Document Title	Requirements on SOME/IP Service Discovery Protocol
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	801

Document Status	published
Part of AUTOSAR Standard	Foundation
Part of Standard Release	R25-11

Document Change History

Date	Release	Changed by	Description
2025-11-27	R25-11	AUTOSAR Release Management	• No content changes
2024-11-27	R24-11	AUTOSAR Release Management	• No content changes
2023-11-23	R23-11	AUTOSAR Release Management	• No content changes
2022-11-24	R22-11	AUTOSAR Release Management	• New requirement on grouping eventgroups (RS_SOMEIPSD_00026)
2021-11-25	R21-11	AUTOSAR Release Management	• No content changes
2020-11-30	R20-11	AUTOSAR Release Management	• Editorial changes
2019-11-28	R19-11	AUTOSAR Release Management	• Editorial changes • Changed Document Status from Final to published
2019-03-29	1.5.1	AUTOSAR Release Management	• No content changes
2018-10-31	1.5.0	AUTOSAR Release Management	• Editorial changes

△

2018-03-29	1.4.0	AUTOSAR Release Management	• No content changes
2017-12-08	1.3.0	AUTOSAR Release Management	• No content changes
2017-10-27	1.2.0	AUTOSAR Release Management	• Editorial changes
2017-03-31	1.1.0	AUTOSAR Release Management	• Editorial changes
2016-11-30	1.0.0	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 this document 5
1.1 Document Conventions 5
2 Acronyms and Abbreviations 6
3 Requirements 7
3.1 General 7
3.2 Service Offering and Finding 10
3.3 Event Subscriptions 13
3.4 Error Handling 14
4 References 16
A Change history of AUTOSAR traceable items 17
A.1 Traceable item history of this document according to AUTOSAR Release R25-11 17
A.1.1 Added Requirements in R25-11 17
A.1.2 Changed Requirements in R25-11 17
A.1.3 Deleted Requirements in R25-11 17
A.2 Traceable item history of this document according to AUTOSAR Release R24-11 17
A.2.1 Added Requirements in R24-11 17
A.2.2 Changed Requirements in R24-11 17
A.2.3 Deleted Requirements in R24-11 17
A.3 Traceable item history of this document according to AUTOSAR Release R23-11 18
A.3.1 Added Requirements in R23-11 18
A.3.2 Changed Requirements in R23-11 18
A.3.3 Deleted Requirements in R23-11 18

1 Scope of this document

The main tasks of Service Discovery is managing the availability (Find/Offer) of functional entities - called services - in the in-vehicle communication as well as managing the need for sending event messages to the network. This allows sending only event messages to receivers requiring them (Publish/Subscribe).

With Service Discovery different ECUs can offer Service Instances and find available Service Instances within the vehicle network. Service Instances are single implementations of a service that is defined by its service interface. An ECU can stop offering a Service Instance it was offering before. Later finds to such a service instance will remain unanswered. In the AUTOSAR context, a find is an operation to identify available Service Instances and their locations.

This document contains the requirements that shall be fulfilled by the SOME/IP Service Discovery protocol to offer this functionality based on SOME/IP communication mechanisms underneath.

1.1 Document Conventions

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 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations relevant to the SOME/IP specification that are not included in the [2, AUTOSAR glossary].

Abbreviation / Acronym:	Description:
Client	The ECU using the service instance of a server shall be called client in the context of this service instance.
Event	A uni-directional data transmission that is only invoked on changes or cyclically and is sent from the producer of data to the consumers.
Eventgroup	A logical grouping of events and notification events of fields inside a service in order to allow subscription
Field	A field does represent a status and thus has a valid value at all times on which getter, setter and notifier act upon.
Finding a service instance	Sending a SOME/IP-SD message in order to find a needed service instance.
Getter	A Request/Response call that allows read access to a field.
Method	A method, procedure, function, or subroutine that is called/invoked.
Notification Event	An event message of the notifier of a field.
Notifier	Sends out event message with a new value on change of the value of the field.
Offering a service instance	An ECU implements an instance of a service and tells other ECUs using SOME/IP-SD that they may use it.
Server	The ECU offering a service instance shall be called server in the context of this service instance.
Service	A logical combination of zero or more methods, zero or more events, and zero or more fields.
Service Instance	Implementation of a service, which can exist more than once in the vehicle and more than once on an ECU
Setter	A Request/Response call that allows write access to a field.
TTL	Time-to-Live

Table 2.1: Acronyms and Abbreviations

3 Requirements

3.1 General

[RS_SOMEIPSD_00021] SOME/IP Service Discovery protocol shall provide functionality to discover services ⌈

Description:	SOME/IP Service Discovery protocol shall provide functionality to discovery services and communication paths during runtime.
Rationale:	Service discovery in combination with service-based communication allows a communication which was not predefined during system design phase.
Use Case:	Communication between partners is not statically defined during system design phase.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00001] SOME/IP Service Discovery Protocol shall be used on top of SOME/IP Protocol ⌈

