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## References

- [1] Specification of Communication  
AUTOSAR\_CP\_SWS\_COM
- [2] Specification of LIN Driver  
AUTOSAR\_CP\_SWS\_LINDriver
- [3] SAE J1939-81 Network Management

# 1 Introduction

## 1.1 Scope of This Document

This document provides an overview of the AUTOSAR standard Classic Platform Release R24-11.

## 1.2 Terminology and Licenses

### 1.2.1 Terminology Statement

AUTOSAR has identified a use of previously common terminology that can be considered oppressive or racist, such as master/slave and black/white list, or in other contexts such as gender or age as harmful connotations. AUTOSAR has started a discussion with all the working groups to replace these terms. AUTOSAR is committed to provide all specification documents without these terminology in the coming and future releases. Nevertheless, it may take several releases before the terms are completely replaced, as AUTOSAR has to continue its operations and thousands of pages of existing specifications have to be reviewed and updated in parallel.

### 1.2.2 Usage of W3C XML Schema

The AUTOSAR XML Schema requires the XML namespace definition file `xml.xsd`.

There are several occurrences of the "xml.xsd" file within this release. For all occurrences the W3C license applies which can be found on <https://www.w3.org/Consortium/Legal/2015/copyright-software-and-document>.

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## 1.3 AUTOSAR Standards

### 1.3.1 Introduction

AUTOSAR addresses a wide range of use cases in automotive software development with its standards. These use cases have different requirements and lead to different technical solutions.

Packaging its deliverables into different "standards"

- eases the access to AUTOSAR solutions for users and
- allows AUTOSAR to scale with market needs.

### 1.3.2 Definition

An AUTOSAR standard is a consistent set of AUTOSAR deliverables, which are released at the same time. AUTOSAR deliverables can, but are not limited to be of the following kinds:

- textual explanations
- textual specifications
- test specifications
- source code
- other formal or semi-formal textual formats (e.g., ARXML, UML models, XML Schemata)

At the time of release, AUTOSAR ensures that dependencies are fulfilled.

### 1.3.3 Overview of AUTOSAR's Standards

AUTOSAR delivers the following standards:

Standard	Abbreviation
Adaptive Platform	AP
Classic Platform	CP
Foundation	FO

#### 1.3.3.1 Adaptive Platform

The Adaptive Platform is AUTOSAR's solution for high-performance computing ECUs to build safety-related systems for use cases such as highly automated and autonomous driving.

#### 1.3.3.2 Classic Platform

The Classic Platform is AUTOSAR's solution for embedded systems with hard real-time and safety constraints.

#### 1.3.3.3 Foundation

The purpose of the Foundation standard is to enforce interoperability between the AUTOSAR platforms.

Foundation contains the generic artifacts that are common for AP and CP to ensure compatibility between

- Classic- and Adaptive Platform
- Non-AUTOSAR platforms to AUTOSAR platforms.

### 1.3.4 Dependencies Between Standards

Each release of Classic and Adaptive Platform relies on a dedicated version of Foundation. The specific dependency is documented in chapter [1.4.5](#).



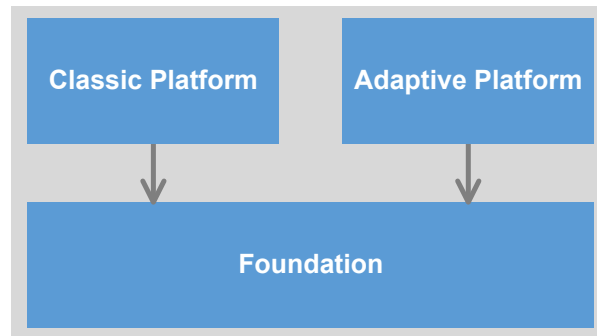


Figure 1.1: Dependencies of AUTOSAR standards

### 1.3.5 Dependencies to Other Standards

This release of the Classic Platform depends on the standard Foundation in release R24-11, which

- defines protocols implemented by Classic Platform
- contains the project objectives and the common requirements from which the features of the Classic Platform are derived
- contains common specification parts which apply to both, the Adaptive Platform and the Classic Platform.

These dependencies are refined in the trace information of the requirements in the respective specifications.

## 1.4 Release Numbering and Life Cycle

### 1.4.1 Release Life Cycle of a Major Release

Each major release goes through four consecutive steps within its life cycle (examples based on the internal release numbering scheme):

1. Development: Between start of life cycle and the initial release (e.g., R4.0.1)
2. Evolution: Following the initial release with zero, one or several minor releases and/or revisions (e.g., R4.0.2, R4.1.1)
3. Maintenance: No new content is added to a major release but only maintenance of the existing content with zero, one or several revisions (e.g., R3.2.2) is provided
4. Issue Notice: No more revisions but zero, one or several issue notices, i.e., updates of the list of known issues until end of life cycle.

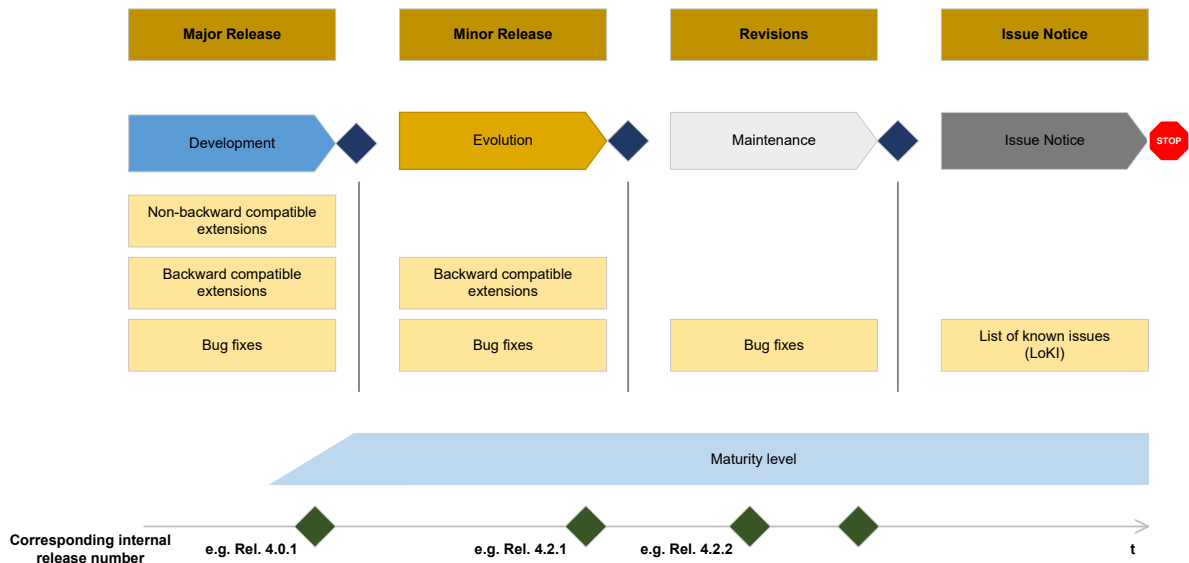


Figure 1.2: Life cycle model of AUTOSAR standards

### 1.4.2 Life Cycle States of Specification Items and Requirements

The life cycle state of a specification item is found after the specification item ID surrounded by curly brackets. The states are:

**VALID** This indicates that the related entity is a valid part of the document. This is the default and also applies if no dedicated life cycle status is annotated for the related entity.

**DRAFT** This indicates that the related entity is newly introduced but still experimental. This information is published but is subject to change without backward compatibility guarantee.

**OBSOLETE** This indicates that the related entity is subject to be removed in one of the following releases without further notice.

The life cycle state of a requirement is found in the attribute "Status". The states are the same as the specification item states.

### 1.4.3 Platform Release Number

AUTOSAR applies a four-digit numbering scheme Ryy-mm to identify releases. The identifiers "yy" and "mm" depict the year and month of the release date, e.g., R20-11 for the November 2020 release.

### 1.4.4 Internal Release Number

AUTOSAR additionally maintains an internal release number for different purposes (e.g., usage in BSW modules in Classic Platform).

The internal release number is used for all platforms and follows up on the Classic Platform release number. In Adaptive Platform this is newly introduced. In Foundation this leads to a discontinuation of the former numbering pattern (e.g., R1.5.0).

A mapping list between Platform Releases and corresponding internal release numbers can be found in chapter 1.4.5. The internal release number uses a three-digit numbering scheme R<major>.<minor>.<revision> to identify releases. Its primary purpose is to identify a release as

- a major release: Valid and draft specification parts may be changed backward incompatibly.
- a minor release: Valid specification parts may only be changed backward compatibly. Draft specification parts may be changed backward incompatibly.
- a revision: Does not contain extensions but only backward compatible bugfixes.

### 1.4.5 Overview of AUTOSAR Releases and Corresponding AUTOSAR Schema Versions

Until the Releases CP R4.4.0 and AP R19-03, AUTOSAR released the platforms separately where a Foundation release went along with each platform release. Since compatibility between the platforms is essential to be able to have AP and CP ECUs within one vehicle project, an XML schema needs to be available that works with the different releases. The following table gives an overview about the different schema versions and the corresponding platform releases they can be used for.

The AUTOSAR schema does not have an impact on the Foundation. The Foundation releases are mentioned for the sake of completeness.

Schema Version	Classic Platform release	Adaptive Platform release	Foundation release
AUTOSAR_00042	R4.3.0	R17-03	R1.1.0
AUTOSAR_00043	R4.3.0	R17-10	R1.2.0
AUTOSAR_00044	R4.3.1	R17-10	R1.3.0
AUTOSAR_00045	R4.3.1	R18-03	R1.4.0
AUTOSAR_00046	R4.4.0	R18-10	R1.5.0
AUTOSAR_00047	R4.4.0	R19-03	R1.5.1

Starting with release R19-11, all platforms are released as one AUTOSAR release and therefore come along with one schema version.

Schema Version	Platform release	Internal release number
AUTOSAR_00048	R19-11	R4.5.0
AUTOSAR_00049	R20-11	R4.6.0
AUTOSAR_00050	R21-11	R4.7.0
AUTOSAR_00051	R22-11	R4.8.0
AUTOSAR_00052	R23-11	R4.9.0
<b>AUTOSAR_00053</b>	<b>R24-11</b>	<b>R4.10.0</b>

According to the release life cycle of AUTOSAR the release R24-11 is a minor release.

## 1.5 Content of Chapters

This document is structured as follows:

- Chapter 1 introduces AUTOSAR's release strategy and its standardization approach.
- Chapter 2 provides a summary of changes since the previous release of the Classic Platform.
- Chapter 3 contains the overview of specifications comprising the AUTOSAR release R24-11. This chapter is structured according to the clusters of AUTOSAR release R24-11.
- Chapter 4 contains remarks about known technical deficiencies.
- Chapter 5 contains the detailed revision history of all released specifications.

## 2 Summary of Changes in Release R24-11

This chapter contains a summary of the changes that have been implemented since the previous release R23-11.

### 2.1 Concepts

#### 2.1.1 Introduced Concepts

The following concepts in [2.1.1.1](#)- [2.1.1.4](#) have been introduced.

##### 2.1.1.1 Charging Interface

This concept incorporates the ISO15118-2 electrical charging standard into the AUTOSAR Classic Platform.

