Document Title	Adaptive Platform Release Overview
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	782

Document Status	Final
Part of AUTOSAR Standard	Adaptive Platform
Part of Standard Release	18-03
Release Life Cycle Status	Initial Release

Document Change History

Date	Release	Changed by	Change Description
2018-03-29	18-03	AUTOSAR Release Management	Initial release

Table of Contents

1 Introduction

1.1 Scope of this document

This document provides an overview on the AUTOSAR standard Adaptive Platform Release 18-03.

1.2 Dependencies to other standards

This release of the Adaptive Platform depends on the standard Foundation in Release 1.4.0, which

- defines protocols implemented by Adaptive Platform and
- contains the project objectives and the common requirements from which the features of the Adaptive Platform are derived.

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

1.3 Content of chapters

This document is structured as follows:

- Chapter 2 provides an introduction to the Adaptive Platform and its standardization approach.
- Chapter 3 provides a list of documentation references.
- Chapter 4 contains the overview of specifications comprising the Release 18-03. This chapter is structured according to the clusters of AUTOSAR Release 18-03.
- Chapter 5 provides a summary of changes since the previous release of the Adaptive Platform.
- Chapter 6 contains remarks about known technical deficiencies.
- Chapter 7 contains the detailed release history of all released specifications.
- Chapter 8 provides a set of definitions aimed to increase the understanding of the content of this document and the Release 18-03.

2 Introduction to the Adaptive Platform

The AUTOSAR Adaptive Platform is the standardized platform for microprocessor-based ECUs supporting use cases like highly automated driving as well as high speed on-board and off-board communication.

The Adaptive Platform differs in a number of aspects from the standardization approach of the Classic Platform:

- Release strategy
- Parallel validation of specification via software implementation
- Specification of functional clusters instead of modules

2.1 Release strategy

The Adaptive Platform will be in lifecycle state “Development” until October 2018 according to AUTOSAR’s lifecycle model for its standards (see figures 1 and 2). During this time, AUTOSAR will release a new version of the Adaptive Platform in a 6-month cycle. The lifecycle state “Development” implies that users of the Adaptive Platform have no guarantee on backward compatibility. Consequently, all requirements have the lifecycle status *draft*. For items in specifications this attribute is not explicitly set but is the default state.

According to current planning the October 2018 release will end the first major development lifecycle. This release will no longer contain any draft specifications. Additionally this release will be fully synchronized with Classic Platform R4.4.0.

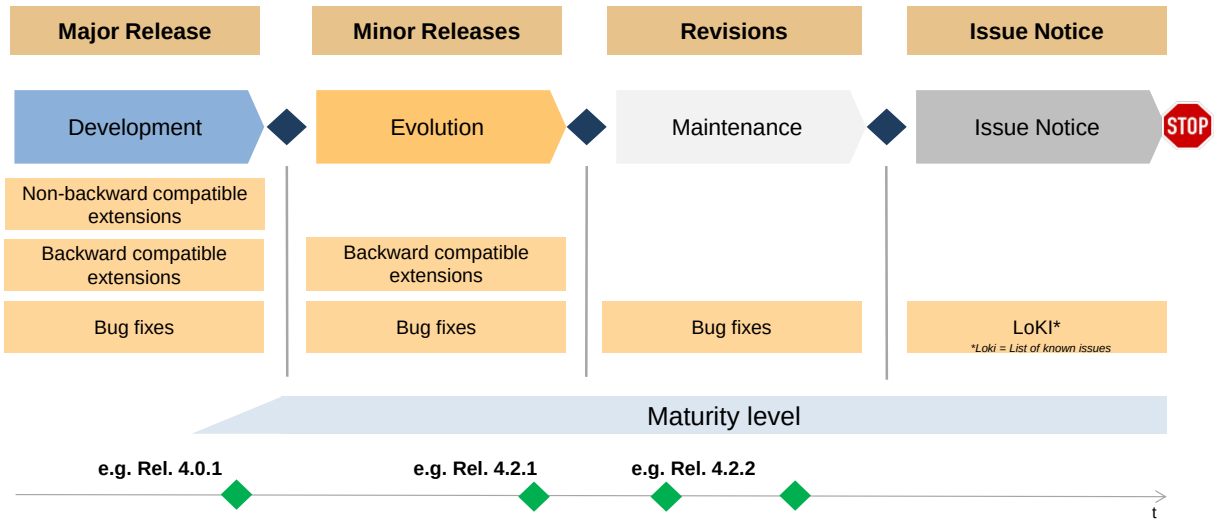

Figure 1: Lifecycle model of AUTOSAR standards and its application to Classic Platform

