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2019-11-28	R19-11	AUTOSAR Release Management	• Introduced CONC 649 DoIP Extension in draft state • Updated the functionality of routing activation for security use-cases • Increased multiplicity of DoIP target address so more than 255 DoIP addresses could be used • Minor corrections / clarifications / editorial changes; for details please refer to the ChangeDocumentation • Changed Document Status from Final to published
2018-10-31	4.4.0	AUTOSAR Release Management	• Updated the functionality to receive vehicle announcements • Support to add an increased number of DoIP target addresses • DoIP header file clean-up • Minor corrections / clarifications / editorial changes; for details please refer to the ChangeDocumentation
2017-12-08	4.3.1	AUTOSAR Release Management	• Support for DoIP UDP Connections with limited broadcast IP addresses • Support for Further Action Code values for vehicle identification and vehicle announcement • Alignment of routing activation confirmation with ISO 13400 • Editorial changes

Document Change History

Date	Release	Changed by	Change Description
2016-11-30	4.3.0	AUTOSAR Release Management	• Support for DoIP Activation line switch • Support for UDP multicast vehicle announcement • Introduction of reliable TxConfirmation • Harmonization of identical APIs functions within BSW
2015-07-31	4.2.2	AUTOSAR Release Management	• DET Renaming and Extension Incorporation • Support for parallel diagnostic sessions
2014-10-31	4.2.1	AUTOSAR Release Management	• Harmonization of identical APIs within BSW • Handling UUDT messages within DoIP • Harmonization of callback functions and configuration parameter names • Editorial changes
2014-03-31	4.1.3	AUTOSAR Release Management	• Harmonization of identical APIs • Multiplicity of some configuration parameters were updated • Editorial changes
2013-10-31	4.1.2	AUTOSAR Release Management	• Formalization of Service Interfaces • Revised return values of Service Interfaces • Editorial changes
2013-03-15	4.1.1	AUTOSAR Administration	• Initial Release

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Table of Contents

1 Introduction and functional overview

The intent of this document is to specify the functionality, API and the configuration of the AUTOSAR Basic Software module Diagnostic over IP (DoIP).
For detailed introduction and information about DoIP please refer to ISO 13400 documents set.

AUTOSAR as SW standard can provide a standardized solution of the ISO DoIP specification in the already existing Ethernet architecture as depict in Figure 1.

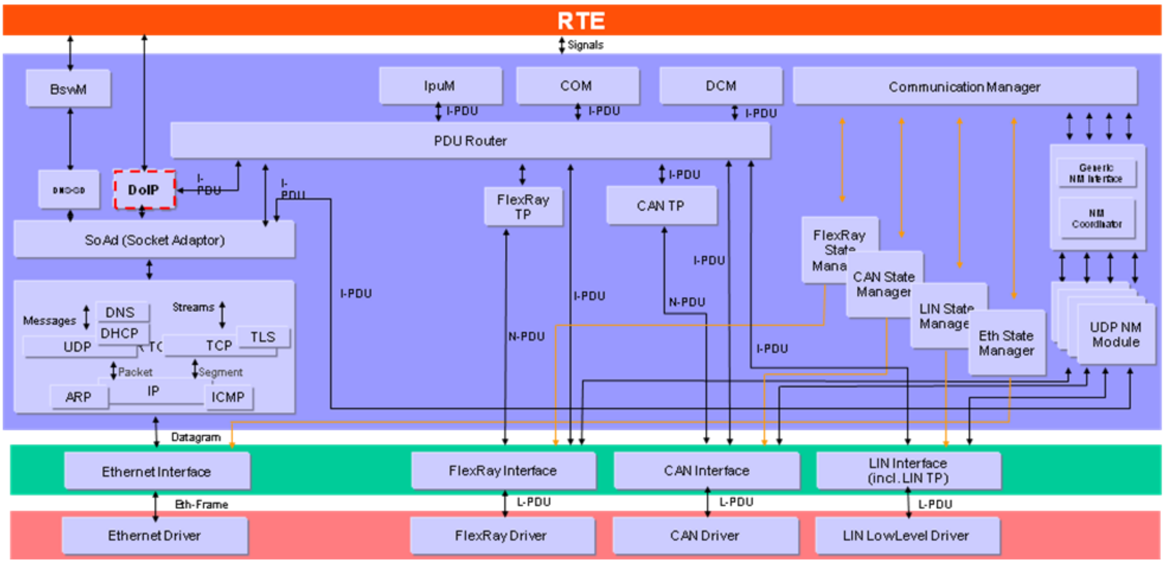


Figure 1: DoIP in the AUTOSAR ComStack Stack Architecture

2 Acronyms and abbreviations

Abbreviation / Acronym:	*Description:*
ARP	Address Resolution Protocol
DHCP	Diagnostic Host Configuration Protocol
EID	Entity identifier
GID	Group identifier
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
TCP	Transmission Control Protocol
TCP/IP	A family of communication protocols used in computer networks
VIN	Vehicle Identification Number
UDP	User Datagram Protocol

3 Related documentation

3.1 Input documents

[1] Layered Software Architecture
AUTOSAR_EXP_LayeredSoftwareArchitecture.pdf

[2] General Requirements on Basic Software Modules
AUTOSAR_SRS_BSWGeneral.pdf

[3] Specification of Communication Stack Types
AUTOSAR_SWS_CommunicationStackTypes.pdf

[4] Specification of Diagnostic Communication Manager
AUTOSAR_SWS_DiagnosticCommunicationManager.pdf

[5] Specification of ECU Configuration
AUTOSAR_TPS_ECUConfiguration.pdf

[6] Specification of RTE
AUTOSAR_SWS_RTE.pdf

[7] Specification of Default Error Tracer
AUTOSAR_SWS_DefaultErrorTracer.pdf

[8] Specification of BSW Module Description Template
AUTOSAR_TPS_BSWModuleDescriptionTemplate.pdf

[9] Requirements on Ethernet Support in AUTOSAR
AUTOSAR_SRS_Ethernet.pdf

[10] List of Basic Software Modules
AUTOSAR_TR_BSWModuleList.pdf

[11] Specification of Socket Adaptor
AUTOSAR_SWS_SocketAdaptor.pdf

[12] Specification of PDU Router
AUTOSAR_SWS_PDURouter.pdf

[13] Specification of TCP/IP Stack
AUTOSAR_SWS_TCPIP.pdf

[14] AUTOSAR General Specification for Basic Software Modules
AUTOSAR_SWS_BSWGeneral.pdf

3.2 Related standards and norms

[15] ISO 13400-2, Road vehicles – Diagnostic communication over Internet Protocol (DoIP) – Part 2: Transport protocol and network layer services

3.3 Related specification

AUTOSAR provides a General Specification on Basic Software modules [14] (SWS BSW General), which is also valid for the DoIP module.

Thus, the specification SWS BSW General [14] shall be considered as additional and required specification for the DoIP module.

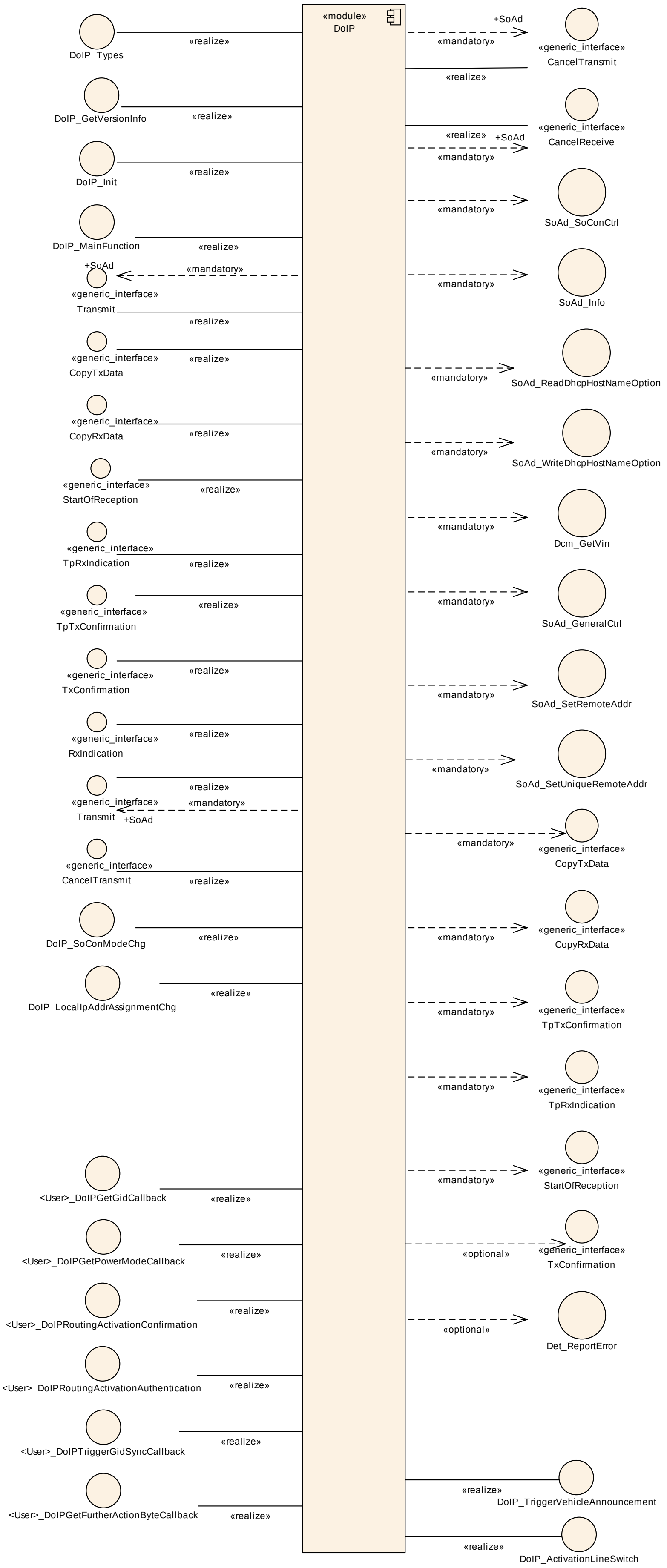
4 Constraints and assumptions

4.1 Applicability to car domains

The DoIP basic software module may be used for all car domains.

5 Dependencies to other modules

This section describes the relations and dependencies between the DoIP module and other AUTOSAR Basic Software modules. It describes briefly the services and interfaces required from other modules and how they call the DoIP module and how they are called by the DoIP module.


«module»
DoIP
DoIP_Types
«realize»
DoIP_GetVersionInfo
«realize»
DoIP_Init
«realize»
DoIP_MainFunction
«realize»
+SoAd
«mandatory»
«generic_interface»
Transmit
«realize»
«generic_interface»
CopyTxData
«realize»
«generic_interface»
CopyRxData
«realize»
«generic_interface»
StartOfReception
«realize»
«generic_interface»
TpRxIndication
«realize»
«generic_interface»
TpTxConfirmation
«realize»
«generic_interface»
TxConfirmation
«realize»
«generic_interface»
RxIndication
«realize»
«realize»
«mandatory»
«generic_interface»
Transmit
+SoAd
«generic_interface»
CancelTransmit
«realize»
DoIP_SoConModeChg
«realize»
DoIP_LocalIpAddrAssignmentChg
«realize»
<User>_DoIPGetGidCallback
«realize»
<User>_DoIPGetPowerModeCallback
«realize»
<User>_DoIPRoutingActivationConfirmation
«realize»
<User>_DoIPRoutingActivationAuthentication
«realize»
<User>_DoIPTriggerGidSyncCallback
«realize»
<User>_DoIPGetFurtherActionByteCallback
«realize»
+SoAd
«mandatory»
«generic_interface»
CancelTransmit
«realize»
«generic_interface»
CancelReceive
«realize»
+SoAd
«mandatory»
«mandatory»
SoAd_SoConCtrl
«mandatory»
SoAd_Info
«mandatory»
SoAd_ReadDhcpHostNameOption
«mandatory»
SoAd_WriteDhcpHostNameOption
«mandatory»
Dcm_GetVin
«mandatory»
SoAd_GeneralCtrl
«mandatory»
SoAd_SetRemoteAddr
«mandatory»
SoAd_SetUniqueRemoteAddr
«mandatory»
«generic_interface»
CopyTxData
«mandatory»
«generic_interface»
CopyRxData
«mandatory»
«generic_interface»
TpTxConfirmation
«mandatory»
«generic_interface»
TpRxIndication
«mandatory»
«generic_interface»
StartOfReception
«optional»
«generic_interface»
TxConfirmation
«optional»
Det_ReportError
«realize»
DoIP_TriggerVehicleAnnouncement
«realize»
DoIP_ActivationLineSwitch

5.1 Socket Adaptor (SoAd)

The Socket Adaptor [11] is the lower layer module of the DoIP module. It provides:

- Interfaces and callbacks for Socket connection establishment and notification
- Transmission of Data via multiple socket connection
- Reception of Data via multiple socket connection
- Notification on Socket status changes
- Notification on IP Address status changes

The Socket Adaptor is the interfacing module for the TCP/IP Stack [13] that supports IP, TCP, UDP,IPv4, IPv6 and address assignment mechanisms like AutoIP and DHCP.

5.2 Pdu Router (PduR)

The Pdu Router [12] is the module used by the DoIP module to connect to the rest of the communication stack. It provides:

- Forward diagnostic messages from the DoIP module to other modules (i.e. internal Dcm or other TP module)
- Forward diagnostic messages from Dcm or other TP modules to the DoIP module.

The PduR is the module to route the diagnostic message from the DoIP module to their according destination and back.

5.3 Diagnostic Communication Manager (Dcm)

The Diagnostic Communication Manager [4] is the module providing the VIN to the DoIP module. Additionally the Dcm will execute the ECU local diagnostic routed via PduR.

5.4 Default Error Tracer (Det)

If the configuration parameter DoIPDevelopmentErrorDetect is set to true and a DoIP API is called with incorrect parameters, the Default Error Tracer [7] is called with an error ID.

5.5 File structure

5.5.1 Code file structure

For details refer to chapter 5.1.6 “Code file structure” in SWS_BSWGeneral [14].

6 Requirements traceability

Requirement	Description	Satisfied by
SRS_BSW_00407	Each BSW module shall provide a function to read out the version information of a dedicated module implementation	SWS_DoIP_00027
SRS_BSW_00411	All AUTOSAR Basic Software Modules shall apply a naming rule for enabling/disabling the existence of the API	SWS_DoIP_00027
SRS_Eth_00024	DoIP messages shall be bi-directionally routed	SWS_DoIP_00022, SWS_DoIP_00023, SWS_DoIP_00024, SWS_DoIP_00026, SWS_DoIP_00031, SWS_DoIP_00032, SWS_DoIP_00033, SWS_DoIP_00037, SWS_DoIP_00038, SWS_DoIP_00197, SWS_DoIP_00198, SWS_DoIP_00200, SWS_DoIP_00207, SWS_DoIP_00208, SWS_DoIP_00209, SWS_DoIP_00210, SWS_DoIP_00212, SWS_DoIP_00214, SWS_DoIP_00216, SWS_DoIP_00217, SWS_DoIP_00218, SWS_DoIP_00219, SWS_DoIP_00220, SWS_DoIP_00221, SWS_DoIP_00223, SWS_DoIP_00224, SWS_DoIP_00225, SWS_DoIP_00226, SWS_DoIP_00228, SWS_DoIP_00229, SWS_DoIP_00230, SWS_DoIP_00231, SWS_DoIP_00232, SWS_DoIP_00233, SWS_DoIP_00244, SWS_DoIP_00245, SWS_DoIP_00253, SWS_DoIP_00254, SWS_DoIP_00257, SWS_DoIP_00259, SWS_DoIP_00260, SWS_DoIP_00277, SWS_DoIP_00278, SWS_DoIP_00279, SWS_DoIP_00284
SRS_Eth_00025	-	SWS_DoIP_00004, SWS_DoIP_00005, SWS_DoIP_00006, SWS_DoIP_00007, SWS_DoIP_00008, SWS_DoIP_00009, SWS_DoIP_00010, SWS_DoIP_00012, SWS_DoIP_00013, SWS_DoIP_00014, SWS_DoIP_00016, SWS_DoIP_00017, SWS_DoIP_00018, SWS_DoIP_00019, SWS_DoIP_00292, SWS_DoIP_00293
SRS_Eth_00026	DoIP Vehicle Identification shall be provided	SWS_DoIP_00015, SWS_DoIP_00050, SWS_DoIP_00051, SWS_DoIP_00056, SWS_DoIP_00057, SWS_DoIP_00059, SWS_DoIP_00060, SWS_DoIP_00061, SWS_DoIP_00062, SWS_DoIP_00063, SWS_DoIP_00064, SWS_DoIP_00065, SWS_DoIP_00066, SWS_DoIP_00067, SWS_DoIP_00068, SWS_DoIP_00069, SWS_DoIP_00070, SWS_DoIP_00071, SWS_DoIP_00072, SWS_DoIP_00073, SWS_DoIP_00074, SWS_DoIP_00075,

		SWS_DoIP_00076, SWS_DoIP_00077, SWS_DoIP_00078, SWS_DoIP_00079, SWS_DoIP_00080, SWS_DoIP_00081, SWS_DoIP_00082, SWS_DoIP_00083, SWS_DoIP_00084, SWS_DoIP_00086, SWS_DoIP_00087, SWS_DoIP_00088, SWS_DoIP_00089, SWS_DoIP_00205, SWS_DoIP_00263, SWS_DoIP_00264, SWS_DoIP_00287, SWS_DoIP_00288, SWS_DoIP_00289, SWS_DoIP_00290, SWS_DoIP_00291
SRS_Eth_00027	DoIP diagnostic message shall have a format	SWS_DoIP_00121, SWS_DoIP_00122, SWS_DoIP_00123, SWS_DoIP_00124, SWS_DoIP_00125, SWS_DoIP_00126, SWS_DoIP_00127, SWS_DoIP_00128, SWS_DoIP_00129, SWS_DoIP_00130, SWS_DoIP_00131, SWS_DoIP_00132, SWS_DoIP_00133, SWS_DoIP_00134, SWS_DoIP_00135, SWS_DoIP_00136, SWS_DoIP_00137, SWS_DoIP_00138, SWS_DoIP_00173, SWS_DoIP_00174
SRS_Eth_00028	Multiple DoIP sockets shall be allowed on a single port	SWS_DoIP_00002, SWS_DoIP_00039, SWS_DoIP_00040, SWS_DoIP_00058, SWS_DoIP_00085, SWS_DoIP_00115, SWS_DoIP_00201, SWS_DoIP_00202, SWS_DoIP_00204, SWS_DoIP_00234, SWS_DoIP_00235, SWS_DoIP_00241, SWS_DoIP_00243, SWS_DoIP_00296, SWS_DoIP_00297, SWS_DoIP_00298
SRS_Eth_00047	DoIP shall be able to access the DHCP host name option.	SWS_DoIP_00154, SWS_DoIP_00155, SWS_DoIP_00156
SRS_Eth_00080	DoIP shall implement a mechanism to retrieve diagnostic power mode	SWS_DoIP_00047, SWS_DoIP_00054, SWS_DoIP_00090, SWS_DoIP_00091, SWS_DoIP_00092, SWS_DoIP_00093, SWS_DoIP_00261
SRS_Eth_00081	DoIP shall be able to dynamically maintain connection to different testers	SWS_DoIP_00001, SWS_DoIP_00002, SWS_DoIP_00039, SWS_DoIP_00040, SWS_DoIP_00058, SWS_DoIP_00085, SWS_DoIP_00115, SWS_DoIP_00201, SWS_DoIP_00202, SWS_DoIP_00204, SWS_DoIP_00234, SWS_DoIP_00235, SWS_DoIP_00241, SWS_DoIP_00243, SWS_DoIP_00296, SWS_DoIP_00297, SWS_DoIP_00298
SRS_Eth_00082	-	SWS_DoIP_00094, SWS_DoIP_00095, SWS_DoIP_00096, SWS_DoIP_00097, SWS_DoIP_00098, SWS_DoIP_00099, SWS_DoIP_00100
SRS_Eth_00083	-	SWS_DoIP_00058, SWS_DoIP_00105, SWS_DoIP_00107, SWS_DoIP_00115, SWS_DoIP_00139, SWS_DoIP_00140, SWS_DoIP_00141, SWS_DoIP_00142, SWS_DoIP_00143, SWS_DoIP_00144, SWS_DoIP_00145, SWS_DoIP_00146, SWS_DoIP_00159

SRS_Eth_00084	-	SWS_DoIP_00048, SWS_DoIP_00049, SWS_DoIP_00055, SWS_DoIP_00101, SWS_DoIP_00102, SWS_DoIP_00103, SWS_DoIP_00104, SWS_DoIP_00105, SWS_DoIP_00106, SWS_DoIP_00107, SWS_DoIP_00108, SWS_DoIP_00109, SWS_DoIP_00110, SWS_DoIP_00111, SWS_DoIP_00112, SWS_DoIP_00113, SWS_DoIP_00114, SWS_DoIP_00116, SWS_DoIP_00117, SWS_DoIP_00118, SWS_DoIP_00119, SWS_DoIP_00120, SWS_DoIP_00160, SWS_DoIP_00161, SWS_DoIP_00262, SWS_DoIP_00274, SWS_DoIP_00294, SWS_DoIP_00295

7 Functional specification

This specification provides the AUTOSAR representation of ISO 13400-2 as specified in the following chapters.

7.1 DoIP usage scenarios

This chapter gives only a brief overview of some use cases. For detailed information about DoIP usage scenarios please refer to ISO 13400-1.

The use cases for usage of DoIP differ from the single connection of external test equipment (see Figure 2) to a brought interconnectivity of the car or single ECUs with the environment (see Figure 3).

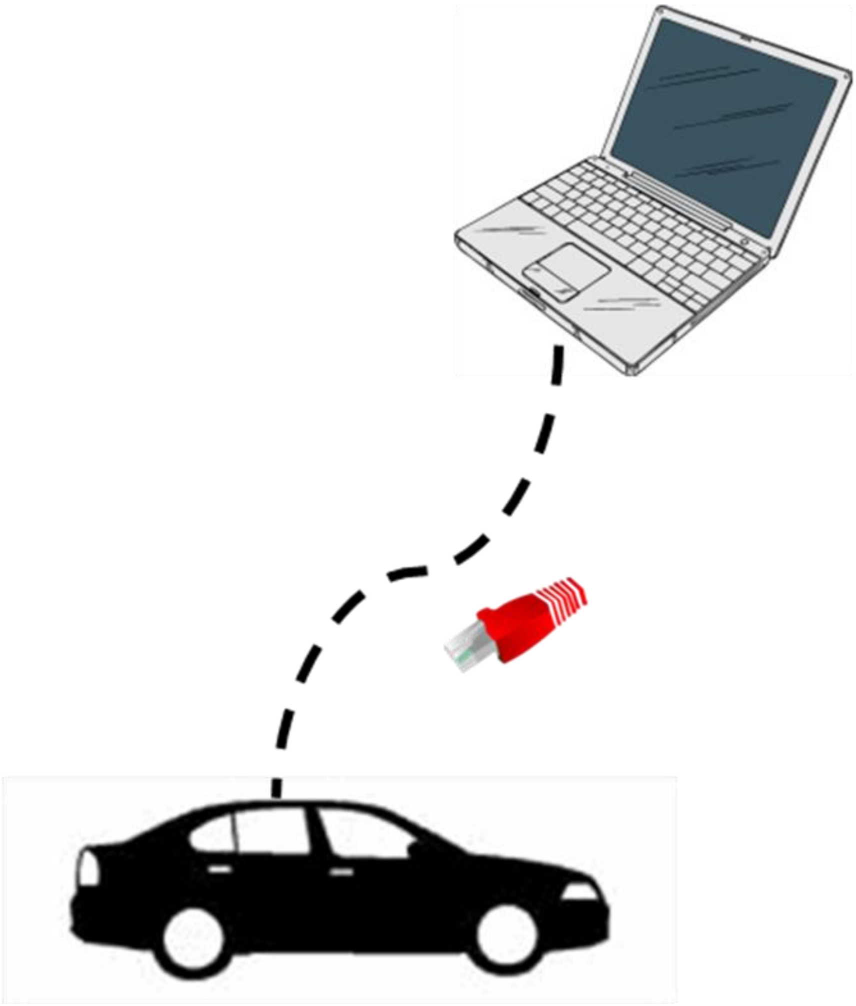


Figure 2: Connection of an external test equipment directly to the car (see ISO 13400-1 [15])

The DoIP is using for this interaction a protocol that executes several services within the single DoIP entities to fulfil the service related requirements of the DoIP ISO 13400 [15]:

Some of the DoIP services are exemplarily:

- Vehicle identification and announcement: Is necessary to detect who is participating in the DoIP communication
- Routing Activation: Allows that single Diagnostic Message pathes are activated or not to treat different protocols different (like UDS and OBD) and to also treat single testers different
- Node information: Provides general information of the single DoIP entity. Usually used by the testers to get the current DoIP protocol relevant information from the single DoIPEntities
- Alive mechanism: Is used to maintain different tester connections

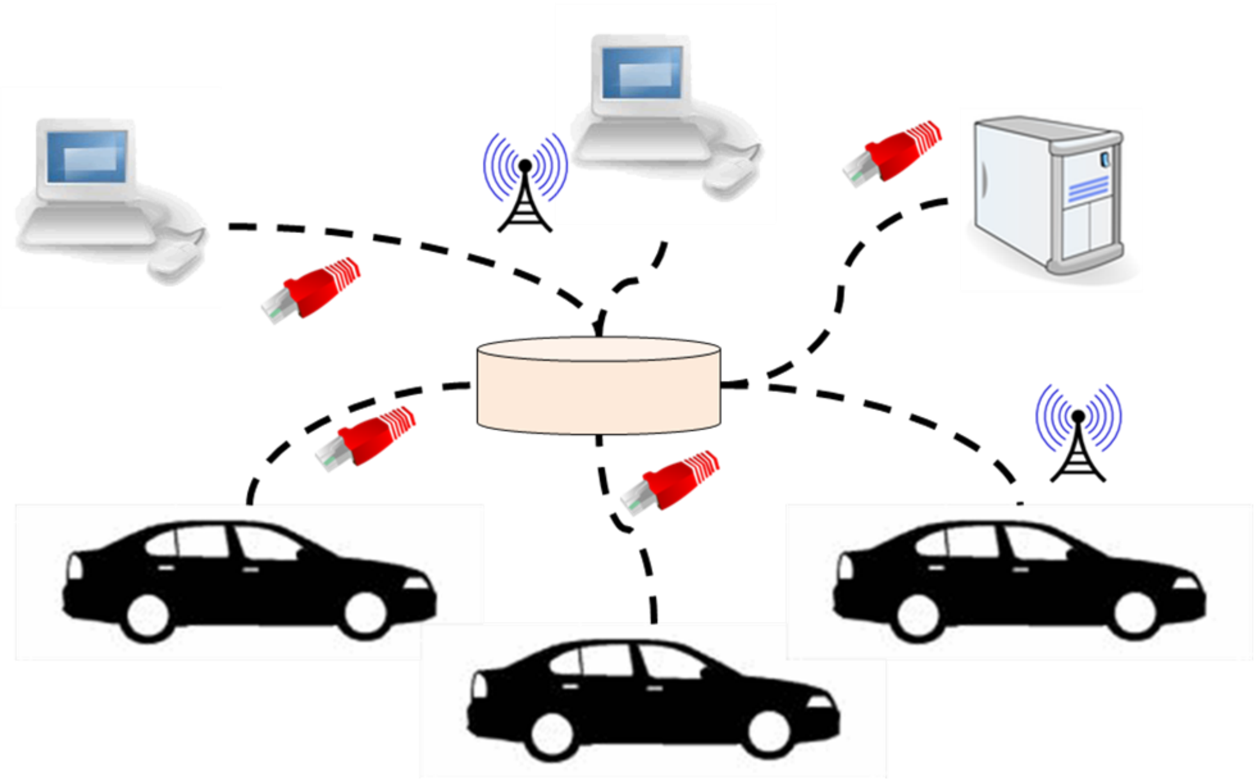


Figure 3: Highly interconnected system of several Cars via the DoIP protocol (see ISO 13400-1 [15])

7.1.1 DoIP Internal Tester Functionality Extension (DRAFT)

Note: Related to CONC_649 DoIP Extension. Everything that is implemented in this section is in DRAFT state.

