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Document Change History

Release	Changed by	Change Description
4.2.2	AUTOSAR Release Management	• Editorial changes
4.2.1	AUTOSAR Release Management	• Introduction of IPv6 for in-vehicle communication • Support for Global Time Synchronization over Ethernet • Support for Switch Control/Configuration, Semi-Static Auto-Configuration • TcpIp generic upper layer support (CDD)
4.1.2	AUTOSAR Release Management	• Added support for ISO 13400-2 • Updated Document Traceability • Editorial changes
4.1.1	AUTOSAR Administration	• Introduced IPv6 Protocol, VLAN • Added support for SWS_Service Discovery • Added support for SWS_TCPIP • Added support for SWS_DoIP • Editorial changes
4.1.1	AUTOSAR Administration	• New traceability mechanism
3.1.5	AUTOSAR Administration	• Initial Release

Disclaimer

Advice for users

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Table of Contents

1 Scope of Document

This document is intended to list the general requirements resulting from concept UID 387 TCP/IP CommStack Extensions (TCP/IP).
These will need to be implemented by the following software specifications:

- 414 UDP Network Management (UdpNm)
- 415 Ethernet State Manager (EthSM)
- 416 Socket Adaptor (SoAd)
- 417 Ethernet Interface (EthIf)
- 418 Diagnostics over IP (DoIP)
- 430 Ethernert Driver (Eth)
- 431 Ethernet Transciever Driver (Eth Trcv)
- 616 Service Discovery (Sd)
- 617 Tcp/Ip Stack (TcpIp)

2 Conventions to be used

- The representation of requirements in AUTOSAR documents follows the table specified in [7].

- In requirements, the following specific semantics shall be used (based on the Internet Engineering Task Force IETF).

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:

- SHALL: This word 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.
- MUST: This word means that the definition is an absolute requirement of the specification due to legal issues.
- MUST NOT: This phrase means that the definition is an absolute prohibition of the specification due to legal constraints.
- SHOULD: This word, or the adjective "RECOMMENDED", mean 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" mean 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, MUST 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, MUST be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides.)

2.1 Acronyms and abbreviations

Abbreviation / Acronym:	*Description:*
ARP	Address Resolution Protocol
COTS	Commercial Of The Shelf
DAD	Duplicate Address Detection
DEM	Diagnostic Event Manager
DET	Development Error Tracer
DHCP	Dynamic Host Configuration Protocol
DHCPv4	Dynamic Host Configuration Protocol for Internet Protocol Version 4
DHCPv6	Dynamic Host Configuration Protocol for Internet Protocol Version 6
DoIP	Diagnostics over IP
HTTP	HyperText Transfer Protocol
IANA	Internet Assigned Numbers Authority
ICMP	Internet Control Message Protocol
ICMPv4	Internet Control Message Protocol for Internet Protocol Version 4
ICMPv6	Internet Control Message Protocol for Internet Protocol Version 6
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPv4	Internet Protocol for Version 4
IPv6	Internet Protocol for Version 6
MTU	Maximum Transmission Unit
NDP	Neighbor Discovery Protocol
SoAd	AUTOSAR Socket Adaptor Module
TCP	Transmission Control Protocol
TCP/IP	A family of communication protocols used in computer networks
UDP	User Datagram Protocol
UdpNm	AUTOSAR UDP Network Management Module
XCP	eXtended Calibration Protocol

3 Functional Overview

3.1 TCP/IP Protocol Stack (TCPIP)

The TCP/IP protocol stack (TCP/IP stack) is intended to handle layers 2 through 4 of the ISO/OSI layer model. This includes, but is not limited to protocols like `IPv4`, `IPv6`, `DHCPv4`, `DHCPv6`, `ARP`, `NDP`, `TCP`, `UDP`, `ICMPv4`, `ICMPv6` and others.
In Terms of this model the SoAd and therefore the whole AUTOSAR COM stack above represent the application at layer 7.

3.2 SWS Socket Adaptor (SoAd)

The SoAd is an adaptor layer, not only matching the AUTOSAR APIs to standard socket APIs [9], but also mapping PDU IDs to socket connections.

3.3 SWS Diagnostics over IP (DoIP)

The DoIP part of the SoAd implements the functionality required by [10].

3.4 SWS Ethernet Interface (EthIf)

The Ethernet Interface provides standardized interfaces to provide the communication with the Ethernet bus system of an ECU. The APIs are independent from the specific Ethernet Controllers and Transceivers and their access through the responsible Driver layer. The Ethernet Interface is conceptually able to access one or more Ethernet Drivers and Ethernet Transceiver Drivers via one uniform interface.

3.5 SWS Ethernet Driver (Eth)

The Ethernet Driver offers uniform interfaces for the Ethernet Interface. The Ethernet Driver hides hardware specific details of the used Ethernet controller.

3.6 SWS Ethernet Transceiver Driver (EthTrcv)

The Ethernet Transceiver Driver offers uniform interfaces for the Ethernet Interface. The Ethernet Transceiver Driver hides hardware specific details of the used Ethernet transceiver.

3.7 SWS Ethernet State Manager (EthSM)

The Ethernet State Manager offers uniform interfaces for the Communication Manager (ComM). The Ethernet State Manager hides network specific details.

3.8 SWS UDP Network Management (UdpNm)

The UDP Network Management offers uniform interfaces for the Network Management Interface (NmIf). The UDP Network Management hides network specific details.

3.9 SWS Service Discovery (Sd)

Service Discovery serves primarily to determine the operational status of a service. A service may be comprised of any combination of SW-Cs and/or BSWs in an ECU. The BswM is used to aggregate the SW-Cs and BSWs status and trigger Sd when the required combination is available. Secondly Sd can also be used as a registration protocol for publish/subscribe communication paterns. In both cases Sd can transport addressing information in addition to the registration and avaialability information.

