

Document Title	Requirements on Communication Management
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	716

Document Status	published
Part of AUTOSAR Standard	Adaptive Platform
Part of Standard Release	R25-11

Document Change History			
Date	Release	Changed by	Description
2025-11-27	R25-11	AUTOSAR Release Management	- Extended requirements to include triggers - Editorial changes
2024-11-27	R24-11	AUTOSAR Release Management	- Communication Groups Removed - IEEE1722 Streams - Editorial changes
2023-11-23	R23-11	AUTOSAR Release Management	Communication Groups marked as OBSOLETE
2022-11-24	R22-11	AUTOSAR Release Management	- Added security requirements - Static service connection - Editorial changes
2021-11-25	R21-11	AUTOSAR Release Management	- Editorial changes - Removed RESTful communication
2020-11-30	R20-11	AUTOSAR Release Management	- E2E protection - Events and methods - Traceability to Safety Requirements - Service uniqueness: Offered service with Fully Qualified Service ID - Raw Data Streaming requirements set to valid - Communication Groups (draft)





2019-11-28	R19-11	AUTOSAR Release Management	• Added new chapter Requirements Guidelines • Introduced – Signal2Service Translation – Service Versioning – Raw Data Streaming Communication – Changed Document Status from Final to published • Additional E2E support
2019-03-29	19-03	AUTOSAR Release Management	• No content changes
2018-10-31	18-10	AUTOSAR Release Management	• Minor changes and bugfixes
2018-03-29	18-03	AUTOSAR Release Management	• Automatic Reconnection of Proxies • E2E Protection of Methods • REST Network Binding • Minor changes and bugfixes
2017-10-27	17-10	AUTOSAR Release Management	• Introduction of Fields • Introduction of E2E protected communication • Introduction of RESTful communication • Queuing of events • Minor changes and bugfixes
2017-03-31	17-03	AUTOSAR Release Management	• Initial release

Disclaimer

This work (specification and/or software implementation) and the material contained in it, as released by AUTOSAR, is for the purpose of information only. AUTOSAR and the companies that have contributed to it shall not be liable for any use of the work.

The material contained in this work is protected by copyright and other types of intellectual property rights. The commercial exploitation of the material contained in this work requires a license to such intellectual property rights.

This work may be utilized or reproduced without any modification, in any form or by any means, for informational purposes only. For any other purpose, no part of the work may be utilized or reproduced, in any form or by any means, without permission in writing from the publisher.

The work has been developed for automotive applications only. It has neither been developed, nor tested for non-automotive applications.

The word AUTOSAR and the AUTOSAR logo are registered trademarks.

Table of Contents

1	Scope of document	6
2	Conventions to be used	7
2.1	Requirements Guidelines	7
2.1.1	Requirements quality	7
2.1.2	Requirements identification	7
2.1.3	Requirements status	8
3	Acronyms and abbreviations	9
4	Requirements Specification	10
4.1	Functional overview	10
4.2	Functional Requirements	11
4.2.1	General requirements	11
4.2.2	Service-oriented communication	13
4.2.2.1	Communication between applications	13
4.2.2.2	Service discovery	16
4.2.2.3	Static Service Connection	19
4.2.2.4	Communication	20
4.2.2.4.1	Events and triggers	20
4.2.2.4.2	Methods	22
4.2.2.4.3	Fields	27
4.2.3	Raw Data Streaming Communication	30
4.2.4	Security	31
4.3	Non-Functional Requirements	33
5	References	34
A	Change history of AUTOSAR traceable items	35
A.1	Traceable item history of this document according to AUTOSAR Release R25-11	35
A.1.1	Added Requirements in R25-11	35
A.1.2	Changed Requirements in R25-11	35
A.1.3	Deleted Requirements in R25-11	35
A.2	Traceable item history of this document according to AUTOSAR Release R24-11	35
A.2.1	Added Requirements in R24-11	35
A.2.2	Changed Requirements in R24-11	36
A.2.3	Deleted Requirements in R24-11	36
A.3	Traceable item history of this document according to AUTOSAR Release R23-11	36
A.3.1	Added Requirements in R23-11	36
A.3.2	Changed Requirements in R23-11	36

A.3.3 Deleted Requirements in R23-11	36
--	----

1 Scope of document

This document specifies requirements on Communication Management of the AUTOSAR Adaptive Platform.

2 Conventions to be used

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

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

2.1 Requirements Guidelines

2.1.1 Requirements quality

2.1.2 Requirements identification

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as follows.

Note that the requirement level of the document in which they are used modifies the force of these words.

- **MUST:** This word, or the adjective "LEGALLY REQUIRED", means that the definition is an absolute requirement of the specification due to legal issues.
- **MUST NOT:** This phrase, or the phrase "MUST NOT", means that the definition is an absolute prohibition of the specification due to legal issues.
- **SHALL:** This phrase, or the adjective "REQUIRED", means that the definition is an absolute requirement of the specification.
- **SHALL NOT:** This phrase means that the definition is an absolute prohibition of the specification.
- **SHOULD:** This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- **SHOULD NOT:** This phrase, or the phrase "NOT RECOMMENDED", means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- **MAY:** This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item.

