRef		EcucReferenceDef
BSW Description		
Reference to the global Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer	
BSW Parameter		**BSW Type**
SecOCTxSecuredPduCollection		EcucParamConfContainerDef
BSW Description		
This container specifies the Pdu that is transmitted by the SecOC module to the PduR after the Mac was generated. Two separate Pdus are transmitted to the PduR: Authentic I-PDU and Cryptographic I-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection	
BSW Parameter		**BSW Type**
SecOCTxAuthenticPdu		EcucParamConfContainerDef
BSW Description		
This container specifies the PDU (that is transmitted by the SecOC module to the PduR) which contains the Secured I-PDU Header and the Authentic I-PDU.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCTxAuthenticPdu	
BSW Parameter		**BSW Type**
SecOCAuthPduHeaderLength		EcucIntegerParamDef
BSW Description		
This parameter indicates the length (in bytes) of the Secured I-PDU Header in the Secured I-PDU. The length of zero means there's no header in the PDU.		
Template Description		
This attribute defines the size of the header which is inserted into the SecuredIPdu. If this attribute is set to anything but noHeader, the SecuredIPdu contains the Secured I-PDU Header to indicate the length of the AuthenticIPdu. The AuthenticIPdu contains the original payload, i.e. the secured data.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecuredIPdu.useSecuredPduHeader		
Mapping Rule		**Mapping Type**
The SecOCAuthPduHeaderLength value shall be derived from useSecuredPdu Header in the following way: If useSecuredIPduHeader is set to "noHeader" the value shall be 0. If useSecuredIPduHeader is set to "securedPduHeader08Bit" the value shall be 1. If useSecuredIPduHeader is set to "securedPduHeader16Bit" the value shall be 2. If useSecuredIPduHeader is set to "securedPduHeader32Bit" the value shall be 4.		full
Mapping Status		**Mapping ID**
valid		up_SecOC_00009

BSW Module	**BSW Context**	
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCTxAuthenticPdu	
BSW Parameter		**BSW Type**
SecOCTxAuthenticPduId		EcucIntegerParamDef
BSW Description		
PDU identifier of the Authentic I-PDU assigned by SecOC module. Used by PduR for confirmation (SecOC_PduRTxConfirmation) and for TriggerTransmit.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCTxAuthenticPdu		
BSW Parameter		**BSW Type**	
SecOCTxAuthenticPduRef		EcucReferenceDef	
BSW Description			
Reference to the global Pdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection		
BSW Parameter		**BSW Type**	
SecOCTxCryptographicPdu		EcucParamConfContainerDef	
BSW Description			
This container specifies the Cryptographic Pdu that is transmitted by the SecOC module to the PduR after the Mac was generated.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCTxCryptographicPdu		
BSW Parameter		**BSW Type**	
SecOCTxCryptographicPduId		EcucIntegerParamDef	
BSW Description			
PDU identifier of the Cryptographic I-PDU assigned by SecOC module. Used by PduR for confirmation (SecOC_PduRTxConfirmation) and for TriggerTransmit.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCTxCryptographicPdu		
BSW Parameter		**BSW Type**	
SecOCTxCryptographicPduRef		EcucReferenceDef	
BSW Description			
Reference to the global Pdu.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection		
BSW Parameter		**BSW Type**	
SecOCUseMessageLink		EcucParamConfContainerDef	
BSW Description			
SecOC links an Authentic I-PDU and Cryptographic I-PDU together by repeating a specific part (Message Linker) of the Authentic I-PDU in the Cryptographic I-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCUseMessageLink		
BSW Parameter		**BSW Type**	
SecOCMessageLinkLen		EcucIntegerParamDef	
BSW Description			
Length of the Message Linker inside the Authentic I-PDU in bits.			
Template Description			
SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the length in bits of the messageLinker.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.messageLinkLength			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_SecOC_00007

BSW Module	BSW Context
SecOC	SecOC/SecOCTxPduProcessing/SecOCTxSecuredPduLayer/SecOCTxSecuredPduCollection/SecOCUseMessageLink
BSW Parameter	**BSW Type**
SecOCMessageLinkPos	EcucIntegerParamDef
BSW Description	
The position of the Message Linker inside the Authentic I-PDU in bits.	
Template Description	
SecOC links an AuthenticIPdu and CryptographicIPdu together by repeating a specific part (Message Linker) of the AuthenticIPdu in the CryptographicIPdu. This attribute defines the startPosition in bits of the messageLinker.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::SecureCommunicationProps.messageLinkPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SecOC_00008

BSW Module	BSW Context
SecOC	SecOC/SecOCTxPduProcessing
BSW Parameter	**BSW Type**
SecOCUseTxConfirmation	EcucBooleanParamDef
BSW Description	
A Boolean value that indicates if the function SecOC_SPduTxConfirmation shall be called for this PDU.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.1.5 PduR

BSW Module	BSW Context
PduR	PduR
BSW Parameter	**BSW Type**
PduRBswModules	EcucParamConfContainerDef
BSW Description	
Each container describes a specific BSW module (upper/CDD/lower/IpduM) that the PDU Router shall interface to. The reason to have it as own configuration container instead of implication of the routing path is to be able to configure CDDs properly and to force module's to be used in a post-build situation even though no routing is made to/from this module (future configurations may include these modules).	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRBswModuleRef		EcucForeignReferenceDef
BSW Description		
This is a reference to one BSW module's configuration (i.e. not the ECUC parameter definition template). Example, there could be several configurations of LinIf and this reference selects one of them.		
Template Description		
Head of the configuration of one Module. A Module can be a BSW module as well as the RTE and ECU Infrastructure. As part of the BSW module description, the EcucModuleConfigurationValues element has two different roles: The recommendedConfiguration contains parameter values recommended by the BSW module vendor. The preconfiguredConfiguration contains values for those parameters which are fixed by the implementation and cannot be changed. These two EcucModuleConfigurationValues are used when the base EcucModuleConfigurationValues (as part of the base ECU configuration) is created to fill parameters with initial values.		
M2 Parameter		
ECUCDescriptionTemplate::EcucModuleConfigurationValues		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRCancelReceive		EcucBooleanParamDef
BSW Description		
Specifies if the Transport protocol module supports the CancelReceive API or not. Value true the API is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context
PduR	PduR/PduRBswModules
BSW Parameter	**BSW Type**
PduRCancelTransmit	EcucBooleanParamDef
BSW Description	
Specifies if the BSW module supports the CancelTransmit API or not. Value true the API is supported.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
PduR	PduR/PduRBswModules
BSW Parameter	**BSW Type**
PduRChangeParameterApi	EcucBooleanParamDef
BSW Description	
This parameter, if set to true, enables the PduR_<Up>ChangeParameter Api for this Module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
PduR	PduR/PduRBswModules
BSW Parameter	**BSW Type**
PduRCommunicationInterface	EcucBooleanParamDef
BSW Description	
Specifies if the BSW module supports the Communication Interface APIs or not. Value true the APIs are supported. A module can have both Communication Interface APIs and Transport Protocol APIs (e.g. the COM module).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**

valid	

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRLowerModule		EcucBooleanParamDef
BSW Description		
The PduRLowerModule will decide who will call the APIs and who will implement the APIs. For example, if the CanIf module is referenced then the PDU Router module will implement the PduR_CanIfRxIndication API. And the PDUR module will call the CanIf_Transmit API. Other APIs are of course also covered. An upper module can also be an lower module (e.g. the IpduM module).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRRetransmission		EcucBooleanParamDef
BSW Description		
If set to true this means that the destination transport protocol module will use the retransmission feature. This parameter might be set to false if the retransmission feature is not used, even though the destination transport protocol is supporting it. This parameter is only valid for transport protocol modules and gateway operations. If transmission from a local upper layer module this module will handle the retransmission.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRTransportProtocol		EcucBooleanParamDef
BSW Description		
The PDU Router module shall use the API parameters specified for transport protocol interface.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRTriggertransmit		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the TriggerTransmit API or not. Value true means that the BSW module supports the TriggerTransmit interface which a lower layer module can call and also that it can call the TriggerTransmit interface of an upper layer module. Value false means that the BSW module does not support the TriggerTransmit interface which a lower layer module can call and also that it shall not call the TriggerTransmit interface of an upper layer module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRTxConfirmation		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the TxConfirmation API or not. Value true the API is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRBswModules	
BSW Parameter		**BSW Type**
PduRUpperModule		EcucBooleanParamDef
BSW Description		

<table>
<tr><td colspan="2">The PduRUpperModule will decide who will call the APIs and who will implement the APIs.

For example, if the COM module is referenced then the PDU Router module will implement the PduR_Transmit API. And the PDUR module will call the Com_RxIndication API. Other APIs are of course also covered.

An upper module can also be an lower module (e.g. the IpduM module).</td></tr>
<tr><td colspan="2">Template Description</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">M2 Parameter</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Mapping Rule</td><td>Mapping Type</td></tr>
<tr><td></td><td>local</td></tr>
<tr><td>Mapping Status</td><td>Mapping ID</td></tr>
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</table>

<table>
<tr><td>BSW Module</td><td colspan="2">BSW Context</td></tr>
<tr><td>PduR</td><td colspan="2">PduR/PduRBswModules</td></tr>
<tr><td colspan="2">BSW Parameter</td><td>BSW Type</td></tr>
<tr><td colspan="2">PduRUseTag</td><td>EcucBooleanParamDef</td></tr>
<tr><td colspan="3">BSW Description</td></tr>
<tr><td colspan="3">This parameter, if set to true, enables the usage of the tag (<up>) in the following API calls:
* PduR_<Up>CancelReceive
* PduR_<Up>CancelTransmit

Example: If used by COM and the parameter is enabled the PduR_ComCancelTransmit is used.

The background is that upper layer modules differ in usage of this tag (e.g. COM is using the tag, DCM is not).</td></tr>
<tr><td colspan="3">Template Description</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">M2 Parameter</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="2">Mapping Rule</td><td>Mapping Type</td></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><td colspan="2">Mapping Status</td><td>Mapping ID</td></tr>
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</table>

<table>
<tr><td>BSW Module</td><td colspan="2">BSW Context</td></tr>
<tr><td>PduR</td><td colspan="2">PduR</td></tr>
<tr><td colspan="2">BSW Parameter</td><td>BSW Type</td></tr>
<tr><td colspan="2">PduRGeneral</td><td>EcucParamConfContainerDef</td></tr>
<tr><td colspan="3">BSW Description</td></tr>
<tr><td colspan="3">This container is a subcontainer of PduR and specifies the general configuration parameters of the PDU Router.</td></tr>
<tr><td colspan="3">Template Description</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">M2 Parameter</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="2">Mapping Rule</td><td>Mapping Type</td></tr>
<tr><td colspan="2"></td><td>local</td></tr>
</table>

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
PduR	PduR/PduRGeneral	
BSW Parameter		**BSW Type**
PduRDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRGeneral	
BSW Parameter		**BSW Type**
PduRMetaDataSupport		EcucBooleanParamDef
BSW Description		
Enable support for MetaData handling. The MetaData is defined by the referenced MetaDataType of the global PDU definitions. This feature may be used for efficient address based routing and generic CAN-CAN-routing, where the MetaData contains the CAN ID.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRGeneral	
BSW Parameter		**BSW Type**
PduRVersionInfoApi		EcucBooleanParamDef
BSW Description		
If true the PduR_GetVersionInfo API is available.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
PduR	PduR/PduRGeneral	
BSW Parameter		**BSW Type**
PduRZeroCostOperation		EcucBooleanParamDef
BSW Description		
If set the PduR configuration generator will report an error if zero-cost-operation cannot be fulfilled. This parameter shall be seen as an input requirement to the configuration generator.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR	
BSW Parameter		**BSW Type**
PduRRoutingPaths		EcucParamConfContainerDef
BSW Description		
Represents one table of routing paths. This routing table allows multiple configurations that can be used to create several routing tables in the same configuration. This is mainly used for post-build (e.g. post-build selectable) but can be used by pre-compile and link-time for variant handling.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRConfigurationId		EcucIntegerParamDef
BSW Description		
Identification of the configuration of the PduR configuration. This identification can be read using the PduR API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRDestPdu		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of PduRRoutingPath and specifies one destination for the PDU to be routed.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRDestPdu	
BSW Parameter		**BSW Type**
PduRDestPduDataProvision		EcucEnumerationParamDef
BSW Description		
Specifies how data are provided: direct (as part of the Transmit call) or via the TriggerTransmit callback function. Only required for non-TP gatewayed I-PDUs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRDestPdu	
BSW Parameter		**BSW Type**
PduRDestPduHandleId		EcucIntegerParamDef
BSW Description		
PDU identifier assigned by PDU Router. Used by communication interface and transport protocol modules for confirmation (PduR_<Lo>TxConfirmation) and for TriggerTransmit (PduR_<Lo>TriggerTransmit).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRDestPdu	
BSW Parameter		**BSW Type**
PduRDestPduRef		EcucReferenceDef
BSW Description		
Destination PDU reference; reference to unique PDU identifier which shall be used by the PDU Router instead of the source PDU ID when calling the related function of the destination module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRDestPdu	
BSW Parameter		**BSW Type**
PduRTransmissionConfirmation		EcucBooleanParamDef
BSW Description		
This parameter is only for communication interfaces. Transport protocol modules will always call the TxConfirmation function. If set the destination communication interface module will call the TxConfirmation. However the TxConfirmation may be not called due to error. So the PduR shall not block until the TxConfirmation is called. One background for this parameter is for the PduR to know when all modules have confirmed a multicast operation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRMaxRoutingPathCnt		EcucIntegerParamDef
BSW Description		
Maximum number of RoutingPaths in all RoutingTables. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRMaxRoutingPathGroupCnt		EcucIntegerParamDef
BSW Description		
Maximum number of RoutingPathGroups. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRRoutingPath		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of PduRRoutingTable and specifies the routing path of a PDU.		
Template Description		
IPduMapping: Arranges those IPdus that are transferred by the gateway from one channel to the other in pairs and defines the mapping between them. **PduTriggering**: The PduTriggering describes on which channel the IPdu is transmitted. The Pdu routing by the PduR is only allowed for subclasses of IPdu. Depending on its relation to entities such channels and clusters it can be unambiguously deduced whether a fan-out is handled by the Pdu router or the Bus Interface. If the fan-out is specified between different clusters it shall be handled by the Pdu Router. If the fan-out is specified between different channels of the same cluster it shall be handled by the Bus Interface. **TpConfig**: Contains all configuration elements for AUTOSAR TP.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::IPduMapping,SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering,SystemTemplate::TransportProtocols::TpConfig		
Mapping Rule		**Mapping Type**

For each MultiplatformGateway.pduMapping; for each SignalPdu-Multiplexed Pdu Connection; for each IPduTriggering; for each TpConfig create one Pdu RRoutingPath.	full
Mapping Status	**Mapping ID**
valid	up_PduR_00003

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRDefaultValue		EcucParamConfContainerDef
BSW Description		
Specifies the default value of the I-PDU. Only required for gateway operation and if at least one PDU specified by PduRDestPdu uses TriggerTransmit Data provision. Represented as an array of IntegerParamDef.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::TargetIPduRef.defaultValue		
Mapping Rule		**Mapping Type**
Container should be created if PduMappingDefaulValue is described in the Sys-T		full
Mapping Status		**Mapping ID**
valid		up_PduR_00004

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath/PduRDefaultValue	
BSW Parameter		**BSW Type**
PduRDefaultValueElement		EcucParamConfContainerDef
BSW Description		
Each value element is represented by the element and the position in an array.		
Template Description		
The default value consists of a number of elements. Each element is one byte long and the number of elements is specified by SduLength.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::DefaultValueElement		
Mapping Rule		**Mapping Type**
Container must be created for each DefaultValueElement that is aggregated by PduMappingDefaultValue		full
Mapping Status		**Mapping ID**
valid		up_PduR_00005

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath/PduRDefaultValue/PduRDefault ValueElement	
BSW Parameter		**BSW Type**
PduRDefaultValueElement		EcucIntegerParamDef
BSW Description		
The default value consists of a number of elements. Each element is one byte long and the number of elements is specified by SduLength. The position of this parameter in the container is specified by the PduRElementBytePosition parameter.		

Template Description	
The integer value of a freely defined data byte.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Multiplatform::DefaultValueElement.elementByteValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_PduR_00006

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath/PduRDefaultValue/PduRDefault ValueElement	
BSW Parameter		**BSW Type**
PduRDefaultValueElementBytePosition		EcucIntegerParamDef
BSW Description		
This parameter specifies the byte position of the element within the default value		
Template Description		
This attribute specifies the byte position of the element within the default value		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::DefaultValueElement.elementPosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_PduR_00007

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRDestPduRRef		EcucReferenceDef
BSW Description		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRDestTxBufferRef		EcucReferenceDef
BSW Description		
Reference to a buffer in the PduR. This buffer is required for communication interface gatewaying, and for transport protocol gatewaying.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRQueueDepth		EcucIntegerParamDef
BSW Description		
This parameter defines the queue depth for this routing path.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRRoutingPathGroupRef		EcucReferenceDef
BSW Description		
Reference to routing path destinations.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRSrcPduRRef		EcucReferenceDef
BSW Description		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRRoutingPath	
BSW Parameter		**BSW Type**
PduRTpThreshold		EcucIntegerParamDef
BSW Description		
This parameter is only relevant for TP routings. When configured, it enables on-the-fly routing and defines the number of bytes which must have been received before transmission on the destination bus may start. When omitted, direct TP routing is enforced. The PduRouter shall ensure that a buffer is allocated for this routing path which is at least as large as the threshold.		
Template Description		
Optionally defines the to be configured Pdu Router TpChunkSize for this routing relation.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Multiplatform::IPduMapping.pdurTpChunkSize		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_PduR_00008

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRRoutingPathGroup		EcucParamConfContainerDef
BSW Description		
This container groups routing path destinations. Destinations are used instead of routing paths since a routing path can be 1:n. It is desirable to be able to enable/disable a specific bus (i.e. a destination) rather than a routing path. Of course it is possible to create groups that covers specific routing paths as well. Enabling and disabling of routing path groups are made using the PduR API		
Template Description		
The AUTOSAR PduR will enable and disable the sending of configurable groups of IPdus during runtime according to the AUTOSAR PduR specification.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PdurIPduGroup		
Mapping Rule		**Mapping Type**
Create container for each existing PduRIPduGroup that is connected to the regarded Ecu		full
Mapping Status		**Mapping ID**
valid		up_PduR_00001

BSW Module	BSW Context	
PduR	PduR/PduRRoutingPaths/PduRRoutingPathGroup	
BSW Parameter		**BSW Type**
PduRIsEnabledAtInit		EcucBooleanParamDef
BSW Description		

If set to true this routing path group will be enabled after initializing the PDU Router module (i.e. enabled in the PduR_Init function).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRRoutingPathGroup	
BSW Parameter		**BSW Type**
PduRRoutingPathGroupId		EcucIntegerParamDef
BSW Description		
Identification of the routing group. The identification will be used by the disable/enable API in the PDU Router module API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRSrcPdu		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of PduRRoutingPath and specifies the source of the PDU to be routed.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRSrcPdu	
BSW Parameter		**BSW Type**
PduRSourcePduBlockSize		EcucIntegerParamDef
BSW Description		
Minimum amount of buffer space required by receiving transport protocol layer to continue reception.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRSrcPdu	
BSW Parameter		**BSW Type**
PduRSourcePduHandleId		EcucIntegerParamDef
BSW Description		
PDU identifier assigned by PDU Router.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRSrcPdu	
BSW Parameter		**BSW Type**
PduRSrcPduRef		EcucReferenceDef
BSW Description		
Source PDU reference; reference to unique PDU identifier which shall be used for the requested PDU Router operation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRSrcPdu	
BSW Parameter		**BSW Type**
PduRSrcPduUpTxConf		EcucBooleanParamDef
BSW Description		
When enabled, the TxConfirmation will be forwarded to the upper layer. Prerequisites: Lower layer and upper layer support TxConfirmation.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths	
BSW Parameter		**BSW Type**
PduRTxBuffer		EcucParamConfContainerDef
BSW Description		
Specifies a buffer used for gatewaying via communication interfaces or transport protocols.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
PduR	PduR/PduRRoutingPaths/PduRTxBuffer	
BSW Parameter		**BSW Type**
PduRPduMaxLength		EcucIntegerParamDef
BSW Description		
Length of the Tx buffer in bytes. This parameter limits the size of buffered routed PDUs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.1.6 Nm Interface

BSW Module	**BSW Context**	
Nm	Nm	
BSW Parameter		**BSW Type**
NmChannelConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of the bus channel(s). The channel parameter shall be harmonized within the whole communication stack.		
Template Description		
Set of NM nodes coordinated with use of the NM algorithm.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster		
Mapping Rule		**Mapping Type**

Create Container for each existing NmCluster.	full
Mapping Status	**Mapping ID**
valid	up_Nm_00015

BSW Module	**BSW Context**	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmActiveCoordinator		EcucBooleanParamDef
BSW Description		
This parameter indicates whether a NM channel - part of a Nm Coordination cluster - will be coordinated actively (NmActiveCoordinator = TRUE) or passively (NmActiveCoordinator = FALSE).		
Template Description		
This attribute indicates the role the NM Coordinator will have on this channel.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmCoordinatorRole		
Mapping Rule		**Mapping Type**
If nmCoordinatorRole is set to Active then NmActiveCoordinator shall be present and set to true. If nmCoordinatorRole is set to Passive then NmActiveCoordinator shall be present and set to false.		full
Mapping Status		**Mapping ID**
valid		up_Nm_00020

BSW Module	**BSW Context**	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmBusType		EcucChoiceContainerDef
BSW Description		
Template Description		
CanNmCluster: Can specific NmCluster attributes **FlexrayNmCluster**: FlexRay specific NM cluster attributes. **UdpNmCluster**: Udp specific NmCluster attributes		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster,SystemTemplate::NetworkManagement::FlexrayNmCluster,SystemTemplate::NetworkManagement::UdpNmCluster		
Mapping Rule		**Mapping Type**
Bus Type can be derived from the BusNm Configuration in the System Description.		full
Mapping Status		**Mapping ID**
valid		up_Nm_00018

BSW Module	**BSW Context**	
Nm	Nm/NmChannelConfig/NmBusType	
BSW Parameter		**BSW Type**
NmGenericBusNmConfig		EcucParamConfContainerDef

BSW Description	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmChannelConfig/NmBusType/NmGenericBusNmConfig
BSW Parameter	**BSW Type**
NmGenericBusNmPrefix	EcucStringParamDef
BSW Description	
The prefix which identifies the generic <BusNm>. This will be used to determine the API name to be called by Nm for the provided interfaces of the <BusNm>. This string will used for the module prefix before the "_" character in the API call name.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmChannelConfig/NmBusType/NmGenericBusNmConfig
BSW Parameter	**BSW Type**
NmGenericBusNmShutdownTime	EcucFloatParamDef
BSW Description	
This parameter shall be used to calculate shutdown delay time.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmChannelConfig/NmBusType
BSW Parameter	**BSW Type**
NmStandardBusNmConfig	EcucParamConfContainerDef
BSW Description	

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Nm	Nm/NmChannelConfig/NmBusType/NmStandardBusNmConfig	
BSW Parameter		**BSW Type**
NmStandardBusType		EcucEnumerationParamDef
BSW Description		
Identifies the bus type of the channel for standard AUTOSAR <BusNm>s and is used to determine which set of API calls to be called by Nm for the <BusNm>s. Note: The Ethernet bus' NM is UdpNm !		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmChannelSleepMaster		EcucBooleanParamDef
BSW Description		
This parameter shall be set to indicate if the sleep of this network can be absolutely decided by the local node only and that no other nodes can oppose that decision. If this parameter is set to TRUE, the Nm shall assume that the channel is always ready to go to sleep and that no calls to Nm_RemoteSleepIndication or Nm_RemoteSleepCancellation will be made from the <BusNm> representing this channel. If this parameter is set to FALSE, the Nm shall not assume that the network is ready to sleep until a call has been made to Nm_RemoteSleepCancellation.		
Template Description		
This parameter shall be set to indicate if the sleep of this network can be absolutely decided by the local node only and that no other nodes can oppose that decision.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmChannelSleepMaster		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Nm_00021

BSW Module	**BSW Context**

Nm	Nm/NmChannelConfig
BSW Parameter	**BSW Type**
NmComMChannelRef	EcucSymbolicNameReferenceDef
BSW Description	
Reference to the corresponding ComM Channel.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmChannelConfig
BSW Parameter	**BSW Type**
NmComUserDataSupport	EcucBooleanParamDef
BSW Description	
This parameter indicates whether on a NM channel user data is accessed via Com signals or by SetUserData API.	
Template Description	
Defines whether this NmCluster contributes to the partial network mechanism.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping,SystemTemplate::NetworkManagement::NmCluster.nmPncParticipation	
Mapping Rule	**Mapping Type**
If an NmPdu contains user data defined via the existence of NmPdu.iSignalToIPduMapping (and is consequently handled via the PduR and Com) then NmComUserDataSupport shall be set to true. If there exists a NmCluster which has a NmNode which refers to a NmEcu and that NmEcu in turn references the EcuInstance for which this Ecu Configuration is derived and the NmCluster.nmPncParticipation has the value "true" or is not defined then NmComUserDataSupport shall be set to true.	full
Mapping Status	**Mapping ID**
valid	up_Nm_00024

BSW Module	**BSW Context**
Nm	Nm/NmChannelConfig
BSW Parameter	**BSW Type**
NmCoordClusterIndex	EcucIntegerParamDef
BSW Description	
If this parameter is undefined for a channel, the corresponding bus does not belong to an NM coordination cluster.	
Template Description	
NmCoordinationCluster identification number.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmNode.nmCoordCluster	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00022

BSW Module	BSW Context	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmPassiveModeEnabled		EcucBooleanParamDef
BSW Description		
This parameter indicates whether a NM channel is active,e.g. can request communication and keep the bus awake, or passive, e.g. can just be woken up and kept awake by other ECUs.		
Template Description		
Enables support of the Passive Mode. The passive mode is configurable per channel.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmPassiveModeEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping.		full
Mapping Status		**Mapping ID**
valid		up_Nm_00025

BSW Module	BSW Context	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmStateReportEnabled		EcucBooleanParamDef
BSW Description		
Specifies if the NMS shall be set for the corresponding network. false: No NMS shall be set true: The NMS shall be set		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmChannelConfig	
BSW Parameter		**BSW Type**
NmStateReportSignalRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the signal for setting the NMS by calling Com_SendSignal for the respective channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
Nm	Nm/NmChannelConfig

BSW Parameter	BSW Type
NmSynchronizingNetwork	EcucBooleanParamDef
BSW Description	
If this parameter is true, then this network is a synchronizing network for the NM coordination cluster which it belongs to. The network is expected to call Nm_SynchronizationPoint() at regular intervals.	
Template Description	
If this parameter is true, then this network is a synchronizing network for the NM coordination cluster which it belongs to. The network is expected to call Nm_SynchronizationPoint() at regular intervals.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmCluster.nmSynchronizingNetwork	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00016

BSW Module	BSW Context	
Nm	Nm	
BSW Parameter		**BSW Type**
NmGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains all global configuration parameters of the Nm Interface.		
Template Description		
A NM coordinator is an ECU, which is connected to at least two busses, and where the requirement exists that shutdown of NM of at least two of these busses (also referred to as coordinated busses) has to be performed synchronously.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCoordinator		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig	
BSW Parameter		**BSW Type**
NmGlobalConstants		EcucParamConfContainerDef
BSW Description		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalConstants	
BSW Parameter		**BSW Type**

NmNumberOfChannels	EcucIntegerParamDef
BSW Description	
Number of NM channels allowed within one ECU.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmGlobalConfig
BSW Parameter	**BSW Type**
NmGlobalFeatures	EcucParamConfContainerDef
BSW Description	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Nm	Nm/NmGlobalConfig/NmGlobalFeatures
BSW Parameter	**BSW Type**
NmBusSynchronizationEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling bus synchronization support of the <BusNm>s. This feature is required for NM Coordinator nodes only.	
Template Description	
Enables bus synchronization support.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmBusSynchronizationEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00002

BSW Module	**BSW Context**
Nm	Nm/NmGlobalConfig/NmGlobalFeatures
BSW Parameter	**BSW Type**
NmCarWakeUpCallout	EcucFunctionNameDef
BSW Description	
Name of the callout function to be called if Nm_CarWakeUpIndication() is called. If this parameter is not configured, the Nm will call BswM_Nm_CarWakeUpIndication.	

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmCarWakeUpCalloutHeader		EcucStringParamDef
BSW Description		
Defines the header file which declares the callout function configured via NmCarWakeUpCallout.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmCarWakeUpRxEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables CWU detection. FALSE - CarWakeUp not supported TRUE - CarWakeUp supported		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmComControlEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Communication Control support.		
Template Description		
Enables the Communication Control support.		
M2 Parameter		

SystemTemplate::NetworkManagement::NmEcu.nmComControlEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00009

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmCoordinatorSupportEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling NM Coordinator support.		
Template Description		
A NM coordinator is an ECU, which is connected to at least two busses, and where the requirement exists that shutdown of NM of at least two of these busses (also referred to as coordinated busses) has to be performed synchronously.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCoordinator		
Mapping Rule		**Mapping Type**
If NmCoordinators are defined set this parameter to true.		full
Mapping Status		**Mapping ID**
valid		up_Nm_00005

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmCoordinatorSyncSupport		EcucBooleanParamDef
BSW Description		
Enables/disables the coordinator synchronisation support.		
Template Description		
Switch for enabling NmCoordinatorSync (coordination of nested busses) support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCoordinator.nmCoordSyncSupport		
Mapping Rule		**Mapping Type**
If NmCoordinator is present then the value of NmCoordinatorSyncSupport shall be set to the value of nmCoordSyncSupport.		full
Mapping Status		**Mapping ID**
valid		up_Nm_00023

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmGlobalCoordinatorTime		EcucFloatParamDef
BSW Description		
This parameter defines the maximum shutdown time of a connected and coordinated NM-Cluster. Note:This includes nested connections.		
Template Description		
This attribute defines the maximum shutdown time (in seconds) of a connected and coordinated NM-Cluster.		
M2 Parameter		

SystemTemplate::NetworkManagement::NmCoordinator.nmGlobalCoordinatorTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00011

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmNodeDetectionEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Node Detection feature.		
Template Description		
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmNodeDetectionEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
obsolete		up_Nm_00007

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmNodeIdEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling transmission of the source node identifier in NM messages.		
Template Description		
Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmNodeIdEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
obsolete		up_Nm_00013

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmPduRxIndicationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the PDU Rx Indication.		
Template Description		

Switch for enabling the PDU Rx Indication.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmPduRxIndicationEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00001

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmRemoteSleepIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling Remote Sleep Indication support. This feature is required for a Gateway or Nm Coordinator functionality. Note that this feature should not be used if all NM channels have Passive Mode enabled.		
Template Description		
Switch for enabling remote sleep indication support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRemoteSleepIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Nm_00008

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmRepeatMsgIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Repeat Message Bit Indication.		
Template Description		
Switch for enabling the Repeat Message Bit Indication. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRepeatMsgIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
obsolete		up_Nm_00010

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmStateChangeIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Network Management state change notification.		

Template Description	
Enables the CAN Network Management state change notification.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmStateChangeIndEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00012

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalFeatures	
BSW Parameter		**BSW Type**
NmUserDataEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling User Data support.		
Template Description		
Switch for enabling user data support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmUserDataEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Nm_00004

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig	
BSW Parameter		**BSW Type**
NmGlobalProperties		EcucParamConfContainerDef
BSW Description		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Nm	Nm/NmGlobalConfig/NmGlobalProperties	
BSW Parameter		**BSW Type**
NmCycletimeMainFunction		EcucFloatParamDef
BSW Description		
The period between successive calls to the Main Function of the NM Interface in seconds.		
Template Description		
The period between successive calls to the Main Function of the NM Interface in seconds.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmCycletimeMainFunction		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Nm_00014

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalProperties	
BSW Parameter		**BSW Type**
NmDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Nm	Nm/NmGlobalConfig/NmGlobalProperties	
BSW Parameter		**BSW Type**
NmVersionInfoApi		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling Version Info API support.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.1.7 EcuC

BSW Module	**BSW Context**	
EcuC	EcuC	
BSW Parameter		**BSW Type**
EcucConfigSet		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the global PduCollection.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet	
BSW Parameter		**BSW Type**
EcucPduCollection		EcucParamConfContainerDef
BSW Description		
Collection of all Pdu objects flowing through the Com-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection	
BSW Parameter		**BSW Type**
MetaDataType		EcucParamConfContainerDef
BSW Description		
Meta data serves to transport information through the AUTOSAR layers. It is transported by the PduInfoType structure via a separate pointer to a byte array alongside the length of and a pointer to the payload of the PDU. This container defines the content of the meta data.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/MetaDataType	
BSW Parameter		**BSW Type**
MetaDataItem		EcucParamConfContainerDef
BSW Description		
The content of meta data in a Pdu consists of an ordered list of meta data items. This container represents a meta data item that is contained in meta data of a Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/MetaDataType/MetaDataItem	
BSW Parameter		**BSW Type**
MetaDataItemLength		EcucIntegerParamDef
BSW Description		
This parameter defines the length of a meta data item in bytes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/MetaDataType/MetaDataItem	
BSW Parameter		**BSW Type**
MetaDataItemType		EcucEnumerationParamDef
BSW Description		
This parameter defines the type of a meta data item.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection	
BSW Parameter		**BSW Type**
Pdu		EcucParamConfContainerDef
BSW Description		
One Pdu flowing through the COM-Stack. This Pdu is used by all Com-Stack modules to agree on referencing the same Pdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/Pdu	
BSW Parameter		**BSW Type**
J1939Requestable		EcucBooleanParamDef

BSW Description	
Pdu can be triggered by the J1939 request message.	
Template Description	
CanFrameTriggering.j1939requestable: Frame can be triggered by the J1939 request message. **J1939TpPg.requestable**: Parameter Group can be triggered by the J1939 request message.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.j1939requestable, SystemTemplate::TransportProtocols::J1939TpPg.requestable	
Mapping Rule	**Mapping Type**
CanFrameTriggering.j1939requestable: CanFrameTriggering references a Frame where the aggregated PduToFrameMapping references the given Pdu. J1939TpPg.requestable: J1939TpPg references the given Pdu in the role sdu.	full
Mapping Status	**Mapping ID**
valid	up_EcuC_00003

BSW Module	**BSW Context**	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/Pdu	
BSW Parameter		**BSW Type**
MetaDataTypeRef		EcucReferenceDef
BSW Description		
Reference to meta data that is transported in the Pdu through the AUTOSAR layers.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/Pdu	
BSW Parameter		**BSW Type**
PduLength		EcucIntegerParamDef
BSW Description		
Length of the Pdu in bytes. It should be noted that in former AUTOSAR releases (Rel 2.1, Rel 3.0, Rel 3.1, Rel 4.0 Rev. 1) this parameter was defined in bits.		
Template Description		
Pdu length in bytes. In case of dynamic length IPdus (containing a dynamical length signal), this value indicates the maximum data length. It should be noted that in former AUTOSAR releases (Rel 2.1, Rel 3.0, Rel 3.1, Rel 4.0 Rev. 1) this parameter was defined in bits. The Pdu length of zero bytes is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Pdu.length		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_EcuC_00002

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/Pdu	
BSW Parameter		**BSW Type**
SysTPduToFrameTriggeringRef		EcucForeignReferenceDef
BSW Description		
Reference to the FrameTriggering from the SystemTemplate which this Pdu belongs to. SysTPduToFrameTriggeringRef shall be used for UserDefinedPdus, NmPdus and NPdus which are not going through the Pdu Router. This reference shall not be used if SysTPduToPduTriggeringRef exists.		
Template Description		
The FrameTriggering describes the instance of a frame sent on a channel and defines the manner of triggering (timing information) and identification of a frame on the channel, on which it is sent. For the same frame, if FrameTriggerings exist on more than one channel of the same cluster the fan-out/in is handled by the Bus interface.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::FrameTriggering		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucConfigSet/EcucPduCollection/Pdu	
BSW Parameter		**BSW Type**
SysTPduToPduTriggeringRef		EcucForeignReferenceDef
BSW Description		
Reference to the PduTriggering from the SystemTemplate which this Pdu represents. SysTPduToPduTriggeringRef shall be used for all Pdus except UserDefinedPdus, NmPdus and NPdus which are not going through the Pdu Router. For these Pdus, SysTPduToFrameTriggeringRef shall be used.		
Template Description		
The PduTriggering describes on which channel the IPdu is transmitted. The Pdu routing by the PduR is only allowed for subclasses of IPdu. Depending on its relation to entities such channels and clusters it can be unambiguously deduced whether a fan-out is handled by the Pdu router or the Bus Interface. If the fan-out is specified between different clusters it shall be handled by the Pdu Router. If the fan-out is specified between different channels of the same cluster it shall be handled by the Bus Interface.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>EcuC</td><td colspan="3">EcuC/EcucConfigSet/EcucPduCollection</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">PduIdTypeEnum</td><td colspan="2">EcucEnumerationParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">The PduIdType is used within the entire AUTOSAR Com Stack except for bus drivers. The size of this global type depends on the maximum number of PDUs used within one software module. If no software module deals with more PDUs that 256, this type can be set to uint8. If at least one software module handles more than 256 PDUs, this type must be set to uint16. See AUTOSAR_SWS_CommunicationStackTypes for more details.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td></td></tr>
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<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>EcuC</td><td colspan="3">EcuC/EcucConfigSet/EcucPduCollection</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">PduLengthTypeEnum</td><td colspan="2">EcucEnumerationParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">The PduLengthType is used within the entire AUTOSAR Com Stack except for bus drivers. The size of this global type depends on the maximum length of PDUs to be sent by an ECU. If no segmentation is used the length depends on the maximum payload size of a frame of the underlying communication system (for FlexRay maximum size is 255 bytes, therefore uint8). If segmentation is used it depends on the maximum length of a segmented N-SDU (in general uint16 is used). See AUTOSAR_SWS_CommunicationStackTypes for more details.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td></td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
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<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>EcuC</td><td colspan="3">EcuC</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">EcucHardware</td><td colspan="2">EcucParamConfContainerDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Hardware definition of this Ecu.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td></td></tr>
</table>

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
EcuC	EcuC/EcucHardware	
BSW Parameter		**BSW Type**
EcucCoreDefinition		EcucParamConfContainerDef
BSW Description		
Definition of one Core on this Ecu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucHardware/EcucCoreDefinition	
BSW Parameter		**BSW Type**
EcucCoreHwRef		EcucForeignReferenceDef
BSW Description		
Optional reference to the HwElement of HwCategory ProcessingUnit that represents this Core in the ECU Resource Template.		
Template Description		
This represents the ability to describe Hardware Elements on an instance level. The particular types of hardware are distinguished by the category. This category determines the applicable attributes. The possible categories and attributes are defined in HwCategory.		
M2 Parameter		
EcuResourceTemplate::HwElement		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucHardware/EcucCoreDefinition	
BSW Parameter		**BSW Type**
EcucCoreId		EcucIntegerParamDef
BSW Description		
ID of the core.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EcuC	EcuC		
BSW Parameter		**BSW Type**	
EcucPartitionCollection		EcucParamConfContainerDef	
BSW Description			
Collection of Partitions defined for this ECU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EcuC	EcuC/EcucPartitionCollection		
BSW Parameter		**BSW Type**	
EcucPartition		EcucParamConfContainerDef	
BSW Description			
Definition of one Partition on this ECU. One Partition will be implemented using one Os-Application.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EcuC	EcuC/EcucPartitionCollection/EcucPartition		
BSW Parameter		**BSW Type**	
EcucPartitionBswModuleDistinguishedPartition		EcucForeignReferenceDef	
BSW Description			
This maps the abstract partition of the Bsw Module to a concrete Partition existing in the ECU.			
Template Description			
Each instance of this meta-class represents an abstract partition in which context the code of the enclosing BswModuleBehavior can be executed. The intended use case is to distinguish between several partitions in order to implement different behavior per partition, for example to behave either as a master or satellite in a multicore ECU with shared BSW code.			
M2 Parameter			
BswModuleTemplate::BswBehavior::BswDistinguishedPartition			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EcuC	EcuC/EcucPartitionCollection/EcucPartition		
BSW Parameter		**BSW Type**	
EcucPartitionBswModuleExecution		EcucBooleanParamDef	
BSW Description			
Denotes that this partition will execute BSW Modules. BSW Modules can only be executed in such partitions.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EcuC	EcuC/EcucPartitionCollection/EcucPartition		
BSW Parameter		**BSW Type**	
EcucPartitionQmBswModuleExecution		EcucBooleanParamDef	
BSW Description			
Denotes that this partition will execute QM BSW.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EcuC	EcuC/EcucPartitionCollection/EcucPartition		
BSW Parameter		**BSW Type**	
EcucPartitionSoftwareComponentInstanceRef		EcucInstanceReferenceDef	
BSW Description			
References the SW Component instances from the Ecu Extract that shall be executed in this partition.			
Template Description			
Role of a software component within a composition.			
M2 Parameter			
SWComponentTemplate::Composition::SwComponentPrototype			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EcuC	EcuC/EcucPartitionCollection/EcucPartition	
BSW Parameter		**BSW Type**

PartitionCanBeRestarted	EcucBooleanParamDef
BSW Description	
Specifies the requirement whether the Partition can be restarted. If set to true all software executing in this partition shall be capable of handling a restart.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EcuC	EcuC
BSW Parameter	**BSW Type**
EcucPostBuildVariants	EcucParamConfContainerDef
BSW Description	
Collection of toplevel PostBuildSelectable variants. The PredefinedVariants linked inside this container will determine how many PostBuildSelectableVariants exist. If this container exist the name pattern for initialization of BSW modules will be <Mip>_Config_<PredefinedVariant.shortName>. If this container does not exist the name pattern for initialization of BSW modlues will be <Mip>_Config.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EcuC	EcuC/EcucPostBuildVariants
BSW Parameter	**BSW Type**
EcucPostBuildVariantRef	EcucForeignReferenceDef
BSW Description	
Reference to a PredefinedVariant that defines one toplevel postBuild configuration set (covering all post-build capable BSW modules). PredefinedVariants that are referenced here shall contain only PostBuildVariantCriterionValueSets.	
Template Description	
This specifies one predefined variant. It is characterized by the union of all system constant values and post-build variant criterion values aggregated within all referenced system constant value sets and post build variant criterion value sets plus the value sets of the included variants.	
M2 Parameter	
GenericStructure::VariantHandling::PredefinedVariant	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EcuC	EcuC	
BSW Parameter		**BSW Type**
EcucUnitGroupAssignment		EcucParamConfContainerDef
BSW Description		
Collection of UnitGroup references to support the generation of ASAM MCD file.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC/EcucUnitGroupAssignment	
BSW Parameter		**BSW Type**
EcucUnitGroupRef		EcucForeignReferenceDef
BSW Description		
Optional reference to the UnitGroup to support the generation of ASAM MCD file. These UnitGroups are selecting a set of units for a specific country.		
Template Description		
This meta-class represents the ability to specify a logical grouping of units.The category denotes the unit system that the referenced units are associated to. In this way, e.g. country-specific unit systems (CATEGORY="COUNTRY") can be defined as well as specific unit systems for certain application domains. In the same way a group of equivalent units, can be defined which are used in different countries, by setting CATEGORY="EQUIV_UNITS". KmPerHour and MilesPerHour could such be combined to one group named "vehicle_speed". The unit MeterPerSec would not belong to this group because it is normally not used for vehicle speed. But all of the mentioned units could be combined to one group named "speed". Note that the UnitGroup does not ensure the physical compliance of the units. This is maintained by the physical dimension.		
M2 Parameter		
AsamHdo::Units::UnitGroup		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EcuC	EcuC	
BSW Parameter		**BSW Type**
EcucVariationResolver		EcucParamConfContainerDef
BSW Description		
Collection of PredefinedVariant elements containing definition of values for SwSystemconst which shall be applied when resolving the variability during ECU Configuration.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EcuC	EcuC/EcucVariationResolver	
BSW Parameter		**BSW Type**
PredefinedVariantRef		EcucForeignReferenceDef
BSW Description		
Template Description		
This specifies one predefined variant. It is characterized by the union of all system constant values and post-build variant criterion values aggregated within all referenced system constant value sets and post build variant criterion value sets plus the value sets of the included variants.		
M2 Parameter		
GenericStructure::VariantHandling::PredefinedVariant		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

C.1.8 ComM

BSW Module	**BSW Context**	
ComM	ComM	
BSW Parameter		**BSW Type**
ComMConfigSet		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR ComM module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet	
BSW Parameter		**BSW Type**
ComMChannel		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of the bus channel(s). The channel parameters shall be harmonized within the whole communication stack.		

Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::PhysicalChannel.commConnector	
Mapping Rule	**Mapping Type**
* Can, Lin, Fr: For each CommunicationCluster the EcuInstance is connected to, one ComMChannel container is created. * For Ethernet: For each EthernetPhysicalChannel the EcuInstance is connected to, one ComMChannel container is created.	full
Mapping Status	**Mapping ID**
valid	up_ComM_00008

BSW Module	BSW Context
ComM	ComM/ComMConfigSet/ComMChannel
BSW Parameter	**BSW Type**
ComMBusType	EcucEnumerationParamDef
BSW Description	
Identifies the bus type of the channel.	
Template Description	
The CommunicationCluster is the main element to describe the topological connection of communicating ECUs. A cluster describes the ensemble of ECUs, which are linked by a communication medium of arbitrary topology (bus, star, ring, ...). The nodes within the cluster share the same communication protocol, which may be event-triggered, time-triggered or a combination of both. A CommunicationCluster aggregates one or more physical channels.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster	
Mapping Rule	**Mapping Type**
Depends of the used CommunicationCluster subclass: abstractCanCluster --> COMM_BUS_TYPE_CAN FlexRayCluster --> COMM_BUS_TYPE_FR EthernetCluster --> COMM_BUS_TYPE_ETH LinCluster --> COMM_BUS_TYPE_LIN UserDefinedCluster --> COMM_BUS_TYPE_CDD	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
ComM	ComM/ComMConfigSet/ComMChannel
BSW Parameter	**BSW Type**
ComMCDDBusPrefix	EcucStringParamDef
BSW Description	
Prefix to be used for API calls to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**

valid	

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMChannelId		EcucIntegerParamDef
BSW Description		
Channel identification number of the corresponding channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMFullCommRequestNotificationEnabled		EcucBooleanParamDef
BSW Description		
Defines if the optional SenderReceiver Port of Interface ComM_CurrentChannelRequest will be provided for this channel. True means enabled. False means disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Specifies the period in seconds that the MainFunction has to be triggered with. Comment: ComM scheduling shall be at least as fast as the communication stack and a schedule longer than 100ms makes no sense for communication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMNetworkManagement		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the networkmanagement.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel/ComMNetworkManagement	
BSW Parameter		**BSW Type**
ComMNmLightTimeout		EcucFloatParamDef
BSW Description		
Defines the timeout (in seconds) after COMM_FULL_COMMUNICATION sub-state COMM_FULL_COM_READY_SLEEP is left. The range shall be greater than 0.0 and less or equal to 255.0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel/ComMNetworkManagement	
BSW Parameter		**BSW Type**
ComMNmVariant		EcucEnumerationParamDef
BSW Description		
Defines the functionality of the networkmanagement. Shall be harmonized with NM configuration.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.controller		
Mapping Rule		**Mapping Type**

If the CommunicationController is not referenced by NmNode the ComMNm Variant of the corresponding ComMChannel shall be set to NONE if not explicitly set to LIGHT. If the CommunicationController is referenced by a NmNode and NmEcu.nmPassiveModeEnabled attribute is present and is set to true, the ComMNm Variant shall be set to PASSIVE. If the CommunicationController is referenced by NmNode and NmEcu.nmPassiveModeEnabled attribute is not present or is set to false the ComMNmVariant shall be set to FULL.	full
Mapping Status	**Mapping ID**
valid	up_ComM_00006

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMChannel/ComMNetworkManagement	
BSW Parameter		**BSW Type**
ComMPncNmRequest		EcucBooleanParamDef
BSW Description		
If this parameter equals true then every time a FULL Communication is requested due to a change in the PNC state machine to COMM_PNC_REQUESTED Nm shall be called using the API Nm_NetworkRequest.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMNoCom		EcucBooleanParamDef
BSW Description		
Not allowed to change state of ComM channel to COMM_SILENT_COMMUNICATION or COMM_FULL_COMMUNICATION. true: Enabled - Not allowed to switch to Communication Modes above. false: Disabled - Allowed to switch Communication Modes above. Shall be possible to change parameter during runtime with ComM API's. ECU/All channels: ComM_LimitECUToNoComMode(). Separate channels: ComM_LimitChannelToNoComMode().		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
ComM	ComM/ComMConfigSet/ComMChannel		
BSW Parameter		**BSW Type**	
ComMNoWakeUpInhibitionNvmStorage		EcucBooleanParamDef	
BSW Description			
If this parameter is set to "true", the NoWakeUp inhibition state of the channel shall be stored (in some implementation specific way) in the block pointed to by ComMGlobalNvmBlockDescriptor.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
ComM	ComM/ComMConfigSet/ComMChannel		
BSW Parameter		**BSW Type**	
ComMNoWakeup		EcucBooleanParamDef	
BSW Description			
Defines if an ECU is not allowed to wake-up the channel. true: Enabled (not allowed to wake-up)) false: Disabled This is the default/init value of a runtime variable that can be changed during runtime using ComM_PreventWakeUp().			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
ComM	ComM/ComMConfigSet/ComMChannel		
BSW Parameter		**BSW Type**	
ComMPncGatewayType		EcucEnumerationParamDef	
BSW Description			
Identifies the Partial Network Gateway behaviour of a ComMChannel.			
Template Description			
Defines if this EcuInstance shall implement the PncGateway functionality on this CommunicationConnector and its respective PhysicalChannel. Several EcuInstances on the same PhysicalChannel can have the PncGateway functionality enabled, but only one of them shall have the pncGatewayType "active".			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationConnector.pncGatewayType			
Mapping Rule			**Mapping Type**
1:1 mapping none or not defined --> do not create ECUC Parameter			full

Mapping Status	Mapping ID
valid	up_ComM_00007

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel	
BSW Parameter		**BSW Type**
ComMUserPerChannel		EcucParamConfContainerDef
BSW Description		
This container contains a list of identifiers that are needed to refer to a user in the system which is linked to a channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMChannel/ComMUserPerChannel	
BSW Parameter		**BSW Type**
ComMUserChannel		EcucReferenceDef
BSW Description		
Reference to the ComMUser that corresponds to this channel user. ImplementationType: COMM_UserHandleType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet	
BSW Parameter		**BSW Type**
ComMPnc		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of the partial network cluster (PNC).		
Template Description		
Describes a mapping between one or several Virtual Function Clusters onto Partial Network Clusters. A Virtual Function Cluster is realized by a PortGroup. A Partial Network Cluster is realized by one or more IPduGroups.		
M2 Parameter		
SystemTemplate::PncMapping::PncMapping		
Mapping Rule		**Mapping Type**
Create ComMPnc container for each PncMapping element.		full

Mapping Status	**Mapping ID**
valid	up_ComM_00004

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc	
BSW Parameter		**BSW Type**
ComMChannelPerPnc		EcucReferenceDef
BSW Description		
Reference to the ComMChannel that is required for this PNC. ImplementationType: NetworkHandleType		
Template Description		
IPduGroup participating in a Partial Network Cluster. This reference is optional in case an ecu extract has only indirect pnc access, i.e. ecu is not directly conntected to a network which supports partial network.		
M2 Parameter		
SystemTemplate::PncMapping::PncMapping.pncGroup		
Mapping Rule		**Mapping Type**
For every PhysicalChannel via which any of the associated PNC-relevant PDUs is send and/or received, one ComMChannelPerPnc ref is created. It references the ComMChannel that has been set up for the PhysicalChannel.		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc	
BSW Parameter		**BSW Type**
ComMPncComSignal		EcucParamConfContainerDef
BSW Description		
Represents the PncComSignals which are used to communicate the EIRA and ERA status of this PNC.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc/ComMPncComSignal	
BSW Parameter		**BSW Type**
ComMPncComSignalChannelRef		EcucReferenceDef
BSW Description		
Reference to the ComMChannel which is used to determine whether this PncComSignal shall participate in the active or passive role (via the parameter ComMPncGatewayType of the ComMChannel).		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc/ComMPncComSignal	
BSW Parameter		**BSW Type**
ComMPncComSignalDirection		EcucEnumerationParamDef
BSW Description		
Indicates the communication direction of this PncComSignal.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc/ComMPncComSignal	
BSW Parameter		**BSW Type**
ComMPncComSignalKind		EcucEnumerationParamDef
BSW Description		
Indicates whether this PncComSignal represents EIRA or ERA PNC information. This parameter ComMPncComSignalKind is optional and shall be ignored when ComMPncComSignalDirection equals TX.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMPnc/ComMPncComSignal	
BSW Parameter		**BSW Type**
ComMPncComSignalRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the ComSignal which is used to transport the partial network channel request information.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMPnc	
BSW Parameter		**BSW Type**
ComMPncEthIfSwitchPortGroupRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the PortGroups that correspond to this PNC. Note: This is only for documentation.		
Template Description		
Reference to the partial networks this CouplingPort participates in.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.pncMapping		
Mapping Rule		**Mapping Type**
The references are derived from the reference CouplingPort to PNC_Mapping.		full
Mapping Status		**Mapping ID**
valid		up_ComM_00009

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMPnc	
BSW Parameter		**BSW Type**
ComMPncId		EcucIntegerParamDef
BSW Description		
Partial network cluster identification number.		
Template Description		
Identifer of the Partial Network Cluster. This number represents the absolute bit position of this Partial Network Cluster in the NM Pdu.		
M2 Parameter		
SystemTemplate::PncMapping::PncMapping.pncIdentifier		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_ComM_00005

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMPnc	
BSW Parameter		**BSW Type**
ComMUserPerPnc		EcucReferenceDef
BSW Description		
Reference to the ComMUsers that correspond to this PNC. ImplementationType: COMM_UserHandleType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet	
BSW Parameter		**BSW Type**
ComMPncEnabled		EcucBooleanParamDef
BSW Description		
Defines whether in this configuration set the partial networking is enabled. true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet	
BSW Parameter		**BSW Type**
ComMUser		EcucParamConfContainerDef
BSW Description		
This container contains a list of identifiers that are needed to refer to a user in the system which is designated to request Communication modes.		
Template Description		
Specifies the abstract needs on the configuration of the Communication Manager for one "user".		
M2 Parameter		
CommonStructure::ServiceNeeds::ComMgrUserNeeds		
Mapping Rule		**Mapping Type**
In case the owner of the ComMgrUserNeeds is a BSW module then the ComMUser.shortName = {capitalizedMip}_{ServiceDependency.symbolicName Props.symbol}.		full
Mapping Status		**Mapping ID**
valid		up_ComM_00003

BSW Module	BSW Context	
ComM	ComM/ComMConfigSet/ComMUser	
BSW Parameter		**BSW Type**
ComMUserEcucPartitionRef		EcucReferenceDef
BSW Description		
Denotes in which "EcucPartition" the requester is executed. When the partition is stopped, the communication request shall be cancelled in the ComM to avoid a stay-awake situation of the bus due to a stopped partition.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMConfigSet/ComMUser	
BSW Parameter		**BSW Type**
ComMUserIdentifier		EcucIntegerParamDef
BSW Description		
An identifier that is needed to refer to a user in the system which is designated to request Communication Modes. ImplementationType: ComM_UserHandleType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM	
BSW Parameter		**BSW Type**
ComMGeneral		EcucParamConfContainerDef
BSW Description		
General configuration parameters of the Communication Manager.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComM0PncVectorAvoidance		EcucBooleanParamDef
BSW Description		
This parameter avoids sending of 0-PNC-Vectors in case ComMPncGatewayEnabled is enabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMDirectUserMapping		EcucBooleanParamDef
BSW Description		
If this parameter is set to true the configuration tool shall automatically create a ComMUser per ComMPnc and a ComMUser per ComMChannel. The shortName of the generated ComMUsers shall follow the following naming convention: PNCUser_ComMPncId, e.g. PNCUser_13 ChannelUser_ComMChannelId, e.g. ChannelUser_25 Restriction: ComMUser, which are created due to this configuration parameter, shall not be used by SWCs (only available for BswM).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMEcuGroupClassification		EcucIntegerParamDef
BSW Description		

Defines whether a mode inhibition affects the ECU or not. Examples: 000: No mode inhibition can be activated 001: Wake up inhibition can be enabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMGlobalNvMBlockDescriptor		EcucSymbolicNameReferenceDef
BSW Description		
Reference to NVRAM block containing the none volatile data. If this parameter is not configured it means that no NVRam is used at all.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMModeLimitationEnabled		EcucBooleanParamDef
BSW Description		
true if mode limitation functionality shall be enabled. true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
ComM	ComM/ComMGeneral

BSW Parameter		BSW Type
ComMPncGatewayEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables support of Partial Network Gateway. False: Partial Networking Gateway is disabled True: Partial Networking Gateway is enabled		
Template Description		
Defines if this EcuInstance shall implement the PncGateway functionality on this Communication-Connector and its respective PhysicalChannel. Several EcuInstances on the same PhysicalChannel can have the PncGateway functionality enabled, but only one of them shall have the pncGateway-Type "active".		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationConnector.pncGatewayType		
Mapping Rule		**Mapping Type**
If at least one pncGatewayType attribute is defined, then ComMPncGateway Enabled shall be set to true, if at least one CommunicationConnector of the Ecu Instance has the pncGatewayType set to either active or passive. If all pncGatewayType attributes are set to none or are not defined, the value shall be set to false.		full
Mapping Status		**Mapping ID**
valid		up_ComM_00002

BSW Module	BSW Context	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMPncPrepareSleepTimer		EcucFloatParamDef
BSW Description		
Time in seconds the PNC state machine shall wait in COMM_PNC_PREPARE_SLEEP.		
Template Description		
Time in seconds the PNC state machine shall wait in PNC_PREPARE_SLEEP.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.pncPrepareSleepTimer		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_ComM_00001

BSW Module	BSW Context	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMPncSupport		EcucBooleanParamDef
BSW Description		
Enables or disables support of partial networking. False: Partial Networking is disabled True: Partial Networking is enabled		
Template Description		
Describes a mapping between one or several Virtual Function Clusters onto Partial Network Clusters. A Virtual Function Cluster is realized by a PortGroup. A Partial Network Cluster is realized by one or more IPduGroups.		
M2 Parameter		

SystemTemplate::PncMapping::PncMapping	
Mapping Rule	**Mapping Type**
If at least one Pnc is configured this parameter shall be set to true. Otherwise false.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMResetAfterForcingNoComm		EcucBooleanParamDef
BSW Description		
ComM shall perform a reset after entering "No Communication" mode because of an active mode limitation to "No Communication" mode. true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMSynchronousWakeUp		EcucBooleanParamDef
BSW Description		
Wake up of one channel shall lead to a wake up of all channels if true. true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMTMinFullComModeDuration		EcucFloatParamDef
BSW Description		
Minimum time duration in seconds, spent in the COMM_FULL_COMMUNICATION sub-state COMM_FULL_COM_NETWORK_REQUESTED.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Switches the possibility to read the published information with the service ComM_GetPublishedInformation(). true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
ComM	ComM/ComMGeneral	
BSW Parameter		**BSW Type**
ComMWakeupInhibitionEnabled		EcucBooleanParamDef
BSW Description		
true if wake up inhibition functionality enabled. true: Enabled false: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.1.9 Xcp

BSW Module	**BSW Context**
Xcp	Xcp

BSW Parameter		BSW Type	
XcpConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters and sub containers of the AUTOSAR Xcp module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig		
BSW Parameter		**BSW Type**	
XcpCommunicationChannel		EcucParamConfContainerDef	
BSW Description			
This container represents the configuration of the communication channel of XCP.			
Template Description			
This meta-class allows to describe the relationship between several PduTriggerings that are defined on the same PhysicalChannel, e.g. to create a link between Rx and Tx Pdu that are used for request/response.			
M2 Parameter			
SystemTemplate::GeneralPurposeConnection::GeneralPurposeConnection			
Mapping Rule			**Mapping Type**
For each GeneralPurposeConnection of category XcpChannel one XcpCommunicationChannel shall be created.			
Mapping Status			**Mapping ID**
valid			up_Xcp_00004

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig/XcpCommunicationChannel		
BSW Parameter		**BSW Type**	
XcpChannelRxPduRef		EcucReferenceDef	
BSW Description			
Optional reference to the XCP Rx PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig/XcpCommunicationChannel		
BSW Parameter		**BSW Type**	

XcpChannelTxPduRef		EcucReferenceDef	
BSW Description			
Reference to the XCP Tx PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpConfig/XcpCommunicationChannel		
BSW Parameter		**BSW Type**	
XcpComMChannelRef		EcucReferenceDef	
BSW Description			
Reference to the ComM channel the PDUs belong to.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpConfig		
BSW Parameter		**BSW Type**	
XcpDaqList		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration of the DAQs.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpDaqListNumber		EcucIntegerParamDef
BSW Description		
Index number of the DAQ list		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpDaqListType		EcucEnumerationParamDef
BSW Description		
This indicates whether this DAQ list represents a DAQ or a STIM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpDto		EcucParamConfContainerDef
BSW Description		
This container collects data transfer object specific parameters for the DAQ list.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpDto	
BSW Parameter		**BSW Type**
XcpDto2PduMapping		EcucChoiceReferenceDef
BSW Description		
This reference specifies the mapping of the DTO to the PDUs from the lower-layer interfaces (CanIf, FrIf, SoAd and Cdd). A reference to a XcpRxPdu is only feasible if the the DaqListType is DAQ_STIM. A reference to a XcpTxPdu is only feasible if the DaqListType is DAQ.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpDto	
BSW Parameter		**BSW Type**
XcpDtoPid		EcucIntegerParamDef
BSW Description		
Packet identifier (PID) of the DTO that identifies the ODT the content of the DTO.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpMaxOdt		EcucIntegerParamDef
BSW Description		
MAX_ODT indicates the maximum amount of ODTs in this DAQ list (STATIC configuration)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpMaxOdtEntries		EcucIntegerParamDef
BSW Description		
This parameter indicates the maximum amount of entries in an ODT of this DAQ list (STATIC configuration).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList	
BSW Parameter		**BSW Type**
XcpOdt		EcucParamConfContainerDef
BSW Description		
This container contains ODT-specific parameter for the DAQ list.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt	
BSW Parameter		**BSW Type**
XcpOdt2DtoMapping		EcucReferenceDef
BSW Description		
This reference maps the ODT to the according DTO in which it will be transmitted.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt	
BSW Parameter		**BSW Type**
XcpOdtEntry		EcucParamConfContainerDef
BSW Description		
This container collects all configuration parameters that comprise an ODT entry.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt/XcpOdtEntry	
BSW Parameter		**BSW Type**
XcpOdtEntryAddress		EcucLinkerSymbolDef
BSW Description		
Memory address that the ODT entry is referencing to.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt/XcpOdtEntry	
BSW Parameter		**BSW Type**
XcpOdtEntryBitOffset		EcucIntegerParamDef
BSW Description		
Represent the bit offset in case of the element represents status bit.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt/XcpOdtEntry	
BSW Parameter		**BSW Type**
XcpOdtEntryLength		EcucIntegerParamDef
BSW Description		
Length of the referenced memory area that is referenced by the ODT entry.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt/XcpOdtEntry	
BSW Parameter		**BSW Type**
XcpOdtEntryNumber		EcucIntegerParamDef
BSW Description		
Index number of the ODT entry		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt	
BSW Parameter		**BSW Type**
XcpOdtEntryMaxSize		EcucIntegerParamDef
BSW Description		
This parameter indicates the upper limit for the size of the element described by an ODT entry. Depending on the DaqListType this ODT belongs to it describes the limit for a DAQ (MAX_ODT_ENTRY_SIZE_DAQ) or a STIM (MAX_ODT_ENTRY_SIZE_STIM).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpDaqList/XcpOdt	
BSW Parameter		**BSW Type**
XcpOdtNumber		EcucIntegerParamDef
BSW Description		
Index number of this ODT within the DAQ list.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig	
BSW Parameter		**BSW Type**
XcpEventChannel		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of event channels on the XCP slave.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelConsistency		EcucEnumerationParamDef	
BSW Description			
Type of consistency used by event channel			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelMaxDaqList		EcucIntegerParamDef	
BSW Description			
Maximum amount of DAQ lists that are handled by this event channel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelNumber		EcucIntegerParamDef	
BSW Description			
Index number of the event channel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelPriority		EcucIntegerParamDef	
BSW Description			
Priority of the event channel			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelTimeCycle		EcucIntegerParamDef	
BSW Description			
The event channel time cycle indicates which sampling period is used to process this event channel. A value of 0 means ’Not cyclic’.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpConfig/XcpEventChannel		
BSW Parameter		**BSW Type**	
XcpEventChannelTimeUnit		EcucEnumerationParamDef	
BSW Description			
This configuration parameter indicates the unit of the event channel time cycle.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpEventChannel	
BSW Parameter		**BSW Type**
XcpEventChannelTriggeredDaqListRef		EcucReferenceDef

BSW Description	
References all DAQ lists that are trigged by this event channel.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpEventChannel	
BSW Parameter		**BSW Type**
XcpEventChannelType		EcucEnumerationParamDef
BSW Description		
This configuration parameter indicates what kind of DAQ list can be allocated to this event channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig	
BSW Parameter		**BSW Type**
XcpPdu		EcucChoiceContainerDef
BSW Description		
Contains PDU information. A PDU may be either a transmission PDU or a reception PDU.		
Template Description		
This element is used for AUTOSAR Pdus without attributes that are routed by the PduR. Please note that the category name of such Pdus is standardized in the AUTOSAR System Template.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::GeneralPurposeIPdu		
Mapping Rule		**Mapping Type**
Create this container if a GeneralPurposeIPdu with the category "Xcp" is defined in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_Xcp_00001

BSW Module	BSW Context	
Xcp	Xcp/XcpConfig/XcpPdu	
BSW Parameter		**BSW Type**
XcpRxPdu		EcucParamConfContainerDef
BSW Description		
This container specifies received PDUs.		
Template Description		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort	
Mapping Rule	**Mapping Type**
The direction of the Pdu can be derived from the PduTriggering that refers to the GeneralPurposePdu that represents the XcpPdu.	full
Mapping Status	**Mapping ID**
valid	up_Xcp_00002

BSW Module	**BSW Context**
Xcp	Xcp/XcpConfig/XcpPdu/XcpRxPdu
BSW Parameter	**BSW Type**
XcpRxPduId	EcucIntegerParamDef
BSW Description	
ID of the PDU that will be received via a Xcp_<module>RxIndication.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Xcp	Xcp/XcpConfig/XcpPdu/XcpRxPdu
BSW Parameter	**BSW Type**
XcpRxPduRef	EcucReferenceDef
BSW Description	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Xcp	Xcp/XcpConfig/XcpPdu
BSW Parameter	**BSW Type**
XcpTxPdu	EcucParamConfContainerDef
BSW Description	
This container specifies transmission PDUs.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort	
Mapping Rule	**Mapping Type**

The direction of the Pdu can be derived from the PduTriggering that refers to the GeneralPurposePdu that represents the XcpPdu.	full
Mapping Status	**Mapping ID**
valid	up_Xcp_00003

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpPdu/XcpTxPdu	
BSW Parameter		**BSW Type**
XcpTxPduId		EcucIntegerParamDef
BSW Description		
The PDU identifier, which has to be used by the lower layer BSW module for TxConfirmations or TriggerTransmits.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpConfig/XcpPdu/XcpTxPdu	
BSW Parameter		**BSW Type**
XcpTxPduRef		EcucReferenceDef
BSW Description		
Reference to the external PDU definition.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp	
BSW Parameter		**BSW Type**
XcpGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration parameters of the XCP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpCounterRef		EcucReferenceDef	
BSW Description			
This parameter contains a reference to the counter, which is used by XCP.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpDaqConfigType		EcucEnumerationParamDef	
BSW Description			
Sets the DAQ_CONFIG_TYPE bit within the DAQ_PROPERTIES parameter to "static" or to "dynamic". If DAQ_STATIC is selected, the DAQ_CONFIG_TYPE bit is set to "0". If DAQ_DYNAMIC is selected, the DAQ_CONFIG_TYPE bit is set to "1".			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpDaqCount		EcucIntegerParamDef	
BSW Description			
Indicates the number of DAQ lists for dynamic configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**

XcpDevErrorDetect	EcucBooleanParamDef
BSW Description	
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpFlashProgrammingEnabled		EcucBooleanParamDef
BSW Description		
Enabling of XCP Flash programming functionality		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpIdentificationFieldType		EcucEnumerationParamDef
BSW Description		
Type of Identification Field the slave will use when transferring DAQ Packets to the master. The master has to use the same Type of Identification Field when transferring STIM Packets to the slave.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpMainFunctionPeriod		EcucFloatParamDef
BSW Description		

The XCP does not require this information but the BSW scheduler, which invokes the main function, needs it in order to plan its tasks.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpMaxCto		EcucIntegerParamDef
BSW Description		
MAX_CTO shows the maximum length of a CTO packet in bytes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpMaxDto		EcucIntegerParamDef
BSW Description		
MAX_DTO shows the maximum length of a DTO packet in bytes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpMaxEventChannel		EcucIntegerParamDef
BSW Description		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpMinDaq		EcucIntegerParamDef
BSW Description		
Indicates the number of predefined, read only DAQ lists on the XCP slave.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpNvRamBlockIdRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference contains the link to a non-volatile memory block to be used in the feature "RESUME MODE" so this information has to be stored non volatile to be available directly after start-up of the ECU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpOdtCount		EcucIntegerParamDef
BSW Description		
This parameter indicates the amount of ODTs of a DAQ list using dynamic DAQ list configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpOdtEntriesCount		EcucIntegerParamDef
BSW Description		
Indicates the amount of entries into an ODT using dynamic DAQ list configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpOdtEntrySizeDaq		EcucIntegerParamDef
BSW Description		
Indicates the size of an element described by an ODT entry to the DaqListType for a DAQ.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpOdtEntrySizeStim		EcucIntegerParamDef
BSW Description		
Indicates the size of an element described by an ODT entry to the DaqListType for a stim.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpOnCanEnabled		EcucBooleanParamDef	
BSW Description			
Enabling of XCPonCAN functionality			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpOnCddEnabled		EcucBooleanParamDef	
BSW Description			
Enabling of XCPonCdd functionality			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Xcp	Xcp/XcpGeneral		
BSW Parameter		**BSW Type**	
XcpOnEthernetEnabled		EcucBooleanParamDef	
BSW Description			
Enabling of XCPonEthernet functionality			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpOnFlexRayEnabled		EcucBooleanParamDef
BSW Description		
Enabling of XCPonFlexRay functionality		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpPrescalerSupported		EcucBooleanParamDef
BSW Description		
This parameter enables and disables the support for Prescaler support. True is Enabled, False is disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpSuppressTxSupport		EcucBooleanParamDef
BSW Description		
Switches the support of suppressing transmission of PDUs per communication channel on or off. TRUE: Suppressing of TxPDUs supported FALSE: Suppressing of TxPDUs not supported		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpTimestampTicks		EcucIntegerParamDef
BSW Description		
This parameter defines the timestamp that will increment based TIMESTAMP_TICKS per unit and wrap around if an overflow occurs.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpTimestampType		EcucEnumerationParamDef
BSW Description		
This parameter indicates the number of bytes used for the timestamp field. In case No_TIME_STAMP is selected the timestamp field is not available.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpTimestampUnit		EcucEnumerationParamDef
BSW Description		
This parameter indicates the resolution of the data acquisition clock of the slave when transferring data to master.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Xcp	Xcp/XcpGeneral	
BSW Parameter		**BSW Type**
XcpVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables/disables the existence of the XCP_GetVersionInfo() API service. TRUE: XCP_GetVersionInfo() API service exists FALSE: XCP_GetVersionInfo() API service does not exist		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

C.2 Can

C.2.1 Can Driver Mapping

BSW Module	**BSW Context**	
Can	Can	
BSW Parameter		**BSW Type**
CanConfigSet		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR Can module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet	
BSW Parameter		**BSW Type**
CanController		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the CAN controller(s).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanBusoffProcessing		EcucEnumerationParamDef
BSW Description		
Enables / disables API Can_MainFunction_BusOff() for handling busoff events in polling mode.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanControllerActivation		EcucBooleanParamDef
BSW Description		
Defines if a CAN controller is used in the configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanControllerBaseAddress		EcucIntegerParamDef
BSW Description		
Specifies the CAN controller base address.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanControllerBaudrateConfig		EcucParamConfContainerDef
BSW Description		
This container contains bit timing related configuration parameters of the CAN controller(s).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerBaudRate		EcucIntegerParamDef
BSW Description		
Specifies the baudrate of the controller in kbps.		
Template Description		
Channels speed in bits/s.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster.baudrate		
Mapping Rule		**Mapping Type**
SystemTemplate speed is in bps, so divide it by 1000 to get kbps		full
Mapping Status		**Mapping ID**
valid		up_Can_00024

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerBaudRateConfigID		EcucIntegerParamDef
BSW Description		
Uniquely identifies a specific baud rate configuration. This ID is used by SetBaudrate API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerFdBaudrateConfig		EcucParamConfContainerDef
BSW Description		
This optional container contains bit timing related configuration parameters of the CAN controller(s) for payload and CRC of a CAN FD frame. If this container exists the controller supports CAN FD frames.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerFdBaudRate		EcucIntegerParamDef
BSW Description		
Specifies the data segment baud rate of the controller in kbps.		
Template Description		
Specifies the data segment baud rate of the controller in bits/s.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::AbstractCanCluster.canFdBaudrate		
Mapping Rule		**Mapping Type**
SystemTemplate speed is in bps, so divide it by 1000 to get kbps		full
Mapping Status		**Mapping ID**
valid		up_Can_00019

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerPropSeg		EcucIntegerParamDef
BSW Description		
Specifies propagation delay in time quantas.		
Template Description		
Specifies propagation delay in time quantas.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.propSeg		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00015

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig	
BSW Parameter		**BSW Type**
CanControllerSeg1		EcucIntegerParamDef
BSW Description		
Specifies phase segment 1 in time quantas.		
Template Description		
Specifies phase segment 1 in time quantas.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.timeSeg1		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00014

BSW Module	BSW Context

Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig
BSW Parameter	**BSW Type**
CanControllerSeg2	EcucIntegerParamDef
BSW Description	
Specifies phase segment 2 in time quantas.	
Template Description	
Specifies phase segment 2 in time quantas.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.timeSeg2	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00020

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig
BSW Parameter	**BSW Type**
CanControllerSyncJumpWidth	EcucIntegerParamDef
BSW Description	
Specifies the synchronization jump width for the controller in time quantas.	
Template Description	
Specifies the synchronization jump width for the controller in time quantas.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.syncJumpWidth	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00017

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig
BSW Parameter	**BSW Type**
CanControllerTrcvDelayCompensationOffset	EcucIntegerParamDef
BSW Description	
Specifies the Transceiver Delay Compensation Offset in ns. If not specified Transceiver Delay Compensation is disabled.	
Template Description	
Specifies the Transceiver Delay Compensation Offset in seconds. If not specified Transceiver Delay Compensation is disabled.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.trcvDelayCompensationOffset	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00016

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>Can</td><td colspan="3">Can/CanConfigSet/CanController/CanControllerBaudrateConfig/CanControllerFdBaudrateConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">CanControllerTxBitRateSwitch</td><td colspan="2">EcucBooleanParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Specifies if the bit rate switching shall be used for transmissions.
If FALSE: CAN FD frames shall be sent without bit rate switching.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">Specifies if the bit rate switching shall be used for transmissions.
TRUE: CAN FD frames shall be sent with bit rate switching.
FALSE: CAN FD frames shall be sent without bit rate switching.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.txBitRateSwitch</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
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<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>Can</td><td colspan="3">Can/CanConfigSet/CanController/CanControllerBaudrateConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">CanControllerPropSeg</td><td colspan="2">EcucIntegerParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Specifies propagation delay in time quantas.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">Specifies propagation delay in time quantas.</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerConfiguration.propSeg</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
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<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>Can</td><td colspan="3">Can/CanConfigSet/CanController/CanControllerBaudrateConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">CanControllerSeg1</td><td colspan="2">EcucIntegerParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Specifies phase segment 1 in time quantas.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4">Specifies phase segment 1 in time quantas.
timeSeg1 = Phase_Seg1</td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerConfiguration.timeSeg1</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td>up_Can_00021</td></tr>
</table>

BSW Module	BSW Context		
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig		
BSW Parameter		**BSW Type**	
CanControllerSeg2		EcucIntegerParamDef	
BSW Description			
Specifies phase segment 2 in time quantas.			
Template Description			
Specifies phase segment 2 in time quantas. timeSeg2 = Phase_Seg2			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerConfiguration.timeSeg2			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Can_00025

BSW Module	BSW Context		
Can	Can/CanConfigSet/CanController/CanControllerBaudrateConfig		
BSW Parameter		**BSW Type**	
CanControllerSyncJumpWidth		EcucIntegerParamDef	
BSW Description			
Specifies the synchronization jump width for the controller in time quantas.			
Template Description			
The number of quanta in the Synchronization Jump Width, SJW. The (Re-)Synchronization Jump Width (SJW) defines how far a resynchronization may move the Sample Point inside the limits defined by the Phase Buffer Segments to compensate for edge phase errors.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerConfiguration.syncJumpWidth			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Can_00022

BSW Module	BSW Context		
Can	Can/CanConfigSet/CanController		
BSW Parameter		**BSW Type**	
CanControllerDefaultBaudrate		EcucReferenceDef	
BSW Description			
Reference to baudrate configuration container configured for the Can Controller.			
Template Description			
Channels speed in bits/s.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster.baudrate			
Mapping Rule			**Mapping Type**
Set the reference to the container of the CanControllerBaudRate parameter that has been configured for SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster.baudrate			full
Mapping Status			**Mapping ID**
valid			up_Can_00029

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanControllerId		EcucIntegerParamDef
BSW Description		
This parameter provides the controller ID which is unique in a given CAN Driver. The value for this parameter starts with 0 and continue without any gaps.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanCpuClockRef		EcucReferenceDef
BSW Description		
Reference to the CPU clock configuration, which is set in the MCU driver configuration		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanRxProcessing		EcucEnumerationParamDef
BSW Description		
Enables / disables API Can_MainFunction_Read() for handling PDU reception events in polling mode.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**

CanTTController		EcucParamConfContainerDef
BSW Description		
CanTTController is specified in the SWS TTCAN and contains the configuration parameters of the TTCAN controller(s) (which are needed in addition to the configuration parameters of the CAN controller(s)). This container is only included and valid if TTCAN is supported by the controller, enabled (see CanSupportTTCANRef, ECUC_Can_00430), and used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerApplWatchdogLimit		EcucIntegerParamDef
BSW Description		
Defines the maximum time period (unit is 256 times NTU) after which the application has to serve the watchdog.		
Template Description		
The Appl_Watchdog_Limit shall be an 8-bit value specifying the period for the application watchdog in Appl_Watchdog_Limit times 256 NTUs.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.applWatch-dogLimit		
Mapping Rule		**Mapping Type**
1:1 mapping		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerCycleCountMax		EcucIntegerParamDef
BSW Description		
Defines the value for cycle_count_max. Allowed values: 0x00: 1 basic cycle 0x01: 2 basic cycles 0x03: 4 basic cycles 0x07: 8 basic cycles 0x0F: 16 basic cycles 0x1F: 32 basic cycles 0x3F: 64 basic cycles		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerExpectedTxTrigger		EcucIntegerParamDef
BSW Description		
Number of expected_tx_trigger.		
Template Description		
The Expected_Tx_Trigger shall be an eight (8) bit value which limits the number of messages the FSE may try to transmit in one matrix cycle.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.expectedTxTrigger		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00009

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerExternalClockSynchronisation		EcucBooleanParamDef
BSW Description		
Enables/disables the external clock synchronization. TRUE: External clock synchronization enabled. FALSE: External clock synchronization disabled. This parameter shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.		
Template Description		
One bit shall be used to configure whether or not external clock synchronisation will be allowed during runtime (only Level 2).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.externalClockSynchronisation		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00010

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerGlobalTimeFiltering		EcucBooleanParamDef
BSW Description		

Enables/disables the global time filtering. TRUE: Global time filtering enabled. FALSE: Global time filtering disabled. This parameter shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerInitialRefOffset		EcucIntegerParamDef
BSW Description		
Defines the initial value for ref trigger offset.		
Template Description		
The Initial_Ref_Offset shall be an eight (8) bit value for the initialisation of Ref_Trigger_Offset.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.initialRef Offset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00006

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerInterruptEnable		EcucIntegerParamDef
BSW Description		

Enables/disables the respective interrupts. Bit Position set to 1: Enable respective interrupt. Bit Position set to 0: Disable respective interrupt. Bit Position / Interrupt Source: 10: Application Watchdog. 9: Watch Trigger reached. 8: Initialization Watch Trigger reached. 7: Change of Error Level. 6: Tx Overflow. 5: Tx Underflow. 4: Global Time Error. 3: Gap. 2: Start of Cycle. 1: Time Discontinuity. 0: Master State Change. Bit position "1: Time Discontinuity" and "4: Global Time Error" shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerLevel2		EcucBooleanParamDef
BSW Description		
Defines whether Level 2 or Level 1 is used. TRUE: Level 2. FALSE: Level 1. If this parameter is set to FALSE then all parameters with dependency to CanTTControllerLevel2 need not be configured.		
Template Description		
One bit shall be used to distinguish between Level 1 and Level 2.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.timeTriggeredCanLevel		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00013

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**

CanTTControllerNTUConfig	EcucFloatParamDef
BSW Description	
Defines the config value for NTU (network time unit). Value given in microseconds. The value configured shall be greater than 0. Together with the local oscillator period, the TUR (time unit ratio) can be derived from the NTU. This parameter shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.	
Template Description	
Unit measuring all times and providing a constant of the whole network. For level 1, this is always the CAN bit time. Unit: seconds.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCluster.ntu	
Mapping Rule	**Mapping Type**
NTU = system clock period x (TUR Numerator / TUR Denominator)	full
Mapping Status	**Mapping ID**
valid	up_Can_00007

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanTTController
BSW Parameter	**BSW Type**
CanTTControllerOperationMode	EcucEnumerationParamDef
BSW Description	
Defines the operation mode.	
Template Description	
Possible operation modes True: Time-Triggered False: Event-Synchronised-Time-Triggered	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCluster.operationMode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00012

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanTTController
BSW Parameter	**BSW Type**
CanTTControllerSyncDeviation	EcucFloatParamDef
BSW Description	
Defines the maximum synchronization deviation: Given as a percentage value of the NTU (network time unit). The value configured shall be greater than 0. This parameter shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Synchronisation Deviation <= 2ˆ (CanTTSyncDeviation + 5).	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerTURRestore		EcucBooleanParamDef
BSW Description		
Enables/disables the TUR restore. Note that the value configured for TUR can be derived from the value configured for NTU and the local oscillator preriod. TRUE: TUR restore enabled. FALSE: TUR restore disabled. This parameter shall only be configurable if parameter CanTTControllerLevel2 equals TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerTimeMaster		EcucBooleanParamDef
BSW Description		
Defines whether the controller acts as a potential time master. TRUE: Potential time master. FALSE: Time slave.		
Template Description		
One bit shall be used to distinguish between (potential) time masters and time slaves. This can be derived from the frame-triggering's triggers.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.master		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Can_00005

BSW Module	BSW Context	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTControllerTimeMasterPriority		EcucIntegerParamDef
BSW Description		
Defines the time master priority.		
Template Description		
The time master priority shall contain a three bit value for the priority of the current time master (the last three bits of the identifier of the reference message). This can be derived from the frame-triggering's triggers.		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.timeMasterPriority	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00008

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanTTController
BSW Parameter	**BSW Type**
CanTTControllerTxEnableWindowLength	EcucIntegerParamDef
BSW Description	
Length of the tx enable window given in CAN bit times. Definition parameter "CanTTControllerTxEnableWindowlength" is used such that: Length of enable window = CanTTControllerTxEnableWindowLength + 1	
Template Description	
The length of the Tx_Enable window shall be a four (4) bit value specifying the length of the time period (1-16 nominal CAN bit times) in which a transmission may be started.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ttcan::TtcanTopology::TtcanCommunicationController.txEnableWindowLength	
Mapping Rule	**Mapping Type**
Length of enable window = CanTTControllerTxEnableWindowLength + 1	full
Mapping Status	**Mapping ID**
valid	up_Can_00011

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanTTController
BSW Parameter	**BSW Type**
CanTTControllerWatchTriggerGapTimeMark	EcucIntegerParamDef
BSW Description	
watch trigger time mark after a gap	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanController/CanTTController
BSW Parameter	**BSW Type**
CanTTControllerWatchTriggerTimeMark	EcucIntegerParamDef
BSW Description	
watch trigger time mark	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController/CanTTController	
BSW Parameter		**BSW Type**
CanTTIRQProcessing		EcucEnumerationParamDef
BSW Description		
Enables / disables API Can_MainFunction_BusOff() for handling busoff events in polling mode.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanTxProcessing		EcucEnumerationParamDef
BSW Description		
Enables / disables API Can_MainFunction_Write() for handling PDU transmission events in polling mode.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanWakeupFunctionalityAPI		EcucBooleanParamDef
BSW Description		
Adds / removes the service Can_CheckWakeup() from the code. True: Can_CheckWakeup can be used. False: Can_CheckWakeup cannot be used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanWakeupProcessing		EcucEnumerationParamDef
BSW Description		
Enables / disables API Can_MainFunction_Wakeup() for handling wakeup events in polling mode.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanWakeupSourceRef		EcucSymbolicNameReferenceDef
BSW Description		
This parameter contains a reference to the Wakeup Source for this controller as defined in the ECU State Manager. Implementation Type: reference to EcuM_WakeupSourceType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanController	
BSW Parameter		**BSW Type**
CanWakeupSupport		EcucBooleanParamDef
BSW Description		
CAN driver support for wakeup over CAN Bus.		
Template Description		
Defines whether the ECU shall be woken up by this CommunicationController. TRUE: wake up is possible FALSE: wake up is not supported Note: If wakeUpByControllerSupported is set to TRUE the feature shall be supported by both hardware and basic software.		
M2 Parameter		

SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationController.wakeUpByControllerSupported	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00026

BSW Module	**BSW Context**	
Can	Can/CanConfigSet	
BSW Parameter		**BSW Type**
CanHardwareObject		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of CAN Hardware Objects.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanControllerRef		EcucReferenceDef
BSW Description		
Reference to CAN Controller to which the HOH is associated to.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanFdPaddingValue		EcucIntegerParamDef
BSW Description		
Specifies the value which is used to pad unspecified data in CAN FD frames > 8 bytes for transmission. This is necessary due to the discrete possible values of the DLC if > 8 bytes. If the length of a PDU which was requested to be sent does not match the allowed DLC values, the remaining bytes up to the next possible value shall be padded with this value.		
Template Description		

CanControllerFdConfiguration.paddingValue: Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD. **CanControllerFdConfigurationRequirements.paddingValue**: Specifies the value which is used to pad unused data in CAN FD frames which are bigger than 8 byte if the length of a Pdu which was requested to be sent does not match the allowed DLC values of CAN FD.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfiguration.paddingValue,SystemTemplate::Fibex::Fibex4Can::CanTopology::CanControllerFdConfigurationRequirements.paddingValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00028

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanHandleType		EcucEnumerationParamDef
BSW Description		
Specifies the type (Full-CAN or Basic-CAN) of a hardware object.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanHardwareObjectUsesPolling		EcucBooleanParamDef
BSW Description		
Enables polling of this hardware object.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**

CanHwFilter		EcucParamConfContainerDef	
BSW Description			
This container is only valid for HRHs and contains the configuration (parameters) of one hardware filter.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanConfigSet/CanHardwareObject/CanHwFilter		
BSW Parameter		**BSW Type**	
CanHwFilterCode		EcucIntegerParamDef	
BSW Description			
Specifies (together with the filter mask) the identifiers range that passes the hardware filter.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanConfigSet/CanHardwareObject/CanHwFilter		
BSW Parameter		**BSW Type**	
CanHwFilterMask		EcucIntegerParamDef	
BSW Description			
Describes a mask for hardware-based filtering of CAN identifiers. The CAN identifiers of incoming messages are masked with the appropriate CanFilterMaskValue. Bits holding a 0 mean don't care, i.e. do not compare the message's identifier in the respective bit position. The mask shall be build by filling with leading 0. In case of CanIdType EXTENDED or MIXED a 29 bit mask shall be build. In case of CanIdType STANDARD a 11 bit mask shall be build			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**

Can	Can/CanConfigSet/CanHardwareObject
BSW Parameter	**BSW Type**
CanHwObjectCount	EcucIntegerParamDef
BSW Description	
Number of hardware objects used to implement one HOH. In case of a HRH this parameter defines the number of elements in the hardware FIFO or the number of shadow buffers, in case of a HTH it defines the number of hardware objects used for multiplexed transmission or for a hardware FIFO used by a FullCAN HTH.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanHardwareObject
BSW Parameter	**BSW Type**
CanIdType	EcucEnumerationParamDef
BSW Description	
Specifies whether the IdValue is of type - standard identifier - extended identifier - mixed mode ImplementationType: Can_IdType	
Template Description	
The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00004

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanHardwareObject/CanIdType
BSW Parameter	**BSW Type**
EXTENDED	EcucEnumerationLiteralDef
BSW Description	
All the CANIDs are of type extended only (29 bit).	
Template Description	
Extended 29-bit-identifiers are used (CAN 2.0B)	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanAddressingModeType.extended	
Mapping Rule	**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject/CanIdType	
BSW Parameter		**BSW Type**
STANDARD		EcucEnumerationLiteralDef
BSW Description		
All the CANIDs are of type standard only (11bit).		
Template Description		
Standard 11-bit-identifiers are used (CAN 2.0A)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanAddressingModeType.standard		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanMainFunctionRWPeriodRef		EcucReferenceDef
BSW Description		
Reference to CanMainFunctionPeriod		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanObjectId		EcucIntegerParamDef
BSW Description		
Holds the handle ID of HRH or HTH. The value of this parameter is unique in a given CAN Driver, and it should start with 0 and continue without any gaps. The HRH and HTH Ids share a common ID range. Example: HRH0-0, HRH1-1, HTH0-2, HTH1-3		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanObjectType		EcucEnumerationParamDef
BSW Description		
Specifies if the HardwareObject is used as Transmit or as Receive object		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanTTHardwareObjectTrigger		EcucParamConfContainerDef
BSW Description		
CanTTHardwareObjectTrigger is specified in the SWS TTCAN and contains the configuration (parameters) of TTCAN triggers for Hardware Objects, which are additional to the configuration (parameters) of CAN Hardware Objects. This container is only included and valid if TTCAN is supported by the controller and, enabled (see CanSupportTTCANRef, ECUC_Can_00430), and used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject/CanTTHardwareObjectTrigger	
BSW Parameter		**BSW Type**
CanTTHardwareObjectBaseCycle		EcucIntegerParamDef
BSW Description		
Defines the cycle_offset. CanTTHardwareObjectBaseCycle must be not greater than cycle_count_max.		
Template Description		
The first communication cycle where the frame is sent. This value is incremented at the beginning of each new cycle, ranging from 0 to 63, and is reset to 0 after a sequence of 64 cycles.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CycleRepetition.BaseCycle	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00001

BSW Module	BSW Context
Can	Can/CanConfigSet/CanHardwareObject/CanTTHardwareObjectTrigger
BSW Parameter	**BSW Type**
CanTTHardwareObjectCycleRepetition	EcucIntegerParamDef
BSW Description	
Defines the repeat_factor. CanTTHardwareObjectCycleRepetition shall be a power of two (2), greater than cycle_offset but not greater than cycle_count_max + 1.	
Template Description	
The number of communication cycles (after the first cycle) whenever the frame described by this timing is sent again.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CycleRepetition.CycleRepetition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Can_00002

BSW Module	BSW Context
Can	Can/CanConfigSet/CanHardwareObject/CanTTHardwareObjectTrigger
BSW Parameter	**BSW Type**
CanTTHardwareObjectTimeMark	EcucIntegerParamDef
BSW Description	
Defines the point in time, when the trigger will be activated. Value is given in cycle time.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
Can	Can/CanConfigSet/CanHardwareObject/CanTTHardwareObjectTrigger
BSW Parameter	**BSW Type**
CanTTHardwareObjectTriggerId	EcucIntegerParamDef
BSW Description	
Sequential number which allows separation of different TTCAN triggers configured for one and the same hardware object.	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject/CanTTHardwareObjectTrigger	
BSW Parameter		**BSW Type**
CanTTHardwareObjectTriggerType		EcucEnumerationParamDef
BSW Description		
Defines the type of the trigger associated with the hardware object. This parameter depends on plain CAN parameter CAN_OBJECT_TYPE. If CAN_OBJECT_TYPE equals RECEIVE than this parameter is fixed to CAN_TT_RX_TRIGGER. If CAN_OBJECT_TYPE equals TRANSMIT than one of the following literals is configurable: CAN_TT_TX_REF_TRIGGER, CAN_TT_TX_REF_TRIGGER_GAP, CAN_TT_TX_TRIGGER_MERGED, CAN_TT_TX_TRIGGER_SINGLE, CAN_TT_TX_TRIGGER_EXCLUSIVE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanHardwareObject	
BSW Parameter		**BSW Type**
CanTriggerTransmitEnable		EcucBooleanParamDef
BSW Description		
This parameter defines if or if not Can supports the trigger-transmit API for this handle.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet	
BSW Parameter		**BSW Type**
CanIcom		EcucParamConfContainerDef

BSW Description	
This container contains the parameters for configuring pretended networking	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom	
BSW Parameter		**BSW Type**
CanIcomConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the ICOM Configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig	
BSW Parameter		**BSW Type**
CanIcomConfigId		EcucIntegerParamDef
BSW Description		
This parameter identifies the ID of the ICOM configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig	
BSW Parameter		**BSW Type**
CanIcomWakeOnBusOff		EcucBooleanParamDef
BSW Description		
This parameter defines that the MCU shall wake if the bus off is detected or not.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig	
BSW Parameter		**BSW Type**
CanIcomWakeupCauses		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the wakeup causes to leave the power saving mode.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses	
BSW Parameter		**BSW Type**
CanIcomRxMessage		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters for the wakeup causes for matching received messages. It has to be configured as often as received messages are defined as wakeup cause. constraint: For all CanIcomRxMessage instances the Message IDs which are defined in CanIcomMessageId and in CanIcomRxMessageIdMask shall not overlap.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage	
BSW Parameter		**BSW Type**
CanIcomCounterValue		EcucIntegerParamDef
BSW Description		
This parameter defines that the MCU shall wake if the message with the ID is received n times on the communication channel.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage
BSW Parameter	**BSW Type**
CanIcomMessageId	EcucIntegerParamDef
BSW Description	
This parameter defines the message ID the wakeup causes of this CanIcomRxMessage are configured for. In addition a mask (CanIcomMessageIdMask) can be defined, in that case it is possible to define a range of rx messages, which can create a wakeup condition.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage
BSW Parameter	**BSW Type**
CanIcomMessageIdMask	EcucIntegerParamDef
BSW Description	
Describes a mask for filtering of CAN identifiers. The CAN identifiers of incoming messages are masked with this CanIcomMessageIdMask. If the masked identifier matches the masked value of CanIcomMessageId, it can create a wakeup condition for this CanIcomRxMessage. Bits holding a 0 mean don't care, i.e. do not compare the message's identifier in the respective bit position. The mask shall be build by filling with leading 0.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage
BSW Parameter	**BSW Type**
CanIcomMissingMessageTimerValue	EcucFloatParamDef

BSW Description	
This parameter defines that the MCU shall wake if the message with the ID is not received for a specific time in s on the communication channel.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage	
BSW Parameter		**BSW Type**
CanIcomPayloadLengthError		EcucBooleanParamDef
BSW Description		
This parameter defines that the MCU shall wake if a payload error occurs		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage	
BSW Parameter		**BSW Type**
CanIcomRxMessageSignalConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters for the wakeup causes for matching signals. It has to be configured as often as a signal is defined as wakeup cause. If at least one Signal conditions defined in a CanIcomRxMessageSignalConfig evaluates to true or if no CanIcomRxMessageSignalConfig are defined, the whole wakeup condition is considered to be true. All instances of this container refer to the same frame/pdu (see CanIcomMessageId).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage/CanIcomRxMessageSignalConfig		
BSW Parameter		**BSW Type**	
CanIcomSignalMask		EcucIntegerParamDef	
BSW Description			
This parameter shall be used to mask a signal in the payload of a CAN message. The mask is binary AND with the signal payload. The result will be used in combination of the operations defined in CanIcomSignalOperation with the CanIcomSignalValue.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage/CanIcomRxMessageSignalConfig		
BSW Parameter		**BSW Type**	
CanIcomSignalOperation		EcucEnumerationParamDef	
BSW Description			
This parameter defines the operation, which shall be used to verify the signal value creates a wakeup condition.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage/CanIcomRxMessageSignalConfig		
BSW Parameter		**BSW Type**	
CanIcomSignalRef		EcucReferenceDef	
BSW Description			
This parameter defines a reference to the signal which shall be checked additional to the message id (CanIcomMessageId). This reference is used for documentation to define which ComSignal originates this filter setting. All signals being referred by this reference shall point to the same PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
Can	Can/CanConfigSet/CanIcom/CanIcomConfig/CanIcomWakeupCauses/CanIcomRxMessage/CanIcomRxMessageSignalConfig
BSW Parameter	**BSW Type**
CanIcomSignalValue	EcucIntegerParamDef
BSW Description	
This parameter shall be used to define a signal value which shall be compared (CanIcomSignalOperation) with the masked CanIcomSignalMask value of the received signal (CanIcomSignalRef).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can
BSW Parameter	**BSW Type**
CanGeneral	EcucParamConfContainerDef
BSW Description	
This container contains the parameters related each CAN Driver Unit.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Can	Can/CanGeneral
BSW Parameter	**BSW Type**
CanDevErrorDetect	EcucBooleanParamDef
BSW Description	
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**

Can	Can/CanGeneral		
BSW Parameter		**BSW Type**	
CanIcomGeneral		EcucParamConfContainerDef	
BSW Description			
This container contains the general configuration parameters of the ICOM Configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanGeneral/CanIcomGeneral		
BSW Parameter		**BSW Type**	
CanIcomLevel		EcucEnumerationParamDef	
BSW Description			
Defines the level of Pretended Networking. This parameter is reserved for future implementations (Pretended Networking level 2).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Can	Can/CanGeneral/CanIcomGeneral		
BSW Parameter		**BSW Type**	
CanIcomVariant		EcucEnumerationParamDef	
BSW Description			
Defines the variant, which is supported by this CanController			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanIndex		EcucIntegerParamDef
BSW Description		

Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanLPduReceiveCalloutFunction		EcucFunctionNameDef
BSW Description		
This parameter defines the existence and the name of a callout function that is called after a successful reception of a received CAN Rx L-PDU. If this parameter is omitted no callout shall take place.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanMainFunctionBusoffPeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to Can_MainFunction_Busoff. Unit is seconds.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanMainFunctionModePeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to Can_MainFunction_Mode. Unit is seconds.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanMainFunctionRWPeriods		EcucParamConfContainerDef
BSW Description		
This container contains the parameter for configuring the period for cyclic call to Can_MainFunction_Read or Can_MainFunction_Write depending on the referring item.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral/CanMainFunctionRWPeriods	
BSW Parameter		**BSW Type**
CanMainFunctionPeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to Can_MainFunction_Read or Can_MainFunction_Write depending on the referring item. Unit is seconds. Different poll-cycles will be configurable if more than one CanMainFunctionPeriod is configured. In this case multiple Can_MainFunction_Read() or Can_MainFunction_Write() will be provided by the CAN Driver module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanMainFunctionWakeupPeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to Can_MainFunction_Wakeup. Unit is seconds.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanMultiplexedTransmission		EcucBooleanParamDef
BSW Description		
Specifies if multiplexed transmission shall be supported.ON or OFF		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanOsCounterRef		EcucReferenceDef
BSW Description		
This parameter contains a reference to the OsCounter, which is used by the CAN driver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanPublicIcomSupport		EcucBooleanParamDef
BSW Description		
Selects support of Pretended Network features in Can driver. True: Enabled False: Disabled		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanSetBaudrateApi		EcucBooleanParamDef
BSW Description		
The support of the Can_SetBaudrate API is optional. If this parameter is set to true the Can_SetBaudrate API shall be supported. Otherwise the API is not supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanSupportTTCANRef		EcucReferenceDef
BSW Description		
The parameter refers to CanIfSupportTTCAN parameter in the CAN Interface Module configuration. The CanIfSupportTTCAN parameter defines whether TTCAN is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanTimeoutDuration		EcucFloatParamDef
BSW Description		
Specifies the maximum time for blocking function until a timeout is detected. Unit is seconds.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Can	Can/CanGeneral	
BSW Parameter		**BSW Type**
CanVersionInfoApi		EcucBooleanParamDef
BSW Description		
Switches the Can_GetVersionInfo() API ON or OFF.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.2.2 Can Interface Mapping

BSW Module	**BSW Context**	
CanIf	CanIf	
BSW Parameter		**BSW Type**
CanIfCtrlDrvCfg		EcucParamConfContainerDef
BSW Description		
Configuration parameters for all the underlying CAN Driver modules are aggregated under this container. For each CAN Driver module a seperate instance of this container has to be provided.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfCtrlDrvCfg	
BSW Parameter		**BSW Type**
CanIfCtrlCfg		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of an adressed CAN controller by an underlying CAN Driver module. This container is configurable per CAN controller.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfCtrlDrvCfg/CanIfCtrlCfg	
BSW Parameter		**BSW Type**
CanIfCtrlCanCtrlRef		EcucSymbolicNameReferenceDef
BSW Description		
This parameter references to the logical handle of the underlying CAN controller from the CAN Driver module to be served by the CAN Interface module. The following parameters of CanController config container shall be referenced by this link: CanControllerId, CanWakeupSourceRef Range: 0..max. number of underlying supported CAN controllers		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfCtrlDrvCfg/CanIfCtrlCfg	
BSW Parameter		**BSW Type**
CanIfCtrlId		EcucIntegerParamDef
BSW Description		
This parameter abstracts from the CAN Driver specific parameter Controller. Each controller of all connected CAN Driver modules shall be assigned to one specific ControllerId of the CanIf. Range: 0..number of configured controllers of all CAN Driver modules		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfCtrlDrvCfg/CanIfCtrlCfg	
BSW Parameter		**BSW Type**
CanIfCtrlWakeupSupport		EcucBooleanParamDef
BSW Description		
This parameter defines if a respective controller of the referenced CAN Driver modules is queriable for wake up events. True: Enabled False: Disabled		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfCtrlDrvCfg	
BSW Parameter		**BSW Type**
CanIfCtrlDrvInitHohConfigRef		EcucReferenceDef
BSW Description		
Reference to the Init Hoh Configuration		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfCtrlDrvCfg	
BSW Parameter		**BSW Type**
CanIfCtrlDrvNameRef		EcucReferenceDef
BSW Description		
CAN Interface Driver Reference. This reference can be used to get any information (Ex. Driver Name, Vendor ID) from the CAN driver. The CAN Driver name can be derived from the ShortName of the CAN driver module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf	
BSW Parameter		**BSW Type**
CanIfDispatchCfg		EcucParamConfContainerDef
BSW Description		
Callback functions provided by upper layer modules of the CanIf. The callback functions defined in this container are common to all configured CAN Driver / CAN Transceiver Driver modules.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserCheckTrcvWakeFlagIndicationName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of <User_CheckTrcvWakeFlagIndication>. If CanIfDispatchUserCheckTrcvWakeFlagIndicationUL equals CAN_SM the name of <User_CheckTrcvWakeFlagIndication> is fixed. If it equals CDD, the name is selectable. If CanIfPublicPnSupport equals False, this parameter shall not be configurable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserCheckTrcvWakeFlagIndicationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer module to which the CheckTrcvWakeFlagIndication from the Driver modules have to be routed. If CANIF_PUBLIC_PN_SUPPORT equals False, this parameter shall not be configurable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserClearTrcvWufFlagIndicationName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of <User_ClearTrcvWufFlagIndication>. If CanIfDispatchUserClearTrcvWufFlagIndicationUL equals CAN_SM the name of <User_ClearTrcvWufFlagIndication> is fixed. If it equals CDD, the name is selectable. If CANIF_PUBLIC_PN_SUPPORT equals False, this parameter shall not be configurable.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserClearTrcvWufFlagIndicationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer module to which the ClearTrcvWufFlagIndication from the Driver modules have to be routed. If CANIF_PUBLIC_PN_SUPPORT equals False, this parameter shall not be configurable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserConfirmPnAvailabilityName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of <User_ConfirmPnAvailability>. If CanIfDispatchUserConfirmP-nAvailabilityUL equals CAN_SM the name of <User_ConfirmPnAvailability> is fixed. If it equals CDD, the name is selectable. If CANIF_PUBLIC_PN_SUPPORT equals False, this parameter shall not be configurable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfDispatchCfg	
BSW Parameter		**BSW Type**
CanIfDispatchUserConfirmPnAvailabilityUL		EcucEnumerationParamDef
BSW Description		

This parameter defines the upper layer module to which the ConfirmPnAvailability notification from the Driver modules have to be routed. If CANIF_PUBLIC_PN_SUPPORT equals False, this parameter shall not be configurable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfDispatchCfg
BSW Parameter	**BSW Type**
CanIfDispatchUserCtrlBusOffName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of <User_ControllerBusOff>. This parameter depends on the parameter CANIF_USERCTRLBUSOFF_UL. If CANIF_USERCTRLBUSOFF_UL equals CAN_SM the name of <User_ControllerBusOff> is fixed. If CANIF_USERCTRLBUSOFF_UL equals CDD, the name of <User_ControllerBusOff> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfDispatchCfg
BSW Parameter	**BSW Type**
CanIfDispatchUserCtrlBusOffUL	EcucEnumerationParamDef
BSW Description	
This parameter defines the upper layer (UL) module to which the notifications of all ControllerBusOff events from the CAN Driver modules have to be routed via <User_ControllerBusOff>. There is no possibility to configure no upper layer (UL) module as the provider of <User_ControllerBusOff>.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfDispatchCfg

BSW Parameter	BSW Type
CanIfDispatchUserCtrlModeIndicationName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of <User_ControllerModeIndication>. This parameter depends on the parameter CANIF_USERCTRLMODEINDICATION_UL. If CANIF_USERCTRLMODEINDICATION_UL equals CAN_SM the name of <User_ControllerModeIndication> is fixed. If CANIF_USERCTRLMODEINDICATION_UL equals CDD, the name of <User_ControllerModeIndication> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfDispatchCfg
BSW Parameter	**BSW Type**
CanIfDispatchUserCtrlModeIndicationUL	EcucEnumerationParamDef
BSW Description	
This parameter defines the upper layer (UL) module to which the notifications of all ControllerTransition events from the CAN Driver modules have to be routed via <User_ControllerModeIndication>.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfDispatchCfg
BSW Parameter	**BSW Type**
CanIfDispatchUserTrcvModeIndicationName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of <User_TrcvModeIndication>. This parameter depends on the parameter CANIF_USERTRCVMODEINDICATION_UL. If CANIF_USERTRCVMODEINDICATION_UL equals CAN_SM the name of <User_TrcvModeIndication> is fixed. If CANIF_USERTRCVMODEINDICATION_UL equals CDD, the name of <User_TrcvModeIndication> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanIf</td><td colspan="2">CanIf/CanIfDispatchCfg</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanIfDispatchUserTrcvModeIndicationUL</td><td>EcucEnumerationParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This parameter defines the upper layer (UL) module to which the notifications of all TransceiverTransition events from the CAN Transceiver Driver modules have to be routed via <User_TrcvModeIndication>. If no UL module is configured, no upper layer callback function will be called.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanIf</td><td colspan="2">CanIf/CanIfDispatchCfg</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanIfDispatchUserValidateWakeupEventName</td><td>EcucFunctionNameDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This parameter defines the name of <User_ValidateWakeupEvent>. This parameter depends on the parameter CANIF_USERVALIDATEWAKEUPEVENT_UL. CANIF_USERVALIDATEWAKEUPEVENT_UL equals ECUM the name of <User_ValidateWakeupEvent> is fixed. CANIF_USERVALIDATEWAKEUPEVENT_UL equals CDD, the name of <User_ValidateWakeupEvent> is selectable. If parameter CANIF_WAKEUP_CHECK_VALIDATION_API is disabled, no <User_ValidateWakeupEvent> API can be configured.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
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<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanIf</td><td colspan="2">CanIf/CanIfDispatchCfg</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanIfDispatchUserValidateWakeupEventUL</td><td>EcucEnumerationParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This parameter defines the upper layer (UL) module to which the notifications about positive former requested wake up sources have to be routed via <User_ValidateWakeupEvent>. If parameter CANIF_WAKEUP_CHECK_VALIDATION_API is disabled, this parameter cannot be configured.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
</table>

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf	
BSW Parameter		**BSW Type**
CanIfInitCfg		EcucParamConfContainerDef
BSW Description		
This container contains the init parameters of the CAN Interface.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfBufferCfg		EcucParamConfContainerDef
BSW Description		
This container contains the Txbuffer configuration. Multiple buffers with different sizes could be configured. If CanIfBufferSize (ECUC_CanIf_00834) equals 0, the CanIf Tx L-PDU only refers via this CanIfBufferCfg the corresponding CanIfHthCfg.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfBufferCfg	
BSW Parameter		**BSW Type**
CanIfBufferHthRef		EcucReferenceDef
BSW Description		
Reference to HTH, that defines the hardware object or the pool of hardware objects configured for transmission. All the CanIf Tx L-PDUs refer via the CanIfBufferCfg and this parameter to the HTHs if TxBuffering is enabled, or not. Each HTH shall not be assigned to more than one buffer.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfBufferCfg	
BSW Parameter		**BSW Type**
CanIfBufferSize		EcucIntegerParamDef
BSW Description		
This parameter defines the number of CanIf Tx L-PDUs which can be buffered in one Txbuffer. If this value equals 0, the CanIf does not perform Txbuffering for the CanIf Tx L-PDUs which are assigned to this Txbuffer. If CanIfPublicTxBuffering equals False, this parameter equals 0 for all TxBuffer. If the CanHandleType of the referred HTH equals FULL, this parameter equals 0 for this TxBuffer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfInitCfgSet		EcucStringParamDef
BSW Description		
Selects the CAN Interface specific configuration setup. This type of the external data structure shall contain the post build initialization data for the CAN Interface for all underlying CAN Dirvers. constant to CanIf_ConfigType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfInitHohCfg		EcucParamConfContainerDef
BSW Description		
This container contains the references to the configuration setup of each underlying CAN Driver.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg		
BSW Parameter		**BSW Type**	
CanIfHrhCfg		EcucParamConfContainerDef	
BSW Description			
This container contains configuration parameters for each hardware receive object (HRH).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg		
BSW Parameter		**BSW Type**	
CanIfHrhCanCtrlIdRef		EcucReferenceDef	
BSW Description			
Reference to controller Id to which the HRH belongs to. A controller can contain one or more HRHs.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg	
BSW Parameter		**BSW Type**
CanIfHrhIdSymRef		EcucSymbolicNameReferenceDef
BSW Description		
The parameter refers to a particular HRH object in the CanDrv configuration (see CanHardwareObject ECUC_Can_00324). CanIf receives the following information of the CanDrv module by this reference: - CanHandleType (see ECUC_Can_00323) - CanObjectId (see ECUC_Can_00326)		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeCfg		EcucParamConfContainerDef
BSW Description		
Defines the parameters required for configurating multiple CANID ranges for a given same HRH.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg/CanIfHrhRangeCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeBaseId		EcucIntegerParamDef
BSW Description		
CAN Identifier used as base value in combination with CanIfHrhRangeMask for a masked ID range in which all CAN Ids shall pass the software filtering. The size of this parameter is limited by CanIfHrhRangeRxPduRangeCanIdType.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg/CanIfHrhRangeCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeMask		EcucIntegerParamDef
BSW Description		
Used as mask value in combination with CanIfHrhRangeBaseId for a masked ID range in which all CAN Ids shall pass the software filtering. The size of this parameter is limited by CanIfHrhRangeRxPduRangeCanIdType.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg/CanIfHrhRangeCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeRxPduLowerCanId		EcucIntegerParamDef
BSW Description		
Lower CAN Identifier of a receive CAN L-PDU for identifier range definition, in which all CAN Ids shall pass the software filtering.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg/CanIfHrhRangeCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeRxPduRangeCanIdType		EcucEnumerationParamDef
BSW Description		
Specifies whether a configured Range of CAN Ids shall only consider standard CAN Ids or extended CAN Ids.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg/CanIfHrhRangeCfg	
BSW Parameter		**BSW Type**
CanIfHrhRangeRxPduUpperCanId		EcucIntegerParamDef
BSW Description		
Upper CAN Identifier of a receive CAN L-PDU for identifier range definition, in which all CAN Ids shall pass the software filtering.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHrhCfg	
BSW Parameter		**BSW Type**
CanIfHrhSoftwareFilter		EcucBooleanParamDef
BSW Description		
Selects the hardware receive objects by using the HRH range/list from CAN Driver configuration to define, for which HRH a software filtering has to be performed at during receive processing. True: Software filtering is enabled False: Software filtering is enabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg	
BSW Parameter		**BSW Type**
CanIfHthCfg		EcucParamConfContainerDef
BSW Description		
This container contains parameters related to each HTH.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHthCfg	
BSW Parameter		**BSW Type**
CanIfHthCanCtrlIdRef		EcucReferenceDef
BSW Description		
Reference to controller Id to which the HTH belongs to. A controller can contain one or more HTHs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfInitHohCfg/CanIfHthCfg	
BSW Parameter		**BSW Type**
CanIfHthIdSymRef		EcucSymbolicNameReferenceDef
BSW Description		
The parameter refers to a particular HTH object in the CanDrv configuration (see CanHardwareObject ECUC_Can_00324). CanIf receives the following information of the CanDrv module by this reference: - CanHandleType (see ECUC_Can_00323) - CanObjectId (see ECUC_Can_00326)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfMaxBufferSize		EcucIntegerParamDef
BSW Description		
Maximum total size of all Tx buffers. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfMaxRxPduCfg		EcucIntegerParamDef
BSW Description		
Maximum number of Pdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfMaxTxPduCfg		EcucIntegerParamDef
BSW Description		
Maximum number of Pdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfRxPduCfg		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of each receive CAN L-PDU. The SHORT-NAME of "CanIfRxPduConfig" container itself represents the symolic name of Receive L-PDU. This L-SDU produces a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduCanId		EcucIntegerParamDef
BSW Description		
CAN Identifier of Receive CAN L-PDUs used by the CAN Interface. Exa: Software Filtering. This parameter is used if exactly one Can Identifier is assigned to the Pdu. If a range is assigned then the CanIfRxPduCanIdRange parameter shall be used. Range: 11 Bit For Standard CAN Identifier ... 29 Bit For Extended CAN identifier		

Template Description	
To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanIf_00004

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduCanIdMask		EcucIntegerParamDef
BSW Description		
Identifier mask which denotes relevant bits in the CAN Identifier. This parameter defines a CAN Identifier range in an alternative way to CanIfRxPduCanIdRange. It identifies the bits of the configured CAN Identifier that must match the received CAN Identifier. Range: 11 bits for Standard CAN Identifier, 29 bits for Extended CAN Identifier.		
Template Description		
Identifier mask which denotes the relevant bits in the CAN Identifier. Together with the identifier, this parameter defines a CAN identifier range.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.rxMask		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanIf_00003

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduCanIdRange		EcucParamConfContainerDef
BSW Description		
Optional container that allows to map a range of CAN Ids to one PduId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdRange	
BSW Parameter		**BSW Type**
CanIfRxPduCanIdRangeLowerCanId		EcucIntegerParamDef

BSW Description	
Lower CAN Identifier of a receive CAN L-PDU for identifier range definition, in which all CAN Ids are mapped to one PduId.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdRange	
BSW Parameter		**BSW Type**
CanIfRxPduCanIdRangeUpperCanId		EcucIntegerParamDef
BSW Description		
Upper CAN Identifier of a receive CAN L-PDU for identifier range definition, in which all CAN Ids are mapped to one PduId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduCanIdType		EcucEnumerationParamDef
BSW Description		
CAN Identifier of receive CAN L-PDUs used by the CAN Driver for CAN L-PDU reception.		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior		
Mapping Rule		**Mapping Type**
Mapping fully defined by all permutations of canAddressingMode and canFrameRxBehavior.		full
Mapping Status		**Mapping ID**
valid		up_CanIf_00005

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType	
BSW Parameter		**BSW Type**
EXTENDED_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN 2.0 or CAN FD frame with extended identifier (29 bits)		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior		
Mapping Rule		**Mapping Type**
canAddressingMode = "extended" and canFrameRxBehavior = "any".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType	
BSW Parameter		**BSW Type**
EXTENDED_FD_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN FD frame with extended identifier (29 bits)		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior		
Mapping Rule		**Mapping Type**
canAddressingMode = "extended" and canFrameRxBehavior = "canFd".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType	
BSW Parameter		**BSW Type**
EXTENDED_NO_FD_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN 2.0 frame with extended identifier (29 bits)		