##### 2.1.1.2 Deterministic Communication with TSN

The concept part “Completion of IEEE1722 specified tunneling process within the AUTOSAR communication stack for legacy communication (CAN and LIN)” focused on completely supporting handling of IEEE1722 streams of sub type “TSCF” and “NTSCF” on AUTOSAR classic platform. Thus, the classic platform communication stack is able to handle IEEE1722 encapsulated bus frames (e.g. CAN frames) transported as ACF messages via AVTP stream across the network (a.k.a. tunneling of legacy communication). Please note: AUTOSAR supports the transport of IEEE1722 encapsulated CAN and LIN frames as ACF messages. Other bus types (e.g. FlexRay) may be added in future.

##### 2.1.1.3 I2CDriver

I2C (Inter-Integrated Circuit) is a 2-wire serial data bus. It was developed by Philips Semiconductors (now NXP Semiconductors). I2C is a simply structured bus system and is widely used in the automotive industry.

##### 2.1.1.4 DDS Protocols

The goal of this concept part is to centralize and homogenize DDS Service-oriented communication protocols by means of:

1. Identifying Service-oriented usages of DDS in Classic and Adaptive Platforms, such as Service Instance Discovery and Provided-Required Service Instance Communication
2. Defining mappings of usages to DDS concepts (entities, types, topics, QoS policies) and mechanisms (standard API calls)
3. Refactoring the DDS Network Binding or Adaptive Platform Communications Management Functional Cluster to rely upon and reference mappings where necessary

### 2.1.2 Impact of Concepts

The introduced concepts had impact on several specifications. The following table provides a detailed overview.

Please note that some of the specifications are marked by special text formatting:

- Specifications in **bold** font are completely new specifications originating from the particular concept.
- If specifications or models like the BSW UML model or the ECUC model are only indirectly affected because they just provide artifacts for other specifications, they are not listed here.

Concept Name	Specification Long Name	Standard	Concept Lifecycle
Charging Interface	Specification of ISO15118 Charging	Classic Platform	draft
	Software Component Template		
	General Specification of Basic Software Modules		
Deterministic Communication with TSN	Specification of TTCAN Interface	Classic Platform	draft
	Layered Software Architecture		
	Requirements on Module XCP		
	Specification of Module XCP		
	Specification of CAN Interface		
	Specification of Firewall for Classic Platform		
	Specification of FlexRay AUTOSAR Transport Layer		
	Specification of FlexRay Interface		
	Specification of FlexRay ISO Transport Layer		





Concept Name	Specification Long Name	Standard	Concept Lifecycle
	Requirements on Ethernet Support in AUTOSAR		
	Requirements on Vehicle-2-X Communication		
	Specification of CAN Network Management		
	Specification of CAN Transport Layer		
	Specification for CAN XL Driver		
	Specification of Chinese Vehicle-2-X Network		
	Specification of Ethernet Driver		
	Specification of Ethernet Interface		
	Specification of FlexRay Network Management		
	Specification of IEEE1722 Transport Protocol Module		
	Specification of LIN Interface		
	Specification of Linklayer Sdu Routing Module		
	Specification of MACsec Key Agreement		
	Specification of PDU Router		
	Specification of Network Management for SAE J1939		
	Specification of a Transport Layer for SAE J1939		
	Specification of TCP/IP Stack		
	Specification of Time Synchronization over CAN		
	Specification of Time Synchronization over Ethernet		
	Specification of Time Synchronization over FlexRay		
	Specification of Vehicle-2-X Geo Networking		
	Specification of Wireless Ethernet Driver		
	Specification of ECU Configuration		
	System Template		
	Requirements on CAN		
	Requirements on LIN		
I2CDriver	<b>Requirements on I2C Driver</b>	Classic Platform, Foundation	draft
	<b>Specification of I2C Driver</b>		





Concept Name	Specification Long Name	Standard	Concept Lifecycle
	Layered Software Architecture		
	General Specification of Basic Software Modules		
DDS Protocols	Specification of Data Distribution Service for Classic Platform	Classic Platform, Adaptive Platform, Foundation	draft

**Table 2.1: Impact of concepts**

### 2.1.3 Validated Concepts

The following concepts have been validated:

- Secured Time Synchronization
- DDS support on Classic Platform

## 2.2 Specifications

### 2.2.1 New Specifications

The following new specifications have been introduced via concepts:

- Requirements on I2C Driver (UID 1100, RS)
- Specification of I2C Driver (UID 1101, SWS)

In addition to the above listed new specifications, the following documents have been added with this release:

- Specification of MSFLibrary (UID 1085, SWS)
- Specification of a Functional Safety Communication Protocol Handler for SAE J1939 (UID 1106, SWS)

### 2.2.2 Migrated Specifications

With this release, the following specifications have been moved from CP to AP, FO:

- none



### 2.2.3 Obsolete Specifications

The following specifications have been set to status "obsolete" in this release:

- Specification of EEPROM Driver (UID 21, SWS)
- Specification of Flash Driver (UID 25, SWS)

### 2.2.4 Removed Specifications

The following specifications have been set to status "removed" in this release and hence are not released anymore:

- List of Basic Software Modules (UID 150, TR)

### 2.2.5 Reworked Specifications

This release removes support for Offset Time Bases because AUTOSAR does no longer see relevant use cases. All traceable items that only related to Offset Time Bases are removed. From traceable items that related to both Synchronized and Offset Time Bases, the part related to Offset Time Bases is removed. Any explanatory text that related to Offset Time Bases is removed. This change affects the following documents of the AUTOSAR Classic Platform:

- System Template (UID 063, TPS)
- Specification of Synchronized Time-Base Manager (UID 421, SWS)
- Specification of Time Synchronization over CAN (UID 674, SWS)
- Specification of Time Synchronization over FlexRay (UID 675, SWS)
- Specification of Time Synchronization over Ethernet (UID 676, SWS)

For effects on the other AUTOSAR platforms, refer to their release overview documents.

### 2.2.6 Moved Specification Parts

The following specification parts have been moved to other documents in this release:

- List of Basic Software Modules (UID 150, TR) to General Specification of Basic Software Modules (UID 578, SWS)

### **2.2.7 Renamed Specifications**

The following specifications have been renamed in this release:

- Specification of ISO15118 Charging (UID 1095, SWS)

### **2.3 Release Documentation**

There are no major changes in the Release Documentation.

### 3 Specification Overview

The published specifications are divided into the clusters:

- ReleaseDocumentation
- ApplicationInterfaces
- BSWGeneral
- Communication
- Crypto
- Diagnostics
- General
- GlobalTime
- IO
- Libraries
- MCAL
- Memory
- MethodologyAndTemplates
- ModeManagement
- RTE
- SWArch
- Safety
- Security
- SystemServices

The assignment of the specifications to these clusters is shown below.

Long Name	File Name	Life cycle changes
<b>ReleaseDocumentation</b>		
Classic Platform Release Overview	AUTOSAR_CP_TR_ReleaseOverview	
AUTOSAR Classic Platform Specification Hashes	AUTOSAR_CP_TR_Specification Hashes	
<b>ApplicationInterfaces</b>		
Explanation of Application Interface of AD/ADAS vehicle motion control	AUTOSAR_CP_EXP_AIADASAnd VMC	
Explanation of Application Interfaces of the Body and Comfort Domain	AUTOSAR_CP_EXP_AIBodyAnd Comfort	





Long Name	File Name	Life cycle changes
Explanation of Application Interfaces of the Chassis Domain	AUTOSAR_CP_EXP_AIChassis	
Explanation of Application Interfaces of the HMI, Multimedia and Telematics Domain	AUTOSAR_CP_EXP_AIHMIMultimediaAndTelematics	
Explanation of Application Interfaces of Occupant and Pedestrian Safety Systems Domain	AUTOSAR_CP_EXP_AIOccupantAndPedestrianSafety	
Explanation of Application Interfaces of the Powertrain Engine Domain	AUTOSAR_CP_EXP_AIPowertrain	
Application Interfaces User Guide	AUTOSAR_CP_EXP_AIUserGuide	
XML Specification of Application Interfaces	AUTOSAR_CP_MOD_AISpecification	
Application Interface Examples	AUTOSAR_CP_MOD_AISpecification Examples	
Requirements on SW-C and System Modeling	AUTOSAR_CP_RS_SWCModeling	
Application Design Patterns Catalogue	AUTOSAR_CP_TR_AIDesignPatterns Catalogue	
Modeling and Naming Aspects for Documentation, Measurement, and Calibration	AUTOSAR_CP_TR_AIMeasurement CalibrationDiagnostics	
SW-C and System Modeling Guide	AUTOSAR_CP_TR_SWCModeling Guide	
<b>BSWGeneral</b>		
Explanation of Error Handling on Application Level	AUTOSAR_CP_EXP_ApplicationLevel ErrorHandling	
Guide to BSW Distribution	AUTOSAR_CP_EXP_BSWDistribution Guide	
Complex Driver design and integration guideline	AUTOSAR_CP_EXP_CDDDesignAnd IntegrationGuideline	
Description of the AUTOSAR standard errors	AUTOSAR_CP_EXP_ErrorDescription	
Basic Software UML Model	AUTOSAR_CP_MOD_BSWUMLModel	
General Requirements on Basic Software Modules	AUTOSAR_CP_RS_BSWGeneral	
General Specification of Basic Software Modules	AUTOSAR_CP_SWS_BSWGeneral	
Specification of Communication Stack Types	AUTOSAR_CP_SWS_Communication StackTypes	
Specification of Platform Types for Classic Platform	AUTOSAR_CP_SWS_PlatformTypes	
Specification of Standard Types	AUTOSAR_CP_SWS_StandardTypes	
Modeling Guidelines of Basic Software EA UML Model	AUTOSAR_CP_TR_BSWUMLModel ModelingGuide	
<b>Communication</b>		
General Specification of Transformers	AUTOSAR_CP_ASWS_Transformer General	
Requirements on Bus Mirroring	AUTOSAR_CP_RS_BusMirroring	
Requirements on CAN	AUTOSAR_CP_RS_CAN	
Requirements on Communication	AUTOSAR_CP_RS_COM	
Requirements on Charging Manager	AUTOSAR_CP_RS_ChargingManager	
Requirements on Chinese Vehicle-2-X Communication	AUTOSAR_CP_RS_Chinese V2XCommunication	





