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1 Introduction

1.1 Scope of this document

This document provides an overview of the complement of AUTOSAR specifications of the AUTOSAR standard “Foundation” comprising the Release 1.1.0 and its latest Revision 0.

1.2 AUTOSAR standards

1.2.1 Introduction

AUTOSAR addresses with its standards a wide range of use cases in automotive software development. 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
- 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 specification
- source code
- other formal or semi-formal textual formats (e.g. ARXML, UML models, XML Schemata)

Each AUTOSAR Standard has its own release schedule. At the time of release, AUTOSAR ensures that the dependencies are fulfilled when a standard depends on another.

1.2.3 Overview on AUTOSAR’s standards

AUTOSAR delivers the following standards:

Cluster / Standard	Abbreviation
Classic Platform	CP
Acceptance Tests for Classic Platform	TC
Adaptive Platform	AP
Foundation	FO

1.2.3.1 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.

1.2.3.2 Classic Platform

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

1.2.3.3 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.

1.2.3.4 Acceptance Tests for Classic Platform

The standard Acceptance Tests for the Classic Platform provides a compilation of test cases to support acceptance testing for a wide range of features of implementations of the Classic Platform.

1.2.4 Dependencies between Standards

Each release of Classic, Adaptive Platform or Acceptance Tests relies on a dedicated version of Foundation. The specific dependency is documented in the release overview of the respective standard.

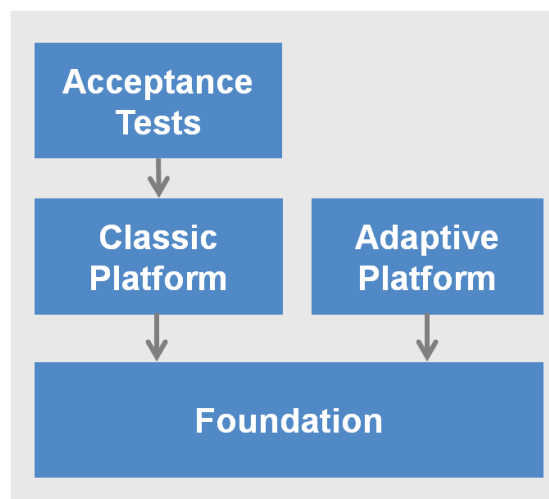


Figure 1: Dependencies of AUTOSAR Standards

1.3 Content of chapters

This document is structured as follows:

- Chapter 2 provides a list of documentation references.
- Chapter 3 provides a summary of changes e.g. in case a document has been migrated from another standard like the Classic Platform.
- Chapter 4 contains the overview of specifications comprising the AUTOSAR Foundation Release 1.1.0 in its latest Revision 0. This chapter is structured according to the clusters being in use in AUTOSAR Foundation Release 1.1.0.
- Chapter 5 contains remarks about known technical deficiencies.
- Chapter 6 contains the detailed revision history of all released specifications
- Chapter 7.1 provides a set of definitions aimed to increase the understanding of the content of this document and the AUTOSAR Foundation Release 1.1.0.

2 Related documentation

- 1) AUTOSAR Specifications in general
- 2) Change Documentation
- 3) Glossary

3 Summary of changes

This chapter contains a summary of changes which were implemented. This can have the following sources:

- Regular maintenance of document
- Documents have been migrated from the Classic Platform R4.3.0 or Adaptive Platform to the Foundation New Documents have been created and are first time released.
- Documents went through a major rework

3.1 Release 1.1.0

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

With the current Release, this goal has been pursued once more. Foundation contains common requirements and technical specifications (e.g. protocols) shared between the AUTOSAR platforms.

3.1.1 Concepts

No Concepts have been introduced with FO R1.1.0.

3.1.2 Specifications

3.1.2.1 New Specifications

No new specifications have been introduced with FO R1.1.0

3.1.3 Migrated Specifications

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

- Requirements on Methodology (UID 362, RS)

3.1.3.1 Obsolete Specifications

No specifications were set to “obsolete”.

3.1.3.2 Reworked specifications

The following specifications have been reworked:

- **Glossary (UID 055, TR):** Major rework (introduction of additional terms from AP and review of existing definitions; formal clean-up)
- **Main Requirements (UID 054, RS):** Introduction of additional main requirements following needs of the Adaptive Platform

- **Requirements on Diagnostic (UID 004, SRS):** Merge with requirements from Adaptive Platform; restructuring
- **Requirements on Methodology (UID 362, RS):** The Requirements from the Classic Platform also applicable to the Adaptive Platform as well as new requirements for Adaptive Platform added.
- **SOME/IP Protocol Specification (UID 696, PRS):** The "support for serialization of extensible data structures" has been introduced - which SOME/IP serializers based on AUTOSAR Foundation R 1.0.0 (AUTOSAR Classic Platform R4.3.0) cannot process.

