Document Title	Specification of Vehicle-2-X Facilities
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	795

Document Status	published
Part of AUTOSAR Standard	Classic Platform
Part of Standard Release	R21-11

Document Change History

Date	Release	Changed by	Change Description
2021-11-25	R21-11	AUTOSAR Release Management	• Editorial Changes
2020-11-30	R20-11	AUTOSAR Release Management	• Corrections of typos in chap. 8 definitions • Editorial Changes
2019-11-28	R19-11	AUTOSAR Release Management	• Added support for C2CCC BSP 1.3 • Editorial Changes • Service API bugs corrections • Changed Document Status from Final to published
2018-10-31	4.4.0	AUTOSAR Release Management	• Added IVIM supporting • Added SPATEM supporting • Added MAPEM supporting
2017-12-08	4.3.1	AUTOSAR Release Management	• Editorial Changes
2016-11-30	4.3.0	AUTOSAR Release Management	• Initial Release

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1 Introduction and functional overview

This document specifies the functionality, API and the configuration of the AUTOSAR Basic Software module Vehicle-2-X Facilities (V2xFac). The Vehicle-2-X Facilities layer together with the Vehicle-2-X Basic Transport (V2xBtp), the Vehicle-2-X GeoNetworking (V2xGn), Vehicle-2-X Management (V2xM) and the communication driver layer forms the V2X stack within the AUTOSAR architecture.

The V2xFac module is designed to be hardware independent.

The V2xFac module is dependent on services of V2X entities in the application layer and on lower V2xBtp module.

1.1 Architectural overview

Positioning of the V2xFac module within the AUTOSAR BSW and the Layered Software architecture is shown in below.

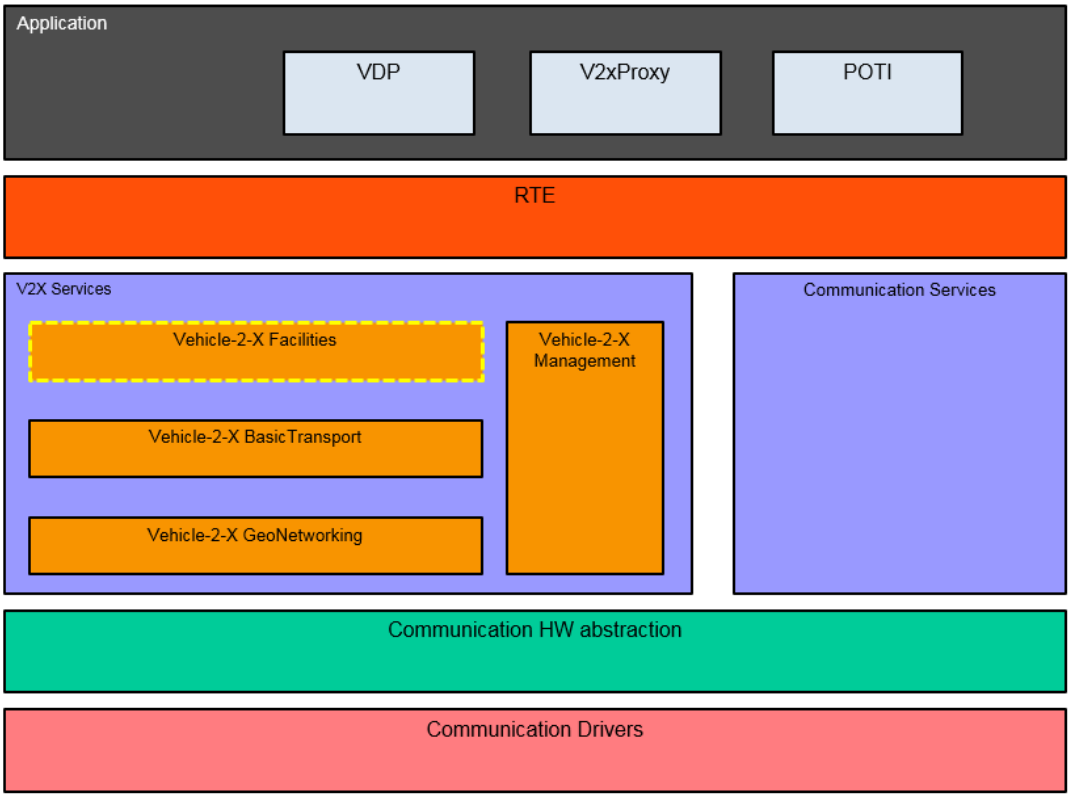

Figure 1 – AUTOSAR BSW software architecture - V2xFac scope

The V2xFac module supports common message management for data exchange between V2X applications.
It provides the basic services (BS) Cooperative Awareness (CA) and Decentralized Environmental Notification (DEN).

1.2 Functional overview

The V2xFac module implements the basic services CA and DEN.

1.2.1 Cooperative Awareness (CA)

1.2.1.1 CA basic service in the AUTOSAR architecture

The CA basic service is a facilities layer entity that operates the CAM protocol.
It provides two services: sending and receiving of CAMs.
The CA basic service generates and sends CAMs to other ITS-Ss or it receives CAMs from ITS-Ss and provides them to the V2x-Applications in the application layer (see [10] chapter 4).

The CA basic service uses the services provided by the protocol entities of the lower layers of the V2X stack to disseminate the CAM.

Upon receiving a CAM, the CA basic service makes the content of the CAM available to the V2X Applications.

Received CAMs are given to the upper Application layer via their standardized AUTOSAR service interface V2xApplRxIndicationCam.

It may interface with the AUTOSAR application layer in order to collect relevant information for CAM generation (Vehicle Data Provider - VDP) and to forward the received CAM content for further processing (V2x Receiver).

1.2.1.2 CA basic service functional architecture

“The CA basic service is part of the Application Support domain of the Facilities Layer according to ETSI TS 102 894-1 [12] shows the functional block diagram with the functional blocks of the CA basic service and interfaces to other facilities and layers.”

For sending and receiving CAMs, the CA basic service part of the V2xFac shall provide the following sub-functions

- Encode CAM
- Decode CAM
- CAM transmission management
- CAM reception management

For details see [10] chapter 5.2.

1.2.2 Decentralized Environmental Notification (DEN)

1.2.2.1 DEN basic service in the AUTOSAR architecture

The DEN basic service is a facilities layer entity that operates the DENM protocol. It provides services to entities at the AUTOSAR application layer.(refer to [11] chapter 4.2)
The DEN basic service generates and sends DENMs to other ITS-Ss or it receives DENMs from other ITS-Ss and provides them to the V2x-Applications in the application layer (see [11] chapter 5 and 6).

Upon receiving a DENM, the DEN basic service makes the content of the DENM available to the V2X Applications.

1.2.2.2 DEN basic service functional architecture

For sending and receiving DENMs, the DEN basic service shall provide the following sub-functions

- Encode DEN
- Decode DEN
- DEN transmission management
- DEN reception management
- Keep-Alive forwarding

For Details see [11] chapter 5.3. Position and Time management (POTI)
The POTI, as specified in ETSI TS 102 890-3 [14], provides the position of the ITS-S and time information.
Within the AUTOSAR architecture POTI service is a V2X Application within the Application layer and is not part of V2xFac.
For details See [11] chapter 5.1.

1.2.3 Vehicle Data Provider (VDP)

"The VDP is connected with the vehicle network and provides the vehicle status information."
Within the AUTOSAR architecture VDP service is a V2X Application within the Application layer and is not part of V2xFac.

The VDP provides an interface to the lower layer (V2X Services).
The facilities basic services CA and DEN get vehicle relevant data from this interface.
The V2xM gets e.g. position and time information from this interface.

1.2.4 Local Dynamic Map (LDM)

The LDM as outlined in [15] is a database in the ITS-S, which may be updated with received CAM or DENM data.

V2x applications may retrieve information from the LDM for further processing.
Within the AUTOSAR architecture LDM service is a V2X Application within the Application layer and is not part of the V2xFac module.

For details see [15] chapter 5.1.

1.2.5 Infrastructure to Vehicle Information (IVI)

1.2.5.1 IVI service in the AUTOSAR architecture

The IVI service is a facilities layer entity that provides receiving of IVIMs.
The IVI service receives IVIMs from Infrastructure ITS-Ss and provides them to the V2x-Applications in the application layer (see [20] chapter 7).
Upon receiving an IVIM, the IVI service makes the content of the IVIM available to the V2X Applications.
Received IVIMs are given to the upper Application layer via their standardized AUTOSAR service interface V2xApplRxIndicationIvim.

1.2.5.2 IVI service functional architecture

The IVI service is part of the Application Support domain of the Facilities Layer according to ETSI TS 103 301 [20] which shows the functional block diagram with the functional blocks of the IVI service and interfaces to other facilities and layers.

For receiving IVIMs, the IVI service part of the V2xFac shall provide the following sub-functions

- Decode IVIM
- IVIM reception management

1.2.6 Road and Lane Topology (RLT) service

The RLT service is a facilities layer entity that provides receiving of MAPEMs.
The RLT service receives MAPEMs from Infrastructure ITS-Ss and provides them to the V2x-Applications in the application layer (see [20] chapter 6).
Upon receiving a MAPEM, the RLT service makes the content of the MAPEM available to the V2X Applications.
Received MAPEMs are given to the upper Application layer via their standardized AUTOSAR service interface V2xApplRxIndicationMapem.

1.2.6.1 RLT service functional architecture

The RLT service is part of the Application Support domain of the Facilities Layer according to ETSI TS 103 301 [20] shows the functional block diagram with the functional blocks of the RLT services and interfaces to other facilities and layers.

For receiving MAPEMs, the RLT service part of the V2xFac shall provide the following sub-functions

- Decode MAPEM
- MAPEM reception management

1.2.7 Traffic Light Maneuver (TLM) service

1.2.7.1 TLM service in the AUTOSAR architecture

The TLM service is a facilities layer entity that provides receiving of SPATEMs.

The TLM service receives SPATEMs from Infrastructure ITS-Ss and provides them to the V2x-Applications in the application layer (see [20] chapter 5).
Upon receiving a SPATEM, the TLM service makes the content of the SPATEM available to the V2X Applications.
Received SPATEMs are given to the application layer via their standardized AUTOSAR service interface V2xApplRxIndicationSpatem.

1.2.7.2 TLM service functional architecture

The TLM service is part of the Application Support domain of the Facilities Layer according to ETSI TS 103 301 [20] which shows the functional blocks of the TLM services and interfaces to other facilities and layers.

For receiving SPATEMs, the TLM service part of the V2xFac shall provide the following sub-functions

- Decode SPATEM
- SPATEM reception management

2 Acronyms and abbreviations

Abbreviation / Acronym:	*Description:*
DEM	Diagnostic Event Manager
DET	Default Error Tracer
API	Application Programming Interface
BS	Basic Service
BSW	Basic Software
BTP	Basic Transport Protocol
CA	Cooperative Awareness
CAM	Cooperative Awareness Message
DCC	Decentralized Congestion Control
DE	Data Element
DEN	Decentralized Environmental Notification
DENM	Decentralized Environmental Notification Messages
DF	Data Frame
EcuM	Electronic Control Unit Manager
ETSI	European Telecommunications Standards Institute
IF	Interface
ITS	Intelligent Transport System
ITS-S	ITS-Station
KAF	DENM Keep Alive Forwarding
LDM	Local Dynamic Map
POTI	Position and Time management
RSU	Road Side Unit
VDP	Vehicle Data Provider
VOD	Verification on Demand
V2X	Either vehicle to vehicle (V2V), or vehicle to infrastructure (V2I) and/or infrastructure to vehicle (I2V)
V2xM	Vehicle-2-X Management
V2xFac	Vehicle-2-X Facilities
V2xBtp	Vehicle-2-X Basic Transport
V2xGn	Vehicle-2-X Geo Networking
IVI	Infrastructure to Vehicle Information
IVIM	Infrastructure to Vehicle Information Message
RLT	Road and Lane Topology
MAPEM	MAP Extended Message
TLM	Traffic Light Maneuver
SPATEM	Signal Phase And Timing Extended Message

3 Related documentation

3.1 Input documents

[1] AUTOSAR Layered Software Architecture
AUTOSAR_EXP_LayeredSoftwareArchitecture.pdf

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

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

[4] Specification of Default Error Tracer
AUTOSAR_SWS_DefaultErrorTracer.pdf

[5] Specification of ECU State Manager
AUTOSAR_SWS_ECUStateManager.pdf

[6] Specification of V2XBasicTransport
AUTOSAR_SWS_Vehicle-2-X BasicTransport.pdf

[7] Specification of Module V2X Communication Stack Types
AUTOSAR_SWS_V2XComStackTypes.pdf

3.2 Related standards and norms

[8] IEC 7498-1 The Basic Model, IEC Norm, 1994

[9] Intelligent Transport Systems (ITS); Communications Architecture
ETSI EN 302 665 V1.1.1 (2010-09)

[10] Intelligent Transport Systems (ITS); Vehicular Communications;
Basic Set of Applications;
Part 2: Specification of Cooperative Awareness Basic Service
ETSI EN 302 637-2 V1.4.1 (2019-04)

[11] Intelligent Transport Systems (ITS); Vehicular Communications;
Basic Set of Applications;
Part 3: Specifications of Decentralized Environmental Notification Basic Service
ETSI EN 302 637-3 V1.3.1 (2019-04)

[12] Intelligent Transport Systems (ITS); Users and applications requirements;
Part 1: Facility layer structure, functional requirements and specifications
ETSI TS 102 894-1 V1.1.1 (2013-08)

[13] Intelligent Transport Systems (ITS); Users and applications requirements;
Part 2: Applications and facilities layer common data dictionary
ETSI TS 102 894-2 V1.3.1 (2018-08)

[14] Intelligent Transport System (ITS); Facilities layer function;
Part 3: Position and time facility specification"
ETSI TS 102 890-3

[15] Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Local Dynamic Map (LDM)
ETSI EN 302 895 (V1.1.1) (2014-09)

[16] Intelligent Transport Systems (ITS); OSI cross-layer topics;
Part 11: Interface between networking and transport layer and facilities layer
ETSI TS 102 723-11 V1.1.1 (2013-11)

[17] Intelligent Transport Systems (ITS); Vehicular Communications;
GeoNetworking;
Part 5: Transport Protocols;
Sub-part 1: Basic Transport Protocol
ETSI EN 302 636-5-1 V2.1.1 (2017-08)

[18] Intelligent Transport Systems (ITS); Vehicular Communications;
GeoNetworking Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality
ETSI EN 302 636-4-1 V1.3.1 (2017-08)

[19] C2C-CC BSP Requirement
C2CCC_RS_2037_BSP_Requirements.docx

[20] Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services
ETSI TS 103 301 V1.2.1(2018-08)

[21] ISO/TS 19321 (2015): Intelligent transport systems -- Cooperative ITS -- Dictionary of in-vehicle information (IVI) data structures

[22] ISO/TS 19091 (2017): Intelligent transport systems -- Cooperative ITS -- Using V2I and I2V communications for applications related to signalized intersections

[23] SAE J 2945/1, On-Board System Requirements for V2V Safety Communications

[24] Intelligent Transport Systems (ITS); Vehicular Communications;
GeoNetworking; Port Numbers for the Basic Transport Protocol (BTP)
ETSI TS 103 248 V1.2.1

3.3 Related specification

AUTOSAR provides a General Specification on Basic Software (SWS BSW General) [3] which is also valid for V2xFac.

Thus, the specification SWS BSW General [3] shall be considered as additional and required specification for V2xFac.

4 Constraints and assumptions

4.1 Limitations

- The V2X modules follow the guidance regarding the Day-1 scenarios defined by Car-2-Car-Consortium and C-Roads platform.
- Extensions to US, Japan, China regions are planned for the future releases.

4.2 Applicability to car domains

This specification is applicable to all car domains.

4.3 Authorisation Tickets and Pseudonyms

The Authorisation Ticket (AT) is referred to as Pseudonym in this document.

5 Dependencies to other modules

This section describes the relations of the V2xFac module to other modules within the AUTOSAR basic software architecture. It outlines the modules that are required or optional for the realization of the V2xFac module and the V2xFac services that these modules use.

5.1 AUTOSAR DET (Default Error Tracer)

In development mode, the V2xFac module reports errors through the Det_ReportError function of the DET Module [4].

5.2 AUTOSAR EcuM (Ecu State Manager)

The EcuM [5] initializes the V2xFac module by calling `V2xFac_Init` specified in 8.3.1.

5.3 V2x Vehicle Data Provider

The V2xFac module retrieves vehicle relevant data from the VDP application by using the Sender-Receiver-Interface V2xFacVdp (see **[SWS_V2xFac_00094]**).

5.4 V2x Proxy

The V2x Proxy is an Application that listens to every CAM and DENM via the Sender-Receiver-Interfaces V2xApplRxIndicationCam and V2xApplRxIndicationDenm and transmits it to one or more ECU's via in-vehicle networks. The transmission via the in-vehicle network is implementation specific.

5.5 V2x Applications

The V2xFac module delivers received DENM data to the V2x Applications by using the Sender-Receiver-Interface V2xApplRxIndicationDenm (see **[SWS_V2xFac_00100]**).

The V2xFac module delivers received CAM data to the V2x Applications by using the Sender-Receiver-Interface V2xApplRxIndicationCam (see **[SWS_V2xFac_00100]**).

The V2xFac module provides the Client-Server-Interface V2xFacDenBs for using the DEN basic service. The operations TriggerEvent, UpdateEvent or TerminateEvent are provided.

The V2xFac module delivers received IVIM data to the V2x Applications by using the Sender-Receiver-Interface V2xApplRxIndicationIvim (see [**SWS_V2xFac_00254**]).

The V2xFac module delivers received MAPEM data to the V2x Applications by using the Sender-Receiver-Interface V2xApplRxIndicationMapem (see [**SWS_V2xFac_00260**]).

The V2xFac module delivers received SPATEM data to the V2x Applications by using the Sender-Receiver-Interface V2xApplRxIndicationSpatem (see [**SWS_V2xFac_00268**]).

5.6 AUTOSAR V2xBtp

The V2xFac module assumes a transmit request primitive (V2xBtp_Transmit [6], see **[SWS_V2xFac_00092]**) to be provided by the V2xBtp module.

5.7 AUTOSAR V2xM

The V2xFac module assumes a request primitive (see **[SWS_V2xFac_00092]**) to be provided by the Vehicle-2-X Management (V2xM) module.

6 Requirements traceability

Requirement	Description	Satisfied by
SRS_BSW_00345	BSW Modules shall support pre-compile configuration	SWS_V2xFac_00238
SRS_V2X_00010	The implementation of the V2X system shall follow additional guidance given by C2C-CC requirements	SWS_V2xFac_20168, SWS_V2xFac_20185, SWS_V2xFac_20215, SWS_V2xFac_20256, SWS_V2xFac_20257, SWS_V2xFac_20313
SRS_V2X_00190	The V2X system shall handle vehicle states in a consistent manner	SWS_V2xFac_20444, SWS_V2xFac_20445
SRS_V2X_00214	The V2X system shall allow applications to deactivate transmission of CAMs	SWS_V2xFac_00006
SRS_V2X_00259	The V2X system shall manage the life time of all DENM packets	SWS_V2xFac_20259
SRS_V2X_00291	The V2X system shall only send messages with valid postion and time	SWS_V2xFac_20215, SWS_V2xFac_20291
SRS_V2X_00301	The V2X system's Facility Layer shall handle DENM repetition	SWS_V2xFac_00029
SRS_V2X_00318	The V2X system's Facility Layer shall generate traces and path histories	SWS_V2xFac_20318
SRS_V2X_00693	The V2X system shall provide functionality for generating traces and path histories	SWS_V2xFac_20285, SWS_V2xFac_20286, SWS_V2xFac_20287, SWS_V2xFac_20288, SWS_V2xFac_20289, SWS_V2xFac_20302, SWS_V2xFac_20303, SWS_V2xFac_20304, SWS_V2xFac_20305, SWS_V2xFac_20306, SWS_V2xFac_20307, SWS_V2xFac_20308
SRS_V2X_00711	The V2X system's CA basic service shall be compliant to ETSI Specification of Cooperative Awareness Basic Service	SWS_V2xFac_00231, SWS_V2xFac_00294, SWS_V2xFac_00295, SWS_V2xFac_00296, SWS_V2xFac_20292, SWS_V2xFac_20297
SRS_V2X_00741	The V2X system's DEN basic service shall be compliant to ETSI Specifications of Decentralized Environmental Notification Basic Service	SWS_V2xFac_00232
SRS_V2X_10001	The V2X system's Facility layer shall support receiving IVI messages	SWS_V2xFac_00246, SWS_V2xFac_00247, SWS_V2xFac_00254, SWS_V2xFac_91603, SWS_V2xFac_91604
SRS_V2X_10002	The implementation of the V2X system shall follow additional guidance given by C-Roads requirements	SWS_V2xFac_00248, SWS_V2xFac_00257, SWS_V2xFac_00265
SRS_V2X_10003	The V2X system's Facility	SWS_V2xFac_00247, SWS_V2xFac_00256,

	layer shall support receiving MAPEM messages	SWS_V2xFac_00260, SWS_V2xFac_91600, SWS_V2xFac_91601
SRS_V2X_10004	The V2X system's Facility layer shall support receiving SPAT extended messages	SWS_V2xFac_00247, SWS_V2xFac_00264, SWS_V2xFac_00268, SWS_V2xFac_91606, SWS_V2xFac_91607

Note:
Requirement IDs within this document have an encoding to state where each requirement has its origin:

- SWS items starting with a leading 0 (SWS_V2xFac_0xxxx) are module specific and not inherited.
- SWS items starting with a leading 2 (SWS_V2xFac_2xxxx) are inherited from C2C-CC Basic System Profile

7 Functional specification

The V2xFac module operates the basic services Cooperative Awareness (CA) and Decentralized Environmental Notification (DEN).

[SWS_V2xFac_00231] ⌈ The V2xFac module shall implement the CA Basic Service as specified in [10] unless specified otherwise in this document ⌋ (SRS_V2X_00711)

[SWS_V2xFac_00232] ⌈ The V2xFac module shall implement the DEN Basic Service as specified in [11] unless specified otherwise in this document ⌋ (SRS_V2X_00741)

[SWS_V2xFac_00246] ⌈ The V2xFac module shall implement the IVI Service as specified in [20] unless specified otherwise in this document ⌋ (SRS_V2X_10001)

[**SWS_V2xFac_00247**] ⌈ The V2xFac module shall use the following BTP ports:

BTP port number	Service
2001	CA
2002	DEN
2003	RLT
2004	TLM
2006	IVI

⌋ (SRS_V2X_10001, SRS_V2X_10003, SRS_V2X_10004)

[SWS_V2xFac_00256] ⌈ The V2xFac module shall implement the RLT Service as specified in [20] unless specified otherwise in this document. ⌋ (SRS_V2X_10003)

[SWS_V2xFac_00264] ⌈
The V2xFac module shall implement the TLM Service as specified in [20] unless specified otherwise in this document. ⌋ (SRS_V2X_10004)

[SWS_V2xFac_20444]⌈
For a stationary vehicle, the system shall report the last estimated heading value. ⌋ (SRS_V2X_00190)
create:
[SWS_V2xFac_20445]⌈
At system shutdown, the system shall store the last heading value and the corresponding gear position (forward, neutral or backward).
At system start-up, the system shall report the heading value based on this stored heading value and the current gear position, until the vehicle is no longer stationary. ⌋ (SRS_V2X_00190)

7.1 Startup behavior

[SWS_V2xFac_00001]⌈
The function V2xFac_Init (refer to chapter 8.3.2) of the V2xFac shall initialize

the internal states of the V2xFac module.

⌋()

Note: The function V2xFac_Init shall not be called before the Vehicle-2-X Management (V2xM) is initialized by the Electronic Control Unit Manager (EcuM).

