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31.05.2005	1.0.0	AUTOSAR Administration	Initial release

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Table of Contents

1 Scope of this document

Scope of this document is the definition of the functional and non-functional requirements for the AUTOSAR PDU Router module and the AUTOSAR Signal Gateway which is integral part of COM.

Other modules relevant for data communication in the AUTOSAR architecture, such as COM, DCM, driver and interface layers for CAN, LIN and FlexRay, and other modules irrelevant for data communication, are not in the scope of this document.

Constraints

For AUTOSAR 2.0 non-TP I-PDUs shall not exceed a length of 8 bytes. This ensures that an I-PDUs can be transmitted in a single CAN message.

2 How to read this document

Each requirement has its unique identifier starting with the prefix “BSW” (for “Basic Software”). For any review annotations, remarks or questions, please refer to this unique ID rather than chapter or page numbers!

2.1 Conventions used

In requirements, the following specific semantics are used (taken from Request for Comment RFC 2119 from the Internet Engineering Task Force IETF)

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. Note that the requirement level of the document in which they are used modifies the force of these words.

- SHALL: This word means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase means that the definition is an absolute prohibition of the specification.
- MUST: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
- MUST NOT: This phrase, or the phrase „SHALL NOT“, means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- MAY: This word, or the adjective „OPTIONAL“, means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation, which does not include a particular option, MUST be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, MUST be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides.)

2.2 Requirements structure

Each module specific chapter contains a short functional description of the Basic Software Module. Requirements of the same kind within each chapter are grouped under the following headlines (where applicable):

Functional Requirements:
- Configuration (which elements of the module need to be configurable)
- Initialization
- Normal Operation
- Shutdown Operation
- Fault Operation
- ...

Non-Functional Requirements:
- Timing Requirements
- Resource Usage
- Usability
- Output for other WPs (e.g. Description Templates, Tooling,...)
- ...

3 Acronyms and abbrevations

The following glossary defines acronyms and terms that are not defined by the AUTOSAR glossary.

Acronym:	***Description:***
Routing Configuration	Configuration data that controls the operation of the PDU Router and Signal Gateway. The configuration data defines the destination for each PDU of the PDURouter and each Signal of the signal gateway. The routing configuration should be encapsulated in a way that allows an update.
Gw	abbreviation of signal based gateway

4 Requirement Specification

4.1 Functional Overview

The AUTOSAR Gateway functionality consists of two parts:

- Gateway functionality on PDU level (frame-based gateway), provided by the PDU Router module
- Gateway functionality on signal level (signal-based gateway), provided by the Signal Gateway, which is integral part of COM.

In addition to the gateway functionality on PDU level, the PDU Router also provides:

- routing of PDUs up and down the communication stack (between COM and interfaces (CAN, LIN, FlexRay), and between DCM and TP modules (CAN, LIN, FlexRay)),
- between communication interface layers,
- between TP modules (for CAN, LIN, and FlexRay),
- connection to I-PDU multiplexer.

Figure 1 shows an overview of the AUTOSAR communication architecture and the interaction of PDU Router and Signal Gateway with other components of the AUTOSAR architecture.