This usecase covers the possibility of in vehicle DoIP communication. The tester(s) can also reside within the vehicle network.

The requirement to be able to communicate with EXTERNAL and INTERNAL test equipment via DoIP can be generalized as:
An ECU/DoIP node might be “multi-homed”. I.e. it can have multiple logical IP interfaces (maybe sharing the same physical Ethernet interface/MAC address).

In this case, the ECU shall be able to “communicate” on each of its IP interfaces via DoIP independently. I.e. DoIP functionalities on each IP interface have to be isolated from each other. That f.i. means that:

- An “Activation-Line-Low” trigger is something restricted to a certain IP interface. So not ALL DoIP connections on ALL interfaces are closed down then, but just the one aggregated to the IP interface for which an “Activation-Line-Low” happened. (so each interface has its own logical activation line)
- During the routing activation, checks for a SA that has already been registered/activated shall also be restricted to that interface! So, it would be possible, that a tester with SA X can have a valid routing activation on two different interfaces (but not on two different connections of the same interface)

DoIP communication on the vehicle internal IP interface typically differs from the one on the external interface:

- Internal IP interface is typically always active/enabled through the lifecycle of the ECU
- Internal IP interface has typically a static IP address assigned.
- Internal IP interface therefore typically has no assigned “Activation-Line” semantics. I.e. on an abstract level for internal IP interface, the “Activation-Line” is always “high”.

To break this down to the more general notion of “multi-homed” ECUs/DoIP nodes, this means:
There shall be the possibility for a DoIP module (CP or AP) to

- Configure on which interfaces it shall “work”
- Per interface configure
  - o Whether Activation Line functionality plays a role/is needed
  - o Whether dynamic IP assignment shall take place
  - o Whether Vehicle announcement shall be done or not (and when it shall be done)

7.2 Connection establishment

This chapter describes the maintenance of the socket connections of the DoIp module

[SWS_DoIP_00201]{DRAFT} ⌈
The DoIP module shall determine the DoIP Activation Line status by the calls to DoIP_ActivationLineSwitch (uint8 InterfaceId, boolean *Active) based on the value of the boolean parameter Active per DoIPInterface with a given InterfaceId**.** The Activation Line status is considered “active”, if the boolean value in the call is set to TRUE. The Activation Line status is considered “inactive”, if the boolean value in the call is set to FALSE.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00202]{DRAFT} ⌈
If data is received from SoAd or PduR (i.e. communication related interfaces are called) via PduIds related to a certain DoIPInterface configured with DoIPInterfaceActLineCtrl = TRUE, where the status of the Activation Line of this

DoIPInterface is currently inactive, the DoIP module shall ignore all these requests and return a negative return value as return value.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

Note: The return value depends on the API that is called. If it is Std_ReturnType it shall return E_NOT_OK, if it is BufReq_ReturnType it shall return BUFREQ_NOT_OK.

[SWS_DoIP_00204]{DRAFT} ⌈
If the Activation Line status of a DoIPInterface switches to “active”, the DoIP module shall loop over all DoIPTcpConnection, DoIPUdpConnection, and DoIPUdpVehicleAnnouncementConnections associated with this DoIPInterface. For each of these DoIPConnections which has a DoIPRequestAddressAssignment set to true the DoIP module shall retrieve the corresponding SoConId via call to the SoAd_GetSoConId and trigger the IP Address assignment via subsequent calls to SoAd_RequestIpAddrAssignment with the retrieved SoConId, LocalIpAddrPtr and DefaultRouterPtr set to NULL_PTR, Netmask set to 0, and Type set to TCPIP_IPADDR_ASSIGNMENT_ALL.
For each of these DoIPConnections (irrespective of the value of DoIPRequestAddressAssignment) the DoIP module shall open the respective connection by an according call to SoAd_OpenSoCon. (SRS_Eth_00081, SRS_Eth_00028, SRS_Eth_00026).
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00296]{DRAFT} ⌈
For non activation line controlled DoIP Interfaces with DoIPInterfaceActLineCtrl = FALSE, the DoIP module shall loop over all its associated DoIPTcpConnection, DoIPUdpConnection, and DoIPUdpVehicleAnnouncementConnections in context of first call to DoIP_MainFunction(). For each of these DoIPConnections, which has a DoIPRequestAddressAssignment set to true, the DoIPRequestAddressAssignment shall happen independently of the settings of DoIPInterfaceActLineCtrl right after opening the socket connections.

The DoIP module shall retrieve the corresponding SoConId via call to the SoAd_GetSoConId and trigger the IP Address assignment via subsequent calls to SoAd_RequestIpAddrAssignment with the retrieved SoConId, LocalIpAddrPtr and DefaultRouterPtr set to NULL_PTR, Netmask set to 0, and Type set to TCPIP_IPADDR_ASSIGNMENT_ALL.

For each of these DoIPConnections (irrespective of the value of DoIPRequestAddressAssignment) the DoIP module shall open the respective connection by a call to SoAd_OpenSoCon. (SRS_Eth_00081, SRS_Eth_00028, SRS_Eth_00026).
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00234]{DRAFT} ⌈
If the Activation Line status of a DoIPInterface switches to “inactive”, the DoIP module shall shall loop over all DoIPTcpConnection, DoIPUdpConnection, and DoIPUdpVehicleAnnouncementConnections. For each of these DoIPConnections the DoIP module shall retrieve the corresponding SoConId via call to the

SoAd_GetSoConId and close all the connection by a call to SoAd_CloseSoCon with the retrieved SoConId.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00235]{DRAFT} ⌈
In addition to SWS_DoIP_00234, the DoIP module shall release the corresponding IP Address assignment via the call to SoAd_ReleaseIpAddrAssignment for those connections, which belong to the DoIPInterface for which the Activation Line status switched to "inactive", that have DoIPRequestAddressAssignment set to true.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00001]⌈
The DoIP module shall maintain the following information of the configured DoIPUDPConnection (for UDP communication):

(a) State of the SocketConnection

⌋ (SRS_Eth_00081)

[SWS_DoIP_00002]⌈
The DoIP module shall be able to maintain DoIPMaxTesterConnections configured connections with the following information:

(a) DoIPSoAdTcpRxPduId, describes the connection to the SocketConnection
(b) Source Address (SA) as soon as the information is available for the DoIP module
(c) All Routing activation status of this socket connection
(d) Status of the SocketConnection
(f) Time since last TCP communication (Rx or Tx)
(g) Information if the connection is active or not

⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00241]⌈
If the DoIP module is called with DoIP_SoConModeChg and the Mode set to SOAD_SOCON_ONLINE the state of the socket connection shall be considered as online and the DoIP module shall behave as described in SWS_DoIP_00143.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00243]⌈
If the DoIP module is called with DoIP_SoConModeChg and the Mode set to something else than SOAD_SOCON_ONLINE the state of the socket connection shall be considered as offline and the DoIP module shall behave as described in SWS_DoIP_00115.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00205]⌈ If the function DoIP_SoConModeChg is called with Mode set to SOAD_SOCON_ONLINE for a UDP vehicle announcement connection, the DoIP module shall send the vehicle announcement message via the corresponding Tx PDU configured in the DoIPUdpVehicleAnnouncementConnection and belonging to the reported socket connection.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00058]⌈

If a connection needs to be closed based on DoIP specific behavior the DoIP module shall call the function SoAd_CloseSoCon with the parameter abort set to TRUE and the SoConId determined by a call to the function SoAd_GetSoConId with the according DoIPSoAdTcpTxPdu. Additionally also the according inactivity timer will be stopped.
⌋ (SRS_Eth_00081, SRS_Eth_00028, SRS_Eth_00083)

[SWS_DoIP_00076]⌈
If the parameter DoIPVinGIDMaster is set to true and the Container DoIPTriggerGIDSynchronization is configured, the DoIP module shall call the <User>_DoIPTriggerGIDSynchronization function (after successful IP Address assignment, see SWS_DoIP_00204) and repeat this call within the DoIP_MainFunction until its return value equals to E_OK or until the complete connection is closed for any other reason.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00085]⌈
If a change in the IP address assignment indicated by DoIP_LocalIpAddrAssignmentChg with another TCP_IpAddrStateType then TCPIP_IPADDR_STATE_ASSIGNED, the function to start GID synchronisation as described in SWS_DoIP_00076 shall not be called any longer independent from the before return value.
⌋ (SRS_Eth_00028, SRS_Eth_00081)

[SWS_DoIP_00115]⌈
If a TCP socket connection gets closed (after the DoIP_SoConModeChg was called with different mode value than SOAD_SOCON_ONLINE or any other reason described by SWS_DoIP_00058) the DoIP module shall
- unregister and release the socket connection to the related Tester,
- discard the ongoing diagnostic message processing and
- reset the inactivity timer of the given socket connection.
⌋ (SRS_Eth_00028, SRS_Eth_00081, SRS_Eth_00083)

Note: This includes cleaning up all the buffers/internal variables and scheduled asynchronous or pending function calls as well as reducing the amount of tester connected by 1.

[SWS_DoIP_00142]⌈
The DoIP module shall maintain an inactivity timer for each registered TCP connection.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00143]⌈
After a successful TCP socket connection (i.e. DoIP_SoConModeChg) the DoIP module shall start the inactivity timer.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00144]⌈

If no Routing Activation request was received on a new opened socket within the configured DoIPInitialInactivityTime, the DoIP module shall close the socket connection.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00159]⌈
If a Routing Activation request was received on a new opened socket before the inactivity timer elapsed (i.e. the configured DoIPInitialInactivityTime did not pass) the DoIP module shall reset the inactivity timer to 0.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00145]⌈
After a routing activation has been performed (see SWS_DoIP_00159), the DoIP module shall reset the inactivtity timer to 0 always when data communication is performed on the socket (send or receive).
⌋ (SRS_Eth_00083)

[SWS_DoIP_00146]⌈
If the inactivity timer reaches the time configured in DoIPGeneralInactivityTime, the according socket connection shall be closed as described in SWS_DoIP_00058.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00154]⌈
If the API DoIP_LocalIpAddrAssignmentChg is called with the State set to TCPIP_IPADDR_STATE_ASSIGNED, the DoIP module shall call the function SoAd_ReadDhcpHostNameOption with the received SoConId to get the currently set host name option. The returned Byte buffer shall be considered as ASCII buffer and shall start with “DoIP-“.
⌋ (SRS_Eth_00047)

[SWS_DoIP_00155]⌈
If the ASCII buffer returned in SWS_DoIP_00154 does not start with “DoIP-“ and the configuration parameter DoIPDhcpOptionVinUse is set to FALSE the DoIP module shall call the SoAd_WriteDhcpHostNameOption with a pointer to the string “DoIP-“ in order to set the hostname.
⌋ (SRS_Eth_00047)

[SWS_DoIP_00156]⌈
If the ASCII buffer returned in SWS_DoIP_00154 does not start with “DoIP-“ and the configuration parameter DoIPDhcpOptionVinUse is set to TRUE the DoIP module shall call the SoAd_WriteDhcpHostNameOption with a pointer to to the ASCII buffer “DoIP-VIN<vinnumberinascii>“ with <vinnumberinascii> representing the ASCII representation of the VIN that is retrieved via Dcm_GetVin. If no valid VIN could be retrieved the DoIP shall use the configured DoIPVinInvalidityPattern in ASCII representation.
⌋ (SRS_Eth_00047)

[SWS_DoIP_00294]⌈
When receiving a routing activation request on a TCP connection where DoIPTcpConnection/DoIPTcpConnectionSecurityRequired is not set or set to FALSE,

the DoIP module shall search for a DoIPTester with an assigned container that matches DoIPTesterSA. If such a DoIPTester container was found and the matching DoIPRoutingActivation container (refer to SWS_DoIP_00108) has the attribute DoIPRoutingActivationSecurityRequired not set or set to FALSE, the connection will be established.
If such a DoIPTester container was found and the matching DoIPRoutingActivation container (refer to SWS_DoIP_00108) has the attribute DoIPRoutingActivationSecurityRequired is set to TRUE, the connection shall be rejected with the response code "0x07".
⌋ (SRS_Eth_00084)

[SWS_DoIP_00295]⌈
When receiving a routing activation request on a TCP connection where DoIPTcpConnection/DoIPTcpConnectionSecurityRequired set to TRUE, the DoIP module shall search for a DoIPTester with an assigned container that matches DoIPTesterSA.
If such a DoIPTester container was found, the connection will be established.
⌋ (SRS_Eth_00084)
Rationale: A secure TCP connection can be established with a DoIPTester that requests a secure or unsecured connection.

7.3 DoIP Message layout according ISO 13400-2

A DoIP message can be identified by its generic DoIP header structure, which is described in the chapter 7.3.1.

7.3.1 Generic DoIP header

All Pdus received or sent via the SoAd shall support the the DoIP header structure as defined in the ISO 13400-2 [15] table 11. The DoIP header is described in this chapter.

[SWS_DoIP_00004]⌈
The first 8 Bytes of a DoIP message shall contain the DoIP Header followed by the actual payload data.

Item	Position (Byte)	Length (Byte)
Generic DoIP header synchronization pattern		
Protocol version	0	1
Inverse protocol version	1	1
Generic DoIP payload type and payload length		
Payload type	2	2
Payload length	4	4
Payload type specific message content	8	…

Table 1: DoIP message Generic header Layout

⌋ (SRS_Eth_00025)

[SWS_DoIP_00005]⌈
Byte 0 of the DoIP header has to contain the protocol version e.g. 0x02.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00006]⌈
The Byte 1 of the DoIP header shall contain the inverse protocol version e.g. 0xFD value shall be added if the protocol version is 0x02.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00007]⌈
Byte 2 and Byte 3 shall contain the PayloadType.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00008]⌈
The following PayloadTypes shall be supported for reception of DoIP messages:

Payload Type value	Payload type name	Chapter in DoIP SWS	Connection Kind
0x0000	Generic DoIP header negative acknowledge	7.3.2.2.1	UDP/TCP
0x0001	Vehicle Identification request message	7.3.2.2.1	UDP
0x0002	Vehicle identification request message with EID	7.3.2.2.2	UDP
0x0003	Vehicle identification request message with VIN	7.3.2.2.3	UDP
0x0004	Vehicle announcement message/vehicle identification response message	7.3.2.2.1	UDP
0x0005	Routing activation request	7.3.2.3.1	TCP
0x0008	Alive Check response	7.3.2.4.2	TCP
0x4001	DoIP entity status request	7.3.2.5.3	UDP
0x4003	Diagnostic power mode information request	7.3.2.5.1	UDP
0x8001	Diagnostic message	7.3.2.6.1	TCP

Table 2: DoIP payload types received by a DoIP entity, chapter reference and the connection type they are received on.

⌋ (SRS_Eth_00025)

[SWS_DoIP_00009]⌈
The following PayloadTypes shall be supported for sending of DoIP messages:

Payload Type value	Payload type name	Chapter in DoIP SWS	Connection Kind
0x0000	Generic DoIP header negative acknowledge	7.3.2.1	UDP/TCP
0x0004	Vehicle announcement	7.3.2.2.4	UDP

	message/vehicle identification response		
0x0006	Routing activation response	7.3.2.3.2	TCP
0x0007	Alive Check request	7.3.2.4.1	TCP
0x4002	DoIP entity status response	7.3.2.5.4	UDP
0x4004	Diagnostic power mode information response	7.3.2.5.2	UDP
0x8002	Diagnostic message positive acknowledgement	7.3.2.6.2	TCP
0x8003	Diagnostic message negative acknowledgement	7.3.2.6.3	TCP

Table 3: DoIP payload types transmitted by a DoIP entity, chapter reference and the connection type they are transmitted on.

⌋ (SRS_Eth_00025)

[SWS_DoIP_00010]⌈
Bytes 4 to 7 shall contain the payload length in Bytes not including the length of the DoIP header information (i.e. if a DoIP message is received with Payload length set to 2 it means that 10 Bytes in total were received).
⌋ (SRS_Eth_00025)

7.3.2 Payload types

This chapter describes the different Payload types in detail.

7.3.2.1 Generic acknowledge

This chapter contains the check of the DoIP header with the according negative acknowledge messages with payload type 0x0000 for an invalid DoIP header.

[SWS_DoIP_00012]⌈
If an invalid DoIP header was received, a DoIP message with payload type 0x0000 shall be transmitted with the payload described in SWS_DoIP_00013 on the TxPdu which is related to the RxPdu the message was received on, if the according SocketConnection status has not changed since the reception of the DoIP message
⌋ (SRS_Eth_00025)

[SWS_DoIP_00013]⌈
The payload of the generic DoIP header shall contain the corresponding NACK code (1 Byte) as specified from SWS_DoIP_00014 to SWS_DoIP_00019.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00014]⌈
If the Protocol information is incorrect, (see SWS_DoIP_00005, SWS_DoIP_00006 and SWS_DoIP_00015 for valid information) the NACK code 0x00 shall be sent and the according socket shall be closed (see SWS_DoIP_00058).
⌋ (SRS_Eth_00025)

[SWS_DoIP_00016]⌈

If a payload type is not supported (see SWS_DoIP_00008 for valid payload types) the DoIP module shall send the NACK code 0x01 to indicate that a unkown payload type was requested. The message shall be discarded for further processing.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00017]⌈
If the payload length exceeds the value configured by DoIPMaxRequestBytes, the DoIP module shall send the NACK code 0x02 to indicate that the message is too large. The message shall be discarded for further processing.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00018]⌈
If the DoIP module is called with DoIP_SoAdTpStartOfReception() and the indicated payload length exceeds the currently available buffer size, the function must return with BUFREQ_E_OVFL value (No buffer of the required length can be provided) and trigger a Negative Response (NACK) with value 0x03.
The currently available buffer size calculation shall be based on Payload Type. If the DoIP message is processed internally (see SWS_DoIP_00008) the locally avalailable buffer, other case the upper layer (PduR_DoIPTpStartOfReception) provided buffer size shall be the base for the response.
⌋ (SRS_Eth_00025)

[SWS_DoIP_00019]⌈
If the DoIP module is called with a payload length that is not valid for the specifc payload type, the NACK code 0x04 shall be sent and the according socket shall be closed (see SWS_DoIP_00058).
⌋ (SRS_Eth_00025)

Note: The single valid payload length ranges for the single payload types are described in the single subchapters of the payloads (see SWS_DoIP_00008 for the list of all receive payload types and the according chapter references).

[SWS_DoIP_00292]⌈
If a DoIP message with payload Type 0x0000 is received on a configured DoIPUDPConnection or DoIPTCPConnection, the message shall be discarded.
⌋ (SRS_Eth_00025)

7.3.2.2 Vehicle Identification

[SWS_DoIP_00015]⌈
On a vehicle identification request the Protocol Type 0xFF and the inverse Protocol Type 0x00 shall be supported as default values, additionally to the ProtocolType described in SWS_DoIP_00005 and SWS_DoIP_00006.
⌋ (SRS_Eth_00026)

7.3.2.2.1 Vehicle Identification request (payload type 0x0001)

[SWS_DoIP_00061]⌈
If a DoIP message with payload type 0x0001 is not received on a configured DoIPUDPConnection, the message shall be discarded.

⌋ (SRS_Eth_00026)
Note: This also means that it is not allowed to receive this payload type on a TCP connection.

[SWS_DoIP_00059]⌈
The expected payload length (see SWS_DoIP_00019) for vehicle identification request message with payload type 0x0001 shall be exactly 0.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00060]⌈
If a DoIP message with payload Type 0x0001 is received on the configured DoIPUDPConnection, the DoIP module shall respond with a vehicle identification response/vehicle announcement message after the configured DoIPInitialVehicleAnnouncementTime with payload type 0x0004 as described inTable 6.
⌋ (SRS_Eth_00026)

7.3.2.2.2 Vehicle Identification request with EID (payload type 0x0002)

The payload data structure of a vehicle identification request message with EID shall be supported as described in Table 4:

Item	Position (Byte)	Length (Byte)
Payload type vehicle identification request message with EID		
EID	0	6

Table 4: Vehicle identification request with EID payload data

[SWS_DoIP_00062]⌈
If a DoIP message with payload Type 0x0002 is not received on a configured DoIPUDPConnection, the message shall be discarded.
⌋ (SRS_Eth_00026)

Note: This also means that it is not allowed to receive this payload type on a TCP connection.

[SWS_DoIP_00063]⌈
The expected payload length (see SWS_DoIP_00019) for vehicle identification request message with payload type 0x0002 shall be exactly 6.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00064]⌈
If a DoIP message with payload Type 0x0002 is received on the configured DoIPUDPConnection, the DoIP module shall further process the message.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00065]⌈
If the Parameter DoIPUseMacAdressForIdentification is set to true the received “EID” 6 payload data bytes shall be compared to the MacAddress received via SoAd_GetPhysAddr . If they match the DoIP module shall respond with a vehicle

identification response/vehicle announcement message with payload type 0x0004 as described inTable 6.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00066]⌈
If the Parameter DoIPUseMacAdressForIdentification is set to false the received “EID” 6 payload data bytes shall be compared to the configured DoIPEID. If they match the DoIP module shall respond with a vehicle identification response/vehicle announcement message with payload type 0x0004 as described inTable 6.
⌋ (SRS_Eth_00026)

7.3.2.2.3 Vehicle Identification request with VIN (payload type 0x003)

The payload data structure of a vehicle identification request message with VIN shall be supported as described in Table 5:

Item	Position (Byte)	Length (Byte)
Payload type vehicle identification request message with VIN		
VIN	0	17

Table 5: Vehicle identification request with VIN payload data

[SWS_DoIP_00067]⌈
If a DoIP message with payload Type 0x0003 is not received on a configured DoIPUDPConnection the message shall be discarded.
⌋ (SRS_Eth_00026)

Note: This also means that it is not allowed to receive this payload type on a TCP connection.

[SWS_DoIP_00068]⌈
The expected payload length (see SWS_DoIP_00019) for vehicle identification request message with payload type 0x0003, shall be exactly 17.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00069]⌈
If a DoIP message with payload Type 0x0003 is received on the configured DoIPUDPConnection the DoIP module shall further process the message.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00070]⌈
The DoIP 17 payload data bytes shall be compared to the data retrieved by the function Dcm_GetVin. If the function returns E_OK, the VIN pointer is considered to contain valid information. If the function returns E_NOT_OK or the returned VIN do not match the requested VIN, the DoIP message with payload Type 0x0003 shall be ignored. If the requested VIN matches the derived VIN, the DoIP module shall respond with a vehicle identification response/vehicle announcement message with payload type 0x0004 as described in Table 6.
⌋ (SRS_Eth_00026)

7.3.2.2.4 Vehicle Identification response/vehicle announcement (payload type 0x0004)

[SWS_DoIP_00297]{DRAFT} ⌈
For a DoIP Interface with DoIPInterfaceAnnouncementStart = DOIP_AUTOMATIC_ANNOUNCE, the DoIP module shall start Vehicle announcement according to SWS_DoIP_00205.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00298]{DRAFT} ⌈
For a DoIP Interface with DoIPInterfaceAnnouncementStart = DOIP_ONTRIGGER_ANNOUNCE, the sending of vehicle announcement only starts if DoIP_TriggerVehicleAnnouncement () has been called for that Interface.
⌋ (SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00299]{DRAFT} ⌈
If DoIP_TriggerVehicleAnnouncement() is called, but the corresponding socket is not yet ONLINE then the request shall be remembered and vehicle announcement shall be sent as soon as the socket goes ONLINE.
⌋ ()

[SWS_DoIP_00071]{DRAFT} ⌈
If the DoIP module needs to send a vehicle announcement message (see SWS_DoIP_00205 and SWS_DoIP_00298), it shall send the vehicle announcement message via the configured DoIPUdpVehicleAnnouncementConnection after DoIPInitialVehicleAnnouncementTime as described in Table 6. This message shall be sent DoIPVehicleAnnouncementCount times with a delay of DoIPVehicleAnnouncementInterval between each message. The last "VIN/GID Status" byte of the Vehicle identification response message is optional as defined in the ISO 13400-2 standard. It shall exist only if the "DoIPUseVehicleIdentificationSyncStatus" configuration parameter is set to True. (See SWS_DoIP_00086).
⌋ (SRS_Eth_00026)

The payload data structure of a vehicle identification response/vehicle announcement message shall be supported as described in Table 6.