[SWS_V2xFac_00004] ⌈
The function V2xFac_Init shall initialize the basic services CA and DEN and the IVI, RLT and TLM services.⌋ ( )

7.2 General Format Specification

[SWS_V2xFac_20313]⌈
The data elements which constitute the content of the CAM and DENM shall be compliant to [13] ⌋ (SRS_V2X_00010)

[SWS_V2xFac_00248] ⌈
The data elements which constitute the content of the IVIM shall be compliant to [21]. ⌋ (SRS_V2X_10002)

[SWS_V2xFac_00257] ⌈
The data elements which constitute the content of the MAPEM shall be compliant to [22]. ⌋ (SRS_V2X_10002)

[SWS_V2xFac_00265] ⌈
The data elements which constitute the content of the SPATEM shall be compliant to [22]. ⌋ (SRS_V2X_10002)

7.3 CA Functional Specification

For details see [10] chapter 6.1.

7.3.1 CA Initialization, Activation and Deactivation

[SWS_V2xFac_00116] ⌈

The path history shall be cleared when the sending functionality is enabled via the V2xFac_V2xM_SetCaBsOperation API.⌋ ( )

[SWS_V2xFac_00006] ⌈

CA basic service initialization shall enable the transmission of CAM messages⌋ (SRS_V2X_00214)

[SWS_V2xFac_00008] ⌈

The function V2xFac_Init shall initialize the parameter T_GenCam_DCC [10] needed for the frequency management for CAMs according to T_GenCamMax [10].

For details see[10] chapter 5.3.5

] ( )

[SWS_V2xFac_00009] [

The function V2xFac_Init shall initialize the parameter T_GenCam [10] to the default value T_GenCamMax.

For details see [10] chapter 6.1.3

] ( )

[SWS_V2xFac_00010] [

The function V2xFac_Init shall initialize the parameter N_GenCam [10] to the default value 0.

] ( )

[SWS_V2xFac_00011] [

The function V2xFac_Init shall initialize the parameter T_CheckCamGen [10] to the default value equal to the configuration parameter T_GenCamMin [10].

For details see [10] chapter 6.1.3

] ( )

7.3.2 CAM Generation, Sending and Receiving, Frequency Management

[SWS_V2xFac_00014] [

The CA basic service shall periodically generate CAMs controlled by a CAM frequency management (For details see [10] chapter 6.1.3.)
] ( )

[SWS_V2xFac_00015] [

The generated CAMs shall be transmitted by the V2xBtp using the API function V2xBtp_Transmit (see chapter 8.6.1).

] ( )

[SWS_V2xFac_00016] [

The CA basic service shall receive CAMs via the callback function V2xFac_RxIndication (see chapter 8.4).

] ( )

[SWS_V2xFac_00294][
The MAX_DANGLE [19] representing the delta angle (in degrees) between two generation rules checks shall use a value of 4°.] (SRS_V2X_00711)

[SWS_V2xFac_00295][
The MAX_DDISTANCE [19] representing the delta distance (in meters) between two generation rules checks shall use a value of 4 meters.] (SRS_V2X_00711)

[SWS_V2xFac_00296][
The MAX_DSPEED [19] representing the delta speed between two generation rules checks shall use a value of 0,5 m/s.] (SRS_V2X_00711)

[SWS_V2xFac_20297][
The adjustable N_GenCam parameter (see [10]) specified in the CAM Generation Frequency Management shall be set to 0 for the V2xFac module.] (SRS_V2X_00711)

[SWS_V2xFac_20291][
The V2xFac module shall transmit CAM messages as long as position and time information are available.] (SRS_V2X_00291)

7.3.3 CAM Generation Frequency Management for RSU ITS-Ss

Generation of CA messages for road side units (RSU-ITS) is currently not supported by AUTOSAR.

7.3.4 CAM Time Requirement

[SWS_V2xFac_00019] [
The CAM generation shall follow time requirements according to [10] chapter 6.1.5.] ( )

[SWS_V2xFac_20168] [
The V2xFac module shall check the timestamp in the security envelope compared to the reception time and accept only CAMs in the last time of 2 seconds and other messages within the last time of 10 minutes.
Due to the tolerance of the ITS station times and allowed clock deviation in [19], the V2xFac module shall accept messages coming from the future compared to ego vehicle clock:

- up to a maximum of 40 ms for vehicles (20 ms estimated deviation from ego vehicle + 20 ms deviation for transmitting vehicle).

- up to a maximum of 220 ms for RSUs (20 ms estimated deviation from ego vehicle + 200 ms deviation for transmitting RSU).

] (SRS_V2X_00010)

7.3.5 CAM Format Specification

For details about CAM data format refer to to the following ETSI documents:
See [10] chapter 7
See [10] Annex A: ASN.1 specification of CAM
See [10] Annex B: Description for data elements and data frames
See [13] Annex A, Annex B

[SWS_V2xFac_20285] [

The path history field inside the CAM low frequency (LF) container shall contain a PathHistory data element covering a distance of at least 200 m (K_PHDISTANCE_M parameter in [23], Appendix A.5).
An exception to the minimum covered distance by PathHistory shall be only made if either of the following conditions is fulfilled:

- the vehicle has not yet physically covered the distance with its current pseudonym (e.g., after vehicle startup or right after pseudonym change when driving)
- the maximum number of PathPoints is used while the overall length covered by the PathHistory still does not reach 200m.

Only in the above two cases the vehicle may send PathHistory information covering a distance below the 200 m lower limit.
] (SRS_V2X_00693)

[SWS_V2xFac_20286] [

The PathHistory in CAMs shall cover at most 500 m.
] (SRS_V2X_00693)

[SWS_V2xFac_20287] [
The V2xFac module shall send PathDeltaTime in every PathPoint of the PathHistory. Therefore, the PathHistory shall describe a time-ordered list (newest point first) of actually travelled geographical locations, including current ego position.
] (SRS_V2X_00693)

[SWS_V2xFac_20288] [

In cases where the vehicle does not move, i.e. PathPoint position information does not change, the PathDeltaTime of the first PathPoint shall still be updated with every CAM.
] (SRS_V2X_00693)

[SWS_V2xFac_20289] [

When the V2xFac module is stationary for a duration longer than the maximum value of PathDeltaTime (specified in [13]) the PathDeltaTime of the first PathPoint in the CAM shall be fixed to the maximum value.
⌋ (SRS_V2X_00693)

[SWS_V2xFac_20292]⌈
The traffic class value for CAM messages shall be set to 2. ⌋ (SRS_V2X_00711)

[SWS_V2xFac_20256]⌈
The V2xFac module shall use a Single Hop Broadcast (SHB) header on all CAM packets it sends. Therefore, the value of the transportType parameter shall be set to 0x50 ⌋ (SRS_V2X_00010)

7.4 DEN Functional Specification

As defined in ETSI documents (See [11] chapter 5.2) the DEN basic service is a facilities layer entity that implements the DEN protocol. It interfaces with ITS-S applications in order to receive the application request for DENM transmission and to provide the received DENM content to the ITS-S applications.

7.4.1 DEN Initialization

[SWS_V2xFac_00025]⌈
The function V2xFac_Init shall initialize an empty originating ITS-S message table.
For details see [11] chapter 8.2.1.6
⌋ ( )

7.4.2 DENM Transmission Management

[SWS_V2xFac_00027]⌈
The DEN basic service is triggered by the V2x-Application via its service operations TriggerEvent, UpdateEvent or TerminateEvent from the service interface V2xFacDenBs (see chapter 8.7.2.1).
The function parameter “EventID” given by the above mentioned operations shall be mapped by the DEN basic service to the actionID generated for DENMs.
For details see [11] chapter 5.3 and 8.2
⌋()

7.4.3 DENM Reception Management

[SWS_V2xFac_00028]⌈
Upon receiving a DENM, the DEN basic service makes the content of the DENM available to the V2X Applications.
Received DENMs shall be sent to the upper application layer via their standardized AUTOSAR service interface V2xApplRxIndicationDenm.

For Details see [11] chapter 5.3 and 8.4
] ( )

7.4.4 DENM Repetition

[SWS_V2xFac_00029]⌈
In between two consequent DENM updates, a DENM may be repeated by the DEN basic service.
For details see [11] chapter 6.1.2.3
] (SRS_V2X_00301)

7.4.5 DENM Keep Alive Forwarding (KAF)

KAF functionality for the DEN basic service as defined by ETSI is not supported.
See [11] chapter 5.3 and 8.3

7.4.6 DENM Format Specification

For details about DENM data format refer to to the following ETSI documents:

See [11] chapter 7,
See [11] Annex A: ASN.1 specification of DENM
See [11] Annex B: Description for data elements and data frames
See [13] Annex A, Annex B

[SWS_V2xFac_20302] ⌈
The path history field inside the DEN messages shall contain Trace data elements covering a distance of at least 600 m (K_PHDISTANCE_M parameter in [23], Appendix A.5).
An exception to the minimum covered distance by Traces shall be only made if either of the following conditions is fulfilled:

- the vehicle has not yet physically covered the distance with its current pseudonym (e.g., after vehicle startup or right after pseudonym change when driving)
- the maximum number of PathPoints is used while the overall length covered by the PathHistory still does not reach 200m.

Only in the above two cases the vehicle may send Traces information covering a distance below the 600 m lower limit.
] (SRS_V2X_00693)

[SWS_V2xFac_20303] ⌈
The Traces in the DENMs shall cover at most 1000 m**.**
] (SRS_V2X_00693)

[SWS_V2xFac_20304] ⌈
The V2xFac module shall use the DENM traces as follow: The PathDeltaTime shall be sent in every PathPoint in the first DENM traces element. Therefore, the first

element of the traces shall describe a time-ordered list (newest point first) of actually travelled geographical locations leading to the event position, including event position.] (SRS_V2X_00693)

[SWS_V2xFac_20305] [
The PathDeltaTime data elements of the PathPoints in the first DENM traces element shall only be updated if the DENM is updated.
] (SRS_V2X_00693)

[SWS_V2xFac_20306] [
In cases where the event detecting vehicle does not move, i.e. PathPoint position information does not change, the PathDeltaTime of the first PathPoint of the first DENM traces element shall still be updated with every DEN_Update.
] (SRS_V2X_00693)

NOTE: This is only the case for stationary events where the detecting vehicle is identical to the event, e.g. a stationary vehicle warning. For dynamic events, e.g. dangerous situations, or events, where the event is not identical to the vehicle, e.g. adverse weather warning, this is not the case.

[SWS_V2xFac_20307] [
When the V2xFac module is stationary for a duration longer than the maximum value of PathDeltaTime (specified in [13]) the PathDeltaTime of the first PathPoint in the DENM shall be set to this maximum value and a new PathPoint shall be created.
] (SRS_V2X_00693)

[SWS_V2xFac_20308] [
Additional PathHistory elements may be present in the DENM traces. However, unlike the first element, these shall describe alternative routes to the event location. These routes may or may not be available at the time of detecting the event. In the alternative routes, the PathPoints shall be position-ordered (i.e. shortest-path routes) and they shall not include the PathDeltaTime.
] (SRS_V2X_00693)

[SWS_V2xFac_20318] [

The traces and path histories used by the V2xFac module shall be generated using the Design Method One as specified in [23], Appendix A.5.
The V2xFac module shall use the generation method with the following settings:

- $K\_PHALLOWABLEERROR\_M = 0{,}47\ m$, where $PH\_ActualError < K\_PHALLOWABLEERROR\_M$
- Maximum distance between concise path points, $K\_PH\_CHORDLENGTHTHRESHOLD = 22{,}5\ m$
- $K\_PH\_MAXESTIMATEDRADIUS = REarthMeridian$
- $K\_PHSMALLDELTAPHI\_R = 1\ degree$

- $REarthMeridian = 6378.137\ km$ (according to IUGG - International Union of Geodesy and Geophysics), used for great-circle or orthodromic distance calculation:

$$PH\_ActualChordLength = REarthMerdian * cos^{-1}[cos(lat1)cos(lat1)cos(long1 - long2) + sin(lat1)sin(lat2)]$$

] (SRS_V2X_00318)

[SWS_V2xFac_20257][
The V2xFac module shall use GeoBroadcast (GBC) headers on all DENM packets it sends. Therefore, the value of the transportType parameter shall be set to 0x40] (SRS_V2X_00010)

[SWS_V2xFac_20259][
The V2xFac module shall set the maxPacketLifetime parameter of the packets transport parameters TxParams of all GBC packets to the minimum of ValidityDuration, RepetitionInterval and itsGnMaxPacketLifetime, with ValidityDuration and RepetitionInterval values as requested by the application and itsGnMaxPacketLifetime value as specified in [18], Annex H.] (SRS_V2X_00259)

7.5 IVI Functional Specification

As defined in ETSI documents (See [20] chapter 7) the IVI service is a facilities layer entity that implements the IVIM reception. It interfaces with ITS-S applications in order to provide them the received IVIM content.

7.5.1 IVIM Reception Management

[SWS_V2xFac_00249] [
Upon receiving a IVIM, the IVI service makes the content of the IVIM available to the V2X Applications.
Received IVIMs shall be sent to the upper application layer via their standardized AUTOSAR service interface V2xApplRxIndicationIvim.
For Details see [20] chapter 7
] ( )

7.5.2 IVIM Format Specification

For details about IVIM data format refer to the following ETSI and ISO documents:

See [20] Chapter 7
See [20] Annex C: ASN.1 specification of IVIM
See [21] Description for data elements

7.6 RLT Functional Specification

As defined in ETSI documents (See [20] chapter 6) the RLT service is a facilities layer entity that implements the MAPEM message reception. It interfaces with ITS-S applications in order to provide the received MAPEM content to the ITS-S applications.

7.6.1 MAPEM Reception Management

[SWS_V2xFac_00258] ⌈

Upon receiving a MAPEM, the RLT service makes the content of the MAPEM available to the V2X Applications.
Received MAPEMs shall be sent to the upper application layer via their standardized AUTOSAR service interface V2xApplRxIndicationMapem.
For Details see [20] chapter 6. ⌋ ()

7.6.2 MAPEM Format Specification

For details about MAPEM data format refer to the following ETSI and ISO documents:

See [20] chapter 6,
See [20] Annex B: ASN.1 specification of MAPEM
See [22] Description for data elements

7.7 TLM Functional Specification

As defined in ETSI documents (See [20] chapter 5) the TLM service is a facilities layer entity that implements the SPAT extended message reception. It interfaces with ITS-S applications in order to provide the received SPATEM content to the ITS-S applications.

7.7.1 SPATEM Reception Management

[SWS_V2xFac_00266] ⌈
Upon receiving a SPATEM, the TLM service makes the content of the SPATEM available to the V2X Applications.
Received SPATEMs shall be sent to the application layer via their standardized AUTOSAR service interface V2xApplRxIndicationSpatem.
For details see [20] chapter 5. ⌋ ()

7.7.2 SPATEM Format Specification

For details about SPATEM data format refer to the following ETSI and ISO documents:

See [20] chapter 5,
See [20] Annex A: ASN.1 specification of SPATEM
See [22] Description for data elements

7.8 Path History

[SWS_V2xFac_20185] ⌈
Facilities layer shall clear the own station's path history cache (used to fill into new messages) when the security entity changes its pseudonym identity.
⌋ (SRS_V2X_00010)

[SWS_V2xFac_20215] ⌈
Traces and path history data shall only be generated when position confidence and ITS time information are available⌋ (SRS_V2X_00010,SRS_V2X_00291)

7.9 Error classification

Section 7.x "Error Handling" of the document "General Specification of Basic Software Modules" describes the error handling of the Basic Software in detail. Above all, it constitutes a classification scheme consisting of five error types, which may occur in BSW modules.

Based on this foundation, the following section specifies particular errors arranged in the respective subsections below.

7.9.1 Development Errors

[SWS_V2xFac_00106] ⌈
In case development error detection is enabled for the V2xFac module, the V2xFac module shall check API parameters for validity and report detected errors to the DET.
⌋()

[SWS_V2xFac_00031]⌈

Type of error	*Related error code*	*Error value*
API service called with wrong parameter	V2XFAC_E_PARAM	0x01
API service called with invalid pointer	V2XFAC_E_PARAM_ POINTER	0x02
V2xFac initialization failed	V2XFAC_E_INIT_FAILED	0x03
API function called before the V2xFac module has been fully initialized	V2XFAC_E_UNINIT	0x04

](

7.9.2 Runtime Errors

There are no runtime errors.

7.9.3 Transient Faults

There are no transient faults.

7.9.4 Production Errors

There are no production errors.

7.9.5 Extended Production Errors

There are no extended production errors.

8 API specification

8.1 Imported types

In this chapter all types included from the following modules are listed:

[SWS_V2xFac_00032]⌈

Module	*Header File*	*Imported Type*
Std	Std_Types.h	Std_ReturnType
	Std_Types.h	Std_VersionInfoType
V2x_GeneralTypes	Rte_V2xM_Type.h	V2xM_PositionAndTimeType
	Rte_V2xM_Type.h	V2xM_SecReportType
	V2x_GeneralTypes.h	V2x_GnAddressType
	V2x_GeneralTypes.h	V2x_GnAreaShapeType
	V2x_GeneralTypes.h	V2x_GnDestinationAreaType
	V2x_GeneralTypes.h	V2x_GnDestinationType
	V2x_GeneralTypes.h	V2x_GnLongPositionVectorType
	V2x_GeneralTypes.h	V2x_GnPacketTransportType
	V2x_GeneralTypes.h	V2x_GnUpperProtocolType
	V2x_GeneralTypes.h	V2x_PseudonymType
	V2x_GeneralTypes.h	V2x_SecProfileType
	V2x_GeneralTypes.h	V2x_TrafficClassIdType
V2xBtp	V2xBtp.h	V2xBtp_TxParamsType

⌋()

8.2 Type definitions

8.2.1 V2xFac_RxParamsType

[SWS_V2xFac_00034]⌈

Name	V2xFac_RxParamsType
Kind	Structure
Elements	destinationPort

	Type	uint16
	Comment	Identifies the protocol entity at the ITS facilities layer at the destination of a BTP packet.
	destinationAddress	
	Type	V2x_GnAddressType
	Comment	Destination address for GeoUnicast packet
	destinationArea	
	Type	V2x_GnDestinationAreaType
	Comment	Destination area for GeoBroadcast/GeoAnycast packet.
	destinationType	
	Type	V2x_GnDestinationType
	Comment	Select which destination type (destinationAddress or destinationArea is used for this packet).
	sourcePositionVector	
	Type	V2x_GnLongPositionVectorType
	Comment	Geographical position for the source of the received GeoNetworking packet.
	securityReport	
	Type	V2xM_SecReportType
	Comment	Result information from the security operations for decryption and verification. This parameter is supplied by the V2xM module and forwarded up to the ITS Facilities layer passing through the Geo Networking and BTP layers.
	certificateId	
	Type	uint64
	Comment	Identification of source certificate, for example the certificate hash. This parameter is supplied by the V2xM and forwarded up to the ITS Facilities layer passing through the GeoNetworking and BTP layers.
	sspBits	
	Type	Array of uint8
	Size	4
	Comment	Sender permissions
	sspLength	
	Type	uint8
	Comment	Sender permissions length

	trafficClass	
	Type	V2x_TrafficClassIdType
	Comment	Traffic class, with which the GeoNetworking packet was generated by the source.
	remPacketLifetime	
	Type	uint16
	Comment	Remaining lifetime of the packet in [s].
	itsAid	
	Type	uint32
	Comment	The numerical value of the ITS-AID (Application Identifier).
Description	Wraps GeoNetworking parameters from V2xBtp	
Available via	V2xFac.h	

]()

8.3 Function definitions

8.3.1 V2xFac_Init

[SWS_V2xFac_00082][

Service Name	V2xFac_Init	

Syntax	`void V2xFac_Init (`
	`  void* CfgPtr`
	`)`	

Service ID [hex]	0x01	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	CfgPtr	Points to a null pointer.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Initializes the V2xFac module.	
Available via	V2xFac.h	

](

8.3.2 V2xFac_GetVersionInfo

[SWS_V2xFac_00084][

Service Name	V2xFac_GetVersionInfo	
Syntax	`void V2xFac_GetVersionInfo ( Std_VersionInfoType* VersionInfoPtr )`	
Service ID [hex]	0x02	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	VersionInfo Ptr	Pointer to where to store the version information of this module.
Return value	None	
Description	Returns the version information of this module.	
Available via	V2xFac.h	

](

[SWS_V2xFac_00085] [
If V2xFacDevErrorDetect is enabled: If the VersionInfoPtr pointer parameter is invalid (e.g. NULL), the error-code V2XFAC_E_PARAM_POINTER shall be reported to the DET module.] ( )

8.3.3 V2xFac_V2xM_PreparePseudonymChange

[SWS_V2xFac_00086][

Service Name	V2xFac_V2xM_PreparePseudonymChange
Syntax	`Std_ReturnType V2xFac_V2xM_PreparePseudonymChange ( const V2x_PseudonymType* PseudonymPtr )`
Service ID [hex]	0x03
Sync/Async	Synchronous
Reentrancy	Non Reentrant

Parameters (in)	PseudonymPtr	The Pseudonym provided by V2xM
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	E_OK: operation successful E_NOT_OK: pseudonym change rejected
Description	By this API primitive the V2xFac module gets an indication that the given Pseudonym and hereby the StationId is about to be changed	
Available via	V2xFac_V2xM.h	

](

[SWS_V2xFac_00136] [
The function V2xFac_V2xM_PreparePseudonymChange shall prepare the setting of the pseudonym specific part of the StationId being used for packet transmission.]()

[SWS_V2xFac_00137] [
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT.]()

[SWS_V2xFac_00138] [
If development error detection is enabled: the function shall check the parameter PseudonymPtr for being valid. If the check fails, the function shall raise the development error V2XFAC_E_PARAM_POINTER.]()

8.3.4 V2xFac_V2xM_CommitPseudonymChange

[SWS_V2xFac_00140][

Service Name	V2xFac_V2xM_CommitPseudonymChange
Syntax	`Std_ReturnType V2xFac_V2xM_CommitPseudonymChange ( void )`
Service ID [hex]	0x04
Sync/Async	Synchronous
Reentrancy	Non Reentrant
Parameters (in)	None
Parameters (inout)	None

Parameters (out)	None	
Return value	Std_ReturnType	E_OK: operation successful E_NOT_OK: operation failed
Description	This function is called by the V2xM when all modules are OK with the pseudonym change and the change is to be committed.	
Available via	V2xFac_V2xM.h	

](

[SWS_V2xFac_00141] [
The function V2xFac_V2xM_CommitPseudonymChange shall set the pseudonym specific part of the GeoNetworking Address being used for packet transmission and clean the path history. V2xFac shall store the access of the GeoNetworking Address for subsequent API calls.](

[SWS_V2xFac_00142] [
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT.](

Note: The function requires previous preparation of the pseudonym via an API call to V2xFac_V2xM_PreparePseudonymChange.

8.3.5 V2xFac_V2xM_AbortPseudonymChange

[SWS_V2xFac_00144][

Service Name	V2xFac_V2xM_AbortPseudonymChange	

Syntax	`Std_ReturnType V2xFac_V2xM_AbortPseudonymChange (`
	`  void`
	`)`	

Service ID [hex]	0x05	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	E_OK: operation successful E_NOT_OK: operation failed

Description	This function is called by the V2xM when not all modules are OK with the pseudonym change and the change is to be rolled back.
Available via	V2xFac_V2xM.h

]()

[SWS_V2xFac_00145] ⌈
The function V2xFac_V2xM_AbortPseudonymChange shall roll back the prepared pseudonym change. ⌋()

[SWS_V2xFac_00146] ⌈
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT. ⌋()

Note: The function requires previous preparation of the pseudonym via an API call to V2xFac_V2xM_PreparePseudonymChange.

8.3.6 V2xFac_V2xM_SetTGenCamDcc

[SWS_V2xFac_00148]⌈

Service Name	V2xFac_V2xM_SetTGenCamDcc	
Syntax	`void V2xFac_V2xM_SetTGenCamDcc ( uint16 TGenCamDcc )`	
Service ID [hex]	0x06	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	TGenCamDcc	The TGenCamDcc in [ms], provided by V2xM
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	By this API primitive the V2xFac module gets an indication of the current TGen CamDcc value.	
Available via	V2xFac_V2xM.h	

]()

[SWS_V2xFac_00149] ⌈
The function V2xFac_V2xM_SetTGenCamDcc shall set the TGenCamDcc for subsequent API calls. ⌋()

[SWS_V2xFac_00150] ⌈
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT. ⌋()

8.3.7 V2xFac_V2xM_SetCaBsOperation

[SWS_V2xFac_00152]⌈

Service Name	V2xFac_V2xM_SetCaBsOperation	
Syntax	`void V2xFac_V2xM_SetCaBsOperation ( boolean OperationState )`	
Service ID [hex]	0x07	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	OperationState	FALSE: CaBs disabled TRUE: CaBs enbaled
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	By this API primitive the V2xFac module gets an indication of the current operation state of the CA Basic Service.	
Available via	V2xFac_V2xM.h	

⌋()

[SWS_V2xFac_00153] ⌈
The function V2xFac_V2xM_SetCaBsOperation shall enable or disable the CA Basic Service. ⌋()

[SWS_V2xFac_00154] ⌈
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT. ⌋()

8.4 Call-back notifications

This is a list of functions provided for other modules.