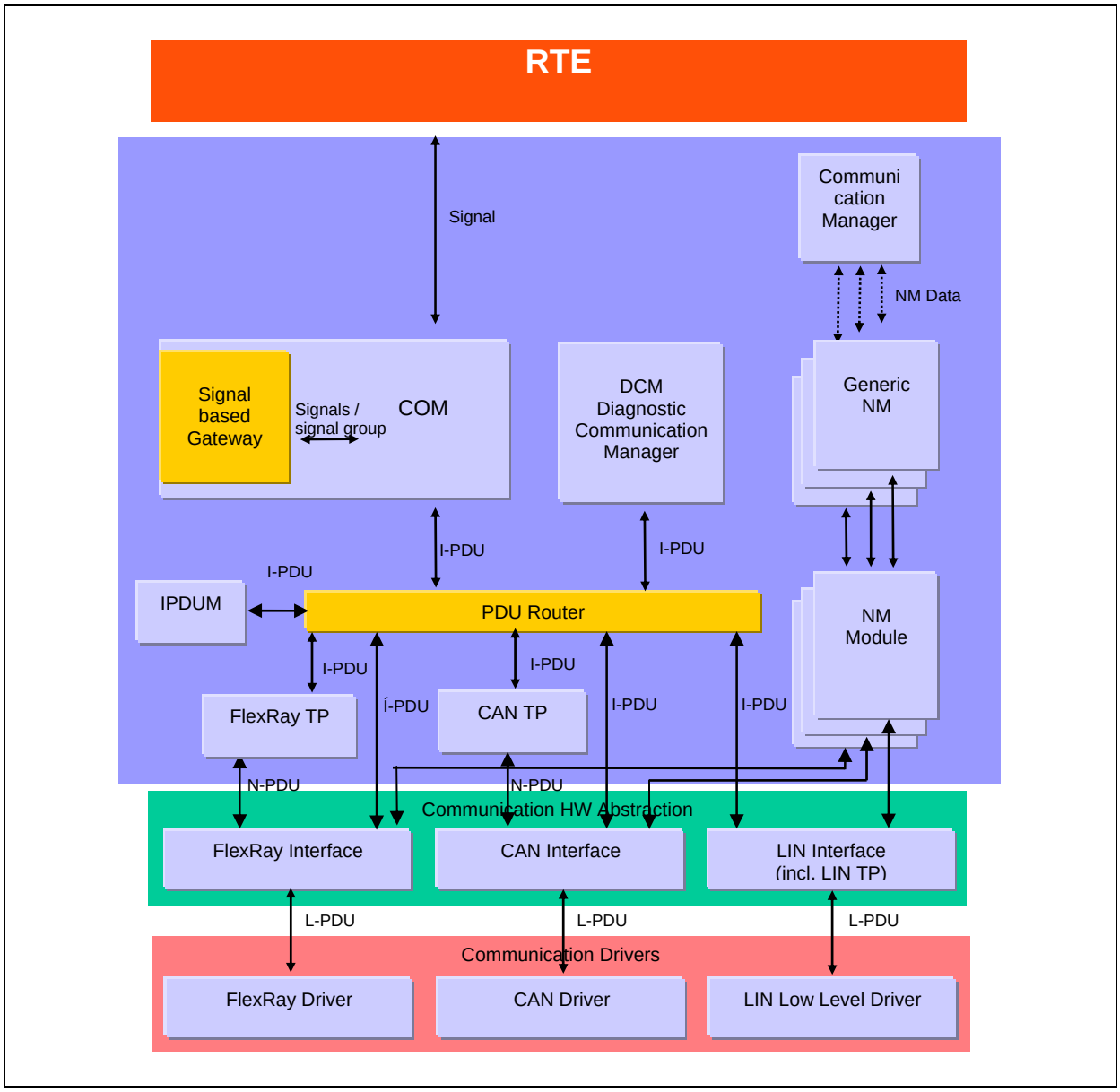

Figure 1: Interaction of gateway components with other modules of the AUTOSAR communication structure. Signal gateway is integral part of COM (only present if required).

4.1.1 PDU Router

- Provides transport of PDUs between
  - communication interface layers, upper service layers and IPDUM,
  - TP modules and upper service layers,
  - different communication interface layers,
  - different TP modules.

- initiated by a PDU routing trigger.

- PDU routing trigger may be generated by the CAN, LIN, or FlexRay interfaces, the corresponding TP modules, the service layers COM and DCM or IPDUM.

- Size of the routing layer is ECU specific, and statically configurable (down to zero size if e.g. no PDU level gateway functionality is needed)

- Provides TP routing on-the-fly. This means that transfer of TP data is started before full TP data is buffered. The gateway therefore provides a buffer to the receiving TP module which is smaller than the overall data length. When this buffer is filled, the gateway starts transmitting these data on the destination bus. In parallel, the receiving TP module get another buffer. Then data are received on the receiving TP module and in parallel transmitted by the transmitting TP module.

4.1.2 Signal Gateway

- Provides mapping of signals or groups of signals (Complex Data Types), initiated by a signal routing trigger.

- Signal routing trigger is generated by COM core functionality.

- Signal Gateway uses packing/unpacking mechanisms and timeout handling mechanisms of COM.