4 Requirements traceability

Document: Requirements on AUTOSAR Features[1].

Requirement	***Satisfied by***
[RS_BRF_00286]	OK, see Chapter 5
[RS_BRF_00283]	OK, see Chapter 5

5 Requirements Specification

5.1 General Requirements

5.1.1 Configuration

5.1.1.1 [SRS_Eth_00053] SWS shall specify configuration

⌈

Type:	New
Description:	The SWS documents shall include a configuration section to allow adaption of the functionality.
Rationale:	The functionality needs to be adapted to different use-cases and environments.
Use Case:	--
Dependencies:	--
Supporting Material:	--

⌋(RS_BRF_01056)

5.1.2 Operation

5.1.2.1 [SRS_Eth_00085] Robustness aganist the change of logical addresses

⌈

Type:	New
Description:	The Ethernet-related BSW modules of the AUTOSAR communication stack shall be able to handle the change of logical addresses of remote nodes.
Rationale:	ECUs can by configured for dynamic address assignment (e.g. DHCP) hence it is possible that ECUs change their addresses
Use Case:	DoIP, V2G, SD
Dependencies:	--
Supporting Material:	--

⌋ ()

5.1.3 AUTOSAR Interfaces

5.1.3.1 [SRS_Eth_00055] SoAd shall support UDP NM

⌈

Type:	New
Description:	The SoAd shall offer an interface API for UDP NM to send network management messages. This interface shall mimic the API of interfaces in Autosar.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

⌋(RS_BRF_01784)

5.1.3.2 [SRS_Eth_00056] SoAd shall support XCP

[

Type:	Valid
Description:	The SoAd module shall offer a data path to the AUTOSAR XCP module.
Rationale:	Exchange XCP frames between master and client
Use Case:	Calibration and Measurement
Dependencies:	--
Supporting Material:	ASAM XCP

](RS_BRF_01656)

5.1.3.3 [SRS_Eth_00058] SoAd shall support generic upper layers

[

Type:	Valid
Description:	The SoAd shall offer an interface API for a generic upper layer to send and receive PDUs via socket connections, to control socket connections and to provide notification of socket connection and IP address assignment state changes.
Rationale:	Simplifies adding of additional upper layers
Use Case:	DoIP, V2G, DNS-SD
Dependencies:	--
Supporting Material:	--

] (RS_BRF_01056)

5.1.3.4 [SRS_Eth_00103] TcpIp shall support generic upper layers [

Type:	Valid
Description:	The TcpIp shall offer a socket-based API for a generic upper layer to send and receive data, to control sockets and to provide notification of sockets and IP address assignment state changes.
Rationale:	Simplifies adding of custom tesing module for TCP/IP protocol testing allowing a more flexible testing than only using SoAd.
Use Case:	TCP/IP Protocol Testing during development and later phases
Dependencies:	--
Supporting Material:	--

] (RS_BRF_01784, RS_BRF_01056)

5.2 Functional Requirement

5.2.1 SWS TCP/IP Protocol Stack

5.2.1.1 TCP/IP General Requirements

5.2.1.1.1 [SRS_Eth_00054] TCPIP minimum functionality

[

Type:	Valid
Description:	If DoIP is not implemented, the minimum requirements on the functionality of the TCP/IP stack shall be determined by the configuration of the Socket Adaptor.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01784)

5.2.1.1.2 [SRS_Eth_00019] TCP and UDP related requirement specified in IETF RFC 1122 shall be implemented

[

Type:	Valid
Description:	TCP and UDP related requirements specified in IETF RFC 1122 shall be implement in the TCP/IP stack
Rationale:	--
Use Case:	IETF RFC 768, IETF RFC 793
Dependencies:	--
Supporting Material:	[10]; IETF RFC 1122

](RS_BRF_01784)

5.2.2 TCP/IP Internet Protocol

5.2.2.1 [SRS_Eth_00045] TCPIP automatic IP address assignment

[

Type:	Valid
Description:	The TCP/IP stack shall implement a mechanism to automatically configure an IP addresses..
Rationale:	This is necessary when no static IP-addresses are assigned to still allow for plug and play configuration of the TCP/IP stack.
Use Case:	--
Dependencies:	[SRS_Eth_00002]
Supporting Material:	[10]

](RS_BRF_01784)

5.2.3 TCP/IP Sub Module: IPv4

5.2.3.1 [SRS_Eth_00014] IPv4 shall be implemented according to IETF RFC 791

[

Type:	Valid
Description:	The Internet Protocol (IPv4) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 791
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	[10]; IETF RFC 791;

](RS_BRF_01784)

5.2.3.2 [SRS_Eth_00015] ARP shall be implemented according to IETF RFC 826

[

Type:	Valid
Description:	For DoIP the Address Resolution Protocol (ARP) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 826
Rationale:	--
Use Case:	--
Dependencies:	[SRS_Eth_00014]
Supporting Material:	[10]; IETF RFC 826

](RS_BRF_01784)

5.2.3.3 [SRS_Eth_00022] The dynamic configuration of IPv4 link-local addresses as specified in IETF RFC 3927 shall be implemented

[

Type:	Valid
Description:	For DoIP the dynamic configuration of IPv4 link-local addresses as specified in IETF RFC 3927 shall be implemented in the TCP/IP stack
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	[10]; IETF RFC 3927

](RS_BRF_01784)

5.2.4 TCP/IP Sub Module: IPv6

5.2.4.1 [SRS_Eth_00059] IPv6 shall be implemented according to IETF RFC 2460

[

Type:	Valid
Description:	Internet Protocol Version 6 (IPv6) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 2460. Limitation: the Authentication and Encapsulating Security Payload extension headers and other IPsec functionalities may not be supported. The handling of IPsec headers shall be tolerated Limitation: The TcpIp shall limit the IETF RFC 2460 to support only the reception of IPv6 fragment header and forbid the transmission. IETF RFC 2460 section 5. Packet Size Issue discourage the use of IP Fragmentation and therefore it can be covered by IETF RFC #1981 Path MTU Discovery for IP version 6). Extension: The Deprecation of Type 0 Routing Headers in IPv6 shall be implemented as stated in IETF RFC 5095
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 2460; IETF RFC 5095; IETF RFC 1981