8.4.1 V2xFac_TxConfirmation

[SWS_V2xFac_00087]⌈

Service Name	V2xFac_TxConfirmation	

Syntax	`void V2xFac_TxConfirmation (`
	`  uint16 TransactionId16`
	`)`	

Service ID [hex]	0x08	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	TransactionId16	TransactionId of the packet that has been transmitted
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	By this API primitive the V2xFac module gets a confirmation that the V2X message with a certain ID was send successfully.	
Available via	V2xFac.h	

⌋()

[SWS_V2xFac_00156] ⌈
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT. ⌋()

8.4.2 V2xFac_RxIndication

[SWS_V2xFac_00088]⌈

Service Name	V2xFac_RxIndication

Syntax	`void V2xFac_RxIndication (`
	`  uint32 TransactionId32,`
	`  const V2xFac_RxParamsType* ReceiveParams,`
	`  uint16 Length,`
	`  const uint8* DataPtr`
	`)`

Service ID [hex]	0x09
Sync/Async	Synchronous
Reentrancy	Non Reentrant

Parameters (in)	Transaction Id32	ID of the received packet. This ID is created in the V2xGn module and handed up in the protocol stack to be used for verification on demand.
	Receive Params	Wraps RxIndication parameters
	Length	Length of the data pointed by DataPtr.
	DataPtr	Payload of the received BTP packet.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	This API primitive is called by the V2xBtp module providing the data and the Geo Networking parameters of a received BTP packet to V2xFac module.	
Available via	V2xFac.h	

](

[SWS_V2xFac_00158] [
If development error detection is enabled: the function shall check that the service V2xFac_Init was previously called. If the check fails, the function shall raise the development error V2XFAC_E_UNINIT.]()

[SWS_V2xFac_00159] [
If development error detection is enabled: the function shall check the parameter ReceiveParams for being valid. If the check fails, the function shall raise the development error V2XFAC_E_PARAM_POINTER.]()

[SWS_V2xFac_00160] [
If development error detection is enabled: the function shall check the parameter DataPtr for being valid. If the check fails, the function shall raise the development error V2XFAC_E_PARAM_POINTER.]()

8.5 Scheduled functions

8.5.1 V2xFac_CaBs_MainFunction

[SWS_V2xFac_00090][

Service Name	V2xFac_CaBs_MainFunction

Syntax	`void V2xFac_CaBs_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x0a

Description	This is the main processing function of the CA basic service
Available via	SchM_V2xFac.h

](

8.5.2 V2xFac_DenBs_MainFunction

[SWS_V2xFac_00091][

Service Name	V2xFac_DenBs_MainFunction

Syntax	`void V2xFac_DenBs_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x0b
Description	This is the main processing function of the DEN basic service.
Available via	SchM_V2xFac.h

](

8.5.3 V2xFac_IviS_MainFunction

[SWS_V2xFac_91603][

Service Name	V2xFac_IviS_MainFunction

Syntax	`void V2xFac_IviS_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x0c
Description	This is the main processing function of the IVI service.
Available via	SchM_V2xFac.h

](SRS_V2X_10001)

[SWS_V2xFac_00251] [
The function shall process the received IVI service as described in chapter 7.5.] ()

8.5.4 V2xFac_RltS_MainFunction

[SWS_V2xFac_91600][

Service Name	V2xFac_RltS_MainFunction

Syntax	`void V2xFac_RltS_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x0d
Description	This is the main processing function of the RLT service.
Available via	SchM_V2xFac.h

](SRS_V2X_10003)

[**SWS_V2xFac_00271**] [
The function shall process the received RLT service as described in chapter 7.6.] ()

8.5.5 V2xFac_TlmS_MainFunction

[SWS_V2xFac_91606][

Service Name	V2xFac_TlmS_MainFunction

Syntax	`void V2xFac_TlmS_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x0e
Description	This is the main processing function of the TLM service.
Available via	

](SRS_V2X_10004)

[**SWS_V2xFac_00272**] [
The function shall process the received TLM service as described in chapter 7.7.] ()

8.6 Expected Interfaces

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

8.6.1 Mandatory Interfaces

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

[SWS_V2xFac_00092][

API Function	***Header File***	***Description***
V2xBtp_Transmit	V2xBtp.h	This API is called by the V2xFac module to request sending a BTP-PDU to the peer BTP entity.
V2xM_CalcDistance	V2xM.h	Calculates the distance between two geographical points on earth with the assumption that they are on elevation 0.

V2xM_CalcHeading-InTolerance	V2xM.h	Calculates if difference of heading values are within a tolerance value
V2xM_GetPosition-AndTime	V2xM.h	Provides the instantaneous position information.
V2xM_GetRefTimePtr	V2xM.h	Provides a pointer to the time reference of the V2X-Stack.
V2xM_SetTolling-ZoneInformation	V2xM.h	Set available tolling zone information. This is done from V2xFac that receives this information via CAM messages.

](

8.6.2 Optional Interfaces

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

[SWS_V2xFac_00093][

API Function	***Header File***	***Description***
Det_ReportError	Det.h	Service to report development errors.

](

8.7 Service Interfaces

8.7.1 Sender-Receiver-Interfaces

8.7.1.1 V2xFacVdp

[SWS_V2xFac_00094] [

The V2xFac requires an interface V2xFacVdp as defined below to get data from the VDP application.

]()

[SWS_V2xFac_00095][

Name	V2xFacVdp	
Comment	Interface to receive data from VDP application	
IsService	false	
Variation	--	
Data Elements	vdpData	
	Type	V2xFac_CoopAwarenessType
	Variation	--

]()

8.7.1.2 V2xApplRxIndicationCam

[SWS_V2xFac_00100] ⌜
For the V2X_Facilities an interface V2xApplRxIndicationCam shall be provided as defined below to provide the capability of delivering received CAMs to applications.
⌟()

[SWS_V2xFac_00101]⌈

Name	V2xApplRxIndicationCam	
Comment	Deliver received CAMs Applications	
IsService	true	
Variation	--	
Data Elements	CamData	
	Type	V2xFac_CamMessageRootType
	Variation	--

]()

8.7.1.3 V2xApplRxIndicationDenm

[SWS_V2xFac_00234] ⌜
For the V2X_Facilities an interface V2xApplRxIndicationDenm shall be provided as defined below to provide the capability of delivering received DENMs to applications.
⌟()

[SWS_V2xFac_00235]⌈

Name	V2xApplRxIndicationDenm	
Comment	Deliver received DENMs to Applications	
IsService	true	
Variation	--	
Data Elements	DenmData	
	Type	V2xFac_DenmMessageRootType
	Variation	--

]()

8.7.1.4 V2xApplRxIndicationIvim

[SWS_V2xFac_00254] ⌈

For the V2X_Facilities an interface V2xApplRxIndicationIvim shall be provided as defined below to provide the capability of delivering received IVIMs to applications. ⌋ (SRS_V2X_10001)

[SWS_V2xFac_91604]⌈

Name	V2xApplRxIndicationIvim	
Comment	Deliver received IVIMs to Applications	
IsService	true	
Variation	--	
Data Elements	IvimData	
	Type	V2xFac_IvimDataType
	Variation	--

⌋(SRS_V2X_10001)

8.7.1.5 V2xApplRxIndicationMapem

[SWS_V2xFac_00260] ⌈
For the V2X_Facilities an interface V2xApplRxIndicationMapem shall be provided as defined below to provide the capability of delivering received MAPEMs to applications. ⌋ (SRS_V2X_10003)

[SWS_V2xFac_91601]⌈

Name	V2xApplRxIndicationMapem	
Comment	Deliver received MAPEMs to Applications	
IsService	true	
Variation	--	
Data Elements	MapemData	
	Type	V2xFac_MapemDataType
	Variation	--

⌋(SRS_V2X_10003)

8.7.1.6 V2xApplRxIndicationSpatem

[SWS_V2xFac_00268] ⌈
For the V2X_Facilities an interface V2xApplRxIndicationSpatem shall be provided as defined below to provide the capability of delivering received SPATEMs to applications. ⌋ (SRS_V2X_10004)

[SWS_V2xFac_91607]⌈

Name	V2xApplRxIndicationSpatem	
Comment	Deliver received SPATEMs to Applications	
IsService	true	
Variation	--	
Data Elements	SpatemData	
	Type	V2xFac_SpatemDataType
	Variation	--

⌋(SRS_V2X_10004)

8.7.2 Client-Server-Interfaces

8.7.2.1 V2xFacDenBs

The V2xFac module provides the Client-Server service Interface V2xFacDenBs to the application layer. The service Interface V2xFacDenBs shall implement the following operations.

- TriggerEvent
- UpdateEvent
- TerminateEvent

[SWS_V2xFac_00098] ⌈

The V2X_Facilities shall provide an interface V2xFacDenBs as defined below to provide tha capability of event handling (triggering, updating and terminating DENMs).

⌋()

[SWS_V2xFac_00099]⌈

Name	V2xFacDenBs		
Comment	Service of V2xFac module basic service DEN		
IsService	true		
Variation	--		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed
	2	E_ACTION_ID_ NONEXISTENT	ActionID provided for Update/Termination does not exist

	3	E_DENM_ UNCONSTRUCTABLE	DENM couldn't be constructed
	4	E_DENM_TIME_OUT	DENM hasn't been sent before timeout of DENM has been reached

Operation	TerminateEvent	
Comment	Requests termination of an existing DENM (see [11] chapter 4 and 5.4.1.4)	
Variation	--	
Parameters	EventData	
	Type	V2xFac_DenMsgType
	Direction	IN
	Comment	Pre-filled DENM message structure, including the ActionID from Trigger Event
	Variation	--
	RepetitionDuration	
	Type	uint32
	Direction	IN
	Comment	Duration of the DENM repetition in units of milliseconds
	Variation	--
	RepetitionInterval	
	Type	uint16
	Direction	IN
	Comment	Interval of DENM repetition in units of milliseconds
	Variation	--
	DestinationArea	
	Type	V2xFac_GnDestinationAreaType
	Direction	IN
	Comment	Destination area for DENM dissemination as specified in ETSI EN 302 931.
	Variation	--
	TrafficClass	
	Type	V2xFac_TrafficClassIdType
	Direction	IN

	Comment	GN traffic class of the DENM as defined in ETSI EN 302 636-4-1
	Variation	--
	ActionID	
	Type	V2xFac_ActionIdType
	Direction	OUT
	Comment	The DEN basic service returns the actionID or other applicable identifier created by the DEN basic service to the requesting ITS-S application
	Variation	--
Possible Errors	E_OK E_NOT_OK E_ACTION_ID_NONEXISTENT E_DENM_UNCONSTRUCTABLE E_DENM_TIME_OUT	

Operation	TriggerEvent	
Comment	Requests creation of a new DENM (see [11] chapter 4 and 5.4.1.2)	
Variation	--	
Parameters	EventData	
	Type	V2xFac_DenMsgType
	Direction	IN
	Comment	Pre-filled DENM message structure
	Variation	--
	RepetitionDuration	
	Type	uint32
	Direction	IN
	Comment	Duration of the DENM repetition in units of milliseconds
	Variation	--
	RepetitionInterval	
	Type	uint16
	Direction	IN
	Comment	Interval of DENM repetition in units of milliseconds
	Variation	--
	DestinationArea	
	Type	V2xFac_GnDestinationAreaType

	Direction	IN
	Comment	Destination area for DENM dissemination as specified in ETSI EN 302 931.
	Variation	--
	TrafficClass	
	Type	V2xFac_TrafficClassIdType
	Direction	IN
	Comment	GN traffic class of the DENM as defined in ETSI EN 302 636-4-1
	Variation	--
	ActionID	
	Type	V2xFac_ActionIdType
	Direction	OUT
	Comment	The DEN basic service returns the actionID or other applicable identifier created by the DEN basic service to the requesting ITS-S application
	Variation	--
Possible Errors	E_OK E_NOT_OK E_DENM_UNCONSTRUCTABLE E_DENM_TIME_OUT	

Operation	UpdateEvent	
Comment	Requests update of an existing DENM (see [11] chapter 4 and 5.4.1.3)	
Variation	--	
Parameters	EventData	
	Type	V2xFac_DenMsgType
	Direction	IN
	Comment	Pre-filled DENM message structure, including the ActionID from Trigger Event
	Variation	--
	RepetitionDuration	
	Type	uint32
	Direction	IN
	Comment	Duration of the DENM repetition in units of milliseconds
	Variation	--

	RepetitionInterval	
	Type	uint16
	Direction	IN
	Comment	Interval of DENM repetition in units of milliseconds
	Variation	--
	DestinationArea	
	Type	V2xFac_GnDestinationAreaType
	Direction	IN
	Comment	Destination area for DENM dissemination as specified in ETSI EN 302 931.
	Variation	--
	TrafficClass	
	Type	V2xFac_TrafficClassIdType
	Direction	IN
	Comment	GN traffic class of the DENM as defined in ETSI EN 302 636-4-1
	Variation	--
	ActionID	
	Type	V2xFac_ActionIdType
	Direction	OUT
	Comment	The DEN basic service returns the actionID or other applicable identifier created by the DEN basic service to the requesting ITS-S application
	Variation	--
Possible Errors	E_OK E_NOT_OK E_ACTION_ID_NONEXISTENT E_DENM_UNCONSTRUCTABLE E_DENM_TIME_OUT	

]()

8.7.3 Implementation Data Types

8.7.3.1 V2xFac specific Implementation DataTypes

[SWS_V2xFac_00162][

Name	V2xFac_TrafficClassIdType
Kind	Type

Derived from	uint8
Description	Traffic class for sending DENMs
Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00163][

Name	V2xFac_GnDestinationAreaType	
Kind	Structure	
Elements	latitude	
	Type	sint32
	Comment	Latitude [1/10 microdegree]
	longitude	
	Type	sint32
	Comment	Longitude [1/10 microdegree]
	distanceA	
	Type	uint16
	Comment	Distance a of the geometric shape [meters]
	distanceB	
	Type	uint16
	Comment	Distance b of the geometric shape [meters]
	angle	
	Type	uint16
	Comment	Angle of the geometric shape [degrees from North]
	shape	
	Type	V2xFac_GnAreaShapeType
	Comment	Shape type of the geometric area
Description	Destination area for DENM dissemination as specified in ETSI EN 302 931.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00164][

Name	V2xFac_GnAreaShapeType

Kind	Type		
Derived from	uint8		
Range	V2XFAC_GNAREASHAPE_CIRCLE	0x00	Circle
	V2XFAC_GNAREASHAPE_RECT	0x01	Rectangle
	V2XFAC_GNAREASHAPE_ELLIPSE	0x02	Ellipsis
Description	Enumeration of a GeoNetworking Area Shape		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()

8.7.3.2 CAM/DENM/IVIM/MAPEM/SPATEM common Implementation DataTypes

[SWS_V2xFac_00036][

Name	V2xFac_ItsPduHeaderType	
Kind	Structure	
Elements	protocolVersion	
	Type	uint8
	Comment	Version of ITS message and/or communication protocol
	messageId	
	Type	uint8
	Comment	Type of the ITS message.
	stationId	
	Type	uint32
	Comment	Identifier of originating ITS-S
Description	DF_ItsPduHeader as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00224][

Name	V2xFac_DeltaReferencePositionType
Kind	Structure
Elements	deltaLatitude

	Type	sint32
	Comment	Defines offset latitude with regards to a referred latitude value.
	deltaLongitude	
	Type	sint32
	Comment	Defines an offset longitude with regards to a referred longitude value.
	deltaAltitude	
	Type	sint16
	Comment	Defines an offset altitude with regards to a referred altitude value.
Description	DF_DeltaReferencePosition as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00037][

Name	V2xFac_AltitudeType	
Kind	Structure	
Elements	altitudeValue	
	Type	sint32
	Comment	Altitude in a WGS84 co-ordinate system
	altitudeConfidence	
	Type	V2xFac_AltitudeConfidenceType
	Comment	Absolute accuracy of a reported altitude value
Description	DF_Altitude as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00165][

Name	V2xFac_AltitudeConfidenceType
Kind	Type

Derived from	uint8		
Range	V2XFAC_ALTITUDECONFIDENCE_ALT_000_01	0x00	the altitude accuracy is equal to or less than 0.01 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_000_02	0x01	the altitude accuracy is equal to or less than 0.02 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_000_05	0x02	the altitude accuracy is equal to or less than 0.05 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_000_10	0x03	the altitude accuracy is equal to or less than 0.1 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_000_20	0x04	the altitude accuracy is equal to or less than 0.2 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_000_50	0x05	the altitude accuracy is equal to or less than 0.5 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_001_00	0x06	the altitude accuracy is equal to or less than 1 meter
	V2XFAC_ALTITUDECONFIDENCE_ALT_002_00	0x07	the altitude accuracy is equal to or less than 2 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_005_00	0x08	the altitude accuracy is equal to or less than 5 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_010_00	0x09	the altitude accuracy is equal to or less than 10 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_020_00	0x0a	the altitude accuracy is equal to or less than 20 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_050_00	0x0b	the altitude accuracy is equal to or less than 50 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_100_00	0x0c	the altitude accuracy is equal to or less than 100 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_200_00	0x0d	the altitude accuracy is equal to or less than 200 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_OUTOFRANGE	0x0e	the altitude accuracy is out of range, i.e. greater than 200 meters
	V2XFAC_ALTITUDECONFIDENCE_ALT_UNAVAILABLE	0x0f	the altitude accuracy information is unavailable
Description	Enumeration of DE_AltitudeConfidence as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00038][

Name	V2xFac_PosConfidenceEllipseType	
Kind	Structure	
Elements	semiMajorConfidence	
	Type	uint16
	Comment	Half of length of the major axis
	semiMinorConfidence	
	Type	uint16
	Comment	Half of length of the minor axis
	semiMajorOrientation	
	Type	uint16
	Comment	Orientation direction of the ellipse major axis
Description	DF_PosConfidenceEllipse as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00039][

Name	V2xFac_HeadingType	
Kind	Structure	
Elements	headingValue	
	Type	uint16
	Comment	Orientation of a heading with regards to the WGS84 north
	headingConfidence	
	Type	uint8
	Comment	Absolute accuracy of a reported heading value
Description	DF_Heading as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00040][

Name	V2xFac_SpeedType	
Kind	Structure	
Elements	speedValue	
	Type	uint16
	Comment	Speed value
	speedConfidence	
	Type	uint8
	Comment	The absolute accuracy of a speed value
Description	DF_Speed as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00047][

Name	V2xFac_ReferencePositionType	
Kind	Structure	
Elements	latitude	
	Type	sint32
	Comment	Latitude of the geographical point
	longitude	
	Type	sint32
	Comment	Longitude of the geographical point
	posConfidenceEllipse	
	Type	V2xFac_PosConfidenceEllipseType
	Comment	Accuracy of the geographical position
	altitude	
	Type	V2xFac_AltitudeType
	Comment	Altitude and altitude accuracy of the geographical point
Description	DF_ReferencePosition as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available	Rte_V2xFac_Type.h	

via	

]()
[SWS_V2xFac_00225][

Name	V2xFac_ActionIdType	
Kind	Structure	
Elements	originatingStationID	
	Type	uint32
	Comment	Identifier for an ITS-S
	sequenceNumber	
	Type	uint16
	Comment	sequenceNumber
Description	DF_ActionID as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00059][

Name	V2xFac_PathHistoryType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_PathPointType
	Size	23
	Comment	--
Description	DF_PathHistory as defined in ETSI TS 102 894-2. Size of the Array shall be 23 as defined in ETSI EN 302 637-2.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00226][

Name	V2xFac_ClosedLanesType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_ClosedLanesPresenceType
	Comment	Mark optional children present or not
	hardShoulderStatus	
	Type	V2xFac_HardShoulderStatusType
	Comment	Indicates the open/closing status of hard shoulder lanes
	drivingLaneStatus	
	Type	V2xFac_DrivingLaneStatusType
	Comment	Indicates whether a driving lane is open to traffic
Description	DF_ClosedLanes as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00166][

Name	V2xFac_ClosedLanesPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	hardShoulderStatus	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_ClosedLanesTypet			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00167][

Name	V2xFac_HardShoulderStatusType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_HARDSHOULDERSTATUS_	0x00	Hard shoulder lane

	AVAILABLE_FOR_STOPPING		available for stopping
	V2XFAC_HARDSHOULDERSTATUS_CLOSED	0x01	Hard shoulder lane closed
	V2XFAC_HARDSHOULDERSTATUS_ AVAILABLE_FOR_DRIVING	0x02	Hard shoulder lane available for driving
Description	Enumeration of DE_HardShoulderStatus as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00168][

Name	V2xFac_DrivingLaneStatusType			
Kind	Bitfield			
Derived from	uint16			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	outermostLaneClosed	0x2000	Bit 13: Outermost lane is closed
	bit	secondLaneFromOutside Closed	0x1000	Bit 12: Second lane from the outside is closed
	bit	thirdLaneFromOutside Closed	0x800	Bit 11: Third lane from the outside is closed
	bit	fourthLaneFromOutside Closed	0x400	Bit 10: Fourth lane from the outside is closed
	bit	fifthLaneFromOutside Closed	0x200	Bit 9: Fifth lane from the outside is closed
	bit	sixthLaneFromOutside Closed	0x100	Bit 8: Sixth lane from the outside is closed
	bit	seventhLaneFromOutside Closed	0x80	Bit 7: Seventh lane from the outside is closed
	bit	eighthLaneFromOutside Closed	0x40	Bit 6: Eighth lane from the outside is closed
	bit	ninthLaneFromOutside Closed	0x20	Bit 5: Ninth lane from the outside is closed
	bit	tenthLaneFromOutside Closed	0x10	Bit 4: Tenth lane from the outside is closed
	bit	eleventhLaneFromOutside Closed	0x08	Bit 3: Eleventh lane from the outside is closed
	bit	twelfthLaneFromOutside	0x04	Bit 2: Twelfth lane from the outside is

		Closed		closed
	bit	thirteenthLaneFrom OutsideClosed	0x02	Bit 1: Thirteenth lane from the outside is closed
	bit	fourteenthLaneFrom OutsideClosed	0x01	Bit 0 (LSB): Fourteenth lane from the outside is closed
Description	BitString DE_DrivingLaneStatus as defined in ETSI TS 102 894-2 V1.2.1.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00074][

Name	V2xFac_CauseCodeType	
Kind	Structure	
Elements	causeCode	
	Type	uint8
	Comment	Encoded value of a traffic event type
	subCauseCode	
	Type	uint8
	Comment	Type of sub cause of a detected event
Description	DF_CauseCode as defined inETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_91035][

Name	V2xFac_StationIDType		
Kind	Type		
Derived from	uint32		
Range	0..4294967295	--	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91036][

Name	V2xFac_LongitudeType		
Kind	Type		
Derived from	sint32		
Range	-1800000000..1800000001	--	--
	oneMicrodegreeWest	-10	--
	oneMicrodegreeEast	10	--
	unavailable	1800000001	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91037][

Name	V2xFac_LatitudeType		
Kind	Type		
Derived from	sint32		
Range	-900000000..900000001	--	--
	oneMicrodegreeSouth	-10	--
	oneMicrodegreeNorth	10	--
	unavailable	900000001	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91038][

Name	V2xFac_AltitudeValueType		
Kind	Type		
Derived from	sint32		
Range	-100000..800001	--	--
	referenceEllipsoidSurface	0	--
	oneCentimeter	1	--

	unavailable	800001	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91039][

Name	V2xFac_DeltaLongitudeType		
Kind	Type		
Derived from	sint32		
Range	-131071..131072	--	--
	oneMicrodegreeWest	-10	--
	oneMicrodegreeEast	10	--
	unavailable	131072	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91040][