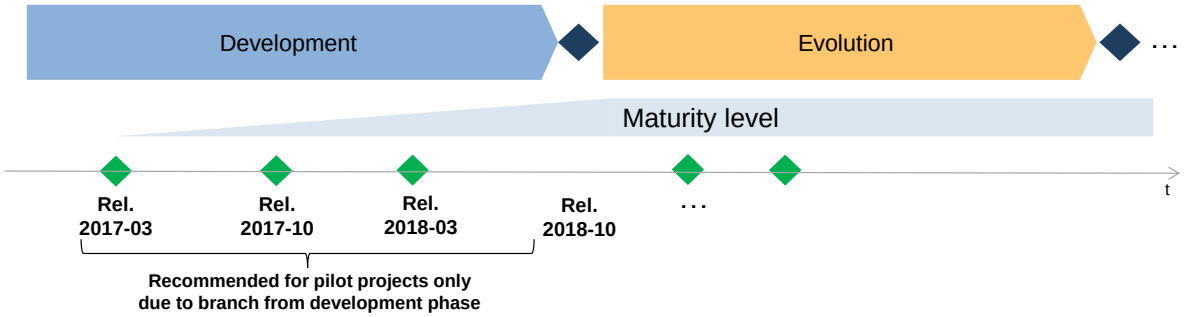

Figure 2: Application of AUTOSAR lifecycle to Adaptive Platform

Apart from the regular specifications that have been elaborated in intensive expert discussion, according to current planning, the releases until March 2018 may comprise draft specifications to indicate the intended scope and direction of discussion to the AUTOSAR development community.

The following must be considered for the draft specifications:

1. Minimal or less quality measures are being applied during development
2. No indication of quality / stability due to a lack of discussions between the AUTOSAR partners

As new features will be added with each release, AUTOSAR encourages the partners to contribute in the development of the features.

2.2 Parallel validation of specification via implementation

The Adaptive Platform is validated through an AUTOSAR-internal implementation: the Adaptive Platform Demonstrator. This Demonstrator is available to all the partners and can be a reference to understand the underlying concepts of the Adaptive Platform. The Demonstrator provides an implementation example based on the specification rather than a reference implementation. All further development based on the Demonstrator will become the responsibility of the respective partner (for legal constraints see the dedicated paragraphs in the Development Agreement).

For the first releases until 18-03, the Demonstrator software implementation has undergone only informal reviews with no strict quality assurance. AUTOSAR plans to increase the quality assurance significantly to ensure the maintainability and extensibility of the Demonstrator software implementation.
The Demonstrator comes with traceability back to the specifications and explanatory documents or the so-called Functional Cluster Design specifications.

The Adaptive Platform source code for 18-03 is meant to be a validation of the released specifications and will therefore be released later than the specifications. The Adaptive Platform software implementation is anticipated to be released latest end of April 2018. The source code baseline will undergo an Open Source Software license scanning and may be subject to change due to potential findings.