4.2 General Gateway Requirements

4.2.1 [BSW06001] Protection of Routing Table

Initiator:	BMW, PORSCHE
Date:	05.05.2004
Short Description:	protection of routing table of gateway when it is in use.
Type:	New
Importance:	High
Description:	Gateway can only be reconfigured while the configuration table to be reconfigured is not in use (e.g. during programming mode). Reconfiguration during normal operation (application running and configuration table is in use) shall not be possible.
Rationale:	Changes during normal operation are regarded as safety risk.
Use Case:	--
Dependencies:	BSW06002
Conflicts:	--
Supporting Material:	--

4.2.2 [BSW06002] Updateable Configuration

Initiator:	BMW, PORSCHE
Date:	07.07.2004
Short Description:	Configuration of gateway shall be updateable.
Type:	New

Importance:	High
Description:	The routing configuration shall be updateable at post-build time.
Rationale:	The goal is to avoid re-compiling and re-loading of huge application binaries in case of minimal routing changes.
Use Case:	A PDU has to be routed to an additional path.
Dependencies:	BSW06001
Conflicts:	--
Supporting Material:	--

4.2.3 [BSW06097] Configuration identification

Initiator:	BMW, PSA
Date:	05.10.2005
Short Description:	It shall be possible to identify the configuration.
Type:	New
Importance:	Medium
Description:	A configuration shall be identified by an unique ID number. This number shall be accessible.
Rationale:	Diagnostic device shall read the present configuration.
Use Case:	--
Dependencies:	BSW06002
Conflicts:	--
Supporting Material:	--

4.2.4 [BSW06003] Static Routing Rules

Initiator:	BMW, PORSCHE
Date:	05.05.2004
Short Description:	No dynamic routing.
Type:	New
Importance:	Medium
Description:	The gateway does not support dynamic routing rules. All routing paths are statically defined, and do not depend on the content of a PDU or signal.
Rationale:	Reduction of complexity, realization of deterministic gateways.
Use Case:	--
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.2.5 [BSW06004] Routing Chronological Order

Initiator:	BMW, PORSCHE
Date:	12.07.2004
Short Description:	The Gateway shall preserve the chronological order of • instances of PDUs with the same identifiers (PDU Router) • instances of the same signal (signal based gateway)
Type:	New
Importance:	High
Description:	The chronological order of different instances of the same PDU or of different instances of the same signal has to be preserved. The loss of some instances of a PDU or signal does not break this rule. The Gateway does not have to preserve the order of different PDUs or different signals on the same

	bus, or of equal PDUs or equal signals sent on different busses.
Rationale:	No reordering of PDU instances and signal instances shall take place.
Use Case:	• The sequence of PDUs and signals may reflect the sequence of user actions. • The sequence of PDUs and signals reflects a sequence of commands to execute by an ECU
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.3 Signal Gateway

This chapter contains the requirements of the signal gateway. The signal gateway is integral part of COM and no separate module. The APIs are specified in the COM SWS document.

4.3.1 Functional Requirements

4.3.1.1 [BSW06055] Signal Based Gateway

Initiator:	BMW, PORSCHE
Date:	05.05.2004
Short Description:	Gateway on signal granularity.
Type:	New
Importance:	High
Description:	The signal gateway shall provide a mechanism to route individual signals between I-PDUs in a 1:n fashion.
Rationale:	Routing of AUTOSAR signals.
Use Case:	• A received signal can be forwarded to different busses. • A received signal can be forwarded to one bus and to RTE. • A TX signal from RTE can be forwarded to different busses. • Combine signals of ECUs (e.g. error signals or display signals) to reduce the amount of received I-PDUs of an ECU (e.g. instrument panel cluster). • Reduce the number of gateway sending I-PDUs (e.g. in case of multiple source I-PDUs with few transmission signals). • Adaptation of different payload length of the connected busses.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.3.1.2 [BSW06056] Routing of Signal Groups

Initiator:	DC, FMC
Date:	08.06.2005
Short Description:	Gateway on signal group granularity
Type:	New
Importance:	High
Description:	The gateway shall provide a mechanism to route signal groups. The routing has to be atomic to keep the data consistent.
Rationale:	Routing of AUTOSAR signal groups.