Template Description	
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "extended" and canFrameRxBehavior = "can20".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType
BSW Parameter	**BSW Type**
STANDARD_CAN	EcucEnumerationLiteralDef
BSW Description	
CAN 2.0 or CAN FD frame with standard identifier (11 bits)	
Template Description	
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "standard" and canFrameRxBehavior = "any".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType
BSW Parameter	**BSW Type**
STANDARD_FD_CAN	EcucEnumerationLiteralDef
BSW Description	
CAN FD frame with standard identifier (11 bits)	
Template Description	

CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "standard" and canFrameRxBehavior = "canFd".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfRxPduCanIdType	
BSW Parameter		**BSW Type**
STANDARD_NO_FD_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN 2.0 frame with standard identifier (11 bits)		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameRxBehavior**: Defines which CAN protocol shall be expected for frame reception.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameRxBehavior		
Mapping Rule		**Mapping Type**
canAddressingMode = "standard" and canFrameRxBehavior = "can20".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduDataLength		EcucIntegerParamDef
BSW Description		
Data length of the received CAN L-PDUs used by the CAN Interface. This information is used for Data Length Check. Additionally it might specify the valid bits in case of the discrete DLC for CAN FD L-PDUs > 8 bytes. The data area size of a CAN L-PDU can have a range from 0 to 64 bytes.		
Template Description		

The used length (in bytes) of the referencing frame. Should not be confused with a static byte length reserved for each frame by some platforms (e.g. FlexRay). The frameLength of zero bytes is allowed.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Frame.frameLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanIf_00002

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduHrhIdRef		EcucReferenceDef
BSW Description		
The HRH to which Rx L-PDU belongs to, is referred through this parameter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduId		EcucIntegerParamDef
BSW Description		
ECU wide unique, symbolic handle for receive CAN L-SDU. It shall fulfill ANSI/AUTOSAR definitions for constant defines. Range: 0..max. number of defined CanRxPduIds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduReadData		EcucBooleanParamDef
BSW Description		

Enables and disables the Rx buffering for reading of received L-SDU data. True: Enabled False: Disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduReadNotifyStatus		EcucBooleanParamDef
BSW Description		
Enables and disables receive indication for each receive CAN L-SDU for reading its notification status. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**

CanIfRxPduUserRxIndicationName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of the <User_RxIndication>. This parameter depends on the parameter CANIF_RXPDU_USERRXINDICATION_UL. If CANIF_RXPDU_USERRXINDICATION_UL equals CAN_TP, CAN_NM, PDUR, XCP, CAN_TSYN, J1939NM or J1939TP, the name of the <User_RxIndication> is fixed. If CANIF_RXPDU_USERRXINDICATION_UL equals CDD, the name of the <User_RxIndication> is selectable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfRxPduUserRxIndicationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer (UL) module to which the indication of the successfully received CANRXPDUID has to be routed via <User_RxIndication>. This <User_RxIndication> has to be invoked when the indication of the configured CANRXPDUID will be received by an Rx indication event from the CAN Driver module. If no upper layer (UL) module is configured, no <User_RxIndication> has to be called in case of an Rx indication event of the CANRXPDUID from the CAN Driver module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg	
BSW Parameter		**BSW Type**
CanIfTTRxFrameTriggering		EcucParamConfContainerDef
BSW Description		
CanIfTTRxFrameTriggering is specified in the SWS TTCAN Interface and defines Frame trigger for TTCAN reception. This container is only included and valid if TTCAN is supported by the controller, enabled (see CanIfSupportTTCAN, ECUC_CanIf_00675), and a joblist is used for reception.		
Template Description		
CAN specific attributes to the FrameTriggering		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanIf_00001

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfTTRxFrameTriggering	
BSW Parameter		**BSW Type**
CanIfTTRxHwObjectTriggerIdRef		EcucReferenceDef
BSW Description		
This parameter refers to a particular TTCAN hardware receive object Trigger of a hardware object in the TTCAN Driver Module, which is referred via plain CAN parameter CANIF_HRH_HANDLETYPE_REF. This parameter is only configurable if a joblist is enabled by parameter CanIfTTJobList.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfRxPduCfg/CanIfTTRxFrameTriggering	
BSW Parameter		**BSW Type**
CanTTRxJoblistTimeMark		EcucIntegerParamDef
BSW Description		
Defines the point in time, when the joblist execution funciton (JLEF) shall be called for the referenced rx trigger. Value is given in cycle time. This parameter is only configurable if a joblist is enabled by parameter CanIfTTJobList.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg	
BSW Parameter		**BSW Type**
CanIfTxPduCfg		EcucParamConfContainerDef
BSW Description		

This container contains the configuration (parameters) of a transmit CAN L-PDU. It has to be configured as often as a transmit CAN L-PDU is needed. The SHORT-NAME of "CanIfTxPduConfig" container represents the symolic name of Transmit L-PDU. This L-SDU consumes a meta data item of type CAN_ID_32.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg
BSW Parameter	**BSW Type**
CanIfTTTxFrameTriggering	EcucParamConfContainerDef
BSW Description	
CanIfTTTxFrameTriggering is specified in the SWS TTCAN Interface and defines Frame trigger for TTCAN transmission. This container is only included and valid if TTCAN is supported by the controller, enabled (see CanIfSupportTTCAN, ECUC_CanIf_00675), and a joblist is used.	
Template Description	
CAN specific attributes to the FrameTriggering	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanIf_00009

BSW Module	**BSW Context**
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTTTxFrameTriggering
BSW Parameter	**BSW Type**
CanIfTTTxHwObjectTriggerIdRef	EcucReferenceDef
BSW Description	
This parameter refers to a particular TTCAN hardware transmit object Trigger of a hardware object in the TTCAN Driver Module, which is referred via plain CAN parameter CANIF_HTH_HANDLETYPE_REF. This parameter is only configurable if a joblist is enabled by parameter CanIfTTJobList.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTTTxFrameTriggering		
BSW Parameter		**BSW Type**	
CanIfTTTxJoblistTimeMark		EcucIntegerParamDef	
BSW Description			
Defines the point in time, when the joblist execution funciton (JLEF) shall be called for the referenced tx frame trigger. Value is given in cycle time. This parameter is only configurable if a joblist is enabled by parameter CanIfTTJobList.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg		
BSW Parameter		**BSW Type**	
CanIfTxPduBufferRef		EcucReferenceDef	
BSW Description			
Configurable reference to a CanIf buffer configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg		
BSW Parameter		**BSW Type**	
CanIfTxPduCanId		EcucIntegerParamDef	
BSW Description			
CAN Identifier of transmit CAN L-PDUs used by the CAN Driver for CAN L-PDU transmission. Range: 11 Bit For Standard CAN Identifier ... 29 Bit For Extended CAN identifier The CAN Identifier may be omitted for dynamic transmit L-PDUs.			
Template Description			
To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier			
Mapping Rule			**Mapping Type**
1:1 mapping			full

Mapping Status	Mapping ID
valid	up_CanIf_00008

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduCanIdMask		EcucIntegerParamDef
BSW Description		
Identifier mask which denotes relevant bits in the CAN Identifier. This parameter may be used to keep parts of the CAN Identifier of dynamic transmit L-PDUs static. Range: 11 bits for Standard CAN Identifier, 29 bits for Extended CAN Identifier.		
Template Description		
Identifier mask which denotes static bits in the CAN identifier. The other bits can be set dynamically.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.txMask		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanIf_00007

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduCanIdType		EcucEnumerationParamDef
BSW Description		
Type of CAN Identifier of the transmit CAN L-PDU used by the CAN Driver module for CAN L-PDU transmission.		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameTxBehavior**: Defines which CAN protocol shall be used for frame transmission.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameTxBehavior		
Mapping Rule		**Mapping Type**
Mapping fully defined by all permutations of canAddressingMode and canFrameTxBehavior.		full
Mapping Status		**Mapping ID**
valid		up_CanIf_00006

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTxPduCanIdType	
BSW Parameter		**BSW Type**
EXTENDED_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN frame with extended identifier (29 bits)		

Template Description	
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameTxBehavior**: Defines which CAN protocol shall be used for frame transmission.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameTxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "extended" and canFrameRxBehavior = "can20".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTxPduCanIdType	
BSW Parameter		**BSW Type**
EXTENDED_FD_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN FD frame with extended identifier (29 bits)		
Template Description		
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameTxBehavior**: Defines which CAN protocol shall be used for frame transmission.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameTxBehavior		
Mapping Rule		**Mapping Type**
canAddressingMode = "extended" and canFrameRxBehavior = "canFd".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTxPduCanIdType	
BSW Parameter		**BSW Type**
STANDARD_CAN		EcucEnumerationLiteralDef
BSW Description		
CAN frame with standard identifier (11 bits)		
Template Description		

CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameTxBehavior**: Defines which CAN protocol shall be used for frame transmission.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameTxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "standard" and canFrameRxBehavior = "can20".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg/CanIfTxPduCanIdType
BSW Parameter	**BSW Type**
STANDARD_FD_CAN	EcucEnumerationLiteralDef
BSW Description	
CAN FD frame with standard identifier (11 bits)	
Template Description	
CanFrameTriggering.canAddressingMode: The CAN protocol supports two types of frame formats. The standard frame format uses 11-bit identifiers and is defined in the CAN specification 2.0 A. Additionally the extended frame format allows 29-bit identifiers and is defined in the CAN specification 2.0 B. **CanFrameTriggering.canFrameTxBehavior**: Defines which CAN protocol shall be used for frame transmission.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canAddressingMode,SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.canFrameTxBehavior	
Mapping Rule	**Mapping Type**
canAddressingMode = "standard" and canFrameRxBehavior = "canFd".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg
BSW Parameter	**BSW Type**
CanIfTxPduId	EcucIntegerParamDef
BSW Description	
ECU wide unique, symbolic handle for transmit CAN L-SDU. Range: 0..max. number of CantTxPduIds	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduPnFilterPdu		EcucBooleanParamDef
BSW Description		
If CanIfPublicPnFilterSupport is enabled, by this parameter PDUs could be configured which will pass the CanIfPnFilter. If there is no CanIfTxPduPnFilterPdu configured per controller, the corresponding controller applies no CanIfPnFilter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduReadNotifyStatus		EcucBooleanParamDef
BSW Description		
Enables and disables transmit confirmation for each transmit CAN L-SDU for reading its notification status. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduTriggerTransmit		EcucBooleanParamDef
BSW Description		
Determines if or if not CanIf shall use the trigger transmit API for this PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduTruncation		EcucBooleanParamDef
BSW Description		
Enables/disables truncation of PDUs that exceed the configured size.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduType		EcucEnumerationParamDef
BSW Description		
Defines the type of each transmit CAN L-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg		
BSW Parameter		**BSW Type**	
CanIfTxPduUserTriggerTransmitName		EcucFunctionNameDef	
BSW Description			
This parameter defines the name of the <User_TriggerTransmit>. This parameter depends on the parameter CanIfTxPduUserTxConfirmationUL. If CanIfTxPduUserTxConfirmationUL equals CAN_TP, CAN_NM, PDUR, XCP, CAN_TSYN, J1939NM or J1939TP, the name of the <User_TriggerTransmit> is fixed. If CanIfTxPduUserTxConfirmationUL equals CDD, the name of the <User_TxConfirmation> is selectable. Please be aware that this parameter depends on the same parameter as CanIfTxPduUserTxConfirmationName. It shall be clear which upper layer is responsible for that PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg		
BSW Parameter		**BSW Type**	
CanIfTxPduUserTxConfirmationName		EcucFunctionNameDef	
BSW Description			
This parameter defines the name of the <User_TxConfirmation>. This parameter depends on the parameter CanIfTxPduUserTxConfirmationUL. If CanIfTxPduUserTxConfirmationUL equals CAN_TP, CAN_NM, PDUR, XCP, CAN_TSYN, J1939NM or J1939TP, the name of the <User_TxConfirmation> is fixed. If CanIfTxPduUserTxConfirmationUL equals CDD, the name of the <User_TxConfirmation> is selectable.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
CanIf	CanIf/CanIfInitCfg/CanIfTxPduCfg	
BSW Parameter		**BSW Type**
CanIfTxPduUserTxConfirmationUL		EcucEnumerationParamDef
BSW Description		

This parameter defines the upper layer (UL) module to which the confirmation of the successfully transmitted CANTXPDUID has to be routed via the <User_TxConfirmation>. This <User_TxConfirmation> has to be invoked when the confirmation of the configured CANTXPDUID will be received by a Tx confirmation event from the CAN Driver module. If no upper layer (UL) module is configured, no <User_TxConfirmation> has to be called in case of a Tx confirmation event of the CANTXPDUID from the CAN Driver module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf
BSW Parameter	**BSW Type**
CanIfPrivateCfg	EcucParamConfContainerDef
BSW Description	
This container contains the private configuration (parameters) of the CAN Interface.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfPrivateCfg
BSW Parameter	**BSW Type**
CanIfFixedBuffer	EcucBooleanParamDef
BSW Description	
This parameter defines if the buffer element length shall be fixed to 8 Bytes for buffers to which only PDUs < 8 Bytes are assigned. TRUE: Minimum buffer element length is fixed to 8 Bytes. FALSE: Buffer element length depends on the size of the referencing PDUs.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfPrivateCfg

BSW Parameter		BSW Type
CanIfPrivateDataLengthCheck		EcucBooleanParamDef
BSW Description		
Selects whether Data Length Check is supported. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPrivateCfg	
BSW Parameter		**BSW Type**
CanIfPrivateSoftwareFilterType		EcucEnumerationParamDef
BSW Description		
Selects the desired software filter mechanism for reception only. Each implemented software filtering method is identified by this enumeration number. Range: Types implemented software filtering methods		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPrivateCfg	
BSW Parameter		**BSW Type**
CanIfSupportTTCAN		EcucBooleanParamDef
BSW Description		
Defines whether TTCAN is supported. TRUE: TTCAN is supported. FALSE: TTCAN is not supported, only normal CAN communication is possible.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
CanIf	CanIf/CanIfPrivateCfg
BSW Parameter	**BSW Type**
CanIfTTGeneral	EcucParamConfContainerDef
BSW Description	
CanIfTTGeneral is specified in the SWS TTCAN Interface and defines if and in which way TTCAN is supported. This container is only included and valid if TTCAN is supported by the controller, enabled (see CanIfSupportTTCAN, ECUC_CanIf_00675), and used.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfPrivateCfg/CanIfTTGeneral
BSW Parameter	**BSW Type**
CanIfTTDemEventParameterRefs	EcucParamConfContainerDef
BSW Description	
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanIf	CanIf/CanIfPrivateCfg/CanIfTTGeneral/CanIfTTDemEventParameterRefs
BSW Parameter	**BSW Type**
CANIF_TT_E_JLE_SYNC	EcucSymbolicNameReferenceDef
BSW Description	
Reference to configured DEM event to report that the JLEF lost synchronization to the local time of the TTCAN controller.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
CanIf	CanIf/CanIfPrivateCfg/CanIfTTGeneral		
BSW Parameter		**BSW Type**	
CanIfTTJoblist		EcucBooleanParamDef	
BSW Description			
Defines whether TTCAN is processed via a joblist. TRUE: Joblist is used. FALSE: No joblist is used. This parameter is only configurable if TTCAN is enabled by parameter CanIfSupportTTCAN.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPrivateCfg/CanIfTTGeneral		
BSW Parameter		**BSW Type**	
CanIfTTMaxIsrDelay		EcucIntegerParamDef	
BSW Description			
Defines the maximum delay for the execution of the joblist execution function JLEF. This parameter is only configurable if a joblist is enabled by parameter CanIfTTJobList.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf		
BSW Parameter		**BSW Type**	
CanIfPublicCfg		EcucParamConfContainerDef	
BSW Description			
This container contains the public configuration (parameters) of the CAN Interface.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfDevErrorDetect		EcucBooleanParamDef	
BSW Description			
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfMetaDataSupport		EcucBooleanParamDef	
BSW Description			
Enable support for dynamic ID handling using L-SDU MetaData.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfPublicCancelTransmitSupport		EcucBooleanParamDef	
BSW Description			
Configuration parameter to enable/disable dummy API for upper layer modules which allows to request the cancellation of an I-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
CanIf	CanIf/CanIfPublicCfg

BSW Parameter		BSW Type
CanIfPublicCddHeaderFile		EcucStringParamDef
BSW Description		
Defines header files for callback functions which shall be included in case of CDDs. Range of characters is 1.. 32.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicHandleTypeEnum		EcucEnumerationParamDef
BSW Description		
This parameter is used to configure the Can_HwHandleType. The Can_HwHandleType represents the hardware object handles of a CAN hardware unit. For CAN hardware units with more than 255 HW objects the extended range shall be used (UINT16).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicIcomSupport		EcucBooleanParamDef
BSW Description		
Selects support of Pretended Network features in CanIf. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
CanIf	CanIf/CanIfPublicCfg

BSW Parameter	**BSW Type**
CanIfPublicMultipleDrvSupport	EcucBooleanParamDef
BSW Description	
Selects support for multiple CAN Drivers. True: Enabled False: Disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfPublicCfg
BSW Parameter	**BSW Type**
CanIfPublicPnSupport	EcucBooleanParamDef
BSW Description	
Selects support of Partial Network features in CanIf. True: Enabled False: Disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanIf	CanIf/CanIfPublicCfg
BSW Parameter	**BSW Type**
CanIfPublicReadRxPduDataApi	EcucBooleanParamDef
BSW Description	
Enables / Disables the API CanIf_ReadRxPduData() for reading received L-SDU data. True: Enabled False: Disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfPublicReadRxPduNotifyStatusApi		EcucBooleanParamDef	
BSW Description			
Enables and disables the API for reading the notification status of receive L-PDUs. True: Enabled False: Disabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfPublicReadTxPduNotifyStatusApi		EcucBooleanParamDef	
BSW Description			
Enables and disables the API for reading the notification status of transmit L-PDUs. True: Enabled False: Disabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfPublicCfg		
BSW Parameter		**BSW Type**	
CanIfPublicSetDynamicTxIdApi		EcucBooleanParamDef	
BSW Description			
Enables and disables the API for reconfiguration of the CAN Identifier for each Transmit L-PDU. True: Enabled False: Disabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicTxBuffering		EcucBooleanParamDef
BSW Description		
Enables and disables the buffering of transmit L-PDUs (rejected by the CanDrv) within the CAN Interface module. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicTxConfirmPollingSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable the API to poll for Tx Confirmation state.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicWakeupCheckValidByNM		EcucBooleanParamDef
BSW Description		
If enabled, only NM messages shall validate a detected wake-up event in CanIf. If disabled, all received messages corresponding to a configured Rx PDU shall validate such a wake-up event. This parameter depends on CanIfPublicWakeupCheckValidSupport and shall only be configurable, if it is enabled. True: Enabled False: Disabled		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfPublicWakeupCheckValidSupport		EcucBooleanParamDef
BSW Description		
Selects support for wake up validation True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfSetBaudrateApi		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable the CanIf_SetBaudrate API to change the baud rate of a CAN Controller. If this parameter is set to true the CanIf_SetBaudrate API shall be supported. Otherwise the API is not supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfTriggerTransmitSupport		EcucBooleanParamDef
BSW Description		

Enables the CanIf_TriggerTransmit API at Pre-Compile-Time. Therefore, this parameter defines if there shall be support for trigger transmit transmissions. TRUE: Enabled FALSE: Disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfTxOfflineActiveSupport		EcucBooleanParamDef
BSW Description		
Determines wether TxOffLineActive feature (see SWS_CANIF_00072) is supported by CanIf. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfPublicCfg	
BSW Parameter		**BSW Type**
CanIfVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables and disables the API for reading the version information about the CAN Interface. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
CanIf	CanIf/CanIfPublicCfg

BSW Parameter		**BSW Type**
CanIfWakeupSupport		EcucBooleanParamDef
BSW Description		
Enables the CanIf_CheckWakeup API at Pre-Compile-Time. Therefore, this parameter defines if there shall be support for wake-up. TRUE: Enabled FALSE: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf	
BSW Parameter		**BSW Type**
CanIfTrcvDrvCfg		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of all addressed CAN transceivers by each underlying CAN Transceiver Driver module. For each CAN transceiver Driver a seperate instance of this container shall be provided.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanIf	CanIf/CanIfTrcvDrvCfg	
BSW Parameter		**BSW Type**
CanIfTrcvCfg		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of one addressed CAN transceiver by the underlying CAN Transceiver Driver module. For each CAN transceiver a seperate instance of this container has to be provided.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
CanIf	CanIf/CanIfTrcvDrvCfg/CanIfTrcvCfg		
BSW Parameter		**BSW Type**	
CanIfTrcvCanTrcvRef		EcucSymbolicNameReferenceDef	
BSW Description			
This parameter references to the logical handle of the underlying CAN transceiver from the CAN transceiver driver module to be served by the CAN Interface module. Range: 0..max. number of underlying supported CAN transceivers			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfTrcvDrvCfg/CanIfTrcvCfg		
BSW Parameter		**BSW Type**	
CanIfTrcvId		EcucIntegerParamDef	
BSW Description			
This parameter abstracts from the CAN Transceiver Driver specific parameter Transceiver. Each transceiver of all connected CAN Transceiver Driver modules shall be assigned to one specific TransceiverId of the CanIf. Range: 0..number of configured transceivers of all CAN Transceiver Driver modules			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanIf	CanIf/CanIfTrcvDrvCfg/CanIfTrcvCfg		
BSW Parameter		**BSW Type**	
CanIfTrcvWakeupSupport		EcucBooleanParamDef	
BSW Description			
This parameter defines if a respective transceiver of the referenced CAN Transceiver Driver modules is queriable for wake up events. True: Enabled False: Disabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

C.2.3 Can Transceiver Mapping

BSW Module	**BSW Context**		
CanTrcv	CanTrcv		
BSW Parameter		**BSW Type**	
CanTrcvConfigSet		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters and sub containers of the AUTOSAR WdgM module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTrcv	CanTrcv/CanTrcvConfigSet		
BSW Parameter		**BSW Type**	
CanTrcvChannel		EcucParamConfContainerDef	
BSW Description			
Container gives CAN transceiver driver information about a single CAN transceiver (channel).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvAccess		EcucChoiceContainerDef	
BSW Description			
Container gives CanTrcv Driver information about access to a single CAN transceiver.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess	
BSW Parameter		**BSW Type**
CanTrcvDioAccess		EcucParamConfContainerDef
BSW Description		
Container gives CAN transceiver driver information about accessing ports and port pins. In addition relation between CAN transceiver hardware pin names and Dio port access information is given. If a CAN transceiver hardware has no Dio interface, there is no instance of this container.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvDio Access	
BSW Parameter		**BSW Type**
CanTrcvDioChannelAccess		EcucParamConfContainerDef
BSW Description		
Container gives DIO channel access by single Can transceiver channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvDio Access/CanTrcvDioChannelAccess	
BSW Parameter		**BSW Type**
CanTrcvDioSymNameRef		EcucChoiceReferenceDef
BSW Description		
Choice Reference to a DIO Port, DIO Channel or DIO Channel Group. This reference replaces the CANTRCV_DIO_PORT_SYM_NAME, CANTRCV_DIO_CHANNEL_SYM_NAME and CANTRCV_DIO_GROUP_SYM_NAME references in the Can Trcv SWS.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvDioAccess/CanTrcvDioChannelAccess	
BSW Parameter		**BSW Type**
CanTrcvHardwareInterfaceName		EcucStringParamDef
BSW Description		
CAN transceiver hardware interface name. It is typically the name of a pin. From a Dio point of view it is either a port, a single channel or a channel group. Depending on this fact either CANTRCV_DIO_PORT_SYMBOLIC_NAME or CANTRCV_DIO_CHANNEL_SYMBOLIC_NAME or CANTRCV_DIO_CHANNEL_GROUP_SYMBOLIC_NAME shall reference a Dio configuration. The CAN transceiver driver implementation description shall list up this name for the appropriate CAN transceiver hardware.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess	
BSW Parameter		**BSW Type**
CanTrcvSpiAccess		EcucParamConfContainerDef
BSW Description		
Container gives CAN transceiver driver information about accessing Spi. If a CAN transceiver hardware has no Spi interface, there is no instance of this container.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvSpiAccess	
BSW Parameter		**BSW Type**
CanTrcvSpiSequence		EcucParamConfContainerDef
BSW Description		

Container gives CAN transceiver driver information about one SPI sequence. One SPI sequence used by CAN transceiver driver is in exclusive use for it. No other driver is allowed to access this sequence. CAN transceiver driver may use one sequence to access n CAN transceiver hardwares chips of the same type or n sequences are used to access one single CAN transceiver hardware chip. If a CAN transceiver hardware has no SPI interface, there is no instance of this container.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvSpiAccess/CanTrcvSpiSequence	
BSW Parameter		**BSW Type**
CanTrcvSpiAccessSynchronous		EcucBooleanParamDef
BSW Description		
This parameter is used to define whether the access to the Spi sequence is synchronous or asynchronous. true: SPI access is synchronous. false: SPI access is asynchronous.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvAccess/CanTrcvSpiAccess/CanTrcvSpiSequence	
BSW Parameter		**BSW Type**
CanTrcvSpiSequenceName		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a Spi sequence configuration container.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvChannelId		EcucIntegerParamDef	
BSW Description			
Unique identifier of the CAN Transceiver Channel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvChannelUsed		EcucBooleanParamDef	
BSW Description			
Shall the related CAN transceiver channel be used?			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvControlsPowerSupply		EcucBooleanParamDef	
BSW Description			
Is ECU power supply controlled by this transceiver? TRUE = Controlled by transceiver. FALSE = Not controlled by transceiver.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel	
BSW Parameter		**BSW Type**

CanTrcvDemEventParameterRefs	EcucParamConfContainerDef
BSW Description	
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvDemEventParameterRefs
BSW Parameter	**BSW Type**
CANTRCV_E_BUS_ERROR	EcucSymbolicNameReferenceDef
BSW Description	
Reference to the DemEventParameter which shall be issued when bus error has occurred.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel
BSW Parameter	**BSW Type**
CanTrcvHwPnSupport	EcucBooleanParamDef
BSW Description	
Indicates whether the HW supports the selective wake-up function TRUE = Selective wakeup feature is supported by the transceiver FALSE = Selective wakeup functionality is not available in transceiver	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel

BSW Parameter		BSW Type
CanTrcvIcuChannelRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the IcuChannel to enable/disable the interrupts for wakeups.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvInitState		EcucEnumerationParamDef	
BSW Description			
State of CAN transceiver after call to CanTrcv_Init.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvMaxBaudrate		EcucIntegerParamDef	
BSW Description			
Indicates the data transfer rate in kbps. Maximum data transfer rate in kbps for transceiver hardware type. Only used for validation purposes. This value can be used by configuration tools.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel	
BSW Parameter		**BSW Type**
CanTrcvPartialNetwork		EcucParamConfContainerDef

BSW Description	
Container gives CAN transceiver driver information about the configuration of Partial Networking functionality.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork	
BSW Parameter		**BSW Type**
CanTrcvBaudRate		EcucIntegerParamDef
BSW Description		
Indicates the data transfer rate in kbps.		
Template Description		
Channels speed in bits/s.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster.baudrate		
Mapping Rule		**Mapping Type**
CanTrcvBaudRate = SystemTemplate baudrate is in bps, so divide it by 1000 to get kbps		full
Mapping Status		**Mapping ID**
valid		up_CanTrcv_00010

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork	
BSW Parameter		**BSW Type**
CanTrcvBusErrFlag		EcucBooleanParamDef
BSW Description		
Indicates if the Bus Error (BUSERR) flag is managed by the BSW. This flag is set if a bus failure is detected by the transceiver. TRUE = Supported by transceiver and managed by BSW. FALSE = Not managed by BSW.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork	
BSW Parameter		**BSW Type**
CanTrcvPnCanIdIsExtended		EcucBooleanParamDef

BSW Description	
Indicates whether extended or standard ID is used. TRUE = Extended Can identifier is used. FALSE = Standard Can identifier is used	
Template Description	
Defines whether pncWakeupCanId and pncWakeupCanIdMask shall be interpreted as extended or standard CAN ID.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupCanIdExtended	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00001

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork	
BSW Parameter		**BSW Type**
CanTrcvPnEnabled		EcucBooleanParamDef
BSW Description		
Indicates whether the selective wake-up function is enabled or disabled in HW. TRUE = Selective wakeup feature is enabled in the transceiver hardware FALSE = Selective wakeup feature is disabled in the transceiver hardware		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork	
BSW Parameter		**BSW Type**
CanTrcvPnFrameCanId		EcucIntegerParamDef
BSW Description		
CAN ID of the Wake-up Frame (WUF).		
Template Description		
CAN Identifier used to configure the CAN Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupCanId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTrcv_00005

BSW Module	BSW Context

CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork
BSW Parameter	**BSW Type**
CanTrcvPnFrameCanIdMask	EcucIntegerParamDef
BSW Description	
ID Mask for the selective activation of the transceiver. It is used to enableFrame Wake-up (WUF) on a group of IDs.	
Template Description	
Bit mask for CAN Identifier used to configure the CAN Transceiver for partial network wakeup.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupCanIdMask	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00007

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork
BSW Parameter	**BSW Type**
CanTrcvPnFrameDataMaskSpec	EcucParamConfContainerDef
BSW Description	
Defines data payload mask to be used on the received payload in order to determine if the transceiver must be woken up by the received Wake-up Frame (WUF).	
Template Description	
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00002

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork/CanTrcvPnFrameDataMaskSpec
BSW Parameter	**BSW Type**
CanTrcvPnFrameDataMask	EcucIntegerParamDef
BSW Description	
Defines the n byte (Byte0 = LSB) of the data payload mask to be used on the received payload in order to determine if the transceiver must be woken up by the received Wake-up Frame (WUF).	
Template Description	
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00004

BSW Module	BSW Context
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork/CanTrcvPnFrameDataMaskSpec
BSW Parameter	**BSW Type**
CanTrcvPnFrameDataMaskIndex	EcucIntegerParamDef
BSW Description	
holds the position n in frame of the mask-part	
Template Description	
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00003

BSW Module	BSW Context
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork
BSW Parameter	**BSW Type**
CanTrcvPnFrameDlc	EcucIntegerParamDef
BSW Description	
Data Length of the Wake-up Frame (WUF).	
Template Description	
Data Length of the remote data frame used to configure the CAN Transceiver for partial network wakeup in Bytes.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDlc	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00008

BSW Module	BSW Context
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel/CanTrcvPartialNetwork
BSW Parameter	**BSW Type**
CanTrcvPowerOnFlag	EcucBooleanParamDef
BSW Description	
Description: Indicates if the Power On Reset (POR) flag is available and is managed by the transceiver. TRUE = Supported by Hardware. FALSE = Not supported by Hardware	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvPorWakeupSourceRef		EcucSymbolicNameReferenceDef	
BSW Description			
Symbolic name reference to specify the wakeup sources that should be used in the calls to EcuM_SetWakeupEvent as specified in [SWS_CanTrcv_00183] and [SWS_CanTrcv_00184]. This reference is mandatory if the HW supports POR or SYSERR flags			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel		
BSW Parameter		**BSW Type**	
CanTrcvSyserrWakeupSourceRef		EcucSymbolicNameReferenceDef	
BSW Description			
Symbolic name reference to specify the wakeup sources that should be used in the calls to EcuM_SetWakeupEvent as specified in [SWS_CanTrcv_00183] and [SWS_CanTrcv_00184] This reference is mandatory if the HW supports POR or SYSERR flags			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel	
BSW Parameter		**BSW Type**
CanTrcvWakeupByBusUsed		EcucBooleanParamDef
BSW Description		
Is wake up by bus supported? If CAN transceiver hardware does not support wake up by bus value is always FALSE. If CAN transceiver hardware supports wake up by bus value is TRUE or FALSE depending whether it is used or not. TRUE = Is used. FALSE = Is not used.		
Template Description		
Defines whether the ECU shall be woken up by this CommunicationController. TRUE: wake up is possible FALSE: wake up is not supported Note: If wakeUpByControllerSupported is set to TRUE the feature shall be supported by both hardware and basic software.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationController.wakeUpByController Supported	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTrcv_00009

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet/CanTrcvChannel	
BSW Parameter		**BSW Type**
CanTrcvWakeupSourceRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a wakeup source in the EcuM configuration. This reference is only needed if CanTrcvWakeupByBusUsed is true.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet	
BSW Parameter		**BSW Type**
CanTrcvSPICommRetries		EcucIntegerParamDef
BSW Description		
Indicates the maximum number of communication retries in case of a failed SPI communication (applies both to timed out communication and to errors/NACK in the response data). If configured value is '0', no retry is allowed (communication is expected to succeed at first try).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvConfigSet	
BSW Parameter		**BSW Type**
CanTrcvSPICommTimeout		EcucIntegerParamDef
BSW Description		
Indicates the maximum time allowed to the CanTrcv for replying (either positively or negatively) to a SPI command. Timeout is configured in milliseconds. Timeout value of '0' means that no specific timeout is to be used by CanTrcv and the communication is executed at the best of the SPI HW capacity.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTrcv	CanTrcv	
BSW Parameter		**BSW Type**
CanTrcvGeneral		EcucParamConfContainerDef
BSW Description		
Container gives CAN transceiver driver basic information.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvGeneral	
BSW Parameter		**BSW Type**
CanTrcvDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvGeneral	
BSW Parameter		**BSW Type**
CanTrcvIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvGeneral	
BSW Parameter		**BSW Type**
CanTrcvMainFunctionDiagnosticsPeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to CanTrcv_MainFunctionDiagnostics. Unit is seconds.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvGeneral	
BSW Parameter		**BSW Type**
CanTrcvMainFunctionPeriod		EcucFloatParamDef
BSW Description		
This parameter describes the period for cyclic call to CanTrcv_MainFunction. Unit is seconds.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTrcv	CanTrcv/CanTrcvGeneral	
BSW Parameter		**BSW Type**
CanTrcvTimerType		EcucEnumerationParamDef
BSW Description		
Type of the Time Service Predefined Timer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvGeneral
BSW Parameter	**BSW Type**
CanTrcvVersionInfoApi	EcucBooleanParamDef
BSW Description	
Switches version information API on and off. If switched off, function need not be present in compiled code.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvGeneral
BSW Parameter	**BSW Type**
CanTrcvWaitTime	EcucFloatParamDef
BSW Description	
Wait time for transceiver state changes in seconds.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTrcv	CanTrcv/CanTrcvGeneral
BSW Parameter	**BSW Type**
CanTrcvWakeUpSupport	EcucEnumerationParamDef
BSW Description	
Informs whether wake up is supported by polling or not supported. In case no wake up is supported by the hardware, setting has to be NOT_SUPPORTED. Only in the case of wake up supported by polling, function CanTrcv_MainFunction has to be present and to be invoked by the scheduler.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**

valid	

C.2.4 CanNm Mapping

BSW Module	BSW Context	
CanNm	CanNm	
BSW Parameter		**BSW Type**
CanNmGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains the global configuration parameter of the CanNm. The parameters and the parameters of the sub containers shall be mapped to the C data type CanNm_ConfigType (for parameters where it is possible) which is passed to the CanNm_Init function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmBusLoadReductionEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling busload reduction support.		
Template Description		
Enables busload reduction support		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmClusterCoupling.nmBusloadReductionEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00036

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmBusSynchronizationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling bus synchronization support. This feature is required for gateway nodes only.		
Template Description		
Enables bus synchronization support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmBusSynchronizationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_CanNm_00033

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmChannelConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the channel specific configuration parameter of the CanNm.			
Template Description			
Can specific NmCluster attributes			
M2 Parameter			
SystemTemplate::NetworkManagement::CanNmCluster			
Mapping Rule			**Mapping Type**
Create container for each existing CanNmCluster.			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00002

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmActiveWakeupBitEnabled		EcucBooleanParamDef	
BSW Description			
Enables/Disables the handling of the Active Wakeup Bit in the CanNm module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmAllNmMessagesKeepAwake		EcucBooleanParamDef	
BSW Description			
Specifies if CanNm drops irrelevant NM PDUs. false: Only NM PDUs with a PNI bit = true and containing a PN request for this ECU triggers the standard RX indication handling true: Every NM PDU triggers the standard RX indication handling			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanNm</td><td colspan="2">CanNm/CanNmGlobalConfig/CanNmChannelConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanNmBusLoadReductionActive</td><td>EcucBooleanParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This parameter defines if bus load reduction for the respective NM channel is active or not.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">It determines if bus load reduction for the respective CanNm channel is active or not.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::NetworkManagement::CanNmCluster.nmBusloadReductionActive</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_CanNm_00010</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanNm</td><td colspan="2">CanNm/CanNmGlobalConfig/CanNmChannelConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanNmCarWakeUpBitPosition</td><td>EcucIntegerParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Specifies the Bit position of the CWU within the NM PDU.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">Specifies the bit position of the CarWakeUp within the NmPdu.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::NetworkManagement::CanNmCluster.nmCarWakeUpBitPosition</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">The position of the Car Wakeup bit in the Ecuc is defined by the configuration parameters CanNmCarWakeUpBytePosition and CanNmCarWakeUpBitPosition (position in wakeUpByte). In the SysT the position is described only by the bit position in the NmMessage.</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_CanNm_00019</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanNm</td><td colspan="2">CanNm/CanNmGlobalConfig/CanNmChannelConfig</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanNmCarWakeUpBytePosition</td><td>EcucIntegerParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Specifies the Byte position of the CWU within the NM PDU.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">Specifies the bit position of the CarWakeUp within the NmPdu.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::NetworkManagement::CanNmCluster.nmCarWakeUpBitPosition</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">The position of the Car Wakeup bit in the Ecuc is defined by the configuration parameters CanNmCarWakeUpBytePosition and CanNmCarWakeUpBitPosition (position in wakeUpByte). In the SysT the position is described only by the bit position in the NM PDU.</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_CanNm_00006</td></tr>
</table>

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmCarWakeUpFilterEnabled		EcucBooleanParamDef
BSW Description		
If CWU filtering is supported, only the CWU bit within the NM PDU with source node identifier CanNmCarWakeUpFilterNodeId is considered as CWU request. FALSE - CWU filtering is not supported TRUE - CWU filtering is supported		
Template Description		
If this attribute is set to true the CareWakeUp filtering is supported.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmNode.nmCarWakeUpFilterEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00024

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmCarWakeUpFilterNodeId		EcucIntegerParamDef
BSW Description		
Source node identifier for CWU filtering. If CWU filtering is supported, only the CWU bit within the NM PDU with source node identifier CanNmCarWakeUpFilterNodeId is considered as CWU request.		
Template Description		
Source node identifier for CarWakeUp filtering.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster.nmCarWakeUpFilterNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00013

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmCarWakeUpRxEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables support of CarWakeUp bit evaluation in received NM PDUs. FALSE - CarWakeUp not supported TRUE - CarWakeUp supported		
Template Description		
If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmNode.nmCarWakeUpRxEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00017

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference points to the unique channel defined by the ComMChannel and provides access to the unique channel index value in ComMChannelId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmImmediateNmCycleTime		EcucFloatParamDef
BSW Description		
Defines the immediate NM PDU cycle time in seconds which is used for CanNmImmediateNmTransmissions NM PDU transmissions.		
Template Description		
Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This parameter is only valid if CanNmImmediateNmTransmissions is greater one.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster.nmImmediateNmCycleTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00015

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmImmediateNmTransmissions		EcucIntegerParamDef
BSW Description		
Defines the number of immediate NM PDUs which shall be transmitted. If the value is zero no immediate NM PDUs are transmitted. The cycle time of immeditate NM PDUs is defined by CanNmImmediateNmCycleTime.		
Template Description		
Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immeditate NmPdus is defined by nmImmediateNmCycleTime.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster.nmImmediateNmTransmissions		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00004

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmMsgCycleOffset		EcucFloatParamDef	
BSW Description			
Time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.			
Template Description			
Node specific time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.			
M2 Parameter			
SystemTemplate::NetworkManagement::CanNmNode.nmMsgCycleOffset			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00020

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmMsgCycleTime		EcucFloatParamDef	
BSW Description			
Period of a NM PDU in seconds. It determines the periodic rate in the "periodic transmission mode with bus load reduction" and is the basis for transmit scheduling in the "periodic transmission mode without bus load reduction".			
Template Description			
Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.			
M2 Parameter			
SystemTemplate::NetworkManagement::CanNmCluster.nmMsgCycleTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00021

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmMsgReducedTime		EcucFloatParamDef	
BSW Description			
Node specific bus cycle time in the periodic transmission mode with bus load reduction. Specified in seconds.			
Template Description			
Node specific bus cycle time in the periodic transmission mode with bus load reduction. Specified in seconds.			
M2 Parameter			
SystemTemplate::NetworkManagement::CanNmNode.nmMsgReducedTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00003

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmMsgTimeoutTime		EcucFloatParamDef	
BSW Description			
When using Partial Network and this timeout is defined then CanNm monitors that a NM-PDU is transmitted successfully within this Transmission Timeout Time and provides an error notification otherwise.			
Template Description			
Timeout of an NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.			
M2 Parameter			
SystemTemplate::NetworkManagement::CanNmCluster.nmMessageTimeoutTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00014

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmNodeDetectionEnabled		EcucBooleanParamDef	
BSW Description			
Precompile time switch to enable the node detection feature.			
Template Description			
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmCluster.nmNodeDetectionEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00045

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig		
BSW Parameter		**BSW Type**	
CanNmNodeId		EcucIntegerParamDef	
BSW Description			
Node identifier of local node.			
Template Description			
Node identifier of local NmNode. Must be unique in the NmCluster.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmNode.nmNodeId			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00023

BSW Module	BSW Context

CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmNodeIdEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling the source node identifier.	
Template Description	
Enables the source node identifier.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmCluster.nmNodeIdEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00047

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmPduCbvPosition	EcucEnumerationParamDef
BSW Description	
Defines the position of the control bit vector within the NM PDU. The value of the parameter represents the location of the Control Bit Vector in the NM PDU (CanNmPduByte0 means byte 0, CanNmPduByte1 means byte 1, CanNmPduOff means source node identifier is not part of the NM PDU) ImplementationType: CanNm_PduPositionType	
Template Description	
Defines the position of the control bit vector within the NmPdu (Byte position). If this attribute is not configured, the Control Bit Vector is not used.	
M2 Parameter	
SystemTemplate::NetworkManagement::CanNmCluster.nmCbvPosition	
Mapping Rule	**Mapping Type**
Derive byte position from nmCbvPosition attribute. If this optional attribute is missing set CANNM_PDU_OFF as value.	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00012

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmPduNidPosition	EcucEnumerationParamDef
BSW Description	
Defines the position of the source node identifier within the NM PDU. The value of the parameter represents the location of the source node identifier in the NM PDU (CANNM_PDU_BYTE_0 means byte 0, CANNM_PDU_BYTE_1 means byte 1, CANNM_PDU_OFF means source node identifier is not part of the NM PDU) ImplementationType: CanNm_PduPositionType	
Template Description	
Defines the byte position of the source node identifier within the NmPdu. If this attribute is not configured, the Node Identification is not used.	

M2 Parameter	
SystemTemplate::NetworkManagement::CanNmCluster.nmNidPosition	
Mapping Rule	**Mapping Type**
Derive byte position from nmNidPosition attribute. If this optional attribute is missing set CANNM_PDU_OFF as value.	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00025

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmPnEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables support of partial networking. false: Partial networking Range not supported true: Partial networking supported		
Template Description		
Defines whether this NmCluster contributes to the partial network mechanism.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmPncParticipation		
Mapping Rule		**Mapping Type**
If NmCluster.nmPncParticipation has the value "true" or is not defined then Can NmPnEnabled shall be set to true.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00011

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmPnEraCalcEnabled		EcucBooleanParamDef
BSW Description		
Specifies if CanNm calculates the PN request information for external requests. (ERA) false: PN request are not calculated true: PN request are calculated		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmPnEraRxNSduRef		EcucReferenceDef
BSW Description		

Reference to a Pdu in the COM-Stack. The SduRef is required for every CanNm Channel, because ERA is reported per channel.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmPnHandleMultipleNetworkRequests	EcucBooleanParamDef
BSW Description	
Specifies if CanNm performs an additional transition from Network Mode to Repeat Message State (true) or not (false).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmRemoteSleepIndTime	EcucFloatParamDef
BSW Description	
Timeout for Remote Sleep Indication. It defines the time in seconds how long it shall take to recognize that all other nodes are ready to sleep.	
Template Description	
Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.	
M2 Parameter	
SystemTemplate::NetworkManagement::CanNmCluster.nmRemoteSleepIndicationTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00022

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmRepeatMessageTime	EcucFloatParamDef
BSW Description	

Timeout for Repeat Message State. It defines the time in seconds how long the NM shall stay in the Repeat Message State.	
Template Description	
Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.	
M2 Parameter	
SystemTemplate::NetworkManagement::CanNmCluster.nmRepeatMessageTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00005

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmRepeatMsgIndEnabled	EcucBooleanParamDef
BSW Description	
Enable/disable the notification that a RepeatMessageRequest bit has been received.	
Template Description	
Switch for enabling the Repeat Message Bit Indication.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmCluster.nmRepeatMsgIndEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00046

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig
BSW Parameter	**BSW Type**
CanNmRxPdu	EcucParamConfContainerDef
BSW Description	
This container is used to configure the Rx PDU properties that are used for the CanNm Channel.	
Template Description	
M2 Parameter	
SystemTemplate::NetworkManagement::NmNode.rxNmPdu	
Mapping Rule	**Mapping Type**
Create container for each NmPdu that is received on the regarded Nm cluster	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00026

BSW Module	**BSW Context**
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmRxPdu
BSW Parameter	**BSW Type**
CanNmRxPduId	EcucIntegerParamDef
BSW Description	
This parameter defines the Rx PDU ID of the CanIf L-PDU range that is associated with this CanNm channel.	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmRxPdu	
BSW Parameter		**BSW Type**
CanNmRxPduRef		EcucReferenceDef
BSW Description		
Reference to the global PDU that is used by this CanNm channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmTimeoutTime		EcucFloatParamDef
BSW Description		
Network Timeout for NM PDUs. It denotes the time in seconds how long the NM shall stay in the Ready Sleep State before transition into the Prepare Bus-Sleep Mode is initiated.		
Template Description		
Network Timeout for NmPdus in seconds It denotes the time how long the CanNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster.nmNetworkTimeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00008

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmTxPdu		EcucParamConfContainerDef
BSW Description		
This container contains the CanNmTxConfirmationPduId and the CanNmTxPduRef.		
Template Description		

M2 Parameter	
SystemTemplate::NetworkManagement::NmNode.txNmPdu	
Mapping Rule	**Mapping Type**
Create container for each NmPdu that is transmitted on the regarded Nmcluster	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00018

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmTxPdu	
BSW Parameter		**BSW Type**
CanNmTxConfirmationPduId		EcucIntegerParamDef
BSW Description		
Handle Id to be used by the Lower Layer to confirm the transmission of the CanNmTxPdu to the LowerLayer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmTxPdu	
BSW Parameter		**BSW Type**
CanNmTxPduRef		EcucReferenceDef
BSW Description		
The reference to the common PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmUserDataTxPdu		EcucParamConfContainerDef
BSW Description		
This optional container is used to configure the UserNm PDU. This container is only available if CanNmComUserDataSupport is enabled.		
Template Description		
An ISignalToIPduMapping describes the mapping of ISignals to ISignalIPdus and defines the position of the ISignal within an ISignalIPdu.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalToIPduMapping		

Mapping Rule	Mapping Type
Create container for each NmPdu that aggregates the ISignalToIPduMapping element. The configuration for these Pdus (e.g. Transfer Properties) shall be derived from this information.	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00016

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmUserDataTxPdu	
BSW Parameter		**BSW Type**
CanNmTxUserDataPduId		EcucIntegerParamDef
BSW Description		
This parameter defines the Handle ID of the NM User Data I-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig/CanNmUserDataTxPdu	
BSW Parameter		**BSW Type**
CanNmTxUserDataPduRef		EcucReferenceDef
BSW Description		
Reference to the NM User Data I-PDU in the global PDU collection.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmChannelConfig	
BSW Parameter		**BSW Type**
CanNmWaitBusSleepTime		EcucFloatParamDef
BSW Description		
Timeout for bus calm down phase. It denotes the time in seconds how long the NM shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.		
Template Description		
Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmCluster.nmWaitBusSleepTime		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00009

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmComControlEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Communication Control support.		
Template Description		
Enables the Communication Control support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmComControlEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00043

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmComUserDataSupport		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling the Tx path of Com User Data. Use case: Setting of NMUserData via SWC.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping		
Mapping Rule		**Mapping Type**
If an NmPdu contains user data defined via the existence of NmPdu.iSignalToIPduMapping and is consequently handled via the PduR and Com this attribute shall be set to true.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00044

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmCoordinatorSyncSupport		EcucBooleanParamDef
BSW Description		
Enables/disables the coordinator synchronization support.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmGlobalPnSupport		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling partial networking support globally.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmImmediateRestartEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the immediate transmission of a NM PDU upon bus-communication request in Prepare-Bus-Sleep mode.		
Template Description		
Enables the asynchronous transmission of a CanNm PDU upon bus-communication request in Prepare-Bus-Sleep mode.		
M2 Parameter		
SystemTemplate::NetworkManagement::CanNmClusterCoupling.nmImmediateRestartEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_CanNm_00029

BSW Module	**BSW Context**		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmImmediateTxconfEnabled		EcucBooleanParamDef	
BSW Description			
Enable/disable the immediate tx confirmation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmMainFunctionPeriod		EcucFloatParamDef	
BSW Description			
Call cycle in seconds of CanNm_MainFunction.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmNodeDetectionEnabled		EcucBooleanParamDef	
BSW Description			
Precompile time switch to enable the node detection feature.			
Template Description			
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmNodeDetectionEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanNm_00030

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmNodeIdEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the source node identifier.		
Template Description		
Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmNodeIdEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00032

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmPassiveModeEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling support of the Passive Mode.		
Template Description		
Enables support of the Passive Mode. The passive mode is configurable per channel.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmPassiveModeEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping. nmNode.nmPassiveModeEnabled shall always have the same value in all Nm Clusters with the same bus protocol in the scope of one EcuInstance.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00028

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmPduRxIndicationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the PDU Rx Indication.		
Template Description		
Switch for enabling the PDU Rx Indication.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmPduRxIndicationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00001

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmPnEiraCalcEnabled		EcucBooleanParamDef	
BSW Description			
Specifies if CanNm calculates the PN request information for internal an external requests. (EIRA) true: PN request are calculated false: PN request are not calculated			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmPnEiraRxNSduRef		EcucReferenceDef	
BSW Description			
Reference to a Pdu in the COM-Stack. Only one SduRef is required for CanNm because the EIRA is the aggregation over all Can Channels.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanNm	CanNm/CanNmGlobalConfig		
BSW Parameter		**BSW Type**	
CanNmPnInfo		EcucParamConfContainerDef	
BSW Description			
PN information configuration			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
CanNm	CanNm/CanNmGlobalConfig/CanNmPnInfo

BSW Parameter		BSW Type
CanNmPnFilterMaskByte		EcucParamConfContainerDef
BSW Description		
PN information configuration		
Template Description		
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing CanCommunicationConnector.pncWakeupDataMask will be bitwise ORed to obtain aggregated pncWakeupDataMask value for this ECU. Since the pncWakeupDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncWakeupDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the CanNmPnFilterMaskByteIndex and CanNmPnFilterMaskByteValue for all the bytes aggregated pncWakeupDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncWakeupDataMask has the value 2ˆ 63 this will end up in a CanNmPnFilterMaskByte with CanNmPnFilterMaskByteIndex = 5 and CanNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00039

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmPnInfo/CanNmPnFilterMaskByte	
BSW Parameter		**BSW Type**
CanNmPnFilterMaskByteIndex		EcucIntegerParamDef
BSW Description		
Index of the filter mask byte. Specifies the position within the filter mask byte array.		
Template Description		
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing CanCommunicationConnector.pncWakeupDataMask will be bitwise ORed to obtain aggregated pncWakeupDataMask value for this ECU. Since the pncWakeupDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncWakeupDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the CanNmPnFilterMaskByteIndex and CanNmPnFilterMaskByteValue for all the bytes aggregated pncWakeupDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncWakeupDataMask has the value 2ˆ 63 this will end up in a CanNmPnFilterMaskByte with CanNmPnFilterMaskByteIndex = 5 and CanNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00041

BSW Module	BSW Context
CanNm	CanNm/CanNmGlobalConfig/CanNmPnInfo/CanNmPnFilterMaskByte

BSW Parameter		BSW Type
CanNmPnFilterMaskByteValue		EcucIntegerParamDef
BSW Description		
Parameter to configure the filter mask byte.		
Template Description		
Bit mask for CAN Payload used to configure the CAN Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanCommunicationConnector.pncWakeupDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing CanCommunicationConnector.pncWakeupDataMask will be bitwise ORed to obtain aggregated pncWakeupDataMask value for this ECU. Since the pncWakeupDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncWakeupDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the CanNmPnFilterMaskByteIndex and CanNmPnFilterMaskByteValue for all the bytes aggregated pncWakeupDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncWakeupDataMask has the value 2ˆ 63 this will end up in a CanNmPnFilterMaskByte with CanNmPnFilterMaskByteIndex = 5 and CanNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00040

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmPnInfo	
BSW Parameter		**BSW Type**
CanNmPnInfoLength		EcucIntegerParamDef
BSW Description		
Specifies the length of the PN request information in the NM PDU.		
Template Description		
Length of the partial networking request release information vector (in bytes).		
M2 Parameter		
SystemTemplate::System.pncVectorLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00038

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig/CanNmPnInfo	
BSW Parameter		**BSW Type**
CanNmPnInfoOffset		EcucIntegerParamDef
BSW Description		
Specifies the offset of the PN request information in the NM PDU.		
Template Description		
Absolute offset (with respect to the NM-PDU) of the partial networking request release information vector that is defined in bytes as an index starting with 0.		
M2 Parameter		
SystemTemplate::System.pncVectorOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_CanNm_00042

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmPnResetTime		EcucFloatParamDef
BSW Description		
Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA. The value shall be the same for every channel. Thus it is a global config parameter.		
Template Description		
Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.pnResetTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00034

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmRemoteSleepIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling remote sleep indication support. This feature is required for gateway nodes only.		
Template Description		
Switch for enabling remote sleep indication support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRemoteSleepIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00037

BSW Module	BSW Context	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmRepeatMsgIndEnabled		EcucBooleanParamDef
BSW Description		
Enable/disable the notification that a RepeatMessageRequest bit has been received.		
Template Description		
Switch for enabling the Repeat Message Bit Indication. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRepeatMsgIndEnabled		

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanNm_00027

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmStateChangeIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the CAN NM state change notification.		
Template Description		
Enables the CAN Network Management state change notification.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmStateChangeIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00035

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmUserDataEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling user data support.		
Template Description		
Switch for enabling user data support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmUserDataEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanNm_00031

BSW Module	**BSW Context**	
CanNm	CanNm/CanNmGlobalConfig	
BSW Parameter		**BSW Type**
CanNmVersionInfoApi		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling version info API support.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.2.5 CanTp Mapping

BSW Module	**BSW Context**
CanTp	CanTp
BSW Parameter	**BSW Type**
CanTpConfig	EcucParamConfContainerDef
BSW Description	
This container contains the configuration parameters and sub containers of the AUTOSAR CanTp module.	
Template Description	
This element defines exactly one CAN TP Configuration. One CanTpConfig element shall be created for each CAN Network in the System.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpConfig	
Mapping Rule	**Mapping Type**
Create Container if CanTpConfig exists in ECU Extract.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00001

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig
BSW Parameter	**BSW Type**
CanTpChannel	EcucParamConfContainerDef
BSW Description	
This container contains the configuration parameters of the CanTp channel.	
Template Description	
Configuration parameters of the CanTp channel.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpChannel	
Mapping Rule	**Mapping Type**
Create Container ifor each CanTpChannel that exist in ECU Extract.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00002

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel
BSW Parameter	**BSW Type**
CanTpChannelMode	EcucEnumerationParamDef
BSW Description	
The CAN Transport Layer supports half and full duplex channel modes.	
Template Description	
The CAN Transport Layer supports half and full duplex channel modes.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpChannel.channelMode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00022

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel		
BSW Parameter		**BSW Type**	
CanTpRxNSdu		EcucParamConfContainerDef	
BSW Description			
The following parameters needs to be configured for each CAN N-SDU that the CanTp module receives via the CanTpChannel. This N-SDU produces meta data items of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16 and ADDRESS_EXTENSION_8.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.tpSdu			
Mapping Rule			**Mapping Type**
Create container for each existing CanTpConnection that contains a reference to an N-SDU that is received.			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00003

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu		
BSW Parameter		**BSW Type**	
CanTpBs		EcucIntegerParamDef	
BSW Description			
Sets the number of N-PDUs the CanTp receiver allows the sender to send, before waiting for an authorization to continue transmission of the following N-PDUs.For further details on this parameter value see ISO 15765-2 specification.			
Template Description			
The maximum number of N-PDUs the CanTp receiver allows the sender to send, before waiting for an authorization to continue transmission of the following N-PDUs. For further details on this parameter value see ISO 15765-2 specification. Note: For reasons of buffer length, the CAN Transport Layer can adapt the BS value within the limit of this maximum BS			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.maxBlockSize			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00013

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu		
BSW Parameter		**BSW Type**	
CanTpNAe		EcucParamConfContainerDef	
BSW Description			
This container is required for each RxNSdu and TxNSdu with AddressingFormat CANTP_MIXED or CANTP_MIXED29BIT.			
Template Description			
Declares which communication addressing mode is supported.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat			
Mapping Rule			**Mapping Type**

Create container if addressingFormat is set to "mixed".	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00028

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpNAe	
BSW Parameter		**BSW Type**
CanTpNAe		EcucIntegerParamDef
BSW Description		
This parameter contains the transport protocol address extension value.		
Template Description		
If the mixed addressing format is used, this parameter contains the transport protocol address extension value.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpAddress.tpAddressExtensionValue		
Mapping Rule		**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddressExtension.		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00029

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpNSa		EcucParamConfContainerDef
BSW Description		
This container is required for each RxNSdu and TxNSdu with RxTaType CANTP_PHYSICAL and CanTpAddressingFormat CANTP_EXTENDED. When DynIdSupport is enabled, this container is also required for each TxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT. When DynIdSupport is enabled and GenericConnectionSupport is not enabled, this container is also required for each RxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT.		
Template Description		
Declares which communication addressing mode is supported.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat		
Mapping Rule		**Mapping Type**
Create container if addressingFormat is set to "extended".		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00025

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpNSa	
BSW Parameter		**BSW Type**
CanTpNSa		EcucIntegerParamDef
BSW Description		
This parameter contains the transport protocol source address value.		
Template Description		
An ECUs TP address on the referenced channel. This represents the diagnostic Address.		
M2 Parameter		

SystemTemplate::TransportProtocols::CanTpAddress.tpAddress	
Mapping Rule	**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddress.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00026

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu
BSW Parameter	**BSW Type**
CanTpNTa	EcucParamConfContainerDef
BSW Description	
This container is required for each RxNSdu and TxNSdu with AddressingFormat CANTP_EXTENDED. When DynIdSupport is enabled, this container is also required for each RxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT. When DynId-Support is enabled and GenericConnectionSupport is not enabled, this container is also required for each TxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT.	
Template Description	
Declares which communication addressing mode is supported.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat	
Mapping Rule	**Mapping Type**
Create container if addressingFormat is set to "extended".	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00032

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpNTa
BSW Parameter	**BSW Type**
CanTpNTa	EcucIntegerParamDef
BSW Description	
This parameter contains the transport protocol target address value.	
Template Description	
An ECUs TP address on the referenced channel. This represents the diagnostic Address.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpAddress.tpAddress	
Mapping Rule	**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddress.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00033

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu
BSW Parameter	**BSW Type**
CanTpNar	EcucFloatParamDef
BSW Description	
Value in seconds of the N_Ar timeout. N_Ar is the time for transmission of a CAN frame (any N_PDU) on the receiver side.	
Template Description	

This attribute states the timeout between the PDU transmit request of the Transport Layer to the Can Interface and the corresponding confirmation of the Can Interface on the receiver side (for FC or AF). Specified in seconds.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpNode.timeoutAr	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00012

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpNbr		EcucFloatParamDef
BSW Description		
Value in seconds of the performance requirement for (N_Br + N_Ar). N_Br is the elapsed time between the receiving indication of a FF or CF or the transmit confirmation of a FC, until the transmit request of the next FC.		
Template Description		
Value in seconds of the performance requirement for (N_Br + N_Ar). N_Br is the elapsed time between the receiving indication of a FF or CF or the transmit confirmation of a FC, until the transmit request of the next FC.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.timeoutBr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00014

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpNcr		EcucFloatParamDef
BSW Description		
Value in seconds of the N_Cr timeout. N_Cr is the time until reception of the next Consecutive Frame N_PDU.		
Template Description		
This parameter defines the timeout value for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.timeoutCr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00010

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpRxAddressingFormat		EcucEnumerationParamDef

BSW Description	
Declares which communication addressing mode is supported for this RxNSdu. Definition of Enumeration values: CanTpStandard to use normal addressing format. CanTpExtended to use extended addressing format. CanTpMixed to use mixed 11 bit addressing format. CanTpNormalFixed to use normal fixed addressing format. CanTpMixed29Bit to use mixed 29 bit addressing format.	
Template Description	
Declares which communication addressing mode is supported.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00007

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpRxNPdu		EcucParamConfContainerDef
BSW Description		
Used for grouping of the ID of a PDU and the Reference to a PDU. This N-PDU consumes a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.dataPdu		
Mapping Rule		**Mapping Type**
Create container if the CanTpConnection contains a reference to a DataNpdu that is received by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00021

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpRxNPdu	
BSW Parameter		**BSW Type**
CanTpRxNPduId		EcucIntegerParamDef
BSW Description		
The N-PDU identifier attached to the RxNsdu is identified by CanTpRxNSduId. Each RxNsdu identifier is linked to only one SF/FF/CF N-PDU identifier. Nevertheless, in the case of extended or mixed addressing format, the same N-PDU identifier can be used for several N-SDU identifiers. The distinction is made by the N_TA or N_AE value (first data byte of SF or FF frames).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpRxNPdu
BSW Parameter	**BSW Type**
CanTpRxNPduRef	EcucReferenceDef
BSW Description	
Reference to a Pdu in the COM-Stack.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu
BSW Parameter	**BSW Type**
CanTpRxNSduId	EcucIntegerParamDef
BSW Description	
Unique identifier user by the upper layer to call CanTp_CancelReceive, CanTp_ChangeParameter and CanTp_ReadParameter.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu
BSW Parameter	**BSW Type**
CanTpRxNSduRef	EcucReferenceDef
BSW Description	
Reference to a Pdu in the COM-Stack.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpRxPaddingActivation		EcucEnumerationParamDef
BSW Description		
Defines if the receive frame uses padding or not. This parameter is restricted to 8 byte N-PDUs. Definition of enumeration values: CanTpOn: The N-PDU received uses padding for SF, FC and the last CF. (N-PDU length is always >= 8 bytes in case of CAN 2.0) CanTpOff: The N-PDU received does not use padding for SF, CF and the last CF. (N-PDU length is dynamic - any valid DLC value). Note: The mandatory mapping to the next higher valid DLC value for N-PDUs with a length > 8 bytes is not affected by this parameter.		
Template Description		
This specifies wheter or not Sfs, FCs and the last CF shall be padded to 8 bytes length in case it contains less payload. true: The N-PDU received uses padding for SF, FC and the last CF. (N-PDU length is always 8 bytes) false: The N-PDU received does not use padding for SF, CF and the last CF. (N-PDU length is dynamic)		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.paddingActivation		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00019

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu	
BSW Parameter		**BSW Type**
CanTpRxTaType		EcucEnumerationParamDef
BSW Description		
Declares the communication type of this Rx N-SDU.		
Template Description		
Network Target Address type.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.taType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00011

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpRxTaType	
BSW Parameter		**BSW Type**

CANTP_FUNCTIONAL		EcucEnumerationLiteralDef	
BSW Description			
Functional request type			
Template Description			
Functional request type			
M2 Parameter			
SystemTemplate::TransportProtocols::NetworkTargetAddressType.functional			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpRxTaType		
BSW Parameter		**BSW Type**	
CANTP_PHYSICAL		EcucEnumerationLiteralDef	
BSW Description			
Physical request type			
Template Description			
Physical request type			
M2 Parameter			
SystemTemplate::TransportProtocols::NetworkTargetAddressType.physical			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu		
BSW Parameter		**BSW Type**	
CanTpRxWftMax		EcucIntegerParamDef	
BSW Description			
This parameter indicates how many Flow Control wait N-PDUs can be consecutively transmitted by the receiver. It is local to the node and is not transmitted inside the FC protocol data unit. CanTpRxWftMax is used to avoid sender nodes being potentially hooked-up in case of a temporarily reception inability on the part of the receiver nodes, whereby the sender could be waiting continuously.			
Template Description			
This attribute defines the maximum number of flow control PDUs that can be consecutively be transmitted by a receiver.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpNode.maxFcWait			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00006

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu

BSW Parameter	BSW Type
CanTpSTmin	EcucFloatParamDef
BSW Description	
Sets the duration of the minimum time the CanTp sender shall wait between the transmissions of two CF N-PDUs. For further details on this parameter value see ISO 15765-2 specification.	
Template Description	
Sets the duration of the minimum time the CanTp sender shall wait between the transmissions of two CF N-PDUs.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpNode.stMin	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00008

BSW Module	BSW Context
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu
BSW Parameter	**BSW Type**
CanTpTxFcNPdu	EcucParamConfContainerDef
BSW Description	
Used for grouping of the ID of a PDU and the Reference to a PDU. This N-PDU produces a meta data item of type CAN_ID_32.	
Template Description	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpConnection.flowControlPdu	
Mapping Rule	**Mapping Type**
Create container if the CanTpConnection contains a reference to a FlowControl NPdu that is received by the regarded ECU.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00009

BSW Module	BSW Context
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpTxFcNPdu
BSW Parameter	**BSW Type**
CanTpTxFcNPduConfirmationPduId	EcucIntegerParamDef
BSW Description	
Handle Id to be used by the CanIf to confirm the transmission of the CanTpTxFcNPdu to the CanIf module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpRxNSdu/CanTpTxFcNPdu		
BSW Parameter		**BSW Type**	
CanTpTxFcNPduRef		EcucReferenceDef	
BSW Description			
Reference to a Pdu in the COM-Stack.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel		
BSW Parameter		**BSW Type**	
CanTpTxNSdu		EcucParamConfContainerDef	
BSW Description			
The following parameters needs to be configured for each CAN N-SDU that the CanTp module transmits via the CanTpChannel. This N-SDU consumes meta data items of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16 and ADDRESS_EXTENSION_8.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.tpSdu			
Mapping Rule			**Mapping Type**
Create container for each existing CanTpConnection that contains a reference to an N-SDU that is transmitted.			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00023

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu		
BSW Parameter		**BSW Type**	
CanTpNAe		EcucParamConfContainerDef	
BSW Description			
This container is required for each RxNSdu and TxNSdu with AddressingFormat CANTP_MIXED or CANTP_MIXED29BIT.			
Template Description			
Declares which communication addressing mode is supported.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat			
Mapping Rule			**Mapping Type**
Create container if addressingFormat is set to "mixed".			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00028

BSW Module	BSW Context

CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpNAe
BSW Parameter	**BSW Type**
CanTpNAe	EcucIntegerParamDef
BSW Description	
This parameter contains the transport protocol address extension value.	
Template Description	
If the mixed addressing format is used, this parameter contains the transport protocol address extension value.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpAddress.tpAddressExtensionValue	
Mapping Rule	**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddressExtension.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00029

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu
BSW Parameter	**BSW Type**
CanTpNSa	EcucParamConfContainerDef
BSW Description	
This container is required for each RxNSdu and TxNSdu with RxTaType CANTP_PHYSICAL and CanTpAddressingFormat CANTP_EXTENDED. When DynIdSupport is enabled, this container is also required for each TxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT. When DynIdSupport is enabled and GenericConnectionSupport is not enabled, this container is also required for each RxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT.	
Template Description	
Declares which communication addressing mode is supported.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat	
Mapping Rule	**Mapping Type**
Create container if addressingFormat is set to "extended".	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00025

BSW Module	**BSW Context**
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpNSa
BSW Parameter	**BSW Type**
CanTpNSa	EcucIntegerParamDef
BSW Description	
This parameter contains the transport protocol source address value.	
Template Description	
An ECUs TP address on the referenced channel. This represents the diagnostic Address.	
M2 Parameter	
SystemTemplate::TransportProtocols::CanTpAddress.tpAddress	
Mapping Rule	**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddress.	full
Mapping Status	**Mapping ID**
valid	up_CanTp_00026

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu		
BSW Parameter		**BSW Type**	
CanTpNTa		EcucParamConfContainerDef	
BSW Description			
This container is required for each RxNSdu and TxNSdu with AddressingFormat CANTP_EXTENDED. When DynIdSupport is enabled, this container is also required for each RxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT. When DynId-Support is enabled and GenericConnectionSupport is not enabled, this container is also required for each TxNSdu with AddressingFormat CANTP_NORMALFIXED or CANTP_MIXED29BIT.			
Template Description			
Declares which communication addressing mode is supported.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat			
Mapping Rule			**Mapping Type**
Create container if addressingFormat is set to "extended".			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00032

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpNTa		
BSW Parameter		**BSW Type**	
CanTpNTa		EcucIntegerParamDef	
BSW Description			
This parameter contains the transport protocol target address value.			
Template Description			
An ECUs TP address on the referenced channel. This represents the diagnostic Address.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpAddress.tpAddress			
Mapping Rule			**Mapping Type**
The CanTPConnection contains a reference to the SDU and a relation to the Tp Node that contains the TpAddress.			full
Mapping Status			**Mapping ID**
valid			up_CanTp_00033

BSW Module	BSW Context		
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu		
BSW Parameter		**BSW Type**	
CanTpNas		EcucFloatParamDef	
BSW Description			
Value in second of the N_As timeout. N_As is the time for transmission of a CAN frame (any N_PDU) on the part of the sender.			
Template Description			
This attribute states the timeout between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the Can Interface and the corresponding confirmation of the Can Interface (when having sent the last PDU of the group used in this con-nection) on the sender side (SF-x, FF-x, CF or FC (in case of Transmit Cancellation)). Specified in seconds.			
M2 Parameter			
SystemTemplate::TransportProtocols::CanTpNode.timeoutAs			
Mapping Rule			**Mapping Type**
1:1 mapping			full

Mapping Status	**Mapping ID**
valid	up_CanTp_00034

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpNbs		EcucFloatParamDef
BSW Description		
Value in seconds of the N_Bs timeout. N_Bs is the time of transmission until reception of the next Flow Control N_PDU.		
Template Description		
This parameter defines the timout for waiting for an FC or AF on the sender side in an 1:1 connection. Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.timeoutBs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00038

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpNcs		EcucFloatParamDef
BSW Description		
Value in seconds of the performance requirement of (N_Cs + N_As). N_Cs is the time in which CanTp is allowed to request the Tx data of a Consecutive Frame N_PDU.		
Template Description		
The attribute timeoutCs represents the time (in seconds) which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.timeoutCs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00027

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpRxFcNPdu		EcucParamConfContainerDef
BSW Description		
Used for grouping of the ID of a PDU and the Reference to a PDU. This N-PDU consumes a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.flowControlPdu		
Mapping Rule		**Mapping Type**
Create container if the CanTpConnection contains a reference to a FlowControl NPdu that is received by the regarded ECU.		full

Mapping Status	Mapping ID
valid	up_CanTp_00024

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpRxFcNPdu	
BSW Parameter		**BSW Type**
CanTpRxFcNPduId		EcucIntegerParamDef
BSW Description		
N-PDU identifier attached to the FC N-PDU of this TxNsdu identified by CanTpTxNSduId. Each TxNsdu identifier is linked to one Rx FC N-PDU identifier only. However, in the case of extended addressing format, the same FC N-PDU identifier can be used for several N-SDU identifiers. The distinction is made by means of the N_TA value (first data byte of FC frames).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpRxFcNPdu	
BSW Parameter		**BSW Type**
CanTpRxFcNPduRef		EcucReferenceDef
BSW Description		
Reference to a Pdu in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTc		EcucBooleanParamDef
BSW Description		
Switch for enabling Transmit Cancellation.		
Template Description		
With this switch Tx Cancellation can be turned on or off. Please note that the Rx Cancellation is always enabled.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.cancellation		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_CanTp_00036

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxAddressingFormat		EcucEnumerationParamDef
BSW Description		
Declares which communication addressing format is supported for this TxNSdu. Definition of Enumeration values: CanTpStandard to use normal addressing format. CanTpExtended to use extended addressing format. CanTpMixed to use mixed 11 bit addressing format. CanTpNormalFixed to use normal fixed addressing format. CanTpMixed29Bit to use mixed 29 bit addressing format.		
Template Description		
Declares which communication addressing mode is supported.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.addressingFormat		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00037

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxNPdu		EcucParamConfContainerDef
BSW Description		
Used for grouping of the ID of a PDU and the Reference to a PDU. This N-PDU produces a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.dataPdu		
Mapping Rule		**Mapping Type**
Create container if the CanTpConnection contains a reference to a DataNpdu that is received by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00035

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpTxNPdu	
BSW Parameter		**BSW Type**
CanTpTxNPduConfirmationPduId		EcucIntegerParamDef
BSW Description		
Handle Id to be used by the CanIf to confirm the transmission of the CanTpTxNPdu to the CanIf module.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu/CanTpTxNPdu	
BSW Parameter		**BSW Type**
CanTpTxNPduRef		EcucReferenceDef
BSW Description		
Reference to a Pdu in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxNSduId		EcucIntegerParamDef
BSW Description		
Unique identifier to a structure that contains all useful information to process the transmission of a TxNsdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxNSduRef		EcucReferenceDef
BSW Description		
Reference to a Pdu in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxPaddingActivation		EcucEnumerationParamDef
BSW Description		
Defines if the transmit frame use padding or not. This parameter is restricted to 8 byte N-PDUs. Definition of Enumeration values: CanTpOn The transmit N-PDU uses padding for SF, FC and the last CF. (N-PDU length is always 8 bytes in case of CAN 2.0) CanTpOff The transmit N-PDU does not use padding for SF, CF and the last CF. (N-PDU length is dynamic - any valid DLC value). Note: The mandatory mapping to the next higher valid DLC value for N-PDUs with a length > 8 bytes is not affected by this parameter.		
Template Description		
This specifies wheter or not Sfs, FCs and the last CF shall be padded to 8 bytes length in case it contains less payload. true: The N-PDU received uses padding for SF, FC and the last CF. (N-PDU length is always 8 bytes) false: The N-PDU received does not use padding for SF, CF and the last CF. (N-PDU length is dynamic)		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.paddingActivation		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00039

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig/CanTpChannel/CanTpTxNSdu	
BSW Parameter		**BSW Type**
CanTpTxTaType		EcucEnumerationParamDef
BSW Description		
Declares the communication type of this TxNsdu. Enumeration values: CanTpPhysical. Used for 1:1 communication. CanTpFunctional. Used for 1:n communication.		
Template Description		
Network Target Address type.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpConnection.taType		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_CanTp_00030

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig	
BSW Parameter		**BSW Type**
CanTpMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Allow to configure the time for the MainFunction (as float in seconds). The CanTpMainFunctionPeriod should be assigned a value which is optimal regarding all of the timers configured for CanTp in TX and RX data transfer i.e. the differences from the configured timing should be as small as possible. Please note: This period shall be the same as call cycle time of the periodic task were CanTp Main function is called.		
Template Description		
The period between successive calls to the Main Function of the AUTOSAR TP. Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::CanTpEcu.cycleTimeMainFunction		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTp_00040

BSW Module	BSW Context	
CanTp	CanTp/CanTpConfig	
BSW Parameter		**BSW Type**
CanTpMaxChannelCnt		EcucIntegerParamDef
BSW Description		
Maximum number of channels. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTp	CanTp	
BSW Parameter		**BSW Type**
CanTpGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration parameters of the CanTp module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
CanTp	CanTp/CanTpGeneral	
BSW Parameter		**BSW Type**
CanTpChangeParameterApi		EcucBooleanParamDef
BSW Description		
This parameter, if set to true, enables the CanTp_ChangeParameterRequest Api for this Module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTp	CanTp/CanTpGeneral	
BSW Parameter		**BSW Type**
CanTpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTp	CanTp/CanTpGeneral	
BSW Parameter		**BSW Type**
CanTpDynIdSupport		EcucBooleanParamDef
BSW Description		
Enable support for dynamic ID handling via N-PDU MetaData.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
CanTp	CanTp/CanTpGeneral		
BSW Parameter		**BSW Type**	
CanTpFlexibleDataRateSupport		EcucBooleanParamDef	
BSW Description			
Enable support for CAN FD frames.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanTp	CanTp/CanTpGeneral		
BSW Parameter		**BSW Type**	
CanTpGenericConnectionSupport		EcucBooleanParamDef	
BSW Description			
Enable support for the handling of generic connections using N-SDUs with MetaData. Requires CanTpDynIdSupport.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
CanTp	CanTp/CanTpGeneral		
BSW Parameter		**BSW Type**	
CanTpPaddingByte		EcucIntegerParamDef	
BSW Description			
Used for the initialization of unused bytes with a certain value			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
CanTp	CanTp/CanTpGeneral	
BSW Parameter		**BSW Type**
CanTpReadParameterApi		EcucBooleanParamDef

BSW Description	
This parameter, if set to true, enables the CanTp_ReadParameterApi for this module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTp	CanTp/CanTpGeneral	
BSW Parameter		**BSW Type**
CanTpVersionInfoApi		EcucBooleanParamDef
BSW Description		
The function CanTp_GetVersionInfo is configurable (On/Off) by this configuration parameter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.2.6 CanSm Mapping

BSW Module	BSW Context	
CanSM	CanSM	
BSW Parameter		**BSW Type**
CanSMConfiguration		EcucParamConfContainerDef
BSW Description		
This container contains the global parameters of the CanSM and sub containers, which are for the CAN network specific configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration	
BSW Parameter		**BSW Type**
CanSMManagerNetwork		EcucParamConfContainerDef
BSW Description		
This container contains the CAN network specific parameters of each CAN network		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMBorCounterL1ToL2		EcucIntegerParamDef
BSW Description		
This threshold defines the count of bus-offs until the bus-off recovery switches from level 1 (short recovery time) to level 2 (long recovery time).		
Template Description		
This threshold defines the count of bus-offs until the bus-off recovery switches from level 1 (short recovery time) to level 2 (long recovery time).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanClusterBusOffRecovery.borCounterL1ToL2		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanSM_00003

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMBorTimeL1		EcucFloatParamDef
BSW Description		
This time parameter defines in seconds the duration of the bus-off recovery time in level 1 (short recovery time).		
Template Description		
This attribute defines the duration of the bus-off recovery time in level 1 (short recovery time) in seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanClusterBusOffRecovery.borTimeL1		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanSM_00002

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMBorTimeL2		EcucFloatParamDef
BSW Description		
This time parameter defines in seconds the duration of the bus-off recovery time in level 2 (long recovery time).		

Template Description	
This attribute defines the duration of the bus-off recovery time in level 2 (long recovery time) in seconds.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanClusterBusOffRecovery.borTimeL2	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanSM_00004

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMBorTimeTxEnsured		EcucFloatParamDef
BSW Description		
This parameter defines in seconds the duration of the bus-off event check. This check assesses, if the recovery has been successful after the recovery reenables the transmit path. If a new bus-off occurs during this time period, the CanSM assesses this bus-off as sequential bus-off without successful recovery. Because a bus-off only can be detected, when PDUs are transmitted, the time has to be great enough to ensure that PDUs are transmitted again (e. g. time period of the fastest cyclic transmitted PDU of the COM module / ComTxModeTimePeriodFactor).		
Template Description		
This attribute defines the duration of the bus-off event check in seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::CanClusterBusOffRecovery.borTimeTxEnsured		
Mapping Rule		**Mapping Type**
If borTimeTxEnsured is defined set this parameter to true otherwise to false.		full
Mapping Status		**Mapping ID**
valid		up_CanSM_00005

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMBorTxConfirmationPolling		EcucBooleanParamDef
BSW Description		
This parameter shall configure, if the CanSM polls the CanIf_GetTxConfirmationState API to decide the bus-off state to be recovered instead of using the CanSMBorTimeTxEnsured parameter for this decision.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**

CanSMComMNetworkHandleRef		EcucSymbolicNameReferenceDef	
BSW Description			
Unique handle to identify one certain CAN network. Reference to one of the network handles configured for the ComM.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork		
BSW Parameter		**BSW Type**	
CanSMController		EcucParamConfContainerDef	
BSW Description			
This container contains the controller IDs assigned to a CAN network.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork/CanSMController		
BSW Parameter		**BSW Type**	
CanSMControllerId		EcucSymbolicNameReferenceDef	
BSW Description			
Unique handle to identify one certain CAN controller. Reference to one of the CAN controllers managed by the CanIf module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork		
BSW Parameter		**BSW Type**	
CanSMDemEventParameterRefs		EcucParamConfContainerDef	
BSW Description			

Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork/CanSMDemEventParameterRefs	
BSW Parameter		**BSW Type**
CANSM_E_BUS_OFF		EcucSymbolicNameReferenceDef
BSW Description		
Reference to configured DEM event to report bus off errors for this CAN network.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork/CanSMDemEventParameterRefs	
BSW Parameter		**BSW Type**
CANSM_E_MODE_REQUEST_TIMEOUT		EcucSymbolicNameReferenceDef
BSW Description		
Reference to configured DEM event to report bus off errors for this CAN network.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMEnableBusOffDelay		EcucBooleanParamDef
BSW Description		

This parameter defines if the <User_GetBusOffDelay> shall be called for this network.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration/CanSMManagerNetwork	
BSW Parameter		**BSW Type**
CanSMTransceiverId		EcucSymbolicNameReferenceDef
BSW Description		
ID of the CAN transceiver assigned to the configured network handle. Reference to one of the transceivers managed by the CanIf module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration	
BSW Parameter		**BSW Type**
CanSMModeRequestRepetitionMax		EcucIntegerParamDef
BSW Description		
Specifies the maximal amount of mode request repetitions without a respective mode indication from the CanIf module until the CanSM module reports a Development Error to the Det and tries to go back to no communication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMConfiguration	
BSW Parameter		**BSW Type**
CanSMModeRequestRepetitionTime		EcucFloatParamDef
BSW Description		
Specifies in which time duration the CanSM module shall repeat mode change requests by using the API of the CanIf module.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanSM	CanSM	
BSW Parameter		**BSW Type**
CanSMGeneral		EcucParamConfContainerDef
BSW Description		
Container for general pre-compile parameters of the CanSM module		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMGetBusOffDelayFunction		EcucFunctionNameDef
BSW Description		
This parameter configures the name of the <User_GetBusOffDelay> callout function, which is used by CanSM to acquire an additional L1/L2 delay time. This function is only called for channels where CanSMEnableBusOffDelay is enabled.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMGetBusOffDelayHeader		EcucStringParamDef
BSW Description		
This parameter configures the header file containing the prototype of the <User_GetBusOffDelay> callout function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMIcomSupport		EcucBooleanParamDef
BSW Description		
Selects support of Pretended Network features in CanSM. True: Enabled False: Disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMMainFunctionTimePeriod		EcucFloatParamDef
BSW Description		
This parameter defines the cycle time of the function CanSM_MainFunction in seconds		
Template Description		
This attribute defines the cycle time of the function CanSM_MainFunction in seconds.		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Can::CanTopology::CanClusterBusOffRecovery.mainFunctionPeriod	
Mapping Rule	**Mapping Type**
The value that is defined in the System Extract defines the upperbound of the cycle time. The integrator may choose a smaller value.	full
Mapping Status	**Mapping ID**
valid	up_CanSM_00001

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMPncSupport		EcucBooleanParamDef
BSW Description		
Enables or disables support of partial networking. False: Partial Networking is disabled True: Partial Networking is enabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMSetBaudrateApi		EcucBooleanParamDef
BSW Description		
The support of the Can_SetBaudrate API is optional. If this parameter is set to true the Can_SetBaudrate API shall be supported. Otherwise the API is not supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMTxOfflineActiveSupport		EcucBooleanParamDef
BSW Description		
Determines whether the ECU passive feature is supported by CanSM. True: Enabled False: Disabled		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanSM	CanSM/CanSMGeneral	
BSW Parameter		**BSW Type**
CanSMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activate/Deactivate the version information API (CanSM_GetVersionInfo). true: version information API activated false: version information API deactivated		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.3 J1939

C.3.1 J1939Tp Mapping

BSW Module	**BSW Context**	
J1939Tp	J1939Tp	
BSW Parameter		**BSW Type**
J1939TpConfiguration		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the J1939Tp module that define the communication paths.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration	
BSW Parameter		**BSW Type**

J1939TpRxChannel		EcucParamConfContainerDef
BSW Description		
This container describes a reception channel of the J1939Tp module. A channel referencing N-PDUs without MetaData is used for all N-SDUs that share the same source address (SA) and the same destination address (BAM: DA = 0xFF, CMDT: DA != 0xFF). A channel with N-PDUs with MetaData is used for all possible source and destination addresses.		
Template Description		
A J1939TpConnection represents an internal path for the transmission or reception of a Pdu via J1939Tp and describes the the sender and the receiver of this particular communication. The J1939Tp module routes a Pdu (J1939 PGN) through the connection.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection		
Mapping Rule		**Mapping Type**
Create container for each existing J1939TpConnection that is used to transmit a NSdu.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00001

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel	
BSW Parameter		**BSW Type**
J1939TpRxCancellationSupport		EcucBooleanParamDef
BSW Description		
Enable receive cancellation using the API J1939Tp_CancelReceive() for this channel.		
Template Description		
Enable support for Tx/Rx cancellation.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.cancellation		
Mapping Rule		**Mapping Type**
Please note that in the System Template the cancellation support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00015

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel	
BSW Parameter		**BSW Type**
J1939TpRxCmNPdu		EcucParamConfContainerDef
BSW Description		
This N-PDU represents the TP.CM frame of a J1939 transport protocol session. TP.CM is used both by BAM and CMDT to initialize the connection. For CMDT, it is also used to abort the connection. This N-PDU consumes a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.flowControlPdu		
Mapping Rule		**Mapping Type**
Information can be derived from a received directNPdu that is referenced by the J1939TpConnection.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00003

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxCmNPdu	
BSW Parameter		**BSW Type**
J1939TpRxCmNPduId		EcucIntegerParamDef
BSW Description		
The N-PDU identifier used for communication with CanIf.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxCmNPdu	
BSW Parameter		**BSW Type**
J1939TpRxCmNPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu object representing the N-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel	
BSW Parameter		**BSW Type**
J1939TpRxDa		EcucIntegerParamDef
BSW Description		
Destination address (DA) of this channel. This parameter is only required for channels with fixed DA which use N-PDUs with MetaData containing the DA.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel	
BSW Parameter		**BSW Type**
J1939TpRxDtNPdu		EcucParamConfContainerDef

BSW Description	
This N-PDU represents the TP.DT frame of a J1939 transport protocol session. TP.DT is used both by BAM and CMDT to transfer the contents of an N-SDU. This N-PDU consumes a meta data item of type CAN_ID_32.	
Template Description	
M2 Parameter	
SystemTemplate::TransportProtocols::J1939TpConnection.dataPdu	
Mapping Rule	**Mapping Type**
Information can be derived from a received NPdu that is referenced by the J1939 TpConnection.	full
Mapping Status	**Mapping ID**
valid	up_J1939Tp_00007

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxDtNPdu	
BSW Parameter		**BSW Type**
J1939TpRxDtNPduId		EcucIntegerParamDef
BSW Description		
The N-PDU identifier used for communication with CanIf.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxDtNPdu	
BSW Parameter		**BSW Type**
J1939TpRxDtNPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu object representing the N-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel	
BSW Parameter		**BSW Type**
J1939TpRxDynamicBlockCalculation		EcucBooleanParamDef
BSW Description		

Enable dynamic calculation of "number of packets that can be sent" value in TP.CM_CTS, based on the size of buffers in upper layers reported via StartOfReception and PduR_J1939TpCopyRxData.	
Template Description	
Enable support for dynamic block size calculation.	
M2 Parameter	
SystemTemplate::TransportProtocols::J1939TpConnection.dynamicBs	
Mapping Rule	**Mapping Type**
Please note that in the System Template the dynamic block size calculation support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.	full
Mapping Status	**Mapping ID**
valid	up_J1939Tp_00006

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxDynamicBufferRatio		EcucIntegerParamDef	
BSW Description			
Percentage of available buffer that shall be used for retry. This parameter is only applicable when "J1939TpRxRetrySupport" and "J1939TpRxDynamicBlockCalculation" are enabled.			
Template Description			
Defines usage of available data for dynamic block size calculation when protocol retry is enabled. This attribute describes in percent of available buffer that shall be used for retry.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.bufferRatio			
Mapping Rule			**Mapping Type**
Please note that in the System Template this attribute is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00004

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxPacketsPerBlock		EcucIntegerParamDef	
BSW Description			
Number of TP.DT frames the receiving J1939Tp module allows the sender to send before waiting for another TP.CM_CTS. This parameter is transmitted in the TP.CM_CTS frame, and is thus only relevant for reception of messages via CMDT. When J1939TpRxDynamicBlockCalculation is enabled, this parameter specifies a maximum for the calculated value. For further details on this parameter value see SAE J1939/21.			
Template Description			
Set maximum block size (number of packets in TP.CM_CTS).			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.maxBs			
Mapping Rule			**Mapping Type**
Please note that in the System Template the maximum block size is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00002

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxPg		EcucParamConfContainerDef	
BSW Description			
Parameter group received by the J1939 transport layer.			
Template Description			
A J1939TpPg represents one J1939 message (parameter group, PG) identified by the PGN (parameter group number) that can be received or transmitted via J1939Tp.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpPg			
Mapping Rule			**Mapping Type**
Create container for each Rx J1939TpPg that is available in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00008

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg		
BSW Parameter		**BSW Type**	
J1939TpRxDirectNPdu		EcucParamConfContainerDef	
BSW Description			
This N-PDU represents the short frame that is used for a dynamic length PGN when it has a length of less that 8 bytes. This N-PDU consumes a meta data item of type CAN_ID_32. Please note: This sub container is only necessary when J1939TpRxPgDynLength is TRUE.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpPg.directPdu			
Mapping Rule			**Mapping Type**
Information can be derived from a received directINPdu that is referenced by the J1939TpPg.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00012

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg/J1939TpRxDirectNPdu		
BSW Parameter		**BSW Type**	
J1939TpRxDirectNPduId		EcucIntegerParamDef	
BSW Description			
The N-PDU identifier used for communication with CanIf.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg/J1939TpRxDirectNPdu		
BSW Parameter		**BSW Type**	
J1939TpRxDirectNPduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu object representing the N-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg		
BSW Parameter		**BSW Type**	
J1939TpRxNSdu		EcucParamConfContainerDef	
BSW Description			
This container describes the parameters that are relevant for the reception of a specific N-SDU. This N-SDU produces meta data items of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpPg.sdu			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00036

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg/J1939TpRxNSdu		
BSW Parameter		**BSW Type**	
J1939TpRxNSduId		EcucIntegerParamDef	
BSW Description			
This is a unique identifier for a received N-SDU. This Id is used in the CancelReceive and ChangeParameter API call.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg/J1939TpRxNSdu		
BSW Parameter		**BSW Type**	
J1939TpRxNSduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu object representing the N-SDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg		
BSW Parameter		**BSW Type**	
J1939TpRxPgDynLength		EcucBooleanParamDef	
BSW Description			
This flag is set to TRUE when the N-SDU refers to a PGN with variable length. Please note: When this attribute is TRUE, the sub container J1939TpRxDirectNPdu is required.			
Template Description			
The length of dynamic length signals is variable in run-time. Only a maximum length of such a signal is specified in the configuration (attribute length in ISignal element).			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SystemSignal.dynamicLength			
Mapping Rule			**Mapping Type**
If a tpSdu that is referenced by the J1939TpPg contains a dynamicLengthSignal than set this parameter to true.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00011

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpRxPg		
BSW Parameter		**BSW Type**	
J1939TpRxPgPGN		EcucIntegerParamDef	
BSW Description			
PGN of the referenced N-SDUs.			
Template Description			
Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpPg.pgn			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00010

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxProtocolType		EcucEnumerationParamDef	
BSW Description			
Protocol type used by this channel. This parameter is only required for channels with fixed destination address.			
Template Description			
BAM (Broadcast Announce Message) is a broadcast protocol. If this attribute is set to true broadcast is used. Since address FF is the only broadcast address, there's no reason to configure it.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.broadcast			
Mapping Rule			**Mapping Type**
If the braodcast attribute is set to true than set this parameter to J1939TP_PROTOCOL_BAM			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00013

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxRetrySupport		EcucBooleanParamDef	
BSW Description			
Enable support for triggering repetition of failed transmission using TP.CM_CTS with a packet number that has already been sent. Retransmission is triggered when a sequence number is missing or a timeout occurs during reception.			
Template Description			
Enable support for protocol retry.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.retry			
Mapping Rule			**Mapping Type**
Please note that in the System Template the retry support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00005

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpRxSa		EcucIntegerParamDef	
BSW Description			
Source address (SA) of this channel. This parameter is only required for channels with fixed SA which use N-PDUs with MetaData containing the SA.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel		
BSW Parameter		**BSW Type**	
J1939TpTxFcNPdu		EcucParamConfContainerDef	
BSW Description			
This N-PDU represents the TP.CM frame that is used in reverse direction for a J1939 transport protocol session using the CMDT protocol type. TP.CM in reverse direction is used for intermediate and final acknowledgement of received data and to abort the connection. This N-PDU produces a meta data item of type CAN_ID_32. Please note: This sub container is only required when J1939TpRxProtocolType is J1939TP_PROTOCOL_CMDT or when it is not configured at all.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.flowControlPdu			
Mapping Rule			**Mapping Type**
Information can be derived from a received FlowControlNPdu that is referenced by the J1939TpConnection.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00014

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpTxFcNPdu		
BSW Parameter		**BSW Type**	
J1939TpTxFcNPduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu object representing the N-PDU. Please note: When two channels have identical but exchanged source and destination addresses, the Pdu referenced by this parameter is shared with J1939TpTxCmNPduRef of the corresponding J1939TpTxChannel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpRxChannel/J1939TpTxFcNPdu		
BSW Parameter		**BSW Type**	
J1939TpTxFcNPduTxConfId		EcucIntegerParamDef	
BSW Description			
The N-PDU identifier used for Tx confirmation from CanIf.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration	
BSW Parameter		**BSW Type**
J1939TpTxChannel		EcucParamConfContainerDef
BSW Description		
This container describes a transmission channel of the J1939Tp module. A channel referencing N-PDUs without MetaData is used for all N-SDUs that share the same source address (SA) and the same destination address (BAM: DA = 0xFF, CMDT: DA != 0xFF). A channel with N-PDUs with MetaData is used for all possible source and destination addresses.		
Template Description		
A J1939TpConnection represents an internal path for the transmission or reception of a Pdu via J1939Tp and describes the the sender and the receiver of this particular communication. The J1939Tp module routes a Pdu (J1939 PGN) through the connection.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection		
Mapping Rule		**Mapping Type**
Create container for each existing J1939TpConnection that is used to transmit a NSdu.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00016

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpRxFcNPdu		EcucParamConfContainerDef
BSW Description		
This N-PDU represents the TP.CM frame that is used in reverse direction for a J1939 transport protocol session using the CMDT protocol type. TP.CM in reverse direction is used for intermediate and final acknowledgement of received data and to abort the connection. This N-PDU consumes a meta data item of type CAN_ID_32. Please note: This sub container is only required when J1939TpRxProtocolType is J1939TP_PROTOCOL_CMDT or when it is not configured at all.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.flowControlPdu		
Mapping Rule		**Mapping Type**
Information can be derived from a transmitted FlowControlNPdu that is referenced by the J1939TpConnection.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00018

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpRxFcNPdu	
BSW Parameter		**BSW Type**
J1939TpRxFcNPduId		EcucIntegerParamDef

BSW Description	
The N-PDU identifier used for communication with CanIf.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpRxFcNPdu		
BSW Parameter		**BSW Type**	
J1939TpRxFcNPduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu object representing the N-PDU. Please note: When two channels have identical but exchanged source and destination addresses, the Pdu referenced by this parameter is shared with J1939TpRxCmNPduRef of the corresponding J1939TpRxChannel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel		
BSW Parameter		**BSW Type**	
J1939TpTxCancellationSupport		EcucBooleanParamDef	
BSW Description			
Enable transmit cancellation using the API J1939Tp_CancelTransmit() for this channel.			
Template Description			
Enable support for Tx/Rx cancellation.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.cancellation			
Mapping Rule			**Mapping Type**
Please note that in the System Template the cancellation support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00021

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**

J1939TpTxCmNPdu		EcucParamConfContainerDef	
BSW Description			
This N-PDU represents the TP.CM frame of a J1939 transport protocol session. TP.CM is used both by BAM and CMDT to initialize the connection. For CMDT, it is also used to abort the connection. This N-PDU produces a meta data item of type CAN_ID_32.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpConnection.flowControlPdu			
Mapping Rule			**Mapping Type**
Information can be derived from a transmitted FlowControlNPdu that is referenced by the J1939TpConnection.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00020

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxCmNPdu		
BSW Parameter		**BSW Type**	
J1939TpTxCmNPduRef		EcucReferenceDef	
BSW Description			
Reference to the Pdu object representing the N-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxCmNPdu		
BSW Parameter		**BSW Type**	
J1939TpTxCmNPduTxConfId		EcucIntegerParamDef	
BSW Description			
The N-PDU identifier used for Tx confirmation from CanIf.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxDa		EcucIntegerParamDef
BSW Description		

Destination address (DA) of this channel. This parameter is only required for channels with fixed DA which use N-PDUs with MetaData containing the DA.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxDtNPdu		EcucParamConfContainerDef
BSW Description		
This N-PDU represents the TP.DT frame of a J1939 transport protocol session. TP.DT is used both by BAM and CMDT to transfer the contents of an N-SDU. This N-PDU produces a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.dataPdu		
Mapping Rule		**Mapping Type**
Information can be derived from a transmitted NPdu that is referenced by the J1939TpConnection.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00019

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxDtNPdu	
BSW Parameter		**BSW Type**
J1939TpTxDtNPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu object representing the N-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxDtNPdu	
BSW Parameter		**BSW Type**
J1939TpTxDtNPduTxConfId		EcucIntegerParamDef
BSW Description		
The N-PDU identifier used for Tx confirmation from CanIf.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxDynamicBlockCalculation		EcucBooleanParamDef
BSW Description		
Enable dynamic calculation of "maximum number of packets that can be sent" value in TP.CM_RTS, based on the available amount of data in upper layers reported via PduR_J1939TpCopyTxData.		
Template Description		
Enable support for dynamic block size calculation.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.dynamicBs		
Mapping Rule		**Mapping Type**
Please note that in the System Template the dynamic block size calculation support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00017

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxMaxPacketsPerBlock		EcucIntegerParamDef
BSW Description		
Maximum number of TP.DT frames the transmitting J1939Tp module is ready to send before waiting for another TP.CM_CTS. This parameter is transmitted in the TP.CM_RTS frame, and is thus only relevant for transmission of messages via CMDT. When J1939TpTxDynamicBlockCalculation is enabled, this parameter specifies a maximum for the calculated value. For further details on this parameter value see SAE J1939/21.		
Template Description		
Set maximum for expected block size (maximum number of packets in TP.CM_RTS).		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.maxExpBs		
Mapping Rule		**Mapping Type**
Please note that in the System Template the maximum for expected block size is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00023

BSW Module	BSW Context	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**

J1939TpTxPg		EcucParamConfContainerDef
BSW Description		
Parameter group transmitted by the J1939 transport layer.		
Template Description		
A J1939TpPg represents one J1939 message (parameter group, PG) identified by the PGN (parameter group number) that can be received or transmitted via J1939Tp.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpPg		
Mapping Rule		**Mapping Type**
Create container for each Tx J1939TpPg that is available in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00024

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg	
BSW Parameter		**BSW Type**
J1939TpTxDirectNPdu		EcucParamConfContainerDef
BSW Description		
This N-PDU represents the short frame that is used for a dynamic length PGN when it has a length of less that 8 bytes. This N-PDU produces a meta data item of type CAN_ID_32. Please note: This sub container is only necessary when J1939TpTxPgDynLength is TRUE.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpPg.directPdu		
Mapping Rule		**Mapping Type**
Information can be derived from a transmitted directlNPdu that is referenced by the J1939TpPg.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00026

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg/J1939TpTx DirectNPdu	
BSW Parameter		**BSW Type**
J1939TpTxDirectNPduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu object representing the N-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg/J1939TpTx DirectNPdu

BSW Parameter	BSW Type
J1939TpTxDirectNPduTxConfId	EcucIntegerParamDef
BSW Description	
The N-PDU identifier used for Tx confirmation from CanIf.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg
BSW Parameter	**BSW Type**
J1939TpTxNSdu	EcucParamConfContainerDef
BSW Description	
This container describes the parameters that are relevant for the transmission of a specific N-SDU. This N-SDU consumes meta data items of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8.	
Template Description	
M2 Parameter	
SystemTemplate::TransportProtocols::J1939TpPg.sdu	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Tp_00025

BSW Module	BSW Context
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg/J1939TpTxNSdu
BSW Parameter	**BSW Type**
J1939TpTxNSduId	EcucIntegerParamDef
BSW Description	
The N-SDU identifier used for communication with PduR.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg/J1939TpTxNSdu
BSW Parameter	**BSW Type**

J1939TpTxNSduRef		EcucReferenceDef
BSW Description		
Reference to the Pdu object representing the N-SDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg		
BSW Parameter		**BSW Type**	
J1939TpTxPgDynLength		EcucBooleanParamDef	
BSW Description			
This flag is set to TRUE when the N-SDU refers to a PGN with variable length. Please note: When this attribute is TRUE, the sub container J1939TpTxDirectNPdu is required.			
Template Description			
The length of dynamic length signals is variable in run-time. Only a maximum length of such a signal is specified in the configuration (attribute length in ISignal element).			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::SystemSignal.dynamicLength			
Mapping Rule			**Mapping Type**
If a tpSdu that is referenced by the J1939TpPg contains a dynamicLengthSignal than set this parameter to true.			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00028

BSW Module	**BSW Context**		
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel/J1939TpTxPg		
BSW Parameter		**BSW Type**	
J1939TpTxPgPGN		EcucIntegerParamDef	
BSW Description			
PGN of the referenced N-SDUs.			
Template Description			
Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.			
M2 Parameter			
SystemTemplate::TransportProtocols::J1939TpPg.pgn			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Tp_00027

BSW Module	**BSW Context**
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel

BSW Parameter		**BSW Type**
J1939TpTxProtocolType		EcucEnumerationParamDef
BSW Description		
Protocol type used by this channel. This parameter is only required for channels with fixed destination address.		
Template Description		
BAM (Broadcast Announce Message) is a broadcast protocol. If this attribute is set to true broadcast is used. Since address FF is the only broadcast address, there's no reason to configure it.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.broadcast		
Mapping Rule		**Mapping Type**
If the braodcast attribute is set to true than set this parameter to J1939TP_PROTOCOL_BAM		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00022

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxRetrySupport		EcucBooleanParamDef
BSW Description		
Enable support for repetition of failed transmission using TP.CM_CTS with a packet number that has already been sent. Retransmission is handled via the retry feature of PduR_J1939TpCopyTxData.		
Template Description		
Enable support for protocol retry.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.retry		
Mapping Rule		**Mapping Type**
Please note that in the System Template the retry support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00029

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpConfiguration/J1939TpTxChannel	
BSW Parameter		**BSW Type**
J1939TpTxSa		EcucIntegerParamDef
BSW Description		
Source address (SA) of this channel. This parameter is only required for channels with fixed SA which use N-PDUs with MetaData containing the SA.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

J1939Tp	J1939Tp	
BSW Parameter		**BSW Type**
J1939TpGeneral		EcucParamConfContainerDef
BSW Description		
This container describes the general configuration parameters of the J1939Tp module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpGeneral	
BSW Parameter		**BSW Type**
J1939TpCancellationSupport		EcucBooleanParamDef
BSW Description		
Enable transmit and receive cancellation. The APIs J1939Tp_CancelTransmit() and J1939Tp_CancelReceive() will only be available when this parameter is enabled.		
Template Description		
Enable support for Tx/Rx cancellation.		
M2 Parameter		
SystemTemplate::TransportProtocols::J1939TpConnection.cancellation		
Mapping Rule		**Mapping Type**
Please note that in the System Template the cancellation support is defined per J1939TpConnection. All J1939TpConnections in an ECU shall have the same value.		full
Mapping Status		**Mapping ID**
valid		up_J1939Tp_00034

BSW Module	**BSW Context**	
J1939Tp	J1939Tp/J1939TpGeneral	
BSW Parameter		**BSW Type**
J1939TpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpGeneral		
BSW Parameter		**BSW Type**	
J1939TpMainFunctionPeriod		EcucFloatParamDef	
BSW Description			
Allow to configure the time for the MainFunction (in seconds). Please note: This configuration value shall be equal to the value in the ScheduleManager module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
J1939Tp	J1939Tp/J1939TpGeneral		
BSW Parameter		**BSW Type**	
J1939TpVersionInfoApi		EcucBooleanParamDef	
BSW Description			
The function J1939Tp_GetVersionInfo is configurable (On/Off) by this configuration parameter.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.3.2 J1939Nm Mapping

BSW Module	BSW Context		
J1939Nm	J1939Nm/J1939NmConfigSet		
BSW Parameter		**BSW Type**	
J1939NmChannel		EcucParamConfContainerDef	
BSW Description			
Physical CAN channel handled by J1939Nm.			
Template Description			
J1939 specific NmCluster attributes			
M2 Parameter			
SystemTemplate::NetworkManagement::J1939NmCluster			
Mapping Rule			**Mapping Type**
Create Container for each existing J1939NmCluster.			full
Mapping Status			**Mapping ID**
valid			up_J1939Nm_00001

BSW Module	BSW Context
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmChannel

BSW Parameter		BSW Type
J1939NmChannelUsesAddressArbitration		EcucBooleanParamDef
BSW Description		
Defines whether the nodes attached to this channel use an initial address claim, and whether they react to contending address claims of other nodes. True: The initial address claim is sent, and the node reacts to address claims of other nodes. False: The node only sends an address claim upon request, and does not react to other address claims.		
Template Description		
Defines whether the nodes attached to this channel use an initial address claim, and whether they react to contending address claims of other nodes. True: The initial address claim is sent, and the node reacts to address claims of other nodes. False: The node only sends an address claim upon request, and does not care for contending address claims.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::J1939Cluster.usesAddressArbitration		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00026

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmChannel	
BSW Parameter		**BSW Type**
J1939NmRxPdu		EcucParamConfContainerDef
BSW Description		
Contains the configuration of the PDU used to receive the AddressClaimed PG. This PDU consumes a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.rxNmPdu		
Mapping Rule		**Mapping Type**
Shall be derived from the NmPdu that is referenced by the NmNode.		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00003

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmChannel	
BSW Parameter		**BSW Type**
J1939NmTxPdu		EcucParamConfContainerDef
BSW Description		
Contains the configuration of the PDU used to transmit the AddressClaimed PG. This PDU produces a meta data item of type CAN_ID_32.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.txNmPdu		
Mapping Rule		**Mapping Type**
Shall be derived from the NmPdu that is referenced by the NmNode.		full
Mapping Status		**Mapping ID**

valid	up_J1939Nm_00002

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodeNameArbitraryAddressCapable		EcucBooleanParamDef
BSW Description		
Arbitrary Address Capable field of the NAME of this external node.		
Template Description		
Arbitrary Address Capable field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.arbitraryAddressCapable		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00016

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodeNameECUInstance		EcucIntegerParamDef
BSW Description		
ECU Instance field of the NAME of this external node.		
Template Description		
ECU Instance field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.ecuInstance		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00017

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodeNameFunction		EcucIntegerParamDef
BSW Description		
Function field of the NAME of this external node.		
Template Description		
Function field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.function		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00018

BSW Module	BSW Context
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode

BSW Parameter	BSW Type
J1939NmExternalNodeNameFunctionInstance	EcucIntegerParamDef
BSW Description	
Function Instance field of the NAME of this external node.	
Template Description	
Function Instance field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.functionInstance	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00019

BSW Module	BSW Context
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode
BSW Parameter	**BSW Type**
J1939NmExternalNodeNameIdentityNumber	EcucIntegerParamDef
BSW Description	
Identity Number field of the NAME of this external node.	
Template Description	
Identity Number field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.identitiyNumber	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00020

BSW Module	BSW Context
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode
BSW Parameter	**BSW Type**
J1939NmExternalNodeNameIndustryGroup	EcucIntegerParamDef
BSW Description	
Industry Group field of the NAME of this external node.	
Template Description	
Industry Group field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.industryGroup	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode
BSW Parameter	**BSW Type**
J1939NmExternalNodeNameManufacturerCode	EcucIntegerParamDef
BSW Description	
Manufacturer Code field of the NAME of this external node.	
Template Description	

Manufacturer Code field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.manufacturerCode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodeNameVehicleSystem		EcucIntegerParamDef
BSW Description		
Vehicle System field of the NAME of this external node.		
Template Description		
Vehicle System field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.vehicleSystem		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00021

BSW Module	**BSW Context**	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodeNameVehicleSystemInstance		EcucIntegerParamDef
BSW Description		
Vehicle System Instance field of the NAME of this external node.		
Template Description		
Vehicle System Instance field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.vehicleSystemInstance		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00022

BSW Module	**BSW Context**	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmExternalNode	
BSW Parameter		**BSW Type**
J1939NmExternalNodePreferredAddress		EcucIntegerParamDef
BSW Description		
Source address of this external node.		
Template Description		
Node identifier of local NmNode. Must be unique in the NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_J1939Nm_00023

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode	
BSW Parameter		**BSW Type**
J1939NmNodeChannelRef		EcucReferenceDef
BSW Description		
Reference to the channels this node has access to.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmNode		
Mapping Rule		**Mapping Type**
This reference shall be derived from NmClusters that aggregate the nmNode in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00015

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode	
BSW Parameter		**BSW Type**
J1939NmNodeNameArbitraryAddressCapable		EcucBooleanParamDef
BSW Description		
Arbitrary Address Capable field of the NAME of this node.		
Template Description		
Arbitrary Address Capable field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.arbitraryAddressCapable		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00009

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode	
BSW Parameter		**BSW Type**
J1939NmNodeNameECUInstance		EcucIntegerParamDef
BSW Description		
ECU Instance field of the NAME of this node.		
Template Description		
ECU Instance field of the NAME of this node.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NodeName.ecuInstance		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00004

BSW Module	BSW Context		
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode		
BSW Parameter		**BSW Type**	
J1939NmNodeNameFunction		EcucIntegerParamDef	
BSW Description			
Function field of the NAME of this node.			
Template Description			
Function field of the NAME of this node.			
M2 Parameter			
SystemTemplate::NetworkManagement::J1939NodeName.function			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Nm_00007

BSW Module	BSW Context		
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode		
BSW Parameter		**BSW Type**	
J1939NmNodeNameFunctionInstance		EcucIntegerParamDef	
BSW Description			
Function Instance field of the NAME of this node.			
Template Description			
Function Instance field of the NAME of this node.			
M2 Parameter			
SystemTemplate::NetworkManagement::J1939NodeName.functionInstance			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Nm_00012

BSW Module	BSW Context		
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode		
BSW Parameter		**BSW Type**	
J1939NmNodeNameIdentityNumber		EcucIntegerParamDef	
BSW Description			
Identity Number field of the NAME of this node.			
Template Description			
Identity Number field of the NAME of this node.			
M2 Parameter			
SystemTemplate::NetworkManagement::J1939NodeName.identitiyNumber			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_J1939Nm_00011

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode	
BSW Parameter		**BSW Type**
J1939NmNodeNameIndustryGroup		EcucIntegerParamDef
BSW Description		

Industry Group field of the NAME of this node.	
Template Description	
Industry Group field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.industryGroup	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00008

BSW Module	**BSW Context**
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode
BSW Parameter	**BSW Type**
J1939NmNodeNameManufacturerCode	EcucIntegerParamDef
BSW Description	
Manufacturer Code field of the NAME of this node.	
Template Description	
Manufacturer Code field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.manufacturerCode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00005

BSW Module	**BSW Context**
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode
BSW Parameter	**BSW Type**
J1939NmNodeNameVehicleSystem	EcucIntegerParamDef
BSW Description	
Vehicle System field of the NAME of this node.	
Template Description	
Vehicle System field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.vehicleSystem	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00006

BSW Module	**BSW Context**
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode
BSW Parameter	**BSW Type**
J1939NmNodeNameVehicleSystemInstance	EcucIntegerParamDef
BSW Description	
Vehicle System Instance field of the NAME of this node.	
Template Description	
Vehicle System Instance field of the NAME of this node.	
M2 Parameter	
SystemTemplate::NetworkManagement::J1939NodeName.vehicleSystemInstance	

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_J1939Nm_00013

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmNode	
BSW Parameter		**BSW Type**
J1939NmNodePreferredAddress		EcucIntegerParamDef
BSW Description		
Source address of this node used for address claiming.		
Template Description		
Node identifier of local NmNode. Must be unique in the NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet	
BSW Parameter		**BSW Type**
J1939NmSharedAddressSpace		EcucParamConfContainerDef
BSW Description		
Set of J1939NmChannels that share a common address space. Address claims will be routed between these channels.		
Template Description		
This meta-class represents the ability to identify several J1939Clusters that share a common address space for the routing of messages		
M2 Parameter		
SystemTemplate::J1939SharedAddressCluster		
Mapping Rule		**Mapping Type**
Container shall be created for each exisiting J1939SharedAddressCluster		full
Mapping Status		**Mapping ID**
valid		up_J1939Nm_00024

BSW Module	BSW Context	
J1939Nm	J1939Nm/J1939NmConfigSet/J1939NmSharedAddressSpace	
BSW Parameter		**BSW Type**
J1939NmSharedChannelRef		EcucReferenceDef
BSW Description		
Reference to a channel that belongs to the shared address space.		
Template Description		
This identifies the J1939Clusters that share a common address space		
M2 Parameter		
SystemTemplate::J1939SharedAddressCluster.participatingJ1939Cluster		
Mapping Rule		**Mapping Type**
Reference shall be created for each J1939 cluster that is referenced by J1939 SharedAddressCluster in the role participating1939Cluster.		full

Mapping Status	Mapping ID
valid	up_J1939Nm_00025

C.3.3 J1939Dcm Mapping

BSW Module	BSW Context	
J1939Dcm	J1939Dcm/J1939DcmConfigSet/J1939DcmNode	
BSW Parameter		**BSW Type**
J1939DcmDiagnosticMessageSupport		EcucParamConfContainerDef
BSW Description		
Contains parameters to configure the diagnostic message support		
Template Description		
Represents the IPdus handled by J1939Dcm.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::J1939DcmIPdu		
Mapping Rule		**Mapping Type**
The container shall be created for every J1939DcmIPdu that is transmitted oder received by the regarded Ecu.		full
Mapping Status		**Mapping ID**
valid		up_J1939Dcm_00001

BSW Module	BSW Context	
J1939Dcm	J1939Dcm/J1939DcmConfigSet/J1939DcmNode/J1939DcmDiagnosticMessageSupport	
BSW Parameter		**BSW Type**
J1939DcmDmxSupport		EcucEnumerationParamDef
BSW Description		
This parameter is used to identify the actual DMx message.		
Template Description		
This attribute is used to identify the actual DMx message, e.g 1 means DM01, etc.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::J1939DcmIPdu.diagnosticMessageType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Dcm_00004

BSW Module	BSW Context	
J1939Dcm	J1939Dcm/J1939DcmConfigSet/J1939DcmNode/J1939DcmDiagnosticMessageSupport	
BSW Parameter		**BSW Type**
J1939DcmRxPdu		EcucParamConfContainerDef
BSW Description		
Contains parameters to configure the J1939DcmRxPdu. This PDU consumes meta data items of type CAN_ID_32 for PDUs received from CanIf, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs received from J1939Tp.		
Template Description		
Represents the IPdus handled by J1939Dcm.		