Long Name	File Name	Life cycle changes
Requirements on Ethernet Support in AUTOSAR	AUTOSAR_CP_RS_Ethernet	
Requirements on FlexRay	AUTOSAR_CP_RS_FlexRay	
Requirements on Gateway	AUTOSAR_CP_RS_Gateway	
Requirements on I2C Driver	AUTOSAR_CP_RS_I2CDriver	
Requirements on I-PDU Multiplexer	AUTOSAR_CP_RS_IPDUMultiplexer	
Requirements on LIN	AUTOSAR_CP_RS_LIN	
Requirements on BSW Modules for SAE J1939	AUTOSAR_CP_RS_SAEJ1939	
Requirements on SPI Handler/Driver	AUTOSAR_CP_RS_SPIHandlerDriver	
Requirements on Secure Onboard Communication	AUTOSAR_CP_RS_SecureOnboard Communication	
Requirements on TTCAN	AUTOSAR_CP_RS_TTCAN	
Requirements on Transformer	AUTOSAR_CP_RS_Transformer	
Requirements on Vehicle-2-X Communication	AUTOSAR_CP_RS_V2XCommunication	
Requirements on Module XCP	AUTOSAR_CP_RS_XCP	
Specification of Bus Mirroring	AUTOSAR_CP_SWS_BusMirroring	
Specification of CAN Driver	AUTOSAR_CP_SWS_CANDriver	
Specification of CAN Interface	AUTOSAR_CP_SWS_CANInterface	
Specification of CAN Network Management	AUTOSAR_CP_SWS_CANNetwork Management	
Specification of CAN State Manager	AUTOSAR_CP_SWS_CANState Manager	
Specification of CAN Transceiver Driver	AUTOSAR_CP_SWS_CANTransceiver Driver	
Specification of CAN Transport Layer	AUTOSAR_CP_SWS_CANTransport Layer	
Specification for CAN XL Driver	AUTOSAR_CP_SWS_CANXLDriver	
Specification of CAN XL Transceiver Driver	AUTOSAR_CP_SWS_CANXLTransceiverDriver	
Specification of Communication	AUTOSAR_CP_SWS_COM	
Specification of COM Based Transformer	AUTOSAR_CP_SWS_COMBased Transformer	
Specification of Cellular Vehicle-2-X Driver	AUTOSAR_CP_SWS_Cellular V2XDriver	
Specification of Chinese Vehicle-2-X Management	AUTOSAR_CP_SWS_Chinese V2XManagement	
Specification of Chinese Vehicle-2-X Message	AUTOSAR_CP_SWS_Chinese V2XMessage	
Specification of Chinese Vehicle-2-X Network	AUTOSAR_CP_SWS_Chinese V2XNetwork	
Specification of Chinese Vehicle-2-X Security	AUTOSAR_CP_SWS_Chinese V2XSecurity	
Specification of Data Distribution Service for Classic Platform	AUTOSAR_CP_SWS_DataDistribution Service	
Specification of Diagnostic Log and Trace	AUTOSAR_CP_SWS_DiagnosticLog AndTrace	
Specification of Diagnostic over IP	AUTOSAR_CP_SWS_DiagnosticOver IP	





Long Name	File Name	Life cycle changes
Specification of Module E2E Transformer	AUTOSAR_CP_SWS_E2ETransformer	
Specification of Ethernet Driver	AUTOSAR_CP_SWS_EthernetDriver	
Specification of Ethernet Interface	AUTOSAR_CP_SWS_EthernetInterface	
Specification of Ethernet State Manager	AUTOSAR_CP_SWS_EthernetStateManager	
Specification of Ethernet Switch Driver	AUTOSAR_CP_SWS_EthernetSwitchDriver	
Specification of Ethernet Transceiver Driver	AUTOSAR_CP_SWS_EthernetTransceiverDriver	
Specification of FlexRay AUTOSAR Transport Layer	AUTOSAR_CP_SWS_FlexRayARTransportLayer	
Specification of FlexRay Driver	AUTOSAR_CP_SWS_FlexRayDriver	
Specification of FlexRay ISO Transport Layer	AUTOSAR_CP_SWS_FlexRayISOTransportLayer	
Specification of FlexRay Interface	AUTOSAR_CP_SWS_FlexRayInterface	
Specification of FlexRay Network Management	AUTOSAR_CP_SWS_FlexRayNetworkManagement	
Specification of FlexRay State Manager	AUTOSAR_CP_SWS_FlexRayStateManager	
Specification of FlexRay Transceiver Driver	AUTOSAR_CP_SWS_FlexRayTransceiverDriver	initial release
Specification of I2C Driver	AUTOSAR_CP_SWS_I2CDriver	initial release
Specification of IEEE1722 Transport Protocol Module	AUTOSAR_CP_SWS_IEEE1722TransportLayer	
Specification of I-PDU Multiplexer	AUTOSAR_CP_SWS_IPDUMultiplexer	
Specification of ISO15118 Charging	AUTOSAR_CP_SWS_ISO15118Charging	
Specification of LIN Driver	AUTOSAR_CP_SWS_LINDriver	
Specification of LIN Interface	AUTOSAR_CP_SWS_LINInterface	
Specification of LIN State Manager	AUTOSAR_CP_SWS_LINStateManager	
Specification of LIN Transceiver Driver	AUTOSAR_CP_SWS_LINTransceiverDriver	
Specification of Linklayer Sdu Routing Module	AUTOSAR_CP_SWS_LSduRouter	
Specification of Large Data COM	AUTOSAR_CP_SWS_LargeDataCOM	
Specification of MACsec Key Agreement	AUTOSAR_CP_SWS_MACsecKeyAgreement	
Specification of Network Management Interface	AUTOSAR_CP_SWS_NetworkManagementInterface	
Specification of PDU Router	AUTOSAR_CP_SWS_PDURouter	
Specification of a Functional Safety Communication Protocol Handler for SAE J1939	AUTOSAR_CP_SWS_SAEJ1939FunctionalSafetyCommProtocol	initial release
Specification of Network Management for SAE J1939	AUTOSAR_CP_SWS_SAEJ1939NetworkManagement	
Specification of a Request Manager for SAE J1939	AUTOSAR_CP_SWS_SAEJ1939RequestManager	
Specification of a Transport Layer for SAE J1939	AUTOSAR_CP_SWS_SAEJ1939TransportLayer	





Long Name	File Name	Life cycle changes
Specification of SOME/IP Transformer	AUTOSAR_CP_SWS_SOMEIPTransformer	
Specification on SOME/IP Transport Protocol	AUTOSAR_CP_SWS_SOMEIPTransportProtocol	
Specification of SPI Handler/Driver	AUTOSAR_CP_SWS_SPIHandlerDriver	
Specification of Secure Onboard Communication	AUTOSAR_CP_SWS_SecureOnboardCommunication	
Specification of Service Discovery	AUTOSAR_CP_SWS_ServiceDiscovery	
Specification of Socket Adaptor	AUTOSAR_CP_SWS_SocketAdaptor	
Specification of TTCAN Driver	AUTOSAR_CP_SWS_TTCANDriver	
Specification of TTCAN Interface	AUTOSAR_CP_SWS_TTCANInterface	
Specification of TCP/IP Stack	AUTOSAR_CP_SWS_Tcplp	
Specification of UDP Network Management	AUTOSAR_CP_SWS_UDPNetworkManagement	
Specification of Vehicle-2-X Basic Transport	AUTOSAR_CP_SWS_V2XBasicTransport	
Specification of Vehicle-2-X Data Manager	AUTOSAR_CP_SWS_V2XDataManager	
Specification of Vehicle-2-X Facilities	AUTOSAR_CP_SWS_V2XFacilities	
Specification of Vehicle-2-X Geo Networking	AUTOSAR_CP_SWS_V2XGeoNetworking	
Specification of Vehicle-2-X Management	AUTOSAR_CP_SWS_V2XManagement	
Specification of Wireless Ethernet Driver	AUTOSAR_CP_SWS_WirelessEthernetDriver	
Specification of Wireless Ethernet Transceiver Driver	AUTOSAR_CP_SWS_WirelessEthernetTransceiverDriver	
Specification of Module XCP	AUTOSAR_CP_SWS_XCP	
<b>Crypto</b>		
Utilization of Crypto Services	AUTOSAR_CP_EXP_UtilizationOfCryptoServices	
Requirements on Crypto Stack	AUTOSAR_CP_RS_CryptoStack	
Specification of Crypto Driver	AUTOSAR_CP_SWS_CryptoDriver	
Specification of Crypto Interface	AUTOSAR_CP_SWS_CryptoInterface	
Specification of Crypto Service Manager	AUTOSAR_CP_SWS_CryptoServiceManager	
Specification of Key Manager	AUTOSAR_CP_SWS_KeyManager	
<b>Diagnostics</b>		
Specification of Diagnostic Communication Manager	AUTOSAR_CP_SWS_DiagnosticCommunicationManager	
Specification of Diagnostic Event Manager	AUTOSAR_CP_SWS_DiagnosticEventManager	
Specification of a Diagnostic Communication Manager for SAE J1939	AUTOSAR_CP_SWS_SAEJ1939DiagnosticCommunicationManager	
<b>General</b>		
Layered Software Architecture	AUTOSAR_CP_EXP_LayeredSoftwareArchitecture	
Virtual Functional Bus	AUTOSAR_CP_EXP_VFB	





Long Name	File Name	Life cycle changes
Requirements on AUTOSAR Features	AUTOSAR_CP_RS_Features	obsolete
Specification of Bulk NvData Manager	AUTOSAR_CP_SWS_BulkNvData Manager	
<b>GlobalTime</b>		
Specification of Synchronized Time-Base Manager	AUTOSAR_CP_SWS_Synchronized TimeBaseManager	
Specification of Time Synchronization over CAN	AUTOSAR_CP_SWS_TimeSyncOver CAN	
Specification of Time Synchronization over Ethernet	AUTOSAR_CP_SWS_TimeSyncOver Ethernet	
Specification of Time Synchronization over FlexRay	AUTOSAR_CP_SWS_TimeSyncOver FlexRay	
<b>IO</b>		
Requirements on ADC Driver	AUTOSAR_CP_RS_ADCDriver	
Requirements on DIO Driver	AUTOSAR_CP_RS_DIODriver	
Requirements on ICU Driver	AUTOSAR_CP_RS_ICUDriver	
Requirements on I/O Hardware Abstraction	AUTOSAR_CP_RS_IOHWAbstraction	
Requirements on OCU Driver	AUTOSAR_CP_RS_OCUDriver	
Requirements on PWM Driver	AUTOSAR_CP_RS_PWMDriver	
Requirements on Port Driver	AUTOSAR_CP_RS_PortDriver	
Specification of ADC Driver	AUTOSAR_CP_SWS_ADCDriver	
Specification of DIO Driver	AUTOSAR_CP_SWS_DIODriver	
Specification of ICU Driver	AUTOSAR_CP_SWS_ICUDriver	
Specification of I/O Hardware Abstraction	AUTOSAR_CP_SWS_IOHardware Abstraction	
Specification of OCU Driver	AUTOSAR_CP_SWS_OCUDriver	
Specification of PWM Driver	AUTOSAR_CP_SWS_PWMDriver	
Specification of Port Driver	AUTOSAR_CP_SWS_PortDriver	
<b>Libraries</b>		
Macro Encapsulation of Interpolation Calls	AUTOSAR_CP_EXP_Macro EncapsulationofInterpolationCalls	
Requirements on Libraries	AUTOSAR_CP_RS_Libraries	
Specification of Bit Handling Routines	AUTOSAR_CP_SWS_BFXLibrary	
Specification of Basic Software Multicore Library	AUTOSAR_CP_SWS_BSWMulticore Library	
Specification of CRC Routines	AUTOSAR_CP_SWS_CRCLibrary	
Specification of SW-C End-to-End Communication Protection Library	AUTOSAR_CP_SWS_E2ELibrary	
Specification of Extended Fixed Point Routines	AUTOSAR_CP_SWS_EFXLibrary	
Specification of Floating Point Interpolation Routines	AUTOSAR_CP_SWS_IFLLibrary	
Specification of Fixed Point Interpolation Routines	AUTOSAR_CP_SWS_IFXLibrary	
Specification of Floating Point Math Routines	AUTOSAR_CP_SWS_MFLLibrary	
Specification of Fixed Point Math Routines	AUTOSAR_CP_SWS_MFXLibrary	
Specification of MSFLibrary	AUTOSAR_CP_SWS_MSFLibrary	initial release







