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1 Introduction

1.1 Scope of this document

This document provides an overview on the AUTOSAR standard “Adaptive Platform” release “17-10”.

1.2 Dependencies to other standards

This release of the Adaptive Platform depends on the standard “Foundation” in Release 1.2.0, 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 17-10. This chapter is structured according to the clusters of AUTOSAR Release 17-10.
- 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 17-10.

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 “Development” mode 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.

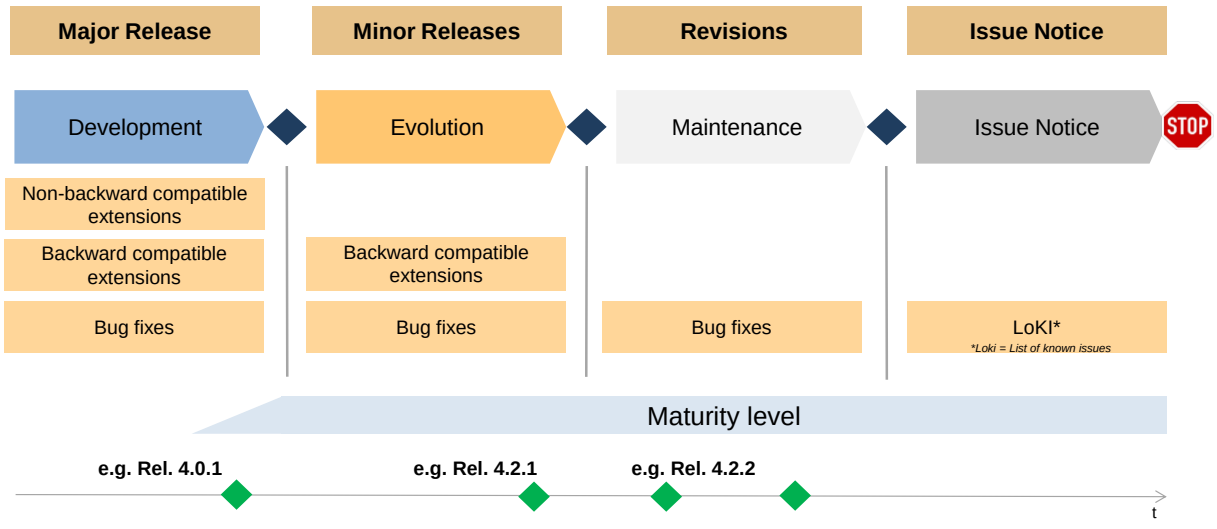

Figure 1: Lifecycle model of AUTOSAR standards and its application to Classic Platform

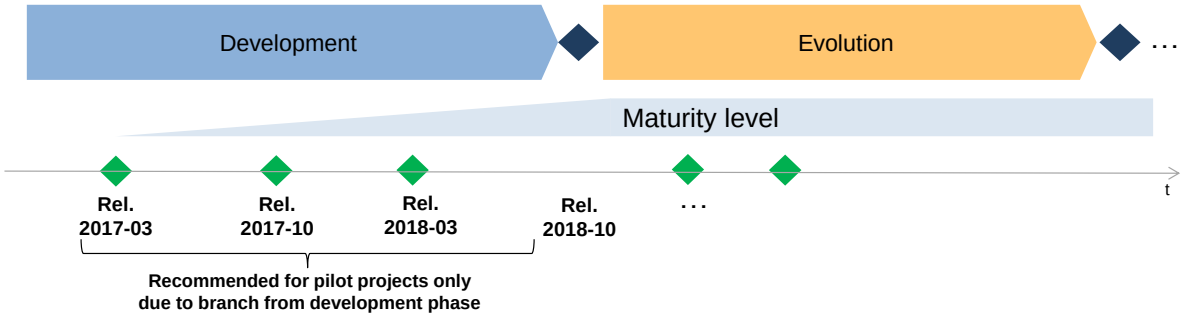

Figure 2: Application of AUTOSAR lifecycle to Adaptive Platform

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 two releases 17-03 and 17-10, 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 17-10 is frozen but still needs clearance regarding obeying the licenses of the Open Source Software being part of the Adaptive Platform source code. The Adaptive Platform software implementation is anticipated to be released latest end of November 2017. The source code baseline will undergo an Open Source Software license scanning and may be subject to change due to potential findings.