	Individual signal information of a signal group needs to be kept consistent within the group during routing the signal group.
Use Case:	• Allow distribution of signal groups between busses. • combine signal groups of ECUs (e.g. error signals or display signals) to reduce the amount of received PDUs of an ECU (e.g. instrument panel cluster). • Reduce the number of sending-PDUs sent by gateway (e.g. in case of multiple source PDUs with few transmission signal groups). • Adaptation of different payload length of the connected busses.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.3.1.3 [BSW06061] Routing operation on signals

Initiator:	DC
Date:	03.02.2005
Short Description:	The Signal gateway shall not change the value of any of the routed signals.
Type:	New
Importance:	High
Description:	The functionality of the router is mapping of signals – not changing the contents or types of signals.
Rationale:	The signal gateway shall be router only.
Use Case:	Examples: No shift from an 8 bit signal to a 6 bit signal; no merging of two signals into one signal. Such changes belongs to application SW.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.3.1.4 [BSW06098] Signal Gateway Error Handling with signal routing

Initiator:	WP4.2.2.1.6
Date:	23.06.2005
Short Description:	When routing signals, the Signal Gateway shall provide error handling in case of unknown IDs.
Type:	New
Importance:	High
Description:	The Signal Gateway shall provide the following error handling: Single signal: 1) Receive signal request returns with “unknown signal ID” (configuration error) Handling: report to DET 2) Send signal request reports “unknown signal ID” (configuration error) Handling: report to DET Development errors have to be reported to DET. A configuration error is e.g. a signal ID which is out of range.
Rationale:	Signal gateway can only detect some configuration errors but no runtime errors.
Use Case:	It is impossible to forward a signal to be routed because of a configuration error.
Dependencies:	--
Conflicts:	--

Supporting Material:	DOC_GENERAL_SRS

4.3.1.5 [BSW06099] Signal Gateway Error Handling with signal group routing

Initiator:	WP4.2.2.1.6
Date:	23.06.2005
Short Description:	When routing signal groups, the Signal Gateway shall provide error handling in case of unknown IDs.
Type:	New
Importance:	High
Description:	Signal Group: 1) One of the receive signal requests returns with “unknown signal ID” (configuration error) Handling: report to DET 2) One of the send signal requests returns with “unknown signal ID” (configuration error) Handling: report to DET Development errors have to be reported to DET. A configuration error is e.g. a signal ID which is out of range.
Rationale:	Signal gateway can only detect some configuration errors but no runtime errors.
Use Case:	It is impossible to forward a signal to be routed because of a configuration error.
Dependencies:	--
Conflicts:	--
Supporting Material:	DOC_GENERAL_SRS

4.3.1.6 [BSW06077] Routing of multiple signals of the same PDU

Initiator:	BMW, DC
Date:	15.02.2005
Short Description:	Multiple signals of one source PDU, to be transmitted together in one target PDU, shall produce only one instance of this transmit PDU.
Type:	New
Importance:	High
Description:	The transmission of the target PDU(s) has to be triggered if and only if all signals of the related source PDU have been copied. Example: Two signals A and B are received by COM in the same source PDU. Both signals shall be routed to the same target bus using the Signal gateway. Both signals are configured to be transmitted on the target bus in the same PDU. Then it shall be avoided that each signal triggers the transmission of one instance of the same target PDU. It shall be ensured, that for both signals together only one instance of the target PDU is produced.
Rationale:	To keep bandwidth usage small, it is necessary to stuff different signals (with the same periodicity) into one PDU. It is not reasonable to define a signal group for signals of different source applications, even if these applications are located at the same ECU.
Use Case:	Some signals of one received PDU have to be copied into one transmit PDU by the gateway ECU.
Dependencies:	COM: possibility to assign forwarded (receive + send) signals to source and destination PDU.
Conflicts:	--

Supporting Material:	There are two approaches to fulfill this requirement: 1) Treat this requirement as an implementation requirement for COM. The consequence would be that access from RTE to COM would be done using the blocking mechanism – even if not required! 2) Treat this requirement as a requirement for the configuration tool. The configuration tool can define a "local" signal group for the router. The COM of the gateway ECU will then use the mechanism which are used for signal groups. Keep in mind that according to actual COM SRS (see COM SRS glossary of COM SRS V1.4.0) a signal group must be continuous and cannot be separated by other signals between.