Name	V2xFac_DeltaLatitudeType		
Kind	Type		
Derived from	sint32		
Range	-131071..131072	--	--
	oneMicrodegreeSouth	-10	--
	oneMicrodegreeNorth	10	--
	unavailable	131072	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91041][

Name	V2xFac_DeltaAltitudeType

Kind	Type		
Derived from	sint16		
Range	-12700..12800	--	--
	oneCentimeterDown	-1	--
	oneCentimeterUp	1	--
	unavailable	12800	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91042][

Name	V2xFac_PathDeltaTimeType		
Kind	Type		
Derived from	uint16		
Range	1..65535	--	--
	tenMilliSecondsInPast	1	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91043][

Name	V2xFac_PtActivationTypeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	undefinedCodingType	0	--
	r09_16CodingType	1	--
	vdv_50149CodingType	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91044][

Name	V2xFac_SemiAxisLengthType		
Kind	Type		
Derived from	uint16		
Range	0..4095	--	--
	oneCentimeter	1	--
	outOfRange	4094	--
	unavailable	4095	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91045][

Name	V2xFac_CauseCodeTypeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	reserved	0	--
	trafficCondition	1	--
	accident	2	--
	roadworks	3	--
	adverseWeatherCondition_Adhesion	6	--
	hazardousLocation_SurfaceCondition	9	--
	hazardousLocation_ObstacleOnTheRoad	10	--
	hazardousLocation_AnimalOnTheRoad	11	--
	humanPresenceOnTheRoad	12	--
	wrongWayDriving	14	--
	rescueAndRecoveryWorkInProgress	15	--
	adverseWeatherCondition_ExtremeWeatherCondition	17	--
	adverseWeatherCondition_Visibility	18	--

	adverseWeatherCondition_Precipitation	19	--
	slowVehicle	26	--
	dangerousEndOfQueue	27	--
	vehicleBreakdown	91	--
	postCrash	92	--
	humanProblem	93	--
	stationaryVehicle	94	--
	emergencyVehicleApproaching	95	--
	hazardousLocation_DangerousCurve	96	--
	collisionRisk	97	--
	signalViolation	98	--
	dangerousSituation	99	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91046][

Name	V2xFac_SubCauseCodeTypeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91047][

Name	V2xFac_TrafficConditionSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--

	increasedVolumeOfTraffic	1	--
	trafficJamSlowlyIncreasing	2	--
	trafficJamIncreasing	3	--
	trafficJamStronglyIncreasing	4	--
	trafficStationary	5	--
	trafficJamSlightlyDecreasing	6	--
	trafficJamDecreasing	7	--
	trafficJamStronglyDecreasing	8	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91048][

Name	V2xFac_AccidentSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	multiVehicleAccident	1	--
	heavyAccident	2	--
	accidentInvolvingLorry	3	--
	accidentInvolvingBus	4	--
	accidentInvolvingHazardousMaterials	5	--
	accidentOnOppositeLane	6	--
	unsecuredAccident	7	--
	assistanceRequested	8	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91049][

Name	V2xFac_RoadworksSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	majorRoadworks	1	--
	roadMarkingWork	2	--
	slowMovingRoadMaintenance	3	--
	shortTermStationaryRoadworks	4	--
	streetCleaning	5	--
	winterService	6	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91050][

Name	V2xFac_HumanPresenceOnTheRoadSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	childrenOnRoadway	1	--
	cyclistOnRoadway	2	--
	motorcyclistOnRoadway	3	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91051][

Name	V2xFac_WrongWayDrivingSubCauseCodeType
Kind	Type

Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	wrongLane	1	--
	wrongDirection	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91052][

Name	V2xFac_AdverseWeatherCondition_ExtremeWeatherConditionSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	strongWinds	1	--
	damagingHail	2	--
	hurricane	3	--
	thunderstorm	4	--
	tornado	5	--
	blizzard	6	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91053][

Name	V2xFac_AdverseWeatherCondition_AdhesionSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--

	heavyFrostOnRoad	1	--
	fuelOnRoad	2	--
	mudOnRoad	3	--
	snowOnRoad	4	--
	iceOnRoad	5	--
	blackIceOnRoad	6	--
	oilOnRoad	7	--
	looseChippings	8	--
	instantBlackIce	9	--
	roadsSalted	10	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91054][

Name	V2xFac_AdverseWeatherCondition_VisibilitySubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	fog	1	--
	smoke	2	--
	heavySnowfall	3	--
	heavyRain	4	--
	heavyHail	5	--
	lowSunGlare	6	--
	sandstorms	7	--
	swarmsOfInsects	8	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91055][

Name	V2xFac_AdverseWeatherCondition_PrecipitationSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	heavyRain	1	--
	heavySnowfall	2	--
	softHail	3	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91056][

Name	V2xFac_SlowVehicleSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	maintenanceVehicle	1	--
	vehiclesSlowingToLookAtAccident	2	--
	abnormalLoad	3	--
	abnormalWideLoad	4	--
	convoy	5	--
	snowplough	6	--
	deicing	7	--
	saltingVehicles	8	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91057][

Name	V2xFac_StationaryVehicleSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	humanProblem	1	--
	vehicleBreakdown	2	--
	postCrash	3	--
	publicTransportStop	4	--
	carryingDangerousGoods	5	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91058][

Name	V2xFac_HumanProblemSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	glycemiaProblem	1	--
	heartProblem	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91059][

Name	V2xFac_EmergencyVehicleApproachingSubCauseCodeType
Kind	Type

Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	emergencyVehicleApproaching	1	--
	prioritizedVehicleApproaching	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91060][

Name	V2xFac_HazardousLocation_DangerousCurveSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	dangerousLeftTurnCurve	1	--
	dangerousRightTurnCurve	2	--
	multipleCurvesStartingWithUnknownTurningDirection	3	--
	multipleCurvesStartingWithLeftTurn	4	--
	multipleCurvesStartingWithRightTurn	5	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91061][

Name	V2xFac_HazardousLocation_SurfaceConditionSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	rockfalls	1	--

	earthquakeDamage	2	--
	sewerCollapse	3	--
	subsidence	4	--
	snowDrifts	5	--
	stormDamage	6	--
	burstPipe	7	--
	volcanoEruption	8	--
	fallingIce	9	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91062][

Name	V2xFac_HazardousLocation_ObstacleOnTheRoadSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	shedLoad	1	--
	partsOfVehicles	2	--
	partsOfTyres	3	--
	bigObjects	4	--
	fallenTrees	5	--
	hubCaps	6	--
	waitingVehicles	7	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91063][

Name	V2xFac_HazardousLocation_AnimalOnTheRoadSubCauseCodeType

Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	wildAnimals	1	--
	herdOfAnimals	2	--
	smallAnimals	3	--
	largeAnimals	4	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91064][

Name	V2xFac_CollisionRiskSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	longitudinalCollisionRisk	1	--
	crossingCollisionRisk	2	--
	lateralCollisionRisk	3	--
	vulnerableRoadUser	4	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91065][

Name	V2xFac_SignalViolationSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--

	unavailable	0	--
	stopSignViolation	1	--
	trafficLightViolation	2	--
	turningRegulationViolation	3	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91066][

Name	V2xFac_RescueAndRecoveryWorkInProgressSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	emergencyVehicles	1	--
	rescueHelicopterLanding	2	--
	policeActivityOngoing	3	--
	medicalEmergencyOngoing	4	--
	childAbductionInProgress	5	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91067][

Name	V2xFac_DangerousEndOfQueueSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	suddenEndOfQueue	1	--
	queueOverHill	2	--

	queueAroundBend	3	--
	queueInTunnel	4	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91068][

Name	V2xFac_DangerousSituationSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	emergencyElectronicBrakeEngaged	1	--
	preCrashSystemEngaged	2	--
	espEngaged	3	--
	absEngaged	4	--
	aebEngaged	5	--
	brakeWarningEngaged	6	--
	collisionRiskWarningEngaged	7	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91069][

Name	V2xFac_VehicleBreakdownSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	lackOfFuel	1	--
	lackOfBatteryPower	2	--

	engineProblem	3	--
	transmissionProblem	4	--
	engineCoolingProblem	5	--
	brakingSystemProblem	6	--
	steeringProblem	7	--
	tyrePuncture	8	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91070][

Name	V2xFac_PostCrashSubCauseCodeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unavailable	0	--
	accidentWithoutECallTriggered	1	--
	accidentWithECallManuallyTriggered	2	--
	accidentWithECallAutomaticallyTriggered	3	--
	accidentWithECallTriggeredWithoutAccessToCellularNetwork	4	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91071][

Name	V2xFac_CurvatureValueType		
Kind	Type		
Derived from	sint16		
Range	-30000..30001	--	--
	reciprocalOf1MeterRadiusToRight	-30000	--
	straight	0	--

	reciprocalOf1MeterRadiusToLeft	30000	--
	unavailable	30001	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91072][

Name	V2xFac_CurvatureConfidenceType		
Kind	Enumeration		
Range	onePerMeter_0_00002	0	--
	onePerMeter_0_0001	1	--
	onePerMeter_0_0005	2	--
	onePerMeter_0_002	3	--
	onePerMeter_0_01	4	--
	onePerMeter_0_1	5	--
	outOfRange	6	--
	unavailable	7	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91073][

Name	V2xFac_HeadingValueType		
Kind	Type		
Derived from	uint16		
Range	0..3601	--	--
	wgs84North	0	--
	wgs84East	900	--
	wgs84South	1800	--
	wgs84West	2700	--
	unavailable	3601	--

Description	Namespace: ITS-Container
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91074][

Name	V2xFac_HeadingConfidenceType		
Kind	Type		
Derived from	uint8		
Range	1..127	--	--
	equalOrWithinZeroPointOneDegree	1	--
	equalOrWithinOneDegree	10	--
	outOfRange	126	--
	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91075][

Name	V2xFac_LanePositionType		
Kind	Type		
Derived from	sint8		
Range	-1..14	--	--
	offTheRoad	-1	--
	hardShoulder	0	--
	outermostDrivingLane	1	--
	secondLaneFromOutside	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91076][

Name	V2xFac_PerformanceClassType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--
	unavailable	0	--
	performanceClassA	1	--
	performanceClassB	2	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91077][

Name	V2xFac_SpeedValueType		
Kind	Type		
Derived from	uint16		
Range	0..16383	--	--
	standstill	0	--
	oneCentimeterPerSec	1	--
	unavailable	16383	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91078][

Name	V2xFac_SpeedConfidenceType		
Kind	Type		
Derived from	uint8		
Range	1..127	--	--
	equalOrWithinOneCentimeterPerSec	1	--
	equalOrWithinOneMeterPerSec	100	--
	outOfRange	126	--

	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91079][

Name	V2xFac_EmbarkationStatusType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	value	0x00	false if 0, true otherwise
Description	Namespace: ITS-Container			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91080][

Name	V2xFac_LongitudinalAccelerationValueType		
Kind	Type		
Derived from	sint16		
Range	-160..161	--	--
	pointOneMeterPerSecSquaredBackward	-1	--
	pointOneMeterPerSecSquaredForward	1	--
	unavailable	161	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91081][

Name	V2xFac_AccelerationConfidenceType
Kind	Type
Derived from	uint8

Range	0..102	--	--
	pointOneMeterPerSecSquared	1	--
	outOfRange	101	--
	unavailable	102	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91082][

Name	V2xFac_LateralAccelerationValueType		
Kind	Type		
Derived from	sint16		
Range	-160..161	--	--
	pointOneMeterPerSecSquaredToRight	-1	--
	pointOneMeterPerSecSquaredToLeft	1	--
	unavailable	161	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91083][

Name	V2xFac_VerticalAccelerationValueType		
Kind	Type		
Derived from	sint16		
Range	-160..161	--	--
	pointOneMeterPerSecSquaredDown	-1	--
	pointOneMeterPerSecSquaredUp	1	--
	unavailable	161	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91084][

Name	V2xFac_StationTypeType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	unknown	0	--
	pedestrian	1	--
	cyclist	2	--
	moped	3	--
	motorcycle	4	--
	passengerCar	5	--
	bus	6	--
	lightTruck	7	--
	heavyTruck	8	--
	trailer	9	--
	specialVehicles	10	--
	tram	11	--
	roadSideUnit	15	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91085][

Name	V2xFac_HeightLonCarrType		
Kind	Type		
Derived from	uint8		
Range	1..100	--	--
	oneCentimeter	1	--
	unavailable	100	--
Description	Namespace: ITS-Container		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91086][

Name	V2xFac_PosLonCarrType		
Kind	Type		
Derived from	uint8		
Range	1..127	--	--
	oneCentimeter	1	--
	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91087][

Name	V2xFac_PosPillarType		
Kind	Type		
Derived from	uint8		
Range	1..30	--	--
	tenCentimeters	1	--
	unavailable	30	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91088][

Name	V2xFac_PosCentMassType		
Kind	Type		
Derived from	uint8		
Range	1..63	--	--
	tenCentimeters	1	--

	unavailable	63	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91089][

Name	V2xFac_SpeedLimitType		
Kind	Type		
Derived from	uint8		
Range	1..255	--	--
	oneKmPerHour	1	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91090][

Name	V2xFac_TemperatureType		
Kind	Type		
Derived from	sint8		
Range	-60..67	--	--
	equalOrSmallerThanMinus60Deg	-60	--
	oneDegreeCelsius	1	--
	equalOrGreaterThan67Deg	67	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91091][

Name	V2xFac_WheelBaseVehicleType
Kind	Type
Derived from	uint8

Range	1..127	--	--
	tenCentimeters	1	--
	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91092][

Name	V2xFac_TurningRadiusType		
Kind	Type		
Derived from	uint8		
Range	1..255	--	--
	point4Meters	1	--
	unavailable	255	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91093][

Name	V2xFac_PosFrontAxType		
Kind	Type		
Derived from	uint8		
Range	1..20	--	--
	tenCentimeters	1	--
	unavailable	20	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91094][

Name	V2xFac_WMInumberType

Kind	Type		
Derived from	V2xFac_StringType		
Range	1..3	--	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91095][

Name	V2xFac_VDSType
Kind	Type
Derived from	V2xFac_StringType
Description	Namespace: ITS-Container
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91096][

Name	V2xFac_EnergyStorageTypeType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	hydrogenStorage	0x01	--
	bit	electricEnergyStorage	0x02	--
	bit	liquidPropaneGas	0x04	--
	bit	compressedNaturalGas	0x08	--
	bit	diesel	0x10	--
	bit	gasoline	0x20	--
	bit	ammonia	0x40	--
Description	Namespace: ITS-Container			
Variation	--			
Available via	V2xFac.h			

]()

[SWS_V2xFac_91097]⌈

Name	V2xFac_VehicleLengthValueType		
Kind	Type		
Derived from	uint16		
Range	1..1023	--	--
	tenCentimeters	1	--
	outOfRange	1022	--
	unavailable	1023	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91098]⌈

Name	V2xFac_VehicleWidthType		
Kind	Type		
Derived from	uint8		
Range	1..62	--	--
	tenCentimeters	1	--
	outOfRange	61	--
	unavailable	62	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91099]⌈

Name	V2xFac_InformationQualityType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--
	unavailable	0	--
	lowest	1	--

	highest	7	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91100][

Name	V2xFac_SteeringWheelAngleValueType		
Kind	Type		
Derived from	sint16		
Range	-511..512	--	--
	onePointFiveDegreesToRight	-1	--
	straight	0	--
	onePointFiveDegreesToLeft	1	--
	unavailable	512	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91101][

Name	V2xFac_SteeringWheelAngleConfidenceType		
Kind	Type		
Derived from	uint8		
Range	1..127	--	--
	equalOrWithinOnePointFiveDegree	1	--
	outOfRange	126	--
	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91102][

Name	V2xFac_TimestampItsType		
Kind	Type		
Derived from	uint64		
Range	0..4398046511103	--	--
	utcStartOf2004	0	--
	oneMillisecAfterUTCStartOf2004	1	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91103][

Name	V2xFac_YawRateValueType		
Kind	Type		
Derived from	sint16		
Range	-32766..32767	--	--
	degSec_000_01ToRight	-1	--
	straight	0	--
	degSec_000_01ToLeft	1	--
	unavailable	32767	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91104][

Name	V2xFac_TransmissionIntervalType		
Kind	Type		
Derived from	uint16		
Range	1..10000	--	--
	oneMilliSecond	1	--
	tenSeconds	10000	--
Description	Namespace: ITS-Container		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91105][

Name	V2xFac_ValidityDurationType		
Kind	Type		
Derived from	uint32		
Range	0..86400	--	--
	timeOfDetection	0	--
	oneSecondAfterDetection	1	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91106][

Name	V2xFac_ActionIDType	
Kind	Structure	
Elements	originatingStationID	
	Type	V2xFac_StationIDType
	Comment	--
	sequenceNumber	
	Type	V2xFac_SequenceNumberType
	Comment	--
Description	Namespace: ITS-Container	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91107][

Name	V2xFac_NumberOfOccupantsType
Kind	Type
Derived from	uint8

Range	0..127	--	--
	oneOccupant	1	--
	unavailable	127	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91108][

Name	V2xFac_SequenceNumberType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91109][

Name	V2xFac_ProtectedZoneRadiusType		
Kind	Type		
Derived from	uint8		
Range	1..255	--	--
	oneMeter	1	--
Description	Namespace: ITS-Container		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91110][

Name	V2xFac_ProtectedZoneIDType		
Kind	Type		
Derived from	uint32		
Range	0..134217727	--	--

Description	Namespace: ITS-Container
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91111][

Name	V2xFac_CenDsrcTollingZoneIDType
Kind	Type
Derived from	V2xFac_ProtectedZoneIDType
Description	Namespace: ITS-Container
Variation	--
Available via	V2xFac.h

]()

8.7.3.3 CAM specific Implementation DataTypes

[SWS_V2xFac_00041][

Name	V2xFac_CamMessageRootType	
Kind	Structure	
Elements	itsPduHeader	
	Type	V2xFac_ItsPduHeaderType
	Comment	Structure of the ItsPduHeader
	coopAwareness	
	Type	V2xFac_CoopAwarenessType
	Comment	Structure of the CoopAwareness data
	transactionId	
	Type	uint32
	Comment	TransactionId for received CAM
Description	CAM root message as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00042][

Name	V2xFac_CoopAwarenessType	
Kind	Structure	
Elements	generationDeltaTime	
	Type	uint16
	Comment	Time corresponding to the time of the reference position in the CAM
	camParameters	
	Type	V2xFac_CamParametersType
	Comment	Structure of V2X CAM-Parameters
Description	CoopAwareness as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00045][

Name	V2xFac_CamParametersType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_CamParametersPresenceType
	Comment	Mark optional childs present or not
	basicContainer	
	Type	V2xFac_BasicContainerType
	Comment	Basic container of CAM
	highFrequencyContainer	
	Type	V2xFac_HighFrequencyContainerType
	Comment	High frequency container of CAM
	lowFrequencyContainer	
	Type	V2xFac_LowFrequencyContainerType
	Comment	Low frequency container of CAM
	specialVehicleContainer	
	Type	V2xFac_SpecialVehicleContainerType
	Comment	Special container of the CAM

Description	CamParameters as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.
Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00169][

Name	V2xFac_CamParametersPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	lowFrequencyContainer	0x02	Bit 1: Optional child present
	bit	specialVehicleContainer	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_CamParametersType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00170][

Name	V2xFac_SpecialVehicleContainerType	
Kind	Structure	
Elements	choice	
	Type	V2xFac_SpecialVehicleContainerChoiceType
	Comment	Marks which element is filled
	publicTransportContainer	
	Type	V2xFac_PublicTransportContainerType
	Comment	--
	specialTransportContainer	
	Type	V2xFac_SpecialTransportContainerType
	Comment	--
	dangerousGoodsContainer	
	Type	V2xFac_DangerousGoodsContainerType
	Comment	--

	roadWorksContainerBasic	
	Type	V2xFac_RoadWorksContainerBasicType
	Comment	--
	rescueContainer	
	Type	V2xFac_RescueContainerType
	Comment	--
	emergencyContainer	
	Type	V2xFac_EmergencyContainerType
	Comment	--
	safetyCarContainer	
	Type	V2xFac_SafetyCarContainerType
	Comment	--
Description	SpecialVehicleContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00171][

Name	V2xFac_SpecialVehicleContainerChoiceType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_SPECIALVEHICLECONTAINER_PUBLIC_TRANSPORT_CONTAINER	0x00	Public transport container chosen
	V2XFAC_SPECIALVEHICLECONTAINER_SPECIAL_TRANSPORT_CONTAINER	0x01	Special transport container chosen
	V2XFAC_SPECIALVEHICLECONTAINER_DANGEROUS_GOODS_CONTAINER	0x02	Dangerous goods container chosen
	V2XFAC_SPECIALVEHICLECONTAINER_ROAD_WORKS_CONTAINER_BASIC	0x03	Road works container basic chosen
	V2XFAC_SPECIALVEHICLECONTAINER_RESCUE_CONTAINER	0x04	Rescue container chosen
	V2XFAC_SPECIALVEHICLECONTAINER_	0x05	Emergency container

	EMERGENCY_CONTAINER		chosen
	V2XFAC_SPECIALVEHICLECONTAINER_SAFETY_CAR_CONTAINER	0x06	Safety car container chosen
Description	Enumeration for Choice V2xFac_SpecialVehicleContainerType		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()

[SWS_V2xFac_00046][

Name	V2xFac_BasicContainerType	
Kind	Structure	
Elements	stationType	
	Type	uint8
	Comment	Station type of the originating ITS-S
	referencePosition	
	Type	V2xFac_ReferencePositionType
	Comment	Position and position accuracy measured at the reference point of the originating ITS-S
Description	BasicContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00048][

Name	V2xFac_HighFrequencyContainerType	
Kind	Structure	
Elements	choice	
	Type	V2xFac_HighFrequencyContainerChoiceType
	Comment	Mark which element is filled
	basicVehicleContainerHighFrequency	
	Type	V2xFac_BasicVehicleContainerHighFrequencyType
	Comment	--

	rsuContainerHighFrequency	
	Type	V2xFac_RSUContainerHighFrequencyType
	Comment	--
Description	HighFrequencyContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00172][

Name	V2xFac_HighFrequencyContainerChoiceType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_HIGHFREQCONTAINER_ BASICVEHICLECONTAINER	0x01	High Frequency basic vehicle container chosen
	V2XFAC_HIGHFREQCONTAINER_ RSUCONTAINERHIGHFREQ	0x02	HIgh frequency RSU container high freq chosen
Description	Enumeration for Choice V2xFac_HighFrequencyContainerType		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00173][

Name	V2xFac_BasicVehicleContainerHighFrequencyType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_BasicVehicleContainerHighFrequencyPresenceType
	Comment	Mark optional childs present or not
	heading	
	Type	V2xFac_HeadingType
	Comment	Heading and heading accuracy of the vehicle movement
	speed	
	Type	V2xFac_SpeedType

	Comment	Driving speed and speed accuracy of the originating ITS-S
	driveDirection	
	Type	V2xFac_DriveDirectionType
	Comment	Vehicle drive direction
	vehicleLength	
	Type	V2xFac_VehicleLengthType
	Comment	Vehicle length and accuracy of the vehicle that originates the CAM
	vehicleWidth	
	Type	uint8
	Comment	Width of a vehicle, including side mirrors
	longitudinalAcceleration	
	Type	V2xFac_LongitudinalAccelerationType
	Comment	Vehicle longitudinal acceleration and accuracy
	curvature	
	Type	V2xFac_CurvatureType
	Comment	Actual trajectory curvature and accuracy
	curvatureCalculationMode	
	Type	V2xFac_CurvatureCalculationModeType
	Comment	Flag indicating whether vehicle yaw-rate is used
	yawRate	
	Type	V2xFac_YawRateType
	Comment	YawRate and accuracy
	accelerationControl	
	Type	V2xFac_AccelerationControlType
	Comment	Current status of the vehicle mechanisms controlling the longitudinal movement
	lanePosition	
	Type	sint8
	Comment	Lane position of the vehicle
	steeringWheelAngle	
	Type	V2xFac_SteeringWheelAngleType