M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::J1939DcmIPdu	
Mapping Rule	**Mapping Type**
The direction of the J1939DcmIPdu shall be derived from the PduTriggering and the references to IPduPorts.	full
Mapping Status	**Mapping ID**
valid	up_J1939Dcm_00002

BSW Module	BSW Context	
J1939Dcm	J1939Dcm/J1939DcmConfigSet/J1939DcmNode/J1939DcmDiagnosticMessageSupport	
BSW Parameter		**BSW Type**
J1939DcmTxPdu		EcucParamConfContainerDef
BSW Description		
Contains parameters to configure the J1939DcmTxPdu. This PDU produces meta data items of type CAN_ID_32 for PDUs transmitted via CanIf, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs transmitted via J1939Tp.		
Template Description		
Represents the IPdus handled by J1939Dcm.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::J1939DcmIPdu		
Mapping Rule		**Mapping Type**
The direction of the J1939DcmIPdu shall be derived from the PduTriggering and the references to IPduPorts.		full
Mapping Status		**Mapping ID**
valid		up_J1939Dcm_00003

C.3.4 J1939Rm Mapping

BSW Module	BSW Context	
J1939Rm	J1939Rm/J1939RmConfigSet	
BSW Parameter		**BSW Type**
J1939RmChannel		EcucParamConfContainerDef
BSW Description		
Contains the parameters for a CAN channel supported by the J1939 Request Manager.		
Template Description		
J1939 specific NmCluster attributes		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NmCluster		
Mapping Rule		**Mapping Type**
Container shall be created for each J1939NmCluster that is available in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00004

BSW Module	BSW Context	
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmChannel	
BSW Parameter		**BSW Type**

J1939RmRqst2RxPdu	EcucParamConfContainerDef	
BSW Description		
Contains the configuration of the I-PDU used to receive the Request2 PG. This PDU consumes a meta data item of type CAN_ID_32.		
Template Description		
Enables support for the Request2 PGN (RQST2).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::J1939Cluster.request2Support		
Mapping Rule		**Mapping Type**
Create container if J1939Cluster.request2Support is set to true.		full
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00008

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmChannel	
BSW Parameter	**BSW Type**	
J1939RmRqst2TxPdu	EcucParamConfContainerDef	
BSW Description		
Contains the configuration of the I-PDU used to transmit the Request2 PG. This PDU produces a meta data item of type CAN_ID_32.		
Template Description		
Enables support for the Request2 PGN (RQST2).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::J1939Cluster.request2Support		
Mapping Rule		**Mapping Type**
Create container if J1939Cluster.request2Support is set to true.		full
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00007

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmConfigSet	
BSW Parameter	**BSW Type**	
J1939RmNode	EcucParamConfContainerDef	
BSW Description		
Contains the parameters for the support of a logical J1939 node (identified by an ECU address).		
Template Description		
J1939 specific NM Node attributes.		
M2 Parameter		
SystemTemplate::NetworkManagement::J1939NmNode		
Mapping Rule		**Mapping Type**
J1939RmNode shall be derived from existing J1939NmNodes that are available in the ExuExtract. Please note that J1939NmNodes that have the same short Name and nmNodeId that are located on different NmClusters shall be combined to one J1939RmNode.		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmNode
BSW Parameter	**BSW Type**

J1939RmNodeChannelRef		EcucReferenceDef	
BSW Description			
Reference to the channels this node has access to.			
Template Description			
M2 Parameter			
SystemTemplate::NetworkManagement::NmCluster.nmNode			
Mapping Rule			**Mapping Type**
This reference shall be derived from NmClusters that aggregate the nmNode in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_J1939Rm_00005

BSW Module	**BSW Context**		
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmNode		
BSW Parameter		**BSW Type**	
J1939RmUser		EcucChoiceContainerDef	
BSW Description			
Contains the configuration of a module that uses the request and acknowledgement interfaces of J1939Rm.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
+ J1939NM user exists always, UserPGN has 0x0ee00 as solitary value + J1939DCM user exists if transmitted J1939DcmIPdus exist which are requestable + COM user exists if transmitted ISignalIPdus exist which are requestable (+ CDD user exists if transmitted UserDefinedPdus or UserDefinedIPdus exist which are requestable) (+ RTE users cannot be derived)			full
Mapping Status			**Mapping ID**
valid			up_J1939Rm_00003

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmCddUser	
BSW Parameter		**BSW Type**
J1939RmUserRequestPGN		EcucIntegerParamDef
BSW Description		
PGN supported to be requested from this module. The PGNs supported by different modules should usually be disjunctive.		
Template Description		

<table>
<tr><td colspan="2">Pdu:
Collection of all Pdus that can be routed through a bus interface.

CanFrameTriggering.j1939requestable:
Frame can be triggered by the J1939 request message.

CanFrameTriggering.identifier:
To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined.

J1939TpPg.requestable:
Parameter Group can be triggered by the J1939 request message.

J1939TpPg.pgn:
Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.</td></tr>
<tr><td colspan="2">M2 Parameter</td></tr>
<tr><td colspan="2">SystemTemplate::Fibex::FibexCore::CoreCommunication::Pdu, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.j1939requestable, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier, SystemTemplate::TransportProtocols::J1939TpPg.requestable, SystemTemplate::TransportProtocols::J1939TpPg.pgn</td></tr>
<tr><td>Mapping Rule</td><td>Mapping Type</td></tr>
<tr><td>This parameter can be derived from the Pdu and a combination of CanFrameTriggering.j1939requestable and CanFrameTriggering.identifier or J1939TpPg.requestable and J1939TpPg.pgn</td><td></td></tr>
<tr><td>Mapping Status</td><td>Mapping ID</td></tr>
<tr><td>valid</td><td>up_J1939Rm_00002</td></tr>
</table>

<table>
<tr><td>BSW Module</td><td colspan="2">BSW Context</td></tr>
<tr><td>J1939Rm</td><td colspan="2">J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmComUser/J1939RmComIPdu</td></tr>
<tr><td colspan="2">BSW Parameter</td><td>BSW Type</td></tr>
<tr><td colspan="2">J1939RmComIPduPGN</td><td>EcucIntegerParamDef</td></tr>
<tr><td colspan="3">BSW Description</td></tr>
<tr><td colspan="3">PGN of the COM I-PDU.</td></tr>
<tr><td colspan="3">Template Description</td></tr>
</table>

ISignalIPdu: Represents the IPdus handled by Com. The ISignalIPdu assembled and disassembled in AUTOSAR COM consists of one or more signals. In case no multiplexing is performed this IPdu is routed to/from the Interface Layer. A maximum of one dynamic length signal per IPdu is allowed. **CanFrameTriggering.j1939requestable**: Frame can be triggered by the J1939 request message. **CanFrameTriggering.identifier**: To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined. **J1939TpPg.requestable**: Parameter Group can be triggered by the J1939 request message. **J1939TpPg.pgn**: Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalIPdu, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.j1939requestable, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier, SystemTemplate::TransportProtocols::J1939TpPg.requestable, SystemTemplate::TransportProtocols::J1939TpPg.pgn		
Mapping Rule		**Mapping Type**
This parameter can be derived fromISignalIPdu and a combination of CanFrameTriggering.j1939requestable and CanFrameTriggering.identifier or J1939TpPg.requestable and J1939TpPg.pgn.		full
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00001

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmDcmUser	
BSW Parameter		**BSW Type**
J1939RmUserRequestPGN		EcucIntegerParamDef
BSW Description		
PGN of DMx PG supported by J1939Dcm.		
Template Description		

Pdu: Collection of all Pdus that can be routed through a bus interface. **CanFrameTriggering.j1939requestable**: Frame can be triggered by the J1939 request message. **CanFrameTriggering.identifier**: To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined. **J1939TpPg.requestable**: Parameter Group can be triggered by the J1939 request message. **J1939TpPg.pgn**: Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Pdu, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.j1939requestable, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier, SystemTemplate::TransportProtocols::J1939TpPg.requestable, SystemTemplate::TransportProtocols::J1939TpPg.pgn		
Mapping Rule		**Mapping Type**
This parameter can be derived from the Pdu and a combination of CanFrameTriggering.j1939requestable and CanFrameTriggering.identifier or J1939TpPg.requestable and J1939TpPg.pgn		
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00002

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmRteUser	
BSW Parameter		**BSW Type**
J1939RmUserRequestPGN		EcucIntegerParamDef
BSW Description		
PGN supported to be requested from this module. The PGNs supported by different modules should usually be disjunctive.		
Template Description		

Pdu: Collection of all Pdus that can be routed through a bus interface. **CanFrameTriggering.j1939requestable**: Frame can be triggered by the J1939 request message. **CanFrameTriggering.identifier**: To describe a frames identifier on the communication system, usually with a fixed identifierValue. In a complete system description this attribute is mandatory. In an Ecu Extract for the sender of the frame the identifier shall also be provided. In an Ecu Extract for the receiver the identifier attribute shall be ignored if rxIdentifierRange is defined. **J1939TpPg.requestable**: Parameter Group can be triggered by the J1939 request message. **J1939TpPg.pgn**: Parameter group number (PGN) of a J1939 message (parameter group, PG) that can be received or transmitted via J1939Tp. The PGN may be omitted when the a directPdu is referenced and is mapped into a CanFrameTriggering with an identifier.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Pdu, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.j1939requestable, SystemTemplate::Fibex::Fibex4Can::CanCommunication::CanFrameTriggering.identifier, SystemTemplate::TransportProtocols::J1939TpPg.requestable, SystemTemplate::TransportProtocols::J1939TpPg.pgn	
Mapping Rule	**Mapping Type**
This parameter can be derived from the Pdu and a combination of CanFrameTriggering.j1939requestable and CanFrameTriggering.identifier or J1939TpPg.requestable and J1939TpPg.pgn	
Mapping Status	**Mapping ID**
valid	up_J1939Rm_00002

BSW Module	**BSW Context**	
J1939Rm	J1939Rm/J1939RmGeneral	
BSW Parameter		**BSW Type**
J1939RmSupportRequest2		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling support of the Request2 PG. Please note: Transfer is not supported.		
Template Description		
Enables support for the Request2 PGN (RQST2).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Can::CanTopology::J1939Cluster.request2Support		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_J1939Rm_00006

C.4 FlexRay

C.4.1 FlexRay Driver Mapping

BSW Module	BSW Context		
Fr	Fr		
BSW Parameter		**BSW Type**	
FrGeneral		EcucParamConfContainerDef	
BSW Description			
General configuration (parameters) of the FlexRay Driver module.			
Template Description			
FlexRay specific attributes to the physicalCluster			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster			
Mapping Rule			**Mapping Type**
Container must be created if the ECU is connected to a FlexRay Cluster			full
Mapping Status			**Mapping ID**
valid			up_Fr_00045

BSW Module	BSW Context		
Fr	Fr/FrGeneral		
BSW Parameter		**BSW Type**	
FrCtrlTestCount		EcucIntegerParamDef	
BSW Description			
Maxmimum number of iterations the FlexRay controller hardware test is performed during controller initialization.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Fr	Fr/FrGeneral		
BSW Parameter		**BSW Type**	
FrDevErrorDetect		EcucBooleanParamDef	
BSW Description			
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
Fr	Fr/FrGeneral

BSW Parameter		BSW Type
FrDisableLPduSupport		EcucBooleanParamDef
BSW Description		
Enables or disabled API function Fr_DisableLPdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrNumCtrlSupported		EcucIntegerParamDef
BSW Description		
Determines the maximum number of communication controllers that the driver supports.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrPrepareLPduSupport		EcucBooleanParamDef
BSW Description		
Enables or disables API function Fr_PrepareLPdu.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrReconfigLPduSupport		EcucBooleanParamDef
BSW Description		
Enables or disabled API function Fr_ReconfigLPdu.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrRxStringentCheck		EcucBooleanParamDef
BSW Description		
If stringent check is enabled (true), received frames are accepted only if no slot status error occurred.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrRxStringentLengthCheck		EcucBooleanParamDef
BSW Description		
If stringent check is enabled (true), received frames are accepted only if the received payload length matches the configured payload length.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Fr	Fr/FrGeneral	
BSW Parameter		**BSW Type**
FrVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables/disables the existence of the Fr_GetVersionInfo API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Fr	Fr	
BSW Parameter		**BSW Type**
FrMultipleConfiguration		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR Fr module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration	
BSW Parameter		**BSW Type**
FrController		EcucParamConfContainerDef
BSW Description		
Configuration of the individual controller.		
Template Description		
FlexRay bus specific communication port attributes.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController		
Mapping Rule		**Mapping Type**
Container must be created if the ECU contains a FlexRay communication controller that is connected to the regarded communication cluster.		full
Mapping Status		**Mapping ID**

valid	up_Fr_00001

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrAbsoluteTimer		EcucParamConfContainerDef
BSW Description		
Specifies the absolute timer configuration parameters of the Fr.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController/FrAbsoluteTimer	
BSW Parameter		**BSW Type**
FrAbsTimerIdx		EcucIntegerParamDef
BSW Description		
Contains the index of an absolute timer contained in Fr on a certain FlexRay CC.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrControllerDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController/FrControllerDemEventParameterRefs		
BSW Parameter		**BSW Type**	
FR_E_CTRL_TESTRESULT		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to DEM event Id that is reported for FlexRay controller hardware test failure. If this parameter is not configured, no event reporting happens.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrCtrlIdx		EcucIntegerParamDef	
BSW Description			
Determines index of CC within Fr.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrFifo		EcucParamConfContainerDef	
BSW Description			
One First In First Out (FIFO) queued receive structure, defining the admittance criteria to the FIFO, and mandating the ability to admit messages into the FIFO based on Message Id filtering criteria.			
Template Description			
One First In First Out (FIFO) queued receive structure, defining the admittance criteria to the FIFO, and mandating the ability to admit messages into the FIFO based on Message Id filtering criteria.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00033

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo

BSW Parameter		BSW Type
FrAdmitWithoutMessageId		EcucBooleanParamDef
BSW Description		
Determines whether or not frames received in the dynamic segment that don't contain a message ID will be admitted into the FIFO.		
Template Description		
Boolean configuration which determines whether or not frames received in the dynamic segment that don't contain a message ID will be admitted into the FIFO.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.admitWithout MessageId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00040

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo	
BSW Parameter		**BSW Type**
FrBaseCycle		EcucIntegerParamDef
BSW Description		
FIFO cycle counter acceptance criteria.		
Template Description		
FIFO cycle counter acceptance criteria.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.baseCycle		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00034

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo	
BSW Parameter		**BSW Type**
FrChannels		EcucEnumerationParamDef
BSW Description		
FIFO channel admittance criteria.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.channel		
Mapping Rule		**Mapping Type**
If channelA is referenced set Parameter to FR_CHANNEL_A. If channelB is referenced set parameter to FR_CHANNEL_B. If two identical FlexrayFifoConfiguration elements exist with references to A and B only one FrFifo container shall be created (FR_CHANNEL_AB		full
Mapping Status		**Mapping ID**
valid		up_Fr_00036

BSW Module	BSW Context

Fr	Fr/FrMultipleConfiguration/FrController/FrFifo		
BSW Parameter		**BSW Type**	
FrCycleRepetition		EcucIntegerParamDef	
BSW Description			
FIFO cycle counter acceptance criteria. Valid values are 1,2,4,5,8,10,16,20,32,40,50,64. Remark: Values 1,2,4,8,16,32,64 are valid only for FlexRay Protocol 2.1 Rev A compliance.			
Template Description			
FIFO cycle counter acceptance criteria.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.cycleRepetition			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00039

BSW Module	**BSW Context**		
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo		
BSW Parameter		**BSW Type**	
FrFifoDepth		EcucIntegerParamDef	
BSW Description			
FrFifoDepth configures the maximum number of rx-frames which can be contained in the FIFO.			
Template Description			
FrFifoDepth configures the maximum number of rx-frames which can be contained in the FIFO.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.fifoDepth			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00038

BSW Module	**BSW Context**		
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo		
BSW Parameter		**BSW Type**	
FrMsgIdMask		EcucIntegerParamDef	
BSW Description			
FIFO message identifier acceptance criteria (Mask filter).			
Template Description			
FIFO message identifier acceptance criteria (Mask filter).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.msgIdMask			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00035

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo	
BSW Parameter		**BSW Type**
FrMsgIdMatch		EcucIntegerParamDef
BSW Description		

FIFO message identifier acceptance criteria (Match filter).		
Template Description		
FIFO message identifier acceptance criteria (Match filter).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoConfiguration.msgIdMatch		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00037

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo	
BSW Parameter		**BSW Type**
FrRange		EcucParamConfContainerDef
BSW Description		
FIFO Frame Id range acceptance criteria.		
Template Description		
FIFO Frame Id range acceptance criteria.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoRange		
Mapping Rule		**Mapping Type**
create container for each Fifo configuration		full
Mapping Status		**Mapping ID**
valid		up_Fr_00041

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo/FrRange	
BSW Parameter		**BSW Type**
FrRangeMax		EcucIntegerParamDef
BSW Description		
Last FrameId of this range that will be accepted by the FIFO.		
Template Description		
Max Range.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoRange.rangeMax		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00043

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController/FrFifo/FrRange	
BSW Parameter		**BSW Type**
FrRangeMin		EcucIntegerParamDef
BSW Description		
First FrameId of this range that will be accepted by the FIFO.		
Template Description		
Min Range.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayFifoRange.rangeMin		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00042

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPAllowHaltDueToClock		EcucBooleanParamDef
BSW Description		
Boolean flag that controls the transition to the POC:halt state due to a clock synchronization errors. If set to true, the CC is allowed to transition to POC:halt. If set to false, the CC will not transition to the POC:halt state but will enter or remain in the POC:normal passive state (self healing would still be possible)		
Template Description		
Boolean flag that controls the transition to the POC:halt state due to a clock synchronization errors. If set to true, the Communication Controller is allowed to transition to POC:halt. If set to false, the Communication Controller will not transition to the POC:halt state but will enter or remain in the normal POC (passive State).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.allowHaltDueToClock		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00021

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPAllowPassiveToActive		EcucIntegerParamDef
BSW Description		
Number of consecutive even/odd cycle pairs that must have valid clock correction terms before the CC will be allowed to transition from the POC:normal passive state to POC:normal active state. If set to zero, the CC is not allowed to transition from POC:normal passive to POC:normal active		
Template Description		
Number of consecutive even/odd cycle pairs that must have valid clock correction terms before the Communication Controller will be allowed to transition from the POC:normal passive state to POC:normal active state. If set to 0, the Communication Controller is not allowed to transition from POC:norm		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.allowPassiveToActive		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00004

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**

FrPChannels	EcucEnumerationParamDef	
BSW Description		
Channels to which the node is connected. Implementation Type: Fr_ChannelType		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::PhysicalChannel.commConnector		
Mapping Rule		**Mapping Type**
If channelA refers the connector set parameter to FR_CHANNEL_A. If ChannelB refers the connector set parameter to FR_CHANNEL_B. If channelA and channelB refer the connector set parameter to FR_CHANNEL_AB,		full
Mapping Status		**Mapping ID**
valid		up_Fr_00025

BSW Module	**BSW Context**		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPClusterDriftDamping		EcucIntegerParamDef	
BSW Description			
Local cluster drift damping factor used for rate correction [Microticks]. Remark: Upper limit 10 for FlexRay Protocol 3.0 compliance.			
Template Description			
The cluster drift damping factor used in clock synchronization rate correction in microticks			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.cluster DriftDamping			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00008

BSW Module	**BSW Context**		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPDecodingCorrection		EcucIntegerParamDef	
BSW Description			
Value used by the receiver to calculate the difference between primary time reference point and secondary time reference point [Microticks]. Remark: Lower limit 14 for FlexRay Protocol 2.1 Rev. A compliance. Upper limit 136 for FlexRay Protocol 3.0 compliance.			
Template Description			
Value used by the receiver to calculate the difference between primary time reference point and secondary time reference point. Unit: Microticks (pDecodingCorrection)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.decodingCorrection			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00005

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPDelayCompensationA		EcucIntegerParamDef	
BSW Description			
Value used to compensate for reception delays on the indicated channel. This covers assumed propagation delay up to cPropagationDelayMax for microticks in the range of 0.0125us to 0.05us [Microticks]. Remark: Lower limit 4 for FlexRay Protocol 3.0 compliance. Remark: Upper limit 200 for FlexRay Protocol 2.1 Rev A compliance.			
Template Description			
Value used to compensate for reception delays on channel A Unit: Microticks. This optional parameter shall only be filled out if channel A is used.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.delayCompensationA			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00013

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPDelayCompensationB		EcucIntegerParamDef	
BSW Description			
Value used to compensate for reception delays on the indicated channel. This covers assumed propagation delay up to cPropagationDelayMax for microticks in the range of 0.0125us to 0.05us [Microticks]. Remark: Lower limit 4 for FlexRay Protocol 3.0 compliance. Remark: Upper limit 200 for FlexRay Protocol 2.1 Rev A compliance.			
Template Description			
Value used to compensate for reception delays on channel B. Unit: Microticks. This optional parameter shall only be filled out if channel B is used.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.delayCompensationB			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00009

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPExternalSync		EcucBooleanParamDef
BSW Description		
Flag indicating whether the node is externally synchronized (operating as time gateway sink in an TT-E cluster) or locally synchronized. If FrPExternalSync is set to ’true’ then FrPTwoKeySlotMode must also be set to ’true’. Remarks: Set to ’false’ for FlexRay Protocol 2.1 Rev. A compliance.		

Template Description	
Flag indicating whether the node is externally synchronized (operating as Time Gateway Sink in an TT-E Time Triggered External Sync cluster) or locally synchronized.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.externalSync	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00026

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPFallBackInternal	EcucBooleanParamDef
BSW Description	
Flag indicating whether a time gateway sink node will switch to local clock operation when synchronization with the time gateway source node is lost (FrPFallBackInternal = true) or will instead go to POC:ready (FrPFallBackInternal =false). Remarks: Set to 'false' for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
Flag indicating whether a Time Gateway Sink node will switch to local clock operation when synchronization with the Time Gateway Source node is lost (pFallBackInternal = true) or will instead go to POC:ready (pFallBackInternal = false).	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.fallBackInternal	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00006

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPKeySlotId	EcucIntegerParamDef
BSW Description	
ID of the key slot, i.e., the slot used to transmit the startup frame, sync frame, or designated key slot frame. If this parameter is set to zero the node does not have a key slot. For Fr3.0: if the value is not provided in System Description it shall be configured to 0. For Fr2.1: if the value is not provided in System Description it is driver implementation specific which value to configure.	
Template Description	
ID of the slot used to transmit the startup frame, sync frame, or designated single slot frame. If the attributes keySlotUsedForStartUp, keySlotUsedForSync, or keySlotOnlyEnabled are set to true the key slot value is mandatory.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotID	
Mapping Rule	**Mapping Type**
1:1 mapping	full

Mapping Status	Mapping ID
valid	up_Fr_00010

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPKeySlotOnlyEnabled	EcucBooleanParamDef
BSW Description	
Flag indicating whether or not the node shall enter key slot only mode following startup. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter pSingleSlotEnabled.	
Template Description	
Flag indicating whether or not the node shall enter key slot only mode following startup.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotOnlyEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00014

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPKeySlotUsedForStartup	EcucBooleanParamDef
BSW Description	
Flag indicating whether the key slot is used to transmit a startup frame. If FrPKeySlotUsedForStartup is set to true then FrPKeySlotUsedForSync must also be set to true. If FrPTwoKeySlotMode is set to true then both FrPKeySlotUsedForSync and FrPKeySlotUsedForStartup must also be set to true.	
Template Description	
Flag indicating whether the Key Slot is used to transmit a startup frame.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotUsedForStartUp	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00028

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPKeySlotUsedForSync	EcucBooleanParamDef
BSW Description	
Flag indicating whether the key slot is used to transmit a sync frame. If FrPKeySlotUsedForStartup is set to true then FrPKeySlotUsedForSync must also be set to true. If FrPTwoKeySlotMode is set to true then both FrPKeySlotUsedForSync and FrPKeySlotUsedForStartup must also be set to true.	
Template Description	
Flag indicating whether the Key Slot is used to transmit a sync frame.	
M2 Parameter	

SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotUsedForSync	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00044

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPLatestTx		EcucIntegerParamDef
BSW Description		
Number of the last minislot in which a frame transmission can start in the dynamic segment. Remark: Upper limit 7980 for FlexRay Protocol 2.1 Rev A compliance.		
Template Description		
The number of the last minislot in which a transmission can start in the dynamic segment for the respective node		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.latestTX		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00018

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPMacroInitialOffsetA		EcucIntegerParamDef
BSW Description		
Integer number of macroticks between the static slot boundary and the following macrotick boundary of the secondary time reference point based on the nominal macrotick duration [Macroticks].		
Template Description		
Integer number of macroticks between the static slot boundary and the closest macrotick boundary of the secondary time reference point based on the nominal macrotick duration. (pMacroInitialOffset). This optional parameter shall only be filled out if channel A is used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.macroInitialOffsetA		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00007

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPMacroInitialOffsetB		EcucIntegerParamDef
BSW Description		
Integer number of macroticks between the static slot boundary and the following macrotick boundary of the secondary time reference point based on the nominal macrotick duration [Macroticks].		
Template Description		

Integer number of macroticks between the static slot boundary and the closest macrotick boundary of the secondary time reference point based on the nominal macrotick duration. (pMacroInitialOffset). This optional parameter shall only be filled out if channel B is used.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.macroInitialOffsetB	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00019

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPMicroInitialOffsetA		EcucIntegerParamDef
BSW Description		
Number of microticks between the secondary time reference point and the macrotick boundary immediately following the secondary time reference point. The parameter depends on FrPDelayCompensationA and therefore it has to be set independently for each channel [Microticks].		
Template Description		
Number of microticks between the closest macrotick boundary described by gMacroInitialOffset and the secondary time reference point. The parameter depends on pDelayCompensationA and therefore it has to be set independently for each channel. This optional parameter shall only be filled out if channel A is used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.microInitialOffsetA		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00020

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPMicroInitialOffsetB		EcucIntegerParamDef
BSW Description		
Number of microticks between the secondary time reference point and the macrotick boundary immediately following the secondary time reference point. The parameter depends on FrPDelayCompensationB and therefore it has to be set independently for each channel [Microticks].		
Template Description		
Number of microticks between the closest macrotick boundary described by gMacroInitialOffset and the secondary time reference point. The parameter depends on pDelayCompensationB and therefore it has to be set independently for each channel. This optional parameter shall only be filled out if channel B is used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.microInitialOffsetB		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00016

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPMicroPerCycle		EcucIntegerParamDef
BSW Description		
Nominal number of microticks in the communication cycle of the local node. If nodes have different microtick durations this number will differ from node to node [Microticks]. Remark: Lower limit 960 for FlexRay Protocol 3.0 compliance. Upper limit 640000 for FlexRay Protocol 2.1 Rev A compliance.		
Template Description		
The nominal number of microticks in a communication cycle		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.microPerCycle		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00002

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPNmVectorEarlyUpdate		EcucBooleanParamDef
BSW Description		
Flag indicating when the update of the Network Management Vector in the CHI shall take place. If FrPNmVectorEarlyUpdate is set to false, the update shall take place after the NIT. If FrPNmVectorEarlyUpdate is set to true, the update shall take place after the end of the static segment. Remarks: Set to 'false' for FlexRay Protocol 2.1 Rev. A compliance.		
Template Description		
Flag indicating when the update of the Network Management Vector in the CHI shall take place. If set to false, the update shall take place after the NIT. If set to true, the update shall take place after the end of the static segment.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.nmVectorEarlyUpdate		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00017

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPOffsetCorrectionOut		EcucIntegerParamDef
BSW Description		

Magnitude of the maximum permissible offset correction value [Microticks]. Remark: Upper limit 15567 for FlexRay Protocol 2.1 Rev A compliance. Remark: Lower limit 15 for FlexRay Protocol 3.0 compliance.	
Template Description	
Magnitude of the maximum permissible offset correction value. Unit:microtick (pOffsetCorrectionOut)	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.offsetCorrectionOut	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00022

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPOffsetCorrectionStart		EcucIntegerParamDef
BSW Description		
Start of the offset correction phase within the NIT, expressed as the number of macroticks from the start of cycle [Macroticks]. Remark: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gOffsetCorrectionStart. Remark: Lower limit 9 for FlexRay Protocol 2.1 Rev A compliance.		
Template Description		
Start of the offset correction phase within the Network Idle Time (NIT), expressed as the number of macroticks from the start of cycle. Unit: macroticks		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.offsetCorrectionStart		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00032

BSW Module	**BSW Context**	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPPayloadLengthDynMax		EcucIntegerParamDef
BSW Description		
Maximum payload length for dynamic frames [16 bit words].		
Template Description		
Maximum payload length for the dynamic channel of a frame in 16 bit WORDS.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.maximumDynamicPayloadLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00027

BSW Module	**BSW Context**
Fr	Fr/FrMultipleConfiguration/FrController

BSW Parameter	BSW Type
FrPRateCorrectionOut	EcucIntegerParamDef
BSW Description	
Magnitude of the maximum permissible rate correction value and the maximum drift offset between two nodes operating with unsynchronized clocks for one communication cycle [Microticks]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter pdMaxDrift. Lower limit 3 for FlexRay Protocol 3.0 compliance. Upper limit 1923 for FlexRay Protocol 2.1 Rev A compliance.	
Template Description	
Magnitude of the maximum permissible rate correction value and the maximum drift offset between two nodes operating with unsynchronized clocks for one communication cycle. Unit:Microticks (pRateCorrectionOut) Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter pdMaxDrift.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.rateCorrectionOut	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00024

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPSamplesPerMicrotick	EcucEnumerationParamDef
BSW Description	
Number of samples per microtick. Remark: Allowed range N1SAMPLES, N2SAMPLES for FlexRay Protocol 3.0 compliance.	
Template Description	
Number of samples per microtick	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.samplesPerMicrotick	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00031

BSW Module	BSW Context
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPSecondKeySlotId	EcucIntegerParamDef
BSW Description	
ID of the second key slot, in which a second startup frame shall be sent when operating as a coldstart node in a TT-L or TT-D cluster. If this parameter is set to zero the node does not have a second key slot. Remark: Set to 0 for FlexRay Protocol 2.1 Rev A compliance.	
Template Description	

ID of the second Key slot, in which a second startup frame shall be sent in TT-L Time Triggered Local Master Sync or TT-E Time Triggered External Sync mode. If this parameter is set to zero the node does not have a second key slot.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.secondKeySlotId	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00003

BSW Module	**BSW Context**
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPTwoKeySlotMode	EcucBooleanParamDef
BSW Description	
Flag indicating whether node operates as a coldstart node in a TT-E or TT-L cluster. If pTwoKeySlotMode is set to true then both pKeySlotUsedForSync and pKeySlotUsedForStartup must also be set to true. If pExternalSync is set to true then pTwoKeySlotMode must also be set to true. Remark: Set to false for FlexRay Protocol 2.1 Rev A compliance.	
Template Description	
Flag indicating whether node operates as a startup node in a TT-E Time Triggered External Sync or TT-L Time Triggered Local Master Sync cluster.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.twoKeySlotMode	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00023

BSW Module	**BSW Context**
Fr	Fr/FrMultipleConfiguration/FrController
BSW Parameter	**BSW Type**
FrPWakeupChannel	EcucEnumerationParamDef
BSW Description	
Channel used by the node to send a wakeup pattern. FrPWakeupChannel must be selected from among the channels configured by FrPChannels.	
Template Description	
Referenced channel used by the node to send a wakeup pattern. (pWakeupChannel)	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationConnector.wakeUpChannel	
Mapping Rule	**Mapping Type**
If channelA refers to the FlexrayCommunicationConnector and wakeUpChannel=true then FrPWakeupChannel = FR_CHANNEL_A. If channelB refers to the FlexrayCommunicationConnector and wakeUpChannel = true then FrPWakeup Chanel = FR_CHANNEL_B.	full
Mapping Status	**Mapping ID**
valid	up_Fr_00030

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPWakeupPattern		EcucIntegerParamDef	
BSW Description			
Number of repetitions of the wakeup symbol that are combined to form a wakeup pattern when the node enters the POC:wakeup send state. Remark: Lower limit 2 for FlexRay Protocol 2.1 Rev A compliance.			
Template Description			
Number of repetitions of the Tx-wakeup symbol to be sent during the CC_WakeupSend state of this Node in the cluster			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.wakeUpPattern			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00012

BSW Module	BSW Context		
Fr	Fr/FrMultipleConfiguration/FrController		
BSW Parameter		**BSW Type**	
FrPdAcceptedStartupRange		EcucIntegerParamDef	
BSW Description			
Expanded range of measured clock deviation allowed for startup frames during integration [Microticks]. Remark: Upper limit 1875 for FlexRay Protocol 2.1 Rev A compliance. Remark: Lower limit 29 for FlexRay Protocol 3.0 compliance.			
Template Description			
Expanded range of measured clock deviation allowed for startup frames during integration. Unit:microtick			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.acceptedStartupRange			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Fr_00011

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPdListenTimeout		EcucIntegerParamDef
BSW Description		
Value for the startup listen timeout and wakeup listen timeout. Although this is a node local parameter, the real time equivalent of this value should be the same for all nodes in the cluster [Microticks]. Remark: Lower limit 1926 for FlexRay Protocol 3.0 compliance. Upper limit 1283846 for FlexRay Protocol 2.1 Rev. A compliance.		
Template Description		
Value for the startup listen timeout and wakeup listen timeout. Although this is a node local parameter, the real time equivalent of this value should be the same for all nodes in the cluster. Unit: Microticks		

M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.listen Timeout	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Fr_00029

BSW Module	BSW Context	
Fr	Fr/FrMultipleConfiguration/FrController	
BSW Parameter		**BSW Type**
FrPdMicrotick		EcucEnumerationParamDef
BSW Description		
Duration of a microtick. Remark: Allowed range T12_5NS, T25NS, T50NS for FlexRay Protocol 3.0 compliance.		
Template Description		
Duration of a microtick. This attribute can be derived from samplePerMicrotick and gdSampleClock-Period. Unit: seconds		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.microtickDuration		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Fr_00015

C.4.2 FlexRay Interface Mapping

BSW Module	BSW Context	
FrIf	FrIf	
BSW Parameter		**BSW Type**
FrIfConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR FrIf module.		
Template Description		
FlexRay specific attributes to the physicalCluster		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster		
Mapping Rule		**Mapping Type**
Container must be created if the ECU is connected to a FlexRay Cluster		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00002

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig	
BSW Parameter		**BSW Type**
FrIfCluster		EcucParamConfContainerDef
BSW Description		

This container specifies a FrIf Cluster and all related data which is required to enable communication of the Cluster. A Cluster may consist of more than one Controller.	
Template Description	
FlexRay specific attributes to the physicalCluster	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster	
Mapping Rule	**Mapping Type**
Container must be created if the ECU is connected to a FlexRay Cluster	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00010

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfClstIdx		EcucIntegerParamDef
BSW Description		
This parameter provides a zero-based consecutive index of the FlexRay Clusters. Upper layer BSW modules and the FrIf itself use this index to identify a FlexRay Cluster.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfClusterDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_ACS_CH_A		EcucSymbolicNameReferenceDef
BSW Description		

Reference to the DemEventParameter which shall be issued when an error in ACS on channel A was detected. If the reference is not configured the error shall not be reported.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_ACS_CH_B		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when an error in ACS on channel B was detected. If the reference is not configured the error shall not be reported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_NIT_CH_A		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when an error in NIT on channel A was detected. If the reference is not configured the error shall not be reported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_NIT_CH_B		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when an error in NIT on channel B was detected. If the reference is not configured the error shall not be reported.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_SW_CH_A		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when an error in SW on channel A was detected. If the reference is not configured the error shall not be reported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRIF_E_SW_CH_B		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when an error in SW on channel B was detected. If the reference is not configured the error shall not be reported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfController		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of FlexRay CC.		
Template Description		
FlexRay bus specific communication port attributes.		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController	
Mapping Rule	**Mapping Type**
Container must be created if the ECU contains a FlexRay communication controller that is connected to the regarded communication cluster.	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00031

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController	
BSW Parameter		**BSW Type**
FrIfCtrlIdx		EcucIntegerParamDef
BSW Description		
This parameter provides a zero-based consecutive index of the FlexRay Communication Controllers. Upper layer BSW modules and the FrIf itself use this index to identify a FlexRay CC.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController	
BSW Parameter		**BSW Type**
FrIfFrCtrlRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a Controller, which is handled by a specific Driver. This reference is unique for the ECU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController	
BSW Parameter		**BSW Type**
FrIfFrameTriggering		EcucParamConfContainerDef
BSW Description		
A Frame triggering contains the communication parameters of the FlexRay Frame as well as a reference to the Frame Construction Plan.		
Template Description		
FlexRay specific attributes to the FrameTriggering		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication::FlexrayFrameTriggering		

Mapping Rule	Mapping Type
If a FlexrayFrameTriggering exists in the System Extract that is connected via a FramePort reference to the regarded Ecu the following two cases exist: 1) If the FlexrayFrameTriggering contains exactly one FlexrayAbsolutelyScheduledTiming then only one FrIfFrameTriggering container shall be created. 2) If the FlexrayFrameTriggering contains more than one FlexrayAbsolutely ScheduledTiming (e.g. to describe a multiple sending within one communication cycle) this FrIfFrameTriggering container shall be created once per defined FlexrayAbsolutelyScheduledTiming. Each created FrIfFrameTriggering container shall refer to the same FrIfFrameStructure.	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00032

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfAllowDynamicLSduLength		EcucBooleanParamDef
BSW Description		
Allows L-PDU length reduction ('FrIfLSduLength' defines max. length) and indicates that the related CC buffer has to be reconfigured for the actual length and Header-CRC before transmission of the L-PDU.		
Template Description		
Allows L-PDU length reduction and indicates that the related CC buffer has to be reconfigured for the actual length and Header-CRC before transmission of the L-PDU. If this attribute is set to true than the referenced Frame length attribute defines the max. length.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication::FlexrayFrameTriggering.allow DynamicLSduLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00038

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfAlwaysTransmit		EcucBooleanParamDef
BSW Description		
Defines whether the driver's API function Fr_TransmitTxLPdu() shall always be called for this L-PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering

BSW Parameter	BSW Type
FrIfBaseCycle	EcucIntegerParamDef
BSW Description	
This parameter contains the FlexRay Base Cycle used to transmit this FlexRay Frame.	
Template Description	
The first communication cycle where the frame is sent. This value is incremented at the beginning of each new cycle, ranging from 0 to 63, and is reset to 0 after a sequence of 64 cycles.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CycleRepetition.BaseCycle	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00039

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering
BSW Parameter	**BSW Type**
FrIfChannel	EcucEnumerationParamDef
BSW Description	
This parameter contains the FlexRay Channel used to transmit this FlexRay Frame.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::PhysicalChannel.frameTriggering	
Mapping Rule	**Mapping Type**
FrameTriggering element in the System Template is aggregated by the Physical Channel that is used to transmit this FlexRay Frame	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00034

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering
BSW Parameter	**BSW Type**
FrIfCycleRepetition	EcucIntegerParamDef
BSW Description	
This parameter contains the FlexRay Cycle Repetition used to transmit this FlexRay Frame.. possible Values: 1,2,4,8,16,32,64	
Template Description	
The number of communication cycles (after the first cycle) whenever the frame described by this timing is sent again.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CycleRepetition.CycleRepetition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00036

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>FrIf</td><td colspan="3">FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">FrIfFrameStructureRef</td><td colspan="2">EcucReferenceDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Reference to the Construction Plan of the FlexRay Frame.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::FibexCore::CoreCommunication::FrameTriggering.frame</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">Reference must comply to the reference in the System Description between the FrameTriggering element and the Frame.element</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td>up_FrIf_00041</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>FrIf</td><td colspan="3">FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">FrIfFrameTriggeringDemEventParameterRefs</td><td colspan="2">EcucParamConfContainerDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td>local</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>FrIf</td><td colspan="3">FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering/FrIfFrameTriggeringDemEventParameterRefs</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">FRIF_E_LPDU_SLOTSTATUS</td><td colspan="2">EcucSymbolicNameReferenceDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Reference to DEM event Id that is reported when FlexRay driver module detects slot errors. If this parameter is not configured, no event reporting happens.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3"></td><td>local</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td></td></tr>
</table>

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfLSduLength		EcucIntegerParamDef
BSW Description		
The payload length of the Frame is given here. This parameter is required for validation if configured PDUs and update information fits into the Frame at configuration time [bytes].		
Template Description		
The used length (in bytes) of the referencing frame. Should not be confused with a static byte length reserved for each frame by some platforms (e.g. FlexRay). The frameLength of zero bytes is allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Frame.frameLength		
Mapping Rule		**Mapping Type**
Find Frame that is referenced by the regarded FrameTriggering and use the frameLength attribute		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00040

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfMessageId		EcucIntegerParamDef
BSW Description		
The first two bytes of the payload segment of the FlexRay frame format for frames transmitted in the dynamic segment can be used as receiver filterable data called the message ID.		
Template Description		
The first two bytes of the payload segment of the FlexRay frame format for frames transmitted in the dynamic segment can be used as receiver filterable data called the message ID.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication::FlexrayFrameTriggering.message Id		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00033

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfPayloadPreamble		EcucBooleanParamDef
BSW Description		
Switching the Payload Preamble bit.		
Template Description		
Switching the Payload Preamble bit.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication::FlexrayFrameTriggering.payload PreambleIndicator		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_FrIf_00037

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfFrameTriggering	
BSW Parameter		**BSW Type**
FrIfSlotId		EcucIntegerParamDef
BSW Description		
This parameter contains the FlexRay Slot ID used to transmit this FlexRay Frame.		
Template Description		
In the static part the SlotID defines the slot in which the frame is transmitted. The SlotID also determines, in combination with FlexrayCluster::numberOfStaticSlots, whether the frame is sent in static or dynamic segment. In the dynamic part, the slot id is equivalent to a priority. Lower dynamic slot ids are all sent until the end of the dynamic segment. Higher numbers, which were ignored that time, have to wait one cycle and then must try again. minValue: 1 maxValue: 2047		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayCommunication::FlexrayAbsolutelyScheduledTiming.slotID		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00035

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController	
BSW Parameter		**BSW Type**
FrIfLPdu		EcucParamConfContainerDef
BSW Description		
Reference to a L-PDU index		
Template Description		
Data frame which is sent over a communication medium. This element describes the pure Layout of a frame sent on a channel.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Frame		
Mapping Rule		**Mapping Type**
Create container for each FlexRay Frame that is transmitted or received via the regarded communication controller..		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00042

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfLPdu	
BSW Parameter		**BSW Type**
FrIfLPduIdx		EcucIntegerParamDef
BSW Description		
This parameter identifies the L-PDU in the interaction between FlexRay Interface and FlexRay Driver.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfLPdu	
BSW Parameter		**BSW Type**
FrIfReconfigurable		EcucBooleanParamDef
BSW Description		
This parameter specifies that this LPdu is reconfigurable using FrIf_ReconfigLPdu. This means that this LPdu can be assigned to a different FrameTriggering at runtime. However, this reconfiguration is limited by hardware constraints. The direction of the LPdu cannot be reconfigured.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfLPdu	
BSW Parameter		**BSW Type**
FrIfVBTriggeringRef		EcucReferenceDef
BSW Description		
Reference to the assigned Frame triggering.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController	
BSW Parameter		**BSW Type**
FrIfTransceiver		EcucParamConfContainerDef
BSW Description		
Up to two FlexRay Transceivers may connect a Controller to a Cluster. This container realizes a Controller-Transceiver assignment.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfTransceiver	
BSW Parameter		**BSW Type**
FrIfClusterChannel		EcucEnumerationParamDef
BSW Description		
This parameter identifies to which one of the two Channels (A, B, A and B) of the Cluster the Transceiver is connected. FrIfClusterChannel shall map to Fr_ChannelType: FRIF_CHANNEL_A == FR_CHANNEL_A FRIF_CHANNEL_B == FR_CHANNEL_B FR_CHANNEL_AB shall not be used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfController/FrIfTransceiver	
BSW Parameter		**BSW Type**
FrIfFrTrcvChannelRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a Transceiver Driver Channel. This reference is unique for the ECU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfDetectNITError		EcucBooleanParamDef
BSW Description		
Indicates whether NIT error status of each cluster shall be detected or not.		
Template Description		
Indicates whether NIT error status of each cluster shall be detected or not.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.detectNitError		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_FrIf_00027

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGChannels		EcucEnumerationParamDef
BSW Description		
The channels that are used by the cluster. Implementation Type: Fr_ChannelType		
Template Description		
FlexRay specific attributes to the physicalChannel		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayPhysicalChannel		
Mapping Rule		**Mapping Type**
The channels that are used by the cluster are described in the System Template by the CommunicationCluster-PhysicalChannel relationship.		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00046

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGColdStartAttempts		EcucIntegerParamDef
BSW Description		
Maximum number of times a node in the cluster is permitted to attempt to start the cluster by initiating schedule synchronization		
Template Description		
The maximum number of times that a node in this cluster is permitted to attempt to start the cluster by initiating schedule synchronization		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.coldStartAttempts		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00047

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGCycleCountMax		EcucIntegerParamDef
BSW Description		
Maximum cycle counter value in a given cluster. Remark: Set to 63 for FlexRay Protocol 2.1 Rev. A compliance.		
Template Description		
Maximum cycle counter value in a given cluster. Remark: Set to 63 for FlexRay Protocol 2.1 Rev. A compliance.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.cycleCountMax		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00011

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGListenNoise		EcucIntegerParamDef
BSW Description		
Upper limit for the start up listen timeout and wake up listen timeout in the presence of noise. It is used as a multiplier of the node parameter pdListenTimeout.		
Template Description		
Upper limit for the start up and wake up listen timeout in the presence of noise. Expressed as a multiple of the cluster constant pdListenTimeout. Unit microticks		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.listenNoise		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00012

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGMacroPerCycle		EcucIntegerParamDef
BSW Description		
Number of macroticks in a communication cycle. Note: Lower limit 10 for FlexRay Protocol 2.1 Rev. A compliance		
Template Description		
The number of macroticks in a communication cycle		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.macroPerCycle		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00053

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGMaxWithoutClockCorrectFatal		EcucIntegerParamDef
BSW Description		
Threshold used for testing the vClockCorrectionFailed counter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active or POC:normal passive state into the POC:halt state. [Even/odd cycle pairs].		
Template Description		

Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active or POC:normal passive state into the POC:halt state.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.maxWithoutClockCorrectionFatal	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00052

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGMaxWithoutClockCorrectPassive		EcucIntegerParamDef
BSW Description		
Threshold used for testing the vClockCorrectionFailed counter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active state to the POC:normal passive state. [Even/Odd cycle pairs]		
Template Description		
Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active state to the POC:normal passive state.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.maxWithoutClockCorrectionPassive		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00020

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGNetworkManagementVectorLength		EcucIntegerParamDef
BSW Description		
Length of the Network Management vector in a cluster [bytes]		
Template Description		
Length of the Network Management vector in a cluster [bytes]		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.networkManagementVectorLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00048

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGNumberOfMinislots		EcucIntegerParamDef

BSW Description	
Number of minislots in the dynamic segment Remark: Upper limit 7986 for FlexRay Protocol 2.1 Rev. A compliance	
Template Description	
Number of Minislots in the dynamic segment.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.numberOfMinislots	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00055

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGNumberOfStaticSlots		EcucIntegerParamDef
BSW Description		
Number of static slots in the static segment		
Template Description		
The number of static slots in the static segment.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.numberOfStaticSlots		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00023

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGPayloadLengthStatic		EcucIntegerParamDef
BSW Description		
Payload length of a static frame [16 bit words]		
Template Description		
Globally configured payload length of a static frame. Unit: 16-bit WORDS.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.payloadLengthStatic		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00015

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGSyncFrameIDCountMax		EcucIntegerParamDef
BSW Description		
Maximum number of distinct syncframe identifiers present in a given cluster. This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gSyncNodeMax.		

Template Description	
Maximum number of distinct syncframe identifiers present in a given cluster. This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gSyncNodeMax.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.syncFrameIdCountMax	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00022

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdActionPointOffset		EcucIntegerParamDef
BSW Description		
Number of macroticks the action point is offset from the beginning of a static slot.		
Template Description		
The offset of the action point in networks		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.actionPointOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00054

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdBit		EcucEnumerationParamDef
BSW Description		
Nominal bit time in seconds		
Template Description		
Nominal bit time (= 1 / fx:SPEED). gdBit = cSamplesPerBit * gdSampleClockPeriod. Unit: seconds (gdBit)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.bit		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00024

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdCasRxLowMax		EcucIntegerParamDef
BSW Description		
Upper limit of the CAS acceptance windows [gdBit] Remark: Range 67 to 99 for FlexRay Protocol 2.1 Rev. A compliance		
Template Description		

Upper limit of the Collision Avoidance Symbol (CAS) acceptance window. Unit:bitDuration	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.casRxLowMax	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00043

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdCycle		EcucFloatParamDef
BSW Description		
Length of the cycle, expressed in [s] Remark: Lower limit 0.000024 for FlexRay Protocol 3.0 compliance.		
Template Description		
Length of the cycle. Unit: seconds		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.cycle		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00045

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdDynamicSlotIdlePhase		EcucIntegerParamDef
BSW Description		
Duration of the idle phase within a dynamic slot [Minislots].		
Template Description		
The duration of the dynamic slot idle phase in minislots.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.dynamicSlotIdlePhase		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00014

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdIgnoreAfterTx		EcucIntegerParamDef
BSW Description		
Duration for which the bitstrobing is paused after transmission [gdBit]. Remark: Set to 0 for FlexRay Protocol 2.1 Rev. A compliance.		
Template Description		
Duration for which the bitstrobing is paused after transmission [gdBit].		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.ignoreAfterTx	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00019

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdMacrotick		EcucFloatParamDef
BSW Description		
Duration of the cluster wide nominal macrotick, expressed in s		
Template Description		
Duration of the cluster wide nominal macrotick, expressed in s.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.macrotickDuration		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00029

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdMiniSlotActionPointOffset		EcucIntegerParamDef
BSW Description		
Number of Macroticks the Minislot action point is offset from the beginning of a Minislot [Macroticks].		
Template Description		
The Offset of the action point within a minislot. Unit: macroticks		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.minislotActionPointOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00049

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdMinislot		EcucIntegerParamDef
BSW Description		
Duration of a minislot [Macroticks]		
Template Description		
The duration of a minislot (dynamic segment). Unit: macroticks.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.minislotDuration		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00030

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdNit	EcucIntegerParamDef
BSW Description	
Duration of the Network Idle Time [Macroticks] Remark: Upper limit 805 for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
The duration of the network idle time in macroticks	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.networkIdleTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00018

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdSampleClockPeriod	EcucEnumerationParamDef
BSW Description	
Sample clock period	
Template Description	
Sample clock period. Unit: seconds	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.sampleClockPeriod	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00050

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdStaticSlot	EcucIntegerParamDef
BSW Description	
Duration of a static slot [Macroticks]. Remark: Range 4-661 for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
The duration of a slot in the static segment. Unit: macroticks	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.staticSlotDuration	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00025

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster

BSW Parameter	BSW Type
FrIfGdSymbolWindow	EcucIntegerParamDef
BSW Description	
Duration of the symbol window [Macroticks]. Remark: Range 0-142 for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
Number of bits in the Transmission Start Sequence [gdBits].	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.transmissionStartSe-quenceDuration	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00044

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdSymbolWindowActionPointOffset	EcucIntegerParamDef
BSW Description	
Number of macroticks the action point offset is from the beginning of the symbol window [Macroticks]. Remark: Set to GdActionPointOffset for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
Number of macroticks the action point offset is from the beginning of the symbol window [Macroticks].	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.symbolWindowActionPoint Offset	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00028

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdTSSTransmitter	EcucIntegerParamDef
BSW Description	
Number of bits in the Transmission Start Sequence [gdBits]. Remark: Lower limit 3 for FlexRay Protocol 2.1 Rev. A compliance.	
Template Description	
Number of bits in the Transmission Start Sequence [gdBits].	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.transmissionStartSe-quenceDuration	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00056

BSW Module	BSW Context		
FrIf	FrIf/FrIfConfig/FrIfCluster		
BSW Parameter		**BSW Type**	
FrIfGdWakeupRxIdle		EcucIntegerParamDef	
BSW Description			
Number of bits used by the node to test the duration of the 'idle' or HIGH phase of a received wakeup [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxIdle. Lower limit 14 for FlexRay Protocol 2.1 Rev. A compliance.			
Template Description			
Number of bits used by the node to test the duration of the 'idle' or HIGH phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxIdle.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.wakeupRxIdle			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrIf_00016

BSW Module	BSW Context		
FrIf	FrIf/FrIfConfig/FrIfCluster		
BSW Parameter		**BSW Type**	
FrIfGdWakeupRxLow		EcucIntegerParamDef	
BSW Description			
Number of bits used by the node to test the duration of the LOW phase of a received wakeup [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxLow. Lower limit 11 for FlexRay Protocol 2.1 Rev. A compliance.			
Template Description			
Number of bits used by the node to test the duration of the LOW phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxLow.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.wakeupRxLow			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrIf_00017

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfGdWakeupRxWindow		EcucIntegerParamDef
BSW Description		
The size of the window used to detect wakeups [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxWindow. Upper limit 301 for FlexRay Protocol 2.1 Rev. A compliance.		
Template Description		
The size of the window used to detect wakeups [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxWindow.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.wakeupRxWindow		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00013

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdWakeupTxActive	EcucIntegerParamDef
BSW Description	
Number of bits used by the node to transmit the LOW phase of awakeup symbol and the HIGH and LOW phases of a WUDOP [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolTxLow.	
Template Description	
Number of bits used by the node to transmit the LOW phase of awakeup symbol and the HIGH and LOW phases of a WUDOP. Unit:bitDuration	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.wakeupTxActive	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00026

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfGdWakeupTxIdle	EcucIntegerParamDef
BSW Description	
Number of bits used by the node to transmit the 'idle' part of a wakeup symbol [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolTxIdle.	
Template Description	
Number of bits used by the node to transmit the 'idle' part of a wakeup symbol. Unit: gDbit	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.wakeupTxIdle	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00021

BSW Module	BSW Context
FrIf	FrIf/FrIfConfig/FrIfCluster
BSW Parameter	**BSW Type**
FrIfJobList	EcucParamConfContainerDef
BSW Description	

This container specifies a list of all FlexRay Jobs of the Cluster to be performed by FrIf_JobListExec_<ClstIdx>().	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList	
BSW Parameter		**BSW Type**
FrIfAbsTimerRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the absolute timer to be used to trigger the interrupt whose ISR contains the FrIf_JobListExec_<ClstIdx>() function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList	
BSW Parameter		**BSW Type**
FrIfJob		EcucParamConfContainerDef
BSW Description		
A job may contain more than one operation that are executed at a specific point in time.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob	
BSW Parameter		**BSW Type**
FrIfCommunicationOperation		EcucParamConfContainerDef
BSW Description		
A separate operation which is part of a FlexRay Job and defines what type of action is executed.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob/FrIfCommunicationOperation	
BSW Parameter		**BSW Type**
FrIfCommunicationAction		EcucEnumerationParamDef
BSW Description		
The action to be performed in the FlexRay Operation		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob/FrIfCommunicationOperation	
BSW Parameter		**BSW Type**
FrIfCommunicationOperationIdx		EcucIntegerParamDef
BSW Description		
For each FlexRay Communication Job, this index spans a range of zero-based consecutive values and thus defines the order of the FlexRay Communication Operation in the respective FlexRay Communication Job.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob/FrIfCommunicationOperation	
BSW Parameter		**BSW Type**
FrIfLPduIdxRef		EcucReferenceDef
BSW Description		
Reference to a L-PDu index		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob/FrIfCommunicationOperation	
BSW Parameter		**BSW Type**
FrIfRxComOpMaxLoop		EcucIntegerParamDef
BSW Description		
Defines the maximum number of loops for the receive RECEIVE_AND_INDICATE (Use case: emptying a FIFO). Please note that the parameter is mandatory if FrIfCommunicationAction parameter is set to RECEIVE_AND_INDICATE. For all other operations this parameter can be ignored.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob	
BSW Parameter		**BSW Type**
FrIfCycle		EcucIntegerParamDef
BSW Description		
The FlexRay Cycle in which the communication operation will execute this job		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob	
BSW Parameter		**BSW Type**
FrIfMacrotick		EcucIntegerParamDef
BSW Description		
Macrotick offset in the Cycle [Macrotick]		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster/FrIfJobList/FrIfJob	
BSW Parameter		**BSW Type**
FrIfMaxIsrDelay		EcucIntegerParamDef
BSW Description		
The maximum delay in macroticks the FrIf_JoblistExec_<cluster>() function is processed after the absolute timer interrupt was triggered.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfMainFunctionPeriod		EcucFloatParamDef
BSW Description		
The execution cycle of the FrIf_MainFunction_<cluster>() in seconds. The FrIf does not require this information but the BSW scheduler, which invokes the cluster main functions, needs it in order to plan its tasks.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig/FrIfCluster	
BSW Parameter		**BSW Type**
FrIfSafetyMargin		EcucIntegerParamDef
BSW Description		
Additional timespan in macroticks which takes jitter into account to be able to set the JobListPointer to the next possible job which can be executed in case the FlexRay Job List Execution Function has be resynchronized.		
Template Description		
Additional timespan in macroticks which takes jitter into account to be able to set the JobListPointer to the next possible job which can be executed in case the FlexRay Job List Execution Function has be resynchronized.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.safetyMargin		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00051

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig	
BSW Parameter		**BSW Type**
FrIfFrameStructure		EcucParamConfContainerDef
BSW Description		
The Frame structure specifies a Construction Plan how a Frame is assembled with PDUs and their respective Update-Bits.		
Template Description		
Data frame which is sent over a communication medium. This element describes the pure Layout of a frame sent on a channel.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::Frame		
Mapping Rule		**Mapping Type**
Create container for each FlexRay Frame that is transmitted or received by the regarded ECU. IPduToFrameMapping element in the System Template contains the construction plan.		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00003

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfFrameStructure	
BSW Parameter		**BSW Type**
FrIfByteOrder		EcucEnumerationParamDef
BSW Description		
This parameter defines the ByteOrder of all Pdus that are mapped into the Frame. The absolute position of a Pdu in the Frame is determined by the definition of the ByteOrder parameter: If BIG_ENDIAN is specified, the FrIfPduOffset indicates the position of the most significant bit in the Frame. If LITTLE_ENDIAN is specified, the FrIfPduOffset indicates the position of the least significant bit in the Frame.		
Template Description		
This attribute defines the order of the bytes of the Pdu and the packing into the Frame. Please consider that [constr_3246] and [constr_3222] are restricting the usage of this attribute.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduToFrameMapping.packingByteOrder		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00007

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfFrameStructure	
BSW Parameter		**BSW Type**
FrIfPdusInFrame		EcucParamConfContainerDef
BSW Description		

This container holds all the information about a PDU in a FlexRay Frame.	
Template Description	
A PduToFrameMapping defines the composition of Pdus in each frame.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduToFrameMapping	
Mapping Rule	**Mapping Type**
Container must be created for each IPduToFrameMapping element inside the frame.	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00004

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfFrameStructure/FrIfPdusInFrame	
BSW Parameter		**BSW Type**
FrIfPduOffset		EcucIntegerParamDef
BSW Description		
The value specifies the offset of the PDU within the Frame [bytes].		
Template Description		
This attribute describes the bitposition of a Pdu within a Frame. Please note that the absolute position of the Pdu in the Frame is determined by the definition of the packingByteOrder attribute. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the Frame. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the Frame. The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. The Pdus are byte aligned in a Frame and only the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) are allowed.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduToFrameMapping.startPosition		
Mapping Rule		**Mapping Type**
Please note that the startPosition attribute is defined in bits and the FrIfPdu Offset parameter is defined in bytes.		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00005

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfFrameStructure/FrIfPdusInFrame	
BSW Parameter		**BSW Type**
FrIfPduRef		EcucReferenceDef
BSW Description		
This is the reference to the local definition of a PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
FrIf	FrIf/FrIfConfig/FrIfFrameStructure/FrIfPdusInFrame		
BSW Parameter		**BSW Type**	
FrIfPduUpdateBitOffset		EcucIntegerParamDef	
BSW Description			
This value specifies where the PDU's Update-Bit is stored in the Frame (bit location of PDU's Update-Bit in the FlexRay Frame).			
Template Description			
Indication to the receivers that the corresponding Pdu was updated by the sender. This attribute describes the position of the update bit in the frame that aggregates this PDUToFrameMapping. Length is always one bit. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing Frame still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduToFrameMapping.updateIndicationBitPosition			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrIf_00006

BSW Module	BSW Context		
FrIf	FrIf/FrIfConfig		
BSW Parameter		**BSW Type**	
FrIfMaxPduCnt		EcucIntegerParamDef	
BSW Description			
Maximum number of Pdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
FrIf	FrIf/FrIfConfig	
BSW Parameter		**BSW Type**
FrIfPdu		EcucParamConfContainerDef
BSW Description		

Contains PDU information. A PDU may be either a transmission PDU or a reception PDU.	
Template Description	
Collection of all Pdus that can be routed through a bus interface.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::Pdu	
Mapping Rule	**Mapping Type**
The container must be created for each Pdu that is contained in a FlexRay Frame.	full
Mapping Status	**Mapping ID**
valid	up_FrIf_00008

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu	
BSW Parameter		**BSW Type**
FrIfPduDirection		EcucChoiceContainerDef
BSW Description		
A PDU is either transmit or receive		
Template Description		
Communication Direction of the Connector Port (input or output Port).		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommConnectorPort.communicationDirection		
Mapping Rule		**Mapping Type**
The PduTriggering contains a reference to a IPduPort with the communication Direction.		full
Mapping Status		**Mapping ID**
valid		up_FrIf_00009

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection	
BSW Parameter		**BSW Type**
FrIfRxPdu		EcucParamConfContainerDef
BSW Description		
Receive PDU		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfRxPdu	
BSW Parameter		**BSW Type**
FrIfRxIndicationName		EcucFunctionNameDef
BSW Description		

This parameter defines the name of the <User_RxIndication>. This parameter depends on the parameter FrIfUserRxIndicationUL. If FrIfUserRxIndicationUL equals FR_TP, FR_AR_TP, FR_NM, PDUR, FR_TSYN or XCP, the name of the <User_RxIndication> is fixed. If FrIfUserRxIndicationUL equals CDD, the name of the <User_RxIndication> is selectable.
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfRxPdu	
BSW Parameter		**BSW Type**
FrIfRxPduRef		EcucReferenceDef
BSW Description		
Reference to the external PDU definition.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfRxPdu	
BSW Parameter		**BSW Type**
FrIfUserRxIndicationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer (UL) module to which the indication of the successfully received FrIfRxPdu has to be routed via <User_RxIndication>. This <User_RxIndication> has to be invoked when the indication of the configured FrIfRxPdu will be received by a Rx indication event from the FR Driver module. If no upper layer (UL) module is configured, no <User_RxIndication> has to be called in case of a Rx indication event of the FrIfRxPdu from the FR Driver module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection	
BSW Parameter		**BSW Type**

FrIfTxPdu	EcucParamConfContainerDef	
BSW Description		
This container specifies transmission PDUs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu		
BSW Parameter		**BSW Type**	
FrIfConfirm		EcucBooleanParamDef	
BSW Description			
Defines whether the transmission of a PDU should be checked and confirmed to the PDU owning BSW module. If "FrIfUserTxUL" is configured as FR_TSYN then this parameter has to be set to FALSE for this PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu		
BSW Parameter		**BSW Type**	
FrIfCounterLimit		EcucIntegerParamDef	
BSW Description			
This value states the maximum number of indication of ready PDU data to the FrIf (i.e. maximum number of invocations of FrIf_Transmit) without an intermediate transmission of the PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu	
BSW Parameter		**BSW Type**
FrIfImmediate		EcucBooleanParamDef
BSW Description		

Defines whether the PDU is transmitted immediate or decoupled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu
BSW Parameter	**BSW Type**
FrIfNoneMode	EcucBooleanParamDef
BSW Description	
Using the "None-Mode" which means that there is no API FrIf_Transmit call of the upper layer for this PDU.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu
BSW Parameter	**BSW Type**
FrIfTxConfirmationName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the <User_TxConfirmation>. This parameter depends on the parameter FrIfUserTxUL. If FrIfUserTxUL equals FR_TP, FR_AR_TP, FR_NM, PDUR or XCP, the name of the <User_TxConfirmation> is fixed. If FrIfUserTxUL equals CDD, the name of the <User_TxConfirmation> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu
BSW Parameter	**BSW Type**
FrIfTxPduId	EcucIntegerParamDef
BSW Description	

The global PDU identifier, which has to be used by the upper layer BSW module. The identifier has to be zero based and consecutive.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu	
BSW Parameter		**BSW Type**
FrIfTxPduRef		EcucReferenceDef
BSW Description		
Reference to the external PDU definition.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu	
BSW Parameter		**BSW Type**
FrIfUserTriggerTransmitName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of the <User_TriggerTransmit>. This parameter depends on the parameter FrIfUserTxUL. If FrIfUserTxUL equals FR_TP, FR_AR_TP, FR_NM, PDUR, FR_TSYN or XCP the name of the <User_TriggerTransmit> is fixed. If FrIfUserTxUL equals CDD, the name of the <User_TriggerTransmit> is selectable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfConfig/FrIfPdu/FrIfPduDirection/FrIfTxPdu	
BSW Parameter		**BSW Type**
FrIfUserTxUL		EcucEnumerationParamDef
BSW Description		

This parameter defines the upper layer (UL) module to which the trigger of the Pdu to be transmitted (via the <User_TriggerTransmit>) or the confirmation of the successfully transmitted Pdu has to be routed (via the <User_TxConfirmation>). Please note that handle IDs which are used in callback functions are defined by the upper layer module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
FrIf	FrIf		
BSW Parameter		**BSW Type**	
FrIfGeneral		EcucParamConfContainerDef	
BSW Description			
This container contains the general configuration parameters of the FlexRay Interface.			
Template Description			
FlexRay specific attributes to the physicalCluster			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster			
Mapping Rule			**Mapping Type**
Container must be created if the ECU is connected to a FlexRay Cluster			full
Mapping Status			**Mapping ID**
valid			up_FrIf_00001

BSW Module	**BSW Context**		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfAbsTimerIdx		EcucIntegerParamDef	
BSW Description			
Maximum number of supported absolute timers.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfAllSlotsSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to enable/disable of switching from key-slot / single-slot mode to all slot mode.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfCancelTransmitSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to request the cancellation of the I-PDU transmission to FrDrv.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfDisableLPduSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to disables the hardware resource of a LPdu for transmission/reception.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfDisableTransceiverBranchSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to disable branches of an active star.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfEnableTransceiverBranchSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to enable branches of an active star.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfFreeOpAApiName		EcucStringParamDef
BSW Description		
API name that is called when FREE_OP_A is selected as communication operation. See also chapter 8.8.3 Configurable Interfaces.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfFreeOpBApiName		EcucStringParamDef
BSW Description		
API name that is called when FREE_OP_B is selected as communication operation. See also chapter 8.8.3 Configurable Interfaces.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfFreeOpsHeader		EcucStringParamDef
BSW Description		
Defines header file for configurable FREE_OP_A / FREE_OP_B functions.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfGetClockCorrectionSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to enable/disable of polling the FlexRay Driver to getting CC clock correction values.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfGetGetChannelStatusSupport		EcucBooleanParamDef	
BSW Description			
Configuration parameter to enable/disable FrIf support to enable/disable of polling the FlexRay Driver to getting error information about the FlexRay communications bus.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfGetNmVectorSupport		EcucBooleanParamDef	
BSW Description			
Configuration parameter to enable/disable FrIf support to request the FlexRay hardware NMVector.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfGetNumOfStartupFramesSupport		EcucBooleanParamDef	
BSW Description			
Configuration parameter to enable/disable FrIf support to enable/disable of polling the FlexRay Driver for the actual number of received startup frames on the bus.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**

FrIfGetSyncFrameListSupport	EcucBooleanParamDef
BSW Description	
Configuration parameter to enable/disable FrIf support to enable/disable of polling the FlexRay Driver to getting a list of actual received sync frames.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfGetTransceiverErrorSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to get the FlexRay Transceiver errors by calling the FlexRay Transceiver module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfGetWakeupRxStatusSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to get the wakeup received information from the FlexRay controller.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfNumClstSupported		EcucIntegerParamDef
BSW Description		

Maximum number of FlexRay Clusters that the FlexRay Interface supports.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfNumCtrlSupported		EcucIntegerParamDef	
BSW Description			
Maximum number of FlexRay CCs that the FlexRay Interface supports			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrIf	FrIf/FrIfGeneral		
BSW Parameter		**BSW Type**	
FrIfPublicCddHeaderFile		EcucStringParamDef	
BSW Description			
Defines header files for callback functions which shall be included in case of CDDs. Range of characters is 1.. 32.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfReadCCConfigApi		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable the optional FrIf_ReadCCConfig API.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfReconfigLPduSupport		EcucBooleanParamDef
BSW Description		
Configuration parameter to enable/disable FrIf support to enable/disable the reconfiguration of a given LPdu according to the parameters (FrameId, Channel, CycleRepetition, CycleOffset, PayloadLength, HeaderCRC) at runtime.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfTxConflictNotificationHeaderName		EcucStringParamDef
BSW Description		
Configuration of the header file name that defines the UL_TxConflictNotification.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfTxConflictNotificationName		EcucStringParamDef
BSW Description		
Configuration of the API name that is called in case a TxConflict has been detected.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfUnusedBitValue		EcucIntegerParamDef
BSW Description		
Set unused bits of transmitted Pdus to a defined value.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrIf	FrIf/FrIfGeneral	
BSW Parameter		**BSW Type**
FrIfVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables/disables the existence of the FrIf_GetVersionInfo() API service true: FrIf_GetVersionInfo() API service exists false: FrIf_GetVersionInfo() API service does not exist		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.4.3 FrNm Mapping

BSW Module	BSW Context	
FrNm	FrNm	
BSW Parameter		**BSW Type**
FrNmChannelConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters for all FlexRay NM channels.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig	
BSW Parameter		**BSW Type**
FrNmChannel		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters for a FlexRay NM Channel.		
Template Description		
FlexRay specific NM cluster attributes.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster		
Mapping Rule		**Mapping Type**
Create Container for each existing FlexrayNmCluster.		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00046

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel	
BSW Parameter		**BSW Type**
FrNmChannelIdentifiers		EcucParamConfContainerDef
BSW Description		
This container contains instance specific identifiers related to the respective FlexRay Channel.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmActiveWakeupBitEnabled		EcucBooleanParamDef
BSW Description		
Enables/Disables the handling of the Active Wakeup Bit in the FrNm module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmCarWakeUpBitPosition		EcucIntegerParamDef	
BSW Description			
Specifies the Bit position of the CWU within the NM-Message.			
Template Description			
Specifies the bit position of the CarWakeUp within the NmPdu.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmCarWakeUpBitPosition			
Mapping Rule			**Mapping Type**
The position of the Car Wakeup bit in the Ecuc is defined by the configuration parameters FrNmCarWakeUpBytePosition and FrNmCarWakeUpBitPosition (position in wakeUpByte). In the SysT the position is described only by the bit position in the NmMessage.			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00032

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmCarWakeUpBytePosition		EcucIntegerParamDef	
BSW Description			
Specifies the Byte position of the CWU within the NM-Message.			
Template Description			
Specifies the bit position of the CarWakeUp within the NmPdu.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmCarWakeUpBitPosition			
Mapping Rule			**Mapping Type**
The position of the Car Wakeup bit in the Ecuc is defined by the configuration parameters FrNmCarWakeUpBytePosition and FrNmCarWakeUpBitPosition (position in wakeUpByte). In the SysT the position is described only by the bit position in the NmMessage.			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00029

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmCarWakeUpFilterEnabled		EcucBooleanParamDef	
BSW Description			
If CWU filtering is supported, only the CWU bit within the NM message with source node identifier FrNmCarWakeUpFilterNodeId is considered as CWU request. FALSE - CWU Filtering is not supported TRUE - CWU Filtering is supported			
Template Description			
If this attribute is set to true the CareWakeUp filtering is supported. In this case only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmCarWakeUpFilterEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full

Mapping Status	Mapping ID
valid	up_FrNm_00031

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmCarWakeUpFilterNodeId		EcucIntegerParamDef
BSW Description		
Source node identifier for CWU filtering. If CWU filtering is supported, only the CWU bit within the NM message with source node identifier FrNmCarWakeUpFilterNodeId is considered as CWU request.		
Template Description		
Source node identifier for CarWakeUp filtering. If CarWakeUp filtering is supported (nmCarWakeUpFilterEnabled), only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmCarWakeUpFilterNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00038

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmCarWakeUpRxEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables support of CarWakeUp bit evaluation in received NM messages. FALSE - CarWakeUp not supported TRUE - CarWakeUp supported		
Template Description		
If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmCarWakeUpRxEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00043

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmChannelHandle		EcucSymbolicNameReferenceDef
BSW Description		
Channel identifier configured for the respective instance of the NM. The FrNmChannelHandle shall be encoded in the FrNmRxPduId parameter which is passed to FrNm_RxIndication() function called by the FrIf.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference points to the unique channel defined by the ComMChannel and provides access to the unique channel index value in ComMChannelId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmControlBitVectorActive		EcucBooleanParamDef
BSW Description		
This parameter is used to activate or deactivate the control bit vector support for a Fr Nm Channel.		
Template Description		
Used to activate or deactivate the control bit vector support for a Fr Nm Channel.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmControlBitVectorActive		
Mapping Rule		**Mapping Type**
full		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00034

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmNodeDetectionEnabled		EcucBooleanParamDef
BSW Description		
This parameter is used to enable or disable node detection support for a FrNm Channel.		
Template Description		
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmNodeDetectionEnabled		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00047

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmNodeId		EcucIntegerParamDef
BSW Description		
NM node identifier configured for the respective FlexRay Channel. It is used for identifying the respective NM node in the NM-cluster. It must be unique for each NM node within one NM cluster.		
Template Description		
Node identifier of local NmNode. Must be unique in the NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00044

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmPduScheduleVariant		EcucEnumerationParamDef
BSW Description		
This parameter defines the PDU scheduling variant that should be used for this channel. Option 1 NM-Vote and NM-Data in static segment (one PDU) Option 2 NM-Vote and NM-Data in dynamic segment (one PDU) Option 3 NM-Vote and NM-Data in static segment (separate PDU) Option 4 NM-Vote in static segment and NM-Data in dynamic segment Option 5 NM-Vote in dynamic segment and NM-Data in static segment Option 6 NM-Vote and NM-Data in dynamic segment (separate PDU) Option 7 Combined NM-Vote and CBV in static segment and NM-Data in dynamic segment		
Template Description		
FrNm schedule variant according to FrNm SWS.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmClusterCoupling.nmScheduleVariant		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00028

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers	
BSW Parameter		**BSW Type**
FrNmPnEnabled		EcucBooleanParamDef
BSW Description		

Enables or disables support of partial networking. false: Partial networking Range not supported true: Partial networking supported	
Template Description	
Defines whether this NmCluster contributes to the partial network mechanism.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmCluster.nmPncParticipation	
Mapping Rule	**Mapping Type**
If NmCluster.nmPncParticipation has the value "true" or is not defined then FrNmPnEnabled shall be set to true.	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00033

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers
BSW Parameter	**BSW Type**
FrNmPnEraCalcEnabled	EcucBooleanParamDef
BSW Description	
Specifies if FrNm calculates the PN request information for external requests. (ERA) false: PN request are not calculated true: PN request are calculated	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers
BSW Parameter	**BSW Type**
FrNmPnEraRxNSduRef	EcucReferenceDef
BSW Description	
Reference to a global Pdu. The SduRef is required for every FrNm Channel, because ERA is reported per channel.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers

BSW Parameter		BSW Type
FrNmRxPdu		EcucParamConfContainerDef
BSW Description		
This container describes the FlexRay NM RX PDU:s.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.rxNmPdu		
Mapping Rule		**Mapping Type**
Create Container if the regarded NmNode recieves a Pdu		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00039

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmRxPdu	
BSW Parameter		**BSW Type**
FrNmRxPduContainsData		EcucBooleanParamDef
BSW Description		
This parameter defines if the PDU contains NM Data.		
Template Description		
Defines if the Pdu contains NM Data. If the NmPdu does not aggregate any ISignalToIPduMappings it still may contain UserData that is set via Nm_SetUserData(). If the ISignalToIPduMapping exists then the nmDataInformation attribute shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.nmDataInformation,SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping		
Mapping Rule		**Mapping Type**
Set to true if either the NmPdu aggregates one or more iSignalToIPduMappings, or - if none are aggregated - if nmDataInformation is true. Set to false in all other cases		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00041

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmRxPdu	
BSW Parameter		**BSW Type**
FrNmRxPduContainsVote		EcucBooleanParamDef
BSW Description		
This parameter defines if the PDU contains NM Vote information.		
Template Description		
Defines if the Pdu contains NM Vote information.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.nmVoteInformation		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00040

BSW Module	BSW Context

FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmRxPdu
BSW Parameter	**BSW Type**
FrNmRxPduId	EcucIntegerParamDef
BSW Description	
PDU identifier configured for the respective FlexRay Channel. It is used for referring to the FlexRay Interface receive function. It must be consistent with the value configured in the FlexRay Interface. This ID is used for the combined reception of NM Vote and NM Data or for the reception of the NM Vote if NM Data is received in a separate PDU. ImplementationType: PduIdType	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmRxPdu
BSW Parameter	**BSW Type**
FrNmRxPduRef	EcucReferenceDef
BSW Description	
The reference to a PDU in the global PDU structure described in the AUTOSAR ECU Configuration Specification. This reference will be used by the FrIf module to derive the PDU Id.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers
BSW Parameter	**BSW Type**
FrNmSourceNodeIdentifierEnabled	EcucBooleanParamDef
BSW Description	
This parameter is used to enable or disable SourceNodeIdentifier support for a FrNm Channel.	
Template Description	
Enables the source node identifier.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmCluster.nmNodeIdEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00048

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmSynchronizationPointEnabled		EcucBooleanParamDef	
BSW Description			
This parameter defines if this channel shall provide the synchronization point indication to the NM Interface.			
Template Description			
If this parameter is true, then this network is a synchronizing network for the NM coordination cluster which it belongs to. The network is expected to call Nm_SynchronizationPoint() at regular intervals.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmCluster.nmSynchronizingNetwork			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00030

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmTxPdu		EcucParamConfContainerDef	
BSW Description			
This container describes the FlexRay NM TX PDU:s.			
Template Description			
M2 Parameter			
SystemTemplate::NetworkManagement::NmNode.txNmPdu			
Mapping Rule			**Mapping Type**
Create Container if the regarded NmNode transmits a Pdu			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00035

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmTxPdu		
BSW Parameter		**BSW Type**	
FrNmTxConfirmationPduId		EcucIntegerParamDef	
BSW Description			
Handle Id used by the Lower Layer when calling FrNm_TriggerTransmit() or FrNm_TxConfirmation().			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmTxPdu	
BSW Parameter		**BSW Type**

FrNmTxPduContainsData	EcucBooleanParamDef
BSW Description	
This parameted defines if the PDU contains NM Data.	
Template Description	
Defines if the Pdu contains NM Data. If the NmPdu does not aggregate any ISignalToIPduMappings it still may contain UserData that is set via Nm_SetUserData(). If the ISignalToIPduMapping exists then the nmDataInformation attribute shall be ignored.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.nmDataInformation,SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping	
Mapping Rule	**Mapping Type**
Set to true if either the NmPdu aggregates one or more iSignalToIPduMappings, or - if none are aggregated - if nmDataInformation is true. Set to false in all other cases	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00037

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmTxPdu
BSW Parameter	**BSW Type**
FrNmTxPduContainsVote	EcucBooleanParamDef
BSW Description	
This parameted defines if the PDU contains NM Vote information.	
Template Description	
Defines if the Pdu contains NM Vote information.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.nmVoteInformation	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00036

BSW Module	**BSW Context**
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmTxPdu
BSW Parameter	**BSW Type**
FrNmTxPduRef	EcucReferenceDef
BSW Description	
The reference to a PDU in the global PDU structure described in the AUTOSAR ECU Configuration Specification. This reference is used to derive the PDU Id that is defined by the FrIf module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**

FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers		
BSW Parameter		**BSW Type**	
FrNmUserDataTxPdu		EcucParamConfContainerDef	
BSW Description			
This optional container is used to configure the UserNm PDU. This container is only available if FrNmComUserDataSupport is enabled.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping			
Mapping Rule			**Mapping Type**
Create container for each NmPdu that aggregates the ISignalToIPduMapping element. The configuration for these Pdus (e.g. Transfer Properties) shall be derived from this information.			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00027

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmUserDataTxPdu		
BSW Parameter		**BSW Type**	
FrNmTxUserDataPduId		EcucIntegerParamDef	
BSW Description			
This parameter defines the Handle ID of the NM User Data I-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelIdentifiers/FrNmUserDataTxPdu		
BSW Parameter		**BSW Type**	
FrNmTxUserDataPduRef		EcucReferenceDef	
BSW Description			
Reference to the NM User Data I-PDU in the global PDU collection.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**

FrNm	FrNm/FrNmChannelConfig/FrNmChannel		
BSW Parameter		**BSW Type**	
FrNmChannelTiming		EcucParamConfContainerDef	
BSW Description			
This container contains instance-specific timing related to the respective FlexRay Channel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming		
BSW Parameter		**BSW Type**	
FrNmDataCycle		EcucEnumerationParamDef	
BSW Description			
Number of FlexRay Schedule Cycles needed to transmit the NM Data of all ECUs on the FlexRay bus			
Template Description			
Number of FlexRay Communication Cycles needed to transmit the Nm Data PDUs of all FlexRay Nm Ecus of this FlexRayNmCluster.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmDataCycle			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00022

BSW Module	**BSW Context**		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming		
BSW Parameter		**BSW Type**	
FrNmMainFunctionPeriod		EcucFloatParamDef	
BSW Description			
This parameter defines the processing cycle of the main function of FrNm module in seconds.			
Template Description			
Defines the processing cycle of the main function of FrNm module.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmMainFunctionPeriod			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00025

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming	
BSW Parameter		**BSW Type**
FrNmMsgTimeoutTime		EcucFloatParamDef

BSW Description	
Timeout of a NM-message. It determines in seconds how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.	
Template Description	
Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.	
M2 Parameter	
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmMessageTimeoutTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00019

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming	
BSW Parameter		**BSW Type**
FrNmReadySleepCnt		EcucIntegerParamDef
BSW Description		
FrNm switches to bus sleep mode at the end of the FrNmReadySleepCnt+1 repetition cycle without any NM vote. E.g. on a value of "1", the NM-State Machine will leave the Ready Sleep State after two NM Repetition Cycles with no "keep awake" votes.		
Template Description		
The value of this attribute influences the shutdown behavior of the FlexRay NM. FrNm switches to bus sleep mode nmReadySleepTime seconds after the completion of the last repetition cycle containing a NM vote.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationConnector.nmReadySleepTime		
Mapping Rule		**Mapping Type**
FrNmReadySleepCnt = ((Float2Int(nmReadySleepTime/cycle))/nmRepetitionCycle)-1		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00045

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming	
BSW Parameter		**BSW Type**
FrNmRemoteSleepIndTime		EcucFloatParamDef
BSW Description		
Timeout for Remote Sleep Indication. It defines the time in seconds how long it shall take to recognize that all other nodes are ready to sleep. The value "0" denotes that no Remote Sleep Indication functionality is configured.		
Template Description		
Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmRemoteSleepIndicationTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00020

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming		
BSW Parameter		**BSW Type**	
FrNmRepeatMessageTime		EcucFloatParamDef	
BSW Description			
Timeout for Repeat Message State. Defines the time in seconds how long the NM shall stay in the Repeat Message State. The value "0" denotes that no Repeat Message State is configured, which means that Repeat Message State is transient and implies that it is left immediately after entry and consequently no startup stability is guaranteed and no node detection procedure is possible.			
Template Description			
Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmRepeatMessageTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00021

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming		
BSW Parameter		**BSW Type**	
FrNmRepetitionCycle		EcucEnumerationParamDef	
BSW Description			
Number of Flexray Schedule Cycles used to repeat the transmission of the Nm vote of all ECUs on the Flexray Bus.			
Template Description			
Number of FlexRay Communication Cycles used to repeat the transmission of the Nm vote Pdus of all FlexRay NmEcus of this FlexRayNmCluster. This value must be an integral multiple of nmVotingCycle.			
M2 Parameter			
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmRepetitionCycle			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrNm_00024

BSW Module	BSW Context		
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming		
BSW Parameter		**BSW Type**	
FrNmVoteInhibitionEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling the inhibition of vote changes from the next-to-last repetition cycle to the last repetition cycle before the Ready Sleep Counter expires.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
FrNm	FrNm/FrNmChannelConfig/FrNmChannel/FrNmChannelTiming	
BSW Parameter		**BSW Type**
FrNmVotingCycle		EcucEnumerationParamDef
BSW Description		
Number of FlexRay Schedule Cycles needed to transmit the Nm vote of all ECUs on the FlexRay Bus.		
Template Description		
Number of FlexRay CommunicationCycles needed to transmit the Nm vote of Pdus of all FlexRay NmEcus of this FlexRayNmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmCluster.nmVotingCycle		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00026

BSW Module	BSW Context	
FrNm	FrNm	
BSW Parameter		**BSW Type**
FrNmGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains all global configuration parameters for the FrNm module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig	
BSW Parameter		**BSW Type**
FrNmGlobalFeatures		EcucParamConfContainerDef
BSW Description		
This container contains module features related to the FlexRay NM functionality.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmBusSynchronizationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the bus synchronization.		
Template Description		
Enables bus synchronization support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmBusSynchronizationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00014

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmComUserDataSupport		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling the Tx path of Com User Data. Use case: Setting of NMUserData via SWC.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping		
Mapping Rule		**Mapping Type**
If an NmPdu contains user data defined via the existence of NmPdu.iSignalToIPduMapping and is consequently handled via the PduR and Com this attribute shall be set to true.		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00016

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmControlBitVectorEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling control bit vector support.		
Template Description		
Enables control bit vector support.		
M2 Parameter		
SystemTemplate::NetworkManagement::FlexrayNmClusterCoupling.nmControlBitVectorEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00007

BSW Module	BSW Context
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures

BSW Parameter	BSW Type
FrNmCoordinatorSyncSupport	EcucBooleanParamDef
BSW Description	
Enables/disables the coordinator synchronization support.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmCycleCounterEmulation		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the cycle counter emulation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmDualChannelPduEnable		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the support of dual channel transmission and reception of NM messages.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmHwVoteEnable		EcucBooleanParamDef
BSW Description		

Pre-processor switch for enabling the processing of FlexRay Hardware aggregated NM-Votes. This switch enables/disables the optional API FrIf_GetNmVector.	
Template Description	
Switch for enabling the processing of FlexRay Hardware aggregated NM-Votes.	
M2 Parameter	
SystemTemplate::NetworkManagement::FlexrayNmEcu.nmHwVoteEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00008

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures
BSW Parameter	**BSW Type**
FrNmNodeDetectionEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling node detection support. calculationFormula = If (FrNmPassiveModeEnabled == False) then Equal(NmNodeDetectionEnabled) else Equal(False)	
Template Description	
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmNodeDetectionEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00001

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures
BSW Parameter	**BSW Type**
FrNmPassiveModeEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling Passive Node Configuration support.	
Template Description	
Enables support of the Passive Mode. The passive mode is configurable per channel.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmNode.nmPassiveModeEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping. nmNode.nmPassiveModeEnabled shall always have the same value in all Nm Clusters with the same bus protocol in the scope of one EcuInstance.	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00015

BSW Module	**BSW Context**

FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmPduRxIndicationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling PDU reception indication.		
Template Description		
Switch for enabling the PDU Rx Indication.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmPduRxIndicationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00009

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmPnEiraCalcEnabled		EcucBooleanParamDef
BSW Description		
Specifies if FrNm calculates the PN request information for internal an external requests. (EIRA) true: PN request are calculated false: PN request are not calculated		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmPnEiraRxNSduRef		EcucReferenceDef
BSW Description		
Reference to a Pdu in the COM-Stack. Only one SduRef is required for FrNm because the EIRA is the aggregation over all FlexRay Channels.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures

BSW Parameter		**BSW Type**
FrNmPnInfo		EcucParamConfContainerDef
BSW Description		
PN information configuration		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures/FrNmPnInfo	
BSW Parameter		**BSW Type**
FrNmPnFilterMaskByte		EcucParamConfContainerDef
BSW Description		
Filter mask byte configuration		
Template Description		
Bit mask for FlexRay Payload used to configure the FlexRay Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationConnector.pncFilterDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing FlexrayCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the FrNmPnFilterMaskByteIndex and FrNmPnFilterMaskByteValue for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a FrNmPnFilterMaskByte with FrNmPnFilterMaskByteIndex = 5 and FrNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00002

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures/FrNmPnInfo/FrNmPnFilterMaskByte	
BSW Parameter		**BSW Type**
FrNmPnFilterMaskByteIndex		EcucIntegerParamDef
BSW Description		
Index of the filter mask byte. Specifies the position within the filter mask byte array.		
Template Description		
Bit mask for FlexRay Payload used to configure the FlexRay Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationConnector.pncFilterDataMask		

Mapping Rule	Mapping Type
For one EcuInstance all contributing FlexrayCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the FrNmPnFilterMaskByteIndex and FrNmPnFilterMaskByteValue for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a FrNmPnFilterMaskByte with FrNmPnFilterMaskByteIndex = 5 and FrNmPnFilterMaskByteValue = 128.	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00004

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures/FrNmPnInfo/FrNmPnFilterMaskByte	
BSW Parameter		**BSW Type**
FrNmPnFilterMaskByteValue		EcucIntegerParamDef
BSW Description		
Parameter to configure the filter mask byte.		
Template Description		
Bit mask for FlexRay Payload used to configure the FlexRay Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationConnector.pncFilterDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing FlexrayCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the FrNmPnFilterMaskByteIndex and FrNmPnFilterMaskByteValue for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a FrNmPnFilterMaskByte with FrNmPnFilterMaskByteIndex = 5 and FrNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00003

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures/FrNmPnInfo	
BSW Parameter		**BSW Type**
FrNmPnInfoLength		EcucIntegerParamDef
BSW Description		
Specifies the length of the PN request information in the NM message.		
Template Description		
Length of the partial networking request release information vector (in bytes).		
M2 Parameter		
SystemTemplate::System.pncVectorLength		

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00005

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures/FrNmPnInfo	
BSW Parameter		**BSW Type**
FrNmPnInfoOffset		EcucIntegerParamDef
BSW Description		
Specifies the offset of the PN request information in the NM message.		
Template Description		
Absolute offset (with respect to the NM-PDU) of the partial networking request release information vector that is defined in bytes as an index starting with 0.		
M2 Parameter		
SystemTemplate::System.pncVectorOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00006

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmPnResetTime		EcucFloatParamDef
BSW Description		
Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA. The value shall be the same for every channel. Thus it is a global config parameter.		
Template Description		
Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.pnResetTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrNm_00010

BSW Module	**BSW Context**	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmRemoteSleepIndicationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling remote sleep indication. calculationFormula = If (FrNmPassiveModeEnabled == True) then Equal(False) else Equal(False or True)		
Template Description		
Switch for enabling remote sleep indication support.		

M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmRemoteSleepIndEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00013

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures
BSW Parameter	**BSW Type**
FrNmSourceNodeIdentifierEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling SourceNodeIdentifier support.	
Template Description	
Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmNodeIdEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00012

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures
BSW Parameter	**BSW Type**
FrNmStateChangeIndicationEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling state change indication.	
Template Description	
Enables the CAN Network Management state change notification.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmStateChangeIndEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00011

BSW Module	**BSW Context**
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures
BSW Parameter	**BSW Type**
FrNmUserDataEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling user data support.	
Template Description	
Switch for enabling user data support.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmUserDataEnabled	

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrNm_00018

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalFeatures	
BSW Parameter		**BSW Type**
FrNmVotingNextToLastRepetitionCycleDisable		EcucBooleanParamDef
BSW Description		
Pre-processor switch for disabling vote changes in the last two repetition cycles before the Ready Sleep Counter expires.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig	
BSW Parameter		**BSW Type**
FrNmGlobalProperties		EcucParamConfContainerDef
BSW Description		
This container contains module properties related to the FlexRay NM functionality.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalProperties	
BSW Parameter		**BSW Type**
FrNmDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalProperties	
BSW Parameter		**BSW Type**
FrNmMainAcrossFrCycle		EcucBooleanParamDef
BSW Description		
If the FlexRay NM MainFunction is executed completely within the FlexRay communication cycle where the last NM vote of the current vote cycle is received, the FrNmMainAcrossFrCycle shall be configured to FALSE. If the FlexRay NM MainFunction is executed completely within the FlexRay communication cycle subsequent to the one where the last NM vote of the current vote cycle is received, the FrNmMainAcrossFrCycle shall be configured to TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrNm	FrNm/FrNmGlobalConfig/FrNmGlobalProperties	
BSW Parameter		**BSW Type**
FrNmVersionInfoApi		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling version info API support.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.4.4 FrTp Mapping

BSW Module	BSW Context	
FrTp	FrTp	
BSW Parameter		**BSW Type**
FrTpGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration parameters of the FlexRay Transport Protocol module.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpAckRt		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling the Acknowledgement and retry mechanisms. True: Acknowledge and Retry is enabled False: Acknowledge and Retry is disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpChanNum		EcucIntegerParamDef
BSW Description		
Preprocessor switch for defining the number of concurrent channels the module supports. Up to 32 channels shall be definable here.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpChangeParamApi		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling the API to change FrTp communication parameters. True: ChangeParameter API is enabled False: ChangeParameter API is disabled.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpFullDuplexEnable		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling full duplex mechanisms for all channels. True: Full duplex is enabled False: Fullduplex is disabled (Half duplex is enabled)		
Template Description		
The full duplex mechanisms is enabled if this attribute is set to true. Otherwise half duplex is enabled.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpEcu.fullDuplexEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00036

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpMainFuncCycle		EcucFloatParamDef
BSW Description		
This parameter contains the calling period of the TPs Main Function. The parameter is specified in seconds.		

Template Description	
The period between successive calls to the Main Function of the AUTOSAR TP. Specified in seconds.	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayTpEcu.cycleTimeMainFunction	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrTp_00035

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpTransmitCancellation		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling Transmit Cancellation and Receive Cancellation. True: Transmit/Receive Cancellation is enabled False: Transmit/Receive Cancellation is disabled		
Template Description		
With this switch Tx and Rx Cancellation can be turned on or off.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpEcu.cancellation		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00037

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpUnknownMsgLength		EcucBooleanParamDef
BSW Description		
Preprocessor switch to support data transfer with unknown message length. True: Transmission with unknown message length is enabled False: Transmission with unknown message length is disabled		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpGeneral	
BSW Parameter		**BSW Type**
FrTpVersionInfoApi		EcucBooleanParamDef
BSW Description		

Preprocessor switch for enabling the Version info API. True: Version Info API is enabled False: Version Info API is disabled	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrTp	FrTp	
BSW Parameter		**BSW Type**
FrTpMultipleConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR FrTp module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrTp	FrTp/FrTpMultipleConfig	
BSW Parameter		**BSW Type**
FrTpConnection		EcucParamConfContainerDef
BSW Description		
This container contains the connection specific parameters to transfer N-PDUs via FlexRay TP.		
Template Description		
A connection identifies the sender and the receiver of this particular communication. The FlexRayTp module routes a Pdu through this connection. In a System Description the references to the PduPools are mandatory. In an ECU Extract these references can be optional: On unicast connections these references are always mandatory. On multicast the txPduPool is mandatory on the sender side. The rxPduPool is mandatory on the receiver side. On Gateway ECUs both references are mandatory.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnection		
Mapping Rule		**Mapping Type**
Create container for each FlexRayTpConnection that is described in the ECU Extract.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00003

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection		
BSW Parameter		**BSW Type**	
FrTpBandwidthLimitation		EcucBooleanParamDef	
BSW Description			
This parameter indicates whether the connection requires a bandwidth limitation or not. If FrTpBandwidthLimitation=True the sender shall send a StartFrame always on the first PDU of a PDU-Pool.			
Template Description			
Specifies whether the connection requires a bandwidth limitation or not.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnection.bandwidthLimitation			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00010

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection		
BSW Parameter		**BSW Type**	
FrTpConCtrlRef		EcucReferenceDef	
BSW Description			
FrTpConnectionControlReference: This parameter defines a reference to a connection control container.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnection.tpConnectionControl			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00011

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection		
BSW Parameter		**BSW Type**	
FrTpLa		EcucIntegerParamDef	
BSW Description			
This parameter defines the Local Address for the respective connection. When the local instance is the sender, this is the Source Address within the TP frame. When the local instance is the receiver, this is the Target Address within the TP frame. If this parameter is not configured, all related Rx N-SDUs must be configured to use the meta data item TARGET_ADDRESS_16, and all related Tx-N-SDUs must be configured to use the meta data item SOURCE_ADDRESS_16.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnection.transmitter,SystemTemplate::Transport Protocols::FlexrayTpConnection.receiver			
Mapping Rule			**Mapping Type**
If the local address is the sender it shall be derived from FlexrayTpConnection.transmitter. If the remote address is the receiver it shall be derived from FlexrayTpConnection.receiver.			full

Mapping Status	Mapping ID
valid	up_FrTp_00008

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection	
BSW Parameter		**BSW Type**
FrTpMultipleReceiverCon		EcucBooleanParamDef
BSW Description		
This parameter defines, whether this connection is an 1:1 ('false') or an 1:n ('true') connection. If data segmentation is required this parameter is used to check whether segmentation is possible or not. If the connection is 1:n segmentation is not possible and an error will occur.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnection.multicast		
Mapping Rule		**Mapping Type**
If FlexRayTpConnection contains a mulicast reference to TpAddress than set this parameter to true		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00007

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection	
BSW Parameter		**BSW Type**
FrTpRa		EcucIntegerParamDef
BSW Description		
This parameter defines the Remote Address for the respective connection. When the local instance is the sender, this is the Target Address within the TP frame. When the local instance is the receiver, this is the Source Address within the TP frame. If this parameter is not configured, all related Rx N-SDUs must be configured to use the meta data item SOURCE_ADDRESS_16, and all related Tx-N-SDUs must be configured to use the meta data item TARGET_ADDRESS_16.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnection.transmitter,SystemTemplate::TransportProtocols::FlexrayTpConnection.receiver		
Mapping Rule		**Mapping Type**
If the local address is the sender it shall be derived from FlexrayTpConnection.transmitter. If the remote address is the receiver it shall be derived from FlexrayTpConnection.receiver.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00006

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection	
BSW Parameter		**BSW Type**
FrTpRxPduPoolRef		EcucReferenceDef
BSW Description		
This parameter defines a reference to a RxPduPool.		
Template Description		

M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayTpConnection.rxPduPool, SystemTemplate::TransportProtocols::FlexrayTpConnection.txPduPool	
Mapping Rule	**Mapping Type**
Depending whether the regarded Ecu is the transmitter or the receiver this reference shall be created if the FlexrayTpPduPool element is referenced by the FlexrayTpConnection via the txPduPool or rxPduPool reference. If the regarded ECU is the transmitter then the txPduPool holds the sent NPdus and the rxPduPool holds the received NPdus. If the ECU is the receiver then the txPduPool holds the received NPdus and the rxPduPool holds the sent NPdus.	full
Mapping Status	**Mapping ID**
valid	up_FrTp_00005

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection	
BSW Parameter		**BSW Type**
FrTpRxSdu		EcucParamConfContainerDef
BSW Description		
This parameter defines the Rx Service Data Unit Identifier (Sdu Id) which uniquely identifies a data transfer (inter-module communication) between FrTp and PDUR. This N-SDU can produce meta data items of type SOURCE_ADDRESS_16 and TARGET_ADDRESS_16.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnection.directTpSdu		
Mapping Rule		**Mapping Type**
Create container if an Rx Pdu is referenced by the FlexRayTpConnection		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00004

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection/FrTpRxSdu	
BSW Parameter		**BSW Type**
FrTpRxSduId		EcucIntegerParamDef
BSW Description		
This unique identifier is used for change parameter request or receive cancellation from PduR to FrTp. ImplementationType: PduIdType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

FrTp	FrTp/FrTpMultipleConfig/FrTpConnection/FrTpRxSdu		
BSW Parameter		**BSW Type**	
FrTpRxSduRef		EcucReferenceDef	
BSW Description			
Reference to a PDU in the global PDU structure.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection		
BSW Parameter		**BSW Type**	
FrTpTxPduPoolRef		EcucReferenceDef	
BSW Description			
This parameter defines a reference to a TxPduPool.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnection.rxPduPool, SystemTemplate::TransportProtocols::FlexrayTpConnection.txPduPool			
Mapping Rule			**Mapping Type**
Depending whether the regarded Ecu is the transmitter or the receiver this reference shall be created if the FlexrayTpPduPool element is referenced by the FlexrayTpConnection via the txPduPool or rxPduPool reference. If the regarded ECU is the transmitter then the txPduPool holds the sent NPdus and the rxPduPool holds the received NPdus. If the ECU is the receiver then the txPduPool holds the received NPdus and the rxPduPool holds the sent NPdus.			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00009

BSW Module	**BSW Context**		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection		
BSW Parameter		**BSW Type**	
FrTpTxSdu		EcucParamConfContainerDef	
BSW Description			
This parameter defines the Tx Service Data Unit Identifier (Sdu Id) which uniquely identifies a data transfer (inter-module communication) between FrTp and PDUR. This N-SDU can consume meta data items of type SOURCE_ADDRESS_16 and TARGET_ADDRESS_16.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnection.directTpSdu			
Mapping Rule			**Mapping Type**
Create container if an Tx Pdu is referenced by the FlexRayTpConnection			full
Mapping Status			**Mapping ID**

valid	up_FrTp_00012

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection/FrTpTxSdu	
BSW Parameter		**BSW Type**
FrTpTxSduId		EcucIntegerParamDef
BSW Description		
This is a unique identifier for a to be transmitted message from the PduR to the FrTp. ImplementationType: PduIdType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnection/FrTpTxSdu	
BSW Parameter		**BSW Type**
FrTpTxSduRef		EcucReferenceDef
BSW Description		
Reference to a PDU in the global PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig	
BSW Parameter		**BSW Type**
FrTpConnectionControl		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters to control a FlexRay TP connection.		
Template Description		
Configuration parameters to control a FlexRay TP connection.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl		
Mapping Rule		**Mapping Type**
Create container for each FlexRayTpConnectionControl that is described in the ECU Extract.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00013

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl		
BSW Parameter		**BSW Type**	
FrTpAckType		EcucEnumerationParamDef	
BSW Description			
This parameter defines the type of acknowledgement which is used for the specific channel.			
Template Description			
This parameter defines the type of acknowledgement which is used for the specific channel.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.ackType			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00022

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl		
BSW Parameter		**BSW Type**	
FrTpMaxFCWait		EcucIntegerParamDef	
BSW Description			
This parameter defines the maximum number of FlowControl N-PDUs with FlowState "WAIT"			
Template Description			
This attribute defines the maximum number of FlowControl N-PDUs with FlowState "WAIT".			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.maxFcWait			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00030

BSW Module	BSW Context		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl		
BSW Parameter		**BSW Type**	
FrTpMaxNbrOfNPduPerCycle		EcucIntegerParamDef	
BSW Description			
This parameter is part of the ISO 10681-2 protocol's FlowControl parameter "Bandwidth Control (BC)". It limits the number of N-Pdus the sender is allowed to transmit within a FlexRay cycle.			
Template Description			
This parameter limits the number of N-Pdus the sender is allowed to transmit within a FlexRay cycle.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.maxNumberOfNpduPerCycle			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00014

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpMaxRn		EcucIntegerParamDef

BSW Description	
This parameter defines the maximum number of retries (if retry is configured).	
Template Description	
This parameter defines the maximum number of retries (if retry is configured for the particular channel).	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.maxRetries	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrTp_00020

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpSCexp		EcucIntegerParamDef
BSW Description		
This parameter is part of the ISO 10681-2 protocol's FlowControl parameter "Bandwidth Control (BC)". It represents the exponent to calculate the minimum number of "Separation Cycles" the sender has to wait for the next transmission of an FrTp N-Pdu.		
Template Description		
Exponent to calculate the minimum number of "Separation Cycles" the sender has to wait for the next transmission of an FrTp N-Pdu.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.separationCycleExponent		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00024

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpTimeBr		EcucFloatParamDef
BSW Description		
This parameter defines the time in seconds the FrTp requires to transmit a corresponding FlowControl Frame. According to ISO 10681-2 this parameter is a performance requirement.		
Template Description		
Time (in seconds) until transmission of the next FlowControl N-PDU.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeBr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00015

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpTimeCs		EcucFloatParamDef

BSW Description	
This parameter defines the time in seconds between the sending of two CFs or between the sending of a CF and LF or between the reception of a FC and sending of the next CF.	
Template Description	
Time (in seconds) until transmission of the next ConsecutiveFrame NPdu / LastFrame NPdu.	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeCs	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrTp_00026

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpTimeoutAr		EcucFloatParamDef
BSW Description		
This parameter states the timeout in seconds between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF).		
Template Description		
This parameter states the timeout between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF). Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeoutAr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00017

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl	
BSW Parameter		**BSW Type**
FrTpTimeoutAs		EcucFloatParamDef
BSW Description		
This parameter specifies the timeout in seconds the FrIf shall confirm a transmitted Pdu to the FrTp.		
Template Description		
This attribute states the timeout between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF or FC (in case of Transmit Cancellation)). Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeoutAs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00023

BSW Module	BSW Context

FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl		
BSW Parameter		**BSW Type**	
FrTpTimeoutBs		EcucFloatParamDef	
BSW Description			
This parameter defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.			
Template Description			
This parameter defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeoutBs			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00018

BSW Module	**BSW Context**		
FrTp	FrTp/FrTpMultipleConfig/FrTpConnectionControl		
BSW Parameter		**BSW Type**	
FrTpTimeoutCr		EcucFloatParamDef	
BSW Description			
This parameter defines the timeout value in seconds a receiver is waiting for a CF or a LF.			
Template Description			
This parameter defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayTpConnectionControl.timeoutCr			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTp_00032

BSW Module	**BSW Context**		
FrTp	FrTp/FrTpMultipleConfig		
BSW Parameter		**BSW Type**	
FrTpMaxConnectionCnt		EcucIntegerParamDef	
BSW Description			
Maximum number of TP connections. This parameter is needed only in case of post-build loadable implementation using static memory allocation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
FrTp	FrTp/FrTpMultipleConfig

BSW Parameter		BSW Type
FrTpRxPduPool		EcucParamConfContainerDef
BSW Description		
This container contains all Pdus that are assigned to that Pdu Pool.		
Template Description		
FlexrayTpPduPool is a set of N-PDUs which are defined for FrTp sending or receiving purpose.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpPduPool		
Mapping Rule		**Mapping Type**
Create container if the FlexrayTpPduPool element is referenced by the Flexray TpConnection via the rxPduPool or txPduPool reference. If the regarded ECU is the transmitter then the txPduPool holds the sent NPdus and the rxPduPool holds the received NPdus. If the ECU is the receiver then the txPduPool holds the received NPdus and the rxPduPool holds the sent NPdus.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00001

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpRxPduPool	
BSW Parameter		**BSW Type**
FrTpRxPdu		EcucParamConfContainerDef
BSW Description		
Container to hold the PDU parameters. ImplementationType: PduInfoType		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpPduPool.nPdu		
Mapping Rule		**Mapping Type**
Create container for each NPdu that is referenced by the regarded FlexrayTp PduPool.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00002

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpRxPduPool/FrTpRxPdu	
BSW Parameter		**BSW Type**
FrTpRxPduId		EcucIntegerParamDef
BSW Description		
This is a unique identifier for a received message which is forwarded from the FrIf to the FrTp. ImplementationType: PduIdType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpRxPduPool/FrTpRxPdu	
BSW Parameter		**BSW Type**
FrTpRxPduRef		EcucReferenceDef
BSW Description		
Reference to a PDU in the global PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig	
BSW Parameter		**BSW Type**
FrTpTxPduPool		EcucParamConfContainerDef
BSW Description		
This container contains all Pdus that are assigned to that Pdu Pool.		
Template Description		
FlexrayTpPduPool is a set of N-PDUs which are defined for FrTp sending or receiving purpose.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpPduPool		
Mapping Rule		**Mapping Type**
Create container if the FlexrayTpPduPool element is referenced by the Flexray TpConnection via the rxPduPool or txPduPool reference. If the regarded ECU is the transmitter then the txPduPool holds the sent NPdus and the rxPduPool holds the received NPdus. If the ECU is the receiver then the txPduPool holds the received NPdus and the rxPduPool holds the sent NPdus.		full
Mapping Status		**Mapping ID**
valid		up_FrTp_00033

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpTxPduPool	
BSW Parameter		**BSW Type**
FrTpTxPdu		EcucParamConfContainerDef
BSW Description		
Container to hold the PDU parameters. ImplementationType: PduInfoType		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayTpPduPool.nPdu		

Mapping Rule	Mapping Type
Create container for each NPdu that is referenced by the regarded FlexrayTp PduPool.	full
Mapping Status	**Mapping ID**
valid	up_FrTp_00034

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpTxPduPool/FrTpTxPdu	
BSW Parameter		**BSW Type**
FrTpTxConfirmationPduId		EcucIntegerParamDef
BSW Description		
Handle Id to be used by the FrIf to confirm the transmission of the FrTpTxPdu to the FrIf module (FrTp_TxConfirmation) and for TriggerTransmit (FrTp_TriggerTransmit).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTp	FrTp/FrTpMultipleConfig/FrTpTxPduPool/FrTpTxPdu	
BSW Parameter		**BSW Type**
FrTpTxPduRef		EcucReferenceDef
BSW Description		
Reference to a PDU in the global PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.4.5 FrArTp Mapping

BSW Module	BSW Context	
FrArTp	FrArTp	
BSW Parameter		**BSW Type**
FrArTpGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration (parameters) of the FlexRay TP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpGeneral	
BSW Parameter		**BSW Type**
FrArTpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpGeneral	
BSW Parameter		**BSW Type**
FrArTpHaveAckRt		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling the Acknowledgement and retry mechanisms.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpGeneral	
BSW Parameter		**BSW Type**
FrArTpHaveGrpSeg		EcucBooleanParamDef
BSW Description		
Preprocessor switch for enabling segmentation of 1:n messages.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
FrArTp	FrArTp/FrArTpGeneral		
BSW Parameter		**BSW Type**	
FrArTpHaveLm		EcucBooleanParamDef	
BSW Description			
Preprocessor switch for enabling the mechanism for message longer than allowed by.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrArTp	FrArTp/FrArTpGeneral		
BSW Parameter		**BSW Type**	
FrArTpHaveTc		EcucBooleanParamDef	
BSW Description			
Preprocessor switch for enabling Transmit Cancellation and Receive Cancellation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrArTp	FrArTp/FrArTpGeneral		
BSW Parameter		**BSW Type**	
FrArTpMainFuncCycle		EcucFloatParamDef	
BSW Description			
This parameter contains the calling period of the TPs Main Function. The parameter is specified in seconds.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpGeneral	
BSW Parameter		**BSW Type**
FrArTpVersionInfoApi		EcucBooleanParamDef

BSW Description	
Preprocessor switch for enabling the Version info API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
FrArTp	FrArTp		
BSW Parameter		**BSW Type**	
FrArTpMultipleConfig		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters and sub containers of the AUTOSAR FrArTp module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig		
BSW Parameter		**BSW Type**	
FrArTpChannel		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration (parameters) of one FlexRay TP channel.			
Template Description			
A channel is a group of connections sharing several properties. The FlexRay AutosarTransport Layer supports several channels. These channels can work concurrently, thus each of them requires its own state machine and management data structures and its own PDU-IDs.			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayArTpChannel			
Mapping Rule			**Mapping Type**
Create container for each FlexrayArTpChannel that exists in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_FrArTp_00001

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpAckType		EcucEnumerationParamDef

BSW Description	
This parameter defines the type of acknowledgement which is used for the specific channel.	
Template Description	
Type of Acknowledgement.	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayArTpChannel.ackType	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00013

BSW Module	BSW Context
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel
BSW Parameter	**BSW Type**
FrArTpAdrType	EcucEnumerationParamDef
BSW Description	
This parameter states the addressing type this connection has. The meanings of the values are one byte and two byte.	
Template Description	
Adressing Type of this connection: true: Two Bytes false: One Byte	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayArTpChannel.extendedAddressing	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00030

BSW Module	BSW Context
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel
BSW Parameter	**BSW Type**
FrArTpConcurrentConnections	EcucIntegerParamDef
BSW Description	
This parameter defines the number of connections that can be active at the same time. If set to 0, all configured connections can be active at the same time.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel
BSW Parameter	**BSW Type**
FrArTpConnection	EcucParamConfContainerDef
BSW Description	

This container contains the configuration (parameters) of one FlexRay TP connection. A connection can only belong to one channel.	
Template Description	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayArTpChannel.tpConnection	
Mapping Rule	**Mapping Type**
Create container for each existing FlexrayArTpConnection that is aggregated by FlexrayArTpChannel in the System description.	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00023

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection	
BSW Parameter		**BSW Type**
FrArTpConPrioPdus		EcucIntegerParamDef
BSW Description		
This parameter defines the number of TxNPdus to which this connection has prioritized access. It must be ensured that the number of prioritized PDUs of all connections is smaller than the total number of TxNPdus in the associated PDU pool.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection	
BSW Parameter		**BSW Type**
FrArTpLa		EcucIntegerParamDef
BSW Description		
This parameter defines the Local Address for the respective connection. When the local instance is the sender, this is the Source Address within the TP frame. When the local instance is the receiver, this is the Target Address within the TP frame. Note that in case of 1 byte addressing only the values from 0x0000 - 0x00FF are valid. If this parameter is not configured, all related Rx N-SDUs must be configured to use the meta data item TARGET_ADDRESS_16, and all related Tx-N-SDUs must be configured to use the meta data item SOURCE_ADDRESS_16.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpConnection.source		
Mapping Rule		**Mapping Type**
LocalAddress can be derived from the TpNode that is referenced by the Flex RayTpConnection as source.		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00024

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection		
BSW Parameter		**BSW Type**	
FrArTpMultRec		EcucBooleanParamDef	
BSW Description			
This parameter defines, whether this connection is an 1:1 ('false') or an 1:n ('true') connection. Of course, if the channel to which the connection is configured has retry or acknowledgement enabled, no retry or acknowledgement will occur in case the connection is an 1:n connection.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayArTpConnection.multicast			
Mapping Rule			**Mapping Type**
If multicast is used set this attribute to true.			full
Mapping Status			**Mapping ID**
valid			up_FrArTp_00025

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection		
BSW Parameter		**BSW Type**	
FrArTpRa		EcucIntegerParamDef	
BSW Description			
This parameter defines the Remote Address for the respective connection. When the local instance is the sender, this is the Target Address within the TP frame. When the local instance is the receiver, this is the Source Address within the TP frame. Note that in case of 1 byte addressing only the values from 0x0000 - 0x00FF are valid. If this parameter is not configured, all related Rx N-SDUs must be configured to use the meta data item SOURCE_ADDRESS_16, and all related Tx-N-SDUs must be configured to use the meta data item TARGET_ADDRESS_16.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayArTpConnection.target			
Mapping Rule			**Mapping Type**
RemoteAddress can be derived from the TpNode that is referenced by the Flex RayTpConnection as target.			full
Mapping Status			**Mapping ID**
valid			up_FrArTp_00026

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection		
BSW Parameter		**BSW Type**	
FrArTpRxSdu		EcucParamConfContainerDef	
BSW Description			
Describes the Rx N-SDU. This N-SDU can produce meta data items of type SOURCE_ADDRESS_16 and TARGET_ADDRESS_16.			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayArTpConnection.directTpSdu			
Mapping Rule			**Mapping Type**

Create container for every IPdu that is received by the FrArTp and the regarded Ecu.	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00027

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection/FrArTpRxSdu	
BSW Parameter		**BSW Type**
FrArTpRxSduRef		EcucReferenceDef
BSW Description		
Reference to a PDU in the global PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection/FrArTpRxSdu	
BSW Parameter		**BSW Type**
FrArTpSduRxId		EcucIntegerParamDef
BSW Description		
This is a unique identifier for a received message. This Id is used in the CancelReceive and ChangeParameter API call. ImplementationType: PduIdType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection	
BSW Parameter		**BSW Type**
FrArTpTxSdu		EcucParamConfContainerDef
BSW Description		
Describes the Tx N-SDU. This N-SDU can consume meta data items of type SOURCE_ADDRESS_16 and TARGET_ADDRESS_16.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpConnection.directTpSdu		
Mapping Rule		**Mapping Type**

Create container for every IPdu that is transmitted by the FrArTp and the regarded Ecu.	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00028

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection/FrArTpTxSdu	
BSW Parameter		**BSW Type**
FrArTpSduTxId		EcucIntegerParamDef
BSW Description		
This is a unique identifier for a received or a to be transmitted message. With this (and by means of e.g. a lookup table) the PDU Router can route the message appropriately without dealing with the particularities of the Transport Layer. This parameter can also be seen as the identifier of a connection. ImplementationType: PduIdType		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpConnection/FrArTpTxSdu	
BSW Parameter		**BSW Type**
FrArTpTxSduRef		EcucReferenceDef
BSW Description		
Reference to a PDU in the global PDU structure.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpGrpSeg		EcucBooleanParamDef
BSW Description		
Here can be specified, whether segmentation within a 1:n connection is allowed or not.		
Template Description		
This attribute defines whether segmentation within a 1:n connection is allowed or not.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.multicastSegmentation		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00017

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpLm		EcucEnumerationParamDef
BSW Description		
This specifies the maximum message length for the particular channel.		
Template Description		
This specifies the maximum message length for the particular channel.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maximumMessageLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00011

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpMaxAr		EcucIntegerParamDef
BSW Description		
This parameter defines the maximum number of trying to send a frame when a TIMEOUT AR occurs.		
Template Description		
This attribute defines the maximum number of trying to send a frame when a TIMEOUT AR occurs (depending on whether retry is configured).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maxAr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00004