Item	Position (Byte)	Length (Byte)
Vehicle identification number		
VIN	0	17
DoIP entity logical address information		
Logical Address	17	2
Entity identification		
EID	19	6
Group identification		
GID	25	6
Further action byte	31	1
VIN/GID Status	32	1

Table 6: Vehicle identification response/vehicle announcement message payload data

[SWS_DoIP_00072]⌈

The “VIN” of a vehicle identification response/vehicle announcement message shall be derived by calling Dcm_GetVin. If Dcm_GetVin returns E_OK, the 17 Bytes in the pointer shall be used, if the callback returns E_NOT_OK the 17 Bytes shall be filled with the configured DoIPVinInvalidityPattern with “Further Action Required” field set to 0x00 and VIN/GID sync. Status field set to 0x10 if (DoIPUseVehicleIdentificationSyncStatus) is set to true.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00073]⌈
The “LA” of a vehicle identification response/vehicle announcement message shall contain the configured DoIPLogicalAddress.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00074]⌈
The “EID” of a vehicle identification response/vehicle announcement message shall contain the MAC address derived by Soad_GetPhysAddr if the configuration parameter DoIPUseMacAdressForIdentification is set to true.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00075]⌈
The “EID” of a vehicle identification response/vehicle announcement message shall contain the configured DoIPEID if the configuration parameter DoIPUseMacAdressForIdentification is set to false.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00077]⌈
The “GID” of a vehicle identification response/vehicle announcement message shall contain the same value as for the EID, if both configuration parameter and DoIPUseEIDasGID are set to true (see SWS_DoIP_00074 and SWS_DoIP_00075).
⌋ (SRS_Eth_00026)

[SWS_DoIP_00078]⌈
The “GID” of a vehicle identification response/vehicle announcement message shall contain the configured DoIPGID value, if the configuration parameter DoIPVinGIDMaster is set to true, the configuration parameter DoIPUseEIDasGID is set to false and the parameter DoIPGID is configured.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00079]⌈
The “GID” of a vehicle identification response/vehicle announcement message shall contain the value retrieved by the configured DoIPGetGidCallback function(for the signature see <User>_DoIPGetGidcallback, SWS_DoIP_00051), if the configuration parameter DoIPVinGIDMaster is set to true, the configuration parameter DoIPUseEIDasGID is set to false and the parameter DoIPGID is not configured. If the function does not return E_OK the GID shall consist of 6 Bytes according to the configured DoIPGIDInvalidityPattern.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00080]⌈

The “GID” of a vehicle identification response/vehicle announcement message shall contain the configured DoIPGID value, if the configuration parameter DoIPVinGIDMaster is set to false and the parameter DoIPGID is configured.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00081]⌈
The “GID” of a vehicle identification response/vehicle announcement message shall contain the value retrieved by the configured DoIPGetGID function, if the configuration parameter DoIPVinGIDMaster is set to false and the parameter DoIPGID is not configured. If the function does not return E_OK, the GID shall consist of 6 Bytes according to the configured DoIPGIDInvalidityPattern.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00082]⌈
The “Further action” byte of a vehicle identification response/vehicle announcement message shall contain the value 0x10 if any DoIPRoutingActivation with DoIPRoutingActivationNumber equal to 0xE0 is configured and the according RoutingActivation was not yet successfully performed.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00083]⌈
The “Further action” byte of a vehicle identification response/vehicle announcement message shall contain the value 0x00, if no DoIPRoutingActivation with DoIPRoutingActivationNumber equal to 0xE0 is configured.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00084]⌈
The “Further action” byte of a vehicle identification response/vehicle announcement message shall contain the value 0x00, if any DoIPRoutingActivation with DoIPRoutingActivationNumber equal to 0xE0 is configured and the according RoutingActivation was successfully performed.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00086]⌈
If the configuration parameter DoIPUseVehicleIdentificationSyncStatus is set to true, the “VIN/GID status” byte shall be additionally added to the vehicle identification response/vehicle announcement message.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00087]⌈
If a valid VIN could be requested in SWS_DoIP_00072, the value of the “VIN/GID status” byte shall be 0x00.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00088]⌈
If no valid VIN could be requested in SWS_DoIP_00072 and the vehicle GID synchronization was not yet successful as described in SWS_DoIP_00076, the value of the “VIN/GID status” byte shall be 0x10.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00089]⌈
If no valid VIN could be requested in SWS_DoIP_00072 and the vehicle GID synchronization was already successful as described in SWS_DoIP_00076, the value of the “VIN/GID status” byte shall be 0x00.
⌋ (SRS_Eth_00026)

[SWS_DoIP_00291]⌈
The “Further action” byte of a vehicle identification response/vehicle announcement message shall contain the 1 Byte value retrieved by a call to the configured DoIPFurtherActionByteCallback (if configured, for the signature see <User>_DoIPGetFurtherActionByteCallback, SWS_DoIP_00288). If the function returns E_OK, the “Further action” byte shall be set to the retrieved value of FurtherActionByte. If the function returns E_NOT_OK, the “Further action” byte shall be set according to [SWS_DoIP_00082], [SWS_DoIP_00083] or [SWS_DoIP_00084].
⌋ (SRS_Eth_00026)

[SWS_DoIP_00293]⌈
If a DoIP message with payload Type 0x0004 is received on a configured DoIPUDPConnection, the message shall be discarded.
⌋ (SRS_Eth_00025)

7.3.2.3 Routing activation

7.3.2.3.1 Routing activation request (payload type 0x0005)

The payload data structure of a routing activation request message shall be supported as described in Table 7:

Item	Position (Byte)	Length (Byte)
External test equipment address information		
Source address	0	2
Activation Type	2	1
Reserved and OEM specific data		
Reserved by the ISO (0x00000000)	3	4
OEM specific	7	4

Table 7: Routing activation request message payload data

[SWS_DoIP_00101]⌈
If a DoIP message with payload Type 0x0005 is not received on a configured DoIPTCPConnection the message shall be discarded. ⌋ (SRS_Eth_00084)

Note: That means that it is also not allowed to receive this payload type on a UDP connection,

[SWS_DoIP_00117]⌈
The expected payload length (see SWS_DoIP_00019) for Routing Activation Request Message with payload type 0x0005 shall be either exactly 7 or 11.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00102]⌈
If a routing activation request message is received with a valid DoIP header, the DoIP module shall process further to SWS_DoIP_00103, if the field “Source address” matches a configured DoIPTesterSA.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00106]⌈
If a routing activation request message is received with a valid “Source address” but the connection this Routing activation was received on is already registered to another source address, the DoIP module shall send a routing activation response message (see chapter 7.3.2.3.2) on the same connection the request was received on, with the routing activation response code set to 0x02. Additionally the socket connection shall be closed as defined in SWS_DoIP_00058.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00104]⌈
If a routing activation request message is received with a “Source address” that does not match a configured DoIPTesterSA, the routing activation response message (see chapter7.3.2.3.2) shall be sent on the same connection as the received request with the routing activation response code 0x00. Additionally the socket connection shall be closed as defined in SWS_DoIP_00058.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00103]⌈
The DoIP module shall always continue with processing as defined in SWS_DOIP_00105, either if the received “Source Address” is already registered to a connection as described in SWS_DoIP_00002 and it is the same socket connection this routing activation request was received on, or if the received “Source Address” is not registered to a connection yet.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00105]{DRAFT} ⌈
If the received “Source Address” is already registered to another connection, belonging to the same DoIPInterface, an alive check request to this connection shall be triggered as described in chapter 7.3.2.4.1 and it shall be waiting for the alive check response message or until the time configured in parameter DoIPAliveCheckResponseTimeout expired. If the alive check response was received within the configured time, the DoIP module shall send a routing activation response message with the activation response code set to 0x03 as described in chapter 7.3.2.3.2. Additionally the socket connection shall be closed as defined in SWS_DoIP_00058. If the “Source Address” is not already registered or the DoIPAliveCheckResponseTimeout expired without receiving an alive check response message the DoIP module shall continue with SWS_DoIP_00107.
⌋ (SRS_Eth_00084, SRS_Eth_00083)

[SWS_DoIP_00107]⌈
If the amount of registered connections is smaller than the configured DoIPMaxTesterConnections, the DoIP module shall proceed with the message as described in SWS_DoIP_00108 otherwise an alive check request shall be sent to all

registered connections as described in chapter7.3.2.4.1. If none of the alive checks times out (i.e. all tester respond with a valid alive check response within the configured DoIPAliveCheckResponseTimeout) the DoIP module shall send a routing activation response message with the activation response code set to 0x01 as described in chapter 7.3.2.3.2. Additionally the socket connection shall be closed as defined in SWS_DoIP_00058. If at least one of them times out the DoIp module shall close the socket connection and continue as described in SWS_DoIP_00108.
⌋ (SRS_Eth_00084, SRS_Eth_00083)

[SWS_DoIP_00108]⌈
If the “Activation type” bytes matches the DoIPRoutingActivationNumber of one of the DoIPRoutingActivationRef of the “Source Address” (i.e. DoIPTester has a DoIPRoutingActivationRef configured which has the DoIPRoutingActivationNumber equal to “Activation type”) the DoIP module shall proceed with SWS_DoIP_109.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00160]⌈
If the “Activation type” bytes do not fulfill the SWS_DOIP_00108 requirement, the DoIP module shall send a routing activation response message with the activation response code set to 0x06 as described in chapter 7.3.2.3.2. In this case the socket connection shall be closed as defined in SWS_DoIP_00058.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00109]⌈
If an DoIPRoutingActivationAuthenticationCallback is configured for the referenced DoIPRoutingActivation, the DoIP module shall call this callback (for the signature see <User>_DoIPRoutingActivationAuthentication, SWS_DoIP_00049). If the DoIPRoutingActivationAuthenticationReqLength is not configured to 0, the DoIP module shall handle additionally the first DoIPRoutingActivationAuthenticationReqLength bytes of the optional field “OEM specific”.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00161]⌈
If the DoIPRoutingActivationAuthenticationCallback returns with E_OK the routing activation authentication shall be considered as successful. If the DoIPRoutingActivationAuthenticationResLength is not set to 0 the first DoIPRoutingActivationAuthenticationResLength byte shall be attached in routing activation response message in the field “OEM specific” as described in chapter 7.3.2.3.2.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00110]⌈
If the DoIPRoutingActivationAuthenticationCallback returns DOIP_E_PENDING the DoIP module shall trigger the callback at next DoIP_MainFunction call again until something else than DOIP_E_PENDING is returned. Additionally the socket connection shall be considered as registered to this DoIPTesterSA without activating the routing.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00111]⌈
If the DoIPRoutingActivationAuthenticationCallback returns something else (e.g. E_NOT_OK) the DoIP module shall send a routing activation response message with the activation response code set to 0x04 as described in chapter 7.3.2.3.2 and the socket connection shall be considered as registered to this DoIPTesterSA without activating the routing.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00112]⌈
If a DoIPRoutingActivationConfirmationCallback is configured for the referenced DoIPRoutingActivation, the DoIp module shall call this callback (for the signature see <User>_DoIPRoutingActivationConfirmation, SWS_DoIP_00048). If the DoIPRoutingActivationConfirmationReqLength is not configured to 0, the DoIP module shall handle additionally the last DoIPRoutingActivationConfirmationReqLength bytes of the optional field “OEM specific”. If the Callback returns with E_OK the routing activation confirmation shall be considered as successful and if the DoIPRoutingActivationConfirmationResLengthis not set to 0, the last DoIPRoutingActivationConfirmationResLength bytes shall be attached in routing activation response message in the field “OEM specific” as described in chapter 7.3.2.3.2.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00114]⌈
If the DoIPRoutingActivationConfirmationCallback returns DOIP_E_PENDING, the DoIP module shall send a routing activation response message once with the activation response code set to 0x11 as described in chapter 7.3.2.3.2.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00274]⌈
If the DoIPRoutingActivationConfirmationCallback returns E_NOT_OK, the DoIP module shall send a routing activation response message with the activation response code set to 0x05 as described in chapter 7.3.2.3.2 and the socket connection shall be closed as defined in SWS_DoIP_00058.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00113]⌈
If no response was sent because of the before mentioned checks this DoIPRoutingActivation is confirmed, authorized and valid so the DoIP module shall send a routing activation response message with the activation response code set to 0x10 as described in chapter 7.3.2.3.2 and the socket connection shall be considered as registered to this DoIPTesterSA and enable the routing for this routing activation. From now on the routing to the configured DoIPTargetAdressRef are active and valid so the diagnostic request messages related to the specified DoIPTargetAdress received via this socket connection are active.
⌋ (SRS_Eth_00084)

7.3.2.3.2 Routing activation response (payload type 0x0006)

The payload data structure of a routing activation response message shall be supported as described in Table 8:

Item	Position (Byte)	Length (Byte)
External test equipment address information		
Logical Address Tester	0	2
Routing activation status information		
Logical address of DoIP entity	2	2
Routing activation response code	4	1
Reserved by ISO (0x00000000)	5	4
OEM specific	9	4

Table 8: Routing activation response message payload data

[SWS_DoIP_00116]⌈
The “Logical Address Tester” field shall be set to the Tester SA the according routing activation request message was received from.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00118]⌈
The “Logical Address DoIP entity” shall be set to the configured parameter DoIPLogicalAddress.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00119]⌈
The “Routing activation response code shall be set according to the response conditions specified in chapter7.3.2.3.1.
⌋ (SRS_Eth_00084)

[SWS_DoIP_00120]⌈
The “OEM specific” field shall be filled with the optional values as defined in chapter 7.3.2.2.1. if the according DoIPRoutingActivationAuthenticationResLength and/or DoIPRoutingActivationConfirmationResLength is used.
⌋ (SRS_Eth_00084)

7.3.2.4 Alive check

7.3.2.4.1 Alive check request (payload type 0x0007)

[SWS_DoIP_00139]⌈
If the DoIP module needs to send a alive check request, it shall have no payload data but only the generic DoIP header and the payload type set 0x0007.
⌋ (SRS_Eth_00083)

[SWS_DoIP_00140]⌈
After sending an alive check request the DoIP module shall wait the configured time DoIPAliveCheckResponseTimeout to receive a valid alive check response as described in chapter 7.3.2.4.2. If it does not receive an alive check response, the socket connection on which the alive check request was sent shall be closed as described in SWS_DoIP_00058.
⌋ (SRS_Eth_00083)

7.3.2.4.2 Alive check response (payload type 0x0008)

The payload data structure of a alive check response message shall be supported as described in Table 9:

Item	Position (Byte)	Length (Byte)
External test equipment address information		
Source address	0	2

Table 9: Alive check response message payload data

[SWS_DoIP_00141]⌈
If the received Alive check response field “SourceAddress” matches the registered Source Address of the socket connection the response was received on, the DoIP module shall do nothing. Otherwise it shall close the socket connection as described in SWS_DoIP_00058.
⌋ (SRS_Eth_00083)

Note: The alive check response can always be sent (not only after an according request): With this method the test equipment can reset the inactivity time.

7.3.2.5 Node information

7.3.2.5.1 Diagnostic power mode information request (payload type 0x4003)

[SWS_DoIP_00090]⌈
If a DoIP message with payload Type 0x4003 is not received on a configured DoIPUDPConnection the message shall be discarded.
⌋ (SRS_Eth_00080)

Note: This means also that it is not allowed to receive this payload type on a TCP connection.

[SWS_DoIP_00091]⌈
The expected payload length (see SWS_DoIP_00019) for diagnostic power mode information request message with payload type 0x4003 shall be exactly 0.
⌋ (SRS_Eth_00080)

[SWS_DoIP_00092]⌈
After a valid Diagnostic power mode request message, the DoIP module shall send a Diagnostic Power mode information response message (see chapter 7.3.2.5.2) on the configured DoIPUDPConnection.
⌋ (SRS_Eth_00080)

7.3.2.5.2 Diagnostic power mode information response (payload type 0x4004)

The payload data structure of a diagnostic power mode information response shall be supported as described in Table 10:

Item	Position (Byte)	Length (Byte)
Diagnostic Power Mode		
Diagnostic power mode	0	1

Table 10: Diagnostic power mode information response message payload data

[SWS_DoIP_00093]⌈
The “Diagnostic Power Mode” byte of diagnostic power mode information response message contains the 1 Byte value retrieved by a call to the configured DoIPPowerModeCallback (for the signature see <User>DoIPGetPowerModeStatus, SWS_DoIP_00047). If the function returns E_OK, the “Diagnostic Power Mode” shall be set to the retrieved value of PowerStateReady, otherwise it shall be set to 0x00 to indicate that the power mode is not ready.
⌋ (SRS_Eth_00080)

7.3.2.5.3 Diagnostic entity status request (payload type 0x4001)

[SWS_DoIP_00094]⌈
If a DoIP message with payload Type 0x4001 is not received on a configured DoIPUDPConnection the message shall be discarded.
⌋ (SRS_Eth_00082)

Note: This means also that it is not allowed to receive this payload type on a TCP connection.

[SWS_DoIP_00095]⌈
The expected payload length (see SWS_DoIP_00019) for diagnostic entity status request message with payload type 0x4001 shall be exactly 0.
⌋ (SRS_Eth_00082)

[SWS_DoIP_00096]⌈
After a valid Diagnostic entity status request message, the DoIP module shall send a Diagnostic entity status response message (see chapter 7.3.2.5.4) on the configured DoIPUDPConnection.
⌋ (SRS_Eth_00082)

7.3.2.5.4 Diagnostic entity status response (payload type 0x4002)

The payload data structure of a diagnostic entity status response message shall be supported as described in Table 11:

Item	Position (Byte)	Length (Byte)
DoIP Entity Status Response		
Node Type	0	1
Max open sockets	1	1
Currently open socket	2	1
Max. data size	3	4

Table 11: Diagnostic entity status response message payload data

[SWS_DoIP_00097]⌈
The “Node Type” byte of a diagnostic entity status response message shall contain the configured DoIPNodeType, whereas DOIP_GATEWAY shall be represented by 0x00 and DOIP_NODE shall be represented by 0x01.
⌋ (SRS_Eth_00082)

[SWS_DoIP_00098]⌈
The “Max open sockets” byte of a diagnostic entity status response message shall contain the configured DoIPMaxTesterConnections. This parameter represents the maximum number of concurrent TCP_DATA sockets allowed with this DoIP entity, excluding the reserve socket required for socket handling as defined in the ISO 13400-2 standard.
⌋ (SRS_Eth_00082)

[SWS_DoIP_00099]⌈
The “Currently open sockets” byte of a diagnostic entity status response message shall contain the currently active connections, based on the information described in SWS_DoIP_00002.
⌋ (SRS_Eth_00082)

[SWS_DoIP_00100]⌈
The “Max data size” bytes are only supported if the configuration parameter DoIPEntityStatusMaxByteFieldUse is set to TRUE. In this case, the diagnostic entity status response message shall contain the configured DoIPMaxRequestBytes in the “Max data size” field.
⌋ (SRS_Eth_00082)

7.3.2.6 Diagnostic Message

For enhanced diagnostic as well as for emissions related diagnostic communication, the DoIP module uses the same diagnostic message structure and payload types. Additionally it provides an acknowledge mechanism to provide early feedback to the tester wether the diagnostic message was received and successfully received for the internal ECU or sent out to the target network.

7.3.2.6.1 Diagnostic message (for request and response) (payload type 0x8001)

The payload data structure of a diagnostic message shall be supported as described in Table 12:

Item	Position (Byte)	Length (Byte)
Logical address information		
Source address	0	2
Target address	2	2
Diagnostic message data		
User data	4	…

Table 12: Diagnostic message payload data

[SWS_DoIP_00121]⌈
If a DoIP message with payload Type 0x8001 is not received on a configured DoIPTcpConnection the message shall be discarded.
⌋ (SRS_Eth_00027)

Note: This means also that it is not allowed to receive this payload type on a UDP connection.

[SWS_DoIP_00122]⌈
The expected payload length (see SWS_DoIP_00019) for diagnostic messages with payload type 0x8001 shall be at least 5 byte.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00123]⌈
If the DoIP module receives a diagnostic message with a “Source Address” (equals DoIPTesterSA) which is not registered on an established socket connection, the DoIP modules shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x02 as described in chapter 7.3.2.6.3. Additionally the socket connection shall be closed as described in SWS_DoIP_00058.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00124]⌈
If the DoIP module receives a diagnostic message with a “Target Addess” (equals DoIPTargetAdressValue) which is not connected via DoIPRoutingActivationRef and DoIPTargetAdressRef to the received valid DoIPTesterSA, than the DoIP module shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x03 as described in chapter 7.3.2.6.3. Additionally the message shall be discarded.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00125]⌈
If the DoIP module receives a diagnostic message with the payload data length in the DoIP header is set to a value bigger than DoIPMaxRequestBytes-4, than the DoIP module shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x04 as described in chapter7.3.2.6.3. Additionally the message shall be discarded.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00126]⌈
If the DoIP module receives a diagnostic message and SWS_DoIP_00125 does not apply but the current buffer size is not sufficient to receive the message, than the DoIP module shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x05 as described in chapter 7.3.2.6.3. Additionally the message shall be discarded.
⌋ (SRS_Eth_00027)

Note: This means that the PduR_DoIPTpStartOfReception is not accepting the buffer.

[SWS_DoIP_00127]⌈
If the DoIP module receives a diagnostic message and the according “TargetAddress” was not activated by routing activation as described in SWS_DoIP_00113, the DoIP module shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x06 as described in chapter 7.3.2.6.3. Additionally the message shall be discarded.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00128]⌈
If no negative acknowledge was sent the DoIP module shall evaluate the message and forward the content (i.e. all UDS Data, not the TargetAddress and SourceAddress) to the DoIPPduRRxPdu connected to the received TargetAddress/SourceAddress combination as configured in DoIPChannel
⌋ (SRS_Eth_00027)

Note: For how to proceed with the communication please refer to the TCP communication described in chapter 7.5.1

[SWS_DoIP_00174]⌈
If the PduR is not accepting the data totally (for details refer to chapter7.5.1), the DoIP module shall send a diagnostic message negative acknowledge message with the diagnostic message negative acknowledge code set to 0x08 as described in chapter 7.3.2.6.3. Additionally the message shall be discarded.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00129]⌈
If the PduR accepted all Data, the DoIP module shall send a diagnostic acknowledge message as described in chapter 7.3.2.6.2.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00130]⌈
The DoIP module will get a diagnostic response message (i.e DoIP_TpTransmit or DoIP_IfTransmit is called with DoIPPduRTxPdu which matches to the DoIPPduRRxPdu that handled the data to the PduR) via the upper layer connection to the PduR, so it has to monitor whether the socket connection the request was received on is still established. If the socket connection has been closed, the response shall be discarded and the DoIP shall return with E_NOT_OK in the return value.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00131]⌈
If the DoIP module is called with DoIPPduRTxPdu in the DoIP_TpTransmit or DoIP_IfTransmit as described in SWS_DoIP_00130 and the according socket connection has not been closed since the reception of the according diagnostic message, the DoIP module shall prepare a diagnostic message via the according socket connection with the message layout as described in Table 12 but with the "SourceAddress" set to the DoIPTargetAdressValue of the request and the "TargetAddress" set to the DoIPTesterSA.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00173]⌈
The field "User data" of the SWS_DoIP_00131 message contains the actual diagnostic payload data which shall not be modified by DoIP.
⌋ (SRS_Eth_00027)

Note: The reception and transmission of diagnostic payload data is described more in detail in chapter 7.5, the diagnostic communication related part of this specification

Note: Because of enhanced diagnostic and emissions related diagnostic communication behavior, several responses to the tester could be sent out before the final response is sent. The DoIP module is not evaluating the content or the amount of responses or requests to the target address. It is just routing the diagnostic data from SoAd to PduR and back.

7.3.2.6.2 Diagnostic acknowledge message (payload type 0x8002)

The payload data structure of a diagnostic acknowledge message shall be supported as described in Table 13:

Item	Position (Byte)	Length (Byte)
Logical address information		
Source address	0	2
Target address	2	2
Diagnostic message acknowledge information		
ACK code (0x00)	4	1
Previous diagnostic message	5	…

Table 13: Diagnostic acknowledge message payload data

[SWS_DoIP_00132]⌈
If the DoIP module needs to send a diagnostic acknowledge message the “Source Address” shall be set to the according “TargetAddress” of the received message (see chapter 7.3.2.6.1).
⌋ (SRS_Eth_00027)

[SWS_DoIP_00133]⌈
If the DoIP module needs to send a diagnostic acknowledge message the “Target Address” shall be set to the according “SourceAddress” of the received message (see chapter7.3.2.6.1).
⌋ (SRS_Eth_00027)

[SWS_DoIP_00134]⌈
If the DoIP module needs to send a diagnostic acknowledge message the field “previous diag message” shall be filled with the number of bytes of the original request message as configured in the parameter DoIPNumByteDiagAckNack for the DoIPTester the request was received on.
⌋ (SRS_Eth_00027)

7.3.2.6.3 Diagnostic negative acknowledge message (payload type 0x8003)

The payload data structure of a diagnostic negative acknowledge message shall be supported as described in Table 14:

Item	Position (Byte)	Length (Byte)
Logical address information		
Source address	0	2
Target address	2	2

Diagnostic message acknowledge information		
Diagnostic message negative acknowledge code	4	1
Previous diagnostic message	5	…

Table 14 Diagnostic negative acknowledge payload data

[SWS_DoIP_00135]⌈
If the DoIP module needs to send a diagnostic negative acknowledge message the “Source Address” shall be set to the according “TargetAddress” of the received message (see chapter7.3.2.6.1).
⌋ (SRS_Eth_00027)

[SWS_DoIP_00136]⌈
If the DoIP module needs to send a diagnostic negative acknowledge message the “Target Address” shall be set to the according “SourceAddress” of the received message (see chapter7.3.2.6.1).
⌋ (SRS_Eth_00027)

[SWS_DoIP_00137]⌈
If the DoIP module needs to send a diagnostic negative acknowledge message, the “Diagnostic message negative acknowledge code” shall be set to the value specified by the specification item that is triggering the diagnostic negative acknowledge message.
⌋ (SRS_Eth_00027)

[SWS_DoIP_00138]⌈
If the DoIP module needs to send a diagnostic negative acknowledge message the field “previous diag message” shall be filled with the configured number of the original request message as configured in the parameter DoIPNumByteDiagAckNack for the DoIPTester the request was received on.
⌋ (SRS_Eth_00027)

7.4 UDP communication

DoIP messages that are communicated via UDP connection are communicated on the SoAd Interface APIs. So all messages which are received via UDP as described in Table 2 and sent via UDP as described in Table 3 shall be treated as described in this chapter.

[SWS_DoIP_00197]⌈ If the SoAd calls the DoIP module via the Interface DoIP_SoAdIfRxIndication, the DoIP module shall copy the message into the internal UDP buffer for further processing.
⌋ (SRS_Eth_00024)

Note: Further processing depends on the header information and on the payload type. For details refer to chapter 7.3.2. Which messages are expected to be received on UDP connection is described in Table 2.

[SWS_DoIP_00198]⌈
If the DoIP module shall send a DoIP message via UDP it shall call the SoAd_IfTransmit with the TxPduId set to the SoAd internal TxPduId that is retrieved via the according configured DoIPSoAdUdpTxPduRef, the PduInfoPtr shall contain the length of the message and the pointer to the to be transmitted message buffer and additionally the buffer shall be locked.
⌋ (SRS_Eth_00024)

Note: The events that lead to the sending of UDP DoIP messages are described in the rest of the specification. Which DoIP message shall use UDP connection is described in Table 3.

[SWS_DoIP_00199]⌈
If the SoAd calls the DoIP module via the Interface DoIP_SoAdIfTxConfirmation, the DoIP module shall release the buffer which is related to the received TxPduId.⌋ ()

[SWS_DoIP_00286]⌈ DoIP module shall consider the announcement successful and process DoIPVehicleAnnouncementCount if the SoAd calls the DoIP module via the interface DoIP_SoAdIfTxConfirmation with Result set to E_OK for the announcement related SoAd_IfTransmit() call i.e. if E_NOT_OK is returned for the last announcement message, it will not be considered an announcement.⌋ ()

[SWS_DoIP_00276]⌈ If the DoIP received more then the configured amount of DoIPMaxUDPRequestPerMessage the DoIP shall sent DoIP NACKs for the Requested Messages that can not be processed⌋ ()

Example1: If the DoIP Tester sends in one UDP message 4 UDP requests but the DoIPMaxUDPRequestPerMessage is set to 2 than the first 2 messages are remembered for further processing, while for the UDP request 3 and 4 a DoIP NACK is sent to the DoIP Tester with buffer overflow.

Example2: If the DoIP Tester sends in one UDP message 2 UDP requests, the DoIPMaxUDPRequestPerMessage is set to 2 and there is currently still 1 message processed for this tester than the first message is remembered for further processing while for the 2nd DoIP request a DoIP NACK is sent to the DoIP Tester with buffer overflow.
⌋ (SRS_Eth_00027)

7.5 TCP communication

DoIP messages that are communicated via TCP connection are communicated on the SoAd Tp APIs. So all messages which are received via TCP as described in Table 2 and sent via TCP as described in Table 3 shall be treated as described in this chapter.

7.5.1 Reception of a TCP DoIP message

[SWS_DoIP_00207]⌈
If the function DoIP_SoAdTpStartOfReception is called with TpSduLength set to 0, the DoIP module shall fill in the bufferSizePtr the available buffer size in the DoIP for the reception of the TCP message, lock the according buffer for other TCP connections and return BUFREQ_OK.
⌋ (SRS_Eth_00024)

Note: The API will be called from SoAd only once per TCP connection, directly when the socket is connected. All the data will be transferred to DoIP via the API DoIP_SoAdTpCopyRxData.

[SWS_DoIP_00208]⌈
If the function DoIP_SoAdTpCopyRxData is called at the start of a new DoIP message (e.g. directly after DoIPSoAdTpStartOfReception succeeded or previous DoIP message processed completely) with info.SduLength set to 0 the DoIP module shall return in the parameter bufferSizePtr the length to the maximum necessary bytes to evaluate the DoIP relevant data for routing of diagnostic data.
⌋ (SRS_Eth_00024)

Note: The DoIP module knows internal when a new DoIP message is started because of the DoIP protocol payload length information (see chapter Generic DoIP header 7.3.1).

[SWS_DoIP_00209]⌈
If the function DoIP_SoAdTpCopyRxData is called at the start of a new DoIP message (e.g. directly after DoIPSoAdTpStartOfReception succeeded or previous DoIP message processed completely) with info.SduLength is not set to 0 and the DoIP TCP buffer is big enough to copy all the data, the DoIP module shall copy the received data to the internal TCP buffer, return the parameter bufferSizePtr set to the available buffer after copying and return BUFREQ_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00210]⌈
If the function DoIP_SoAdTpCopyRxData is called at the start of a new DoIP message (e.g. directly after DoIPSoAdTpStartOfReception succeeded or previous DoIP message processed completely) with info.SduLength is not set to 0 and the DoIP TCP buffer is not big enough to copy all the data, the DoIP module shall return BUFREQ_E_NOT_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00214]⌈
If the DoIP module has received sufficient data to evaluate the DoIP header and the payload type is not diagnostic message the DoIP shall copy all data of this DoIP message to the internal DoIP TCP buffer, lock the according buffer for other TCP connections and process the DoIP message as described in SWS_DoIP_00219.
⌋ (SRS_Eth_00024)

Note: The length of the DoIP message is encoded in the DoIP header. It has to be considered that after the first DoIP message, there can be more in one single TCP stream.