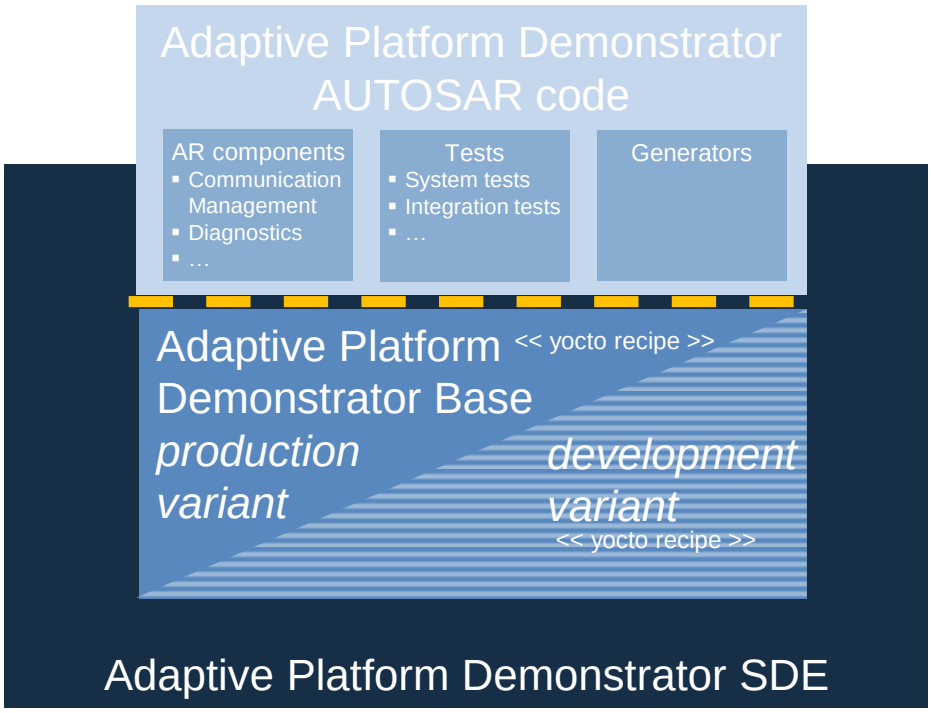

Figure 3: Overview of the AUTOSAR Adaptive Platform Demonstrator

2.3 Specification depth

Based on the development history of the Classic Platform, AUTOSAR has decided to specify functional clusters instead of a specific software architecture to provide the implementers with options to find efficient solutions for the standardized features.

3 Related documentation

[1] AUTOSAR Specifications in general
[2] Change Documentation
[3] Glossary

4 Specification overview

The published specifications are divided into the following clusters:

- Release Documentation
- General
- Methodology and Manifests
- Adaptive Foundation
- Adaptive Services
- Protocols

These clusters are further structured into subcategories to provide better guidance to the specification users. The assignment of specifications to clusters is shown below.

Long Name	File Name	Life cycle changes	Draft Specification
Cluster: Release Documentation			
Adaptive Platform Release Overview	AUTOSAR_TR_AdaptivePlatformReleaseOverview		
AUTOSAR Adaptive Platform Specification Hashes	AUTOSAR_TR_AdaptivePlatformSpecificationHashes		
Cluster: General			
Explanation of Adaptive Platform Design	AUTOSAR_EXP_PlatformDesign		
General Requirements specific to Adaptive Platform	AUTOSAR_RS_General		
General Specification of Adaptive Platform	AUTOSAR_SWS_General		
Guidelines for the use of the C++14 language in critical and safety-related systems	AUTOSAR_RS_CPP14Guidelines		
Design guidelines for using parallel processing technologies on Adaptive Platform	AUTOSAR_EXP_ParallelProcessingGuidelines		X
System Tests of Adaptive Platform	AUTOSAR_TR_AdaptivePlatformSystemTests		
Functional Cluster Shortnames	AUTOSAR_TR_FunctionalClusterShortnames		
Explanation of Safety Overview	AUTOSAR_EXP_SafetyOverview	Initial release	
Specification of Core Types for Adaptive Platform	AUTOSAR_SWS_AdaptiveCoreTypes	Initial release	
Cluster: Methodology and Manifests			
Methodology for Adaptive Platform	AUTOSAR_TR_AdaptiveMethodology		
Requirements on Manifest Specification	AUTOSAR_RS_ManifestSpecification		
Specification of Manifest	AUTOSAR_TPS_ManifestSpecification		