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpMaxAs		EcucIntegerParamDef
BSW Description		
This parameter defines the maximum number of trying to send a frame when a TIMEOUT AS occurs.		
Template Description		
This attribute defines the maximum number of trying to send a frame when a TIMEOUT AS occurs (depending on whether retry is configured).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maxAs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_FrArTp_00009

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpMaxBs		EcucIntegerParamDef
BSW Description		
This parameter defines the number of consecutive CFs between two FCs (block size). Valid values are 1 .. 16 when retry is activated, and 0 .. 255 otherwise.		
Template Description		
This attribute defines the number of consecutive CFs between two FCs (block size). Valid values are 1 .. 16 when retry is activated, and 0 .. 255 otherwise.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maxBs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00007

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpMaxRn		EcucIntegerParamDef
BSW Description		
This parameter defines the maximum number of retries (if retry is configured for the particular channel).		
Template Description		
This attribute defines the maximum number of retries (if retry is configured for the particular channel).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maxRetries		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00031

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpMaxWft		EcucIntegerParamDef
BSW Description		
This parameter defines the maximal number of wait frames to be sent for a pending connection.		
Template Description		
This attribute defines the maximal number of wait frames to be sent for a pending connection. Range is 0..255.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.maxFcWait		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00008

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel		
BSW Parameter		**BSW Type**	
FrArTpPdu		EcucParamConfContainerDef	
BSW Description			
Container to hold the PDU parameters. ImplementationType: PduInfoType			
Template Description			
M2 Parameter			
SystemTemplate::TransportProtocols::FlexrayArTpChannel.nPdu			
Mapping Rule			**Mapping Type**
Create container if NPdus are referenced by the FlexrayArTpChannel.			full
Mapping Status			**Mapping ID**
valid			up_FrArTp_00002

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpPdu		
BSW Parameter		**BSW Type**	
FrArTpPduDirection		EcucEnumerationParamDef	
BSW Description			
This parameter defines the direction of the PDU.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort			
Mapping Rule			**Mapping Type**
The direction of the Npdu can be derived from the triggering elements that contain references to IN- and OUT-Ports.			full
Mapping Status			**Mapping ID**
valid			up_FrArTp_00003

BSW Module	BSW Context		
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpPdu		
BSW Parameter		**BSW Type**	
FrArTpPduId		EcucIntegerParamDef	
BSW Description			
This is the identifier of the FlexRay Interface PDUs (Fr N-PDU, Fr L-SDU) in which the Transport Layer Frames of this channel should be transmitted. For FrArTpPduDirection == FRARTP_RX, this parameter specifies the ID that is used by FrIf when calling FrArTp_RxIndication, while for FrArTpPduDirection == FRARTP_TX this ID is used by FrIf when calling FrArTp_TxConfirmation or FrArTp_TriggerTransmit. ImplementationType: PduIdType			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel/FrArTpPdu	
BSW Parameter		**BSW Type**
FrArTpPduRef		EcucReferenceDef
BSW Description		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpStMin		EcucFloatParamDef
BSW Description		
This parameter defines the minimum amount of time between two succeeding CFs of a 1:1 segmented transmission in seconds. Valid values are 0, 100μs, 200μs .. 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. FrArTpStMin must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. FrArTpStMin = n * FrIfGdCycle * m, where n is an integer >= 0 and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrArTp, FrArTpStMin can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle.		
Template Description		
This attribute defines the minimum amount of time between two succeeding CFs of a 1:1 segmented transmission in seconds. Valid values are 0, 100μs, 200μs .. 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. The minimumSeparationTime must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. minimumSeparationTime = n * cycle * m, where n is an integer >=0, cycle is FlexrayCluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrTp, minimumSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle. Range: 0 .. 0.127		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.minimumSeparationTime		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00012

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpStMinGrpSeg		EcucFloatParamDef
BSW Description		
This parameter defines the minimum amount of time between two succeeding CFs of a 1:n segmented transmission in seconds. Valid values are 0, 100μs, 200μs ... 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. FrArTpStMinGrpSeg must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. FrArTpStMinGrpSeg = n * FrIfGdCycle * m, where n is an integer >= 0 and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrArTp, FrArTpStMinGrpSeg can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle.		
Template Description		
This attribute defines the minimum amount of time between two succeeding CFs of a 1:n segmented transmission in seconds. Valid values are 0, 100μs, 200μs ... 900μs, 1ms, 2ms .. 127ms. The value can be changed at runtime using the FrArTp_ChangeParameter interface. minimumMulticastSeparationTime must be an integer multiple of the cycle length multiplied with the multiplexing factor, i.e. minimumMulticastSeparationTime = n * cycle * m, where n is an integer >= 0, cycle is FlexrayCluster.cycle, and m is the cycle multiplexor of those cycles where PDUs of the PDU pool are scheduled. Please note: Due to the scheduling strategies of FrTp, minimumMulticastSeparationTime can only be kept to a degree defined by the maximum temporal distance of the PDUs of a PDU pool within one FlexRay cycle. Range: 0 .. 0.127		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.minimumMulticastSeperationTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00021

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTc		EcucBooleanParamDef
BSW Description		
With this switch Transmit Cancellation and Receive Cancellation can be turned on or off for this channel.		
Template Description		
With this switch Tx and Rx Cancellation can be turned on or off.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.cancellation		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00015

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeBr		EcucFloatParamDef
BSW Description		
This parameter defines the time in seconds between receiving the last CF of a block or an FF-x (or SF-x) and sending out an FC or AF. It is obvious that FRARTP_TIME_BR + (FRARTP_TIMEOUT_AR * FRARTP_MAX_AR) < FRARTP_TIMEOUT_BS must hold (because the transmission duration on the bus has also to be considered). This parameter is defined in ISO 15765-2. It is contained in the configuration as a performance requirement.		
Template Description		
This attribute defines the time in seconds between receiving the last CF of a block or an FF-x (or SF-x) and sending out an FC or AF.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeBr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00018

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeCs		EcucFloatParamDef
BSW Description		
This parameter defines the time in seconds between the sending of two consecutive CFs or between reception of an FC or AF and sending of the next CF . It is obvious that FRARTP_TIME_CS + (FRARTP_TIMEOUT_AS * FRARTP_MAX_AS) < FRARTP_TIMEOUT_CR must hold (because the transmission duration on the bus has also to be considered). This parameter is defined in ISO 15765-2. It is contained in the configuration as a performance requirement.		
Template Description		
This attribute defines the time in seconds between the sending of two consecutive frames or between a consecutive frame and a flow control (for Transmit Cancellation) or between reception of an flow control or Acknowledgement Frame and sending of the next consecutive frame or a flow control (for Transmit Cancellation).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeCs		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_FrArTp_00010

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeoutAr		EcucFloatParamDef
BSW Description		
This parameter states the timeout in seconds between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF).		
Template Description		
This attribute states the timeout in seconds between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeoutAr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00005

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeoutAs		EcucFloatParamDef
BSW Description		
This parameter states the timeout in seconds between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF).		
Template Description		
This attribute states the timeout in seconds between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF).		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeoutAs		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00032

BSW Module	BSW Context	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeoutBs		EcucFloatParamDef
BSW Description		
This parameter defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.		
Template Description		

This attribute defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.	
M2 Parameter	
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeoutBs	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrArTp_00022

BSW Module	**BSW Context**	
FrArTp	FrArTp/FrArTpMultipleConfig/FrArTpChannel	
BSW Parameter		**BSW Type**
FrArTpTimeoutCr		EcucFloatParamDef
BSW Description		
This parameter defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side.		
Template Description		
This attribute defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side.		
M2 Parameter		
SystemTemplate::TransportProtocols::FlexrayArTpChannel.timeoutCr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrArTp_00029

C.4.6 FrSM Mapping

BSW Module	**BSW Context**	
FrSM	FrSM	
BSW Parameter		**BSW Type**
FrSMConfig		EcucParamConfContainerDef
BSW Description		
This container comprises the cluster specific configuration of the FlexRay State Manager.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig	
BSW Parameter		**BSW Type**
FrSMCluster		EcucParamConfContainerDef
BSW Description		
This container specifies a FlexRay cluster and all related data. A FlexRay cluster may consist of more than one controller per ECU.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMCheckWakeupReason		EcucBooleanParamDef
BSW Description		
If FrSMCheckWakeupReason is true, the FrSM will check the wakeup reason in order to skip the wakeup in case of wakeup by bus. If FrSMCheckWakeupReason is false, the FrSM will always try to perform a wakeup.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMClusterDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrSM	FrSM/FrSMConfig/FrSMCluster/FrSMClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRSM_E_CLUSTER_STARTUP		EcucSymbolicNameReferenceDef
BSW Description		

Reference to the DemEventParameter which shall be issued when the error "FRSM_E_CLUSTER_STARTUP" has occurred. If the reference is not configured the error shall be reported as DET error.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster/FrSMClusterDemEventParameterRefs	
BSW Parameter		**BSW Type**
FRSM_E_CLUSTER_SYNC_LOSS		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when the error "FRSM_E_CLUSTER_SYNC_LOSS" has occurred. If the reference is not configured the error shall be reported as DET error.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the unique handle to identify one certain FlexRay network correspond to one of the network handles of the ComM configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMDelayStartupWithoutWakeup		EcucBooleanParamDef
BSW Description		

If true, timer t1 shall be started instead of immediately calling FrIf_AllowColdstart in case of a startup without wakeup.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMDurationT1		EcucFloatParamDef
BSW Description		
The duration of timer t1 in seconds. A value of 0 shall imply that the timer is not used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMDurationT2		EcucFloatParamDef
BSW Description		
The duration of timer t2 in seconds. A value of 0 shall imply that the timer is not used. The value of this parameter shall be larger than the value of FrSMDurationT1 parameter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMDurationT3		EcucFloatParamDef
BSW Description		

The duration of timer t3 in seconds. The value of this parameter shall be larger than the value of FrSMDurationT1 parameter. A value of 0 shall imply that the timer is not used. It shall only be possible to configure a value 0 if no FrNm is used.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMDurationT4		EcucFloatParamDef
BSW Description		
The timer t4 ensures that a dual channel node will eventually clear its coldstart inhibit bit and become a leading coldstarter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMFrIfClusterRef		EcucSymbolicNameReferenceDef
BSW Description		
References the cluster configuration in the FlexRay Interface configuration. Note that the assigned controllers and transceivers are defined in the FrIf configuration and can be accessed via this reference.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMIsColdstartEcu		EcucBooleanParamDef

BSW Description	
True: The ECU is a coldstart node for this FlexRay cluster. False: The ECU is no coldstart node for this FlexRay cluster.	
Template Description	
FlexrayCommunicationController.keySlotID: ID of the slot used to transmit the startup frame, sync frame, or designated single slot frame. If the attributes keySlotUsedForStartUp, keySlotUsedForSync, or keySlotOnlyEnabled are set to true the key slot value is mandatory. **FlexrayCommunicationController.keySlotUsedForStartUp**: Flag indicating whether the Key Slot is used to transmit a startup frame.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotID,SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCommunicationController.keySlotUsedForStartUp,	
Mapping Rule	**Mapping Type**
<= TRUE if keySlotId existing and valid (i.e. not 0) and keySlotUsedForStartUp set to true <= FALSE otherwise	
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMIsWakeupEcu		EcucBooleanParamDef
BSW Description		
True: FrSM shall perform a wakeup for this cluster. False: FrSM shall never perform a wakeup for this FlexRay cluster.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMMainFunctionCycleTime		EcucFloatParamDef
BSW Description		
This parameter defines the cycle time in seconds of the periodic calling of FrSM main function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMMinNumberOfColdstarter		EcucIntegerParamDef
BSW Description		
This parameter defines the number of coldstarter that should not be underrun. If this parameter is not configured the mainfunction shall not check the number of startup frames.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMNumWakeupPatterns		EcucIntegerParamDef
BSW Description		
Maximum number of Wakeup Patterns the node may send before going to FRSM_STARTUP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMStartupRepetitions		EcucIntegerParamDef
BSW Description		
The number of times an ECU may repeat the startup procedure for a FlexRay cluster.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMStartupRepetitionsWithWakeup		EcucIntegerParamDef

BSW Description	
The number of times an ECU may repeat the startup procedure including a wakeup for a FlexRay cluster.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrSM	FrSM/FrSMConfig/FrSMCluster	
BSW Parameter		**BSW Type**
FrSMTrcvStdbyDelay		EcucFloatParamDef
BSW Description		
The duration of timer t_TrcvStdbyDelay in seconds. The granularity of this parameter shall be restricted to full FlexRay cycles (FrIfGdCycle). A value of 0 shall imply that the timer is not used.		
Template Description		
The duration of timer t_TrcvStdbyDelay in seconds. The granularity of this parameter shall be restricted to full FlexRay cycles (cycle). The transceiver status setting to STANDBY shall be delayed by this value. Not specifying a value or a value of 0 shall imply that the timer is not used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology::FlexrayCluster.tranceiverStandbyDelay		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrSM_00001

BSW Module	**BSW Context**	
FrSM	FrSM	
BSW Parameter		**BSW Type**
FrSMGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration parameters of the FlexRay State Manager.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

FrSM	FrSM/FrSMGeneral
BSW Parameter	**BSW Type**
FrSMAllSlotsSupport	EcucBooleanParamDef
BSW Description	
Configuration parameter to enable/disable FrSM support to enable/disable the switching from key-slot/single-slot mode to all-slot mode.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrSM	FrSM/FrSMGeneral
BSW Parameter	**BSW Type**
FrSMCddHeaderFile	EcucStringParamDef
BSW Description	
This parameter defines header files for callback functions which are implemented by CDD, e.g. <Cdd>_SyncLossErrorIndication.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrSM	FrSM/FrSMGeneral
BSW Parameter	**BSW Type**
FrSMDevErrorDetect	EcucBooleanParamDef
BSW Description	
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrSM	FrSM/FrSMGeneral

BSW Parameter		BSW Type
FrSMSyncLossErrorIndicationName		EcucFunctionNameDef
BSW Description		
Name of <Cdd>_SyncLossErrorIndication function that shall be called on loss of synchronization. If this parameter is omitted no indication shall take place.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrSM	FrSM/FrSMGeneral	
BSW Parameter		**BSW Type**
FrSMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables and disables the version info API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

C.5 Lin

C.5.1 Lin Driver Mapping

BSW Module	BSW Context	
Lin	Lin	
BSW Parameter		**BSW Type**
LinDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Lin	Lin/LinDemEventParameterRefs		
BSW Parameter		**BSW Type**	
LIN_E_TIMEOUT		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Timeout caused by hardware error" has occurred. If the reference is not configured the error shall be reported as DET error.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Lin	Lin		
BSW Parameter		**BSW Type**	
LinGeneral		EcucParamConfContainerDef	
BSW Description			
This container contains the parameters related to each LIN Driver Unit.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Lin	Lin/LinGeneral		
BSW Parameter		**BSW Type**	
LinDevErrorDetect		EcucBooleanParamDef	
BSW Description			
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

Lin	Lin/LinGeneral	
BSW Parameter		**BSW Type**
LinIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Lin	Lin/LinGeneral	
BSW Parameter		**BSW Type**
LinTimeoutDuration		EcucIntegerParamDef
BSW Description		
Specifies the maximum number of loops for blocking function until a timeout is raised in short term wait loops		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Lin	Lin/LinGeneral	
BSW Parameter		**BSW Type**
LinVersionInfoApi		EcucBooleanParamDef
BSW Description		
Switches the Lin_GetVersionInfo function ON or OFF.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Lin	Lin	
BSW Parameter		**BSW Type**
LinGlobalConfig		EcucParamConfContainerDef

BSW Description	
This container contains the global configuration parameter of the Lin driver.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Lin	Lin/LinGlobalConfig	
BSW Parameter		**BSW Type**
LinChannel		EcucParamConfContainerDef
BSW Description		
This container contains the configuration (parameters) of the LIN Controller(s).		
Template Description		
A physical channel is the transmission medium that is used to send and receive information between communicating ECUs. Each CommunicationCluster has at least one physical channel. Bus systems like CAN and LIN only have exactly one PhysicalChannel. A FlexRay cluster may have more than one PhysicalChannels that may be used in parallel for redundant communication. An ECU is part of a cluster if it contains at least one controller that is connected to at least one channel of the cluster.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::PhysicalChannel		
Mapping Rule		**Mapping Type**
A LinChannel container is constructed per CommunicationConnector belonging to the CommunicationController associated with the owning Lin Module container		full
Mapping Status		**Mapping ID**
valid		up_Lin_00001

BSW Module	**BSW Context**	
Lin	Lin/LinGlobalConfig/LinChannel	
BSW Parameter		**BSW Type**
LinChannelBaudRate		EcucIntegerParamDef
BSW Description		
Specifies the baud rate of the LIN channel		
Template Description		
Channels speed in bits/s.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationCluster.baudrate		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Lin_00002

BSW Module	**BSW Context**

Lin	Lin/LinGlobalConfig/LinChannel		
BSW Parameter		**BSW Type**	
LinChannelEcuMWakeupSource		EcucSymbolicNameReferenceDef	
BSW Description			
This parameter contains a reference to the Wakeup Source for this controller as defined in the ECU State Manager.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Lin	Lin/LinGlobalConfig/LinChannel		
BSW Parameter		**BSW Type**	
LinChannelId		EcucIntegerParamDef	
BSW Description			
Identifies the LIN channel. Replaces LIN_CHANNEL_INDEX_NAME from the LIN SWS.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Implicit from each CommunicationConnector on the ECU representing a LIN channel. Increase the LinChannelId for each LIN channel created on the same CommunicationController, for each CommunicationController start indexing at zero.			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Lin	Lin/LinGlobalConfig/LinChannel		
BSW Parameter		**BSW Type**	
LinChannelWakeupSupport		EcucBooleanParamDef	
BSW Description			
Specifies if the LIN hardware channel supports wake up functionality			
Template Description			
Defines whether the ECU shall be woken up by this CommunicationController. TRUE: wake up is possible FALSE: wake up is not supported Note: If wakeUpByControllerSupported is set to TRUE the feature shall be supported by both hardware and basic software.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationController.wakeUpByControllerSupported			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Lin_00003

BSW Module	BSW Context		
Lin	Lin/LinGlobalConfig/LinChannel		
BSW Parameter		**BSW Type**	
LinClockRef		EcucReferenceDef	
BSW Description			
Reference to the LIN clock source configuration, which is set in the MCU driver configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.5.2 Lin Interface Mapping

BSW Module	BSW Context		
LinIf	LinIf		
BSW Parameter		**BSW Type**	
LinIfGeneral		EcucParamConfContainerDef	
BSW Description			
This container contains the general parameters of LIN Interface module.			
Template Description			
LIN specific attributes			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinCluster			
Mapping Rule			**Mapping Type**
Container must be created if the ECU is connected to a LIN Cluster			full
Mapping Status			**Mapping ID**
valid			up_LinIf_00001

BSW Module	BSW Context		
LinIf	LinIf/LinIfGeneral		
BSW Parameter		**BSW Type**	
LinIfCancelTransmitSupported		EcucBooleanParamDef	
BSW Description			
Global Pre-Compile Switch to enable/disable the APIs LinIf_CancelTransmit/LinTp_CancelReceive.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**

LinIfDevErrorDetect	EcucBooleanParamDef	
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
LinIf	LinIf/LinIfGeneral		
BSW Parameter		**BSW Type**	
LinIfMultipleDriversSupported		EcucBooleanParamDef	
BSW Description			
States if multiple drivers are supported by the LIN Interface or not. The reason for this parameter is to reduce the size of LIN Interface if multiple drivers are not used.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
LinIf	LinIf/LinIfGeneral		
BSW Parameter		**BSW Type**	
LinIfMultipleTrcvDriverSupported		EcucBooleanParamDef	
BSW Description			
States if multiple transceiver drivers are supported by the LIN Interface or not. The reason for this parameter is to reduce the size of LIN Interface if multiple transceiver drivers are not used.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**
LinIfNcOptionalRequestSupported		EcucBooleanParamDef

BSW Description	
States if the node configuration commands Assign NAD and Conditional Change NAD are supported.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**
LinIfPublicCddHeaderFile		EcucStringParamDef
BSW Description		
Defines header files for callback functions which shall be included in case of CDDs. Range of characters is 1.. 32.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**
LinIfTpSupported		EcucBooleanParamDef
BSW Description		
States if the TP is included in the LIN Interface or not. The reason for this parameter is to reduce the size of LIN Interface if the TP is not used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**
LinIfTrcvDriverSupported		EcucBooleanParamDef
BSW Description		
States if transceiver driver support is included in the LIN Interface or not. The reason for this parameter is to reduce the size of LIN Interface if transceiver drivers are not used.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
LinIf	LinIf/LinIfGeneral	
BSW Parameter		**BSW Type**
LinIfVersionInfoApi		EcucBooleanParamDef
BSW Description		
Switches the LinIf_GetVersionInfo function ON or OFF.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf	
BSW Parameter		**BSW Type**
LinIfGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains the global configuration parameters of the LinIf.		
Template Description		
LIN specific attributes		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinCluster		
Mapping Rule		**Mapping Type**
Container must be created if the ECU is connected to a LIN Cluster		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00002

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig	
BSW Parameter		**BSW Type**
LinIfChannel		EcucParamConfContainerDef
BSW Description		
Describes each LIN channel the LinIf is connected to.		
Template Description		

The connection between the referencing ECU and the referenced channel via the referenced controller. Connectors are used to describe the bus interfaces of the ECUs and to specify the sending/receiving behavior. Each CommunicationConnector has a reference to exactly one communicationController. Note: Several CommunicationConnectors can be assigned to one PhysicalChannel in the scope of one ECU Instance.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::CommunicationConnector	
Mapping Rule	**Mapping Type**
Container must be created if the CommunicationConnector belonging to the ECU is connected to a LinChannel.	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00003

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfCddRef		EcucForeignReferenceDef
BSW Description		
Reference to the CDD module description. This parameter is only required when LinIfWakeupConfirmationUL, LinIfScheduleRequestConfirmationUL, and/or LinIfGotoSleepConfirmationUL is set to CDD.		
Template Description		
Head of the configuration of one Module. A Module can be a BSW module as well as the RTE and ECU Infrastructure. As part of the BSW module description, the EcucModuleConfigurationValues element has two different roles: The recommendedConfiguration contains parameter values recommended by the BSW module vendor. The preconfiguredConfiguration contains values for those parameters which are fixed by the implementation and cannot be changed. These two EcucModuleConfigurationValues are used when the base EcucModuleConfigurationValues (as part of the base ECU configuration) is created to fill parameters with initial values.		
M2 Parameter		
ECUCDescriptionTemplate::EcucModuleConfigurationValues		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfChannelRef		EcucSymbolicNameReferenceDef
BSW Description		

Reference to the channel definition in the LIN driver.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
Unique handle to identify one LIN network. Reference to one of the network handles configured for the ComM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfFrame		EcucParamConfContainerDef
BSW Description		
Generic container for all types of LIN frames.		
Template Description		
LIN specific attributes to the FrameTriggering		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering		
Mapping Rule		**Mapping Type**
Create container for each LinFrameTriggering aggregated by the PhysicalChannel representing the regarded LIN channel.		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00022

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame	
BSW Parameter		**BSW Type**
LinIfChecksumType		EcucEnumerationParamDef
BSW Description		
Type of checksum that the frame is using. This parameter is optional because in case of sporadic frames it should not be set.		

Template Description	
Type of checksum that the frame is using. This attribute is optional because in case of sporadic frames it should not be set.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering.linChecksum	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00028

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame	
BSW Parameter		**BSW Type**
LinIfFixedFrameSdu		EcucParamConfContainerDef
BSW Description		
In case this is a fixed frame this is the SDU (response). This container represents an eight byte array. The Byte order shall be MSB first.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFixedFrameSdu	
BSW Parameter		**BSW Type**
LinIfFixedFrameSduByte		EcucParamConfContainerDef
BSW Description		
This container represents a byte within the 8 byte array.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFixedFrameSdu/LinIfFixed FrameSduByte	
BSW Parameter		**BSW Type**
LinIfFixedFrameSduBytePos		EcucIntegerParamDef
BSW Description		
Index of the Byte in the SDU (response) 8 byte array.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFixedFrameSdu/LinIfFixedFrameSduByte	
BSW Parameter		**BSW Type**
LinIfFixedFrameSduByteVal		EcucIntegerParamDef
BSW Description		
Byte value in the SDU (response) 8-byte array.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame	
BSW Parameter		**BSW Type**
LinIfFrameId		EcucIntegerParamDef
BSW Description		
ID of the LIN frame. The Protected ID including parity is calculated by the generation tool.		
Template Description		
To describe a frames identifier on the communication system, usually with a fixed identifierValue. For LinSporadicFrames the attribute shall be ignored.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering.identifier		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00026

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame	
BSW Parameter		**BSW Type**
LinIfFrameType		EcucEnumerationParamDef
BSW Description		
Type of frame/slot. A sporadic slot may be used by a set of unconditional frames in the role of substitution frames.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
see details in EnumerationLiteralDef descritpions	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00032

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
ASSIGN		EcucEnumerationLiteralDef
BSW Description		
AssignFrameId		
Template Description		
Schedule entry for an Assign Frame Id master request.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::AssignFrameId		
Mapping Rule		**Mapping Type**
Use FrameType "Assign" if ScheduleEntry is an "AssignFrameId".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
ASSIGN_FRAME_ID_RANGE		EcucEnumerationLiteralDef
BSW Description		
AssignFrameIdRange		
Template Description		
AssignFrameIdRange generates an assign frame PID range request.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::AssignFrameIdRange		
Mapping Rule		**Mapping Type**
Use FrameType "Assign_Frame_Id_Range" if ScheduleEntry is an "Assign FrameIdRange".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
ASSIGN_NAD		EcucEnumerationLiteralDef
BSW Description		
AssignNAD		
Template Description		
Schedule entry for an Assign NAD master request.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::AssignNad		
Mapping Rule		**Mapping Type**
Use FrameType "Assign_NAD" if ScheduleEntry is an "AssignNad".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType		
BSW Parameter		**BSW Type**	
CONDITIONAL		EcucEnumerationLiteralDef	
BSW Description			
Conditional Change NAD			
Template Description			
Generates an conditional change NAD request. See LIN 2.1 protocol specification for more information.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::ConditionalChangeNad			
Mapping Rule			**Mapping Type**
Use FrameType "CONDITIONAL" if ScheduleEntry is an "ConditionalChange Nad".			
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType		
BSW Parameter		**BSW Type**	
EVENT_TRIGGERED		EcucEnumerationLiteralDef	
BSW Description			
Event triggered frame			
Template Description			
An event triggered frame is used as a placeholder to allow multiple slave nodes to provide its response. The header of an event triggered frame is transmitted when a frame slot allocated to the event triggered frame is processed. The publisher of an associated unconditional frame shall only transmit the response if at least one of the signals carried in its unconditional frame is updated. The LIN Master discovers and purges collisions with the collisionResolvingScheduleTable. The event controlled frame shall not contain any Pdus.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinEventTriggeredFrame			
Mapping Rule			**Mapping Type**
Derive the type from System Description			full
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType		
BSW Parameter		**BSW Type**	
FREE		EcucEnumerationLiteralDef	
BSW Description			
FreeFormat			
Template Description			
Representing freely defined data.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::FreeFormat			
Mapping Rule			**Mapping Type**
Use FrameType "Free Format" if ScheduleEntry is a "FreeFormatEntry".			full

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
MRF		EcucEnumerationLiteralDef
BSW Description		
Master Request Frame		
Template Description		
The FrameTriggering describes the instance of a frame sent on a channel and defines the manner of triggering (timing information) and identification of a frame on the channel, on which it is sent. For the same frame, if FrameTriggerings exist on more than one channel of the same cluster the fan-out/in is handled by the Bus interface.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::FrameTriggering		
Mapping Rule		**Mapping Type**
Use common Frame for Master Request.		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
SAVE_CONFIGURATION		EcucEnumerationLiteralDef
BSW Description		
SaveConfiguration		
Template Description		
This service is used to notify a slave node to store its configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::SaveConfigurationEntry		
Mapping Rule		**Mapping Type**
Use FrameType "Save_Configuration" is an "SaveConfiguration".		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType	
BSW Parameter		**BSW Type**
SPORADIC		EcucEnumerationLiteralDef
BSW Description		
Sporadic slot		
Template Description		
A sporadic frame is a group of unconditional frames that share the same frame slot. The sporadic frame shall not contain any Pdus.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinSporadicFrame		
Mapping Rule		**Mapping Type**
Derive the type from System Description		full

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType
BSW Parameter	**BSW Type**
SRF	EcucEnumerationLiteralDef
BSW Description	
Slave Response Frame	
Template Description	
The FrameTriggering describes the instance of a frame sent on a channel and defines the manner of triggering (timing information) and identification of a frame on the channel, on which it is sent. For the same frame, if FrameTriggerings exist on more than one channel of the same cluster the fan-out/in is handled by the Bus interface.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::FrameTriggering	
Mapping Rule	**Mapping Type**
Use common Frame for Slave Response.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType
BSW Parameter	**BSW Type**
UNASSIGN	EcucEnumerationLiteralDef
BSW Description	
UnassignFrameId	
Template Description	
Schedule entry for an Unassign Frame Id master request where the protected identifier is assigned the value 0x40. This will disable reception/transmission of a previously dynamically assigned frame identifier.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::UnassignFrameId	
Mapping Rule	**Mapping Type**
Use FrameType "Unassign" if ScheduleEntry is an "UnassignFrameId".	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfFrameType
BSW Parameter	**BSW Type**
UNCONDITIONAL	EcucEnumerationLiteralDef
BSW Description	
Unconditional Frame	
Template Description	
Unconditional frames carry signals. The master sends a frame header in a scheduled frame slot and the designated slave node fills the frame with data.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinUnconditionalFrame	

Mapping Rule	**Mapping Type**
Derive the type from System Description	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame	
BSW Parameter		**BSW Type**
LinIfPduDirection		EcucChoiceContainerDef
BSW Description		
Direction of the frame		
Template Description		
LIN specific attributes to the FrameTriggering		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering		
Mapping Rule		**Mapping Type**
Create container for each existing LinFrame.		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00029

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection	
BSW Parameter		**BSW Type**
LinIfInternalPdu		EcucParamConfContainerDef
BSW Description		
Represents a Diagnostic or Configuration frame : no Message ID (no PduId).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection	
BSW Parameter		**BSW Type**
LinIfRxPdu		EcucParamConfContainerDef
BSW Description		
represents a received PDU/frame		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering.framePort		
Mapping Rule		**Mapping Type**
Create container if the regarded LinFrameTriggering in the ECU Extract contains a reference to an "in" FramePort		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00030

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfRxPdu		
BSW Parameter		**BSW Type**	
LinIfRxIndicationUL		EcucFunctionNameDef	
BSW Description			
This parameter defines the name of the <User_RxIndication>. This parameter depends on the parameter LinIfUserRxIndicationUL. If LinIfUserRxIndicationUL equals PDUR, the name of the <User_RxIndication> is fixed. If LinIfUserRxIndicationUL equals CDD, the name of the <User_RxIndication> is selectable.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfRxPdu		
BSW Parameter		**BSW Type**	
LinIfRxPduRef		EcucReferenceDef	
BSW Description			
Reference to the PDU that is received in this frame.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfRxPdu		
BSW Parameter		**BSW Type**	
LinIfUserRxIndicationUL		EcucEnumerationParamDef	
BSW Description			
This parameter defines the upper layer (UL) module to which the indication of the successfully received LinIfRxPdu has to be routed via <User_RxIndication>.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection
BSW Parameter	**BSW Type**
LinIfSlaveToSlavePdu	EcucParamConfContainerDef
BSW Description	
Represents a slave-to-slave PDU/frame. Master does only send the header but doesn't receive the response.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection
BSW Parameter	**BSW Type**
LinIfTxPdu	EcucParamConfContainerDef
BSW Description	
represents a transmitted PDU/frame	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinFrameTriggering.framePort	
Mapping Rule	**Mapping Type**
Create container if the regarded LinFrameTriggering in the ECU Extract contains a reference to an "out" FramePort	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00031

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfTxPdu
BSW Parameter	**BSW Type**
LinIfTxConfirmationUL	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the <User_TxConfirmation>. This parameter depends on the parameter LinIfUserTxUL. If LinIfUserTxUL equals PDUR, the name of the <User_TxConfirmation> is fixed. If LinIfUserTxUL equals CDD, the name of the <User_TxConfirmation> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfTxPdu
BSW Parameter	**BSW Type**
LinIfTxPduId	EcucIntegerParamDef
BSW Description	
Identifier of the Pdu for the upper layer.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfTxPdu
BSW Parameter	**BSW Type**
LinIfTxPduRef	EcucReferenceDef
BSW Description	
Reference to the PDU that is transmitted in this frame.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfTxPdu
BSW Parameter	**BSW Type**
LinIfTxTriggerTransmitUL	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the <User_TriggerTransmit>. This parameter depends on the parameter LinIfUserTxUL. If LinIfUserTxUL equals PDUR, the name of the <User_TriggerTransmit> is fixed. If LinIfUserTxUL equals CDD, the name of the <User_TriggerTransmit> is selectable.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfPduDirection/LinIfTxPdu

BSW Parameter	**BSW Type**
LinIfUserTxUL	EcucEnumerationParamDef
BSW Description	
This parameter defines the upper layer (UL) module to which the trigger of the transmitted LinTxPdu (via the <User_TriggerTransmit>) or the confirmation of the successfully transmitted LinTxPdu has to be routed (via the <User_TxConfirmation>).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame
BSW Parameter	**BSW Type**
LinIfSubstitutionFrames	EcucParamConfContainerDef
BSW Description	
List of sporadic frames that can be sent in a sporadic frame slot.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinSporadicFrame.substitutedFrame	
Mapping Rule	**Mapping Type**
emulate reference from System Description	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00024

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfSubstitutionFrames
BSW Parameter	**BSW Type**
LinIfFramePriority	EcucIntegerParamDef
BSW Description	
Priority of sporadic frame.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinSporadicFrame.substitutedFrame	
Mapping Rule	**Mapping Type**
In the System Description the priority is described by the Order of the UnconditionalFrames	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00025

BSW Module	**BSW Context**
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfFrame/LinIfSubstitutionFrames
BSW Parameter	**BSW Type**

LinIfSubstitutionFrameRef	EcucReferenceDef
BSW Description	
Reference to an unconditional Frame that is used as sporadic frame.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfGotoSleepConfirmationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer (UL) module to which the confirmation of the goto-sleep command shall be sent.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Defines the interval of calls to main functions per channel in seconds.		
Template Description		
Time base is mandatory for the master. It is not used for slaves. LIN 2.0 Spec states: "The time_base value specifies the used time base in the master node to generate the maximum allowed frame transfer time." The time base shall be specified AUTOSAR conform in seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinMaster.timeBase		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00033

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfMaster		EcucParamConfContainerDef

BSW Description	
Each Master can only be connected to one physical channel. This could be compared to the Node parameter in a LDF file.	
Template Description	
Describing the properties of the refering ecu as a LIN master.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinMaster	
Mapping Rule	**Mapping Type**
Create container if the regarded ECU contains a CommunicationController that is defined as a LinMaster. In the System Template the LinMaster is connected to the LinChannel via a CommunicationConnector.	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00004

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfMaster	
BSW Parameter		**BSW Type**
LinIfJitter		EcucFloatParamDef
BSW Description		
The jitter specifies the differences between the maximum and minimum delay from time base tick to the header sending start point in seconds.		
Template Description		
The attribute timeBaseJitter is a mandatory attribute for the master and not used for slaves. LIN 2.0 Spec states: "The jitter value specifies the differences between the maximum and minimum delay from time base start point to the frame header sending start point (falling edge of BREAK signal)." The jitter shall be specified AUTOSAR conform in seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinMaster.timeBaseJitter		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00005

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfMaxFrameCnt		EcucIntegerParamDef
BSW Description		
Maximum number of Frames. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

LinIf	LinIf/LinIfGlobalConfig/LinIfChannel
BSW Parameter	**BSW Type**
LinIfScheduleChangeNextTimeBase	EcucBooleanParamDef
BSW Description	
Enables/disables the switch to a new schedule table at the start of the next time base after status check. True: LinIf selects a new schedule table in next main function.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel
BSW Parameter	**BSW Type**
LinIfScheduleRequestConfirmationUL	EcucEnumerationParamDef
BSW Description	
This parameter defines the upper layer (UL) module to which the confirmation of the successfully performed schedule table change shall be sent.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel
BSW Parameter	**BSW Type**
LinIfScheduleTable	EcucParamConfContainerDef
BSW Description	
Describes a schedule table. Each LinIfChannel may have several schedule tables. Each schedule table can only be connected to one channel. The SHORT-NAME of the LinIfScheduleTable container represents the symbolic name of the schedule table.	
Template Description	
The master task (in the master node) transmits frame headers based on a schedule table. The schedule table specifies the identifiers for each header and the interval between the start of a frame and the start of the following frame.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinScheduleTable	
Mapping Rule	**Mapping Type**
Create container for each ScheduleTable that is defined for this channel.	full
Mapping Status	**Mapping ID**
valid	up_LinIf_00007

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable		
BSW Parameter		**BSW Type**	
LinIfEntry		EcucParamConfContainerDef	
BSW Description			
Describes an entry in the schedule table (also known as Frame Slot).			
Template Description			
Table entry in a LinScheduleTable. Specifies what will be done in the frame slot.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::ScheduleTableEntry			
Mapping Rule			**Mapping Type**
Each RelativelyScheduledTiming element in the System Description requires the creation of a LinIfEntry. RelativelyScheduledTiming.scheduleTablle decides to which schedule table the LinIfEntry belongs.			full
Mapping Status			**Mapping ID**
valid			up_LinIf_00011

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable/LinIfEntry		
BSW Parameter		**BSW Type**	
LinIfCollisionResolvingRef		EcucReferenceDef	
BSW Description			
Reference to the schedule table, which resolves the collision. This parameter is only used if the referenced frames are event triggered frames.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinEventTriggeredFrame.collisionResolvingSchedule			
Mapping Rule			**Mapping Type**
Emulate the reference from the System Description.			full
Mapping Status			**Mapping ID**
valid			up_LinIf_00013

BSW Module	BSW Context		
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable/LinIfEntry		
BSW Parameter		**BSW Type**	
LinIfDelay		EcucFloatParamDef	
BSW Description			
Delay to next entry in schedule table in seconds.			
Template Description			
Relative delay between this tableEntry and the start of the successor in the schedule table in seconds.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::ScheduleTableEntry.delay			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinIf_00014

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable/LinIfEntry	
BSW Parameter		**BSW Type**
LinIfEntryIndex		EcucIntegerParamDef
BSW Description		
Position of the Frame Entry in the Schedule Table. The first entry index in the schedule table is 0.		
Template Description		
Relative position in the schedule table. The first entry index in the schedule table is 0.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::ScheduleTableEntry.positionInTable		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00015

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable/LinIfEntry	
BSW Parameter		**BSW Type**
LinIfFrameRef		EcucReferenceDef
BSW Description		
Reference to the frames that belong to this schedule table entry.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::ApplicationEntry.frameTriggering		
Mapping Rule		**Mapping Type**
Emulate reference from the System Description		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00012

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable	
BSW Parameter		**BSW Type**
LinIfResumePosition		EcucEnumerationParamDef
BSW Description		
Defines where a RUN_CONTINUOUS schedule table shall proceed in case it has been interrupted by a RUN_ONCE table.		
Template Description		
Defines, where a schedule table shall be proceeded in case if it has been interrupted by a run-once table or MRF/SRF.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinScheduleTable.resumePosition		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00008

BSW Module	BSW Context	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable	
BSW Parameter		**BSW Type**

LinIfRunMode		EcucEnumerationParamDef
BSW Description		
The schedule table can be executed in two different modes.		
Template Description		
The schedule table can be executed in two different modes.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Lin::LinCommunication::LinScheduleTable.runMode		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinIf_00010

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfScheduleTable	
BSW Parameter		**BSW Type**
LinIfScheduleTableIndex		EcucIntegerParamDef
BSW Description		
This is the unique index used by upper layers to identify a schedule. Note that the NULL_SCHEDULE for each channel must have index 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfStartupState		EcucEnumerationParamDef
BSW Description		
Defines the state of each LIN channel after startup		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
obsolete		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfTransceiverDrvConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of each underlying LIN Transceiver Driver.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel/LinIfTransceiverDrvConfig	
BSW Parameter		**BSW Type**
LinIfTrcvIdRef		EcucSymbolicNameReferenceDef
BSW Description		
Logical handle of the underlying LIN transceiver to be served by the LIN Interface.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinIf	LinIf/LinIfGlobalConfig/LinIfChannel	
BSW Parameter		**BSW Type**
LinIfWakeupConfirmationUL		EcucEnumerationParamDef
BSW Description		
This parameter defines the upper layer (UL) module to which the confirmation of the wake-up shall be sent.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

C.5.3 LinNm Mapping

BSW Module	**BSW Context**	
LinNm	LinNm	
BSW Parameter		**BSW Type**
LinNmGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains the global configuration parameter of the LinNm.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinNm	LinNm/LinNmGlobalConfig	
BSW Parameter		**BSW Type**
LinNmBusSynchronizationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling bus synchronization support of the LinNm. This feature is required for NM Coordinator nodes only.		
Template Description		
Enables bus synchronization support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmBusSynchronizationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinNm_00006

BSW Module	**BSW Context**	
LinNm	LinNm/LinNmGlobalConfig	
BSW Parameter		**BSW Type**
LinNmChannelConfig		EcucParamConfContainerDef
BSW Description		
This container contains the channel specific configuration parameter of the LinNm.		
Template Description		
Lin specific NmCluster attributes.		
M2 Parameter		
SystemTemplate::NetworkManagement::LinNmCluster		
Mapping Rule		**Mapping Type**
Create Container for each existing LinNmCluster.		full
Mapping Status		**Mapping ID**
valid		up_LinNm_00010

BSW Module	**BSW Context**	
LinNm	LinNm/LinNmGlobalConfig/LinNmChannelConfig	
BSW Parameter		**BSW Type**
LinNmComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference points to the unique channel defined by the ComMChannel and provides access to the unique channel index value in ComMChannelId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
LinNm	LinNm/LinNmGlobalConfig/LinNmChannelConfig	
BSW Parameter		**BSW Type**
LinNmNodeDetectionEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Node Detection feature.		
Template Description		
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmNodeDetectionEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinNm_00013

BSW Module	BSW Context	
LinNm	LinNm/LinNmGlobalConfig/LinNmChannelConfig	
BSW Parameter		**BSW Type**
LinNmNodeIdEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling transmission of the source node identifier in NM messages.		
Template Description		
Enables the source node identifier.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmNodeIdEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinNm_00014

BSW Module	BSW Context	
LinNm	LinNm/LinNmGlobalConfig/LinNmChannelConfig	
BSW Parameter		**BSW Type**
LinNmTimeoutTime		EcucFloatParamDef
BSW Description		
Network Timeout after passive start-up. It denotes the time in seconds how long the NM shall stay in Network Mode in case of passive start-up before transition into Bus-Sleep Mode is initiated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmComControlEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling the Communication Control support.			
Template Description			
Enables the Communication Control support.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmComControlEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00007

BSW Module	BSW Context		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmCoordinatorSyncSupport		EcucBooleanParamDef	
BSW Description			
Enables/disables the coordinator synchronization support.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmDevErrorDetect		EcucBooleanParamDef	
BSW Description			
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	

LinNmMainFunctionPeriod		EcucFloatParamDef	
BSW Description			
Call cycle in seconds of LinNm_MainFunction.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmNodeDetectionEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling the Node Detection feature.			
Template Description			
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmNodeDetectionEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00002

BSW Module	**BSW Context**		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmNodeIdEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling transmission of the source node identifier in NM messages.			
Template Description			
Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmNodeIdEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00001

BSW Module	**BSW Context**

LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmPassiveModeEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling support of the Passive Mode of the LinNm.			
Template Description			
Enables support of the Passive Mode. The passive mode is configurable per channel.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmNode.nmPassiveModeEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping. nmNode.nmPassiveModeEnabled shall always have the same value in all Nm Clusters with the same bus protocol in the scope of one EcuInstance.			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00004

BSW Module	**BSW Context**		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmRemoteSleepIndicationEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling Remote Sleep Indication support. This feature is required for NM Coordinator nodes only.			
Template Description			
Switch for enabling remote sleep indication support.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmRemoteSleepIndEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00003

BSW Module	**BSW Context**		
LinNm	LinNm/LinNmGlobalConfig		
BSW Parameter		**BSW Type**	
LinNmStateChangeIndEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling the Network Management state change notification.			
Template Description			
Enables the CAN Network Management state change notification.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmStateChangeIndEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_LinNm_00008

BSW Module	**BSW Context**	
LinNm	LinNm/LinNmGlobalConfig	
BSW Parameter		**BSW Type**

LinNmSynchronizationPointEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling the Synchronize NM feature.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinNm	LinNm/LinNmGlobalConfig
BSW Parameter	**BSW Type**
LinNmUserDataEnabled	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling User Data support.	
Template Description	
Switch for enabling user data support.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmUserDataEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_LinNm_00005

BSW Module	**BSW Context**
LinNm	LinNm/LinNmGlobalConfig
BSW Parameter	**BSW Type**
LinNmVersionInfoApi	EcucBooleanParamDef
BSW Description	
Pre-processor switch for enabling version info API support.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.5.4 LinTp Mapping

BSW Module	**BSW Context**
LinTp	LinTp
BSW Parameter	**BSW Type**
LinTpGeneral	EcucParamConfContainerDef
BSW Description	
Container that holds all LIN transport protocol general parameters.	

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGeneral	
BSW Parameter		**BSW Type**
LinTpChangeParameterApi		EcucBooleanParamDef
BSW Description		
This parameter, if set to true, enables the LinTp_ChangeParameterRequest Api for this Module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGeneral	
BSW Parameter		**BSW Type**
LinTpVersionInfoApi		EcucBooleanParamDef
BSW Description		
Switches the LinTp_GetVersionInfo function ON or OFF.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinTp	LinTp	
BSW Parameter		**BSW Type**
LinTpGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains the global configuration parameters of the LinTp.		
Template Description		
TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpNode		

Mapping Rule	Mapping Type
Create container if the regarded ECU is a LinTpNode.	full
Mapping Status	**Mapping ID**
valid	up_LinTp_00001

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpChannelConfig		EcucParamConfContainerDef
BSW Description		
This container contains the channel specific configuration parameters of LinTp.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpConnection.linTpNSdu		
Mapping Rule		**Mapping Type**
Create container for each NSdu that is received by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_LinTp_00002

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig/LinTpChannelConfig	
BSW Parameter		**BSW Type**
LinTpChannelRef		EcucSymbolicNameReferenceDef
BSW Description		
Index of the channel this LinTp channel belongs to.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig/LinTpChannelConfig	
BSW Parameter		**BSW Type**
LinTpDropNotRequestedNad		EcucBooleanParamDef
BSW Description		
Configures if TP Frames of not requested LIN-Slaves are dropped or not. TRUE: Drop TP Frames of not requested LIN-Slaves FALSE: Keep TP Frames of not requested LIN-Slaves		
Template Description		
Configures if TP Frames of not requested LIN-Slaves are dropped or not.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpConnection.dropNotRequestedNad		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	**Mapping ID**
valid	up_LinTp_00003

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGlobalConfig/LinTpChannelConfig	
BSW Parameter		**BSW Type**
LinTpScheduleChangeDiag		EcucBooleanParamDef
BSW Description		
Enables or disables the call of BswM_LinTp_RequestMode() to diagnostic request/response schedule. false: BswM is not called true: BswM is called		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpMaxNumberOfRespPendingFrames		EcucIntegerParamDef
BSW Description		
Configures the maximum number of allowed response pending frames.		
Template Description		
Configures the maximum number of allowed response pending frames.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpNode.maxNumberOfRespPendingFrames		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinTp_00009

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpMaxRxNSduCnt		EcucIntegerParamDef
BSW Description		
Maximum number of NSdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpMaxTxNSduCnt		EcucIntegerParamDef
BSW Description		
Maximum number of NSdus. This parameter is needed only in case of post-build loadable implementation using static memory allocation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpP2Max		EcucFloatParamDef
BSW Description		
P2*max timeout when a response pending frame is expected in seconds. Note that the minimum value of LinTpP2Max shall be more than or equal to the value of LinTpP2Timing.		
Template Description		
After reception of a response pending frame the P2 timeout counter is reloaded with the timeout time P2max.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpNode.p2Max		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinTp_00004

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpP2Timing		EcucFloatParamDef
BSW Description		
Definition of the P2max timeout observation parameter in seconds.		
Template Description		
P2 timeout observation parameter.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpNode.p2Timing		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_LinTp_00010

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpRxNSdu		EcucParamConfContainerDef
BSW Description		
This container exists once for each received N-SDU on any channel the node is connected to. This N-SDU produces meta data items of type LIN_NAD_8.		
Template Description		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpConnection.linTpNSdu		
Mapping Rule		**Mapping Type**
Create container for each NSdu that is received by the regarded ECU.		full
Mapping Status		**Mapping ID**
valid		up_LinTp_00005

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig/LinTpRxNSdu	
BSW Parameter		**BSW Type**
LinTpNcr		EcucFloatParamDef
BSW Description		
Value in seconds of the N_Cr timeout. N_Cr is the time until reception of the next Consecutive Frame N_PDU.		
Template Description		
This attribute defines the timeout value for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.		
M2 Parameter		
SystemTemplate::TransportProtocols::LinTpConnection.timeoutCr		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_LinTp_00008

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig/LinTpRxNSdu	
BSW Parameter		**BSW Type**
LinTpRxNSduChannelRef		EcucSymbolicNameReferenceDef
BSW Description		
Index of the channel this N-SDU belongs to.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
LinTp	LinTp/LinTpGlobalConfig/LinTpRxNSdu		
BSW Parameter		**BSW Type**	
LinTpRxNSduId		EcucIntegerParamDef	
BSW Description			
The identifier of the Transport Protocol message. This ID will be used by upper layers to call LinTp_ChangeParameter and LinTp_CancelReceive.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
LinTp	LinTp/LinTpGlobalConfig/LinTpRxNSdu		
BSW Parameter		**BSW Type**	
LinTpRxNSduNad		EcucIntegerParamDef	
BSW Description			
A N-SDU transported on LIN is identified using the NAD for the specific slave.			
Template Description			
To distinguish LIN slaves that are used twice or more within the same cluster.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinSlave.configuredNad			
Mapping Rule			**Mapping Type**
Find connection from NSdu to CommunicationController			full
Mapping Status			**Mapping ID**
valid			up_LinTp_00006

BSW Module	BSW Context		
LinTp	LinTp/LinTpGlobalConfig/LinTpRxNSdu		
BSW Parameter		**BSW Type**	
LinTpRxNSduPduRef		EcucReferenceDef	
BSW Description			
Reference to the global PDU			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
LinTp	LinTp/LinTpGlobalConfig	
BSW Parameter		**BSW Type**
LinTpTxNSdu		EcucParamConfContainerDef

BSW Description	
This container exists once for each transmitted N-SDU on any channel the node is connected to. This N-SDU consumes meta data items of type LIN_NAD_8.	
Template Description	
M2 Parameter	
SystemTemplate::TransportProtocols::LinTpConnection.linTpNSdu	
Mapping Rule	**Mapping Type**
Create container for each NSdu that is received by the regarded ECU.	full
Mapping Status	**Mapping ID**
valid	up_LinTp_00011

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpMaxBufReq	EcucIntegerParamDef
BSW Description	
This parameter defines the maximum number of times the LinTp should request upper layer for the Tx Buffer. It is also used to limit the number of retries for PduR_LinTpCopyTxData when no timer is active.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpNas	EcucFloatParamDef
BSW Description	
Value in seconds of the N_As timeout. N_As is the time for transmission of a LIN frame (any N_PDU) on the part of the sender.	
Template Description	
Time for transmission of the LIN frame (any N-PDU) on the sender side. Specified in seconds.	
M2 Parameter	
SystemTemplate::TransportProtocols::LinTpConnection.timeoutAs	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_LinTp_00014

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpNcs	EcucFloatParamDef
BSW Description	

Value in seconds of the performance requirement of N_Cs. N_Cs is the time which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.	
Template Description	
The attribute timeoutCs represents the time (in seconds) which elapses between the transmit request of a CF N-PDU until the transmit request of the next CF N-PDU.	
M2 Parameter	
SystemTemplate::TransportProtocols::LinTpConnection.timeoutCs	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_LinTp_00013

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpTxNSduChannelRef	EcucSymbolicNameReferenceDef
BSW Description	
Index of the channel this N-SDU belongs to.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpTxNSduId	EcucIntegerParamDef
BSW Description	
The identifier of the Transport Protocol message. This ID will be the one that is communicated with upper layers.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu
BSW Parameter	**BSW Type**
LinTpTxNSduNad	EcucIntegerParamDef
BSW Description	
A N-SDU transported on LIN is identified using the NAD for the specific slave.	
Template Description	

To distinguish LIN slaves that are used twice or more within the same cluster.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Lin::LinTopology::LinSlave.configuredNad	
Mapping Rule	**Mapping Type**
Find connection from NSdu to CommunicationController	full
Mapping Status	**Mapping ID**
valid	up_LinTp_00012

BSW Module	**BSW Context**	
LinTp	LinTp/LinTpGlobalConfig/LinTpTxNSdu	
BSW Parameter		**BSW Type**
LinTpTxNSduPduRef		EcucReferenceDef
BSW Description		
Reference to the global PDU		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.6 Ethernet

C.6.1 Ethernet Driver Mapping

BSW Module	**BSW Context**	
Eth	Eth	
BSW Parameter		**BSW Type**
EthConfigSet		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR Eth module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet	
BSW Parameter		**BSW Type**
EthCtrlConfig		EcucParamConfContainerDef
BSW Description		
Configuration of the individual controller		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlConfigEgress		EcucParamConfContainerDef
BSW Description		
Configuration of one Ethernet controler egress behavior.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress	
BSW Parameter		**BSW Type**
EthCtrlConfigEgressFifo		EcucParamConfContainerDef
BSW Description		
Represents a Fifo at the egress side.		
Template Description		
Defines a Fifo for the CouplingPort egress structure.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortFifo		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Eth_00013

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigEgressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigEgressFifoBufLenByte		EcucIntegerParamDef
BSW Description		
Length of Fifo elements in bytes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigEgressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigEgressFifoBufTotal		EcucIntegerParamDef
BSW Description		
Fifo buffer count.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigEgressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigEgressFifoIdx		EcucIntegerParamDef
BSW Description		
Egress Fifo index.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigEgressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigEgressFifoPriorityAssignment		EcucIntegerParamDef
BSW Description		
Message egress prority assignment.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress		
BSW Parameter		**BSW Type**	
EthCtrlConfigEgressLastSchedulerRef		EcucReferenceDef	
BSW Description			
Reference to the scheduler which is the last in the egress structure.			
Template Description			
Defines which CouplingPortScheduler is the last in the egress port structure.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortDetails.lastEgressScheduler			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Eth_00005

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress		
BSW Parameter		**BSW Type**	
EthCtrlConfigScheduler		EcucParamConfContainerDef	
BSW Description			
Represents a Scheduler on the egress side.			
Template Description			
Defines a scheduler for the CouplingPort egress structure.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Eth_00006

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigScheduler		
BSW Parameter		**BSW Type**	
EthCtrlConfigSchedulerPredecessor		EcucParamConfContainerDef	
BSW Description			
Defines an ordered list of predecessors for this scheduler.			
Template Description			
Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Eth_00007

BSW Module	**BSW Context**
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigScheduler/EthCtrlConfigSchedulerPredecessor

BSW Parameter	BSW Type
EthCtrlConfigSchedulerPredecessorOrder	EcucIntegerParamDef
BSW Description	
Defines the order of the scheduler predecessors.	
Template Description	
Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor	
Mapping Rule	**Mapping Type**
Defined by the order of CouplingPortScheduler.predecessor.	full
Mapping Status	**Mapping ID**
valid	up_Eth_00008

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigScheduler/EthCtrlConfigSchedulerPredecessor
BSW Parameter	**BSW Type**
EthCtrlConfigSchedulerPredecessorRef	EcucChoiceReferenceDef
BSW Description	
Choice reference to the scheduler predecessor.	
Template Description	
Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Eth_00009

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress
BSW Parameter	**BSW Type**
EthCtrlConfigShaper	EcucParamConfContainerDef
BSW Description	
Represents a Shaper an the egress side.	
Template Description	
Defines a shaper for the CouplingPort egress structure.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Eth_00010

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigShaper
BSW Parameter	**BSW Type**
EthCtrlConfigShaperIdleSlope	EcucIntegerParamDef

BSW Description	
Defines the increase of credit in bits per second for the AVB shaper.	
Template Description	
Defines the increase of credit in bits per second for the AVB shaper.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper.idleSlope	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Eth_00011

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigEgress/EthCtrlConfigShaper
BSW Parameter	**BSW Type**
EthCtrlConfigShaperPredecessorFifoRef	EcucReferenceDef
BSW Description	
Reference to the fifo which is the predecessor for this shaper.	
Template Description	
Defines the CouplingPortFifo which provides the input to this shaper.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper.predecessorFifo	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Eth_00012

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig
BSW Parameter	**BSW Type**
EthCtrlConfigIngress	EcucParamConfContainerDef
BSW Description	
Configuration of one Ethernet controler ingress behavior.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigIngress
BSW Parameter	**BSW Type**
EthCtrlConfigIngressFifo	EcucParamConfContainerDef
BSW Description	
Represents a Fifo at the ingress side.	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigIngress/EthCtrlConfigIngressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigIngressFifoBufLenByte		EcucIntegerParamDef
BSW Description		
Length of Fifo elements in bytes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigIngress/EthCtrlConfigIngressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigIngressFifoBufTotal		EcucIntegerParamDef
BSW Description		
Fifo buffer count.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigIngress/EthCtrlConfigIngressFifo	
BSW Parameter		**BSW Type**
EthCtrlConfigIngressFifoIdx		EcucIntegerParamDef
BSW Description		
Ingress Fifo index.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlConfigIngress/EthCtrlConfigIngressFifo		
BSW Parameter		**BSW Type**	
EthCtrlConfigIngressFifoPriorityAssignment		EcucIntegerParamDef	
BSW Description			
Message ingress prority assignment.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig		
BSW Parameter		**BSW Type**	
EthCtrlEnableMii		EcucBooleanParamDef	
BSW Description			
Enables / Disables Media Independent Interface (MII) for transceiver access			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig		
BSW Parameter		**BSW Type**	
EthCtrlEnableRxInterrupt		EcucBooleanParamDef	
BSW Description			
Enables / Disables receive interrupt			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlEnableTxInterrupt		EcucBooleanParamDef
BSW Description		

Enables / Disables transmit interrupt	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlIdx		EcucIntegerParamDef
BSW Description		
Specifies the instance ID of the configured controller.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlMacLayerSpeed		EcucEnumerationParamDef
BSW Description		
Defines the baud rate of the MAC layer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlMacLayerSubType		EcucEnumerationParamDef
BSW Description		
Defines the MAC layer subtype of a switch port		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig	
BSW Parameter		**BSW Type**
EthCtrlMacLayerType		EcucEnumerationParamDef
BSW Description		
Defines the MAC layer type of the ethernet controller.		
Template Description		
Specifies the mac layer type of the CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.macLayerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Eth_00001

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlMacLayerType	
BSW Parameter		**BSW Type**
ETH_MAC_LAYER_TYPE_XGMII		EcucEnumerationLiteralDef
BSW Description		
MAC layer interface (data) bandwith class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII)		
Template Description		
Mac layer interface (data) bandwith class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xGMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Eth_00003

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlMacLayerType	
BSW Parameter		**BSW Type**
ETH_MAC_LAYER_TYPE_XMII		EcucEnumerationLiteralDef
BSW Description		
MAC layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Eth_00002

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthCtrlMacLayerType		
BSW Parameter		**BSW Type**	
ETH_MAC_LAYER_TYPE_XXGMII		EcucEnumerationLiteralDef	
BSW Description			
MAC layer interface (data) bandwith class 10Gbit/s			
Template Description			
Mac layer interface (data) bandwith class 10Gbit/s			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xXGMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Eth_00004

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig		
BSW Parameter		**BSW Type**	
EthCtrlPhyAddress		EcucStringParamDef	
BSW Description			
Specifies the unique 48-bit physical address (MAC address) of the controller in network byte order. Regular Expression: [0-9a-fA-F]{2}[[:-][0-9a-fA-F]{2}]{5}			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Eth	Eth/EthConfigSet/EthCtrlConfig		
BSW Parameter		**BSW Type**	
EthDemEventParameterRefs		EcucParamConfContainerDef	
BSW Description			
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETH_E_ACCESS		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Controller access failed" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETH_E_ALIGNMENT		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Alignment Error" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETH_E_CRC		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "CRC Failure" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs

BSW Parameter		BSW Type	
ETH_E_LATECOLLISION		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Late Collisions" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETH_E_MULTIPLECOLLISION		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Multiple Collisions" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETH_E_OVERSIZEFRAME		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Oversized Frame" has occured.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs	
BSW Parameter		**BSW Type**
ETH_E_RX_FRAMES_LOST		EcucSymbolicNameReferenceDef

BSW Description	
Reference to the DemEventParameter which shall be issued when the error "receive frames lost" has occured.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs	
BSW Parameter		**BSW Type**
ETH_E_SINGLECOLLISION		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when the error "Single Collisions" has occured.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Eth	Eth/EthConfigSet/EthCtrlConfig/EthDemEventParameterRefs	
BSW Parameter		**BSW Type**
ETH_E_UNDERSIZEFRAME		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when the error "Undersized Frame" has occured.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Eth	Eth	
BSW Parameter		**BSW Type**
EthGeneral		EcucParamConfContainerDef
BSW Description		
General configuration of Ethernet Driver module		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthCtrlOffloading		EcucParamConfContainerDef
BSW Description		
Configuration of hardware offloading features.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral/EthCtrlOffloading	
BSW Parameter		**BSW Type**
EthCtrlEnableOffloadChecksumICMP		EcucBooleanParamDef
BSW Description		
Enables / Disables hardware offloading for ICMP checksums.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral/EthCtrlOffloading	
BSW Parameter		**BSW Type**
EthCtrlEnableOffloadChecksumIPv4		EcucBooleanParamDef
BSW Description		
Enables / Disables hardware offloading for IPv4 checksums.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral/EthCtrlOffloading	
BSW Parameter		**BSW Type**
EthCtrlEnableOffloadChecksumTCP		EcucBooleanParamDef
BSW Description		
Enables / Disables hardware offloading for TCP checksums.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral/EthCtrlOffloading	
BSW Parameter		**BSW Type**
EthCtrlEnableOffloadChecksumUDP		EcucBooleanParamDef
BSW Description		
Enables / Disables hardware offloading for UDP checksums.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Eth	Eth/EthGeneral		
BSW Parameter		**BSW Type**	
EthGetDropCountApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables Eth_GetCounterValues API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthGeneral		
BSW Parameter		**BSW Type**	
EthGetEtherStatsApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables Eth_GetEtherStats API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Eth	Eth/EthGeneral		
BSW Parameter		**BSW Type**	
EthGetTxErrorCounterValuesApi		EcucBooleanParamDef	
BSW Description			
Enables/Disables Eth_GetTxErrorCounterValues API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthGetTxStatsApi		EcucBooleanParamDef
BSW Description		

Enables/Disables Eth_GetTxStats API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthGlobalTimeSupport		EcucBooleanParamDef
BSW Description		
Enables/Disables the GlobalTime APIs used amongst others by Global Time Synchronization over Ethernet.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Specifies the period of main function Eth_MainFunction in seconds. Ethernet driver does not require this information but the BSW scheduler.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthMaxCtrlsSupported		EcucIntegerParamDef
BSW Description		
Limits the total number of supported controllers.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthUpdatePhysAddrFilter		EcucBooleanParamDef
BSW Description		
Enables/Disables optional API Eth_UpdatePhysAddrFilter.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Eth	Eth/EthGeneral	
BSW Parameter		**BSW Type**
EthVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables / Disables version info API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

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BSW Module	BSW Context	
EthIf	EthIf	
BSW Parameter		**BSW Type**
EthIfConfigSet		EcucParamConfContainerDef
BSW Description		
Collecting container for all parameters with post-build configuration classes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfController		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of EthIfController.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet/EthIfController	
BSW Parameter		**BSW Type**
EthIfCtrlIdx		EcucIntegerParamDef
BSW Description		
This parameter provides a zero-based consecutive index of the Ethernet Communication Controllers. Upper layer BSW modules and the EthIf itself use this index to identify a Ethernet CC.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfController		
BSW Parameter		**BSW Type**	
EthIfCtrlMtu		EcucIntegerParamDef	
BSW Description			
Specifies the maximum transmission unit (MTU) of the EthIfCtrl in [bytes]. Note: In case a VLAN tag is used for the EthIfCtrl, the frame length of the Ethernet frame will increase by 4 bytes.			
Template Description			
This attribute specifies the maximum transmission unit in bytes.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.maximumTransmissionUnit			
Mapping Rule			**Mapping Type**
Different MTU values may be defined for different VLANs. Therefore the maximumTransmissionUnit is specified in the EthernetCommunicationConnector. The value that is defined in the CommunicationConnector shall be used as the value of this parameter.			full
Mapping Status			**Mapping ID**
valid			up_EthIf_00001

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfController		
BSW Parameter		**BSW Type**	
EthIfEthTrcvRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to an Ethernet transceiver, which is handled by the Ethernet Interface.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfController		
BSW Parameter		**BSW Type**	
EthIfMaxTxBufsTotal		EcucIntegerParamDef	
BSW Description			
Limits the total number of transmit buffers.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfController	
BSW Parameter		**BSW Type**
EthIfPhysControllerRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a physical Ethernet controller, which is handled by the Ethernet Interface.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfController	
BSW Parameter		**BSW Type**
EthIfSwitchRefOrPortGroupRef		EcucChoiceReferenceDef
BSW Description		
The choice reference allows to configure either the EthIfController references an EthIfSwitch or an EthIfSwitchPortGroup. Reference to a EthIfSwitchPortGroup. In case port groups are controlled by PNC EthIfSwitchPortGroupRefSemantics shall have the value ETHIF_SWITCH_PORT_GROUP_LINK_INFO. In case port groups are controlled by the EhtIfController EthIfSwitchPortGroupRefSemantics shall have the value ETHIF_SWITCH_PORT_GROUP_CONTROL.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfController	
BSW Parameter		**BSW Type**
EthIfVlanId		EcucIntegerParamDef
BSW Description		
A virtual-LAN is identified by this attribute according to IEEE 802.1Q.		
Template Description		
A VLAN is identified by this attribute according to IEEE 802.1Q. The allowed values range is from 0..4095.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanConfig.vlanIdentifier		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthIf_00002

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet		
BSW Parameter		**BSW Type**	
EthIfFrameOwnerConfig		EcucParamConfContainerDef	
BSW Description			
Configuration of Ethernet frame owner			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfFrameOwnerConfig		
BSW Parameter		**BSW Type**	
EthIfFrameType		EcucIntegerParamDef	
BSW Description			
Selects the Ethernet frame type.			
Template Description			
Ethernet specific attributes to the Frame.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::AbstractEthernetFrame			
Mapping Rule			**Mapping Type**
If an AbstractEthernetFrame is defined in the System Extract then it may be possible to derive this parameter from this information.			partial
Mapping Status			**Mapping ID**
valid			up_EthIf_00003

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfFrameOwnerConfig		
BSW Parameter		**BSW Type**	
EthIfOwner		EcucIntegerParamDef	
BSW Description			
Selects the owner of an Ethernet frame type. The owner is a zero based index into the callback function configuration 'EthIfRxIndicationConfig'. I.e. an Ethernet frame of type IPv4 (0x800) at index 0 will call the first callback function configured in 'EthIfRxIndicationConfig'.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
EthIf	EthIf/EthIfConfigSet

BSW Parameter		**BSW Type**
EthIfPhysController		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of EthIfPhysController. The usage of EthIfEthCtrlRef and EthIfWEthCtrlRef is exclusive OR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfPhysController		
BSW Parameter		**BSW Type**	
EthIfEthCtrlRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to a physical Ethernet controller, which is handled by a specific Ethernet controller driver.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfPhysController		
BSW Parameter		**BSW Type**	
EthIfPhysControllerIdx		EcucIntegerParamDef	
BSW Description			
This parameter provides a zero-based consecutive index of the physical Ethernet controllers. Upper layer BSW modules and the Ethernet Interface itself use this index to identify a physical Ethernet controller.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfPhysController	
BSW Parameter		**BSW Type**

EthIfPhysCtrlRxMainFunctionPriorityProcessing	EcucParamConfContainerDef	
BSW Description		
Configuration of ingress FIFO based main function processing.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfPhysController/EthIfPhysCtrlRxMainFunctionPriorityProcessing		
BSW Parameter		**BSW Type**	
EthIfPhysCtrlRxIndicationIterations		EcucIntegerParamDef	
BSW Description			
Max number of Ethernet frames polled per main function invocation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfPhysController/EthIfPhysCtrlRxMainFunctionPriorityProcessing		
BSW Parameter		**BSW Type**	
EthIfPhysCtrlRxIngressFifoRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the reception FIFO.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfPhysController/EthIfPhysCtrlRxMainFunctionPriorityProcessing	
BSW Parameter		**BSW Type**
EthIfPhysCtrlRxMainFunctionPeriod		EcucFloatParamDef
BSW Description		

Specifies the period of main function in seconds.
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthIf	EthIf/EthIfConfigSet/EthIfPhysController
BSW Parameter	**BSW Type**
EthIfWEthCtrlRef	EcucSymbolicNameReferenceDef
BSW Description	
Reference to a physical Wireless Ethernet controller, which is handled by a specific Wireless Ethernet controller driver.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthIf	EthIf/EthIfConfigSet
BSW Parameter	**BSW Type**
EthIfRxIndicationConfig	EcucParamConfContainerDef
BSW Description	
Configuration of receive callback functions.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthIf	EthIf/EthIfConfigSet/EthIfRxIndicationConfig
BSW Parameter	**BSW Type**
EthIfRxIndicationFunction	EcucFunctionNameDef
BSW Description	
Specifies receive indication callback function.	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfSwitch		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of EthIfSwitches.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfSwitch	
BSW Parameter		**BSW Type**
EthIfSwitchIdx		EcucIntegerParamDef
BSW Description		
This parameter provides a zero-based consecutive index of the Ethernet Interface Switches. Upper layer BSW modules and the EthIf itself use this index to identify a Ethernet Switch.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfSwitch	
BSW Parameter		**BSW Type**
EthIfSwitchRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a Ethernet Switch, which is handled by a specific Ethernet Switch driver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfSwitchMgmtInfoIndicationConfig		EcucParamConfContainerDef
BSW Description		
Configuration of Switch Management callback function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet/EthIfSwitchMgmtInfoIndicationConfig	
BSW Parameter		**BSW Type**
EthIfSwitchMgmtInfoIndicationFunction		EcucFunctionNameDef
BSW Description		
Enables/Disables the ingress Switch management info indication redirected call to upper layers who registered for the call.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfSwitchPortGroup		EcucParamConfContainerDef
BSW Description		
This container contains the configuration of EthIfSwitchPortGroups. If EthIfSwitchPortGroups are controlled by PNC one EthIfSwitchPortGroup per PNC shall exist. The host port shall be part of all EthIfSwitchPortGroups. The up link port of a master switch and the up link port of the slave switch shall be part of all EthIfSwitchPortGroups that contain EthSwtPorts belonging to the slave switch.		
Template Description		

EcuInstance.ethSwitchPortGroupDerivation: Defines whether the derivation of SwitchPortGroups based on VLAN and/or CouplingPort.pncMapping shall be performed for this EcuInstance. If not defined the derivation shall not be done. **CouplingPort.pncMapping**: Reference to the partial networks this CouplingPort participates in.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.ethSwitchPortGroupDerivation, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.pncMapping	
Mapping Rule	**Mapping Type**
Derive EthIfSwitchPortGroup from M2 according to the following requirements only if EcuInstance.ethSwitchPortGroupDerivation is defined and set to TRUE: * For each EthernetPhysicalChannel that has CouplingPorts connected (CouplingPort has a VlanMembership refering to the EthernetPhysicalChannel) exactly one EthIfSwitchPortGroup shall be derived containing all connected CouplingPorts via the EthIfPortRef. Thus a EthSwtPort may be part in several EthIfSwitchPortGroups. * For each PNC that is referenced by at least one CouplingPort exactly one EthIfSwitchPortGroup shall be derived. The referenced CouplingPort shall be part of the EthIfSwitchPortGroup via the EthIfPortRef. Thus a EthSwtPort may be part in several EthIfSwitchPortGroups. * If the CouplingPorts have no reference to any PNC or all referenced PNCs have no relation to this EthernetPhysicalChannel then the derived EthIfSwitchPortGroupRefSemantics shall have the value ETHIF_SWITCH_PORT_GROUP_CONTROL, because this EthIfSwitchPortGroup is switched by EthSM. * If the CouplingPorts have at least one reference to any PNC that has a relation to this EthernetPhysicalChannel then the derived EthIfSwitchPortGroupRefSemantics shall have the value ETHIF_SWITCH_PORT_GROUP_LINK_INFO, because this EthIfSwitchPortGroup is only used for link status accumulation towards EthSM.	full
Mapping Status	**Mapping ID**
valid	up_EthIf_00004

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfSwitchPortGroup	
BSW Parameter		**BSW Type**
EthIfPortRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to an Ethernet Switch Port.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfSwitchPortGroup		
BSW Parameter		**BSW Type**	
EthIfSwitchPortGroupIdx		EcucIntegerParamDef	
BSW Description			
This parameter provides a zero-based consecutive index of the Ethernet Switch Port Groups. Upper layer BSW modules and the EthIf itself use this index to identify an Ethernet Switch Port Group.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet/EthIfSwitchPortGroup		
BSW Parameter		**BSW Type**	
EthIfSwitchPortGroupRefSemantics		EcucEnumerationParamDef	
BSW Description			
Defines how the EthIfSwitchRefOrPortGroupRef refering to a EthIfSwitchPortGroup shall be interpreted.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfConfigSet		
BSW Parameter		**BSW Type**	
EthIfSwitchTimeStampIndicationConfig		EcucParamConfContainerDef	
BSW Description			
Configuration of Switch timestamp indications.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
EthIf	EthIf/EthIfConfigSet/EthIfSwitchTimeStampIndicationConfig	
BSW Parameter		**BSW Type**

EthIfSwitchEgressTimeStampIndicationFunction		EcucFunctionNameDef	
BSW Description			
Enables/Disables to upper layers an egress timestamp indication function.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfSwitchTimeStampIndicationConfig		
BSW Parameter		**BSW Type**	
EthIfSwitchIngressTimeStampIndicationFunction		EcucFunctionNameDef	
BSW Description			
Enables/Disables to upper layers an ingress timestamp indication function.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet		
BSW Parameter		**BSW Type**	
EthIfTransceiver		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration of EthIfTransceiver. The usage of EthIfEthTrcvRef and EthIfWEthTrcvRefis exclusive OR.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfConfigSet/EthIfTransceiver		
BSW Parameter		**BSW Type**	
EthIfEthTrcvRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to an Ethernet transceiver, which is handled by a specific Ethernet transceiver driver.			

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfTransceiver	
BSW Parameter		**BSW Type**
EthIfTransceiverIdx		EcucIntegerParamDef
BSW Description		
This parameter provides a zero-based consecutive index of the Ethernet transceivers. Upper layer BSW modules and the Ethernet Interface itself use this index to identify an Ethernet tranceiver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfTransceiver	
BSW Parameter		**BSW Type**
EthIfWEthTrcvRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to an Wireless Ethernet transceiver, which is handled by a specific Wireless Ethernet transceiver driver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfTrcvLinkStateChgConfig		EcucParamConfContainerDef
BSW Description		
Specifies link state change callback function		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfTrcvLinkStateChgConfig	
BSW Parameter		**BSW Type**
EthIfTrcvLinkStateChgFunction		EcucFunctionNameDef
BSW Description		
Specifies link state change callback function		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet	
BSW Parameter		**BSW Type**
EthIfTxConfirmationConfig		EcucParamConfContainerDef
BSW Description		
Configuration of transmit indication callback functions.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfConfigSet/EthIfTxConfirmationConfig	
BSW Parameter		**BSW Type**
EthIfTxConfirmationFunction		EcucFunctionNameDef
BSW Description		
Specifies transmit indication callback function		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthIf	EthIf		
BSW Parameter		**BSW Type**	
EthIfGeneral		EcucParamConfContainerDef	
BSW Description			
This container contains the general configuration parameters of the Ethernet Interface.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfDevErrorDetect		EcucBooleanParamDef	
BSW Description			
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfEnableRxInterrupt		EcucBooleanParamDef	
BSW Description			
Enables / Disables receive interrupt.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**

EthIfEnableSignalQualityApi		EcucBooleanParamDef	
BSW Description			
Enable/disable the APIs read and clear the signal quality.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfEnableTxInterrupt		EcucBooleanParamDef	
BSW Description			
Enables / Disables the transmit interrupt.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfEnableWEthApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables API's for WEth / WEthTrcv			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetAndResetMeasurementDataApi		EcucBooleanParamDef
BSW Description		
Enables / Disables the Get and Reset Measurement Data API		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetBaudRate		EcucBooleanParamDef
BSW Description		
Enables / Disables GetBaudRate API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetCounterState		EcucBooleanParamDef
BSW Description		
Enables / Disables GetCounterState API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetCtrlIdxList		EcucBooleanParamDef
BSW Description		
Enables / Disables GetCtrlIdxList API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetTransceiverWakeupModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthIf_GetTransceiverWakeupMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGetVlanIdSupport		EcucBooleanParamDef
BSW Description		
Enables / Disables GetVlanId API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfGlobalTimeSupport		EcucBooleanParamDef
BSW Description		
Enables/Disables the Global Time APIs used amongst others by Global Time Synchronization over Ethernet.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfMainFunctionPeriod		EcucFloatParamDef	
BSW Description			
Specifies the period of main function EthIf_MainFunctionRx and EthIf_MainFunctionTx in seconds. Ethernet Interface does not require this information but the BSW scheduler.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfMainFunctionStatePeriod		EcucFloatParamDef	
BSW Description			
Specifies the period of main function EthIf_MainFunctionState in seconds. Ethernet Interface does not require this information but the BSW scheduler.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfMaxTrcvsTotal		EcucIntegerParamDef	
BSW Description			
Limits the total number of transceivers.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfPortStartupActiveTime		EcucFloatParamDef	

BSW Description	
Denote the time delay after the mode "ETHTRCV_MODE_ACTIVE" of all EthIfSwitchPorts are requested via EthIf_StartAllPorts. This is only used for ports in EthIfSwtPortGroups which are not referenced by any EthIfController.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfPublicCddHeaderFile		EcucStringParamDef
BSW Description		
Defines header files for callback functions which shall be included in case of CDDs. Range of characters is 1.. 32.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfRxIndicationIterations		EcucIntegerParamDef
BSW Description		
Maximum number of Ethernet frames per Ethernet controller polled from the Ethernet driver within EthIf_MainFunctionRx.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**

EthIfSetForwardingModeApi		EcucBooleanParamDef
BSW Description		
Enables /disables EthIf_SetForwardingMode API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfSignalQualityCheckPeriod		EcucFloatParamDef	
BSW Description			
Specifies the period in units of seconds in which the signal quality it polled in the context of EthIf_MainfunctionState. The value shall be an integral multiple of EthIfMainFunctionStatePeriod.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfStartAutoNegotiation		EcucBooleanParamDef	
BSW Description			
Enables / Disables StartAutoNegotiation API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfSwitchManagementSupport		EcucBooleanParamDef
BSW Description		
Enables/Disables the Switch management APIs to support a Switch-port specific communication attribute access.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfSwitchOffPortTimeDelay		EcucFloatParamDef
BSW Description		
Denote the time delay after the mode "ETHTRCV_MODE_DOWN" of a EthIfSwitchPortGroup will be executed. This is only used for EthIfSwtPortGroups which are not referenced by any EthIfController. The time delay shall be greater than the UdpNm timings, because UdpNm shall finish its shutdown handling. (Repeat Message State, Prepare Bus-Sleep state, Bus-Sleep state).		
Template Description		
Switch off delay for CouplingPorts in seconds. It denotes the delay of switching off couplingPorts after the request to switch off a couplingPort was issued. (e.g. switch off of Ethernet switch ports).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCluster.couplingPortSwitchoffDelay		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthIf_00005

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**
EthIfTrcvLinkStateChgMainReload		EcucIntegerParamDef
BSW Description		
Specifies the frequency of transceiver link state change checks in each period of main function EthIf_MainFunctionTx.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthIf	EthIf/EthIfGeneral	
BSW Parameter		**BSW Type**

EthIfVerifyConfigApi		EcucBooleanParamDef	
BSW Description			
Enables /disables EthIf_VerifyConfig API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfVersionInfoApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables version info API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfVersionInfoApiMacro		EcucBooleanParamDef	
BSW Description			
Enables / Disables version info API macro implementation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthIf	EthIf/EthIfGeneral		
BSW Parameter		**BSW Type**	
EthIfWakeUpSupport		EcucBooleanParamDef	
BSW Description			
Configures if wakeup is supported or not.			
Template Description			

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.6.3 Ethernet Switch Driver Mapping

BSW Module	BSW Context	
EthSwt	EthSwt	
BSW Parameter		**BSW Type**
EthSwtConfig		EcucParamConfContainerDef
BSW Description		
Configuration of one Ethernet Switch.		
Template Description		
A CouplingElement is used to connect EcuInstances to the VLAN of an EthernetCluster. CouplingElements can reach from a simple hub to a complex managed switch or even devices with functionalities in higher layers. A CouplingElement that is not related to an EcuInstance occurs as a dedicated single device.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingElement		
Mapping Rule		**Mapping Type**
For each CouplingElement with couplingType=switch one EthSwtConfig shall be created.		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00001

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtDemEventParameterRefs	
BSW Parameter		**BSW Type**
ETHSWT_E_ACCESS		EcucSymbolicNameReferenceDef

BSW Description	
Reference to the DemEventParameter which shall be issued when the error "Ethernet Switch Access Failure" has occurred.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtDemEventParameterRefs
BSW Parameter	**BSW Type**
ETHSWT_E_SYNCPORT2PHY	EcucSymbolicNameReferenceDef
BSW Description	
Reference to the DemEventParameter which shall be issued when the error "Ethernet switch port and the referenced Ethernet transceiver are in contradicting modes" has occurred.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig
BSW Parameter	**BSW Type**
EthSwtDropDoubleTagged	EcucBooleanParamDef
BSW Description	
This parameter defines if a switch shall drop double tagged (Q in Q) frames. If this parameter is set to TRUE double tagged frames are dropped at all ports. If this parameter is set to FALSE, then double tagged frames are forwarded. If double tagging is used as a feature, this parameter must be set to FALSE. This parameter shall only be set to TRUE when Switch-HW supports the filtering of double tagged frames as filtering by SW is NOT possible!	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtIdx		EcucIntegerParamDef
BSW Description		
Specifies the instance ID of the configured Ethernet Switch.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtManagementEthCtrlRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the Ethernet controller connected to the management port where the management frames will be transmitted/received.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtManagementPortRef		EcucReferenceDef
BSW Description		
Reference to the port where the management CPU is connected to.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtNvm		EcucParamConfContainerDef

BSW Description	
Configuration of one Ethernet Switch Nvm usage in case the module requires non volatile memory in the Ecu to store switch configuration.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtNvm	
BSW Parameter		**BSW Type**
EthSwtNvmBlockDescriptorRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the Nvm block description in the Nvm module configuration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtPort		EcucParamConfContainerDef
BSW Description		
Configuration of one Ethernet Switch Port.		
Template Description		
A CouplingPort is used to connect a CouplingElement with an EcuInstance or two CouplingElements with each other via a CouplingPortConnection. Optionally, the CouplingPort may also have a reference to a macMulticastGroup and a defaultVLAN.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort		
Mapping Rule		**Mapping Type**
For each CouplingElement.couplingPort of a CouplingElement with couplingType=switch one EthSwtPort shall be created.		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00002

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort	
BSW Parameter		**BSW Type**
EthSwtPortEgress		EcucParamConfContainerDef
BSW Description		

Configuration of one Ethernet Switch Port Egress behavior.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress
BSW Parameter	**BSW Type**
EthSwtPortEgressLastSchedulerRef	EcucReferenceDef
BSW Description	
Reference to the port scheduler which is the last in the egress port structure.	
Template Description	
Defines which CouplingPortScheduler is the last in the egress port structure.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortDetails.lastEgressScheduler	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00027

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress
BSW Parameter	**BSW Type**
EthSwtPortFifo	EcucParamConfContainerDef
BSW Description	
Represents a Fifo in the egress port.	
Template Description	
Defines a Fifo for the CouplingPort egress structure.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortFifo	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00020

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortFifo
BSW Parameter	**BSW Type**
EthSwtPortFifoMinimumLength	EcucIntegerParamDef
BSW Description	
FIFO minimum length in Byte. This assignment is used to configure a guaranteed size of a configured FIFO.	
Template Description	
FIFO minimum length in Byte. An actual configuration/hardware may use a bigger value.	

M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortFifo.minimumFifoLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00061

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortFifo
BSW Parameter	**BSW Type**
EthSwtPortFifoTrafficClassAssignment	EcucIntegerParamDef
BSW Description	
Defines which traffic classes are assigned to this Fifo.	
Template Description	
Defines a set of Traffic Classes which shall be handled by this Fifo. range: 0-7	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortFifo.assignedTrafficClass	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00021

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress
BSW Parameter	**BSW Type**
EthSwtPortScheduler	EcucParamConfContainerDef
BSW Description	
Represents a Scheduler in the egress port.	
Template Description	
Defines a scheduler for the CouplingPort egress structure.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00022

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler
BSW Parameter	**BSW Type**
EthSwtPortSchedulerAlgorithm	EcucEnumerationParamDef
BSW Description	
Defines the scheduler algorithm.	
Template Description	
Defines the schedule algorithm to be used.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.portScheduler	
Mapping Rule	**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00026

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler/EthSwtPortSchedulerAlgorithm	
BSW Parameter		**BSW Type**
ETHSWT_SCHEDULER_DEFICIT_ROUND_ROBIN		EcucEnumerationLiteralDef
BSW Description		
deficit round robin		
Template Description		
Schedule algorithm "deficit round robin"		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCouplingPortSchedulerEnum.deficitRoundRobin		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00032

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler/EthSwtPortSchedulerAlgorithm	
BSW Parameter		**BSW Type**
ETHSWT_SCHEDULER_STRICT_PRIORITY		EcucEnumerationLiteralDef
BSW Description		
strict priority		
Template Description		
Schedule algorithm "strict priority"		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCouplingPortSchedulerEnum.strictPriority		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00034

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler/EthSwtPortSchedulerAlgorithm	
BSW Parameter		**BSW Type**
ETHSWT_SCHEDULER_WEIGHTED_ROUND_ROBIN		EcucEnumerationLiteralDef
BSW Description		
weighted round robin		
Template Description		
Schedule algorithm "weighted round robin"		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCouplingPortSchedulerEnum.weightedRoundRobin		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00033

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler
BSW Parameter	**BSW Type**
EthSwtPortSchedulerPredecessor	EcucParamConfContainerDef
BSW Description	
Defines an ordered list of predecessors for this scheduler.	
Template Description	
Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00023

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler/EthSwtPortSchedulerPredecessor
BSW Parameter	**BSW Type**
EthSwtPortEgressPredecessorRef	EcucChoiceReferenceDef
BSW Description	
Choice reference to the scheduler predecessor.	
Template Description	
Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00024

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortScheduler/EthSwtPortSchedulerPredecessor
BSW Parameter	**BSW Type**
EthSwtPortSchedulerPredecessorOrder	EcucIntegerParamDef
BSW Description	
Defines the order of the scheduler predecessors. This value has to be understood as a relative value, i.e. the value shows only the relative ordering of the elements. The highest value has the highest priority and gaps are allowed (not dense based). The values need to be unique within one EthSwtPortScheduler.	
Template Description	

Ordered List of predecessor inputs. The first element has the highest priority. The following elements have decreasing priorities.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortScheduler.predecessor	
Mapping Rule	**Mapping Type**
Defined by the order of CouplingPortScheduler.predecessor.	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00025

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress	
BSW Parameter		**BSW Type**
EthSwtPortShaper		EcucParamConfContainerDef
BSW Description		
Represents a Shaper in the egress port.		
Template Description		
Defines a shaper for the CouplingPort egress structure.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00014

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortShaper	
BSW Parameter		**BSW Type**
EthSwtPortEgressPredecessorFifoRef		EcucReferenceDef
BSW Description		
Reference to the fifo which is the predecessor for this shaper.		
Template Description		
Defines the CouplingPortFifo which provides the input to this shaper.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper.predecessorFifo		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00016

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortEgress/EthSwtPortShaper	
BSW Parameter		**BSW Type**
EthSwtPortShaperIdleSlope		EcucIntegerParamDef
BSW Description		
Defines the increase of credit in bits per second for the AVB shaper.		
Template Description		
Defines the increase of credit in bits per second for the AVB shaper.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortShaper.idleSlope		
Mapping Rule		**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00015

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort
BSW Parameter	**BSW Type**
EthSwtPortEnableLinkDownCallback	EcucBooleanParamDef
BSW Description	
Enables the callback <User>_LinkDown for this EthSwtPort if an IEEE802.1X link loss is detected. <User> is defined by EthSwtLinkDownUser.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort
BSW Parameter	**BSW Type**
EthSwtPortIdx	EcucIntegerParamDef
BSW Description	
Specifies the instance ID of the configured Ethernet Switch Port.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort
BSW Parameter	**BSW Type**
EthSwtPortIngress	EcucParamConfContainerDef
BSW Description	
Configuration of one Ethernet Switch Port ingress behavior.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress		
BSW Parameter		**BSW Type**	
EthSwtPortIngressDefaultPriority		EcucIntegerParamDef	
BSW Description			
Default priority for ingress.			
Template Description			
Standard output-priority outgoing Frames will be tagged with. This allows to assign different default-Priorities to each VLAN. Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.defaultPriority			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00060

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress		
BSW Parameter		**BSW Type**	
EthSwtPortIngressDefaultVlan		EcucIntegerParamDef	
BSW Description			
Default VLAN for ingress.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.defaultVlan			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00059

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress		
BSW Parameter		**BSW Type**	
EthSwtPortIngressDropUntagged		EcucBooleanParamDef	
BSW Description			
Defines the ingress behavior for untagged frames.			
Template Description			
Defines the handling of frames at the ingress port.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.receiveActivity			
Mapping Rule			**Mapping Type**
If CouplingPort.receiveActivity is set to "dropUntagged" then EthSwtPortIngress DropUntagged shall be set to true. If CouplingPort.receiveActivity is set to something different than "dropUntagged" then EthSwtPortIngressDropUntagged shall be set to false.			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00058

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress	
BSW Parameter		**BSW Type**
EthSwtPortIngressVlanModification		EcucIntegerParamDef
BSW Description		
If this parameter is defined all messages which arrive at this ingress port will be tagged with this VLAN Id. This tagging happen also if the arriving message already has a VLAN Id, it will be overwritten by the defined one. If this parameter is not defined no changes to the VLAN Id shall happen at this ingress port.		
Template Description		
All incoming messages at this CouplingPort shall be tagged with this VLAN Id. This tagging is performed regardless whether the message already has a VLAN tag or is untagged, an existing VLAN tag will be overwritten. This feature is XOR with CoupligPort.defaultVlan.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.vlanModifier		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00004

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress	
BSW Parameter		**BSW Type**
EthSwtPortPolicer		EcucParamConfContainerDef
BSW Description		
Definition of Rate Policing parameters.		
Template Description		
Defines a rate policy on a CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00050

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer	
BSW Parameter		**BSW Type**
EthSwtPortRatePolicedByteCount		EcucIntegerParamDef
BSW Description		
Amount of Byte Counts (excluding Header information) which can be received in a configured EthSwtPortRatePolicedTimeInterval.		
Template Description		
Amount of data in bytes (excluding header information) that can be received to define the rate policy.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy.dataLength		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_EthSwt_00051

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer
BSW Parameter	**BSW Type**
EthSwtPortRatePolicedPriority	EcucIntegerParamDef
BSW Description	
Defines the priority which this rate policy shall be limited on. If no priority is given this rate policy is not considering priority.	
Template Description	
Defines the priority which this rate policy shall be limited on. If no priority is given this rate policy is not considering priority.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy.priority	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00053

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer
BSW Parameter	**BSW Type**
EthSwtPortRatePolicedTimeInterval	EcucFloatParamDef
BSW Description	
Time interval in seconds where a configured EthSwtPortRatePolicedByteCount can be received without a rate limitation.	
Template Description	
Time interval used to define the base of the rate policy.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy.timeInterval	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00052

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer
BSW Parameter	**BSW Type**
EthSwtPortRateViolationAction	EcucEnumerationParamDef
BSW Description	
Action to be taken when the rate policy criteria defined for this EthSwtPortPolicer are met.	
Template Description	
Defines the action to be performed when this rate policy is violated.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy.policyAction	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00054

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer/EthSwtPortRateViolationAction
BSW Parameter	**BSW Type**
BLOCK_SOURCE	EcucEnumerationLiteralDef
BSW Description	
All incoming traffic from the violating Source based on the MAC-Address is blocked.	
Template Description	
If the rate policy is violated the CouplingPort this CouplingPortRatePolicy is defined on shall block all frames from the MAC-Address the violation was caused by.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicyActionEnum.blockSource	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00055

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer/EthSwtPortRateViolationAction
BSW Parameter	**BSW Type**
DROP_FRAME	EcucEnumerationLiteralDef
BSW Description	
The received frame which led to the violation of the rate policy is dropped.	
Template Description	
If the rate policy is violated the frame shall be dropped.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicyActionEnum.dropFrame	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00056

BSW Module	BSW Context
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPortPolicer
BSW Parameter	**BSW Type**
EthSwtPortRateVlanMembershipRef	EcucReferenceDef
BSW Description	
References the Vlans this rate policy shall apply to. If no EthSwtPortRateVlanMembershipRef is configured the rate policing applies only on the configured EthSwtPortRatePolicedPriority.	
Template Description	
Defines the VLANs this rate policy shall be limited on. If no VLAN is given this rate policy is not considering VLAN tags.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortRatePolicy.vLan	
Mapping Rule	**Mapping Type**
1:1 mapping	full

Mapping Status	Mapping ID
valid	up_EthSwt_00057

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress	
BSW Parameter		**BSW Type**
EthSwtPortTrafficClassAssignment		EcucIntegerParamDef
BSW Description		
If this parameter is defined all arriving messages at this ingress port shall be assigned this traffic class. If this parameter is not defined no general port based traffic class assignment is done.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortDetails.ethernetTrafficClassAssignment		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00005

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress	
BSW Parameter		**BSW Type**
EthSwtPriorityRegeneration		EcucParamConfContainerDef
BSW Description		
Defines a priority regeneration where the EthSwtPriorityRegenerationIngressPriority is replaced by EthSwtPriorityRegenerationRegeneratedPriority. The EthSwtPriorityRegeneration is optional in case no priority regeneration shall be performed. In case a EthSwtPriorityRegeneration is defined it shall have 8 mappings, one for each priority.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortDetails.ethernetPriorityRegeneration		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00009

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPriorityRegeneration	
BSW Parameter		**BSW Type**
EthSwtPriorityRegenerationIngressPriority		EcucIntegerParamDef
BSW Description		
Message priority of the incoming message.		

Template Description	
Message priority of the incoming message. range: 0-7	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPriorityRegeneration.ingressPriority	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00011

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPriorityRegeneration	
BSW Parameter		**BSW Type**
EthSwtPriorityRegenerationRegeneratedPriority		EcucIntegerParamDef
BSW Description		
Message priority the incoming message will be tagged with.		
Template Description		
Regenerated message priority. range: 0-7		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPriorityRegeneration.regeneratedPriority		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00010

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress	
BSW Parameter		**BSW Type**
EthSwtPriorityTrafficClassAssignment		EcucParamConfContainerDef
BSW Description		
Defines a priority based traffic class assignment. All messages with a specific priority (EthSwtPriorityTrafficClassAssignmentPriority) arriving at this ingress port or, if enabled regenerated priorities (EthSwtPriorityRegeneration), shall be assigned to a traffic class (EthSwtPriorityTrafficClassAssignmentTrafficClass).		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortDetails.ethernetTrafficClassAssignment		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00006

BSW Module	BSW Context

EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPriorityTrafficClassAssignment		
BSW Parameter		**BSW Type**	
EthSwtPriorityTrafficClassAssignmentPriority		EcucIntegerParamDef	
BSW Description			
Message priority.			
Template Description			
Defines a priority which is mapped onto a Traffic Class.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortTrafficClassAssignment.priority			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00008

BSW Module	**BSW Context**		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortIngress/EthSwtPriorityTrafficClassAssignment		
BSW Parameter		**BSW Type**	
EthSwtPriorityTrafficClassAssignmentTrafficClass		EcucIntegerParamDef	
BSW Description			
Traffic Class value.			
Template Description			
Defines the Traffic Class which is assigned. range: 0-7			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPortTrafficClassAssignment.trafficClass			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00007

BSW Module	**BSW Context**		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort		
BSW Parameter		**BSW Type**	
EthSwtPortMacLayerSpeed		EcucEnumerationParamDef	
BSW Description			
Defines the baud rate of the MAC layer.			
Template Description			
Specifies the mac layer type of the CouplingPort.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.macLayerType			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00045

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSpeed		
BSW Parameter		**BSW Type**	
ETH_MAC_LAYER_SPEED_100M		EcucEnumerationLiteralDef	
BSW Description			
Template Description			
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00046

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSpeed		
BSW Parameter		**BSW Type**	
ETH_MAC_LAYER_SPEED_10G		EcucEnumerationLiteralDef	
BSW Description			
Template Description			
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00046

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSpeed		
BSW Parameter		**BSW Type**	
ETH_MAC_LAYER_SPEED_10M		EcucEnumerationLiteralDef	
BSW Description			
Template Description			
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00046

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSpeed	
BSW Parameter		**BSW Type**
ETH_MAC_LAYER_SPEED_1G		EcucEnumerationLiteralDef
BSW Description		

Template Description	
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00046

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort	
BSW Parameter		**BSW Type**
EthSwtPortMacLayerSubType		EcucEnumerationParamDef
BSW Description		
Defines the MAC layer subtype of this EthSwtPort.		
Template Description		
Specifies the mac layer type of the CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.macLayerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00045

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSubType	
BSW Parameter		**BSW Type**
REDUCED		EcucEnumerationLiteralDef
BSW Description		
Reduced media-independent interface		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00046

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSubType	
BSW Parameter		**BSW Type**
REVERSED		EcucEnumerationLiteralDef
BSW Description		
reversed media-independent interface (to provide direct connection between two Ethernet MACs)		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00046

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSubType	
BSW Parameter		**BSW Type**
SERIAL		EcucEnumerationLiteralDef
BSW Description		
low-power and low pin-count serial 8b/10b-coded media-independent interface		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00046

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSubType	
BSW Parameter		**BSW Type**
STANDARD		EcucEnumerationLiteralDef
BSW Description		
standard media-independent interface		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00046

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortMacLayerSubType	
BSW Parameter		**BSW Type**
UNIVERSAL_SERIAL		EcucEnumerationLiteralDef
BSW Description		
Universal low-power and low pin-count serial 8b/10b-coded media-independent interface		
Template Description		
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00046

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<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>EthSwt</td><td colspan="3">EthSwt/EthSwtConfig/EthSwtPort</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">EthSwtPortMacLayerType</td><td colspan="2">EcucEnumerationParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Defines the MAC layer type of this EthSwtPort.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
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<tr><td colspan="2">EthSwtPortPhysicalLayerType</td><td colspan="2">EcucEnumerationParamDef</td></tr>
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<tr><td colspan="4">Defines the physical layer type of this EthSwtPort.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
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<tr><th colspan="4">M2 Parameter</th></tr>
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<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
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<tr><td>EthSwt</td><td colspan="3">EthSwt/EthSwtConfig/EthSwtPort</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
<tr><td colspan="2">EthSwtPortPredefinedMacAddresses</td><td colspan="2">EcucStringParamDef</td></tr>
<tr><th colspan="4">BSW Description</th></tr>
<tr><td colspan="4">Specifies a list of 48-bit physical addresses (MAC addresses) which can be reached via this port in network byte order.
Note that further addresses can be learned during runtime.</td></tr>
<tr><th colspan="4">Template Description</th></tr>
<tr><td colspan="4"></td></tr>
<tr><th colspan="4">M2 Parameter</th></tr>
<tr><td colspan="4">SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.macMulticastAddress</td></tr>
<tr><th colspan="3">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="3">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="3">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="3">valid</td><td>up_EthSwt_00013</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="3">BSW Context</th></tr>
<tr><td>EthSwt</td><td colspan="3">EthSwt/EthSwtConfig/EthSwtPort</td></tr>
<tr><th colspan="2">BSW Parameter</th><th colspan="2">BSW Type</th></tr>
</table>

EthSwtPortRole	EcucEnumerationParamDef
BSW Description	
Set a special role of the Ethernet switch port. It is either a host port or a up link port. If not configured it is a standard port.	
Template Description	
Defines the role this CouplingPort takes in the context of the CouplingElement.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.couplingPortRole	
Mapping Rule	**Mapping Type**
hostPort mapps to ETHSWT_HOST_PORT. upLinkPort mapps to ETHSWT_UP_LINK_PORT. standardPort mapps to non configured EthSwtPortRole.	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00062

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort
BSW Parameter	**BSW Type**
EthSwtPortTimeStampSupport	EcucBooleanParamDef
BSW Description	
Enables/Disables the Switch-port specific timestamping.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtConfig/EthSwtPort
BSW Parameter	**BSW Type**
EthSwtPortTrcvRef	EcucSymbolicNameReferenceDef
BSW Description	
Reference to the Ethernet transceiver driver this EthSwtPort is connected with.	
Template Description	
Specifies the physical layer type of the CouplingPort.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.physicalLayerType	
Mapping Rule	**Mapping Type**
The reference shall be set if the CouplingPort for which the EthSwtPort is created has a defined physicalLayerType. The value of the parameter EthTrcvPhysLayerType that is defined within the referenced EthTrcvConfig container shall be derived from CouplingPort.physicalLayerType.	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00063

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort		
BSW Parameter		**BSW Type**	
EthSwtPortVlanMembership		EcucParamConfContainerDef	
BSW Description			
Description Determines the membership of this port to the virtual network, i.e. frames with this VID can be received and transmitted via this port.			
Template Description			
Static logical channel or VLAN binding to a switch-port. The reference to an EthernetPhysicalChannel without a VLAN defined represents the handling of untagged frames.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00049

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership		
BSW Parameter		**BSW Type**	
EthSwtPortVlanDefaultPriority		EcucIntegerParamDef	
BSW Description			
Determines the standard output-priority outgoing messages will be tagged with.			
Template Description			
Standard output-priority outgoing Frames will be tagged with. This allows to assign different default-Priorities to each VLAN. Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.defaultPriority			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthSwt_00017

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership		
BSW Parameter		**BSW Type**	
EthSwtPortVlanForwardingType		EcucEnumerationParamDef	
BSW Description			
Defines how the message with a specific VLAN Id shall be handled.			
Template Description			
Attribute denotes whether a VLAN tagged ethernet frame will be 1. sent with its VLAN tag (sentTagged) 2. sent without a VLAN tag (sentUntagged) 3. will be dropped at this port (notSent or VLAN not member of this list)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.sendActivity			
Mapping Rule			**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00018

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership/EthSwtPortVlanForwardingType	
BSW Parameter		**BSW Type**
ETHSWT_NOT_SENT		EcucEnumerationLiteralDef
BSW Description		
The message with the specific VLAN Id shall not be sent at this port.		
Template Description		
will not be sent		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetSwitchVlanEgressTaggingEnum.notSent		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00035

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership/EthSwtPortVlanForwardingType	
BSW Parameter		**BSW Type**
ETHSWT_SENT_TAGGED		EcucEnumerationLiteralDef
BSW Description		
The message with the specific VLAN Id shall be sent with its VLAN Id at this port.		
Template Description		
sent with its VLAN tag		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetSwitchVlanEgressTaggingEnum.sentTagged		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00037

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership/EthSwtPortVlanForwardingType	
BSW Parameter		**BSW Type**
ETHSWT_SENT_UNTAGGED		EcucEnumerationLiteralDef
BSW Description		
The message with the specific VLAN Id shall sent untagged.		
Template Description		
sent without a VLAN tag		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetSwitchVlanEgressTaggingEnum.sentUntagged		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthSwt_00036

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtPort/EthSwtPortVlanMembership	
BSW Parameter		**BSW Type**
EthSwtPortVlanMembershipId		EcucIntegerParamDef
BSW Description		
Determines the VID of the virtual network this port belongs to.		
Template Description		
A VLAN is identified by this attribute according to IEEE 802.1Q. The allowed values range is from 0..4095.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanConfig.vlanIdentifier		
Mapping Rule		**Mapping Type**
if a EthernetPhysicalChannel.vlan.vlanIdentifier is defined the value of vlanIdentifier shall be used for EthSwtPortVlanMembershipId. If no EthernetPhysical Channel.vlan or EthernetPhysicalChannel.vlan.vlanIdentifier is defined then Eth SwtPortVlanMembershipId shall be set to 0.		full
Mapping Status		**Mapping ID**
valid		up_EthSwt_00019

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig	
BSW Parameter		**BSW Type**
EthSwtSpi		EcucParamConfContainerDef
BSW Description		
Configuration of one Ethernet Switch SPI access (if SPI is used).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtConfig/EthSwtSpi	
BSW Parameter		**BSW Type**
EthSwtSpiSequence		EcucParamConfContainerDef
BSW Description		
Container gives EthSwt driver information about one SPI sequence. One SPI sequence used by EthSwt driver is in exclusive use for it. No other driver is allowed to access this sequence. EthSwt driver may use one sequence to access n EthSwt hardware chips of the same type or n sequences are used to access one single EthSwt hardware chip. If a EthSwt hardware has no SPI interface, there is no instance of this container.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtSpi/EthSwtSpiSequence	
BSW Parameter		**BSW Type**
EthSwtSpiAccessSynchronous		EcucBooleanParamDef
BSW Description		
This parameter is used to define whether the access to the Spi sequence is synchronous or asynchronous. true: SPI access is synchronous. false: SPI access is asynchronous.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtConfig/EthSwtSpi/EthSwtSpiSequence	
BSW Parameter		**BSW Type**
EthSwtSpiSequenceName		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a Spi sequence configuration container.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt	
BSW Parameter		**BSW Type**
EthSwtGeneral		EcucParamConfContainerDef
BSW Description		
General configuration of Ethernet Switch Driver module.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtEnableVlanApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_EnableVLAN API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetArlTableApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetArlTable API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetBaudRateApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetBaudRate API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetBufferLevelApi		EcucBooleanParamDef
BSW Description		
Enables / Disables API to fetch the switch buffer utilization.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetCfgDataRawDone		EcucFunctionNameDef
BSW Description		
Defines the function name for <GetCfgDataRawDone>		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetCfgHexDumpApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetCfgHexDump API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetCfgHexDumpLengthApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetCfgHexDumpLength API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetCfgRaw		EcucBooleanParamDef
BSW Description		
Disable /Enable support of reading raw data from switch memory		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetDropCountApi		EcucBooleanParamDef
BSW Description		

Enables / Disables EthSwt_GetCounterValues API	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetDuplexModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetDuplexMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetLinkStateApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetLinkState API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetMacLearningModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetMacLearningMode API.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetPortCableDiagnosticsResultApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetPortCableDiagnosticsResult API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetPortIdentifierApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetPortIdentifier API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetPortMacAddrApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetPortMacAddr API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetPortMirrorStateApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetPortMirrorState API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetPortSignalQualityApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetPortSignalQuality API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetRxStatsApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetEtherStats API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetSwitchIdentifierApi		EcucBooleanParamDef
BSW Description		

Enables / Disables EthSwt_GetSwitchIdentifier API	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetSwitchPortModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetSwitchPortMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetSwitchRegApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_GetSwitchReg API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetTxErrorCounterValuesApi		EcucBooleanParamDef
BSW Description		
Enables/Disables Eth_GetTxErrorCounterValues API.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGetTxStatsApi		EcucBooleanParamDef
BSW Description		
Enables/Disables Eth_GetTxStats API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtGlobalTimeSupportApi		EcucBooleanParamDef
BSW Description		
Enables/Disables the Global Time APIs used amongst others by Global Time Synchronization over Ethernet.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtLinkDownCallout	EcucFunctionNameDef
BSW Description	
Defines the function name for the <EthSwtLinkDownCallout> callout.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtLinkDownUser	EcucFunctionNameDef
BSW Description	
Defines the <User> function name for the <User>_LinkDown callback.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtLinkUpCallout	EcucFunctionNameDef
BSW Description	
Defines the function name for the <EthSwtLinkUpCallout> callout.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral

BSW Parameter	**BSW Type**
EthSwtLinkUpUser	EcucFunctionNameDef
BSW Description	
Defines the <User> function name for the <User>_LinkUp callback.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtLowPowerModeSupport	EcucBooleanParamDef
BSW Description	
Disable / Enable support of low power mode.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtMainFunctionPeriod	EcucFloatParamDef
BSW Description	
The cycle time of the periodic main function of EthSwt. Defined in seconds .	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthSwt	EthSwt/EthSwtGeneral
BSW Parameter	**BSW Type**
EthSwtManagementSupportApi	EcucBooleanParamDef
BSW Description	
Enables/Disables the Switch management APIs to support a Switch-port specific communication attribute access.	