[SWS_DoIP_00212]{DRAFT} ⌈
If the DoIP module has received sufficient data to evaluate the DoIP header, the payload type is diagnostic message and the Routing was already activated for the SourceAddress/TargetAddress combination on this DoIPInterface, the DoIP module shall call the PduR_DoIPTpStartOfReception with the according id set to the DoIPPduRRxPduId matching the SourceAddress/TargetAddress combination of the diagnostic message on this DoIPInterface, set the info.SduLength to the already received diagnostic data, set the info->SduDataPtr to the buffer containing the received diagnostic data and set the TpSduLength to the total size of the diagnostic message extracted from DoIP Header.
⌋ (SRS_Eth_00024)

Note: For the SourceAddress/TargetAddress combinations refer to configuration container DoIPChannel.

[SWS_DoIP_00260]⌈
If PduR_DoIPTpStartOfReception returns BUFREQ_OK the reception was accepted and the DoIP module shall forward already received data of the diagnostic message to the upper layer by subsequent calls to PduR_DoIPTpCopyRxData.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00218]⌈
If PduR_DoIPTpStartOfReception returns BUFREQ_OK the reception was accepted and the DoIP shall forward all subsequent calls to DoIP_SoAdTpCopyRxData directly to PduR_DoIPTpCopyRxData until all diagnostic data was handed to the PduR.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00259]⌈
At the end of the copy procedure via PduR_DoIPTpCopyRxData to PduR, the DoIP module has to modify the available buffer size pointer returned to SoAd in order to stop before the next DoIP header.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00253]⌈
If the buffer size reported by PduR_DoIPTpStartOfReception does not suffice for already received data, DoIP shall abort the reception and call PduR_DoIPTpRxIndication with E_NOT_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00216]⌈
If PduR_DoIPTpStartOfReception returns BUFREQ_E_NOT_OK or BUFREQ_E_OVFL, the DoIP module shall react as described in SWS_DoIP_00174 and discard all the TCP data until the next DoIP message.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00217]⌈

If PduR_DoIPTpCopyRxData returns BUFREQ_E_NOT_OK, the DoIP module shall react as described in SWS_DoIP_00174, discard all the TCP data until the next DoIP message and call the PduR_DoIPTpRxIndication with the according PduId and the result set to E_NOT_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00221]⌈
If all diagnostic data was successfully forwarded to the PduR (see SWS_DoIP_00216) the DoIP module shall call the PduR_DoIPTpRxIndication with the according PduId and the result set to E_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00219]⌈
If the DoIP module has received with the DoIP_SoAdTpCopyRxData operations enough data to evaluate the DoIP header and the payload type is not diagnostic message (see SWS_DoIP_00214), the DoIP module shall receive via subsequent calls to DoIP_SoAdTpCopyRxData all data for the DoIP message and process it.
⌋ (SRS_Eth_00024)

Note: The possible DoIP messages on TCP are described in Table 2 and in the according chapters in this specification.

[SWS_DoIP_00200]⌈
If the function DoIP_SoAdTpRxIndication is called the DoIp module shall release all data connected to the reception and forward the result to PduR_DoIPTpRxIndication if a reception for diagnostic message is currently ongoing.
⌋ (SRS_Eth_00024)

Note: The function DoIP_SoAdTpRxIndication is only called once when the socket is closed.

[SWS_DoIP_00258]⌈
If the DoIP module is called with DoIP_TpCancelReceive, the DoIP module shall call the SoAd_TpCancelReceive function with the RxPduId that is retrieved via the according configured DoIPSoAdTcpRxPduRef.
⌋ ()

7.5.2 Transmission of a TCP DoIP message

[SWS_DoIP_00220]⌈
If the DoIP module needs to send a DoIP message that is not a diagnostic message on the TCP connection, the DoIP shall call the SoAd_TpTransmit with the TxPduId containing the Id of the according socket, the PduInfoPtr.SduLength set to the size of the data to be transmitted and lock the buffer to send.
⌋ (SRS_Eth_00024)

Note: If the call to SoAd_TpTransmit returns E_OK the DoIP module shall consider that the data will be transmitted by subsequent calls to the DoIP_SoAdTpCopyTxData.

[SWS_DoIP_00223]⌈
If the call to SoAd_TpTransmit returns E_NOT_OK the DoIP module shall discard the DoIP message.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00224]⌈
If the function DoIP_SoAdCopyTxData is called after a sucessfull call to SoAd_TpTransmit, with a valid id and the info.SduLength is set to 0 the DoIP shall return BUFREQ_OK and set the parameter availableDataPtr to the total available data size of the current DoIP message to be transmitted.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00225]⌈
If the function DoIP_SoAdCopyTxData is called after a sucessfull call to SoAd_TpTransmit, with a valid id and the info.SduLength is not set to 0, the DoIP module shall copy the bytes specified in the info.SduLength to the info->SduDataPtr, return BUFREQ_OK and set the parameter availableDataPtr to the total available data size of the current DoIP message after the copy process.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00229]⌈
If the function DoIP_SoAdTpTxConfirmation is called the DoIP module shall release the buffer related to the id. ⌋ (SRS_Eth_00024)

[SWS_DoIP_00230]⌈
If the function DoIP_TpTransmit or DoIP_IfTransmit is called and the data package is allowed to be sent according to the current DoIP protocol related information, the DoIP module shall return E_OK.
1.) If the connection to the SoAd is idle, the DoIP shall call the SoAd_TpTransmit function according to SWS_DoIP_00284.
2.) If the connection to the SoAd is not idle, the DoIP shall store the transmission request and call SoAd_TpTransmit according to SWS_DoIP_00284 as soon as the connection is idle again.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00284]⌈
To transmit a DoIP diagnostic message the DoIP shall assemble the DoIP header considering the information of the handed PduInfoPtr.SduLength and call SoAd_TpTransmit with the TxPduId set to the according PduId of the socket connection and the PduInfoPtr.SduLength set to the sum of the following lengths: DoIP header (8 Byte), the DoIP diagnostic message specific data (4 Byte) and received length of the call to DoIP_TpTransmit or DoIP_IfTransmit (PduInfoPtr.SduLength).
⌋ (SRS_Eth_00024)

[SWS_DoIP_00226]⌈
If the function DoIP_TpTransmit or DoIP_IfTransmit is called and the data package is not allowed according to the current DoIP protocol related information, the DoIP module shall return E_NOT_OK.

⌋ (SRS_Eth_00024)

[SWS_DoIP_00279]⌈ If the DoIPPduType of a DoIPPduRTxPdu is DOIP_IFPDU, the content of the PDU provided by DoIP_IfTransmit shall be stored completely in the DoIP internal buffer. If the buffer is too small, E_NOT_OK shall be returned immediately.
⌋ (SRS_Eth_00024)

Note: If the function SoAd_TpTransmit returns for the use case “diagnostic message” E_OK, the DoIP module shall consider that the data will be transmitted by subsequent calls to the DoIP_SoAdTpCopyTxData.

[SWS_DoIP_00228]⌈ If the call to SoAd_TpTransmit returns for the use case “diagnostic message” E_NOT_OK the DoIP module shall discard the DoIP message and, in case the DoIPPduType of the corresponding DoIPPduRTxPdu is DOIP_TPPDU, call the PduR_DoIPTpTxConfirmation with result set to E_NOT_OK.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00231]⌈
If the function DoIP_SoAdCopyTxData is called after a sucessfull call to SoAd_TpTransmit for the use case “diagnostic message”, with a valid id and the info.SduLength is set to 0 the DoIP shall return BUFREQ_OK and set the parameter availableDataPtr to the total available data size of the current buffered DoIP message to be transmitted.
⌋ (SRS_Eth_00024)

Note: This means that only the length for the created DoIP header and the diagnostic SourceAddress/TargetAddress is returned and not the total data length.

[SWS_DoIP_00232]⌈
If the function DoIP_SoAdCopyTxData is called after a sucessfull call to SoAd_TpTransmit for the use case “diagnostic message” with a valid id and the info.SduLength is not set to 0, the DoIP module shall copy the bytes specified in the info.SduLength to the info->SduDataPtr. If the requested bytes are more than in the DoIP internal buffer, the DoIP shall call the PduR_DoIPTpCopyTxData with the info.SduLength set to the remaining requested data bytes and the info-> SduDataPtr set to the position where the PduR shall continue to copy the data.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00254]⌈
If the call to PduR_DoIPTpCopyTxData returns BUFREQ_OK or all the requested data was part of the DoIP internal buffer, the DoIP module shall return BUFREQ_OK and set the parameter availableDataPtr to the remaining data size of the DoIP header and diagnostic SourceAddress/TargetAddress if they have not been copied completely or to the remaining data size returned from PduR_DoIPTpCopyTxData.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00233]⌈
If the DoIP module has copied via subsequent calls to DoIP_SoAdTpCopyTxData for the use case “diagnostic message” all information stored in the DoIP internal buffer,

the DoIP module shall forward all subsequent calls to DoIP_SoAdTpCopyTxData/DoIP_SoAdTpTxConfirmation for this transmission directly to the PduR using PduR_DoIPTpCopyTxData/PduR_DoIPTpTxConfirmation in case the DoIPPduRTxPdu is DOIP_TPPDU and PduR_DoIPIfTxConfirmation otherwise, and release the internal buffer for this transmission.
⌋ (SRS_Eth_00024)

[SWS_DoIP_00257]⌈
If the DoIP module is called with DoIP_TpCancelTransmit or DoIP_IfCancelTransmit, the DoIP module shall call the SoAd_TpCancelTransmit function of the according SoAdTxPduId.
⌋ (SRS_Eth_00024))

7.6 Error classification

7.6.1 Development Errors

[SWS_DoIP_00148]⌈ Development Error Types

Type or error	***Relevance***	***Related error code***	***Value [hex]***
API service call without module initialization	Development	DOIP_E_UNINIT	0x01
NULL-Pointer on any API call	Development	DOIP_E_PARAM_POINTER	0x02
Wrong Lower Layer (SoaAd) or Upper Layer (PduRouter) Id received	Development	DOIP_E_INVALID_PDU_SDU_ID	0x03
API call with invalid Parameter	Development	DOIP_E_INVALID_PARAMETER	0x04
DoIP Init service call failure	Development	DOIP_E_INIT_FAILED	0x05

⌋ ()

7.6.2 Runtime Errors

[SWS_DoIP_00282]⌈ Runtime Error Types

Type of Error	*Relevance*	*Related Error Code*	*Value [hex]*
	Runtime		
	Runtime		
	Runtime		
	Runtime		
	Runtime		

⌋ ()

7.6.3 Transient Faults

[SWS_DoIP_00283]⌈
Transient Fault Types

Type of Error	*Relevance*	*Related Error Code*	*Value [hex]*
	Transient		
	Transient		
	Transient		
	Transient		
	Transient		

⌋ ()

8 API specification

8.1 Imported types

The follwing types shall be imported by the DoIP module from the modules given:
[SWS_DoIP_00020]⌈

Module	***Header File***	***Imported Type***
ComStack_Types	ComStack_Types.h	BufReq_ReturnType
	ComStack_Types.h	PduIdType
	ComStack_Types.h	PduInfoType
	ComStack_Types.h	PduLengthType
	ComStack_Types.h	RetryInfoType
	ComStack_Types.h	TpDataStateType
SoAd	SoAd.h	SoAd_SoConIdType
	SoAd.h	SoAd_SoConModeType
Std	Std_Types.h	Std_ReturnType
	Std_Types.h	Std_VersionInfoType
TcpIp	TcpIp.h	TcpIp_DomainType
	TcpIp.h	TcpIp_IpAddrAssignmentType
	TcpIp.h	TcpIp_IpAddrStateType
	TcpIp.h	TcpIp_SockAddrType

⌋()

The following types are contained in the Rte_DoIP_Type.h header file, which is generated by the RTE generator:

[SWS_DoIP_00266]⌈

Name	DoIP_PowerStateType		
Kind	Type		
Derived from	uint8		
Range	DOIP_NOT_READY	0x00	DoIP Power Mode "not ready"
	DOIP_READY	0x01	DoIP Power Mode "ready"
	DOIP_NOT_SUPPORTED	0x02	DoIP Power Mode "not supported"
	0x03-0xFF	0x03-0xFF	Reserved

Description	Used for handling of the PowerMode in DoIP entity status requests
Variation	--
Available via	Rte_DoIP_Type.h

⌋()

[SWS_DoIP_00267]⌈

Name	AuthenticationReqDataType_{Name}		
Kind	Array	***Element type***	uint8
Size	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRouting ActivationAuthenticationCallback.DoIPRoutingActivationAuthenticationReqLength)} Elements		
Description	--		
Variation	Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}		
Available via	Rte_DoIP_Type.h		

⌋()

[SWS_DoIP_00268]⌈

Name	AuthenticationResDataType_{Name}		
Kind	Array	***Element type***	uint8
Size	{ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivation AuthenticationCallback.DoIPRoutingActivationAuthenticationResLength)} Elements		
Description	--		
Variation	Name = {ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation.SHORT-NAME)}		
Available via	Rte_DoIP_Type.h		

⌋()

[SWS_DoIP_00269]⌈

Name	ConfirmationReqDataType_{Name}		
Kind	Array	***Element type***	uint8
Size	{ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivation ConfirmationCallback.DoIPRoutingActivationConfirmationReqLength)} Elements		
Description	--		
Variation	Name = {ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation.SHORT-NAME)}		

Available via	Rte_DoIP_Type.h

⌋()

[SWS_DoIP_00270]⌈

Name	ConfirmationResDataType_{Name}		
Kind	Array	***Element type***	uint8
Size	{ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation/DoIPRoutingActivation ConfirmationCallback.DoIPRoutingActivationConfirmationResLength)} Elements		
Description	--		
Variation	Name = {ecuc(DoIP/DoIPConfigSet/DoIPRoutingActivation.SHORT-NAME)}		
Available via	Rte_DoIP_Type.h		

⌋()

[SWS_DoIP_00271]{OBSOLETE} ⌈

Name	DoIP_ActivationLineType (obsolete)	
Kind	ModeDeclarationGroup	
Category	ALPHABETIC_ORDER	
Initial mode	DOIP_ACTIVATION_LINE_INACTIVE	
On transition value	--	
Modes	DOIP_ACTIVATION_LINE_ACTIVE	--
	DOIP_ACTIVATION_LINE_INACTIVE	--
Description	-- **Tags:**atp.Status=obsolete	

⌋()
[SWS_DoIP_00287]⌈

Name	DoIP_FurtherActionByteType		
Kind	Type		
Derived from	uint8		
Range	0x11..0xFF	--	Available for additional OEM-specific use
Description	Used to get the OEM specific Further Action Byte for the DoIP vehicle identification response/vehicle announcement.		
Variation	--		

Available via	Rte_DoIP_Type.h

⌋(SRS_Eth_00026)

8.2 Type definitions

[SWS_DoIP_00272]⌈ The value of DOIP_E_PENDING shall be 0x10.
⌋ ()

The following Data Types shall be used for the functions defined in this specification.

8.2.1 DoIP_ConfigType

[SWS_DoIP_00025]⌈

Name	DoIP_ConfigType	
Kind	Structure	
Elements	Implementation specific	
	Type	--
	Comment	The content of the configuration data structure is implementation specific
Description	Configuration data structure of the DoIP module	
Available via	DoIP.h	

⌋()

8.3 Function definitions

This chapter contains a list of functions provided to upper layer modules.

8.3.1 DoIP_TpTransmit

[SWS_DoIP_00022]⌈

Service Name	DoIP_TpTransmit

Syntax	`Std_ReturnType DoIP_TpTransmit (`
	`  PduIdType TxPduId,`
	`  const PduInfoType* PduInfoPtr`
	`)`

Service ID [hex]	0x49
Sync/Async	Synchronous

Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	Identifier of the PDU to be transmitted
	PduInfoPtr	Length of and pointer to the PDU data and pointer to Meta Data.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Transmit request has been accepted. E_NOT_OK: Transmit request has not been accepted.
Description	Requests transmission of a PDU.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)

[SWS_DoIP_00162]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`. Otherwise, if DET is not enabled, return E_NOT_OK.⌋ ()

[SWS_DoIP_00163]⌈
If development error detection is enabled: The function shall check if the `TxPduId` matches a configured `DoIPPduRTxPduId`. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`. Otherwise, if DET is not enabled, return E_NOT_OK. ⌋ ()

[SWS_DoIP_00164]⌈
If development error detection is enabled: The function shall check if the `PduInfoPtr` is not a `NULL_PTR`. If the check fails the function shall raise the development error `DOIP_E_PARAM_POINTER`. Otherwise, if DET is not enabled, return E_NOT_OK. ⌋ ()

8.3.2 DoIP_TpCancelTransmit

[SWS_DoIP_00023]⌈

Service Name	DoIP_TpCancelTransmit

Syntax	`Std_ReturnType DoIP_TpCancelTransmit (`
	`  PduIdType TxPduId`
	`)`

Service ID [hex]	0x4a
Sync/Async	Synchronous
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.

Parameters (in)	TxPduId	Identification of the PDU to be cancelled.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Cancellation was executed successfully by the destination module. E_NOT_OK: Cancellation was rejected by the destination module.
Description	Requests cancellation of an ongoing transmission of a PDU in a lower layer communication module.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)
[SWS_DoIP_00166]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`. Otherwise, if DET is not enabled, return E_NOT_OK.
⌋ ()

[SWS_DoIP_00167]⌈
If development error detection is enabled: The function shall check if the `TxPduId` matches a configured DoIPPduRTxPduId. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`. Otherwise, if DET is not enabled, return E_NOT_OK. ⌋ ()

8.3.3 DoIP_TpCancelReceive

[SWS_DoIP_00024]⌈

Service Name	DoIP_TpCancelReceive	

Syntax	`Std_ReturnType DoIP_TpCancelReceive (`
	`  PduIdType RxPduId`
	`)`	

Service ID [hex]	0x4c	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	RxPduId	Identification of the PDU to be cancelled.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Cancellation was executed successfully by the destination module.

		E_NOT_OK: Cancellation was rejected by the destination module.
Description	Requests cancellation of an ongoing reception of a PDU in a lower layer transport protocol module.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)
[SWS_DoIP_00169]⌈
If development error detection is enabled: The function shall check that the service DoIP_Init was previously called. If the check fails, the function shall raise the development error DOIP_E_UNINIT. Otherwise, if DET is not enabled, return E_NOT_OK. ⌋ ()

[SWS_DoIP_00170]⌈
If development error detection is enabled: The function shall check if the RxPduId matches a configured DoIPPduRRxPduId. If the check fails the function shall raise the development error DOIP_E_INVALID_PDU_SDU_ID. Otherwise, if DET is not enabled, return E_NOT_OK. ⌋ ()

8.3.4 DoIP_IfTransmit

[SWS_DoIP_00277]⌈

Service Name	DoIP_IfTransmit	

Syntax	`Std_ReturnType DoIP_IfTransmit (`
	`  PduIdType TxPduId,`
	`  const PduInfoType* PduInfoPtr`
	`)`	

Service ID [hex]	0x49	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	Identifier of the PDU to be transmitted
	PduInfoPtr	Length of and pointer to the PDU data and pointer to Meta Data.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Transmit request has been accepted. E_NOT_OK: Transmit request has not been accepted.
Description	Requests transmission of a PDU.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)

8.3.5 DoIP_IfCancelTransmit

[SWS_DoIP_00278]⌈

Service Name	DoIP_IfCancelTransmit	

Syntax	`Std_ReturnType DoIP_IfCancelTransmit (`
	`  PduIdType TxPduId`
	`)`	

Service ID [hex]	0x4a	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	Identification of the PDU to be cancelled.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Cancellation was executed successfully by the destination module. E_NOT_OK: Cancellation was rejected by the destination module.
Description	Requests cancellation of an ongoing transmission of a PDU in a lower layer communication module.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)

8.3.6 DoIP_Init

[SWS_DoIP_00026]⌈

Service Name	DoIP_Init	

Syntax	`void DoIP_Init (`
	`  const DoIP_ConfigType* DoIPConfigPtr`
	`)`	

Service ID [hex]	0x01	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DoIPConfigPtr	Pointer to the configuration data of the DoIP module

Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	This service initializes all global variables of the DoIP module. After return of this service the DoIP module is operational.
Available via	DoIP.h

⌋(SRS_Eth_00024)

8.3.7 DoIP_GetVersionInfo

[SWS_DoIP_00027]⌈

Service Name	DoIP_GetVersionInfo	

Syntax	`void DoIP_GetVersionInfo (`
	`  Std_VersionInfoType* versioninfo`
	`)`	

Service ID [hex]	0x00	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	versioninfo	Pointer to where to store the version information of this module.
Return value	None	
Description	Returns the version information of this module.	
Available via	DoIP.h	

⌋(SRS_BSW_00407, SRS_BSW_00411)
[SWS_DoIP_00172]⌈
If development error detection is enabled: The function shall check if the `versioninfo` is not a `NULL_PTR`. If the check fails the function shall raise the development error `DOIP_E_PARAM_POINTER`.

⌋ ((SRS_BSW_00323, SRS_BSW_00386)

[SWS_DoIP_00030]⌈
If source code for caller and callee of `DoIP_GetVersionInfo` is available, the DoIP module should realize `DoIP_GetVersionInfo` as a macro, defined in the module’s header file.
⌋ ()

8.3.8 DoIP_ActivationLineSwitch

[SWS_DoIP_91000]{DRAFT} ⌈

Service Name	DoIP_ActivationLineSwitch (draft)	

Syntax	`void DoIP_ActivationLineSwitch (`
	`  uint8 InterfaceId  ,`
	`  boolean active`
	`)`	

Service ID [hex]	0x0e	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	Interface Id	Indentifier of the DoIP interface for which DoIP_ActivationLineSwitch function is called.
Parameters (inout)	active	Boolean value acting as input parameter to request active/inactive status of the given DoIP Interface and acts as an output parameter indicating the activation line status.
Parameters (out)	None	
Return value	None	
Description	This function is to be used by integrators to inform the DoIP implementation about the status of the activation line of a DoIP interface with given InterfaceId. **Tags:**atp.Status=draft	
Available via	DoIP.h	

⌋()

[SWS_DoIP_00285]⌈ If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00302]{DRAFT} ⌈
If development error detection is enabled DoIP_ ActivationLineSwitch (InterfaceId,*Active) shall check if interface identified by InterfaceId actually exists and DoIPInterfaceActLineCtrl is set to TRUE. If the check fails, the function shall raise the development error DOIP_E_INVALID_PARAMETER.
⌋ ()

[SWS_DoIP_00303]{DRAFT} ⌈
If development error detection is enabled call to DoIP_ ActivationLineSwitch shall check if the interface identified by InterfaceId actually exists. If the check fails, the function shall raise the development error DOIP_E_INVALID_PARAMETER.
⌋ ()

8.3.9 DoIP_ TriggerVehicleAnnouncement

[SWS_DoIP_91002]{DRAFT} ⌈

Service Name	DoIP_TriggerVehicleAnnouncement (draft)	

Syntax	`void DoIP_TriggerVehicleAnnouncement (`
	`  uint8 interfaceID`
	`)`	

Service ID [hex]	0x0d	
Sync/Async	Asynchronous	
Reentrancy	Non Reentrant	
Parameters (in)	interfaceID	Indentifier of the DoIP interface for which DoIP_TriggerVehicle Announcement is called.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	This function is used to notify the DoIP module to start vehicle announcement for DoIP interfaces with given InterfaceId. **Tags:**atp.Status=draft	
Available via	DoIP.h	

⌋()

[SWS_DoIP_00304]{DRAFT} ⌈
If development error detection is enabled DoIP_ TriggerVehicleAnnouncement shall check if the interface identified by InterfaceId is configured with DoIPInterfaceActLineCtrl set to FALSE. If the check fails the function shall raise the development error DOIP_E_INVALID_PARAMETER.
⌋ ()

[SWS_DoIP_00305]{DRAFT} ⌈
If development error detection is enabled call to DoIP_ TriggerVehicleAnnouncement shall check if the interface identified by InterfaceId actually exists. If the check fails, the function shall raise the development error DOIP_E_INVALID_PARAMETER.
⌋ ()

8.4 Call-back notifications

In AUTOSAR, the functions a module provides to layers which are placed below the module in the AUTOSAR software layer model, are called 'call-back functions'.

Generally, a software entity A (DoIP), which, in order to be informed about some event C in software entity B (SoAd), is registered as interested in event C at software entity B by calling a register mechanism B provides, and is called by entity B if event C occurs.

This chapter contains a list of Call-Back functions which are called by the lower layer SoAd module.