](RS_BRF_01784)

5.2.4.2 [SRS_Eth_00089] The Deprecation of Type 0 Routing Headers shall be implemented according to IETF RFC 5095 [

Type:	Valid
Description:	The Deprecation of Type 0 Routing Headers in IPv6 shall be implemented as stated in IETF RFC 5095
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	IETF RFC 2460
Supporting Material:	[10]; IETF RFC 5095

] (RS_BRF_01784)

5.2.4.3 [SRS_Eth_00090] The Neighbor Discovery Protocol shall be implemented according to IETF RFC 4861 [

Type:	Valid
Description:	Neighbour Discovery Protocol shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4861 Limitation: Section 4.5 Redirect Message Format, section 7.2.8.Proxy Neighbor Advertisements and section 8. Redirect Function shall not be supported. No router functionality shall be supported.
Rationale:	IETF RFC 4861 replaces the IETF RFC 2461
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 4861

] (RS_BRF_01784)

5.2.4.4 [SRS_Eth_00091] The Optimistic Duplicate Address Detection (DAD) for IPv6 shall be implemented according to IETF RFC 4429 [

Type:	Valid
Description:	The Optimistic Duplicate Address Detection (DAD) for IPv6 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4429.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	IETF RFC 4861
Supporting Material:	[10]; IETF RFC 4429

] (RS_BRF_01784)

5.2.4.5 [SRS_Eth_00092] The IPv6 Addressing Architecture shall be implemented according to IETF RFC 4291 [

Type:	Valid
Description:	The IPv6 Addressing Architecture shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4291. Limitation: Section 2.6. Anycast Addresses shall not be supported. Section 2.8 A Node's Required Addresses shall be limited to the node requirements for host only.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 4291

] (RS_BRF_01784)

5.2.4.6 [SRS_Eth_00093] The Transmission of IPv6 Packets shall be implemented according to IETF RFC 2464 [

Type:	Valid
Description:	The Transmission of IPv6 Packets over Ethernet Networks shall at least be implemented in the TCP/IP stack as stated in IETF RFC 2464.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 2464

⌋ (RS_BRF_01784)

5.2.4.7 [SRS_Eth_00094] The Default Address Selection for IPv6 shall be implemented according to IETF RFC 6724 ⌈

Type:	Valid
Description:	The Default Address Selection for IPv6 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 6724. Limitation: Only Section 5. Source Address Selection shall be supported
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 6724

⌋ (RS_BRF_01784)

5.2.4.8 [SRS_Eth_00095] The Handling of Overlapping IPv6 Fragments shall be implemented according to IETF RFC 5722 ⌈

Type:	Valid
Description:	The Handling of Overlapping IPv6 Fragments shall at least be implemented in the TCP/IP stack as stated in IETF RFC 5722. Limitation: Only section 4. Node Behavior, first paragraph shall be supported.
Rationale:	For security reason, the overlapping of IP Fragments is explicitly forbidden (transmission and reception).
Use Case:	In-vehicle communication and diagnostics
Dependencies:	IETF RFC 2460
Supporting Material:	[10]; IETF RFC 5722

⌋ (RS_BRF_01784)

5.2.4.9 [SRS_Eth_00096] The Stateless Address Autoconfiguration for IPv6 shall be implemented according to IETF RFC 4862 ⌈

Type:	Valid
Description:	The Stateless Address Autoconfiguration for IPv6 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4862. Limitation: Only the sections 5.1. Node Configuration Variables, 5.3. Creation of Link-Local Addresses, 5.4. Duplicate Address Detection, 5.5 Creation of Global Addresses and section 5.6 Configuration Consistency shall be supported.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 4862

⌋ (RS_BRF_01784)

5.2.4.10 [SRS_Eth_00097] The Path MTU Discovery for IPv6 shall be implemented according to IETF RFC 1981 [

Type:	Valid
Description:	The Path MTU Discovery for IPv6 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 1981.
Rationale:	If a packet exceeds the configured MTU size, the packet shall be discarded.
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 1981

] (RS_BRF_01784)

5.2.5 TCP/IP ICMP

5.2.5.1 [SRS_Eth_00061]An API shall be available to generate any ICMP message

[

Type:	Valid
Description:	An API Shall be available to generate any ICMP message
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01784)

5.2.5.2 [SRS_Eth_00062]A call-back function shall be configurable for any received ICMP message type

[

Type:	Valid
Description:	A call-back function shall be configurable for any received ICMP message type
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01784)

5.2.1 TCP/IP Sub Module: ICMPv4

5.2.1.1 [SRS_Eth_00016] ICMPv4 shall be implemented according to IETF RFC 792

[

Type:	Valid
Description:	For the Internet Control Message Protocol (ICMP) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 792
Rationale:	
Use Case:	In-vehicle communication and diagnostics
Dependencies:	[SRS_Eth_00014]
Supporting Material:	[10]; IETF RFC 792

](RS_BRF_01784)

5.2.2 TCP/IP Sub Module: ICMPv6

5.2.2.1 [SRS_Eth_00098] ICMPv6 shall be implemented according to IETF RFC 4443

[

Type:	Valid
Description:	Internet Control Message Protocol (ICMPv6) for IPv6 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4443
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	IETF RFC 4443

] (RS_BRF_01784)

5.2.3 TCP/IP TCP

5.2.3.1 [SRS_Eth_00017] TCP shall be implemented according to IETF RFC 793

[

Type:	Valid
Description:	The Transmission Control Protocol (TCP) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 793
Rationale:	
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 793