	Comment	Steering wheel angle and accuracy
	lateralAcceleration	
	Type	V2xFac_LateralAccelerationType
	Comment	Vehicle lateral acceleration and accuracy
	verticalAcceleration	
	Type	V2xFac_VerticalAccelerationType
	Comment	Vertical Acceleration of the originating ITS-S
	performanceClass	
	Type	uint8
	Comment	Characterizes the maximum age of the CAM data elements
	cenDsrcTollingZone	
	Type	V2xFac_CenDsrcTollingZoneType
	Comment	Information about the position of a CEN DSRC Tolling Station
Description	BasicVehicleContainerHighFrequency as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00174][

Name	V2xFac_BasicVehicleContainerHighFrequencyPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	accelerationControl	0x40	Bit 6: Optional child present
	bit	lanePosition	0x20	Bit 5: Optional child present
	bit	steeringWheelAngle	0x10	Bit 4: Optional child present
	bit	lateralAcceleration	0x08	Bit 3: Optional child present
	bit	verticalAcceleration	0x04	Bit 2: Optional child present
	bit	performanceClass	0x02	Bit 1: Optional child present
	bit	cenDsrcTollingZone	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_BasicVehicleContainerHighFrequencyType			

Variation	--
Available via	Rte_V2xFac_Type.h

]()

[SWS_V2xFac_00175][

Name	V2xFac_DriveDirectionType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_DRIVINGDIRECTION_FORWARD	0x00	Driving direction forward
	V2XFAC_DRIVINGDIRECTION_BACKWARD	0x01	Driving direction backward
	V2XFAC_DRIVINGDIRECTION_ UNAVAILABLE	0x02	Driving direction unavailable
Description	Enumeration of DE_DrivingDirection as defined in ETSI EN 302 637-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()

[SWS_V2xFac_00176][

Name	V2xFac_CurvatureCalculationModeType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_CURVATURECALCMODE_YAWRATE_ USED	0x00	Calc mode Yawrate used
	V2XFAC_CURVATURECALCMODE_YAWRATE_ NOT_USED	0x01	Calc mode Yawrate not used
	V2XFAC_CURVATURECALCMODE_ UNAVAILABLE	0x02	Calc mode unavailable
Description	Enumeration of DE_CurvatureCalculationMode as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()

[SWS_V2xFac_00177][

Name	V2xFac_AccelerationControlType
Kind	Bitfield

Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	brakePedalEngaged	0x40	Bit 6: Driver is stepping on the brake pedal
	bit	gasPedalEngaged	0x20	Bit 5: Driver is stepping on the gas pedal
	bit	emergencyBrake Engaged	0x10	Bit 4: Emergency brake system is engaged
	bit	collisionWarningEngaged	0x08	Bit 3: Collision warning system is engaged
	bit	accEngaged	0x04	Bit 2: ACC is engaged
	bit	cruiseControlEngaged	0x02	Bit 1: Cruise control is engaged
	bit	speedLimiterEngaged	0x01	Bit 0 (LSB): Speed limiter is engaged
Description	BitString DE_AccelerationControl as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00178][

Name	V2xFac_RSUContainerHighFrequencyType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_RSUContainerHighFrequencyPresenceType
	Comment	Mark optional childs present or not
	protectedCommunicationZonesRSU	
	Type	V2xFac_ProtectedCommunicationZonesRSUType
	Comment	Describes a list of protected communication zones by a road side ITS-S (Road Side Unit RSU)
Description	DF_VehicleLength as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00179][

Name	V2xFac_RSUContainerHighFrequencyPresenceType

Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	protectedCommunicationZones RSU	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_RSUContainerHighFrequencyType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()

[SWS_V2xFac_00180][

Name	V2xFac_ProtectedCommunicationZonesRSUType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_ProtectedCommunicationZoneType
	Size	16
	Comment	--
Description	DF_ProtectedCommunicationZonesRSU as defined in ETSI TS 102 894-2. Size of the Array shall be 16.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00181][

Name	V2xFac_ProtectedCommunicationZoneType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_ProtectedCommunicationZonePresenceType
	Comment	Mark optional children present or not
	protectedZoneType	

	Type	V2xFac_ProtectedZoneTypeType
	Comment	type of the protected zone
	expiryTime	
	Type	uint64
	Comment	time at which the validity of the protected communication zone will expire
	protectedZoneLatitude	
	Type	sint32
	Comment	latitude of the center point of the protected communication zone.
	protectedZoneLongitude	
	Type	sint32
	Comment	longitude of the center point of the protected communication zone
	protectedZoneRadius	
	Type	uint8
	Comment	Radius of a protected communication zone in meters
	protectedZoneID	
	Type	uint32
	Comment	ID of a protected communication zone
Description	DF_VehicleLength as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00182][

Name	V2xFac_ProtectedCommunicationZonePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	expiryTime	0x04	Bit 2: Optional child present
	bit	protectedZoneRadius	0x02	Bit 1: Optional child present
	bit	protectedZoneID	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_ProtectedCommunicationZoneType			

Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00183][

Name	V2xFac_ProtectedZoneTypeType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_PROTECTEDZONETYPE_CEN_DSRC_TOLLING	0x00	CenDscrTolling Zone
Description	Enumeration of DE_ProtectedZoneType as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00050][

Name	V2xFac_VehicleLengthType	
Kind	Structure	
Elements	vehicleLengthValue	
	Type	uint16
	Comment	Length of a vehicle
	vehicleLengthConfidenceIndication	
	Type	V2xFac_VehicleLengthConfidenceIndicationType
	Comment	Indication of whether trailer is detected to be present and whether the length of the trailer is known.
Description	DF_VehicleLength as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00239][

Name	V2xFac_VehicleLengthConfidenceIndicationType
Kind	Type
Derived from	uint8

Range	V2XFAC_VEHICLELENGTHCONFIDENCEINDICATION_NOTRAILERPRESENT	0x00	no trailer present
	V2XFAC_VEHICLELENGTHCONFIDENCEINDICATION_TRAILERPRESENTWITHKNOWNLENGTH	0x01	trailer present with known length
	V2XFAC_VEHICLELENGTHCONFIDENCEINDICATION_TRAILERPRESENTWITHUNKNOWNLENGTH	0x02	trailer present with unknown length
	V2XFAC_VEHICLELENGTHCONFIDENCEINDICATION_TRAILERPRESENCEISUNKNOWN	0x03	trailer presence is unknown
	V2XFAC_VEHICLELENGTHCONFIDENCEINDICATION_UNAVAILABLE	0x04	information is not known
Description	Enumeration of DE_VehicleLengthConfidenceIndication as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00051][

Name	V2xFac_LongitudinalAccelerationType	
Kind	Structure	
Elements	longitudinalAccelerationValue	
	Type	sint16
	Comment	Vehicle acceleration at longitudinal direction
	longitudinalAccelerationConfidence	
	Type	uint8
	Comment	The absolute accuracy of a reported vehicle acceleration
Description	DF_LongitudinalAcceleration as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00052][

Name	V2xFac_CurvatureType
Kind	Structure
Elements	curvatureValue

	Type	sint16
	Comment	Describes the inverse of a detected vehicle turning curve radius
	curvatureConfidence	
	Type	V2xFac_CurvartureConfidenceType
	Comment	Describes the absolute accuracy range of a reported curvature value
Description	DF_Curvature as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()

[SWS_V2xFac_00184][

Name	V2xFac_CurvartureConfidenceType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_00002	0x00	The accuracy is less than or equal to 0,00002 m-1
	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_0001	0x01	The accuracy is less than or equal to 0,0001 m-1
	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_0005	0x02	The accuracy is less than or equal to 0,0005 m-1
	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_002	0x03	The accuracy is less than or equal to 0,002 m-1
	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_01	0x04	The accuracy is less than or equal to 0,01 m-1
	V2XFAC_CURVATURECONFIDENCE_ONE_PER_METER_0_1	0x05	The accuracy is less than or equal to 0,1 m-1
	V2XFAC_CURVATURECONFIDENCE_OUT_OF_RANGE	0x06	The accuracy is out of range, i.e. greater than 0,1 m-1
	V2XFAC_CURVATURECONFIDENCE_UNAVAILABLE	0x07	The information is not available
Description	Enumeration of DE_CurvatureConfidence as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()

[SWS_V2xFac_00053]⌈

Name	V2xFac_YawRateType	
Kind	Structure	
Elements	yawRateValue	
	Type	sint16
	Comment	Vehicle rotation around z-axis
	yawRateConfidence	
	Type	V2xFac_YawRateConfidenceType
	Comment	Absolute accuracy range for reported yaw rate value
Description	DF_YawRate as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

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[SWS_V2xFac_00245]⌈

Name	V2xFac_YawRateConfidenceType		
Kind	Type		
Derived from	uint8		
Range	YAWRATECONFIDENCE_ DEGSEC_000_01	0x00	0 if the accuracy is equal to or less than 0,01 degree/second
	YAWRATECONFIDENCE_ DEGSEC_000_05	0x01	1 if the accuracy is equal to or less than 0,05 degrees/second
	YAWRATECONFIDENCE_ DEGSEC_000_10	0x02	2 if the accuracy is equal to or less than 0,1 degree/second
	YAWRATECONFIDENCE_ DEGSEC_001_00	0x03	3 if the accuracy is equal to or less than 1 degree/second
	YAWRATECONFIDENCE_ DEGSEC_005_00	0x04	4 if the accuracy is equal to or less than 5 degrees/second
	YAWRATECONFIDENCE_ DEGSEC_010_00	0x05	5 if the accuracy is equal to or less than 10 degrees/second
	YAWRATECONFIDENCE_ DEGSEC_100_00	0x06	6 if the accuracy is equal to or less than 100 degrees/second
	YAWRATECONFIDENCE_ OUTOFRANGE	0x07	7 if the accuracy is out of range, i.e. greater than 100 degrees/second
	YAWRATECONFIDENCE_	0x08	8 if the accuracy information is

	UNAVAILABLE		unavailable
Description	Enumeration of DE_YawRateConfidence as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00054][

Name	V2xFac_SteeringWheelAngleType	
Kind	Structure	
Elements	steeringWheelAngleValue	
	Type	uint16
	Comment	Steering wheel angle of the vehicle at certain point in time.
	steeringWheelAngleConfidence	
	Type	uint8
	Comment	Absolute accuracy for a reported steering wheel angle value.
Description	DF_SteeringWheelAngle as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00055][

Name	V2xFac_LateralAccelerationType	
Kind	Structure	
Elements	lateralAccelerationValue	
	Type	sint16
	Comment	Vehicle acceleration at lateral direction
	lateralAccelerationConfidence	
	Type	uint8
	Comment	The absolute accuracy of a reported vehicle acceleration
Description	DF_LateralAcceleration as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	

Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00056][

Name	V2xFac_VerticalAccelerationType	
Kind	Structure	
Elements	verticalAccelerationValue	
	Type	sint16
	Comment	Vehicle acceleration at vertival direction
	verticalAccelerationConfidence	
	Type	uint8
	Comment	The absolute accuracy of a reported vehicle acceleration
Description	DF_VerticalAcceleration as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00057][

Name	V2xFac_CenDsrcTollingZoneType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_CenDsrcTollingZonePresenceType
	Comment	Marks optional children present or not
	protectedZoneLatitude	
	Type	sint32
	Comment	The latitude of the CEN DSRC road side equipment
	protectedZoneLongitude	
	Type	sint32
	Comment	The longitude of the CEN DSRC road side equipment
	cenDsrcTollingZoneID	
	Type	V2xFac_CenDsrcTollingZoneIDType
	Comment	The ID of the CEN DSRC road side equipment

Description	DF_CenDsrcTollingZone as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.
Variation	--
Available via	Rte_V2xFac_Type.h

](
[SWS_V2xFac_00185][

Name	V2xFac_CenDsrcTollingZonePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	cenDsrcTollingZoneID	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_CenDsrcTollingZoneType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00058][

Name	V2xFac_LowFrequencyContainerType	
Kind	Structure	
Elements	choice	
	Type	V2xFac_LowFrequencyContainerChoiceType
	Comment	Mark which element is filled
	basicVehicleContainerLowFrequency	
	Type	V2xFac_BasicVehicleContainerLowFrequencyType
	Comment	--
Description	LowFrequencyContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00186][

Name	V2xFac_LowFrequencyContainerChoiceType

Kind	Type		
Derived from	uint8		
Range	V2XFAC_LOWFREQCONTAINER_BASIC_VEHICLE_CONTAINER_LOW_FREQ	0x01	Element choosen
Description	Enumeration of Choice V2xFac_LowFrequencyContainerType		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00187][

Name	V2xFac_BasicVehicleContainerLowFrequencyType	
Kind	Structure	
Elements	vehicleRole	
	Type	V2xFac_VehicleRoleType
	Comment	Vehicle role
	exteriorLights	
	Type	V2xFac_ExteriorLightsType
	Comment	Exterior Lights
	pathHistory	
	Type	V2xFac_PathHistoryType
	Comment	Path History
Description	BasicVehicleLowFrequencyContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00188][

Name	V2xFac_VehicleRoleType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_VEHICLEROLE_DEFAULT	0x00	default vehicle role as indicated by the vehicle type

	V2XFAC_VEHICLEROLE_PUBLIC_TRANSPORT	0x01	vehicle is used to operate public transport service
	V2XFAC_VEHICLEROLE_SPECIAL_TRANSPORT	0x02	vehicle is used for special transport purpose, e.g. oversized trucks
	V2XFAC_VEHICLEROLE_DANGEROUS_GOODS	0x03	vehicle is used for dangerous goods transportation
	V2XFAC_VEHICLEROLE_ROAD_WORK	0x04	vehicle is used to realize roadwork or road maintenance mission
	V2XFAC_VEHICLEROLE_RESCUE	0x05	vehicle is used for rescue purpose in case of an accident, e.g. as a towing service
	V2XFAC_VEHICLEROLE_EMERGENCY	0x06	vehicle is used for emergency mission, e.g. ambulance, fire brigade
	V2XFAC_VEHICLEROLE_SAFETY_CAR	0x07	vehicle is used for public safety, e.g. patrol
	V2XFAC_VEHICLEROLE_AGRICULTURAL	0x08	vehicle is used for agriculture, e.g. farm tractor
	V2XFAC_VEHICLEROLE_COMMERCIAL	0x09	vehicle is used for transportation of commercial goods
	V2XFAC_VEHICLEROLE_MILITARY	0x0a	vehicle is used for military purpose
	V2XFAC_VEHICLEROLE_ROAD_OPERATOR	0x0b	vehicle is used in road operator missions
	V2XFAC_VEHICLEROLE_TAXI	0x0c	vehicle is used to provide an authorized taxi service
	V2XFAC_VEHICLEROLE_RESERVED_1	0x0d	reserved for future usage
	V2XFAC_VEHICLEROLE_RESERVED_2	0x0e	reserved for future usage
	V2XFAC_VEHICLEROLE_RESERVED_3	0x0f	reserved for future usage
Description	Enumeration of DE_VehicleRole as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00189][

Name	V2xFac_ExteriorLightsType
Kind	Bitfield
Derived from	uint8

Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	lowBeamHeadlightsOn	0x80	Bit 7: low beam headlights on
	bit	highBeamHeadlightsOn	0x40	Bit 6: high beam headlights on
	bit	leftTurnSignalOn	0x20	Bit 5: left turn signal on
	bit	rightTurnSignalOn	0x10	Bit 4: right turn signal on
	bit	daytimeRunningLightsOn	0x08	Bit 3: daytime running lights on
	bit	reverseLightOn	0x04	Bit 2: reverse light on
	bit	fogLightOn	0x02	Bit 1: fog light on
	bit	parkingLightsOn	0x01	Bit 0: parking lights on
Description	BitString DE_ExteriorLights as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00060][

Name	V2xFac_PathPointType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_PathPointPresenceType
	Comment	Mark optional children present or not
	pathPosition	
	Type	V2xFac_DeltaReferencePositionType
	Comment	Defines a geographical point position as offset position to a reference geographical point.
	pathDeltaTime	
	Type	uint16
	Comment	Presents the time difference when two consecutive PathPoint values are measured.
Description	DF_PathPoint as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

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[SWS_V2xFac_00190][

Name	V2xFac_PathPointPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	pathDeltaTime	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_PathPointType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00061][

Name	V2xFac_PublicTransportContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_PublicTransportContainerPresenceType
	Comment	Mark optional childs present or not
	embarkationStatus	
	Type	boolean
	Comment	Indicates whether the passenger embarkation is currently ongoing
	ptActivation	
	Type	V2xFac_PtActivationType
	Comment	Used by public transport vehicles for controlling traffic lights, barriers, bollards, etc.
Description	PublicTransportContainer as defined in ETSI EN 302 637-2 V1.3.2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00191][

Name	V2xFac_PublicTransportContainerPresenceType
Kind	Bitfield
Derived from	uint8

Elements	Kind	Name	Mask	Description
	bit	ptActivation	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_PublicTransportContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00229][

Name	V2xFac_PtActivationType	
Kind	Structure	
Elements	ptActivationType	
	Type	uint8
	Comment	Indicates a certain coding type of the PtActivationData
	ptActivationData	
	Type	V2xFac_PtActivationDataType
	Comment	Controlling traffic signal systems to prioritize and speed up public transportation
Description	DF_PtActivation as defined in ETSI TS 102 894-2.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00237][

Name	V2xFac_PtActivationDataType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	20
	Comment	--
Description	DF_PtActivationData as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	

Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00062][

Name	V2xFac_SpecialTransportContainerType	
Kind	Structure	
Elements	specialTransportType	
	Type	V2xFac_SpecialTransportTypeType
	Comment	Indicates whether the originating ITS-S is mounted on a special transport vehicle
	lightBarSirenInUse	
	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
Description	SpecialTransportContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00192][

Name	V2xFac_SpecialTransportTypeType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	heavyLoad	0x08	Bit 3: heavy load
	bit	excessWidth	0x04	Bit 2: excess width
	bit	excessLength	0x02	Bit 1: excess length
	bit	excessHeight	0x01	Bit 0 (LSB): excess height
Description	BitString DE_SpecialTransportType as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()

[SWS_V2xFac_00193][

Name	V2xFac_LightBarSirenInUseType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	lightBarActivated	0x02	Bit 1: light bar activated
	bit	sirenActivated	0x01	Bit 0 (LSB): siren activated
Description	BitString DE_LightBarSirenInUse as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00064][

Name	V2xFac_DangerousGoodsContainerType	
Kind	Structure	
Elements	dangerousGoodsBasic	
	Type	V2xFac_DangerousGoodsBasicType
	Comment	Identifies the type of the dangerous goods transported
Description	DangerousGoodsContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00194][

Name	V2xFac_DangerousGoodsBasicType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_DANGEROUSGOODSBASIC_ EXPLOSIVES_1	0x00	explosives 1
	V2XFAC_DANGEROUSGOODSBASIC_ EXPLOSIVES_2	0x01	explosives 2
	V2XFAC_DANGEROUSGOODSBASIC_ EXPLOSIVES_3	0x02	explosives 3

	V2XFAC_DANGEROUSGOODSBASIC_EXPLOSIVES_4	0x03	explosives 4
	V2XFAC_DANGEROUSGOODSBASIC_EXPLOSIVES_5	0x04	explosives 5
	V2XFAC_DANGEROUSGOODSBASIC_EXPLOSIVES_6	0x05	explosives 6
	V2XFAC_DANGEROUSGOODSBASIC_FLAMMABLE_GASES	0x06	flammable gases
	V2XFAC_DANGEROUSGOODSBASIC_NON_FLAMMABLE_GASES	0x07	non flammable gases
	V2XFAC_DANGEROUSGOODSBASIC_TOXIC_GASES	0x08	toxic gases
	V2XFAC_DANGEROUSGOODSBASIC_FLAMMABLE_LIQUIDS	0x09	flammable liquids
	V2XFAC_DANGEROUSGOODSBASIC_FLAMMABLE_SOLIDS	0x0a	flammable solids
	V2XFAC_DANGEROUSGOODSBASIC_SUBSTANCES_LIBLE_TO_SPONTANEOUS_COMBUSTION	0x0b	substances lible to spontaneous combustion
	V2XFAC_DANGEROUSGOODSBASIC_SUBSTANCES_EMITTING_FLAMMABLE_GASES_UPON_CONTACT_WITH_WATER	0x0c	substances emitting flammable gases upon contact with water
	V2XFAC_DANGEROUSGOODSBASIC_OXIDIZING_SUBSTANCES	0x0d	oxidizing substances
	V2XFAC_DANGEROUSGOODSBASIC_ORGANIC_PEROXIDES	0x0e	organic peroxides
	V2XFAC_DANGEROUSGOODSBASIC_TOXIC_SUBSTANCES	0x0f	toxic substances
	V2XFAC_DANGEROUSGOODSBASIC_INFECTIOUS_SUBSTANCES	0x10	infectious substances
	V2XFAC_DANGEROUSGOODSBASIC_RADIOACTIVE_MATERIAL	0x11	radioactive material
	V2XFAC_DANGEROUSGOODSBASIC_CORROSIVE_SUBSTANCES	0x12	corrosive substances
	V2XFAC_DANGEROUSGOODSBASIC_MISCELLANEOUS_DANGEROUS_SUBSTANCES	0x13	miscellaneous dangerous substances
Description	Enumeration of DE_DangerousGoodsBasic as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00065][

Name	V2xFac_RoadWorksContainerBasicType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_RoadWorksContainerBasicPresenceType
	Comment	Mark optional childs present or not
	roadworksSubCauseCode	
	Type	uint8
	Comment	Information on the type of roadwork
	lightBarSirenInUse	
	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
	closedLanes	
	Type	V2xFac_ClosedLanesType
	Comment	Information about the opening/closure status of the lanes ahead
Description	RoadWorksContainerBasic as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00195][

Name	V2xFac_RoadWorksContainerBasicPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	roadworksSubCauseCode	0x02	Bit 1: Optional child present
	bit	closedLanes	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_RoadWorksContainerBasicType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00066][

Name	V2xFac_RescueContainerType	
Kind	Structure	
Elements	lightBarSirenInUse	
	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
Description	RescueContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00067][

Name	V2xFac_EmergencyContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_EmergencyContainerPresenceType
	Comment	Mark optional childs present or not
	lightBarSirenInUse	
	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
	incidentIndication	
	Type	V2xFac_CauseCodeType
	Comment	Describes the event type of the emergency or safety mission
	emergencyPriority	
	Type	V2xFac_EmergencyPriorityType
	Comment	Right of way indicator of the vehicle
Description	EmergencyContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00196][

Name	V2xFac_EmergencyPriorityType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	requestForRightOfWay	0x02	Bit 1: request for right of way
	bit	requestForFreeCrossingAtATrafficLight	0x01	Bit 0 (LSB): request for free crossing at a traffic light
Description	BitString DE_EmergencyPriority as defined in ETSI TS 102 894-2			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00197][

Name	V2xFac_EmergencyContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	incidentIndication	0x02	Bit 1: Optional child present
	bit	emergencyPriority	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_EmergencyContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00068][

Name	V2xFac_SafetyCarContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_SafetyCarContainerPresenceType
	Comment	Mark optional childs present or not
	lightBarSirenInUse	

	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
	incidentIndication	
	Type	V2xFac_CauseCodeType
	Comment	Describes the event type of the emergency or safety mission
	trafficRule	
	Type	V2xFac_TrafficRuleType
	Comment	Indicates whether vehicles are allowed to overtake a safety car
	speedLimit	
	Type	uint8
	Comment	Indicates whether a speed limit is applied to vehicles following the safety car
Description	SafetyCarContainer as defined in ETSI EN 302 637-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00198]⌈

Name	V2xFac_SafetyCarContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	incidentIndication	0x04	Bit 2: Optional child present
	bit	trafficRule	0x02	Bit 1: Optional child present
	bit	speedLimit	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_SafetyCarContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
8.7.3.4 DENM specific Implementation DataTypes