8.4.1 DoIP_SoAdTpCopyTxData

[SWS_DoIP_00031]⌈

Service Name	DoIP_SoAdTpCopyTxData	

Syntax	`BufReq_ReturnType DoIP_SoAdTpCopyTxData (`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  const RetryInfoType* retry,`
	`  PduLengthType* availableDataPtr`
	`)`	

Service ID [hex]	0x43	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	id	Identification of the transmitted I-PDU.
	info	Provides the destination buffer (SduDataPtr) and the number of bytes to be copied (SduLength). If not enough transmit data is available, no data is copied by the upper layer module and BUFREQ_E_BUSY is returned. The lower layer module may retry the call. An SduLength of 0 can be used to indicate state changes in the retry parameter or to query the current amount of available data in the upper layer module. In this case, the SduDataPtr may be a NULL_PTR.
	retry	This parameter is used to acknowledge transmitted data or to retransmit data after transmission problems. If the retry parameter is a NULL_PTR, it indicates that the transmit data can be removed from the buffer immediately after it has been copied. Otherwise, the retry parameter must point to a valid RetryInfoType element. If TpDataState indicates TP_CONFPENDING, the previously copied data must remain in the TP buffer to be available for error recovery. TP_DATACONF indicates that all data that has been copied before this call is confirmed and can be removed from the TP buffer. Data copied by this API call is excluded and will be confirmed later. TP_DATARETRY indicates that this API call shall copy previously copied data in order to recover from an error. In this case TxTpDataCnt specifies the offset in bytes from the current data copy position.
Parameters (inout)	None	
Parameters	available	Indicates the remaining number of bytes that are available in the upper

(out)	DataPtr	layer module's Tx buffer. availableDataPtr can be used by TP modules that support dynamic payload lengths (e.g. FrIsoTp) to determine the size of the following CFs.
Return value	BufReq_-Return-Type	BUFREQ_OK: Data has been copied to the transmit buffer completely as requested. BUFREQ_E_BUSY: Request could not be fulfilled, because the required amount of Tx data is not available. The lower layer module may retry this call later on. No data has been copied. BUFREQ_E_NOT_OK: Data has not been copied. Request failed.
Description	This function is called to acquire the transmit data of an I-PDU segment (N-PDU). Each call to this function provides the next part of the I-PDU data unless retry->TpDataState is TP_DATARETRY. In this case the function restarts to copy the data beginning at the offset from the current position indicated by retry->TxTpDataCnt. The size of the remaining data is written to the position indicated by availableDataPtr.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)

[SWS_DoIP_00175]⌈
If development error detection is enabled: The function shall check that the service DoIP_Init was previously called. If the check fails, the function shall raise the development error DOIP_E_UNINIT. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

[SWS_DoIP_00176]⌈
If development error detection is enabled: The function shall check if the id matches a configured DoIPSoAdTcpTxPduId. If the check fails the function shall raise the development error DOIP_E_INVALID_PDU_SDU_ID. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

[SWS_DoIP_00177]⌈
If development error detection is enabled: The function shall check that neither the info nor the availableDataPtr are a NULL_PTR. If the check fails the function shall raise the development error DOIP_E_PARAM_POINTER. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

[SWS_DoIP_00178]⌈
If development error detection is enabled: The function shall check if the retry is a NULL_PTR. If the check fails the function shall raise the development error DOIP_E_INVALID_PARAMETER. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

8.4.2 DoIP_SoAdTpTxConfirmation

[SWS_DoIP_00032]⌈

Service Name	DoIP_SoAdTpTxConfirmation	

Syntax	`void DoIP_SoAdTpTxConfirmation (`
	`  PduIdType id,`
	`  Std_ReturnType result`
	`)`	

Service ID [hex]	0x48	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	id	Identification of the transmitted I-PDU.
	result	Result of the transmission of the I-PDU.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	This function is called after the I-PDU has been transmitted on its network, the result indicates whether the transmission was successful or not.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)

[SWS_DoIP_00180]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00181]⌈
If development error detection is enabled: The function shall check if the `id` matches a configured DoIPSoAdTcpTxPduId. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`.
⌋ ()

[SWS_DoIP_00182]⌈
If development error detection is enabled: The function shall check if the result is valid. If the check fails the function shall raise the development error `DOIP_E_INVALID_PARAMETER`.
⌋ ()

8.4.3 DoIP_SoAdTpCopyRxData

[SWS_DoIP_00033]⌈

Service Name	DoIP_SoAdTpCopyRxData	

Syntax	`BufReq_ReturnType DoIP_SoAdTpCopyRxData (`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  PduLengthType* bufferSizePtr`
	`)`	

Service ID [hex]	0x44	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	id	Identification of the received I-PDU.
	info	Provides the source buffer (SduDataPtr) and the number of bytes to be copied (SduLength). An SduLength of 0 can be used to query the current amount of available buffer in the upper layer module. In this case, the SduDataPtr may be a NULL_PTR.
Parameters (inout)	None	
Parameters (out)	bufferSizePtr	Available receive buffer after data has been copied.
Return value	BufReq_ReturnType	BUFREQ_OK: Data copied successfully BUFREQ_E_NOT_OK: Data was not copied because an error occurred.
Description	This function is called to provide the received data of an I-PDU segment (N-PDU) to the upper layer. Each call to this function provides the next part of the I-PDU data. The size of the remaining buffer is written to the position indicated by bufferSizePtr.	
Available via	DoIP.h	

⌋(SRS_Eth_00024)
[SWS_DoIP_00183]⌈
If development error detection is enabled: The function shall check that the service DoIP_Init was previously called. If the check fails, the function shall raise the development error DOIP_E_UNINIT. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

[SWS_DoIP_00036]⌈
If development error detection is enabled: The function shall check if the id matches a configured DoIPSoAdTcpRxPduId. If the check fails the function shall raise the development error DOIP_E_INVALID_PDU_SDU_ID. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK.
⌋ ()

[SWS_DoIP_00184]⌈
If development error detection is enabled: The function shall check that neither the `info` nor the `bufferSizePtr` are a `NULL_PTR`. If the check fails, the function shall raise the development error `DOIP_E_PARAM_POINTER`. Otherwise, if DET is not enabled, return `BUFREQ_E_NOT_OK`.
⌋ ()

8.4.4 DoIP_SoAdTpStartOfReception

[SWS_DoIP_00037]⌈

Service Name	DoIP_SoAdTpStartOfReception	

Syntax	`BufReq_ReturnType DoIP_SoAdTpStartOfReception (`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  PduLengthType TpSduLength,`
	`  PduLengthType* bufferSizePtr`
	`)`	

Service ID [hex]	0x46	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	id	Identification of the I-PDU.
	info	Pointer to a PduInfoType structure containing the payload data (without protocol information) and payload length of the first frame or single frame of a transport protocol I-PDU reception, and the MetaData related to this PDU. If neither first/single frame data nor MetaData are available, this parameter is set to NULL_PTR.
	TpSdu Length	Total length of the N-SDU to be received.
Parameters (inout)	None	
Parameters (out)	buffer SizePtr	Available receive buffer in the receiving module. This parameter will be used to compute the Block Size (BS) in the transport protocol module.
Return value	BufReq_-Return-Type	BUFREQ_OK: Connection has been accepted. bufferSizePtr indicates the available receive buffer; reception is continued. If no buffer of the requested size is available, a receive buffer size of 0 shall be indicated by bufferSizePtr. BUFREQ_E_NOT_OK: Connection has been rejected; reception is aborted. bufferSizePtr remains unchanged. BUFREQ_E_OVFL: No buffer of the required length can be provided; reception is aborted. bufferSizePtr remains unchanged.
Description	This function is called at the start of receiving an N-SDU. The N-SDU might be fragmented into multiple N-PDUs (FF with one or more following CFs) or might consist of a single N-PDU (SF). The service shall provide the currently available	

	maximum buffer size when invoked with TpSduLength equal to 0.
Available via	DoIP.h

⌋(SRS_Eth_00024)

[SWS_DoIP_00186]⌈ If development error detection is enabled: The function shall check that the service DoIP_Init was previously called. If the check fails, the function shall raise the development error DOIP_E_UNINIT. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK. ⌋ ()

[SWS_DoIP_00187]⌈ If development error detection is enabled: The function shall check if the id matches a configured DoIPSoAdTcpRxPduId. If the check fails the function shall raise the development error DOIP_E_INVALID_PDU_SDU_ID. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK. ⌋ ()

[SWS_DoIP_00188]⌈ If development error detection is enabled: The function shall check if the bufferSizePtr is not a NULL_PTR. If the check fails the function shall raise the development error DOIP_E_PARAM_POINTER. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK. ⌋ ()

[SWS_DoIP_00189]⌈ If development error detection is enabled: The function shall check if the TpSduLength is not 0. If TpSduLength is not 0 the function shall raise the development error DOIP_E_INVALID_PARAMETER. Otherwise, if DET is not enabled, return BUFREQ_E_NOT_OK. ⌋ ()

Note: This is because SoAd will call the DoIP module only once with the TpSduLength set to 0 after the TCP connection has been established.

8.4.5 DoIP_SoAdTpRxIndication

[SWS_DoIP_00038]⌈

Service Name	DoIP_SoAdTpRxIndication	

Syntax	`void DoIP_SoAdTpRxIndication (`
	`  PduIdType id,`
	`  Std_ReturnType result`
	`)`	

Service ID [hex]	0x45	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	id	Identification of the received I-PDU.
	result	Result of the reception.
Parameters (inout)	None	

Parameters (out)	None
Return value	None
Description	Called after an I-PDU has been received via the TP API, the result indicates whether the transmission was successful or not.
Available via	DoIP.h

⌋(SRS_Eth_00024)
[SWS_DoIP_00190]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00191]⌈
If development error detection is enabled: The function shall check if the `id` matches a configured DoIPSoAdTcpRxPduId. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`.
⌋ ()

[SWS_DoIP_00192]⌈
If development error detection is enabled: The function shall check if the result is valid. If the check fails the function shall raise the development error `DOIP_E_INVALID_PARAMETER`.
⌋ ()

8.4.6 DoIP_SoAdIfRxIndication

[SWS_DoIP_00244]⌈

Service Name	DoIP_SoAdIfRxIndication	

Syntax	`void DoIP_SoAdIfRxIndication (`
	`  PduIdType RxPduId,`
	`  const PduInfoType* PduInfoPtr`
	`)`	

Service ID [hex]	0x42	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	RxPduId	ID of the received PDU.
	PduInfoPtr	Contains the length (SduLength) of the received PDU, a pointer to a buffer (SduDataPtr) containing the PDU, and the MetaData related to this PDU.

Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Indication of a received PDU from a lower layer communication interface module.
Available via	DoIP.h

⌋(SRS_Eth_00024)
[SWS_DoIP_00246]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00247]⌈
If development error detection is enabled: The function shall check if the `RxPduId` matches a configured DoIPSoAdUdpRxPduId. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`.
⌋ ()

[SWS_DoIP_00248]⌈
If development error detection is enabled: The function shall check the validity of the PduInfoPtr and call the DET with DOIP_E_PARAM_POINTER error id if it is a NULL_PTR.
⌋ ()

8.4.7 DoIP_SoAdIfTxConfirmation

[SWS_DoIP_00245]⌈

Service Name	DoIP_SoAdIfTxConfirmation	

Syntax	`void DoIP_SoAdIfTxConfirmation (`
	`  PduIdType TxPduId,`
	`  Std_ReturnType result`
	`)`	

Service ID [hex]	0x40	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	ID of the PDU that has been transmitted.
	result	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.
Parameters	None	

(inout)	
Parameters (out)	None
Return value	None
Description	The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU.
Available via	DoIP.h

⌋(SRS_Eth_00024)

[SWS_DoIP_00249]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00250]⌈
If development error detection is enabled: The function shall check if the `TxPduId` matches a configured DoIPSoAdUdpTxPduId. If the check fails the function shall raise the development error `DOIP_E_INVALID_PDU_SDU_ID`.
⌋ ()

8.4.8 DoIP_SoConModeChg

[SWS_DoIP_00039]⌈

Service Name	DoIP_SoConModeChg	

Syntax	`void DoIP_SoConModeChg (`
	`  SoAd_SoConIdType SoConId,`
	`  SoAd_SoConModeType Mode`
	`)`	

Service ID [hex]	0x0b	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different SoConIds. Non reentrant for the same SoConId.	
Parameters (in)	SoConId	socket connection index specifying the socket connection with the mode change.
	Mode	new mode
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	

Description	Notification about a SoAd socket connection state change, e.g. socket connection gets online
Available via	DoIP.h

⌋(SRS_Eth_00081, SRS_Eth_00028)

[SWS_DoIP_00193]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00194]⌈
If development error detection is enabled: The function shall check if the `SoConId` and Mode are valid. If the check fails the function shall raise the development error `DOIP_E_INVALID_PARAMETER`.
⌋ ()

8.4.9 DoIP_LocalIpAddrAssignmentChg

[SWS_DoIP_00040]⌈

Service Name	DoIP_LocalIpAddrAssignmentChg	

Syntax	`void DoIP_LocalIpAddrAssignmentChg (`
	`  SoAd_SoConIdType SoConId,`
	`  TcpIp_IpAddrStateType State`
	`)`	

Service ID [hex]	0x0c	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different SoConIds. Non reentrant for the same SoConId.	
Parameters (in)	SoConId	socket connection index specifying the socket connection where the IP address assigment has changed
	State	state of IP address assignment
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	This function gets called by the SoAd if an IP address assignment related to a socket connection changes (i.e. new address assigned or assigned address becomes invalid).	
Available via	DoIP.h	

⌋(SRS_Eth_00081, SRS_Eth_00028)
[SWS_DoIP_00195]⌈
If development error detection is enabled: The function shall check that the service `DoIP_Init` was previously called. If the check fails, the function shall raise the development error `DOIP_E_UNINIT`.
⌋ ()

[SWS_DoIP_00196]⌈
If development error detection is enabled: The function shall check if the `SoConId` and State are valid. If the check fails the function shall raise the development error `DOIP_E_INVALID_PARAMETER`.
⌋ ()

8.5 Scheduled functions

The Basic Software Scheduler within the Rte [6] directly calls these functions. The following functions shall have no return value and no parameter. All functions shall be non reentrant.

8.5.1 DoIP_MainFunction

[SWS_DoIP_00041]⌈

Service Name	DoIP_MainFunction

Syntax	`void DoIP_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x02
Description	Schedules the Diagnostic over IP module. (Entry point for scheduling)
Available via	SchM_DoIP.h

⌋()
[SWS_DoIP_00042]⌈
The main function for scheduling the DoIP module (Entry point for scheduling) shall be called by the Schedule Manager according to the configured call period.
⌋ ()

[SWS_DoIP_00043]⌈
The call period of the `DoIP_MainFunction`() is determined by the configuration parameter DoIPMainFunctionPeriod.
⌋ ()

8.6 Expected Interfaces

In this chapter all interfaces required from other modules are listed.

8.6.1 Mandatory Interfaces

This chapter defines all interfaces which are required to fulfill the core functionality of the module.

[SWS_DoIP_00044]⌈

API Function	***Header File***	***Description***
Dcm_GetVin	Dcm.h	Function to get the VIN (as defined in SAE J1979-DA)
PduR_DoIPTp-CopyRxData	PduR_DoIPTp.h	This function is called to provide the received data of an I-PDU segment (N-PDU) to the upper layer. Each call to this function provides the next part of the I-PDU data. The size of the remaining buffer is written to the position indicated by bufferSizePtr.
PduR_DoIPTp-CopyTxData	PduR_DoIPTp.h	This function is called to acquire the transmit data of an I-PDU segment (N-PDU). Each call to this function provides the next part of the I-PDU data unless retry->TpDataState is TP_DATARETRY. In this case the function restarts to copy the data beginning at the offset from the current position indicated by retry->TxTpDataCnt. The size of the remaining data is written to the position indicated by availableDataPtr.
PduR_DoIPTp-RxIndication	PduR_DoIPTp.h	Called after an I-PDU has been received via the TP API, the result indicates whether the transmission was successful or not.
PduR_DoIPTp-StartOf-Reception	PduR_DoIPTp.h	This function is called at the start of receiving an N-SDU. The N-SDU might be fragmented into multiple N-PDUs (FF with one or more following CFs) or might consist of a single N-PDU (SF). The service shall provide the currently available maximum buffer size when invoked with TpSduLength equal to 0.
PduR_DoIPTp-TxConfirmation	PduR_DoIPTp.h	This function is called after the I-PDU has been transmitted on its network, the result indicates whether the transmission was successful or not.
SoAd_CloseSo-Con	SoAd.h	This service closes the socket connection specified by SoConId.
SoAd_Get-LocalAddr	SoAd.h	Retrieves the local address (IP address and port) actually used for the SoAd socket connection specified by SoConId, the netmask and default router
SoAd_GetPhys-Addr	SoAd.h	Retrieves the physical source address of the EthIf controller used by the SoAd socket connection specified by SoConId.
SoAd_Get-RemoteAddr	SoAd.h	Retrieves the remote address (IP address and port) actually used for the SoAd socket connection specified by SoConId
SoAd_GetSo-ConId	SoAd.h	Returns socket connection index related to the specified TxPduId.

SoAd_IfTransmit	SoAd.h	Requests transmission of a PDU.
SoAd_OpenSoCon	SoAd.h	This service opens the socket connection specified by SoConId.
SoAd_ReadDhcpHostNameOption	SoAd.h	By this API service an upper layer of the SoAd can read the currently configured hostname, i.e. FQDN option in the DHCP submodule of the TCP/IP stack.
SoAd_ReleaseIpAddrAssignment	SoAd.h	By this API service the local IP address assignment used for the socket connection specified by SoConId is released.
SoAd_RequestIpAddrAssignment	SoAd.h	By this API service the local IP address assignment which shall be used for the socket connection specified by SoConId is initiated.
SoAd_SetRemoteAddr	SoAd.h	By this API service the remote address (IP address and port) of the specified socket connection shall be set.
SoAd_SetUniqueRemoteAddr	SoAd.h	This API service shall either return the socket connection index of the SoAdSocketConnectionGroup where the specified remote address (IP address and port) is set or assign the remote address to an unused socket connection from the same SoAdSocketConnectionGroup.
SoAd_TpCancelReceive	SoAd.h	Requests cancellation of an ongoing reception of a PDU in a lower layer transport protocol module.
SoAd_TpCancelTransmit	SoAd.h	Requests cancellation of an ongoing transmission of a PDU in a lower layer communication module.
SoAd_TpTransmit	SoAd.h	Requests transmission of a PDU.
SoAd_WriteDhcpHostNameOption	SoAd.h	By this API service an upper layer of the SoAd can set the hostname, i.e. FQDN option in the DHCP submodule of the TCP/IP stack.

⌋()

8.6.2 Optional Interfaces

This chapter defines all interfaces which are required by the DoIP module to fulfill an optional functionality of the DoIP module.

[SWS_DoIP_00045]⌈

API Function	***Header File***	***Description***
Det_ReportError	Det.h	Service to report development errors.
PduR_DoIPIfTxConfirmation	PduR_DoIPIf.h	The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU.

⌋()

Note: The PduR_DoIPIfTxConfirmation optional interface is needed only if the DoIPPduType is set to DOIP_IFPDU for at least one Tx PDU, which is the case when UUDT frames are sent via Ethernet

8.6.3 Configurable interfaces

In this chapter all interfaces are listed where the target function could be configured. The target function is usually a call-back function. The names of these kind of interfaces is not fixed because they are configurable.

8.6.3.1 <User>_DoIPGetPowerModeCallback

[SWS_DoIP_00047]⌈

Service Name	<User>_DoIPGetPowerModeCallback	

Syntax	`Std_ReturnType <User>_DoIPGetPowerModeCallback (`
	`  DoIP_PowerStateType* PowerStateReady`
	`)`	

Service ID [hex]	0x00	
Sync/Async	Synchronous	
Reentrancy	Don't care	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	PowerState Ready	Pointer containing the information of the PowerModeStatus. Only valid if the return value equals E_OK.
Return value	Std_Return-Type	E_OK: PowerStateReady contains valid information E_NOT_OK: PowerStateReady contains no valid information
Description	Callback function to check if the PowerMode of the DoIP entity is ready or not.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00080)

8.6.3.2 <User>_DoIPRoutingActivationConfirmation

[SWS_DoIP_00048]⌈

Service Name	<User>_DoIPRoutingActivationConfirmation

Syntax	`Std_ReturnType <User>_DoIPRoutingActivationConfirmation (`
	`  boolean* Confirmed,`
	`  const uint8* ConfirmationReqData,`
	`  uint8* ConfirmationResData`
	`)`

Service ID [hex]	0x00

Sync/Async	Synchronous/Asynchronous	
Reentrancy	Don't care	
Parameters (in)	Confirmation ReqData	Pointer to OEM specific bytes for Routing activation request. Only needed if DoIPRoutingActivationConfirmationReqLength is not 0.
Parameters (inout)	None	
Parameters (out)	Confirmed	Pointer containing the information if Confirmation was successful (TRUE) or not (FALSE). Only valid if the return value equals E_OK.
	Confirmation ResData	Pointer to OEM specific bytes for Response on Routing activation. Only needed if DoIPRoutingActivationConfirmationResLength if not 0. Contains valid data if function return with E_OK.
Return value	Std_Return-Type	E_OK: Confirmed and ConfirmationResData contain valid Data. DOIP_E_PENDING: Confirmation still running. Call next DoIP_MainFunction cycle again. E_NOT_OK: Confirmed and/or ConfirmationResData do not contain valid information.
Description	Callback function to get the confirmation for the Routing Activation.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00084)

8.6.3.3 <User>_DoIPRoutingActivationAuthentication

[SWS_DoIP_00049]⌈

Service Name	<User>_DoIPRoutingActivationAuthentication	

Syntax	`Std_ReturnType <User>_DoIPRoutingActivationAuthentication (`
	`  boolean* Authentified,`
	`  const uint8* AuthenticationReqData,`
	`  uint8* AuthenticationResData`
	`)`	

Service ID [hex]	0x00	
Sync/Async	Synchronous/Asynchronous	
Reentrancy	Don't care	
Parameters (in)	Authentication ReqData	Pointer to OEM specific bytes for Routing activation request. Only needed if DoIPRoutingActivationAuthenticationReqLength is not 0.
Parameters (inout)	None	
Parameters (out)	Authentified	Pointer containing the information if Confirmation was successful (TRUE) or not (FALSE). Only valid if the return value equals E_OK.
	Authentication	Pointer to OEM specific bytes for Response on Routing

	ResData	activation. Only needed if DoIPRoutingActivationAuthentication ResLength if not 0. Contains valid data if function return with E_OK.
Return value	Std_ReturnType	E_OK: Authentified and AuthenticationResData contain valid Data. DOIP_E_PENDING: Authentication still running. Call next DoIP_MainFunction cycle again. E_NOT_OK: Authentified and/or AuthenticationResData do not contain valid information.
Description	Callback function to get the confirmation for the Routing Activation.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00084)

8.6.3.4 <User>_DoIPTriggerGidSyncCallback

[SWS_DoIP_00050]⌈

Service Name	<User>_DoIPTriggerGidSyncCallback	

Syntax	`Std_ReturnType <User>_DoIPTriggerGidSyncCallback (`
	`  void`
	`)`	

Service ID [hex]	0x00	
Sync/Async	Synchronous/Asynchronous	
Reentrancy	Don't care	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	E_OK: GroupIdentifier Synchronization was triggered E_NOT_OK: GroupIdentifier Synchronization could not be triggered so try again next MainFunction
Description	Function is used in the case that DoIPVinGIDMaster is set to true and a container DoIPTriggerGidSyncCallback is configured to trigger the synchronization process of the GroupIdentifier.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00026)

8.6.3.5 <User>_DoIPGetGidCallback

[SWS_DoIP_00051]⌈

Service Name	<User>_DoIPGetGidCallback

Syntax	`Std_ReturnType <User>_DoIPGetGidCallback (`
	`  uint8* GroupId`

	)	
Service ID [hex]	0x00	
Sync/Async	Synchronous/Asynchronous	
Reentrancy	Don't care	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	GroupId	Pointer to GroupIdentifier
Return value	Std_ReturnType	E_OK: GroupId contains a valid value E_NOT_OK: GroupId does not contain a valid value
Description	Function is used in the case that DoIPVinGIDMaster is set to false and DoIPGetGid Callback is configured to get on a vehicle identification the GID. If the return value is not E_OK the DoIP shall use the default GID.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00026)

8.6.3.6 <User>_DoIPGetFurtherActionByteCallback

[SWS_DoIP_00288]⌈

Service Name	<User>_DoIPGetFurtherActionByteCallback	

Syntax	`Std_ReturnType <User>_DoIPGetFurtherActionByteCallback (`
	`  DoIP_FurtherActionByteType* FurtherActionByte`
	`)`	

Service ID [hex]	0x00	
Sync/Async	Synchronous	
Reentrancy	Don't care	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	FurtherAction Byte	Pointer containing the information of the FurtherActionByte. Only valid if the return value equals E_OK.
Return value	Std_Return-Type	E_OK: FurtherActionByte contains valid information E_NOT_OK: FurtherActionByte contains no valid information
Description	Callback function to get the OEM specific Further Action Byte for the DoIP vehicle identification response/vehicle announcement.	
Available via	DoIP_Externals.h	

⌋(SRS_Eth_00026)

8.6.4 DoIP Service Component

The following section describes the DoIP service representation and the condition for which configuration Services have to be requested and provided by the DoIP module.

[SWS_DoIP_00052]⌈
A *DoIP Service Component* with the ShortName DoIP shall be provided based on the configuration of the DoIP module.
⌋ ()

The *DoIP Service Component* shall provide the interface *CallbackGetPowerMode* as described below to request the value of the Power mode for DoIP diagnostic power mode handling.

[SWS_DoIP_00054]⌈

Name	CallbackGetPowerMode		
Comment	--		
IsService	true		
Variation	{ecuc(DoIP/DoIPGeneral/DoIPPowerModeCallback/DoIPPowerModeDirect)} == NULL		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	GetPowerMode	
Comment	--	
Variation	--	
Parameters	PowerStateReady	
	Type	DoIP_PowerStateType
	Direction	OUT
	Comment	--
	Variation	--
Possible Errors	E_OK E_NOT_OK	

⌋(SRS_Eth_00080)

The *DoIP Service Component* shall be equipped with a service port as described below to request the value of the Power mode for DoIP diagnostic power mode handling.

[SWS_DoIP_00261]⌈

Name	CBGetPowerMode		
Kind	RequiredPort	***Interface***	CallbackGetPowerMode
Description	--		
Variation	{ecuc(DoIP/DoIPGeneral/DoIPPowerModeCallback/DoIPPowerModeDirect)} == NULL		

⌋(SRS_Eth_00080)

The *DoIP Service Component* shall provide the service port interface <NameOfRoutingActivation>_RoutingActivation as described below for each DoIPRoutingActivation that has at least DoIPRoutingActivationConfirmationCallback or DoIPRoutingActivationAuthenticationCallback configured without direct Callback functions.

[SWS_DoIP_00055]⌈

Name	{Name}_RoutingActivation		
Comment	--		
IsService	true		
Variation	(({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback)} != null) && ({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback/DoIPRoutingActivationAuthenticationFunc)} == "")) || (({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback)} != null) && ({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback/DoIPRoutingActivationConfirmationFunc)} == "")) Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed
	16	DOIP_E_PENDING	RoutingActivation still pending.

Operation	RoutingActivationAuthentication
Comment	--
Variation	(({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback)} != NULL) && ({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback/DoIPRoutingActivationAuthenticationFunc)} ==NULL))
Parameters	Authentified

	Type	boolean
	Direction	OUT
	Comment	--
	Variation	--
	AuthenticationReqData	
	Type	AuthenticationReqDataType_{Name}
	Direction	IN
	Comment	--
	Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback.DoIPRoutingActivationAuthenticationReqLength)} > 0 Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}
	AuthenticationResData	
	Type	AuthenticationResDataType_{Name}
	Direction	OUT
	Comment	--
	Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationAuthenticationCallback.DoIPRoutingActivationAuthenticationResLength)} > 0 Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}
Possible Errors	E_OK E_NOT_OK DOIP_E_PENDING	

Operation	RoutingActivationConfirmation	
Comment	--	
Variation	(({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback)} != NULL) &&({ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback/DoIPRoutingActivationConfirmationFunc)} ==NULL))	
Parameters	Confirmed	
	Type	boolean
	Direction	OUT
	Comment	--
	Variation	--
	ConfirmedReqData	

	Type	ConfirmationReqDataType_{Name}
	Direction	IN
	Comment	--
	Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback.DoIPRoutingActivationConfirmationReqLength)} > 0 Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}
	ConfirmedResData	
	Type	ConfirmationResDataType_{Name}
	Direction	OUT
	Comment	--
	Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation/DoIPRoutingActivationConfirmationCallback.DoIPRoutingActivationConfirmationResLength)} > 0 Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}
Possible Errors	E_OK E_NOT_OK DOIP_E_PENDING	

⌋(SRS_Eth_00084)

The *DoIP Service Component* shall be equipped with a service port as described below for each DoIPRoutingActivation that has at least DoIPRoutingActivationConfirmationCallback or DoIPRoutingActivationAuthenticationCallback configured without direct Callback functions.

[SWS_DoIP_00262]⌈

Name	CB{Name}RoutingActivation		
Kind	RequiredPort	***Interface***	{Name}_RoutingActivation
Description	--		
Variation	Name = {ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPRoutingActivation.SHORT-NAME)}		

⌋(SRS_Eth_00084)

The *DoIP Service Component* shall provide the service port interface *CallbackTriggerGIDSyncronization* as described below if the container DoIPTriggerGIDSyncCallback is configured without direct Callback function.

[SWS_DoIP_00056]⌈

Name	CallbackTriggerGIDSynchronization		
Comment	--		
IsService	true		
Variation	({ecuc(DoIP/DoIPGeneral/DoIPTriggerGidSyncCallback)} != NULL) && ({ecuc(DoIP/DoIPGeneral/DoIPTriggerGidSyncCallback/DoIPTriggerGidSyncDirect)} == NULL) && ({ecuc(DoIP/DoIPGeneral/DoIPVinGidMaster)} == TRUE)		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	TriggerGIDSynchronization
Comment	--
Variation	--
Possible Errors	E_OK E_NOT_OK

⌋(SRS_Eth_00026)

The *DoIP Service Component* shall be equipped with a service port as described below if the container DoIPTriggerGIDSyncCallback is configured without direct Callback function.

[SWS_DoIP_00263]⌈

Name	CBTriggerGIDSynchronization		
Kind	RequiredPort	***Interface***	CallbackTriggerGIDSynchronization
Description	--		
Variation	({ecuc(DoIP/DoIPGeneral/DoIPTriggerGidSyncCallback)} != NULL) && ({ecuc(DoIP/DoIPGeneral/DoIPTriggerGidSyncCallback/DoIPTriggerGidSyncDirect)} == NULL) && ({ecuc(DoIP/DoIPGeneral/DoIPVinGidMaster)} == TRUE)		

⌋(SRS_Eth_00026)

The *DoIP Service Component* shall provide the service port interface *CallbackGetGID* as described below to request the GID if the container DoIPGetGidCallback is configured without direct Callback function.