Description:	SOME/IP Service Discovery Protocol shall be used on top of SOME/IP Protocol to serialize and communicate service discovery related messages.
Rationale:	SOME/IP Service Discovery is specialized on SOME/IP based communication, common functionality needs only to be designed and implemented once.
Use Case:	Service discovery of SOME/IP services.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00002] SOME/IP Service Discovery Protocol shall support unicast messages ⌈

Description:	SOME/IP Service Discovery Protocol shall support unicast Service Discovery messages which are sent to exactly one receiver.
Rationale:	Unicast messages are a mechanism to hide data for certain receivers that do not need to spend processing resources on reception of unwanted data. Furthermore, also in switched network segments that don't contain any receivers the bandwidth usage is reduced.
Use Case:	SD message that offers the service is sent as answer to a find message to exactly one receiver.
AppliesTo:	FO

▽

△

Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00003] SOME/IP Service Discovery Protocol shall support multicast messages ⌈

Description:	SOME/IP Service Discovery Protocol shall support multicast Service Discovery messages which are sent from one sender to many receivers.
Rationale:	Low bandwidth consumption in comparison with unicast because multicast can be used to save data transmission if many receivers shall receive the same data.
Use Case:	SD message that offers the service is sent via IP multicast.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00004] SOME/IP Service Discovery Protocol shall support SOME/IP and non-SOME/IP services ⌈

Description:	SOME/IP Service Discovery Protocol shall support to publish and subscribe to data which belongs to SOME/IP and non-SOME/IP services. Non-SOME/IP services can be discovered and subscribed using SOME/IP SD but they are used afterwards without SOME/IP.
Rationale:	All services in the vehicle can be coordinated by the same service discovery protocol.
Use Case:	Use service discovery for legacy and new communication
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00005] SOME/IP Service Discovery Protocol shall support different versions of the same service ⌈

Description:	SOME/IP Service Discovery Protocol shall support different versions of the same service with different levels of functionality.
Rationale:	New ECUs can understand multiple versions of a service and can be reused in older vehicles.
Use Case:	Reusage of new ECUs in older vehicles.

▽

△

AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00006] SOME/IP Service Discovery Protocol shall define the format of the Service Discovery message ⌈

Description:	SOME/IP Service Discovery Protocol shall define the format of the Service Discovery header and payload
Rationale:	Header and payload needs to be defined to enable communication of service discovery between different parties
Use Case:	Service Discovery between different parties.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00007] SOME/IP Service Discovery Protocol shall define ordered feature sets for compliance of implementations ⌈

Description:	SOME/IP Service Discovery Protocol shall define ordered feature sets for compliance of implementations which provide different levels of functionality. The lowest level shall be supported by every implementation.
Rationale:	Enable small ECUs with low resource to participate at service discovery with a basic feature set.
Use Case:	Small ECUs can implement fewer features than large ECUs with a lot of resources.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00022] SOME/IP Service Discovery shall operate in a distributed manner ⌈

Description:	SOME/IP Service Discovery shall operate in a distributed manner with no centralized service directory.
Rationale:	A centralized service directory would impose a single point of failure and could become a performance bottleneck.
Use Case:	Robustness if single ECUs fail.

▽

△

AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00024] SOME/IP Service Discovery shall support configurable timings ⌈

Description:	SOME/IP Service Discovery shall support configurable timings to enable state changes after a certain time has passed.
Rationale:	The times need to be configurable to meet different in vehicle network requirements.
Use Case:	Configuration of period of cyclic offers
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00026] SOMEIPSD shall group events in accordance with SOMEIP Protocol ⌈

Description:	Grouping events into SOMEIPSD eventgroups shall be implemented in accordance with SOMEIP Protocol.
Rationale:	Service Discovery is based on SOME/IP
Use Case:	–
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

3.2 Service Offering and Finding

[RS_SOMEIPSD_00008] SOME/IP Service Discovery Protocol shall support to find the location of service instances ⌈

Description:	SOME/IP Service Discovery Protocol shall support to find the location of service instances within the local network.
Rationale:	Locations of services needs to be known to the communication partners.