An implementation, which does not include a particular option, SHALL be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, SHALL be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides).

2.1.3 Requirements status

No content

3 Acronyms and abbreviations

The glossary below includes terms, acronyms and abbreviations relevant to AP_RS_CommunicationManagement that are not included in the AUTOSAR Glossary [2].

Terms:	Description:
Fully qualified service ID	A fully qualified name of a service used as a system-wide unique identifier, e.g. 'com.someOEM.adas.collisionwarner'.
Data ID	A unique identifier of an instance of data transmitted. In case of events, this maps to a specific instance of an event.
Event	It is a notification mechanism that is used by the Service Skeleton to inform the Service Proxy that a specific condition or state change occurred. The notification includes the data related to the event. Events are sent to a Service Proxy only if it is subscribed to the Event.
Trigger	It is a notification mechanism that is used by the Service Skeleton to inform the Service Proxy that a specific condition or state change occurred. The notification does not include any data. Triggers are sent to a Service Proxy only if it is subscribed to the Trigger.

4 Requirements Specification

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

4.1 Functional overview

The AUTOSAR Adaptive Platform Communication Management provides services for the network and protocol independent communication between applications. This document therefore includes requirements on

- Communication between applications
 - Signature of the communication API
 - Behavior of the communication API
 - On-wire protocol for inter-ECU and inter-machine data communication to classic and adaptive platform
- Service discovery
 - Scope
 - Service registry
 - On-wire protocol for inter-ECU and inter-machine service discovery
- Configuration of middleware for communication aspects (register services)

The AUTOSAR Adaptive Platform Communication Management provides requirements for the safety mechanisms related to the communication, precisely for the E2E supervision. They are defined in [\[3\]](#).

4.2 Functional Requirements

4.2.1 General requirements

[RS_CM_00001] The Communication Management shall provide a standardized header file structure for each service.

Status: DRAFT

[

Description:	The Communication Management shall provide a standardized header file structure for each service. The application uses the standardized header files which are independent of the underlying actual Communication Management implementation.
Rationale:	The application code shall be reusable for different AUTOSAR Adaptive platform implementations.
Dependencies:	–
Use Case:	The application developers implement their code against the standardized header files.
Supporting Material:	–

]

[RS_CM_00002] The service header files shall define the namespace for the respective service.

Status: DRAFT

[

Description:	The service header files shall define the namespace for the respective service to uniquely identify each service instance.
Rationale:	The application code shall be reusable for different AUTOSAR Adaptive platform implementations and for different vehicle lines.
Dependencies:	–
Use Case:	To avoid conflicts with other applications and other services each service shall have its own namespace.
Supporting Material:	–

]

[RS_CM_00003] The Communication Management shall define how language specific data types are derived from modeled data types.

Status: DRAFT

[

Description:	The Communication Management shall define how language specific data types, e.g. C++ data types, are derived from modeled data types.
Rationale:	The Communication Management shall support different language bindings.
Dependencies:	–
Use Case:	The Communication Management supports C++ language binding and therefore has to define the modeled data types in C++.
Supporting Material:	–

]

[RS_CM_00004] Communication Management shall support the translation between signal-based and service-oriented communication

Status: DRAFT

[

Description:	The Communication Management shall support the translation between signal-based and service-oriented communication in the protocol binding
Rationale:	Adaptive Platform restricts communication to Service-oriented communication, the rest of the vehicle however still uses Signal-based communication means - therefore a translation of these two approaches shall be performed.
Dependencies:	–
Use Case:	Data which is produced on a Can ECU is needed at an Adaptive machine in a safe and secure manner. The protocol binding is able to de-serialize and serialize signal-based Can messages and provide the payload to the adaptive application.
Supporting Material:	–

]

[RS_CM_00006] Support of IEEE1722 Stream ACF Message handling

Status: DRAFT

[

Description:	ACF messages of an IEEE1722 stream with subtype set to NTSCF or TSCF shall be available via signal / service translation for an application.
Rationale:	ACF Encapsulated bus frames (e.g. CAN, LIN) need to be processed by signal / service translation to provide data as event to the application. AP ECUs need to be able to monitor bus frames.
Dependencies:	RS_CM_00004





Use Case:	An AP application of a high performance ECU receive events via S2S which are transported as ACF encapsulated bus frames (e.g. CAN, LIN) within an zonal automotive network
Supporting Material:	[4, IEEE1722]

]

[RS_CM_00005] Handling of malformed messages or with errors

Status: DRAFT

[

Description:	The Communication Management shall implement validation check of received messages to decide if it shall be processed or rejected.
Rationale:	Malformed messages do not have to be passed to the Application but rejected.
Dependencies:	–
Use Case:	Malformed messages do not have to be passed to the Application but rejected.
Supporting Material:	–