](RS_BRF_01784)

5.2.3.2 [SRS_Eth_00099] Congestion Control strategies shall be implemented according to IETF RFC 5681 [

Type:	Valid
Description:	The Congestion control strategies shall at least be implemented in the TCP/IP stack as stated in IETF RFC 5681. Limitation: The strategies Slow-Start, Congestion Avoidance, Fast Retransmit and Fast Recovery shall be implemented.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	[10]; IETF RFC 5681

] (RS_BRF_01784)

5.2.3.3 [SRS_Eth_00100] The NewReno Modification shall be implemented according to IETF RFC 6582 [

Type:	Valid
Description:	The NewReno Modification to TCP's Fast Recovery Algorithm shall at least be implemented in the TCP/IP stack as stated in IETF RFC 6582. Limitation: The modification shall only be used if the Fast Recovery strategy of IETF RFC 5681 is enabled.
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	IETF RFC 5681
Supporting Material:	[10]; IETF RFC 6582

] (RS_BRF_01784)

5.2.4 TCP/IP UDP

5.2.4.1 [SRS_Eth_00018] UDP shall be implemented according to IETF RFC 768

[

Type:	Valid
Description:	The User Datagram Protocol (UDP) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 768
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	[10], IETF RFC 768

](RS_BRF_01784)

5.2.5 TCP/IP DHCP

5.2.5.1 [SRS_Eth_00065]An API shall be available to fill DHCP field

[

Type:	Valid
Description:	An API shall be available to fill any DHCPv4 and DHCPv6 options field
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01784)

5.2.5.2 [SRS_Eth_00066]An API shall be available to read any received DHCP field

⌈

Type:	Valid
Description:	An API shall be available to read any received DHCPv4 and DHCPv6 options field
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

⌋(RS_BRF_01784)

5.2.5.3 [SRS_Eth_00088] DHCP Server ⌈

Name:	DHCP Server
Short Description:	Assignment of IP-addresses
Description:	IP-addresses can be assigned depending on the port a DHCP request has been received.
Rationale:	DHCP server functionality is a standard feature in IP-networks and shall be supported. In automotive networks a modification is necessary that allows to assign defined IP addresses on a port basis.
Use Case:	ECU without a predefined IP address can get an IP address assigned via DHCP.
Functional Limits:	--
Error Handling:	--
Dependencies:	--
Conflicts:	--
Supporting Material:	--

⌋ (*RS_BRF_01776, RS_BRF_01784*)

5.2.6 TCP/IP Sub-Module: DHCPv4

5.2.6.1 [SRS_Eth_00020] DHCPv4 shall be implemented according to IETF RFC 2131

⌈

Type:	Valid
Description:	The Dynamic Host Configuration Protocol (DHCP) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 2131
Rationale:	--
Use Case:	--
Dependencies:	
Supporting Material:	[10]; IETF RFC 2131

⌋(RS_BRF_01784)

5.2.6.2 [SRS_Eth_00021] The DHCPv4 host name option shall be implemented according to IETF RFC 2132

⌈

Type:	Valid
Description:	The DHCPv4 host name option shall at least be implemented in the TCP/IP stack as stated in IETF RFC 2132
Rationale:	--
Use Case:	--
Dependencies:	[SRS_Eth_00047]; SRS_Eth_00020
Supporting Material:	[10]; IETF RFC 2132

](RS_BRF_01784)

5.2.6.3 [SRS_Eth_00101] DHCPv4 shall be implemented according to IETF RFC 4702 [

Type:	Valid
Description:	The Fully Qualified Domain Name Option for Dynamic Host Configuration Protocol for IPv4 shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4702 (The Dynamic Host Configuration Protocol for IPv4 (DHCPv4) Client Fully Qualified Domain Name (FQDN) Option).
Rationale:	--
Use Case:	--
Dependencies:	
Supporting Material:	[10]; IETF RFC 4702

] (RS_BRF_01784)

5.2.7 TCP/IP Sub-Module: DHCPv6

5.2.7.1 [SRS_Eth_00067]The IPv6 stack shall implement DHCPv6 as a DHCPv6 client according to IETF RFC 3315

[

Type:	Valid
Description:	The Dynamic Host Configuration Protocol for IPv6 (DHCPv6) shall at least be implemented in the TCP/IP stack as stated in IETF RFC 3315 as a DHCPv6 client. Limitation: The following sections shall not be implemented according to the “only Client” Use Case: • Relay Agent Behavior • Server Behavior • Section 12. Management of Temporary Addresses • Section 21. Authentication of DHCP Messages • Section 22.5. Identity Association for Temporary Addresses Option • Section 22.11. Authentication Option • Section 22.14. Rapid Commit Option
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	--
Supporting Material:	IETF RFC 3315

](RS_BRF_01784)

5.2.7.2 [SRS_Eth_00102] The Client Fully Qualified Domain Name (FQDN) Option for IPv6 shall be implemented according to IETF RFC 4704 [

Type:	Valid
Description:	The Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Client Fully Qualified Domain Name (FQDN) Option shall at least be implemented in the TCP/IP stack as stated in IETF RFC 4704. Limitation: Only the client behavior shall be supported
Rationale:	--
Use Case:	In-vehicle communication and diagnostics
Dependencies:	IETF RFC 3315
Supporting Material:	IETF RFC 4704

] (RS_BRF_01784)

5.2.7.3 [SRS_Eth_00068]The DNS configuration options for DHCPv6 shall be supported by IETF RFC 3646

[

Type:	Valid
Description:	The DNS Configuration Options for Dynamic Host Configuration Protocol for IPv6 shall be supported by IETF RFC 3646.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	IETF RFC 3646; IETF RFC 3315

](RS_BRF_01784)

5.3 SWS Socket Adaptor (SoAd)

5.3.1.1 [SRS_Eth_00004] The SoAd shall support a local multi-homed host

[

Type:	Valid
Description:	The SoAd shall support a local multi-homed host.
Rationale:	An ECU might be connected to multiple IP networks for different use-cases
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.2 [SRS_Eth_00002] The IP addresses as well as the method of acquisition shall be a configurable item.