4.3.2 Non-Functional requirements

4.3.2.1 [BSW06064] Signal gateway scalability

Initiator:	DC
Date:	04.02.2005
Short Description:	signal gateway scalability to zero size
Type:	New
Importance:	High
Description:	The signal gateway shall be scalable to zero size and zero resource usage when signal routing is not required.
Rationale:	This layer is important for some ECU structures, but in other ECUs, no additional overhead shall be introduced. To achieve this without any software implementation changing, the software (the signal gateway) shall be scalable.
Use Case:	Is required for ECUs with no gateway functionality (but the same software).
Dependencies:	Configuration process: The scalability is result of a well defined software and its interfaces and suitable configuration processes and configuration tools.
Conflicts:	--
Supporting Material:	--

4.3.2.2 [BSW06089] timeout handling

Initiator:	BMW, PORSCHE, DC
Date:	12.07.2004
Short Description:	Handling of outdated signals (expired reception timeout)
Type:	New
Importance:	High
Description:	The timeout of a signal, which is deadline monitored and to be routed, shall be ignored by the SigG. Only the related transmit signals, which are to be deadline monitored, and which are not of types n-times or direct, shall be configured to have update bits. (Behaviour of COM: After transmission of a signal equipped with an update bit, the update bit will be cleared by COM automatically.)
Rationale:	Timeout indication of the source signal for receiver.
Use Case:	In case of general signal routing, the ECU behind the gateway must be able to detect that a timeout occurred.
Dependencies:	--
Conflicts:	--
Supporting Material:	Timeout indication informs a receiver that the signals are not up-to-date because of a missing message (or a cleared update bit) on the source bus of the gateway. If the update bit is not handled during a timeout, it will remain cleared and the receiving node will inform the application with the help of

	deadline monitoring.

4.4 PDU Router

4.4.1 Constraints

If the PDU Router is used to route PDUs between two communication interface modules, without incorporation of COM, the minimum send interval for transmission on a CAN target bus can not be guaranteed.

4.4.2 Functional Requirements

4.4.2.1 [BSW06012] Transparent non-TP PDU routing without rate conversion

Initiator:	BMW, PORSCHE
Date:	05.05.2004
Short Description:	Direct (1:1) routing of non-TP PDUs with a fixed length and without rate conversion.
Type:	New
Importance:	High
Description:	PDU router shall route PDUs (with a fixed length) without payload modifications between local communication interface layers and local upper software layers. If the maximum PDU length of the destination bus is smaller than the PDU to route – no routing is possible. This case indicates a faulty configuration.
Rationale:	This layer allows the construction of a PDU based gateway and handles the distribution of PDUs between the communication interface layers and COM. The payload is not modified in any way.
Use Case:	• Direct routing of PDUs without modification from any bus to COM and vice versa • Direct routing of PDUs without modification from one bus to another bus
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.2.2 [BSW06026] Transparent TP PDU routing

Initiator:	BMW, PORSCHE
Date:	09.09.2004
Short Description:	Direct (1:1) on the fly routing of transport protocol PDUs
Type:	New
Importance:	High
Description:	In the gateway case: The PDU router provides data buffers for forwarding TP data on request. In the non gateway case: DCM provides data buffers for transmitting and receiving TP data on request. Furthermore the PDU router manages the on the fly routing of these data buffers from TP modules to DCM or TP modules and from DCM to TP modules.
Rationale:	Save buffer memory and reduce latency of forwarding TP data.