]

4.2.2 Service-oriented communication

4.2.2.1 Communication between applications

[RS_CM_00200] The Communication Management shall transform Fully Qualified Service IDs to communication protocol specific Service IDs [

Description:	The Communication Management shall transform Fully Qualified Service IDs to communication protocol specific Service IDs. Fully Qualified Service IDs are used within the application code by the developer and need to be defined to enable cooperation of services of different vendors. Communication protocol specific Service IDs may be used within the messages on the network and may be needed if the communication protocol service ID space was not designed for Fully Qualified Service IDs.
Rationale:	Binary of application shall be unaware of communication protocol specific Service IDs.
Dependencies:	–
Use Case:	One platform is used in multiple vehicle lines but the service IDs are different for the platform in the two vehicle lines. Communication Binding still uses Fully Qualified Service IDs. Communication Management transforms Fully Qualified to SOME/IP Service IDs.
Supporting Material:	see Adaptive Platform Scenarios

]

[RS_CM_00204] Service Oriented Communication realization with configured protocol [

Description:	The Communication Management shall realize the Service Oriented Communication with the configured protocol binding.
Rationale:	The application code should use service oriented communication independently of the actually configured protocol.
Dependencies:	–
Use Case:	One application is used in multiple vehicle lines but the used communication protocols are different in the two vehicle lines, e.g. in one case it uses SOME/IP and in another case it uses local IPC.
Supporting Material:	–

]

[RS_CM_00315] The Communication Management shall support a change of the configured protocol binding without requiring a re-compilation of the adaptive application

Status: DRAFT

[

Description:	Since the selection of a particular network protocol binding is an integrator driven deployment decision, any change in the selection of a particular network protocol binding or changes in the various attributes and parameters of a particular network protocol binding shall be possible without requiring a re-compilation of the involved adaptive applications. The required changes to the involved adaptive application shall be limited to a re-linking (either static or dynamic) of the involved adaptive application.
Rationale:	Binary of application shall be unaware of concrete configured protocol binding. Concrete protocol binding shall be configurable/changeable upon deployment time of the binary of the application.
Dependencies:	–
Use Case:	Binary of application shall be usable in various different deployment scenarios (e.g., using SOME/IP protocol binding in one deployment scenario and local IPC-based protocol binding in some other deployment scenario.)
Supporting Material:	see Adaptive Platform Scenarios

]

[RS_CM_00205] The Communication Management shall realize the SOME/IP service discovery protocol, the SOME/IP protocol and the E2E supervision (E2E protocol). [

Description:	The Communication Management shall realize the SOME/IP service discovery protocol, the SOME/IP protocol and the E2E supervision (E2E protocol). The protocols are described in AUTOSAR SOME/IP Service Discovery Protocol specification, AUTOSAR SOME/IP Protocol specification and AUTOSAR E2E Protocol Specification. SOME/IP and E2E protocols shall be realized as independent protocol layers, without dependencies between each other.
Rationale:	SOME/IP and E2E are supported in both AUTOSAR classic and adaptive.
Dependencies:	–
Use Case:	Radar, Camera and SensorFusion applications communicate by Ethernet using SOME/IP protocol. Safety-related applications communicating over a non-safety-related bus (e.g. Ethernet, CAN).
Supporting Material:	–

]

[RS_CM_00499] Service Contract Versioning shall be supported by the AUTOSAR

Status: DRAFT

[

Description:	Service Contract Versioning shall be supported by AUTOSAR.
Rationale:	Service Contract Versioning is an essential feature for SOA systems
Dependencies:	–
Use Case:	Service catalogue, a system which contains different Service versions
Supporting Material:	–

]

[RS_CM_00500] Service Contract Version for a Service Interface [

Description:	The Service Interface shall contain a Service contract version number
Rationale:	The versioning number is used to differentiate different Service configurations (scope Service interface and behaviour)
Dependencies:	–
Use Case:	Service catalogue, a system which contains different Service versions
Supporting Material:	–

]

[RS_CM_00501] Service Contract Versioning for all Transport Deployment Protocols [

Description:	The transport deployment protocols shall support Service contract versioning
Rationale:	To support Service contract from design phase to deployment phase the transport deployment protocols need to support versioning
Dependencies:	–
Use Case:	Support of service contract versioning inside AUTOSAR Adaptive platform
Supporting Material:	–

]

4.2.2.2 Service discovery

[RS_CM_00101] Communication Management shall provide an interface to offer services [

Description:	Application developers shall be able to offer services provided by their application for usage by other applications.
Rationale:	To support communication a mechanism is needed to offer provided services to other applications, which are able to use them.
Dependencies:	–
Use Case:	Application “A” offers a wall clock service to other applications.
Supporting Material:	–

]