Long Name	File Name	Life cycle changes
<b>MCAL</b>		
Requirements on Core Test	AUTOSAR_CP_RS_CoreTest	
Requirements on GPT Driver	AUTOSAR_CP_RS_GPTDriver	
Requirements on MCU Driver	AUTOSAR_CP_RS_MCUDriver	
General Requirements on SPAL	AUTOSAR_CP_RS_SPALGeneral	
Specification of Core Test	AUTOSAR_CP_SWS_CoreTest	
Specification of GPT Driver	AUTOSAR_CP_SWS_GPTDriver	
Specification of MCU Driver	AUTOSAR_CP_SWS_MCUDriver	
<b>Memory</b>		
Explanation of Firmware Over-The-Air	AUTOSAR_CP_EXP_FirmwareOverTheAir	
NV Data Handling Guideline	AUTOSAR_CP_EXP_NVDataHandling	
Requirements on EEPROM Driver	AUTOSAR_CP_RS_EEPROMDriver	
Requirements on Firmware Over-The-Air	AUTOSAR_CP_RS_FirmwareOverTheAir	
Requirements on Flash Driver	AUTOSAR_CP_RS_FlashDriver	
Requirements on Flash Test	AUTOSAR_CP_RS_FlashTest	
Requirements on Memory Hardware Abstraction Layer	AUTOSAR_CP_RS_MemoryHWAbstractionLayer	
Requirements on Memory Services	AUTOSAR_CP_RS_MemoryServices	
Requirements on RAM Test	AUTOSAR_CP_RS_RAMTest	
Specification of EEPROM Abstraction	AUTOSAR_CP_SWS_EEPROMAbstraction	
Specification of EEPROM Driver	AUTOSAR_CP_SWS_EEPROMDriver	obsolete
Specification of Flash Driver	AUTOSAR_CP_SWS_FlashDriver	obsolete
Specification of Flash EEPROM Emulation	AUTOSAR_CP_SWS_FlashEEPROMEmulation	
Specification of Flash Test	AUTOSAR_CP_SWS_FlashTest	
Specification of Memory Abstraction Interface	AUTOSAR_CP_SWS_MemoryAbstractionInterface	
Specification of Memory Access	AUTOSAR_CP_SWS_MemoryAccess	
Specification of Memory Driver	AUTOSAR_CP_SWS_MemoryDriver	
Specification of Memory Mapping	AUTOSAR_CP_SWS_MemoryMapping	
Specification of NVRAM Manager	AUTOSAR_CP_SWS_NVRAMManager	
Specification of RAM Test	AUTOSAR_CP_SWS_RAMTest	
<b>MethodologyAndTemplates</b>		
Modeling Show Cases Examples	AUTOSAR_CP_EXP_ModelingShowCases	
Specification of ECU Configuration Parameters (XML)	AUTOSAR_CP_MOD_ECUConfigurationParameters	
Requirements on Basic Software Module Description Template	AUTOSAR_CP_RS_BSWModuleDescriptionTemplate	
Requirements on Diagnostic Extract Template	AUTOSAR_CP_RS_DiagnosticExtractTemplate	
Requirements on ECU Configuration	AUTOSAR_CP_RS_ECUConfiguration	
Requirements on ECU Resource Template	AUTOSAR_CP_RS_ECUResourceTemplate	





Long Name	File Name	Life cycle changes
Requirements on Software Component Template	AUTOSAR_CP_RS_SoftwareComponentTemplate	
Requirements on System Template	AUTOSAR_CP_RS_SystemTemplate	
Basic Software Module Description Template	AUTOSAR_CP_TPS_BSWModuleDescriptionTemplate	
Diagnostic Extract Template	AUTOSAR_CP_TPS_DiagnosticExtractTemplate	
Specification of ECU Configuration	AUTOSAR_CP_TPS_ECUConfiguration	
Specification of ECU Resource Template	AUTOSAR_CP_TPS_ECUResourceTemplate	
Software Component Template	AUTOSAR_CP_TPS_SoftwareComponentTemplate	
System Template	AUTOSAR_CP_TPS_SystemTemplate	
Specification of Timing Extensions for Classic Platform	AUTOSAR_CP_TPS_TimingExtensions	
Integration of Franca IDL Software Component Descriptions	AUTOSAR_CP_TR_FrancaIntegration	
Supplementary material of general blueprints for AUTOSAR	AUTOSAR_CP_TR_GeneralBlueprintsSupplement	
Methodology for Classic Platform	AUTOSAR_CP_TR_Methodology	
Modeling Show Cases Report	AUTOSAR_CP_TR_ModelingShowCases	
<b>ModeManagement</b>		
Guide to Mode Management	AUTOSAR_CP_EXP_ModeManagementGuide	
Requirements on Mode Management	AUTOSAR_CP_RS_ModeManagement	
Specification of Basic Software Mode Manager	AUTOSAR_CP_SWS_BSWModeManager	
Specification of ECU State Manager	AUTOSAR_CP_SWS_ECUIStateManager	
<b>RTE</b>		
Requirements on Runtime Environment	AUTOSAR_CP_RS_RTE	
Specification of RTE Software	AUTOSAR_CP_SWS_RTE	
<b>SWArch</b>		
Explanatory Document for usage of AUTOSAR RunTimeInterface	AUTOSAR_CP_EXP_ARTI	
Requirements on Debugging, Tracing and Profiling support of AUTOSAR Components	AUTOSAR_CP_RS_DebugTraceProfile	
Specification of AUTOSAR Run-Time Interface	AUTOSAR_CP_SWS_ARTI	
<b>Safety</b>		
Overview of Functional Safety Measures in AUTOSAR	AUTOSAR_CP_EXP_FunctionalSafetyMeasures	
Safety Use Case Example	AUTOSAR_CP_EXP_SafetyUseCase	
Requirements on Watchdog Driver	AUTOSAR_CP_RS_WatchdogDriver	
Specification of Watchdog Driver	AUTOSAR_CP_SWS_WatchdogDriver	
Specification of Watchdog Interface	AUTOSAR_CP_SWS_WatchdogInterface	





Long Name	File Name	Life cycle changes
Specification of Watchdog Manager	AUTOSAR_CP_SWS_Watchdog Manager	
<b>Security</b>		
Specification of Firewall for Classic Platform	AUTOSAR_CP_SWS_Firewall	
Specification of Intrusion Detection System Manager	AUTOSAR_CP_SWS_Intrusion DetectionSystemManager	
<b>SystemServices</b>		
Explanation of Software Cluster Design And Integration Guideline for Classic Platform	AUTOSAR_CP_EXP_SwCluster DesignAndIntegrationGuideline	
Requirements on Function Inhibition Manager	AUTOSAR_CP_RS_FunctionInhibition Manager	
Requirements on Hardware Test Manager on start up and shutdown	AUTOSAR_CP_RS_HWTestManager	
Requirements on Operating System	AUTOSAR_CP_RS_OS	
Requirements on Software Cluster Connection module	AUTOSAR_CP_RS_SoftwareCluster Connection	
Requirements on Time Service	AUTOSAR_CP_RS_TimeService	
Specification of Communication Manager	AUTOSAR_CP_SWS_COMManager	
Specification of Default Error Tracer	AUTOSAR_CP_SWS_DefaultError Tracer	
Specification of Function Inhibition Manager	AUTOSAR_CP_SWS_Function InhibitionManager	
Specification of Hardware Test Manager on start up and shutdown	AUTOSAR_CP_SWS_HWTest Manager	
Specification of Operating System	AUTOSAR_CP_SWS_OS	
Specification of Software Cluster Connection module	AUTOSAR_CP_SWS_SoftwareCluster Connection	
Specification of Time Service	AUTOSAR_CP_SWS_TimeService	
Specification and Integration of Hardware Test Management at start up and shutdown	AUTOSAR_CP_TR_HWTest ManagementIntegrationGuide	

**Table 3.1: Specification overview**

## 4 Remarks to Known Technical Deficiencies

The technical deficiencies per specification are – if applicable – mentioned inside the respective specification in a chapter “Known Limitations” located after the table of contents.

The following technical deficiencies are to be mentioned, where clicking on the section reference will bring you to the respective document:

Document UID	Long Name	Document Type	Section Reference
631	Guide to BSW Distribution	EXP	<a href="#">4.1</a>
873	Specification of Bus Mirroring	SWS	<a href="#">4.2</a>
253	Specification of CAN State Manager	SWS	<a href="#">4.3</a>
417	Specification of Ethernet Interface	SWS	<a href="#">4.4</a>
601	Specification of FlexRay AUTOSAR Transport Layer	SWS	<a href="#">4.5</a>
28	Specification of FlexRay Network Management	SWS	<a href="#">4.6</a>
182	Specification of I-PDU Multiplexer	SWS	<a href="#">4.7</a>
72	Specification of LIN Driver	SWS	<a href="#">4.8</a>
73	Specification of LIN Interface	SWS	<a href="#">4.9</a>
255	Specification of LIN State Manager	SWS	<a href="#">4.10</a>
610	Specification of a Diagnostic Communication Manager for SAE J1939	SWS	<a href="#">4.11</a>
1106	Specification of a Functional Safety Communication Protocol Handler for SAE J1939	SWS	<a href="#">4.12</a>
612	Specification of Network Management for SAE J1939	SWS	<a href="#">4.13</a>
611	Specification of a Request Manager for SAE J1939	SWS	<a href="#">4.14</a>
425	Specification of a Transport Layer for SAE J1939	SWS	<a href="#">4.15</a>
974	Specification of Software Cluster Connection module	SWS	<a href="#">4.16</a>
80	Specification of Watchdog Manager	SWS	<a href="#">4.17</a>
33	Specification of NVRAM Manager	SWS	<a href="#">4.18</a>
1018	Specification of Memory Driver	SWS	<a href="#">4.19</a>
1017	Specification of Memory Access	SWS	<a href="#">4.20</a>

**Table 4.1: Overview of known technical deficiencies**

### 4.1 Guide to BSW Distribution

The support for Basic Software Allocation in AUTOSAR is currently limited to backward compatible changes (w.r.t. AUTOSAR 4.0.3). This currently results in the following restrictions, which may not apply to future releases of AUTOSAR:

- Communication between master and satellites is not standardized.
- BSW functional clusters and their AUTOSAR BSW Cluster Interface are not standardized.

Since concept Memory Stack Rework is still draft, this also applies to the properties of the Mem driver mentioned in Section 2.5.8 of the EXP document.

## 4.2 Specification of Bus Mirroring

The Bus Mirroring module cannot be used to influence the traffic on one of the buses configured as a source bus. To ensure this and to avoid loop-back of messages leading to bus overload, the generation tool shall ensure that no bus is connected to the Bus Mirroring module both as source and destination bus (see SWS\_Mirror\_00001).

The Bus Mirroring module is controlled by a diagnostic control application through the dedicated (service) API listed in Chapter 8 of the specification. The control functionality is made accessible to a diagnostic tester by special diagnostic services, which are handled by the DCM and implemented by the diagnostic control application. The DCM provides the necessary security to exclude inadvertent activation of the Bus Mirroring. The Bus Mirroring module does not provide another control interface, and it does not receive control messages on the destination bus.

In general, the Bus Mirroring module does not support source buses that have a larger frame size or more additional information than the destination bus can carry, e.g. CAN XL to CAN FD, CAN FD to CAN, CAN to LIN, FlexRay to CAN or CAN FD, Ethernet to CAN, or Ethernet to FlexRay. The Bus Mirroring module does not fragment mirrored frames.