[SWS_DoIP_00057]⌈

Name	CallbackGetGID
Comment	--
IsService	true
Variation	({ecuc(DoIP/DoIPGeneral/DoIPGetGidCallback)} != NULL) && ({ecuc(DoIP/Do

	IPGeneral/DoIPGetGidCallback/DoIPGetGidDirect)} == NULL)		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	GetGID	
Comment	--	
Variation	--	
Parameters	Data	
	Type	uint8
	Direction	OUT
	Comment	--
	Variation	--
Possible Errors	E_OK E_NOT_OK	

⌋(SRS_Eth_00026)

The *DoIP Service Component* shall provide the service port as described below to request the GID if the container DoIPGetGidCallback is configured without direct Callback function

[SWS_DoIP_00264]⌈

Name	CBGetGID		
Kind	RequiredPort	***Interface***	CallbackGetGID
Description	--		
Variation	({ecuc(DoIP/DoIPGeneral/DoIPGetGidCallback)} != NULL) && ({ecuc(DoIP/DoIPGeneral/DoIPGetGidCallback/DoIPGetGidDirect)} == NULL)		

⌋(SRS_Eth_00026)

The DoIP Service Component shall provide the interface DoIPActivationLineStatus as described below to be informed on the transition of the ActivationLine for DoIP.

[SWS_DoIP_00242]{OBSOLETE} ⌈

Name	DoIPActivationLineStatus
Comment	--
IsService	true
Variation	--

ModeGroup	currentDoIPActivationLineStatus	DoIP_ActivationLineType

⌋ ( )

[SWS_DoIP_00265]{OBSOLETE} ⌈

Name	DoIPActivationLineSwitchNotification		
Kind	RequiredPort	***Interface***	DoIPActivationLineStatus
Description	--		
Variation	--		

⌋ ( )

The DoIP Service Component shall provide the interface CallbackGetFurtherActionByte as described below to request the value of the OEM specific Further Action Byte for the DoIP vehicle identification response/vehicle announcement.

[SWS_DoIP_00290]⌈

Name	CallbackGetFurtherActionByte		
Comment	--		
IsService	true		
Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPFurtherActionByteCallback/DoIPFurtherActionByteDirect)} == NULL		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	GetFurtherActionByte	
Comment	--	
Variation	--	
Parameters	FurtherActionByte	
	Type	DoIP_FurtherActionByteType
	Direction	OUT
	Comment	--
	Variation	--
Possible Errors	E_OK E_NOT_OK	

⌋(SRS_Eth_00026)

The DoIP Service Component shall be equipped with a service port per DoIPInterface as described below to request the value of the Further Action Byte for DoIP diagnostic vehicle identification response/vehicle announcement.

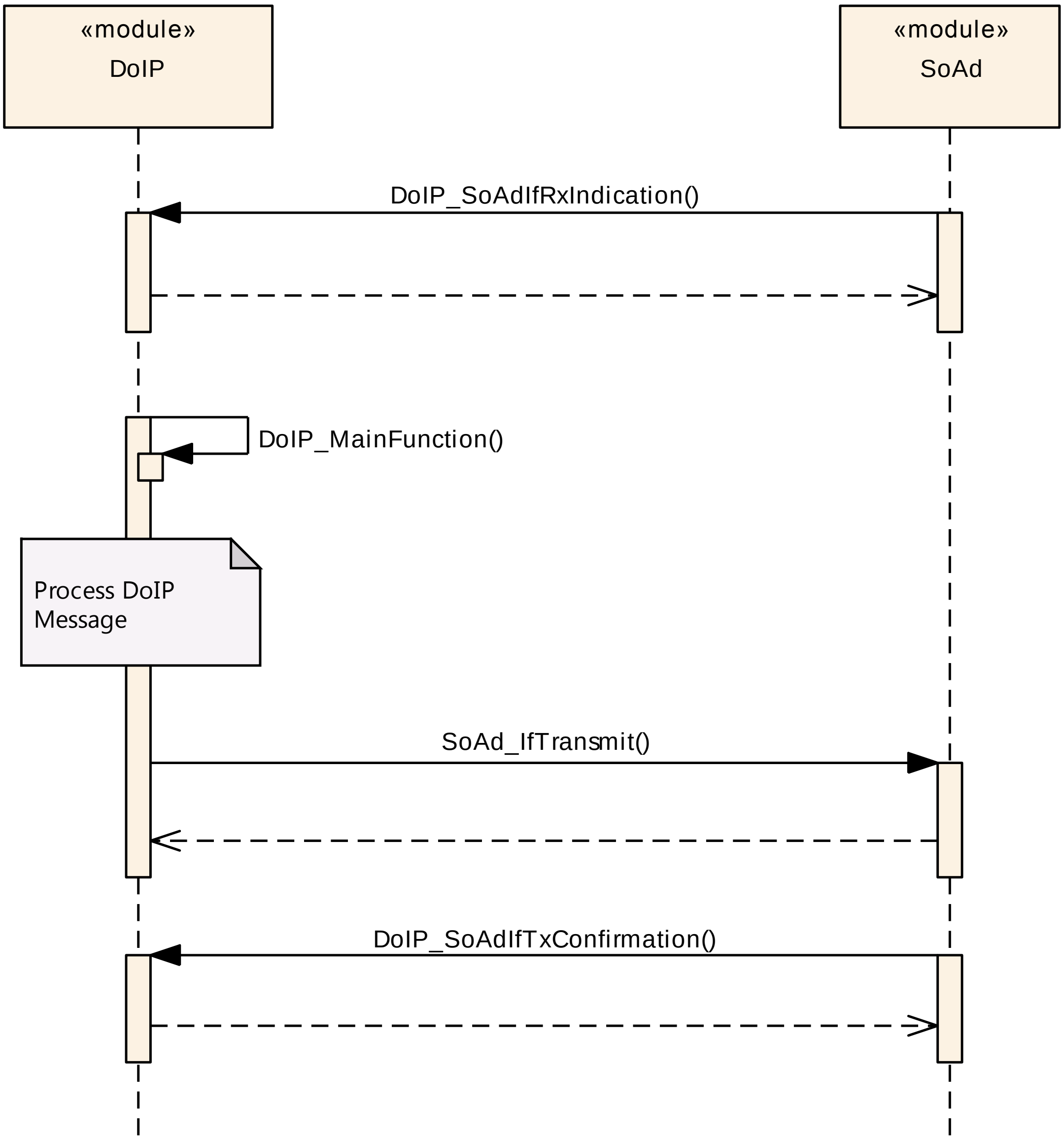
[SWS_DoIP_00289]{DRAFT} ⌈

Name	CBGetfurtherActionByte*_{DoIPInterface_short_name}*		
Kind	RequiredPort	***Interface***	CallbackGetFurtherActionByte
Description	--		
Variation	{ecuc(DoIP/DoIPConfigSet/DoIPInterface/DoIPFurtherActionByteCallback/DoIPFurtherActionByteDirect)} == NULL		

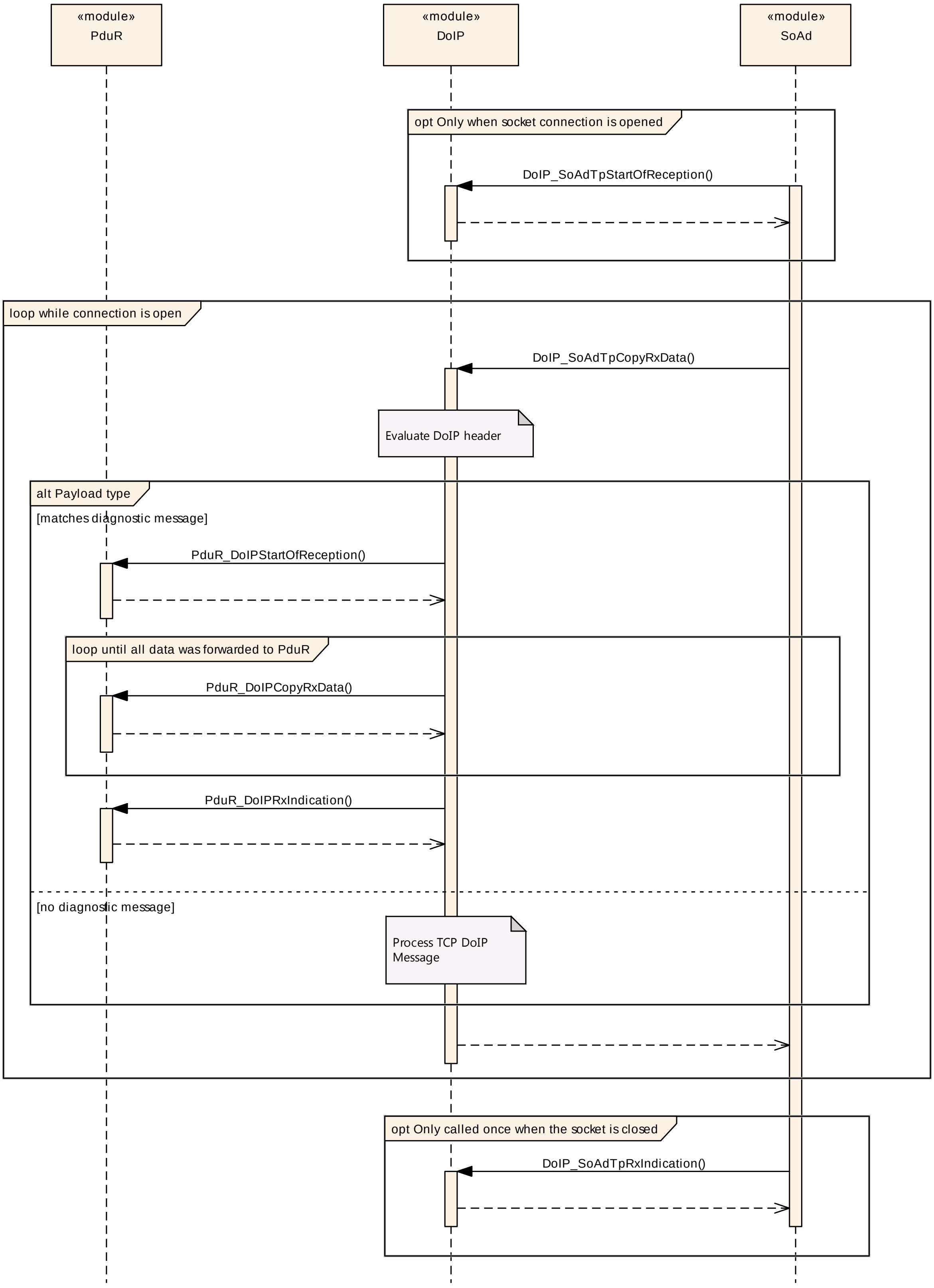
⌋(SRS_Eth_00026)

9 Sequence diagrams

9.1 UDP DoIP communication

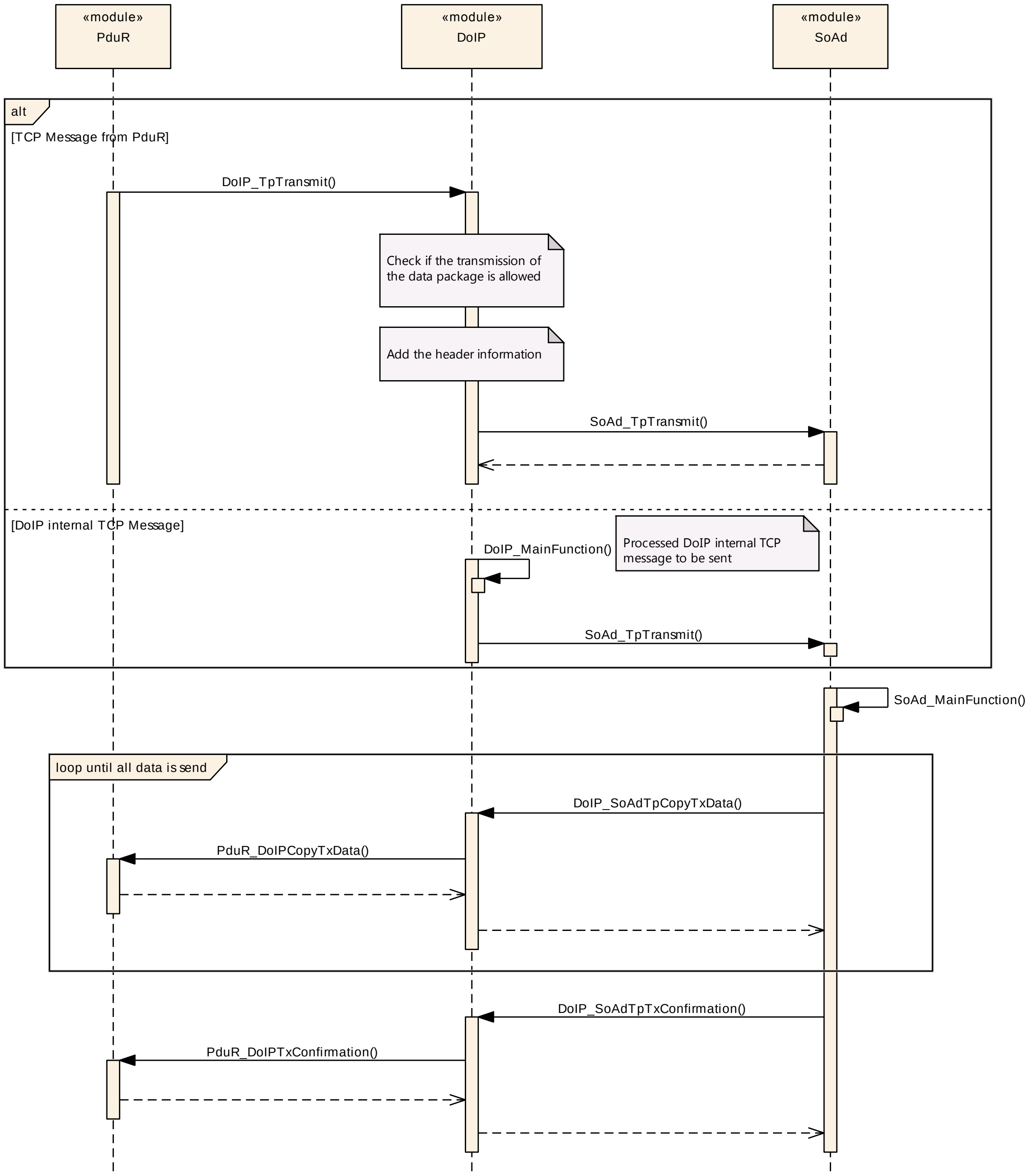


9.2 Rx TCP message

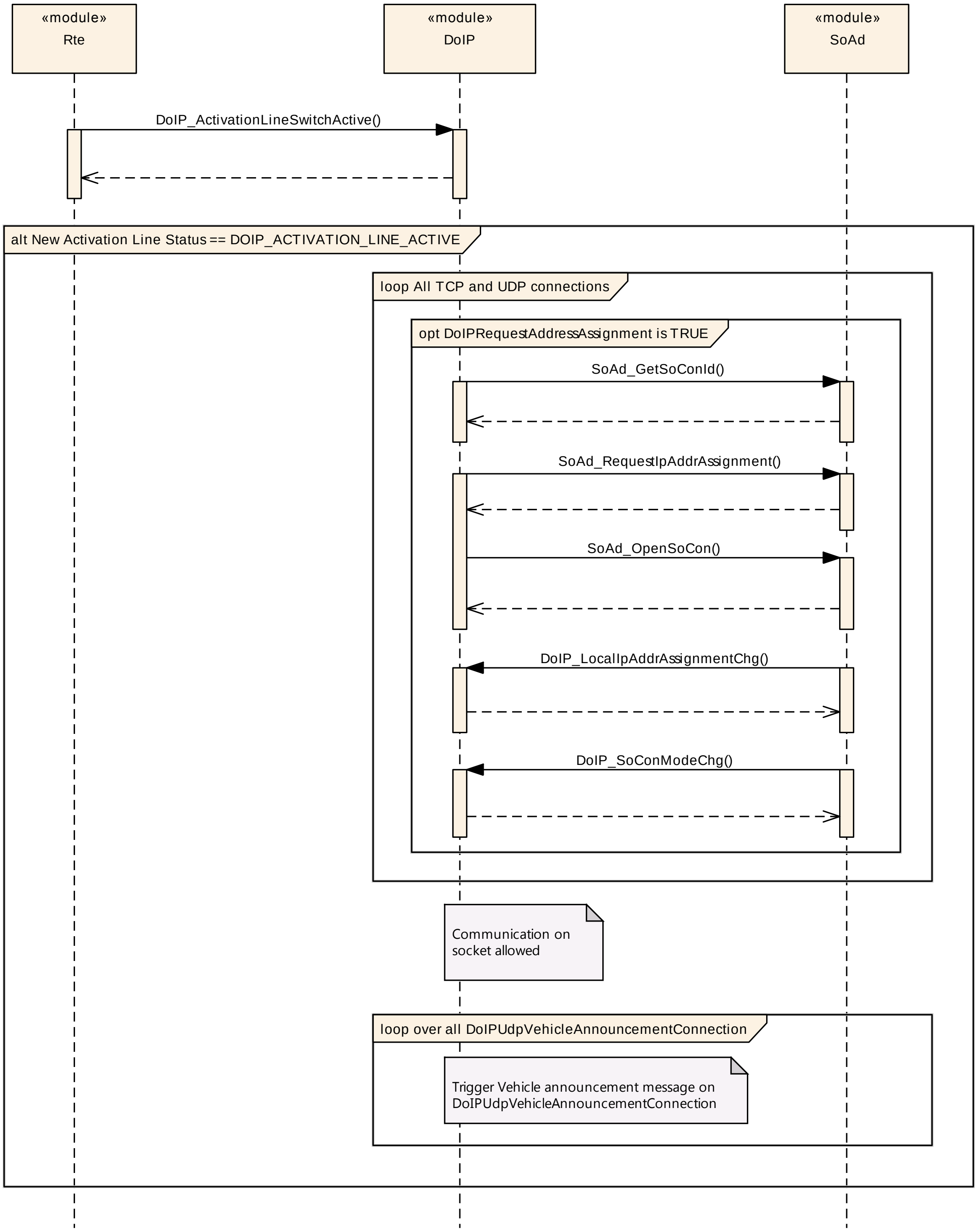

«module»
PduR
«module»
DoIP
«module»
SoAd
opt Only when socket connection is opened
DoIP_SoAdTpStartOfReception()
loop while connection is open
DoIP_SoAdTpCopyRxData()
Evaluate DoIP header
alt Payload type
[matches diagnostic message]
PduR_DoIPStartOfReception()
loop until all data was forwarded to PduR
PduR_DoIPCopyRxData()
PduR_DoIPRxIndication()
[no diagnostic message]
Process TCP DoIP Message
opt Only called once when the socket is closed
DoIP_SoAdTpRxIndication()

Note that more than one CopyRxData could provide the data of one request, but to reduce complexity this detail was omitted.

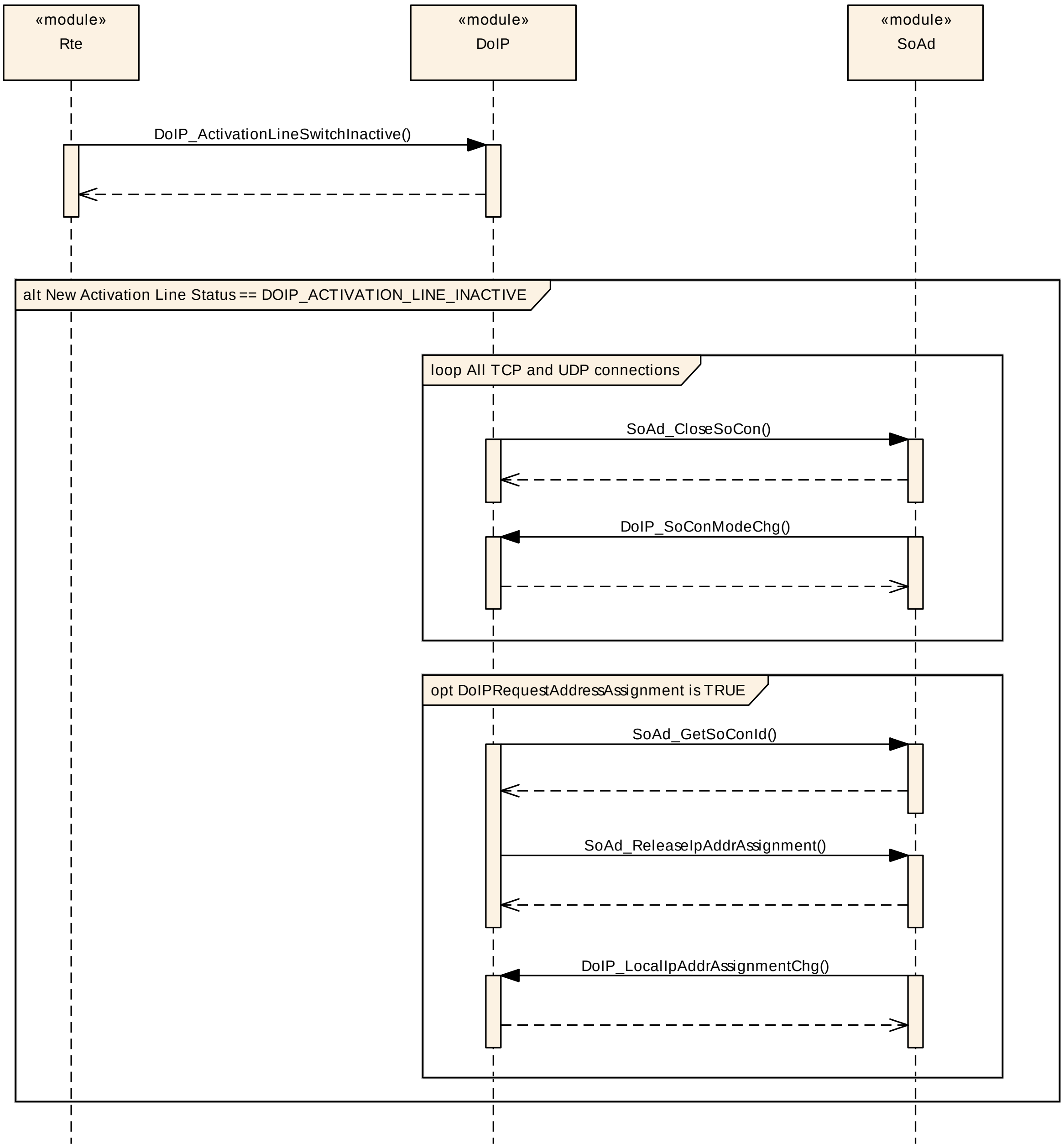
9.3 Tx TCP message


«module»
PduR
«module»
DoIP
«module»
SoAd
alt
[TCP Message from PduR]
DoIP_TpTransmit()
Check if the transmission of the data package is allowed
Add the header information
SoAd_TpTransmit()
[DoIP internal TCP Message]
DoIP_MainFunction()
Processed DoIP internal TCP message to be sent
SoAd_TpTransmit()
SoAd_MainFunction()
loop until all data is send
DoIP_SoAdTpCopyTxData()
PduR_DoIPCopyTxData()
DoIP_SoAdTpTxConfirmation()
PduR_DoIPTxConfirmation()

9.4 Activation Line Handling – Active


«module»
Rte
«module»
DoIP
«module»
SoAd
DoIP_ActivationLineSwitchActive()
alt New Activation Line Status == DOIP_ACTIVATION_LINE_ACTIVE
loop All TCP and UDP connections
opt DoIPRequestAddressAssignment is TRUE
SoAd_GetSoConId()
SoAd_RequestIpAddrAssignment()
SoAd_OpenSoCon()
DoIP_LocalIpAddrAssignmentChg()
DoIP_SoConModeChg()
Communication on socket allowed
loop over all DoIPUdpVehicleAnnouncementConnection
Trigger Vehicle announcement message on DoIPUdpVehicleAnnouncementConnection

9.5 Activation Line Handling – Inactive


«module»
Rte
«module»
DoIP
«module»
SoAd
DoIP_ActivationLineSwitchInactive()
alt New Activation Line Status == DOIP_ACTIVATION_LINE_INACTIVE
loop All TCP and UDP connections
SoAd_CloseSoCon()
DoIP_SoConModeChg()
opt DoIPRequestAddressAssignment is TRUE
SoAd_GetSoConId()
SoAd_ReleaseIpAddrAssignment()
DoIP_LocalIpAddrAssignmentChg()

10 Configuration specification

In general, this chapter defines configuration parameters and their clustering into containers. In order to support the specification, Chapter 10.1 describes fundamentals. It also specifies a template (table) you shall use for the parameter specification. We intend to leave Chapter 10.1 in the specification to guarantee comprehension.

Chapter 10.2 specifies the structure (containers) and the parameters of the module DoIP.

10.1 How to read this chapter

For details refer to the chapter 10.1 "Introduction to configuration specification" in SWS_BSWGeneral [14].

10.2 Configuration and configuration parameters

The following chapters summarize all configuration parameters. For a detailed description of parameters please refer to chapter 7 and chapter 8.

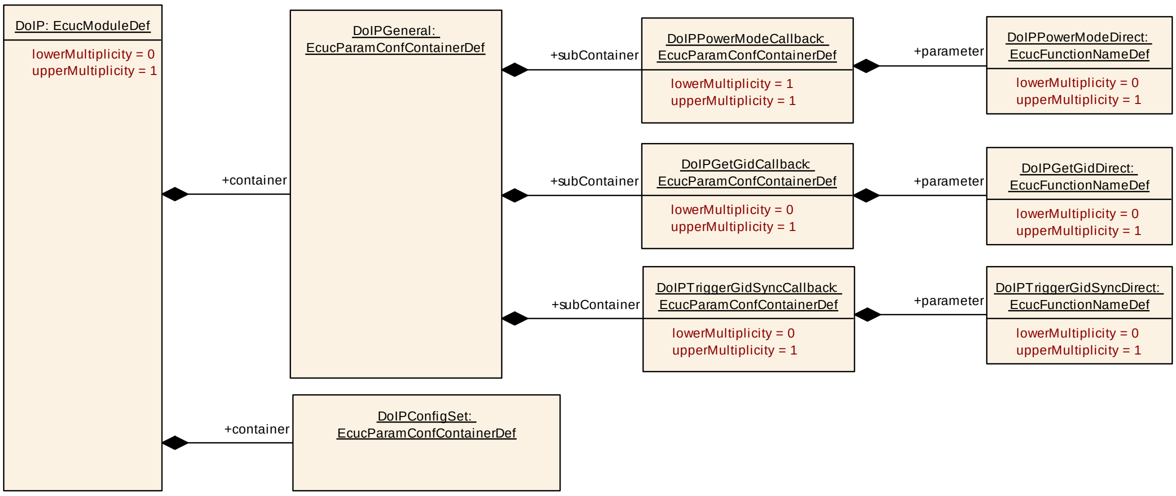
10.2.1 Variants

For details refer to the chapter 10.1.2 "Variants" in SWS_BSWGeneral [14].

10.2.2 DoIP

SWS Item	**ECUC_DoIP_00001 :**
Module Name	*DoIP*
Module Description	Configuration of the DoIP (Diagnostic over IP) module.
Post-Build Variant Support	true
Supported Config Variants	VARIANT-LINK-TIME, VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPConfigSet	1	This container contains the configuration parameters and sub containers of the AUTOSAR DoIP module.
DoIPGeneral	1	This container specifies the general configuration parameters of the DoIP module.



