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Disclaimer

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1 Scope of Document

This document specifies requirements on the Manifest of the Adaptive Platform.

The Manifest is a formal specification of configuration content that ships along a given piece of software and is used to deploy the software in the field.

The Manifest content can be divided into two areas:

- The Application-related Manifest can be taken to configure the deployment of software, but on the other hand, the same piece of configuration information can also be used in the design of the software.
- The machine-related Manifest content describes the configuration of a machine that runs an AUTOSAR adaptive platform, i.e. without any application running on the machine.

2 Conventions to be used

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

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

3 Requirements Specification

This chapter describes all requirements driving the work to define the TPS_ManifestSpecification [2].

[RS_MANI_00015] Definition of the nature of a manifest ⌈

Type:	draft
Description:	AUTOSAR shall define the term "manifest"
Rationale:	A unique understanding of the term "manifest" is an immediate prerequisite for the usage of a manifest. Since the term is so prominent on the AUTOSAR adaptive platform it is important to provide a proper definition
Dependencies:	–
Use Case:	Readers want to be able to fully grasp the meaning of the AUTOSAR specification
Supporting Material:	–

⌋*(RS_Main_00002, RS_Main_00503)*

3.1 Application Manifest Overview

The manifest contains all necessary information about an AUTOSAR application that is necessary for the configuration of the middleware.

3.1.1 Application Manifest Requirements

[RS_MANI_00001] Adaptive AUTOSAR Application ⌈

Type:	draft
Description:	AUTOSAR shall be able to describe an Adaptive AUTOSAR Application.
Rationale:	The description of the Adaptive AUTOSAR Application represents the prerequisite for the creation of a manifest, i.e. the information the Adaptive Platform needs to integrate the application into the middleware and execution model.
Dependencies:	–
Use Case:	Software that is uploaded to an AUTOSAR adaptive platform.
Supporting Material:	–

⌋*(RS_Main_00150)*

3.1.1.1 Application Design

[RS_MANI_00004] Support of application design ⌈

Type:	draft
Description:	AUTOSAR shall provide design elements that are necessary to develop and to describe software for the Adaptive AUTOSAR platform.
Rationale:	Standardized software component design description.
Dependencies:	–
Use Case:	Development of Application Software Components.
Supporting Material:	–

⌋*(RS_Main_00150, RS_Main_00300, RS_Main_00080, RS_Main_00310)*

[RS_MANI_00002] Declaration of provided and required services in an application ⌈

Type:	draft
Description:	AUTOSAR shall support the declaration of services that the application implements and uses. This shall be the only way to describe the interaction of an application with other applications and the platform.
Rationale:	A contract between service consumers and service providers needs to be defined.
Dependencies:	–

Use Case:	The declaration of services allows service consumers to discover services and to use them. Only the Service description is visible to the outside world.
Supporting Material:	–

⌋(*RS_Main_00150*, *RS_Main_00140*, *RS_Main_00330*, *RS_Main_00080*)

[RS_MANI_00003] Specification of service interfaces ⌈

Type:	draft
Description:	AUTOSAR shall allow the specification of service interfaces that define the service functionality.
Rationale:	A service interface defines the way in which applications can interact and exchange information.
Dependencies:	–
Use Case:	Application Design, generation of C++ proxies and skeletons from the service interface description in order to implement the service interface of an application.
Supporting Material:	–

⌋(*RS_Main_00150*, *RS_Main_00060*, *RS_Main_00190*, *RS_Main_00330*, *RS_Main_00080*)

[RS_MANI_00017] Specification of the mapping of Service Interfaces ⌈

Type:	draft
Description:	AUTOSAR shall allow the specification of a mapping of service interfaces such that the granularity of service-oriented communication can be controlled by the model author.
Rationale:	A service interface defines the way in which an application can interact and exchange information. However, there are cases where the choice made by application developers is not met by the designers of external communication.
Dependencies:	–
Use Case:	Application designers and designers of external communication have different approaches onto granularity of service definition.
Supporting Material:	–

⌋(*RS_Main_00320*)

[RS_MANI_00005] Configuration of diagnostic capabilities of an application ⌈

Type:	draft
Description:	AUTOSAR shall support the configuration of diagnostic capabilities of an application.
Rationale:	Each application shall be able to describe how it interacts with the Diagnostic Management.
Dependencies:	–
Use Case:	Description of diagnostic services the application implements and provides to the Diagnostic Management.