[RS_CM_00108] Service Communication – Uniqueness of offered service

Status: DRAFT

[

Description:	The Communication Management shall check the offered service for uniqueness (i.e., a service with the same ServiceIdentifier and InstanceIdentifier was already previously offered). Uniqueness shall be applied locally and, if possible, on system/vehicle-wide level using a Fully Qualified Service ID for identification purposes.
Rationale:	To support communication a mechanism is needed to offer provided services to other applications, which are able to use them.
Dependencies:	–
Use Case:	Application “A” offers a wall clock service to other applications.
Supporting Material:	–

]

[RS_CM_00102] Communication Management shall provide an interface to find services [

Description:	Application developers shall be able to find all service instances provided by other applications at runtime.
Rationale:	To establish communication during runtime a mechanism is needed to find provided services based on the type of the service and the concrete service instance.
Dependencies:	–
Use Case:	Application “A” searches for a wall clock service provided by another application. Communication Management finds all available matching service instances and the application can select the right one.
Supporting Material:	–

]

[RS_CM_00103] Communication Management shall provide an interface to subscribe to a specific event or trigger provided by an instance of a certain service [

Description:	Application developers shall be able to subscribe to one specific event or trigger inside of one selected service instance.
Rationale:	After finding instances of a service type, it shall be possible to subscribe to certain events and triggers of a specific instance.
Dependencies:	–
Use Case:	Application “A” subscribes to the power on event of the application controlling the ignition lock.
Supporting Material:	–

]

[RS_CM_00104] Communication Management shall provide an interface to stop the subscription to an event or a trigger of a service instance [

Description:	Application developers shall be able to stop an active subscription to an event or a trigger of a service instance by the application.
Rationale:	After subscribing to an event of a specific service instance, it shall be possible to stop the subscription later on.
Dependencies:	–
Use Case:	Application “A” stops the subscription to the power on event and receives no longer such events.
Supporting Material:	–

]

[RS_CM_00106] Communication Management shall provide a means to monitor the state of the subscription to an event or a trigger [

Description:	Application developers shall be able to query the current state of a subscription to an event or a trigger of a service instance by the application or to get a notification about the change of the current state of a subscription to an event or a trigger of a service instance.
Rationale:	It shall be possible to monitor/query the actual state of a subscription.
Dependencies:	–
Use Case:	An Application wants to keep track of the subscription state to the power on event and get notified if it changes.
Supporting Material:	–

]

[RS_CM_00107] Communication Management shall provide a means to automatically update a proxy instance in case of restart of the offered service [

Description:	Communication Management shall automatically update the proxy instance of a service in a way that clients do not have to renew/reinstanciate their proxy instances. The reconnection has to fulfill all the requirements for the initial connection attempt.
Rationale:	It shall be possible to use a proxy instance independably of wether a server instance has been restarted and/or the handle of the proxy instance changes.
Dependencies:	–
Use Case:	Save the client application from the effort of keeping track of subscription state and resubscribing in case of restarts on server side
Supporting Material:	–

]

[RS_CM_00105] Communication Management shall provide an interface to stop offering services [

Description:	Application developers shall be able to stop the offering services which the application started to offer before.
Rationale:	After the offering of a service, it shall be possible to stop the offering of the service later on.
Dependencies:	–
Use Case:	Application “A” stops offering the wall clock service.
Supporting Material:	–

]

[RS_CM_00700] The Service Discovery shall evaluate the service version compatibility for service connection

Status: DRAFT

[

Description:	The Service Discovery shall evaluate the Service version compatibility for the service connection
Rationale:	Only Service versions of providers and clients which are compatible can be connected.
Dependencies:	–
Use Case:	Support of service contract versioning inside AUTOSAR Adaptiven platform
Supporting Material:	–

]

[RS_CM_00701] Service Versioning Blocklist [

Description:	A Service client instance can specify provider Service version which shall not be used for connection.
Rationale:	This feature enables last minute changes to "block" provider versions.
Dependencies:	–
Use Case:	Last minute changes/patches on OEM site
Supporting Material:	–

]

4.2.2.3 Static Service Connection

[RS_CM_00710] Static Service Connection [

Description:	AUTOSAR shall support Static service connection for selected/standardized bindings. Additional information: Static Can be pre-configured (not discovered dynamically at runtime). Selected/Standardized Explicitly defined by AUTOSAR
Rationale:	Compatibility to Classic platform. Performance, safety and cyber security improvements for service connect.
Dependencies:	Address info of service provider needs to exist. Service provider needs to be available
Use Case:	Statically configured connection to services.
Supporting Material:	–

]

4.2.2.4 Communication

4.2.2.4.1 Events and triggers

[RS_CM_00201] Communication Management shall provide an API to send events and triggers to other applications [

Description:	Application developers shall be able to provide data in form of events or triggers to other applications.
Rationale:	After offering a service, it shall be possible to send events of the respective service to all subscribed applications.
Dependencies:	–
Use Case:	Application “A” sends the power on event upon turning the key in the ignition lock.
Supporting Material:	–

]

[RS_CM_00223] The Communication Management shall protect the transmission of events using E2E protocol. The E2E Protection has to be executed behind the event API.