The Bus Mirroring module will only mirror traffic that is actually received or transmitted by the bus interface modules. For CAN this means that besides the transmitted frames only those data frames that pass the hardware filter will be mirrored, and that remote frames and error frames will not be mirrored. For LIN, slave-to-slave communication will not be mirrored by a LIN master. And for FlexRay, only transmitted frames and those received frames for which reception buffers are assigned (possibly as a FIFO) will be mirrored.

Another limitation of the mirroring from a FlexRay source bus concerns the reported time stamps and cycles. The Timestamp reported for a FlexRay frame contains the time when the corresponding job list entry was executed. The actual transmission time has to be calculated from the slot ID contained in the reported FrameID. The cycle contained in the reported FrameID is accurate only for received frames and frames transmitted in the static segment. For frames transmitted in the dynamic segment, the reported cycle can be inaccurate because it can happen that a frame cannot be transmitted in the expected cycle, it is then deferred to the next suitable cycle.

A re-serialization of received serialized frames shall not be done by the Bus Mirroring module, because that would require too much resources. Instead, the serialized PDUs shall be routed directly to the destination bus.

The Bus Mirroring module will also not support the forwarding from Ethernet to Ethernet. This use case is already covered by the Port Mirroring feature of the AUTOSAR Ethernet Switch Driver.

### 4.3 Specification of CAN State Manager

The CanSM module can be used for CAN communication only. Its task is to operate with the CanIf module to control one or multiple underlying CAN Controllers and CAN Transceiver Drivers. Other protocols than CAN (i.e. LIN or FlexRay) are not supported.

### 4.4 Specification of Ethernet Interface

The Ethernet Interface is conceptually able to access one or more Ethernet Driver and one or more Ethernet Transceiver Driver. It is not possible to transmit data which exceeds the available buffer size of the used Ethernet controller. Longer data has to be transmitted using the Internet Protocol (IP) or Transmission Control Protocol (TCP).

### 4.5 Specification of FlexRay AUTOSAR Transport Layer

AUTOSAR architecture defines protocol specific transport layer (CanTp, LinTp, Fr[Ar]Tp, etc.). The FlexRay AUTOSAR Transport Layer covers only FlexRay transport protocol specifics. The FlexRay AUTOSAR Transport Layer has an interface to a single underlying Linklayer SDU Router and a single upper PDU Router.

### 4.6 Specification of FlexRay Network Management

- FlexRay NM can be applied to FlexRay communication systems that support bus sleep mode and that are implemented with appropriate wakeup mechanisms.
- One instance of FlexRay NM can be applied to only one instance of FlexRay Interface within the same ECU.
- One instance of FlexRay NM can be applied to only one FlexRay NM-Cluster in one FlexRay network. One FlexRay NM-Cluster can have only one instance of FlexRay NM.
- FlexRay NM can be applied to both FlexRay channels of the same FlexRay Bus at the same time.

### 4.7 Specification of I-PDU Multiplexer

For transmission of multiplexed I-PDUs, minimum delay time observation cannot be taken into account. For more details, see [1] and Chapter 7.2.4.1 of the specification.

For transmission of container PDUs with static layout, minimum delay time cannot be ensured if two or more contained PDUs have each MDT configuration.

## 4.8 Specification of LIN Driver

Only one LIN channel of an ECU is allowed to connect to a particular LIN cluster. Unless there are unused (not connected) channels in the ECU, the number of LIN channels is equal to the number of LIN clusters.

In the context of Lin driver the following apply:

- One LIN driver provides access to one LIN hardware unit type (simple UART or dedicated LIN hardware) that may consist of several LIN channels.
- Each different LIN hardware units requires a separate LIN driver instance implementation.
  - It is up to the implementer to adapt the driver to the different instances of similar LIN channels.
  - Several LIN driver instances implemented in one ECU, from same or different vendor, special naming convention rules apply as specified in General Requirements on Basic Software Module.
  - API names and published parameters must be modified such that no two definitions with the same name are generated.
  - The LIN Interface is responsible for handling several LIN driver instances, i.e. calling the correct function.

## 4.9 Specification of LIN Interface

If `LinTpScheduleChangeDiag` was set to TRUE, simultaneous Schedule Table Switch requests originated from `LinTp` and from `Non-LinTp` (BswM or CDD) must be avoided, to prevent premature termination of diagnostic connections. This issue will be fixed in next release(s).

## 4.10 Specification of LIN State Manager

There is at most one instance of the LinSM in each ECU. If the underlying LIN Driver [2] supports multiple networks, the LinSM may be LIN master or LIN slave on more than one cluster.

All references to (switching of) schedule tables do only apply to LIN master node; there are no schedule tables for LIN slave node.

## 4.11 Specification of a Diagnostic Communication Manager for SAE J1939

The J1939 Diagnostic Communication Manager implements only the subset of Diagnostic Messages defined in SWS\_J1939Dcm\_00238. The DM13 does not support Suspend Signal and Suspend Duration. NACK is not provided for received DMx messages that are not supported or not configured. This restriction mainly affects handling of DM07 and DM13.

## 4.12 Specification of a Functional Safety Communication Protocol Handler for SAE J1939

The SAE J1939 Functional Safety Communication Protocol is specified in accordance with SAE J1939-76, which is able to satisfy the functional safety standards IEC 61508-2:2010 (up to SIL 3) and the industrial safety communication standard IEC 61784-3:2016. It is up to the system designer to perform the analysis and determine if the SAE J1939 Functional Safety Communication Protocol, the E2E protection layers and their integration into the AUTOSAR architecture satisfy the functional safety goals. Some limitations are described in sections 4.3 Limitations and 4.4 SAE J1939 PG Constraints of SAE J1939-76 of the specification.

Please note that due to the architecture of AUTOSAR, the SAE J1939 Functional Safety Communication Protocol can only detect a subset of the IEC 61784-3 Communication Errors listed in table A1 in appendix A.1 Qualitative Analysis of SAE J1939-76. The majority of the communication errors are detected by the E2E protection layers, and only these can be reported directly to the application alongside the data as overlaid errors.

The following communication errors are detected directly by the SAE J1939 Functional Safety Communication Protocol:

Unacceptable Delay is detected only for the SRVT, and is reported via runtime error J1939FSCP\_E\_TIMEOUT\_RX\_SRVT. The SCT has to be measured and supervised directly by the application.

Addressing may be reported via runtime errors J1939FSCP\_E\_UNKNOWN\_PGN, J1939FSCP\_E\_NO\_SDM\_RECEIVED, or J1939FSCP\_E\_NO\_SHM\_RECEIVED, or may result in silently dropping a message, depending on the actually observed problem.

An AUTOSAR ECU may also entirely ignore the SHM by configuring the SDM as ordinary communication message.



### 4.13 Specification of Network Management for SAE J1939

The J1939 Network Management module does not support all features defined in [3, SAE J1939-81], especially:

- Changing the address of a node after reception of CommandedAddress or after an address loss.
- Changing the NAME of a node using the Name Management protocol.
- Detection of address violations by messages other than AddressClaimed.

### 4.14 Specification of a Request Manager for SAE J1939

The J1939 Request Manager only implements Request, Request2, and Acknowledgement PGs. It does not provide support for the Transfer PG.

### 4.15 Specification of a Transport Layer for SAE J1939

The AUTOSAR architecture contains several communication system specific transport layers (J1939Tp, CanTp, FrTp, etc.). All of these modules need to have identical APIs, with the exception of API functions for which the PduR has separate configuration abilities.

The J1939Tp module does not implement the TriggerTransmit API, because it is only needed for time triggered bus architectures.

### 4.16 Specification of Software Cluster Connection module

The specification currently supports a limited number of BSW modules. Furthermore, for the supported BSW modules, the functionality and APIs available for Application Software Clusters is only subset of the overall functionality. In addition, the available VFB communication features are restricted.

### 4.17 Specification of Watchdog Manager

The main limitations of Watchdog Manager design are as follows. They may be removed in upcoming versions of this document:

- {DRAFT} A Supervised Entity cannot span over multiple EcucPartitions.

- {DRAFT} Handling of unconnected transition proxies for Logical Supervision based on `Cross-Cluster External Graph` by Watchdog Manager is unspecified in this release.
- As libraries cannot call BSWs, libraries cannot be supervised by Watchdog Manager.
- The nesting of Deadline Supervision (i.e. start 1, start 2, end 2, end 1) is not supported.
- The Alive Supervision function with more than one `Checkpoint` per Supervised Entity is not consistently specified within the document. For now, it is recommended to support only one Alive Supervision `Checkpoint` per Supervised Entity.

Also, there're known inconsistencies between:

- IDs in the arrows in the figures in `SWS_WdgM_91005 Global Supervision Status` and `SWS_WdgM_91006 Local Supervision Status`, and
- IDs in the spec items which references `SWS_WdgM_91005`.

They will be fixed in the next release(s) together with other improvements.

## 4.18 Specification of NVRAM Manager

Limitations are given mainly by the finite number of “Block Management Types” and their individual treatment of NV data. These limits can be reduced by an enhanced user defined management information, which can be stored as a structured part of the real NV data. In this case the user defined management information has to be interpreted and handled by the application at least.

## 4.19 Specification of Memory Driver

### General Limitations

- Block based memory devices like NAND flash devices are out of scope of this specification.

### Implementation Limitations

- The following implementation limitations apply for the Mem driver:
  - The Mem driver does not provide any strategy for write accesses smaller than the physical segmentation, i.e. pages and sectors for flash memory since it does not use any internal buffers.
  - The Mem driver does not provide mechanisms for providing data integrity (e.g. checksums, redundant storage, etc.).

- The size of Mem driver service requests is limited to 32-Bits to avoid a resource overhead for 32-Bit microcontroller.

#### Memory Test Capabilities

- The Mem driver does not provide any general APIs for performing background memory tests since the memory test capabilities are very hardware dependent. To implement memory tests, the Mem driver's hardware specific request service API can be used.

## 4.20 Specification of Memory Access

#### General Limitations

- The MemAcc module is targeted for address based memory access. File based access is not considered. Block based memory devices like NAND flash devices which require an explicit bad block management are out of scope of this specification.

#### Memory Mapped Access

- It's not possible to perform a memory-mapped access on a shared memory resource while at the same time, the AUTOSAR memory stack performs an access on a shared memory resource. This restriction applies to memory devices like flash or EEPROM where the memory must be put into a special programming mode in which a concurrent read access is not possible. This restriction applies to internal and external shared memory devices and also affects hardware-based flash EEPROM emulations. In case a memory-mapped access is needed, MemAcc coordination must be implemented at the application level. The application must ensure that no concurrent access is performed on the shared memory.

## 5 Release History

### 5.1 Release R24-11

The following deliverables had major changes.