Long Name	File Name	Life cycle changes	Draft Specification
Specification of Platform Types for Adaptive Platform	AUTOSAR_SWS_Adaptive PlatformTypes		
Meta Model	AUTOSAR_MMOD_Meta Model		
Meta Model-generated XML Schema	AUTOSAR_MMOD_XML Schema		
Supplementary material of the AUTOSAR XML Schema	AUTOSAR_TR_XMLSchema Supplement		
Cluster: Adaptive Foundation			
Requirements on Communication Management	AUTOSAR_RS_ CommunicationManagement		
Specification of Communication Management	AUTOSAR_SWS_ CommunicationManagement		
Requirements on Operating System Interface	AUTOSAR_RS_Operating SystemInterface		
Specification of Operating System Interface	AUTOSAR_SWS_Operating SystemInterface		
Requirements on Execution Management	AUTOSAR_RS_Execution Management		
Specification of Execution Management	AUTOSAR_SWS_Execution Management		
Explanation of ara::com API	AUTOSAR_EXP_ARACom API		
Specification of Log and Trace for Adaptive Platform	AUTOSAR_SWS_Adaptive LogAndTrace		
Requirements on Health Management for Adaptive Platform	AUTOSAR_RS_Health Management	Initial release	
Specification of Health Management for Adaptive Platform	AUTOSAR_SWS_Health Management	Initial release	
Requirements on Network Management for Adaptive Platform	AUTOSAR_RS_Adaptive NetworkManagement		
Requirements on Persistency	AUTOSAR_RS_Persistency		
Specification of Persistency	AUTOSAR_SWS_Persistency		
Specification of RESTful Communication	AUTOSAR_SWS_REST		
Requirement on Time Synchronization for Adaptive Platform	AUTOSAR_RS_TimeSync		
Specification of Time Synchronization for Adaptive Platform	AUTOSAR_SWS_TimeSync		
Requirements on Security Management for Adaptive Platform	AUTOSAR_RS_Security Management		
Cluster: Adaptive Services			
Specification of Diagnostics for Adaptive Platform	AUTOSAR_SWS_Adaptive Diagnostics		

Long Name	File Name	Life cycle changes	Draft Specification
Specification of Crypto Interface for Adaptive Platform	AUTOSAR_SWS_AdaptiveCryptoInterface		X
Requirements on Update and Configuration Management	AUTOSAR_RS_UpdateAndConfigManagement		
Specification of Update and Configuration Management	AUTOSAR_SWS_UpdateAndConfigManagement		
Requirements on Cryptography	AUTOSAR_RS_Crypto		X
Specification for Network Management for Adaptive Platform	AUTOSAR_SWS_AdaptiveNetworkManagement	Initial release	
Requirements on Identity and Access Management	AUTOSAR_RS_IdentityAndAccessManagement	Initial release	
Specification of Identity and Access Management	AUTOSAR_SWS_IdentityAndAccessManagement	Initial release	
Cluster: Protocols			
UDP Network Management Protocol Specification	AUTOSAR_PRS_UDPNetworkManagementProtocol		X

All specifications contain requirements which are identified by special braces:
⌈ = Beginning of the requirement content
⌋ = End of the requirement content
In addition, all XML files and schemas are considered as requirements.

5 Summary of changes

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

- Regular maintenance of document.
- New Documents have been created and are released for the first time.
- Documents went through a major rework.

5.1 Release 18-03

In AUTOSAR R18-03 the Adaptive Platform integrates essential new concepts with respect to Network Management, Time Synchronization, Security concepts and Update and Configuration Management.

Additionally newly defined System Tests to test the AUTOSAR Adaptive Platform Demonstrator are part of the release.

Further improvements have been applied to all the specifications that are part of R18-03.

5.1.1 Concepts

No Concepts have been introduced with AP R18-03.

5.1.2 Specifications

5.1.2.1 New Specifications

The following documents and templates were added to the R18-03:

- Explanation of Safety Overview (UID 895, EXP)
- Specification for Network Management for Adaptive Platform (UID 898, SWS)
- Requirements on Identity and Access Management (UID 899, RS)
- Specification of Identity and Access Management (UID 900, SWS)
- Specification of Core Types for Adaptive Platform (UID 903, SWS)
- Requirements on Health Management for Adaptive Platform (UID 852, RS)
- Specification of Health Management for Adaptive Platform (UID 851, SWS)

5.1.2.2 Obsolete Specifications

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

- No specifications were set to “obsolete”.

