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References

- [1] Adaptive Platform Release Overview
AUTOSAR_TR_AdaptivePlatformReleaseOverview
- [2] Classic Platform Release Overview
AUTOSAR_TR_ClassicPlatformReleaseOverview

1 Introduction

1.1 Scope of this document

This document provides an overview of the AUTOSAR standard Foundation Release R19-11.

1.2 AUTOSAR standards

1.2.1 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.

1.2.2 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.

1.2.3 Overview on AUTOSAR's standards

AUTOSAR delivers the following standards:

Standard	Abbreviation
Adaptive Platform	AP
Classic Platform	CP
Foundation	FO

1.2.3.1 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.

1.2.3.2 Classic Platform

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

1.2.3.3 Foundation

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

Foundation contains common requirements and technical specifications (e.g. protocols) shared between the AUTOSAR platforms.

1.2.4 Dependencies between Standards

Each release of Classic and Adaptive Platform relies on a dedicated version of Foundation. The specific dependency is documented in chapter [1.3.6](#).

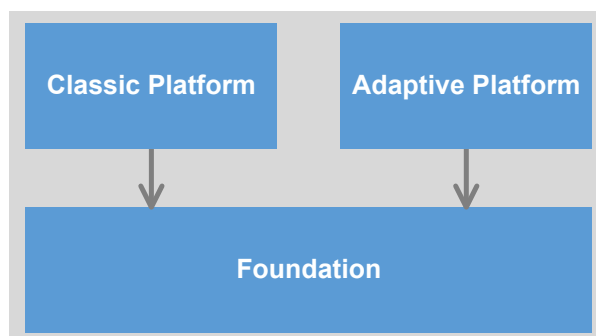


Figure 1.1: Dependencies of AUTOSAR Standards

1.3 Release Numbering and Life Cycle

1.3.1 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. R19-11 for the November 2019 release.

1.3.2 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 1.3.5. 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.

1.3.3 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.

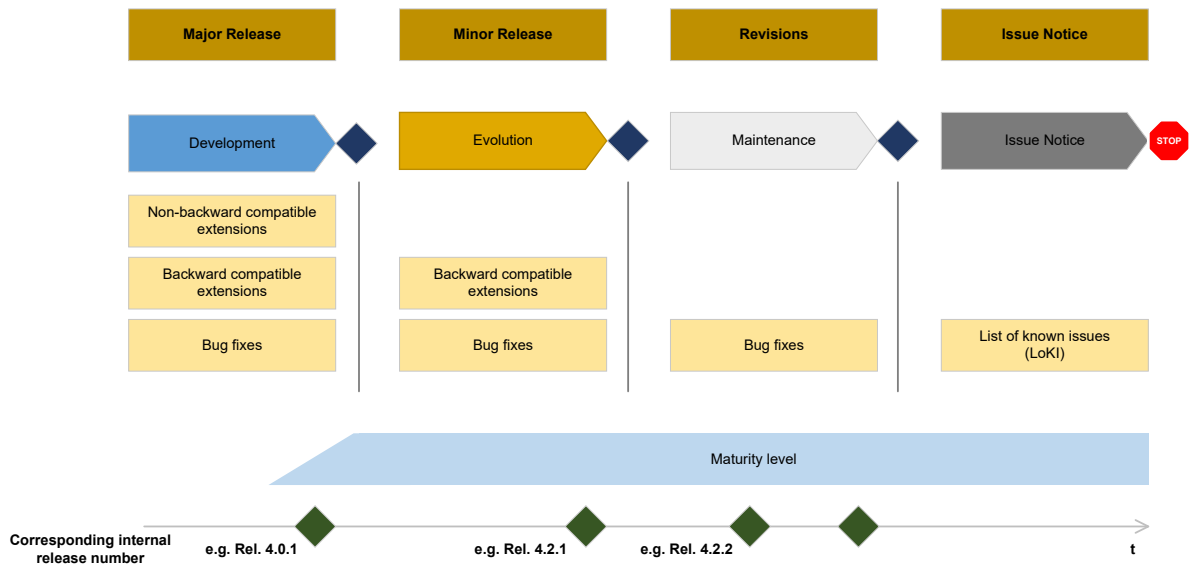


Figure 1.2: Life cycle model of AUTOSAR standards

1.3.4 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 "type". The states are the same as the specification item states.