[

Type:	Valid
Description:	The IP addresses as well as the method of acquisition shall be a configurable item.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.3 [SRS_Eth_00001] The initialisation the SoAd shall be able to establish all TCP connections

[

Type:	Valid
Description:	The initialisation the SoAd shall be able to establish all TCP connections as described in the configuration.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.4 [SRS_Eth_00005] Both UDP or TCP shall be usable

[

Type:	Valid
Description:	Both UDP or TCP shall be usable.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.5 [SRS_Eth_00009] Upon Shutdown the Socket Adaptor shall close all open TCP connections

[

Type:	Valid
Description:	Upon Shutdown the Socket Adaptor shall close all open TCP connections.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.6 [SRS_Eth_00008] The Socket Adaptor shall immediately try to re-establish any TCP connection if it is lost

[

Type:	Valid
Description:	The Socket Adaptor shall immediately try to re-establish any TCP connection if it is lost. ‘never give up’ strategy
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.7 [SRS_Eth_00010] The SoAd shall implement a mechanism by which resources can be shared among multiple socket connections

[

Type:	Valid
Description:	The SoAd shall implement a mechanism by which resources can be shared among multiple socket connections.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.8 [SRS_Eth_00011] The resources required for the socket connections shall be predictable by analyzing the configuration information

[

Type:	Valid
Description:	The resources required for the socket connections shall be predictable by analyzing the configuration information.
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.9 [SRS_Eth_00012] An API shall be offered where buffer memory is required

[

Type:	Valid
Description:	The Socket Adaptor, TcpIp,EthIf and Eth shall offer an API where buffer memory for transmission and reception of AUTOSAR PDUs via Ethernet is required
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	AUTOSAR API will be able to satisfy this requirement!

](RS_BRF_01776)

5.3.1.10 [SRS_Eth_00013] An API shall be offered for reduced copy operation

[

Type:	Valid
Description:	The Socket Adaptor, TcpIp, EthIf and Eth shall offer an API where the number of copy operations for transmission and reception of AUTOSAR PDUs via Ethernet is optimized (i.e. reduced to a minimum)
Rationale:	--
Use Case:	AUTOSAR API
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.11 [SRS_Eth_00006] The Socket Adaptor shall be able to transfer data using TCP/IP without the introduction of additional protocol overhead

[

Type:	Valid
Description:	The Socket Adaptor shall be able to transfer data using TCP/IP without the introduction of additional protocol overhead.
Rationale:	The protocol overhead introduced by Ethernet and TCP/IP is so large, that additional overhead is considered harmful.
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.12 [SRS_Eth_00048] SoAd shall implement a mechanism to bi-directionally route PDUs between an AUTOSAR connector and the TCP/IP stack

[

Type:	Valid
Description:	SoAd shall implement a mechanism to bi-directionally route PDUs between an AUTOSAR connector and the TCP/IP stack.
Rationale:	This is necessary to allow communication
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.13 [SRS_Eth_00049] SoAd shall implement an API towards higher layers, which is equivalent to the API provided by interface modules

[

Type:	Valid
Description:	SoAd shall implement an API towards higher layers, which is equivalent to the API provided by interface modules like FrIf, CanIf and LinIf.
Rationale:	Higher layers shall not be aware of the underlining communication stack.
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.14 [SRS_Eth_00050] SoAd shall implement an API towards higher layers, which is equivalent to the API provided by transport layer

[

Type:	Valid
Description:	SoAd shall implement an API towards higher layers, which is equivalent to the API provided by transport layer modules like FrTP and CanTP.
Rationale:	Higher layers shall not be aware of the underlining communication stack.
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.15 [SRS_Eth_00051] The Socket Adapter shall specify and be able to use a call-back interface towards the TCP/IP stack

[

Type:	Valid
Description	The Socket Adapter shall specify and be able to use a call-back interface towards the TCP/IP stack.
Rationale	the SoAd shall specify and be able to make use of a call-back interface, that reduces the number of required copy actions to and from the TCP/IP stack (optimized parameter) and reduces the latency (call-back functions).
Use Case	Instead of a commercial of the shelf TCP/IP stack an optimized automotive TCP/IP stack shall be usable.
Dependencies:	--
Supporting Material:	

](RS_BRF_01776)

5.3.1.16 [SRS_Eth_00069]The Socket Adapter shall implement a mechanism to share multiple PDUs from/to the same or different upper modules

[

Type:	Valid
Description:	The SoAd shall implement a mechanism by which a socket connection can be shared among multiple PDUs from/to the same or different upper layer modules.
Rationale:	Minimize resource consumption
Use Case:	Transmission of multiple COM-PDUs to the same remote node.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.17 [SRS_Eth_00070]The Socket Adapter shall implement a mechanism to transmit PDUs to more than one receiver

[

Type:	Valid
Description:	The SoAd shall implement a mechanism by which a PDU shall be transmitted to more than one receiver using the same or a different socket connection and by which a received PDU shall be forwarded to more than one upper layer PDU using the same or a different socket connection to the same or a different upper layer module. (i.e. fan out to lower and upper layer, fan in from mulitple connections)
Rationale:	--
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.3.1.18 [SRS_Eth_00071]The Socket Adapter shall implement a mechanism to activate or deactivate an upper layer using a routing group

[

Type:	Valid
Description:	The SoAd shall implement a mechanism by which a routing group can be activated or deactivated by an upper layer during runtime. A routing group consist of a number of PDUs from the same or different socket connections which shall be blocked (i.e. not routed to or from the upper layer). A PDU may only be part of a single routing group.
Rationale:	Blocking of undesired messages
Use Case:	Blocking of undesired notifications from a Publish/Subscribe Server
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.4 SWS Diagnostics over IP (DoIP)

5.4.1.1 [SRS_Eth_00047] DoIP shall be able to access the DHCP host name option.

