Document Title	Requirements of State Management
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	909

Document Status	published
Part of AUTOSAR Standard	Adaptive Platform
Part of Standard Release	R19-11

Document Change History

Date	Release	Changed by	Description
2019-11-28	R19-11	AUTOSAR Release Management	• No content changes • Changed Document Status from Final to published
2019-03-29	19-03	AUTOSAR Release Management	• Updated requirements due to reworked intended design
2018-10-31	18-10	AUTOSAR Release Management	• Initial release

Disclaimer

Table of Contents

1 Scope of Document

This document specifies requirements on State Management. State Management implements interfaces of State Manager on the AUTOSAR Adaptive Platform, because State Management is highly project specific and therefor to be implemented by the project itself.

1.1 Document Conventions

The representation of requirements in AUTOSAR documents follows the table specified in [TPS_STDT_00078], see Standardization Template, chapter Support for Traceability ([1]).

The verbal forms for the expression of obligation specified in [TPS_STDT_00053] shall be used to indicate requirements, see Standardization Template, chapter Support for Traceability ([1]).

2 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations relevant to the State Management module that are not included in the AUTOSAR glossary[2].

Terms:	Description:
Process	A process is a loaded instance of an Executable to be executed on a Machine.
Execution Management	The element of the Adaptive Platform Foundation responsible for the ordered startup and shutdown of the AUTOSAR Adaptive Platform and the Applications.
State Management	The element defining modes of operation for AUTOSAR Adaptive Platform. It allows flexible definition of functions which are active on the platform at any given time.
Function Group	A Function Group is a set of coherent Processes, which need to be controlled consistently. Depending on the state of the Function Group, Processes are started or terminated.
Function Group State	The element of State Management that characterizes the current status of a set of (functionally coherent) user-level Applications. The set of Function Groups and their Function Group States is machine specific and are configured in the Machine Manifest [3].
Machine State	The element of the State Management. See Function Group State.
Network Management	A Functional Cluster within the Adaptive Platform Services. Part of Communication Management.

The following technical terms used throughout this document are defined in the official [2] AUTOSAR Glossary or [3] TPS Manifest Specification – they are repeated here for tracing purposes.

Term	Description
Adaptive Application	see [2] AUTOSAR Glossary
Application	see [2] AUTOSAR Glossary
AUTOSAR Adaptive Platform	see [2] AUTOSAR Glossary
Executable	see [2] AUTOSAR Glossary
Functional Cluster	see [2] AUTOSAR Glossary
Machine	see [2] AUTOSAR Glossary
Manifest	see [2] AUTOSAR Glossary
Adaptive Platform Foundation	see [2] AUTOSAR Glossary
Adaptive Platform Services	see [2] AUTOSAR Glossary

Table 2.1: Glossary-defined Technical Terms

3 Requirements Specification

This chapter describes all requirements driving the work to define the State Management.

3.1 Functional Overview

This document specifies the requirements regarding the realization of the State Management on Adaptive Platform. Only the interfaces and abstract functionality will be defined, because State Management is highly project specific.

3.2 Functional Requirements

3.2.1 State Management

[RS_SM_00001]{DRAFT} **State Management shall coordinate and control multiple sets of Applications.** ⌈

Type:	draft
Description:	State Management shall allow to change the availability of Applications based on internal decision and/or external requests.

▽

△

Rationale:	State Management shall coordinate and control one or multiple sets of Applications (Function Group State) and the platform (Machine State) itself so that the machine behaves as to fulfill the intended system design of a particular project.
Dependencies:	–
Use Case:	Provide interface to influence State Managements internal states.
Supporting Material:	–

⌋(*RS_Main_00050*, *RS_Main_00460*)

[RS_SM_00004]{DRAFT} **State Management shall provide standardized interfaces.** ⌈

Type:	draft
Description:	State Management implementation shall be portable between different AUTOSAR Adaptive Platform compliant stacks. State Management shall only depend on the standardized interfaces when it interacts with other Functional Cluster. Therefor State Management shall provide interfaces over at least ara::com.
Rationale:	
Dependencies:	
Use Case:	Support error reaction of "Platform Health Management", configure Application availability based on "Diagnostic" and "Update and Configuration Management"
Supporting Material:	