[SWS_V2xFac_00069]⌈

Name	V2xFac_DenmMessageRootType	
Kind	Structure	
Elements	itsPduHeader	
	Type	V2xFac_ItsPduHeaderType
	Comment	Structure of the ItsPduHeader
	denm	
	Type	V2xFac_DenMsgType
	Comment	Structure of the DEN data
	transactionId	
	Type	uint32
	Comment	TransactionId for received DENM
Description	DENM root message as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00070][

Name	V2xFac_DenMsgType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_DenMsgPresenceType
	Comment	Mark optional childs present or not
	management	
	Type	V2xFac_ManagementContainerType
	Comment	management container
	situation	
	Type	V2xFac_SituationContainerType
	Comment	situation container
	location	
	Type	V2xFac_LocationContainerType
	Comment	location container

	alacarte	
	Type	V2xFac_AlacarteContainerType
	Comment	alacarte container
Description	DecentralizedEnvironmentalNotificationMessage as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00199][

Name	V2xFac_DenMsgPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	situation	0x04	Bit 2: Optional child present
	bit	location	0x02	Bit 1: Optional child present
	bit	alacarte	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_DenMsgType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00071][

Name	V2xFac_ManagementContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_ManagementContainerPresenceType
	Comment	Mark optional childs present or not
	actionId	
	Type	V2xFac_ActionIdType
	Comment	Action identifier
	detectionTime	
	Type	uint64

	Comment	Time at which the event is detected
	referenceTime	
	Type	uint64
	Comment	Refers to the time at which a new DENM, an update DENM or a cancellation DENM is generated
	termination	
	Type	V2xFac_TerminationType
	Comment	Indicates if the type of generated DENM is a cancellation DENM or a negation DENM.
	eventPosition	
	Type	V2xFac_ReferencePositionType
	Comment	Geographical position of the detected event
	relevanceDistance	
	Type	V2xFac_RelevanceDistanceType
	Comment	The distance in which event information is relevant for the receiving ITS-S
	relevanceTrafficDirection	
	Type	V2xFac_RelevanceTrafficDirectionType
	Comment	Traffic direction that is relevant to information indicated in a message
	validityDuration	
	Type	uint32
	Comment	estimation of how long the event may persist
	transmissionInterval	
	Type	uint16
	Comment	Time interval between two consecutive message transmissions
	stationType	
	Type	uint8
	Comment	Station type information of the originating ITS-S
Description	ManagementContainer as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00240][

Name	V2xFac_TerminationType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_TERMINATION_ISCANCELLATION	0x00	Cancellation
	V2XFAC_TERMINATION_ISNEGATION	0x01	--
Description	Enumeration of Termination as defined inETSI EN 302 637-3.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00200][

Name	V2xFac_RelevanceDistanceType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_50_M	0x00	less than 50 m
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_100_M	0x01	less than 100 m
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_200_M	0x02	less than 200 m
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_500_M	0x03	less than 500 m
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_1000_M	0x04	less than 1000 m
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_5_KM	0x05	less than 5 km
	V2XFAC_RELEVANCEDISTANCE_LESS_THAN_10_KM	0x06	less than 10 km
	V2XFAC_RELEVANCEDISTANCE_OVER_10_KM	0x07	over 10 km
Description	Enumeration of DE_RelevanceDistance as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00201][

Name	V2xFac_RelevanceTrafficDirectionType
Kind	Type

Derived from	uint8		
Range	V2XFAC_RELEVANCETRAFFICDIRECTION_ALL_ TRAFFIC_DIRECTIONS	0x00	all traffic directions
	V2XFAC_RELEVANCETRAFFICDIRECTION_ UPSTREAM_TRAFFIC	0x01	upstream traffic
	V2XFAC_RELEVANCETRAFFICDIRECTION_ DOWNSTREAM_TRAFFIC	0x02	downstream traffic
	V2XFAC_RELEVANCETRAFFICDIRECTION_OPPOSITE_ TRAFFIC	0x03	opposite traffic
Description	Enumeration of DE_RelevanceTrafficDirection as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00202][

Name	V2xFac_ManagementContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	termination	0x08	Bit 3: Optional child present
	bit	relevanceDistance	0x04	Bit 2: Optional child present
	bit	relevanceTrafficDirection	0x02	Bit 1: Optional child present
	bit	transmissionInterval	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_ManagementContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00073][

Name	V2xFac_SituationContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_SituationContainerPresenceType
	Comment	Mark optional childs present or not

	informationQuality	
	Type	uint8
	Comment	Quality level of the information provided by the ITS-S application
	eventType	
	Type	V2xFac_CauseCodeType
	Comment	Encoded value of a traffic event type
	linkedCause	
	Type	V2xFac_CauseCodeType
	Comment	Encoded value of a traffic event type
	eventHistory	
	Type	V2xFac_EventHistoryType
	Comment	EventHistory
Description	SituationContainer as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00203][

Name	V2xFac_SituationContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	linkedCause	0x02	Bit 1: Optional child present
	bit	eventHistory	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_SituationContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00075][

Name	V2xFac_EventHistoryType
Kind	Structure

Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_EventPointType
	Size	23
	Comment	--
Description	DF_EventHistory as defined in ETSI TS 102 894-2.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00076][

Name	V2xFac_EventPointType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_EventPointPresenceType
	Comment	Mark optional childs present or not
	eventPosition	
	Type	V2xFac_DeltaReferencePositionType
	Comment	Offset position of a detected event point.
	eventDeltaTime	
	Type	uint16
	Comment	Time travelled by the detecting ITS-S since the previous detected event point.
	informationQuality	
	Type	uint8
	Comment	Information quality of the detection for this event point.
Description	DF_EventPoint as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00204][

Name	V2xFac_EventPointPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	eventDeltaTime	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_EventPointType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00077][

Name	V2xFac_LocationContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_LocationContainerPresenceType
	Comment	Mark optional childs present or not
	eventSpeed	
	Type	V2xFac_SpeedType
	Comment	Moving speed of a detected event
	eventPositionHeading	
	Type	V2xFac_HeadingType
	Comment	The heading direction of the event
	traces	
	Type	V2xFac_TracesType
	Comment	One or more paths
	roadType	
	Type	V2xFac_RoadTypeType
	Comment	Type of a road segment.
Description	LocationContainer as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	

Available via	Rte_V2xFac_Type.h

](
[SWS_V2xFac_00241][

Name	V2xFac_RoadTypeType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_ROADTYPE_URBAN_ NOSTRUCTURALSEPARATIONTOOPPOSITELANES	0x00	Urban road without structural separation to opposite lanes.
	V2XFAC_ROADTYPE_URBAN_ WITHSTRUCTURALSEPARATIONTOOPPOSITELANES	0x01	Urban road with structural separation to opposite lanes.
	V2XFAC_ROADTYPE_NONURBAN_ NOSTRUCTURALSEPARATIONTOOPPOSITELANES	0x02	Non-urban road without structural separation to opposite lanes.
	V2XFAC_ROADTYPE_ONURBAN_ WITHSTRUCTURALSEPARATIONTOOPPOSITELANES	0x03	Non-urban road with structural separation to opposite lanes.
Description	Enumeration of DE_RoadType as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00205][

Name	V2xFac_TracesType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_PathHistoryType

	Size	7
	Comment	--
Description	DF_Traces as defined in ETSI TS 102 894-2. Size of the Array shall be 7.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00206][

Name	V2xFac_LocationContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	eventSpeed	0x04	Bit 2: Optional child present
	bit	eventPositionHeading	0x02	Bit 1: Optional child present
	bit	roadType	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_LocationContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00078][

Name	V2xFac_AlacarteContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_AlacarteContainerPresenceType
	Comment	Mark optional childs present or not
	lanePosition	
	Type	sint8
	Comment	The lane position of the event position
	impactReduction	
	Type	V2xFac_ImpactReductionContainerType
	Comment	--
	externalTemperature	

	Type	sint8
	Comment	Indicates the ambient temperature at the event position
	roadWorks	
	Type	V2xFac_RoadWorksContainerExtendedType
	Comment	--
	positioningSolution	
	Type	V2xFac_PositioningSolutionTypeType
	Comment	Indicates the positioning technology being used to estimate a geographical position
	stationaryVehicle	
	Type	V2xFac_StationaryVehicleContainerType
	Comment	--
Description	AlacarteContainer as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00207][

Name	V2xFac_PositioningSolutionTypeType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_POSITIONINGSOLUTIONTYPE_NO_POSITIONING_SOLUTION	0x00	No GNSS
	V2XFAC_POSITIONINGSOLUTIONTYPE_SGNSS	0x01	Global Navigation Satellite System
	V2XFAC_POSITIONINGSOLUTIONTYPE_DGNSS	0x02	Differential GNSS
	V2XFAC_POSITIONINGSOLUTIONTYPE_SGNSSPLUSDR	0x03	GNSS and dead reckoning
	V2XFAC_POSITIONINGSOLUTIONTYPE_DGNSSPLUSDR	0x04	Differential GNSS and dead reckoning
	V2XFAC_POSITIONINGSOLUTIONTYPE_DR	0x05	dead reckoning
Description	Enumeration of DE_PositioningSolutionType as defined in ETSI TS 102 894-2.		
Variation	--		

Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00208][

Name	V2xFac_AlacarteContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	lanePosition	0x20	Bit 5: Optional child present
	bit	impactReduction	0x10	Bit 4: Optional child present
	bit	externalTemperature	0x08	Bit 3: Optional child present
	bit	roadWorks	0x04	Bit 2: Optional child present
	bit	positioningSolution	0x02	Bit 1: Optional child present
	bit	stationaryVehicle	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_AlacarteContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00079][

Name	V2xFac_ImpactReductionContainerType	
Kind	Structure	
Elements	heightLonCarrLeft	
	Type	uint8
	Comment	Height of left longitudinal carrier of the vehicle from base to top
	heightLonCarrRight	
	Type	uint8
	Comment	Height of right longitudinal carrier of the vehicle from base to top
	posLonCarrLeft	
	Type	uint8
	Comment	Distance from the centre of vehicle front bumper to the front of the left longitudinal carrier of vehicle
	posLonCarrRight	

	Type	uint8
	Comment	Distance from the centre of vehicle front bumper to the front of the right longitudinal carrier of vehicle
	positionOfPillars	
	Type	V2xFac_PositionOfPillarsType
	Comment	Indicates the perpendicular inter-distance of neighbouring pillar
	posCentMass	
	Type	uint8
	Comment	Indicates the perpendicular distance from the centre of mass of an empty load vehicle
	wheelBaseVehicle	
	Type	uint8
	Comment	Perpendicular distance between front and rear axle of the wheel base of vehicle
	turningRadius	
	Type	uint8
	Comment	The smallest circular turn (i.e. U-turn) that the vehicle is capable of making
	posFrontAx	
	Type	uint8
	Comment	Perpendicular distance between the vehicle front line of the bounding box and the front wheel axle in 10 centimetres
	positionOfOccupants	
	Type	V2xFac_PositionOfOccupantsType
	Comment	indicates whether a in vehicle seat is occupied at the moment when the impactReduction is generated
	vehicleMass	
	Type	uint16
	Comment	Mass of an empty loaded vehicle in multiple of 100 kg
	requestResponseIndication	
	Type	V2xFac_RequestResponseIndicationType
	Comment	This DE includes whether an ITS message is transmitted as request from ITS-S or a response transmitted from ITS-S after receiving request from other ITS-Ss
Description	ImpactReductionContainer as defined in ETSI EN 302 637-3. Values for data	

	elements within this structure shall be used according that document.
Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00209][

Name	V2xFac_PositionOfPillarsType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	3
	Comment	--
Description	DF_PositionOfPillars as defined in ETSI TS 102 894-2. Size of the Array shall be 3.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00210][

Name	V2xFac_PositionOfOccupantsType			
Kind	Bitfield			
Derived from	uint32			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	row1LeftOccupied	0x80000	Bit 19: row 1 left occupied
	bit	row1RightOccupied	0x40000	Bit 18: row 1 right occupied
	bit	row1MidOccupied	0x20000	Bit 17: row 1 mid occupied
	bit	row1NotDetectable	0x10000	Bit 16: row 1 not detectable
	bit	row1NotPresent	0x8000	Bit 15: row 1 not present
	bit	row2LeftOccupied	0x4000	Bit 14: row 2 left occupied
	bit	row2RightOccupied	0x2000	Bit 13: row 2 right occupied
	bit	row2MidOccupied	0x1000	Bit 12: row 2 mid occupied

	bit	row2NotDetectable	0x800	Bit 11: row 2 not detectable
	bit	row2NotPresent	0x400	Bit 10: row 2 not present
	bit	row3LeftOccupied	0x200	Bit 9: row 3 left occupied
	bit	row3RightOccupied	0x100	Bit 8: row 3 right occupied
	bit	row3MidOccupied	0x80	Bit 7: row 3 mid occupied
	bit	row3NotDetectable	0x40	Bit 6: row 3 not detectable
	bit	row3NotPresent	0x20	Bit 5: row 3 not present
	bit	row4LeftOccupied	0x10	Bit 4: row 4 left occupied
	bit	row4RightOccupied	0x08	Bit 3: row 4 right occupied
	bit	row4MidOccupied	0x04	Bit 2: row 4 mid occupied
	bit	row4NotDetectable	0x02	Bit 1: row 4 not detectable
	bit	row4NotPresent	0x01	Bit 0 (LSB): row 4 not present
Description	BitString DE_PositionOfOccupants as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00242][

Name	V2xFac_RequestResponseIndicationType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_REQUESTRESPONSEINDICATION_REQUEST	0x00	Request
	V2XFAC_REQUESTRESPONSEINDICATION_RESPONSE	0x01	Response
Description	Enumeration of DE_RequestResponseIndication as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

]()
[SWS_V2xFac_00080][

Name	V2xFac_RoadWorksContainerExtendedType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_RoadWorksContainerExtendedPresenceType

	Comment	Mark optional childs present or not
	lightBarSirenInUse	
	Type	V2xFac_LightBarSirenInUseType
	Comment	Indicates whether light-bar or a siren is in use
	closedLanes	
	Type	V2xFac_ClosedLanesType
	Comment	Indicates the opening/closure status of a lane or a set of lanes
	restriction	
	Type	V2xFac_RestrictedTypesType
	Comment	List of ITS-S types to which a certain traffic restriction e.g. the speed limit, applies
	speedLimit	
	Type	uint8
	Comment	Speed limitation applied to a geographical position, a road section or a geographical region
	incidentIndication	
	Type	V2xFac_CauseCodeType
	Comment	Describes the event type of the emergency or safety mission
	recommendedPath	
	Type	V2xFac_ItineraryPathType
	Comment	--
	startingPointSpeedLimit	
	Type	V2xFac_DeltaReferencePositionType
	Comment	--
	trafficFlowRule	
	Type	V2xFac_TrafficRuleType
	Comment	Indicates traffic rules that apply to vehicles at a certain position
	referenceDenms	
	Type	V2xFac_ReferenceDenmsType
	Comment	Indicates a sequence of actionIDs for different DENMs that describe the same event
Description	RoadWorksContainerExtended as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	

Variation	--
Available via	Rte_V2xFac_Type.h

]()
[SWS_V2xFac_00211][

Name	V2xFac_RestrictedTypesType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array
	values	
	Type	Array of uint8
	Size	3
	Comment	--
Description	DF_RestrictedTypes as defined in ETSI TS 102 894-2. Size of the Array shall be 3.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00212][

Name	V2xFac_ItineraryPathType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_ReferencePositionType
	Size	40
	Comment	--
Description	DF_ItineraryPath as defined in ETSI TS 102 894-2. Size of the Array shall be 40.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00213][

Name	V2xFac_TrafficRuleType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_TRAFFICRULE_NO_PASSING	0x00	Overtaking is prohibited for all vehicles
	V2XFAC_TRAFFICRULE_NO_PASSING_FOR_TRUCKS	0x01	Overtaking is prohibited for trucks
	V2XFAC_TRAFFICRULE_PASS_TO_RIGHT	0x02	Vehicles should pass to the right lane
	V2XFAC_TRAFFICRULE_PASS_TO_LEFT	0x03	Vehicles should pass to the left lane
Description	Enumeration of DE_TrafficRule as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00214][

Name	V2xFac_ReferenceDenmsType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of V2xFac_ActionIdType
	Size	8
	Comment	--
Description	ReferenceDenms as defined in ETSI EN 302 637-3. Size of the Array shall be 8.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00215][

Name	V2xFac_RoadWorksContainerExtendedPresenceType			
Kind	Bitfield			
Derived from	uint16			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	lightBarSirenInUse	0x100	Bit 8: Optional child present
	bit	closedLanes	0x80	Bit 7: Optional child present
	bit	restriction	0x40	Bit 6: Optional child present
	bit	speedLimit	0x20	Bit 5: Optional child present
	bit	incidentIndication	0x10	Bit 4: Optional child present
	bit	recommendedPath	0x08	Bit 3: Optional child present
	bit	startingPointSpeedLimit	0x04	Bit 2: Optional child present
	bit	trafficFlowRule	0x02	Bit 1: Optional child present
	bit	referenceDenms	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_RoadWorksContainerExtendedType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00081][

Name	V2xFac_StationaryVehicleContainerType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_StationaryVehicleContainerPresenceType
	Comment	Mark optional childs present or not
	stationarySince	
	Type	V2xFac_StationarySinceType
	Comment	Duration in minutes of a vehicle being stationary
	stationaryCause	
	Type	V2xFac_CauseCodeType
	Comment	Additional information to describe causes of the stationary vehicle
	carryingDangerousGoods	
	Type	V2xFac_DangerousGoodsExtendedType

	Comment	In case the stationary vehicle is carrying dangerous goods
	numberOfOccupants	
	Type	uint8
	Comment	Number of occupants in a vehicle
	vehicleIdentification	
	Type	V2xFac_VehicleIdentificationType
	Comment	Provides information related to the identification of a vehicle
	energyStorageType	
	Type	V2xFac_EnergyStorageType
	Comment	Type of energy being used and stored
Description	StationaryVehicleContainer as defined in ETSI EN 302 637-3. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00216][

Name	V2xFac_StationarySinceType		
Kind	Type		
Derived from	uint8		
Range	V2XFAC_STATIONARYSINCE_LESS_THAN_1_ MINUTE	0x00	less than 1 minute
	V2XFAC_STATIONARYSINCE_LESS_THAN_2_ MINUTES	0x01	less than 2 minutes
	V2XFAC_STATIONARYSINCE_LESS_THAN_15_ MINUTES	0x02	less than 15 minutes
	V2XFAC_STATIONARYSINCE_EQUAL_OR_ GREATER_15_MINUTES	0x03	equal or greater 15 minutes
Description	Enumeration of DE_StationarySince as defined in ETSI TS 102 894-2.		
Variation	--		
Available via	Rte_V2xFac_Type.h		

](
[SWS_V2xFac_00217][

Name	V2xFac_EnergyStorageType			
Kind	Bitfield			
Derived from	uint8			
Elements	**Kind**	**Name**	**Mask**	**Description**
	bit	hydrogenStorage	0x40	Bit 6: hydrogen storage
	bit	electricEnergyStorage	0x20	Bit 5: electric energy storage
	bit	liquidPropaneGas	0x10	Bit 4: liquid propane gas
	bit	compressedNaturalGas	0x08	Bit 3: compressed natural gas
	bit	diesel	0x04	Bit 2: diesel
	bit	gasoline	0x02	Bit 1: gasoline
	bit	ammonia	0x01	Bit 0 (LSB): ammonia
Description	BitString DE_EnergyStorage as defined in ETSI TS 102 894-2.			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00218][

Name	V2xFac_StationaryVehicleContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	**Kind**	**Name**	**Mask**	**Description**
	bit	stationarySince	0x20	Bit 5: Optional child present
	bit	stationaryCause	0x10	Bit 4: Optional child present
	bit	carryingDangerousGoods	0x08	Bit 3: Optional child present
	bit	numberOfOccupants	0x04	Bit 2: Optional child present
	bit	vehicleIdentification	0x02	Bit 1: Optional child present
	bit	energyStorageType	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_StationaryVehicleContainerType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00236][

Name	V2xFac_DangerousGoodsExtendedType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_DangerousGoodsExtendedPresenceType
	Comment	Mark optional childs present or not
	dangerousGoodsType	
	Type	V2xFac_DangerousGoodsBasicType
	Comment	Type of dangerous goods
	unNumber	
	Type	uint16
	Comment	4-digit number that identifies the substance of the dangerous goods
	elevatedTemperature	
	Type	boolean
	Comment	Whether the carried dangerous goods are transported at high temperature
	tunnelsRestricted	
	Type	boolean
	Comment	whether the heavy vehicle carrying dangerous goods is restricted to enter tunnels
	limitedQuantity	
	Type	boolean
	Comment	whether the carried dangerous goods are packed with limited quantity
	emergencyActionCode	
	Type	V2xFac_EmergencyActionCodeType
	Comment	Physical signage placard at the vehicle
	phoneNumber	
	Type	V2xFac_PhoneNumberType
	Comment	Contact phone number of assistance service in case of incident or accident
	companyName	
	Type	V2xFac_CompanyNameType
	Comment	Name of company that manages the transportation of the dangerous goods

Description	DF_DangerousGoodsExtended as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.
Variation	--
Available via	Rte_V2xFac_Type.h

](
[SWS_V2xFac_00219][

Name	V2xFac_EmergencyActionCodeType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	24
	Comment	--
Description	emergencyActionCode as defined in DangerousGoodsExtended in ETSI TS 102 894-2. Size of the Array shall be 24.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00220][

Name	V2xFac_PhoneNumberType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	24
	Comment	--
Description	phoneNumber as defined in DangerousGoodsExtended in ETSI TS 102 894-2. Size of the Array shall be 24.	