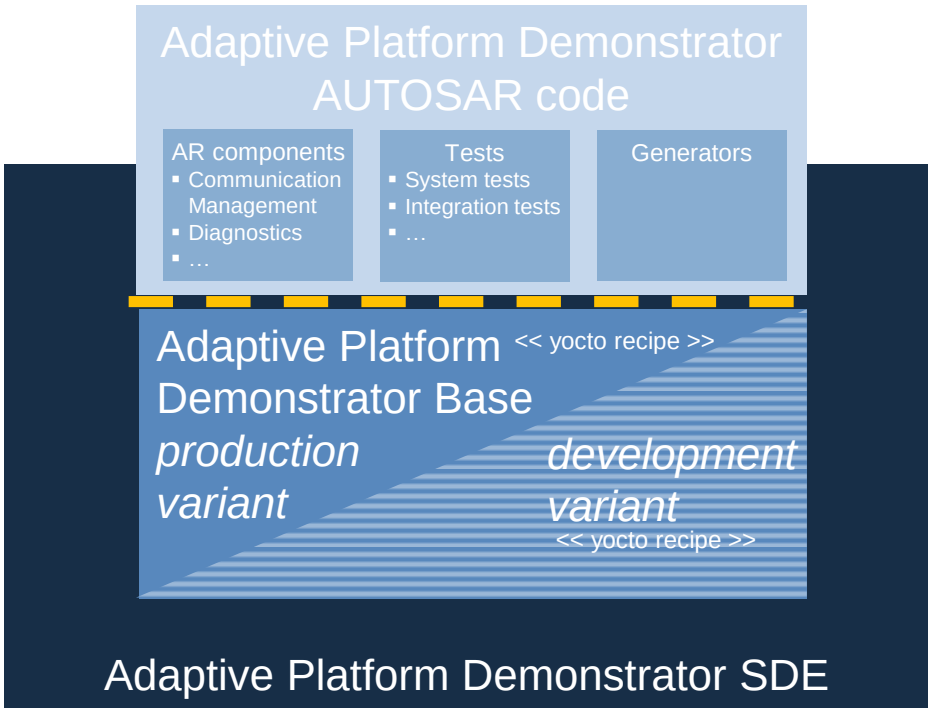

Figure 3: Overview of the AUTOSAR Adaptive Platform Demonstrator

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	Initial release	X
System Tests of Adaptive Platform	AUTOSAR_TR_AdaptivePlatformSystemTests	Initial release	X
Functional Cluster Shortnames	AUTOSAR_TR_FunctionalClusterShortnames		
Cluster: Methodology and Manifests			
Methodology for Adaptive Platform	AUTOSAR_TR_AdaptiveMethodology		
Requirements on Manifest Specification	AUTOSAR_RS_ManifestSpecification		
Specification of Manifest	AUTOSAR_TPS_ManifestSpecification		
Specification of Platform Types for Adaptive Platform	AUTOSAR_SWS_AdaptivePlatformTypes	Initial release	
Meta Model	AUTOSAR_MMOD_MetaModel		

Long Name	File Name	Life cycle changes	Draft Specification
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 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	Initial release	
Requirement on Time Synchronization for Adaptive Platform	AUTOSAR_RS_TimeSync	Initial release	
Specification of Time Synchronization for Adaptive Platform	AUTOSAR_SWS_TimeSync	Initial release	
Requirements on Security Management for Adaptive Platform	AUTOSAR_RS_Security Management		
Cluster: Adaptive Services			
Specification of Diagnostics for Adaptive Platform	AUTOSAR_SWS_Adaptive Diagnostics		
Specification of Crypto Interface for Adaptive Platform	AUTOSAR_SWS_Adaptive CryptoInterface	Initial release	X
Requirements on Update and Configuration Management	AUTOSAR_RS_UpdateAnd ConfigManagement	Initial release	X
Specification of Update and Configuration Management	AUTOSAR_SWS_UpdateAnd ConfigManagement	Initial release	X
Requirements on Cryptography	AUTOSAR_RS_Crypto	Initial release	X

Long Name	File Name	Life cycle changes	Draft Specification
Cluster: Protocols			
UDP Network Management Protocol Specification	AUTOSAR_PRS_UDPNetworkManagementProtocol	Initial release	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 first time released.
- Documents went through a major rework.

5.1 Release 17-10

In AUTOSAR R17-10 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 R17-03.