10.2.3 DoIPGeneral

SWS Item	**ECUC_DoIP_00002 :**
Container Name	DoIPGeneral
Parent Container	DoIP
Description	This container specifies the general configuration parameters of the DoIP module.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00004 :**		
Name	DoIPDevelopmentErrorDetect		
Parent Container	DoIPGeneral		
Description	Switches the development error detection and notification on or off. • true: detection and notification is enabled. • false: detection and notification is disabled.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	*Pre-compile time*	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00067 :**		
Name	DoIPDhcpOptionVinUse		
Parent Container	DoIPGeneral		
Description	If DoIPDhcpOptionVinUse is set to true the DoIP module will add the VIN to the Dhcp host name if no valid Dhcp host name is already set.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	*Pre-compile time*	X	All Variants
	Link time	--	
	Post-build time	--	

Scope / Dependency	scope: local

SWS Item	**ECUC_DoIP_00064 :**		
Name	DoIPEntityStatusMaxByteFieldUse		
Parent Container	DoIPGeneral		
Description	This parameter is used to distinguish the optional support of the Max data size element of a diagnostic entity status response.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00065 :**		
Name	DoIPGIDInvalidityPattern		
Parent Container	DoIPGeneral		
Description	Specifies the Byte pattern that is used for response messages if no valid GID could be retrieved. Only the value '0' or '255' is allowed".		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00073 :**		
Name	DoIPHostNameSizeMax		
Parent Container	DoIPGeneral		
Description	Maximum Size of the DHCP HostName in ASCII. This parameter is necessary to reserve the correct amount of bytes for working with the DHCP HostName option. Minimum range is 5 because Dhcp Host Name should be at least "DoIP-" on any configuration.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	5 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00006 :**
Name	DoIPMainFunctionPeriod
Parent Container	DoIPGeneral
Description	Determines the frequency at which the DoIP_MainFunction() is called in [s].
Multiplicity	1
Type	EcucFloatParamDef

Range	]0 .. INF[		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00019 :**		
Name	DoIPMaxRequestBytes		
Parent Container	DoIPGeneral		
Description	Specifies the maximum allowed bytes of a DoIP message request without the DoIP header.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	1 .. 18446744073709551615		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00074 :**		
Name	DoIPMaxUDPRequestPerMessage		
Parent Container	DoIPGeneral		
Description	This parameter captures the maximum amount of UDP Requests necessary to handle parallel within a single UDP connection.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	1 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00021 :**		
Name	DoIPNodeType		
Parent Container	DoIPGeneral		
Description	Describes the Type of the DoIP node.		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	DOIP_GATEWAY	The DoIP Entity is a DoIP Gateway.	
	DOIP_NODE	The DoIP Entity is a DoIP Node.	
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00018 :**

Name	DoIPUseEIDasGID		
Parent Container	DoIPGeneral		
Description	Specifies if the DoIP entity shall use its EID if it is the Master for vehicle identification gid on the vehicle identification/vehicle announcement.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

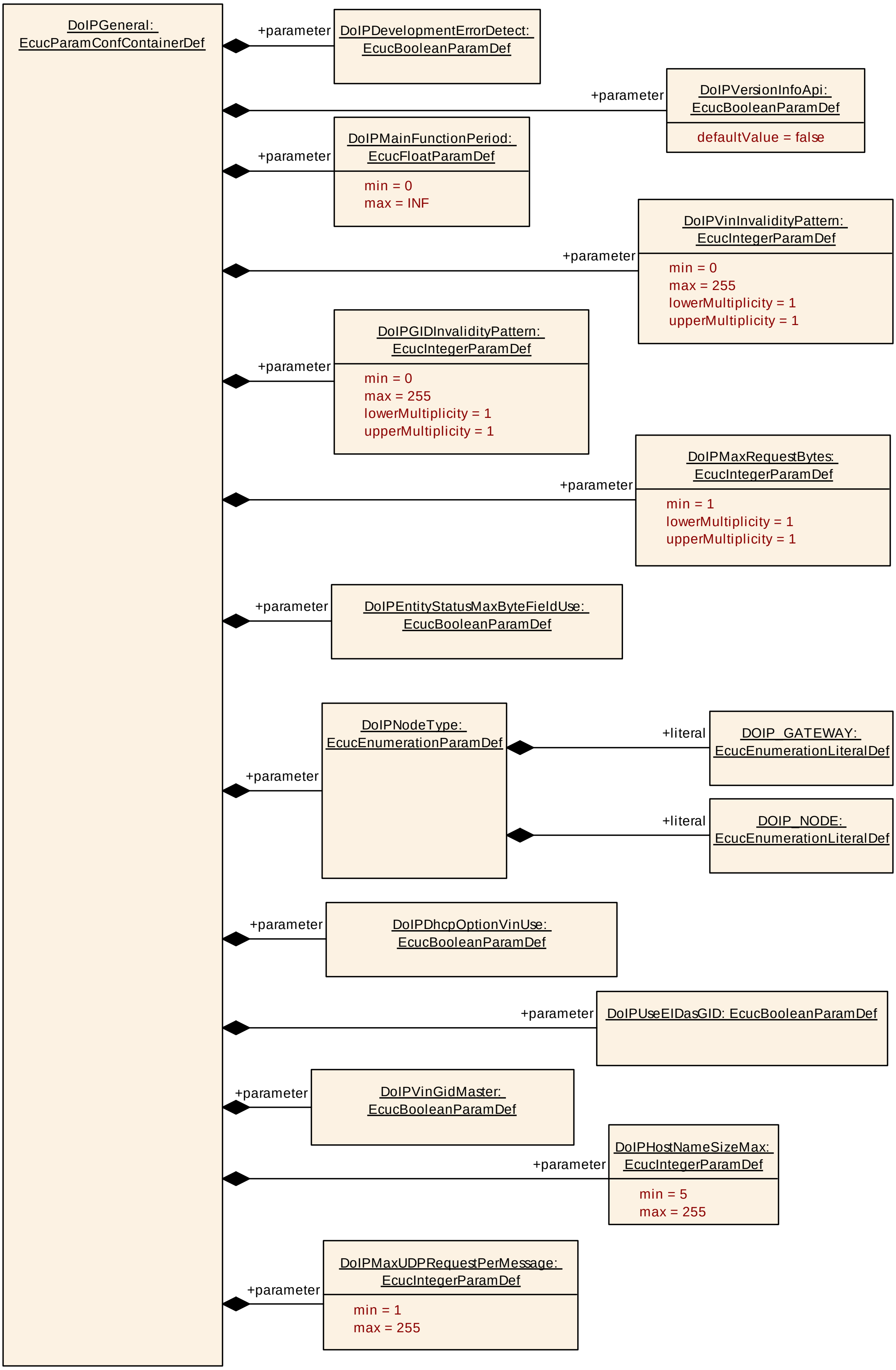
SWS Item	**ECUC_DoIP_00005 :**		
Name	DoIPVersionInfoApi		
Parent Container	DoIPGeneral		
Description	Activates the DoIP_GetVersionInfo() API. TRUE: Enables the DoIP_GetVersionInfo() API. FALSE: DoIP_GetVersionInfo() API is not included.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	false		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00017 :**		
Name	DoIPVinGidMaster		
Parent Container	DoIPGeneral		
Description	Specifies if the DoIP entity is the Vehicle identification Master for the GID (Group ID).		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local dependency: DoIPUseEIDasGID, DoIPTriggerGIDSynchronization		

SWS Item	**ECUC_DoIP_00066 :**		
Name	DoIPVinInvalidityPattern		
Parent Container	DoIPGeneral		
Description	Specifies the Byte pattern that is used for response messages if no valid VIN could be retrieved. Only the value '0' or '255' is allowed".		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	

	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPGetGidCallback	0..1	This container describes the usage of a callback function to get the GID. (If this container is not present no callback function shall be used by DoIP module to retrive the GID.)
DoIPPowerModeCallback	1	This container describes the usage of a callback function to retrieve the current power mode. This container shall always be present.
DoIPTriggerGidSyncCallback	0..1	This container describes the usage of a callback function to trigger the GID synchronization. (If this container does not exist no callback function shall be used by DoIP module to trigger the GID synchronization.)


DoIPGeneral:
EcucParamConfContainerDef
+parameter
DoIPDevelopmentErrorDetect:
EcucBooleanParamDef
+parameter
DoIPVersionInfoApi:
EcucBooleanParamDef
defaultValue = false
+parameter
DoIPMainFunctionPeriod:
EcucFloatParamDef
min = 0
max = INF
+parameter
DoIPVinInvalidityPattern:
EcucIntegerParamDef
min = 0
max = 255
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPGIDInvalidityPattern:
EcucIntegerParamDef
min = 0
max = 255
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPMaxRequestBytes:
EcucIntegerParamDef
min = 1
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPEntityStatusMaxByteFieldUse:
EcucBooleanParamDef
+parameter
DoIPNodeType:
EcucEnumerationParamDef
+literal
DOIP_GATEWAY:
EcucEnumerationLiteralDef
+literal
DOIP_NODE:
EcucEnumerationLiteralDef
+parameter
DoIPDhcpOptionVinUse:
EcucBooleanParamDef
+parameter
DoIPUseEIDasGID: EcucBooleanParamDef
+parameter
DoIPVinGidMaster:
EcucBooleanParamDef
+parameter
DoIPHostNameSizeMax:
EcucIntegerParamDef
min = 5
max = 255
+parameter
DoIPMaxUDPRequestPerMessage:
EcucIntegerParamDef
min = 1
max = 255

10.2.4 DoIPFurtherActionByteCallback

SWS Item	**ECUC_DoIP_00092 :**
Container Name	DoIPFurtherActionByteCallback
Parent Container	DoIPInterface
Description	This container describes the Callbackfunction to get the Further Action byte. This container shall always be present. If the DoIPFurtherActionByteDirect parameter is not present, the DoIP module will use an RPort of ServiceInterface CallbackGetFurtherActionByte with the name "CBGetFurtherActionByte_<shortname of enclosing DoIPInterface container>".
Configuration Parameters	

SWS Item	**ECUC_DoIP_00093 :**		
Name	DoIPFurtherActionByteDirect		
Parent Container	DoIPFurtherActionByteCallback		
Description	Direct C Callback function to get the OEM specific Further Action Byte for the DoIP vehicle identification response/vehicle announcement. If the DoIPFurtherActionByteDirect parameter is present, the DoIP module will not use an RPort of ServiceInterface "CBGetFurtherActionByte" but will call the configured function.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.5 DoIPGetGidCallback

SWS Item	**ECUC_DoIP_00024 :**
Container Name	DoIPGetGidCallback
Parent Container	DoIPGeneral
Description	This container describes the usage of a callback function to get the GID. (If this container is not present no callback function shall be used by DoIP module to retrive the GID.)
Configuration Parameters	

SWS Item	**ECUC_DoIP_00028 :**
Name	DoIPGetGidDirect
Parent Container	DoIPGetGidCallback
Description	If the DoIPGetGidDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPGetGID) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPGetGidDirect parameter does NOT exist the DoIP module shall use a RPort with a CallbackGetGID type of client-server port interface to retrive the GID.

Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.6 DoIPPowerModeCallback

SWS Item	**ECUC_DoIP_00023 :**
Container Name	DoIPPowerModeCallback
Parent Container	DoIPGeneral
Description	This container describes the usage of a callback function to retrieve the current power mode. This container shall always be present.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00027 :**		
Name	DoIPPowerModeDirect		
Parent Container	DoIPPowerModeCallback		
Description	If the DoIPPowerModeDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPGetPowerModeCallback) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPPowerModeDirect parameter does NOT present the DoIP module shall use a RPort with a CallbackGetPowerMode type of client-server port interface to retrive the current power mode.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE

	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.7 DoIPTriggerGidSyncCallback

SWS Item	**ECUC_DoIP_00025 :**
Container Name	DoIPTriggerGidSyncCallback
Parent Container	DoIPGeneral
Description	This container describes the usage of a callback function to trigger the GID synchronization. (If this container does not exist no callback function shall be used by DoIP module to trigger the GID synchronization.)
Configuration Parameters	

SWS Item	**ECUC_DoIP_00029 :**		
Name	DoIPTriggerGidSyncDirect		
Parent Container	DoIPTriggerGidSyncCallback		
Description	If the DoIPTriggerGidSyncDirect parameter exist the DoIP module shall call the configured callback function (<User>_DoIPTriggerGidSyncCallback) direct. (It is not needed to specify a service port to the DoIP service component.) If the DoIPTriggerGidSyncDirect parameter does NOT present the DoIP module shall use a RPort with a CallbackTriggerGIDSynchnonization type of client-server port interface to trigger the GID synchronization.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	*Pre-compile time*	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Value Configuration Class	*Pre-compile time*	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.8 DoIPConfigSet

SWS Item	**ECUC_DoIP_00003 :**

Container Name	DoIPConfigSet
Parent Container	DoIP
Description	This container contains the configuration parameters and sub containers of the AUTOSAR DoIP module.
Configuration Parameters	

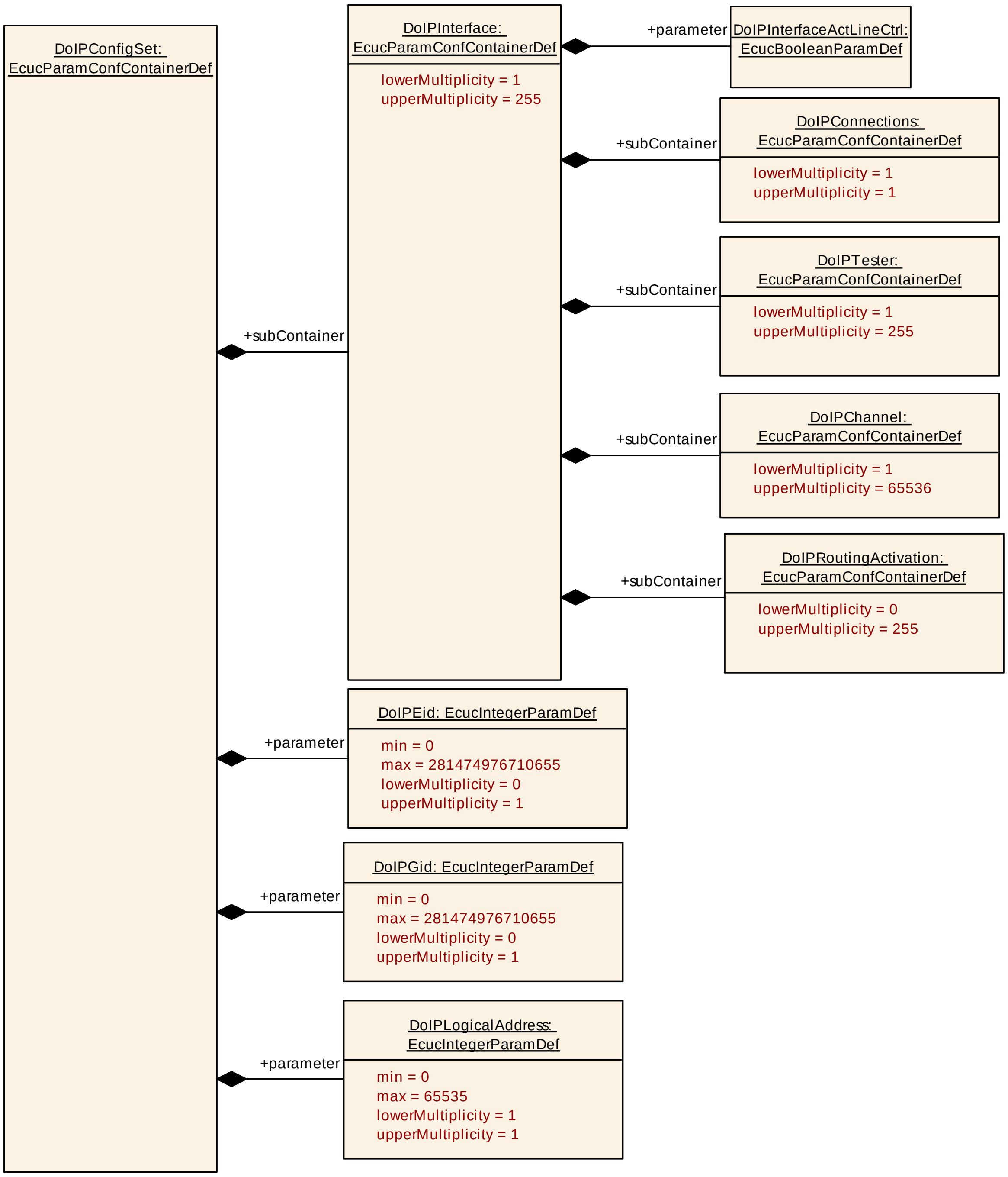
SWS Item	**ECUC_DoIP_00014 :**		
Name	DoIPEid		
Parent Container	DoIPConfigSet		
Description	Configured EID (Entity ID of) for vehicle identification/vehicle announcement. Only necessary if DoIPUseMacAddressForIdentification is set to FALSE.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	0 .. 281474976710655		
Default value	--		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local dependency: DoIPUseMacAdressForIdentification		

SWS Item	**ECUC_DoIP_00015 :**		
Name	DoIPGid		
Parent Container	DoIPConfigSet		
Description	Configured GID (Group ID of) for vehicle identification/vehicle announcement.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	0 .. 281474976710655		
Default value	--		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local dependency: DoIPUseEIDasGID, DoIPVinGIDMaster, DoIPGetGID		

SWS Item	**ECUC_DoIP_00020 :**
Name	DoIPLogicalAddress
Parent Container	DoIPConfigSet
Description	Describes the logical address of the DoIP entity, i.e. the LA that will route diagnostic requests to the Dcm of the DoIP entity.
Multiplicity	1
Type	EcucIntegerParamDef

Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPInterface	1..255	This container defines a logical IP interface and collects properties to configure this interface. **Tags:** atp.Status=draft



10.2.9 DoIPInterface

SWS Item	**ECUC_DoIP_00100 :**
Container Name	DoIPInterface
Parent Container	DoIPConfigSet
Description	This container defines a logical IP interface and collects properties to configure this interface. **Tags:** atp.Status=draft
Post-Build Variant Multiplicity	false
Configuration Parameters	

SWS Item	**ECUC_DoIP_00009 :**		
Name	DoIPAliveCheckResponseTimeout		
Parent Container	DoIPInterface		
Description	Timeout in [s] for waiting for a response to an Alive Check request before the connection is considered to be disconnected. Represents parameter T_TCP_AliveCheck of ISO 13400-2:2012.		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	[0 .. INF]		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00068 :**		
Name	DoIPGeneralInactivityTime		
Parent Container	DoIPInterface		
Description	Timeout in [s] for maximum inactivity of a TCP socket connection before the DoIP module will close the according socket connection. Represents parameter T_TCP_General_Inactivity of ISO 13400-2:2012		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00010 :**		
Name	DoIPInitialInactivityTime		
Parent Container	DoIPInterface		
Description	Timeout in [s] used for initial inactivity of a connected TCP socket connection directly after socket connection. Represents parameter T_TCP_Initial_Inactivity of ISO 13400-2:2012		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00008 :**
Name	DoIPInitialVehicleAnnouncementTime
Parent Container	DoIPInterface
Description	Time to wait in [s] for sending first vehicle anouncement message after IP address assignment. Represents parameter A_DoIP_Announce_Wait of ISO 13400-2:2012
Multiplicity	1

Type	EcucFloatParamDef		
Range	[0 .. INF]		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00101 :**		
Name	DoIPInterfaceActLineCtrl		
Parent Container	DoIPInterface		
Description	This attribute defines whether the network interface ▪ is started "on-demand" when an activation line is sensed (TRUE) or ▪ is always available (FALSE). **Tags:** atp.Status=draft		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00099 :**		
Name	DoIPInterfaceAnnouncementStart		
Parent Container	DoIPInterface		
Description	This attribute defines, when vehicle announcement is started on a DoIPInterface • Automatic: As soon as the underlying UDP vehicle announcement connection switches to SOAD_SOCON_ONLINE • OnTrigger: As soon as the API DoIP_TriggerVehicleAnnouncement is called for the given DoIPInterface instance **Tags:** atp.Status=draft		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	DOIP_AUTOMATIC_ANNOUNCE	AUTOMATIC announcement **Tags:** atp.Status=draft	
	DOIP_ONTRIGGER_ANNOUNCE	TRIGGERED announcement **Tags:** atp.Status=draft	
Default value	DOIP_AUTOMATIC_ANNOUNCE		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	

Scope / Dependency	scope: local

SWS Item	**ECUC_DoIP_00098 :**		
Name	DoIPInterfaceId		
Parent Container	DoIPInterface		
Description	This parameter is an identifier of the DoIPInterface. The value of this parameter will be assigned to the symbolic name derived from the container short name. **Tags:** atp.Status=draft		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 255		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00012 :**		
Name	DoIPMaxTesterConnections		
Parent Container	DoIPInterface		
Description	Maximum amount of tester connections that shall be maintained at one time before alive check is performed.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	1 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00013 :**		
Name	DoIPUseMacAddressForIdentification		
Parent Container	DoIPInterface		
Description	Provided the information if a configured EID at vehicle identification response/vehicle announment is used or the MAC address. TRUE: Use MAC Address instead of EID for Vehicle identification/announcement. FALSE: Use configured EID for vehicle identification/announcement. Dependencies: DoIPEID		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00016 :**		
Name	DoIPUseVehicleIdentificationSyncStatus		
Parent Container	DoIPInterface		
Description	Defines if the optional VIN/GID synchronization status is used additionally in the vehicle identification/announcement.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00094 :**		
Name	DoIPVehicleAnnouncementCount		
Parent Container	DoIPInterface		
Description	Number of vehicle announcement messages on IP address assignment. Represents parameter A_DoIP_Announce_Num of ISO 13400-2:2012.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00007 :**		
Name	DoIPVehicleAnnouncementInterval		
Parent Container	DoIPInterface		
Description	Time to wait in [s] for sending subsequent vehicle anouncement messages. Represents parameter A_DoIP_Announce_Interval of ISO 13400-2:2012		
Multiplicity	0..1		
Type	EcucFloatParamDef		
Range	[0 .. INF]		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPChannel	1..65536	Configuration of one DoIPChannel.
DoIPConnections	1	Container contains all lower layer connection specific information, i.e. the single Pdu References and Handle IDs to the SoAd.
DoIPFurtherActionByteCallback	0..1	This container describes the Callbackfunction to get the Further Action byte. This container shall always be present. If the DoIPFurtherActionByteDirect parameter is not present, the DoIP module will use an RPort of ServiceInterface CallbackGetFurtherActionByte with the name

		"CBGetFurtherActionByte_<shortname of enclosing DoIPInterface container>".
DoIPRoutingActivation	0..255	This container describes the routing activation possibilities by representing for each container a possible routing activation request message to the DoIP entity and the according references to the activated diagnostic messages.
DoIPTester	1..255	This container describes the properties of the possible connectable Tester for the DoIP entity.

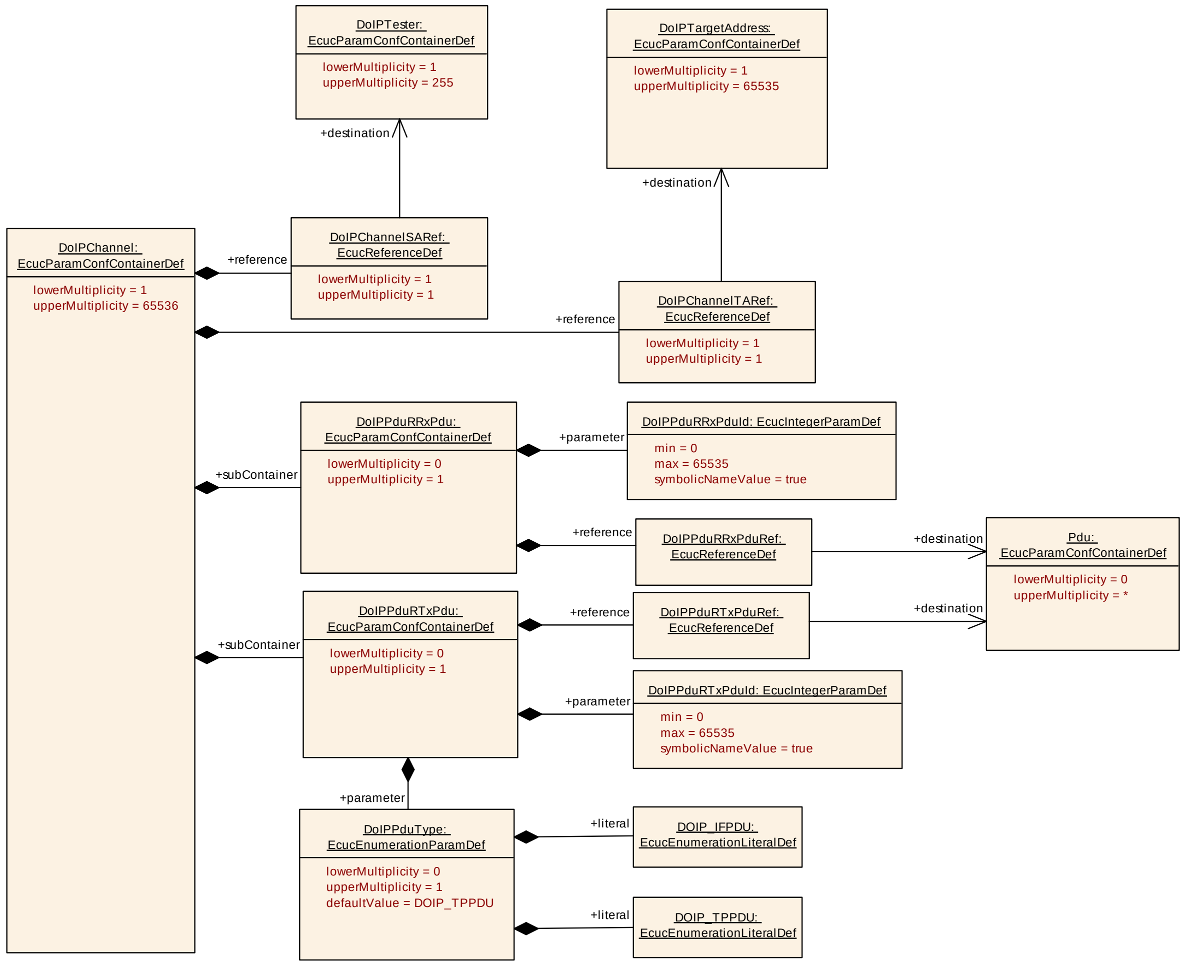
10.2.10 DoIPChannel

SWS Item	**ECUC_DoIP_00069 :**
Container Name	DoIPChannel
Parent Container	DoIPInterface
Description	Configuration of one DoIPChannel.
Post-Build Variant Multiplicity	false
Configuration Parameters	

SWS Item	**ECUC_DoIP_00070 :**
Name	DoIPChannelSARef
Parent Container	DoIPChannel
Description	Reference to the DoIPTester.
Multiplicity	1
Type	Reference to [DoIPTester]
Post-Build Variant Value	false
Scope / Dependency	

SWS Item	**ECUC_DoIP_00071 :**
Name	DoIPChannelTARef
Parent Container	DoIPChannel
Description	Reference to the target address.
Multiplicity	1
Type	Reference to [DoIPTargetAddress]
Post-Build Variant Value	false
Scope / Dependency	

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPPduRRxPdu	0..1	This container contains the Rx Pdus to connect with the Rx Pdus of the PduR.
DoIPPduRTxPdu	0..1	This container contains the Tx Pdus to connect with the Tx Pdus of the PduR. If the parameter is not configured the channel is for functional addressing.