[

Type:	Valid
Description:	The value used in the DHCP host name option shall be accessable and changeable by DoIP.
Rationale:	--
Use Case:	--
Dependencies:	[SRS_Eth_00021]
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.2 [SRS_Eth_00024] DoIP messages shall be bi-directionally routed

[

Type:	Valid
Description:	DoIP shall implement a mechanism to bi-directionally route DoIP messages between the vehicle networks and TCP sockets.
Rationale:	This is necessary to allow DoIP communication
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.3 [SRS_Eth_00025] Valid DoIP messages shall be recognized

Type:	Valid
Description:	DoIP shall provide a mechanism to recognize valid DoIP Messages
Rationale:	This is necessary to ensure correct DoIP communication
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.4 [SRS_Eth_00026] DoIP Vehicle Identification shall be provided

[

Type:	Valid
Description:	DoIP shall provide a mechanism to identify a vehicle respective its DoIP entity in a network
Rationale:	This is necessary to determine the IP addresses of the DoIP entity
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.5 [SRS_Eth_00027] DoIP diagnostic message shall have a format

[

Type:	Valid
Description:	DoIP shall implement a message format to allow the routing of diagnostic messages
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.6 [SRS_Eth_00028] Multiple DoIP sockets shall be allowed on a single port

[

Type:	Valid
Description:	DoIP shall implement a mechanism to allow the use and assignment of multiple sockets on a single port, while ensuring that no active communication is disturbed
Rationale:	This is necessary for the efficient use of socket communication
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.7 [SRS_Eth_00080] DoIP shall implement a mechanism to retrieve diagnostic power mode

[

Type:	Valid
Description:	DoIP shall implement a mechanism to retrieve the diagnostic power mode of a DoIP Entity via a diagnostic power mode request as described in ISO 134000-2:2012. The service is needed to provide the tester with the diagnostic capability information.
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.8 [SRS_Eth_00081]DoIP shall be able to dynamically maintain connection to different testers

[

Type:	Valid
Description:	DoIP shall be able to dynamically maintain the connection to different testers as described in ISO 134000-2:2012
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.9 [SRS_Eth_00082]DoIP shall implement a mechanism to retrieve Entity Status

Type:	Valid
Description:	DoIP shall implement a mechanism to retrieve the entity status information of a DoIP Entity via an Entity status request as described in ISO 134000-2:2012. The service is needed to provide the tester with the diagnostic capability information
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.10 [SRS_Eth_00083]DoIP shall implement a mechanism to check if diagnostic testers are alive

Type:	Valid
Description:	DoIP shall implement a mechanism to check if the connected testers are still available to allow an efficient management of connections for diagnostics from the DoIP entity point of view. The alive check mechanism shall be according to 13400-2:2012.
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.11 [SRS_Eth_00084]DoIP shall implement routing activation mechanism

Type:	Valid
Description:	DoIP shall implement a mechanism to allow the selective activation of diagnostics on all supported socket connections with the Routing activation mechanisms described in ISO 13400-2:2012
Rationale:	This is necessary to allow DoIP
Use Case:	--
Dependencies:	--
Supporting Material:	[10]

](RS_BRF_01440)

5.4.1.12 [SRS_Eth_00104] DoIP shall support USDT and UUDT messages according to ISO 14229-5 [

Type:	Valid
Description:	DoIP module shall support both the interface-API (for UUDT) and the transport layer API towards the PduR for USDT.
Rationale:	DoIP shall be able to route both USDT (Unacknowledged segmented data transfer) and UUDT (Unacknowledged unsegmented data transfer) messages.
Use Case:	Routing of USDT and UUDT messages
Dependencies:	--
Supporting Material:	ISO 14229

] (RS_BRF_01440)

5.5 SWS Ethernet Interface (EthIf)

5.5.1.1 [SRS_Eth_00031] The Ethernet Interface shall be pre-compile time configurable for interrupt or polling.

[

Type:	Valid
Description:	The Ethernet Interface shall provide configuration for interrupt and polling mode. In interrupt mode received frames shall be reported from the driver. In polling mode the main function shall check for received frames.
Rationale	Interface and interaction
Use Case	For low latency interrupt mode is crucial. On systems with high system load the polling mode reduces the system load
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.5.1.2 [SRS_Eth_00032] The Ethernet Interface shall provide hardware configuration and intitialization.

[

Type:	Valid
Description:	The Ethernet Interface shall provide hardware independent configuration and initialization interface.
Rationale	Hardware abstraction
Use Case	Exchanging the used Ethernet controller and transceiver shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.5.1.3 [SRS_Eth_00033] The Ethernet Interface shall provide indication for link state change.

[

Type:	Valid
Description:	The Ethernet Interface shall provide indication for link state change of connected transceivers.
Rationale	Interface and interaction
Use Case	Disconnection of the cable results in invalid IP address. Thus a valid IP assignment cycle has to be started.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.5.1.4 [SRS_Eth_00072]The Ethernet Interface shall provide VLAN support

[

Type:	Valid
Description:	The Ethernet Interface shall support VLAN tagging of Ethernet frames according to IEEE 802.1Q, i.e. add/remove VLAN tag at transmission/reception of Ethernet frames. A VLAN shall appear as a separate EthIf controller to the upper layer. The VLAN identifier shall be specified via EthIf configuration; the VLAN priority shall be specified by the upper layer as part of the transmission request and ignored at reception.
Rationale	Separation of logical networks
Use Case	Separation of internal and external vehicle communication
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.6 SWS Ethernet Driver (Eth)

5.6.1.1 [SRS_Eth_00035] The Ethernet Driver shall be pre-compile time configurable for interrupt or polling.