Supporting Material:	–

⌋(*RS_Main_00260*, *RS_Main_00080*)

[RS_MANI_00016] Usage of data types specifically on the AUTOSAR adaptive platform ⌈

Type:	draft
Description:	The AUTOSAR Adpative platform shall support the usage of data types as defined in classic AUTOSAR and shall also support additional or deviating data types natively available on the AUTOSAR adaptive platform
Rationale:	An application on the AUTOSAR adaptive platform shall be able to describe the usage of data types.
Dependencies:	–
Use Case:	Usages of data types that are natively available on the AUTOSAR adaptive platform, e.g. `vector` or `string`.
Supporting Material:	–

⌋(*RS_Main_00513*)

[RS_MANI_00025] Definition and configuration of serialization ⌈

Type:	draft
Description:	AUTOSAR shall allow to define and configure the serialization in the application design.
Rationale:	Serialization code is generated out of the service description and is linked with the application component object file to an application binary.
Dependencies:	–
Use Case:	SOME/IP serialization properties like length fields that are put in front of variable data.
Supporting Material:	–

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3.1.1.2 Execution

[RS_MANI_00006] Support of application deployment ⌈

Type:	draft
Description:	The manifest shall support a connection between application design and application deployment
Rationale:	Definition of an executable that at runtime makes a POSIX process.
Dependencies:	–
Use Case:	The Execution Manager uses the manifest content to start up and configure each process individually.

Supporting Material:	–

⌋(*RS_Main_00320*, *RS_Main_00049*, *RS_Main_00050*)

[RS_MANI_00007] Configuration of application startup behavior ⌈

Type:	draft
Description:	The manifest shall support the configuration of an application startup that is dependent on the current machine state
Rationale:	Different machine states require a different set of (executed) applications
Dependencies:	–
Use Case:	The Execution Manager uses the manifest content to start up and shutdown each process depending on the available machine state.
Supporting Material:	–

⌋(*RS_Main_00320*, *RS_Main_00049*, *RS_Main_00050*)

3.2 Deployment Manifest Overview

The Manifest contains all necessary information about the deployment of an AUTOSAR application onto the adaptive AUTOSAR platform that is necessary for the configuration of the middleware.

3.2.1 Deployment Manifest Requirements

[RS_MANI_00011] Instantiation of provided and required services in an application ⌈

Type:	draft
Description:	The manifest shall support the instantiation of provided and required services in an application by defining service instances and assigning these to the respective services.
Rationale:	Each time an application is instantiated on a machine for each provided service and for each required service a service instance shall be defined. Each time a single service is used in different roles within a single application different instances shall be defined.
Dependencies:	–
Use Case:	Camera Service may be instantiated as FrontCamera and RearCamera instances.
Supporting Material:	–

⌋(*RS_Main_00280*, *RS_Main_00505*, *RS_Main_00320*, *RS_Main_01005*)

[RS_MANI_00009] Service instance configuration on the network-level ⌈

Type:	draft
Description:	The manifest shall support the configuration of service instances on the network-level and the assignment of these service instances to a machine.
Rationale:	For each service that is provided or requested on a machine a service instance shall be defined.
Dependencies:	–
Use Case:	Facilitate the definition of service instances without requiring the definition of a component model.
Supporting Material:	–

⌋(*RS_Main_00280*, *RS_Main_00505*, *RS_Main_00320*, *RS_Main_01005*)

[RS_MANI_00008] Service interface deployment to a transport layer mechanism ⌈

Type:	draft
Description:	The manifest shall support the deployment of a service interface to one or several transport layer mechanisms.
Rationale:	Different service interfaces support different transport mechanisms because of deployment decisions.
Dependencies:	–
Use Case:	Offering of a service interface via SOME/IP and/or user-defined transport layer mechanisms
Supporting Material:	–

⌋(*RS_Main_00280*, *RS_Main_00505*, *RS_Main_00320*, *RS_Main_01005*)

[RS_MANI_00014] User defined transport layer mechanisms ⌈

Type:	draft
Description:	The manifest shall support the usage of transport layer mechanisms that are not standardized by AUTOSAR.
Rationale:	Adaptive AUTOSAR applications shall be able to communicate with non-AUTOSAR applications located on the same or on remote ECUs using transport layers that are not standardized by AUTOSAR
Dependencies:	–
Use Case:	Usage of shared memory based IPC transport mechanism not standardized by AUTOSAR. Interaction with DDS-based systems/ECUs.
Supporting Material:	–

⌋(*RS_Main_01001*, *RS_Main_01005*)

[RS_MANI_00024] SOME/IP transport layer mechanisms ⌈

Type:	draft
Description:	The manifest shall support the usage of the SOME/IP transport layer mechanism.