DoIPTester: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 255
DoIPTargetAddress: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 65535
+destination
+destination
DoIPChannel: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 65536
+reference
DoIPChannelSARef: EcucReferenceDef
lowerMultiplicity = 1
upperMultiplicity = 1
+reference
DoIPChannelTARef: EcucReferenceDef
lowerMultiplicity = 1
upperMultiplicity = 1
DoIPPduRRxPdu: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 1
+parameter
DoIPPduRRxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+subContainer
+reference
DoIPPduRRxPduRef: EcucReferenceDef
+destination
Pdu: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = *
DoIPPduRTxPdu: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 1
+reference
DoIPPduRTxPduRef: EcucReferenceDef
+destination
+subContainer
+parameter
DoIPPduRTxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+parameter
DoIPPduType: EcucEnumerationParamDef
lowerMultiplicity = 0
upperMultiplicity = 1
defaultValue = DOIP_TPPDU
+literal
DOIP_IFPDU: EcucEnumerationLiteralDef
+literal
DOIP_TPPDU: EcucEnumerationLiteralDef

10.2.11 DoIPPduRRxPdu

SWS Item	**ECUC_DoIP_00055 :**
Container Name	DoIPPduRRxPdu
Parent Container	DoIPChannel
Description	This container contains the Rx Pdus to connect with the Rx Pdus of the PduR.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00057 :**		
Name	DoIPPduRRxPduId		
Parent Container	DoIPPduRRxPdu		
Description	The DoIPPduRRxPduId is required by the API call DoIP_TpCancelReceive.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00058 :**		
Name	DoIPPduRRxPduRef		
Parent Container	DoIPPduRRxPdu		
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.12 DoIPPduRTxPdu

SWS Item	**ECUC_DoIP_00056 :**
Container Name	DoIPPduRTxPdu
Parent Container	DoIPChannel
Description	This container contains the Tx Pdus to connect with the Tx Pdus of the PduR. If the parameter is not configured the channel is for functional addressing.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00060 :**		
Name	DoIPPduRTxPduId		
Parent Container	DoIPPduRTxPdu		
Description	The DoIPPduRTxPduId is required by DoIP_TpTransmit or DoIP_IfTransmit and DoIP_TpCancelTransmit.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00075 :**	
Name	DoIPPduType	
Parent Container	DoIPPduRTxPdu	
Description	API Type to use for communication with PduR. DOIP_IFPDU for UUDT messages, DOIP_TPPDU for all other diagnostic messages.	
Multiplicity	0..1	
Type	EcucEnumerationParamDef	
Range	DOIP_IFPDU	DOIP_IFPDU for UUDT messages,
	DOIP_TPPDU	DOIP_TPPDU for all other diagnostic messages.
Default value	DOIP_TPPDU	
Post-Build Variant Multiplicity	true	

Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00059 :**		
Name	DoIPPduRTxPduRef		
Parent Container	DoIPPduRTxPdu		
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

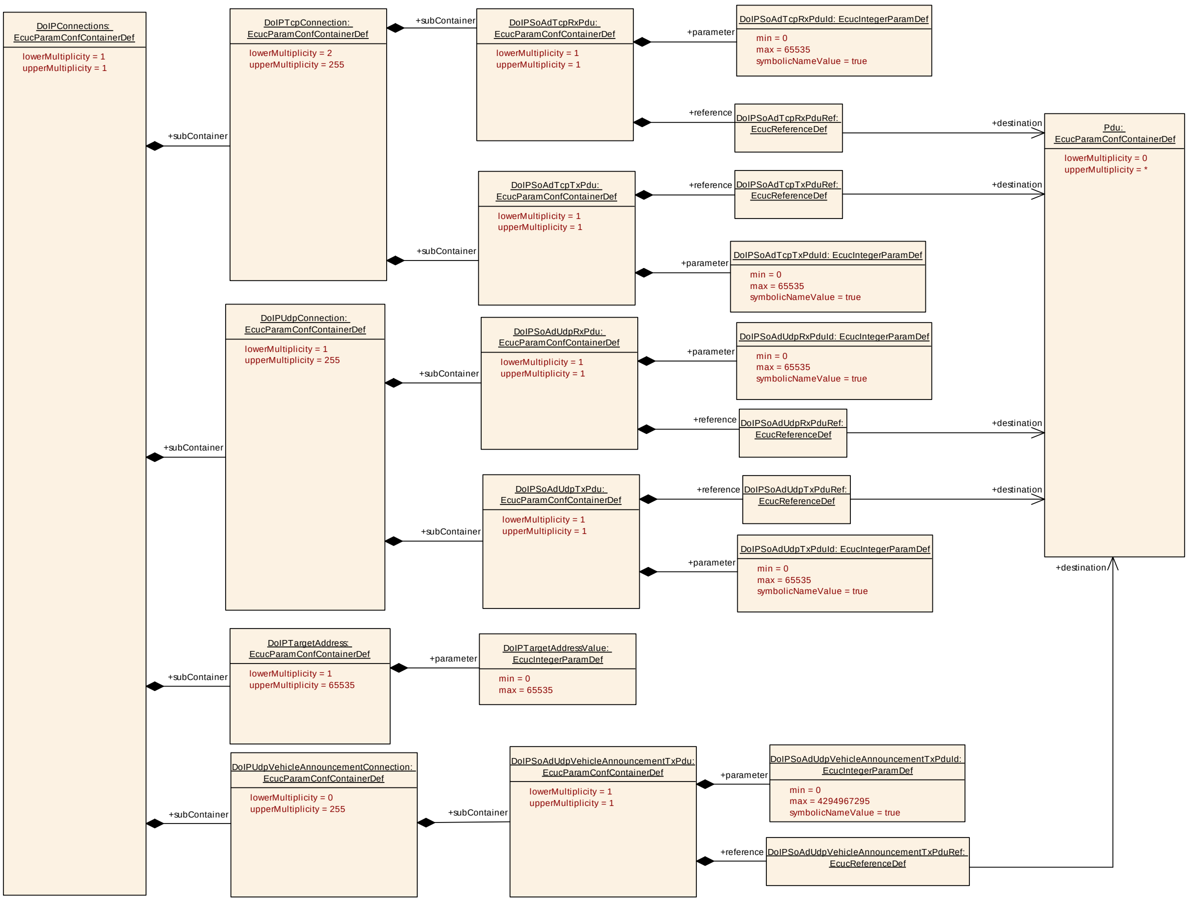
No Included Containers

10.2.13 DoIPConnections

SWS Item	**ECUC_DoIP_00032 :**
Container Name	DoIPConnections
Parent Container	DoIPInterface
Description	Container contains all lower layer connection specific information, i.e. the single Pdu References and Handle IDs to the SoAd.
Post-Build Variant Multiplicity	false
Configuration Parameters	

Included Containers

Container Name	***Multiplicity***	***Scope / Dependency***
DoIPTargetAddress	1..65535	This container describes a possible TargetAddress that is supported by DoIP.
DoIPTcpConnection	2..255	This container describes a TCP connection to the lower layer SoAd module.
DoIPUdpConnection	1..255	This Container describes a Udp connection to the lower layer SoAd module.
DoIPUdpVehicleAnnouncementConnection	0..255	This container describes the UDP multicast connections to the lower layer SoAd module.


DoIPConnections: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+subContainer
DoIPTcpConnection: EcucParamConfContainerDef
lowerMultiplicity = 2
upperMultiplicity = 255
+subContainer
DoIPSoAdTcpRxPdu: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPSoAdTcpRxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+reference
DoIPSoAdTcpRxPduRef: EcucReferenceDef
+destination
Pdu: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = *
+subContainer
DoIPSoAdTcpTxPdu: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+reference
DoIPSoAdTcpTxPduRef: EcucReferenceDef
+destination
+parameter
DoIPSoAdTcpTxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+subContainer
DoIPUdpConnection: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 255
+subContainer
DoIPSoAdUdpRxPdu: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPSoAdUdpRxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+reference
DoIPSoAdUdpRxPduRef: EcucReferenceDef
+destination
+subContainer
DoIPSoAdUdpTxPdu: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+reference
DoIPSoAdUdpTxPduRef: EcucReferenceDef
+destination
+parameter
DoIPSoAdUdpTxPduId: EcucIntegerParamDef
min = 0
max = 65535
symbolicNameValue = true
+destination
+subContainer
DoIPTargetAddress: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 65535
+parameter
DoIPTargetAddressValue: EcucIntegerParamDef
min = 0
max = 65535
+subContainer
DoIPUdpVehicleAnnouncementConnection: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 255
+subContainer
DoIPSoAdUdpVehicleAnnouncementTxPdu: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 1
+parameter
DoIPSoAdUdpVehicleAnnouncementTxPduId: EcucIntegerParamDef
min = 0
max = 4294967295
symbolicNameValue = true
+reference
DoIPSoAdUdpVehicleAnnouncementTxPduRef: EcucReferenceDef

10.2.14 DoIPTargetAddress

SWS Item	**ECUC_DoIP_00053 :**
Container Name	DoIPTargetAddress
Parent Container	DoIPConnections
Description	This container describes a possible TargetAddress that is supported by DoIP.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00054 :**		
Name	DoIPTargetAddressValue		
Parent Container	DoIPTargetAddress		
Description	Valid Target Address of a DoIP target address.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.15 DoIPTcpConnection

SWS Item	**ECUC_DoIP_00045 :**
Container Name	DoIPTcpConnection
Parent Container	DoIPConnections
Description	This container describes a TCP connection to the lower layer SoAd module.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00095 :**		
Name	DoIPRequestAddressAssignment		
Parent Container	DoIPTcpConnection		
Description	The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	true		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00097 :**
Name	DoIPTcpConnectionSecurityRequired
Parent Container	DoIPTcpConnection
Description	Indicates if the associated TCP socket uses a secure connection (e.g. TLS)
Multiplicity	0..1
Type	EcucBooleanParamDef
Default value	false
Scope / Dependency	scope: local

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPSoAdTcpRxPdu	1	This container describes a Rx PDU received via SoAd over TCP
DoIPSoAdTcpTxPdu	1	This container describes a Tx PDU sent via SoAd over TCP

10.2.16 DoIPSoAdTcpRxPdu

SWS Item	**ECUC_DoIP_00080 :**
Container Name	DoIPSoAdTcpRxPdu
Parent Container	DoIPTcpConnection
Description	This container describes a Rx PDU received via SoAd over TCP
Configuration Parameters	

SWS Item	**ECUC_DoIP_00082 :**
Name	DoIPSoAdTcpRxPduId
Parent Container	DoIPSoAdTcpRxPdu
Description	The DoIPSoAdTcpRxPduId is required by the API call DoIP_SoAdTpRxIndication to receive I-PDUs from the SoAd.

Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00083 :**		
Name	DoIPSoAdTcpRxPduRef		
Parent Container	DoIPSoAdTcpRxPdu		
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.17 DoIPSoAdTcpTxPdu

SWS Item	**ECUC_DoIP_00081 :**
Container Name	DoIPSoAdTcpTxPdu
Parent Container	DoIPTcpConnection
Description	This container describes a Tx PDU sent via SoAd over TCP
Configuration Parameters	

SWS Item	**ECUC_DoIP_00085 :**		
Name	DoIPSoAdTcpTxPduId		
Parent Container	DoIPSoAdTcpTxPdu		
Description	The DoIPSoAdTcpTxPduId is required by the API call DoIP_SoAdTpTxConfirmation that is called by the SoAd to confirm that the IPdu has been transmitted successfully.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00084 :**
Name	DoIPSoAdTcpTxPduRef
Parent Container	DoIPSoAdTcpTxPdu
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.

Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.18 DoIPUdpConnection

SWS Item	**ECUC_DoIP_00052 :**
Container Name	DoIPUdpConnection
Parent Container	DoIPConnections
Description	This Container describes a Udp connection to the lower layer SoAd module.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00095 :**		
Name	DoIPRequestAddressAssignment		
Parent Container	DoIPUdpConnection		
Description	The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	true		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPSoAdUdpRxPdu	1	This container describes a Rx PDU received via SoAd over UDP.
DoIPSoAdUdpTxPdu	1	This container describes a Tx PDU sent via SoAd over UDP.

10.2.19 DoIPSoAdUdpRxPdu

SWS Item	**ECUC_DoIP_00046 :**
Container Name	DoIPSoAdUdpRxPdu
Parent Container	DoIPUdpConnection
Description	This container describes a Rx PDU received via SoAd over UDP.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00048 :**
Name	DoIPSoAdUdpRxPduId
Parent Container	DoIPSoAdUdpRxPdu

Description	The DoIPSoAdUdpRxPduId is required by the API call DoIP_SoAdIfRxIndication to receive I-PDUs from the SoAd.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00049 :**		
Name	DoIPSoAdUdpRxPduRef		
Parent Container	DoIPSoAdUdpRxPdu		
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.20 DoIPSoAdUdpTxPdu

SWS Item	**ECUC_DoIP_00047 :**
Container Name	DoIPSoAdUdpTxPdu
Parent Container	DoIPUdpConnection
Description	This container describes a Tx PDU sent via SoAd over UDP.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00051 :**		
Name	DoIPSoAdUdpTxPduId		
Parent Container	DoIPSoAdUdpTxPdu		
Description	The DoIPSoAdUdpTxPduId is required by the API call DoIP_SoAdIfTxConfirmation that is called by the SoAd to confirm that the IPdu has been transmitted successfully.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00050 :**
Name	DoIPSoAdUdpTxPduRef

Parent Container	DoIPSoAdUdpTxPdu		
Description	Reference to the "global" Pdu structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.21 DoIPUdpVehicleAnnouncementConnection

SWS Item	**ECUC_DoIP_00076 :**
Container Name	DoIPUdpVehicleAnnouncementConnection
Parent Container	DoIPConnections
Description	This container describes the UDP multicast connections to the lower layer SoAd module.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00095 :**		
Name	DoIPRequestAddressAssignment		
Parent Container	DoIPUdpVehicleAnnouncementConnection		
Description	The DoIP module shall request IP address assignment by calling SoAd_RequestIpAddrAssignment() for the TcpIpLocalAddr related to this DoIpConnection.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	true		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPSoAdUdpVehicleAnnouncementTxPdu	1	This container describes the vehicle announcement TxPdu sent via the SoAd.

10.2.22 DoIPSoAdUdpVehicleAnnouncementTxPdu

SWS Item	**ECUC_DoIP_00077 :**
Container Name	DoIPSoAdUdpVehicleAnnouncementTxPdu
Parent Container	DoIPUdpVehicleAnnouncementConnection
Description	This container describes the vehicle announcement TxPdu sent via the SoAd.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00078 :**		
Name	DoIPSoAdUdpVehicleAnnouncementTxPduId		
Parent Container	DoIPSoAdUdpVehicleAnnouncementTxPdu		
Description	The DoIPSoAdUdpVehicleAnnouncementTxPduId is required by the API call DoIP_SoAdIfTxConfirmation() that is called by the SoAd to confirm that the IPdu has been transmitted successfully.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 4294967295		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	*Pre-compile time*	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_DoIP_00079 :**		
Name	DoIPSoAdUdpVehicleAnnouncementTxPduRef		
Parent Container	DoIPSoAdUdpVehicleAnnouncementTxPdu		
Description	Reference to the "global" PDU structure to allow harmonization of handle IDs in the COM-Stack.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	*Pre-compile time*	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.23 DoIPRoutingActivation

SWS Item	**ECUC_DoIP_00030 :**
Container Name	DoIPRoutingActivation
Parent Container	DoIPInterface
Description	This container describes the routing activation possibilities by representing for each container a possible routing activation request message to the DoIP entity and the according references to the activated diagnostic messages.
Post-Build Variant Multiplicity	false
Configuration Parameters	

SWS Item	**ECUC_DoIP_00033 :**	
Name	DoIPRoutingActivationNumber	
Parent Container	DoIPRoutingActivation	
Description	Identifies the Routing activation Number which is received for a DoIP routing activation request message.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	0 .. 255	
Default value	--	

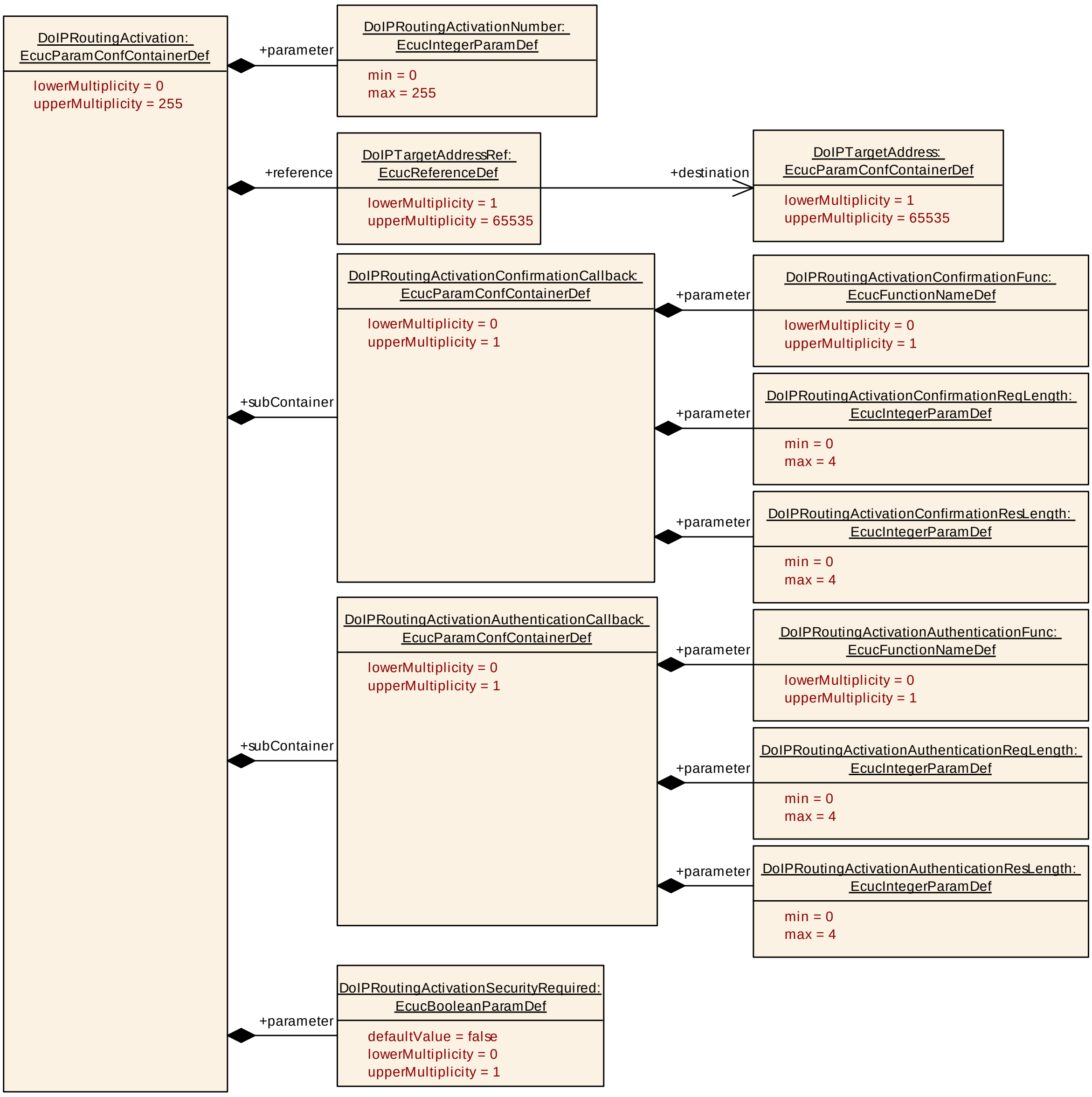
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00096 :**
Name	DoIPRoutingActivationSecurityRequired
Parent Container	DoIPRoutingActivation
Description	Indicates if a routing activation requires a secure TCP connection
Multiplicity	0..1
Type	EcucBooleanParamDef
Default value	false
Scope / Dependency	scope: local

SWS Item	**ECUC_DoIP_00034 :**		
Name	DoIPTargetAddressRef		
Parent Container	DoIPRoutingActivation		
Description	Reference to all DoIPTargetAddress which are activated on this Routing activation.		
Multiplicity	1..65535		
Type	Reference to [DoIPTargetAddress]		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
DoIPRoutingActivationAuthenticationCallback	0..1	Container describes the Callbackfunction to call on a Routing Activation Request for Authentication. If this container is configured but the DoIPRoutingActivationAuthenticationFunc parameter is not present, the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the DoIPRoutingActiviation container.
DoIPRoutingActivationConfirmationCallback	0..1	Container describes the Callbackfunction to call on a Routing Activation Request for Confirmation. If this container is configured but the DoIPRoutingActivationConfirmationFunc parameter is not present the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the

		DoIPRoutingActiviation container.


DoIPRoutingActivation: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 255
+parameter
DoIPRoutingActivationNumber: EcucIntegerParamDef
min = 0
max = 255
+reference
DoIPTargetAddressRef: EcucReferenceDef
lowerMultiplicity = 1
upperMultiplicity = 65535
+destination
DoIPTargetAddress: EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = 65535
+subContainer
DoIPRoutingActivationConfirmationCallback: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 1
+parameter
DoIPRoutingActivationConfirmationFunc: EcucFunctionNameDef
lowerMultiplicity = 0
upperMultiplicity = 1
+parameter
DoIPRoutingActivationConfirmationReqLength: EcucIntegerParamDef
min = 0
max = 4
+parameter
DoIPRoutingActivationConfirmationResLength: EcucIntegerParamDef
min = 0
max = 4
+subContainer
DoIPRoutingActivationAuthenticationCallback: EcucParamConfContainerDef
lowerMultiplicity = 0
upperMultiplicity = 1
+parameter
DoIPRoutingActivationAuthenticationFunc: EcucFunctionNameDef
lowerMultiplicity = 0
upperMultiplicity = 1
+parameter
DoIPRoutingActivationAuthenticationReqLength: EcucIntegerParamDef
min = 0
max = 4
+parameter
DoIPRoutingActivationAuthenticationResLength: EcucIntegerParamDef
min = 0
max = 4
+parameter
DoIPRoutingActivationSecurityRequired: EcucBooleanParamDef
defaultValue = false
lowerMultiplicity = 0
upperMultiplicity = 1

10.2.24 DoIPRoutingActivationAuthenticationCallback

SWS Item	**ECUC_DoIP_00035 :**
Container Name	DoIPRoutingActivationAuthenticationCallback
Parent Container	DoIPRoutingActivation
Description	Container describes the Callbackfunction to call on a Routing Activation Request for Authentication. If this container is configured but the DoIPRoutingActivationAuthenticationFunc parameter is not present, the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the DoIPRoutingActiviation container.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00039 :**		
Name	DoIPRoutingActivationAuthenticationFunc		
Parent Container	DoIPRoutingActivationAuthenticationCallback		
Description	Direct C Callback function to trigger the authentication function for routing activation. If the DoIPRoutingActivationAuthenticationFunc parameter is present, the DoIP module will not use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation but call the configured function.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00040 :**		
Name	DoIPRoutingActivationAuthenticationReqLength		
Parent Container	DoIPRoutingActivationAuthenticationCallback		
Description	Describes the amount of bytes used to handle to the authentication function on routing activation. If 0 is configured as length the parameter AuthenticationReqData will not be handled to the API.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 4		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00041 :**		
Name	DoIPRoutingActivationAuthenticationResLength		
Parent Container	DoIPRoutingActivationAuthenticationCallback		
Description	Describes the amount of bytes used to read by the authentication function on routing activation. If 0 is configured as length the parameter AuthenticationResData will not be fetched via the API.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 4		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-

			BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.25 DoIPRoutingActivationConfirmationCallback

SWS Item	**ECUC_DoIP_00061 :**
Container Name	DoIPRoutingActivationConfirmationCallback
Parent Container	DoIPRoutingActivation
Description	Container describes the Callbackfunction to call on a Routing Activation Request for Confirmation. If this container is configured but the DoIPRoutingActivationConfirmationFunc parameter is not present the DoIP module will use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation with the name "CB<RoutingActivation>RoutingActivation". <RoutingActivation> is the ShortName of the DoIPRoutingActiviation container.
Configuration Parameters	

SWS Item	**ECUC_DoIP_00036 :**		
Name	DoIPRoutingActivationConfirmationFunc		
Parent Container	DoIPRoutingActivationConfirmationCallback		
Description	Direct C Callback function to trigger the confirmation function for routing activation. If the DoIPRoutingActivationConfirmationFunc parameter is present the DoIP module will not use an RPort of ServiceInterface <RoutingActivation>_RoutingActivation but call the configured function.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	--		
maxLength	--		
minLength	--		
regularExpression	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00037 :**
Name	DoIPRoutingActivationConfirmationReqLength
Parent Container	DoIPRoutingActivationConfirmationCallback
Description	Describes the amount of bytes used to handle to the confirmation function on routing activation. If 0 is configured as length the parameter ConfirmedReqData will not be handled to the API.
Multiplicity	1
Type	EcucIntegerParamDef

Range	0 .. 4		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00038 :**		
Name	DoIPRoutingActivationConfirmationResLength		
Parent Container	DoIPRoutingActivationConfirmationCallback		
Description	Describes the amount of bytes used to read by the confirmation function on routing activation. If 0 is configured as length the parameter ConfirmedResData will not be fetched via the API.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 4		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.2.26 DoIPTester

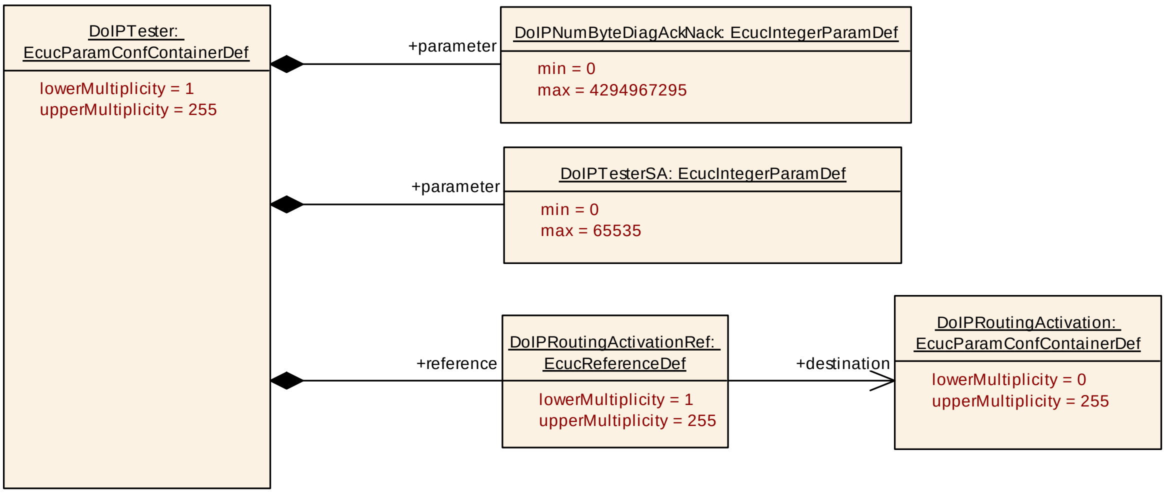
SWS Item	**ECUC_DoIP_00031 :**
Container Name	DoIPTester
Parent Container	DoIPInterface
Description	This container describes the properties of the possible connectable Tester for the DoIP entity.
Post-Build Variant Multiplicity	false
Configuration Parameters	

SWS Item	**ECUC_DoIP_00042 :**		
Name	DoIPNumByteDiagAckNack		
Parent Container	DoIPTester		
Description	Specifies the number of original Diagnostic request bytes the DoIP entity responses on a NACK of a diagnostic response message to the Tester.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 4294967295		
Default value	--		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00043 :**		
Name	DoIPTesterSA		
Parent Container	DoIPTester		
Description	Source Address of the Tester sent via routing activation or diagnostic message.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_DoIP_00062 :**		
Name	DoIPRoutingActivationRef		
Parent Container	DoIPTester		
Description	Reference to a DoIPRoutingActivation describing the possible routing activations of the DoIPTester		
Multiplicity	1..255		
Type	Reference to [DoIPRoutingActivation]		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers



10.3 Published Information

For details refer to the chapter 10.3 “Published Information” in *SWS_BSWGeneral* [14].