4 Specification overview

The published specifications are divided up into the following clusters:

- Release Documentation,
- General,
- Diagnostics,
- Methodology and Templates,
- Protocols.

These clusters are then further structured by subcategories to provide a better orientation to the specification users. The assignment of the specifications to those clusters is shown below.

Long Name	File Name	Life cycle changes
Cluster: Release Documentation		
Foundation Release Overview	AUTOSAR_TR_FoundationReleaseOverview	
AUTOSAR Foundation Specification Hashes	AUTOSAR_TR_FoundationSpecificationHashes	
Cluster: General		
Main Requirements	AUTOSAR_RS_Main	
Project Objectives	AUTOSAR_RS_ProjectObjectives	
Glossary	AUTOSAR_TR_Glossary	
Cluster: Diagnostics		
Requirements on Diagnostic	AUTOSAR_SRS_Diagnostic	
Cluster: Methodology And Templates		
Requirements on Methodology	AUTOSAR_RS_Methodology	Migrated from standard CP
Cluster: Protocols		
SOME/IP Protocol Specification	AUTOSAR_PRS_SOMEIPProtocol	
Logging and Tracing Protocol Specification	AUTOSAR_PRS_LogAndTraceProtocol	
Requirements on SOME/IP Protocol	AUTOSAR_RS_SOMEIPProtocol	
Requirements on SOME/IP Service Discovery Protocol	AUTOSAR_RS_SOMEIPServiceDiscoveryProtocol	
SOME/IP Service Discovery Protocol Specification	AUTOSAR_PRS_SOMEIPServiceDiscoveryProtocol	
Remote Event Communication Protocol Specification	AUTOSAR_PRS_RemoteEventCommunicationProtocol	

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 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 to be mentioned which are not related to a specific specification:

- **Requirements on Diagnostics (UID 004):** Requirements will be further aligned between Classic and Adaptive Platform with next release (e.g. further harmonization of more common terms). Additionally "Default Error Tracer" (DET) will not part of next foundation release, because it is only relevant for Classic Platform.
- **Requirements on Methodology (UID 362, RS):** Requirements which are valid for the Classic Platform only will be added with the next release.
- **SOME/IP Protocol Specification (UID 696, PRS):** The "support for serialization of extensible data structures" has been introduced but not validated for compatibility with Classic Platform yet. Therefore this feature is draft and might be subject to change.

6 Revision history

6.1 Release 1.1.0

Revision 0 of Release 1.1.0 has been released on the 31st of March 2017. The following deliverables had major changes.

Name	Specification history entry
Glossary	Added terms: <ul style="list-style-type: none"> - Adaptability - Adaptive Application - Adaptive Platform Foundation - Adaptive Platform Services - ASIL Decomposition - Audit - AUTOSAR Adaptive Platform - AUTOSAR Runtime for Adaptive Applications - Cascaded Switch - Cascading Failure - Classic Platform - Common Cause Failure - Dependent Failures - Diagnostic Coverage - Diversity - Ethernet Switch Port Groups - Executable - External Port - Failure Mode - Fault Reaction Time - Fault Tolerant Time Interval - Freedom from Interference - Functional Cluster - Functional Safety Concept - Functional Safety Requirement - Host ECU - Host Port - Hypervisor - Independence - Independent Failures - Internal Port - Link State Accumulation - Machine - Manifest - Master Switch - Microcontroller - Performance - Plausibility - Predictability - Proven In Use Argument - Recovery - Safe State - Safety Case

Name	Specification history entry
Glossary	<ul style="list-style-type: none"> - Safety Goal - Safety Measure - Safety Mechanism - Service Discovery - Service Instance - Service Interface - Service Oriented Communication - Service Proxy - Service Skeleton - Slave Switch - Software package - Software Unit - Systematic Fault - Uplink Port - Virtualization Removed terms: - Accreditation Body - Accreditation - Attestation Conformance Declaration - Conformance Test Agency (CTA) - First party - Implementation Conformance Statement - Interrupt Logic - Partial Model - Surveillance - Third party Changed terms: - Automotive Safety Integrity Levels - Availability - Acceptance Test Suite - Electronic Control Unit - Error - Fail-safe - Fail-silent - Failure Rate - Failure - Fault Tolerance - Fault - FlexRay Bus - FlexRay Cycle - FlexRay L-PDU-Identifier - FlexRay L-SDU-Identifier - FlexRay Matrix - FlexRay Slot Multiplexing - Graceful Degradation - Fail-degraded - Implementation Conformance Class 1 (ICC1) - Implementation Conformance Class 2 (ICC2) - Implementation Conformance Class 3 (ICC3) - Link Time Configuration - Partitioning - Protocol Control Information - Protocol Data Unit