5.1.1 Concepts

No Concepts have been introduced with AP R17-10.

5.1.2 Specifications

5.1.2.1 New Specifications

In addition to the above listed new specifications which were introduced via Concepts, the following documents and templates were added to the R17-10:

- UDPNetworkManagement Protocol Specification (UID 856, PRS)
- Requirement on Time Synchronization for Adaptive Platform (UID 879, RS)
- Specification of Time Synchronization for Adaptive Platform (UID 880, SWS)
- Requirements on Security Management for Adaptive Platform (UID 881, RS)
- Requirements on Cryptography (UID 889, RS)
- Specification of Crypto Interface for Adaptive Platform (UDI 883, SWS)
- Requirements on Update and Configuration Management (UID 887, RS)
- Specification of Update and Configuration Management (UID 888, SWS)
- System Tests of Adaptive Platform (UID 890, TR): The System Test specification is released as Technical Report in this release since it is an initial specification. With further specification depth the specification type will change in upcoming releases.

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:

- Requirements on Log and Trace for Adaptive Platform (UID 864, RS)

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	• Analysis and traceability to HIC, CERT, JSF and CPP Core guidelines not completed
	• No explicit rules for
	  ○ Standard libs
	  ○ Parallel computing
	  ○ Security

Specification of Communication Management	• No support of SubscriptionState • No error handling in case of Local Buffer Overruns • E2E only for periodic communication • No support of optional method arguments
Specification of Execution Management	The following functionality is mentioned within the specification but is not fully specified in this release: • Appendix A details requirements from Execution Management Requirement Specification that are not elaborated within this specification. The presence of these requirements in this document ensures that the requirement tracing is complete and also provides an indication of how Execution Management will evolve in future releases of the Adaptive Platform. • Resource limitation and deterministic execution will be expanded with more properties and formal requirements (see 7.7 and 7.8 of specification). • ECU/VM reset needs more clarification. • Error handling and timeout is not finished and will be expanded.
Specification of Operating System Interface	The following functionality is mentioned within the specification but is not fully specified in this release: • RS_OSI_00201 • RS_OSI_00202 • RS_OSI_00203 • RS_OSI_00204

Document Long Name	Known Limitations

Specification of Diagnostics for Adaptive Platform	• OBD ISO 15031 and WWH OBD ISO 27145 is not supported by the DM
	• DM interfaces supports Software Cluster/Diagnostic Server instances but are not specified in detail
	• DM does not support DoIP edge node
	• DM does not support all payload types
	• DM does not support all UDS services
	• Security Access: "Delay on boot" mechanism is not supported
	• Event memory:
	  ○ Variant handling at runtime for events/DTCs is not supported.
	  ○ User controlled warning indicator bit is not supported.
	  ○ Details for combined events are not specified.
	  ○ Event displacement is not supported. The DM stores for each DTC related data.
	  ○ Interface to read the number of event memory entries is not supported.
	  ○ Internal configuration parameters and DM values as extended data are not supported.

Specification of LogAndTrace for Adaptive Platform	• none
Specification of Persistency	• There is no possibility to model AUTOSAR data types for storage in Persistency. As a result with the methods offered by Persistency it is not possible to store Non-POD-types without a serialization algorithm implemented in the application • The interpretation of deployment related information in the AUTOSAR model is not yet covered in detail in this specification.
Methodology for Adaptive Platform	• Diagnostics use cases are not described • Key management use cases are not described • Only fundamental description of software update by means of SoftwareClusters • Roles are not modeled
Specification of Manifest	• The Specification of RESTful Communication for Adaptive Platform defines a low-level API for REST- based communication. The content of this specification, on the other hand, applies for the configuration of a not-yet standardized API on top of the ara::rest API • Interaction between an Application and Platform Modules is still under discussion