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtMgmtInfoIndicationTimeout		EcucFloatParamDef
BSW Description		
This parameter specifies the timeout while the Switch driver is waiting for management information out of the Switch for reception. The value 0 deactivates the timeout supervision. Unit: seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtPersistentConfigurationResult		EcucBooleanParamDef
BSW Description		
Enables / Disables the callback API <User>_PersistentConfigurationResult.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtPersistentConfigurationResultUser		EcucFunctionNameDef
BSW Description		
Defines the <User> function name for the <User>_PersistentConfigurationResult callback.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtPublicCddHeaderFile		EcucStringParamDef
BSW Description		
Defines header files for callback functions which shall be included in case of CDDs.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtReadPortMirrorConfigurationApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_ReadPortMirrorConfiguration API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtReadTrcvRegisterApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_ReadTrcvRegister API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtResetConfigurationApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_ResetConfiguration API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtSetForwardingModeApi		EcucBooleanParamDef
BSW Description		
Enables /disables EthSwt_SetForwardingMode API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtSetMacLearningModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_SetMacLearningMode API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtGeneral		
BSW Parameter		**BSW Type**	
EthSwtSetPortLoopbackModeApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthSwt_SetPortLoopbackModeApi API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtGeneral		
BSW Parameter		**BSW Type**	
EthSwtSetPortMirrorStateApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthSwt_SetPortMirrorState API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthSwt	EthSwt/EthSwtGeneral		
BSW Parameter		**BSW Type**	
EthSwtSetPortTestModeApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthSwt_SetPortTestMode API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtSetPortTxModeApi		EcucBooleanParamDef
BSW Description		

Enables / Disables EthSwt_SetPortTxModeApi API	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtSetSwitchPortModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_SetSwitchPortMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtSetSwitchRegApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_SetSwitchReg API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtStartSwitchPortAutoNegotiationApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_StartSwitchPortAutoNegotiation API		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtStoreConfigurationApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_StoreConfiguration API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtVerifyConfigApi		EcucBooleanParamDef
BSW Description		
Enables /disables EthSwt_VerifyConfig API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables / Disables version info API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtWritePortMirrorConfigurationApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_WritePortMirrorConfiguration API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthSwt	EthSwt/EthSwtGeneral	
BSW Parameter		**BSW Type**
EthSwtWriteTrcvRegisterApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthSwt_WriteTrcvRegister API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.6.4 Service Discovery

BSW Module	BSW Context	
Sd	Sd	
BSW Parameter		**BSW Type**
SdConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR Service Discovery module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
Sd	Sd/SdConfig

BSW Parameter		BSW Type
SdCapabilityRecordMatchCallout		EcucParamConfContainerDef
BSW Description		
Callout that is invoked by the Sd implementation to determine whether the configuration options contained in the entries of a received SD message match the capability record elements configured in SdServerCapabilityRecord or SdClientCapabilityRecord.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdCapabilityRecordMatchCallout	
BSW Parameter		**BSW Type**
SdCapabilityRecordMatchCalloutName		EcucFunctionNameDef
BSW Description		
Function name (i.e., C-identifier) of the SdCapabilityRecordMatchCallout.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig	
BSW Parameter		**BSW Type**
SdInstance		EcucParamConfContainerDef
BSW Description		
This container represents an instance of the SD; i.e. the SD configuration for a certain link.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdClientService		EcucParamConfContainerDef
BSW Description		

This container specifies all parameters used by Client services.	
Template Description	
Service instances that are consumed by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedServiceInstance	
Mapping Rule	**Mapping Type**
Create container for each existing ConsumedServiceInstance that is available in the Ecu Extract.	full
Mapping Status	**Mapping ID**
valid	up_Sd_00012

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientCapabilityRecord		EcucParamConfContainerDef
BSW Description		
Sd uses capability records to store arbitrary name/value pairs conveying additional information about the named service. The following use cases are supported: 1) Key present, with no value (e.g. "passreq" -- password required for this service) 2) Key present, with empty value (e.g. "PlugIns=" server supports plugins, but none are presently installed) 3) Key present, with non-empty value (e.g. "PlugIns=JPEG,MPEG2,MPEG4")		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdClientConfig.capabilityRecord		
Mapping Rule		**Mapping Type**
1:1 mapping to ConsumedServiceInstance.sdClientConfig.capabilityRecord.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00023

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdClientService/SdClientCapabilityRecord	
BSW Parameter		**BSW Type**
SdClientServiceCapabilityRecordKey		EcucStringParamDef
BSW Description		
Defines a CapabilityRecord key.		
Template Description		
Defines a key.		
M2 Parameter		
GenericStructure::GeneralTemplateClasses::TagWithOptionalValue::TagWithOptionalValue.key		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00025

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService/SdClientCapabilityRecord	
BSW Parameter		**BSW Type**
SdClientServiceCapabilityRecordValue		EcucStringParamDef
BSW Description		
Defines the corresponding CapabilityRecord value.		
Template Description		
Defines the corresponding value.		
M2 Parameter		
GenericStructure::GeneralTemplateClasses::TagWithOptionalValue::TagWithOptionalValue.value		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00024

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientCapabilityRecordMatchCalloutRef		EcucReferenceDef
BSW Description		
Reference to a SdCapabilityRecordMatchCallout, The referenced SdCapabilityRecordMatchCallout is invoked to determine whether the configuration options contained in the entries of a received SD message match the client's configured SdClientCapabilityRecord elements.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientServiceAutoRequire		EcucBooleanParamDef
BSW Description		
If existing and set to true, this Service will be set to "required" on start.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**

SdClientServiceHandleId		EcucIntegerParamDef	
BSW Description			
The HandleId by which the BswM can identify this Client Service Instance.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService		
BSW Parameter		**BSW Type**	
SdClientServiceId		EcucIntegerParamDef	
BSW Description			
Id to identify the service. This is unique for the service interface.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedServiceInstance.provided ServiceInstance			
Mapping Rule			**Mapping Type**
Shall be derived from the ConsumedServiceInstance.providedServiceInstance reference (serviceIdentifier attribute).			full
Mapping Status			**Mapping ID**
valid			up_Sd_00030

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService		
BSW Parameter		**BSW Type**	
SdClientServiceInstanceId		EcucIntegerParamDef	
BSW Description			
Configuration parameter to specify Instance Id of the service as used in SD entries.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedServiceInstance.provided ServiceInstance			
Mapping Rule			**Mapping Type**
Shall be derived from the ConsumedServiceInstance.providedServiceInstance reference (InstanceIdentifier attribute).			full
Mapping Status			**Mapping ID**
valid			up_Sd_00013

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientServiceMajorVersion		EcucIntegerParamDef

BSW Description	
Major version number of the Service as used in the SD entries.	
Template Description	
Major version number of the Service.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdClientConfig.clientServiceMajorVersion	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Sd_00014

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientServiceMinorVersion		EcucIntegerParamDef
BSW Description		
Minor version number of the Service as used in the SD Service Entries. If configured to 0xffffffff (any), SD will accept all Minor Versions.		
Template Description		
Minor version number of the Service.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdClientConfig.clientServiceMinorVersion		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00029

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdClientService	
BSW Parameter		**BSW Type**
SdClientServiceTcpRef		EcucReferenceDef
BSW Description		
Reference to the SoAdSocketConnection representing the data path (TCP) for communication with methods. This element is also used to set the remote address of the server and to open the TCP connection.		
Template Description		
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint		
Mapping Rule		**Mapping Type**
Shall be derived from the ApplicationEndpoint which aggregates the ConsumedServiceInstance		full
Mapping Status		**Mapping ID**
valid		up_Sd_00019

BSW Module	**BSW Context**

Sd	Sd/SdConfig/SdInstance/SdClientService		
BSW Parameter		**BSW Type**	
SdClientServiceTimerRef		EcucReferenceDef	
BSW Description			
The reference of the SdClientTimer container for this service.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedServiceInstance.sdClientConfig			
Mapping Rule			**Mapping Type**
The reference to the SdClientTimer shall be created pointing to the SdClientTimer container which was created based on the ConsumedServiceInstance.sdClientConfig			full
Mapping Status			**Mapping ID**
valid			up_Sd_00067

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService		
BSW Parameter		**BSW Type**	
SdClientServiceUdpRef		EcucReferenceDef	
BSW Description			
Reference to the SoAdSocketConnection representing the data path (UDP) for communication with methods. This element is also used to set the remote address of the server.			
Template Description			
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint			
Mapping Rule			**Mapping Type**
Shall be derived from the ApplicationEndpoint which aggregates the ConsumedServiceInstance			full
Mapping Status			**Mapping ID**
valid			up_Sd_00020

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService		
BSW Parameter		**BSW Type**	
SdConsumedEventGroup		EcucParamConfContainerDef	
BSW Description			
A Service may have event groups which can be consumed. A service consumer has to subscribe to the corresponding event-group. After the subscription the event consumer takes the role of a server and the event provider that of a client.			
Template Description			
A Service may have event groups which can be consumed. A service consumer has to subscribe to the corresponding event-group. After the subscription the event consumer takes the role of a server and the event provider that of a client.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup			
Mapping Rule			**Mapping Type**

Create container for every existing consumedEventGroup that is aggregated by the ConsumedServiceInstance	full
Mapping Status	**Mapping ID**
valid	up_Sd_00021

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup		
BSW Parameter		**BSW Type**	
SdConsumedEventGroupAutoRequire		EcucBooleanParamDef	
BSW Description			
If existing and set to true, this EventGroup will be set to "required" on start.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup		
BSW Parameter		**BSW Type**	
SdConsumedEventGroupHandleId		EcucIntegerParamDef	
BSW Description			
The HandleId by which the BswM can identify this EventGroup.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup		
BSW Parameter		**BSW Type**	
SdConsumedEventGroupId		EcucIntegerParamDef	
BSW Description			
The Eventgroup Id of this eventGroup as a unique identifier of the eventgroup in this service. This identifier is used for EventGroup entries as well.			
Template Description			
EventGroup ID. Shall be unique within one system to allow service discovery.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.eventGroupIdentifier			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**

valid	up_Sd_00027

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup	
BSW Parameter		**BSW Type**
SdConsumedEventGroupMulticastActivationRef		EcucSymbolicNameReferenceDef
BSW Description		
The reference of a Routing Group in order to activate and setup the Socket Connection for Multicast Events of this EventGroup. The multicast address from the received Multicast option is setup by SoAd_RequestIpAddrAssignment. The local address is the same as for the unicast events; thus, it was sent in the UDP Endpoint option of the Subscribe EventGroup entry. This is usually equal to the SdConsumedEventGroupUdpActivationRef.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.routingGroup		
Mapping Rule		**Mapping Type**
This container shall be created if the CEG that is aggregated by an Application Endpoint with a multicast configuration contains a reference to the SoAdRoutingGroup and the eventGroupControlType of the SoAdRoutingGroup is set to activationMulticast.ulticast".		full
Mapping Status		**Mapping ID**
valid		up_Sd_00026

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup	
BSW Parameter		**BSW Type**
SdConsumedEventGroupMulticastGroupRef		EcucReferenceDef
BSW Description		
Reference to the SoAdSocketConnectionGroup representing the multicast data path (UDP).		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.clientPort		
Mapping Rule		**Mapping Type**
Reference shall be derived from a SocketConnection that contains a reference to a SocketAddress with mutlicastConnector and with the regarded EventHandler in the ApplicationEndpoint.		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup	
BSW Parameter		**BSW Type**
SdConsumedEventGroupTcpActivationRef		EcucSymbolicNameReferenceDef
BSW Description		

The reference of the Routing Group for activation of the data path for receiving TCP events. This element is also being used for getting the IP address and port number for building the TCP endpoint option for the Subscribe EventGroup entry. If no TCP methods are used in the service, this element is also being used for setting the remote address (TCP Endpoint option referenced by the Offer Service entry) and opening the TCP connection to the server before sending the Subscribe EventGroup entry. If multiple EventGroups of the same Service Instance are subscribed the TCP connection will be shared and must be opened only once.
Template Description
M2 Parameter
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.routingGroup

Mapping Rule	**Mapping Type**
This container shall be created if the CEG that is aggregated by an Application Endpoint with a TcpTp configuration contains a reference to the SoAdRouting Group and the eventGroupControlType of the SoAdRoutingGroup is set to activationUnicast.st".	full
Mapping Status	**Mapping ID**
valid	up_Sd_00022

BSW Module	**BSW Context**
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup
BSW Parameter	**BSW Type**
SdConsumedEventGroupTimerRef	EcucReferenceDef
BSW Description	
The reference of the SdClientTimer container for this eventGroup.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedServiceInstance.sdClient Config	
Mapping Rule	**Mapping Type**
The reference to the SdClientTimer shall be created pointing to the SdClient Timer container which was created based on the ConsumedEventGroup.sd ClientConfig	full
Mapping Status	**Mapping ID**
valid	up_Sd_00069

BSW Module	**BSW Context**
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedEventGroup
BSW Parameter	**BSW Type**
SdConsumedEventGroupUdpActivationRef	EcucSymbolicNameReferenceDef
BSW Description	

The reference of the Routing Group for activation of the data path for receiving UDP events. This element is also being used for getting the IP address and port number for building the UDP endpoint option for the Subscribe EventGroup entry.   If no UDP methods are used in the service, this element is also being used for setting the remote address (UDP Endpoint option referenced by the Offer Service entry). If multiple EventGroups of the same Service Instance are subscribed the UDP Socket Connection will be shared and must be set only once.
Template Description
M2 Parameter
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.routingGroup

Mapping Rule	**Mapping Type**
This container shall be created if the CEG that is aggregated by an ApplicationEndpoint with UdpTp configuration contains a reference to the SoAdRouting Group and the eventGroupControlType of the SoAdRoutingGroup is set to activationUnicast.st".	full
Mapping Status	**Mapping ID**
valid	up_Sd_00028

BSW Module	**BSW Context**
Sd	Sd/SdConfig/SdInstance/SdClientService
BSW Parameter	**BSW Type**
SdConsumedMethods	EcucParamConfContainerDef
BSW Description	
Container element for representing the data path for accessing the server methods.	
Template Description	
M2 Parameter	
SystemTemplate::DataMapping::DataMapping.serviceInstance	
Mapping Rule	**Mapping Type**
A method is described as a ClientServerInterface of a Software Component. If DataMappings exist that map operations of a ClientServerInterface to the regarded ConsumedServiceInstance then this container needs to be created.	full
Mapping Status	**Mapping ID**
valid	up_Sd_00018

BSW Module	**BSW Context**
Sd	Sd/SdConfig/SdInstance/SdClientService/SdConsumedMethods
BSW Parameter	**BSW Type**
SdClientServiceActivationRef	EcucSymbolicNameReferenceDef
BSW Description	
Reference to a SoAdRoutingGroupRef to activate/deactivate the data path for the methods.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::AbstractServiceInstance.routingGroup	
Mapping Rule	**Mapping Type**
This reference shall be created if the ConsumedServiceInstance contains a reference to the SoAdRoutingGroup.	local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdClientTimer		EcucParamConfContainerDef
BSW Description		
This container specifies all timers used by the Service Discovery module for Client Services.		
Template Description		
Client configuration for Service-Discovery.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdClientConfig		
Mapping Rule		**Mapping Type**
The Timing parameters can be derived from the SdClientConfig attributes and the aggregated elements RequestResponseDelay and InitialSdDelayConfig.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00032

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientTimer	
BSW Parameter		**BSW Type**
SdClientTimerInitialFindDelayMax		EcucFloatParamDef
BSW Description		
Max value in [s] to delay randomly the transmission of a find message. This parameter is mandatory for ClientService.		
Template Description		
Max Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialDelayMaxValue		
Mapping Rule		**Mapping Type**
Take information from SdClientConfig.initialFindBehavior		full
Mapping Status		**Mapping ID**
valid		up_Sd_00035

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientTimer	
BSW Parameter		**BSW Type**
SdClientTimerInitialFindDelayMin		EcucFloatParamDef
BSW Description		
Min value in [s] to delay randomly the transmission of a find message. This parameter is mandatory for ClientService.		
Template Description		
Min Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialDelayMinValue		

Mapping Rule	Mapping Type
Take information from SdClientConfig.initialFindBehavior	full
Mapping Status	**Mapping ID**
valid	up_Sd_00033

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientTimer	
BSW Parameter		**BSW Type**
SdClientTimerInitialFindRepetitionsBaseDelay		EcucFloatParamDef
BSW Description		
The base delay in [s] for find repetitions. Successive finds have an exponential back off delay (1x base delay, 2x base delay, 4x base delay, ...). This parameter is mandatory for ClientService.		
Template Description		
The base delay for offer repetitions (if aggregated by SdServerConfig) or find repetitions (if aggregated by SdClientConfig. Successive find messages have an exponential back off delay.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialRepetitionsBaseDelay		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00036

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientTimer	
BSW Parameter		**BSW Type**
SdClientTimerInitialFindRepetitionsMax		EcucIntegerParamDef
BSW Description		
Configuration for the maximum number of find repetitions. This parameter is mandatory for ClientService.		
Template Description		
Describes the maximum amount of offer repetitions (if aggregated by SdServerConfig) or the maximum amount of find repetitions (if aggregated by SdClientConfig).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialRepetitionsMax		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00038

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdClientTimer	
BSW Parameter		**BSW Type**
SdClientTimerRequestResponseMaxDelay		EcucFloatParamDef
BSW Description		
Maximum allowable response delay to entries received by multicast in seconds. This parameter is mandatory for ConsumedEventGroups.		
Template Description		
Maximum allowable response delay to entries received by multicast in seconds.		

M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::RequestResponseDelay.maxValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Sd_00039

BSW Module	BSW Context
Sd	Sd/SdConfig/SdInstance/SdClientTimer
BSW Parameter	**BSW Type**
SdClientTimerRequestResponseMinDelay	EcucFloatParamDef
BSW Description	
Minimum allowable response delay to the find message in seconds. This parameter is mandatory for ConsumedEventGroups.	
Template Description	
Minimum allowable response delay to entries received by multicast in seconds.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::RequestResponseDelay.minValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Sd_00037

BSW Module	BSW Context
Sd	Sd/SdConfig/SdInstance/SdClientTimer
BSW Parameter	**BSW Type**
SdClientTimerTTL	EcucIntegerParamDef
BSW Description	
Time to live for find and subscribe messages.	
Template Description	
TTL for Request and Subscribe messages.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdClientConfig.ttl	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Sd_00034

BSW Module	BSW Context
Sd	Sd/SdConfig/SdInstance
BSW Parameter	**BSW Type**
SdInstanceDemEventParameterRefs	EcucParamConfContainerDef
BSW Description	
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdInstanceDemEventParameterRefs	
BSW Parameter		**BSW Type**
SD_E_MALFORMED_MSG		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when the SD Instance received malformed messsage.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdInstanceDemEventParameterRefs	
BSW Parameter		**BSW Type**
SD_E_OUT_OF_RES		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when the SD Instance does not have enough resources to handle client.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdInstanceDemEventParameterRefs	
BSW Parameter		**BSW Type**
SD_E_SUBSCR_NACK_RECV		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the DemEventParameter which shall be issued when receiving SubscribeEventgroupNack entry.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdInstanceHostname		EcucStringParamDef
BSW Description		
Configuration parameter to specify the Hostname.		
Template Description		
Defines the fully qualified domain name (FQDN) e.g. some.example.host.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpoint.fullyQualifiedDomainName		
Mapping Rule		**Mapping Type**
Shall be derived from the NetworkEndpoint.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00031

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdInstanceLocalAdressCheckLength		EcucIntegerParamDef
BSW Description		
This item describes on how many bits of the addresses shall be compared to determine, if a remote address is acceptable to be used. This shall support IPv4 (0..32) and IPv6 (0..128). If this item is not present, the security checks use the configured netmask instead. "0" meaning not to check at all. For example "8" means that the first 8 bits of a remote address must be equal to the local address to be considered acceptable.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdInstanceMulticastRxPdu		EcucParamConfContainerDef
BSW Description		
This container specifies the received PDU.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort		

Mapping Rule	**Mapping Type**
The direction of the Pdu can be derived from the PduTriggering that refers to the GeneralPurposePdu that represents the SdPdu.	full
Mapping Status	**Mapping ID**
valid	up_Sd_00011

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdInstanceMulticastRxPdu	
BSW Parameter		**BSW Type**
SdRxPduId		EcucIntegerParamDef
BSW Description		
ID of the PDU that will be received via the API Sd_SoAdIfRxIndication().		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdInstanceMulticastRxPdu	
BSW Parameter		**BSW Type**
SdRxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdInstanceTxPdu		EcucParamConfContainerDef
BSW Description		
This container specifies the transmitted PDU.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort		
Mapping Rule		**Mapping Type**
The direction of the Pdu can be derived from the PduTriggering that refers to the GeneralPurposePdu that represents the SdPdu.		full
Mapping Status		**Mapping ID**

valid	up_Sd_00010

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdInstanceTxPdu	
BSW Parameter		**BSW Type**
SdTxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance	
BSW Parameter		**BSW Type**
SdInstanceUnicastRxPdu		EcucParamConfContainerDef
BSW Description		
This container specifies the received PDU.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPduPort		
Mapping Rule		**Mapping Type**
The direction of the Pdu can be derived from the PduTriggering that refers to the GeneralPurposePdu that represents the SdPdu.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00040

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdInstanceUnicastRxPdu	
BSW Parameter		**BSW Type**
SdRxPduId		EcucIntegerParamDef
BSW Description		
ID of the PDU that will be received via the API Sd_SoAdIfRxIndication().		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

Sd	Sd/SdConfig/SdInstance/SdInstanceUnicastRxPdu		
BSW Parameter		**BSW Type**	
SdRxPduRef		EcucReferenceDef	
BSW Description			
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance		
BSW Parameter		**BSW Type**	
SdServerService		EcucParamConfContainerDef	
BSW Description			
This container specifies all parameters used by Server services.			
Template Description			
Service instances that are provided by the ECU that is connected via the ApplicationEndpoint to a CommunicationConnector.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ProvidedServiceInstance			
Mapping Rule			**Mapping Type**
Create container for each existing ProvidedServiceInstance that is available in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00041

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdEventHandler		EcucParamConfContainerDef	
BSW Description			
Container Element for representing an EventGroup as part of the Service Instance.			
Template Description			
Configures the outbound application endpoint a server uses to call a clients callback. Only required if the source TpPort is not dynamically assigned. If a consumed event group is referenced the configuration is only valid for this relation.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler			
Mapping Rule			**Mapping Type**
Create container for every existing EventHandler that is aggregated by the ProvidedServiceInstance			full
Mapping Status			**Mapping ID**
valid			up_Sd_00047

BSW Module	**BSW Context**

Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler		
BSW Parameter		**BSW Type**	
SdEventHandlerEventGroupId		EcucIntegerParamDef	
BSW Description			
The EventGroup Id of this EventGroup as a unique identifier of the EventGroup in this service. This identifier is used for EventGroup entries as well.			
Template Description			
EventGroup ID. Shall be unique within one system to allow service discovery.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.eventGroupIdentifier			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00054

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler		
BSW Parameter		**BSW Type**	
SdEventHandlerHandleId		EcucIntegerParamDef	
BSW Description			
The HandleId by which the BswM can identify this EventGroup.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler		
BSW Parameter		**BSW Type**	
SdEventHandlerMulticast		EcucParamConfContainerDef	
BSW Description			
The subcontainer including the Routing Group for Activation of Events sent over Multicast. The activation ref is also being used for identification of the related Socket Connection in order to find the Multicast Address used in the Multicast Option referenced by the Subscribe EventGroup Ack entry.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler.routingGroup			
Mapping Rule			**Mapping Type**
This container shall be created if the EventHandler that is aggregated by an ApplicationEndpoint with a multicast configuration contains a reference to the SoAdRoutingGroup.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00051

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>Sd</td><td colspan="2">Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandler Multicast</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SdEventActivationRef</td><td>EcucSymbolicNameReferenceDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Reference to a SoAdRoutingGroup for activation of the data path for a subscribed client (start sending events after subscribe). This is usually equal to the SdEventActivationRef referenced by SdEventHandlerUdp</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed.

Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroup ControlType</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">Use this reference if eventGroupControlType is set to activationUnicast, activationMulticast or activationAndTriggerUnicast.</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_Sd_00057</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>Sd</td><td colspan="2">Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandler Multicast</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SdMulticastEventSoConRef</td><td>EcucSymbolicNameReferenceDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Reference to the SoAdSocketConnection representing the multicast data path (UDP).</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.clientPort</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">Reference shall be derived from a SocketConnection that contains a reference to a SocketAddress with mutlicastConnector and with the regarded EventHandler in the ApplicationEndpoint.</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>Sd</td><td colspan="2">Sd/SdConfig/SdInstance/SdServerService/SdEventHandler</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SdEventHandlerMulticastThreshold</td><td>EcucIntegerParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
</table>

<table>
<tr><td colspan="2">Specifies the number of subscribed clients that trigger the Server to change the transmission of events to Multicast.

If configured to 0 only unicast will be used.
If configured to 1 the first client will be already served by multicast.
If configured to 2 the first client will be served with unicast and as soon as the second client arrives both will be served by multicast.

This does not influence the handling of initial events, which are served using unicast only.</td></tr>
<tr><th colspan="2">Template Description</th></tr>
<tr><td colspan="2">Specifies the number of subscribed clients that trigger the server to change the transmission of events to multicast.

If configured to 0 only unicast will be used.
If configured to 1 the first client will be already served by multicast.
If configured to 2 the first client will be server with unicast and as soon as the second client arrives both will be served by multicast.

This does not influence the handling of initial events, which are served using unicast only.</td></tr>
<tr><th colspan="2">M2 Parameter</th></tr>
<tr><td colspan="2">SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler.multicastThreshold</td></tr>
<tr><th>Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td>1:1 mapping</td><td>full</td></tr>
<tr><th>Mapping Status</th><th>Mapping ID</th></tr>
<tr><td>valid</td><td>up_Sd_00053</td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>Sd</td><td colspan="2">Sd/SdConfig/SdInstance/SdServerService/SdEventHandler</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SdEventHandlerTcp</td><td>EcucParamConfContainerDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">The subcontainer including the Routing Groups for Activation and Trigger Transmit for Events sent over TCP.

The activation ref (or triggering ref if no activation ref exists) is also being used for identification of the related socket connections in order to find the related client by iterating the SdEventHandlerTcp elements (remote address statically configured or automatically set by opening TCP connection before subscription).</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler.routingGroup</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">This container shall be created if the EventHandler that is aggregated by an ApplicationEndpoint with a TcpTp configuration contains a reference to the So AdRoutingGroup.</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_Sd_00055</td></tr>
</table>

BSW Module	BSW Context
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandler Tcp

BSW Parameter		**BSW Type**
SdEventActivationRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a SoAdRoutingGroup for activation of the data path for a subscribed client (start sending events after subscribe). This is usually equal to the SdEventActivationRef referenced by SdEventHandlerUdp		
Template Description		
This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroupControlType		
Mapping Rule		**Mapping Type**
Use this reference if eventGroupControlType is set to activationUnicast, activationMulticast or activationAndTriggerUnicast.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00057

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandlerTcp	
BSW Parameter		**BSW Type**
SdEventTriggeringRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a SoAdRoutingGroup that is used for triggered transmit. Triggering is needed to sent out initial events on the server side after a client got subscribed.		
Template Description		
This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroupControlType		
Mapping Rule		**Mapping Type**
Use this reference if eventGroupControlType is set to triggerUnicast or activationAndTriggerUnicast.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00056

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler	
BSW Parameter		**BSW Type**
SdEventHandlerTimerRef		EcucReferenceDef

BSW Description	
The reference of the SdServerTimer container for this EventGroup.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler.sdServerConfig	
Mapping Rule	**Mapping Type**
The reference to the SdServerTimer shall be created pointing to the SdServer Timer container which was created based on the EventHandler.sdServerConfig	full
Mapping Status	**Mapping ID**
valid	up_Sd_00068

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler	
BSW Parameter		**BSW Type**
SdEventHandlerUdp		EcucParamConfContainerDef
BSW Description		
The subcontainer including the Routing Groups for Activation and Trigger Transmit for Events sent over UDP. The activation ref (or triggering ref if no activation ref exists) is also being used for identification of the related socket connections in order to set the remote address of the client or find the related client by iterating the SdEventHandlerUdp elements (remote address statically configured or automatically set by method call before subscription).		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EventHandler.routingGroup		
Mapping Rule		**Mapping Type**
This container shall be created if the EventHandler that is aggregated by an ApplicationEndpoint with a UdpTp configuration contains a reference to the SoAdRoutingGroup.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00048

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandlerUdp	
BSW Parameter		**BSW Type**
SdEventActivationRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a SoAdRoutingGroup for activation of the data path for a subscribed client (start sending events after subscribe). This is usually equal to the SdEventActivationRef referenced by SdEventHandlerUdp		
Template Description		
This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.		

M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroupControlType	
Mapping Rule	**Mapping Type**
Use this reference if eventGroupControlType is set to activationUnicast, activationMulticast or activationAndTriggerUnicast.	full
Mapping Status	**Mapping ID**
valid	up_Sd_00057

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdEventHandler/SdEventHandlerUdp	
BSW Parameter		**BSW Type**
SdEventTriggeringRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a SoAdRoutingGroup that is used for triggered transmit. Triggering is needed to sent out initial events on the server side after a client got subscribed.		
Template Description		
This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroupControlType		
Mapping Rule		**Mapping Type**
Use this reference if eventGroupControlType is set to triggerUnicast or activationAndTriggerUnicast.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00056

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdServerService	
BSW Parameter		**BSW Type**
SdProvidedMethods		EcucParamConfContainerDef
BSW Description		
Container element for representing the needed elements of the data path for the methods provided by the service.		
Template Description		
M2 Parameter		
SystemTemplate::DataMapping::DataMapping.serviceInstance		
Mapping Rule		**Mapping Type**
A method is described as a ClientServerInterface of a Software Component. If DataMappings exist that map operations of a ClientServerInterface to the regarded ProvidedServiceInstance then this container needs to be created.		full
Mapping Status		**Mapping ID**
valid		up_Sd_00043

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService/SdProvidedMethods		
BSW Parameter		**BSW Type**	
SdServerServiceActivationRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to a SoAdRoutingGroup to activated and deactivate the data path for methods of the service.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::AbstractServiceInstance.routingGroup			
Mapping Rule			**Mapping Type**
This reference shall be created if the ProvidedServiceInstance contains a reference to the SoAdRoutingGroup.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00045

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerCapabilityRecord		EcucParamConfContainerDef	
BSW Description			
Sd uses capability records to store arbitrary name/value pairs conveying additional information about the named service. The following use cases are supported: 1) Key present, with no value (e.g. "passreq" -- password required for this service) 2) Key present, with empty value (e.g. "PlugIns=" server supports plugins, but none are presently installed) 3) Key present, with non-empty value (e.g. "PlugIns=JPEG,MPEG2,MPEG4")			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig.capabilityRecord			
Mapping Rule			**Mapping Type**
1:1 mapping to ProvidedServiceInstance.sdServerConfig.capabilityRecord.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00062

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService/SdServerCapabilityRecord		
BSW Parameter		**BSW Type**	
SdServerCapabilityRecordKey		EcucStringParamDef	
BSW Description			
Defines a CapabilityRecord key.			
Template Description			
Defines a key.			
M2 Parameter			
GenericStructure::GeneralTemplateClasses::TagWithOptionalValue::TagWithOptionalValue.key			
Mapping Rule			**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_Sd_00063

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdServerService/SdServerCapabilityRecord	
BSW Parameter		**BSW Type**
SdServerCapabilityRecordValue		EcucStringParamDef
BSW Description		
Defines the corresponding CapabilityRecord value.		
Template Description		
Defines the corresponding value.		
M2 Parameter		
GenericStructure::GeneralTemplateClasses::TagWithOptionalValue::TagWithOptionalValue.value		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00064

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdServerService	
BSW Parameter		**BSW Type**
SdServerCapabilityRecordMatchCalloutRef		EcucReferenceDef
BSW Description		
Reference to a SdCapabilityRecordMatchCallout, The referenced SdCapabilityRecordMatchCallout is invoked to determine whether the configuration options contained in the entries of a received SD message match the server's configured SdServerCapabilityRecord elements.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdConfig/SdInstance/SdServerService	
BSW Parameter		**BSW Type**
SdServerServiceAutoAvailable		EcucBooleanParamDef
BSW Description		
If existing and set to true, this Service will be set to "Available" on start.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceHandleId		EcucIntegerParamDef	
BSW Description			
The HandleId by which the BswM can identify this Server Service Instance.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceId		EcucIntegerParamDef	
BSW Description			
Id to identify the service. This is unique for the service interface.			
Template Description			
Service ID. Shall be unique within one system to allow service discovery.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ProvidedServiceInstance.serviceIdentifier			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00066

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceInstanceId		EcucIntegerParamDef	
BSW Description			
Configuration parameter to specify Instance Id of the Service implemented by the Server Service.			
Template Description			
Instance identifier. Can be used for e.g. service discovery to identify the instance of the service.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ProvidedServiceInstance.instanceIdentifier			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00046

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	

SdServerServiceMajorVersion	EcucIntegerParamDef	
BSW Description		
Major version number of the Service as used in SD Entries.		
Template Description		
Major version number of the Service.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig.serverServiceMajorVersion		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_Sd_00042

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceMinorVersion		EcucIntegerParamDef	
BSW Description			
Minor version number of the Service as used e.g. in Offer Service entries.			
Template Description			
Minor version number of the Service.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig.serverServiceMinorVersion			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00065

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceTcpRef		EcucReferenceDef	
BSW Description			
Reference to SoAdSocketConnectionGroup used for methods. This is used to access the local IP address and port for building the endpoint option for offers of this service.			
Template Description			
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint			
Mapping Rule			**Mapping Type**
Shall be derived from the ApplicationEndpoint which aggregates the Provided ServiceInstance.			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**

Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceTimerRef		EcucReferenceDef	
BSW Description			
The reference of the SdServerTimer container for this service.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ProvidedServiceInstance.sdServerConfig			
Mapping Rule			**Mapping Type**
The reference to the SdServerTimer shall be created pointing to the SdServerTimer container which was created based on the ProvidedServiceInstance.sdServerConfig.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00061

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerService		
BSW Parameter		**BSW Type**	
SdServerServiceUdpRef		EcucReferenceDef	
BSW Description			
Reference to SoAdSocketConnectionGroup used for methods. This is used to access the local IP address and port for building the endpoint option for offers of this service.			
Template Description			
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint			
Mapping Rule			**Mapping Type**
Shall be derived from the ApplicationEndpoint which aggregates the ProvidedServiceInstance.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00044

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance		
BSW Parameter		**BSW Type**	
SdServerTimer		EcucParamConfContainerDef	
BSW Description			
This container specifies all timers used by the Service Discovery module for Server Services.			
Template Description			
Server configuration for Service-Discovery.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig			
Mapping Rule			**Mapping Type**
The Timing parameters can be derived from the SdServerConfig attributes and the aggregated elements RequestResponseDelay and InitialSdDelayConfig.			full
Mapping Status			**Mapping ID**
valid			up_Sd_00001

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerInitialOfferDelayMax		EcucFloatParamDef	
BSW Description			
Max value in [s] to delay randomly the first offer. This parameter is mandatory for ServerService.			
Template Description			
Max Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialDelayMax Value			
Mapping Rule			**Mapping Type**
Take information from SdServerConfig.initialOfferBehavior			full
Mapping Status			**Mapping ID**
valid			up_Sd_00004

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerInitialOfferDelayMin		EcucFloatParamDef	
BSW Description			
Min value in [s] to delay randomly the first offer. This parameter is mandatory for ServerService.			
Template Description			
Min Value in seconds to delay randomly the first offer (if aggregated by SdServerConfig) or the transmission of a find message (if aggregated by SdClientConfig).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialDelayMin Value			
Mapping Rule			**Mapping Type**
Take information from SdServerConfig.initialOfferBehavior			full
Mapping Status			**Mapping ID**
valid			up_Sd_00007

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerInitialOfferRepetitionBaseDelay		EcucFloatParamDef	
BSW Description			
The base delay in [s] for offer repetitions. Successive offers have an exponential back off delay (1x base delay, 2x base delay, 4x base delay, ...). This parameter is mandatory for ServerService.			
Template Description			
The base delay for offer repetitions (if aggregated by SdServerConfig) or find repetitions (if aggregated by SdClientConfig. Successive find messages have an exponential back off delay.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialRepetitions BaseDelay			
Mapping Rule			**Mapping Type**
Take information from SdServerConfig.initialOfferBehavior			full
Mapping Status			**Mapping ID**
valid			up_Sd_00008

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerInitialOfferRepetitionsMax		EcucIntegerParamDef	
BSW Description			
Configure the maximum amount of offer repetition. This parameter is mandatory for ServerService.			
Template Description			
Describes the maximum amount of offer repetitions (if aggregated by SdServerConfig) or the maximum amount of find repetitions (if aggregated by SdClientConfig).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InitialSdDelayConfig.initialRepetitionsMax			
Mapping Rule			**Mapping Type**
Take information from SdServerConfig.initialOfferBehavior			full
Mapping Status			**Mapping ID**
valid			up_Sd_00006

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerOfferCyclicDelay		EcucFloatParamDef	
BSW Description			
Interval between cyclic offers in the main phase. This parameter is mandatory for ServerService.			
Template Description			
Optional attribute to define cyclic offers. Cyclic offer is active, if the delay is set (in seconds).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig.offerCyclicDelay			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00002

BSW Module	BSW Context		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerRequestResponseMaxDelay		EcucFloatParamDef	
BSW Description			
Maximum allowable response delay to entries received by multicast in seconds.			
Template Description			
Maximum allowable response delay to entries received by multicast in seconds.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::RequestResponseDelay.maxValue			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00003

BSW Module	BSW Context	
Sd	Sd/SdConfig/SdInstance/SdServerTimer	
BSW Parameter		**BSW Type**

SdServerTimerRequestResponseMinDelay		EcucFloatParamDef	
BSW Description			
Minimum allowable response delay to entries received by multicast in seconds.			
Template Description			
Minimum allowable response delay to entries received by multicast in seconds.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::RequestResponseDelay.minValue			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00009

BSW Module	**BSW Context**		
Sd	Sd/SdConfig/SdInstance/SdServerTimer		
BSW Parameter		**BSW Type**	
SdServerTimerTTL		EcucIntegerParamDef	
BSW Description			
Time to live for offer service.			
Template Description			
Time to live. Shall be a positive value (sInt32).			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::SdServerConfig.ttl			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Sd_00005

BSW Module	**BSW Context**		
Sd	Sd		
BSW Parameter		**BSW Type**	
SdGeneral		EcucParamConfContainerDef	
BSW Description			
This container lists the general configuration parameters for the Service Discovery module.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
Sd	Sd/SdGeneral	
BSW Parameter		**BSW Type**
SdDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
Sd	Sd/SdGeneral	
BSW Parameter		**BSW Type**
SdMainFunctionCycleTime		EcucFloatParamDef
BSW Description		
This parameter defines the cycle time in seconds of the periodic calling of Sd main function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
Sd	Sd/SdGeneral	
BSW Parameter		**BSW Type**
SdVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables and disables the version info API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.6.5 SoAd

BSW Module	**BSW Context**	
SoAd	SoAd	
BSW Parameter		**BSW Type**
SoAdBswModules		EcucParamConfContainerDef
BSW Description		
Each container describes a specific BSW module that the SoAd shall interface to.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdBswModuleRef		EcucForeignReferenceDef
BSW Description		
This is a reference to one BSW module's configuration (i.e. not the ECUC parameter definition template). Example, there could be several configurations of PduR and this reference selects one of them. SoAd has to figure out from the structure of the referenced BSW module's configuration, what kind of upper layer he deals with. In case of a CDD SoAd expects UL-APIs in form of _SoAd<If|Tp><function> and expects CDD Pdu configuration structures according to the Ecu Configuration specification (chapter CDD module\Socket Adaptor). In case it is one of the standardized AUTOSAR BSW modules, the configuration structures and API names for interaction with SoAd are defined in the corresponding SWS.		
Template Description		
Head of the configuration of one Module. A Module can be a BSW module as well as the RTE and ECU Infrastructure. As part of the BSW module description, the EcucModuleConfigurationValues element has two different roles: The recommendedConfiguration contains parameter values recommended by the BSW module vendor. The preconfiguredConfiguration contains values for those parameters which are fixed by the implementation and cannot be changed. These two EcucModuleConfigurationValues are used when the base EcucModuleConfigurationValues (as part of the base ECU configuration) is created to fill parameters with initial values.		
M2 Parameter		
ECUCDescriptionTemplate::EcucModuleConfigurationValues		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdIf		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the Communication Interface APIs or not. Value true means that the APIs are supported. A module can have both Communication Interface APIs and Transport Protocol APIs (e.g. the PduR module).		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdIfTriggerTransmit		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the TriggerTransmit API or not. Value true means that the API is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdIfTxConfirmation		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the TxConfirmation API or not. Value true means that the API is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdLocalIpAddrAssigmentChg		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the LocalIpAddrAssigmentChg API or not. Value true means that the API is supported.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdSoConModeChg		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the SoConModeChg API or not. Value true means that the API is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdTp		EcucBooleanParamDef
BSW Description		
Specifies if the BSW module supports the TransportProtocol APIs or not. Value true means that the APIs are supported. A module can have both Communication Interface APIs and Transport Protocol APIs (e.g. the PduR module).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdUseCallerInfix		EcucBooleanParamDef
BSW Description		
Specifies if SoAd shall use (TRUE) the infix "SoAd" when calling an upper layer module function or not (FALSE). E.g. if SoAdUseCallerInfix is TRUE for the upper layer "ABC" then SoAd will call ABC_SoAdIfRxIndication() otherwise SoAd would call ABC_IfRxIndication().		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
SoAd	SoAd/SoAdBswModules	
BSW Parameter		**BSW Type**
SoAdUseTypeInfix		EcucBooleanParamDef
BSW Description		
Specifies if SoAd shall use (TRUE) the API type infix "Tp" or "If" when calling an upper layer module function or not (FALSE). E.g. if SoAdUseTypeInfix is TRUE for the upper layer "ABC" then SoAd will call ABC_IfRxIndication(), otherwise SoAd would call ABC_RxIndication().		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd	
BSW Parameter		**BSW Type**
SoAdConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR SoAd module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig	
BSW Parameter		**BSW Type**
SoAdPduRoute		EcucParamConfContainerDef
BSW Description		
Describes the path of a PDU from an upper layer of the SoAd to the socket in the TCP/IP stack for transmission. This PDU can consume meta data items of type SOCKET_CONNECTION_ID_16.		
Template Description		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduTriggering	
Mapping Rule	**Mapping Type**
The SoAdPduRoute container shall be created for every Pdu that is transmitted by the regarded ECU within a SocketConnectionBundle. The information whether the Pdu is received or transmitted over a SocketConnection shall be derived from the PduTriggering element. The PduTriggering element contains references to IPduPorts of an EcuInstance. The IPduPort element contains a communicationDirection.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00003

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdPduRoute
BSW Parameter	**BSW Type**
SoAdPduRouteDest	EcucParamConfContainerDef
BSW Description	
Specifies the PDU route destination.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.pdu,SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.pdu	
Mapping Rule	**Mapping Type**
The SoAdPduRouteDest container shall be created for every client that receives the Pdu from the server. This information shall be derived from the SocketConnectionBundle (if the SocketConnectionBundle contains Pdus) or from Socket Connection elements (if the SocketConnections contain Pdus) that are aggregated by the SocketConnectionBundle.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00006

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdPduRouteDest
BSW Parameter	**BSW Type**
SoAdTxPduHeaderId	EcucIntegerParamDef
BSW Description	
ID to be sent on the TCP/IP connection if the PDU header option is enabled.	
Template Description	
If multiple Pdus are transmitted over the same connection this headerId can be used to distinguish between the different Pdus.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.headerId	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00010

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdPduRouteDest

BSW Parameter		BSW Type
SoAdTxRoutingGroupRef		EcucReferenceDef
BSW Description		
Reference to the routing group.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.routingGroup		
Mapping Rule		**Mapping Type**
The SoAdTxRoutingGroupRef references to SoAdRoutingGroups shall be derived from SocketConnectionIpduIdentifier.routingGroup references.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00009

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdPduRouteDest	
BSW Parameter		**BSW Type**
SoAdTxSocketConnOrSocketConnBundleRef		EcucChoiceReferenceDef
BSW Description		
Choice Reference to a SocketConnection or to a SocketConnectionGroup on which the PDU is to be sent on. The reference to a SocketConnectionGroup shall only be used for upper layers with IF API.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.pdu, SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.pdu		
Mapping Rule		**Mapping Type**
The reference to the SocketConnection shall be set if the SocketConnection in the System Description contains SocketConnectionIpduIdentifier elements. In this case the SoAdTxSocketConnOrSocketConnBundleRef reference shall point to the SoAdSocketConnection container that is derived from the Socket Connection that is aggregated by the regarded SocketConnectionBundle and points to the regarded Pdu. The reference to the SocketConnectionGroup shall be set if the Socket ConnectionBundle in the System Description contains SocketConnectionIpdu Identifier elements. In this case the SoAdTxSocketConnOrSocketConnBundle Ref reference shall point to the SoAdSocketConnectionGroup container that is derived from the SocketConnectionBundle element.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00007

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdPduRouteDest	
BSW Parameter		**BSW Type**
SoAdTxUdpTriggerMode		EcucEnumerationParamDef
BSW Description		

Specifies whether a PDU triggers the transmission of the nPduUdpTxBuffer. If this parameter is set to TRIGGER_NEVER, SoAd shall use an nPduUdpTxBuffer for the related socket connection. nPduUdpTxBuffer can only be used for upper layers with IF API, i.e. this parameter shall only be set to TRIGGER_NEVER if all upper layers belonging to the related socket connection have SoAdTxUpperLayerType set to "IF". This parameter is only relevant for UDP connections.	
Template Description	
Defines whether the referenced Pdu contributes to the triggering of the socket transmission if Pdu collection is enabled for this socket.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduCollectionTrigger	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00008

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdPduRouteDest	
BSW Parameter		**BSW Type**
SoAdTxUdpTriggerTimeout		EcucFloatParamDef
BSW Description		
Specifies the timeout in [s] the nPduUdpTxBuffer shall be transmitted at the latest after this PDU is put into the buffer. This optional parameter is only relevant if SoAdTxUdpTriggerMode is TRIGGER_NEVER.		
Template Description		
Defines the timeout in seconds the PDU collection shall be transmitted at the latest after this PDU has been put into the buffer.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduCollectionPduTimeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdPduRoute	
BSW Parameter		**BSW Type**
SoAdTxPduCollectionSemantics		EcucEnumerationParamDef
BSW Description		
Specifies if this PDU shall be collected using a queued or last-is-best semantics. This parameter is only relevant if the PDU collection feature is enabled. Shall only be set to SOAD_COLLECT_LAST_IS_BEST if the related upper layer is configured with SoAdIfTriggerTransmit set to TRUE.		
Template Description		
Specifies if the referenced PduTriggering shall be collected using a queued (i.e. all PDU instances) or last-is-best (i.e. only the last PDU instance) semantics. If this attribute is not present the behavior of "queued" is assumed.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduCollectionSemantics		

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00039

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdTxPduCollectionSemantics	
BSW Parameter		**BSW Type**
SOAD_COLLECT_LAST_IS_BEST		EcucEnumerationLiteralDef
BSW Description		
The PDU data will be fetched via <Up>_[SoAd][If]TriggerTransmit just before the transmission executes.		
Template Description		
Only the latest PDU instances are transmitted.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::PduCollectionSemanticsEnum.lastIsBest		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00040

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdPduRoute/SoAdTxPduCollectionSemantics	
BSW Parameter		**BSW Type**
SOAD_COLLECT_QUEUED		EcucEnumerationLiteralDef
BSW Description		
The PDU data will instantly be stored in the context of the SoAd_IfTransmit API.		
Template Description		
All instances of PDUs are transmitted.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::PduCollectionSemanticsEnum.queued		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00041

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdPduRoute	
BSW Parameter		**BSW Type**
SoAdTxPduId		EcucIntegerParamDef
BSW Description		
Tx PDU ID of the PDU coming from the PDU Router.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context
SoAd	SoAd/SoAdConfig/SoAdPduRoute
BSW Parameter	**BSW Type**
SoAdTxPduRef	EcucReferenceDef
BSW Description	
Reference to the global PDU structure	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduTriggering	
Mapping Rule	**Mapping Type**
This SoAdTxPduRef reference shall be derived from the PduTriggering that is referenced by the SocketConnectionIpduIdentifier.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00005

BSW Module	BSW Context
SoAd	SoAd/SoAdConfig/SoAdPduRoute
BSW Parameter	**BSW Type**
SoAdTxUpperLayerType	EcucEnumerationParamDef
BSW Description	
Specifies the upper layer interface type (must be "IF" in case of multiple PduRoutes).	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPdu	
Mapping Rule	**Mapping Type**
The SoAdTxUpperLayerType parameter can be derived from the actual type of the PDU: DcmIPdu -> "Tp" UUDT DcmIPdu: "If" (according to [SWS_Dcm_01101]) ISignalIPdu -> "If" if ComIPduType=NORMAL, "Tp" if ComIPduType=TP NmPdu -> "If" GeneralPurposePdu with category SD -> "If" GeneralPurposePdu with category DoIP -> "If" for UDP, "Tp" for TCP GeneralPurposePdu with category GLOBAL_TIME -> "If" GeneralPurposeIPdu with category = XCP -> "If" UserDefinedIPdu: "If" if CddPduRApiType=IF, "Tp" if CddPduRApiType=TP UserDefinedPdu: "If" if CddPduRApiType=IF, "Tp" if CddPduRApiType=TP MultiplexedIPdu: "If" ContainerIPdu: "If" SecuredIPdu: "If" (see limitation in AUTOSAR_SWS_SecureOnboardCommunication)	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00004

BSW Module	BSW Context

SoAd	SoAd/SoAdConfig		
BSW Parameter		**BSW Type**	
SoAdRoutingGroup		EcucParamConfContainerDef	
BSW Description			
Each container describes a specific routing group which can be enabled or disabled. A routing group consists of PDUs. Routing of PDUs can either be forwarding of PDUs from the upper layer to a TCP or UDP socket of the TCP/IP stack specified by a SoAdPduRoute or the other way around specified by a SoAdSocketRoute.			
Template Description			
Routing of Pdus in the SoAd can be activated or deactivated. The ShortName of this element shall contain the RoutingGroupId.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup			
Mapping Rule			**Mapping Type**
The SoAdRoutingGroup container shall be created for every SoAdRouting Group element that is available in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_SoAd_00001

BSW Module	**BSW Context**		
SoAd	SoAd/SoAdConfig/SoAdRoutingGroup		
BSW Parameter		**BSW Type**	
SoAdRoutingGroupId		EcucIntegerParamDef	
BSW Description			
Unique ID of Routing Group			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SoAd	SoAd/SoAdConfig/SoAdRoutingGroup		
BSW Parameter		**BSW Type**	
SoAdRoutingGroupIsEnabledAtInit		EcucBooleanParamDef	
BSW Description			
If set to true this routing group will be enabled after initializing the SoAd module (i.e. enabled in the SoAd_Init function).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SoAd	SoAd/SoAdConfig/SoAdRoutingGroup		
BSW Parameter		**BSW Type**	
SoAdRoutingGroupTxTriggerable		EcucBooleanParamDef	
BSW Description			
Specifies if the If-TxPDUs related to the PduRouteDest containers referenced by this routing group can be triggered via SoAd_IfRoutingGroupTransmit (TRUE) or not (FALSE).			
Template Description			
This attribute defines the type of a RoutingGroup. There are RoutingGroups that activate the data path for unicast or multicast events of an event group. And there are RoutingGroups that activate the data path for initial events that are triggered, namely events that are sent out on the server side after a client got subscribed. Please note that this attribute is only valid for event communication (Sender Receiver communication) and shall be omitted in MethodActivationRoutingGroups.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SoAdRoutingGroup.eventGroupControlType			
Mapping Rule			**Mapping Type**
The SoAdRoutingGroupTxTriggerable parameter shall be derived from the eventGroupControlType enumeration. If triggerUnicast or activationAndTriggerUnicast is set than this parameter shall be set to true.			full
Mapping Status			**Mapping ID**
valid			up_SoAd_00002

BSW Module	BSW Context		
SoAd	SoAd/SoAdConfig		
BSW Parameter		**BSW Type**	
SoAdSocketConnectionGroup		EcucParamConfContainerDef	
BSW Description			
Specifies the configuration of a socket connection group, i.e. specifies the socket connections belonging to the group and the parameters which are common for all socket connections of the group. A socket connection specifies how data can be received and transmited via a TCP or UDP socket.			
Template Description			
This elements groups SocketConnections, i.e. specifies socket connections belonging to the bundle and describes properties which are common for all socket connections in the bundle.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle			
Mapping Rule			**Mapping Type**

Server Ecu: SoAdSocketConnectionGroups on Server ECUs shall be derived from the SocketConnectionBundle element in the ARXML. For every existing Socket ConnectionBundle that is connected via the SocketConnectionBundle.server Port.connector relation to theregarded ECU a SocketConnectionGroup container in the SoAd configuration shall be created. Client Ecu: SoAdSocketConnectionGroups on Client ECUs shall be derived from the SocketConnection element in the ARXML. For every existing SocketConnection that is connected via the SocketConnection.clientPort.connector relation to the regarded ECU a SocketConnectionGroup container in the SoAd configuration shall be created. Please note that the same SoAdSocketConnectionGroup shall be used for all SocketConnections with the same SoAdSocketLocalAddress, SoAdSocketLocalPort and TP.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00011

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup
BSW Parameter	**BSW Type**
SoAdPduHeaderEnable	EcucBooleanParamDef
BSW Description	
Enables the transmission of the PDU header (ID, length) on this socket connection. TRUE: add SoAd PDU header before PDU data FALSE: No SoAd PDU header is used	
Template Description	
If multiple Pdus are transmitted over the same connection this headerId can be used to distinguish between the different Pdus.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.headerId	
Mapping Rule	**Mapping Type**
If SocketConnectionIpduIdentifier elements within the SocketConnection contain headerIds then this parameter shall be set to true.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00014

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup
BSW Parameter	**BSW Type**
SoAdSocketAutomaticSoConSetup	EcucBooleanParamDef
BSW Description	
Specifies if the setup of the socket connection shall be done automatically (TRUE) or manually (FALSE) via SoAd_OpenSoCon() and SoAd_CloseSoCon().	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**

valid	

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketConnection		EcucParamConfContainerDef
BSW Description		
Specifies the socket connection (Id and remote address information). Note: Parameters which are common to all socket connections of a socket connection group are specified directly at the group.		
Template Description		
The SoAd serves as a (De)Multiplexer between different PDU sources and the TCP/IP stack.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection		
Mapping Rule		**Mapping Type**
The SoAdSocketConnection container shall be derived from SocketConnection elements that are aggregated by the SocketConnectionBundle. For every existing SocketConnection that is defined in the SocketConnectionBundle a SoAd SocketConnection in the SoAd Config shall be created.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00016

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketConnection	
BSW Parameter		**BSW Type**
SoAdSocketId		EcucIntegerParamDef
BSW Description		
Socket connection identifier used as SoConId in the interaction with upper layers.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketConnection	
BSW Parameter		**BSW Type**
SoAdSocketRemoteAddress		EcucParamConfContainerDef
BSW Description		
Subcontainer of SoAdSocketConnection to specify the remote address (IP address and port) for a socket connection. If SoAdSocketRemoteAddress is not specified the remote address has to be set by the upper layer via SoAd_SetRemoteAddr().		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.clientPort		

Mapping Rule	Mapping Type
Server Ecu: The SoAdSocketRemoteAddress shall be derived from the ApplicationEndpoint that is aggregated by the SocketAddress referenced from the SocketConnection with the clientPort reference. Client Ecu: The SoAdSocketRemoteAddress shall be derived from the ApplicationEndpoint that is aggregated by the SocketAddress referenced from the SocketConnection Bundle with the serverPort reference and from SocketConnection. runtimeIp AddressConfiguration. If the TpPort.dynamicallyAssigned is true for the Socket Connection.clientPort in the System Extract then the SoAdSocketRemotePort shall be configured with *.* (dynamicallyAssigned = true).	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00017

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketConnection/So AdSocketRemoteAddress	
BSW Parameter		**BSW Type**
SoAdSocketRemoteIpAddress		EcucStringParamDef
BSW Description		
IP address of remote node. The configured address must be of the same TcpIpDomainType (i.e. IPv4 or IPv6) as the TcpIpLocalAddr referred by SoAdSocketLocalAddressRef . To accept any remote IP address, set SoAdSocketRemoteIpAddress to "ANY". See message acceptance policy for more details.		
Template Description		
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress		
Mapping Rule		**Mapping Type**
Server Ecu: The SoAdSocketRemoteIpAddress shall be derived from the attributes IPv4 Configuration.ipv4Address or IPv6Configuration.ipv6Address from the Network Endpoint that is referenced by the ApplicationEndpoint and from Socket Connection.clientIpAddrFromConnectionRequest. See addressing examples in the SystemTemplate for more details. Client Ecu: The SoAdSocketRemoteIpAddress shall be derived from the attributes IPv4 Configuration.ipv4Address or IPv6Configuration.ipv6Address from the Network Endpoint that is referenced by the ApplicationEndpoint.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00018

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketConnection/So AdSocketRemoteAddress	
BSW Parameter		**BSW Type**
SoAdSocketRemotePort		EcucIntegerParamDef
BSW Description		

Remote UDP or TCP port used for this connection. To accept any remote port, set SoAdSocketRemotePort to 0. See message acceptance policy for more details.	
Template Description	
Port Number.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TpPort.portNumber	
Mapping Rule	**Mapping Type**
Server Ecu: The SoAdSocketRemotePort shall be derived from the value of the attribute TpPort.portNumber (if defined) or SoAdSocketRemotePort shall be set to 0 if TpPort.dynamicallyAssigned is set to true in the ApplicationEndpoint and from SocketConnection.clientPortAddrFromConnectionRequest. See addressing examples in the SystemTemplate for more details. Client Ecu: The SoAdSocketRemotePort shall be derived from the value of the attribute TpPort.portNumber (if defined) or SoAdSocketRemotePort shall be set to 0 if TpPort.dynamicallyAssigned is set to true in the ApplicationEndpoint.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00019

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketDifferentiatedServicesField		EcucIntegerParamDef
BSW Description		
The 6-bit Differentiated Service Field in the IP headers may be used for classifying network traffic. If not set a value of zero is used to indicate packets that have not been classified.		
Template Description		
The 6-bit Differentiated Service Field in the IP headers may be used for classifying network traffic. If not set a value of zero is used to indicate packets that have not been classified.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.differentiatedServiceField		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00037

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketFlowLabel		EcucIntegerParamDef
BSW Description		
The 20-bit Flow Label field in the IPv6 header may be used by a source to label sequences of packets for which it requests special handling by the IPv6 routers, such as non-default quality of service. If not set a Flow Label of zero is used to indicate packets that have not been labeled.		
Template Description		
The 20-bit Flow Label field in the IPv6 header may be used by a source to label sequences of packets for which it requests special handling by the IPv6 routers, such as non-default quality of service. If not set a Flow Label of zero is used to indicate packets that have not been labeled.		

M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.flowLabel	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00036

BSW Module	BSW Context
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup
BSW Parameter	**BSW Type**
SoAdSocketFramePriority	EcucIntegerParamDef
BSW Description	
Specifies the priority of the Ethernet frame. If IEEE 802.1Q VLAN Tags are used, the specified priority will be used in the VLAN Tag PCP filed. If this optional parameter is not available the default priority specified in the TcpIp module is used.	
Template Description	
VlanMembership.defaultPriority: Standard output-priority outgoing Frames will be tagged with. This allows to assign different defaultPriorities to each VLAN. Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified. **NetworkEndpoint.priority**: Priority of this Network-Endpoint. **ApplicationEndpoint.priority**: Priority defined per application endpoint **ProvidedServiceInstance.priority**: Priority defined per provided ServiceInstance. **ConsumedEventGroup.priority**: Priority defined per consumed Event-Group	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.defaultPriority, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpoint.priority, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint.priority, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ProvidedServiceInstance.priority, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ConsumedEventGroup.priority	
Mapping Rule	**Mapping Type**
It shall be considered that the priority in the SoAd is defined only once per SocketConnectionGroup. The SocketConnections in the system description shall be created adequate. The priority in the system description can be defined at the ConsumedEventGroup, ProvidedServiceInstance, at the ApplicationEndpoint and at the NetworkEndpoint. A default priority can be set at CouplingPort.VlanMembership. The priority defined on the ProvidedServiceInstance or ConsumedEventGroup overrides the priority defined on the ApplicationEndpoint. The priority on the ApplicationEndpoint overrides the priority on the NetworkEndpoint. The priority on the NetworkEndpoint overrides the default priority.	full

Mapping Status	Mapping ID
valid	up_SoAd_00015

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketIpAddrAssignmentChgNotification		EcucBooleanParamDef
BSW Description		
Specifies if the local IP address assignment change notification callback function of the upper layer shall be called if the assignment of the local IP address used by this socket connection changes.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketLocalAddressRef		EcucSymbolicNameReferenceDef
BSW Description		
Local IP address and interface used for this connection.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.serverPort		
Mapping Rule		**Mapping Type**
The SoAdSocketLocalAddressRef shall be derived from the attributes IPv4Configuration.ipv4Address or IPv6Configuration.ipv6Address from the NetworkEndpoint that is referenced by the ApplicationEndpoint that is aggregated by the SocketAddress referenced from the SocketConnectionBundle. Please note that the IPv4 multicast address range is from 224.0.0.0 through 239.255.255.255. If the multicast address is set at runtime, the IP address might not be available in the system description. Whether a SocketAddress is multicast or not can also be retrieved from the fact that SocketAddress.connector is undefined and SocketAddress.multicastConnector has at least one reference set. The TcpIpAddressType shall be set accordingly.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00012

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketLocalPort		EcucIntegerParamDef
BSW Description		

Local UDP or TCP port used for this connection. If this parameter set to 0 SoAd requests TcpIp to select an ephemeral port.	
Template Description	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.serverPort	
Mapping Rule	**Mapping Type**
Server Ecu: SocketConnetionBundle.serverPort: The SoAdSocketLocalPort shall be derived from the value of the attribute TpPort.portNumber (if defined) or SoAdSocketLocalPort shall be set to 0 if TpPort.dynamicallyAssigned is set to true in the ApplicationEndpoint that is aggregated by the SocketAddress referenced from the SocketConnectionBundle. Client Ecu: SocketConnection.clientPort: The SoAdSocketLocalPort shall be derived from the value of the attribute TpPort.portNumber (if defined) or SoAdSocketLocalPort shall be set to 0 if TpPort.dynamicallyAssigned is set to true in the ApplicationEndpoint that is aggregated by the SocketAddress referenced from the SocketConnection.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00013

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketMsgAcceptanceFilterEnabled		EcucBooleanParamDef
BSW Description		
Specifies if the message acceptance filter is enabled (TRUE) or not (FALSE). Note: if a wildcard is used in SoAdSocketRemoteAddress AND SoAdSocketUdpListenOnly is FALSE, this parameter must be TRUE. Note: if multiple SoAdSocketConnections are configured for one SoAdSocketConnectionGroup, this parameter must be TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketPathMTUEnable		EcucBooleanParamDef
BSW Description		
Specifies if path MTU discovery shall be performed for this connection. If this optional parameter is not available the default behavior configured for the controller in the TcpIp module via the parameter TcpIpIpV4PathMtuEnabled or TcpIpIpV6PathMtuEnabled is applied.		

Template Description	
Defines whether the Path MTU Discovery shall be performed for the related socket.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.pathMtuDiscoveryEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00035

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketProtocol		EcucChoiceContainerDef
BSW Description		
Specifies the transport protocol and transport protocol specific parameters used for the socket connections of the socket connection group.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol	
BSW Parameter		**BSW Type**
SoAdSocketTcp		EcucParamConfContainerDef
BSW Description		
Specifies that TCP is used as transport protocol for the socket connection group and parameters only related to TCP socket connections.		
Template Description		
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint		
Mapping Rule		**Mapping Type**
Server Ecu: SoAdSocketTcp shall be derived from the ApplicationEndpoint (TpConfiguration) that is referenced via the serverPort by the SocketConnectionBundle. SoAdSocketTcp shall be created if TcpTp is used as Transport Protocol. Client Ecu: SoAdSocketTcp shall be derived from the ApplicationEndpoint (TpConfiguration) that is referenced via the clientPort by the SocketConnection. SoAdSocketTcp shall be created if TcpTp is used as Transport Protocol.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00023

BSW Module	**BSW Context**		
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp		
BSW Parameter		**BSW Type**	
SoAdSocketTCPOptionFilterRef		EcucSymbolicNameReferenceDef	
BSW Description			
Specifies which TCP option filter shall be applied on the related socket.			
Template Description			
Reference to a list of TCP options allowed for this SocketConnection.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.allowedTcpOptions			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_SoAd_00034

BSW Module	**BSW Context**		
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp		
BSW Parameter		**BSW Type**	
SoAdSocketTcpImmediateTpTxConfirmation		EcucBooleanParamDef	
BSW Description			
If set to FALSE, SoAd notifies the TP upper layer via transmit confirmation after a Tcp Ack has been received. If set to TRUE, SoAd notifies the TP upper layer via transmit confirmation immediately after transmit has been accepted by TcpIp.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp		
BSW Parameter		**BSW Type**	
SoAdSocketTcpInitiate		EcucBooleanParamDef	
BSW Description			
Specifies the initiator for this TCP connection. It will not be defined for UDP sockets. TRUE: This TCP connection is initiated by this module. FALSE: This TCP connection is to be initiated in the listen mode.			
Template Description			
Content Model for TCP configuration.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp			
Mapping Rule			**Mapping Type**

Server Ecu: SoAdSocketTcpInitiate can be set to false here since Servers do not initiate Tcp connections by themselves. Client Ecu: SoAdSocketTcpInitiate can be set to true if TcpTp is configured and the Ecu is in the client role.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00025

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp
BSW Parameter	**BSW Type**
SoAdSocketTcpKeepAlive	EcucBooleanParamDef
BSW Description	
Specifies to use the keep-alive mechanism for this connection. It will not be defined for UDP sockets. TRUE: This TCP connection will use the keep-alive mechanism. FALSE: This TCP connection will not use the keep-alive mechanism. Note: This parameter must not be set to TRUE if TcpIpTcpKeepAliveEnabled is set to FALSE.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
1:1 mapping	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp
BSW Parameter	**BSW Type**
SoAdSocketTcpKeepAliveInterval	EcucFloatParamDef
BSW Description	
Specifies the interval in seconds between subsequent keepalive probes.	
Template Description	
Specifies the interval in seconds between subsequent keepalive probes.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAliveInterval	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp
BSW Parameter	**BSW Type**
SoAdSocketTcpKeepAliveProbesMax	EcucIntegerParamDef
BSW Description	

Maximum number of times that TCP retransmits an individual data segment before aborting the connection.	
Template Description	
Maximum number of times that TCP retransmits an individual data segment before aborting the connection.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAliveProbesMax	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp	
BSW Parameter		**BSW Type**
SoAdSocketTcpKeepAliveTime		EcucFloatParamDef
BSW Description		
Specifies the time in seconds between the last data packet sent and the first keepalive probe.		
Template Description		
Specifies the time in seconds between the last data packet sent and the first keepalive probe.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAliveTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp	
BSW Parameter		**BSW Type**
SoAdSocketTcpNoDelay		EcucBooleanParamDef
BSW Description		
Specifies not to use the congestion control mechanism for this connection. It will not be defined for UDP sockets. TRUE: This TCP connection will NOT use congestion control. FALSE: This TCP connection will use congestion control. If the optional parameter is not enabled, the default behavior configured for TcpIp via the parameter TcpIpTcpNagleEnabled is applied. Note: This parameter must not be set to FALSE if TcpIpTcpNagleEnabled is set to FALSE.		
Template Description		
Indicates if Nagle's Algorithm is used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.naglesAlgorithm		
Mapping Rule		**Mapping Type**

If TcpTp.naglesAlgorithm in the System Extract is set to true then SoAdSocketTcpNoDelay shall be set to false. If TcpTp.naglesAlgorithm in is set to false then SoAdSocketTcpNoDelay shall be set to true. If TcpTp.naglesAlgorithm in the System Extract is not defined then SoAdSocketTcpNoDelay shall not be set.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00024

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketTcp	
BSW Parameter		**BSW Type**
SoAdSocketTcpTxQuota		EcucIntegerParamDef
BSW Description		
Specifies the maximum amount of bytes (PDU data provided by the upper layer and PDU Header if used) the SoAd may queue for transmission via TCP at the TcpIp module for each socket connection of this socket connection group. Rationale: prohibits that a socket connection consumes all available transmit buffers at the TcpIp and blocks transmissions via other socket connections. If the optional parameter is not enabled, the amount of data is not limited.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol	
BSW Parameter		**BSW Type**
SoAdSocketUdp		EcucParamConfContainerDef
BSW Description		
Specifies that UDP is used as transport protocol for the socket connection group and parameters only related to UDP socket connections.		
Template Description		
An application endpoint is the endpoint on an Ecu in terms of application addressing (e.g. socket). The application endpoint represents e.g. the listen socket in client-server-based communication.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::ApplicationEndpoint		
Mapping Rule		**Mapping Type**

Server Ecu: SoAdSocketUdp shall be derived from the ApplicationEndpoint (TpConfiguration) that is referenced via the serverPort by the SocketConnectionBundle. This container shall be created if UdpTp is used as Transport Protocol. Client Ecu: SoAdSocketUdp shall be derived from the ApplicationEndpoint (TpConfiguration) that is referenced via the clientPort by the SocketConnection. This container shall be created if UdpTp is used as Transport Protocol.	full
Mapping Status	**Mapping ID**
valid	up_SoAd_00020

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp	
BSW Parameter		**BSW Type**
SoAdSocketUdpAliveSupervisionTimeout		EcucFloatParamDef
BSW Description		
Specifies the time in [s] a UDP socket connection remains in the mode SOAD_SOCON_ONLINE after the latest reception of a frame from the remote peer specified by the remote address. If this optional parameter is not enabled UDP Alive Supervision is deactivated for the related socket connection group.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp	
BSW Parameter		**BSW Type**
SoAdSocketUdpChecksumEnabled		EcucBooleanParamDef
BSW Description		
Specifies if UDP checksum calculation shall be enabled (TRUE) or skipped (FALSE) on the related socket. FALSE implies that the upper layer of the socket connection is either capable to handle malformed messages or applies a checksum mechanism itself.		
Template Description		
Specifies if UDP checksum handling shall be enabled (udpChecksumEnabled) or skipped (udpChecksumDisabled) on the related socket connection.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.udpChecksumHandling		
Mapping Rule		**Mapping Type**
If udpChecksumHandling.udpChecksumEnabled is set the value shall be TRUE; if udpChecksumHandling.udpChecksumDisabled is set the value shall be FALSE;		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00038

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>SoAd</td><td colspan="2">SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SoAdSocketUdpListenOnly</td><td>EcucBooleanParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Specifies if the socket connection group is only used for reception (TRUE) or used for both reception and transmission (FALSE).</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>SoAd</td><td colspan="2">SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SoAdSocketUdpStrictHeaderLenCheckEnabled</td><td>EcucBooleanParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Specifies if UDP messages shall be dropped (TRUE) if the length of all contained PDUs does not match the length of the whole message or not (FALSE). Shall only be set to TRUE if SoAdPduHeaderEnable is also set to TRUE.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>SoAd</td><td colspan="2">SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">SoAdSocketUdpTriggerTimeout</td><td>EcucFloatParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">Specifies the timeout in [s] a nPduUdpTxBuffer is waiting for a PDU with TriggerMode = TRIGGER_ALWAYS, i.e. when the timeout expires the nPduUdpTxBuffer is transmitted. Timer is reset after each UDP transmission. This optional parameter is only relevant if a nPduUdpTxBuffer is used.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">Defines the time in seconds which shall pass before a socket with Pdu collection enabled shall be transmitted to the lower layer after the first Pdu has been put into the socket buffer.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.pduCollectionTimeout</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">1:1 mapping</td><td>full</td></tr>
</table>

Mapping Status	Mapping ID
valid	up_SoAd_00021

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup/SoAdSocketProtocol/SoAdSocketUdp	
BSW Parameter		**BSW Type**
SoAdSocketnPduUdpTxBufferMin		EcucIntegerParamDef
BSW Description		
Specifies the amount of data in bytes (PDU data provided by the upper layer and PDU Header if used) the SoAd shall be able to buffer for data transmission via this socket connection in case the UDP message shall be buffered for transmission of multiple PDUs per UDP. Note: in case of a UDP socket and an upper layer with TP API is configured, the required buffer size can be determined automatically. This optional parameter is only relevant if a nPduUdpTxBuffer is used.		
Template Description		
Defines the maximum buffer size in Byte which shall be filled before a socket with Pdu collection enabled shall be transmitted to the lower layer.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.pduCollectionMaxBufferSize		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00022

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketSoConModeChgNotifUpperLayerRef		EcucReferenceDef
BSW Description		
Reference to an additional upper layer that shall receive socket connection state changes (although it is not a direct upper layer of the socket connection).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketSoConModeChgNotification		EcucBooleanParamDef
BSW Description		
Specifies if the SoCon mode change notification callback function of the upper layer shall be called in case of SoCon mode change.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketConnectionGroup	
BSW Parameter		**BSW Type**
SoAdSocketTpRxBufferMin		EcucIntegerParamDef
BSW Description		
Specifies the amount of data in bytes (PDU data for the upper layer and PDU Header if used) the SoAd shall at least be able to buffer for data reception via each socket connection of the socket connection group and using an upper layer with TP. Note: in case of a TCP socket where PduHeaderMode is used and an upper layer with IF-API, the required buffer size can be determined automatically.		
Template Description		
Minimum size of the TCP receive window in byte.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.receiveWindowMin		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00033

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig	
BSW Parameter		**BSW Type**
SoAdSocketRoute		EcucParamConfContainerDef
BSW Description		
Describes the path of a PDU from a socket in the TCP/IP stack to an upper layer of the SoAd after reception in the TCP/IP Stack.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduTriggering		
Mapping Rule		**Mapping Type**
The SoAdSocketRoute shall be derived from the from the SocketConnection element and the reference to the PduTriggering via the SocketConnectionIPdu Identifier. The SoAdSocketRoute container shall be created for every PduTriggering that is received by the regarded ECU on the SocketConnection. The information whether the Pdu is received or transmitted over a SocketConnection shall be derived from the PduTriggering element. The PduTriggering element contains references to IPduPorts of an EcuInstance. The IPduPort element contains a communicationDirection.		full
Mapping Status		**Mapping ID**

valid	up_SoAd_00026

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketRoute	
BSW Parameter		**BSW Type**
SoAdRxPduHeaderId		EcucIntegerParamDef
BSW Description		
ID contained in the packet received on the TCP/IP connection if the PDU header option is enabled.		
Template Description		
If multiple Pdus are transmitted over the same connection this headerId can be used to distinguish between the different Pdus.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.headerId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00031

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketRoute	
BSW Parameter		**BSW Type**
SoAdRxSocketConnOrSocketConnBundleRef		EcucChoiceReferenceDef
BSW Description		
Choice Reference to a SocketConnection or to a SocketConnectionGroup on which the PDU was received. The reference to a SocketConnectionGroup shall only be used for upper layers with IF API.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionBundle.pdu, SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.pdu		
Mapping Rule		**Mapping Type**
The reference to the SocketConnection shall be set if the SocketConnection in the System Description contains SocketConnectionIpduIdentifier elements. In this case the SoAdRxSocketConnOrSocketConnBundleRef reference shall point to the SoAdSocketConnection container that is derived from the Socket Connection that is aggregated by the regarded SocketConnectionBundle and points to the regarded Pdu. The reference to the SocketConnectionGroup shall be set if the Socket ConnectionBundle in the System Description contains SocketConnectionIpdu Identifier elements. In this case the SoAdRxSocketConnOrSocketConnBundle Ref reference shall point to the SoAdSocketConnectionGroup container that is derived from the SocketConnectionBundle element.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00027

BSW Module	BSW Context	
SoAd	SoAd/SoAdConfig/SoAdSocketRoute	
BSW Parameter		**BSW Type**

SoAdSocketRouteDest		EcucParamConfContainerDef
BSW Description		
Describes the upper layer destination PDU for a message received on a TcpIp socket. This PDU can produce meta data items of type SOCKET_CONNECTION_ID_16.		
Template Description		
An Identifier is required in case of one port per ECU communication where multiple Pdus are transmitted over the same connection. If only one IPdu is transmitted over the connetion this attribute can be ignored.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier		
Mapping Rule		**Mapping Type**
The SoAdSocketRouteDest container shall always be created for a SoAdSocket Route.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00028

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketRoute/SoAdSocketRouteDest	
BSW Parameter		**BSW Type**
SoAdRxPduId		EcucIntegerParamDef
BSW Description		
This unique identifier is used for a receive cancellation request from an upper layer of the SoAd.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdConfig/SoAdSocketRoute/SoAdSocketRouteDest	
BSW Parameter		**BSW Type**
SoAdRxPduRef		EcucReferenceDef
BSW Description		
Reference to the global PDU structure		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.pduTriggering		
Mapping Rule		**Mapping Type**
The SoAdRxPduRef reference shall be derived from the PduTriggering that is referenced by the SocketConnectionIpduIdentifier.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00030

BSW Module	**BSW Context**
SoAd	SoAd/SoAdConfig/SoAdSocketRoute/SoAdSocketRouteDest

BSW Parameter		BSW Type
SoAdRxRoutingGroupRef		EcucReferenceDef
BSW Description		
Reference to the routing group.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnectionIpduIdentifier.routingGroup		
Mapping Rule		**Mapping Type**
The SoAdRxRoutingGroupRef reference to SoAdRoutingGroups shall be derived from SocketConnectionIpduIdentifier.routingGroup references.		full
Mapping Status		**Mapping ID**
valid		up_SoAd_00029

BSW Module	BSW Context		
SoAd	SoAd/SoAdConfig/SoAdSocketRoute/SoAdSocketRouteDest		
BSW Parameter		**BSW Type**	
SoAdRxUpperLayerType		EcucEnumerationParamDef	
BSW Description			
Specifies the upper layer interface type (must be "IF" in case of multiple RxPdus).			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::PduTriggering.iPdu			
Mapping Rule			**Mapping Type**
The SoAdRxUpperLayerType parameter can be derived from the actual type of the PDU: DcmIPdu -> "Tp" UUDT DcmIPdu: "If" (according to [SWS_Dcm_01101]) ISignalIPdu -> "If" if ComIPduType=NORMAL, "Tp" if ComIPduType=TP NmPdu -> "If" GeneralPurposePdu with category SD -> "If" GeneralPurposePdu with category DoIP -> "If" for UDP, "Tp" for TCP GeneralPurposePdu with category GLOBAL_TIME -> "If" GeneralPurposeIPdu with category = XCP -> "If" UserDefinedIPdu: "If" if CddPduRApiType=IF, "Tp" if CddPduRApiType=TP UserDefinedPdu: "If" if CddPduRApiType=IF, "Tp" if CddPduRApiType=TP MultiplexedIPdu: "If" ContainerIPdu: "If" SecuredIPdu: "If" (see limitation in AUTOSAR_SWS_SecureOnboardCommunication)			full
Mapping Status			**Mapping ID**
valid			up_SoAd_00032

BSW Module	BSW Context	
SoAd	SoAd	
BSW Parameter		**BSW Type**
SoAdGeneral		EcucParamConfContainerDef
BSW Description		
This container contains all global configuration parameters of SoAd.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdGetAndResetMeasurementDataApi		EcucBooleanParamDef
BSW Description		
Enables / Disables the Get and Reset Measurement Data API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdIPv6AddressEnabled		EcucBooleanParamDef
BSW Description		
Allows for increased memory allocation to store IPv6 addresses. TRUE: Enables support for IPv6 addresses FALSE: Only IPv4 addresses are supported		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Determines the frequency at which the SoAd_MainFunction() is called in [s].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdRoutingGroupMax		EcucIntegerParamDef
BSW Description		
Specifies the maximum number of SoAd routing groups. Furthermore it defines the platform type used for RoutingGroupIdType. If SoAdRoutingGroupMax is not greater than 256, a uint8 is used, otherwise a uint16.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdSoConMax		EcucIntegerParamDef
BSW Description		
Specifies the maximum number of SoAd socket connections. Furthermore it defines the platform type used for SoAd_SoConIdType. If SoAdSoConMax is not greater than 256, a uint8 is used, otherwise uint16.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
SoAd	SoAd/SoAdGeneral	
BSW Parameter		**BSW Type**
SoAdVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activates the SoAd_GetVersionInfo() API. TRUE: Enables the SoAd_GetVersionInfo() API. FALSE: SoAd_GetVersionInfo() API is not included.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.6.6 EthSM

BSW Module	**BSW Context**	
EthSM	EthSM	
BSW Parameter		**BSW Type**
EthSMGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the global parameter of the Ethernet State Manager.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMGeneral	
BSW Parameter		**BSW Type**
EthSMDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMGeneral	
BSW Parameter		**BSW Type**
EthSMDummyMode		EcucBooleanParamDef
BSW Description		
Disables the API to the EthIf. The API to the ComM is available but the functionality is deactivated. The function calls from the ComM will be answered with the return value E_OK.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMGeneral	
BSW Parameter		**BSW Type**
EthSMMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Specifies the period in seconds that the MainFunction has to be triggered with.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMGeneral	
BSW Parameter		**BSW Type**
EthSMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Enables and disables the version info API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthSM	EthSM	
BSW Parameter		**BSW Type**
EthSMNetwork		EcucParamConfContainerDef
BSW Description		
This container contains the Ethernet network-specific parameters of each Ethernet network. It also contains the reference to combination of controller and transceiver assigned to an Ethernet network.		
Template Description		
The EthernetPhysicalChannel represents a VLAN or an untagged channel. An untagged channel is modeled as an EthernetPhysicalChannel without an aggregated VLAN.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPhysicalChannel		
Mapping Rule		**Mapping Type**
1:1 For each EthernetPhysicalChannel the EcuInstance is connected to, one EthSMNetwork container is created.		full
Mapping Status		**Mapping ID**
valid		up_EthSM_00001

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMNetwork	
BSW Parameter		**BSW Type**
EthSMComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
Unique handle to identify one certain Ethernet network. Reference to one of the network handles configured for the ComM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthSM	EthSM/EthSMNetwork	
BSW Parameter		**BSW Type**
EthSMDemEventParameterRefs		EcucParamConfContainerDef
BSW Description		
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
EthSM	EthSM/EthSMNetwork/EthSMDemEventParameterRefs
BSW Parameter	**BSW Type**
ETHSM_E_LINK_DOWN	EcucSymbolicNameReferenceDef
BSW Description	
Reference to configured DEM event to report bus off errors for this Eth network.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
EthSM	EthSM/EthSMNetwork
BSW Parameter	**BSW Type**
EthSMEthIfControllerRef	EcucSymbolicNameReferenceDef
BSW Description	
Reference to EthIfCtrl container where a ETH controller and transceiver (optional) combination is configured.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.6.7 EthTrcv

BSW Module	BSW Context
EthTrcv	EthTrcv
BSW Parameter	**BSW Type**
EthTrcvConfigSet	EcucParamConfContainerDef
BSW Description	
This container contains the configuration parameters and sub containers of the AUTOSAR EthTrcv module.	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet	
BSW Parameter		**BSW Type**
EthTrcvConfig		EcucParamConfContainerDef
BSW Description		
Configuration of the individual transceiver		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvAutoNegotiationEnabled		EcucBooleanParamDef
BSW Description		
Specifies if Auto-Negotiation is enabled (TRUE) or disabled (FALSE) for determination of the Ethernet transceiver speed.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvConnNeg		EcucEnumerationParamDef
BSW Description		
Specifies the connection negotiation of the Ethernet transceiver link.		
Template Description		
Specifies the connection negotiation of the CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.connectionNegotiationBehavior		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_EthTrcv_00007

BSW Module	BSW Context	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvConnNeg	
BSW Parameter		**BSW Type**
TRCV_CONN_NEG_AUTO		EcucEnumerationLiteralDef
BSW Description		
Automatic Negotiation		
Template Description		
Automatic Negotiation		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetConnectionNegotiationEnum.auto		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00005

BSW Module	BSW Context	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvConnNeg	
BSW Parameter		**BSW Type**
TRCV_CONN_NEG_MASTER		EcucEnumerationLiteralDef
BSW Description		
Master		
Template Description		
Master		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetConnectionNegotiationEnum.master		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00003

BSW Module	BSW Context	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvConnNeg	
BSW Parameter		**BSW Type**
TRCV_CONN_NEG_SLAVE		EcucEnumerationLiteralDef
BSW Description		
Slave		
Template Description		
Slave		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetConnectionNegotiationEnum.slave		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00004

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig		
BSW Parameter		**BSW Type**	
EthTrcvCtrlIdx		EcucIntegerParamDef	
BSW Description			
Specifies the controller used for MII access to the transceiver			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig		
BSW Parameter		**BSW Type**	
EthTrcvDemEventParameterRefs		EcucParamConfContainerDef	
BSW Description			
Container for the references to DemEventParameter elements which shall be invoked using the API Dem_SetEventStatus in case the corresponding error occurs. The EventId is taken from the referenced DemEventParameter's DemEventId symbolic value. The standardized errors are provided in this container and can be extended by vendor-specific error references.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvDemEventParameterRefs		
BSW Parameter		**BSW Type**	
ETHTRCV_E_ACCESS		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the DemEventParameter which shall be issued when the error "Transceiver access failed" has occurred.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvDuplexMode		EcucEnumerationParamDef
BSW Description		
Specifies the duplex mode of the Ethernet transceiver link if Auto-Negotiation is disabled. This parameter is ignored if Auto-Negotiation is enabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvIcuChannelRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to the IcuChannel to enable/disable the interrupts for wakeups.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvIdx		EcucIntegerParamDef
BSW Description		
Specifies the instance ID of the configured transceiver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvMgmtInterface		EcucChoiceContainerDef
BSW Description		

The choice container allow to configure either the EthTrcv is accessed by a MII interface or Switch interface.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface	
BSW Parameter		**BSW Type**
EthTrcvMiiInterface		EcucParamConfContainerDef
BSW Description		
This container includes the MII interface configuration between an Ethernet Controller and the Ethernet Transceiver. If this container is configured the EthTrcv shall call Eth_WriteMii / Eth_ReadMii API to access the hardware ethernet tranceiver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface/EthTrcvMii Interface	
BSW Parameter		**BSW Type**
EthTrcvMiiIdx		EcucIntegerParamDef
BSW Description		
Specifies the transceiver index used for MII access to the transceiver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface/EthTrcvMii Interface	
BSW Parameter		**BSW Type**
EthTrcvMiiSelection		EcucEnumerationParamDef
BSW Description		

This parameter specifies the type of transceiver / controller interface. The interface is either MII, Light-MII or RGMII.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface	
BSW Parameter		**BSW Type**
EthTrcvSwitchInterface		EcucParamConfContainerDef
BSW Description		
This container includes the Switch interface configuration between an Ethernet Switch and an Ethernet Transceiver. If this container is configured the EthTrcv shall call EthSwt_WriteTrcvRegister / EthSwt_WriteTrcvRegister API to access the hardware ethernet transceiver.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface/EthTrcvSwitchInterface	
BSW Parameter		**BSW Type**
EthTrcvSwitchPortRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to a switch port.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvMgmtInterface/EthTrcvSwitchInterface	
BSW Parameter		**BSW Type**
EthTrcvSwitchRef		EcucSymbolicNameReferenceDef
BSW Description		

Reference to a switch configuration container.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvPhysLayerType		EcucEnumerationParamDef
BSW Description		
Specifies the physical layer type of the Ethernet transceiver link.		
Template Description		
Specifies the physical layer type of the CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.physicalLayerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00006

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPhysLayerType	
BSW Parameter		**BSW Type**
TRCV_PHYS_LAYER_TYPE_1000BASE_T		EcucEnumerationLiteralDef
BSW Description		
physical layer interface 1000BASE-T (1Gbit/s, 4 pairs). Used for consumer electronic.		
Template Description		
Ethernet Standard (IEEE 802.3ab) to support 1Gbit/s over 4 twisted pairs.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPhysicalLayerTypeEnum.1000 BASE-T		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00009

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPhysLayerType	
BSW Parameter		**BSW Type**
TRCV_PHYS_LAYER_TYPE_1000BASE_T1		EcucEnumerationLiteralDef
BSW Description		
physical layer interface 1000BASE-T1 (1Gbit/s, 1 pair). Used for automotive.		
Template Description		
Ethernet Standard (IEEE 802.3bp) to support 1Gbit/s over a single twisted pair cable.		
M2 Parameter		

SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPhysicalLayerTypeEnum.1000BASE-T1	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTrcv_00011

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPhysLayerType	
BSW Parameter		**BSW Type**
TRCV_PHYS_LAYER_TYPE_100BASE_T1		EcucEnumerationLiteralDef
BSW Description		
physical layer interface 100BASE-T1 (100Mbit/s, 1 pair). Used for automotive.		
Template Description		
Ethernet Standard (IEEE 802.3bw) to support 100Mbit/s over a single twisted pair cable. 100BASE-T1 is the IEEE Standardized version of BroadRReach.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPhysicalLayerTypeEnum.100BASE-T1		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00010

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPhysLayerType	
BSW Parameter		**BSW Type**
TRCV_PHYS_LAYER_TYPE_100BASE_TX		EcucEnumerationLiteralDef
BSW Description		
physical layer interface 100BASE-TX (100Mbit/s, 2 pairs). Used for consumer electronic.		
Template Description		
Ethernet Standard (IEEE 802.3u) to support 100Mbit/s over two twisted pairs.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetPhysicalLayerTypeEnum.100BASE-TX		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00008

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvPortMacLayerSpeed		EcucEnumerationParamDef
BSW Description		
Defines the baud rate of the MAC layer.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvPortMacLayerSubType		EcucEnumerationParamDef
BSW Description		
Defines the MAC layer subtype of a switch port		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvPortMacLayerType		EcucEnumerationParamDef
BSW Description		
Defines the MAC layer type of the ethernet transceiver.		
Template Description		
Specifies the mac layer type of the CouplingPort.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort.macLayerType		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00012

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPortMacLayerType	
BSW Parameter		**BSW Type**
TRCV_MAC_LAYER_TYPE_XGMII		EcucEnumerationLiteralDef
BSW Description		
MAC layer interface (data) bandwith class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII)		
Template Description		
Mac layer interface (data) bandwith class 1Gbit/s (e.g. GMII, RGMII, SGMII, RvGMII, USGMII)		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xGMII		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTrcv_00014

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPortMacLayerType		
BSW Parameter		**BSW Type**	
TRCV_MAC_LAYER_TYPE_XMII		EcucEnumerationLiteralDef	
BSW Description			
MAC layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)			
Template Description			
Mac layer interface (data) bandwith class 100Mbit/s (e.g. RMII, RvMII, SMII, RvMII)			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthTrcv_00013

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvPortMacLayerType		
BSW Parameter		**BSW Type**	
TRCV_MAC_LAYER_TYPE_XXGMII		EcucEnumerationLiteralDef	
BSW Description			
MAC layer interface (data) bandwith class 10Gbit/s			
Template Description			
Mac layer interface (data) bandwith class 10Gbit/s			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetMacLayerTypeEnum.xXGMII			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_EthTrcv_00015

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig		
BSW Parameter		**BSW Type**	
EthTrcvSpeed		EcucEnumerationParamDef	
BSW Description			
Specifies the speed of the Ethernet transceiver link in [MBit/s]. If AutoNegotiation is enabled this is the maximum speed advertised for Auto-Negotiation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvWakeUpCallout		EcucFunctionNameDef

BSW Description	
Configuration of the call-out name.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig	
BSW Parameter		**BSW Type**
EthTrcvWakeupMap		EcucParamConfContainerDef
BSW Description		
Container for the mapping of wake up reasons to wake up sources. At least one container is needed if EthTrcvWakeUpSupport is not ETHTRCV_WAKEUP_NOT_SUPPORTED.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvWakeupMap	
BSW Parameter		**BSW Type**
EthTrcvWakeupReason		EcucEnumerationParamDef
BSW Description		
This parameter defines the transceiver wake up reasons.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvConfigSet/EthTrcvConfig/EthTrcvWakeupMap	
BSW Parameter		**BSW Type**
EthTrcvWakeupSourceRef		EcucSymbolicNameReferenceDef
BSW Description		
Configures the wake-up source defined in EcuM.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv	
BSW Parameter		**BSW Type**
EthTrcvGeneral		EcucParamConfContainerDef
BSW Description		
General configuration of Ethernet Transceiver Driver module		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvGetBaudRateApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_GetBaudRate API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvGetCableDiagnosticsResultApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_GetCableDiagnosticsResult API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvGetDuplexModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_GetDuplexMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvGetLinkStateApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_GetLinkState API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvGetPhyIdentifierApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthTrcv_GetPhyIdentifier API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvGetPhySignalQualityApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthTrcv_GetPhySignalQuality API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvGetTransceiverModeApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthTrcv_GetTransceiverMode API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvGetTransceiverWakeupModeApi		EcucBooleanParamDef	
BSW Description			

Enables / Disables EthTrcv_GetTransceiverWakeupMode API	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvIndex		EcucIntegerParamDef
BSW Description		
Specifies the InstanceId of this module instance. If only one instance is present it shall have the Id 0.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Specifies the period of main function EthTrcv_MainFunction in seconds.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvMaxTrcvsSupported		EcucIntegerParamDef
BSW Description		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvSetPhyTestModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_SetPhyTestMode API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvSetPhyTxModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_SetPhyTxMode API.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvSetTransceiverModeApi		EcucBooleanParamDef
BSW Description		
Enables / Disables EthTrcv_SetTransceiverMode API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvStartAutoNegotiationApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables EthTrcv_StartAutoNegotiation API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvVersionInfoApi		EcucBooleanParamDef	
BSW Description			
Enables / Disables version info API			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTrcv	EthTrcv/EthTrcvGeneral		
BSW Parameter		**BSW Type**	
EthTrcvVersionInfoApiMacro		EcucBooleanParamDef	
BSW Description			
Enables / Disables version info API macro implementation			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
EthTrcv	EthTrcv/EthTrcvGeneral	
BSW Parameter		**BSW Type**
EthTrcvWakeUpSupport		EcucEnumerationParamDef
BSW Description		

Configures wake-up to polling or interrupt or to not used/not supported. In case no wake up is supported by the hardware, the BSWMD pre-configuration shall be set to ETHTRCV_WAKEUP_NOT_SUPPORTED.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.6.8 TcpIp

BSW Module	**BSW Context**	
TcpIp	TcpIp	
BSW Parameter		**BSW Type**
TcpIpConfig		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR TcpIp module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig	
BSW Parameter		**BSW Type**
TcpIpCtrl		EcucParamConfContainerDef
BSW Description		
Specifies the EthIf controller used for IP communication.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl	
BSW Parameter		**BSW Type**
TcpIpDhcpServerConfigRef		EcucReferenceDef
BSW Description		

Reference to a TcpIpDhcpServerConfig which shall be used for this controller setting (VLAN).	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl		
BSW Parameter		**BSW Type**	
TcpIpEthIfCtrlRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to EthIf controller where the IP address shall be assigned.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl		
BSW Parameter		**BSW Type**	
TcpIpIpFramePrioDefault		EcucIntegerParamDef	
BSW Description			
Specifies the default value for the priority for all outgoing frames. Note: the value can be changed for each socket individually via TcpIp_ChangeParameter() service. If this optional parameter is not available, 0 is used as default priority.			
Template Description			
Standard output-priority outgoing Frames will be tagged with. This allows to assign different default-Priorities to each VLAN. Defines the priority that received frames are assigned together with the VLAN Id (defaultVlan). In case modifyVlan and an already tagged received frame, the actual priority of the received frame is not modified.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.defaultPriority			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00011

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl	
BSW Parameter		**BSW Type**
TcpIpIpVXCtrl		EcucChoiceContainerDef

BSW Description	
Specifies whether this controller is an Internet Protocol version 4 (IPv4) or Internet Protocol version 6 (IPv4) instance.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl	
BSW Parameter		**BSW Type**
TcpIpIpV4Ctrl		EcucParamConfContainerDef
BSW Description		
Specifies an Internet Protocol version 4 (IPv4) instance.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl	
BSW Parameter		**BSW Type**
TcpIpArpConfigRef		EcucReferenceDef
BSW Description		
Reference to ARP configuration for this IPv4 instance. (Multiple IPv4 instances may use the same configuration container but will operate independently)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl	
BSW Parameter		**BSW Type**
TcpIpAutoIpConfigRef		EcucReferenceDef
BSW Description		
Reference to AutoIp configuration for this IPv4 instance. (Multiple IPv4 instances may use the same configuration container but will operate independently)		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl	
BSW Parameter		**BSW Type**
TcpIpDhcpConfigRef		EcucReferenceDef
BSW Description		
Reference to DHCP configuration for this IPv4 instance. (Multiple IPv4 instances may use the same configuration container but will operate independently)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl	
BSW Parameter		**BSW Type**
TcpIpFragmentationConfigRef		EcucReferenceDef
BSW Description		
Reference to Fragmentation configuration for this IPv4 instance. (Multiple IPv4 instances may use the same configuration container but will operate independently)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl	
BSW Parameter		**BSW Type**
TcpIpIpV4MtuConfig		EcucParamConfContainerDef
BSW Description		
This container specifies the Maximum Transmission Unit parameters for this IPv4 instance.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl/TcpIpIpV4MtuConfig	
BSW Parameter		**BSW Type**
TcpIpIpV4PathMtuEnabled		EcucBooleanParamDef
BSW Description		
If enabled the IPv4 processes incoming ICMPv4 "Packet Too Big" messages and stores a MTU value for each destination address.		
Template Description		
If enabled the IPv4/IPv6 processes incoming ICMP "Packet Too Big" messages and stores a MTU value for each destination address.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pathMtuEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00048

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV4Ctrl/TcpIpIpV4MtuConfig	
BSW Parameter		**BSW Type**
TcpIpIpV4PathMtuTimeout		EcucFloatParamDef
BSW Description		
If this value is >0 the IpV4 will reset the MTU value stored for each destination after n seconds. see [RFC1191 6.3. Purging stale PMTU information] Default: 600 seconds (10 minutes)		
Template Description		
If this value is >0 the IPv4/IPv6 will reset the MTU value stored for each destination after n seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pathMtuTimeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00047

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl	
BSW Parameter		**BSW Type**
TcpIpIpV6Ctrl		EcucParamConfContainerDef
BSW Description		
Specifies an Internet Protocol version 6 (IPv6) instance.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl	
BSW Parameter		**BSW Type**
TcpIpIpV6DhcpConfigRef		EcucReferenceDef
BSW Description		
Reference to DHCPv6 configuration. (Multiple IPv6 instances may use the same configuration container but will operate independently)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl	
BSW Parameter		**BSW Type**
TcpIpIpV6FragmentationConfigRef		EcucReferenceDef
BSW Description		
Reference to IPv6 Fragmentation Configuration. (Multiple IPv6 instances may use the same configuration container but will operate independently)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl	
BSW Parameter		**BSW Type**
TcpIpIpV6MtuConfig		EcucParamConfContainerDef
BSW Description		
This container specifies the Maximum Transmission Unit parameters for this IPv6 instance.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl/TcpIpIpV6MtuConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6PathMtuEnabled		EcucBooleanParamDef
BSW Description		
If enabled the IPv6 processes incoming ICMPv6 "Packet Too Big" messages and stores a MTU value for each destination address. See RFC1981 "Path MTU Discovery for IP version 6" for details about PathMTU.		
Template Description		
If enabled the IPv4/IPv6 processes incoming ICMP "Packet Too Big" messages and stores a MTU value for each destination address.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pathMtuEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00013

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl/TcpIpIpV6MtuConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6PathMtuTimeout		EcucFloatParamDef
BSW Description		
If this value is >0 the IpV6 will reset the MTU value stored for each destination after n seconds. see [RFC1981 5.3. Purging stale PMTU information] Default: 600 seconds (10 minutes)		
Template Description		
If this value is >0 the IPv4/IPv6 will reset the MTU value stored for each destination after n seconds.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pathMtuTimeout		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00014

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpCtrl/TcpIpIpVXCtrl/TcpIpIpV6Ctrl	
BSW Parameter		**BSW Type**
TcpIpIpV6NdpConfigRef		EcucReferenceDef
BSW Description		
Reference to Neighbor Discovery Protocol Configuration. (Multiple IPv6 instances may use the same configuration container but will operate independently)		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig	
BSW Parameter		**BSW Type**
TcpIpDhcpServerConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the DHCP Server sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig	
BSW Parameter		**BSW Type**
TcpIpDhcpAddressAssignment		EcucParamConfContainerDef
BSW Description		
Defines a Ethernet Switch port based IP address assignment.		
Template Description		
Specifies the IP Address which will be assigned to a DHCP Client at this SwitchPort. If no dhcpAddressAssignment is provided all DHCP-Discover messages received at this Port will be discarded by the DHCP Server.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.dhcpAddressAssignment		
Mapping Rule		**Mapping Type**
The existence of a dhcpAddressAssignment leads to one container.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00028

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig/TcpIpDhcpAddressAssignment	
BSW Parameter		**BSW Type**
TcpIpDhcpAddressLowerBound		EcucStringParamDef
BSW Description		
The lower bound IP address which shall be assigned. If lower bound and upper bound are identical exactly this IP address shall be assigned.		
Template Description		

Ipv4DhcpServerConfiguration.addressRangeLowerBound: Lower range of IP addresses to be issued to DHCP clients. IPv4 Address. Notation: 255.255.255.255. **Ipv6DhcpServerConfiguration.addressRangeLowerBound**: Lower range of IP addresses to be issued to DHCP clients. IPv6 Address. Notation: FFFF:...:FFFF.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4DhcpServerConfiguration.addressRangeLowerBound,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6DhcpServerConfiguration.addressRangeLowerBound	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00033

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig/TcpIpDhcpAddressAssignment	
BSW Parameter		**BSW Type**
TcpIpDhcpAddressUpperBound		EcucStringParamDef
BSW Description		
The upper bound IP address which shall be assigned. If lower bound and upper bound are identical exactly this IP address shall be assigned.		
Template Description		
Ipv4DhcpServerConfiguration.addressRangeUpperBound: Upper range of IP addresses to be issued to DHCP clients. Pv4 Address. Notation: 255.255.255.255. **Ipv6DhcpServerConfiguration.addressRangeUpperBound**: Upper range of IP addresses to be issued to DHCP clients. IPv6 Address. Notation: FFFF:...:FFFF.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4DhcpServerConfiguration.addressRangeUpperBound,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6DhcpServerConfiguration.addressRangeUpperBound		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00034

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig/TcpIpDhcpAddressAssignment	
BSW Parameter		**BSW Type**
TcpIpDhcpSwitchPortRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to Ethernet Switch port. Optional in case the Dhcp server is operating without an Ethernet switch.		
Template Description		
A CouplingPort is used to connect a CouplingElement with an EcuInstance or two CouplingElements with each other via a CouplingPortConnection. Optionally, the CouplingPort may also have a reference to a macMulticastGroup and a defaultVLAN.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::CouplingPort		

Mapping Rule	Mapping Type
The Switch CouplingPort the VlanMembership.dhcpAddressAssignment belongs to.	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00032

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig	
BSW Parameter		**BSW Type**
TcpIpDhcpDefaultRouter		EcucStringParamDef
BSW Description		
IP address of default router (gateway).		
Template Description		
Ipv4DhcpServerConfiguration.defaultGateway: IP address of the default gateway. Notation 255.255.255.255 **Ipv6DhcpServerConfiguration.defaultGateway**: IP address of the default gateway. Notation 255.255.255.255		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4DhcpServerConfiguration.defaultGateway,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6DhcpServerConfiguration.defaultGateway		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00031

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig	
BSW Parameter		**BSW Type**
TcpIpDhcpEthIfSwitchRef		EcucSymbolicNameReferenceDef
BSW Description		
Reference to EthIfSwitch representation. Optional in case the Dhcp server is operating without an Ethernet switch.		
Template Description		
Specifies the IP Address which will be assigned to a DHCP Client at this SwitchPort. If no dhcpAddressAssignment is provided all DHCP-Discover messages received at this Port will be discarded by the DHCP Server.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::VlanMembership.dhcpAddressAssignment,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::InfrastructureServices.dhcpServerConfiguration		
Mapping Rule		**Mapping Type**
The Switch CouplingElement the VlanMembership.dhcpAddressAssignment belongs to. In case no Switch is used the InfrastructureServices.dhcpServerConfiguration is used instead.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00029

BSW Module	BSW Context

TcpIp	TcpIp/TcpIpConfig/TcpIpDhcpServerConfig		
BSW Parameter		**BSW Type**	
TcpIpDhcpNetmask		EcucIntegerParamDef	
BSW Description			
Network mask of IPv4 address or address prefix of IPv6 address in CIDR Notation, i.e. decimal value between 0 and 32 (IPv4) or 0 and 128 (IPv6) that describes the number of significant bits defining the network number or prefix of an IP address.			
Template Description			
Ipv4DhcpServerConfiguration.networkMask: Default network mask to be used by DHCP clients. Notation 255.255.255.255 **Ipv6DhcpServerConfiguration.networkMask**: Default network mask to be used by DHCP clients. Notation 255.255.255.255			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4DhcpServerConfiguration.networkMask,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6DhcpServerConfiguration.networkMask			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00030

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig		
BSW Parameter		**BSW Type**	
TcpIpDuplicateAddressDetectionConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the DAD callout function.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpDuplicateAddressDetectionConfig		
BSW Parameter		**BSW Type**	
TcpIpDuplicateAddressDetectionCalloutName		EcucFunctionNameDef	
BSW Description			
This parameter defines the name of the DAD callout function <Up_DADAddressConflict>.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**

valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpDuplicateAddressDetectionConfig	
BSW Parameter		**BSW Type**
TcpIpDuplicateAddressDetectionHeaderFileName		EcucStringParamDef
BSW Description		
This parameter specifies the name of the header file containing the definition of the DAD callout function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig	
BSW Parameter		**BSW Type**
TcpIpIpConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the IP (Internet Protocol) sub-module		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig	
BSW Parameter		**BSW Type**
TcpIpIpV4Config		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the IPv4 (Internet Protocol version 4) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config	
BSW Parameter		**BSW Type**
TcpIpArpConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the ARP (Address Resolution Protocol) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpArpConfig	
BSW Parameter		**BSW Type**
TcpIpArpNumGratuitousARPonStartup		EcucIntegerParamDef
BSW Description		
Specifies the number of gratuitous ARP replies which shall be sent on assignment of a new IP address.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpArpConfig	
BSW Parameter		**BSW Type**
TcpIpArpPacketQueueEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of the ARP Packet Queue according to IETF RFC 1122, section 2.3.2.2.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpArpConfig	
BSW Parameter		**BSW Type**
TcpIpArpTableEntryTimeout		EcucFloatParamDef

BSW Description	
Timeout in seconds after which an unused ARP entry is removed.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpArpConfig
BSW Parameter	**BSW Type**
TcpIpArpTableSizeMax	EcucIntegerParamDef
BSW Description	
Maximum number of entries in the ARP table.	
Template Description	
This attribute specifies the size of neighbor cache or ARP table in units of entries.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.neighborCacheSize	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00035

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config
BSW Parameter	**BSW Type**
TcpIpAutoIpConfig	EcucParamConfContainerDef
BSW Description	
Specifies the configuration parameters of the Auto-IP (automatic private IP addressing) sub-module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpAutoIpConfig
BSW Parameter	**BSW Type**
TcpIpAutoIpInitTimeout	EcucFloatParamDef
BSW Description	
The time in seconds Auto-IP waits at startup, before beginning with ARP probing. This delay is used to give DHCP time to acquire a lease in case a DHCP server is present.	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config	
BSW Parameter		**BSW Type**
TcpIpDhcpConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the DHCPv4. This container may be referenced by multiple IPv4 instances if they shall use the same configuration. This container may have multiple instances if different configurations are required for different IPv4 instances.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config	
BSW Parameter		**BSW Type**
TcpIpIcmpConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the ICMP (Internet Control Message Protocol) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIcmpConfig	
BSW Parameter		**BSW Type**
TcpIpIcmpEchoReplyEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables transmission of ICMP echo reply message in case of a ICMP echo reception.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIcmpConfig	
BSW Parameter		**BSW Type**
TcpIpIcmpMsgHandler		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIpIcmpConfig and specifies the configuration parameters for the ICMP message handler.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIcmpConfig/TcpIp IcmpMsgHandler	
BSW Parameter		**BSW Type**
TcpIpIcmpMsgHandlerHeaderFileName		EcucStringParamDef
BSW Description		
This parameter specifies the name of the header file containing the definition of the ICMP message handler function.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIcmpConfig/TcpIp IcmpMsgHandler	
BSW Parameter		**BSW Type**
TcpIpIcmpMsgHandlerName		EcucFunctionNameDef
BSW Description		
This parameter defines the name of the ICMP message handler function <Up_IcmpMsgHandler>.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIcmpConfig	
BSW Parameter		**BSW Type**
TcpIpIcmpTtl		EcucIntegerParamDef
BSW Description		
Default Time-to-live value of outgoing ICMP packets.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config	
BSW Parameter		**BSW Type**
TcpIpIpFragmentationConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of IPv4 packet fragmentation/reassembly. This container may be referenced by multiple IPv4 instances if they shall use the same configuration. This container may have multiple instances if different configurations are required for different IPv4 instances.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIpFragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpFragmentationRxEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support for reassembling of incoming datagrams that are fragmented according to IETF RFC 815 (IP Datagram Reassembly Algorithms).		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIpFragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpNumFragments		EcucIntegerParamDef
BSW Description		
Specifies the maximum number of IP fragments per datagram. Note: this parameter is only relevant if TcpIpIpFragmentationRxEnabled is TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIpFragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpNumReassDgrams		EcucIntegerParamDef
BSW Description		
Specifies the maximum number of fragmented IP datagrams that can be reassembled in parallel. Note: this parameter is only relevant if TcpIpIpFragmentationRxEnabled is TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV4Config/TcpIpIpFragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpReassTimeout		EcucFloatParamDef
BSW Description		
Specifies the timeout in [s] after which an incomplete datagram gets discarded. Note: this parameter is only relevant if TcpIpIpFragmentationRxEnabled is TRUE.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6Config		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the IPv6 (Internet Protocol version 6) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6Config		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the DHCPv6. This container may be referenced by multiple IPv6 instances if they shall use the same configuration. This container may have multiple instances if different configurations are required for different IPv6 instances.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6CnfDelayMax		EcucFloatParamDef
BSW Description		
Maximum delay (s) before sending the first Confirm message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6CnfDelayMin		EcucFloatParamDef
BSW Description		
Minimum delay (s) before the first Confirm message will be sent.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6InfDelayMax		EcucFloatParamDef
BSW Description		
Maximum delay (s) before sending the first Information Request message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6InfDelayMin		EcucFloatParamDef
BSW Description		
Minimum delay (s) before the first Information Request message will be sent.		
Template Description		
M2 Parameter		

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6SolDelayMax		EcucFloatParamDef
BSW Description		
Maximum delay (s) before sending the first Solicit message. If this value is bigger than the previous minimum delay value a random delay will be chosen from the interval.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpDhcpV6Config	
BSW Parameter		**BSW Type**
TcpIpDhcpV6SolDelayMin		EcucFloatParamDef
BSW Description		
Minimum delay (s) before the first Solicit message will be sent.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config	
BSW Parameter		**BSW Type**
TcpIpIcmpV6Config		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters of the ICMPv6 (Internet Control Message Protocol for IPv6) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config	
BSW Parameter		**BSW Type**
TcpIpIcmpV6EchoReplyAvoidFragmentation		EcucBooleanParamDef
BSW Description		
If enabled, the stack will respond only to incoming ICMPv6 Echo Requests (Pings) that fit the MTU of the respective interface, i.e. can be transmitted without IPv6 fragmentation. Only relevant if TcpIpIcmpV6EchoReplyEnabled is enabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config	
BSW Parameter		**BSW Type**
TcpIpIcmpV6EchoReplyEnabled		EcucBooleanParamDef
BSW Description		
If enabled, the stack will respond to incoming ICMPv6 Echo Requests (Pings).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config	
BSW Parameter		**BSW Type**
TcpIpIcmpV6HopLimit		EcucIntegerParamDef
BSW Description		
Default Hop-Limit value of outgoing ICMPv6 packets.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config		
BSW Parameter		**BSW Type**	
TcpIpIcmpV6MsgDestinationUnreachableEnabled		EcucBooleanParamDef	
BSW Description			
Dis/Enables transmission of Destination Unreachable Messages			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config		
BSW Parameter		**BSW Type**	
TcpIpIcmpV6MsgHandler		EcucParamConfContainerDef	
BSW Description			
This container is a subcontainer of TcpIpIcmpConfig and specifies the configuration parameters for the ICMPv6 message handler.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config/TcpIpIcmpV6MsgHandler		
BSW Parameter		**BSW Type**	
TcpIpIcmpV6MsgHandlerHeaderFileName		EcucStringParamDef	
BSW Description			
This parameter specifies the name of the header file containing the definition of the ICMPv6 message handler function.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config/TcpIpIcmpV6MsgHandler
BSW Parameter	**BSW Type**
TcpIpIcmpV6MsgHandlerName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the ICMP message handler function <Up_IcmpMsgHandler>.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIcmpV6Config
BSW Parameter	**BSW Type**
TcpIpIcmpV6MsgParameterProblemEnabled	EcucBooleanParamDef
BSW Description	
If enabled an ICMPv6 parameter problem message will be sent if a received packet has been dropped due to unknown options or headers that are found in the packet. [RFC2460 4. IPv6 Extension Headers]	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config
BSW Parameter	**BSW Type**
TcpIpIpV6ConfigExtHeaderFilter	EcucParamConfContainerDef
BSW Description	
This container describes the white list for the filtering of IPv6 extension headers, i.e. frames containing IPv6 extension headers not listed here shall be silently dropped.	
Template Description	
White list for the filtering of IPv6 extension headers.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::IPv6ExtHeaderFilterList	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00037

BSW Module	**BSW Context**

TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6ConfigExtHeaderFilter		
BSW Parameter		**BSW Type**	
TcpIpIpV6ConfigExtHeaderFilterEntry		EcucIntegerParamDef	
BSW Description			
IPv6 Extension Header type allowed by this filter.			
Template Description			
IPv6 Extension Header type allowed by this filter.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::IPv6ExtHeaderFilterList.allowedIPv6ExtHeader			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00038

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config		
BSW Parameter		**BSW Type**	
TcpIpIpV6FragmentationConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the configuration parameters of IPv6 packet fragmentation/reassembly. This container may be referenced by multiple IPv6 instances if they shall use the same configuration. This container may have multiple instances if different configurations are required for different IPv6 instances.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6ReassemblyBufferCount		EcucIntegerParamDef
BSW Description		

Number of buffers that can be used for fragment reassembly. In case of a reassembly error or if not all fragments are received in time this buffer will be blocked until the specified "Fragment Reassembly Timeout" has been exceeded. A value of 0 disables fragment reassembly. [RFC2460 5. Packet Size Issues] "In order to send a packet larger than a path's MTU, a node may use the IPv6 Fragment header to fragment the packet at the source and have it reassembled at the destination(s). However, the use of such fragmentation is discouraged in any application that is able to adjust its packets to fit the measured path MTU (i.e., down to 1280 octets)."
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig

BSW Parameter	**BSW Type**
TcpIpIpV6ReassemblyBufferSize	EcucIntegerParamDef

BSW Description
[RFC2460 5. Packet Size Issues] "A node must be able to accept a fragmented packet that, after reassembly, is as large as 1500 octets. A node is permitted to accept fragmented packets that reassemble to more than 1500 octets."the measured path MTU (i.e., down to 1280 octets)."
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig

BSW Parameter	**BSW Type**
TcpIpIpV6ReassemblySegmentCount	EcucIntegerParamDef

BSW Description
Specifies the maximum number of consecutive data segments that can be managed in each reassembly buffer. If all fragments are received in order, only one segment will be needed. To deal with fragments received out of order this value should be configured bigger than 1.
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6ReassemblyTimeout		EcucFloatParamDef
BSW Description		
[RFC2460 4.5 Fragment Header] Default: 60 seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig	
BSW Parameter		**BSW Type**
TcpIpIpV6TxFragmentBufferCount		EcucIntegerParamDef
BSW Description		
These buffers will be used if the IpV6 receives packets from the upper layer that do not fit into the MTU and thus must be fragmented. A value of 0 disables tx fragmentation. If the upper layer transmits packets that do not fit into the link or path MTU, the IpV6 will split-up the packet into fragments. see "Enable Fragment Reassembly"		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpIpV6FragmentationConfig	
BSW Parameter		**BSW Type**

TcpIpIpV6TxFragmentBufferSize		EcucIntegerParamDef	
BSW Description			
Size of each fragment tx buffer in bytes			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config		
BSW Parameter		**BSW Type**	
TcpIpNdpConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the configuration parameters of the Neighbor Discovery Protocol for IPv6 This container may be referenced by multiple IPv6 instances if they shall use the same configuration. This container may have multiple instances if different configurations are required for different IPv6 instances.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig		
BSW Parameter		**BSW Type**	
TcpIpNdpArNudConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the configuration parameters for NDP Address Resolution and Neighbor Unreachability Detection.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig

BSW Parameter		BSW Type
TcpIpNdpDefaultReachableTime		EcucFloatParamDef
BSW Description		
Configuration of the ReachableTime (s) specified in [RFC4861 6.3.2. Host Variables]. "The time a neighbor is considered reachable after receiving a reachability confirmation." If "TcpIpNdpDynamicReachableTimeEnabled" is checked, this value may be reconfigured based on received Router Advertisements. Default: REACHABLE_TIME = 30 seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig		
BSW Parameter			**BSW Type**
TcpIpNdpDefaultRetransTimer			EcucFloatParamDef
BSW Description			
Configures the default value (s) for the RetransTimer variable specified in [RFC4861 6.3.2. Host Variables]. "The time between retransmissions of Neighbor Solicitation messages to a neighbor when resolving the address or when probing the reachability of a neighbor." If "TcpIpNdpDynamicRetransTimeEnabled" is checked, this value may be reconfigured based on received Router Advertisements. Default: RETRANS_TIMER = 1 second			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpDefensiveProcessing		EcucBooleanParamDef
BSW Description		

If enabled the NDP shall only process Neighbor Advertisements which are received in reaction to a previously transmitted Neighbor Solicitation as well as skipping updates to the Neighbor Cache based on received Neighbor Solicitations. If disabled all Neighbor Advertisements and Solicitations shall be processed as specified in RFC4861. [RFC4861 7.2.5. Receipt of Neighbor Advertisements]	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpDelayFirstProbeTime		EcucFloatParamDef
BSW Description		
Delay before sending the first NUD probe in (s). [RFC4861 7.3.3. Node Behavior] Default: DELAY_FIRST_PROBE_TIME = 5 seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpMaxNeighborCacheSize		EcucIntegerParamDef
BSW Description		
Maximum number of entries in the neighbor cache. [RFC4861 5.1. Conceptual Data Structures]		
Template Description		
This attribute specifies the size of neighbor cache or ARP table in units of entries.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.neighborCacheSize		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00036

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpMaxRandomFactor		EcucIntegerParamDef
BSW Description		
Maximum random factor used for randomization [RFC4861 10. Protocol Constants] Default: 15 (MAX_RANDOM_FACTOR = 1.5)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpMinRandomFactor		EcucIntegerParamDef
BSW Description		
Minimum random factor used for randomization [RFC4861 10. Protocol Constants] Default: 5 (MIN_RANDOM_FACTOR = 0.5)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpNeighborUnreachabilityDetectionEnabled		EcucBooleanParamDef
BSW Description		
Neighbor Unreachability Detection is used to remove unused entries from the neighbor cache. This feature is a basic feature of NDP and should be turned on.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig
BSW Parameter	**BSW Type**
TcpIpNdpNumMulticastSolicitations	EcucIntegerParamDef
BSW Description	
Maximum number of multicast solicitations that will be sent when performing address resolution. [RFC4861 7.2.2. Sending Neighbor Solicitations] Default: MAX_MULTICAST_SOLICIT = 3	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig
BSW Parameter	**BSW Type**
TcpIpNdpNumUnicastSolicitations	EcucIntegerParamDef
BSW Description	
Maximum number of unicast solicitations that will be sent when performig Neighbor Unreachability Detection. [RFC4861 7.3.3. Node Behavior] Default: MAX_UNICAST_SOLICIT = 3	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig
BSW Parameter	**BSW Type**
TcpIpNdpPacketQueueEnabled	EcucBooleanParamDef

BSW Description	
Enables (TRUE) or disables (FALSE) support of a NDP Packet Queue according to IETF RFC 4861, section 7.2.2.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpArNudConfig	
BSW Parameter		**BSW Type**
TcpIpNdpRandomReachableTimeEnabled		EcucBooleanParamDef
BSW Description		
If enabled the value of ReachableTime will be multiplied with a random value between MIN_RANDOM_FACTOR and MAX_RANDOM_FACTOR in order to prevent multiple nodes from transmitting at exactly the same time [RFC4861 6.3.2. Host Variables / ReachableTime]		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixRouterDiscoveryConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters for NDP Prefix and Router Discovery.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig

BSW Parameter		BSW Type	
TcpIpNdpDefaultRouterListSize		EcucIntegerParamDef	
BSW Description			
Maximum number of default router entries. [RFC4861 5.1. Conceptual Data Structures]			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig		
BSW Parameter		**BSW Type**	
TcpIpNdpDestinationCacheSize		EcucIntegerParamDef	
BSW Description			
Maximum number of entries in the destination cache. [RFC4861 5.1. Conceptual Data Structures]			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig		
BSW Parameter		**BSW Type**	
TcpIpNdpDynamicHopLimitEnabled		EcucBooleanParamDef	
BSW Description			
If enabled the default hop limit may be reconfigured based on received Router Advertisements. [RFC4861 6.3.4. Processing Received Router Advertisements]			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig		
BSW Parameter		**BSW Type**	
TcpIpNdpDynamicMtuEnabled		EcucBooleanParamDef	
BSW Description			
Allow dynamic reconfiguration of link MTU via Router Advertisements. [RFC4861 4.6.4. MTU]			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig		
BSW Parameter		**BSW Type**	
TcpIpNdpDynamicReachableTimeEnabled		EcucBooleanParamDef	
BSW Description			
If enabled the default Reachable Time value may be reconfigured based on received Router Advertisements. [RFC4861 6.3.4. Processing Received Router Advertisements] Default: Enabled			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpDynamicRetransTimeEnabled		EcucBooleanParamDef
BSW Description		
If enabled the default Retransmit Timer value may be reconfigured based on received Router Advertisements. [RFC4861 6.3.4. Processing Received Router Advertisements] Default: Enabled		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpMaxRtrSolicitationDelay		EcucFloatParamDef
BSW Description		
Maximum delay before the first Router Solicitation will be sent after interface initialization in (s). [RFC4861 6.3.7. Sending Router Solicitations] Default: MAX_RTR_SOLICITATION_DELAY = 1 second		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpMaxRtrSolicitations		EcucIntegerParamDef
BSW Description		
Maximum number of Router Solicitations that will be sent before the first Router Advertisement has been received. 0 = No Router Solicitations will be sent. This has no impact on handling Router Advertisements. [RFC4861 6.3.7. Sending Router Solicitations] Default: MAX_RTR_SOLICITATIONS = 3 transmissions		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixList		EcucParamConfContainerDef
BSW Description		
Specifies a list of prefixes to be treated as "on-link" according to IETF RFC 4861 Section 5.1.		
Template Description		
Internet Protocol version 6 (IPv6) configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration		
Mapping Rule		**Mapping Type**
A distinct list of all prefixes used within the same local network shall be retrieved for the respective ECU configuration. This can be achieved by following all socket connections of this ECU, identify the communication partners and their NetworkEndPoint elements via the ApplicationEndpoint references, retrieve the prefixes of NetworkEndPoint/Ipv6Configuration/ipAddressPrefixLength and NetworkEndPoint/Ipv6Configuration/ipv6Address and create a distinct list of them.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00043

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig/TcpIpNdpPrefixList	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixListEntry		EcucParamConfContainerDef
BSW Description		
Single entry in the prefix list.		
Template Description		
Internet Protocol version 6 (IPv6) configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration		
Mapping Rule		**Mapping Type**
see upstream mapping in TcpIpNdpPrefixList		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00045

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig/TcpIpNdpPrefixList/TcpIpNdpPrefixListEntry	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixListEntryPrefixAddress		EcucStringParamDef
BSW Description		
The prefix of an IP address. This prefix can be used for on-link determination.		
Template Description		
Internet Protocol version 6 (IPv6) configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration		
Mapping Rule		**Mapping Type**
see upstream mapping in TcpIpNdpPrefixList		full

Mapping Status	Mapping ID
valid	up_TcpIp_00044

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig/TcpIpNdpPrefixList/TcpIpNdpPrefixListEntry	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixListEntryPrefixLength		EcucIntegerParamDef
BSW Description		
The number of leading bits in the Prefix that are valid.		
Template Description		
Internet Protocol version 6 (IPv6) configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration		
Mapping Rule		**Mapping Type**
see upstream mapping in TcpIpNdpPrefixList		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00046

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixListSize		EcucIntegerParamDef
BSW Description		
Maximum number of entries in the on-link prefix list. [RFC4861 5.1. Conceptual Data Structures]		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpRndRtrSolicitationDelayEnabled		EcucBooleanParamDef
BSW Description		
If enabled the first router solicitation will be delayed randomly from [0...MAX_RTR_SOLICITATION_DELAY]. Otherwise the first router solicitation will be sent after exactly MAX_RTR_SOLICITATION_DELAY milliseconds. [RFC4861 6.3.7. Sending Router Solicitations] Default: Enabled		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpPrefixRouterDiscoveryConfig	
BSW Parameter		**BSW Type**
TcpIpNdpRtrSolicitationInterval		EcucFloatParamDef
BSW Description		
Interval between consecutive Router Solicitations in (s). [RFC4861 6.3.7. Sending Router Solicitations] Default: RTR_SOLICITATION_INTERVAL = 4 seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig	
BSW Parameter		**BSW Type**
TcpIpNdpSlaacConfig		EcucParamConfContainerDef
BSW Description		
Specifies the configuration parameters for StateLess Address AutoConfiguration.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpSlaacConfig	
BSW Parameter		**BSW Type**
TcpIpNdpSlaacDadNumberOfTransmissions		EcucIntegerParamDef
BSW Description		

Number of Neighbor Solicitations that have to be unanswered in order to set an autoconfigurated address to PREFERRED (usable) state. [RFC4861 5.1. Node Configuration Variables] Default: DupAddrDetectTransmits = 1 Setting this value to 0 turns off DAD.
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpSlaacConfig

BSW Parameter	**BSW Type**
TcpIpNdpSlaacDadRetransmissionDelay	EcucFloatParamDef

BSW Description
Sets the maximum value for the address configuration delay (s). According to [RFC4861 5.4.2. Sending Neighbor Solicitation Messages] this value should be the same as MAX_RTR_SOLICITATION_DELAY. Default: MAX_RTR_SOLICITATION_DELAY = 1 second
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpSlaacConfig

BSW Parameter	**BSW Type**
TcpIpNdpSlaacDelayEnabled	EcucBooleanParamDef

BSW Description

If enabled transmission of the first DAD Neighbor Solicitation will be delayed by a random value from [0...MAX_DAD_DELAY]. "This serves to alleviate congestion when many nodes start up on the link at the same time, such as after a power failure, and may help to avoid race conditions when more than one node is trying to solicit for the same address at the same time." "The delay will avoid similar congestion when multiple nodes are going to configure addresses by receiving the same single multicast router advertisement." [RFC4861 5.4.2. Sending Neighbor Solicitation Messages] Default: True
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpIpConfig/TcpIpIpV6Config/TcpIpNdpConfig/TcpIpNdpSlaacConfig	
BSW Parameter		**BSW Type**
TcpIpNdpSlaacOptimisticDadEnabled		EcucBooleanParamDef
BSW Description		
Enable Optimistic Duplicate Address Detection (DAD) according to RFC4429.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig	
BSW Parameter		**BSW Type**
TcpIpLocalAddr		EcucParamConfContainerDef
BSW Description		
Specifies the local IP (Internet Protocol) addresses used for IP communication.		
Template Description		
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress		
Mapping Rule		**Mapping Type**
Create container for each NetworkEndpointAddress element that is defined in the ECU Extract.		full

Mapping Status	Mapping ID
valid	up_TcpIp_00005

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpAddrAssignment		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIpLocalAddr and specifies the assignment policy for the IP address.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment	
BSW Parameter		**BSW Type**
TcpIpAssignmentLifetime		EcucEnumerationParamDef
BSW Description		
Defines the lifetime of a dynamically fetched IP address. If TcpIpAssignmentMethod = TCPIP_STATIC then TcpIpAssignmentLifetime shall be omitted.		
Template Description		
Ipv4Configuration.ipAddressKeepBehavior: Defines the lifetime of a dynamically fetched IP address. **Ipv6Configuration.ipAddressKeepBehavior**: Defines the lifetime of a dynamically fetched IP address.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.ipAddressKeepBehavior,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.ipAddress KeepBehavior		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00025

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignment Lifetime	
BSW Parameter		**BSW Type**
TCPIP_FORGET		EcucEnumerationLiteralDef
BSW Description		
After a dynamic IP address has been assigned just use it for this link-up time.		
Template Description		
After a dynamic IP address has been assigned just use it for this session.		