Name	Specification history entry
Application Design Patterns Catalogue	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Application Interfaces User Guide	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Basic Software Module Description Template	<ul style="list-style-type: none"> <li>• Added imposition times to constraints</li> <li>• Minor corrections / clarifications / editorial changes; For details please refer to the ChangeDocumentation</li> </ul>
Classic Platform Release Overview	<ul style="list-style-type: none"> <li>• Release Life Cycle Status: R24-11 is in Evolution, R24-11 supersedes R23-11</li> </ul>
Complex Driver design and integration guideline	<ul style="list-style-type: none"> <li>• Clarifications regarding names of include files.</li> </ul>
Description of the AUTOSAR standard errors	<ul style="list-style-type: none"> <li>• Removed the description of Transient Faults.</li> </ul>
Diagnostic Extract Template	<ul style="list-style-type: none"> <li>• Improved handling of variants</li> <li>• Improved handling of security events</li> <li>• minor corrections / clarifications / editorial changes</li> </ul>
Explanation of Application Interface of AD/ADAS vehicle motion control	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Application Interfaces of Occupant and Pedestrian Safety Systems Domain	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Application Interfaces of the Body and Comfort Domain	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Application Interfaces of the Chassis Domain	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Application Interfaces of the HMI, Multimedia and Telematics Domain	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Application Interfaces of the Powertrain Engine Domain	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Error Handling on Application Level	<ul style="list-style-type: none"> <li>• Cleanup after removal of partition restart option</li> </ul>
Explanation of Firmware Over-The-Air	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanation of Software Cluster Design And Integration Guideline for Classic Platform	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Explanatory Document for usage of AUTOSAR RunTime Interface	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
General Requirements on Basic Software Modules	<ul style="list-style-type: none"> <li>• Removed Transient Faults</li> <li>• Clarified meaning of machine readable module description ([SRS_BSW_00334])</li> <li>• Allowed callbacks with void return ([SRS_BSW_00359])</li> </ul>
General Requirements on SPAL	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
General Specification of Basic Software Modules	<ul style="list-style-type: none"> <li>• Removal of Transient Faults</li> <li>• Added Appendix "List of Basic Software Modules"</li> <li>• Minor corrections / clarifications / editorial changes</li> </ul>
General Specification of Transformers	<ul style="list-style-type: none"> <li>• Changed transformers Init and Delnit from "reentrant" to "non reentrant"</li> <li>• ECUC_Xfrm_00014 Supported Config Variants: updated from VARIANT-LINK-TIME, VARIANT-POST-BUILD, VARIANT-PRECOMPILE to VARIANT-PRECOMPILE</li> </ul>
Guide to BSW Distribution	<ul style="list-style-type: none"> <li>• Removed partition restart</li> </ul>





Name	Specification history entry
Guide to Mode Management	<ul style="list-style-type: none"> <li>• Partition restart removed.</li> <li>• Description of mode managers and mode users improved.</li> <li>• Editorial changes.</li> </ul>
Integration of Franca IDL Software Component Descriptions	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Layered Software Architecture	<ul style="list-style-type: none"> <li>• Added L-SDU Router</li> <li>• Incorporated J1939Fscp transformer into comm stack extensions</li> <li>• Incorporated Partitioning examples</li> <li>• Incorporated migration of BSWModuleList to BSWGeneral</li> <li>• Added I2C in Comm Drivers</li> <li>• Improve documentation about error handling and usage</li> <li>• Cleanup remains of partition restart</li> <li>• Added changes in memory manipulation library: Copy, Set, Move, Compare</li> <li>• Remove E2EPW support</li> <li>• Added changes to error handling</li> </ul>
Macro Encapsulation of Interpolation Calls	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Methodology for Classic Platform	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Modeling Guidelines of Basic Software EA UML Model	<ul style="list-style-type: none"> <li>• restructured chapters of the document</li> <li>• removed modeling of "Transient Faults"</li> <li>• support for explicitly modeling dependencies between datatypes (TR_BSWMG_00933)</li> <li>• support to mark model elements as externally modelled (i.e. use definition from other standards, see TR_BSWMG_00930)</li> <li>• support to mark ClientServerInterfaces as unmapped to any API (TR_BSWMG_00932)</li> </ul>
Modeling Show Cases Report	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Modeling and Naming Aspects for Documentation, Measurement, and Calibration	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
NV Data Handling Guideline	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Overview of Functional Safety Measures in AUTOSAR	<ul style="list-style-type: none"> <li>• Reflected the removal of partition restart from AUTOSAR</li> <li>• Reflected the deprecation of E2E protection wrapper from AUTOSAR</li> </ul>
Requirements on ADC Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on BSW Modules for SAE J1939	<ul style="list-style-type: none"> <li>• Support for J1939-76</li> <li>• Introduced Trace Groups</li> </ul>
Requirements on Basic Software Module Description Template	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Bus Mirroring	<ul style="list-style-type: none"> <li>• Added support for CAN FD</li> </ul>
Requirements on CAN	<ul style="list-style-type: none"> <li>• Minor corrections / clarifications / editorial changes</li> <li>• Modified from draf to valid SRS_Can_02001, SRS_Can_02002, SRS_Can_02003</li> <li>• Introduced Deterministic Communication with TSN :Obsolete requirements SRS_Can_01002, SRS_Can_01003, SRS_Can_01111Added Requirements SRS_Can_02004, SRS_Can_02005, SRS_Can_02006, SRS_Can_02007</li> </ul>





Name	Specification history entry
Requirements on Charging Manager	<ul style="list-style-type: none"> <li>• Editorial changes to CP_RS_ChrgM_00001, CP_RS_ChrgM_00002, CP_RS_ChrgM_00003</li> </ul>
Requirements on Chinese Vehicle-2-X Communication	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Communication	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on Core Test	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Crypto Stack	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on DIO Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on Debugging, Tracing and Profiling support of AUTOSAR Components	<ul style="list-style-type: none"> <li>• Removal of "transient faults"</li> </ul>
Requirements on Diagnostic Extract Template	<ul style="list-style-type: none"> <li>• Cleaned up upstream traces</li> </ul>
Requirements on ECU Configuration	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on ECU Resource Template	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on EEPROM Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Ethernet Support in AUTOSAR	<ul style="list-style-type: none"> <li>• DoIP - Trace links from AP to CP</li> <li>• EthSwt - Specification is lacking of SRS requirement to access Ethernet switch internal configuration</li> <li>• Introduce independent VLAN learning</li> <li>• EthSwt - The specification is lacking of a SRS requirement to support handling of low power mode for an Ethernet switch</li> <li>• Add EgressSchedulerAlgorithm at Ethernet driver</li> <li>• Deterministic Communication with TSN Concept Part 2, Concept Part 3 - frame preemption is missing in the Eth Swt datamodel</li> <li>• Deterministic Communication with TSN - Concept Part 8</li> </ul>
Requirements on Firmware Over-The-Air	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Flash Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Flash Test	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on FlexRay	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Function Inhibition Manager	<ul style="list-style-type: none"> <li>• SRS_Fim_04700 extended</li> <li>• Editorial Changes</li> </ul>
Requirements on GPT Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Gateway	<ul style="list-style-type: none"> <li>• Clarification for Linklayer Sdu Routing Module related items</li> <li>• Editorial changes</li> </ul>
Requirements on Hardware Test Manager on start up and shutdown	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on I-PDU Multiplexer	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on I/O Hardware Abstraction	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on I2C Driver	<ul style="list-style-type: none"> <li>• Initial release</li> </ul>
Requirements on ICU Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on LIN	<ul style="list-style-type: none"> <li>• Support IEEE 1722 Tunneling</li> <li>• Editorial changes</li> </ul>
Requirements on Libraries	<ul style="list-style-type: none"> <li>• Addition of MSF library</li> </ul>
Requirements on MCU Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Memory Hardware Abstraction Layer	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Memory Services	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>





Name	Specification history entry
Requirements on Mode Management	<ul style="list-style-type: none"> <li>• Use case based rework of EcuM requirements</li> </ul>
Requirements on Module XCP	<ul style="list-style-type: none"> <li>• The AUTOSAR XCP module shall be located above the PduR and make use of the data transmit and receive APIs of the PduR</li> </ul>
Requirements on OCU Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on Operating System	<ul style="list-style-type: none"> <li>• Removed partition restart</li> </ul>
Requirements on PWM Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Port Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on RAM Test	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on Runtime Environment	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on SPI Handler/Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on SW-C and System Modeling	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Secure Onboard Communication	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Software Cluster Connection module	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Software Component Template	<ul style="list-style-type: none"> <li>• No content changes.</li> </ul>
Requirements on System Template	<ul style="list-style-type: none"> <li>• Added Firewall requirement</li> <li>• Replaced several requirements by a general variant handling requirement. For details please refer to the ChangeDocumentation.</li> </ul>
Requirements on TTCAN	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Requirements on Time Service	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Requirements on Transformer	<ul style="list-style-type: none"> <li>• Editorial Changes - No content changes</li> </ul>
Requirements on Vehicle-2-X Communication	<ul style="list-style-type: none"> <li>• New requirement to support L-SDU router</li> </ul>
Requirements on Watchdog Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
SW-C and System Modeling Guide	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Safety Use Case Example	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Software Component Template	<ul style="list-style-type: none"> <li>• Improve calibration data description</li> <li>• Add further constraints to refine model semantics</li> <li>• minor corrections / clarifications / editorial changes</li> </ul>
Specification and Integration of Hardware Test Management at start up and shutdown	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification for CAN XL Driver	<ul style="list-style-type: none"> <li>• Introduce CanXL_ReleaseRxBuffer() and CanXL_ImmediateTransmit() as draft</li> <li>• CanXL_SetControllerMode() change to Synchronous</li> <li>• Fix Service IDs</li> <li>• Update mandatory interfaces and imported types</li> </ul>
Specification of ADC Driver	<ul style="list-style-type: none"> <li>• Not applicable requirements list updated</li> <li>• Datatype definition updated</li> </ul>
Specification of AUTOSAR Run-Time Interface	<ul style="list-style-type: none"> <li>• Added ARTI description for schedule tables and spinlocks</li> <li>• Changed handling of Arti in RTE generation</li> </ul>
Specification of Basic Software Mode Manager	<ul style="list-style-type: none"> <li>• Added new BswM Actions for BswMIdsMTransmissionStateChangeRequest and BswMIdsMBlockStateChangeRequest</li> <li>• Editorial Changes</li> </ul>
Specification of Basic Software Multicore Library	<ul style="list-style-type: none"> <li>• Service IDs cleaned up</li> </ul>
Specification of Bit Handling Routines	<ul style="list-style-type: none"> <li>• No content change</li> </ul>
Specification of Bulk NvData Manager	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>