▽

△

Use Case:	Communicate with a service instance which location is unknown to the other party.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00025] SOME/IP Service Discovery messages shall contain information how to contact the communication partner ⌈

Description:	SOME/IP Service Discovery messages shall contain information how to contact the communication partner. This information how to talk with the communication partner shall be aware of the underlying transport protocol.
Rationale:	To establish communication with a remote partner endpoint information are needed, these depend on the used transport protocol.
Use Case:	Support IPv4 and IPv6 in parallel.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00009] SOME/IP Service Discovery Protocol shall support to transport text-based names of services ⌈

Description:	SOME/IP Service Discovery Protocol shall support to transport text-based names (human readable) of services additional to the unique identifiers.
Rationale:	During debugging text-based names are easier to understand.
Use Case:	Human readable identification of service during debugging.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00010] SOME/IP Service Discovery Protocol shall provide support to transport optional data ⌈

Description:	SOME/IP Service Discovery Protocol shall provide support to transport optional data in addition to the standardized data.
Rationale:	During service discovery additional non standardized data might be needed.
Use Case:	Instance selection based on additional criteria
AppliesTo:	FO

▽

△

Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00011] SOME/IP Service Discovery Protocol shall provide support for load balancing ⌈

Description:	SOME/IP Service Discovery Protocol shall provide support for load balancing to distribute service subscriptions evenly.
Rationale:	Load balancing can be necessary if the load is not totally clear during system design phase.
Use Case:	Multiple providers provide the same service to the subscribers. The load shall be evenly balanced.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00012] SOME/IP Service Discovery Protocol shall support to detect whether service instances are active ⌈

Description:	SOME/IP Service Discovery Protocol shall support to detect whether published service instances are active or terminated and inform subscribers.
Rationale:	Services can shutdown ungracefully; some applications want to detect this.
Use Case:	Detection of ungraceful shutdown.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00013] SOME/IP Service Discovery Protocol shall support to offer published services ⌈

Description:	SOME/IP Service Discovery Protocol shall support to actively offer published services to other communication partners within the local network.
Rationale:	Active propagation of services.
Use Case:	Detection of available services without cyclic find messages
AppliesTo:	FO
Dependencies:	–

▽

△

Supporting Material:	–

⌋

[RS_SOMEIPSD_00014] SOME/IP Service Discovery Protocol shall support to stop offering services ⌈

Description:	SOME/IP Service Discovery Protocol shall support to actively stop offering services to notify other parties.
Rationale:	When a published service was gracefully terminated, it is necessary to inform the other parties that the service is not available anymore.
Use Case:	Graceful termination of published services
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

3.3 Event Subscriptions

[RS_SOMEIPSD_00015] SOME/IP Service Discovery Protocol shall support to subscribe to events ⌈

Description:	SOME/IP Service Discovery Protocol shall support to subscribe to events which are provided by a service instance.
Rationale:	Service based event communication is based on a publish/subscribe pattern to control the communication.
Use Case:	Reception of events
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00016] SOME/IP Service Discovery Protocol shall support to deny subscriptions ⌈

Description:	SOME/IP Service Discovery Protocol shall support to actively deny requested subscriptions to events.
Rationale:	If a publisher cannot provide the requested event to a requester, it is necessary to inform the subscriber about the rejection
Use Case:	Prevention of overload of publisher

▽

△

AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00017] SOME/IP Service Discovery Protocol shall support to stop subscriptions to events ⌈

Description:	SOME/IP Service Discovery Protocol shall support to actively stop a subscription of subscribed events.
Rationale:	When the data of an event is not needed any more by the receiver, the communication needs to be stopped.
Use Case:	Events provided by another party are not used any more.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

3.4 Error Handling

[RS_SOMEIPSD_00018] SOME/IP Service Discovery Protocol shall support reboot detection of service providers ⌈

Description:	SOME/IP Service Discovery Protocol shall support a detection whether service provider were rebooted.
Rationale:	An ECU reboot can lead to lost internal state of a service provider and hence to data which do not fit the expectation of the subscriber.
Use Case:	Detection of ECU reboot
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00019] SOME/IP Service Discovery Protocol shall standardize error handling ⌈

Description:	SOME/IP Service Discovery Protocol shall standardize error handling if unexpected situations occur.
Rationale:	Graceful error handling necessary if unexpected situations occur. The protocol needs to support this to give the applications the possibility to react on these.
Use Case:	Reaction to errors.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

[RS_SOMEIPSD_00020] SOME/IP Service Discovery Protocol shall support TTL ⌈

Description:	SOME/IP Service Discovery Protocol shall support TTL for service discovery functionality that can be subject for timely expiration, e.g service offers.
Rationale:	TTL prevents that service discovery states (e.g. a service is offered) persists endlessly if updates of the sate (e.g. stop of a service offer) are omitted due to faulty implementations, configurations or due to other errors in the system.
Use Case:	Limit erroneous state of service discovery to a maximal amount of time.
AppliesTo:	FO
Dependencies:	–
Supporting Material:	–

⌋

4 References

[1] Standardization Template
AUTOSAR_FO_TPS_StandardizationTemplate

[2] Glossary
AUTOSAR_FO_TR_Glossary

A Change history of AUTOSAR traceable items

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

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

none

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

none

A.2.2 Changed Requirements in R24-11

none

A.2.3 Deleted Requirements in R24-11

none

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

none

A.3.3 Deleted Requirements in R23-11

none