Use Case:	• Diagnostic tester communicates with an ECU connected to a different bus. • Diagnostic tester communicates with the (this PDU router) hosting ECU itself.
Dependencies:	Transport layer modules have to provide a generic interface for transmission of data block fragments.
Conflicts:	--
Supporting Material:	--

4.4.2.3 [BSW06048] Minimum Routing Capability

Initiator:	PSA, Porsche, Bosch
Date:	30/11/05
Short Description:	PDU Router shall always be able to guarantee access (one RX and one TX) to local DCM (one RX and one TX) without using a post-compile reconfigurable routing table. Remark: This requirements only requires a guaranteed access to local DCM but not to COM.
Type:	New
Importance:	High
Description:	PDU Router shall provide a dedicated routing path only configurable at pre-compile time or link time. This path shall always be active. The configuration of this special routing path shall be separated from the post-compile time routing configuration. Details – especially the consequences for the lower modules (interfaces and TP) are under discussion.
Rationale:	PDU Router shall always be able to route TP PDUs without using a post-compile reconfigurable routing table.
Use Case:	This guarantees access to local DCM. Bring the ECU into programming mode, by activating the boot loader via DCM.
Dependencies:	DCM, Bus interfaces and TP shall also support this functionality.
Conflicts:	--
Supporting Material:	PDU_Identifiers PDUR_RX_0000 and PDUR_TX_0000 should be used for the minimum routing. These unique global IDs should be used by all modules (Interface, DCM and TP) to simplify implementation of minimum routing

4.4.2.4 [BSW06029] Routing of Multicast SF-TP PDUs

Initiator:	BMW, PORSCHE
Date:	13.12.2004
Short Description:	Routing of Single Frame TP-PDUs to one or more than one destinations (1:n routing), including DCM of Gateway ECU
Type:	New
Importance:	High
Description:	The PDU Router shall be able to support routing of Single Frame TP PDUs independent from the source (bus interface or DCM) to more than one destinations, e.g. CanTp, FrTp,, and it's own DCM.
Rationale:	Gateway ECU should support multicast.
Use Case:	TesterPresent to maintain diagnostic on all ECUs.
Dependencies:	--
Conflicts:	--

Supporting Material:	--

4.4.2.5 [BSW06030] Routing of Multicast non TP PDUs without rate conversion

Initiator:	WP4.2.2.1.6
Date:	13.12.2004
Short Description:	Routing of non TP-PDUs to one or more than one destinations without rate conversion (1:n routing)
Type:	New
Importance:	High
Description:	Routing of non TP PDUs to more than one destination (e.g. multiple communication buses, local COM) independent from the source (bus interface or COM) shall be supported by the PDU Router.
Rationale:	Sending or routing of multicast PDUs.
Use Case:	Broadcast, e.g. keyPosition: send out key information to all ECUs.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.2.6 [BSW06032] PDU transmit buffering in PDU Router

Initiator:	BMW
Date:	07.07.2004
Short Description:	In the gateway case, transmission of each PDU routed between different interface modules shall be configurably buffered in PDU Router. Different buffering sizes shall be possible. There shall be, if configured, a separate buffer for each PDU ID.
Type:	New
Importance:	Medium
Description:	PDU buffering strategy elements: - **Buffer size**: number of buffers for each PDU can vary from 1 to n, if n > 1 Buffer is a FIFO - **Buffer Overwrite**: - If buffer is full, the buffer shall be flushed and the new value shall be forwarded to interface. - **TriggerTransmit in case of Empty Buffer** - If interface requests a value but PduRouter Buffer is empty the most recent value shall be provided, if there has been no transmission before, the most recent value shall be the default value The strategy shall be configured for each PDU to be routed by the PDU Router. Only youngest PDUs are transmitted (buffer size equals 1) or up to n received PDUs are to be processed and routed without any data leakage. A PDU can also be configured to have no buffer.
Rationale:	It can be necessary to handle a sequence of instances of the same PDU in a way, that no instance is lost and their order has to be preserved.
Use Case:	Usage of cycle counter information in normal PDUs Usage of other transport protocols (e.g. MCNet)
Dependencies:	Default values of to be buffered PDUs shall be configured.
Conflicts:	--
Supporting Material:	--

4.4.2.7 [BSW06049] Consistency of PDU Buffer Content

Initiator:	WP4.2.2.1.6
Date:	16.03.2005
Short Description:	The PDU Router shall guarantee consistency of stored PDUs.
Type:	New
Importance:	High
Description:	In case the PDU Router stores PDUs in PDU buffers it shall be guaranteed that the stored data is kept consistent during the time needed to read this data.
Rationale:	Data consistency
Use Case:	Avoidance of inconsistent data. Guarantee that during writing e.g. a 16byte variable, another task may not read the data.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.2.8 [BSW06103] PDU Router Error Handling at unknown PDU-ID