Name	Specification history entry
Specification of Bus Mirroring	<ul style="list-style-type: none"> <li>• Support for serialization to CAN FD</li> </ul>
Specification of CAN Driver	<ul style="list-style-type: none"> <li>• Minor corrections / clarifications / editorial changes</li> <li>• Added Change history of AUTOSAR traceable items</li> <li>• Removed SWS_Can_CONSTR_00508</li> <li>• Change the Header file name SWS_Can_00234, SWS_Can_00235</li> </ul>
Specification of CAN Interface	<ul style="list-style-type: none"> <li>• Replaced upper communication layers by LSduR</li> <li>• Changed available via header file</li> <li>• Enhanced chapter Security Events</li> <li>• Editorial changes</li> </ul>
Specification of CAN Network Management	<ul style="list-style-type: none"> <li>• adapted interaction with lower layer to LSduR</li> <li>• Editorial changes</li> </ul>
Specification of CAN State Manager	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of CAN Transceiver Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of CAN Transport Layer	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> <li>• Added detection of header violations</li> </ul>
Specification of CAN XL Transceiver Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> <li>• Fix Service IDs</li> </ul>
Specification of COM Based Transformer	<ul style="list-style-type: none"> <li>• Changed Reentrancy of Init and Delnit.</li> </ul>
Specification of CRC Routines	<ul style="list-style-type: none"> <li>• Introduction of a new CRC-32 based on SAE J1939-76 Standard</li> <li>• Minor corrections / clarifications / editorial changes</li> </ul>
Specification of Cellular Vehicle-2-X Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Chinese Vehicle-2-X Management	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Chinese Vehicle-2-X Message	<ul style="list-style-type: none"> <li>• Align information of scheduled functions</li> </ul>
Specification of Chinese Vehicle-2-X Network	<ul style="list-style-type: none"> <li>• Completion of IEEE1722 specified tunneling process within the AUTOSAR communication stack for legacy communication (CAN and LIN)</li> </ul>
Specification of Chinese Vehicle-2-X Security	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Communication	<ul style="list-style-type: none"> <li>• Security event handling</li> <li>• Minor corrections / clarifications / editorial changes</li> </ul>
Specification of Communication Manager	<ul style="list-style-type: none"> <li>• Introduced validation findings of concept "ReworkOf PNCrelatedComMandNM handling (part2)</li> <li>• Harmonized names of possible erros at service interfaces</li> <li>• Minor bug fixes</li> </ul>
Specification of Communication Stack Types	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Core Test	<ul style="list-style-type: none"> <li>• Removed SWS_CorTst_01007</li> <li>• Editorial changes</li> </ul>
Specification of Crypto Driver	<ul style="list-style-type: none"> <li>• Add KeyWrap / KeyUnwrap to CryptoPrimitiveService.</li> <li>• Update Custom service and function profile1.</li> <li>• List CRYPTO_E_KEY_EMPTY as a return value of Csm_RandomSeed() API.</li> <li>• Update CryptoDriverObject for multicore/partitions support.</li> </ul>







Name	Specification history entry
Specification of Crypto Interface	<ul style="list-style-type: none"> <li>• Add CRYPTO_E_KEY_EMPTY as a return value for CryIf_RandomSeed API</li> <li>• Minor changes</li> </ul>
Specification of Crypto Service Manager	<ul style="list-style-type: none"> <li>• Add configuration, cryptographic primitives and schemes for AES KeyWrap and KeyUnwrap Csm_JobKeyWrap() Csm_JobKeyUnwrap()</li> <li>• Add CRYPTO_E_KEY_EMPTY error for Csm_RandomSeed() and CsmJobRandomSeed service interface</li> <li>• Add CRYPTO_E_CUSTOM_ERROR error for reporting custom processing failure</li> <li>• Editorial changes</li> </ul>
Specification of DIO Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Data Distribution Service for Classic Platform	<ul style="list-style-type: none"> <li>• Refinement of some specification item</li> <li>• Added details on reception and transmission requirements</li> <li>• Clarification regarding remote participants</li> <li>• Validation of all specification items</li> </ul>
Specification of Default Error Tracer	<ul style="list-style-type: none"> <li>• Transient faults removed.</li> <li>• Editorial Changes</li> </ul>
Specification of Diagnostic Communication Manager	<ul style="list-style-type: none"> <li>• DCM Context Data for IdsM event</li> <li>• Improvement of various Requirements related to Authentication Service 0x29</li> <li>• Remove protocol type and related APIs</li> <li>• Minor corrections / clarifications / editorial changes; For details please refer to the ChangeDocumentation</li> </ul>
Specification of Diagnostic Event Manager	<ul style="list-style-type: none"> <li>• Support of FunctionalGroupIdentifier 0x33 (OBD)</li> <li>• Configurability of the ControlDTCSetting action to specific event memories</li> </ul>
Specification of Diagnostic Log and Trace	<ul style="list-style-type: none"> <li>• Added error code DLT_E_ERROR to SWS_Dlt_00736</li> <li>• Added error code DLT_E_NOT_SUPPORTED to SWS_Dlt_91011</li> <li>• Minor corrections</li> <li>• Editorial changes</li> </ul>
Specification of Diagnostic over IP	<ul style="list-style-type: none"> <li>• New API: DoIP_AllowNonTlsDoIPConnection</li> <li>• Editorial changes</li> </ul>
Specification of ECU Configuration	<ul style="list-style-type: none"> <li>• Minor changes</li> </ul>
Specification of ECU Resource Template	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of ECU State Manager	<ul style="list-style-type: none"> <li>• Correct broken references</li> <li>• update related documents</li> <li>• Correct uptraces to SRS document</li> <li>• Correct some document syntax issues</li> </ul>
Specification of EEPROM Abstraction	<ul style="list-style-type: none"> <li>• Remove the up-trace to SRS_BSW_00334 from SWS_Ea_NA_00999.</li> </ul>
Specification of EEPROM Driver	<ul style="list-style-type: none"> <li>• Marked the document as obsolete</li> </ul>
Specification of Ethernet Driver	<ul style="list-style-type: none"> <li>• Add EgressSchedulerAlgorithm at Ethernet driver</li> </ul>





Name	Specification history entry
Specification of Ethernet Interface	<ul style="list-style-type: none"> <li>• IEEE1722 streams support</li> <li>• Independent VLAN learning support</li> <li>• Editorial changes</li> </ul>
Specification of Ethernet State Manager	<ul style="list-style-type: none"> <li>• EthSM state diagram changes in regard to Silent Communication</li> </ul>
Specification of Ethernet Switch Driver	<ul style="list-style-type: none"> <li>• Added shared and independent VLAN learning modes</li> <li>• Added frame preemption support</li> <li>• Added MMD support</li> <li>• Added multi-gigabit interface support</li> </ul>
Specification of Ethernet Transceiver Driver	<ul style="list-style-type: none"> <li>• Support of multi-gigabite( 2.5Gbit/s, 5Gbit/s, 10Gbit/s)</li> <li>• Multicore Support</li> <li>• Support for clause 45 MII register access</li> <li>• Change the container of EthTrcvEnablePLCA from EthTrcvGeneral to EthTrcvConfig</li> <li>• Editorial changes</li> </ul>
Specification of Extended Fixed Point Routines	<ul style="list-style-type: none"> <li>• Changed Service ID of specific APIs to prevent conflict</li> <li>• Corrected typos in specific math formulas</li> <li>• Removed unreachable branch in psuedo code of Efx Lp FilterFac1</li> </ul>
Specification of Firewall for Classic Platform	<ul style="list-style-type: none"> <li>• Changed reception interface from TcpIp to LSduR</li> <li>• Updated SEv context data specification table</li> </ul>
Specification of Fixed Point Interpolation Routines	<ul style="list-style-type: none"> <li>• Fixed CheckDocumentSource errors</li> </ul>
Specification of Fixed Point Math Routines	<ul style="list-style-type: none"> <li>• No content changes.</li> </ul>
Specification of Flash Driver	<ul style="list-style-type: none"> <li>• Marked the document as obsolete</li> </ul>
Specification of Flash EEPROM Emulation	<ul style="list-style-type: none"> <li>• Removed draft status of MemAcc_Compare in SWS_Fee_00105</li> </ul>
Specification of Flash Test	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of FlexRay AUTOSAR Transport Layer	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> </ul>
Specification of FlexRay Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of FlexRay ISO Transport Layer	<ul style="list-style-type: none"> <li>• Migration from word to Latex</li> <li>• Figures moved out of specification items</li> <li>• Adapted lower layer communication to LSduR</li> </ul>
Specification of FlexRay Interface	<ul style="list-style-type: none"> <li>• Replaced upper communications layers by LSduR</li> </ul>
Specification of FlexRay Network Management	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> <li>• Fixed include file for callback functions</li> </ul>
Specification of FlexRay State Manager	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of FlexRay Transceiver Driver	<ul style="list-style-type: none"> <li>• Clarification of multicore support.</li> <li>• Editorial updates</li> </ul>
Specification of Floating Point Interpolation Routines	<ul style="list-style-type: none"> <li>• Added import type</li> </ul>
Specification of Floating Point Math Routines	<ul style="list-style-type: none"> <li>• New function added SWS_Mfl_91007.</li> <li>• Added SWS_Mfl_91006.</li> </ul>





Name	Specification history entry
Specification of Function Inhibition Manager	<ul style="list-style-type: none"> <li>• ECUC_FiM_00613 added</li> <li>• ECUC_FiM_00614 added</li> <li>• SWS_Fim_00109 added</li> <li>• SWS_Fim_00110 added</li> <li>• SWS_Fim_91001 added</li> <li>• SWS_Fim_91002 added</li> <li>• SWS_Fim_91003 added</li> <li>• SWS_Fim_91004 added</li> <li>• SWS_Fim_00101 changed</li> <li>• ECUC_FiM_00096 description of enumeration changed</li> <li>• ECUC_FiM_00039 changed/extended</li> <li>• Editorial changes</li> </ul>
Specification of GPT Driver	<ul style="list-style-type: none"> <li>• Gpt notification defined in SWS_Gpt_00292 shall be available into header Gpt_Externals.h.</li> <li>• Remove multicore constraint SWS_Gpt_CONSTR_00005.</li> <li>• Remove reference of SRS_BSW_00334 from list of Non applicable requirements (Appendix A).</li> <li>• Naming of BSW module component is defined into CP SWS BSWGeneral instead of CP TR BSWModuleList.</li> </ul>
Specification of Hardware Test Manager on start up and shutdown	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of I-PDU Multiplexer	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of I/O Hardware Abstraction	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of I2C Driver	<ul style="list-style-type: none"> <li>• Initial release</li> </ul>
Specification of ICU Driver	<ul style="list-style-type: none"> <li>• Editorial Changes</li> </ul>
Specification of IEEE1722 Transport Protocol Module	<ul style="list-style-type: none"> <li>• Update module for a fully integration with the communication layers by LSduR</li> </ul>
Specification of ISO15118 Charging	<ul style="list-style-type: none"> <li>• Added chapter 8</li> <li>• Revised diagrams in chapter 9</li> <li>• replaced ChrgM with ISO15118Chrg</li> <li>• requirements updated with service interfaces</li> <li>• Section 3.2 updated</li> <li>• Added missing references</li> <li>• Fixed the scale of figures</li> <li>• Removed appendix A with no applicable requirements</li> <li>• changed lowercase to uppercase starting letters in bullet points</li> </ul>
Specification of Intrusion Detection System Manager	<ul style="list-style-type: none"> <li>• Introduction of Context Data Version</li> <li>• Introduction of new Reporting API for Security Events</li> <li>• Storage of Security Events remove draft status and add description</li> <li>• Use BswM transistion to start/stop transmission of QSEvs</li> <li>• Introduce Severity of Security Events</li> </ul>
Specification of Key Manager	<ul style="list-style-type: none"> <li>• Add security events.</li> <li>• Editorial changes.</li> </ul>