1.3.5 Overview of AUTOSAR schema versions and corresponding internal AUTOSAR releases

Schema Version	Platform release	Internal release number
AUTOSAR_00048	R19-11	R4.5.0

According to the release life cycle of AUTOSAR the release R19-11 is a minor release.

1.3.6 Overview of AUTOSAR schema versions and corresponding valid AUTOSAR releases

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

Schema Version	AUTOSAR release
AUTOSAR_00048	R19-11

1.4 Content of chapters

This document is structured as follows:

- Chapter 1 provides an introduction to AUTOSAR’s release strategy and its standardization approach.
- Chapter 2 provides a summary of changes since the previous release of the Foundation.
- Chapter 3 contains the overview of specifications comprising the AUTOSAR Foundation Release R19-11. This chapter is structured according to the clusters being in use in AUTOSAR Foundation Release R19-11.
- Chapter 4 contains remarks about known technical deficiencies.
- Chapter 5 contains the detailed revision history of all released specifications.

2 Summary of changes

This chapter contains a summary of changes which were implemented since the previous release R1.5.1.

2.1 Release R19-11

The purpose of the Foundation standard is to enforce interoperability between the AUTOSAR platforms and therefore contains common requirements and technical specifications (e.g. protocols) shared between the AUTOSAR platforms.

With the current release, this goal has been pursued once more. Especially in the technical fields of communication security, diagnostics and translation between signal- and service-based communication progress has been made to strengthen the interoperability between Classic and Adaptive Platform.

2.1.1 Concepts

2.1.1.1 Introduced Concepts

The following concepts in [2.1.1.1.2](#) - [2.1.1.1.4](#) have been introduced.

2.1.1.1.1 DoIPExtension

The concept extends the DoIP specification with the possibility to allow diagnostic communication between DoIP nodes and internal testers located within the vehicle network.

2.1.1.1.2 IPsec Protocol

The concept provides the ability to configure authenticated and/or encrypted communication between ECUs based on the the IETF IPsec standards. Since it works on the IP network layer 3, it can be used transparently. Applications need not be changed or even aware that their communication is secured.

2.1.1.1.3 Abstract Platform System Description (VFB++)

The first concept part of "Abstract Platform System Description (VFB++)" is released as draft. The concept will be further elaborated and extended in 2020.

The concept introduces a model of a software platform independent system description (VFB-level communications, requirement annotation, requirement tracing) on an

abstract platform level using the AUTOSAR methodology and meta-model. The abstract platform description should allow an OEM to model the vehicle communications matrix without specifying deployment platform specifics which may be deferred to a later methodology design stage. Using AUTOSAR traceability, it shall be possible to bi-directionally trace between abstract platform and concrete level models.

The principal use cases are targeting AUTOSAR deployments in Classic or Adaptive AUTOSAR. However, deployments to "other" automotive or non-automotive domains should also be possible.

2.1.1.1.4 Signal Service Translation

For End-to-End support (safety) for signal service translation both directions, signal-service-translation and service-signal-translation are covered. This includes use cases where both sides of communication use the same E2E profile as well as uses cases where different E2E profiles are in place. While performing signal service translation the E2E status of the received payload is checked and forwarded to the targeted receiving communication part together with the translated payload.

The general description of this concept can be found in the Release Overviews of the Adaptive Platform [1] and Classic Platform [2].

2.1.1.2 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.
- Specifications in *italic* font are affected indirectly as they provide artefacts for the actually impacted specifications.

Concept Name	Specification Long Name	Standard
DoIPExtension	Requirements on Diagnostics	Foundation
	Specification of Diagnostic over IP	Classic Platform
	System Template	
	Specification of ECU Configuration Parameters (XML)	
	<i>Basic Software UML Model</i>	Adaptive Platform
Specification of Diagnostics		





Concept Name	Specification Long Name	Standard
	Specification of Manifest	
IPsecProtocol	Requirements on IPsec Protocol	Foundation
	Requirements on AUTOSAR Features	Classic Platform
	System Template	
	Requirements on Ethernet Support in AUTOSAR	
	Specification of TCP/IP Stack	
	Specification of Manifest	Adaptive Platform
Abstract Platform System Description (VFB++)	Glossary	Foundation
	Main Requirements	
	Specification of Abstract Platform	Adaptive Platform
Socket Network Binding for ARA:com	Glossary	Foundation
	Specification of Manifest	Adaptive Platform
	Specification of Communication Management	
	Requirements on Communication Management	
	Explanation of ara::com API	
	Explanation of Sensor Interfaces	
	Explanation of Adaptive Platform Design	
Signal Service Translation	Explanation of Foundation Diagram Source	Foundation
	E2E Protocol Specification	
	Main Requirements	
	Glossary	
	General Specification on Transformers	Classic Platform
	<i>Basic Software UML Model</i>	
	Specification of SW-C End-to-End Communication Protection Library	
	Specification of Module E2E Transformer	
	Specification of RTE Software	
	Software Component Template	
	System Template	
	Specification of SOME/IP Transformer	
	Specification of COM Based Transformer	
	Layered Software Architecture	
	Requirements on System Template	
	General Specification on Transformers	
	Requirements on Manifest Specification	
	Specification of Manifest	