[

Type:	Valid
Description:	The Ethernet Driver shall provide configuration for interrupt and polling mode. In interrupt mode received frames shall be reported from the driver.
Use Case	For low latency interrupt mode is crucial. On systems with high system load the polling mode reduces the system load
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.6.1.2 [SRS_Eth_00036] The Ethernet Driver shall provide hardware configuration and intitialization.

[

Type:	Valid
Description:	The Ethernet Driver shall provide hardware independent configuration and initialization interface.
Rationale	Hardware abstraction
Use Case	Exchanging the used Ethernet controller shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.6.1.3 [SRS_Eth_00073]The Ethernet Driver shall support to receive MAC broadcast frames

⌈

Type:	Valid
Description:	The Ethernet driver shall support the configuration of the Ethernet controller to receive MAC broadcast frames.
Rationale	Reception of frames by all nodes
Use Case	ARP Request
Dependencies:	--
Supporting Material:	--

⌋(RS_BRF_01776)

5.6.1.4 [SRS_Eth_00074]The Ethernet Driver shall support to receive MAC groupcast frames

⌈

Type:	Valid
Description:	The Ethernet driver shall support the configuration of the Ethernet controller to receive MAC multicast frames.
Rationale	Reception of frames by multiple nodes
Use Case	Notification messages
Dependencies:	--
Supporting Material:	--

⌋(RS_BRF_01776)

5.6.1.5 [SRS_Eth_00105] Support of time stamping in hardware

⌈

Type:	New
Description:	The Ethernet driver shall provide an implementation which allows time stamping of Ethernet frames for time synchronized messages. This implementation has to be compatible as defined in“[12], ANNEX B.1.2 Time measurement granularity”. If this granularity could be ensured less than 100% by the supported hardware an additional software solution within the driver might be needed. However, a 100% software solution, by using resources outside of the Ethernet controller, e.g. own GPT etc., is not recommended.
Rationale:	Efficient implementation without hidden hardware ressources
Use Case:	GlobalTimeSynchronization
Dependencies:	--
Supporting Material:	--

⌋ (RS_BRF_01776)

5.7 SWS Ethernet Transceiver Driver (EthTrcv)

5.7.1.1 [SRS_Eth_00039] The Ethernet Transceiver Driver shall provide hardware configuration and intitialization.

⌈

Type:	Valid
Description:	The Ethernet Transceiver Driver shall provide hardware independent configuration and initialization interface.
Rationale	Hardware abstraction
Use Case	Exchanging the used Ethernet transceiver shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.7.1.2 [SRS_Eth_00040] The Ethernet Transceiver Driver shall provide access to the link state.

[

Type:	Valid
Description:	The Ethernet Transceiver Driver shall provide access to the link state of connected transceivers.
Rationale	Interface and interaction
Use Case	Disconnection of the cable results in invalid IP address. Thus a valid IP assignment cycle has to be started.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.7.1.3 [SRS_Eth_00106] The Ethernet Transceiver Driver shall switch on/off wake up functionality at pre compile time.

[

Type:	Valid
Description:	The Ethernet Transceiver Driver shall enable and disable wake up functionality of connected transceivers if supported by the hardware.
Rationale	Support the transceivers' wake-up capabilities
Use Case	Wake up the ECU by bus
Dependencies:	--
Supporting Material:	--

] (RS_BRF_01104, RS_BRF_01776)

5.7.1.4 [SRS_Eth_00107] The Ethernet Transceiver Driver shall support access to the wake up reason.

[

Type:	Valid
Description:	The Ethernet Transceiver Driver shall provide access to the wake up reason of connected transceivers if supported by the hardware.
Rationale	Distinguish between wake-up by bus or other wake-up
Use Case	Different handling of the wake-up event (e.g. starting/non starting of communication after a wake-up)
Dependencies:	--
Supporting Material:	--

] (RS_BRF_01104, RS_BRF_01776)

5.7.1.5 [SRS_Eth_00108] The Ethernet Transceiver Driver shall be able to wake-up the bus.

[

Type:	Valid
Description:	The Ethernet stack shall be able to wake-up the bus if supported by hardware.
Rationale	Support the transceivers' wake-up capabilities
Use Case	Wake up the bus actively
Dependencies:	--
Supporting Material:	--

⌋ (RS_BRF_01104, RS_BRF_01776)

5.8 SWS Ethernet Switch Driver (EthSwt)

5.8.1.1 [SRS_Eth_00086] Ethernet Switch Control

⌈

Name:	Ethernet Switch Control
Short Description:	Ethernet Switch Control shall provide an interface for managing and controlling a switch over an interface like SPI
Description:	Ethernet is a switched network and switches need to be integrated into AUTOSAR-ECUs. These ECUs need to have the capability to configure Ethernet switches.
Rationale:	Automotive Ethernet networks can include managed switches. For the management, i.e. control and configuration of these switches, an interface has to be provided.
Use Case:	Each ECU with an integrated Ethernet switch
Functional Limits:	--
Error Handling:	Software can detect errors at Ethernet switch ports, e.g. short circuits
Dependencies:	--
Conflicts:	--
Supporting Material:	--

⌋ (*RS_BRF_01776*)

5.8.1.2 [SRS_Eth_00087] Semi-Static Auto-Configuration

⌈

Name:	Semi-static Auto-Configuration for Ethernet
Short Description:	Semi-static Auto-Configuration shall trigger an optional learning process to learn MAC/Port-tables, assign IP-addresses, and learn MAC/IP-tables.
Description:	Beside the possibility to statically configure a switch, switches are able to automatically learn certain parameters. This learning process should be executed at assembly time or after replacement of ECUs with spare parts. Therefore, a process needs to be defined which triggers the learning process in these scenarios and also allows a persistent storage of learned parameters.
Rationale:	This Semi-static Auto-Configuration will be used in assembly and maintenance situations where Ethernet components are connected for the first time or replaced by spare parts.
Use Case:	Necessary for each Ethernet-ECU
Functional Limits:	--
Error Handling:	Uncompleted auto-configuration shall be detectable.
Dependencies:	--
Conflicts:	--
Supporting Material:	--

⌋ (*RS_BRF_01776*)

5.9 SWS Ethernet State Manager (EthSM)

5.9.1.1 [SRS_Eth_00043] The Ethernet State Manager shall provide network configuration and intitialization.