Name	Specification history entry
Specification of LIN Driver	<ul style="list-style-type: none"> <li>• Clarification of configuration data structure for multicore support</li> <li>• Editorial Changes</li> </ul>
Specification of LIN Interface	<ul style="list-style-type: none"> <li>• Support IEEE 1722 Tunneling – Changed the upper layer (in the PDU path) from PduR / CDD to LSduR</li> <li>• Editorial changes</li> </ul>
Specification of LIN State Manager	<ul style="list-style-type: none"> <li>• Editorial Changes</li> <li>• removed uptrace to SRS_BSW_00334</li> </ul>
Specification of LIN Transceiver Driver	<ul style="list-style-type: none"> <li>• Clarified multicore support</li> </ul>
Specification of Large Data COM	<ul style="list-style-type: none"> <li>• Cleaned up header references</li> </ul>
Specification of Linklayer Sdu Routing Module	<ul style="list-style-type: none"> <li>• LSduR is a mandatory upper layer for all communication interface modules and a mandatory lower layer for all direct linked modules.</li> <li>• Added support for Multicore Distribution</li> <li>• Editorial changes</li> </ul>
Specification of MACsec Key Agreement	<ul style="list-style-type: none"> <li>• Configurable interface added</li> <li>• Editorial changes</li> <li>• 2 Jobs Reference to Csm Encrypt added (ECUC_Mka_00074, ECUC_Mka_00075)</li> <li>• CP_SWS_Mka_91019, CP_SWS_Mka_91024, CP_SWS_Mka_91031, CP_SWS_Mka_91032, CP_SWS_Mka_91033, CP_SWS_Mka_91001, CP_SWS_Mka_91014, CP_SWS_Mka_91008 revised</li> <li>• Description of callback notifications is changed</li> <li>• CP_SWS_Mka_00303 removed</li> <li>• Security event context data definition tables incorporated</li> <li>• Titles added to Traceltems</li> <li>• CONC 710 (Deterministic Communication with TSN - Concept Part 8) incorporated</li> <li>• Description of return values modified</li> </ul>
Specification of MCU Driver	<ul style="list-style-type: none"> <li>• Cleaned up unresolved references in traceability.</li> <li>• Removed SWS_Mcu_CONSTR_00001</li> </ul>
Specification of MSFLibrary	<ul style="list-style-type: none"> <li>• Initial release</li> </ul>
Specification of Memory Abstraction Interface	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Memory Access	<ul style="list-style-type: none"> <li>• Removed all draft markings</li> <li>• Added SynchronizationGroups</li> <li>• Moved MemAccUseMemFuncPtrTable, MemAccMemNamePrefix and MemAccMemInvocation to MemDrv</li> <li>• Minor corrections and bugfixes</li> </ul>
Specification of Memory Driver	<ul style="list-style-type: none"> <li>• Removed all draft markings</li> <li>• Added MemUseFuncPtrTable, MemNamePrefix and MemInvocation</li> <li>• Minor corrections and bugfixes</li> </ul>
Specification of Memory Mapping	<ul style="list-style-type: none"> <li>• Simplify MemMap header implementation</li> <li>• Add and rework examples</li> <li>• Add requirements for function level tracing</li> </ul>
Specification of Module E2E Transformer	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>





Name	Specification history entry
Specification of Module XCP	<ul style="list-style-type: none"> <li>• adapted interaction with lower layer to LSduR</li> </ul>
Specification of NVRAM Manager	<ul style="list-style-type: none"> <li>• NvMBlockEcucPartitionRef multiplicity changed to 1</li> <li>• Corresponding API mentioned for each Client-Server operation</li> </ul>
Specification of Network Management Interface	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Network Management for SAE J1939	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> </ul>
Specification of OCU Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Operating System	<ul style="list-style-type: none"> <li>• Clarification on PRO_IGNORE, new PRO_PREVENT_ARRIVAL_RATE</li> <li>• Clarification of CallTrustedFunction, added new column to table 7.1</li> <li>• Remove option to restart a OS-Application</li> <li>• Minor correction / clarification / editorial changes</li> </ul>
Specification of PDU Router	<ul style="list-style-type: none"> <li>• Added support for Linklayer SDU Router</li> <li>• Clarification for buffering in case of fan-in and multicast routings</li> <li>• Editorial changes</li> </ul>
Specification of PWM Driver	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Platform Types for Classic Platform	<ul style="list-style-type: none"> <li>• No content changes.</li> </ul>
Specification of Port Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> <li>• Removed uptrace from SWS_Port_NA_00227 to SRS_BSW_00334</li> </ul>
Specification of RAM Test	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of RTE Software	<ul style="list-style-type: none"> <li>• Cleanup of header files for interaction with Basic Software</li> <li>• NvM corrections</li> <li>• Configuration of VFB Tracing enhanced</li> <li>• Minor corrections / clarifications/ editorial changes</li> </ul>
Specification of SOME/IP Transformer	<ul style="list-style-type: none"> <li>• Clarified handling of Message Types RESPONSE(0x80) and ERROR(0x81)</li> <li>• Clarified handling of UTF-8 and UTF-16</li> <li>• New section 'De-serialization of Parameters and Data Structures'</li> <li>• Fix of Uptraces and Editorial Changes</li> </ul>
Specification of SPI Handler/Driver	<ul style="list-style-type: none"> <li>• SRS_BSW_00334 removed from SWS_Spi_NA_00999</li> </ul>
Specification of SW-C End-to-End Communication Protection Library	<ul style="list-style-type: none"> <li>• E2EPW Support removed</li> <li>• Profile 76 added</li> <li>• Change Interfaces of Profile 22</li> </ul>
Specification of Secure Onboard Communication	<ul style="list-style-type: none"> <li>• Minor corrections / clarifications / editorial changes; For details please refer to the Change Documentation</li> </ul>
Specification of Service Discovery	<ul style="list-style-type: none"> <li>• Enable/Disable ACL at runtime</li> <li>• Configuration parameter with Max number of IP addresses in ACL</li> <li>• Change the Callback from SD to SoAd</li> <li>• Minor bugfixes and editorial changes</li> </ul>





Name	Specification history entry
Specification of Socket Adaptor	<ul style="list-style-type: none"> <li>• Replaced Sd_AclPolicyCheck() by Sd_RequestRouting GroupEnable.</li> <li>• Added SoAdSocketConnectionGroup.SoAdSocketTimeTo Live.</li> <li>• Corrected occurrence of TpTp in Up_SoAdTpTx Confirmation and Up_SoAdTpRxIndication</li> </ul>
Specification of Software Cluster Connection module	<ul style="list-style-type: none"> <li>• Remove NvM_SetBlockLockStatus API support</li> <li>• Clenaup EcuC spec item IDs</li> <li>• Corrections and editorial changes of existing features</li> </ul>
Specification of Standard Types	<ul style="list-style-type: none"> <li>• Editorial Changes</li> </ul>
Specification of Synchronized Time-Base Manager	<ul style="list-style-type: none"> <li>• Offset Time Bases removed</li> <li>• Cloning of Time Bases enhanced</li> <li>• Several minor clarifications and corrections</li> </ul>
Specification of TCP/IP Stack	<ul style="list-style-type: none"> <li>• Minor corrections and clarifications</li> <li>• Error reporting scenarios update in Tcplp</li> <li>• DoIP - Trace links from AP to CP</li> <li>• Extension of Security Events for Tcplp</li> <li>• Description update of TCP retransmissions handling</li> <li>• Interpretation update of SWS_Tcplp_00077</li> <li>• Adaptations for LSduR as lower layer</li> </ul>
Specification of TTCAN Driver	<ul style="list-style-type: none"> <li>• Editorial changes</li> <li>• Fix Service IDs</li> </ul>
Specification of TTCAN Interface	<ul style="list-style-type: none"> <li>• Replaced upper communication layers by LSduR</li> <li>• Editorial changes</li> <li>• Fix Service IDs</li> </ul>
Specification of Time Service	<ul style="list-style-type: none"> <li>• Major rework of whole specification, added service interface</li> <li>• SRS_BSW_00334 removed from SWS_Tm_NA_00059</li> </ul>
Specification of Time Synchronization over CAN	<ul style="list-style-type: none"> <li>• Offset Time Domains removed</li> <li>• Changed lower layer from CanIf to LSduR</li> <li>• Static link delay on CAN added</li> <li>• CRC calculation specification corrected</li> </ul>
Specification of Time Synchronization over Ethernet	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> <li>• Offset Time Bases removed</li> <li>• Retry strategy for transmission added</li> <li>• Clarification for configuration of VLAN</li> </ul>
Specification of Time Synchronization over FlexRay	<ul style="list-style-type: none"> <li>• Offset Time Domains removed</li> <li>• Changed lower layer from FrIf to LSduR</li> </ul>
Specification of Timing Extensions for Classic Platform	<ul style="list-style-type: none"> <li>• Major rework of SL-LET</li> <li>• Clarification of ordering of TimingDescriptionEventChain segments</li> <li>• Annotation of imposition times to constraints</li> </ul>
Specification of UDP Network Management	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Vehicle-2-X Basic Transport	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
Specification of Vehicle-2-X Data Manager	<ul style="list-style-type: none"> <li>• Definition of imported data types.</li> </ul>





Name	Specification history entry
Specification of Vehicle-2-X Facilities	<ul style="list-style-type: none"> <li>• Rework of VDP service API for CAM</li> <li>• Removal of useless data types</li> </ul>
Specification of Vehicle-2-X Geo Networking	<ul style="list-style-type: none"> <li>• Adaptation to new lower interface through L-SDU router</li> </ul>
Specification of Vehicle-2-X Management	<ul style="list-style-type: none"> <li>• Automatic alignment modifications of imported types and required interfaces</li> </ul>
Specification of Watchdog Driver	<ul style="list-style-type: none"> <li>• Added support for I2C External WDG Configuration</li> </ul>
Specification of Watchdog Interface	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Specification of Watchdog Manager	<ul style="list-style-type: none"> <li>• Fixed uptraces to SRS ModeManagement</li> <li>• Editorial changes</li> </ul>
Specification of Wireless Ethernet Driver	<ul style="list-style-type: none"> <li>• Alignment of configuration to multicore partition</li> <li>• Removal of mask in address filter</li> <li>• Support of L-SDU router</li> </ul>
Specification of Wireless Ethernet Transceiver Driver	<ul style="list-style-type: none"> <li>• Alignment of configuration to multicore partition</li> <li>• Editorial corrections</li> </ul>
Specification of a Diagnostic Communication Manager for SAE J1939	<ul style="list-style-type: none"> <li>• Fixed "Possible Errors" of J1939Dcm_Calibration Information</li> </ul>
Specification of a Functional Safety Communication Protocol Handler for SAE J1939	<ul style="list-style-type: none"> <li>• Initial Release</li> </ul>
Specification of a Request Manager for SAE J1939	<ul style="list-style-type: none"> <li>• Clarified internal feedback of RQST(2) and ACKM</li> <li>• Fixed included header for CDD user callouts</li> </ul>
Specification of a Transport Layer for SAE J1939	<ul style="list-style-type: none"> <li>• Changed lower layer to LSduR</li> </ul>
Specification on SOME/IP Transport Protocol	<ul style="list-style-type: none"> <li>• Several minor bugfixes</li> <li>• Updated Sequence diagrams for Transmission of SOME/IP segments</li> <li>• Editorial changes</li> </ul>
Supplementary material of general blueprints for AUTOSAR	<ul style="list-style-type: none"> <li>• No content changes</li> </ul>
System Template	<ul style="list-style-type: none"> <li>• Enhanced PduR Fanout chapters</li> <li>• Added imposition times to constraints</li> <li>• Introduced J1939ProtectedIPdu</li> <li>• Reworked Ethernet Switch configuration:</li> <li>• Added Frame preemption support</li> <li>• Reworked CouplingPortTrafficClassAssignment</li> </ul>
Utilization of Crypto Services	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>
Virtual Functional Bus	<ul style="list-style-type: none"> <li>• References to the document "List of Basic Software Modules" (AUTOSAR_CP_TR_BSWModuleList) changed to "General Specification of Basic Software Modules" (AUTOSAR_CP_SWS_BSWGeneral)</li> <li>• Editorial changes mostly related to spacing, subtitles and phrasing</li> </ul>

**Table 5.1: Overview of specification release histories**