Concept Name	Specification Long Name	Standard
	Requirements on Communication Management	
	Specification of Communication Management	

Table 2.1: Impact of Concepts

2.1.2 Specifications

2.1.2.1 New Specifications

- Secure Hardware Extensions (UID 948, TR)
- List of known Issues of Secure Hardware Extensions (UID 971, TR)
- Requirements on IPsec Protocol (UID 970, RS)

2.1.2.2 Migrated Specifications

With this release, the following specifications were moved from Adaptive Platform to the Foundation standard:

- none

With this release, the following specifications were moved from Classic Platform to the Foundation standard:

- Requirements on E2E Communication Protection (UID 651, SRS) to Requirements on E2E (UID 847, RS)

2.1.2.3 Obsolete Specifications

The following specification is set to status "obsolete" in this release:

- none

2.1.2.4 Removed Specifications

The following specification is set to status "removed" in this release:

- none

2.1.2.5 Reworked Specifications

The following documents have been changed fundamentally in R19-11

- none

2.1.2.6 Moved specification parts

The following specification parts have been moved to other documents in R19-11.

2.1.2.6.1 Specification parts moved to RS E2E

- Source: Requirements on E2E Communication Protection (UID 651, SRS)
- Target: Requirements on E2E (UID 847, RS)

SRS_E2E Requirement ID	RS_E2E Requirement ID
SRS_E2E_08540	RS_E2E_08540
SRS_E2E_08538	RS_E2E_08538
SRS_E2E_08528	RS_E2E_08528
SRS_E2E_08527	RS_E2E_08527
SRS_E2E_08529	RS_E2E_08529
SRS_E2E_08530	RS_E2E_08530
SRS_E2E_08531	RS_E2E_08531
SRS_E2E_08533	RS_E2E_08533
SRS_E2E_08534	RS_E2E_08534
SRS_E2E_08536	RS_E2E_08536
SRS_E2E_08537	RS_E2E_08537
SRS_E2E_08539	RS_E2E_08539

2.1.3 Release Documentation

There were no major changes regarding the Release Documentation.

2.2 History information in AUTOSAR

The following diagram shows the location of documentation of changes.

The Change Documentation will be available for Adaptive Platform starting with R20-11.