5.1.2.3 Cancelled Specifications

The following specification is cancelled in this release:

- No specifications were canceled.

5.1.3 Release Documentation

There were no major changes regarding the Release Documentation.

6 Remarks to known technical deficiencies

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

There are the following technical deficiencies which are not related to a particular specification: None

6.1 Known technical deficiencies per document

Document Long Name	Known Limitations

Guidelines for the use of the C++14 language in critical and safety-related systems	• Rule sets for parallel computing and security not provided, yet
	• Traceability to ISO 26262 not provided, yet
	• Not finally analyzed and therefore only partially covered:
	  ○ C++ standard libraries
	  ○ C++ core guidelines

System Tests of Adaptive Platform	• Test cases do not cover all acceptance criteria which are listed in this document • Test setup figure is not exactly the same as test case description • There are multiple ways to corrupt E2E messages. System test description is just one example • Acceptance Criteria ID is not consecutive

Explanation of Safety Overview	• Chapter 5 Functional Safety Concept only drafted and will be updated/reworked for the upcoming release
	• The following chapters are not provided, yet and will be part of upcoming releases:
	  ○ Technical Safety Concept
	  ○ Safety Requirements
	  ○ Validation of Safety requirements

Methodology for Adaptive Platform	• Changes can be expected for Section “Define and Configure Service Instances” • The sections related to the deployment of Software Packages are still under discussion.
Specification of Manifest	• The description of the meta-model functionality for crypto services is under construction and for documentation only

Document Long Name	Known Limitations
Specification of Communication Management	• Currently it is not specified what happens if local buffers are full because the application accesses data slower than they are received over the network. • The E2E communication protection works only for events which are polled and which are transmitted at least once per fault tolerant time interval • E2E-protection of methods is not supported, yet • EndToEndTransformationComSpecProps are not supported. • TLV: ○ The Specification does not support the existence of optional method arguments. • The definition on sender side of which wire type should be used for Complex Data Types is implementation defined.
Specification of Operating System Interface	• There is currently no API to provide periodic time-based processing based on POSIX APIs • Requirements RS_OSI_00201, RS_OSI_00202, RS_OSI_00204 not supported

Specification of Execution Management	• Deterministic Execution Resource Limitation are not complete with respect to properties and formal requirements
	• Error handling within Execution Management will be expanded in a future release
	• The State Management chapter will be moved to an own specification
	• The following functionality within the state management is not specified yet:
	  ○ ECU/VM reset interface
	  ○ Application integrity management
	  ○ Application authentication and authorization
	  ○ Container Support

Requirements on Health Management for Adaptive Platform	• Rationales partially missing, use cases need to be updated, partially. •
Specification of Health Management for Adaptive Platform	• Daisy chaining is currently not supported • Approach to partially use generated code will eventually be modified in future releases • Only a single PHM instance is currently supported. Multiple PHM instances and daisy-chaining of multiple instances is currently not supported • currently no definition of behavior for interaction with these clusters • Transistions between Supervised Entities are not supported by the manifest, yet
Specification of Persistency	• The interpretation of deployment related information in the AUTOSAR model is not yet covered in detail