Initiator:	WP4.2.2.1.6
Date:	29th March 2005
Short Description:	PDU Router Error Handling at unknown PDU-ID
Type:	New
Importance:	High
Description:	The PDU Router shall provide the following error handling: In case a PDU Router is called with an unknown PDU-ID (out of range), the PDU Router shall ignore the error and report to DET.
Rationale:	Handle development and runtime errors.
Use Case:	Handle development and runtime errors.
Dependencies:	--
Conflicts:	--
Supporting Material:	DOC_GENERAL_SRS

4.4.2.9 [BSW06104] PDU Router Error Handling at local reception or transmission

Initiator:	WP4.2.2.1.6
Date:	29th March 2005
Short Description:	PDU Router Error Handling for PDUs
Type:	New
Importance:	High
Description:	The PDU Router shall provide the following error handling: Local reception or transmission: 1) Transmission request to interface module returns with ERROR Handling: Return ERROR to upper layer (COM). In case of multicast ERROR is returned to COM if at least one transmit request returned with ERROR. 2) Transmitting interface reports an ERROR Handling: Forward ERROR to upper layer (COM). In case of multicast ERROR is not forwarded (configuration error). 3) Receiving TP module reports an ERROR

	Handling: Return ERROR to upper layer (DCM) 4) receiving interface module reports an ERROR Handling: Return ERROR to upper layer (COM) 5) Transmission request to TP module returns with ERROR Handling: Return ERROR to upper layer (DCM). In case of multicast of single-frame TP ERROR is returned to DCM if at least one transmit request returned with ERROR. 6) Transmitting TP module reports an ERROR Handling: Forward ERROR indication to upper layer (DCM). In case of multicast an indication with ERROR is forwarded to DCM if at least one ERROR indication is received from a TP module.
Rationale:	Handle development and runtime errors.
Use Case:	Handle development and runtime errors.
Dependencies:	--
Conflicts:	--
Supporting Material:	DOC_GENERAL_SRS

4.4.2.10 [BSW06105] PDU Router Error Handling in gateway case

Initiator:	WP4.2.2.1.6
Date:	29th March 2005
Short Description:	PDU Router Error Handling for PDUs
Type:	New
Importance:	High
Description:	The PDU Router shall provide the following error handling: Gateway case: 1) Transmission request to interface module returns with ERROR (when using the function call to lower layer) Handling: Ignore that error in the non-FIFO case, send next element in the FIFO case. 2) Transmitting interface reports an ERROR (in case of notification “asynchronous call” by lower layer) Handling: Ignore that error 3) Receiving TP module reports an ERROR Handling: Release TP buffer. Do not continue TP transmission. 4) Transmission request to TP module returns with ERROR Handling: Do not continue TP reception. 5) Transmitting TP module reports an ERROR Handling: Release TP buffer. Do not continue TP reception.
Rationale:	Handle development and runtime errors.
Use Case:	Handle development and runtime errors.
Dependencies:	--
Conflicts:	--
Supporting Material:	DOC_GENERAL_SRS

4.4.2.11 [BSW06106] PDU Router Error Handling at FIFO handling

Initiator:	WP4.2.2.1.6
Date:	29th March 2005
Short Description:	PDU Router Error Handling for PDUs
Type:	New
Importance:	High
Description:	The PDU Router shall provide the following error handling: FIFO handling:

	PDU Router shall report a loss of a PDU instance to DEM if and only if it is configured to store this PDU instances in a FIFO (of size 2 or more) within the PDU Router.
Rationale:	Handle development and runtime errors.
Use Case:	Handle development and runtime errors.
Dependencies:	BSW06032
Conflicts:	--
Supporting Material:	DOC_GENERAL_SRS

4.4.2.12 [BSW06119] confirmation in case of fan-out

Initiator:	WP4.2.2.1.6
Date:	15th February 2006
Short Description:	Confirmation in case of fan-out
Type:	New
Importance:	High
Description:	In case of fan-out by PDURouter, the PDURouter shall not give a confirmation to the upper layer.
Rationale:	--
Use Case:	--
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.3 Non-functional Requirements