Name	Specification history entry
	<ul style="list-style-type: none"> - Post-build Time Configuration - Pre-Compile Time Configuration - Probability of Failure - Redundancy - Risk - Safety - Service Data Unit
Log and Trace Protocol Specification	<ul style="list-style-type: none"> - Added requirement for the header format (Big-endian)
Main Requirements	<ul style="list-style-type: none"> - Introduced RS Methodology requirements - Introduced RS Communication Management requirements - Editorial review for AP and CP application - Added service oriented communication requirements
Project Objectives	<ul style="list-style-type: none"> - Editorial changes
Remote Event Communication Protocol Specification	<ul style="list-style-type: none"> - Editorial changes
Requirements on Diagnostic	<ul style="list-style-type: none"> - Merge and alignment with AP requirements - Restructured chapter 4 - Removed reference to HIS
Requirements on Methodology	<ul style="list-style-type: none"> - Migration of document to standard "Foundation" – - Only those requirements from Classic Platform incorporated which apply to Adaptive Platform as well - New requirements for Adaptive Platform added
Requirements on SOME/IP Protocol	<ul style="list-style-type: none"> - Added requirement for Serialization of Structured Datatypes and Arguments with Identifier and optional members
Requirements on SOME/IP Service Discovery Protocol	<ul style="list-style-type: none"> - Editorial changes
SOME/IP Protocol Specification	<ul style="list-style-type: none"> - Serialization of Structured Datatypes and Arguments with Identifier and optional members
SOME/IP Service Discovery Protocol Specification	<ul style="list-style-type: none"> - Configuration Parameters SD_PORT and SD_MULTICAST_IP are added and defined - Rules relating to Options are reordered

7 Appendix

7.1 Definitions

As far as not explained in this chapter, a collection of AUTOSAR definitions is provided in 1).

7.1.1 Release number

AUTOSAR applies a two-digit numbering scheme Rx.y to identify Releases. Its primary purpose is to identify a Release as a major (upgrade, can contain non-backward-compatible extensions) or as minor (update, backward compatible extensions) Release. Referring to previous Releases (e.g. R2.0), incrementing the first digit “x” does identify a Release as major, whereas incrementing “y” will mark a Release as only minor by nature.

7.1.2 Revision number

The Revision Number was first time introduced with Release 2.1 and extends the Release Numbering scheme as explained in section 7.1.1. Combined with the Release Number, the Revision Number shall:

- 1) Precisely identify the actual content (set of specifications) of a given Release.
- 2) As depicted in every specification, precisely identify a given specification (with its unique name and three-digit version ID) as being part of the Release.

Item 1) addresses the fact that the set of specifications comprising a Release (in the meaning of a baseline) is rarely established once at a certain point in time (“Big Bang”), but rather evolves and/or varies over a certain timeframe. The maximum duration, which is limited by the timeframe, a Release is declared as “valid” by the AUTOSAR Partnership (see section 7.1.3).

Hence with Item 1), a major prerequisite will be put in place to enable the Standard Maintenance as planned by the AUTOSAR Partnership. In general, the primary objective is to avoid the provision of an additional – previously not planned – Release in case only one or a few specifications were to be modified as part of the Standard Maintenance. Conversely, without the application of a Revision Number, if the AUTOSAR partnership wants to avoid the provision of (an) additional intermediate Release(s), one would have to defer the introduction of any changes until the next planned Release – even in case of changes urgently needed by the applicants of the AUTOSAR Standard.

Item 2) is complementary to Item 1) in that for every specification a unique identifier is provided upon which Revision a) a specification was either 1st time added to/removed from a Release or b) a specification was modified as being part of one and the same Release, as long the latter is valid and therefore subject to Standard Maintenance.

Hence with item 2), the combination of Release and Revision Number in a specification can be interpreted either as a) “specification was (1st time) added to the Release x.y Rev n” or b) as “specification was modified as part of Release x.y Rev m”, with $m > n$.

Conversely, the Revision number will only change for specifications subject to addition or modification of a valid Release (baseline). After their 1st time addition to the Release (baseline), it will not change for specifications which are not modified.

In the light of the above provided background, as an additional remark, the Revision Number will only be applied for each specification’s Release version, i.e. it will not be applied to working versions.

7.1.3 Release life cycle of a major release

Each major release goes through four consecutive steps within its lifecycle:

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 contents 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.

7.1.4 Specification item and requirement life cycle states

Specification items: After the specification item ID the life cycle state follows in curly brackets. The allowed values are possible:

- **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 introduced newly but still experimental. This information is published but is subject to be changed without backward compatibility management.
- **Obsolete:** This indicates that the related entity is obsolete and will be removed with the next release.

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

Requirements: The requirement attribute „type“ holds the life cycle state of the requirement. The values and meanings are the same as of the specification Items.

7.1.5 History information in AUTOSAR

The following diagram shows where which changes are documented.