Variation	--
Available via	Rte_V2xFac_Type.h

](
[SWS_V2xFac_00221][

Name	V2xFac_CompanyNameType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	24
	Comment	--
Description	companyName as defined in DangerousGoodsExtended in ETSI TS 102 894-2. Size of the Array shall be 24.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

](
[SWS_V2xFac_00222][

Name	V2xFac_DangerousGoodsExtendedPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	emergencyActionCode	0x04	Bit 2: Optional child present
	bit	phoneNumber	0x02	Bit 1: Optional child present
	bit	companyName	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_DangerousGoodsExtendedType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

](
[SWS_V2xFac_00230][

Name	V2xFac_VehicleIdentificationType	
Kind	Structure	
Elements	presence	
	Type	V2xFac_VehicleIdentificationPresenceType
	Comment	Mark optional childs present or not
	wmiNumber	
	Type	V2xFac_WmiNumberType
	Comment	World Manufacturer Identifier (WMI)
	vds	
	Type	V2xFac_VdsType
	Comment	Vehicle Descriptor Section (VDS)
Description	DF_VehicleIdentification as defined in ETSI TS 102 894-2. Values for data elements within this structure shall be used according that document.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

]()
[SWS_V2xFac_00223][

Name	V2xFac_VehicleIdentificationPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	wmiNumber	0x02	Bit 1: Optional child present
	bit	vds	0x01	Bit 0 (LSB): Optional child present
Description	Presence flags for V2xFac_VehicleIdentificationType			
Variation	--			
Available via	Rte_V2xFac_Type.h			

]()
[SWS_V2xFac_00243][

Name	V2xFac_WmiNumberType
Kind	Structure
Elements	count

	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	3
	Comment	--
Description	DE_WMInumber as defined in ETSI TS 102 894-2. Size of the Array shall be 3.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

⌋()

[SWS_V2xFac_00244]⌈

Name	V2xFac_VdsType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	Number of valid elements within array.
	values	
	Type	Array of uint8
	Size	6
	Comment	--
Description	DE_VDS as defined in ETSI TS 102 894-2. Size of the Array shall be 6.	
Variation	--	
Available via	Rte_V2xFac_Type.h	

⌋()

8.7.3.5 IVIM/MAPEM/SPATEM Common Implementation DataTypes

[SWS_V2xFac_91027]⌈

Name	V2xFac_EuVehicleCategoryCodeType	
Kind	Structure	
Elements	euVehicleCategoryL	
	Type	V2xFac_EuVehicleCategoryLType
	Comment	--

	euVehicleCategoryM	
	Type	V2xFac_EuVehicleCategoryMType
	Comment	--
	euVehicleCategoryN	
	Type	V2xFac_EuVehicleCategoryNType
	Comment	--
	euVehicleCategoryO	
	Type	V2xFac_EuVehicleCategoryOType
	Comment	--
	euVehicleCategoryT	
	Type	V2xFac_NULLType
	Comment	--
	euVehicleCategoryG	
	Type	V2xFac_NULLType
	Comment	--
	choice	
	Type	V2xFac_EuVehicleCategoryCodeChoiceType
	Comment	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91028][

Name	V2xFac_NULLType		
Kind	Enumeration		
Range	V2XFAC_NULL	0x00	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91029][

Name	V2xFac_EuVehicleCategoryCodeChoiceType		
Kind	Enumeration		
Range	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHICLE_CATEGORY_L	0x01	--
	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHICLE_CATEGORY_M	0x02	--
	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHICLE_CATEGORY_N	0x03	--
	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHICLE_CATEGORY_O	0x04	--
	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHIC_IE_CATEGORY_T	0x05	--
	V2XFAC_EUVEHICLECATEGORYCODE_EU_VEHIC_IE_CATEGORY_G	0x06	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91030][

Name	V2xFac_EuVehicleCategoryLType		
Kind	Enumeration		
Range	l1	0	--
	l2	1	--
	l3	2	--
	l4	3	--
	l5	4	--
	l6	5	--
	l7	6	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91031][

Name	V2xFac_EuVehicleCategoryMType		
Kind	Enumeration		
Range	m1	0	--

	m2	1	--
	m3	2	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91032][

Name	V2xFac_EuVehicleCategoryNType		
Kind	Enumeration		
Range	n1	0	--
	n2	1	--
	n3	2	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91033][

Name	V2xFac_EuVehicleCategoryOType		
Kind	Enumeration		
Range	o1	0	--
	o2	1	--
	o3	2	--
	o4	3	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91034][

Name	V2xFac_Iso3833VehicleTypeType		
Kind	Enumeration		
Range	passengerCar	0	--

	saloon	1	--
	convertibleSaloon	2	--
	pullmanSaloon	3	--
	stationWagon	4	--
	truckStationWagon	5	--
	coupe	6	--
	convertible	7	--
	multipurposePassengerCar	8	--
	forwardConrolPassengerCar	9	--
	specialPassengerCar	10	--
	bus	11	--
	minibus	12	--
	urbanBus	13	--
	interurbanCoach	14	--
	longDistanceCoach	15	--
	articulatedBus	16	--
	trolleyBus	17	--
	specialBus	18	--
	commercialVehicle	19	--
	specialCommercialVehicle	20	--
	specialVehicle	21	--
	trailingTowingVehicle	22	--
	semiTrailerTowingVehicle	23	--
	trailer	24	--
	busTrailer	25	--
	generalPurposeTrailer	26	--
	caravan	27	--
	specialTrailer	28	--
	semiTrailer	29	--
	busSemiTrailer	30	--
	generalPurposesSemiTrailer	31	--

	specialSemiTrailer	32	--
	roadTrain	33	--
	passengerRoadTrain	34	--
	articulatedRoadTrain	35	--
	doubleRoadTrain	36	--
	compositeRoadTrain	37	--
	specialRoadTrain	38	--
	moped	39	--
	motorCycle	40	--
Description	Namespace: ElectronicRegistrationIdentificationVehicleDataModule		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91413][

Name	V2xFac_GenericLocationsType		
Kind	Enumeration		
Range	on_bridges	7937	--
	in_tunnels	7938	--
	entering_or_leaving_tunnels	7939	--
	on_ramps	7940	--
	in_road_construction_area	7941	--
	around_a_curve	7942	--
	on_minor_roads	7943	--
	in_the_opposing_lanes	7944	--
	adjacent_to_roadway	7945	--
	on_bend	7946	--
	entire_intersection	7947	--
	in_the_median	7948	--
	moved_to_side_of_road	7949	--
	moved_to_shoulder	7950	--

	on_the_roadway	7951	--
	in_shaded_areas	7952	--
	in_low_lying_areas	7953	--
	in_the_downtown_area	7954	--
	in_the_inner_city_area	7955	--
	in_parts	7956	--
	in_some_places	7957	--
	in_the_ditch	7958	--
	in_the_valley	7959	--
	on_hill_top	7960	--
	near_the_foothills	7961	--
	at_high_altitudes	7962	--
	near_the_lake	7963	--
	near_the_shore	7964	--
	over_the_crest_of_a_hill	7965	--
	other_than_on_the_roadway	7966	--
	near_the_beach	7967	--
	near_beach_access_point	7968	--
	lower_level	7969	--
	upper_level	7970	--
	airport	7971	--
	concourse	7972	--
	gate	7973	--
	baggage_claim	7974	--
	customs_point	7975	--
	station	7976	--
	platform	7977	--
	dock	7978	--
	depot	7979	--
	ev_charging_point	7980	--
	information_welcome_point	7981	--

	at_rest_area	7982	--
	at_service_area	7983	--
	at_weigh_station	7984	--
	picnic_areas	7985	--
	rest_area	7986	--
	service_stations	7987	--
	toilets	7988	--
	on_the_right	7989	--
	on_the_left	7990	--
	in_the_center	7991	--
	in_the_opposite_direction	7992	--
	cross_traffic	7993	--
	northbound_traffic	7994	--
	eastbound_traffic	7995	--
	southbound_traffic	7996	--
	westbound_traffic	7997	--
	north	7998	--
	south	7999	--
	east	8000	--
	west	8001	--
	northeast	8002	--
	northwest	8003	--
	southeast	8004	--
	southwest	8005	--
	mountain_pass	8006	--
	reservation_center	8007	--
	nearby_basin	8008	--
	on_tracks	8009	--
	dip	8010	--
	traffic_circle	8011	--
	park_and_ride_lot	8012	--

	to	8014	--
	by	8015	--
	through	8016	--
	area_of	8017	--
	under	8018	--
	over	8019	--
	from	8020	--
	approaching	8021	--
	entering_at	8022	--
	exiting_at	8023	--
	across_tracks	8024	--
	in_street	8025	--
	on_curve	8026	--
	shoulder	8027	--
	crossover	8028	--
	cross_road	8029	--
	side_road	8030	--
	bus_stop	8031	--
	intersection	8032	--
	roadside_park	8033	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91414][

Name	V2xFac_IncidentResponseEquipmentType		
Kind	Enumeration		
Range	ground_fire_suppression	9985	--
	heavy_ground_equipment	9986	--
	aircraft	9988	--
	marine_equipment	9989	--

	support_equipment	9990	--
	medical_rescue_unit	9991	--
	other	9993	--
	ground_fire_suppression_other	9994	--
	engine	9995	--
	truck_or_aerial	9996	--
	quint	9997	--
	tanker_pumper_combination	9998	--
	brush_truck	10000	--
	aircraft_rescue_firefighting	10001	--
	heavy_ground_equipment_other	10004	--
	dozer_or_plow	10005	--
	tractor	10006	--
	tanker_or_tender	10008	--
	aircraft_other	10024	--
	aircraft_fixed_wing_tanker	10025	--
	helitanker	10026	--
	helicopter	10027	--
	marine_equipment_other	10034	--
	fire_boat_with_pump	10035	--
	boat_no_pump	10036	--
	support_apparatus_other	10044	--
	breathing_apparatus_support	10045	--
	light_and_air_unit	10046	--
	medical_rescue_unit_other	10054	--
	rescue_unit	10055	--
	urban_search_rescue_unit	10056	--
	high_angle_rescue	10057	--
	crash_fire_rescue	10058	--
	bLS_unit	10059	--
	aLS_unit	10060	--

	mobile_command_post	10075	--
	chief_officer_car	10076	--
	hAZMAT_unit	10077	--
	type_i_hand_crew	10078	--
	type_ii_hand_crew	10079	--
	privately_owned_vehicle	10083	--
	other_apparatus_resource	10084	--
	ambulance	10085	--
	bomb_squad_van	10086	--
	combine_harvester	10087	--
	construction_vehicle	10088	--
	farm_tractor	10089	--
	grass_cutting_machines	10090	--
	hAZMAT_containment_tow	10091	--
	heavy_tow	10092	--
	hedge_cutting_machines	10093	--
	light_tow	10094	--
	mobile_crane	10095	--
	refuse_collection_vehicle	10096	--
	resurfacing_vehicle	10097	--
	road_sweeper	10098	--
	roadside_litter_collection_crews	10099	--
	salvage_vehicle	10100	--
	sand_truck	10101	--
	snowplow	10102	--
	steam_roller	10103	--
	swat_team_van	10104	--
	track_laying_vehicle	10105	--
	unknown_vehicle	10106	--
	white_lining_vehicle	10107	--
	dump_truck	10108	--

	supervisor_vehicle	10109	--
	snow_blower	10110	--
	rotary_snow_blower	10111	--
	road_grader	10112	--
	steam_truck	10113	--
	flatbed_tow	10114	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91415][

Name	V2xFac_ITIStextType		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..500	--	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91416][

Name	V2xFac_ResponderGroupAffectedType		
Kind	Enumeration		
Range	emergency_vehicle_units	9729	--
	federal_law_enforcement_units	9730	--
	state_police_units	9731	--
	county_police_units	9732	--
	local_police_units	9733	--
	ambulance_units	9734	--
	rescue_units	9735	--
	fire_units	9736	--
	hAZMAT_units	9737	--

	light_tow_unit	9738	--
	heavy_tow_unit	9739	--
	freeway_service_patrols	9740	--
	transportation_response_units	9741	--
	private_contractor_response_units	9742	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91417][

Name	V2xFac_VehicleGroupAffectedType		
Kind	Enumeration		
Range	all_vehicles	9217	--
	bicycles	9218	--
	motorcycles	9219	--
	cars	9220	--
	light_vehicles	9221	--
	cars_and_light_vehicles	9222	--
	cars_with_trailers	9223	--
	cars_with_recreational_trailers	9224	--
	vehicles_with_trailers	9225	--
	heavy_vehicles	9226	--
	trucks	9227	--
	buses	9228	--
	articulated_buses	9229	--
	school_buses	9230	--
	vehicles_with_semi_trailers	9231	--
	vehicles_with_double_trailers	9232	--
	high_profile_vehicles	9233	--
	wide_vehicles	9234	--
	long_vehicles	9235	--

	hazardous_loads	9236	--
	exceptional_loads	9237	--
	abnormal_loads	9238	--
	convoys	9239	--
	maintenance_vehicles	9240	--
	delivery_vehicles	9241	--
	vehicles_with_even_numbered_license_plates	9242	--
	vehicles_with_odd_numbered_license_plates	9243	--
	vehicles_with_parking_permits	9244	--
	vehicles_with_catalytic_converters	9245	--
	vehicles_without_catalytic_converters	9246	--
	gas_powered_vehicles	9247	--
	diesel_powered_vehicles	9248	--
	lPG_vehicles	9249	--
	military_convoys	9250	--
	military_vehicles	9251	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91418][

Name	V2xFac_ITIScodesType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91419][

Name	V2xFac_ITIScodesAndTextType

Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ITIScodesAndText113Type
	Size	100
	Comment	--
Description	Namespace: ITIS	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91420][

Name	V2xFac_ITIScodesAndText113Type	
Kind	Structure	
Elements	item	
	Type	V2xFac_item114Type
	Comment	--
Description	Namespace: ITIS	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91421][

Name	V2xFac_item114Type	
Kind	Structure	
Elements	itis	
	Type	V2xFac_ITIScodesType
	Comment	--
	text	
	Type	V2xFac_ITIStextType
	Comment	--

	choice	
	Type	V2xFac_item114ChoiceType
	Comment	--
Description	Namespace: ITIS	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91422][

Name	V2xFac_item114ChoiceType		
Kind	Enumeration		
Range	V2XFAC_ITEM114_ITIS	0x01	--
	V2XFAC_ITEM114_TEXT	0x02	--
Description	Namespace: ITIS		
Variation	--		
Available via	V2xFac.h		

]()
8.7.3.6 IVIM specific Implementation DataTypes

[SWS_V2xFac_91000][

Name	V2xFac_AxleWeightLimitsType	
Kind	Structure	
Elements	maxLadenweightOnAxle1	
	Type	V2xFac_Int2Type
	Comment	--
	maxLadenweightOnAxle2	
	Type	V2xFac_Int2Type
	Comment	--
	maxLadenweightOnAxle3	
	Type	V2xFac_Int2Type
	Comment	--
	maxLadenweightOnAxle4	
	Type	V2xFac_Int2Type

	Comment	--
	maxLadenweightOnAxle5	
	Type	V2xFac_Int2Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91001][

Name	V2xFac_DieselEmissionValuesType	
Kind	Structure	
Elements	particulate	
	Type	V2xFac_particulate0Type
	Comment	--
	absorbtionCoeff	
	Type	V2xFac_Int2Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91002][

Name	V2xFac_particulate0Type	
Kind	Structure	
Elements	unitType	
	Type	V2xFac_UnitTypeType
	Comment	--
	value	
	Type	uint16
	Comment	--
Description	Namespace: EfcModule	

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91003][

Name	V2xFac_ExhaustEmissionValuesType	
Kind	Structure	
Elements	unitType	
	Type	V2xFac_UnitTypeType
	Comment	--
	emissionCO	
	Type	uint16
	Comment	--
	emissionHC	
	Type	V2xFac_Int2Type
	Comment	--
	emissionNOX	
	Type	V2xFac_Int2Type
	Comment	--
	emissionHCNOX	
	Type	V2xFac_Int2Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91004][

Name	V2xFac_EngineCharacteristicsType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
	noEntry	0	--

	noEngine	1	--
	petrolUnleaded	2	--
	petrolLeaded	3	--
	diesel	4	--
	lPG	5	--
	battery	6	--
	solar	7	--
	hybrid	8	--
	hydrogen	9	--
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91005][

Name	V2xFac_EnvironmentalCharacteristicsType		
Kind	Structure		
Elements	euroValue		
	Type	V2xFac_EuroValueType	
	Comment	--	
	copValue		
	Type	V2xFac_CopValueType	
	Comment	--	
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91006][

Name	V2xFac_EuroValueType		
Kind	Enumeration		
Range	noEntry	0	--
	euro_1	1	--

	euro_2	2	--
	euro_3	3	--
	euro_4	4	--
	euro_5	5	--
	euro_6	6	--
	reservedForUse1	7	--
	reservedForUse2	8	--
	reservedForUse3	9	--
	reservedForUse4	10	--
	reservedForUse5	11	--
	reservedForUse6	12	--
	reservedForUse7	13	--
	reservedForUse8	14	--
	eev	15	--
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91007][

Name	V2xFac_CopValueType		
Kind	Enumeration		
Range	noEntry	0	--
	co2class1	1	--
	co2class2	2	--
	co2class3	3	--
	co2class4	4	--
	co2class5	5	--
	co2class6	6	--
	co2class7	7	--
	reservedforUse	8	--
Description	Namespace: EfcModule		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91008][

Name	V2xFac_Int1Type		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91009][

Name	V2xFac_Int2Type		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91010][

Name	V2xFac_PassengerCapacityType	
Kind	Structure	
Elements	numberOfSeats	
	Type	V2xFac_Int1Type
	Comment	--
	numberOfStandingPlaces	
	Type	V2xFac_Int1Type
	Comment	--
Description	Namespace: EfcModule	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91011][

Name	V2xFac_ProviderType	
Kind	Structure	
Elements	countryCode	
	Type	V2xFac_CountryCodeType
	Comment	--
	providerIdentifier	
	Type	V2xFac_IssuerIdentifierType
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91012][

Name	V2xFac_SoundLevelType	
Kind	Structure	
Elements	soundstationary	
	Type	V2xFac_Int1Type
	Comment	--
	sounddriveby	
	Type	V2xFac_Int1Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91013][

Name	V2xFac_UnitTypeType

Kind	Enumeration		
Range	mg_km	0	--
	mg_kWh	1	--
Description	Namespace: EfcModule		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91014][

Name	V2xFac_VehicleDimensionsType	
Kind	Structure	
Elements	vehicleLengthOverall	
	Type	V2xFac_Int1Type
	Comment	--
	vehicleHeigthOverall	
	Type	V2xFac_Int1Type
	Comment	--
	vehicleWidthOverall	
	Type	V2xFac_Int1Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91015][

Name	V2xFac_VehicleWeightLimitsType	
Kind	Structure	
Elements	vehicleMaxLadenWeight	
	Type	V2xFac_Int2Type
	Comment	--
	vehicleTrainMaximumWeight	
	Type	V2xFac_Int2Type

	Comment	--
	vehicleWeightUnladen	
	Type	V2xFac_Int2Type
	Comment	--
Description	Namespace: EfcModule	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91016][

Name	V2xFac_CS5Type
Kind	Type
Derived from	V2xFac_StringType
Description	Namespace: AVIAEINumberingAndDataStructures
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91017][

Name	V2xFac_StringType
Kind	Type
Derived from	uint8
Description	Namespace: AVIAEINumberingAndDataStructures
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91018][

Name	V2xFac_CountryCodeType
Kind	Bitfield
Derived from	uint8
Description	Namespace: AVIAEINumberingAndDataStructures
Variation	--

Available via	V2xFac.h

]()
[SWS_V2xFac_91019][

Name	V2xFac_IssuerIdentifierType		
Kind	Type		
Derived from	uint16		
Range	0..16383	--	--
Description	Namespace: AVIAEINumberingAndDataStructures		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91020][

Name	V2xFac_VarLengthNumberType	
Kind	Structure	
Elements	content	
	Type	--
	Comment	--
	extension	
	Type	--
	Comment	--
	choice	
	Type	V2xFac_VarLengthNumberChoiceType
	Comment	--
Description	Namespace: CITSapplMgmtIDs	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91021][

Name	V2xFac_VarLengthNumberChoiceType		
Kind	Enumeration		
Range	V2XFAC_VARLENGTHNUMBER_CONTENT	0x01	--

	V2XFAC_VARLENGTHNUMBER_EXTENSION	0x02	--
Description	Namespace: CITSapplMgmtIDs		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91022][

Name	V2xFac_Ext1Type		
Kind	Structure		
Elements	content		
	Type	--	
	Comment	--	
	extension		
	Type	--	
	Comment	--	
	choice		
	Type	V2xFac_Ext1ChoiceType	
	Comment	--	
Description	Namespace: CITSapplMgmtIDs		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91023][

Name	V2xFac_Ext1ChoiceType		
Kind	Enumeration		
Range	V2XFAC_EXT1_CONTENT	0x01	--
	V2XFAC_EXT1_EXTENSION	0x02	--
Description	Namespace: CITSapplMgmtIDs		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91024][

Name	V2xFac_Ext2Type	
Kind	Structure	
Elements	content	
	Type	--
	Comment	--
	extension	
	Type	--
	Comment	--
	choice	
	Type	V2xFac_Ext2ChoiceType
	Comment	--
Description	Namespace: CITSapplMgmtIDs	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91025][

Name	V2xFac_Ext2ChoiceType		
Kind	Enumeration		
Range	V2XFAC_EXT2_CONTENT	0x01	--
	V2XFAC_EXT2_EXTENSION	0x02	--
Description	Namespace: CITSapplMgmtIDs		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91026][

Name	V2xFac_Ext3Type		
Kind	Type		
Derived from	uint32		
Range	2113663..270549119	--	--
Description	Namespace: CITSapplMgmtIDs		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91112][

Name	V2xFac_IvimDataType	
Kind	Structure	
Elements	management	
	Type	V2xFac_ManagementContainerType
	Comment	--
	glc	
	Type	V2xFac_GeographicLocationContainerType
	Comment	--
	gic	
	Type	V2xFac_GeneralIviContainerType
	Comment	--
	rcc	
	Type	V2xFac_RoadConfigurationContainerType
	Comment	--
	tc	
	Type	V2xFac_TextContainerType
	Comment	--
	lac	
	Type	V2xFac_LayoutContainerType
	Comment	--
	transactionId	
	Type	uint32
	Comment	--
	presence	
	Type	V2xFac_IvimDataPresenceType
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91113][

Name	V2xFac_IvimDataPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	glc	0x01	Bit 0 (LSB): Optional child present
	bit	gic	0x02	Bit 1: Optional child present
	bit	rcc	0x04	Bit 2: Optional child present
	bit	tc	0x08	Bit 3: Optional child present
	bit	lac	0x10	Bit 4: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91114][

Name	V2xFac_IviStructureType	
Kind	Structure	
Elements	mandatory	
	Type	V2xFac_ManagementContainerType
	Comment	--
	optional	
	Type	V2xFac_optional4Type
	Comment	--
	presence	
	Type	V2xFac_IviStructurePresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	

Available via	V2xFac.h

](
[SWS_V2xFac_91115][

Name	V2xFac_optional4Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_IviContainerType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91116][

Name	V2xFac_IviStructurePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	optional	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91117][

Name	V2xFac_IviContainerType	
Kind	Structure	
Elements	glc	
	Type	V2xFac_GeographicLocationContainerType

	Comment	--
	gic	
	Type	V2xFac_GeneralIviContainerType
	Comment	--
	rcc	
	Type	V2xFac_RoadConfigurationContainerType
	Comment	--
	tc	
	Type	V2xFac_TextContainerType
	Comment	--
	lac	
	Type	V2xFac_LayoutContainerType
	Comment	--
	choice	
	Type	V2xFac_IviContainerChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91118][

Name	V2xFac_IviContainerChoiceType		
Kind	Enumeration		
Range	V2XFAC_IVICONTAINER_GLC	0x01	--
	V2XFAC_IVICONTAINER_GIC	0x02	--
	V2XFAC_IVICONTAINER_RCC	0x03	--
	V2XFAC_IVICONTAINER_TC	0x04	--
	V2XFAC_IVICONTAINER_LAC	0x05	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91119][

Name	V2xFac_GeographicLocationContainerType	
Kind	Structure	
Elements	referencePosition	
	Type	V2xFac_ReferencePositionType
	Comment	--
	referencePositionTime	
	Type	V2xFac_TimestampItsType
	Comment	--
	referencePositionHeading	
	Type	V2xFac_HeadingType
	Comment	--
	referencePositionSpeed	
	Type	V2xFac_SpeedType
	Comment	--
	parts	
	Type	V2xFac_parts5Type
	Comment	--
	presence	
	Type	V2xFac_GeographicLocationContainerPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91120][

Name	V2xFac_parts5Type	
Kind	Structure	
Elements	count	
	Type	uint8

	Comment	--
	values	
	Type	Array of V2xFac_GlcPartType
	Size	16
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91121][

Name	V2xFac_GeographicLocationContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	referencePositionTime	0x01	Bit 0 (LSB): Optional child present
	bit	refereneePositionHeading	0x02	Bit 1: Optional child present
	bit	refereneePositionSpeed	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91122][

Name	V2xFac_GlcPartType	
Kind	Structure	
Elements	zoneId	
	Type	V2xFac_ZidType
	Comment	--
	laneNumber	
	Type	V2xFac_LanePositionType
	Comment	--
	zoneExtension	

	Type	uint8
	Comment	--
	zoneHeading	
	Type	V2xFac_HeadingValueType
	Comment	--
	zone	
	Type	V2xFac_ZoneType
	Comment	--
	presence	
	Type	V2xFac_GlcPartPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](){}
[SWS_V2xFac_91123][

Name	V2xFac_GlcPartPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	laneNumber	0x01	Bit 0 (LSB): Optional child present
	bit	zoneExtension	0x02	Bit 1: Optional child present
	bit	zoneHeading	0x04	Bit 2: Optional child present
	bit	zone	0x08	Bit 3: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](){}
[SWS_V2xFac_91124][

Name	V2xFac_GeneralIviContainerType
Kind	Structure

Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_GicPartType
	Size	16
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91125][

Name	V2xFac_GicPartType	
Kind	Structure	
Elements	detectionZoneIds	
	Type	V2xFac_detectionZoneIds7Type
	Comment	--
	its_Rrid	
	Type	V2xFac_VarLengthNumberType
	Comment	--
	relevanceZoneIds	
	Type	V2xFac_relevanceZoneIds8Type
	Comment	--
	direction	
	Type	V2xFac_DirectionType
	Comment	--
	driverAwarenessZoneIds	
	Type	V2xFac_driverAwarenessZoneIds9Type
	Comment	--
	minimumAwarenessTime	
	Type	uint8