Document Long Name	Known Limitations
Specification of Update and Configuration Management	• Management of application life cycle during update process isn't addressed in this release. Currently it is the responsibility of the Adaptive Application triggering the update process • The UCM receives a locally available software package for processing. The software package is downloaded by another application, i.e. there is no ara::com interface for transferring software packages directly to the UCM • No security aspects are considered yet • Validation requirements, IE what to validate and what information is required to perform validations are not considered in this release • Meta-data, configuration data or manifests contained inside a Software Package is mentioned in many places in this document. This is to showcase where such information will be stored for implementers, however the form or content of this meta-data are not considered in this release • A rollback to a stable version of the platform is not yet considered in this specification.
UDPNetworkManagement Protocol Specification	• One 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.
Specification of RESTful Communication	• No metamodel configuration exists • Interfaces are only specified to the point to make semantics clear, no full C++ semantics yet (e.g. exceptions are missing)
Specification of Time Synchronization for Adaptive Platform	• The Time Synchronization module is bound to Adaptive Platform Systems • For the Time Synchronization, it is necessary that at least there is one Time Base Resource in the system, otherwise no functionality can be provided to the Adaptive Application

Specification of Crypto Interface for Adaptive Platform	• There is currently no API available to access secure counter primitives that an implementation may provide
	• The following functionality is required but not worked out currently:
	  ○ Asynchronous interface
	  ○ Memory management

Design guidelines for using parallel processing technologies on Adaptive Platform	• The approach taken with the guidelines is to specify the recommended design pattern to embrace various existing parallelization technologies
System Tests of Adaptive Platform	• Test cases for communication management end execution management are not specifically evaluated yet in system test implementation

7 Release history

7.1 Release 17-10

Release 17-10 was originally released on the 27th of October 2017.

Name	Specification history entry
Design guidelines for using parallel processing technologies on Adaptive Platform	• Initial release
Explanation of Adaptive Platform Design	• Added RESTful Communication
Explanation of ara::com API	• Added explanation of TLV • Minor changes and bugfixes
Functional Cluster Shortnames	• Addition of new Functional Clusters
General Requirements specific to Adaptive Platform	• Minor fixes
General Specification of Adaptive Platform	• Minor fixes
Guidelines for the use of the C++14 language in critical and safety-related systems	• Updated traceability for HIC, CERT, • C++ Core Guideline • Partially included MISRA review of the 2017-03 release • Changes and fixes for existing rules, more details in the Changelog (C.1)
Methodology for Adaptive Platform	• Design of service oriented communication between CP and AP • Design of signal oriented communication between CP and AP • Deployment by means of SoftwareCluster • Removed concept of TransportLayerIndependentInstanceId
Requirement on Time Synchronization for Adaptive Platform	• Initial release
Requirements on Communication Management	• Introduction of Fields • Introduction of E2E protected communication • Introduction of RESTful communication • Queuing of events • Minor changes and bugfixes
Requirements on Cryptography	• Initial release
Requirements on Execution Management	• Minor changes, document clean up
Requirements on Manifest Specification	• Added requirements for - Software Component System Design - Security and Safety - Signal-based communication - REST

Name	Specification history entry
Requirements on Network Management for Adaptive Platform	• Initial release
Requirements on Operating System Interface	• Minor changes, document clean up
Requirements on Persistency	• Requirements on Secure Storage • Requirements on Safe Storage
Requirements on Security Management for Adaptive Platform	• Initial release
Requirements on Update and Configuration Management	• Initial release
Specification of Communication Management	• Introduction of Fields • Introduction of E2E protected communication • Introduction of TLV • Improved specification of SOME/IP functional behavior • Minor changes and bugfixes
Specification of Crypto Interface for Adaptive Platform	• Initial release
Specification of Diagnostics for Adaptive Platform	• General API rework • TP Plug-in interface • Introduction of SoftwareCluster in APIs • Additional UDS services like SecurityAccess
Specification of Execution Management	• State Management elaboration, introduction of Function Groups • Recovery actions for Platform Health Management • Resource limitation and deterministic execution
Specification of Log and Trace for Adaptive Platform	• No content changes
Specification of Manifest	• Optional elements in Service Interfaces • Interaction with web services • Secure Communication • Support for interaction with crypto and persistency • Signal-to-Service translation • Support for E2E communication • Platform Health Management • Uploadable Software Package
Specification of Operating System Interface	• Minor changes, document clean up
Specification of Persistency	• Introduction of AUTOSAR model • Security added • Redundancy added • Rework of FileProxy/Stream API

Name	Specification history entry
Specification of Platform Types for Adaptive Platform	• Initial release
Specification of RESTful Communication	• Initial release
Specification of Time Synchronization for Adaptive Platform	• Initial release
Specification of Update and Configuration Management	• Initial release
System Tests of Adaptive Platform	• Initial release
UDP Network Management Protocol Specification	• Initial release

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.