Status: DRAFT

Upstream requirements: RS_SAF_10039

[

Description:	Application developers shall be able to have an E2E-protected event-based communication, regardless of the bus used.
Rationale:	It shall be ensured that communication failure modes introduced by the communication bus (on the E2E-protected serialized data) which are detectable by the E2E protocol are detected by Communication Management. Note: It depends on the used communication type (periodic/ non-periodic) and the application which failure modes are to be detected.
Dependencies:	–
Use Case:	Application “A” receives an E2E-protected speed (as a part of an event). In case of a corruption or a loss, this is detected by a periodic polling by application and by E2E checks (CRC and a stuck-at counter), reported by Communication Management by E2E result. As a result, the application could enforce the safe state of its function, e.g. refusing to open tail gate.
Supporting Material:	[3]

]

[RS_CM_00202] Communication Management shall provide an API to the application to poll received events and triggers [

Description:	Application developers shall be able to query whether a certain event or trigger has been received from another application and read that data at the same time.
Rationale:	After subscribing to an event of a specific service instance, it shall be possible to receive events send by the server and access them in a polling-based style.
Dependencies:	–
Use Case:	Application “A” polls for the receiving of the power on event and is able to access the corresponding data.
Supporting Material:	–

]

[RS_CM_00203] Communication Management shall trigger the application on reception of an event or a trigger [

Description:	Application developers shall be able to let the platform trigger the application when a new event or trigger has been received from another application. The platform shall not deliver the data directly, but instead provide a mechanism to read the data upon request.
Rationale:	After subscribing to an event of a specific service instance, it shall be possible to receive events send by the server and access them in a event-based style through triggering of a processing function.
Dependencies:	–
Use Case:	Application “A” gets triggered whenever receiving the power on event and is able to access the corresponding data.
Supporting Material:	–

]

[RS_CM_00206] Communication Management shall queue received events and triggers

Status: DRAFT

[

Description:	Communication Management shall queue received events and triggers with configurable queue length and policy.
Rationale:	The application wants to ensure that it receives the last n events, n being the queue length.
Dependencies:	–
Use Case:	An application polls received events and wants to get the last n events received since the last polling.
Supporting Material:	–

]

[RS_CM_00224] The communication management shall provide the E2E information of the received event to the application.

Status: DRAFT

Upstream requirements: RS_SAF_10039, RS_SAF_10014

[

Description:	The communication management shall provide the E2E information of the received event to the application.
Rationale:	In case of reception of invalid E2E check result, the application shall be able to perform an appropriate error handling. The access to the event data is identical for safety-related and non-safety-related data.
Dependencies:	–
Use Case:	Application “A” polls gets invalid E2E check result and as a result it switches to a safe state.
Supporting Material:	The provided E2E information shall be, for each event in the queue: E2E status, E2E state, and the sample. Note that in case applications are triggered, there may be a need of an application-level detection of timeouts. This is because in case of delay or loss, the event will not arrive and E2E check will not be performed.

]

4.2.2.4.2 Methods

[RS_CM_00211] Communication Management shall provide an interface to provide methods to other applications [

Description:	Application developers shall be able to provide methods which can be called by other applications.
Rationale:	After offering a service, it shall be possible for other applications to call methods of the service and get the respective result.
Dependencies:	–
Use Case:	Application “A” calls the “getCurrentTime” method of the wall clock service provided by application “B”.

]

[RS_CM_00212] Communication Management shall provide an interface to call methods of other applications synchronously [

Description:	Application developers shall be able to synchronously call methods provided by other applications. It is required that the result is available when the method call returns.
Rationale:	After finding a service, it shall be possible for an application to call a method of the service as a synchronous service call: the calling application wants to wait for the completion of the service method execution and have the result available before continuing.





Dependencies:	–
Use Case:	Application “A” calls the “getCurrentTime” method of the wall clock service provided by application “B” and wants to stop processing until the result has been received.
Supporting Material:	–

]

[RS_CM_00213] Communication Management shall provide an interface to call service methods asynchronously [

Description:	Application developers shall be able to asynchronously call methods provided by other applications. It is not required that the result is available when the method call returns. Either the calling application checks for the completion of the service method execution by itself or it is notified on the completion.
Rationale:	After finding a service, it shall be possible for an application to call a method of the service as an asynchronous service call: the calling application does not want to wait for the completion of the service method execution and continues without the result available.
Dependencies:	–
Use Case:	Application “A” calls the “getCurrentTime” method of the wall clock service provided by application “B” asynchronously and can do further processing until the “getCurrentTime” method execution is finished.
Supporting Material:	–

]

[RS_CM_00400] Communication Management shall protect the transmission of methods using E2E protocol.