Rationale:	Adaptive AUTOSAR applications shall be able to communicate with other adaptive (or classic) AUTOSAR applications located on remote ECUs using SOME/IP transport layer mechanisms.
Dependencies:	–
Use Case:	Standardized service-oriented communication.
Supporting Material:	–

⌋(*RS_Main_00280*, *RS_Main_00505*, *RS_Main_01005*)

[RS_MANI_00019] Service discovery message exchange configuration ⌈

Type:	draft
Description:	The manifest shall provide means to configure the service discovery message exchange for the different supported transport layer mechanisms
Rationale:	Service discovery messages are exchanged in the System with multicast addressing to a specific configured IP multicast address at a specific configured port number
Dependencies:	–
Use Case:	SOME/IP service discovery configuration
Supporting Material:	–

⌋(*RS_Main_00280*, *RS_Main_00505*, *RS_Main_01005*)

3.3 Machine Manifest Overview

The Manifest contains all necessary information about the configuration of a machine.

3.3.1 Machine Manifest Requirements

[RS_MANI_00018] Network connections of the machine ⌈

Type:	draft
Description:	The manifest shall provide means to configure the network connections of a machine.
Rationale:	Configure the network connections for in-vehicle usage.
Dependencies:	–
Use Case:	IPv4 and IPv6 configuration.
Supporting Material:	–

⌋(*RS_Main_00230*)

[RS_MANI_00020] Hardware resources of the machine ⌈

Type:	draft
Description:	The manifest shall provide means to describe the hardware resources of a machine.
Rationale:	The knowledge of existing hardware resources is essential if new applications are allocated to the machine.
Dependencies:	–
Use Case:	Description of available RAM. Description of available CPU power.
Supporting Material:	–

⌋(*RS_Main_00503*, *RS_Main_00435*)

[RS_MANI_00021] Description of machine states ⌈

Type:	draft
Description:	The manifest shall provide means to describe available machine states.
Rationale:	Provides mechanism to define machine states for various operational conditions
Dependencies:	–
Use Case:	Application is running only in a given machine state.
Supporting Material:	–

⌋(*RS_Main_00002*, *RS_Main_00460*)

[RS_MANI_00022] Adaptive Platform configuration ⌈

Type:	draft
Description:	The manifest shall provide means to configure the adaptive platform on a specific machine.
Rationale:	Decision which Adaptive Modules and their respective configuration are deployed to a specific machine.
Dependencies:	–
Use Case:	For one dedicated Platform Instance the following Adaptive Modules are deployed: ExecutionManagment, CommunicationManagement and WatchdogManagement, but not Diagnostics.
Supporting Material:	–

⌋(*RS_Main_00002*)

[RS_MANI_00023] Adaptive Module configuration ⌈

Type:	draft
Description:	The manifest shall provide means to configure the instance of a module on a specific machine.
Rationale:	Configuration of Watchdog and OS.
Dependencies:	–
Use Case:	Configure the effective access role of OS.

Supporting Material:	–

⌋(*RS_Main_00002*)

4 Requirements Tracing

The following table references the features specified in [3] and links to the fulfillments of these.