[

Type:	Valid
Description:	The Ethernet State Manager shall provide network independent configuration and initialization interface.
Rationale	Hardware abstraction
Use Case	Exchanging the used network shall be transparent and only be reflected by replacing the used State Manager.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776,RS_BRF_01664)

5.10 SWS UDP Network Management (UdpNm)

5.10.1.1 [SRS_Eth_00037] The UDP Network Management shall provide an interface for transmission of network management information.

[

Type:	Valid
Description:	The UDP Network Management shall provide an interface to send and receive network management information over UDP.
Rationale	Hardware abstraction
Use Case	Exchanging the used network shall be transparent and only be reflected by replacing the used Network Management.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776,RS_BRF_01680)

5.10.1.2 [SRS_Eth_00075]The UDP Network Management shall atleast provide the functionality of CAN NM.

Type:	Valid
Description:	The UDP Network Management shall match the functionality of CAN NM. (i.e Including optional services such as Partial Networking)
Rationale	Bus independence
Use Case	Replacement of CAN by Ethernet and IP
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776,RS_BRF_01680)

5.11 SWS Service Discovery (Sd)

5.11.1.1 [SRS_Eth_00076]The APIs of the Service Discovery module shall support any protocol

Type:	Valid
Description:	The APIs of the Sd module shall encapsulate the use of any protocol on the wire.
Rationale	The Sd functionality may be achieved with any number of different wire protocols.
Use Case	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12 Non-Functional Requirements

5.12.1 SWS TCP/IP Protocol Stack

5.12.1.1 [SRS_Eth_00077]The TCP/IP stack shall be implemented as independent sub-modules.

[

Type:	Valid
Description:	The TCP/IP stack shall be implemented as independent sub-modules.
Rationale:	The TCP/IP protocol suite is too large to be implemented in a monolithic block.
Use Case:	--
Dependencies:	--
Supporting Material:	--

](RS_BRF_01784)

5.12.2 SWS Socket Adaptor (SoAd)

5.12.2.1 [SRS_Eth_00078]The SoAd module shall be the sole PDU interface to the TCP/IP stack

[

Type:	Valid
Description:	SoAd module shall be the single PDU interface to the TCP/IP stack for AUTOSAR modules.
Rationale:	Modular design Single implementations of PDU to socket transformation
Use Case:	PDU communication via Ethernet used by multiple AUTOSAR modules.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12.3 SWS Ethernet Interface (EthIf)

5.12.3.1 [SRS_Eth_00029] Ethernet Interface shall be the single interface of all Ethernet modules to the Ethernet hardware drivers.

[

Type:	Valid
Description:	The Ethernet Interface shall be the single interface for all upper modules (i.e. TCP/IP module and Ethernet State Manager) to the lower layer Ethernet hardware drivers for each Ethernet controller (Ethernet Driver) and Ethernet transceiver (Ethernet Transceiver Driver).
Rationale:	Interface and interaction
Use Case:	Multiple software modules shall transmit and receive data through multiple Ethernet connections in a uniform way.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12.3.2 [SRS_Eth_00030] The Ethernet Interface shall be independent of the actual hardware.

[

Type:	Valid
Description:	The Ethernet Interface shall provide a hardware independent interface to its upper layer modules (i.e. TCP/IP module and Ethernet State Manager).
Rationale	Portability and reusability
Use Case	Exchanging the used Ethernet controller and transceiver shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12.4 SWS Ethernet Driver (Eth)

5.12.4.1 [SRS_Eth_00034] An Ethernet Driver shall offer a hardware independent interface.

[

Type:	Valid
Description:	An Ethernet Driver shall offer a hardware independent interface for all Ethernet controllers of the same type
Rationale	Hardware abstraction
Use Case	Exchanging the used Ethernet controller shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12.5 SWS Ethernet Transceiver Driver (EthTrcv)

5.12.5.1 [SRS_Eth_00038] An Ethernet Transceiver Driver shall offer a hardware independent interface.

[

Type:	Valid
Description:	An Ethernet Transceiver Driver shall offer a hardware independent interface for all Ethernet transceivers of the same type
Rationale	Hardware abstraction
Use Case	Exchanging the used Ethernet transceiver shall be transparent and only be reflected by replacing the used driver.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776)

5.12.6 SWS Ethernet State Manager (EthSM)

5.12.6.1 [SRS_Eth_00041] An Ethernet State Manager shall offer network independent state handling

[

Type:	Valid
Description:	An Ethernet State Manager shall offer network independent state handling. - Uninitialized - No Communication - Full Communication
Rationale	Hardware abstraction
Use Case	Exchanging the used network shall be transparent and only be reflected by replacing the used State Manager.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776,RS_BRF_01664)

5.12.7 SWS UDP Network Management (UdpNm)

5.12.7.1 [SRS_Eth_00042] A UDP Network Management shall offer network independent interface.

[

Type:	Valid
Description:	A UDP Network Management shall offer network independent interface
Rationale	Hardware abstraction
Use Case	Exchanging the used network shall be transparent and only be reflected by replacing the used Network Management.
Dependencies:	--
Supporting Material:	--

](RS_BRF_01776,RS_BRF_01680)

6 References

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[5] AUTOSAR Socket Adaptor
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[6] AUTOSAR Ethernet Interface
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