Status: DRAFT

Upstream requirements: RS_SAF_10039

[

Description:	Communication Management shall, transparent to the application, protect the transmission of methods using E2E protocol.
Rationale:	It shall be ensured that communication failure modes introduced by the communication bus (on the E2E-protected serialized request or response data) which are detectable by the E2E protocol are detected at the client side by Communication Management. Note: It depends on the used communication type (periodic/ non-periodic) and the application which failure modes are to be detected.
Dependencies:	–
Use Case:	E2E protected method calls in client-server based communication
Supporting Material:	[3]

]

[RS_CM_00401] The communication management shall provide the E2E information of the received method call to the application.

Status: DRAFT

Upstream requirements: RS_SAF_10039, RS_SAF_10014

[

Description:	The communication management shall provide the E2E information of the received method call to the application.
Rationale:	In case of reception of invalid E2E check result, the application shall be able to propagate detected E2E failure modes to the response data provided to the client. The access to the request data is identical for safety-related and non-safety-related data.
Dependencies:	–
Use Case:	Application “B” provides a method and this method is called by application “A” and receives with the request invalid E2E check result and as a result the same invalid E2E data are added to the response data
Supporting Material:	The provided E2E information shall be E2E status, E2E state and object data.

]

[RS_CM_00402] Communication Management shall support a decision for applying the method call based on E2E results.

Status: DRAFT

[

Description:	Communication Management shall provide the E2E information to the application that has received the request for the method call and decide based on the E2E information if the called method will be applied or not.
Rationale:	In case of reception of invalid E2E check result, the application shall be able to skip the received method call. Requests which have been corrupted during data transmission are not valid and could result in unintended results. The user of these results is not aware of this.
Dependencies:	–
Use Case:	Application “B” provides a method and this method is called by application “A” and receives with the request invalid E2E check result and as a result the called method is not applied
Supporting Material:	–

]

[RS_CM_00225] Communication Management shall provide an interface to call fire&forget service methods

Status: DRAFT

Description:	Application developers shall be able to call fire&forget methods provided by other applications for a "best effort" approach. The application is not expecting any kind of acknowledge or handshake from the provider of the service method. It even accepts, that the call will not even reach the provider of the service method.
Rationale:	After finding a service, it shall be possible for an application to call a method of the service as an fire&forget service call: the calling application does not want to get any information about the service method execution.
Dependencies:	–
Use Case:	Application "A" calls the "setCurrentTime" fire&forget method of the wall clock service provided by application "B" and will continue its execution independently of the method execution within "B".
Supporting Material:	–

[RS_CM_00214] Communication Management shall provide an interface to query the result of an asynchronously called service method

Status: DRAFT

Description:	Application developers shall be able to retrieve the result of an asynchronously called method. The method to query the result can be called at any time after the called method has returned: if it is called before completion of the service method execution, it returns instantly; if it is called after completion, it returns providing the result.
Rationale:	After calling a service method asynchronously, the application shall be able to get the result of this service method.
Dependencies:	–
Use Case:	Application "A" calls the "getCurrentTime" method of the wall clock service provided by application "B" asynchronously. After "getCurrentTime" method execution has completed, Application "A" accesses the result.
Supporting Material:	–

[RS_CM_00215] Communication Management shall trigger the application on completion of an asynchronously called service method [

Description:	Application developers shall be able to let the platform trigger the application when the result of an asynchronously called method is available.
Rationale:	After asynchronously calling a method of a specific service instance, it shall be possible to trigger a processing function on the availability of the method result.
Dependencies:	–
Use Case:	Application “A” calls the “getCurrentTime” method of the wall clock service provided by application “B” asynchronously. After “getCurrentTime” method execution has completed, Application “A” a specific function of Application “A” is called to notify that the result of “getCurrentTime” is available.
Supporting Material:	–

]

[RS_CM_00403] Communication management shall provide an interface to detect delay of E2E protected service responses at the client side by supervision of a predefined response deadline.*Status:* DRAFT*Upstream requirements:* RS_SAF_10039, RS_SAF_10014

[

Description:	Communication management shall provide an interface to detect delayed service responses at the client side by supervision of a predefined response deadline.
Rationale:	A delayed response shall be detected and the application can apply a safety related error reaction.
Dependencies:	–
Use Case:	Client is sending a method call. Client is awaiting the response within 300ms. After reaching the deadline the fault is detected at client side.
Supporting Material:	–

]

[RS_CM_00404] The communication management shall provide the E2E information of the method response to the application.*Status:* DRAFT*Upstream requirements:* RS_SAF_10039, RS_SAF_10014

[

Description:	The communication management shall provide the E2E information of the method response to the application.
Rationale:	In case of reception of invalid E2E check result, the application shall be able to perform an appropriate error handling. The access to the response data is identical for safety-related and non-safety-related data.

▽



Dependencies:	–
Use Case:	Application “A” requests a method call and receives with the response an invalid E2E check result and as a result it switches to a safe state.
Supporting Material:	Note, there may be a need of an application-level monitoring of a deadline to stop waiting for a response.