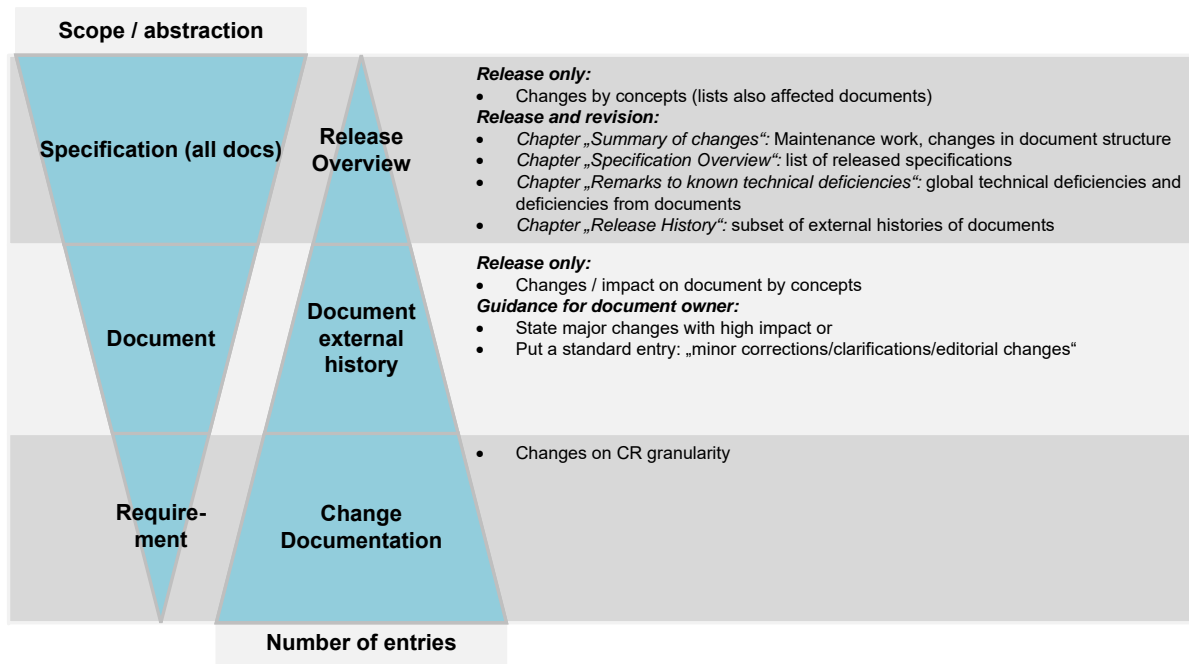


Figure 2.1: History information in AUTOSAR

3 Specification overview

The published specifications are divided into the clusters

- Release Documentation
- General
- Methodology and Templates
- Diagnostics
- Communication Management
- Protocols
- Health Monitoring
- Crypto

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

Long Name	File Name	Life cycle changes
Release Documentation		
Foundation Release Overview	AUTOSAR_TR_FoundationReleaseOverview	
AUTOSAR Foundation Specification Hashes	AUTOSAR_TR_FoundationSpecificationHashes	
General		
Explanation of Foundation Diagram Source	AUTOSAR_EXP_FoundationDiagramSource	
Glossary	AUTOSAR_TR_Glossary	
Main Requirements	AUTOSAR_RS_Main	
Project Objectives	AUTOSAR_RS_ProjectObjectives	
Methodology and Templates		
Requirements on Methodology	AUTOSAR_RS_Methodology	
Diagnostics		
Requirements on Diagnostics	AUTOSAR_RS_Diagnostics	
Communication Management		
Requirements on AUTOSAR Network Management	AUTOSAR_RS_NetworkManagement	
Requirements on Debugging, Tracing and Profiling support of AUTOSAR Components	AUTOSAR_RS_FoundationDebugTraceProfile	
Requirements on E2E	AUTOSAR_RS_E2E	
Requirements on Log and Trace	AUTOSAR_RS_LogAndTrace	
Protocols		
E2E Protocol Specification	AUTOSAR_PRS_E2EProtocol	
Log and Trace Protocol Specification	AUTOSAR_PRS_LogAndTraceProtocol	
Requirements on IPsec Protocol	AUTOSAR_RS_IPsecProtocol	Initial release





Long Name	File Name	Life cycle changes
Requirements on SOME/IP Protocol	AUTOSAR_RS_SOMEIPProtocol	
Requirements on SOME/IP Service Discovery Protocol	AUTOSAR_RS_SOMEIPServiceDiscoveryProtocol	
Requirements on Time Synchronization	AUTOSAR_RS_TimeSync	
SOME/IP Protocol Specification	AUTOSAR_PRS_SOMEIPProtocol	
SOME/IP Service Discovery Protocol Specification	AUTOSAR_PRS_SOMEIPServiceDiscoveryProtocol	
Specification of the AUTOSAR Network Management Protocol	AUTOSAR_PRS_NetworkManagementProtocol	
Time Synchronization Protocol Specification	AUTOSAR_PRS_TimeSyncProtocol	
Health Monitoring		
Requirements on Health Monitoring	AUTOSAR_RS_HealthMonitoring	
Specification of Health Monitoring	AUTOSAR_SWS_HealthMonitoring	
Crypto		
List of known Issues of Secure Hardware Extensions	AUTOSAR_TR_ListOfKnownIssuesSecureHardwareExtensions	Initial release
Secure Hardware Extensions	AUTOSAR_TR_SecureHardwareExtensions	Initial release

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.

There are no additional technical deficiencies to be mentioned in this release.

5 Release history

5.1 Release R19-11

Release R19-11 was originally released on 28 November 2019.