M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::IpAddressKeepEnum.forget	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00026

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignment Lifetime	
BSW Parameter		**BSW Type**
TCPIP_STORE		EcucEnumerationLiteralDef
BSW Description		
After a dynamic IP address has been assigned store the address persistently.		
Template Description		
After a dynamic IP address has been assigned store the address persistently.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::IpAddressKeepEnum.storePersistently		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00027

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment	
BSW Parameter		**BSW Type**
TcpIpAssignmentMethod		EcucEnumerationParamDef
BSW Description		
Method of address assignment		
Template Description		
Ipv4Configuration.ipv4AddressSource: Defines how the node obtains its IP address. **Ipv6Configuration.ipv6AddressSource**: Defines how the node obtains its IP address.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.ipv4AddressSource, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.ipv6AddressSource		
Mapping Rule		**Mapping Type**
Derive parameter from the AddressSource attributes.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00010

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignment Method	
BSW Parameter		**BSW Type**
TCPIP_DHCP		EcucEnumerationLiteralDef
BSW Description		
Dynamic Assigned IP Address using DHCP		

Template Description	
Ipv4AddressSourceEnum.dhcpv4: DHCP is a service for the automatic IP configuration of a client. **Ipv6AddressSourceEnum.dhcpv6**: DHCP is a service for the automatic IP configuration of a client.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4AddressSourceEnum.dhcpv4, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6AddressSourceEnum.dhcpv6	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00017

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignmentMethod	
BSW Parameter		**BSW Type**
TCPIP_IPV6_ROUTER		EcucEnumerationLiteralDef
BSW Description		
Dynamic Configured IPv6 Address by Router Advertisement		
Template Description		
IPv6 Stateless Autoconfiguration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6AddressSourceEnum.routerAdvertisement		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00018

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignmentMethod	
BSW Parameter		**BSW Type**
TCPIP_LINKLOCAL		EcucEnumerationLiteralDef
BSW Description		
Linklocal IPv4/IPv6 Address Assignment		
Template Description		
Ipv4AddressSourceEnum.autoIp: AutoIP is used to dynamically assign IP addresses at device startup. **Ipv6AddressSourceEnum.linkLocal**: LinkLocal is intended only for communications within the segment of a local network (a link) or a point-to-point connection that a host is connected to.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4AddressSourceEnum.autoIp, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6AddressSourceEnum.linkLocal		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00016

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignmentMethod	
BSW Parameter		**BSW Type**
TCPIP_LINKLOCAL_DOIP		EcucEnumerationLiteralDef
BSW Description		
Linklocal IPv4/IPv6 Address Assignment using DoIP Parameters		
Template Description		
Ipv4AddressSourceEnum.autoIp_doip: Linklocal IPv4 Address Assignment using DoIP Parameters **Ipv6AddressSourceEnum.linkLocal_doip**: Linklocal IPv6 Address Assignment using DoIP Parameters		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4AddressSourceEnum.autoIp_doip, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6AddressSourceEnum.linkLocal_doip		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00020

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment/TcpIpAssignmentMethod	
BSW Parameter		**BSW Type**
TCPIP_STATIC		EcucEnumerationLiteralDef
BSW Description		
Static Assigned IP Address		
Template Description		
Ipv4AddressSourceEnum.fixed: The IP Address shall be declared manually. **Ipv6AddressSourceEnum.fixed**: The IP Address shall be declared manually.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4AddressSourceEnum.fixed,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6AddressSourceEnum.fixed		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00019

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment	
BSW Parameter		**BSW Type**
TcpIpAssignmentPriority		EcucIntegerParamDef
BSW Description		
Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.		
Template Description		

Ipv4Configuration.assignmentPriority: Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority. **Ipv6Configuration.assignmentPriority**: Priority of assignment (1 is highest). If a new address from an assignment method with a higher priority is available, it overwrites the IP address previously assigned by an assignment method with a lower priority.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.assignmentPriority, SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.assignmentPriority	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00021

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddrAssignment	
BSW Parameter		**BSW Type**
TcpIpAssignmentTrigger		EcucEnumerationParamDef
BSW Description		
Trigger of address assignment.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpAddrId		EcucIntegerParamDef
BSW Description		
IP address table identifier assigned by TCP/IP stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpAddressType		EcucEnumerationParamDef

BSW Description	
Address type.	
Template Description	
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress	
Mapping Rule	**Mapping Type**
shall be derived from the IP Address (see more details in upstream mapping of enum literals).	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddressType	
BSW Parameter		**BSW Type**
TCPIP_ANYCAST		EcucEnumerationLiteralDef
BSW Description		
Anycast address		
Template Description		
This attribute is used to enable anycast addressing (i.e. to one of multiple receivers).		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.enableAnycast		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddressType	
BSW Parameter		**BSW Type**
TCPIP_MULTICAST		EcucEnumerationLiteralDef
BSW Description		
Multicast address.		
Template Description		
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress		
Mapping Rule		**Mapping Type**
Shall be set if Multicast Address is used. IPv4: 224.0.0.0 to 239.255.255.255 IPv6: address with the prefix ff00::/8.		
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpAddressType	
BSW Parameter		**BSW Type**
TCPIP_UNICAST		EcucEnumerationLiteralDef

BSW Description	
Unicast address	
Template Description	
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress	
Mapping Rule	**Mapping Type**
Shall be set if Unicast Address is used.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpCtrlRef		EcucReferenceDef
BSW Description		
Reference to a TcpIpCtrl specifying the EthIf Controller where the IP address shall be assigned.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpDomainType		EcucEnumerationParamDef
BSW Description		
Address family.		
Template Description		
To build a valid network endpoint address there has to be either one MAC multicast group reference or an ipv4 configuration or an ipv6 configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::NetworkEndpointAddress		
Mapping Rule		**Mapping Type**
Derive this parameter from the NetworkEndpointAddress.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00006

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpDomainType	
BSW Parameter		**BSW Type**
TCPIP_AF_INET		EcucEnumerationLiteralDef
BSW Description		
IPv4 address		
Template Description		

Internet Protocol version 4 (IPv4) configuration.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration	
Mapping Rule	**Mapping Type**
Set literal to TCPIP_AF_INETwhen the NetworkEndpoint contains an Ipv4Configuration.	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpDomainType	
BSW Parameter		**BSW Type**
TCPIP_AF_INET6		EcucEnumerationLiteralDef
BSW Description		
IPv6 address		
Template Description		
Internet Protocol version 6 (IPv6) configuration.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration		
Mapping Rule		**Mapping Type**
Set literal to TCPIP_AF_INET6 when the NetworkEndpoint contains an Ipv6 Configuration.		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpLocalAddrIPv6ExtHeaderFilterRef		EcucReferenceDef
BSW Description		
Reference to a set of IPv6 Extension Headers which are allowed for this local IPv6 address. Note: this parameter is only relevant if the related TcpIpDomainType is TCPIP_AF_INET6.		
Template Description		
Reference to a list of IPv6 Extension Headers allowed for this SocketConnection. If no list is referenced all IPv6 Extension Headers are allowed and processed.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection.allowedIPv6 ExtHeaders		
Mapping Rule		**Mapping Type**
1:1 mapping. constraint: All related SocketConnections shall reference either no or exactly the same IPv6ExtHeaderFilterList.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00039

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr	
BSW Parameter		**BSW Type**
TcpIpStaticIpAddressConfig		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIpLocalAddr and specifies a static IP address including directly related parameters.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpStaticIpAddressConfig
BSW Parameter	**BSW Type**
TcpIpDefaultRouter	EcucStringParamDef
BSW Description	
IP address of default router (gateway)	
Template Description	
Ipv6Configuration.defaultRouter: IP address of the default router. **Ipv4Configuration.defaultGateway**: IP address of the default gateway.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.defaultRouter,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.defaultGateway	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00009

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpStaticIpAddressConfig
BSW Parameter	**BSW Type**
TcpIpNetmask	EcucIntegerParamDef
BSW Description	
Network mask of IPv4 address or address prefix of IPv6 address in CIDR Notation, i.e. decimal value between 0 and 32 (IPv4) or 0 and 128 (IPv6) that describes the number of significant bits defining the network number or prefix of an IP address.	
Template Description	
Ipv4Configuration.networkMask: Network mask. Notation 255.255.255.255 **Ipv6Configuration.ipAddressPrefixLength**: IPv6 prefix length defines the part of the IPv6 address that is the network prefix.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.networkMask,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.ipAddressPrefixLength	
Mapping Rule	**Mapping Type**
- 1:1 mapping for Ipv6 - conversion to CIDR notation for Ipv4	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00007

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpLocalAddr/TcpIpStaticIpAddressConfig		
BSW Parameter		**BSW Type**	
TcpIpStaticIpAddress		EcucStringParamDef	
BSW Description			
Static IP Address. To specify any IP address for a certain EthIfCtrl, "ANY" has to be set as wildcard. See TcpIp_Bind() for more details.			
Template Description			
Ipv4Configuration.ipv4Address: IPv4 Address. Notation: 255.255.255.255. The IP Address shall be declared in case the ipv4AddressSource is FIXED and thus no auto-configuration mechanism is used. **Ipv6Configuration.ipv6Address**: IPv6 Address. Notation: FFFF:...:FFFF. The IP Address shall be declared in case the ipv6AddressSource is FIXED and thus no auto-configuration mechanism is used.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv4Configuration.ipv4Address,SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::Ipv6Configuration.ipv6Address			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00008

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig		
BSW Parameter		**BSW Type**	
TcpIpNvmBlock		EcucParamConfContainerDef	
BSW Description			
Configuration of optional usage of Nvm in case the TcpIp module requires non volatile memory in the Ecu to store information (e.g. IP Address received via DHCP and shall be stored).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpNvmBlock		
BSW Parameter		**BSW Type**	
TcpIpNvmBlockDescriptorRef		EcucSymbolicNameReferenceDef	
BSW Description			
Reference to the Nvm block description in the Nvm module configuration.			
Template Description			
M2 Parameter			

Mapping Rule	Mapping Type
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig		
BSW Parameter		**BSW Type**	
TcpIpPhysAddrConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the physical address configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpPhysAddrConfig		
BSW Parameter		**BSW Type**	
TcpIpPhysAddrChgHandler		EcucParamConfContainerDef	
BSW Description			
This container is a subcontainer of TcpIpPhysAddrConfig and specifies the configuration parameters for physical address change handler.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpConfig/TcpIpPhysAddrConfig/TcpIpPhysAddrChgHandler		
BSW Parameter		**BSW Type**	
TcpIpPhysAddrChgHandlerHeaderFileName		EcucStringParamDef	
BSW Description			
This parameter specifies the name of the header file containing the definition of the physical address change handler function.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**

valid	

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig/TcpIpPhysAddrConfig/TcpIpPhysAddrChgHandler
BSW Parameter	**BSW Type**
TcpIpPhysAddrChgHandlerName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the physical address change function <Up>_PhysAddrTableChg.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig
BSW Parameter	**BSW Type**
TcpIpSocketOwnerConfig	EcucParamConfContainerDef
BSW Description	
Specifies the upper layer modules of TcpIp using the socket API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig
BSW Parameter	**BSW Type**
TcpIpSocketOwner	EcucParamConfContainerDef
BSW Description	
This container is a subcontainer of TcpIpSocketOwnerConfig and specifies an upper layer of TcpIp that uses the socket API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context

TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerCopyTxDataName	EcucStringParamDef
BSW Description	
This parameter defines the name of the <Up_CopyTxData> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerHeaderFileName	EcucStringParamDef
BSW Description	
This parameter specifies the name of the header file containing the definition of the TcpIpSocketOwner module functions. The header file name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerLocalIpAddrAssignmentChgName	EcucStringParamDef
BSW Description	
This parameter defines the name of the <Up_LocalIpAddrAssignmentChg> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner	
BSW Parameter		**BSW Type**
TcpIpSocketOwnerRxIndicationName		EcucStringParamDef
BSW Description		
This parameter defines the name of the <Up_RxIndication> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner	
BSW Parameter		**BSW Type**
TcpIpSocketOwnerTcpAcceptedName		EcucStringParamDef
BSW Description		
This parameter defines the name of the <Up_TcpAccepted> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner	
BSW Parameter		**BSW Type**
TcpIpSocketOwnerTcpConnectedName		EcucStringParamDef
BSW Description		
This parameter defines the name of the <Up_TcpConnected> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerTcpIpEventName	EcucFunctionNameDef
BSW Description	
This parameter defines the name of the <Up_TcpIpEvent> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerTxConfirmationName	EcucStringParamDef
BSW Description	
This parameter defines the name of the <Up_TxConfirmation> function of the TcpIpSocketOwner module. The function name shall only be configurable if TcpIpSocketOwnerUpperLayerType is set to CDD.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
TcpIp	TcpIp/TcpIpConfig/TcpIpSocketOwnerConfig/TcpIpSocketOwner
BSW Parameter	**BSW Type**
TcpIpSocketOwnerUpperLayerType	EcucEnumerationParamDef
BSW Description	
This parameter specifies the type of the upper layer module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context

TcpIp	TcpIp/TcpIpConfig		
BSW Parameter		**BSW Type**	
TcpIpTcpConfig		EcucParamConfContainerDef	
BSW Description			
Specifies the configuration parameters of the TCP (Transmission Control Protocol) sub-module.			
Template Description			
Content Model for TCP configuration.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp			
Mapping Rule			**Mapping Type**
This container shall be created if the TcpTp element is used in the ECU Extract.			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00002

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig		
BSW Parameter		**BSW Type**	
TcpIpTcpConfigOptionFilter		EcucParamConfContainerDef	
BSW Description			
This container describes the white list for the filtering of TCP options, i.e. segments containing TCP options not listed here shall be silently dropped.			
Template Description			
White list for the filtering of TCP options.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::TcpOptionFilterList			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00040

BSW Module	**BSW Context**		
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig/TcpIpTcpConfigOptionFilter		
BSW Parameter		**BSW Type**	
TcpIpTcpConfigOptionFilterEntry		EcucIntegerParamDef	
BSW Description			
TCP option kind allowed by this filter.			
Template Description			
TCP option kind allowed by this filter.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::TcpOptionFilterList.allowedTcpOption			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_TcpIp_00042

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig/TcpIpTcpConfigOptionFilter	
BSW Parameter		**BSW Type**
TcpIpTcpConfigOptionFilterId		EcucIntegerParamDef

BSW Description	
Identification of the TCP option filter.	
Template Description	
TCP option kind allowed by this filter.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::TcpOptionFilterList.allowedTcpOption	
Mapping Rule	**Mapping Type**
The list of allowedTcpOptions in TcpOptionFilterList is ordered. The Id of an entry can be derived from the order.	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00041

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpCongestionAvoidanceEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of TCP congestion avoidance algorithm according to IETF RFC 5681.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpFastRecoveryEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of TCP Fast Recovery according to IETF RFC 5681.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpFastRetransmitEnabled		EcucBooleanParamDef
BSW Description		

Enables (TRUE) or disables (FALSE) support of TCP Fast Retransmission according to IETF RFC 5681.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpFinWait2Timeout		EcucFloatParamDef
BSW Description		
Timeout in [s] to receive a FIN from the remote node (after this node has initiated connection termination), i.e. maximum time waiting in FINWAIT-2 for a connection termination request from the remote TCP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpKeepAliveEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) TCP Keep Alive Probes according to IETF RFC 1122 chapter 4.2.3.6		
Template Description		
Indicates if Keep-Alive messages are send.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAlives		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00004

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpKeepAliveInterval		EcucFloatParamDef
BSW Description		
Specifies the interval in [s] between subsequent keepalive probes.		

Template Description	
Specifies the interval in seconds between subsequent keepalive probes.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAliveInterval	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00022

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpKeepAliveProbesMax		EcucIntegerParamDef
BSW Description		
Maximum number of times that a TCP Keep Alive is retransmitted before the connection is closed.		
Template Description		
Maximum number of times that TCP retransmits an individual data segment before aborting the connection.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.keepAliveProbesMax		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00023

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpKeepAliveTime		EcucFloatParamDef
BSW Description		
Specifies the time in [s] between the last data packet sent (simple ACKs are not considered data) and the first keepalive probe. Note: Setting this configuration parameter to a value smaller or equal to the value of TcpIpMainFunctionPeriod results in the transmission of keep alive probes within every MainFunction cycle.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpMaxRtx		EcucIntegerParamDef
BSW Description		
Maximum number of times that a TCP segment is retransmitted before the TCP connection is closed. This parameter is only valid if TcpIpTcpRetransmissionTimeout is configured. Note: This parameter also applies for FIN retransmissions.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpMsl		EcucFloatParamDef
BSW Description		
Maximum segment lifetime in [s]. (Note: TIME-WAIT = 2 x TcpIpTcpMsl - to ensure that the remote node received the acknowledgment to its connection termination request.)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpNagleEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of Nagle's algorithm according to IETF RFC 896. If enabled the Nagle's algorithm is activated per default for all TCP sockets, but can be deactivated via TcpIp_ChangeParameter() API.		
Template Description		
Indicates if Nagle's Algorithm is used.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::TcpTp.naglesAlgorithm		
Mapping Rule		**Mapping Type**
If at least one of the TcpTp.naglesAlgorithm per ApplicationEndpoint is set to true, the parameter shall be set to true. If all of the TcpTp.naglesAlgorithm per ApplicationEndpoint are set to false, the parameter shall be set to false.		full
Mapping Status		**Mapping ID**
valid		up_TcpIp_00003

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpReceiveWindowMax		EcucIntegerParamDef

BSW Description	
Default value of maximum receive window in bytes.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpRetransmissionTimeout		EcucFloatParamDef
BSW Description		
Timeout in [s] before an unacknowledged TCP segment is sent again. If the timeout is disabled or set to INF, no TCP segments shall be retransmitted.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpSlowStartEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of TCP slow start algorithm according to IETF RFC 5681.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpSynMaxRtx		EcucIntegerParamDef
BSW Description		

Maximum number of times that a TCP SYN is retransmitted. Note: SYN will be retried after TcpIpTcpRetransmissionTimeout. The connection will be dropped if no matching connection request has been received after the last TCP SYN has been sent and TcpIpTcpRetransmissionTimeout has been expired.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpSynReceivedTimeout		EcucFloatParamDef
BSW Description		
Timeout in [s] to complete a remotely initiated TCP connection establishment, i.e. maximum time waiting in SYN-RECEIVED for a confirming connection request acknowledgment after having both received and sent a connection request.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpTcpConfig	
BSW Parameter		**BSW Type**
TcpIpTcpTtl		EcucIntegerParamDef
BSW Description		
Default Time-to-live value of outgoing TCP packets.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig	
BSW Parameter		**BSW Type**
TcpIpUdpConfig		EcucParamConfContainerDef
BSW Description		

Specifies the configuration parameters of the UDP (User Datagram Protocol) sub-module	
Template Description	
Content Model for UDP configuration.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::UdpTp	
Mapping Rule	**Mapping Type**
This container shall be created if the UdpTp element is used in the ECU Extract.	full
Mapping Status	**Mapping ID**
valid	up_TcpIp_00001

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpConfig/TcpIpUdpConfig	
BSW Parameter		**BSW Type**
TcpIpUdpTtl		EcucIntegerParamDef
BSW Description		
Default Time-to-live value of outgoing UDP packets.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp	
BSW Parameter		**BSW Type**
TcpIpGeneral		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIp and specifies the general configuration parameters of the TCP/IP stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpBufferMemory		EcucIntegerParamDef
BSW Description		
Memory size in bytes reserved for TCP/IP buffers.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpDhcpServerEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) the DHCP (Dynamic Host Configuration Protocol) Server.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpGetAndResetMeasurementDataApi		EcucBooleanParamDef
BSW Description		
Enables / Disables the Get and Reset Measurement Data API		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpIpV4General		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIp and specifies the general configuration parameters of the TCP/IP stack for IPv4		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General	
BSW Parameter		**BSW Type**
TcpIpArpEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of ARP (Address Resolution Protocol).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General	
BSW Parameter		**BSW Type**
TcpIpAutoIpEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) the Auto-IP (automatic private IP addressing) sub-module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General		
BSW Parameter		**BSW Type**	
TcpIpDhcpClientEnabled		EcucBooleanParamDef	
BSW Description			
Enables (TRUE) or disables (FALSE) the DHCP (Dynamic Host Configuration Protocol) Client.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General		
BSW Parameter		**BSW Type**	
TcpIpIcmpEnabled		EcucBooleanParamDef	
BSW Description			
Enables (TRUE) or disabled (FALSE) support of ICMP (Internet Control Message Protocol).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General		
BSW Parameter		**BSW Type**	
TcpIpIpV4Enabled		EcucBooleanParamDef	
BSW Description			
Enables (TRUE) or disables (FALSE) support of IPv4 (Internet Protocol version 4).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General	
BSW Parameter		**BSW Type**
TcpIpLocalAddrIpv4EntriesMax		EcucIntegerParamDef
BSW Description		

Maximum number of LocalAddr table entries for IPv4.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV4General	
BSW Parameter		**BSW Type**
TcpIpPathMtuDiscoveryEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) the discovery of the maximum transmission unit on a path according to IETF RfC 1191.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpIpV6General		EcucParamConfContainerDef
BSW Description		
This container is a subcontainer of TcpIp and specifies the general configuration parameters of the TCP/IP stack for IPv6.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpDhcpV6ClientEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) the DHCPv6 (Dynamic Host Configuration Protocol for IPv6) Client.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpIpV6Enabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of IPv6 (Internet Protocol version 6).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpIpV6PathMtuDiscoveryEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) Path MTU Discovery support for IPv6 according to IETF RFC 1981.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpLocalAddrIpv6EntriesMax		EcucIntegerParamDef
BSW Description		
Maximum number of LocalAddr table entries for IPv6.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpNdpAddressResolutionUnrechabilityDetection Enabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of Address Resoultion and Neighbor Unreachability Detetion via NDP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral/TcpIpIpV6General	
BSW Parameter		**BSW Type**
TcpIpNdpPrefixAndRouterDiscoveryEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disables (FALSE) support of Prefix and Router Discovery via NDP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Period of TcpIp_MainFunction in [s].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral		
BSW Parameter		**BSW Type**	
TcpIpResetIpAssignmentApi		EcucBooleanParamDef	
BSW Description			
Enables/disables the API TcpIp_ResetIpAssignment of a DHCP-client.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral		
BSW Parameter		**BSW Type**	
TcpIpScalabilityClass		EcucEnumerationParamDef	
BSW Description			
In order to customize the TcpIp Stack to the specific needs of the user it can be scaled according to the scalability classes.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral		
BSW Parameter		**BSW Type**	
TcpIpTcpEnabled		EcucBooleanParamDef	
BSW Description			
Enables (TRUE) or disabled (FALSE) support of TCP (Transmission Control Protocol).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
TcpIp	TcpIp/TcpIpGeneral		
BSW Parameter		**BSW Type**	
TcpIpTcpSocketMax		EcucIntegerParamDef	

BSW Description	
Maximum number of TCP sockets	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpUdpEnabled		EcucBooleanParamDef
BSW Description		
Enables (TRUE) or disabled (FALSE) support of UDP (User Datagram Protocol)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpUdpSocketMax		EcucIntegerParamDef
BSW Description		
Maximum number of UDP sockets.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
TcpIp	TcpIp/TcpIpGeneral	
BSW Parameter		**BSW Type**
TcpIpVersionInfoApi		EcucBooleanParamDef
BSW Description		
If true the TcpIp_GetVersionInfo API is available.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

C.6.9 DoIP

BSW Module	**BSW Context**	
DoIP	DoIP	
BSW Parameter		**BSW Type**
DoIPConfigSet		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters and sub containers of the AUTOSAR DoIP module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet	
BSW Parameter		**BSW Type**
DoIPChannel		EcucParamConfContainerDef
BSW Description		
Configuration of one DoIPChannel.		
Template Description		
A connection identifies the sender and the receiver of this particular communication. The DoIp module routes a tpSdu through this connection.		
M2 Parameter		
SystemTemplate::DiagnosticConnection::DoIpTpConnection		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPChannel	
BSW Parameter		**BSW Type**
DoIPChannelSARef		EcucReferenceDef
BSW Description		
Reference to the DoIPTester.		
Template Description		
Reference to the address of the sender of the tpSdu.		
M2 Parameter		
SystemTemplate::DiagnosticConnection::DoIpTpConnection.doIpSourceAddress		

Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPChannel	
BSW Parameter		**BSW Type**
DoIPChannelTARef		EcucReferenceDef
BSW Description		
Reference to the target address.		
Template Description		
Reference to the address of the receiver of the tpSdu.		
M2 Parameter		
SystemTemplate::DiagnosticConnection::DoIpTpConnection.doIpTargetAddress		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPChannel	
BSW Parameter		**BSW Type**
DoIPPduRRxPdu		EcucParamConfContainerDef
BSW Description		
This container contains the Rx Pdus to connect with the Rx Pdus of the PduR.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPChannel/DoIPPduRRxPdu	
BSW Parameter		**BSW Type**
DoIPPduRRxPduId		EcucIntegerParamDef
BSW Description		
The DoIPPduRRxPduId is required by the API call DoIP_TpCancelReceive.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
DoIP	DoIP/DoIPConfigSet/DoIPChannel/DoIPPduRRxPdu		
BSW Parameter		**BSW Type**	
DoIPPduRRxPduRef		EcucReferenceDef	
BSW Description			
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
DoIP	DoIP/DoIPConfigSet/DoIPChannel		
BSW Parameter		**BSW Type**	
DoIPPduRTxPdu		EcucParamConfContainerDef	
BSW Description			
This container contains the Tx Pdus to connect with the Tx Pdus of the PduR. If the parameter is not configured the channel is for functional addressing.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
DoIP	DoIP/DoIPConfigSet/DoIPChannel/DoIPPduRTxPdu		
BSW Parameter		**BSW Type**	
DoIPPduRTxPduId		EcucIntegerParamDef	
BSW Description			
The DoIPPduRTxPduId is required by DoIP_TpTransmit or DoIP_IfTransmit and DoIP_TpCancelTransmit.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPChannel/DoIPPduRTxPdu	
BSW Parameter		**BSW Type**

DoIPPduRTxPduRef	EcucReferenceDef	
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet/DoIPChannel/DoIPPduRTxPdu		
BSW Parameter		**BSW Type**	
DoIPPduType		EcucEnumerationParamDef	
BSW Description			
API Type to use for communication with PduR. DOIP_IFPDU for UUDT messages, DOIP_TPPDU for all other diagnostic messages.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet		
BSW Parameter		**BSW Type**	
DoIPConnections		EcucParamConfContainerDef	
BSW Description			
Container contains all lower layer connection specific information, i.e. the single Pdu References and Handle IDs to the SoAd.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections	
BSW Parameter		**BSW Type**
DoIPTargetAddress		EcucParamConfContainerDef
BSW Description		
This container describes a possible TargetAddress that is supported by DoIP.		

Template Description	
The logical DoIP address.	
M2 Parameter	
SystemTemplate::TransportProtocols::DoIpLogicAddress	
Mapping Rule	**Mapping Type**
This container shall be created for each DoIpLogicAddress referenced by a DoIpTpConnection in the role doIpTargetAddress	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTargetAddress
BSW Parameter	**BSW Type**
DoIPTargetAddressValue	EcucIntegerParamDef
BSW Description	
Valid Target Address of a DoIP target address.	
Template Description	
The logical DoIP address.	
M2 Parameter	
SystemTemplate::TransportProtocols::DoIpLogicAddress.address	
Mapping Rule	**Mapping Type**
This value shall be derived from DoIpLogicAddress that is referenced by DoIpConnection in the role doIpTargetAddress	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPConnections
BSW Parameter	**BSW Type**
DoIPTcpConnection	EcucParamConfContainerDef
BSW Description	
This container describes a TCP connection to the lower layer SoAd module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection
BSW Parameter	**BSW Type**
DoIPRequestAddressAssignment	EcucBooleanParamDef
BSW Description	
The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection
BSW Parameter	**BSW Type**
DoIPSoAdTcpRxPdu	EcucParamConfContainerDef
BSW Description	
This container describes a Rx PDU received via SoAd over TCP	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection/DoIPSoAdTcpRxPdu
BSW Parameter	**BSW Type**
DoIPSoAdTcpRxPduId	EcucIntegerParamDef
BSW Description	
The DoIPSoAdTcpRxPduId is required by the API call DoIP_SoAdTpRxIndication to receive I-PDUs from the SoAd.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection/DoIPSoAdTcpRxPdu
BSW Parameter	**BSW Type**
DoIPSoAdTcpRxPduRef	EcucReferenceDef
BSW Description	
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.	
Template Description	
M2 Parameter	

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection	
BSW Parameter		**BSW Type**
DoIPSoAdTcpTxPdu		EcucParamConfContainerDef
BSW Description		
This container describes a Tx PDU sent via SoAd over TCP		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection/DoIPSoAdTcpTxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdTcpTxPduId		EcucIntegerParamDef
BSW Description		
The DoIPSoAdTcpTxPduId is required by the API call DoIP_SoAdTpTxConfirmation that is called by the SoAd to confirm that the IPdu has been transmitted successfully.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPTcpConnection/DoIPSoAdTcpTxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdTcpTxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections
BSW Parameter	**BSW Type**
DoIPUdpConnection	EcucParamConfContainerDef
BSW Description	
This Container describes a Udp connection to the lower layer SoAd module.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection
BSW Parameter	**BSW Type**
DoIPRequestAddressAssignment	EcucBooleanParamDef
BSW Description	
The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection
BSW Parameter	**BSW Type**
DoIPSoAdUdpRxPdu	EcucParamConfContainerDef
BSW Description	
This container describes a Rx PDU received via SoAd over UDP.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection/DoIPSoAdUdpRxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdUdpRxPduId		EcucIntegerParamDef
BSW Description		
The DoIPSoAdUdpRxPduId is required by the API call DoIP_SoAdIfRxIndication to receive I-PDUs from the SoAd.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection/DoIPSoAdUdpRxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdUdpRxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection	
BSW Parameter		**BSW Type**
DoIPSoAdUdpTxPdu		EcucParamConfContainerDef
BSW Description		
This container describes a Tx PDU sent via SoAd over UDP.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context

DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection/DoIPSoAdUdpTxPdu		
BSW Parameter		**BSW Type**	
DoIPSoAdUdpTxPduId		EcucIntegerParamDef	
BSW Description			
The DoIPSoAdUdpTxPduId is required by the API call DoIP_SoAdIfTxConfirmation that is called by the SoAd to confirm that the IPdu has been transmitted successfully.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpConnection/DoIPSoAdUdpTxPdu		
BSW Parameter		**BSW Type**	
DoIPSoAdUdpTxPduRef		EcucReferenceDef	
BSW Description			
Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet/DoIPConnections		
BSW Parameter		**BSW Type**	
DoIPUdpVehicleAnnouncementConnection		EcucParamConfContainerDef	
BSW Description			
This container describes the UDP multicast connections to the lower layer SoAd module.			
Template Description			
The SoAd serves as a (De)Multiplexer between different PDU sources and the TCP/IP stack.			
M2 Parameter			
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection			
Mapping Rule			**Mapping Type**

This container shall be created: - if a SocketConnection contains a single SocketConnectionIpduIdentifier that references a PduTriggering of a GeneralPurposePdu with category set to DoIp - if the GeneralPurposePdu with category set to DoIp is sent by the regarded ECU. - if the SocketConnectionBundle containing this SocketConnection references (via role serverPort) a SocketAddress with an ApplicationEndpoint with a UdpTp configuration - if the SocketConnectionBundle containing this SocketConnection references (via role serverPort) a SocketAddress with an ipAddress that either is a the limited broadcast address (i.e., 255.255.255.255) in case of IPv4 or the link-local scope multicast address (i.e., FF02::1) in case of IPv6.	full
Mapping Status	**Mapping ID**
valid	up_DoIP_00001

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpVehicleAnnouncementConnection
BSW Parameter	**BSW Type**
DoIPRequestAddressAssignment	EcucBooleanParamDef
BSW Description	
The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpVehicleAnnouncementConnection
BSW Parameter	**BSW Type**
DoIPSoAdUdpVehicleAnnouncementTxPdu	EcucParamConfContainerDef
BSW Description	
This container describes the vehicle announcement TxPdu sent via the SoAd.	
Template Description	
The SoAd serves as a (De)Multiplexer between different PDU sources and the TCP/IP stack.	
M2 Parameter	
SystemTemplate::Fibex::Fibex4Ethernet::EthernetCommunication::SocketConnection	
Mapping Rule	**Mapping Type**

This container shall be created: - if a SocketConnection contains a single SocketConnectionIpduIdentifier that references a PduTriggering of a GeneralPurposePdu with category set to DoIp - if the GeneralPurposePdu with category set to DoIp is sent by the regarded E CU. - if the SocketConnectionBundle containing this SocketConnection references (via role serverPort) a SocketAddress with an ApplicationEndpoint with a Udp Tp configuration - if the SocketConnectionBundle containing this SocketConnection references (via role serverPort) a SocketAddress with an ipAddress that either is a the limited broadcast address (i.e., 255.255.255.255) in case of IPv4 or the link-local scope multicast address (i.e., FF02::1) in case of IPv6.	full
Mapping Status	**Mapping ID**
valid	up_DoIP_00002

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpVehicleAnnouncementConnection/DoIPSoAdUdpVehicleAnnouncementTxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdUdpVehicleAnnouncementTxPduId		EcucIntegerParamDef
BSW Description		
The DoIPSoAdUdpVehicleAnnouncementTxPduId is required by the API call DoIP_SoAdIfTxConfirmation() that is called by the SoAd to confirm that the IPdu has been transmitted successfully.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPConnections/DoIPUdpVehicleAnnouncementConnection/DoIPSoAdUdpVehicleAnnouncementTxPdu	
BSW Parameter		**BSW Type**
DoIPSoAdUdpVehicleAnnouncementTxPduRef		EcucReferenceDef
BSW Description		
Reference to the "global" PDU structure to allow harmonization of handle IDs in the COM-Stack.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet

BSW Parameter	**BSW Type**
DoIPEid	EcucIntegerParamDef
BSW Description	
Configured EID (Entity ID of) for vehicle identification/vehicle announcement. Only necessary if DoIPUseMacAddressForIdentification is set to FALSE.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet
BSW Parameter	**BSW Type**
DoIPGid	EcucIntegerParamDef
BSW Description	
Configured GID (Group ID of) for vehicle identification/vehicle announcement.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet
BSW Parameter	**BSW Type**
DoIPLogicalAddress	EcucIntegerParamDef
BSW Description	
Describes the logical address of the DoIP entity, i.e. the LA that will route diagnostic requests to the Dcm of the DoIP entity.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet
BSW Parameter	**BSW Type**
DoIPRoutingActivation	EcucParamConfContainerDef
BSW Description	

This container describes the routing activation possibilities by representing for each container a possible routing activation request message to the DoIP entity and the according references to the activated diagnostic messages.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation
BSW Parameter	**BSW Type**
DoIPRoutingActivationAuthenticationCallback	EcucParamConfContainerDef
BSW Description	
Container describes the Callbackfunction to call on a Routing Activation Request for Authentication. If this container is configured but the DoIPRoutingActivationAuthenticationFunc parameter is not present, the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the DoIPRoutingActiviation container.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback
BSW Parameter	**BSW Type**
DoIPRoutingActivationAuthenticationFunc	EcucFunctionNameDef
BSW Description	
Direct C Callback function to trigger the authentication function for routing activation. If the DoIPRoutingActivationAuthenticationFunc parameter is present, the DoIP module will not use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation but call the configured function.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**

DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback		
BSW Parameter		**BSW Type**	
DoIPRoutingActivationAuthenticationReqLength		EcucIntegerParamDef	
BSW Description			
Describes the amount of bytes used to handle to the authentication function on routing activation. If 0 is configured as length the parameter AuthenticationReqData will not be handled to the API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback		
BSW Parameter		**BSW Type**	
DoIPRoutingActivationAuthenticationResLength		EcucIntegerParamDef	
BSW Description			
Describes the amount of bytes used to read by the authentication function on routing activation. If 0 is configured as length the parameter AuthenticationResData will not be fetched via the API.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation		
BSW Parameter		**BSW Type**	
DoIPRoutingActivationConfirmationCallback		EcucParamConfContainerDef	
BSW Description			
Container describes the Callbackfunction to call on a Routing Activation Request for Confirmation. If this container is configured but the DoIPRoutingActivationConfirmationFunc parameter is not present the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the DoIPRoutingActiviation container.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback
BSW Parameter	**BSW Type**
DoIPRoutingActivationConfirmationFunc	EcucFunctionNameDef
BSW Description	
Direct C Callback function to trigger the confirmation function for routing activation. If the DoIPRoutingActivationConfirmationFunc parameter is present the DoIP module will not use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation but call the configured function.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback
BSW Parameter	**BSW Type**
DoIPRoutingActivationConfirmationReqLength	EcucIntegerParamDef
BSW Description	
Describes the amount of bytes used to handle to the confirmation function on routing activation. If 0 is configured as length the parameter ConfirmedReqData will not be handled to the API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback
BSW Parameter	**BSW Type**
DoIPRoutingActivationConfirmationResLength	EcucIntegerParamDef
BSW Description	
Describes the amount of bytes used to read by the confirmation function on routing activation. If 0 is configured as length the parameter ConfirmedResData will not be fetched via the API.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation	
BSW Parameter		**BSW Type**
DoIPRoutingActivationNumber		EcucIntegerParamDef
BSW Description		
Identifies the Routing activation Number which is received for a DoIP routing activation request message.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPRoutingActivation	
BSW Parameter		**BSW Type**
DoIPTargetAddressRef		EcucReferenceDef
BSW Description		
Reference to all DoIPTargetAddress which are activated on this Routing activation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet	
BSW Parameter		**BSW Type**
DoIPTester		EcucParamConfContainerDef
BSW Description		
This container describes the properties of the possible connectable Tester for the DoIP entity.		
Template Description		
The logical DoIP address.		
M2 Parameter		
SystemTemplate::TransportProtocols::DoIpLogicAddress		
Mapping Rule		**Mapping Type**
This container shall be created for each DoIpLogicAddress referenced by a DoIpTpConnection in the role doIpSourceAddress		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPConfigSet/DoIPTester	
BSW Parameter		**BSW Type**

DoIPNumByteDiagAckNack		EcucIntegerParamDef
BSW Description		
Specifies the number of original Diagnostic request bytes the DoIP entity responses on a NACK of a diagnostic response message to the Tester.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPTester	
BSW Parameter		**BSW Type**
DoIPRoutingActivationRef		EcucReferenceDef
BSW Description		
Reference to a DoIPRoutingActivation describing the possible routing activations of the DoIPTester		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPConfigSet/DoIPTester	
BSW Parameter		**BSW Type**
DoIPTesterSA		EcucIntegerParamDef
BSW Description		
Source Address of the Tester sent via routing activation or diagnostic message.		
Template Description		
The logical DoIP address.		
M2 Parameter		
SystemTemplate::TransportProtocols::DoIpLogicAddress.address		
Mapping Rule		**Mapping Type**
This value shall be derived from DoIpLogicAddress that is referenced by DoIp Connection in the role doIpSourceAddress		full
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP	
BSW Parameter		**BSW Type**
DoIPGeneral		EcucParamConfContainerDef
BSW Description		
This container specifies the general configuration parameters of the DoIP module.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPAliveCheckResponseTimeout		EcucFloatParamDef
BSW Description		
Timeout in [s] for waiting for a response to an Alive Check request before the connection is considered to be disconnected. Represents parameter T_TCP_AliveCheck of ISO 13400-2:2012.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPDevelopmentErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPDhcpOptionVinUse		EcucBooleanParamDef
BSW Description		
If DoIPDhcpOptionVinUse is set to true the DoIP module will add the VIN to the Dhcp host name if no valid Dhcp host name is already set.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPEntityStatusMaxByteFieldUse		EcucBooleanParamDef
BSW Description		
This parameter is used to distinguish the optional support of the Max data size element of a diagnostic entity status response.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPFurtherActionByteCallback		EcucParamConfContainerDef
BSW Description		
This container describes the Callbackfunction to get the Further Action byte. This container shall always be present. If the DoIPFurtherActionByteDirect parameter is not present, the DoIP module will use an RPort of ServiceInterface CallbackGetFurtherActionByte with the name "CBGetFurtherActionByte".		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral/DoIPFurtherActionByteCallback	
BSW Parameter		**BSW Type**
DoIPFurtherActionByteDirect		EcucFunctionNameDef
BSW Description		
Direct C Callback function to get the OEM specific Further Action Byte for the DoIP vehicle identification response/vehicle announcement. If the DoIPFurtherActionByteDirect parameter is present, the DoIP module will not use an RPort of ServiceInterface "CBGetFurtherActionByte" but will call the configured function.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPGIDInvalidityPattern		EcucIntegerParamDef
BSW Description		
Specifies the Byte pattern that is used for response messages if no valid GID could be retrieved. Only the value '0' or '255' is allowed".		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPGeneralInactivityTime		EcucFloatParamDef
BSW Description		
Timeout in [s] for maximum inactivity of a TCP socket connection before the DoIP module will close the according socket connection. Represents parameter T_TCP_General_Inactivity of ISO 13400-2:2012		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPGetGidCallback		EcucParamConfContainerDef
BSW Description		
This container describes the usage of a callback function to get the GID. (If this container is not present no callback function shall be used by DoIP module to retrive the GID.)		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral/DoIPGetGidCallback	
BSW Parameter		**BSW Type**
DoIPGetGidDirect		EcucFunctionNameDef
BSW Description		
If the DoIPGetGidDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPGetGID) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPGetGidDirect parameter does NOT exist the DoIP module shall use a RPort with a CallbackGetGID type of client-server port interface to retrive the GID.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPHeaderFileInclusion		EcucStringParamDef
BSW Description		
Name of the header file(s) to be included by the DoIP module containing the used C-callback declarations.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPHostNameSizeMax		EcucIntegerParamDef
BSW Description		

Maximum Size of the DHCP HostName in ASCII. This parameter is necessary to reserve the correct amount of bytes for working with the DHCP HostName option. Minimum range is 5 because Dhcp Host Name should be at least "DoIP-" on any configuration.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPInitialInactivityTime		EcucFloatParamDef
BSW Description		
Timeout in [s] used for initial inactivity of a connected TCP socket connection directly after socket connection. Represents parameter T_TCP_Initial_Inactivity of ISO 13400-2:2012		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPInitialVehicleAnnouncementTime		EcucFloatParamDef
BSW Description		
Time to wait in [s] for sending first vehicle anouncement message after IP address assignment. Represents parameter A_DoIP_Announce_Wait of ISO 13400-2:2012		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Determines the frequency at which the DoIP_MainFunction() is called in [s].		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPMaxRequestBytes		EcucIntegerParamDef
BSW Description		
Specifies the maximum allowed bytes of a DoIP message request without the DoIP header.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPMaxTesterConnections		EcucIntegerParamDef
BSW Description		
Maximum ammount of tester connections that shall be maintained at one time before alive check is performed.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPMaxUDPRequestPerMessage		EcucIntegerParamDef
BSW Description		
This parameter captures the maximum amont of UDP Requests necessary to handle paralel within a single UDP connection.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPNodeType		EcucEnumerationParamDef
BSW Description		
Describes the Type of the DoIP node.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPPowerModeCallback		EcucParamConfContainerDef
BSW Description		
This container describes the usage of a callback function to retrieve the current power mode. This container shall always be present.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral/DoIPPowerModeCallback	
BSW Parameter		**BSW Type**
DoIPPowerModeDirect		EcucFunctionNameDef
BSW Description		
If the DoIPPowerModeDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPGetPowerModeCallback) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPPowerModeDirect parameter does NOT present the DoIP module shall use a RPort with a CallbackGetPowerMode type of client-server port interface to retrive the current power mode.		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPTriggerGidSyncCallback		EcucParamConfContainerDef
BSW Description		
This container describes the usage of a callback function to trigger the GID synchronization. (If this container does not exist no callback function shall be used by DoIP module to trigger the GID synchronization.)		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral/DoIPTriggerGidSyncCallback	
BSW Parameter		**BSW Type**
DoIPTriggerGidSyncDirect		EcucFunctionNameDef
BSW Description		
If the DoIPTriggerGidSyncDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPTriggerGidSyncCallback) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPTriggerGidSyncDirect parameter does NOT present the DoIP module shall use a RPort with a CallbackTriggerGIDSynchnonization type of client-server port interface to trigger the GID synchronization.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPUseEIDasGID		EcucBooleanParamDef
BSW Description		
Specifies if the DoIP entity shall use its EID if it is the Master for vehicle identification gid on the vehicle identification/vehicle announcement.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPUseMacAddressForIdentification		EcucBooleanParamDef
BSW Description		
Provided the information if a configured EID at vehicle identification response/vehicle announment is used or the MAC address. TRUE: Use MAC Address instead of EID for Vehicle identification/announcement. FALSE: Use configured EID for vehicle identification/announcement. Dependencies: DoIPEID		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPUseVehicleIdentificationSyncStatus		EcucBooleanParamDef
BSW Description		
Defines if the optional VIN/GID synchronization status is used additionally in the vehicle identification/announcement.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPVehicleAnnouncementCount		EcucIntegerParamDef
BSW Description		
Number of vehicle announcement messages on IP address assignment. Represents parameter A_DoIP_Announce_Num of ISO 13400-2:2012.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPVehicleAnnouncementInterval		EcucFloatParamDef
BSW Description		
Time to wait in [s] for sending subsequent vehicle anouncement messages. Represents parameter A_DoIP_Announce_Interval of ISO 13400-2:2012		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPVehicleAnnouncementRepetition		EcucIntegerParamDef
BSW Description		
Amount of repetitions of the vehicle announcement message on IP address assignment. Represents parameter A_DoIP_Annunce_Num of ISO 13400-2:2012		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
DoIP	DoIP/DoIPGeneral	
BSW Parameter		**BSW Type**
DoIPVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activates the DoIP_GetVersionInfo() API. TRUE: Enables the DoIP_GetVersionInfo() API. FALSE: DoIP_GetVersionInfo() API is not included.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPGeneral		
BSW Parameter		**BSW Type**	
DoIPVinGidMaster		EcucBooleanParamDef	
BSW Description			
Specifies if the DoIP entity is the Vehicle identification Master for the GID (Group ID).			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
DoIP	DoIP/DoIPGeneral		
BSW Parameter		**BSW Type**	
DoIPVinInvalidityPattern		EcucIntegerParamDef	
BSW Description			
Specifies the Byte pattern that is used for response messages if no valid VIN could be retrieved. Only the value ’0’ or ’255’ is allowed".			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

C.6.10 UdpNm

BSW Module	**BSW Context**	
UdpNm	UdpNm	
BSW Parameter		**BSW Type**
UdpNmGlobalConfig		EcucParamConfContainerDef
BSW Description		
This container contains all global configuration parameters of UDP NM configured from the CanTrcv Module perspective.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmBusSynchronizationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling bus synchronization support. This feature is required for gateway nodes only. It must not be defined if UdpNmPassiveModeEnabled==true. This parameter shall be derived from NmBusSynchronizationEnabled.		
Template Description		
Enables bus synchronization support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmBusSynchronizationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00020

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmChannelConfig		EcucParamConfContainerDef
BSW Description		
This container contains the channel-specific configuration parameters of the UdpNm.		
Template Description		
Udp specific NmCluster attributes		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00034

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmActiveWakeupBitEnabled		EcucBooleanParamDef
BSW Description		
Enables/Disables the handling of the Active Wakeup Bit in the UdpNm module.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmAllNmMessagesKeepAwake		EcucBooleanParamDef
BSW Description		
Specifies if UdpNm drops irrelevant NM PDUs. false: Only NM PDUs with a PNI bit = true and containing a PN request for this ECU triggers the standard RX indication handling true: Every NM PDU triggers the standard RX indication handling		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmCarWakeUpBitPosition		EcucIntegerParamDef
BSW Description		
Specifies the Bit position of the CWU within the NM PDU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmCarWakeUpBytePosition		EcucIntegerParamDef
BSW Description		
Specifies the Byte position of the CWU within the NM PDU.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmCarWakeUpFilterEnabled		EcucBooleanParamDef
BSW Description		
If CWU filtering is supported, only the CWU bit within the NM PDU with source node identifier UdpNmCarWakeUpFilterNodeId is considered as CWU request. FALSE - CWU filtering is not supported TRUE - CWU filtering is supported.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmCarWakeUpFilterNodeId		EcucIntegerParamDef
BSW Description		
Source node identifier for CWU filtering. If CWU filtering is supported, only the CWU bit within the NM PDU with source node identifier UdpNmCarWakeUpFilterNodeId is considered as CWU request.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmCarWakeUpRxEnabled		EcucBooleanParamDef
BSW Description		
Enables or disables support of CarWakeUp bit evaluation in received NM PDUs. FALSE - CarWakeUp not supported. TRUE - CarWakeUp supported.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmComMNetworkHandleRef		EcucSymbolicNameReferenceDef
BSW Description		
This reference points to the unique channel defined by the ComMChannel and provides access to the unique channel index value in ComMChannelId.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmImmediateNmCycleTime		EcucFloatParamDef
BSW Description		
Defines the immediate NM PDU cycle time in seconds which is used for UdpNmImmediateNmTransmissions NM PDU transmissions.		
Template Description		
Defines the immediate NmPdu cycle time in seconds which is used for nmImmediateNmTransmissions NmPdu transmissions. This attribute is only valid if nmImmediateNmTransmissions is greater one.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster.nmImmediateNmCycleTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00035

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmImmediateNmTransmissions		EcucIntegerParamDef
BSW Description		
Defines the number of immediate NM PDUs which shall be transmitted. If the value is zero no immediate NM PDUs are transmitted. The cycle time of immeditate NM PDUs is defined by UdpNmImmediateNmCycleTime.		

Template Description	
Defines the number of immediate NmPdus which shall be transmitted. If the value is zero no immediate NmPdus are transmitted. The cycle time of immediate NmPdus is defined by nmImmediateNmCycleTime.	
M2 Parameter	
SystemTemplate::NetworkManagement::UdpNmCluster.nmImmediateNmTransmissions	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00036

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Call cycle of UdpNm_MainFunction_x for the respective instance in [s].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmMsgCycleOffset		EcucFloatParamDef
BSW Description		
Time offset in the periodic transmission node. It determines the start delay of the transmission. < UdpNmMsgCycleTime This parameter is only valid if UdpNmPassiveModeEnabled is disabled.		
Template Description		
Node specific time offset in the periodic transmission node. It determines the start delay of the transmission. Specified in seconds.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmNode.nmMsgCycleOffset		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00015

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmMsgCycleTime		EcucFloatParamDef

BSW Description	
Period of a NM-message. It determines the periodic rate and is the basis for transmit scheduling. NmTimeoutTime = n * UdpNmMsgCycleTime This parameter is only valid if UdpNmPassiveModeEnabled is disabled.	
Template Description	
Period of a NmPdu in seconds. It determines the periodic rate in the periodic transmission mode with bus load reduction and is the basis for transmit scheduling in the periodic transmission mode without bus load reduction.	
M2 Parameter	
SystemTemplate::NetworkManagement::UdpNmCluster.nmMsgCycleTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00012

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmMsgTimeoutTime		EcucFloatParamDef
BSW Description		
Transmission Timout of NM-message. If there is no transmission confirmation by the UDP Interface within this timeout, the UDPNM module shall gibe an error notification. This parameter is only valid if UdpNmPassiveModeEnabled is disabled. UdpNmMsgTimeoutTime should be a multiple of UdpNmMsgCycleTime.		
Template Description		
Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster.nmMessageTimeoutTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00010

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmNodeDetectionEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the node detection support. This parameter shall be derived from NmNodeDetectionEnabled. This parameter shall only be enabled if UdpNmNodeIdEnabled == true. If(UdpNmPduCbvPosition != UDPNM_PDU_OFF) then Equal(NmNodeDetectionEnabled) else Equal(False).		
Template Description		
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true.		
M2 Parameter		

SystemTemplate::NetworkManagement::NmCluster.nmNodeDetectionEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00038

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmNodeId		EcucIntegerParamDef
BSW Description		
Node identifier of local node. This parameter is only valid if UdpNmPassiveModeEnabled is set to OFF and UdpNmNodeDetectionEnabled is set to ON.		
Template Description		
Node identifier of local NmNode. Must be unique in the NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmNodeId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00002

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmNodeIdEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the source node identifier. This parameter shall be derived from NmNodeIdEnabled.		
Template Description		
Enables the source node identifier.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmNodeIdEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00039

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmPduCbvPosition		EcucEnumerationParamDef
BSW Description		

Defines the position of the control bit vector within the NM PACKET.
 	
The value of the parameter represents the location of the control bit vector in the NM PACKET (UDPNM_PDU_BYTE_0 means byte 0, UDPNM_PDU_BYTE_1 means byte 1, UDPNM_PDU_OFF means the control bit vector is not part of the NM PACKET)
 	
See also UdpNmPduNidPosition
 	
if (UdpNmPduCbvPosition != UDPNM_PDU_OFF && UdpNmPduNidPosition != UDPNM_PDU_OFF) then UdpNmPduCbvPosition != UdpNmPduNidPosition
 	
if (UdpNmPduCbvPosition != UDPNM_PDU_OFF && UdpNmPduNidPosition == UDPNM_PDU_OFF) then UdpNmPduCbvPosition = UDPNM_PDU_BYTE0	

Template Description	
Defines the position of the control bit vector within the NmPdu (Byte positon).	
M2 Parameter	
SystemTemplate::NetworkManagement::UdpNmCluster.nmCbvPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00005

BSW Module	**BSW Context**
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig
BSW Parameter	**BSW Type**
UdpNmPduNidPosition	EcucEnumerationParamDef
BSW Description	

Defines the position of the source node identifier within the NM PACKET.
 	
ImplementationType: UdpNm_PduPositionType
 	
The value of the parameter represents the location of the source node identifier in the NM PACKET (UDPNM_PDU_BYTE_0 means byte 0, UDPNM_PDU_BYTE_1 means byte 1, UDPNM_PDU_OFF means source node identifier is not part of the NM PACKET)
 	
See also UdpNmPduCbvPosition
if (UDPNM_PDU_NID_POSITION != UDPNM_PDU_OFF && UDPNM_PDU_CBV_POSITION != UDPNM_PDU_OFF) then UDPNM_PDU_NID_POSITION != UDPNM_PDU_CBV_POSITION
 	
if (UDPNM_PDU_NID_POSITION != UDPNM_PDU_OFF && UDPNM_PDU_CBV_POSITION == UDPNM_PDU_OFF) then UDPNM_PDU_IND_POSITION = UDPNM_PDU_BYTE0	

Template Description	
Defines the byte position of the source node identifier within the NmPdu.	
M2 Parameter	
SystemTemplate::NetworkManagement::UdpNmCluster.nmNidPosition	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00008

BSW Module	**BSW Context**

UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig		
BSW Parameter		**BSW Type**	
UdpNmPnEnabled		EcucBooleanParamDef	
BSW Description			
Enables or disables support of partial networking. false: Partial networking Range not supported true: Partial networking supported			
Template Description			
Defines whether this NmCluster contributes to the partial network mechanism.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmCluster.nmPncParticipation			
Mapping Rule			**Mapping Type**
If NmCluster.nmPncParticipation has the value "true" or is not defined then UdpNmPnEnabled shall be set to true.			full
Mapping Status			**Mapping ID**
valid			up_UdpNm_00037

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig		
BSW Parameter		**BSW Type**	
UdpNmPnEraCalcEnabled		EcucBooleanParamDef	
BSW Description			
Specifies if UdpNm calculates the PN request information for external requests. (ERA) false: PN request are not calculated true: PN request are calculated.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig		
BSW Parameter		**BSW Type**	
UdpNmPnEraRxNSduRef		EcucReferenceDef	
BSW Description			
Reference to a Pdu in the COM-Stack. The SduRef is required for every UdpNm Channel, because ERA is reported per channel.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmPnHandleMultipleNetworkRequests		EcucBooleanParamDef
BSW Description		
false: UdpNm_NetworkRequest is ignored in NO. true: UdpNm_NetworkRequest triggers a change from NO to RM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmRemoteSleepIndTime		EcucFloatParamDef
BSW Description		
Timeout for Remote Sleep Indication. It defines the time in [s] how long it shall take to recognize that all other nodes are ready to sleep. Typically it should be equal to: n * UdpNmMsgCycleTime, where n denotes the number of NM packets that are normally sent before Remote Sleep Indication is detected. The value of n decremented by one determines the amount of lost NM packets that can be tolerated by the Remote Sleep Indication procedure.		
Template Description		
Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster.nmRemoteSleepIndicationTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00004

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmRepeatMessageTime		EcucFloatParamDef
BSW Description		
Timeout for Repeat Message State. It defines the time in seconds how long the NM shall stay in the Repeat Message State.		
Template Description		
Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster.nmRepeatMessageTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full

Mapping Status	Mapping ID
valid	up_UdpNm_00007

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmRepeatMsgIndEnabled		EcucBooleanParamDef
BSW Description		
Enable/disable the notification that a RepeatMessageRequest bit has been received.		
Template Description		
Switch for enabling the Repeat Message Bit Indication.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmCluster.nmRepeatMsgIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00040

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmRetryFirstMessageRequest		EcucBooleanParamDef
BSW Description		
Specifies if first message request in UdpNm is repeated until accepted by SoAd.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmRxPdu		EcucParamConfContainerDef
BSW Description		
This container describes the UdpNm RX PDU's.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.rxNmPdu		
Mapping Rule		**Mapping Type**
Create container for each NmPdu that is received on the regarded Nm cluster		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00016

BSW Module	BSW Context

UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmRxPdu		
BSW Parameter		**BSW Type**	
UdpNmRxPduId		EcucIntegerParamDef	
BSW Description			
ID of the RxPdu that will be used by a RxIndication of the lower layer.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmRxPdu		
BSW Parameter		**BSW Type**	
UdpNmRxPduRef		EcucReferenceDef	
BSW Description			
The reference to a PDU in the global PDU structure described in the AUTOSAR ECU Configuration Specification. This reference will be used by the UdpNm module to derive the PDU Id.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig		
BSW Parameter		**BSW Type**	
UdpNmTimeoutTime		EcucFloatParamDef	
BSW Description			
Network Timeout for NM packets. It denotes the time in [s] how long the NM shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place. It shall be equal for all nodes in the cluster. It shall be greater than UdpNmMsgCycleTime. Typically, it should be equal to: x * UdpNmMsgCycleTime, where n denotes the number of NM PACKET cycle times in the Ready Sleep State before transition into the Bus-Sleep Mode is initiated. The value of n decremented by one determines the amount of lost NM packets that can be tolerated by the coordination algorithm.			
Template Description			
Network Timeout for NmPdus in seconds. It denotes the time how long the UdpNm shall stay in the Network Mode before transition into Prepare Bus-Sleep Mode shall take place.			
M2 Parameter			
SystemTemplate::NetworkManagement::UdpNmCluster.nmNetworkTimeout			
Mapping Rule			**Mapping Type**

1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00014

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig	
BSW Parameter		**BSW Type**
UdpNmTxPdu		EcucParamConfContainerDef
BSW Description		
This container describes the UdpNm TX PDU's.		
Template Description		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.txNmPdu		
Mapping Rule		**Mapping Type**
Create container for each NmPdu that is transmitted on the regarded Nmcluster		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00009

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmTxPdu	
BSW Parameter		**BSW Type**
UdpNmTxConfirmationPduId		EcucIntegerParamDef
BSW Description		
Id of the TxPdu that will be used by a TxConfirmation from the lower layer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmTxPdu	
BSW Parameter		**BSW Type**
UdpNmTxPduRef		EcucReferenceDef
BSW Description		
The reference to a PDU in the global PDU structure described in the AUTOSAR ECU Configuration Specification. This reference will be used by the UdpNm module to derive the PDU Id.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig		
BSW Parameter		**BSW Type**	
UdpNmUserDataTxPdu		EcucParamConfContainerDef	
BSW Description			
Preprocessor switch for enabling the Tx path of Com User Data. Use case: Setting of NMUserData via SWC.			
Template Description			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping			
Mapping Rule			**Mapping Type**
Create container for each NmPdu that aggregates the ISignalToIPduMapping element. The configuration for these Pdus (e.g. Transfer Properties) shall be derived from this information.			full
Mapping Status			**Mapping ID**
valid			up_UdpNm_00013

BSW Module	BSW Context		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmUserDataTxPdu		
BSW Parameter		**BSW Type**	
UdpNmTxUserDataPduId		EcucIntegerParamDef	
BSW Description			
This parameter defines the Handle ID of the NM User Data I-PDU.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig/UdpNmUserDataTxPdu		
BSW Parameter		**BSW Type**	
UdpNmTxUserDataPduRef		EcucReferenceDef	
BSW Description			
Reference to the NM User Data I-PDU in the global PDU collection.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmChannelConfig

BSW Parameter		BSW Type
UdpNmWaitBusSleepTime		EcucFloatParamDef
BSW Description		
Timeout for bus calm down phase. It denotes the time in [s] how long the NM shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place. It shall be equal for all nodes in the cluster. It shall be long enough to empty all Tx-buffer empty.		
Template Description		
Timeout for bus calm down phase in seconds. It denotes the time how long the CanNm shall stay in the Prepare Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmCluster.nmWaitBusSleepTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00011

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmComControlEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the Communication Control support.		
Template Description		
Enables the Communication Control support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmComControlEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00017

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmComUserDataSupport		EcucBooleanParamDef
BSW Description		
Enable/disable the user data support.		
Template Description		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreCommunication::NmPdu.iSignalToIPduMapping		
Mapping Rule		**Mapping Type**
If an NmPdu contains user data defined via the existence of NmPdu.iSignalToIPduMapping and is consequently handled via the PduR and Com this attribute shall be set to true.		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00030

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmCoordinatorEnabled		EcucBooleanParamDef
BSW Description		
Enable/disable the NM Coordination algorithm to being able to initiate the synchronization algorithm. TRUE: Option is enabled FALSE: The parameter shall be FALSE by default and shall only be allowed to be TRUE if the parameter UdpNmRemoteSleepIndEnabled is TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmCoordinatorId		EcucIntegerParamDef
BSW Description		
Set the NM coordination ID for this gateway. 0x00: passive coordinator only 0x01 - 0x03: coordinator priority Only valid, if UdpmCoordinatorEnabled is TRUE.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmCoordinatorSyncSupport		EcucBooleanParamDef
BSW Description		
Enables/disables the coordinator synchronization support.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmImmediateRestartEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the immediate transmission of a NM PACKET upon bus-communication request in Prepare-Bus-Sleep mode. Must not be defined if UdpNmPassiveModeEnabled== true.		
Template Description		
Enables the asynchronous transmission of a CanNm PDU upon bus-communication request in Prepare-Bus-Sleep mode.		
M2 Parameter		
SystemTemplate::NetworkManagement::UdpNmClusterCoupling.nmImmediateRestartEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00021

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmNodeDetectionEnabled		EcucBooleanParamDef
BSW Description		

Pre-processor switch for enabling the node detection support. This parameter shall be derived from NmNodeDetectionEnabled. This parameter shall only be enabled if UdpNmNodeIdEnabled == true. If(UdpNmPduCbvPosition != UDPNM_PDU_OFF) then Equal(NmNodeDetectionEnabled) else Equal(False).	
Template Description	
Enables the Request Repeat Message Request support. Only valid if nmNodeIdEnabled is set to true. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.	
M2 Parameter	
SystemTemplate::NetworkManagement::NmEcu.nmNodeDetectionEnabled	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00029

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmNodeIdEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the source node identifier. This parameter shall be derived from NmNodeIdEnabled.		
Template Description		
Enables the source node identifier. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmNodeIdEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00028

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmNumberOfChannels		EcucIntegerParamDef
BSW Description		
Number of NM channels allowed within one ECU.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmPassiveModeEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling support of the Passive Mode.		
Template Description		
Enables support of the Passive Mode. The passive mode is configurable per channel.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmNode.nmPassiveModeEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping nmNode.nmPassiveModeEnabled shall always have the same value in all Nm Clusters with the same bus protocol in the scope of one EcuInstance.		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00001

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmPduRxIndicationEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling the PDU Rx Indication. This parameter shall be derived from NmPduRxIndicationEnabled.		
Template Description		
Switch for enabling the PDU Rx Indication.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmPduRxIndicationEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00027

BSW Module	BSW Context	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmPnEiraCalcEnabled		EcucBooleanParamDef
BSW Description		
Specifies if UdpNm calculates the PN request information for internal and external requests. (EIRA) true: PN request are calculated false: PN request are not calculated		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmPnEiraRxNSduRef		EcucReferenceDef
BSW Description		
Reference to a Pdu in the COM-Stack. Only one SduRef is required for UdpNm because the EIRA is the aggregation over all Ethernet Channels.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmPnInfo		EcucParamConfContainerDef
BSW Description		
PN information configuration		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmPnInfo	
BSW Parameter		**BSW Type**
UdpNmPnFilterMaskByte		EcucParamConfContainerDef
BSW Description		
PN information configuration		
Template Description		
Bit mask for Ethernet Payload used to configure the Ethernet Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pncFilterDataMask		
Mapping Rule		**Mapping Type**

For one EcuInstance all contributing EthernetCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the UdpNmPnFilterMaskByteIndex and UdpNmPnFilterMaskByte Value for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a UdpNmPnFilterMaskByte with UdpNmPnFilterMask ByteIndex = 5 and UdpNmPnFilterMaskByteValue = 128.	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00031

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmPnInfo/UdpNmPnFilterMaskByte	
BSW Parameter		**BSW Type**
UdpNmPnFilterMaskByteIndex		EcucIntegerParamDef
BSW Description		
Index of the filter mask byte. Specifies the position within the filter mask byte array.		
Template Description		
Bit mask for Ethernet Payload used to configure the Ethernet Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pnc FilterDataMask		
Mapping Rule		**Mapping Type**
For one EcuInstance all contributing EthernetCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the UdpNmPnFilterMaskByteIndex and UdpNmPnFilterMaskByte Value for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a UdpNmPnFilterMaskByte with UdpNmPnFilterMask ByteIndex = 5 and UdpNmPnFilterMaskByteValue = 128.		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00032

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmPnInfo/UdpNmPnFilterMaskByte	
BSW Parameter		**BSW Type**
UdpNmPnFilterMaskByteValue		EcucIntegerParamDef
BSW Description		
Parameter to configure the filter mask byte.		
Template Description		
Bit mask for Ethernet Payload used to configure the Ethernet Transceiver for partial network wakeup.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::EthernetCommunicationConnector.pnc FilterDataMask		
Mapping Rule		**Mapping Type**

For one EcuInstance all contributing EthernetCommunicationConnector.pncFilterDataMask will be bitwise ORed to obtain aggregated pncFilterDataMask value for this ECU. Since the pncFilterDataMask is calculated over the whole payload of the NmPdu, the leading Bytes of this aggregated pncFilterDataMask shall be ignored based on the System.pncVectorOffset value. In order to get the UdpNmPnFilterMaskByteIndex and UdpNmPnFilterMaskByte Value for all the bytes aggregated pncFilterDataMask shall be processed in a littleEndian way. E.g. if pncVectorOffset = 2 and aggregated pncFilterDataMask has the value 2ˆ 63 this will end up in a UdpNmPnFilterMaskByte with UdpNmPnFilterMask ByteIndex = 5 and UdpNmPnFilterMaskByteValue = 128.	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00033

BSW Module	**BSW Context**
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmPnInfo
BSW Parameter	**BSW Type**
UdpNmPnInfoLength	EcucIntegerParamDef
BSW Description	
Specifies the length of the PN request information in the NM message.	
Template Description	
Length of the partial networking request release information vector (in bytes).	
M2 Parameter	
SystemTemplate::System.pncVectorLength	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00024

BSW Module	**BSW Context**
UdpNm	UdpNm/UdpNmGlobalConfig/UdpNmPnInfo
BSW Parameter	**BSW Type**
UdpNmPnInfoOffset	EcucIntegerParamDef
BSW Description	
Specifies the offset of the PN request information in the NM message.	
Template Description	
Absolute offset (with respect to the NM-PDU) of the partial networking request release information vector that is defined in bytes as an index starting with 0.	
M2 Parameter	
SystemTemplate::System.pncVectorOffset	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00023

BSW Module	**BSW Context**
UdpNm	UdpNm/UdpNmGlobalConfig
BSW Parameter	**BSW Type**
UdpNmPnResetTime	EcucFloatParamDef
BSW Description	

Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA. The value shall be the same for every channel. Thus it is a global config parameter.	
Template Description	
Specifies the runtime of the reset timer in seconds. This reset time is valid for the reset of PN requests in the EIRA and in the ERA.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.pnResetTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_UdpNm_00022

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmRemoteSleepIndEnabled		EcucBooleanParamDef
BSW Description		
Pre-processor switch for enabling remote sleep indication support. This feature is required for gateway nodes only. It must not be defined if UdpNmPassiveModeEnabled==true. This parameter shall be derived from NmRemoteSleepIndEnabled.		
Template Description		
Switch for enabling remote sleep indication support.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRemoteSleepIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00019

BSW Module	**BSW Context**	
UdpNm	UdpNm/UdpNmGlobalConfig	
BSW Parameter		**BSW Type**
UdpNmRepeatMsgIndEnabled		EcucBooleanParamDef
BSW Description		
Enable/disable the notification that a RepeatMessageRequest bit has been received.		
Template Description		
Switch for enabling the Repeat Message Bit Indication. Please note that this attribute is deprecated and will be removed in future. It is replaced by the channel specific attribute located in NmCluster.		
M2 Parameter		
SystemTemplate::NetworkManagement::NmEcu.nmRepeatMsgIndEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_UdpNm_00026

BSW Module	**BSW Context**

UdpNm	UdpNm/UdpNmGlobalConfig		
BSW Parameter		**BSW Type**	
UdpNmStateChangeIndEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling the UDP NM state change notification. This parameter shall be derived from NmStateChangeIndEnabled.			
Template Description			
Enables the CAN Network Management state change notification.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmStateChangeIndEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_UdpNm_00025

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig		
BSW Parameter		**BSW Type**	
UdpNmUserDataEnabled		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling user data support. This parameter shall be derived from NmUserDataEnabled.			
Template Description			
Switch for enabling user data support.			
M2 Parameter			
SystemTemplate::NetworkManagement::NmEcu.nmUserDataEnabled			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_UdpNm_00018

BSW Module	**BSW Context**		
UdpNm	UdpNm/UdpNmGlobalConfig		
BSW Parameter		**BSW Type**	
UdpNmVersionInfoApi		EcucBooleanParamDef	
BSW Description			
Pre-processor switch for enabling version info API support.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.6.11 SomeIpTp

BSW Module	**BSW Context**

SomeIpTp	SomeIpTp		
BSW Parameter		**BSW Type**	
SomeIpTpChannel		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters of the SomeIpTp channel.			
Template Description			
A connection identifies the sender and the receiver of this particular communication. The SOME/IP TP module routes a Pdu through this connection.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SomeIpTp	SomeIpTp/SomeIpTpChannel		
BSW Parameter		**BSW Type**	
SomeIpTpNPduSeparationTime		EcucFloatParamDef	
BSW Description			
Sets the duration of the minimum time in seconds the SomeIpTp module shall wait between the transmissions of N-PDUs.			
Template Description			
Sets the duration of the minimum time in seconds the SOME/IP TP module shall wait between the transmissions of NPdus.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.separationTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_SomeIpTp_00001

BSW Module	**BSW Context**		
SomeIpTp	SomeIpTp/SomeIpTpChannel		
BSW Parameter		**BSW Type**	
SomeIpTpRxNSdu		EcucParamConfContainerDef	
BSW Description			
The following parameters needs to be configured for each N-SDU which has to be passed as one assembled RxPdu to the upper layer.			
Template Description			
Reference to an IPdu that is segmented by the Transport Protocol.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.tpSdu			
Mapping Rule			**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role tpSdu that is received by the EcuInstance that is contained in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_SomeIpTp_00007

BSW Module	BSW Context		
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpRxNSdu		
BSW Parameter		**BSW Type**	
SomeIpTpRxNPdu		EcucParamConfContainerDef	
BSW Description			
This container contains the configuration parameters of the NPdu that is received from a lower layer			
Template Description			
Reference to the segmented IPdu.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.transportPdu			
Mapping Rule			**Mapping Type**
Create container if a SomeipTpConnection exists that points to a PduTriggering in the role transportPdu that is received by the EcuInstance that is contained in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_SomeIpTp_00006

BSW Module	BSW Context		
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpRxNSdu/SomeIpTpRxNPdu		
BSW Parameter		**BSW Type**	
SomeIpTpRxNPduHandleId		EcucIntegerParamDef	
BSW Description			
This parameter defines the handle ID that is used by the PduR when calling SomeIpTp_RxIndication.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpRxNSdu/SomeIpTpRxNPdu		
BSW Parameter		**BSW Type**	
SomeIpTpRxNPduRef		EcucReferenceDef	
BSW Description			
Reference to a global Pdu that is used to harmonize HandleIDs in the COM-Stack.			
Template Description			
Reference to the segmented IPdu.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.transportPdu			
Mapping Rule			**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role transportPdu that is received by the EcuInstance that is contained in the Ecu Extract.			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpRxNSdu		
BSW Parameter		**BSW Type**	
SomeIpTpRxSduRef		EcucReferenceDef	
BSW Description			
Reference to a Pdu in the COM-Stack that represents the assembled RxPdu which is passed via the PduR to the upper layer.			
Template Description			
Reference to an IPdu that is segmented by the Transport Protocol.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.tpSdu			
Mapping Rule			**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role tpSdu that is received by the EcuInstance that is contained in the Ecu Extract.			full
Mapping Status			**Mapping ID**
valid			up_SomeIpTp_00005

BSW Module	**BSW Context**		
SomeIpTp	SomeIpTp/SomeIpTpChannel		
BSW Parameter		**BSW Type**	
SomeIpTpRxTimeoutTime		EcucFloatParamDef	
BSW Description			
Timer to monitor the successful reception. It is started when the first NPdu is received, restarted after reception of intermediate NPdus, and is stopped when the last NPdu has been received. The value shall be calculated as follows: (SomeIpTpRxTimeoutTime = SomeIpTpNPduSeparationTime + budget), where the time budget compensates intermediary hops and jitters within the ECU implementation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
SomeIpTp	SomeIpTp/SomeIpTpChannel		
BSW Parameter		**BSW Type**	
SomeIpTpTxNSdu		EcucParamConfContainerDef	
BSW Description			
The following parameters needs to be configured for each N-SDU that the SomeIpTp module transmits via the SomeIpTpChannel.			
Template Description			
Reference to an IPdu that is segmented by the Transport Protocol.			
M2 Parameter			
SystemTemplate::TransportProtocols::SomeipTpConnection.tpSdu			
Mapping Rule			**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role tpSdu that is transmitted by the EcuInstance that is contained in the Ecu Extract.			full
Mapping Status			**Mapping ID**

valid	up_SomeIpTp_00008

BSW Module	**BSW Context**	
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpTxNSdu	
BSW Parameter		**BSW Type**
SomeIpTpTxNPdu		EcucParamConfContainerDef
BSW Description		
This container contains the configuration parameters of the segmented Tx NPdus that are transmitted to a lower layer.		
Template Description		
Reference to the segmented IPdu.		
M2 Parameter		
SystemTemplate::TransportProtocols::SomeipTpConnection.transportPdu		
Mapping Rule		**Mapping Type**
Create container if a SomeipTpConnection exists that points to a PduTriggering in the role transportPdu that is transmitted by the EcuInstance that is contained in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_SomeIpTp_00003

BSW Module	**BSW Context**	
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpTxNSdu/SomeIpTpTxNPdu	
BSW Parameter		**BSW Type**
SomeIpTpTxNPduHandleId		EcucIntegerParamDef
BSW Description		
This parameter defines the handle ID that is used by PduR when calling SomeIpTp_TriggerTransmit.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpTxNSdu/SomeIpTpTxNPdu	
BSW Parameter		**BSW Type**
SomeIpTpTxNPduRef		EcucReferenceDef
BSW Description		
Reference to a global Pdu that is used to harmonize HandleIDs in the COM-Stack.		
Template Description		
Reference to the segmented IPdu.		
M2 Parameter		
SystemTemplate::TransportProtocols::SomeipTpConnection.transportPdu		
Mapping Rule		**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role transportPdu that is transmitted by the EcuInstance that is contained in the Ecu Extract.		full
Mapping Status		**Mapping ID**

valid	up_SomeIpTp_00004

BSW Module	BSW Context	
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpTxNSdu	
BSW Parameter		**BSW Type**
SomeIpTpTxNSduHandleId		EcucIntegerParamDef
BSW Description		
This parameter defines the handle ID of the NSdu that represents the original TxSdu which is segmented and passed via the PduR to the lower layer. This handle ID is used by PduR when calling SomeIpTp_Transmit.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SomeIpTp	SomeIpTp/SomeIpTpChannel/SomeIpTpTxNSdu	
BSW Parameter		**BSW Type**
SomeIpTpTxNSduRef		EcucReferenceDef
BSW Description		
Reference to a global Pdu in the COM-Stack that represents the original TxSdu which is segmented and passed via the PduR to the lower layer.		
Template Description		
Reference to an IPdu that is segmented by the Transport Protocol.		
M2 Parameter		
SystemTemplate::TransportProtocols::SomeipTpConnection.tpSdu		
Mapping Rule		**Mapping Type**
Create reference if a SomeipTpConnection exists that points to a PduTriggering in the role tpSdu that is transmitted by the EcuInstance that is contained in the Ecu Extract.		full
Mapping Status		**Mapping ID**
valid		up_SomeIpTp_00002

BSW Module	BSW Context	
SomeIpTp	SomeIpTp	
BSW Parameter		**BSW Type**
SomeIpTpGeneral		EcucParamConfContainerDef
BSW Description		
This container contains the general configuration parameters of the SomeIpTp module.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
SomeIpTp	SomeIpTp/SomeIpTpGeneral	
BSW Parameter		**BSW Type**
SomeIpTpDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the Development Error Detection and Notification ON or OFF.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SomeIpTp	SomeIpTp/SomeIpTpGeneral	
BSW Parameter		**BSW Type**
SomeIpTpRxMainFunctionPeriod		EcucFloatParamDef
BSW Description		
This parameter defines the cycle time in seconds of the periodic call of the SomeIpTp_MainFunctionRx.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
SomeIpTp	SomeIpTp/SomeIpTpGeneral	
BSW Parameter		**BSW Type**
SomeIpTpTxMainFunctionPeriod		EcucFloatParamDef
BSW Description		
This parameter defines the cycle time in seconds of the periodic call of the SomeIpTp_MainFunctionTx.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
SomeIpTp	SomeIpTp/SomeIpTpGeneral		
BSW Parameter		**BSW Type**	
SomeIpTpVersionInfoApi		EcucBooleanParamDef	
BSW Description			
Activates the SomeIpTp_GetVersionInfo() API. TRUE: Enables the SomeIpTp_GetVersionInfo() API. FALSE: SomeIpTp_GetVersionInfo() API is not included.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.7 Diagnostic

C.7.1 Dcm Mapping

BSW Module	BSW Context		
Dcm	Dcm/DcmConfigSet/DcmDsl/DcmDslProtocol/DcmDslProtocolRow/DcmDslConnection/DcmDslMainConnection		
BSW Parameter		**BSW Type**	
DcmDslProtocolRxConnectionId		EcucIntegerParamDef	
BSW Description			
Unique identifier of the tester which uses this connection for diagnostic communication.			
Template Description			
An ECU specific ID for responses of diagnostic routines.			
M2 Parameter			
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.diagnosticAddress			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_Dcm_00055

BSW Module	BSW Context	
Dcm	Dcm/DcmConfigSet/DcmDsl/DcmDslProtocol/DcmDslProtocolRow/DcmDslConnection/DcmDslMainConnection	
BSW Parameter		**BSW Type**
DcmDslProtocolRxTesterSourceAddr		EcucIntegerParamDef
BSW Description		
Tester source address uniquely describes a client and will be used e.g within the jump to Bootloader interfaces. This parameter is not required for generic connections (DcmPdus with MetaDataLength >= 1).		
Template Description		
An ECU specific ID for responses of diagnostic routines.		
M2 Parameter		
SystemTemplate::Fibex::FibexCore::CoreTopology::EcuInstance.diagnosticAddress		

Mapping Rule	Mapping Type
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

C.8 Time management

C.8.1 StbM Time Management

BSW Module	BSW Context	
StbM	StbM	
BSW Parameter		**BSW Type**
StbMGeneral		EcucParamConfContainerDef
BSW Description		
This container holds the general parameters of the Synchronized Time-base Manager		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMCustomerHeaderInclude		EcucStringParamDef
BSW Description		
Defines the header file, which has the declaration of the the callback function prototype for the notification customer of the reference Time Base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMGetCurrentTimeExtendedAvailable		EcucBooleanParamDef
BSW Description		
This allows to define whether an additional variant of the API GetCurrentTime with a 64 bit argument is provided.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMGptTimerRef		EcucSymbolicNameReferenceDef
BSW Description		
This represents an optional sub-container in case any Time Notification Customer is configured. The designated GPT timer has to be configured to have a tick duration of one micro second.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Schedule period of the main function StbM_MainFunction. Unit: [s].		
Template Description		
M2 Parameter		

Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMTimeRecordingSupport		EcucBooleanParamDef
BSW Description		
Enables/Disables the usage of the recording functionality for Synchronized and Offset timebases for Global Time precision measurement purpose.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMGeneral	
BSW Parameter		**BSW Type**
StbMVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activate/Deactivate the version information API (StbM_GetVersionInfo). True: version information API activated False: version information API deactivated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM	
BSW Parameter		**BSW Type**
StbMSynchronizedTimeBase		EcucParamConfContainerDef
BSW Description		
Synchronized time.base collects the information about a specific time-base provider within the system.		
Template Description		
This represents the ability to define a global time domain.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain		
Mapping Rule		**Mapping Type**

For each GlobalTimeDomain where - the configured Ecu is connected to as slave or - the configured Ecu is connected to as master if the Ecu is not in the role of a GlobalTimeGateway for this GlobalTimeDomain an instance of StbMSynchronizedTimeBase shall be created.	full
Mapping Status	**Mapping ID**
valid	up_StbM_00001

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMAllowMasterRateCorrection		EcucBooleanParamDef
BSW Description		
This attribute describes whether the rate correction value of a Time Base can be set by StbM_SetRateCorrection(): * false: the rate correction value can not be set by StbM_SetRateCorrection() * true: the rate correction value can be set by StbM_SetRateCorrection()		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMAllowSystemWideGlobalTimeMaster		EcucBooleanParamDef
BSW Description		
For postbuild variant of the StbM this parameter has to be set to true for a Global Time Master that may act as a system-wide source of time. Otherwise no corresponding service ports/interfaces is provided. The Global Time Master functionality behind the service ports/interfaces has to be enabled/disabled separately via parameter StbMIsSystemWideGlobalTimeMaster.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMClearTimeleapCount		EcucIntegerParamDef

BSW Description	
This attribute describes the required number of updates to the Time Base where the time difference to the previous value has to remain below StbMTimeLeapPastThreshold/StbMTimeLeapFutureThreshold until the TIMELEAP_PAST/TIMELEAP_FUTURE bit within timeBaseStatus of the Time Base is cleared.	
Template Description	
Defines the required number of updates to the Time Base where the time difference to the previous received value has to remain within the bounds of timeLeapFutureThreshold and timeLeapPastThreshold until that Time Base is considered healed.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeSlave.timeLeapHealingCounter	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_StbM_00010

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMIsSystemWideGlobalTimeMaster		EcucBooleanParamDef
BSW Description		
This parameter shall be set to true for a Global Time Master that acts as a system-wide source of time information with respect to Global Time. It is possible that several Global Time Masters exist that have set this parameter set to true because the Global Time Masters exist once per Global Time Domain and one ECU may own several Global Time Domains on different buses it is connected to.		
Template Description		
If set to TRUE, the GlobalTimeMaster is supposed to act as the root of global time information.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeMaster.isSystemWideGlobalTimeMaster		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_StbM_00002

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMLocalTimeClock		EcucParamConfContainerDef
BSW Description		
References the hardware reference clock of this Synchronized Time Base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMLocalTimeClock	
BSW Parameter		**BSW Type**
StbMClockFrequency		EcucIntegerParamDef
BSW Description		
Represents the frequency [Hz] of the HW reference clock used by the StbM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMLocalTimeClock	
BSW Parameter		**BSW Type**
StbMClockPrescaler		EcucIntegerParamDef
BSW Description		
Represents the prescaler to calculate the resulting frequency of the HW reference clock used by the StbM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMLocalTimeClock	
BSW Parameter		**BSW Type**
StbMLocalTimeHardware		EcucChoiceReferenceDef
BSW Description		
Reference to the local time hardware.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMMasterRateDeviationMax		EcucIntegerParamDef

BSW Description	
This attribute describes the maximum allowed absolute value of the rate deviation value to be set by StbM_SetRateCorrection() [unit: ppm].	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMNotificationCustomer		EcucParamConfContainerDef
BSW Description		
This container holds the configuration of a notification customer, which is notified is informed about the occurance of a Time-base related event.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMNotificationCustomer	
BSW Parameter		**BSW Type**
StbMNotificationCustomerId		EcucIntegerParamDef
BSW Description		
Identification of a event notification customer.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMNotificationCustomer	
BSW Parameter		**BSW Type**
StbMTimeNotificationCallback		EcucFunctionNameDef
BSW Description		
Name of the customer specific notification callback function, which shall be called, if the time previously set by the customer is reached.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase/StbMNotificationCustomer	
BSW Parameter		**BSW Type**
StbMTimerStartThreshold		EcucFloatParamDef
BSW Description		
This interval defines, when a GPT Timer shall be started for Time Notification Customers for which the corresponding Customer Timer is running [unit: seconds].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMOffsetTimeBase		EcucReferenceDef
BSW Description		
This is the reference to the Synchronized Time-Base this Offset Time-Base is based on. This reference makes the containing StbMSynchronizedTimeBase an Offset Time-Base.		
Template Description		
Reference to a synchronized time domain this offset time domain is based on. The reference source is the offset time domain. The reference target is the synchronized time domain.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain.offsetTimeDomain		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_StbM_00005

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMStatusNotificationCallback		EcucFunctionNameDef
BSW Description		
Name of the customer specific status notification callback function, which shall be called, if a non-masked status event occurs.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase
BSW Parameter	**BSW Type**
StbMStatusNotificationMask	EcucIntegerParamDef
BSW Description	
The parameter defines the initial value for NotificationMask mask, which defines the events for which the event notification callback function shall be called.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase
BSW Parameter	**BSW Type**
StbMStoreTimebaseNonVolatile	EcucEnumerationParamDef
BSW Description	
This allows for specifying that the Time Base shall be stored in the NvRam.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase
BSW Parameter	**BSW Type**
StbMSyncLossTimeout	EcucFloatParamDef
BSW Description	
This attribute describes the timeout for the situation that the time synchronization gets lost in the scope of the time domain. Unit: seconds	
Template Description	
This attribute describes the timeout for the situation that the time synchronization gets lost in the scope of the time domain.	
M2 Parameter	

SystemTemplate::GlobalTime::GlobalTimeDomain.syncLossTimeout	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_StbM_00004

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMSynchronizedTimeBaseIdentifier		EcucIntegerParamDef
BSW Description		
Identification of a Synchronized TimeBase via a unique identifier. Range: * 0 .. 15: Synchronized Time Bases * 16 .. 31: Offset Time Bases * 32 .. 127: Pure Local Time Bases * 128 .. 65535: Reserved		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMTimeCorrection		EcucParamConfContainerDef
BSW Description		
Collects the information relevant for the rate- and offset correction of a Time Base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeCorrection	
BSW Parameter		**BSW Type**
StbMOffsetCorrectionAdaptionInterval		EcucFloatParamDef
BSW Description		
Defines the interval during which the adaptive rate correction cancels out the rate- and time deviation [unit: seconds].		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeCorrection
BSW Parameter	**BSW Type**
StbMOffsetCorrectionJumpThreshold	EcucFloatParamDef
BSW Description	
Threshold for the correction method. Deviations below this value will be corrected by a linear reduction over a defined timespan. Values equal- and greater than this value will be corrected by immediately setting the correct time- and rate in form of a jump [unit: seconds].	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeCorrection
BSW Parameter	**BSW Type**
StbMRateCorrectionMeasurementDuration	EcucFloatParamDef
BSW Description	
Definition of the time span [s] which is used to calculate the rate deviation.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeCorrection
BSW Parameter	**BSW Type**
StbMRateCorrectionsPerMeasurementDuration	EcucIntegerParamDef
BSW Description	
Number of simultaneous rate measurements to determine the current rate deviation.	
Template Description	
M2 Parameter	

Mapping Rule	Mapping Type
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMTimeLeapFutureThreshold		EcucFloatParamDef
BSW Description		
This represents the maximum allowed positive difference between a newly received Global Time Base value and the current Local Time Base value [unit: seconds].		
Template Description		
Defines the maximum allowed positive difference between the current Local Time Base value and a newly received Global Time Base value.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeSlave.timeLeapFutureThreshold		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_StbM_00008

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMTimeLeapPastThreshold		EcucFloatParamDef
BSW Description		
This represents the maximum allowed negative difference between the current Local Time Base value and a newly received Global Time Base value [unit: seconds].		
Template Description		
Defines the maximum allowed negative difference between the current Local Time Base value and a newly received Global Time Base value.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeSlave.timeLeapPastThreshold		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_StbM_00009

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase	
BSW Parameter		**BSW Type**
StbMTimeRecording		EcucParamConfContainerDef
BSW Description		
Collects the information relevant for configuration of the precision measurement of a Time Base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeRecording	
BSW Parameter		**BSW Type**
StbMOffsetTimeRecordBlockCallback		EcucFunctionNameDef
BSW Description		
Name of the customer specific callback function, which shall be called, if a measurement data for a Offset Time Base are available.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeRecording	
BSW Parameter		**BSW Type**
StbMOffsetTimeRecordTableBlockCount		EcucIntegerParamDef
BSW Description		
Represents the number of Blocks used for queing time measurement events for the Offset Time Base Record Table.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeRecording	
BSW Parameter		**BSW Type**
StbMSyncTimeRecordBlockCallback		EcucFunctionNameDef
BSW Description		
Name of the customer specific callback function, which shall be called, if a measurement data for a Synchronized Time Base are available.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**

valid	

BSW Module	BSW Context	
StbM	StbM/StbMSynchronizedTimeBase/StbMTimeRecording	
BSW Parameter		**BSW Type**
StbMSyncTimeRecordTableBlockCount		EcucIntegerParamDef
BSW Description		
Represents the number of Blocks used for queing time measurement events for the Synchronized Time Base Record Table.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM	
BSW Parameter		**BSW Type**
StbMTriggeredCustomer		EcucParamConfContainerDef
BSW Description		
The triggered customer is directly triggered by the Synchronized Time-base Manager by getting synchronized with the current (global) definition of time and passage of time.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
StbM	StbM/StbMTriggeredCustomer	
BSW Parameter		**BSW Type**
StbMOSScheduleTableRef		EcucReferenceDef
BSW Description		
Mandatory reference to synchronized OS ScheduleTable, which will be explicitly synchronized by the StbM.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
StbM	StbM/StbMTriggeredCustomer		
BSW Parameter		**BSW Type**	
StbMSynchronizedTimeBaseRef		EcucReferenceDef	
BSW Description			
Mandatory reference to the required synchronized time-base.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
StbM	StbM/StbMTriggeredCustomer		
BSW Parameter		**BSW Type**	
StbMTriggeredCustomerPeriod		EcucIntegerParamDef	
BSW Description			
The triggering period of the triggered customer, called by the StbM_MainFunction. The period is documented in microseconds.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

C.8.2 CAN Time Management

BSW Module	BSW Context		
CanTSyn	CanTSyn		
BSW Parameter		**BSW Type**	
CanTSynGeneral		EcucParamConfContainerDef	
BSW Description			
This container holds the general parameters of the CAN-specific Synchronized Time-base Manager			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context

CanTSyn	CanTSyn/CanTSynGeneral	
BSW Parameter		**BSW Type**
CanTSynDevErrorDetect		EcucBooleanParamDef
BSW Description		
Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGeneral	
BSW Parameter		**BSW Type**
CanTSynMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Schedule period of the main function CanTSyn_MainFunction. Unit: [s].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGeneral	
BSW Parameter		**BSW Type**
CanTSynVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activate/Deactivate the version information API (CanTSyn_GetVersionInfo). True: version information API activated False: version information API deactivated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
CanTSyn	CanTSyn	
BSW Parameter		**BSW Type**

CanTSynGlobalTimeDomain		EcucParamConfContainerDef
BSW Description		
This represents the existence of a global time domain on CAN. The CanTSyn module can administrate several global time domains at the same time that in itself form a hierarchy of domains and sub-domains. If the CanTSyn exists it is assumed that at least one global time domain exists.		
Template Description		
This represents the ability to define a global time domain.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain		
Mapping Rule		**Mapping Type**
The container shall exist if a GlobalTimeDomain exists that has a slave or master that refers to a CommunicationConnector that in turn is aggregated by the EcuInstance for which the ECU configuration is created. The container shall also exist if GlobalTimeDomain exists that has a gateway that refers to the EcuInstance for which the ECU configuration is created.		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00001

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain		
BSW Parameter		**BSW Type**	
CanTSynGlobalTimeDomainId		EcucIntegerParamDef	
BSW Description			
The global time domain ID.			
Template Description			
This represents the ID of the GlobalTimeDomain used in the network messages sent on behalf of global time management.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeDomain.domainId			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00011

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain		
BSW Parameter		**BSW Type**	
CanTSynGlobalTimeFupDataIDList		EcucParamConfContainerDef	
BSW Description			
The DataIDList for FUP messages ensures the identification of data elements due to CRC calculation process.			
Template Description			
The DataIDList for FUP messages to calculate CRC.			
M2 Parameter			
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.fupDataIDList			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00015

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeFupDataIDList	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeFupDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for FUP messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for FUP messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.fupDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered fupDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00019

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeFupDataIDList/ CanTSynGlobalTimeFupDataIDListElement	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeFupDataIDListIndex		EcucIntegerParamDef
BSW Description		
Index of the DataIDList for FUP messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeFupDataIDList/ CanTSynGlobalTimeFupDataIDListElement	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeFupDataIDListValue		EcucIntegerParamDef
BSW Description		
Value of the DataIDList for FUP messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain		
BSW Parameter		**BSW Type**	
CanTSynGlobalTimeMaster		EcucParamConfContainerDef	
BSW Description			
Configuration of the global time master. Each global time domain is required to have exactly one global time master. This master may or may not exist on the configured ECU.			
Template Description			
This represents the generic concept of a global time master.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeMaster			
Mapping Rule			**Mapping Type**
The existence of the CanTSynGlobalTimeMaster is bound to the existence of a GlobalTimeMaster that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists,			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00006

BSW Module	BSW Context		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
CanTSynCyclicMsgResumeTime		EcucFloatParamDef	
BSW Description			
Defines the time where the 1st regular cycle time based message transmission takes place, after an immediate transmission before. Unit: seconds			
Template Description			
Defines the minimum time between an "immediate" message and the next periodic message.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeMaster.immediateResumeTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00023

BSW Module	BSW Context		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
CanTSynGlobalTimeDebounceTime		EcucFloatParamDef	
BSW Description			
This represents the configuration of a TX debounce time for SYNC, FUP, OFS and OFNS messages compared to a message before with the same PDU. Unit: seconds			
Template Description			
Defines the minimum amount of time between two time sync messages are transmitted.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeDomain.debounceTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00022

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanTSyn</td><td colspan="2">CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanTSynGlobalTimeMasterPdu</td><td>EcucParamConfContainerDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This container encloses the configuration of the PDU that is supposed to contain the global time information.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
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<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanTSyn</td><td colspan="2">CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster/CanTSynGlobalTimeMasterPdu</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanTSynGlobalTimeMasterConfirmationHandleId</td><td>EcucIntegerParamDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This represents the handle ID of the PDU that contains the global time information.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3"></td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2"></td><td>local</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td></td></tr>
</table>

<table>
<tr><th>BSW Module</th><th colspan="2">BSW Context</th></tr>
<tr><td>CanTSyn</td><td colspan="2">CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster/CanTSynGlobalTimeMasterPdu</td></tr>
<tr><th colspan="2">BSW Parameter</th><th>BSW Type</th></tr>
<tr><td colspan="2">CanTSynGlobalTimePduRef</td><td>EcucReferenceDef</td></tr>
<tr><th colspan="3">BSW Description</th></tr>
<tr><td colspan="3">This represents the reference to the Pdu taken to transmit the global time information. The global time master of a global time domain acts as the sender of the Pdu while all the time slaves are supposed to receive the Pdu.</td></tr>
<tr><th colspan="3">Template Description</th></tr>
<tr><td colspan="3">This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves.</td></tr>
<tr><th colspan="3">M2 Parameter</th></tr>
<tr><td colspan="3">SystemTemplate::GlobalTime::GlobalTimeDomain.globalTimePduTriggering</td></tr>
<tr><th colspan="2">Mapping Rule</th><th>Mapping Type</th></tr>
<tr><td colspan="2">1:1 mapping</td><td>full</td></tr>
<tr><th colspan="2">Mapping Status</th><th>Mapping ID</th></tr>
<tr><td colspan="2">valid</td><td>up_CanTSyn_00005</td></tr>
</table>

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
CanTSynGlobalTimeTxCrcSecured		EcucEnumerationParamDef	
BSW Description			
This represents the configuration of whether or not CRC is supported.			
Template Description			
Definition of whether or not CRC is supported. This is only relevant for selected bus systems.			
M2 Parameter			
SystemTemplate::GlobalTime::CAN::GlobalTimeCanMaster.crcSecured			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00010

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster/CanTSynGlobalTimeTxCrcSecured		
BSW Parameter		**BSW Type**	
CRC_NOT_SUPPORTED		EcucEnumerationLiteralDef	
BSW Description			
This represents a configuration where CRC is not supported.			
Template Description			
This indicates that CRC is not supported			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcNotSupported			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_StbM_00007

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster/CanTSynGlobalTimeTxCrcSecured		
BSW Parameter		**BSW Type**	
CRC_SUPPORTED		EcucEnumerationLiteralDef	
BSW Description			
This represents a configuration where CRC is supported.			
Template Description			
This indicates that CRC is supported			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcSupported			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_StbM_00006

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**

CanTSynGlobalTimeTxPeriod		EcucFloatParamDef	
BSW Description			
This represents configuration of the TX period. Unit: seconds			
Template Description			
This represents the period. Unit: seconds			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeMaster.syncPeriod			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00008

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
CanTSynImmediateTimeSync		EcucBooleanParamDef	
BSW Description			
Enables/Disables the cyclic polling of StbM_GetTimeBaseUpdateCounter() within CanTSyn_MainFunction().			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
CanTSynMasterConfirmationTimeout		EcucFloatParamDef	
BSW Description			
This represents the confirmation timeout after transmission of a SYNC message resp. OFS message. Unit: seconds.			
Template Description			
This represents the value for the confirmation timeout. Unit: seconds.			
M2 Parameter			
SystemTemplate::GlobalTime::CAN::GlobalTimeCanMaster.syncConfirmationTimeout			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_CanTSyn_00007

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeOfnsDataIDList		EcucParamConfContainerDef
BSW Description		

The DataIDList for OFNS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
The DataIDList for OFNS messages to calculate CRC.	
M2 Parameter	
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.ofnsDataIDList	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00017

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfnsDataIDList
BSW Parameter	**BSW Type**
CanTSynGlobalTimeOfnsDataIDListElement	EcucParamConfContainerDef
BSW Description	
Element of the DataIDList for OFNS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
The DataIDList for OFNS messages to calculate CRC.	
M2 Parameter	
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.ofnsDataIDList	
Mapping Rule	**Mapping Type**
Value shall be derived from element of the ordered ofnsDataIDList.	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00021

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfnsDataIDList/ CanTSynGlobalTimeOfnsDataIDListElement
BSW Parameter	**BSW Type**
CanTSynGlobalTimeOfnsDataIDListIndex	EcucIntegerParamDef
BSW Description	
Index of the DataIDList for OFNS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfnsDataIDList/ CanTSynGlobalTimeOfnsDataIDListElement
BSW Parameter	**BSW Type**
CanTSynGlobalTimeOfnsDataIDListValue	EcucIntegerParamDef
BSW Description	

Value of the DataIDList for OFNS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeOfsDataIDList		EcucParamConfContainerDef
BSW Description		
The DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for OFS messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.ofsDataIDList		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00016

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfsDataIDList	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeOfsDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for OFS messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.ofsDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered ofsDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00020

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfsDataIDList/ CanTSynGlobalTimeOfsDataIDListElement	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeOfsDataIDListIndex		EcucIntegerParamDef
BSW Description		
Index of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeOfsDataIDList/ CanTSynGlobalTimeOfsDataIDListElement
BSW Parameter	**BSW Type**
CanTSynGlobalTimeOfsDataIDListValue	EcucIntegerParamDef
BSW Description	
Value of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain
BSW Parameter	**BSW Type**
CanTSynGlobalTimeSlave	EcucParamConfContainerDef
BSW Description	
Configuration of a global time slave. Each global time domain is required to have at least one time slave. The configured ECU may or may not represent a time slave.	
Template Description	
This represents the generic concept of a global time slave.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeSlave	
Mapping Rule	**Mapping Type**
The existence of the CanTSynGlobalTimeSlave is bound to the existence of a GlobalTimeSlave that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists,	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00003

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave
BSW Parameter	**BSW Type**
CanTSynGlobalTimeFollowUpTimeout	EcucFloatParamDef
BSW Description	
Rx timeout for the follow-up message. This is only relevant for selected bus systems Unit:seconds	

Template Description	
Rx timeout for the follow-up message.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeSlave.followUpTimeoutValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00002

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeSequenceCounterJumpWidth		EcucIntegerParamDef
BSW Description		
The SequenceCounterJumpWidth specifies the maximum allowed gap of the Sequence Counter between two SYNC resp. two OFS messages.		
Template Description		
Specifies the maximum allowed gap of the sequence counter between two SYNC resp. two OFS messages.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::GlobalTimeCanSlave.sequenceCounterJumpWidth		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00012

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeSlavePdu		EcucParamConfContainerDef
BSW Description		
This container encloses the configuration of the PDU that is supposed to contain the global time information.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSyn GlobalTimeSlavePdu	
BSW Parameter		**BSW Type**
CanTSynGlobalTimePduRef		EcucReferenceDef
BSW Description		
This represents the reference to the Pdu taken to transmit the global time information. The global time master of a global time domain acts as the sender of the Pdu while all the time slaves are supposed to receive the Pdu.		

Template Description	
This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeDomain.globalTimePduTriggering	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00005

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSynGlobalTimeSlavePdu
BSW Parameter	**BSW Type**
CanTSynGlobalTimeSlaveHandleId	EcucIntegerParamDef
BSW Description	
This represents the handle ID of the PDU that contains the global time information.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave
BSW Parameter	**BSW Type**
CanTSynRxCrcValidated	EcucEnumerationParamDef
BSW Description	
Definition of whether or not validation of the CRC is supported.	
Template Description	
Definition of whether or not validation of the CRC is supported.	
M2 Parameter	
SystemTemplate::GlobalTime::CAN::GlobalTimeCanSlave.crcValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_CanTSyn_00004

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_IGNORED	EcucEnumerationLiteralDef
BSW Description	
The Timesync module accepts Time Synchronization messages, which are CRC secured (without actually validating the CRC) and those, which are not CRC secured. That means, the Timesync module ignores the CRC.	

Template Description	
The CRC is supposed to be ignored	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcIgnored	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSynRxCrcValidated	
BSW Parameter		**BSW Type**
CRC_NOT_VALIDATED		EcucEnumerationLiteralDef
BSW Description		
The Timesync module accepts only Time Synchronization messages, which are not CRC secured. All other Time Synchronization messages are ignored.		
Template Description		
The CRC is supposed to be present but not supposed to be validated.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcNotValidated		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSynRxCrcValidated	
BSW Parameter		**BSW Type**
CRC_OPTIONAL		EcucEnumerationLiteralDef
BSW Description		
The Timesync module accepts only Time Synchronization messages which are not CRC secured and Time Synchronization messages which are CRC secured and have the correct CRC. All other Time Synchronization messages are ignored.		
Template Description		
Either the CRC is present and then shall be validated or the CRC is not present and no CRC check is done.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcOptional		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSlave/CanTSynRxCrcValidated	
BSW Parameter		**BSW Type**
CRC_VALIDATED		EcucEnumerationLiteralDef

BSW Description	
The Timesync module accepts only Time Synchronization messages, which are CRC secured and have the correct CRC. All other Time Synchronization messages are ignored.	
Template Description	
This CRC is supposed to be validated.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeSyncDataIDList		EcucParamConfContainerDef
BSW Description		
The DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for SYNC messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.syncDataIDList		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00014

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSyncDataIDList	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeSyncDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for SYNC messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::CAN::CanGlobalTimeDomainProps.syncDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered syncDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_CanTSyn_00018

BSW Module	**BSW Context**	
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSyncDataIDList/ CanTSynGlobalTimeSyncDataIDListElement	
BSW Parameter		**BSW Type**
CanTSynGlobalTimeSyncDataIDListIndex		EcucIntegerParamDef
BSW Description		

Index for the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain/CanTSynGlobalTimeSyncDataIDList/ CanTSynGlobalTimeSyncDataIDListElement
BSW Parameter	**BSW Type**
CanTSynGlobalTimeSyncDataIDListValue	EcucIntegerParamDef
BSW Description	
Value of the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain
BSW Parameter	**BSW Type**
CanTSynSynchronizedTimeBaseRef	EcucSymbolicNameReferenceDef
BSW Description	
Mandatory reference to the required synchronized time-base.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
CanTSyn	CanTSyn/CanTSynGlobalTimeDomain
BSW Parameter	**BSW Type**
CanTSynUseExtendedMsgFormat	EcucBooleanParamDef
BSW Description	
Switches support for 16 Byte Timesync messages on or off (for CAN FD only) * true: use 16 byte Timesync message formats (for CAN FD only). * false: use 8 byte Timesync message formats.	

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

C.8.3 Ethernet Time Management

BSW Module	**BSW Context**	
EthTSyn	EthTSyn	
BSW Parameter		**BSW Type**
EthTSynGeneral		EcucParamConfContainerDef
BSW Description		
This container holds the general parameters of the Ethernet-specific Synchronized Time-base Manager		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**
EthTSynDestPhyAddr		EcucStringParamDef
BSW Description		
Destination Physical Address (MAC-Address). Destination Physical Hardware Address (MAC-Address) of EthTSyn-gPTP Frames. Input format has to match xx:xx:xx:xx:xx:xx, where x stands for a hex value between 0 and F.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**
EthTSynDevErrorDetect		EcucBooleanParamDef
BSW Description		

Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**
EthTSynEthIfFrameType		EcucReferenceDef
BSW Description		
The chosen frame owner determines which frames (in respect to ethertype) are received.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeRxToUplinkSwitchResidenceTime		EcucFloatParamDef
BSW Description		
This parameter is specifying the default value used for the residence time of the Ethernet Switch [Ingress to Uplink]. This value is used by the EthTSyn if the calculation of the residence time failed. Unit: seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**

EthTSynGlobalTimeUplinkToTxSwitchResidenceTime	EcucFloatParamDef
BSW Description	
This parameter is specifying the default value used for the residence time of the Ethernet Switch [Uplink to Egress]. This value is used by the EthTSyn if the calculation of the residence time failed. Unit: seconds	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGeneral
BSW Parameter	**BSW Type**
EthTSynHardwareTimestampSupport	EcucBooleanParamDef
BSW Description	
Activate/Deactivate the hardware time stamping functionality of the Ethernet hardware. True: Timestamp is retrieved from the Ethernet hardware False: Timestamp is retrieved from the StbM	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGeneral
BSW Parameter	**BSW Type**
EthTSynMainFunctionPeriod	EcucFloatParamDef
BSW Description	
Schedule period of the main function EthTSyn_MainFunction. Unit: seconds.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context		
EthTSyn	EthTSyn/EthTSynGeneral		
BSW Parameter		**BSW Type**	
EthTSynMasterSlaveConflictDetection		EcucBooleanParamDef	
BSW Description			
Enables master / slave conflict detection and notification. * true: detection and notification is enabled. * false: detection and notification is disabled.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	BSW Context		
EthTSyn	EthTSyn/EthTSynGeneral		
BSW Parameter		**BSW Type**	
EthTSynMessageCompliance		EcucBooleanParamDef	
BSW Description			
* true: IEEE 802.1AS compliant message format will be used. * false: IEEE 802.1AS message format with AUTOSAR extension will be used.			
Template Description			
Defines the compliance of the Ethernet time sync messages to specific standards.			
M2 Parameter			
SystemTemplate::GlobalTime::ETH::EthGlobalTimeDomainProps.messageCompliance			
Mapping Rule			**Mapping Type**
If EthGlobalTimeDomainProps.messageFormat = IEEE802_1AS then EthTSyn MessageCompliance shall be true. If EthGlobalTimeDomainProps.messageFormat = IEEE802_1AS_AUTOSAR then EthTSynMessageCompliance shall be false.			full
Mapping Status			**Mapping ID**
valid			up_EthTSyn_00019

BSW Module	BSW Context		
EthTSyn	EthTSyn/EthTSynGeneral		
BSW Parameter		**BSW Type**	
EthTSynSwitchMgmtRxMessageBufferCount		EcucIntegerParamDef	
BSW Description			
This parameter is used to determine the amount of Rx message buffers available in the EthTSyn when EthTSyn is used in a Bridge configuration.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGeneral	
BSW Parameter		**BSW Type**
EthTSynVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activate/Deactivate the version information API (EthTSyn_GetVersionInfo). True: version information API activated False: version information API deactivated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeDomain		EcucParamConfContainerDef
BSW Description		
This represents the existence of a global time domain on Ethernet. The EthTSyn module can administrate several global time domains at the same time that in itself form a hierarchy of domains and sub-domains. If the EthTSyn exists it is assumed that at least one global time domain exists.		
Template Description		
This represents the ability to define a global time domain.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain		
Mapping Rule		**Mapping Type**
The container shall exist if a GlobalTimeDomain exists that has a slave or master that refers to a CommunicationConnector that in turn is aggregated by the EcuInstance for which the ECU configuration is created. The container shall also exist if GlobalTimeDomain exists that has a gateway that refers to the EcuInstance for which the ECU configuration is created.		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00001

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeDomainId		EcucIntegerParamDef
BSW Description		
The global time domain ID.		
Template Description		

This represents the ID of the GlobalTimeDomain used in the network messages sent on behalf of global time management.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeDomain.domainId	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00013

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeFollowUpDataIDList		EcucParamConfContainerDef
BSW Description		
The DataIDList for Follow_Up message ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for FUP messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::ETH::EthGlobalTimeDomainProps.fupDataIDList		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00030

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynGlobalTimeFollowUpDataIDList	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeFollowUpDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for Follow_Up message ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for FUP messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::ETH::EthGlobalTimeDomainProps.fupDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered fupDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00031

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynGlobalTimeFollowUpDataIDList/ EthTSynGlobalTimeFollowUpDataIDListElement	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeFollowUpDataIDListIndex		EcucIntegerParamDef
BSW Description		
Index of the DataIDList for Follow_Up message ensures the identification of data elements due to CRC calculation process.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynGlobalTimeFollowUpDataIDList/ EthTSynGlobalTimeFollowUpDataIDListElement	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeFollowUpDataIDListValue		EcucIntegerParamDef
BSW Description		
Value of the DataIDList for Follow_Up message ensures the identification of data elements due to CRC calculation process.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
EthTSynPortConfig		EcucParamConfContainerDef
BSW Description		
Configuration of the EthTSyn-Ports within the TimeDomain.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig	
BSW Parameter		**BSW Type**
EthTSynFramePrio		EcucIntegerParamDef
BSW Description		
This optional parameter, if present, indicates the priority of outgoing EthTSyn messages, if sent via VLAN (used for the 3-bit PCP field of the VLAN tag). If this optional parameter is not present, frames are sent without a priority and VLAN field.		
Template Description		
Defines which VLAN priority shall be assigned to a time sync message in case the message is sent using a VLAN tag.		