]

4.2.2.4.3 Fields

[RS_CM_00216] Communication Management shall provide an interface which aggregates methods to receive a notification on a changed field value as well as explicitly getting and setting the field value

Status: DRAFT

[

Description:	The interface shall aggregate the methods to receive a notification that the field value has changed, explicitly get the field value and explicitly set the field value. It shall also be possible to aggregate any non-empty subset of these methods.
Rationale:	To access properties held in a central location it is necessary to be able to query and modify the value as well as get notifications on change of the value.
Dependencies:	–
Use Case:	The consumers of sensor data would like to know the update rate of the sensor data and want to be able to change this value if they have different requirements.
Supporting Material:	–

]

[RS_CM_00227] Communication Management shall trigger the application on reception of a notification on field value change

Status: DRAFT

[

Description:	Application developers shall be able to let the platform trigger the application when a new notification on field value change has been received from another application. The platform shall not deliver the data directly, but instead provide a mechanism to read the data upon request.
Rationale:	It shall be possible to receive notifications on field value change sent by the server and access them in a event-based style through triggering of a processing function.
Dependencies:	–





Use Case:	A consumer of sensor data gets triggered on reception of a modified update rate.
Supporting Material:	–

]

[RS_CM_00217] Communication Management shall provide a method to remotely set the field value [

Description:	Communication Management shall provide a method to remotely set the field value.
Rationale:	The application wants to change the value of a field provided by another application.
Dependencies:	–
Use Case:	A consumer of sensor data would like to modify the update rate.
Supporting Material:	–

]

[RS_CM_00218] Communication Management shall provide a method to remotely get the field value [

Description:	Communication Management shall provide a method to remotely get the field value.
Rationale:	The application wants to know the value of a field provided by another application.
Dependencies:	–
Use Case:	A consumer of sensor data would like to know the sensor's current update rate.
Supporting Material:	–

]

[RS_CM_00219] Communication Management shall provide an interface which aggregates methods to send a notification on value change and to register a get and set function for the field value

Status: DRAFT

[

Description:	The interface shall aggregate the methods to send a notification on value change, and to register a get and set function for the field value. It shall also be possible to aggregate any non-empty subset of these methods. In case the method to send a notification is included in the aggregation, the first subscription shall trigger an event to the client with the field value.
---------------------	---



△

Rationale:	To share properties held in a central location with multiple consumers the providing application shall offer methods to query the current property value, modify the value and notify all consumers of changes to the value.
Dependencies:	–
Use Case:	The provider of sensor data notifies the consumers about the update rate. It also provides methods to the consumers to query and modify the update rate.
Supporting Material:	–

]

[RS_CM_00226] Communication Management shall provide a method to send notifications on data change to other applications

Status: DRAFT

[

Description:	Application developers shall be able to send notifications on change of a field value to other applications.
Rationale:	To share properties held in a central location with multiple consumers the providing application shall be able to notify all consumers of changes to the value.
Dependencies:	–
Use Case:	A provider of sensor data notifies the consumers that the current update rate has changed.
Supporting Material:	–

]

[RS_CM_00220] Communication Management shall trigger the set method of the application which provides the field [

Description:	Communication Management shall trigger the set method of the application which provides the field.
Rationale:	When other applications want to modify the current value of a field the Communication Management shall trigger the respective set method of the providing application.
Dependencies:	–
Use Case:	A provider of sensor data offers the consumers a method to modify the current update rate.
Supporting Material:	–

]

[RS_CM_00221] Communication Management shall trigger the get method of the application which provides the field [

Description:	Communication Management shall trigger the get method of the application which provides the field.
Rationale:	When other applications query the current value of a field the Communication Management shall trigger the respective get method of the providing application.
Dependencies:	–
Use Case:	A provider of sensor data offers the consumers a method to query the current update rate.
Supporting Material:	–

]

4.2.3 Raw Data Streaming Communication

[RS_CM_00410] The Communication Management shall provide an API to support reading and writing raw data streams that has no datatype information [

Description:	The Communication Management shall provide an API to support reading and writing raw data streams that has no datatype information.
Rationale:	A separate API is needed, since using SOME/IP services for raw data streams requires typed data and serialization, which introduces unnecessary overhead.
Dependencies:	–
Use Case:	Exchanging binary data between an ECU running adaptive applications and sensors in a car.
Supporting Material:	–

]

[RS_CM_00411] Application developers shall be able to send and receive raw binary data streams independent of the underlying network protocol [

Description:	Application developers shall be able to send and receive raw binary data streams independent of the underlying network protocol
Rationale:	The application API for Raw Data Streams shall be static. The network protocol and configuration shall only be handled in the deployment information.
Dependencies:	–
Use Case:	Sensors using different network protocols can be changed without updating the application code.
Supporting Material:	–

]

[RS_CM_00412] The Communication Management shall provide TCP/IP Sockets as network protocol for Raw Data Streams [