Name	Specification history entry
E2E Protocol Specification	<ul style="list-style-type: none"> • Introduction of Constraints for Client-Server Communication. • Added E2E_PXXForward functionality to provide a mechanism for replicating received E2E Errors. • Incorporated new configuration options for switching between valid and invalid state of E2E-Statemachine. • Fixed interoperability issues between P01 and P11, P02 and P22. • Changed Document Status from Final to published.
Foundation Release Overview	<ul style="list-style-type: none"> • Release Life Cycle Status: R19-11 is in Evolution, R19-11 supersedes R1.5
Glossary	<ul style="list-style-type: none"> • Removed FlexRay specific terms • Added new terms: <ul style="list-style-type: none"> – Secure channel – Abstract Platform – Raw Data Stream – Signal Service Translation • Changed Document Status from Final to published
List of known Issues of Secure Hardware Extensions	<ul style="list-style-type: none"> • Initial release. • This is a republication of "Errata and amendments to SHE v1.1, rev439" from 2009-10-16 applicable to AUTOSAR_TR_SecureHardwareExtensions
Log and Trace Protocol Specification	<ul style="list-style-type: none"> • Added Proposal Usage of LogLevels • Added Recommendation to transmit IDs of arbitrary length • Editorial changes • Changed Document Status from Final to published
Main Requirements	<ul style="list-style-type: none"> • Added requirement from concept VFB++ • Added requirement from concept Signal Service Translation • Changed Document Status from Final to published
Project Objectives	<ul style="list-style-type: none"> • Update of project objectives to reflect AUTOSAR objectives discussed in SC • Changed Document Status from Final to published
Requirements on AUTOSAR Network Management	<ul style="list-style-type: none"> • Editorial changes/clarifications • Changed Document Status from Final to published
Requirements on Debugging, Tracing and Profiling support of AUTOSAR Components	<ul style="list-style-type: none"> • Editorial changes • Changed Document Status from Final to published





Name	Specification history entry
Requirements on Diagnostics	<ul style="list-style-type: none"> • Renamed to RS Diagnostics • New requirements for CP and AP • Changed Document Status from Final to published
Requirements on E2E	<ul style="list-style-type: none"> • Functional requirements: information added • Requirements moved from CP SRS E2E • Changed Document Status from Final to published
Requirements on Health Monitoring	<ul style="list-style-type: none"> • Editorial changes • Changed Document Status from Final to published
Requirements on IPsec Protocol	<ul style="list-style-type: none"> • Initial release
Requirements on Log and Trace	<ul style="list-style-type: none"> • No content changes • Changed Document Status from Final to published
Requirements on Methodology	<ul style="list-style-type: none"> • No content changes • Changed Document Status from Final to published
Requirements on SOME/IP Protocol	<ul style="list-style-type: none"> • No content changes • Changed Document Status from Final to published
Requirements on SOME/IP Service Discovery Protocol	<ul style="list-style-type: none"> • Editorial changes • Changed Document Status from Final to published
Requirements on Time Synchronization	<ul style="list-style-type: none"> • Added Time Validation use case • Changed Document Status from Final to published
Secure Hardware Extensions	<ul style="list-style-type: none"> • Initial release
SOME/IP Protocol Specification	<ul style="list-style-type: none"> • Added <ul style="list-style-type: none"> – Support for unit64 / sint64 – Error-Codes for E2E-Protection • Clarify <ul style="list-style-type: none"> – Serialization of fixed length array data – Support for Data Accumulation feature – Contradicting requirements • Introduce implementsLegacyStringSerialization tag (as successor of implementsSOMEIPStringHandling) • Editorial Changes • Changed Document Status from Final to published
SOME/IP Service Discovery Protocol Specification	<ul style="list-style-type: none"> • Clarify: <ul style="list-style-type: none"> – Startup Behavior (random value) – Service Versioning in VLAN – Load Balancing option behavior – Re-boot Detection • Introduce retry max counter for subscription of Eventgroup • Contradicting requirements improved • Editorial changes • Changed Document Status from Final to published





Name	Specification history entry
Specification of Health Monitoring	<ul style="list-style-type: none"> • Clarifications in specification of supervisions • Deleted parameter "number of instances" from HealthChannel and SupervisedEntity • Removed SWS_HM_00071 • Changed Document Status from Final to published
Specification of the AUTOSAR Network Management Protocol	<ul style="list-style-type: none"> • No content changes • Changed Document Status from Final to published
Time Synchronization Protocol Specification	<ul style="list-style-type: none"> • Clarified SGW value handling for missing Sub-TLVs • Changed Document Status from Final to published

Table 5.1: Release History