4.4.3.1 [BSW06020] PDU Router scalability

Initiator:	BMW, PORSCHE
Date:	05.05.2004
Short Description:	Routing layer scalability
Type:	New
Importance:	High
Description:	The PDU Router resource usage (memory and runtime) shall be scalable to zero in case no PDU gateway, no I-PDUM and no multicast functionality is needed.
Rationale:	This layer is necessary for some ECU structures, but in ECUs with no gateway functionality no additional overhead shall be introduced.
Use Case:	Is required for ECUs with no gateway functionality.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.3.2 [BSW06114] PDU Router API for COM

Initiator:	WP4.2.2.1.6
Date:	13.12.2005
Short Description:	Provision of an special API for COM
Type:	New
Importance:	High
Description:	The PDU Router provides an interface for usage by COM, to use the PDU router functionality.

	This API provides an interface for sending of non-TP PDUs.
Rationale:	An API is required, to use the functionality of the PDU router.
Use Case:	COM sends a non TP-PDU to be forwarded to an bus interface.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.3.3 [BSW06115] PDU Router API for DCM

Initiator:	WP4.2.2.1.6
Date:	13.12.2005
Short Description:	Provision of an special API for DCM
Type:	New
Importance:	High
Description:	The PDU Router provides an interface for usage by DCM, to use the PDU router functionality. This API provides an interface for sending of TP PDUs.
Rationale:	An API is required, to use the functionality of the PDU router.
Use Case:	DCM sends a TP PDU to be forwarded to a bus TP module.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.3.4 [BSW06116] PDU Router API for IPDUM

Initiator:	WP4.2.2.1.6
Date:	13.12.2005
Short Description:	Provision of an special API for IPDUM
Type:	New
Importance:	High
Description:	The PDU Router provides an interface for usage by IPDUM, to use the PDU router functionality. This API provides an interface for: • Sending of non-TP PDUs • Reception Indication of non-TP PDUs • Transmit Confirmation for non-TP PDUs • TriggerTransmit call for non-TP PDUs
Rationale:	An API is required, to use the functionality auf the PDU router.
Use Case:	• IPDUM sends a non-TP PDU to be forwarded to a bus interface. • IPDUM notifies the reception of a received non-TP PDU
Dependencies:	--
Conflicts:	--
Supporting Material:	--

4.4.3.5 [BSW06117] PDU Router API for bus interfaces

Initiator:	WP4.2.2.1.6
Date:	13.12.2005
Short Description:	Provision of an special API for the bus interfaces
Type:	New
Importance:	High
Description:	The PDU Router provides an interface for usage by bus interfaces, to use

	the PDU router functionality. This API provides an interface for: • Reception Indication of non-TP or TP PDUs • Transmit Confirmation for non-TP or TP PDUs • TriggerTransmit call for non-TP PDUs • Request a TP receive buffer or TP transmit buffer The PDU router provided bus interfaces are: • CAN • FlexRay • LIN
Rationale:	An API is required, to use the functionality auf the PDU router.
Use Case:	• CAN-Interface notifies the reception of a received non-TP PDU
Dependencies:	--
Conflicts:	--
Supporting Material:	--

5 References

5.1 Deliverables of AUTOSAR

[DOC_LAYERED_ARCH] Layered Software Architecture,
https:/svn2.autosar.org/repos2/22_Releases
AUTOSAR_LayeredSoftwareArchitecture.pdf

[DOC_COMSTACK_TYPES] Specification of Communication Stack Types,
https:/svn2.autosar.org/repos2/22_Releases
AUTOSAR_SWS_ComStackTypes.pdf

[DOC_COM_SRS] Requirements on Communication,
https:/svn2.autosar.org/repos2/22_Releases
AUTOSAR_SWS_Com.pdf

[DOC_ GLOSSARY] Glossary,
https:/svn2.autosar.org/repos2/22_Releases
AUTOSAR_Glossary.pdf

[DOC_GENERAL_SRS] General Requirements on Basic Software Modules,
https:/svn2.autosar.org/repos2/22_Releases
AUTOSAR_SRS_General.pdf

5.2 Related standards and norms

[DOC_ISO_TP] ISO transport protocol specification,
http://www.iso.org