Description:	The Communication Management shall provide TCP/IP Sockets as network protocol for Raw Data Streams
Rationale:	Sockets is the most common transport mechanism used for ethernet communication
Dependencies:	–
Use Case:	Exchanging binary data between an ECU running adaptive applications and sensors in a car
Supporting Material:	–

]

[RS_CM_00413] Support of IEEE1722 Stream handling

Status: DRAFT

[

Description:	IEEE1722 stream access shall be available via Raw Data Stream
Rationale:	Application need to have the possibility to communicate via IEEE1722 streams in order to handle e.g. audio / video streams.
Dependencies:	RS_CM_00410
Use Case:	An AP application receive audio / video streams to feed local hardware drivers for replaying the received samples
Supporting Material:	[4, IEEE1722]

]

4.2.4 Security

[RS_CM_00801] Secure communication shall be transmitted using secure channels

Status: DRAFT

[

Description:	Communication that is subject to specific security requirements shall be transmitted using a secure channel.
Rationale:	Provide secure communication means.
Dependencies:	–
Use Case:	Nodes may need to communicate over a secure channel.
Supporting Material:	–

]

[RS_CM_00802] Secure channels shall be configurable

Status: DRAFT

[

Description:	Secure channels can be realized using various technologies. Therefore the kind and the parameters of a specific secure channel shall be configurable.
Rationale:	Enable modeling system security
Dependencies:	–
Use Case:	Nodes may host several services having different protection requirements thus requiring appropriate secure communication channels.
Supporting Material:	–

]

[RS_CM_00803] The assignment of communication to specific secure channels shall be configurable

Status: DRAFT

[

Description:	Secure channels can be realized using various technologies. Therefore, an application may be deployed in projects supporting different kinds of secure channels. The communication of the application shall be assigned to the respective secure channel.
Rationale:	Increase flexibility of an Adaptive Application
Dependencies:	–
Use Case:	Specific communication shall be assigned to the appropriate secure channel.
Supporting Material:	–

]

[RS_CM_00804] Using secure channels shall be transparent on the communication API

Status: DRAFT

[

Description:	Communication through configured secure channels shall be facilitated transparently by the communication stack. Communicating through a secured channel shall make no difference for the application.
Rationale:	Reduce maintenance effort of Adaptive Application code
Dependencies:	–
Use Case:	Application code may be reused to transfer data with different security requirements.
Supporting Material:	–

]

4.3 Non-Functional Requirements

There is no non-functional requirement.

5 References

- [1] Standardization Template
AUTOSAR_FO_TPS_StandardizationTemplate
- [2] Glossary
AUTOSAR_FO_TR_Glossary
- [3] Requirements on E2E
AUTOSAR_FO_RS_E2E
- [4] IEEE Standard 1722-2016 - IEEE Standard for a Transport Protocol for Time-Sensitive Applications in Bridged Local Area Networks

A Change history of AUTOSAR traceable items

A.1 Traceable item history of this document according to AUTOSAR Release R25-11

A.1.1 Added Requirements in R25-11

none

A.1.2 Changed Requirements in R25-11

Number	Heading
[RS_CM_00103]	Communication Management shall provide an interface to subscribe to a specific event or trigger provided by an instance of a certain service
[RS_CM_00104]	Communication Management shall provide an interface to stop the subscription to an event or a trigger of a service instance
[RS_CM_00106]	Communication Management shall provide a means to monitor the state of the subscription to an event or a trigger
[RS_CM_00201]	Communication Management shall provide an API to send events and triggers to other applications
[RS_CM_00202]	Communication Management shall provide an API to the application to poll received events and triggers
[RS_CM_00203]	Communication Management shall trigger the application on reception of an event or a trigger
[RS_CM_00204]	Service Oriented Communication realization with configured protocol
[RS_CM_00206]	Communication Management shall queue received events and triggers

Table A.1: Changed Requirements in R25-11

A.1.3 Deleted Requirements in R25-11

none

A.2 Traceable item history of this document according to AUTOSAR Release R24-11

A.2.1 Added Requirements in R24-11

Number	Heading
[RS_CM_00006]	Support of IEEE1722 Stream ACF Message handling





Number	Heading
[RS_CM_00413]	Support of IEEE1722 Stream handling

Table A.2: Added Requirements in R24-11

A.2.2 Changed Requirements in R24-11

none

A.2.3 Deleted Requirements in R24-11

Number	Heading
[RS_CM_00600]	Creation of CommunicationGroups
[RS_CM_00601]	Provide origin of information

Table A.3: Deleted Requirements in R24-11

A.3 Traceable item history of this document according to AUTOSAR Release R23-11

A.3.1 Added Requirements in R23-11

none

A.3.2 Changed Requirements in R23-11

Number	Heading
[RS_CM_00600]	Creation of CommunicationGroups
[RS_CM_00601]	Provide origin of information

Table A.4: Changed Requirements in R23-11

A.3.3 Deleted Requirements in R23-11

none