⌋(*RS_Main_00060*, *RS_Main_01002*, *RS_Main_01005*)

[RS_SM_00005]{DRAFT} **State Management internal states.** ⌈

Type:	draft
Description:	State Management shall support to change State Managements its internal states based on external inputs
Rationale:	State Management shall support to implement one or more state machines. State Management shall change its internal states in a project-specific manner based on requests from external inputs via its provided interfaces. State Management may reflect the changes of its internal states based on project-specific requirements via its provided interfaces.
Dependencies:	–
Use Case:	–
Supporting Material:	–

⌋(*RS_Main_00460*)

3.2.2 Support for Diagnostics

[RS_SM_00100]{DRAFT} **State Management shall support ECU reset** ⌈

Type:	draft
Description:	State Management shall support to reset the ECU.
Rationale:	Diagnostic Application [4] shall support ECUReset according to ISO 14229-1 [5]. State Management shall handle and coordinate the requests from Diagnostic Application.
Dependencies:	–
Use Case:	–
Supporting Material:	–

⌋(*RS_Main_00260*)

[RS_SM_00101]{DRAFT} **State Management shall support diagnostic reset cause** ⌈

Type:	draft
Description:	State Management shall support the provision of the last reset cause to Functional Clusters, e.g. Diagnostics.
Rationale:	(Diagnostic) Applications need to determine the cause of the last reset, e.g. to support UDS service ECUReset. The information on what triggered a reset is required so that as after a reset Diagnostics can determine whether it was a planned (controlled, requested) reset or unplanned and have to react accordingly.
Dependencies:	–
Use Case:	–
Supporting Material:	–

⌋(*RS_Main_00260*)

3.2.3 Virtualization support / Hierarchical State Management

[RS_SM_00200]{DRAFT} **State Management shall provide an interface between State Management instances.** ⌈

Type:	draft
Description:	State Management shall provide an interface between State Management instances used in a hierarchically manner.

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△

Rationale:	In a virtualized/hierarchical environment several instances of `State Management` will be active. Instances with lower priority have to be controlled by instances with a higher priority
Dependencies:	
Use Case:	The components are possibly provided by different vendors, working on different microcontrollers or virtual machines. On each controller or (virtual) machine a separate instance of `State Management` might be used and it should be possible to operate these instances in a hierarchically manner.
Supporting Material:	

⌋(*RS_Main_00511*)

3.2.4 Calibration and variant support

[RS_SM_00300]{DRAFT} **`State Management` shall support variant handling based on calibration data.** ⌈

Type:	draft
Description:	`State Management` shall evaluate calibration data. `State Management` should (or not) set `Function Groups` to specified `Function Group State` depending on read configuration data.
Rationale:	
Dependencies:	
Use Case:	For different car lines, countries or regions different `Function Groups` will be allowed to be started. `State Management` evaluates this information from calibration data to enable only the wanted `Function Groups`.
Supporting Material:	

⌋(*RS_Main_00261*, *RS_Main_00360*)

3.2.5 Dynamic communication paths

[RS_SM_00400]{DRAFT} **`State Management` shall establish communication paths dynamically.** ⌈

Type:	draft
Description:	State Management shall be able to evaluate which communication channels are needed by Applications and therefor by their corresponding Function Group. Opening and closing of these channels shall be done by requesting them from Network Management.
Rationale:	
Dependencies:	
Use Case:	Applications as part of aFunction Group will have a need to use communication with other ones. Therefore State Management evaluates this information from configuration and requests Network Management to establish or shutdown the corresponding communication channel.
Supporting Material:	

⌋(*RS_Main_00140*, *RS_Main_01002*, *RS_Main_01005*)

[RS_SM_00401]{DRAFT} **State Management shall control Applications depending on dynamic communication paths .** ⌈

Type:	draft
Description:	State Management shall be able to evaluate which Applications and therefor their corresponding Function Group are needed by establishing communication channels. starting and stopping of Applications shall be done on request from Network Management.
Rationale:	
Dependencies:	
Use Case:	Applications as part of a Function Group will have a need to use communication with other ones. Therefore State Management evaluates this information from configuration and requests Execution Management to set a Function Group (and therefor the related Applications) to a dedicated state.
Supporting Material:	

⌋(*RS_Main_00140*, *RS_Main_01002*, *RS_Main_01005*)

4 Requirements Tracing

The following table references the features specified in [6] and links to the fulfillments of these.