M2 Parameter	
SystemTemplate::GlobalTime::ETH::EthGlobalTimeDomainProps.vlanPriority	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00012

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeDebounceTime		EcucFloatParamDef
BSW Description		
This represents the configuration of a TX debounce time for Sync and Follow_Up messages compared to a message before with the same PDU. Unit: seconds		
Template Description		
Defines the minimum amount of time between two time sync messages are transmitted.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain.debounceTime		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00027

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeEthIfRef		EcucSymbolicNameReferenceDef
BSW Description		
This represents the reference to the Ethernet interface taken to fetch the global time information.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig	
BSW Parameter		**BSW Type**
EthTSynPdelayConfig		EcucParamConfContainerDef
BSW Description		
Configuration of cyclic propagation delay measurement.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**

Mapping Status	Mapping ID
valid	

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPdelay Config	
BSW Parameter		**BSW Type**
EthTSynGlobalTimePdelayRespEnable		EcucBooleanParamDef
BSW Description		
This parameter allows disabling Pdelay_Resp / Pdelay_Resp_Follow_Up transmission, if no Pdelay_Req messages are expected. FALSE: No Pdelay requests expected. Pdelay_Resp / Pdelay_Resp_Follow_Up transmission is disabled. TRUE: Pdelay requests expected. Pdelay_Resp / Pdelay_Resp_Follow_Up transmission is enabled.		
Template Description		
Defines whether PDELAY RESPONSE and PDELAY RESPONSE FOLLOW UP shall be sent on this CouplingPort.		
M2 Parameter		
SystemTemplate::GlobalTime::ETH::EthGlobalTimeManagedCouplingPort.pdelayResponseEnabled		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00022

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPdelay Config	
BSW Parameter		**BSW Type**
EthTSynGlobalTimePropagationDelay		EcucFloatParamDef
BSW Description		
If cyclic propagation delay measurement is enabled, this parameter represents the default value of the propagation delay until the first actually measured propagation delay is available. If cyclic propagation delay measurement is disabled, this parameter replaces a measured propagation delay by a fixed value. Unit: seconds		
Template Description		
If cyclic propagation delay measurement is enabled, this parameter represents the default value of the propagation delay until the first actually measured propagation delay is available. If cyclic propagation delay measurement is disabled, this parameter defines a fixed value for the propagation delay.		
M2 Parameter		
SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology::GlobalTimeCouplingPort Props.propagationDelay		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**

valid	up_EthTSyn_00023

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPdelayConfig	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeTxPdelayReqPeriod		EcucFloatParamDef
BSW Description		
This represents configuration of the TX period for Pdelay_Req messages. A value of 0 disables the cyclic Pdelay measurement. Unit: seconds		
Template Description		
Defines the period for the pdelay request messages.		
M2 Parameter		
SystemTemplate::GlobalTime::ETH::EthGlobalTimeManagedCouplingPort.pdelayRequestPeriod		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00024

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPdelayConfig	
BSW Parameter		**BSW Type**
EthTSynPdelayLatencyThreshold		EcucFloatParamDef
BSW Description		
Threshold for calculated Pdelay. If a measured Pdelay exceeds EthTSynPdelayLatencyThreshold, this value is discarded. Unit: seconds		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPdelayConfig	
BSW Parameter		**BSW Type**
EthTSynPdelayRespAndRespFollowUpTimeout		EcucFloatParamDef
BSW Description		

Timeout value for Pdelay_Resp and Pdelay_Resp_Follow_Up after a Pdelay_Req has been transmitted resp. a Pdelay_Resp has been received. A value of 0 deactivates this timeout observation. Unit: seconds
Template Description
M2 Parameter

Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig	
BSW Parameter		**BSW Type**
EthTSynPortRole		EcucChoiceContainerDef
BSW Description		
Specifying the Role of the EthTSyn-Port (Master or Slave).		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeMaster		EcucParamConfContainerDef
BSW Description		
Configuration of the global time master. Each global time domain is required to have exactly one global time master. This master may or may not exist on the configured ECU.		
Template Description		
This represents the generic concept of a global time master.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeMaster		
Mapping Rule		**Mapping Type**
The existence of a EthTSynGlobalTimeMaster is bound to the existence of a GlobalTimeMaster that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists.		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00004

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster

BSW Parameter		BSW Type
EthTSynCrcTimeFlagsTxSecured		EcucParamConfContainerDef
BSW Description		
This container collects definitions which parts of the Follow_Up message elements shall be used for CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured	
BSW Parameter		**BSW Type**
EthTSynCrcCorrectionField		EcucBooleanParamDef
BSW Description		
correctionField from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured	
BSW Parameter		**BSW Type**
EthTSynCrcDomainNumber		EcucBooleanParamDef
BSW Description		
domainNumber from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured	
BSW Parameter		**BSW Type**

EthTSynCrcMessageLength	EcucBooleanParamDef	
BSW Description		
messageLength from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**		
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured		
BSW Parameter		**BSW Type**	
EthTSynCrcPreciseOriginTimestamp		EcucBooleanParamDef	
BSW Description			
preciseOriginTimestamp from the Follow_Up Message Field shall be included in CRC calculation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured		
BSW Parameter		**BSW Type**	
EthTSynCrcSequenceId		EcucBooleanParamDef	
BSW Description			
sequenceId from the Follow_Up Message Header shall be included in CRC calculation.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster/EthTSynCrcTimeFlagsTxSecured	
BSW Parameter		**BSW Type**
EthTSynCrcSourcePortIdentity		EcucBooleanParamDef
BSW Description		

sourcePortIdentity from the Follow_Up Message Header shall be included in CRC calculation.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster
BSW Parameter	**BSW Type**
EthTSynCyclicMsgResumeTime	EcucFloatParamDef
BSW Description	
Defines the time where the 1st regular cycle time based message transmission takes place, after an immediate transmission before. Unit: seconds	
Template Description	
Defines the minimum time between an "immediate" message and the next periodic message.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeMaster.immediateResumeTime	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00029

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster
BSW Parameter	**BSW Type**
EthTSynGlobalTimeTxCrcSecured	EcucEnumerationParamDef
BSW Description	
This represents the configuration of whether or not CRC is supported.	
Template Description	
Definition of whether or not CRC is supported. This is only relevant for selected bus systems.	
M2 Parameter	
SystemTemplate::GlobalTime::ETH::GlobalTimeEthMaster.crcSecured	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00026

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeMaster/EthTSynGlobalTimeTxCrcSecured
BSW Parameter	**BSW Type**
CRC_NOT_SUPPORTED	EcucEnumerationLiteralDef
BSW Description	
This represents a configuration where CRC is not supported.	

Template Description	
This indicates that CRC is not supported	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcNotSupported	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_StbM_00007

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster/EthTSynGlobalTimeTxCrcSecured
BSW Parameter	**BSW Type**
CRC_SUPPORTED	EcucEnumerationLiteralDef
BSW Description	
This represents a configuration where CRC is supported.	
Template Description	
This indicates that CRC is supported	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcSupported	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_StbM_00006

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster
BSW Parameter	**BSW Type**
EthTSynGlobalTimeTxPeriod	EcucFloatParamDef
BSW Description	
This represents configuration of the TX period. Unit: seconds	
Template Description	
This represents the period. Unit: seconds	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeMaster.syncPeriod	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00007

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster
BSW Parameter	**BSW Type**
EthTSynImmediateTimeSync	EcucBooleanParamDef
BSW Description	
Enables/Disables the cyclic polling of StbM_GetTimeBaseUpdateCounter() within EthTSyn_MainFunction().	
Template Description	

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
EthTSynIsSystemWideGlobalTimeMaster		EcucBooleanParamDef
BSW Description		
This represents the configuration whether or not the global time master represents the root of a tree of global time domains. It is possible that several global time masters exist that have set this parameter set to true because the global time masters exist once per global time domain and one ECU may start several global time domains on different busses it is connected to.		
Template Description		
If set to TRUE, the GlobalTimeMaster is supposed to act as the root of global time information.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeMaster.isSystemWideGlobalTimeMaster		
Mapping Rule		**Mapping Type**
		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00028

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
EthTSynTLVFollowUpOFSSubTLV		EcucBooleanParamDef
BSW Description		
This represents the configuration of whether an AUTOSAR Follow_Up TLV OFS Sub-TLV is used or not. * true: This represents a configuration where an AUTOSAR Follow_Up TLV OFS Sub-TLV is used. * false: This represents a configuration where an AUTOSAR Follow_Up TLV OFS Sub-TLV is not used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**

EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
EthTSynTLVFollowUpStatusSubTLV		EcucBooleanParamDef
BSW Description		
This represents the configuration of whether an AUTOSAR Follow_Up TLV Status Sub-TLV is used or not. * true: This represents a configuration where an AUTOSAR Follow_Up TLV Status Sub-TLV is used. * false: This represents a configuration where an AUTOSAR Follow_Up TLV Status Sub-TLV is not used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
EthTSynTLVFollowUpTimeSubTLV		EcucBooleanParamDef
BSW Description		
This represents the configuration of whether an AUTOSAR Follow_Up TLV Time Sub-TLV is used or not. * true: This represents a configuration where an AUTOSAR Follow_Up TLV Time Sub-TLV is used. * false: This represents a configuration where an AUTOSAR Follow_Up TLV Time Sub-TLV is not used.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
EthTSynTLVFollowUpUserDataSubTLV		EcucBooleanParamDef
BSW Description		
This represents the configuration of whether an AUTOSAR Follow_Up TLV UserData Sub-TLV is used or not. * true: This represents a configuration where an AUTOSAR Follow_Up TLV UserData Sub-TLV is used. * false: This represents a configuration where an AUTOSAR Follow_Up TLV UserData Sub-TLV is not used.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeSlave		EcucParamConfContainerDef
BSW Description		
Configuration of a time slave. Each global time domain is required to have at least one time slave. The configured ECU may or may not represent a time slave.		
Template Description		
This represents the generic concept of a global time slave.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeSlave		
Mapping Rule		**Mapping Type**
The existence of the EthTSynGlobalTimeSlave is bound to the existence of a GlobalTimeSlave that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists,		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00005

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
EthTSynCrcFlagsRxValidated		EcucParamConfContainerDef
BSW Description		
This container collects definitions which parts of the Follow_Up message elements shall be included in CRC validation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/ EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcCorrectionField		EcucBooleanParamDef
BSW Description		
correctionField from the Follow_Up Message Header shall be included in CRC calculation.		

Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcDomainNumber		EcucBooleanParamDef
BSW Description		
domainNumber from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcMessageLength		EcucBooleanParamDef
BSW Description		
messageLength from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcPreciseOriginTimestamp		EcucBooleanParamDef
BSW Description		
preciseOriginTimestamp from the Follow_Up Message Field shall be included in CRC calculation.		
Template Description		

M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcSequenceId		EcucBooleanParamDef
BSW Description		
sequenceId from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynCrcFlagsRxValidated	
BSW Parameter		**BSW Type**
EthTSynCrcSourcePortIdentity		EcucBooleanParamDef
BSW Description		
sourcePortIdentity from the Follow_Up Message Header shall be included in CRC calculation.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
EthTSynGlobalTimeFollowUpTimeout		EcucFloatParamDef
BSW Description		
Timeout value of the Follow_Up message (of the subsequent Sync message). A value of 0 deactivates this timeout observation. Unit: seconds		

Template Description	
Rx timeout for the follow-up message.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeSlave.followUpTimeoutValue	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00003

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
EthTSynRxCrcValidated		EcucEnumerationParamDef
BSW Description		
Definition of whether or not validation of the CRC takes place.		
Template Description		
Definition of whether or not validation of the CRC is supported.		
M2 Parameter		
SystemTemplate::GlobalTime::ETH::GlobalTimeEthSlave.crcValidated		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00018

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynRxCrcValidated	
BSW Parameter		**BSW Type**
CRC_IGNORED		EcucEnumerationLiteralDef
BSW Description		
EthTSyn ignores any CRC inside the Sub-TLVs.		
Template Description		
The CRC is supposed to be ignored		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcIgnored		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_EthTSyn_00014

BSW Module	**BSW Context**	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynRxCrcValidated	
BSW Parameter		**BSW Type**
CRC_NOT_VALIDATED		EcucEnumerationLiteralDef
BSW Description		
If EthTSynMessageCompliance is set to FALSE: EthTSyn discards Follow_Up messages with Sub-TLVs of Type 0x28, 0x44, 0x50 or 0x60.		
Template Description		

The CRC is supposed to be present but not supposed to be validated.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcNotValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00015

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_OPTIONAL	EcucEnumerationLiteralDef
BSW Description	
If EthTSynMessageCompliance is set to FALSE: EthTSyn discards Follow_Up messages with Sub-TLVs of Type 0x28, 0x44, 0x50 or 0x60, that contain an incorrect CRC value.	
Template Description	
Either the CRC is present and then shall be validated or the CRC is not present and no CRC check is done.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcOptional	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00017

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig/EthTSynPortRole/EthTSynGlobalTimeSlave/EthTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_VALIDATED	EcucEnumerationLiteralDef
BSW Description	
If EthTSynMessageCompliance is set to FALSE: EthTSyn discards Follow_Up messages with Sub-TLVs of Type 0x28, 0x44, 0x50 or 0x60, that contain an incorrect CRC value. EthTSyn rejects Follow_Up messages with Sub-TLVs of Type 0x34, 0x51 or 0x61.	
Template Description	
This CRC is supposed to be validated.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00016

BSW Module	**BSW Context**
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain/EthTSynPortConfig
BSW Parameter	**BSW Type**
EthTSynSwitchManagementEthSwitchPortRef	EcucSymbolicNameReferenceDef
BSW Description	
In an AVB-Bridge config, this reference is used to assign the EthTSyn-Port to an Ethernet Switch-Port.	

Template Description	
Defines which CouplingPort is managed by this EthGlobalTimeManagedCouplingPort.	
M2 Parameter	
SystemTemplate::GlobalTime::ETH::EthGlobalTimeManagedCouplingPort.couplingPort	
Mapping Rule	**Mapping Type**
If the referenced CouplingPort is aggregated by a CouplingElement with couplingType = switch then the reference EthTSynSwitchManagementEthSwitchPortRef shall be defined and refer to the EthSwtPort which was derived from the CouplingPort.	full
Mapping Status	**Mapping ID**
valid	up_EthTSyn_00025

BSW Module	BSW Context	
EthTSyn	EthTSyn/EthTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
EthTSynSynchronizedTimeBaseRef		EcucSymbolicNameReferenceDef
BSW Description		
Mandatory reference to the required synchronized time-base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.8.4 Flexray Time Management

BSW Module	BSW Context	
FrTSyn	FrTSyn	
BSW Parameter		**BSW Type**
FrTSynGeneral		EcucParamConfContainerDef
BSW Description		
This container holds the general parameters of the Flexray-specific Synchronized Time-base Manager		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context	
FrTSyn	FrTSyn/FrTSynGeneral	
BSW Parameter		**BSW Type**
FrTSynDevErrorDetect		EcucBooleanParamDef
BSW Description		

Switches the development error detection and notification on or off. * true: detection and notification is enabled. * false: detection and notification is disabled.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGeneral	
BSW Parameter		**BSW Type**
FrTSynMainFunctionPeriod		EcucFloatParamDef
BSW Description		
Schedule period of the main function FrTSyn_MainFunction. Unit: [s].		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGeneral	
BSW Parameter		**BSW Type**
FrTSynVersionInfoApi		EcucBooleanParamDef
BSW Description		
Activate/Deactivate the version information API (FrTSyn_GetVersionInfo). True: version information API activated False: version information API deactivated.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrTSyn	FrTSyn	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeDomain		EcucParamConfContainerDef
BSW Description		

This represents the existence of a global time domain on Flexray. The FrTSyn module can administrate several global time domains at the same time that in itself form a hierarchy of domains and sub-domains. If the FrTSyn exists it is assumed that at least one global time domain exists.	
Template Description	
This represents the ability to define a global time domain.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeDomain	
Mapping Rule	**Mapping Type**
The container shall exist if a GlobalTimeDomain exists that has a slave or master that refers to a CommunicationConnector that in turn is aggregated by the EcucInstance for which the ECU configuration is created. The container shall also exist if GlobalTimeDomain exists that has a gateway that refers to the EcuInstance for which the ECU configuration is created.	full
Mapping Status	**Mapping ID**
valid	up_FrTSyn_00001

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeDomainId		EcucIntegerParamDef
BSW Description		
The global time domain ID.		
Template Description		
This represents the ID of the GlobalTimeDomain used in the network messages sent on behalf of global time management.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain.domainId		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00009

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeMaster		EcucParamConfContainerDef
BSW Description		
Configuration of the global time master. Each global time domain is required to have exactly one global time master. This master may or may not exist on the configured ECU.		
Template Description		
This represents the generic concept of a global time master.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeMaster		
Mapping Rule		**Mapping Type**
The existence of the FrTSynGlobalTimeMaster is bound to the existence of a GlobalTimeMaster that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists,		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00002

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
FrTSynCyclicMsgResumeTime		EcucFloatParamDef	
BSW Description			
Defines the time where the 1st regular cycle time based message transmission takes place, after an immediate transmission before. Unit: seconds			
Template Description			
Defines the minimum time between an "immediate" message and the next periodic message.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeMaster.immediateResumeTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTSyn_00016

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimeDebounceTime		EcucFloatParamDef	
BSW Description			
This represents the configuration of a TX debounce time for SYNC and OFS messages compared to a message before with the same PDU. Unit: seconds			
Template Description			
Defines the minimum amount of time between two time sync messages are transmitted.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeDomain.debounceTime			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTSyn_00015

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimeMasterPdu		EcucParamConfContainerDef	
BSW Description			
This container carries all properties required to configure the PDU sent by the global time master for the given global time domain.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**

FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster/FrTSynGlobalTimeMasterPdu		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimeMasterHandleId		EcucIntegerParamDef	
BSW Description			
This represents the handle ID of the PDU that contains the global time information.			
Template Description			
M2 Parameter			
Mapping Rule			**Mapping Type**
			local
Mapping Status			**Mapping ID**
valid			

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster/FrTSynGlobalTimeMasterPdu		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimePduRef		EcucReferenceDef	
BSW Description			
This represents the reference to the Pdu taken to transmit the global time information. The global time master of a global time domain acts as the sender of the Pdu while all the time slaves are supposed to receive the Pdu.			
Template Description			
This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves.			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeDomain.globalTimePduTriggering			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTSyn_00006

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimeTxCrcSecured		EcucEnumerationParamDef	
BSW Description			
This represents the configuration of whether or not CRC is supported.			
Template Description			
Definition of whether or not CRC is supported. This is only relevant for selected bus systems.			
M2 Parameter			
SystemTemplate::GlobalTime::FR::GlobalTimeFrMaster.crcSecured			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTSyn_00003

BSW Module	**BSW Context**

FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster/FrTSynGlobalTimeTxCrcSecured		
BSW Parameter		**BSW Type**	
CRC_NOT_SUPPORTED		EcucEnumerationLiteralDef	
BSW Description			
This represents a configuration where CRC is not supported.			
Template Description			
This indicates that CRC is not supported			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcNotSupported			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_StbM_00007

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster/FrTSynGlobalTimeTxCrcSecured		
BSW Parameter		**BSW Type**	
CRC_SUPPORTED		EcucEnumerationLiteralDef	
BSW Description			
This represents a configuration where CRC is supported.			
Template Description			
This indicates that CRC is supported			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeCrcSupportEnum.crcSupported			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_StbM_00006

BSW Module	**BSW Context**		
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster		
BSW Parameter		**BSW Type**	
FrTSynGlobalTimeTxPeriod		EcucFloatParamDef	
BSW Description			
This represents the TX period. Unit: seconds			
Template Description			
This represents the period. Unit: seconds			
M2 Parameter			
SystemTemplate::GlobalTime::GlobalTimeMaster.syncPeriod			
Mapping Rule			**Mapping Type**
1:1 mapping			full
Mapping Status			**Mapping ID**
valid			up_FrTSyn_00005

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeMaster	
BSW Parameter		**BSW Type**
FrTSynImmediateTimeSync		EcucBooleanParamDef

BSW Description	
Enables/Disables the cyclic polling of StbM_GetTimeBaseUpdateCounter() within FrTSyn_MainFunction().	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeOfsDataIDList		EcucParamConfContainerDef
BSW Description		
The DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for OFS messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::FR::FrGlobalTimeDomainProps.ofsDataIDList		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00011

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeOfsDataIDList	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeOfsDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for OFS messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::FR::FrGlobalTimeDomainProps.ofsDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered ofsDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00012

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeOfsDataIDList/FrTSynGlobalTimeOfsDataIDListElement	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeOfsDataIDListIndex		EcucIntegerParamDef
BSW Description		

Index of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeOfsDataIDList/FrTSynGlobalTimeOfsDataIDListElement	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeOfsDataIDListValue		EcucIntegerParamDef
BSW Description		
Value of the DataIDList for OFS messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeSlave		EcucParamConfContainerDef
BSW Description		
This represents the time slave for the enclosing global time domain.		
Template Description		
This represents the generic concept of a global time slave.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeSlave		
Mapping Rule		**Mapping Type**
The existence of the FrTSynGlobalTimeSlave is bound to the existence of a GlobalTimeSlave that refers to a CommunicationConnector that in turn in aggregated at the EcuInstance for which the ECU configuration exists,		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00007

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeSequenceCounterJumpWidth		EcucIntegerParamDef
BSW Description		

The SequenceCounterJumpWidth specifies the maximum allowed gap of the Sequence Counter between two SYNC resp. two OFS messages.	
Template Description	
Specifies the maximum allowed gap of the sequence counter between two SYNC resp. two OFS messages.	
M2 Parameter	
SystemTemplate::GlobalTime::FR::GlobalTimeFrSlave.sequenceCounterJumpWidth	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrTSyn_00010

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeSlavePdu		EcucParamConfContainerDef
BSW Description		
This container carries all properties required to configure the PDU received by the time slave for the given global time domain.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynGlobalTimeSlavePdu	
BSW Parameter		**BSW Type**
FrTSynGlobalTimePduRef		EcucReferenceDef
BSW Description		
This represents the reference to the Pdu taken to transmit the global time information. The global time master of a global time domain acts as the sender of the Pdu while all the time slaves are supposed to receive the Pdu.		
Template Description		
This PduTriggering will be taken to transmit the global time information from a GlobalTimeMaster to a the associated GlobalTimeSlaves.		
M2 Parameter		
SystemTemplate::GlobalTime::GlobalTimeDomain.globalTimePduTriggering		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00006

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynGlobalTimeSlavePdu	
BSW Parameter		**BSW Type**

FrTSynGlobalTimeSlaveHandleId	EcucIntegerParamDef
BSW Description	
This represents the handle ID of the PDU that contains the global time information.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave
BSW Parameter	**BSW Type**
FrTSynRxCrcValidated	EcucEnumerationParamDef
BSW Description	
This parameter controls whether or not CRC validation shall be supported.	
Template Description	
Definition of whether or not validation of the CRC is supported.	
M2 Parameter	
SystemTemplate::GlobalTime::FR::GlobalTimeFrSlave.crcValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	up_FrTSyn_00008

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_IGNORED	EcucEnumerationLiteralDef
BSW Description	
The Timesync module accepts Time Synchronization messages, which are CRC secured (without actually validating the CRC) and those, which are not CRC secured. That means, the Timesync module ignores the CRC.	
Template Description	
The CRC is supposed to be ignored	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcIgnored	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_NOT_VALIDATED	EcucEnumerationLiteralDef

BSW Description	
The Timesync module accepts only Time Synchronization messages, which are not CRC secured. All other Time Synchronization messages are ignored.	
Template Description	
The CRC is supposed to be present but not supposed to be validated.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcNotValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_OPTIONAL	EcucEnumerationLiteralDef
BSW Description	
The Timesync module accepts only Time Synchronization messages which are not CRC secured and Time Synchronization messages which are CRC secured and have the correct CRC. All other Time Synchronization messages are ignored.	
Template Description	
Either the CRC is present and then shall be validated or the CRC is not present and no CRC check is done.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcOptional	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSlave/FrTSynRxCrcValidated
BSW Parameter	**BSW Type**
CRC_VALIDATED	EcucEnumerationLiteralDef
BSW Description	
The Timesync module accepts only Time Synchronization messages, which are CRC secured and have the correct CRC. All other Time Synchronization messages are ignored.	
Template Description	
This CRC is supposed to be validated.	
M2 Parameter	
SystemTemplate::GlobalTime::GlobalTimeCrcValidationEnum.crcValidated	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain

BSW Parameter		BSW Type
FrTSynGlobalTimeSyncDataIDList		EcucParamConfContainerDef
BSW Description		
The DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for SYNC messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::FR::FrGlobalTimeDomainProps.syncDataIDList		
Mapping Rule		**Mapping Type**
1:1 mapping		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00013

BSW Module	BSW Context	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSyncDataIDList	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeSyncDataIDListElement		EcucParamConfContainerDef
BSW Description		
Element of the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
The DataIDList for SYNC messages to calculate CRC.		
M2 Parameter		
SystemTemplate::GlobalTime::FR::FrGlobalTimeDomainProps.syncDataIDList		
Mapping Rule		**Mapping Type**
Value shall be derived from element of the ordered syncDataIDList.		full
Mapping Status		**Mapping ID**
valid		up_FrTSyn_00014

BSW Module	BSW Context	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSyncDataIDList/FrTSynGlobalTimeSyncDataIDListElement	
BSW Parameter		**BSW Type**
FrTSynGlobalTimeSyncDataIDListIndex		EcucIntegerParamDef
BSW Description		
Index of the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

BSW Module	BSW Context
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain/FrTSynGlobalTimeSyncDataIDList/FrTSynGlobalTimeSyncDataIDListElement

BSW Parameter	**BSW Type**
FrTSynGlobalTimeSyncDataIDListValue	EcucIntegerParamDef
BSW Description	
Value of the DataIDList for SYNC messages ensures the identification of data elements due to CRC calculation process.	
Template Description	
M2 Parameter	
Mapping Rule	**Mapping Type**
	local
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**	
FrTSyn	FrTSyn/FrTSynGlobalTimeDomain	
BSW Parameter		**BSW Type**
FrTSynSynchronizedTimeBaseRef		EcucSymbolicNameReferenceDef
BSW Description		
Mandatory reference to the required synchronized time-base.		
Template Description		
M2 Parameter		
Mapping Rule		**Mapping Type**
		local
Mapping Status		**Mapping ID**
valid		

C.9 Services

C.9.1 Transformer General

BSW Module	**BSW Context**	
Xfrm	Xfrm/XfrmImplementationMapping/XfrmSignal/XfrmSignalChoice/XfrmISignal GroupRefChoice	
BSW Parameter		**BSW Type**
XfrmISignalGroupRef		EcucForeignReferenceDef
BSW Description		
Reference to the ISignalGroup in the system description that transports the transformed data.		
Template Description		
SignalGroup of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal Group is sent in different SignalIPdus to multiple receivers. An ISignalGroup refers to a set of ISignals that shall always be kept together. A ISignal-Group represents a COM Signal Group. Therefore it is recommended to put the ISignalGroup in the same Package as ISignals (see atp.recommendedPackage)		
M2 Parameter		

SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignalGroup	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Xfrm	Xfrm/XfrmImplementationMapping/XfrmSignal/XfrmSignalChoice/XfrmISignalRefChoice
BSW Parameter	**BSW Type**
XfrmISignalRef	EcucForeignReferenceDef
BSW Description	
Reference to the ISignal in the system description that transports the transformed data.	
Template Description	
Signal of the Interaction Layer. The RTE supports a "signal fan-out" where the same System Signal is sent in different SignalIPdus to multiple receivers. To support the RTE "signal fan-out" each SignalIPdu contains ISignals. If the same System Signal is to be mapped into several SignalIPdus there is one ISignal needed for each ISignalToIPduMapping. ISignals describe the Interface between the Precompile configured RTE and the potentially Postbuild configured Com Stack (see ECUC Parameter Mapping). In case of the SystemSignalGroup an ISignal must be created for each SystemSignal contained in the SystemSignalGroup.	
M2 Parameter	
SystemTemplate::Fibex::FibexCore::CoreCommunication::ISignal	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Xfrm	Xfrm/XfrmImplementationMapping
BSW Parameter	**BSW Type**
XfrmTransformationTechnologyRef	EcucForeignReferenceDef
BSW Description	
Reference to the TransformationTechnology in the DataTransformation of the system description for which the implementation (BswModuleEntry) shall be mapped.	
Template Description	
A TransformationTechnology is a transformer inside a transformer chain.	
M2 Parameter	
SystemTemplate::Transformer::TransformationTechnology	
Mapping Rule	**Mapping Type**
1:1 mapping	full
Mapping Status	**Mapping ID**
valid	

BSW Module	**BSW Context**
Xfrm	Xfrm/XfrmImplementationMapping

BSW Parameter	BSW Type
XfrmVariableDataPrototypeInstanceRef	EcucInstanceReferenceDef
BSW Description	
Instance Reference to a VariableDataPrototype in case a dedicated transformer BswModuleEntry is required per VariableDataPrototype access.	
Template Description	
This attribute defines whether the Transformer has an internal state or not.	
M2 Parameter	
SystemTemplate::Transformer::TransformationTechnology.hasInternalState	
Mapping Rule	**Mapping Type**
If an ISignal with dataTypePolicy set to transformingISignal - is received by this EcuInstance and - one of the TransformerTechnologys in the transformerChain has TransformationTechnology.hasInternalState set to true and - the corresponding VariableDataPrototype is consumed via multiple RPorts then this XfrmVariableDataPrototypeInstanceRef shall be used.	full
Mapping Status	**Mapping ID**
valid	up_Xfrm_00001

D Constraint History

D.1 Constraint History of this Document according to AUTOSAR R4.0.1

D.1.1 Changed Constraints in R4.0.1

N/A

D.1.2 Added Constraints in R4.0.1

Number	Heading
[constr_3000]	valid SenderRecCompositeTypeMappings
[constr_3001]	valid ClientServerToSignalGroupMappings
[constr_3002]	valid SwcToImplMapping
[constr_3003]	Number of CAN channels
[constr_3004]	Clustering and separation must be exclusive
[constr_3005]	valid EcuResourceEstimation
[constr_3006]	valid EcuMapping
[constr_3007]	SelectorFieldCodes for dynamic part alternatives
[constr_3008]	EcuInstance subelements
[constr_3009]	Overlapping of ISignals is prohibited
[constr_3010]	ISignalIPdu shall not be exceeded
[constr_3011]	Overlapping of updateIndicationBits for ISignals is prohibited
[constr_3012]	Overlapping of Pdus is prohibited
[constr_3013]	Frame length shall not be exceeded
[constr_3014]	Overlapping of updateIndicationBits for Pdus is prohibited
[constr_3015]	Number of LIN channels
[constr_3016]	Number of Ethernet channels
[constr_3017]	Length of multiplexed Pdu shall not be exceeded
[constr_3018]	Number of FlexRay channels

Table D.1: Added Constraints in R4.0.1

D.1.3 Deleted Constraints in R4.0.1

N/A

D.2 Constraint History of this Document according to AUTOSAR R4.0.2

D.2.1 Changed Constraints in R4.0.2

N/A

D.2.2 Added Constraints in R4.0.2

Number	Heading
[constr_3019]	In the flat ECU extract each required interface must be satisfied by connected provided interfaces

Table D.2: Added Constraints in R4.0.2

D.2.3 Deleted Constraints in R4.0.2

N/A

D.3 Constraint and Specification Item History of this document according to AUTOSAR R4.0.3

D.3.1 Changed Constraints in R4.0.3

N/A

D.3.2 Changed Specification Items in R4.0.3

N/A

D.3.3 Added Constraints in R4.0.3

Number	Heading
[constr_3020]	CommmunicationDirection of containedIPduGroups
[constr_3021]	Mapping of `SensorActuatorSwComponents` to SensorActuator `HwElements`
[constr_3024]	Usage of `triggeredWithoutRepetition` and `triggeredOnChangeWithoutRepetition` is not allowed for signal groups and group signals.
[constr_3025]	Usage of NPdus in TpConnections
[constr_3026]	valid `EmptySignalMappings`

Table D.3: Added Constraints in R4.0.3

D.3.4 Added Specification Items in R4.0.3

Number	Heading
[TPS_SYST_01000]	`FlatInstanceDescriptor` roles

Table D.4: Added Specification Items in 4.0.3

D.3.5 Deleted Constraints in R4.0.3

N/A

D.3.6 Deleted Specification Items in R4.0.3

N/A

D.4 Constraint and Specification Item History of this document according to AUTOSAR R4.1.1

D.4.1 Changed Constraints in R4.1.1

Number	Heading
[constr_3018]	Number of FlexRay channels

Table D.5: Changed Constraints in R4.1.1

D.4.2 Changed Specification Items in R4.1.1

N/A

D.4.3 Added Constraints in R4.1.1

Number	Heading
[constr_1198]	TriggerToSignalMapping.systemSignals eligible for a TriggerToSignalMapping
[constr_1199]	ISignals relating to systemSignals eligible for a TriggerToSignalMapping
[constr_1206]	DataMapping to PRPortPrototype
[constr_1207]	Existence of the attribute DataMapping.communicationDirection in the context of a SenderReceiverInterface or TriggerInterface
[constr_1208]	Existence of the attribute DataMapping.communicationDirection in the context of a ClientServerInterface
[constr_1265]	DoIpGidSynchronizationNeeds can only exist once per ECU_EXTRACT
[constr_1266]	DoIpGidNeeds can only exist once per ECU_EXTRACT
[constr_1267]	DoIpActivationLineNeeds can only exist once per ECU_EXTRACT
[constr_3027]	Existence of ecuExtractVersion
[constr_3028]	FibexElements
[constr_3029]	Assign-Frame command usage
[constr_3030]	valid relationship between ECUMapping and EcuInstance
[constr_3031]	Complete System Description does not have outside ports
[constr_3032]	Combinations of SwcToEcuMapping targets
[constr_3033]	Criteria for primitive argument mapping

[constr_3034]	Values of LinSlaveConfig and LinSlave attributes
[constr_3035]	CanNm user data configuration in case NID/CBV are enabled
[constr_3036]	Pdus in CAN and LIN Frames
[constr_3037]	maximum Frame frameLength for CAN and LIN
[constr_3038]	maximum Frame frameLength for FlexRay
[constr_3039]	pncIdentifier range
[constr_3040]	Restriction of pncIdentifier values
[constr_3041]	pncVectorOffset range
[constr_3042]	pncVectorLength range
[constr_3043]	pncVector configuration in AUTOSAR Com
[constr_3044]	CBV configuration in case partial network is used
[constr_3045]	Signal content evaluation vs. Mode evaluation
[constr_3046]	Consistency of TransmissionModeCondition.iSignalInIPdu
[constr_3047]	Uniqueness of macMulticastAddresses
[constr_3048]	Range of vlanIdentifier
[constr_3049]	Role of SystemSignal in inter-ECU client server communication with clients located on different ECUs
[constr_3050]	J1939Cluster uses exactly one CanPhysicalChannel
[constr_3051]	Restriction of ISignalMapping references
[constr_3052]	Complete ISignalMapping of ISignalGroup signals
[constr_3053]	Complete ISignalMapping of target ISignalGroup
[constr_3054]	SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System Description
[constr_3055]	SystemSignalGroup in a complete System Description
[constr_3056]	pduLength of the NmPdu
[constr_3057]	Maximal one BusspecificNmEcu per NmEcu and bus system is allowed to be defined
[constr_3058]	References from SenderRecArrayElementMapping and from SenderRecRecordElementMapping to SystemSignals are not allowed within a SenderReceiverCompositeElementToSignalMapping
[constr_3059]	Mandatory DataMapping on the receiver side for elements of a composite data type
[constr_3060]	Usage of networkRepresentationProps and physicalProps
[constr_3061]	CompuMethod specification in networkRepresentationProps
[constr_3062]	The EcuInstance that is referenced from a specific CouplingElement shall be connected to the same EthernetCluster as the specific CouplingElement
[constr_3063]	Usage of portNumber and dynamicallyAssigned with value “true” is mutually exclusive
[constr_3064]	Usage of serviceInstance, eventHandler and eventGroup references
[constr_3065]	Mapping of queued Triggers to SystemSignals is prohibited
[constr_3066]	Restriction of SenderComSpecs that refer to dataElements mapped to the same SystemSignal
[constr_3067]	initValue defined in the context of ISignal
[constr_3068]	DoIPPowerModeStatusNeeds in the category ECU_EXTRACT
[constr_3501]	Role of SystemSignal in 1:n communication
[constr_3502]	Role of SystemSignal in n:1 sender-receiver communication
[constr_3503]	SystemSignal that is not part of a SystemSignalGroup in a complete System Description
[constr_3505]	Criteria for primitive Data Mapping
[constr_3506]	Mapping of composite data type to SystemSignals in SystemSignalGroup
[constr_3508]	Value of nmReadySleepTime
[constr_3514]	No two ISignalToIPduMappings shall reference the identical ISignal

Table D.6: Added Constraints in R4.1.1

D.4.4 Added Specification Items in R4.1.1

Number	Heading
[TPS_SYST_01001]	Definition of SwcToEcuMapping
[TPS_SYST_01002]	System Category
[TPS_SYST_01003]	Standardized System Category Definitions
[TPS_SYST_01004]	Definition of AUTOSAR ECU
[TPS_SYST_01005]	Definition of EcuInstance
[TPS_SYST_01006]	Assign ECU type to EcuInstance
[TPS_SYST_01007]	Definition of CommunicationController
[TPS_SYST_01008]	Assign CommunicationController to the AUTOSAR Communication Peripheral
[TPS_SYST_01009]	Definition of CommunicationConnector
[TPS_SYST_01010]	Definition of CommunicationCluster
[TPS_SYST_01011]	Definition of PhysicalChannel
[TPS_SYST_01012]	Different Properties of LinMaster and LinSlave
[TPS_SYST_01013]	EcuInstance stands for its own
[TPS_SYST_01014]	Semantics of CommunicationControllerMapping
[TPS_SYST_01015]	Semantics of HwPortMapping
[TPS_SYST_01016]	System Extract, Ecu System Description and Ecu Extract may have ports
[TPS_SYST_01017]	The role of the top-level software composition
[TPS_SYST_01019]	Mapping of topology elements to elements of the ECU Resource Template
[TPS_SYST_01020]	Unconditional mapping of atomic Software Components
[TPS_SYST_01021]	Mapping of CompositionSwComponentType
[TPS_SYST_01022]	Prototype of a ParameterSwComponentType can be mapped to more than one ECU
[TPS_SYST_01023]	Prototype of an ServiceProxySwComponentType can be mapped to more than one ECU
[TPS_SYST_01024]	Component Clustering
[TPS_SYST_01025]	Clustering of Compositions
[TPS_SYST_01026]	Separation of Compositions
[TPS_SYST_01027]	Mapping of specific SW components to dedicated Ecus
[TPS_SYST_01028]	Task of the System Generator
[TPS_SYST_01029]	Mapping of specific SW components to exclusive Ecus
[TPS_SYST_01030]	Representation of VariableDataPrototypes and ClientServerOperations in System Description
[TPS_SYST_01032]	Independence of SystemSignals from CommunicationClusters
[TPS_SYST_01033]	DataMapping and SwConnector
[TPS_SYST_01034]	Data Mappings can be applied to compositions and atomic software components
[TPS_SYST_01035]	Transformation of Data Mappings during flattening
[TPS_SYST_01036]	No additional Data Mappings in composition substructure
[TPS_SYST_01037]	primitive Data Mapping of UINT8-Arrays
[TPS_SYST_01038]	Mapping of primitive arguments
[TPS_SYST_01039]	primitive Argument Mapping of UINT8-Arrays
[TPS_SYST_01040]	Mapping of composite arguments
[TPS_SYST_01041]	CommonSignalPath definition
[TPS_SYST_01042]	ForbiddenSignalPath definition
[TPS_SYST_01043]	PermissibleSignalPath definition
[TPS_SYST_01044]	SeparateSignalPath definition
[TPS_SYST_01045]	Component Seperation
[TPS_SYST_01046]	ShortNames of LinSlaveConfig and LinSlave
[TPS_SYST_01048]	Handling of large IPdus

[TPS_SYST_01049]	Handling of IPdus with dynamic signals
[TPS_SYST_01050]	SystemSignal in the System Extract and ECU Extract
[TPS_SYST_01051]	Handling of DcmIPdus
[TPS_SYST_01052]	Routing of UserDefinedPdus, NmPdus, NPdus
[TPS_SYST_01053]	Low-level routing of NPdus
[TPS_SYST_01054]	Routing of DcmIPdus
[TPS_SYST_01055]	Routing of ISignalIPdus that are part of a MultiplexedIPdu
[TPS_SYST_01056]	Routing of ISignalIPdus, UserDefinedIPdus, MultiplexedIPdus
[TPS_SYST_01057]	Routing of NmPdus
[TPS_SYST_01058]	Pdu Gateway where an Ecu only routes a PduTriggering without being interested in the content
[TPS_SYST_01059]	Relationship between FrameTriggering and CommConnectorPort
[TPS_SYST_01060]	Relationship between PduTriggering and CommConnectorPort
[TPS_SYST_01061]	Relationship between ISignalTriggering and CommConnectorPort
[TPS_SYST_01062]	Network representation of an ISignal
[TPS_SYST_01063]	Context of network representation of an ISignal
[TPS_SYST_01064]	Transmit/Receive Semantics of Pdu Pools
[TPS_SYST_01065]	Mapping onto the of ComSignalType enumeration
[TPS_SYST_01066]	Derivation of Tx COM Signals
[TPS_SYST_01067]	Derivation of Rx COM Signals
[TPS_SYST_01068]	Bit Counting in AUTOSAR
[TPS_SYST_01069]	Bit Order in AUTOSAR
[TPS_SYST_01069]	Bit Order in AUTOSAR
[TPS_SYST_01070]	E2E Protection of ISignalGroups
[TPS_SYST_01071]	E2E Protection of several ISignalGroups in one ISignalIPdu
[TPS_SYST_01072]	Offset attributes of EndToEndDescription
[TPS_SYST_01073]	E2E Protection via COM Callouts
[TPS_SYST_01074]	E2E Protection in the E2E Wrapper
[TPS_SYST_01075]	Signal content evaluation via TransmissionModeCondition
[TPS_SYST_01076]	Mode evaluation via modeDrivenTrueCondition
[TPS_SYST_01077]	Mapping of Com Transmission Modes to System Template elements
[TPS_SYST_01078]	Dynamic Part of a MultiplexedIPdu
[TPS_SYST_01079]	Static Part of a MultiplexedIPdu
[TPS_SYST_01080]	Sending or receiving of a MultiplexedIPdu in System Extract/ECU Extract
[TPS_SYST_01081]	Gatewaying of a MultiplexedIPdu in System Extract/ECU Extract
[TPS_SYST_01082]	Receiving and gatewaying of a MultiplexedIPdu in System Extract/ECU Extract
[TPS_SYST_01083]	A Frame represents a general design object that is used to describe the layout of the included Pdus as a reusable asset.
[TPS_SYST_01084]	FrameTriggering
[TPS_SYST_01085]	Transmission of a Frame multiple times within one communication cycle
[TPS_SYST_01086]	Number of Ethernet channels
[TPS_SYST_01087]	Role of SystemSignal in inter-ECU client server communication with clients located on the same ECU
[TPS_SYST_01088]	NetworkEndpoint priority
[TPS_SYST_01089]	ApplicationEndpoint priority
[TPS_SYST_01090]	valid NetworkEndpoint
[TPS_SYST_01091]	Definition of SoAdConfig
[TPS_SYST_01092]	Transmission of multiple Pdus over the same SocketConnection
[TPS_SYST_01093]	Activation/Deactivation of SoAdRoutingGroups
[TPS_SYST_01094]	allowed key/value CapabilityRecord combinations
[TPS_SYST_01095]	tagged VLANs
[TPS_SYST_01096]	untagged VLANs

[TPS_SYST_01097]	Assignment of CouplingPorts to a VLAN
[TPS_SYST_01098]	Assignment of CouplingPorts to an “untagged” VLAN
[TPS_SYST_01099]	Context of TpConfig
[TPS_SYST_01100]	TP routing using the same transport protocol
[TPS_SYST_01101]	TP routing using different transport protocols
[TPS_SYST_01102]	FlexrayTpConnectionControl reuse
[TPS_SYST_01103]	FlexrayTpConnection shall specify one txPduPool
[TPS_SYST_01104]	FlexrayTpConnection with several receivers
[TPS_SYST_01105]	CanTpConnection with several receivers
[TPS_SYST_01106]	Usage of additional directPdu in case of variable length sdu
[TPS_SYST_01107]	Definition of NmCoordinator
[TPS_SYST_01108]	ProvidedServiceInstance priority
[TPS_SYST_01109]	RTE fan-out support
[TPS_SYST_01110]	Com Signal Gateway fan-out support
[TPS_SYST_01111]	Pdu Router fan-out support
[TPS_SYST_01112]	FlexRay dual channel Pdu Router interaction
[TPS_SYST_01113]	FlexRay Interface fan-out support
[TPS_SYST_01114]	Frame fan-out support
[TPS_SYST_01115]	CDD communication support
[TPS_SYST_01116]	Frame Mapping is not supported by the AUTOSAR BSW
[TPS_SYST_01117]	Pdu Gateway support
[TPS_SYST_01118]	Support of Multicast Pdu routing
[TPS_SYST_01119]	Signal Gateway support
[TPS_SYST_01120]	Precedence of ISignalMappings
[TPS_SYST_01121]	Support of Mulicast signal routing
[TPS_SYST_01122]	partial routing between ISignalGroups
[TPS_SYST_01123]	System Extract may cover one or many EcuInstances
[TPS_SYST_01124]	SystemSignal fan-out and fan-in
[TPS_SYST_01125]	SystemSignalGroup fan-out and fan-in
[TPS_SYST_01126]	Resource Consumption for RTE and basic software
[TPS_SYST_01127]	CDD Topology support
[TPS_SYST_01128]	Communication over FlexRay
[TPS_SYST_01129]	Communication over LIN
[TPS_SYST_01130]	Communication over CAN
[TPS_SYST_01131]	TCP/IP and UDP/IP communication over Ethernet
[TPS_SYST_01132]	Communication over SAE J1939
[TPS_SYST_01133]	Partial Network Clusters
[TPS_SYST_01134]	Abstract System Description
[TPS_SYST_01135]	Refactoring of an Abstract System Description into a project specific technical view of the software architecture
[TPS_SYST_01136]	ViewMapSet and ViewMap are used to trace the transformations between different models
[TPS_SYST_01137]	Several DataMappings may be defined for the same SystemSignal
[TPS_SYST_01138]	Low-level routing of XcpPdus
[TPS_SYST_01139]	Ecu Extract covers exactly one EcuInstance
[TPS_SYST_01140]	Ecu Extract contains only SwComponentPrototypes of type AtomicSwComponentType in the RootSwCompositionPrototype
[TPS_SYST_01141]	Derivation of ComSignalType
[TPS_SYST_01142]	Rules for the creation of Triggerings and Ports on the sender side
[TPS_SYST_01143]	DataMapping on the sender side for elements of a composite data type
[TPS_SYST_01144]	Physical properties of a System Signal
[TPS_SYST_01145]	PortInterfaceMappings in the ECU Extract
[TPS_SYST_01146]	Generic CanTpConnections

[TPS_SYST_01147]	Generic J1939TpConnections
[TPS_SYST_01148]	Mapping of IN and INOUT ArgumentDataPrototypes to callSignals
[TPS_SYST_01149]	Mapping of OUT and INOUT ArgumentDataPrototypes to returnSignals
[TPS_SYST_01150]	Mapping of returnSignal and callSignal to COM Signal
[TPS_SYST_01151]	DataMapping reference to an EventHandler
[TPS_SYST_01152]	DataMapping reference to a ConsumedEventGroup
[TPS_SYST_01153]	Atomic transport of SystemSignalGroups
[TPS_SYST_01154]	CAN Controller support of CAN FD frames
[TPS_SYST_03000]	Co-existing System with category SYSTEM_DESCRIPTION and System with category SYSTEM_EXTRACT
[TPS_SYST_05000]	System Description doesn't use a complete Software Component Description
[TPS_SYST_05001]	Send a Trigger across a network
[TPS_SYST_05002]	The value of startPosition is irrelevant

Table D.7: Added Specification Items in 4.1.1

D.4.5 Deleted Constraints in R4.1.1

[constr_3016]	Number of Ethernet channels

Table D.8: Deleted Constraints in R4.1.1

D.4.6 Deleted Specification Items in R4.1.1

N/A

D.5 Constraint and Specification Item History of this document according to AUTOSAR R4.1.2

D.5.1 Changed Specification Items in R4.1.2

Number	Heading
[TPS_SYST_01052]	Routing of UserDefinedPdus, NmPdus, NPdus, GeneralPurposePdus
[TPS_SYST_01056]	Routing of ISignalIPdus, UserDefinedIPdus, MultiplexedIPdus, GeneralPurposeIPdus
[TPS_SYST_01138]	Low-level routing of XcpPdus

Table D.9: Added Specification Items in 4.1.2

D.5.2 Added Specification Items in R4.1.2

Number	Heading
[TPS_SYST_02001]	networkRepresentationProps are mandatory in case the dataTypePolicy is set to override or legacy
[TPS_SYST_02002]	SoAdRoutingGroup for Services with Methods

[TPS_SYST_02003]	SoAdRoutingGroups for Services with event groups
[TPS_SYST_02004]	SoAdRoutingGroups for Services with event groups that contain triggered events
[TPS_SYST_02005]	Low-level routing of J1939DcmIPdus
[TPS_SYST_02006]	Usage of networkRepresentationFromComSpec
[TPS_SYST_02007]	Usage of SocketConnection attributes in the unicast server view
[TPS_SYST_02008]	Usage of SocketConnection attributes in the unicast client view
[TPS_SYST_02009]	Usage of SocketConnection attributes in the multicast server view
[TPS_SYST_02010]	Usage of SocketConnection attributes in the multicast client view

Table D.10: Added Specification Items in 4.1.2

D.5.3 Added Constraints in R4.1.2

Number	Heading
[constr_3069]	Allowed CanNmCluster.nmNidPosition values
[constr_3070]	Allowed CanNmCluster.nmCbvPosition values
[constr_3071]	CanNmCluster.nmCbvPosition and CanNmCluster.nmNidPosition shall never have the same value
[constr_3073]	nmVoteInformation only valid for FrNm
[constr_3074]	No TransmissionAcknowledgementRequest for multiple senders
[constr_3078]	Allowed UdpNmCluster.nmNidPosition values
[constr_3079]	Allowed UdpNmCluster.nmCbvPosition values
[constr_3080]	UdpNmCluster.nmCbvPosition and UdpNmCluster.nmNidPosition shall never have the same value
[constr_3081]	Value of category in GeneralPurposePdu
[constr_3082]	Value of category in GeneralPurposeIPdu
[constr_3083]	Exactly one AtomicSwComponentType on an EcuInstance may use GeneralCallbackEventDataChanged / GeneralCallbackEventStatusChange
[constr_3084]	Service port in the role PowerTakeOff
[constr_3085]	Service port in the role CallbackDCMRequestServices

Table D.11: Added Constraints in R4.1.2

D.5.4 Changed Constraints in R4.1.2

Number	Heading
[constr_2025]	Uniqueness of symbol attributes

Table D.12: Changed Constraints in R4.1.2

D.5.5 Deleted Constraints in R4.1.2

[constr_3066]	Restriction of SenderComSpecs that refer to dataElements mapped to the same SystemSignal

Table D.13: Deleted Constraints in R4.1.2

D.6 Constraint and Specification Item History of this document according to AUTOSAR R4.1.3

D.6.1 Changed Specification Items in R4.1.3

N/A

D.6.2 Added Specification Items in R4.1.3

Number	Heading
[TPS_SYST_01155]	Routing of ISignalGroups
[TPS_SYST_01156]	Definition of ISignalTriggerings is allowed for ISignalGroups and for GroupSignals
[TPS_SYST_01157]	Allowed usage of attributes for ISignals, ISignalGroups and GroupSignals
[TPS_SYST_02011]	initValues of receivers that are mapped to the same Ecu
[TPS_SYST_02012]	initValue and invalidValue represent internal values

Table D.14: Added Specification Items in 4.1.3

D.6.3 Deleted Specification Items in R4.1.3

Number	Heading
[TPS_SYST_01124]	SystemSignal fan-out and fan-in
[TPS_SYST_01125]	SystemSignalGroup fan-out and fan-in

Table D.15: Deleted Specification Items in 4.1.3

D.6.4 Added Constraints in R4.1.3

[constr_3086]	Role of SystemSignal in n:1 sender-receiver communication
[constr_3087]	DataMapping to PRPortPrototype
[constr_3088]	SystemSignal that is not part of a SystemSignalGroup in a complete System Description
[constr_3089]	SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System Description
[constr_3090]	TpSdu transmission on a PhysicalChannel
[constr_3094]	Consistent ISignalPort.communicationDirection for ISignalTriggerings of ISignalGroups and contained ISignals

Table D.16: Added Constraints in R4.1.3

D.6.5 Changed Constraints in R4.1.3

[constr_3051]	Restriction of ISignalMapping references

Table D.17: Changed Constraints in R4.1.3

D.6.6 Deleted Constraints in R4.1.3

[constr_3502]	Role of SystemSignal in n:1 sender-receiver communication
[constr_1206]	DataMapping to PRPortPrototype
[constr_3503]	SystemSignal that is not part of a SystemSignalGroup in a complete System Description
[constr_3054]	SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System Description

Table D.18: Deleted Constraints in R4.1.3

D.7 Constraint and Specification Item History of this document according to AUTOSAR R4.2.1

D.7.1 Added Traceables in 4.2.1

Id	Heading
[TPS_SYST_02013]	Usage of dataFilters on GroupSignals on receiver side
[TPS_SYST_02014]	ConsumedEventGroup priority
[TPS_SYST_02015]	LdCom: only one ISignal mapped to the ISignalIPdu
[TPS_SYST_02016]	LdCom: only Transformer output and UINT8_N or UINT8_DYN supported
[TPS_SYST_02017]	LdCom: Opaque ISignalToIPduMapping.packingByteOrder
[TPS_SYST_02018]	LdCom: ISignalToIPduMapping.startPosition shall be 0
[TPS_SYST_02019]	LdCom: ISignalToIPduMapping.transferProperty shall be triggered or triggeredWithoutRepetition
[TPS_SYST_02020]	LdCom: No IPduTiming.minimumDelay defined
[TPS_SYST_02021]	LdCom: ISignalToIPduMapping.updateIndicationBitPosition shall not be defined
[TPS_SYST_02022]	LdCom: Only the transmissionModeTrueTiming defined
[TPS_SYST_02023]	LdCom: DataFilter "always" if TransmissionModeCondition defined
[TPS_SYST_02024]	LdCom: No ModeDrivenTransmissionModeCondition defined
[TPS_SYST_02025]	LdCom: Only EventControlledTiming defined
[TPS_SYST_02026]	LdCom: Only EventControlledTiming with no repetition defined
[TPS_SYST_02027]	LdCom: No ISignalPort.timeout reception timeout defined
[TPS_SYST_02028]	LdCom: No ISignalPort.dataFilter defined
[TPS_SYST_02029]	Multiple ParameterDataPrototype instances in an EcuExtract
[TPS_SYST_02030]	The DataTransformationSet contains all transformer chains
[TPS_SYST_02031]	A transformer is represented by a TransformationTechnology
[TPS_SYST_02032]	Transformer chains are ordered list of transformers
[TPS_SYST_02033]	Order of the transformers in the configuration represents the order on the sending side
[TPS_SYST_02034]	Order of the transformers on the receiving side is the reverse of the sending side
[TPS_SYST_02035]	protocol contains the human readable protocol identifier
[TPS_SYST_02036]	version contains the version of the protocol

[TPS_SYST_02037]	The attribute needsOriginalData configures a transformer's access to the original data
[TPS_SYST_02038]	Specification of transformer class
[TPS_SYST_02039]	Specification of transformer specific properties
[TPS_SYST_02040]	Specification of transformer buffer handling
[TPS_SYST_02041]	In-place buffer handling of transformers
[TPS_SYST_02042]	Header length to be considered by transformers
[TPS_SYST_02043]	Buffer computation of transformer
[TPS_SYST_02044]	Buffer computation of transformer
[TPS_SYST_02045]	SOME/IP Transformer configuration
[TPS_SYST_02046]	E2E Transformer configuration
[TPS_SYST_02047]	Custom transformer configuration
[TPS_SYST_02048]	ISignal specific transformation configuration
[TPS_SYST_02049]	Transformer specific TransformationISignalProps
[TPS_SYST_02050]	ISignal specific configuration of the SOME/IP Transformer
[TPS_SYST_02051]	ISignal specific configuration of the E2E Transformer
[TPS_SYST_02052]	ISignal specific configuration of custom transformers
[TPS_SYST_02053]	A reference from ISignal to DataTransformation in the role dataTransformation enables data transformation
[TPS_SYST_02054]	Definition of data which shall be transformed
[TPS_SYST_02055]	Alignment of SOME/IP
[TPS_SYST_02056]	Byte Order of SOME/IP
[TPS_SYST_02057]	Interface Version of SOME/IP
[TPS_SYST_02058]	Usage of COM Based Transformer
[TPS_SYST_02059]	Routing of SecuredIPdus
[TPS_SYST_02060]	SecuredIPdus
[TPS_SYST_02061]	Routing of IPdus that are part of a ContainerIPdu
[TPS_SYST_02062]	Allowed ContainedIPduProps.headerIdLongHeader and ContainedIPduProps.headerIdShortHeader values
[TPS_SYST_02063]	Byte order of ContainerIPdu header information
[TPS_SYST_02064]	Reception acceptance of contained IPdus
[TPS_SYST_02065]	Contained IPdu specific transmission timeout
[TPS_SYST_02066]	ContainerIPdu.thresholdSize
[TPS_SYST_02067]	E2E profile
[TPS_SYST_02068]	E2E header field representation in an ISignalGroup
[TPS_SYST_02069]	Recommended configuration settings for E2E Profile 1 configuration setting C
[TPS_SYST_02070]	Recommended configuration settings for E2E Profile 4 configuration setting A
[TPS_SYST_02071]	Recommended configuration settings for E2E Profile 4 configuration setting B
[TPS_SYST_02072]	profileName of EndToEndTransformationDescription
[TPS_SYST_02073]	EndToEndTransformationDescription.profileName
[TPS_SYST_02074]	Precedence of transformer configuration settings
[TPS_SYST_02075]	Mandatory attributes in transformer configuration elements
[TPS_SYST_03001]	LdCom: ISignalIPdu not part of any ISignalIPduGroup
[TPS_SYST_03002]	Keep behavior of DHCP clients
[TPS_SYST_03003]	Ethernet priority regeneration
[TPS_SYST_03004]	VLAN specific sending behavior
[TPS_SYST_03005]	VLAN re-tagging
[TPS_SYST_03006]	Ethernet switch egress port setup
[TPS_SYST_03007]	Ethernet port scheduler algorithm
[TPS_SYST_03008]	Ethernet port scheduler priority

[TPS_SYST_03009]	Ethernet port shaper idleSlope
[TPS_SYST_03010]	Ethernet switch packet to traffic class assignment
[TPS_SYST_03011]	Ethernet switch traffic class to FIFO assignment
[TPS_SYST_03013]	Semi-static DHCP server configuration
[TPS_SYST_03014]	Transmission triggering by the first contained IPdu put into a ContainerIPdu
[TPS_SYST_05003]	Usage of DiagnosticConnection in combination with a TP
[TPS_SYST_05004]	Usage of DiagnosticConnection in combination with UUDT
[TPS_SYST_05005]	Relation of GlobalTimeDomain to CommunicationCluster
[TPS_SYST_05006]	Chaining of GlobalTimeDomains
[TPS_SYST_05007]	separation of roles within a GlobalTimeDomain
[TPS_SYST_05008]	Semantics of a GlobalTimeGateway
[TPS_SYST_05009]	Pdu for transmitting global time information
[TPS_SYST_05010]	Pdu is not required on Ethernet
[TPS_SYST_05011]	Ownership of GlobalTimeGateway
[TPS_SYST_05013]	Semantics of GlobalTimeMaster.isSystemWideGlobalTimeMaster
[TPS_SYST_05014]	GlobalTimeMaster.isSystemWideGlobalTimeMaster
[TPS_SYST_05015]	Naming conventions

Table D.19: Added Traceables in 4.2.1

D.7.2 Changed Traceables in 4.2.1

Id	Heading
[TPS_SYST_01024]	Component Clustering
[TPS_SYST_01025]	Clustering of Compositions
[TPS_SYST_01026]	Separation of Compositions
[TPS_SYST_01045]	Component Seperation
[TPS_SYST_01056]	Routing of ISignalIPdus, UserDefinedIPdus, MultiplexedIPdus, GeneralPurposeIPdus, ContainerIPdus
[TPS_SYST_01057]	Routing of NmPdus
[TPS_SYST_01088]	NetworkEndpoint priority
[TPS_SYST_01089]	ApplicationEndpoint priority
[TPS_SYST_01106]	Usage of additional directPdu in case of variable length sdu
[TPS_SYST_01108]	ProvidedServiceInstance priority
[TPS_SYST_01138]	Low-level routing of XcpPdus
[TPS_SYST_01157]	Allowed usage of attributes for ISignals, ISignalGroups and GroupSignals
[TPS_SYST_02005]	Low-level routing of J1939DcmIPdus

Table D.20: Changed Traceables in 4.2.1

D.7.3 Deleted Traceables in 4.2.1

Id	Heading
[TPS_SYST_01038]	Mapping of primitive arguments
[TPS_SYST_01039]	primitive Argument Mapping of UINT8-Arrays
[TPS_SYST_01040]	Mapping of composite arguments
[TPS_SYST_01051]	Handling of DcmIPdus

Table D.21: Deleted Traceables in 4.2.1

D.7.4 Added Constraints in 4.2.1

Id	Heading
[constr_1367]	periodicResponseUudt.periodicResponseUudt shall only refer to a DcmIPdu
[constr_1368]	Limitation of the target of references from DiagnosticConnection
[constr_1369]	CommunicationConnectors shall be attached to the same CommunicationCluster
[constr_1370]	Consistency of GlobalTimeDomain
[constr_1371]	Consistency of attribute host
[constr_1372]	Consistency of attribute globalTimePdu
[constr_1373]	GlobalTimeMaster with attribute isSystemWideGlobalTimeMaster set to TRUE
[constr_1374]	Only fan-out possible for GlobalTimeGateway
[constr_3095]	canControllerFdAttributes and canControllerFdRequirements are mutually exclusive.
[constr_3096]	Allowed values for diagnosticMessageType
[constr_3097]	Overlapping of segments of one MultiplexedIPdu is not allowed
[constr_3098]	Defined segments of one MultiplexedIPdu shall not exceed the length of the MultiplexedIPdu
[constr_3099]	Defined segments in a DynamicPart shall not exceed the length of any DynamicPartAlternative.iPdu
[constr_3100]	Defined segments in a StaticPart shall not exceed the length of the StaticPart.iPdu
[constr_3101]	Signal representation of selector field for DynamicPartAlternative
[constr_3102]	Restriction on usage of J1939NodeName attributes
[constr_3103]	Range of ecuInstance
[constr_3104]	Range of function
[constr_3105]	Range of functionInstance
[constr_3106]	Range of identitiyNumber
[constr_3107]	Range of industryGroup
[constr_3108]	Range of manufacturerCode
[constr_3109]	Range of vehicleSystem
[constr_3110]	Range of vehicleSystemInstance
[constr_3111]	returnSignal in ClientServerToSignalMapping is mandatory
[constr_3112]	Invalidation support for partial mapping of a data element typed by composite data type
[constr_3113]	EthernetFrame shall not have a PduToFrameMapping
[constr_3114]	FlatInstanceDescriptors pointing to the same ParameterDataPrototype shall have different postBuildVariantConditions
[constr_3115]	FlatInstanceDescriptors pointing to the same ParameterDataPrototype instance
[constr_3116]	Overlap of ClientIdRanges in the context of the enclosing System
[constr_3117]	Allowed value of attribute clientId
[constr_3118]	Valid reference target for ClientIdDefinition.clientServerOperation.contextPort
[constr_3121]	The length of transformer chains is limited to 255 transformers
[constr_3122]	At most one transformer of each transformer class inside a transformer chain
[constr_3123]	Serializer transformer shall be the first in a chain
[constr_3124]	Applicability of needsOriginalData
[constr_3125]	Value of attribute inPlace for the first transformer in a chain
[constr_3126]	headerLength shall be less or equal output buffer size
[constr_3127]	Certain ISignals always need a reference to DataTransformation
[constr_3128]	SOME/IP transformer configuration

[constr_3129]	Byte Order of SOME/IP transformer
[constr_3130]	Range of Interface Version
[constr_3131]	Required first data transformation for comBasedSignalGroupTransformation
[constr_3132]	Required COM Based Transformation for comBasedSignalGroupTransformation
[constr_3133]	physicalLayerType of connected CouplingPorts
[constr_3134]	The connection of two CouplingPorts with connectionNegotiationBehavior set to master is forbidden
[constr_3135]	The connection of two CouplingPorts with connectionNegotiationBehavior set to slave is forbidden
[constr_3136]	Allowed payload of SecuredIPdus
[constr_3137]	IPduPort.rxSecurityVerification is configurable on the receiver side
[constr_3138]	IPduPort.rxSecurityVerification validness
[constr_3139]	Usage of IPduPort.rxSecurityVerification
[constr_3140]	No ByteOrderEnum.opaque allowed for System.containerIPduHeaderByteOrder
[constr_3141]	Only IPdus shall be part of a ContainerIPdu
[constr_3142]	Mandatory headerIdLongHeader for longHeader
[constr_3143]	Mandatory headerIdShortHeader for shortHeader
[constr_3144]	Mandatory IPdu.containedIPduProps for contained IPdus
[constr_3146]	Partial Networking timing constraint
[constr_3148]	executeDespiteDataUnavailability setting in case an E2E Transformer is used
[constr_3149]	TransformationTechnology settings for E2E Transformer
[constr_3150]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01 in case it is 0
[constr_3151]	BufferProperties.headerLength settings for an E2E transformer used in combination with a SOME/IP transformer
[constr_3152]	BufferProperties.headerLength settings for an E2E transformer used in combination with a COM Based transformer
[constr_3153]	E2E header field reservation required by COM Based transformer
[constr_3154]	BufferProperties.bufferComputation setting for an E2E transformer
[constr_3155]	Allowed values for EndToEndTransformationDescription.upperHeaderBitsToShift
[constr_3156]	Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01
[constr_3157]	Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01 in case dataIdMode is set to lower12Bit
[constr_3158]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_01
[constr_3159]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_04
[constr_3160]	EndToEndTransformationISignalProps.dataId in PROFILE_02
[constr_3161]	EndToEndTransformationISignalProps.dataLength in PROFILE_01, PROFILE_02, PROFILE_05
[constr_3162]	EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_01, PROFILE_02, PROFILE_05
[constr_3163]	EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_04 and PROFILE_06
[constr_3164]	EndToEndTransformationISignalProps.dataLength in PROFILE_04 and PROFILE_06

[constr_3165]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01
[constr_3166]	EndToEndTransformationDescription.upperHeaderBitsToShift in PROFILE_02
[constr_3167]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3169]	Attribute multiplicities and values in PROFILE_02
[constr_3171]	Value of EndToEndTransformationISignalProps.dataId shall be unique in PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3172]	Effect of EndToEndTransformationDescription.profileBehavior value in PROFILE_01
[constr_3173]	Effect of EndToEndTransformationDescription.profileBehavior value in PROFILE_02
[constr_3174]	EndToEndTransformationDescription settings not allowed in PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3176]	Value range of windowSize
[constr_3177]	Dependency between maxErrorStateValid, maxErrorStateInit and maxErrorStateInvalid
[constr_3178]	Dependency between minOkStateValid, minOkStateInit and minOkStateInvalid
[constr_3179]	Dependency between minOkStateInit, maxErrorStateInit and windowSizeStateInit
[constr_3180]	Dependency between minOkStateValid, maxErrorStateValid and windowSizeStateValid
[constr_3181]	Dependency between minOkStateInvalid, maxErrorStateInvalid and windowSizeStateInvalid
[constr_3182]	Restriction on TransformationTechnology.transformationDescription VariationPoint
[constr_3183]	ISignalGroup with transformationISignalProps
[constr_3184]	Only one EndToEndTransformationISignalProps.dataId element in PROFILE_01
[constr_3185]	Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_01
[constr_3186]	Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_02, PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3187]	Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_01
[constr_3188]	Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_02, PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3189]	Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_01
[constr_3190]	Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_02, PROFILE_04, PROFILE_05 and PROFILE_06
[constr_3191]	Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_01 and dataIdMode equal to lower12Bit
[constr_3192]	Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_02, PROFILE_04, PROFILE_05 and PROFILE_06 or dataIdMode different from lower12Bit
[constr_3193]	Multiplicity of EndToEndTransformationDescription.offset in PROFILE_01
[constr_3194]	Multiplicity of EndToEndTransformationDescription.offset in Profiles different from PROFILE_01
[constr_3195]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_02

[constr_3196]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_05
[constr_3197]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_06
[constr_3515]	Fully filled EthernetPriorityRegeneration table
[constr_3516]	limitation of Pdu.length for CAN L-PDUs
[constr_3517]	Consistent setting of ContainedIPduProps.collectionSemantics in the context of one ContainerIPdu
[constr_3518]	Range of CanControllerFdConfiguration.paddingValue and CanControllerFdConfigurationRequirements.paddingValue

Table D.22: Added Constraints in 4.2.1

D.7.5 Changed Constraints in 4.2.1

Id	Heading
[constr_3010]	ISignalIPdu length shall not be exceeded
[constr_3011]	Overlapping of updateIndicationBits of ISignals is prohibited
[constr_3028]	FibexElements
[constr_3037]	maximum Frame frameLength for CAN and LIN
[constr_3081]	Value of category in GeneralPurposePdu
[constr_3082]	Value of category in GeneralPurposeIPdu
[constr_3506]	Mapping of composite data type to SystemSignals in SystemSignalGroup

Table D.23: Changed Constraints in 4.2.1

D.7.6 Deleted Constraints in 4.2.1

Id	Heading
[constr_1208]	Existence of the attribute DataMapping.communicationDirection in the context of a ClientServerInterface
[constr_3001]	valid ClientServerToSignalGroupMappings
[constr_3017]	Length of multiplexed Pdu shall not be exceeded.
[constr_3026]	valid EmptySignalMappings
[constr_3033]	Criteria for primitive argument mapping
[constr_3056]	pduLength of the NmPdu

Table D.24: Deleted Constraints in 4.2.1

D.8 Constraint and Specification Item History of this document according to AUTOSAR R4.2.2

D.8.1 Added Traceables in 4.2.2

Id	Heading
[TPS_SYST_02076]	networkRepresentationProps in case the dataTypePolicy is set to transformingISignal
[TPS_SYST_02077]	Subscribers of a LinEventTriggeredFrame

[TPS_SYST_02078]	LinUnconditionalFrames associated with a LinEventTriggeredFrame
[TPS_SYST_02079]	Identification of ImplementationDataType for a given ISignal in an Ecu Extract
[TPS_SYST_02080]	Message type of SOME/IP
[TPS_SYST_02081]	PduTriggering that is used for ClientServer Communication
[TPS_SYST_02082]	SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category VALUE or BOOLEAN and a DataTypeMap exists
[TPS_SYST_02083]	SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and a DataTypeMap exists
[TPS_SYST_02084]	SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and a DataTypeMap exists
[TPS_SYST_02085]	SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category ARRAY
[TPS_SYST_02086]	SenderReceiverInterface.dataElement is typed by an ImplementationDataType of category VALUE or TYPE_REFERENCE
[TPS_SYST_02087]	SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category BOOLEAN and no DataTypeMap exists
[TPS_SYST_02088]	SenderReceiverInterface.dataElement is typed by an ApplicationArrayDataType and no DataTypeMap exists
[TPS_SYST_02089]	SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category STRING and no DataTypeMap exists
[TPS_SYST_02090]	SenderReceiverInterface.dataElement is typed by an ApplicationPrimitiveDataType of category VALUE and no DataTypeMap exists
[TPS_SYST_02091]	Routing of GeneralPurposePdus with category SD and GeneralPurposePdus with category DoIP
[TPS_SYST_02092]	Size of Fixed-size Array Length Fields
[TPS_SYST_02093]	Size of Structure Length Fields
[TPS_SYST_02094]	Size of Union Length Fields
[TPS_SYST_03015]	Offset time domain requires synchronized time domain

Table D.25: Added Traceables in 4.2.2

D.8.2 Changed Traceables in 4.2.2

Id	Heading
[TPS_SYST_01003]	Standardized System Category Definitions
[TPS_SYST_01052]	Routing of UserDefinedPdus, NmPdus, NPdus, GeneralPurposePdus with category GLOBAL_TIME
[TPS_SYST_01065]	Mapping onto the ComSignalType enumeration
[TPS_SYST_01066]	Derivation of Tx COM Signals
[TPS_SYST_01067]	Derivation of Rx COM Signals
[TPS_SYST_01077]	Mapping of Com Transmission Modes to System Template elements
[TPS_SYST_01113]	FlexRay Interface fan-out support
[TPS_SYST_01157]	Allowed usage of attributes for ISignals, ISignalGroups and GroupSignals
[TPS_SYST_02017]	LdCom: Opaque ISignalToIPduMapping.packingByteOrder

[TPS_SYST_02069]	Recommended configuration settings for E2E Profile 1 configuration setting C
[TPS_SYST_02070]	Recommended configuration settings for E2E Profile 4 configuration setting A
[TPS_SYST_02071]	Recommended configuration settings for E2E Profile 4 configuration setting B

Table D.26: Changed Traceables in 4.2.2

D.8.3 Deleted Traceables in 4.2.2

none

D.8.4 Added Constraints in 4.2.2

Id	Heading
[constr_1002]	End-to-end protection does not support n:1 communication
[constr_1387]	Transmission of Variable-Size Array Data Types by means of a Transformer
[constr_3198]	Uniqueness of PncMapping.shortLabel
[constr_3199]	ISignal that has dataTypePolicy set to transformingISignal shall reference a DataTransformation
[constr_3201]	eventGroupIdentifier in ConsumedEventGroups that are referenced by the same EventHandler
[constr_3202]	LinFrameTriggering to LinUnconditionalFrame reference restriction in LinEventTriggeredFrame context
[constr_3203]	LinFrameTriggering to LinSporadicFrame reference restriction in LinSporadicFrame context
[constr_3204]	LinUnconditionalFrames associated with a LinSporadicFrame
[constr_3205]	Existence of FramePort for a FrameTriggering that references a LinSporadicFrame
[constr_3206]	Existence of FramePort for a FrameTriggering that references a LinEventTriggeredFrame
[constr_3207]	Assignment of SocketConnectionIpduIdentifiers used for ClientServer Communication to SocketConnections
[constr_3208]	executeDespiteDataUnavailability usage restriction
[constr_3209]	CanFrameTriggerings with identical PGN
[constr_3210]	J1939TpPgs with identical pgn value
[constr_3211]	PduTriggerings with triggerIPduSendCondition
[constr_3212]	Limitation of DoIpTpConnection.tpSdu
[constr_3213]	TransformationISignalProps.csErrorReaction setting in case that the serializer transformerClass and Client/Server communication is used
[constr_3214]	TransformationISignalProps.csErrorReaction setting in case that a transformerClass different from serializer is used or the Client/Server communication is not used
[constr_3215]	TransformationTechnology.version and TransformationTechnology.protocol settings for request and response of a client/server communication
[constr_3216]	Usage of SOMEIPTransformationISignalProps.sessionHandlingSR
[constr_3218]	Range of Size of Fixed-size Array Length Fields
[constr_3219]	The existence of LinSlaves in the LinMaster EcuExtract
[constr_3220]	Range of Size of Structure Length Fields
[constr_3221]	Range of Size of Union Length Fields

[constr_3519]	Value of category of GlobalTimeDomain
[constr_3520]	Offset time domain shall be based on a synchronized time domain

Table D.27: Added Constraints in 4.2.2

D.8.5 Changed Constraints in 4.2.2

Id	Heading
[constr_1368]	Limitation of the target of references from DiagnosticConnection
[constr_1374]	Only fan-out possible for GlobalTimeGateway
[constr_3002]	valid swcToImplMapping
[constr_3003]	Number of CAN channels
[constr_3004]	Clustering and separation must be exclusive
[constr_3005]	valid EcuResourceEstimation
[constr_3006]	valid EcuMapping
[constr_3007]	selectorFieldCodes for dynamic part alternatives
[constr_3008]	EcuInstance subelements
[constr_3015]	Number of LIN channels
[constr_3018]	Number of FlexRay channels
[constr_3019]	In the flat ECU extract each required interface must be satisfied by connected provided interfaces
[constr_3020]	communicationDirection of containedIPduGroups
[constr_3021]	Mapping of SensorActuatorSwComponents to SensorActuator HwElements
[constr_3025]	Usage of NPdus in TpConnections
[constr_3027]	Existence of ecuExtractVersion
[constr_3049]	Role of SystemSignal in inter-ECU client server communication with clients located on different ECUs
[constr_3081]	Value of category in GeneralPurposePdu
[constr_3086]	Role of SystemSignal in n:1 sender-receiver communication
[constr_3089]	SystemSignal that is part of exactly one SystemSignalGroup and is not transmitted additionally as standalone SystemSignal in a complete System Description
[constr_3095]	canControllerFdAttributes and canControllerFdRequirements are mutually exclusive
[constr_3153]	E2E header field reservation required by COM Based transformer
[constr_3179]	Dependency between minOkStateInit, maxErrorStateInit and windowSize
[constr_3180]	Dependency between minOkStateValid, maxErrorStateValid and windowSize
[constr_3181]	Dependency between minOkStateInvalid, maxErrorStateInvalid and windowSize
[constr_3501]	Role of SystemSignal in 1:n communication
[constr_3506]	Mapping of composite data type to SystemSignals in SystemSignalGroup
[constr_3518]	Range of CanControllerFdConfiguration.paddingValue and CanControllerFdConfigurationRequirements.paddingValue

Table D.28: Changed Constraints in 4.2.2

D.8.6 Deleted Constraints in 4.2.2

Id	Heading
[constr_3131]	Required first data transformation for comBasedSignalGroupTransformation
[constr_3505]	Criteria for primitive Data Mapping

Table D.29: Deleted Constraints in 4.2.2

D.9 Constraint and Specification Item History of this document according to AUTOSAR R4.3.0

D.9.1 Added Traceables in 4.3.0

Id	Heading
[TPS_SYST_02095]	LinFrameTriggering.linChecksum for LinUnconditionalFrames
[TPS_SYST_02096]	Sending of ANY finds for minor version
[TPS_SYST_02097]	Basic definition of contained IPdus
[TPS_SYST_02098]	Header id and header type of a contained IPdu
[TPS_SYST_02099]	Relation between ContainerIPdu and contained IPdus on sender side
[TPS_SYST_02100]	Relation between ContainerIPdu and contained IPdus on receiver side
[TPS_SYST_02101]	Usage of LinSlaveConfig in Ecu Extract
[TPS_SYST_02102]	FrameTriggering.pduTriggering references that shall be ignored
[TPS_SYST_02103]	Semantics of GlobalTimeDomain.domainId
[TPS_SYST_02104]	Triggerings on PhysicalChannel
[TPS_SYST_02105]	ISignalGroup and ISignal referenced from ISignalTriggering
[TPS_SYST_02106]	Rules for the creation of references to Ports (ecuCommPortInstance) with communicationDirection in on receiving Ecu
[TPS_SYST_02107]	Shared address space for J1939 routing relations
[TPS_SYST_02108]	Address proxying for J1939 routing relations
[TPS_SYST_02109]	Absence of J1939SharedAddressCluster.participatingJ1939Cluster to a J1939Cluster
[TPS_SYST_02110]	Default behavior for ISignal.iSignalType
[TPS_SYST_02111]	VariableDataPrototype in case ISignal.iSignalType is set to array
[TPS_SYST_02112]	Usage of EventHandler.applicationEndpoint reference
[TPS_SYST_02113]	Usage of ConsumedEventGroup.applicationEndpoint reference
[TPS_SYST_02114]	Mapping of SwComponentPrototypes onto SwcToEcuMapping targets
[TPS_SYST_02115]	Applicability of GlobalTimeDomain.globalTimeDomainProps
[TPS_SYST_02116]	Modeling of Service Discovery Pdus
[TPS_SYST_02117]	Length of GeneralPurposePdu with category SD
[TPS_SYST_02118]	Rules for the creation of references to IPduPorts from PduTriggerings related to GeneralPurposePdus with category SD
[TPS_SYST_02119]	SocketConnectionBundles for GeneralPurposePdus with category SD
[TPS_SYST_02120]	runtimeIpAddressConfiguration and runtimePortConfiguration settings for SD SocketConnections
[TPS_SYST_02121]	Scope of DataPrototypeTransformationProps
[TPS_SYST_02123]	Size of a length field for a chosen fixed-size array
[TPS_SYST_02124]	Size of a length field for a chosen structure
[TPS_SYST_02125]	Size of a length field for a chosen union
[TPS_SYST_02126]	Alignment of a dynamic DataPrototype
[TPS_SYST_02127]	Usage of DataPrototypeTransformationProps in case of a VariableDataPrototype

[TPS_SYST_02128]	Usage of DataPrototypeTransformationProps in case of a ClientServerOperation
[TPS_SYST_02129]	Assignment of SOMEIPTransformationProps to a root AutosarDataPrototype typed by an ApplicationDataType
[TPS_SYST_02130]	Assignment of SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype typed by an ApplicationDataType
[TPS_SYST_02131]	Assignment of SOMEIPTransformationProps to a root AutosarDataPrototype typed by an ImplementationDataType
[TPS_SYST_02132]	Assignment of SOMEIPTransformationProps to a subElement of a root AutosarDataPrototype typed by an ImplementationDataType
[TPS_SYST_02133]	BufferProperties.bufferComputation setting for a COM Based transformer
[TPS_SYST_02134]	Recommended configuration settings for E2E Profile 7 configuration setting A
[TPS_SYST_02135]	Recommended configuration settings for E2E Profile 7 configuration setting B
[TPS_SYST_02136]	Serialization based on the network representation
[TPS_SYST_02137]	Serialization based on the ImplementationDataTypes
[TPS_SYST_02138]	Definition of the network representation
[TPS_SYST_02139]	Applicability of the SwDataDefProps attributes for the network representation of the serialized data
[TPS_SYST_02140]	SocketConnectionBundle.udpChecksumHandling default value
[TPS_SYST_02141]	Semantics of udpChecksumHandling
[TPS_SYST_02142]	Reception of invalid checksum
[TPS_SYST_02143]	Support of Multisource Pdu routing
[TPS_SYST_02144]	ComTimeoutSubstitution does not apply for signal gateway operation
[TPS_SYST_02145]	Default behavior for not defined nmPncParticipation
[TPS_SYST_02146]	Explicit definition of pncVector at NmPdu
[TPS_SYST_02147]	Implicit definition of pncVector at NmPdu
[TPS_SYST_02148]	Meaning of useAsCryptographicIPdu that is not set or set to false
[TPS_SYST_02149]	Meaning of useAsCryptographicIPdu that is set to true
[TPS_SYST_02150]	Role of SystemSignal in inter-ECU client server communication over Ethernet with clients located on different ECUs in case that LdCom is used
[TPS_SYST_02151]	MetaData support required for inter-ECU client server communication over Ethernet with clients located on different ECUs if one SystemSignal per communication direction is used
[TPS_SYST_02152]	Security profile
[TPS_SYST_02153]	Standardized values for the attribute category of meta-class SecureCommunicationFreshnessProps
[TPS_SYST_02154]	Standardized values for the attribute category of meta-class SecureCommunicationAuthenticationProps
[TPS_SYST_02155]	Recommended configuration settings for E2E Profile 11 configuration setting C
[TPS_SYST_02156]	Length of GeneralPurposeIPdu with category SOMEIP_SEGMENTED_IPDU
[TPS_SYST_02157]	Default value for the attribute category of meta-class EthernetCommunicationConnector
[TPS_SYST_02158]	Default value for the attribute category of meta-class EthernetCommunicationController
[TPS_SYST_02159]	Default value for the attribute category of meta-class EthernetPhysicalChannel
[TPS_SYST_02160]	EthernetPhysicalChannels with different category values are not allowed within an EthernetCluster

[TPS_SYST_02161]	Role of SystemSignal in inter-ECU client server communication over Ethernet with clients located on different ECUs in case that Com is used
[TPS_SYST_03016]	Applicability of EthGlobalTimeManagedCouplingPort.pdelayRequestPeriod
[TPS_SYST_03017]	Reference to CouplingPort in the context of a GlobalTimeDomain
[TPS_SYST_03018]	Aggregation of PNCs at the hostPort
[TPS_SYST_03019]	Modeling of CouplingPorts for managed CouplingElement
[TPS_SYST_03020]	Default value for CouplingPort.couplingPortRole if not defined
[TPS_SYST_03021]	Routing of GeneralPurposePdus with category GLOBAL_TIME

Table D.30: Added Traceables in 4.3.0

D.9.2 Changed Traceables in 4.3.0

Id	Heading
[TPS_SYST_01001]	Definition of SwcToEcuMapping
[TPS_SYST_01052]	Routing of UserDefinedPdus, NmPdus, NPdus
[TPS_SYST_01065]	Mapping onto the ComSignalType enumeration
[TPS_SYST_01066]	Derivation of Tx COM Signals
[TPS_SYST_01067]	Derivation of Rx COM Signals
[TPS_SYST_01118]	Support of Multicast Pdu routing
[TPS_SYST_01142]	Rules for the creation of references to Ports (ecuCommPortInstance) with communicationDirection out on sending Ecu
[TPS_SYST_02002]	SoAdRoutingGroup for Services with Methods
[TPS_SYST_02003]	SoAdRoutingGroups for Services with event groups
[TPS_SYST_02004]	SoAdRoutingGroups for Services with event groups that contain triggered events
[TPS_SYST_02033]	Order of the transformerChain references in the configuration represents the order on the sending side
[TPS_SYST_02044]	Buffer computation of transformer
[TPS_SYST_02073]	EndToEndTransformationDescription.profileName
[TPS_SYST_02092]	Size of Fixed-size Array Length Fields
[TPS_SYST_02093]	Size of Structure Length Fields
[TPS_SYST_02094]	Size of Union Length Fields
[TPS_SYST_05009]	GlobalTimeDomain.globalTimePduTriggering for transmitting global time information
[TPS_SYST_05010]	GlobalTimeDomain.globalTimePduTriggering is not required on Ethernet

Table D.31: Changed Traceables in 4.3.0

D.9.3 Deleted Traceables in 4.3.0

Id	Heading
[TPS_SYST_01027]	Mapping of specific SW components to dedicated Ecus
[TPS_SYST_01028]	Task of the System Generator
[TPS_SYST_01029]	Mapping of specific SW components to exclusive Ecus
[TPS_SYST_01141]	Derivation of ComSignalType

Table D.32: Deleted Traceables in 4.3.0

D.9.4 Added Constraints in 4.3.0

Id	Heading
[constr_1441]	In AUTOSAR, the transmission of union data types over the network is only supported by the SOME/IP Transformer
[constr_1463]	Applicable values for J1939Cluster.networkId
[constr_3222]	No ByteOrderEnum.opaque allowed for PduToFrameMapping.packingByteOrder
[constr_3223]	No ByteOrderEnum.opaque allowed for MultiplexedIPdu.selectorFieldByteOrder
[constr_3224]	No ByteOrderEnum.opaque allowed for SegmentPosition.segmentByteOrder.
[constr_3225]	LinFrameTriggering.linChecksum not allowed for LinSporadicFrames
[constr_3226]	LinFrameTriggering.linChecksum for LinEventTriggeredFrames
[constr_3227]	NmNode.nmPassiveModeEnabled setting
[constr_3229]	SwComponentPrototype mapped to an ApplicationPartition and EcuInstance
[constr_3230]	Usage of SenderRecRecordElementMapping.applicationRecordElement
[constr_3231]	Usage of IndexedArrayElement.applicationArrayElement
[constr_3232]	ApplicationPartition is allowed to be mapped to only one EcuPartition
[constr_3239]	Consistent mapping of software-component to J1939NmNode
[constr_3240]	Consistent mapping of J1939ControllerApplication to EcuInstance
[constr_3241]	Usage of AssignFrameId.messageId
[constr_3242]	Usage of UnassignFrameId.messageId
[constr_3243]	FrameTriggering.pduTriggering condition
[constr_3244]	Usage of SenderRecRecordElementMapping.implementationRecordElement
[constr_3245]	Usage of IndexedArrayElement.implementationArrayElement
[constr_3246]	Frame.packingByteOrder mix within a Frame is not allowed
[constr_3247]	Byte order mix within a MultiplexedIPdu is not allowed
[constr_3248]	Category of HwElement for ECUMapping
[constr_3249]	Category of HwElement for SwcToEcuMapping
[constr_3250]	PduTriggering.iSignalTriggering condition
[constr_3251]	Value of GlobalTimeDomain.domainId in subDomain chains
[constr_3252]	ISignalTriggering.iSignalPort reference condition
[constr_3253]	PduTriggering.iPduPort reference condition
[constr_3254]	FrameTriggering.framePort reference condition
[constr_3255]	FrameTriggering.pduTriggering reference condition with regard to the PhysicalChannel
[constr_3256]	PduTriggering.iSignalTriggering reference condition with regard to the PhysicalChannel
[constr_3257]	TimeSyncTechnology of servers and clients in a time synchronized network.
[constr_3258]	Restriction on ISignal.length in case iSignalType is set to array
[constr_3259]	Allowed use of SdServerConfig.capabilityRecord
[constr_3260]	Allowed use of SdClientConfig.capabilityRecord
[constr_3261]	GlobalTimeDomain.globalTimePduTriggering category
[constr_3262]	ConsumedEventGroup.eventGroupIdentifier is mandatory
[constr_3263]	Restriction of usage of SwcToEcuMapping in a System
[constr_3264]	Server side ClientServerToSignalMappings in case of a n:1 inter-ECU client-server communication
[constr_3265]	TransformationTechnology.hasInternalState setting for an E2E transformer
[constr_3266]	TransformationTechnology.hasInternalState setting for a SOME/IP Transformer

[constr_3267]	PduTriggerings in Service Discovery SocketConnectionBundles
[constr_3268]	Service Discovery SocketConnectionBundle serverPort reference to a TpPort
[constr_3269]	Service Discovery SocketConnection clientPort reference to a TpPort
[constr_3270]	Service Discovery SocketConnection clientPort reference to an IP Address
[constr_3271]	clientIpAddrFromConnectionRequest and clientPortFromConnectionRequest settings for SD SocketConnections
[constr_3272]	SocketConnectionIpduIdentifier.headerId setting for SD SocketConnectionBundles
[constr_3273]	Service Discovery multicast SocketConnectionBundle's serverPort reference to an IP Address
[constr_3274]	Service Discovery unicast SocketConnectionBundle's serverPort reference to an IP Address
[constr_3275]	PduTriggering containment in different PdurIPduGroups of the same EcuInstance is not allowed
[constr_3276]	Prohibition of usage of allowedIPv6ExtHeaders in IPv4 SocketConnections
[constr_3277]	Restriction of usage of IPv6ExtHeaderFilterLists in IPv6 SocketConnections
[constr_3278]	Usage of SOMEIPTransformationProps.sizeOfArrayLengthField
[constr_3279]	Usage of SOMEIPTransformationProps.sizeOfStructLengthField
[constr_3280]	Usage of SOMEIPTransformationProps.sizeOfUnionLengthField
[constr_3281]	Usage of SOMEIPTransformationProps.alignment
[constr_3282]	SOME/IP Transformation settings for static size arrays in the context of an ISignal
[constr_3283]	SOME/IP Transformation settings for structures in the context of an ISignal
[constr_3284]	SOME/IP Transformation settings for unions in the context of an ISignal
[constr_3285]	Alignment of variable data length data elements in the context of an ISignal
[constr_3286]	ISignal.length shall be consistent to transformer configuration
[constr_3297]	Prohibition of usage of allowedTcpOptions in Udp SocketConnections
[constr_3298]	Ipv6Configuration.ipv6Address range in case of enableAnycast
[constr_3299]	SocketConnectionBundle.pathMtuDiscoveryEnabled setting dependency
[constr_3311]	Usage of SocketConnectionBundle.flowLabel
[constr_3312]	Consistency of vlanPriority and EthernetCommunicationConnector
[constr_3313]	E2E transformer configuration
[constr_3314]	BufferProperties.bufferComputation is mandatory
[constr_3315]	The value of V0 in BufferProperties.bufferComputation setting for a COM Based transformer
[constr_3316]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_07
[constr_3317]	Assuring the same data interpretation on the sender and receiver sides in case of serialization based on the ImplementationDataTypes
[constr_3318]	Allowed use of ISignal.networkRepresentationProps
[constr_3319]	Existence of DataPrototypeTransformationProps.networkRepresentationProps
[constr_3322]	Consistent setting of SocketConnectionIpduIdentifier.pduCollectionSemantics in the context of one SocketConnectionBundle
[constr_3323]	Relation between NmCluster.nmPncParticipation and PncMapping.pncGroup
[constr_3324]	Category of SecureCommunicationFreshnessProps and SecureCommunicationAuthenticationProps
[constr_3325]	SecureCommunicationFreshnessProps and SecureCommunicationAuthenticationProps attribute values for predefined categories
[constr_3326]	Allowed values for EndToEndTransformationISignalProps.dataIdMode in PROFILE_11

[constr_3327]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_22
[constr_3328]	SomeipTpConnection.transportPdu reference restriction
[constr_3329]	SomeipTpConnection.tpSdu reference restriction
[constr_3330]	Same transportPdu shall not be used in different SomeipTpConnections
[constr_3331]	Standardized values for the attribute category of meta-class EthernetCommunicationConnector
[constr_3332]	Standardized values for the attribute category of meta-class EthernetCommunicationController
[constr_3333]	Standardized values for the attribute category of meta-class EthernetPhysicalChannel
[constr_3334]	Allowed references between EthernetPhysicalChannel and EthernetCommunicationConnector
[constr_3335]	Allowed references between EthernetCommunicationConnector and EthernetCommunicationController
[constr_3336]	EthernetPhysicalChannel.soAdConfig in case of WIRELESS EthernetPhysicalChannel
[constr_3337]	IPduPort.useAuthDataFreshness is configurable on the receiver side
[constr_3338]	IPduPort.useAuthDataFreshness validness
[constr_3339]	Relation between authDataFreshnessStartPosition, authDataFreshnessLength and useAuthDataFreshness
[constr_3521]	defaultVlan and vlanMembership
[constr_3522]	vlanModifier and vlanMembership
[constr_3523]	CouplingPort and PncMapping in the scope of an EthernetPhysicalChannel
[constr_3524]	Definition of couplingPortRole on CouplingPort for managed CouplingElement
[constr_3525]	Connection of CouplingPort with couplingPortRole set to upLinkPort

Table D.33: Added Constraints in 4.3.0

D.9.5 Changed Constraints in 4.3.0

Id	Heading
[constr_1372]	Consistency of attribute globalTimePduTriggering
[constr_3042]	pncVectorLength range
[constr_3049]	Role of SystemSignal in inter-ECU client server communication with clients located on different ECUs in case of networks other than Ethernet
[constr_3069]	Allowed CanNmCluster.nmNidPosition values
[constr_3070]	Allowed CanNmCluster.nmCbvPosition values
[constr_3078]	Allowed UdpNmCluster.nmNidPosition values
[constr_3079]	Allowed UdpNmCluster.nmCbvPosition values
[constr_3082]	Value of category in GeneralPurposeIPdu
[constr_3113]	AbstractEthernetFrame shall not have a PduToFrameMapping
[constr_3121]	The length of transformer chains is limited to 255 transformers
[constr_3128]	SOME/IP transformer configuration
[constr_3136]	Allowed payload of SecuredIPdus
[constr_3149]	TransformationTechnology.needsOriginalData settings for E2E Transformer
[constr_3150]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01 and PROFILE_11 in case it is 0
[constr_3151]	BufferProperties.headerLength settings for an E2E transformer used in combination with a SOME/IP transformer

[constr_3153]	E2E header field reservation required by COM Based transformer
[constr_3154]	BufferProperties.bufferComputation setting for an E2E transformer when used together with a Com-based transformer
[constr_3156]	Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01 and PROFILE_11
[constr_3157]	Allowed values for EndToEndTransformationISignalProps.dataId in PROFILE_01 and PROFILE_11 in case dataIdMode is set to lower12Bit
[constr_3158]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_01 and PROFILE_11
[constr_3160]	EndToEndTransformationISignalProps.dataId in PROFILE_02 and PROFILE_22
[constr_3161]	EndToEndTransformationISignalProps.dataLength in PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, PROFILE_22
[constr_3162]	EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_01, PROFILE_02, PROFILE_05, PROFILE_11, PROFILE_22
[constr_3163]	EndToEndTransformationISignalProps.minDataLength and EndToEndTransformationISignalProps.maxDataLength in PROFILE_04, PROFILE_06, PROFILE_07
[constr_3164]	EndToEndTransformationISignalProps.dataLength in PROFILE_04, PROFILE_06, PROFILE_07
[constr_3165]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_01, PROFILE_11
[constr_3167]	Effect of EndToEndTransformationDescription.upperHeaderBitsToShift value in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07
[constr_3169]	Attribute multiplicities and values in PROFILE_02 and PROFILE_22
[constr_3171]	Value of EndToEndTransformationISignalProps.dataId shall be unique in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07
[constr_3174]	EndToEndTransformationDescription settings not allowed in PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_11, PROFILE_22
[constr_3184]	Only one EndToEndTransformationISignalProps.dataId element in PROFILE_01 and PROFILE_11
[constr_3185]	Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_01 and PROFILE_11
[constr_3186]	Multiplicity of EndToEndTransformationDescription.dataIdMode in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22
[constr_3187]	Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_01 and PROFILE_11
[constr_3188]	Multiplicity of EndToEndTransformationDescription.counterOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22
[constr_3189]	Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_01 and PROFILE_11
[constr_3190]	Multiplicity of EndToEndTransformationDescription.crcOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22
[constr_3191]	Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_01, PROFILE_11 and dataIdMode equal to lower12Bit
[constr_3192]	Multiplicity of EndToEndTransformationDescription.dataIdNibbleOffset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22 or dataIdMode different from lower12Bit
[constr_3193]	Multiplicity of EndToEndTransformationDescription.offset in PROFILE_01 and PROFILE_11
[constr_3194]	Multiplicity of EndToEndTransformationDescription.offset in PROFILE_02, PROFILE_04, PROFILE_05, PROFILE_06, PROFILE_07, PROFILE_22

[constr_3195]	Allowed values for EndToEndTransformationDescription.maxDeltaCounter in PROFILE_02 and PROFILE_22
[constr_3514]	No two ISignalToIPduMappings shall reference the identical ISignal

Table D.34: Changed Constraints in 4.3.0

D.9.6 Deleted Constraints in 4.3.0

Id	Heading
[constr_3032]	Combinations of SwcToEcuMapping targets
[constr_3061]	CompuMethod specification in networkRepresentationProps
[constr_3207]	Assignment of SocketConnectionIpduIdentifiers used for ClientServer Communication to SocketConnections

Table D.35: Deleted Constraints in 4.3.0

D.10 Constraint and Specification Item History of this document according to AUTOSAR R4.3.1

D.10.1 Added Traceables in 4.3.1

Number	Heading
[TPS_SYST_02162]	Routing of ISignals of ISignalGroups
[TPS_SYST_02163]	Applicability of syncLossTimeout
[TPS_SYST_02164]	LdCom: No ISignalPort.firstTimeout reception timeout defined
[TPS_SYST_02165]	Derivation of CanNmPnFilterMaskByte
[TPS_SYST_02166]	Derivation of UdpNmPnFilterMaskByte
[TPS_SYST_02167]	Derivation of FrNmPnFilterMaskByte
[TPS_SYST_02168]	MetaData support required if CanFrameTriggering.txMask is used
[TPS_SYST_02169]	MetaData support may be required if CanFrameTriggering.rxMask is used
[TPS_SYST_02170]	category of the GeneralPurposeConnection
[TPS_SYST_02171]	Secured Area in payload Pdu
[TPS_SYST_02172]	Modeling of SecuredIPdu in case useAsCryptographicIPdu is set to false
[TPS_SYST_02173]	Modeling of SecuredIPdu in case useAsCryptographicIPdu is set to true
[TPS_SYST_02174]	Initial Wait Phase configuration for a ProvidedServiceInstance
[TPS_SYST_02175]	Repetition Wait Phase configuration for a ProvidedServiceInstance
[TPS_SYST_02176]	Main Phase configuration for a ProvidedServiceInstance
[TPS_SYST_02177]	TTL for Offer Service Entries
[TPS_SYST_02178]	Servers RequestResponseDelay for received FindService entries
[TPS_SYST_02179]	Server Capability Records
[TPS_SYST_02180]	Usage of EventHandler.multicastThreshold
[TPS_SYST_02181]	TTL for SubscribeEventGroupAck Entries

Number	Heading
[TPS_SYST_02182]	Servers RequestResponseDelay for received SubscribeEventGroup entries
[TPS_SYST_02183]	Initial Wait Phase configuration for a ConsumedServiceInstance
[TPS_SYST_02184]	Repetition Wait Phase configuration for a ConsumedServiceInstance
[TPS_SYST_02185]	TTL for Find Service Entries
[TPS_SYST_02186]	Client Capability Records
[TPS_SYST_02187]	SdClientConfig.ttl for SubscribeEventGroup Entries
[TPS_SYST_02188]	Clients RequestResponseDelay for received ServiceOffer entries
[TPS_SYST_02189]	Setting of useSecuredPduHeader attribute

Table D.36: Added Traceables in 4.3.1

D.10.2 Changed Traceables in 4.3.1

Number	Heading
[TPS_SYST_01120]	Precedence of ISignalMappings
[TPS_SYST_02098]	Header id and header type of a contained IPdu
[TPS_SYST_02100]	Relation between ContainerIPdu and contained IPdus on receiver side
[TPS_SYST_02112]	Usage of EventHandler.applicationEndpoint reference

Table D.37: Changed Traceables in 4.3.1

D.10.3 Deleted Traceables in 4.3.1

Number	Heading
[TPS_SYST_02005]	Low-level routing of J1939DcmIPdus
[TPS_SYST_02160]	EthernetPhysicalChannels with different category values are not allowed within an EthernetCluster

Table D.38: Deleted Traceables in 4.3.1

D.10.4 Added Constraints in 4.3.1

Number	Heading
[constr_3364]	headerLength shall be a multiple of 8
[constr_3365]	EthernetPhysicalChannels with different category values are not allowed within an EthernetCluster
[constr_3373]	Limitation on the number of PhysicalChannels that are referencing a CommunicationConnector
[constr_3378]	Maximal one AliasNameAssignment allowed per FlatInstanceDescriptor
[constr_3379]	Multiple SocketAddress entries with the same IP Address, Protocol and Port in the context of a given EcuInstance
[constr_3383]	Standardized values for the attribute category of meta-class GeneralPurposeConnection

Number	Heading
[constr_3384]	PduTriggerings referenced by GeneralPurposeConnection shall be defined on the same PhysicalChannel
[constr_3385]	XcpChannel is allowed to reference exactly two PduTriggerings
[constr_3386]	XcpChannel is only allowed to reference PduTriggerings of GeneralPurposeIPdus with category XCP
[constr_3399]	Existence of securedAreaOffset and securedAreaLength
[constr_3400]	Usage of SdClientConfig attributes in ConsumedServiceInstance and ConsumedEventGroup
[constr_3401]	Usage of SdServerConfig attributes in ProvidedServiceInstance and EventHandler
[constr_3402]	Mandatory offset if noHeader is used
[constr_3403]	Usage of ContainerIPdu.rxAcceptContainedIPdu if noHeader is used
[constr_3404]	Usage of ContainedIPduProps.updateIndicationBitPosition
[constr_3405]	Dynamic Length IPdu inside of a static configured ContainerIPdu
[constr_3406]	All signals before authDataFreshnessStartPosition shall have a static length
[constr_3407]	Freshness Value in Authentic IPdu is not allowed to be used in case of ContainerIPdu with a dynamic layout

Table D.39: Added Constraints in 4.3.1

D.10.5 Changed Constraints in 4.3.1

Number	Heading
[constr_2025]	Uniqueness of symbol attributes
[constr_3052]	Complete ISignalMapping of ISignalGroup signals
[constr_3053]	Complete ISignalMapping of target ISignalGroup
[constr_3136]	Allowed payload of SecuredIPdus

Table D.40: Changed Constraints in 4.3.1

D.10.6 Deleted Constraints in 4.3.1

Number	Heading
[constr_3139]	Usage of IPduPort.rxSecurityVerification

Table D.41: Deleted Constraints in 4.3.1

E Mentioned Class Tables

For the sake of completeness, this chapter contains a set of class tables representing meta-classes mentioned in the context of this document but which are not contained directly in the scope of describing specific meta-model semantics.

Class	**ARElement (abstract)**			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
Note	An element that can be defined stand-alone, i.e. without being part of another element (except for packages of course).			
Base	ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Packageable Element, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.1: ARElement

Class	**ARPackage**			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
Note	AUTOSAR package, allowing to create top level packages to structure the contained ARElements. ARPackages are open sets. This means that in a file based description system multiple files can be used to partially describe the contents of a package. This is an extended version of MSR's SW-SYSTEM.			
Base	ARObject, AtpBlueprint, AtpBlueprintable, CollectableElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
arPackage	ARPackage	*	aggr	This represents a sub package within an ARPackage, thus allowing for an unlimited package hierarchy. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=blueprintDerivationTime xml.sequenceOffset=30
element	PackageableEle ment	*	aggr	Elements that are part of this package **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=systemDesignTime xml.sequenceOffset=20

referenceBase	ReferenceBase	*	aggr	This denotes the reference bases for the package. This is the basis for all relative references within the package. The base needs to be selected according to the base attribute within the references. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortLabel xml.sequenceOffset=10

Table E.2: ARPackage

Class	**AbstractProvidedPortPrototype (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This abstract class provides the ability to become a provided PortPrototype.			
Base	ARObject, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, PortPrototype, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
providedComSpec	PPortComSpec	*	aggr	Provided communication attributes per interface element (data element or operation).

Table E.3: AbstractProvidedPortPrototype

Class	**AdminData**			
Package	M2::MSR::AsamHdo::AdminData			
Note	AdminData represents the ability to express administrative information for an element. This administration information is to be treated as meta-data such as revision id or state of the file. There are basically four kinds of meta-data • The language and/or used languages. • Revision information covering e.g. revision number, state, release date, changes. Note that this information can be given in general as well as related to a particular company. • Document meta-data specific for a company			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
docRevision (ordered)	DocRevision	*	aggr	This allows to denote information about the current revision of the object. Note that information about previous revisions can also be logged here. The entries shall be sorted descendant by date in order to reflect the history. Therefore the most recent entry representing the current version is denoted first. **Tags:** xml.roleElement=true; xml.roleWrapperElement=true; xml.sequenceOffset=50; xml.typeElement=false; xml.typeWrapperElement=false

language	LEnum	0..1	attr	This attribute specifies the master language of the document or the document fragment. The master language is the one in which the document is maintained and from which the other languages are derived from. In particular in case of inconsistencies, the information in the master language is priority. **Tags:** xml.sequenceOffset=20
sdg	Sdg	*	aggr	This property allows to keep special data which is not represented by the standard model. It can be utilized to keep e.g. tool specific data. **Tags:** xml.roleElement=true; xml.roleWrapperElement=true; xml.sequenceOffset=60; xml.typeElement=false; xml.typeWrapperElement=false
usedLanguages	MultiLanguagePlainText	0..1	aggr	This property specifies the languages which are provided in the document. Therefore it should only be specified in the top level admin data. For each language provided in the document there is one entry in MultilanguagePlainText. The content of each entry can be used for illustration of the language. The used language itself depends on the language attribute in the entry. **Tags:** xml.sequenceOffset=30

Table E.4: AdminData

Class	**AnyInstanceRef**			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::AnyInstanceRef			
Note	Describes a reference to any instance in an AUTOSAR model. This is the most generic form of an instance ref. Refer to the superclass notes for more details.			
Base	ARObject,AtpInstanceRef			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
base	AtpClassifier	1	ref	This is the base from which navigation path begins. **Stereotypes:** atpDerived
contextElement	AtpFeature	*	ref	This is one step in the navigation path specified by the instance ref.
target	AtpFeature	1	ref	This is the target of the instance ref.

Table E.5: AnyInstanceRef

Class	ApplicationArrayDataType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	An application data type which is an array, each element is of the same application data type. **Tags:** atp.recommendedPackage=ApplicationDataTypes			
Base	ARElement, ARObject, ApplicationCompositeDataType, ApplicationDataType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
dynamicArraySizeProfile	String	0..1	attr	Specifies the profile which the array will follow if it is a variable size array.
element	ApplicationArrayElement	1	aggr	This association implements the concept of an array element. That is, in some cases it is necessary to be able to identify single array elements, e.g. as input values for an interpolation routine.

Table E.6: ApplicationArrayDataType

Class	ApplicationCompositeDataType (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	Abstract base class for all application data types composed of other data types.			
Base	ARElement, ARObject, ApplicationDataType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table E.7: ApplicationCompositeDataType

Class	ApplicationCompositeElementDataPrototype (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	This class represents a data prototype which is aggregated within a composite application data type (record or array). It is introduced to provide a better distinction between target and context in instanceRefs.			
Base	ARObject, AtpFeature, AtpPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
type	ApplicationDataType	1	tref	This represents the corresponding data type. **Stereotypes:** isOfType

Table E.8: ApplicationCompositeElementDataPrototype

Class	ApplicationDataType (abstract)			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	ApplicationDataType defines a data type from the application point of view. Especially it should be used whenever something "physical" is at stake. An ApplicationDataType represents a set of values as seen in the application model, such as measurement units. It does not consider implementation details such as bit-size, endianess, etc. It should be possible to model the application level aspects of a VFB system by using ApplicationDataTypes only.			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table E.9: ApplicationDataType

Class	ApplicationPrimitiveDataType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	A primitive data type defines a set of allowed values. **Tags:** atp.recommendedPackage=ApplicationDataTypes			
Base	ARElement, ARObject, ApplicationDataType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table E.10: ApplicationPrimitiveDataType

Class	ApplicationRecordDataType			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	An application data type which can be decomposed into prototypes of other application data types. **Tags:** atp.recommendedPackage=ApplicationDataTypes			
Base	ARElement, ARObject, ApplicationCompositeDataType, ApplicationDataType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
element (ordered)	ApplicationRecordElement	1..*	aggr	Specifies an element of a record. The aggregation of ApplicationRecordElement is subject to variability with the purpose to support the conditional existence of elements inside a ApplicationrecordDataType. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.11: ApplicationRecordDataType

Class	**ApplicationRecordElement**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	Describes the properties of one particular element of an application record data type.			
Base	ARObject, ApplicationCompositeElementDataPrototype, AtpFeature, AtpPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table E.12: ApplicationRecordElement

Class	**ApplicationSwComponentType**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The ApplicationSwComponentType is used to represent the application software. **Tags:** atp.recommendedPackage=SwComponentTypes			
Base	ARElement, ARObject, AtomicSwComponentType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
–	–	–	–	–

Table E.13: ApplicationSwComponentType

Class	**ArgumentDataPrototype**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	An argument of an operation, much like a data element, but also carries direction information and is owned by a particular ClientServerOperation.			
Base	ARObject, AtpFeature, AtpPrototype, AutosarDataPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
direction	ArgumentDirectionEnum	1	attr	This attribute specifies the direction of the argument prototype.
serverArgumentImplPolicy	ServerArgumentImplPolicyEnum	0..1	attr	This defines how the argument type of the servers RunnableEntity is implemented. If the attribute is not defined this has the same semantics as if the attribute is set to the value useArgumentType for primitive arguments and structures and to the value useArrayBaseType for arrays.

Table E.14: ArgumentDataPrototype

Class	**AssemblySwConnector**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	AssemblySwConnectors are exclusively used to connect SwComponentPrototypes in the context of a CompositionSwComponentType.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable, SwConnector			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
provider	AbstractProvidedPortPrototype	0..1	iref	Instance of providing port.
requester	AbstractRequiredPortPrototype	0..1	iref	Instance of requiring port.

Table E.15: AssemblySwConnector

Class	**AtomicSwComponentType (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	An atomic software component is atomic in the sense that it cannot be further decomposed and distributed across multiple ECUs.			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
internalBehavior	SwcInternalBehavior	0..1	aggr	The SwcInternalBehaviors owned by an AtomicSwComponentType can be located in a different physical file. Therefore the aggregation is «atpSplitable». **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=internalBehavior, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
symbolProps	SymbolProps	0..1	aggr	This represents the SymbolProps for the AtomicSwComponentType. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName

Table E.16: AtomicSwComponentType

Class	**AtpInstanceRef (abstract)**			
Package	M2::AUTOSARTemplates::GenericStructure::AbstractStructure			
Note	An M0 instance of a classifier may be represented as a tree rooted at that instance, where under each node come the sub-trees representing the instances which act as features under that node. An instance ref specifies a navigation path from any M0 tree-instance of the base (which is a classifier) to a leaf (which is an instance of the target).			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

atpBase	AtpClassifier	1	ref	This is the base from which the navigaion path starts. **Stereotypes:** atpAbstract; atpDerived
atpContextElement (ordered)	AtpPrototype	*	ref	This is one particular step in the navigation path. **Stereotypes:** atpAbstract
atpTarget	AtpFeature	1	ref	This is the target of the instance ref. In other words it is the terminal of the navigation path. **Stereotypes:** atpAbstract

Table E.17: AtpInstanceRef

Class	**AutosarDataPrototype (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	Base class for prototypical roles of an AutosarDataType.			
Base	ARObject, AtpFeature, AtpPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
type	AutosarDataType	1	tref	This represents the corresponding data type. **Stereotypes:** isOfType

Table E.18: AutosarDataPrototype

Class	**AutosarDataType (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	Abstract base class for user defined AUTOSAR data types for ECU software.			
Base	ARElement, ARObject, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
swDataDefProps	SwDataDefProps	0..1	aggr	The properties of this AutosarDataType.

Table E.19: AutosarDataType

Class	**BaseType (abstract)**			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	This abstract meta-class represents the ability to specify a platform dependant base type.			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

baseType Definition	BaseTypeDefinition	1	aggr	This is the actual definition of the base type. **Tags:** xml.roleElement=false; xml.roleWrapperElement=false; xml.sequenceOffset=20; xml.typeElement=false; xml.typeWrapperElement=false

Table E.20: BaseType

Class	**BaseTypeDirectDefinition**			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	This BaseType is defined directly (as opposite to a derived BaseType)			
Base	ARObject, BaseTypeDefinition			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
baseType Encoding	BaseTypeEncodingString	1	attr	This specifies, how an object of the current BaseType is encoded, e.g. in an ECU within a message sequence. **Tags:** xml.sequenceOffset=90
baseType Size	PositiveInteger	0..1	attr	Describes the length of the data type specified in the container in bits. **Tags:** xml.sequenceOffset=70
byteOrder	ByteOrderEnum	0..1	attr	This attribute specifies the byte order of the base type. **Tags:** xml.sequenceOffset=110
maxBaseTypeSize	PositiveInteger	0..1	attr	Describes the maximum length of the BaseType in bits. **Tags:** atp.Status=obsolete xml.sequenceOffset=80
memAlignment	PositiveInteger	0..1	attr	This attribute describes the alignment of the memory object in bits. E.g. "8" specifies, that the object in question is aligned to a byte while "32" specifies that it is aligned four byte. If the value is set to "0" the meaning shall be interpreted as "unspecified". **Tags:** xml.sequenceOffset=100

nativeDeclaration	NativeDeclarationString	0..1	attr	This attribute describes the declaration of such a base type in the native programming language, primarily in the Programming language C. This can then be used by a code generator to include the necessary declarations into a header file. For example
				
				BaseType with
				`shortName: "MyUnsignedInt"`
				`nativeDeclaration: "unsigned short"`
				
				Results in
				`typedef unsigned short MyUnsignedInt;`
				
				If the attribute is not defined the referring ImplementationDataTypes will not be generated as a typedef by RTE.
				
				If a nativeDeclaration type is given it shall fulfill the characteristic given by basetypeEncoding and baseTypeSize.
				
				This is required to ensure the consistent handling and interpretation by software components, RTE, COM and MCM systems.
				