Document Long Name	Known Limitations
Specification of RESTful Communication	• The interfaces are only specified to the point to make semantics clear • The error handling for RESTful communication is currently limited due to the fact that errors are not reported in the context of a request transmission
Specification of Time Synchronization for Adaptive Platform	• The Time Synchronization module is bound to Adaptive Platform Systems • Time Gateway functionality is currently not in scope of the Time Synchronization module for the Adaptive Platform • Errors, which occurred during Global Time establishment and which are not caused by the module are out of the scope of this module • In the case where the TSP is based on Ethernet, the protocol to be used should be PTP, as defined in Classic Platform. Nevertheless, any assumptions regarding or related to the usage or the existence of static networks should be avoided by any means.
Specification of Diagnostics for Adaptive Platform	• OBD ISO 15031 and WWH OBD ISO 27145 is not supported by the DM • Software Cluster/Diagnostic Server instances are supported by DM interfaces but are not specified in detail • DoIP edge node is not supported by the DM • Not all DoIP payload types supported by the DM • Not all UDS services implemented by the DM • Several UDS services are only supported with the interface GenericUDSService • Sub-functions of UDS services are implemented according to ISO 14229-1 • The UDS mirror event memory is not supported by the DM • The OBD/WWH OBD is not supported by the DM • Security Access: "Delay on boot" mechanism is not supported • Event Memory: Variant handling at runtime for events/DTCs is not supported • Event Memory: User controlled warning indicator bit is not supported • Event Memory: Details for combined events are not specified • Event Memory: Event displacement is not supported. The DM stores for each DTC related data • Event Memory: Interface to read the number of event memory entries is not supported • Event Memory: Internal configuration parameters and DM values as extended data are not supported

Document Long Name	Known Limitations
Specification of Crypto Interface for Adaptive Platform	• There is currently no API available to access secure counter primitives that an implementation may provide • Currently there is only a synchronous API specification and asynchronous behaviormust be implemented by the client • An asynchronous interface requires a specification for managing memory and access to memory (e.g. shared state for std::shared_ptr or std::future). Currently this has to be addressed by the client • Both Crypto APIs don't provide complete support of the X.509 functionality yet. But the Direct Crypto API provides a skeleton of the future X.509 interface that should be extended and completed in the next release
Specification of Update and Configuration Management	• Client application needs to trigger the update process • Client application needs to download the data to target and provide the data to UCM • Communication and dependency management over several ECU is not supported • Configuration to separate different update types such as security or safety critical updates is not supported
Specification for Network Management for Adaptive Platform	• The Adaptive Network Management currently only supports UdpNM • The Adaptive Network Management cannot be configured as the master network coordinator • The Adaptive Network Management does not support coordinated shutdown using the information in CBV • The Adaptive Network Management does not support passive mode and passive startup • The API's described in this specification will be reworked depending on the final solution for the planned State Manager and therefore shall be considered draft • Modelling part for mapping the logical networks to the BitVector positions is not available in the manifest
Specification of Identity and Access Management	• The topic of providing identity information of Adaptive Applications to PEPs is still under discussion. Requirements and specification details regarding Application ID / Application Instance ID and providing application identity in general may be affected by this discussion and may change accordingly. • No complete description of IAM API parameters since the content of the parameters is still under discussion
UDP Network Management Protocol Specification	• One NM instance of UdpNm is associated with only one NM-Cluster in one network. One NM-Cluster can have only one instance of UdpNm in one node. • UdpNm is only applicable for TCP/IP based systems

7 Release history

7.1 Release 18-03

Release 18-03 was originally released on the 29th of March 2018.

Name	Specification history entry
Design guidelines for using parallel processing technologies on Adaptive Platform	• Minor changes
Explanation of Adaptive Platform Design	• Update of logical view of AP architecture. • Addition of Update and Configuration Management, State Management, Time Synchronization, Adaptive Network Management, Identity Access Management, Cryptography, and Core types.
Explanation of ara::com API	• Added Fire&Forget Methods • Minor changes and bugfixes
Explanation of Safety Overview	• Initial release
Functional Cluster Shortnames	• Addition of new Functional Clusters
General Requirements specific to Adaptive Platform	• Text entry for Supporting Material for RS_AP_00111 • Text entry for Supporting Material for RS_AP_00114 only refers now to ISO/IEC 14882 • Description of RS_AP_00115 revised • Description of RS_AP_00116, RS_AP_00117, RS_AP_00118, RS_AP_00120, RS_AP_00121, RS_AP_00124, RS_AP_00125 revised (in general "all ara libraries" changed to "all functional clusters").
General Specification of Adaptive Platform	• Description and supporting material changed for SWS_AP_00001 and SWS_AP_00002
Guidelines for the use of the C++14 language in critical and safety-related systems	• New rules resulting from the analysis of JSF, HIC, CERT, C++ Core Guideline • Improvements of already existing rules • Covered smart pointers usage • Reworked checked/unchecked exception definitions and rules
Methodology for Adaptive Platform	• Split of machine design and machine configuration • Added diagnostic mapping • Added roles • Review of section on deployment of Software Packages
Requirement on Time Synchronization for Adaptive Platform	• Minor changes and bugfixes
Requirements on Communication Management	• Automatic Reconnection of Proxies • E2E Protection of Methods • REST Network Binding • Minor changes and bugfixes
Requirements on Cryptography	• Existing requirements are corrected • Additional requirements are added
Requirements on Execution Management	• Minor changes