Feature	Description	Satisfied by
[RS_Main_00002]	AUTOSAR shall provide a software platform for high performance computing platforms	[RS_MANI_00015] [RS_MANI_00021] [RS_MANI_00022] [RS_MANI_00023]
[RS_Main_00049]	AUTOSAR shall provide an Execution Management for running multiple applications	[RS_MANI_00006] [RS_MANI_00007]
[RS_Main_00050]	AUTOSAR shall provide an Execution Framework towards applications to implement concurrent application internal control flows.	[RS_MANI_00006] [RS_MANI_00007]
[RS_Main_00060]	AUTOSAR shall provide a standardized software interface for communication between Applications	[RS_MANI_00003]
[RS_Main_00080]	AUTOSAR shall provide means to describe a component model for Application Software	[RS_MANI_00002] [RS_MANI_00003] [RS_MANI_00004] [RS_MANI_00005]
[RS_Main_00140]	AUTOSAR shall provide network independent communication mechanisms for applications	[RS_MANI_00002]
[RS_Main_00150]	AUTOSAR shall support the deployment and reallocation of AUTOSAR Application Software	[RS_MANI_00001] [RS_MANI_00002] [RS_MANI_00003] [RS_MANI_00004]
[RS_Main_00190]	AUTOSAR shall support interoperability with non-AUTOSAR software on the same ECU	[RS_MANI_00003]
[RS_Main_00230]	AUTOSAR shall support network topologies including gateways	[RS_MANI_00018]
[RS_Main_00260]	AUTOSAR shall provide diagnostics means during runtime, for production and services purposes	[RS_MANI_00005]
[RS_Main_00280]	AUTOSAR shall provide standardized communication interfaces for the onboard data exchange between ECUs with different software platforms	[RS_MANI_00008] [RS_MANI_00009] [RS_MANI_00011] [RS_MANI_00019] [RS_MANI_00024]
[RS_Main_00300]	AUTOSAR shall provide data exchange formats to support work-share in large inter and intra company development groups	[RS_MANI_00004]
[RS_Main_00310]	AUTOSAR shall support hierarchical Application Software design methods	[RS_MANI_00004]

[RS_Main_00320]	AUTOSAR shall provide formats to specify all aspects necessary to integrate Application Software on an ECU	[RS_MANI_00006] [RS_MANI_00007] [RS_MANI_00008] [RS_MANI_00009] [RS_MANI_00011] [RS_MANI_00017]
[RS_Main_00330]	AUTOSAR shall support the principle of information hiding	[RS_MANI_00002] [RS_MANI_00003]
[RS_Main_00435]	AUTOSAR shall support automotive microcontrollers	[RS_MANI_00020]
[RS_Main_00460]	AUTOSAR shall standardize methods to organize mode management on Application, ECU and System level	[RS_MANI_00021]
[RS_Main_00503]	AUTOSAR shall provide a Software Platform that supports adaptation of communication topology after production	[RS_MANI_00015] [RS_MANI_00020]
[RS_Main_00505]	AUTOSAR support the interaction of onboard application software with offboard systems.	[RS_MANI_00008] [RS_MANI_00009] [RS_MANI_00011] [RS_MANI_00019] [RS_MANI_00024]
[RS_Main_00513]	AUTOSAR shall support language bindings for different programming languages	[RS_MANI_00016]
[RS_Main_01001]	AUTOSAR shall support intra ECU communication	[RS_MANI_00014]
[RS_Main_01005]	AUTOSRA shall establish communication paths dynamically	[RS_MANI_00008] [RS_MANI_00009] [RS_MANI_00011] [RS_MANI_00014] [RS_MANI_00019] [RS_MANI_00024]

5 References

[1] Requirements on Standardization Template
AUTOSAR_RS_StandardizationTemplate

[2] Specification of Manifest
AUTOSAR_TPS_ManifestSpecification

[3] Main Requirements
AUTOSAR_RS_Main

6 Change History of this Document according to the original version of the Document

Number	Heading
[RS_MANI_00001]	Adaptive AUTOSAR Application
[RS_MANI_00002]	Declaration of provided and required services in an application
[RS_MANI_00003]	Specification of service interfaces
[RS_MANI_00004]	Support of application design
[RS_MANI_00005]	Configuration of diagnostic capabilities of an application
[RS_MANI_00006]	Support of application deployment
[RS_MANI_00007]	Configuration of application startup behavior
[RS_MANI_00008]	Service interface deployment to a transport layer mechanism
[RS_MANI_00009]	Service instance configuration on the network-level
[RS_MANI_00011]	Instantiation of provided and required services in an application
[RS_MANI_00014]	User defined transport layer mechanisms
[RS_MANI_00015]	Definition of the nature of a manifest
[RS_MANI_00016]	Usage of data types specifically on the AUTOSAR adaptive platform
[RS_MANI_00017]	Specification of the mapping of Service Interfaces
[RS_MANI_00018]	Network connections of the machine
[RS_MANI_00019]	Service discovery message exchange configuration
[RS_MANI_00020]	Hardware resources of the machine
[RS_MANI_00021]	Description of machine states
[RS_MANI_00022]	Adaptive Platform configuration
[RS_MANI_00023]	Adaptive Module configuration
[RS_MANI_00024]	SOME/IP transport layer mechanisms
[RS_MANI_00025]	Definition and configuration of serialization

Table 6.1: Added Requirements in original Version