				Tags: xml.sequenceOffset=120

Table E.21: BaseTypeDirectDefinition

Class	**BswInternalBehavior**			
Package	M2::AUTOSARTemplates::BswModuleTemplate::BswBehavior			
Note	Specifies the behavior of a BSW module or a BSW cluster w.r.t. the code entities visible by the BSW Scheduler. It is possible to have several different BswInternalBehaviors referring to the same BswModuleDescription.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, Internal Behavior, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
arTypedPerInstanceMemory	VariableDataPrototype	*	aggr	Defines an AUTOSAR typed memory-block that needs to be available for each instance of the Basic Software Module. The aggregation of arTypedPerInstanceMemory is subject to variability with the purpose to support variability in the Basic Software Module's implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

bswPerInstanceMemoryPolicy	BswPerInstanceMemoryPolicy	*	aggr	Policy for a arTypedPerInstanceMemory The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
clientPolicy	BswClientPolicy	*	aggr	Policy for a requiredClientServerEntry. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=clientPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
distinguishedPartition	BswDistinguishedPartition	*	aggr	Indicates an abstract partition context in which the enclosing BswModuleEntity can be executed. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.ShortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=60
entity	BswModuleEntity	*	aggr	A code entity for which the behavior is described **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=5
event	BswEvent	*	aggr	An event required by this module behavior. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=10
exclusiveAreaPolicy	BswExclusiveAreaPolicy	*	aggr	Policy for an ExclusiveArea in this BswInternalBehavior. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=exclusiveAreaPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
includedDataTypeSet	IncludedDataTypeSet	*	aggr	The includedDataTypeSet is used by a basic software module for its implementation. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=includedDataTypeSet

internalTriggeringPoint	BswInternalTriggeringPoint	*	aggr	An internal triggering point. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=2
internalTriggeringPointPolicy	BswInternalTriggeringPointPolicy	*	aggr	Policy for an internalTriggeringPoint in this BswInternalBehavior.. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=internalTriggeringPointPolicy, variationPoint.shortPoint vh.latestBindingTime=preCompileTime
modeReceiverPolicy	BswModeReceiverPolicy	*	aggr	Implementation policy for the reception of mode switches. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=modeReceiverPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=25
modeSenderPolicy	BswModeSenderPolicy	*	aggr	Implementation policy for providing a mode group. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=modeSenderPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=20
parameterPolicy	BswParameterPolicy	*	aggr	Policy for a perInstanceParameter in this BswInternalBehavior. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=parameterPolicy, variatioPoint.shortLabel vh.latestBindingTime=preCompileTime

perInstanceParameter	ParameterDataPrototype	*	aggr	Describes a read only memory object containing characteristic value(s) needed by this BswInternalBehavior. The role name perInstanceParameter is chosen in analogy to the similar role in the context of SwcInternalBehavior. In contrast to constantMemory, this object is not allocated locally by the module's code, but by the BSW Scheduler and it is accessed from the BSW module via the BSW Scheduler API. The main use case is the support of software emulation of calibration data. The aggregation is subject to variability with the purpose to support implementation variants. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=atp.Splitkey shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=45
receptionPolicy	BswDataReceptionPolicy	*	aggr	Data reception policy for inter-partition and/or inter-core communication. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=receptionPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=55
releasedTriggerPolicy	BswReleasedTriggerPolicy	*	aggr	Policy for a releasedTrigger. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=releasedTriggerPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
schedulerNamePrefix	BswSchedulerNamePrefix	*	aggr	Optional definition of one or more prefixes to be used for the BswScheduler. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=schedulerNamePrefix, variationPoint.ShortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=50
sendPolicy	BswDataSendPolicy	*	aggr	Policy for a providedData. The policy selects the options of the Schedule Manager API generation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=sendPolicy, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

serviceDependency	BswServiceDependency	*	aggr	Defines the requirements on AUTOSAR Services for a particular item. The aggregation is subject to variability with the purpose to support the conditional existence of ServiceNeeds. The aggregation is splitable in order to support that ServiceNeeds might be provided in later development steps. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=serviceDependency, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=40
triggerDirectImplementation	BswTriggerDirectImplementation	*	aggr	Specifies a trigger to be directly implemented via OS calls. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=triggerDirectImplementation, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=15
variationPointProxy	VariationPointProxy	*	aggr	Proxy of a variation points in the C/C++ implementation. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName

Table E.22: BswInternalBehavior

Class	**CalibrationParameterValue**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::MeasurementAndCalibration::CalibrationParameterValues			
Note	Specifies instance specific calibration parameter values used to initialize the memory objects implementing calibration parameters in the generated RTE code. RTE generator will use the implInitValue to override the initial values specified for the DataPrototypes of a component type. The applInitValue is used to exchange init values with the component vendor not publishing the transformation algorithm between ApplicationDataTypes and ImplementationDataTypes or defining a instance specific initialization of components which are only defined with ApplicationDataTypes. Note: If both representations of init values are available these need to represent the same content. Note further that in this case an explicit mapping of ValueSpecification is not implemented because calibration parameters are delivered back after the calibration phase.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
applInitValue	ValueSpecification	0..1	aggr	This is the initial value specification structured according to the ApplicationDataType
implInitValue	ValueSpecification	0..1	aggr	This is the initial value specification structured according to the ImplementationDataType
initializedParameter	FlatInstanceDescriptor	1	ref	This represents the parameter that is initialized by the CalibrationParameterValue.

Table E.23: CalibrationParameterValue

Class	**ClientServerInterface**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A client/server interface declares a number of operations that can be invoked on a server by a client. **Tags:** atp.recommendedPackage=PortInterfaces			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, PortInterface, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
operation	ClientServerOperation	1..*	aggr	ClientServerOperation(s) of this ClientServerInterface. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=blueprintDerivationTime
possibleError	ApplicationError	*	aggr	Application errors that are defined as part of this interface.

Table E.24: ClientServerInterface

Class	**ClientServerOperation**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	An operation declared within the scope of a client/server interface.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
argument (ordered)	ArgumentDataPrototype	*	aggr	An argument of this ClientServerOperation **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=blueprintDerivationTime
possibleError	ApplicationError	*	ref	Possible errors that may by raised by the referring operation.

Table E.25: ClientServerOperation

Enumeration	**CommunicationDirectionType**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication
Note	Describes the communication direction.
Literal	*Description*
in	Reception (Input) **Tags:** atp.EnumerationValue=0
out	Transmission (Output) **Tags:** atp.EnumerationValue=1

Table E.26: CommunicationDirectionType

Class	**CompositionSwComponentType**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	A CompositionSwComponentType aggregates SwComponentPrototypes (that in turn are typed by SwComponentTypes) as well as SwConnectors for primarily connecting SwComponentPrototypes among each others and towards the surface of the CompositionSwComponentType. By this means hierarchical structures of software-components can be created. **Tags:** atp.recommendedPackage=SwComponentTypes			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

component	SwComponentPrototype	*	aggr	The instantiated components that are part of this composition. The aggregation of SwComponentPrototype is subject to variability with the purpose to support the conditional existence of a SwComponentPrototype. Please be aware: if the conditional existence of SwComponentPrototypes is resolved post-build the deselected SwComponentPrototypes are still contained in the ECUs build but the instances are inactive in in that they are not scheduled by the RTE. The aggregation is marked as atpSplitable in order to allow the addition of service components to the ECU extract during the ECU integration. The use case for having 0 components owned by the CompositionSwComponentType could be to deliver an empty CompositionSwComponentType to e.g. a supplier for filling the internal structure. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
connector	SwConnector	*	aggr	SwConnectors have the principal ability to establish a connection among PortPrototypes. They can have many roles in the context of a CompositionSwComponentType. Details are refined by subclasses. The aggregation of SwConnectors is subject to variability with the purpose to support variant data flow. The aggregation is marked as atpSplitable in order to allow the extension of the ECU extract with AssemblySwConnectors between ApplicationSwComponentTypes and ServiceSwComponentTypes during the ECU integration. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild
constantValueMapping	ConstantSpecificationMappingSet	*	ref	Reference to the ConstantSpecificationMapping to be applied for initValues of PPortComSpecs and RPortComSpec. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=constantValueMapping

dataTypeMapping	DataTypeMappingSet	*	ref	Reference to the DataTypeMapping to be applied for the used ApplicationDataTypes in PortInterfaces. Background: when developing subsystems it may happen that ApplicationDataTypes are used on the surface of CompositionSwComponentTypes. In this case it would be reasonable to be able to also provide the intended mapping to the ImplementationDataTypes. However, this mapping shall be informal and not technically binding for the implementers mainly because the RTE generator is not concerned about the CompositionSwComponentTypes. Rationale: if the mapping of ApplicationDataTypes on the delegated and inner PortPrototype matches then the mapping to ImplementationDataTypes is not impacting compatibility. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=dataTypeMapping
instantiationRTEEventProps	InstantiationRTEEventProps	*	aggr	This allows to define instantiation specific properties for RTE Events, in particular for instance specific scheduling. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortLabel, variationPoint.shortLabel vh.latestBindingTime=codeGenerationTime

Table E.27: CompositionSwComponentType

Class	**CompuMethod**			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the ability to express the relationship between a physical value and the mathematical representation. Note that this is still independent of the technical implementation in data types. It only specifies the formula how the internal value corresponds to its physical pendant. **Tags:** atp.recommendedPackage=CompuMethods			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
compuInternalToPhys	Compu	0..1	aggr	This specifies the computation from internal values to physical values. **Tags:** xml.sequenceOffset=80
compuPhysToInternal	Compu	0..1	aggr	This represents the computation from physical values to the internal values. **Tags:** xml.sequenceOffset=90

displayFormat	DisplayFormatString	0..1	attr	This property specifies, how the physical value shall be displayed e.g. in documents or measurement and calibration tools. **Tags:** xml.sequenceOffset=20
unit	Unit	0..1	ref	This is the physical unit of the Physical values for which the CompuMethod applies. **Tags:** xml.sequenceOffset=30

Table E.28: CompuMethod

Class	**CompuScale**			
Package	M2::MSR::AsamHdo::ComputationMethod			
Note	This meta-class represents the ability to specify one segment of a segmented computation method.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
desc	MultiLanguageOverviewParagraph	0..1	aggr	<desc> represents a general but brief description of the object in question. **Tags:** xml.sequenceOffset=30
compuInverseValue	CompuConst	0..1	aggr	This is the inverse value of the constraint. This supports the case that the scale is not reversible per se. **Tags:** xml.sequenceOffset=60
compuScaleContents	CompuScaleContents	0..1	aggr	This represents the computation details of the scale. **Tags:** xml.roleElement=false; xml.roleWrapperElement=false; xml.sequenceOffset=70; xml.typeElement=false; xml.typeWrapperElement=false
lowerLimit	Limit	0..1	attr	This specifies the lower limit of the scale. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=40

mask	PositiveInteger	0..1	attr	In difference to all the other computational methods every COMPU-SCALE will be applied including the bit MASK. Therefore it is allowed for this type of COMPU-METHOD, that COMPU-SCALES overlap. To calculate the string reverse to a value, the string has to be split and the according value for each substring has to be summed up. The sum is finally transmitted. The processing has to be done in order of the COMPU-SCALE elements. **Tags:** xml.sequenceOffset=35
shortLabel	Identifier	0..1	attr	This element specifies a short name for the particular scale. The name can for example be used to derive a programming language identifier. **Tags:** xml.sequenceOffset=20
symbol	CIdentifier	0..1	attr	The symbol, if provided, is used by code generators to get a C identifier for the CompuScale. The name will be used as is for the code generation, therefore it needs to be unique within the generation context. **Tags:** xml.sequenceOffset=25
upperLimit	Limit	0..1	attr	This specifies the upper limit of a of the scale. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=50

Table E.29: CompuScale

Class	≪atpMixedString≫ **ConditionByFormula**			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	This class represents a condition which is computed based on system constants according to the specified expression. The expected result is considered as boolean value. The result of the expression is interpreted as a condition. • "0" represents "false"; • a value other than zero is considered "true"			
Base	ARObject, FormulaExpression, SwSystemconstDependentFormula			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

bindingTime	BindingTimeEnum	1	attr	This attribute specifies the point in time when condition may be evaluated at earliest. At this point in time all referenced system constants shall have a value. **Tags:** xml.attribute=true

Table E.30: ConditionByFormula

Enumeration	**CouplingPortRoleEnum**
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Ethernet::EthernetTopology
Note	Defines the role a CouplingPort takes in the context of a CouplingElement.
Literal	***Description***
hostPort	The hostPort is connected to an ECU (host ecu). The host ECU controls the connected CouplingElement (e.g. Ethernet switch). **Tags:** atp.EnumerationValue=0
standardPort	A CouplingPort can be a standardPort that is used to connect the CouplingElement with CouplingPorts outside the ECU. **Tags:** atp.EnumerationValue=2
upLinkPort	A CouplingPort can be connected to another CouplingPort of a CouplingElement located on the same ECU (CouplingElement.ecuInstance) using the CouplingPortConnection. This is used to model a cascaded switch. **Tags:** atp.EnumerationValue=1

Table E.31: CouplingPortRoleEnum

Class	**DataPrototype (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	Base class for prototypical roles of any data type.			
Base	ARObject, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
swDataDefProps	SwDataDefProps	0..1	aggr	This property allows to specify data definition properties which apply on data prototype level.

Table E.32: DataPrototype

Class	**DataPrototypeMapping**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Defines the mapping of two particular VariableDataPrototypes, ParameterDataPrototypes or ArgumentDataPrototypes with unequal names and/or unequal semantic (resolution or range) in context of two different SenderReceiverInterface, NvDataInterface or ParameterInterface or Operations. If the semantic is unequal following rules apply: The textTableMapping is only applicable if the referred DataPrototypes are typed by AutosarDataType referring to CompuMethods of category TEXTTABLE, SCALE_LINEAR_AND_TEXTTABLE or BITFIELD_TEXTTABLE. In the case that the DataPrototypes are typed by AutosarDataType either referring to CompuMethods of category LINEAR, IDENTICAL or referring to no CompuMethod (which is similar as IDENTICAL) the linear conversion factor is calculated out of the factorSiToUnit and offsetSiToUnit attributes of the referred Units and the CompuRationalCoeffs of a compuInternalToPhys of the referred CompuMethods.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
firstDataPrototype	AutosarDataPrototype	1	ref	First to be mapped DataPrototype in context of a SenderReceiverInterface, NvDataInterface, ParameterInterface or Operation.
firstToSecondDataTransformation	DataTransformation	0..1	ref	This defines the need to execute the DataTransformation <Mip>_<transformerId> functions of the transformation chain when communicating from the DataPrototypeMapping.firstDataPrototype to the DataPrototypeMapping.secondDataPrototype. And to execute the DataTransformation <Mip>_Inv_<transformerId> functions of the transformation chain when communicating from the DataPrototypeMapping.secondDataPrototype to the DataPrototypeMapping.firstDataPrototype.
secondDataPrototype	AutosarDataPrototype	1	ref	Second to be mapped DataPrototype in context of a SenderReceiverInterface, NvDataInterface, ParameterInterface or Operation.
subElementMapping	SubElementMapping	*	aggr	This represents the owned SubelementMapping.
textTableMapping	TextTableMapping	0..2	aggr	Applied TextTableMapping(s)

Table E.33: DataPrototypeMapping

Class	**DataTypeMap**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	This class represents the relationship between ApplicationDataType and its implementing ImplementationDataType.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
applicationDataType	ApplicationDataType	1	ref	This is the corresponding ApplicationDataType

implementationDataType	ImplementationDataType	1	ref	This is the corresponding ImplementationDataType.

Table E.34: DataTypeMap

Class	**DataTypeMappingSet**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::Datatypes			
Note	This class represents a list of mappings between ApplicationDataTypes and ImplementationDataTypes. In addition, it can contain mappings between ImplementationDataTypes and ModeDeclarationGroups. **Tags:** atp.recommendedPackage=DataTypeMappingSets			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dataTypeMap	DataTypeMap	*	aggr	This is one particular association between an ApplicationDataType and its ImplementationDataType.
modeRequestTypeMap	ModeRequestTypeMap	*	aggr	This is one particular association between an ModeDeclarationGroup and its ImplementationDataType.

Table E.35: DataTypeMappingSet

Class	**DelegationSwConnector**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	A delegation connector delegates one inner PortPrototype (a port of a component that is used inside the composition) to a outer PortPrototype of compatible type that belongs directly to the composition (a port that is owned by the composition).			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable, SwConnector			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
innerPort	PortPrototype	1	iref	The port that belongs to the ComponentPrototype in the composition **Tags:** xml.typeElement=true
outerPort	PortPrototype	1	ref	The port that is located on the outside of the CompositionType

Table E.36: DelegationSwConnector

Class	Describable (abstract)			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable			
Note	This meta-class represents the ability to add a descriptive documentation to non identifiable elements.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
desc	MultiLanguage OverviewParagr aph	0..1	aggr	This represents a general but brief (one paragraph) description what the object in question is about. It is only one paragraph! Desc is intended to be collected into overview tables. This property helps a human reader to identify the object in question. More elaborate documentation, (in particlar how the object is built or used) should go to "introduction". **Tags:** xml.sequenceOffset=-60
category	CategoryString	0..1	attr	The category is a keyword that specializes the semantics of the Describable. It affects the expected existence of attributes and the applicability of constraints. **Tags:** xml.sequenceOffset=-50
adminData	AdminData	0..1	aggr	This represents the administrative data for the describable object. **Tags:** xml.sequenceOffset=-20
introductio n	Documentation Block	0..1	aggr	This represents more information about how the object in question is built or is used. Therefore it is a DocumentationBlock. **Tags:** xml.sequenceOffset=-30

Table E.37: Describable

Class	DoIpActivationLineNeeds			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	A DoIP entity needs to be informed when an external tester is attached or activated. The DoIpActivationServiceNeeds specifies the trigger for such an event. Examples would be a Pdu via a regular communication bus, a PWM signal, or an I/O. For details please refer to the ISO 13400.			
Base	ARObject, DoIpServiceNeeds, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table E.38: DoIpActivationLineNeeds

Class	**DoIpGidNeeds**			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	The DoIpGidNeeds indicates that the software-component owning this ServiceNeeds is providing the GID number either after a GID Synchronisation or by other means like e.g. flashed EEPROM parameter. This need can be used independent from DoIpGidSynchronizationNeeds and is necessary if the GID can not be provided out of the DoIP configuration options.			
Base	ARObject, DoIpServiceNeeds, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.39: DoIpGidNeeds

Class	**DoIpGidSynchronizationNeeds**			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	The DoIpGidSynchronizationNeeds indicates that the software-component owning this ServiceNeeds is triggered by the DoIP entity to start a synchronization of the GID (Group Identification) on the DoIP service 0x0001, 0x0002, 0x0003 or before announcement via service 0x0004 according to ISO 13400-2:2012 if necessary. Note that this need is only relevant for DoIP synchronization masters.			
Base	ARObject, DoIpServiceNeeds, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.40: DoIpGidSynchronizationNeeds

Class	**DoIpPowerModeStatusNeeds**			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	The DoIpPowerModeStatusNeeds indicates that the software-component owning this ServiceNeeds is providing the PowerModeStatus for the DoIP service 0x4003 according to ISO 13400-2:2012.			
Base	ARObject, DoIpServiceNeeds, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.41: DoIpPowerModeStatusNeeds

Class	**DoIpServiceNeeds (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	This represents an abstract base class for ServiceNeeds related to DoIP.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable, ServiceNeeds			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.42: DoIpServiceNeeds

Class	EcucContainerValue			
Package	M2::AUTOSARTemplates::ECUCDescriptionTemplate			
Note	Represents a Container definition in the ECU Configuration Description.			
Base	ARObject, EcucIndexableValue, Identifiable, MultilanguageReferrable, Referrable			
Attribute	Type	Mul.	Kind	Note
definition	EcucContainerDef	1	ref	Reference to the definition of this Container in the ECU Configuration Parameter Definition. **Tags:** xml.sequenceOffset=-10
parameterValue	EcucParameterValue	*	aggr	Aggregates all ECU Configuration Values within this Container. atpVariation: [RS_ECUC_00079] **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=definition, variationPoint.shortLabel vh.latestBindingTime=postBuild
referenceValue	EcucAbstractReferenceValue	*	aggr	Aggregates all References with this container. atpVariation: [RS_ECUC_00079] **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=definition, variationPoint.shortLabel vh.latestBindingTime=postBuild
subContainer	EcucContainerValue	*	aggr	Aggregates all sub-containers within this container. atpVariation: [RS_ECUC_00078] **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=definition, shortName, variationPoint.shortLabel vh.latestBindingTime=postBuild

Table E.43: EcucContainerValue

Class	EndToEndProtectionVariablePrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::EndToEndProtection			
Note	It is possible to protect the data exchanged between software components. For this purpose, for each communication to be protected, the user defines a separate EndToEndProtection (specifying a set of protection settings) and refers to a variableDataPrototype in the role of sender and to one or many variableDataPrototypes in the role of receiver. For details, see EndToEnd Library.			
Base	ARObject			
Attribute	Type	Mul.	Kind	Note
receiver	VariableDataPrototype	*	iref	This represents the receiver. Note that 1:n communication is supported for this use case.

sender	VariableDataPrototype	0..1	iref	This represents the sender. Can be optional if an ecu extract is provided and the sender is part of the extract.
shortLabel	Identifier	0..1	attr	This serves as part of the split key in case of more than one EndToEndProtectionVariablePrototype is aggregated in the bound model.

Table E.44: EndToEndProtectionVariablePrototype

Class	**EndToEndTransformationComSpecProps**			
Package	M2::AUTOSARTemplates::SystemTemplate::Transformer			
Note	The class EndToEndTransformationIComSpecProps specifies port specific configuration properties for EndToEnd transformer attributes.			
Base	ARObject, Describable, TransformationComSpecProps			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
disableEndToEndCheck	Boolean	1	attr	Disables/Enables the E2E check. The E2Eheader is removed from the payload independent from the setting of this attribute.
maxDeltaCounter	PositiveInteger	0..1	attr	Maximum allowed difference between two counter values of two consecutively received valid messages. For example, if the receiver gets data with counter 1 and MaxDeltaCounter is 3, then at the next reception the receiver can accept Counters with values 2, 3 or 4.
maxErrorStateInit	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_INIT. The minimum value is 0.
maxErrorStateInvalid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_INVALID. The minimum value is 0.
maxErrorStateValid	PositiveInteger	0..1	attr	Maximal number of checks in which ProfileStatus equal to E2E_P_ERROR was determined, within the last WindowSize checks, for the state E2E_SM_VALID. The minimum value is 0.
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.
minOkStateInit	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INIT. The minimum value is 1.

minOkStateInvalid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_INVALID. The minimum value is 1.
minOkStateValid	PositiveInteger	0..1	attr	Minimal number of checks in which ProfileStatus equal to E2E_P_OK was determined, within the last WindowSize checks, for the state E2E_SM_VALID. The minimum value is 1.
syncCounterInit	PositiveInteger	0..1	attr	EndToEndTransformationDescription holds these attributes which are profile specific and have the same value for all E2E transformers.
windowSize	PositiveInteger	0..1	attr	Size of the monitoring window for the E2E state machine. The meaning is the number of correct cycles (E2E_P_OK) that are required in E2E_SM_INITCOM before the transition to E2E_SM_VALID. The minimum allowed value is 1.

Table E.45: EndToEndTransformationComSpecProps

Class	**ExecutableEntity (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
Note	Abstraction of executable code.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
activationReason	ExecutableEntityActivationReason	*	aggr	If the ExecutableEntity provides at least one activationReason element the RTE resp. BSW Scheduler shall provide means to read the activation vector of this executable entity execution. If no activationReason element is provided the feature of being able to determine the activating RTEEvent is disabled for this ExecutableEntity.
canEnterExclusiveArea	ExclusiveArea	*	ref	This means that the executable entity can enter/leave the referenced exclusive area through explicit API calls.
exclusiveAreaNestingOrder	ExclusiveAreaNestingOrder	*	ref	This represents the set of ExclusiveAreaNestingOrders recognized by this ExecutableEntity.
minimumStartInterval	TimeValue	1	attr	Specifies the time in seconds by which two consecutive starts of an ExecutableEntity are guaranteed to be separated.

reentrancy Level	ReentrancyLevelEnum	0..1	attr	The reentrancy level of this ExecutableEntity. See the documentation of the enumeration type ReentrancyLevelEnum for details. Please note that nonReentrant interfaces can have also reentrant or multicoreReentrant implementations, and reentrant interfaces can also have multicoreReentrant implementations.
runsInside ExclusiveArea	ExclusiveArea	*	ref	The executable entity runs completely inside the referenced exclusive area.
swAddrMethod	SwAddrMethod	0..1	ref	Addressing method related to this code entity. Via an association to the same SwAddrMethod, it can be specified that several code entities (even of different modules or components) shall be located in the same memory without already specifying the memory section itself.

Table E.46: ExecutableEntity

Class	**ExecutionTime (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::ExecutionTime			
Note	Base class for several means how to describe the ExecutionTime of software. The required context information is provided through this class.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
exclusiveArea	ExclusiveArea	0..1	ref	Reference to the ExclusiveArea this execution time is provided for.
executableEntity	ExecutableEntity	0..1	ref	The executable entity for which this execution time is described.
hardwareConfiguration	HardwareConfiguration	1	aggr	Provides information on the HardwareConfiguration used to specify this ExecutionTime.
hwElement	HwElement	0..1	ref	The hardware element (e.g. type of ECU) for which the execution time is specified.
includedLibrary	DependencyOnArtifact	*	ref	If this dependency is specified, the execution time of the library code is included in the execution time data for the runnable.
memorySectionLocation	MemorySectionLocation	*	aggr	Provides information on the MemorySectionLocation which is involved in the ExecutionTime description.
softwareContext	SoftwareContext	1	aggr	Provides information on the detailed SoftwareContext used to provide the ExecutionTime description.

Table E.47: ExecutionTime

Class	FibexElement (abstract)			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore			
Note	ASAM FIBEX elements specifying Communication and Topology.			
Base	ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Packageable Element, Referrable			
Attribute	Type	Mul.	Kind	Note
–	–	–	–	–

Table E.48: FibexElement

Class	≪atpVariation≫ FlexrayCluster			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Flexray::FlexrayTopology			
Note	FlexRay specific attributes to the physicalCluster **Tags:** atp.recommendedPackage=CommunicationClusters			
Base	ARObject, CollectableElement, CommunicationCluster, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	Type	Mul.	Kind	Note
actionPoint Offset	Integer	1	attr	The offset of the action point in networks
bit	TimeValue	1	attr	Nominal bit time (= 1 / fx:SPEED). gdBit = cSamplesPerBit * gdSampleClockPeriod. Unit: seconds (gdBit)
casRxLow Max	Integer	1	attr	Upper limit of the Collision Avoidance Symbol (CAS) acceptance window. Unit:bitDuration
coldStartAt tempts	Integer	1	attr	The maximum number of times that a node in this cluster is permitted to attempt to start the cluster by initiating schedule synchronization
cycle	TimeValue	1	attr	Length of the cycle. Unit: seconds
cycleCount Max	Integer	1	attr	Maximum cycle counter value in a given cluster. Remark: Set to 63 for FlexRay Protocol 2.1 Rev. A compliance.
detectNitEr ror	Boolean	1	attr	Indicates whether NIT error status of each cluster shall be detected or not.
dynamicSl otIdlePhas e	Integer	1	attr	The duration of the dynamic slot idle phase in minislots.
ignoreAfter Tx	Integer	1	attr	Duration for which the bitstrobing is paused after transmission [gdBit].
listenNoise	Integer	1	attr	Upper limit for the start up and wake up listen timeout in the presence of noise. Expressed as a multiple of the cluster constant pdListenTimeout. Unit microticks
macroPer Cycle	Integer	1	attr	The number of macroticks in a communication cycle
macrotickD uration	TimeValue	1	attr	Duration of the cluster wide nominal macrotick, expressed in s.

maxWithoutClockCorrectionFatal	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active or POC:normal passive state into the POC:halt state.
maxWithoutClockCorrectionPassive	Integer	1	attr	Threshold concerning vClockCorrectionFailedCounter. Defines the number of consecutive even/odd Cycle pairs with missing clock correction terms that will cause the protocol to transition from the POC:normal active state to the POC:normal passive state.
minislotActionPointOffset	Integer	1	attr	The Offset of the action point within a minislot. Unit: macroticks
minislotDuration	Integer	1	attr	The duration of a minislot (dynamic segment). Unit: macroticks.
networkIdleTime	Integer	1	attr	The duration of the network idle time in macroticks
networkManagementVectorLength	Integer	1	attr	Length of the Network Management vector in a cluster [bytes]
numberOfMinislots	Integer	1	attr	Number of Minislots in the dynamic segment.
numberOfStaticSlots	Integer	1	attr	The number of static slots in the static segment.
offsetCorrectionStart	Integer	1	attr	Start of the offset correction phase within the Network Idle Time (NIT), expressed as the number of macroticks from the start of cycle. Unit: macroticks
payloadLengthStatic	Integer	1	attr	Globally configured payload length of a static frame. Unit: 16-bit WORDS.
safetyMargin	Integer	1	attr	Additional timespan in macroticks which takes jitter into account to be able to set the JobListPointer to the next possible job which can be executed in case the FlexRay Job List Execution Function has be resynchronized.
sampleClockPeriod	TimeValue	0..1	attr	Sample clock period. Unit: seconds
staticSlotDuration	Integer	1	attr	The duration of a slot in the static segment. Unit: macroticks
symbolWindow	Integer	1	attr	The duration of the symbol window. Unit: macroticks
symbolWindowActionPointOffset	Integer	1	attr	Number of macroticks the action point offset is from the beginning of the symbol window [Macroticks].

syncFrameIdCountMax	Integer	1	attr	Maximum number of distinct syncframe identifiers present in a given cluster. This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gSyncNodeMax.
tranceiverStandbyDelay	Float	0..1	attr	The duration of timer t_TrcvStdbyDelay in seconds. The granularity of this parameter shall be restricted to full FlexRay cycles (cycle). The transceiver status setting to STANDBY shall be delayed by this value. Not specifying a value or a value of 0 shall imply that the timer is not used.
transmissionStartSequenceDuration	Integer	1	attr	Number of bits in the Transmission Start Sequence [gdBits].
wakeupRxIdle	Integer	1	attr	Number of bits used by the node to test the duration of the 'idle' or HIGH phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxIdle.
wakeupRxLow	Integer	1	attr	Number of bits used by the node to test the duration of the LOW phase of a received wakeup. Unit:bitDuration Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxLow.
wakeupRxWindow	Integer	1	attr	The size of the window used to detect wakeups [gdBit]. Remarks: This parameter maps to FlexRay Protocol 2.1 Rev. A parameter gdWakeupSymbolRxWindow.
wakeupTxActive	Integer	1	attr	Number of bits used by the node to transmit the LOW phase of awakeup symbol and the HIGH and LOW phases of a WUDOP. Unit:bitDuration
wakeupTxIdle	Integer	1	attr	Number of bits used by the node to transmit the 'idle' part of a wakeup symbol. Unit: gDbit

Table E.49: FlexrayCluster

Class	**FlexrayNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	FlexRay specific NM cluster attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nmCarWakeUpBitPosition	PositiveInteger	0..1	attr	Specifies the bit position of the CarWakeUp within the NmPdu.
nmCarWakeUpFilterEnabled	Boolean	0..1	attr	If this attribute is set to true the CareWakeUp filtering is supported. In this case only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.

nmCarWakeUpFilterNodeId	PositiveInteger	0..1	attr	Source node identifier for CarWakeUp filtering. If CarWakeUp filtering is supported (nmCarWakeUpFilterEnabled), only the CarWakeUp bit within the NmPdu with source node identifier nmCarWakeUpFilterNodeId is considered as CarWakeUp request.
nmCarWakeUpRxEnabled	Boolean	0..1	attr	If set to true this attribute enables the support of CarWakeUp bit evaluation in received NmPdus.
nmControlBitVectorActive	Boolean	1	attr	Used to activate or deactivate the control bit vector support for a Fr Nm Channel.
nmDataCycle	Integer	1	attr	Number of FlexRay Communication Cycles needed to transmit the Nm Data PDUs of all FlexRay Nm Ecus of this FlexRayNmCluster.
nmMainFunctionPeriod	TimeValue	0..1	attr	Defines the processing cycle of the main function of FrNm module.
nmMessageTimeoutTime	TimeValue	1	attr	Timeout of a NmPdu in seconds. It determines how long the NM shall wait with notification of transmission failure while communication errors occur on the bus.
nmRemoteSleepIndicationTime	TimeValue	1	attr	Timeout for Remote Sleep Indication in seconds. It defines the time how long it shall take to recognize that all other nodes are ready to sleep.
nmRepeatMessageTime	TimeValue	1	attr	Timeout for Repeat Message State in seconds. Defines the time how long the NM shall stay in the Repeat Message State.
nmRepetitionCycle	Integer	1	attr	Number of FlexRay Communication Cycles used to repeat the transmission of the Nm vote Pdus of all FlexRay NmEcus of this FlexRayNmCluster. This value must be an integral multiple of nmVotingCycle.
nmVotingCycle	Integer	1	attr	Number of FlexRay CommunicationCycles needed to transmit the Nm vote of Pdus of all FlexRay NmEcus of this FlexRayNmCluster.

Table E.50: FlexrayNmCluster

Class	**FlexrayTpConfig**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	This element defines exactly one FlexRay ISO TP Configuration. One FlexRayTpConfig element shall be created for each FlexRay Network in the System that uses FlexRay Iso Tp. **Tags:** atp.recommendedPackage=TpConfigs			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, TpConfig			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

pduPool	FlexrayTpPduPool	1..*	aggr	Configuration of FlexRay TP Pdu Pools. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpAddress	TpAddress	1..*	aggr	Collection of TpAddresses. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnection	FlexrayTpConnection	*	aggr	Configuration of FlexRay TP Connections. atpVariation: Derived, because TpNode can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpConnectionControl	FlexrayTpConnectionControl	*	aggr	Configuration of FlexRay TP Connection Controls. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpEcu	FlexrayTpEcu	1..*	aggr	Collection of TP Ecus atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild
tpNode	FlexrayTpNode	*	aggr	Senders and receivers of FlexRay TP messages. atpVariation: Derived, because EcuInstance can vary. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=postBuild

Table E.51: FlexrayTpConfig

Class	**FlexrayTpConnection**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	A connection identifies the sender and the receiver of this particular communication. The FlexRayTp module routes a Pdu through this connection. In a System Description the references to the PduPools are mandatory. In an ECU Extract these references can be optional: On unicast connections these references are always mandatory. On multicast the txPduPool is mandatory on the sender side. The rxPduPool is mandatory on the receiver side. On Gateway ECUs both references are mandatory.			
Base	ARObject, TpConnection			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
bandwidthLimitation	Boolean	1	attr	Specifies whether the connection requires a bandwidth limitation or not.

directTpSdu	IPdu	1	ref	Reference to the IPdu that is segmented by the Transport Protocol.
multicast	TpAddress	0..1	ref	TP address for 1:n connections.
receiver	FlexrayTpNode	1..*	ref	The target of the TP connection.
reversedTpSdu	IPdu	0..1	ref	Reference to the IPdu that is segmented by the Transport Protocol. If support of both sending and receiving is used, this association references the IPdu used for the additional second direction.
rxPduPool	FlexrayTpPduPool	0..1	ref	A connection has a reference to a set of NPdus (FrTpRxPduPool) which are defined for receiving data via this particular connection. The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the rxPduPool holds the actually received NPdus. In case this connection is applied to the receiver the rxPduPool holds the actually sent NPdus.
tpConnectionControl	FlexrayTpConnectionControl	1	ref	Reference to the connection control.
transmitter	FlexrayTpNode	1	ref	The source of the TP connection.
txPduPool	FlexrayTpPduPool	0..1	ref	A connection has a reference to a set of NPdus (FrTpTxPduPool) which are defined for sending data via this particular connection. The following constraint is valid only for the System Extract/ECU Extract: In case this connection is applied to the transmitter the txPduPool holds the actually sent NPdus. In case this connection is applied to the receiver the txPduPool holds the actually received NPdus.

Table E.52: FlexrayTpConnection

Class	**FlexrayTpConnectionControl**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	Configuration parameters to control a FlexRay TP connection.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
ackType	TpAckType	0..1	attr	This parameter defines the type of acknowledgement which is used for the specific channel.
maxFcWait	Integer	0..1	attr	This attribute defines the maximum number of FlowControl N-PDUs with FlowState "WAIT".
maxNumberOfNpduPerCycle	Integer	0..1	attr	This parameter limits the number of N-Pdus the sender is allowed to transmit within a FlexRay cycle.
maxRetries	Integer	0..1	attr	This parameter defines the maximum number of retries (if retry is configured for the particular channel).

separationCycleExponent	Integer	0..1	attr	Exponent to calculate the minimum number of "Separation Cycles" the sender has to wait for the next transmission of an FrTp N-Pdu.
timeBr	TimeValue	0..1	attr	Time (in seconds) until transmission of the next FlowControl N-PDU.
timeBuffer	TimeValue	0..1	attr	This parameter defines the time of waiting for the next try to get a Tx or Rx buffer. This parameter is equivalent to the temporal distance between two FC.WT N-Pdus in case the buffer request returns busy. Specified in seconds.
timeCs	TimeValue	0..1	attr	Time (in seconds) until transmission of the next ConsecutiveFrame NPdu / LastFrame NPdu.
timeoutAr	TimeValue	0..1	attr	This parameter states the timeout between the PDU transmit request of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface on the receiver side (for FC or AF). Specified in seconds.
timeoutAs	TimeValue	0..1	attr	This attribute states the timeout between the PDU transmit request for the first PDU of the group used in the current connection of the Transport Layer to the FlexRay Interface and the corresponding confirmation of the FlexRay Interface (when having sent the last PDU of the group used in this connection) on the sender side (SF-x, FF-x, CF or FC (in case of Transmit Cancellation)). Specified in seconds.
timeoutBs	TimeValue	0..1	attr	This parameter defines the timeout in seconds for waiting for an FC or AF on the sender side in a 1:1 connection.
timeoutCr	TimeValue	0..1	attr	This parameter defines the timeout value in seconds for waiting for a CF or FF-x (in case of retry) after receiving the last CF or after sending an FC or AF on the receiver side. Specified in seconds.

Table E.53: FlexrayTpConnectionControl

Class	**FlexrayTpNode**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	TP Node (Sender or Receiver) provides the TP Address and the connection to the Topology description.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

connector	Communication Connector	*	ref	Asscociation to one or more physical connectors (max number of connectors for FlexRay: 2). In a System Description this reference is mandatory. In an ECU Extract this reference is optional (references to ECUs that are not part of the ECU Extract shall be avoided).
tpAddress	TpAddress	0..1	ref	Reference to the TP Address that is used by the TpNode. This reference is optional in case that the multicast TP Address is used (reference from TpConnection).

Table E.54: FlexrayTpNode

Class	**FlexrayTpPduPool**			
Package	M2::AUTOSARTemplates::SystemTemplate::TransportProtocols			
Note	FlexrayTpPduPool is a set of N-PDUs which are defined for FrTp sending or receiving purpose.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
nPdu	NPdu	1..*	ref	Reference to NPdus that are part of the PduPool.

Table E.55: FlexrayTpPduPool

Class	**HeapUsage (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::HeapUsage			
Note	Describes the heap memory usage of a SW-Component.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
hardwareConfiguration	HardwareConfiguration	0..1	aggr	Contains information about the hardware context this heap usage is describing.
hwElement	HwElement	0..1	ref	Specifies for which hardware element (e.g. ECU) this heap usage usage is given.
softwareContext	SoftwareContext	0..1	aggr	Contains details about the software context this heap usage is provided for.

Table E.56: HeapUsage

Class	**HwElement**			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This represents the ability to describe Hardware Elements on an instance level. The particular types of hardware are distinguished by the category. This category determines the applicable attributes. The possible categories and attributes are defined in HwCategory. **Tags:** atp.recommendedPackage=HwElements			
Base	ARElement, ARObject, CollectableElement, HwDescriptionEntity, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
hwElementConnection	HwElementConnector	*	aggr	This represents one particular connection between two hardware elements. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime xml.sequenceOffset=110
hwPinGroup	HwPinGroup	*	aggr	This aggregation is used to describe the connection facilities of a hardware element. Note that hardware element has no pins but only pingroups. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime xml.sequenceOffset=90
nestedElement	HwElement	*	ref	This association is used to establish hierarchies of hw elements. Note that one particular HwElement can be target of this association only once. I.e. multiple instantiation of the same HwElement is not supported (at any hierarchy level). **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=systemDesignTime xml.sequenceOffset=70

Table E.57: HwElement

Class	**HwPinGroup**			
Package	M2::AUTOSARTemplates::EcuResourceTemplate			
Note	This meta-class represents the ability to describe groups of pins which are used to connect hardware elements. This group acts as a bundle of pins. Thereby they allow to describe high level connections. Pin groups can even be nested.			
Base	ARObject, HwDescriptionEntity, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
hwPinGroupContent	HwPinGroupContent	1	aggr	This aggregation describes the contained pins/pin groups.

Table E.58: HwPinGroup

Class	**HwPortMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::ECUResourceMapping			
Note	HWPortMapping specifies the hwCommunicationPort (defined in the ECU Resource Template) to realize the specified CommunicationConnector in a physical topology.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
communicationConnector	CommunicationConnector	1	ref	Reference to the CommunicationConnector in the System Template
hwCommunicationPort	HwPinGroup	1	ref	Reference to the HwPinPortGroup of category CommunicationPort. The connection to the HwCommunicationController is described in the Ecu Resource Description.

Table E.59: HwPortMapping

Class	**IPdu (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	The IPdu (Interaction Layer Protocol Data Unit) element is used to sum up all Pdus that are routed by the PduR.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
containedIPduProps	ContainedIPduProps	0..1	aggr	Defines whether this IPdu may be collected inside a ContainerIPdu.

Table E.60: IPdu

Class	**Identifiable (abstract)**			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable			
Note	Instances of this class can be referred to by their identifier (within the namespace borders). In addition to this, Identifiables are objects which contribute significantly to the overall structure of an AUTOSAR description. In particular, Identifiables might contain Identifiables.			
Base	ARObject, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
desc	MultiLanguageOverviewParagraph	0..1	aggr	This represents a general but brief (one paragraph) description what the object in question is about. It is only one paragraph! Desc is intended to be collected into overview tables. This property helps a human reader to identify the object in question. More elaborate documentation, (in particular how the object is built or used) should go to "introduction". **Tags:** xml.sequenceOffset=-60

category	CategoryString	0..1	attr	The category is a keyword that specializes the semantics of the Identifiable. It affects the expected existence of attributes and the applicability of constraints. **Tags:** xml.sequenceOffset=-50
adminData	AdminData	0..1	aggr	This represents the administrative data for the identifiable object. **Tags:** xml.sequenceOffset=-40
annotation	Annotation	*	aggr	Possibility to provide additional notes while defining a model element (e.g. the ECU Configuration Parameter Values). These are not intended as documentation but are mere design notes. **Tags:** xml.sequenceOffset=-25
introduction	DocumentationBlock	0..1	aggr	This represents more information about how the object in question is built or is used. Therefore it is a DocumentationBlock. **Tags:** xml.sequenceOffset=-30
uuid	String	0..1	attr	The purpose of this attribute is to provide a globally unique identifier for an instance of a meta-class. The values of this attribute should be globally unique strings prefixed by the type of identifier. For example, to include a DCE UUID as defined by The Open Group, the UUID would be preceded by "DCE:". The values of this attribute may be used to support merging of different AUTOSAR models. The form of the UUID (Universally Unique Identifier) is taken from a standard defined by the Open Group (was Open Software Foundation). This standard is widely used, including by Microsoft for COM (GUIDs) and by many companies for DCE, which is based on CORBA. The method for generating these 128-bit IDs is published in the standard and the effectiveness and uniqueness of the IDs is not in practice disputed. If the id namespace is omitted, DCE is assumed. An example is "DCE:2fac1234-31f8-11b4-a222-08002b34c003". The uuid attribute has no semantic meaning for an AUTOSAR model and there is no requirement for AUTOSAR tools to manage the timestamp. **Tags:** xml.attribute=true

Table E.61: Identifiable

Class	Implementation (abstract)			
Package	M2::AUTOSARTemplates::CommonStructure::Implementation			
Note	Description of an implementation a single software component or module.			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
buildActionManifest	BuildActionManifest	0..1	ref	A manifest specifying the intended build actions for the software delivered with this implementation. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=codeGenerationTime
codeDescriptor	Code	1..*	aggr	Specifies the provided implementation code.
compiler	Compiler	*	aggr	Specifies the compiler for which this implementation has been released
generatedArtifact	DependencyOnArtifact	*	aggr	Relates to an artifact that will be generated during the integration of this Implementation by an associated generator tool. Note that this is an optional information since it might not always be in the scope of a single module or component to provide this information. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
hwElement	HwElement	*	ref	The hardware elements (e.g. the processor) required for this implementation.
linker	Linker	*	aggr	Specifies the linker for which this implementation has been released.
mcSupport	McSupportData	0..1	aggr	The measurement & calibration support data belonging to this implementation. The aggregtion is «atpSplitable» because in case of an already exisiting BSW Implementation model, this description will be added later in the process, namely at code generation time. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=mcSupport
programmingLanguage	ProgramminglanguageEnum	1	attr	Programming language the implementation was created in.
requiredArtifact	DependencyOnArtifact	*	aggr	Specifies that this Implementation depends on the existance of another artifact (e.g. a library). This aggregation of DependencyOnArtifact is subject to variability with the purpose to support variability in the implementations. Different algorithms in the implementation might cause different dependencies, e.g. the number of used libraries. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

requiredGeneratorTool	DependencyOnArtifact	*	aggr	Relates this Implementation to a generator tool in order to generate additional artifacts during integration. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
resourceConsumption	ResourceConsumption	1	aggr	All static and dynamic resources for each implementation are described within the ResourceConsumption class. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName
swVersion	RevisionLabelString	1	attr	Software version of this implementation. The numbering contains three levels (like major, minor, patch), its values are vendor specific.
swcBswMapping	SwcBswMapping	0..1	ref	This allows a mapping between an SWC and a BSW behavior to be attached to an implementation description (for AUTOSAR Service, ECU Abstraction and Complex Driver Components). It is up to the methodology to define whether this reference has to be set for the Swc- or BswImplementtion or for both.
usedCodeGenerator	String	0..1	attr	Optional: code generator used.
vendorId	PositiveInteger	1	attr	Vendor ID of this Implementation according to the AUTOSAR vendor list

Table E.62: Implementation

Class	**ImplementationDataType**			
Package	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
Note	Describes a reusable data type on the implementation level. This will typically correspond to a typedef in C-code. **Tags:** atp.recommendedPackage=ImplementationDataTypes			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, AutosarDataType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
dynamicArraySizeProfile	String	0..1	attr	Specifies the profile which the array will follow in case this data type is a variable size array.

subElement (ordered)	ImplementationDataTypeElement	*	aggr	Specifies an element of an array, struct, or union data type. The aggregation of ImplementionDataTypeElement is subject to variability with the purpose to support the conditional existence of elements inside a ImplementationDataType representing a structure. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
symbolProps	SymbolProps	0..1	aggr	This represents the SymbolProps for the ImplementationDataType. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName
typeEmitter	NameToken	0..1	attr	This attribute is used to control which part of the AUTOSAR toolchain is supposed to trigger data type definitions.

Table E.63: ImplementationDataType

Class	**ImplementationDataTypeElement**			
Package	M2::AUTOSARTemplates::CommonStructure::ImplementationDataTypes			
Note	Declares a data object which is locally aggregated. Such an element can only be used within the scope where it is aggregated. This element either consists of further subElements or it is further defined via its swDataDefProps. There are several use cases within the system of ImplementationDataTypes fur such a local declaration: • It can represent the elements of an array, defining the element type and array size • It can represent an element of a struct, defining its type • It can be the local declaration of a debug element.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
arraySize	PositiveInteger	0..1	attr	The existence of this attributes (if bigger than 0) defines the size of an array and declares that this ImplementationDataTypeElement represents the type of each single array element. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
arraySizeHandling	ArraySizeHandlingEnum	0..1	attr	The way how the size of the array is handled in case of a variable size array.
arraySizeSemantics	ArraySizeSemanticsEnum	0..1	attr	This attribute controls the meaning of the value of the array size.

subElement (ordered)	ImplementationDataTypeElement	*	aggr	Element of an array, struct, or union in case of a nested declaration (i.e. without using "typedefs"). The aggregation of ImplementionDataTypeElement is subject to variability with the purpose to support the conditional existence of elements inside a ImplementationDataType representing a structure. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
swDataDefProps	SwDataDefProps	0..1	aggr	The properties of this ImplementationDataTypeElementt.

Table E.64: ImplementationDataTypeElement

Class	**ImplementationProps (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::Implementation			
Note	Defines a symbol to be used as (depending on the concrete case) either a complete replacement or a prefix when generating code artifacts.			
Base	ARObject, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
symbol	CIdentifier	1	attr	The symbol to be used as (depending on the concrete case) either a complete replacement or a prefix.

Table E.65: ImplementationProps

Class	**InternalBehavior (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::InternalBehavior			
Note	Common base class (abstract) for the internal behavior of both software components and basic software modules/clusters.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

constantMemory	ParameterDataPrototype	*	aggr	Describes a read only memory object containing characteristic value(s) implemented by this InternalBehavior. The shortName of ParameterDataPrototype has to be equal to the "C' identifier of the described constant. The characteristic value(s) might be shared between SwComponentPrototypes of the same SwComponentType. The aggregation of constantMemory is subject to variability with the purpose to support variability in the software component or module implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
constantValueMapping	ConstantSpecificationMappingSet	*	ref	Reference to the ConstanSpecificationMapping to be applied for the particular InternalBehavior **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=constantValueMapping
dataTypeMapping	DataTypeMappingSet	*	ref	Reference to the DataTypeMapping to be applied for the particular InternalBehavior **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=dataTypeMapping
exclusiveArea	ExclusiveArea	*	aggr	This specifies an ExclusiveArea for this InternalBehavior. The exclusiveArea is local to the component resp. module. The aggregation of ExclusiveAreas is subject to variability. Note: the number of ExclusiveAreas might vary due to the conditional existence of RunnableEntities or BswModuleEntities. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
exclusiveAreaNestingOrder	ExclusiveAreaNestingOrder	*	aggr	This represents the set of ExclusiveAreaNestingOrder owned by the InternalBehavior. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

staticMemory	VariableDataPrototype	*	aggr	Describes a read and writeable static memory object representing measurerment variables implemented by this software component. The term "static" is used in the meaning of "non-temporary" and does not necessarily specify a linker encapsulation. This kind of memory is only supported if supportsMultipleInstantiation is FALSE. The shortName of the VariableDataPrototype has to be equal with the ”C’ identifier of the described variable. The aggregation of staticMemory is subject to variability with the purpose to support variability in the software component's implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

Table E.66: InternalBehavior

Class	≪atpVariation≫ **LinCommunicationController (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::Fibex4Lin::LinTopology			
Note	LIN bus specific communication controller attributes.			
Base	ARObject, CommunicationController, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
protocolVersion	String	1	attr	Version specifier for a communication protocol.

Table E.67: LinCommunicationController

Class	**LinNmCluster**			
Package	M2::AUTOSARTemplates::SystemTemplate::NetworkManagement			
Note	Lin specific NmCluster attributes.			
Base	ARObject, Identifiable, MultilanguageReferrable, NmCluster, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.68: LinNmCluster

Class	**MemorySection**			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::MemorySectionUsage			
Note	Provides a description of an abstract memory section used in the Implementation for code or data. It shall be declared by the Implementation Description of the module or component, which actually allocates the memory in its code. This means in case of data prototypes which are allocated by the RTE, that the generated Implementation Description of the RTE shall contain the corresponding MemorySections. The attribute "symbol" (if symbol is missing: "shortName") defines the module or component specific section name used in the code. For details see the document "Specification of Memory Mapping". Typically the section name is build according the pattern: <SwAddrMethod shortName>[_<further specialization nominator>][_<alignment>] where • **[<SwAddrMethod shortName>]** is the shortName of the referenced SwAddrMethod • **[_<further specialization nominator>]** is an optional infix to indicate the specialization in the case that several MemorySections for different purpose of the same Implementation Description referring to the same or equally named SwAddrMethods. • **[_<alignment>]** is the alignment attributes value and is only applicable in the case that the memoryAllocationKeywordPolicy value of the referenced SwAddrMethod is set to addrMethodShortNameAndAlignment MemorySection used to Implement the code of RunnableEntitys and BswSchedulableEntitys shall have a symbol (if missing: shortName) identical to the referred SwAddrMethod to conform to the generated RTE header files. In addition to the section name described above, a prefix is used in the corresponding macro code in order to define a name space. This prefix is by default given by the shortName of the BswModuleDescription resp. the SwComponentType. It can be superseded by the prefix attribute.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
alignment	AlignmentType	0..1	attr	The attribute describes the alignment of objects within this memory section.
executableEntity	ExecutableEntity	*	ref	Reference to the ExecutableEntitites located in this section. This allows to locate different ExecutableEntitities in different sections even if the associated SwAddrmethod is the same. This is applicable to code sections only.

memClass Symbol	CIdentifier	0..1	attr	Defines a specific symbol in order to generate the compiler abstraction "memclass" code for this MemorySection. The existence of this attribute supersedes the usage of swAddrmethod.shortName for this purpose. The complete name of the "memclass" preprocessor symbol is constructed as <prefix>_<memClassSymbol> where prefix is defined in the same way as for the enclosing MemorySection. See also AUTOSAR_SWS_CompilerAbstraction SWS_COMPILER_00040.
option	Identifier	*	attr	This attribute introduces the ability to specify further intended properties of this MemorySection. The following two values are standardized (to be used for code sections only and exclusively to each other): • INLINE - The code section is declared with the compiler abstraction macro INLINE. • LOCAL_INLINE - The code section is declared with the compiler abstraction macro LOCAL_INLINE In both cases (INLINE and LOCAL_INLINE) the inline expansion depends on the compiler specific implementation of these macros. Depending on this, the code section either corresponds to an actual section in memory or is put into the section of the caller. See AUTOSAR_SWS_CompilerAbstraction for more details.
prefix	SectionNamePrefix	0..1	ref	The prefix used to set the memory section's namespace in the code. The existence of a prefix element supersedes rules for a default prefix (such as the BswModuleDescription's shortName). This allows the user to define several name spaces for memory sections within the scope of one module, cluster or SWC.
size	PositiveInteger	0..1	attr	The size in bytes of the section.

swAddrmethod	SwAddrMethod	1	ref	This association indicates that this module specific (abstract) memory section is part of an overall SwAddrMethod, referred by the upstream declarations (e.g. calibration parameters, data element prototypes, code entities) which share a common addressing strategy. This can be evaluated for the ECU configuration of the build support. This association shall always be declared by the Implementation description of the module or component, which allocates the memory in its code. This means in case of data prototypes which are allocated by the RTE, that the software components only declare the grouping of its data prototypes to SwAddrMethods, and the generated Implementation Description of the RTE actually sets up this association.
symbol	Identifier	0..1	attr	Defines the section name as explained in the main description. By using this attribute for code generation (instead of the shortName) it is possible to define several different MemorySections having the same name - e.g. symbol = CODE - but using different sectionNamePrefixes.

Table E.69: MemorySection

Class	**ModeDeclaration**			
Package	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
Note	Declaration of one Mode. The name and semantics of a specific mode is not defined in the meta-model.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
value	PositiveInteger	0..1	attr	The RTE shall take the value of this attribute for generating the source code representation of this ModeDeclaration.

Table E.70: ModeDeclaration

Class	**ModeDeclarationGroup**			
Package	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
Note	A collection of Mode Declarations. Also, the initial mode is explicitly identified. **Tags:** atp.recommendedPackage=ModeDeclarationGroups			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

initialMode	ModeDeclaration	1	ref	The initial mode of the ModeDeclarationGroup. This mode is active before any mode switches occurred.
modeDeclaration	ModeDeclaration	1..*	aggr	The ModeDeclarations collected in this ModeDeclarationGroup. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=blueprintDerivationTime
modeManagerErrorBehavior	ModeErrorBehavior	0..1	aggr	This represents the ability to define the error behavior expected by the mode manager in case of errors on the mode user side (e.g. terminated mode user).
modeTransition	ModeTransition	*	aggr	This represents the avaliable ModeTransitions of the ModeDeclarationGroup
modeUserErrorBehavior	ModeErrorBehavior	0..1	aggr	This represents the definition of the error behavior expected by the mode user in case of errors on the mode manager side (e.g. terminated mode manager).
onTransitionValue	PositiveInteger	0..1	attr	The value of this attribute shall be taken into account by the RTE generator for programmatically representing a value used for the transition between two statuses.

Table E.71: ModeDeclarationGroup

Class	**ModeDeclarationGroupPrototype**			
Package	M2::AUTOSARTemplates::CommonStructure::ModeDeclaration			
Note	The ModeDeclarationGroupPrototype specifies a set of Modes (ModeDeclarationGroup) which is provided or required in the given context.			
Base	ARObject, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
swCalibrationAccess	SwCalibrationAccessEnum	0..1	attr	This allows for specifying whether or not the enclosing ModeDeclarationGroupPrototype can be measured at run-time.
type	ModeDeclarationGroup	1	tref	The "collection of ModeDeclarations" (= ModeDeclarationGroup) supported by a component **Stereotypes:** isOfType

Table E.72: ModeDeclarationGroupPrototype

Class	NmPdu			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Network Management Pdu **Tags:** atp.recommendedPackage=Pdus			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Pdu, Referrable			
Attribute	Type	Mul.	Kind	Note
iSignalToIPduMapping	ISignalToIPduMapping	*	aggr	This optional aggregation is used to describe NmUserData that is transmitted in the NmPdu. The counting of the startPosition starts at the beginning of the NmPdu regardless whether Cbv or Nid are used.
nmDataInformation	Boolean	0..1	attr	Defines if the Pdu contains NM Data. If the NmPdu does not aggregate any ISignalToIPduMappings it still may contain UserData that is set via Nm_SetUserData(). If the ISignalToIPduMapping exists then the nmDataInformation attribute shall be ignored.
nmVoteInformation	Boolean	0..1	attr	Defines if the Pdu contains NM Vote information.
unusedBitPattern	Integer	0..1	attr	AUTOSAR COM is filling not used areas of an Pdu with this bit-pattern. This attribute can only be used if the nmDataInformation attribute is set to true.

Table E.73: NmPdu

Class	NumericalValueSpecification			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	A numerical ValueSpecification which is intended to be assigned to a Primitive data element. Note that the numerical value is a variant, it can be computed by a formula.			
Base	ARObject, ValueSpecification			
Attribute	Type	Mul.	Kind	Note
value	Numerical	1	attr	This is the value itself. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.74: NumericalValueSpecification

Class	PPortPrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Component port providing a certain port interface.			
Base	ARObject, AbstractProvidedPortPrototype, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, PortPrototype, Referrable			
Attribute	Type	Mul.	Kind	Note
providedInterface	PortInterface	1	tref	The interface that this port provides. **Stereotypes:** isOfType

Table E.75: PPortPrototype

Class	PRPortPrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This kind of PortPrototype can take the role of both a required and a provided PortPrototype.			
Base	ARObject, AbstractProvidedPortPrototype, AbstractRequiredPortPrototype, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, PortPrototype, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
providedRequiredInterface	PortInterface	1	tref	This represents the PortInterface used to type the PRPortPrototype **Stereotypes:** isOfType

Table E.76: PRPortPrototype

Class	PackageableElement (abstract)			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::ARPackage			
Note	This meta-class specifies the ability to be a member of an AUTOSAR package.			
Base	ARObject, CollectableElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table E.77: PackageableElement

Class	ParameterDataPrototype			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	A parameter element used for parameter interface and internal behavior, supporting signal like parameter and characteristic value communication patterns and parameter and characteristic value definition.			
Base	ARObject, AtpFeature, AtpPrototype, AutosarDataPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
initValue	ValueSpecification	0..1	aggr	Specifies initial value(s) of the ParameterDataPrototype

Table E.78: ParameterDataPrototype

Class	**ParameterInterface**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A parameter interface declares a number of parameter and characteristic values to be exchanged between parameter components and software components. **Tags:** atp.recommendedPackage=PortInterfaces			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, DataInterface, Identifiable, MultilanguageReferrable, PackageableElement, PortInterface, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
parameter	ParameterData Prototype	1..*	aggr	The ParameterDataPrototype of this ParameterInterface.

Table E.79: ParameterInterface

Class	**ParameterSwComponentType**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The ParameterSwComponentType defines parameters and characteristic values accessible via provided Ports. The provided values are the same for all connected SwComponentPrototypes **Tags:** atp.recommendedPackage=SwComponentTypes			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
constantMapping	ConstantSpecificationMappingSet	*	ref	Reference to the ConstanSpecificationMapping to be applied for the particular ParameterSwComponentType **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=constantMapping
dataTypeMapping	DataTypeMappingSet	*	ref	Reference to the DataTypeMapping to be applied for the particular ParameterSwComponentType **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=dataTypeMapping
instantiationDataDefProps	InstantiationDataDefProps	*	aggr	The purpose of this is that within the context of a given SwComponentType some data def properties of individual instantiations can be modified. The aggregation of InstantiationDataDefProps is subject to variability with the purpose to support the conditional existence of PortPrototypes **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.80: ParameterSwComponentType

Class	**PassThroughSwConnector**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	This kind of SwConnector can be used inside a CompositionSwComponentType to connect two delegation PortPrototypes.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable, SwConnector			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
providedOuterPort	AbstractProvidedPortPrototype	1	ref	This represents the provided outer delegation PortPrototype of the PassThroughSwConnector.
requiredOuterPort	AbstractRequiredPortPrototype	1	ref	This represents the required outer delegation PortPrototype of the PassThroughSwConnector.

Table E.81: PassThroughSwConnector

Class	**Pdu (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	Collection of all Pdus that can be routed through a bus interface.			
Base	ARObject, CollectableElement, FibexElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
length	Integer	0..1	attr	Pdu length in bytes. In case of dynamic length IPdus (containing a dynamical length signal), this value indicates the maximum data length. It should be noted that in former AUTOSAR releases (Rel 2.1, Rel 3.0, Rel 3.1, Rel 4.0 Rev. 1) this parameter was defined in bits. The Pdu length of zero bytes is allowed.

Table E.82: Pdu

Class	≪atpPrototype≫ **PduToFrameMapping**			
Package	M2::AUTOSARTemplates::SystemTemplate::Fibex::FibexCore::CoreCommunication			
Note	A PduToFrameMapping defines the composition of Pdus in each frame.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
packingByteOrder	ByteOrderEnum	1	attr	This attribute defines the order of the bytes of the Pdu and the packing into the Frame. Please consider that [constr_3246] and [constr_3222] are restricting the usage of this attribute.
pdu	Pdu	1	ref	Reference to a I-Pdu, N-Pdu or NmPdu that is transmitted in the Frame.

startPosition	Integer	1	attr	This attribute describes the bitposition of a Pdu within a Frame. Please note that the absolute position of the Pdu in the Frame is determined by the definition of the packingByteOrder attribute. If Big Endian is specified, the start position indicates the bit position of the most significant bit in the Frame. If Little Endian is specified, the start position indicates the bit position of the least significant bit in the Frame. The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7. The Pdus are byte aligned in a Frame and only the values 0, 8, 16, 24,... (for little endian) and 7, 15, 23, ... (for big endian) are allowed.
updateIndicationBitPosition	Integer	0..1	attr	Indication to the receivers that the corresponding Pdu was updated by the sender. This attribute describes the position of the update bit in the frame that aggregates this PDUToFrameMapping. Length is always one bit. Note that the exact bit position of the updateIndicationBitPosition is linked to the value of the attribute packingByteOrder because the method of finding the bit position is different for the values mostSignificantByteFirst and mostSignificantByteLast. This means that if the value of packingByteOrder is changed while the value of updateIndicationBitPosition remains unchanged the exact bit position of updateIndicationBitPosition within the enclosing Frame still undergoes a change. This attribute denotes the least significant bit for "Little Endian" and the most significant bit for "Big Endian" packed signals within the IPdu (see the description of the packingByteOrder attribute). In AUTOSAR the bit counting is always set to "sawtooth" and the bit order is set to "Decreasing". The bit counting in byte 0 starts with bit 0 (least significant bit). The most significant bit in byte 0 is bit 7.

Table E.83: PduToFrameMapping

Class	**PhysConstrs**			
Package	M2::MSR::AsamHdo::Constraints::GlobalConstraints			
Note	This meta-class represents the ability to express physical constraints. Therefore it has (in opposite to InternalConstrs) a reference to a Unit.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
lowerLimit	Limit	0..1	attr	This specifies the lower limit of the constraint. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=20
maxDiff	Numerical	0..1	attr	Maximum difference that is permitted between two consecutive values if the constraint is applied to an axis. **Tags:** xml.sequenceOffset=60
maxGradient	Numerical	0..1	attr	This element specifies the maximum slope that may be used in curves and maps. **Tags:** xml.sequenceOffset=50
monotony	MonotonyEnum	0..1	attr	This specifies the monotony constraints on the data object. Note that this applies only to curves and maps. **Tags:** xml.sequenceOffset=70
scaleConstr (ordered)	ScaleConstr	*	aggr	This is one particular scale which contributes to the data constraints. **Tags:** xml.roleElement=true; xml.roleWrapperElement=true; xml.sequenceOffset=40; xml.typeElement=false; xml.typeWrapperElement=false
unit	Unit	0..1	ref	This is the unit to which the physical constraints relate to. In particular, it is the physical unit of the specified limits. **Tags:** xml.sequenceOffset=80
upperLimit	Limit	0..1	attr	This specifies the upper limit of the constraint. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=30

Table E.84: PhysConstrs

Class	**PncMappingIdent**			
Package	M2::AUTOSARTemplates::SystemTemplate::PncMapping			
Note	This meta-class is created to add the ability to become the target of a reference to the non-Referrable PncMapping.			
Base	ARObject, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.85: PncMappingIdent

Class	**PortGroup**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Group of ports which share a common functionality, e.g. need specific network resources. This information shall be available on the VFB level in order to delegate it properly via compositions. When propagated into the ECU extract, this information is used as input for the configuration of Services like the Communication Manager. A PortGroup is defined locally in a component (which can be a composition) and refers to the "outer" ports belonging to the group as well as to the "inner" groups which propagate this group into the components which are part of a composition. A PortGroup within an atomic SWC cannot be linked to inner groups.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
innerGroup	PortGroup	*	iref	Links a PortGroup in a composition to another PortGroup, that is defined in a component which is part of this CompositionSwComponentType.
outerPort	PortPrototype	*	ref	Outer PortPrototype of this AtomicSwComponentType which belongs to the group. A port can belong to several groups or to no group at all. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.86: PortGroup

Class	**PortInterface (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Abstract base class for an interface that is either provided or required by a port of a software component.			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

isService	Boolean	1	attr	This flag is set if the PortInterface is to be used for communication between an • ApplicationSwComponentType or • ServiceProxySwComponentType or • SensorActuatorSwComponentType or • ComplexDeviceDriverSwComponentType • ServiceSwComponentType • EcuAbstractionSwComponentType and a ServiceSwComponentType (namely an AUTOSAR Service) located on the same ECU. Otherwise the flag is not set.
serviceKind	ServiceProviderEnum	0..1	attr	This attribute provides further details about the nature of the applied service.

Table E.87: PortInterface

Class	**PortInterfaceMapping (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	Specifies one PortInterfaceMapping to support the connection of Ports typed by two different PortInterfaces with PortInterface elements having unequal names and/or unequal semantic (resolution or range).			
Base	ARObject, AtpBlueprint, AtpBlueprintable, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.88: PortInterfaceMapping

Class	**PortPrototype (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Base class for the ports of an AUTOSAR software component. The aggregation of PortPrototypes is subject to variability with the purpose to support the conditional existence of ports.			
Base	ARObject, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
clientServerAnnotation	ClientServerAnnotation	*	aggr	Annotation of this PortPrototype with respect to client/server communication.
delegatedPortAnnotation	DelegatedPortAnnotation	0..1	aggr	Annotations on this delegated port.

ioHwAbstractionServerAnnotation	IoHwAbstractionServerAnnotation	*	aggr	Annotations on this IO Hardware Abstraction port.
modePortAnnotation	ModePortAnnotation	*	aggr	Annotations on this mode port.
nvDataPortAnnotation	NvDataPortAnnotation	*	aggr	Annotations on this non voilatile data port.
parameterPortAnnotation	ParameterPortAnnotation	*	aggr	Annotations on this parameter port.
senderReceiverAnnotation	SenderReceiverAnnotation	*	aggr	Collection of annotations of this ports sender/receiver communication.
triggerPortAnnotation	TriggerPortAnnotation	*	aggr	Annotations on this trigger port.

Table E.89: PortPrototype

Class	**RPortPrototype**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Component port requiring a certain port interface.			
Base	ARObject, AbstractRequiredPortPrototype, AtpBlueprintable, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, PortPrototype, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
requiredInterface	PortInterface	1	tref	The interface that this port requires, i.e. the port depends on another port providing the specified interface. **Stereotypes:** isOfType

Table E.90: RPortPrototype

Class	**RTEEvent (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::RTEEvents			
Note	Abstract base class for all RTE-related events			
Base	ARObject, AbstractEvent, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
disabledMode	ModeDeclaration	*	iref	Reference to the Modes that disable the Event. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=contextPort, contextModeDeclarationGroupPrototype, targetModeDeclaration
startOnEvent	RunnableEntity	0..1	ref	RunnableEntity starts when the corresponding RTEEvent occurs.

Table E.91: RTEEvent

Class	**ReceiverComSpec (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Receiver-specific communication attributes (RPortPrototype typed by SenderReceiverInterface).			
Base	ARObject, RPortComSpec			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
compositeNetworkRepresentation	CompositeNetworkRepresentation	*	aggr	This represents a CompositeNetworkRepresentation defined in the context of a ReceiverComSpec. The purpose of this aggregation is to be able to specify the network representation of leaf elements of ApplicationCompositeDataTypes.
dataElement	AutosarDataPrototype	0..1	ref	Data element these attributes belong to.
handleOutOfRange	HandleOutOfRangeEnum	1	attr	This attribute controls how values that are out of the specified range are handled according to the values of HandleOutOfRangeEnum.
handleOutOfRangeStatus	HandleOutOfRangeStatusEnum	0..1	attr	Control the way how return values are created in case of an out-of-range situation.
maxDeltaCounterInit	PositiveInteger	0..1	attr	Initial maximum allowed gap between two counter values of two consecutively received valid Data, i.e. how many subsequent lost data is accepted. For example, if the receiver gets Data with counter 1 and MaxDeltaCounterInit is 1, then at the next reception the receiver can accept Counters with values 2 and 3, but not 4. Note that if the receiver does not receive new Data at a consecutive read, then the receiver increments the tolerance by 1. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
maxNoNewOrRepeatedData	PositiveInteger	0..1	attr	The maximum amount of missing or repeated Data which the receiver does not expect to exceed under normal communication conditions.
networkRepresentation	SwDataDefProps	0..1	aggr	A networkRepresentation is used to define how the dataElement is mapped to a communication bus.
replaceWith	VariableAccess	0..1	aggr	This aggregation is used to identify the AutosarDataPrototype to be taken for sourcing an external replacement in the out-of-range handling.
syncCounterInit	PositiveInteger	0..1	attr	Number of Data required for validating the consistency of the counter that shall be received with a valid counter (i.e. counter within the allowed lock-in range) after the detection of an unexpected behavior of a received counter.
transformationComSpecProps	TransformationComSpecProps	*	aggr	This references the TransformationComSpecProps which define port-specific configuration for data transformation.

usesEndToEndProtection	Boolean	0..1	attr	This indicates whether the corresponding dataElement shall be transmitted using end-to-end protection. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.92: ReceiverComSpec

Class	**Referrable (abstract)**			
Package	M2::AUTOSARTemplates::GenericStructure::GeneralTemplateClasses::Identifiable			
Note	Instances of this class can be referred to by their identifier (while adhering to namespace borders).			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
shortName	Identifier	1	attr	This specifies an identifying shortName for the object. It needs to be unique within its context and is intended for humans but even more for technical reference. **Tags:** xml.enforceMinMultiplicity=true; xml.sequenceOffset=-100
shortNameFragment	ShortNameFragment	*	aggr	This specifies how the Referrable.shortName is composed of several shortNameFragments. **Tags:** xml.sequenceOffset=-90

Table E.93: Referrable

Class	**RoleBasedPortAssignment**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior::ServiceMapping			
Note	This class specifies an assignment of a role to a particular service port (RPortPrototype or PPortPrototype) of an AtomicSwComponentType. With this assignment, the role of the service port can be mapped to a specific ServiceNeeds element, so that a tool is able to create the correct connector.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
portPrototype	PortPrototype	1	ref	Service PortPrototype used in the assigned role. This PortPrototype shall either belong to the same AtomicSwComponentType as the SwcInternalBehavior which owns the ServiceDependency or to the same NvBlockSwComponentType as the NvBlockDescriptor.

role	Identifier	1	attr	This is the role of the assigned Port in the given context. The value shall be a shortName of the Blueprint of a PortInterface as standardized in the Software Specification of the related AUTOSAR Service.

Table E.94: RoleBasedPortAssignment

Class	**RunnableEntity**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior			
Note	A RunnableEntity represents the smallest code-fragment that is provided by an AtomicSwComponentType and are executed under control of the RTE. RunnableEntities are for instance set up to respond to data reception or operation invocation on a server.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, ExecutableEntity, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
argument (ordered)	RunnableEntity Argument	*	aggr	This represents the formal definition of a an argument to a RunnableEntity.
asynchronousServerCallResultPoint	AsynchronousServerCallResultPoint	*	aggr	The server call result point admits a runnable to fetch the result of an asynchronous server call. The aggregation of AsynchronousServerCallResultPoint is subject to variability with the purpose to support the conditional existence of client server PortPrototypes and the variant existence of server call result points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
canBeInvokedConcurrently	Boolean	1	attr	If the value of this attribute is set to "true" the enclosing RunnableEntity can be invoked concurrently (even for one instance of the corresponding AtomicSwComponentType). This implies that it is the responsibility of the implementation of the RunnableEntity to take care of this form of concurrency. Note that the default value of this attribute is set to "false".

dataReadAccess	VariableAccess	*	aggr	RunnableEntity has implicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The aggregation of dataReadAccess is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of dataReadAccess in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
dataReceivePointByArgument	VariableAccess	*	aggr	RunnableEntity has explicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The result is passed back to the application by means of an argument in the function signature. The aggregation of dataReceivePointByArgument is subject to variability with the purpose to support the conditional existence of sender receiver PortPrototype or the variant existence of data receive points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
dataReceivePointByValue	VariableAccess	*	aggr	RunnableEntity has explicit read access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The result is passed back to the application by means of the return value. The aggregation of dataReceivePointByValue is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of data receive points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

dataSendPoint	VariableAccess	*	aggr	RunnableEntity has explicit write access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The aggregation of dataSendPoint is subject to variability with the purpose to support the conditional existence of sender receiver PortPrototype or the variant existence of data send points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
dataWriteAccess	VariableAccess	*	aggr	RunnableEntity has implicit write access to dataElement of a sender-receiver PortPrototype or nv data of a nv data PortPrototype. The aggregation of dataWriteAccess is subject to variability with the purpose to support the conditional existence of sender receiver ports or the variant existence of dataWriteAccess in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
externalTriggeringPoint	ExternalTriggeringPoint	*	aggr	The aggregation of ExternalTriggeringPoint is subject to variability with the purpose to support the conditional existence of trigger ports or the variant existence of external triggering points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=externalTriggeringPoint, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
internalTriggeringPoint	InternalTriggeringPoint	*	aggr	The aggregation of InternalTriggeringPoint is subject to variability with the purpose to support the variant existence of internal triggering points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

modeAccessPoint	ModeAccessPoint	*	aggr	The runnable has a mode access point. The aggregation of ModeAccessPoint is subject to variability with the purpose to support the conditional existence of mode ports or the variant existence of mode access points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=modeAccessPoint, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
modeSwitchPoint	ModeSwitchPoint	*	aggr	The runnable has a mode switch point. The aggregation of ModeSwitchPoint is subject to variability with the purpose to support the conditional existence of mode ports or the variant existence of mode switch points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
parameterAccess	ParameterAccess	*	aggr	The presence of a ParameterAccess implies that a RunnableEntity needs read only access to a ParameterDataPrototype which may either be local or within a PortPrototype. The aggregation of ParameterAccess is subject to variability with the purpose to support the conditional existence of parameter ports and component local parameters as well as the variant existence of ParameterAccess (points) in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

readLocal Variable	VariableAccess	*	aggr	The presence of a readLocalVariable implies that a RunnableEntity needs read access to a VariableDataPrototype in the role of implicitInterRunnableVariable or explicitInterRunnableVariable. The aggregation of readLocalVariable is subject to variability with the purpose to support the conditional existence of implicitInterRunnableVariable and explicitInterRunnableVariable or the variant existence of readLocalVariable (points) in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime
serverCall Point	ServerCallPoint	*	aggr	The RunnableEntity has a ServerCallPoint. The aggregation of ServerCallPoint is subject to variability with the purpose to support the conditional existence of client server PortPrototypes or the variant existence of server call points in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime
symbol	CIdentifier	1	attr	The symbol describing this RunnableEntity's entry point. This is considered the API of the RunnableEntity and is required during the RTE contract phase.
waitPoint	WaitPoint	*	aggr	The WaitPoint associated with the RunnableEntity.
writtenLoc alVariable	VariableAccess	*	aggr	The presence of a writtenLocalVariable implies that a RunnableEntity needs write access to a VariableDataPrototype in the role of implicitInterRunnableVariable or explicitInterRunnableVariable. The aggregation of writtenLocalVariable is subject to variability with the purpose to support the conditional existence of implicitInterRunnableVariable and explicitInterRunnableVariable or the variant existence of writtenLocalVariable (points) in the implementation. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime

Table E.95: RunnableEntity

Class	**SenderComSpec (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	Communication attributes for a sender port (PPortPrototype typed by SenderReceiverInterface).			
Base	ARObject, PPortComSpec			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
compositeNetworkRepresentation	CompositeNetworkRepresentation	*	aggr	This represents a CompositeNetworkRepresentation defined in the context of a SenderComSpec.
dataElement	AutosarDataPrototype	0..1	ref	Data element these quality of service attributes apply to.
handleOutOfRange	HandleOutOfRangeEnum	1	attr	This attribute controls how out-of-range values shall be dealt with.
networkRepresentation	SwDataDefProps	0..1	aggr	A networkRepresentation is used to define how the dataElement is mapped to a communication bus.
transmissionAcknowledge	TransmissionAcknowledgementRequest	0..1	aggr	Requested transmission acknowledgement for data element.
usesEndToEndProtection	Boolean	1	attr	This indicates whether the corresponding dataElement shall be transmitted using end-to-end protection. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime

Table E.96: SenderComSpec

Class	**SenderReceiverInterface**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A sender/receiver interface declares a number of data elements to be sent and received. **Tags:** atp.recommendedPackage=PortInterfaces			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, DataInterface, Identifiable, MultilanguageReferrable, PackageableElement, PortInterface, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
dataElement	VariableDataPrototype	1..*	aggr	The data elements of this SenderReceiverInterface.
invalidationPolicy	InvalidationPolicy	*	aggr	InvalidationPolicy for a particular dataElement

Table E.97: SenderReceiverInterface

Class	**SensorActuatorSwComponentType**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	The SensorActuatorSwComponentType introduces the possibility to link from the software representation of a sensor/actuator to its hardware description provided by the ECU Resource Template. **Tags:** atp.recommendedPackage=SwComponentTypes			
Base	ARElement, ARObject, AtomicSwComponentType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
sensorActuator	HwDescriptionEntity	1	ref	Reference from the Sensor Actuator Software Component Type to the description of the actual hardware.

Table E.98: SensorActuatorSwComponentType

Class	**ServiceNeeds (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::ServiceNeeds			
Note	This expresses the abstract needs that a Software Component or Basic Software Module has on the configuration of an AUTOSAR Service to which it will be connected. "Abstract needs" means that the model abstracts from the Configuration Parameters of the underlying Basic Software.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.99: ServiceNeeds

Class	**ServiceProxySwComponentType**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This class provides the ability to express a software-component which provides access to an internal service for remote ECUs. It acts as a proxy for the service providing access to the service. An important use case is the request of vehicle mode switches: Such requests can be communicated via sender-receiver interfaces across ECU boundaries, but the mode manager being responsible to perform the mode switches is an AUTOSAR Service which is located in the Basic Software and is not visible in the VFB view. To handle this situation, a ServiceProxySwComponentType will act as proxy for the mode manager. It will have R-Ports to be connected with the mode requestors on VFB level and Service-Ports to be connected with the local mode manager at ECU integration time. Apart from the semantics, a ServiceProxySwComponentType has these specific properties: • A prototype of it can be mapped to more than one ECUs in the system description. • Exactly one additional instance of it will be created in the ECU-Extract per ECU to which the prototype has been mapped. • For remote communication, it can have only R-Ports with sender-receiver interfaces and 1:n semantics. • There shall be no connectors between two prototypes of any ServiceProxySwComponentType. **Tags:** atp.recommendedPackage=SwComponentTypes			
Base	ARElement, ARObject, AtomicSwComponentType, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable, SwComponentType			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table E.100: ServiceProxySwComponentType

Class	**SignalPathConstraint (abstract)**			
Package	M2::AUTOSARTemplates::SystemTemplate::SignalPaths			
Note	Additional guidelines for the System Generator, which specific way a signal between two Software Components should take in the network without defining in which frame and with which timing it is transmitted.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
introduction	DocumentationBlock	1	aggr	This represents introductory documentation about the signal path constraint.

Table E.101: SignalPathConstraint

Class	**StackUsage (abstract)**			
Package	M2::AUTOSARTemplates::CommonStructure::ResourceConsumption::StackUsage			
Note	Describes the stack memory usage of a software.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
executableEntity	ExecutableEntity	0..1	ref	The executable entity for which this stack usage is described.
hardwareConfiguration	HardwareConfiguration	0..1	aggr	Contains information about the hardware context this stack usage is describing.
hwElement	HwElement	0..1	ref	Specifies for which hardware element (e.g. ECU) this stack usage is given.
softwareContext	SoftwareContext	0..1	aggr	Contains details about the software context this stack usage is provided for.

Table E.102: StackUsage

Class	**SwBaseType**			
Package	M2::MSR::AsamHdo::BaseTypes			
Note	This meta-class represents a base type used within ECU software. **Tags:** atp.recommendedPackage=BaseTypes			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, BaseType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
–	–	–	–	–

Table E.103: SwBaseType

Class	**SwComponentPrototype**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	Role of a software component within a composition.			
Base	ARObject, AtpFeature, AtpPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
type	SwComponentType	1	tref	Type of the instance. **Stereotypes:** isOfType

Table E.104: SwComponentPrototype

Class	**SwComponentType (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	Base class for AUTOSAR software components.			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*
consistencyNeeds	ConsistencyNeeds	*	aggr	This represents the collection of ConsistencyNeeds owned by the enclosing SwComponentType. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
port	PortPrototype	*	aggr	The PortPrototypes through which this SwComponentType can communicate. The aggregation of PortPrototype is subject to variability with the purpose to support the conditional existence of PortPrototypes. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
portGroup	PortGroup	*	aggr	A port group being part of this component. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
swComponentDocumentation	SwComponentDocumentation	0..1	aggr	This adds a documentation to the SwComponentType. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=swComponentDocumentation, variationPoint.shortLabel vh.latestBindingTime=preCompileTime xml.sequenceOffset=-10
unitGroup	UnitGroup	*	ref	This allows for the specification of which UnitGroups are relevant in the context of referencing SwComponentType.

Table E.105: SwComponentType

Class	**SwConnector (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Composition			
Note	The base class for connectors between ports. Connectors have to be identifiable to allow references from the system constraint template.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	*Type*	*Mul.*	*Kind*	*Note*

mapping	PortInterfaceMapping	0..1	ref	Reference to a PortInterfaceMapping specifying the mapping of unequal named PortInterface elements of the two different PortInterfaces typing the two PortPrototypes which are referenced by the ConnectorPrototype.

Table E.106: SwConnector

Class	≪atpVariation≫ **SwDataDefProps**			
Package	M2::MSR::DataDictionary::DataDefProperties			
Note	This class is a collection of properties relevant for data objects under various aspects. One could consider this class as a "pattern of inheritance by aggregation". The properties can be applied to all objects of all classes in which SwDataDefProps is aggregated. Note that not all of the attributes or associated elements are useful all of the time. Hence, the process definition (e.g. expressed with an OCL or a Document Control Instance MSR-DCI) has the task of implementing limitations. SwDataDefProps covers various aspects: • Structure of the data element for calibration use cases: is it a single value, a curve, or a map, but also the recordLayouts which specify how such elements are mapped/converted to the DataTypes in the programming language (or in AUTOSAR). This is mainly expressed by properties like swRecordLayout and swCalprmAxisSet • Implementation aspects, mainly expressed by swImplPolicy, swVariableAccessImplPolicy, swAddrMethod, swPointerTagetProps, baseType, implementationDataType and additionalNativeTypeQualifier • Access policy for the MCD system, mainly expressed by swCalibrationAccess • Semantics of the data element, mainly expressed by compuMethod and/or unit, dataConstr, invalidValue • Code generation policy provided by swRecordLayout **Tags:** vh.latestBindingTime=codeGenerationTime			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
additionalNativeTypeQualifier	NativeDeclarationString	0..1	attr	This attribute is used to declare native qualifiers of the programming language which can neither be deduced from the baseType (e.g. because the data object describes a pointer) nor from other more abstract attributes. Examples are qualifiers like "volatile", "strict" or "enum" of the C-language. All such declarations have to be put into one string. **Tags:** xml.sequenceOffset=235

annotation	Annotation	*	aggr	This aggregation allows to add annotations (yellow pads ...) related to the current data object. **Tags:** xml.roleElement=true; xml.roleWrapperElement=true; xml.sequenceOffset=20; xml.typeElement=false; xml.typeWrapperElement=false
baseType	SwBaseType	0..1	ref	Base type associated with the containing data object. **Tags:** xml.sequenceOffset=50
compuMethod	CompuMethod	0..1	ref	Computation method associated with the semantics of this data object. **Tags:** xml.sequenceOffset=180
dataConstr	DataConstr	0..1	ref	Data constraint for this data object. **Tags:** xml.sequenceOffset=190
displayFormat	DisplayFormatString	0..1	attr	This property describes how a number is to be rendered e.g. in documents or in a measurement and calibration system. **Tags:** xml.sequenceOffset=210
implementationDataType	ImplementationDataType	0..1	ref	This association denotes the ImplementationDataType of a data declaration via its aggregated SwDataDefProps. It is used whenever a data declaration is not directly referring to a base type. Especially • redefinition of an ImplementationDataType via a "typedef" to another ImplementationDatatype • the target type of a pointer (see SwPointerTargetProps), if it does not refer to a base type directly • the data type of an array or record element within an ImplementationDataType, if it does not refer to a base type directly • the data type of an SwServiceArg, if it does not refer to a base type directly **Tags:** xml.sequenceOffset=215
invalidValue	ValueSpecification	0..1	aggr	Optional value to express invalidity of the actual data element. **Tags:** xml.sequenceOffset=255
stepSize	Float	0..1	attr	This attribute can be used to define a value which is added to or subtracted from the value of a DataPrototype when using up/down keys while calibrating.

swAddrMethod	SwAddrMethod	0..1	ref	Addressing method related to this data object. Via an association to the same SwAddrMethod it can be specified that several DataPrototypes shall be located in the same memory without already specifying the memory section itself. **Tags:** xml.sequenceOffset=30
swAlignment	AlignmentType	0..1	attr	The attribute describes the intended alignment of the DataPrototype. If the attribute is not defined the alignment is determined by the swBaseType size and the memoryAllocationKeywordPolicy of the referenced SwAddrMethod. **Tags:** xml.sequenceOffset=33
swBitRepresentation	SwBitRepresentation	0..1	aggr	Description of the binary representation in case of a bit variable. **Tags:** xml.sequenceOffset=60
swCalibrationAccess	SwCalibrationAccessEnum	0..1	attr	Specifies the read or write access by MCD tools for this data object. **Tags:** xml.sequenceOffset=70
swCalprmAxisSet	SwCalprmAxisSet	0..1	aggr	This specifies the properties of the axes in case of a curve or map etc. This is mainly applicable to calibration parameters. **Tags:** xml.sequenceOffset=90
swComparisonVariable	SwVariableRefProxy	*	aggr	Variables used for comparison in an MCD process. **Tags:** xml.sequenceOffset=170; xml.typeElement=false
swDataDependency	SwDataDependency	0..1	aggr	Describes how the value of the data object has to be calculated from the value of another data object (by the MCD system). **Tags:** xml.sequenceOffset=200
swHostVariable	SwVariableRefProxy	0..1	aggr	Contains a reference to a variable which serves as a host-variable for a bit variable. Only applicable to bit objects. **Tags:** xml.sequenceOffset=220; xml.typeElement=false
swImplPolicy	SwImplPolicyEnum	0..1	attr	Implementation policy for this data object. **Tags:** xml.sequenceOffset=230

swIntendedResolution	Numerical	0..1	attr	The purpose of this element is to describe the requested quantization of data objects early on in the design process. The resolution ultimately occurs via the conversion formula present (compuMethod), which specifies the transition from the physical world to the standardized world (and vice-versa) (here, "the slope per bit" is present implicitly in the conversion formula). In the case of a development phase without a fixed conversion formula, a pre-specification can occur through swIntendedResolution. The resolution is specified in the physical domain according to the property "unit". **Tags:** xml.sequenceOffset=240
swInterpolationMethod	Identifier	0..1	attr	This is a keyword identifying the mathematical method to be applied for interpolation. The keyword needs to be related to the interpolation routine which needs to be invoked. **Tags:** xml.sequenceOffset=250
swIsVirtual	Boolean	0..1	attr	This element distinguishes virtual objects. Virtual objects do not appear in the memory, their derivation is much more dependent on other objects and hence they shall have a swDataDependency . **Tags:** xml.sequenceOffset=260
swPointerTargetProps	SwPointerTargetProps	0..1	aggr	Specifies that the containing data object is a pointer to another data object. **Tags:** xml.sequenceOffset=280
swRecordLayout	SwRecordLayout	0..1	ref	Record layout for this data object. **Tags:** xml.sequenceOffset=290
swRefreshTiming	MultidimensionalTime	0..1	aggr	This element specifies the frequency in which the object involved shall be or is called or calculated. This timing can be collected from the task in which write access processes to the variable run. But this cannot be done by the MCD system. So this attribute can be used in an early phase to express the desired refresh timing and later on to specify the real refresh timing. **Tags:** xml.sequenceOffset=300

swTextProps	SwTextProps	0..1	aggr	the specific properties if the data object is a text object. **Tags:** xml.sequenceOffset=120
swValueBlockSize	Numerical	0..1	attr	This represents the size of a Value Block **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=80
unit	Unit	0..1	ref	Physical unit associated with the semantics of this data object. This attribute applies if no compuMethod is specified. If both units (this as well as via compuMethod) are specified the units shall be compatible. **Tags:** xml.sequenceOffset=350
valueAxisDataType	ApplicationPrimitiveDataType	0..1	ref	The referenced ApplicationPrimitiveDataType represents the primitive data type of the value axis within a compound primitive (e.g. curve, map). It supersedes CompuMethod, Unit, and BaseType. **Tags:** xml.sequenceOffset=355

Table E.107: SwDataDefProps

Enumeration	**SwImplPolicyEnum**
Package	M2::MSR::DataDictionary::DataDefProperties
Note	Specifies the implementation strategy with respect to consistency mechanisms of variables.
Literal	***Description***
const	forced implementation such that the running software within the ECU shall not modify it. For example implemented with the "const" modifier in C. This can be applied for parameters (not for those in NVRAM) as well as argument data prototypes. **Tags:** atp.EnumerationValue=0
fixed	This data element is fixed. In particular this indicates, that it might also be implemented e.g. as in place data, (#DEFINE). **Tags:** atp.EnumerationValue=1
measurementPoint	The data element is created for measurement purposes only. The data element is never read directly within the ECU software. In contrast to a "standard" data element in an unconnected provide port is, this unconnection is guaranteed for measurementPoint data elements. **Tags:** atp.EnumerationValue=2
queued	The content of the data element is queued and the data element has 'event' semantics, i.e. data elements are stored in a queue and all data elements are processed in 'first in first out' order. The queuing is intended to be implemented by RTE Generator. This value is not applicable for parameters. **Tags:** atp.EnumerationValue=3

standard	This is applicable for all kinds of data elements. For variable data prototypes the 'last is best' semantics applies. For parameter there is no specific implementation directive. **Tags:** atp.EnumerationValue=4

Table E.108: SwImplPolicyEnum

Class	**SwRecordLayout**			
Package	M2::MSR::DataDictionary::RecordLayout			
Note	Defines how the data objects (variables, calibration parameters etc.) are to be stored in the ECU memory. As an example, this definition specifies the sequence of axis points in the ECU memory. Iterations through axis values are stored within the sub-elements swRecordLayoutGroup. **Tags:** atp.recommendedPackage=SwRecordLayouts			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
swRecordLayoutGroup	SwRecordLayoutGroup	1	aggr	This is the top level record layout group. **Tags:** xml.roleElement=true; xml.roleWrapperElement=false; xml.sequenceOffset=20; xml.typeElement=false; xml.typeWrapperElement=false

Table E.109: SwRecordLayout

Class	**SwRecordLayoutGroup**			
Package	M2::MSR::DataDictionary::RecordLayout			
Note	Specifies how a record layout is set up. Using SwRecordLayoutGroup it recursively models iterations through axis values. The subelement swRecordLayoutGroupContentType may reference other SwRecordLayouts, SwRecordLayoutVs and SwRecordLayoutGroups for the modeled record layout.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
desc	MultiLanguageOverviewParagraph	0..1	aggr	This aggregation allows a brief description about the particular record layout group which can help to identify the entry. In-depth documentation should be added to the introduction of the surrounding record layout. **Tags:** xml.sequenceOffset=20

category	AsamRecordLayoutSemantics	0..1	attr	This attribute denotes the semantics in particular in terms of the corresponding A2L-Keyword. This is to support the mapping of the more general record layouts in AUTOSAR/MSR to the specific A2l keywords. It is possible to express the specific semantics of A2l recordlayout keywords in swRecordlayoutGroup but not always vice versa. Therefore the mapping is provided in this optional attribute. **Tags:** xml.sequenceOffset=5
shortLabel	Identifier	1	attr	This attribute specifies a name which can be used e.g. when ECU code is generated from the record layout group. **Tags:** xml.sequenceOffset=3
swGenericAxisParamType	SwGenericAxisParamType	0..1	ref	This association allows to specify record layout groups to iterate over generic axis parameters. For example, if the generic axis parameter is an array, the record layout group will iterate over this array. Obviously, the axis referred to by swRecordLayoutGroupAxis shall be a generic axis in which the referenced SwGenericAxisType is aggregated. **Tags:** xml.sequenceOffset=50
swRecordLayoutComponent	Identifier	0..1	attr	This attribute is used to denote the component to which the group in question applies. Thus, the record layout supports structured objects. This secures independence from the sequence of components, because they can be referred to via name. **Tags:** xml.sequenceOffset=90
swRecordLayoutGroupAxis	AxisIndexType	0..1	attr	This attribute specifies the iteration axis number for a SwRecordLayoutGroup. The current record layout group then refers exactly to the axis with this number. This means that the values are taken by iterating along the thus referenced axis. **Tags:** xml.sequenceOffset=30
swRecordLayoutGroupContentType	SwRecordLayoutGroupContent	0..1	aggr	This is the contents of the recordLayout which is produced for every step of iteration. **Tags:** xml.roleElement=false; xml.roleWrapperElement=false; xml.sequenceOffset=100; xml.typeElement=false; xml.typeWrapperElement=false

swRecordLayoutGroupFrom	RecordLayoutIteratorPoint	0..1	attr	This attribute specifies the iterator index for the point in the axis from which a record layout group is commenced. Negative values are also possible, i.e. the value -4 counts from the fourth value from the end. If this property is missing, the iteration starts with '1'. **Tags:** xml.sequenceOffset=60
swRecordLayoutGroupIndex	NameToken	0..1	attr	This attribute attributes a symbolic name to the iterator of the superimposed record layout group. This can be referenced as a loop index in contained SwRecordLayoutV elements. **Tags:** xml.sequenceOffset=40
swRecordLayoutGroupStep	Integer	0..1	attr	This attribute specifies the step width for the iterator index that is used for the current record layout group. Note that negative values are also possible, in case of the starting point is higher than the endpoint. If the property is missing, the step width is "1". **Tags:** xml.sequenceOffset=80
swRecordLayoutGroupTo	RecordLayoutIteratorPoint	0..1	attr	This attribute specifies the end point for the iteration. Negative values are also possible, i.e. the value -4 counts up to the fourth value from the end. If this property is not there, the iteration ends at "-1" which is the last element. Note that depending on the arraySizeSemantics of SwTextProps the iteration ends at the value specified in swMaxTextSize. **Tags:** xml.sequenceOffset=70

Table E.110: SwRecordLayoutGroup

Class	**SwSystemconst**			
Package	M2::MSR::DataDictionary::SystemConstant			
Note	This element defines a system constant which serves an input to select a particular variation point. In particular a system constant serves as an operand of the binding function (swSyscond) in a Variation point. Note that the binding process can only happen if a value was assigned to to the referenced system constants. **Tags:** atp.recommendedPackage=SwSystemconsts			
Base	ARElement, ARObject, AtpDefinition, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***

swDataDefProps	SwDataDefProps	0..1	aggr	This denotes the data defintion properties of the system constant. This supports to express the limits and optionally a conversion within the internal to physical values by a compu method. **Tags:** xml.sequenceOffset=40

Table E.111: SwSystemconst

Class	**SwSystemconstValue**			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	This meta-class assigns a particular value to a system constant.			
Base	ARObject			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
annotation	Annotation	*	aggr	This provides the ability to add information why the value is set like it is. **Tags:** xml.sequenceOffset=30
swSystemconst	SwSystemconst	1	ref	This is the system constant to which the value applies. **Tags:** xml.sequenceOffset=10
value	Numerical	1	attr	This is the particular value of a system constant. It is specified as Numerical. Further restrictions may apply by the definition of the system constant. The value attribute defines the internal value of the SwSystemconst as it is processed in the Formula Language. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime xml.sequenceOffset=20

Table E.112: SwSystemconstValue

Class	**SwSystemconstantValueSet**			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	This meta-class represents the ability to specify a set of system constant values. **Tags:** atp.recommendedPackage=SwSystemconstantValueSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
swSystemconstantValue	SwSystemconstValue	*	aggr	This is one particular value of a system constant.

Table E.113: SwSystemconstantValueSet

Class	SwcImplementation			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcImplementation			
Note	This meta-class represents a specialization of the general Implementation meta-class with respect to the usage in application software. **Tags:** atp.recommendedPackage=SwcImplementations			
Base	ARElement, ARObject, CollectableElement, Identifiable, Implementation, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
behavior	SwcInternalBehavior	1	ref	The internal behavior implemented by this Implementation.
perInstanceMemorySize	PerInstanceMemorySize	*	aggr	Allows a definition of the size of the per-instance memory for this implementation. The aggregation of PerInstanceMemorySize is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects, in this case PerInstanceMemory. **Stereotypes:** atpVariation **Tags:** vh.latestBindingTime=preCompileTime
requiredRTEVendor	String	0..1	attr	Identify a specific RTE vendor. This information is potentially important at the time of integrating (in particular: linking) the application code with the RTE. The semantics is that (if the association exists) the corresponding code has been created to fit to the vendor-mode RTE provided by this specific vendor. Attempting to integrate the code with another RTE generated in vendor mode is in general not possible.

Table E.114: SwcImplementation

Class	SwcInternalBehavior			
Package	M2::AUTOSARTemplates::SWComponentTemplate::SwcInternalBehavior			
Note	The SwcInternalBehavior of an AtomicSwComponentType describes the relevant aspects of the software-component with respect to the RTE, i.e. the RunnableEntities and the RTEEvents they respond to.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, Internal Behavior, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**

arTypedPerInstanceMemory	VariableDataPrototype	*	aggr	Defines an AUTOSAR typed memory-block that needs to be available for each instance of the SW-component. This is typically only useful if supportsMultipleInstantiation is set to "true" or if the component defines NVRAM access via permanent blocks. The aggregation of arTypedPerInstanceMemory is subject to variability with the purpose to support variability in the software component's implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
event	RTEEvent	*	aggr	This is a RTEEvent specified for the particular SwcInternalBehavior. The aggregation of RTEEvent is subject to variability with the purpose to support the conditional existence of RTE events. Note: the number of RTE events might vary due to the conditional existence of PortPrototypes using DataReceivedEvents or due to different scheduling needs of algorithms. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
exclusiveAreaPolicy	SwcExclusiveAreaPolicy	*	aggr	Options how to generate the ExclusiveArea related APIs. When no SwcExclusiveAreaPolicy is specified for an ExclusiveArea the default values apply. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=exclusiveAreaPolicy vh.latestBindingTime=preCompileTime

explicitInterRunnableVariable	VariableDataPrototype	*	aggr	Implement state message semantics for establishing communication among runnables of the same component. The aggregation of explicitInterRunnableVariable is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
handleTerminationAndRestart	HandleTerminationAndRestartEnum	1	attr	This attribute controls the behavior with respect to stopping and restarting. The corresponding AtomicSwComponentType may either not support stop and restart, or support only stop, or support both stop and restart.
implicitInterRunnableVariable	VariableDataPrototype	*	aggr	Implement state message semantics for establishing communication among runnables of the same component. The aggregation of implicitInterRunnableVariable is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
includedDataTypeSet	IncludedDataTypeSet	*	aggr	The includedDataTypeSet is used by a software component for its implementation. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=includedDataTypeSet
includedModeDeclarationGroupSet	IncludedModeDeclarationGroupSet	*	aggr	This aggregation represents the included ModeDeclarationGroups **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=includedModeDeclarationGroupSet

instantiationDataDefProps	InstantiationDataDefProps	*	aggr	The purpose of this is that within the context of a given SwComponentType some data def properties of individual instantiations can be modified. The aggregation of InstantiationDataDefProps is subject to variability with the purpose to support the conditional existence of PortPrototypes and component local memories like "perInstanceParameter" or "arTypedPerInstanceMemory". **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=instantiationDataDefProps, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
perInstanceMemory	PerInstanceMemory	*	aggr	Defines a per-instance memory object needed by this software component. The aggregation of PerInstanceMemory is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
perInstanceParameter	ParameterDataPrototype	*	aggr	Defines parameter(s) or characteristic value(s) that needs to be available for each instance of the software-component. This is typically only useful if supportsMultipleInstantiation is set to "true". The aggregation of perInstanceParameter is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variationPoint.shortLabel vh.latestBindingTime=preCompileTime
portAPIOption	PortAPIOption	*	aggr	Options for generating the signature of port-related calls from a runnable to the RTE and vice versa. The aggregation of PortPrototypes is subject to variability with the purpose to support the conditional existence of ports. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=portAPIOption, variationPoint.shortLabel vh.latestBindingTime=preCompileTime

runnable	RunnableEntity	*	aggr	This is a RunnableEntity specified for the particular SwcInternalBehavior. The aggregation of RunnableEntity is subject to variability with the purpose to support the conditional existence of RunnableEntities. Note: the number of RunnableEntities might vary due to the conditional existence of PortPrototypes using DataReceivedEvents or due to different scheduling needs of algorithms. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime
serviceDependency	SwcServiceDependency	*	aggr	Defines the requirements on AUTOSAR Services for a particular item. The aggregation of SwcServiceDependency is subject to variability with the purpose to support the conditional existence of ports as well as the conditional existence of ServiceNeeds. The SwcServiceDependency owned by an SwcInternalBehavior can be located in a different physical file in order to support that SwcServiceDependency might be provided in later development steps or even by different expert domain (e.g OBD expert for Obd related Service Needs) tools. Therefore the aggregation is «atpSplitable». **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime
sharedParameter	ParameterDataPrototype	*	aggr	Defines parameter(s) or characteristic value(s) shared between SwComponentPrototypes of the same SwComponentType The aggregation of sharedParameter is subject to variability with the purpose to support variability in the software components implementations. Typically different algorithms in the implementation are requiring different number of memory objects. **Stereotypes:** atpSplitable; atpVariation **Tags:** atp.Splitkey=shortName, variation Point.shortLabel vh.latestBindingTime=preCompileTime
supportsMultipleInstantiation	Boolean	1	attr	Indicate whether the corresponding software-component can be multiply instantiated on one ECU. In this case the attribute will result in an appropriate component API on programming language level (with or without instance handle).

variationPointProxy	VariationPointProxy	*	aggr	Proxy of a variation points in the C/C++ implementation. **Stereotypes:** atpSplitable **Tags:** atp.Splitkey=shortName

Table E.115: SwcInternalBehavior

Class	**SymbolProps**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Components			
Note	This meta-class represents the ability to attach with the symbol attribute a symbolic name that is conform to C language requirements to another meta-class, e.g. AtomicSwComponentType, that is a potential subject to a name clash on the level of RTE source code.			
Base	ARObject, ImplementationProps, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.116: SymbolProps

Class	**TextValueSpecification**			
Package	M2::AUTOSARTemplates::CommonStructure::Constants			
Note	The purpose of TextValueSpecification is to define the labels that correspond to enumeration values.			
Base	ARObject, ValueSpecification			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
value	VerbatimString	1	attr	This is the value itself. Note that vt uses the | operator to separate the values for the different bitfield masks in case that the semantics of the related DataPrototype is described by means of a BITFIELD_TEXTTABLE in the associated CompuMethod.

Table E.117: TextValueSpecification

Class	**TransformationComSpecProps (abstract)**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Communication			
Note	TransformationComSpecProps holds all the attributes for transformers that are port specific.			
Base	ARObject, Describable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
–	–	–	–	–

Table E.118: TransformationComSpecProps

Class	**Trigger**			
Package	M2::AUTOSARTemplates::CommonStructure::TriggerDeclaration			
Note	A trigger which is provided (i.e. released) or required (i.e. used to activate something) in the given context.			
Base	ARObject, AtpClassifier, AtpFeature, AtpStructureElement, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
swImplPolicy	SwImplPolicyEnum	0..1	attr	This attribute, when set to value queued, allows for a queued processing of Triggers.
triggerPeriod	MultidimensionalTime	0..1	aggr	Optional definition of a period in case of a periodically (time or angle) driven external trigger.

Table E.119: Trigger

Class	**TriggerInterface**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::PortInterface			
Note	A trigger interface declares a number of triggers that can be sent by an trigger source. **Tags:** atp.recommendedPackage=PortInterfaces			
Base	ARElement, ARObject, AtpBlueprint, AtpBlueprintable, AtpClassifier, AtpType, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, PortInterface, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
trigger	Trigger	1..*	aggr	The Trigger of this trigger interface.

Table E.120: TriggerInterface

Class	**VariableDataPrototype**			
Package	M2::AUTOSARTemplates::SWComponentTemplate::Datatype::DataPrototypes			
Note	A VariableDataPrototype is used to contain values in an ECU application. This means that most likely a VariableDataPrototype allocates "static" memory on the ECU. In some cases optimization strategies might lead to a situation where the memory allocation can be avoided. In particular, the value of a VariableDataPrototype is likely to change as the ECU on which it is used executes.			
Base	ARObject, AtpFeature, AtpPrototype, AutosarDataPrototype, DataPrototype, Identifiable, MultilanguageReferrable, Referrable			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
initValue	ValueSpecification	0..1	aggr	Specifies initial value(s) of the VariableDataPrototype

Table E.121: VariableDataPrototype

Class	**VariationPoint**			
Package	M2::AUTOSARTemplates::GenericStructure::VariantHandling			
Note	This meta-class represents the ability to express a "structural variation point". The container of the variation point is part of the selected variant if swSyscond evaluates to true and each postBuildVariantCriterion is fulfilled.			
Base	ARObject			
Attribute	**Type**	**Mul.**	**Kind**	**Note**
desc	MultiLanguageOverviewParagraph	0..1	aggr	This allows to describe shortly the purpose of the variation point. **Tags:** xml.sequenceOffset=20
blueprintCondition	DocumentationBlock	0..1	aggr	This represents a description that documents how the variation point shall be resolved when deriving objects from the blueprint. Note that variationPoints are not allowed within a blueprintCondition. **Tags:** xml.sequenceOffset=28
formalBlueprintCondition	BlueprintFormula	0..1	aggr	This denotes a formal blueprintCondition. This shall be not in contradiction with blueprintCondition. It is recommanded only to use one of the two. **Tags:** xml.sequenceOffset=29
postBuildVariantCondition	PostBuildVariantCondition	*	aggr	This is the set of post build variant conditions which all shall be fulfilled in order to (postbuild) bind the variation point. **Tags:** xml.sequenceOffset=40
sdg	Sdg	0..1	aggr	An optional special data group is attached to every variation point. These data can be used by external software systems to attach application specific data. For example, a variant management system might add an identifier, an URL or a specific classifier. **Tags:** xml.sequenceOffset=50
shortLabel	Identifier	0..1	attr	This provides a name to the particular variation point to support the RTE generator. It is necessary for supporting splitable aggregations and if binding time is later than codeGenerationTime, as well as some RTE conditions. It needs to be unique with in the enclosing Identifiables with the same ShortName. **Tags:** xml.sequenceOffset=10
swSyscond	ConditionByFormula	0..1	aggr	This condition acts as Binding Function for the VariationPoint. Note that the mulitplicity is 0..1 in order to support pure postBuild variants. **Tags:** xml.sequenceOffset=30

Table E.122: VariationPoint

Class	**ViewMap**			
Package	M2::AUTOSARTemplates::GenericStructure::ViewMapSet			
Note	The ViewMap allows to relate any number of elements on the "first" side to any number of elements on the "second" side. Since the ViewMap does not address a specific mapping use-case the roles "first" and "second" shall imply this generality. This mapping allows to trace transformations of artifacts within the AUTOSAR environment. The references to the mapped elements can be plain references and/or InstanceRefs.			
Base	ARObject, Identifiable, MultilanguageReferrable, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
firstElement	Referrable	*	ref	Reference to identifible elements on the first "side". **Tags:** xml.sequenceOffset=20
firstElementInstance	AtpFeature	*	iref	InstanceRefs to elements on the first "side". **Tags:** xml.sequenceOffset=50
role	Identifier	0..1	attr	This attribute is used to describe specific mapping scenarios, e.g. the mappings: AR_AbstractSystemDescription_SystemDescription AR_SystemDescription_SystemExtract **Tags:** xml.sequenceOffset=10
secondElement	Referrable	*	ref	Reference to identifible elements on the second "side". **Tags:** xml.sequenceOffset=30
secondElementInstance	AtpFeature	*	iref	InstanceRefs to elements on the second "side". **Tags:** xml.sequenceOffset=60

Table E.123: ViewMap

Class	**ViewMapSet**			
Package	M2::AUTOSARTemplates::GenericStructure::ViewMapSet			
Note	Collection of ViewMaps that are used to establish relationships between different AUTOSAR artifacts. **Tags:** atp.recommendedPackage=ViewMapSets			
Base	ARElement, ARObject, CollectableElement, Identifiable, MultilanguageReferrable, PackageableElement, Referrable			
Attribute	***Type***	***Mul.***	***Kind***	***Note***
viewMap	ViewMap	*	aggr	ViewMaps that are collected by the ViewMapSet.

Table E.124: ViewMapSet

F Splitable Elements in the Scope of this Document

This chapter contains a table of all model elements stereotyped ≪atpSplitable≫ in the scope of this document.

Each entry in Table F.1 consists of the identification of the specific model element itself and the applicable value of the tagged value atp.Splitkey.

For more information about the concept of splitable model elements and how these shall be treated please refer to [2].

Name of splitable element	Splitkey
AliasNameSet.aliasName	shortLabel
ClientIdDefinitionSet.clientIdDefinition	shortName, variationPoint.shortLabel
CommunicationCluster.physicalChannel	shortName, variationPoint.shortLabel
CouplingElement.couplingPort	shortName, variationPoint.shortLabel
DataTransformationSet.dataTransformation	shortName, variationPoint.shortLabel
DataTransformationSet.transformationTechnology	shortName, variationPoint.shortLabel
EthernetCluster.couplingPortConnection	couplingPortConnection, variationPoint.shortLabel
EthernetPhysicalChannel.networkEndpoint	shortName
FlatMap.instance	shortName, variationPoint.shortLabel
ISignal.dataTransformation	dataTransformation, variationPoint.shortLabel
ISignal.iSignalProps	iSignalProps
ISignalGroup.comBasedSignalGroupTransformation	comBasedSignalGroupTransformation, variationPoint.shortLabel
PhysicalChannel.frameTriggering	shortName, variationPoint.shortLabel
PhysicalChannel.iSignalTriggering	shortName, variationPoint.shortLabel
PhysicalChannel.pduTriggering	shortName, variationPoint.shortLabel
RootSwCompositionPrototype.calibrationParameterValueSet	calibrationParameterValueSet
RootSwCompositionPrototype.flatMap	flatMap
System.j1939SharedAddressCluster	shortName, variationPoint.shortLabel
System.mapping	shortName, variationPoint.shortLabel
System.rootSoftwareComposition	shortName, variationPoint.shortLabel
System.systemDocumentation	shortName, variationPoint.shortLabel
SystemMapping.applicationPartitionToEcuPartitionMapping	shortName, variationPoint.shortLabel
SystemMapping.swcToApplicationPartitionMapping	shortName, variationPoint.shortLabel

Table F.1: Usage of splitable elements

G Variation Points in the Scope of this Document

This chapter contains a table of all model elements stereotyped ≪atpVariation≫ in the scope of this document.

Each entry in Table G.1 consists of the identification of the model element itself and the applicable value of the tagged value vh.latestBindingTime.

For more information about the concept of variation points and how model elements that contain variation points shall be treated please refer to [2].

Variation Point	Latest Binding Time
AbstractCanCluster	postBuild
AbstractCanCommunicationController	postBuild
AliasNameSet.aliasName	preCompileTime
CanCluster	postBuild
CanCommunicationController	postBuild
CanTpConfig.tpAddress	postBuild
CanTpConfig.tpChannel	postBuild
CanTpConfig.tpConnection	postBuild
CanTpConfig.tpEcu	postBuild
CanTpConfig.tpNode	postBuild
ClientIdDefinitionSet.clientIdDefinition	postBuild
ClientIdRange.lowerLimit	postBuild
ClientIdRange.upperLimit	postBuild
CommunicationCluster	postBuild
CommunicationCluster.physicalChannel	systemDesignTime
CommunicationConnector.ecuCommPortInstance	postBuild
CommunicationController	postBuild
CouplingElement.couplingPort	postBuild
DataTransformationSet.dataTransformation	codeGenerationTime
DataTransformationSet.transformationTechnology	codeGenerationTime
EndToEndTransformationISignalProps	postBuild
EthernetCluster	postBuild
EthernetCluster.couplingPortConnection	postBuild
EthernetCommunicationController	postBuild
FlatMap.instance	postBuild
FlexrayArTpConfig.tpAddress	postBuild
FlexrayArTpConfig.tpChannel	postBuild
FlexrayArTpConfig.tpNode	postBuild
FlexrayCluster	postBuild
FlexrayCommunicationController	postBuild
FlexrayTpConfig.pduPool	postBuild
FlexrayTpConfig.tpAddress	postBuild
FlexrayTpConfig.tpConnection	postBuild
FlexrayTpConfig.tpConnectionControl	postBuild
FlexrayTpConfig.tpEcu	postBuild
FlexrayTpConfig.tpNode	postBuild
Frame.pduToFrameMapping	postBuild
FrameTriggering.pduTriggering	postBuild
Gateway.frameMapping	postBuild
Gateway.iPduMapping	postBuild
Gateway.signalMapping	postBuild

ISignal.dataTransformation	codeGenerationTime
ISignalGroup.comBasedSignalGroupTransformation	codeGenerationTime
ISignalIPdu.iPduTimingSpecification	postBuild
ISignalIPdu.iSignalToPduMapping	postBuild
ISignalIPdu.pduCounter	preCompileTime
ISignalIPdu.pduReplication	preCompileTime
ISignalIPduGroup.iSignalIPdu	postBuild
ISignalIPduGroup.nmPdu	postBuild
J1939Cluster	postBuild
J1939TpConfig.tpAddress	postBuild
J1939TpConfig.tpConnection	postBuild
J1939TpConfig.tpNode	postBuild
LinCluster	postBuild
LinCommunicationController	postBuild
LinMaster	postBuild
LinPhysicalChannel.scheduleTable	postBuild
LinSlave	postBuild
LinTpConfig.tpAddress	postBuild
LinTpConfig.tpConnection	postBuild
LinTpConfig.tpNode	postBuild
MultiplexedIPdu.dynamicPart	postBuild
MultiplexedIPdu.staticPart	postBuild
NmCluster.nmNode	postBuild
NmConfig.nmCluster	postBuild
NmConfig.nmClusterCoupling	postBuild
NmConfig.nmIfEcu	preCompileTime
PdurIPduGroup.iPdu	postBuild
PduTriggering.iSignalTriggering	postBuild
PhysicalChannel.commConnector	postBuild
PhysicalChannel.frameTriggering	postBuild
PhysicalChannel.iSignalTriggering	postBuild
PhysicalChannel.pduTriggering	postBuild
SoAdConfig.connectionBundle	postBuild
SoAdConfig.socketAddress	postBuild
SOMEIPTransformationISignalProps	postBuild
System.fibexElement	postBuild
System.j1939SharedAddressCluster	postBuild
System.mapping	postBuild
System.rootSoftwareComposition	systemDesignTime
System.systemDocumentation	systemDesignTime
SystemMapping.applicationPartitionToEcuPartitionMapping	postBuild
SystemMapping.dataMapping	postBuild
SystemMapping.ecuResourceMapping	systemDesignTime
SystemMapping.mappingConstraint	systemDesignTime
SystemMapping.pncMapping	systemDesignTime
SystemMapping.resourceEstimation	systemDesignTime
SystemMapping.signalPathConstraint	systemDesignTime
SystemMapping.swcToApplicationPartitionMapping	postBuild
SystemMapping.swImplMapping	preCompileTime
SystemMapping.swMapping	preCompileTime
TransformationISignalProps	postBuild
TransformationTechnology.transformationDescription	postBuild
TtcanCluster	postBuild

TtcanCommunicationController	postBuild
UserDefinedCluster	postBuild
UserDefinedCommunicationController	postBuild
UserDefinedTransformationISignalProps	postBuild

Table G.1: Usage of variation points