Feature	Description	Satisfied by
[RS_Main_00050]	AUTOSAR shall provide an Execution Framework towards applications to implement concurrent application internal control flows	[RS_SM_00001]
[RS_Main_00060]	AUTOSAR shall provide a standardized software interface for communication between Applications	[RS_SM_00004]

[RS_Main_00140]	AUTOSAR shall provide network independent communication mechanisms for applications	[RS_SM_00400] [RS_SM_00401]
[RS_Main_00260]	AUTOSAR shall provide diagnostics means during runtime, for production and services purposes	[RS_SM_00100] [RS_SM_00101]
[RS_Main_00261]	AUTOSAR shall provide means for calibration	[RS_SM_00300]
[RS_Main_00360]	AUTOSAR shall support variant management	[RS_SM_00300]
[RS_Main_00460]	AUTOSAR shall standardize methods to organize mode management on Application, ECU and System level	[RS_SM_00001] [RS_SM_00005]
[RS_Main_00511]	AUTOSAR shall support virtualization	[RS_SM_00200]
[RS_Main_01002]	AUTOSAR shall support service-oriented communication	[RS_SM_00004] [RS_SM_00400] [RS_SM_00401]
[RS_Main_01005]	AUTOSAR shall establish communication paths dynamically	[RS_SM_00004] [RS_SM_00400] [RS_SM_00401]

5 References

[1] Standardization Template
AUTOSAR_TPS_StandardizationTemplate

[2] Glossary
AUTOSAR_TR_Glossary

[3] Specification of Manifest
AUTOSAR_TPS_ManifestSpecification

[4] Specification of Diagnostics
AUTOSAR_SWS_Diagnostics

[5] Unified diagnostic services (UDS) – Part 1: Specification and requirements (Release 2013-03)
http://www.iso.org

[6] Main Requirements
AUTOSAR_RS_Main

A History of Constraints and Specification Items

Please note that the lists in this chapter also include constraints and specification items that have been removed from the specification in a later version. These constraints and specification items do not appear as hyperlinks in the document.

A.1 Constraint and Specification Item History of this document according to AUTOSAR Release 19-11

A.1.1 Added Traceables in 19-11

none

A.1.2 Changed Traceables in 19-11

Number	Heading
[RS_SM_00004]	`State Management` shall provide standardized interfaces.
[RS_SM_00300]	`State Management` shall support variant handling based on calibration data.
[RS_SM_00400]	`State Management` shall establish communication paths dynamically.

Table A.1: Changed Traceables in 19-11

A.1.3 Deleted Traceables in 19-11

Number	Heading
[RS_SM_00500]	`State Management` shall support efficient resource usage.

Table A.2: Deleted Traceables in 19-11

A.1.4 Added Constraints in 19-11

none

A.1.5 Changed Constraints in 19-11

none

A.1.6 Deleted Constraints in 19-11

none

A.2 Constraint and Specification Item History of this document according to AUTOSAR Release 19-03

A.2.1 Added Traceables in 19-03

Number	Heading
[RS_SM_00004]	State Management shall provide standardized interfaces.
[RS_SM_00005]	State Management internal states.
[RS_SM_00401]	State Management shall control Applications depending on dynamic communication paths .

Table A.3: Added Traceables in 19-03

A.2.2 Changed Traceables in 19-03

Number	Heading
[RS_SM_00001]	State Management shall coordinate and control multiple sets of Applications.
[RS_SM_00200]	State Management shall provide an interface between State Management instances.
[RS_SM_00400]	State Management shall establish communication paths dynamically.

Table A.4: Changed Traceables in 19-03

A.2.3 Deleted Traceables in 19-03

Number	Heading
[RS_SM_00002]	State Management shall support Component State change requests.
[RS_SM_00201]	State Management shall provide the interface over ara::com.

Table A.5: Deleted Traceables in 19-03

A.2.4 Added Constraints in 19-03

none

A.2.5 Changed Constraints in 19-03

none

A.2.6 Deleted Constraints in 19-03

none