Name	Specification history entry
Requirements on Health Management for Adaptive Platform	• Initial release
Requirements on Identity and Access Management	• Initial release
Requirements on Manifest Specification	Added requirements for • Configuration of logging and tracing • Time Synchronization • DDS • Configuration of function groups
Requirements on Network Management for Adaptive Platform	• Minor changes and bugfixes
Requirements on Operating System Interface	• Removed: RS_OSI_00101, RS_OSI_00200 and RS_OSI_00205. • Added: [RS_OSI_00103].
Requirements on Persistency	• Added requirement on configuration • Removed requirement on authorization
Requirements on Security Management for Adaptive Platform	• Moved the Identity and Access chapter into RS Identity and Access Management (899)
Requirements on Update and Configuration Management	• Requirements on Software Updates • Requirements on Data Transfer • Requirements on Version Reporting • Requirements on Validation
Specification for Adaptive Network Management for Adaptive Platform	• Initial release
Specification of Communication Management	• DDS Network Binding • Datatype Namespaces changed • E2E Protected Methods • Automatic Reconnection of Proxies • Minor changes and bugfixes
Specification of Core Types for Adaptive Platform	• Initial release
Specification of Crypto Interface for Adaptive Platform	• Crypto API introduced at previous release is renamed to Modeled API, chapter 7 is updated • Added specification of additional Direct Crypto API (chapter 9)
Specification of Diagnostics for Adaptive Platform	• Chapter 7.1. Software Cluster added • Chapter 7.2. Diagnostic Service Management, common parts for all services separated • Chapter 7.3. Event Management, several additions and rework • Chapter 8. API specification, complete rework
Specification of Execution Management	• Deterministic Execution • Resource Limitation • State Management • Fault Tolerance elaboration

Name	Specification history entry
Specification of Health Management for Adaptive Platform	• Initial release
Specification of Identity and Access Management	• Initial release
Specification of Log and Trace for Adaptive Platform	• Refactoring and editorial changes • Log and Trace extensions added
Specification of Manifest	• Time Synchronization • DDS Deployment
Specification of Operating System Interface	• Minor changes
Specification of Persistency	• Installation/update of persistent data • Data types supported by KeyValueStorage API
Specification of Platform Types for Adaptive Platform	• Editorial changes
Specification of RESTful communication	• Added HTTP/JSON network binding • Added support for payload compression • Adapted Event API • Added support for binary data • Minor extensions on API (e.g. helper functions)
Specification of Time Synchronization for Adaptive Platform	• Class design changed to ensure type safety • API related sections moved from chapter 7 to chapter 8 • Minor changes and bugfixes
Specification of Update and Configuration Management	• Extended and updated service interface • Introduction of Software Package • Introduction to securing update process
System Tests of Adaptive Platform	• Test case for RESTful communication is added • Test case for Security is added • Test case for Update and configuration management is added • Test case for E2E is added
UDP Network Management Protocol Specification	• No content changes

8 Appendix

8.1 Definitions

See [3] for AUTOSAR definitions.

8.1.1 Release number

AUTOSAR applies a four-digit numbering scheme Ryy-mm to identify releases.

- yy = year
- mm = month

8.1.2 Specification item and requirement life cycle states

Specification items: The life cycle state is 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.
- **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 obsolete and will be removed in the next release.

If there is no life cycle state information stated then the state is Valid.

Requirements: The requirement attribute “type” indicates the life cycle state of the requirement. The states are the same as the specification item states.