	Comment	--
	applicableLanes	
	Type	V2xFac_applicableLanes11Type
	Comment	--
	iviType	
	Type	V2xFac_IviTypeType
	Comment	--
	iviPurpose	
	Type	V2xFac_IviPurposeType
	Comment	--
	laneStatus	
	Type	V2xFac_LaneStatusType
	Comment	--
	vehicleCharacteristics	
	Type	V2xFac_CompleteVehicleCharacteristicsType
	Comment	--
	driverCharacteristics	
	Type	V2xFac_DriverCharacteristicsType
	Comment	--
	layoutId	
	Type	uint8
	Comment	--
	preStoredLayoutId	
	Type	uint8
	Comment	--
	roadSignCodes	
	Type	V2xFac_roadSignCodes14Type
	Comment	--
	extraText	
	Type	V2xFac_extraText15Type
	Comment	--

	presence	
	Type	V2xFac_GicPartPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91126][

Name	V2xFac_detectionZoneIds7Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91127][

Name	V2xFac_relevanceZoneIds8Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91128][

Name	V2xFac_driverAwarenessZoneIds9Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91129][

Name	V2xFac_applicableLanes11Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LanePositionType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91130][

Name	V2xFac_roadSignCodes14Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RSCodeType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91131][

Name	V2xFac_extraText15Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_TextCopy63Type
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91132][

Name	V2xFac_GicPartPresenceType

Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	detectionZoneIds	0x01	Bit 0 (LSB): Optional child present
	bit	its_Rrid	0x02	Bit 1: Optional child present
	bit	relevanceZoneIds	0x04	Bit 2: Optional child present
	bit	direction	0x08	Bit 3: Optional child present
	bit	driverAwarenessZoneIds	0x10	Bit 4: Optional child present
	bit	minimumAwarenessTime	0x20	Bit 5: Optional child present
	bit	applicableLanes	0x40	Bit 6: Optional child present
	bit	iviPurpose	0x80	Bit 7: Optional child present
	bit	laneStatus	0x100	Bit 8: Optional child present
	bit	vehicleCharacteristics	0x200	Bit 9: Optional child present
	bit	driverCharacteristics	0x400	Bit 10: Optional child present
	bit	layoutId	0x800	Bit 11: Optional child present
	bit	preStoredLayoutId	0x1000	Bit 12: Optional child present
	bit	extraText	0x2000	Bit 13: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91133][

Name	V2xFac_RoadConfigurationContainerType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RccPartType
	Size	16
	Comment	--

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91134][

Name	V2xFac_RccPartType	
Kind	Structure	
Elements	zoneIds	
	Type	V2xFac_zoneIds16Type
	Comment	--
	roadType	
	Type	V2xFac_RoadTypeType
	Comment	--
	laneConfiguration	
	Type	V2xFac_laneConfiguration17Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91135][

Name	V2xFac_zoneIds16Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91136][

Name	V2xFac_laneConfiguration17Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LaneInformationType
	Size	16
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91137][

Name	V2xFac_TextContainerType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_TcPartType
	Size	16
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91138][

Name	V2xFac_TcPartType	
Kind	Structure	
Elements	detectionZoneIds	
	Type	V2xFac_detectionZoneIds18Type
	Comment	--
	relevanceZoneIds	
	Type	V2xFac_relevanceZoneIds19Type
	Comment	--
	direction	
	Type	V2xFac_DirectionType
	Comment	--
	driverAwarenessZoneIds	
	Type	V2xFac_driverAwarenessZoneIds20Type
	Comment	--
	minimumAwarenessTime	
	Type	uint8
	Comment	--
	applicableLanes	
	Type	V2xFac_applicableLanes22Type
	Comment	--
	layoutId	
	Type	uint8
	Comment	--
	preStoredLayoutId	
	Type	uint8
	Comment	--
	text	
	Type	V2xFac_text25Type
	Comment	--
	data	

	Type	V2xFac_data26Type
	Comment	--
	presence	
	Type	V2xFac_TcPartPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91139][

Name	V2xFac_detectionZoneIds18Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91140][

Name	V2xFac_relevanceZoneIds19Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType

	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91141][

Name	V2xFac_driverAwarenessZoneIds20Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ZidType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91142][

Name	V2xFac_applicableLanes22Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LanePositionType
	Size	8
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91143][

Name	V2xFac_text25Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_TextType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91144][

Name	V2xFac_data26Type		
Kind	Array	***Element type***	--
Size	--		
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91145][

Name	V2xFac_TcPartPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	detectionZoneIds	0x01	Bit 0 (LSB): Optional child present

	bit	driverAwarenessZoneIds	0x02	Bit 1: Optional child present
	bit	minimumAwarenessTime	0x04	Bit 2: Optional child present
	bit	applicableLanes	0x08	Bit 3: Optional child present
	bit	layoutId	0x10	Bit 4: Optional child present
	bit	preStoredLayoutId	0x20	Bit 5: Optional child present
	bit	text	0x40	Bit 6: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91146][

Name	V2xFac_LayoutContainerType	
Kind	Structure	
Elements	layoutId	
	Type	uint8
	Comment	--
	height	
	Type	uint8
	Comment	--
	width	
	Type	uint16
	Comment	--
	layoutComponents	
	Type	V2xFac_layoutComponents30Type
	Comment	--
	presence	
	Type	V2xFac_LayoutContainerPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91147][

Name	V2xFac_layoutComponents30Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LayoutComponentType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91148][

Name	V2xFac_LayoutContainerPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	height	0x01	Bit 0 (LSB): Optional child present
	bit	width	0x02	Bit 1: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91149][

Name	V2xFac_AbsolutePositionType	
Kind	Structure	
Elements	latitude	
	Type	V2xFac_LatitudeType

	Comment	--
	longitude	
	Type	V2xFac_LongitudeType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91150][

Name	V2xFac_AbsolutePositionWAltitudeType	
Kind	Structure	
Elements	latitude	
	Type	V2xFac_LatitudeType
	Comment	--
	longitude	
	Type	V2xFac_LongitudeType
	Comment	--
	altitude	
	Type	V2xFac_AltitudeType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91151][

Name	V2xFac_AnyCatalogueType	
Kind	Structure	
Elements	owner	
	Type	V2xFac_ProviderType
	Comment	--
	version	

	Type	uint8
	Comment	--
	pictogramCode	
	Type	uint16
	Comment	--
	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
	attributes	
	Type	V2xFac_ISO14823AttributesType
	Comment	--
	presence	
	Type	V2xFac_AnyCataloguePresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91152][

Name	V2xFac_AnyCataloguePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	value	0x01	Bit 0 (LSB): Optional child present
	bit	unit	0x02	Bit 1: Optional child present
	bit	attributes	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			

Available via	V2xFac.h

](
[SWS_V2xFac_91153][

Name	V2xFac_ComparisonOperatorType		
Kind	Type		
Derived from	uint8		
Range	0..3	--	--
	greaterThan	0	--
	greaterThanOrEqualTo	1	--
	lessThan	2	--
	lessThanOrEqualTo	3	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91154][

Name	V2xFac_CompleteVehicleCharacteristicsType	
Kind	Structure	
Elements	tractor	
	Type	V2xFac_TractorCharacteristicsType
	Comment	--
	trailer	
	Type	V2xFac_trailer34Type
	Comment	--
	train	
	Type	V2xFac_TrainCharacteristicsType
	Comment	--
	presence	
	Type	V2xFac_CompleteVehicleCharacteristicsPresenceType
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91155][

Name	V2xFac_trailer34Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_TrailerCharacteristicsType
	Size	3
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91156][

Name	V2xFac_CompleteVehicleCharacteristicsPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	tractor	0x01	Bit 0 (LSB): Optional child present
	bit	trailer	0x02	Bit 1: Optional child present
	bit	train	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91157][

Name	V2xFac_ComputedSegmentType

Kind	Structure	
Elements	zoneId	
	Type	V2xFac_ZidType
	Comment	--
	laneNumber	
	Type	V2xFac_LanePositionType
	Comment	--
	laneWidth	
	Type	V2xFac_LaneWidthType
	Comment	--
	offsetDistance	
	Type	sint16
	Comment	--
	offsetPosition	
	Type	V2xFac_DeltaReferencePositionType
	Comment	--
	presence	
	Type	V2xFac_ComputedSegmentPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91158][

Name	V2xFac_ComputedSegmentPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	offsetDistance	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: IVI			
Variation	--			

Available via	V2xFac.h

]()
[SWS_V2xFac_91159][

Name	V2xFac_DeltaPositionType	
Kind	Structure	
Elements	deltaLatitude	
	Type	V2xFac_DeltaLatitudeType
	Comment	--
	deltaLongitude	
	Type	V2xFac_DeltaLongitudeType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91160][

Name	V2xFac_DirectionType		
Kind	Type		
Derived from	uint8		
Range	0..3	--	--
	sameDirection	0	--
	oppositeDirection	1	--
	bothDirections	2	--
	valueNotUsed	3	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91161][

Name	V2xFac_DistanceType
Kind	Structure

Elements	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91162][

Name	V2xFac_DistanceOrDurationType	
Kind	Structure	
Elements	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91163][

Name	V2xFac_DriverCharacteristicsType		
Kind	Type		
Derived from	uint8		
Range	0..3	--	--
	unexperiencedDrivers	0	--
	experiencedDrivers	1	--
	rfu1	2	--

	rfu2	3	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91164][

Name	V2xFac_GoodsTypeType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
	ammunition	0	--
	chemicals	1	--
	empty	2	--
	fuel	3	--
	glass	4	--
	dangerous	5	--
	liquid	6	--
	livestock	7	--
	dangerousForPeople	8	--
	dangerousForTheEnvironment	9	--
	dangerousForWater	10	--
	perishableProducts	11	--
	pharmaceutical	12	--
	vehicles	13	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91165][

Name	V2xFac_ISO14823AttributesType
Kind	Structure

Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ISO14823Attributes38Type
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91166][

Name	V2xFac_ISO14823Attributes38Type	
Kind	Structure	
Elements	dtm	
	Type	V2xFac_DTMType
	Comment	--
	edt	
	Type	V2xFac_EDTType
	Comment	--
	illl	
	Type	V2xFac_DFLType
	Comment	--
	ved	
	Type	V2xFac_VEDType
	Comment	--
	spe	
	Type	V2xFac_SPEType
	Comment	--
	roi	
	Type	V2xFac_ROIType

	Comment	--
	dbv	
	Type	V2xFac_DBVType
	Comment	--
	ddd	
	Type	V2xFac_DDDType
	Comment	--
	choice	
	Type	V2xFac_ISO14823Attributes38ChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91167][

Name	V2xFac_ISO14823Attributes38ChoiceType		
Kind	Enumeration		
Range	V2XFAC_ISO14823ATTRIBUTES38_DTM	0x01	--
	V2XFAC_ISO14823ATTRIBUTES38_EDT	0x02	--
	V2XFAC_ISO14823ATTRIBUTES38_ILLL	0x03	--
	V2XFAC_ISO14823ATTRIBUTES38_VED	0x04	--
	V2XFAC_ISO14823ATTRIBUTES38_SPE	0x05	--
	V2XFAC_ISO14823ATTRIBUTES38_ROI	0x06	--
	V2XFAC_ISO14823ATTRIBUTES38_DBV	0x07	--
	V2XFAC_ISO14823ATTRIBUTES38_DDD	0x08	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91168][

Name	V2xFac_ISO14823CodeType

Kind	Structure	
Elements	pictogramCode	
	Type	V2xFac_pictogramCode39Type
	Comment	--
	attributes	
	Type	V2xFac_ISO14823AttributesType
	Comment	--
	presence	
	Type	V2xFac_ISO14823CodePresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91169][

Name	V2xFac_pictogramCode39Type	
Kind	Structure	
Elements	countryCode	
	Type	V2xFac_countryCode40Type
	Comment	--
	serviceCategoryCode	
	Type	V2xFac_serviceCategoryCode41Type
	Comment	--
	pictogramCategoryCode	
	Type	V2xFac_pictogramCategoryCode45Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91170][

Name	V2xFac_countryCode40Type		
Kind	Array	***Element type***	uint8
Size	--		
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91171][

Name	V2xFac_serviceCategoryCode41Type	
Kind	Structure	
Elements	trafficSignPictogram	
	Type	V2xFac_trafficSignPictogram42Type
	Comment	--
	publicFacilitiesPictogram	
	Type	V2xFac_publicFacilitiesPictogram43Type
	Comment	--
	ambientOrRoadConditionPictogram	
	Type	V2xFac_ambientOrRoadConditionPictogram44Type
	Comment	--
	choice	
	Type	V2xFac_serviceCategoryCode41ChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91172][

Name	V2xFac_trafficSignPictogram42Type		
Kind	Enumeration		
Range	dangerWarning	0	--
	regulatory	1	--

	informative	2	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91173][

Name	V2xFac_publicFacilitiesPictogram43Type		
Kind	Enumeration		
Range	publicFacilities	0	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91174][

Name	V2xFac_ambientOrRoadConditionPictogram44Type		
Kind	Enumeration		
Range	ambientCondition	0	--
	roadCondition	1	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91175][

Name	V2xFac_serviceCategoryCode41ChoiceType		
Kind	Enumeration		
Range	V2XFAC_SERVICECATEGORYCODE41_TRAFFIC_SIGN_PICTOGRAM	0x01	--
	V2XFAC_SERVICECATEGORYCODE41_PUBLIC_FACILITIES_PICTOGRAM	0x02	--
	V2XFAC_SERVICECATEGORYCODE41_AMBIENT_OR_ROAD_CONDITION_PICTOGRAM	0x03	--
Description	Namespace: IVI		
Variation	--		

Available via	V2xFac.h

](
[SWS_V2xFac_91176][

Name	V2xFac_pictogramCategoryCode45Type	
Kind	Structure	
Elements	nature	
	Type	uint8
	Comment	--
	serialNumber	
	Type	uint8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91177][

Name	V2xFac_ISO14823CodePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	attributes	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91178][

Name	V2xFac_IviIdentificationNumberType		
Kind	Type		
Derived from	uint16		
Range	1..32767	--	--
Description	Namespace: IVI		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91179][

Name	V2xFac_IviPurposeType		
Kind	Type		
Derived from	uint8		
Range	0..3	--	--
	safety	0	--
	environmental	1	--
	trafficOptimisation	2	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91180][

Name	V2xFac_IviStatusType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--
	new	0	--
	update	1	--
	cancellation	2	--
	negation	3	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91181][

Name	V2xFac_IviTypeType
Kind	Type

Derived from	uint8		
Range	0..7	--	--
	immediateDangerWarningMessages	0	--
	regulatoryMessages	1	--
	trafficRelatedInformationMessages	2	--
	pollutionMessages	3	--
	notTrafficRelatedInformationMessages	4	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91182][

Name	V2xFac_LaneInformationType	
Kind	Structure	
Elements	laneNumber	
	Type	V2xFac_LanePositionType
	Comment	--
	direction	
	Type	V2xFac_DirectionType
	Comment	--
	validity	
	Type	V2xFac_DTMType
	Comment	--
	laneType	
	Type	V2xFac_LaneTypeType
	Comment	--
	laneTypeQualifier	
	Type	V2xFac_CompleteVehicleCharacteristicsType
	Comment	--
	laneStatus	
	Type	V2xFac_LaneStatusType

	Comment	--
	laneWidth	
	Type	V2xFac_LaneWidthType
	Comment	--
	presence	
	Type	V2xFac_LaneInformationPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91183][

Name	V2xFac_LaneInformationPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	validity	0x01	Bit 0 (LSB): Optional child present
	bit	laneTypeQualifier	0x02	Bit 1: Optional child present
	bit	laneWidth	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91184][

Name	V2xFac_LaneStatusType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--
	open	0	--
	closed	1	--
	mergeR	2	--

	mergeL	3	--
	mergeLR	4	--
	provisionallyOpen	5	--
	diverging	6	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91185][

Name	V2xFac_LaneTypeType		
Kind	Type		
Derived from	uint8		
Range	0..31	--	--
	traffic	0	--
	through	1	--
	reversible	2	--
	acceleration	3	--
	deceleration	4	--
	leftHandTurning	5	--
	rightHandTurning	6	--
	dedicatedVehicle	7	--
	bus	8	--
	taxi	9	--
	hov	10	--
	hot	11	--
	pedestrian	12	--
	bikeLane	13	--
	median	14	--
	striping	15	--
	trackedVehicle	16	--
	parking	17	--

	emergency	18	--
	verge	19	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91186][

Name	V2xFac_LaneWidthType		
Kind	Type		
Derived from	uint16		
Range	0..1023	--	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91187][

Name	V2xFac_LayoutComponentType	
Kind	Structure	
Elements	layoutComponentId	
	Type	uint8
	Comment	--
	height	
	Type	uint8
	Comment	--
	width	
	Type	uint16
	Comment	--
	x	
	Type	uint16
	Comment	--
	y	

	Type	uint8
	Comment	--
	textScripting	
	Type	V2xFac_textScripting53Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91188][

Name	V2xFac_textScripting53Type		
Kind	Type		
Derived from	uint8		
Range	0..1	--	--
	horizontal	0	--
	vertical	1	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91189][

Name	V2xFac_LoadTypeType	
Kind	Structure	
Elements	goodsType	
	Type	V2xFac_GoodsTypeType
	Comment	--
	dangerousGoodsType	
	Type	V2xFac_DangerousGoodsBasicType
	Comment	--
	specialTransportType	
	Type	V2xFac_SpecialTransportTypeType

	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91190][

Name	V2xFac_PolygonalLineType	
Kind	Structure	
Elements	deltaPositions	
	Type	V2xFac_deltaPositions54Type
	Comment	--
	deltaPositionsWithAltitude	
	Type	V2xFac_deltaPositionsWithAltitude55Type
	Comment	--
	absolutePositions	
	Type	V2xFac_absolutePositions56Type
	Comment	--
	absolutePositionsWithAltitude	
	Type	V2xFac_absolutePositionsWithAltitude57Type
	Comment	--
	choice	
	Type	V2xFac_PolygonalLineChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91191][

Name	V2xFac_deltaPositions54Type
Kind	Structure
Elements	count

	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DeltaPositionType
	Size	32
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91192][

Name	V2xFac_deltaPositionsWithAltitude55Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DeltaReferencePositionType
	Size	32
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91193][

Name	V2xFac_absolutePositions56Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	

	Type	Array of V2xFac_AbsolutePositionType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91194][

Name	V2xFac_absolutePositionsWithAltitude57Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_AbsolutePositionWAltitudeType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91195][

Name	V2xFac_PolygonalLineChoiceType		
Kind	Enumeration		
Range	V2XFAC_POLYGONALLINE_DELTA_POSITIONS	0x01	--
	V2XFAC_POLYGONALLINE_DELTA_POSITIONS_WITH_ALTITUDE	0x02	--
	V2XFAC_POLYGONALLINE_ABSOLUTE_POSITIONS	0x03	--
	V2XFAC_POLYGONALLINE_ABSOLUTE_POSITIONS_WITH_ ALTITUDE	0x04	--
Description	Namespace: IVI		
Variation	--		
Available	V2xFac.h		

via	

](
[SWS_V2xFac_91196][

Name	V2xFac_RSCodeType	
Kind	Structure	
Elements	layoutComponentId	
	Type	uint8
	Comment	--
	code	
	Type	V2xFac_code59Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91197][

Name	V2xFac_code59Type	
Kind	Structure	
Elements	viennaConvention	
	Type	V2xFac_VcCodeType
	Comment	--
	iso14823	
	Type	V2xFac_ISO14823CodeType
	Comment	--
	itisCodes	
	Type	uint16
	Comment	--
	anyCatalogue	
	Type	V2xFac_AnyCatalogueType
	Comment	--
	choice	

	Type	V2xFac_code59ChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91198][

Name	V2xFac_code59ChoiceType		
Kind	Enumeration		
Range	V2XFAC_CODE59_VIENNA_CONVENTION	0x01	--
	V2XFAC_CODE59_ISO14823	0x02	--
	V2XFAC_CODE59_ITIS_CODES	0x03	--
	V2XFAC_CODE59_ANY_CATALOGUE	0x04	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91199][

Name	V2xFac_RSCUnitType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
	kmperh	0	--
	milesperh	1	--
	kilometre	2	--
	meter	3	--
	decimetre	4	--
	centimetre	5	--
	mile	6	--
	yard	7	--
	foot	8	--

	minutesOfTime	9	--
	tonnes	10	--
	hundredkg	11	--
	pound	12	--
	rateOfIncline	13	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91200][

Name	V2xFac_SegmentType	
Kind	Structure	
Elements	line	
	Type	V2xFac_PolygonalLineType
	Comment	--
	laneWidth	
	Type	V2xFac_LaneWidthType
	Comment	--
	presence	
	Type	V2xFac_SegmentPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91201][

Name	V2xFac_SegmentPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	laneWidth	0x01	Bit 0 (LSB): Optional child present

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91202][

Name	V2xFac_TextType	
Kind	Structure	
Elements	layoutComponentId	
	Type	uint8
	Comment	--
	language	
	Type	V2xFac_language62Type
	Comment	--
	textContent	
	Type	V2xFac_StringType
	Comment	--
	presence	
	Type	V2xFac_TextPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91203][

Name	V2xFac_language62Type
Kind	Bitfield
Derived from	uint8
Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

]()

[SWS_V2xFac_91204][

Name	V2xFac_TextPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	layoutComponentId	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()

[SWS_V2xFac_91205][

Name	V2xFac_TextCopy63Type	
Kind	Structure	
Elements	layoutComponentId	
	Type	uint8
	Comment	--
	language	
	Type	V2xFac_language62Type
	Comment	--
	textContent	
	Type	uint8
	Comment	--
	layoutComponentId	
	Type	uint8
	Comment	--
	language	
	Type	V2xFac_language62Type
	Comment	--
	textContent	
	Type	V2xFac_StringType
	Comment	--

	presence	
	Type	V2xFac_TextPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91206][

Name	V2xFac_TractorCharacteristicsType	
Kind	Structure	
Elements	equalTo	
	Type	V2xFac_equalTo65Type
	Comment	--
	notEqualTo	
	Type	V2xFac_notEqualTo66Type
	Comment	--
	ranges	
	Type	V2xFac_ranges67Type
	Comment	--
	presence	
	Type	V2xFac_TractorCharacteristicsPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91207][

Name	V2xFac_equalTo65Type	
Kind	Structure	
Elements	count	
	Type	uint8

	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsFixValuesType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91208][

Name	V2xFac_notEqualTo66Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsFixValuesType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91209][

Name	V2xFac_ranges67Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsRangesType

	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91210][

Name	V2xFac_TractorCharacteristicsPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	equalTo	0x01	Bit 0 (LSB): Optional child present
	bit	notEqualTo	0x02	Bit 1: Optional child present
	bit	ranges	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91211][

Name	V2xFac_TrailerCharacteristicsType	
Kind	Structure	
Elements	equalTo	
	Type	V2xFac_equalTo68Type
	Comment	--
	notEqualTo	
	Type	V2xFac_notEqualTo69Type
	Comment	--
	ranges	
	Type	V2xFac_ranges70Type
	Comment	--
	presence	

	Type	V2xFac_TrailerCharacteristicsPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91212][

Name	V2xFac_equalTo68Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsFixValuesCopy74Type
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91213][

Name	V2xFac_notEqualTo69Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsFixValuesCopy75Type
	Size	4
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91214][

Name	V2xFac_ranges70Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_VehicleCharacteristicsRangesCopy78Type
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91215][

Name	V2xFac_TrailerCharacteristicsPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	equalTo	0x01	Bit 0 (LSB): Optional child present
	bit	notEqualTo	0x02	Bit 1: Optional child present
	bit	ranges	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91216][

Name	V2xFac_TrainCharacteristicsType

Kind	Structure	
Elements	equalTo	
	Type	V2xFac_equalTo65Type
	Comment	--
	notEqualTo	
	Type	V2xFac_notEqualTo66Type
	Comment	--
	ranges	
	Type	V2xFac_ranges67Type
	Comment	--
	presence	
	Type	V2xFac_TractorCharacteristicsPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91217][

Name	V2xFac_VcClassType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--
	classA	0	--
	classB	1	--
	classC	2	--
	classD	3	--
	classE	4	--
	classF	5	--
	classG	6	--
	classH	7	--
Description	Namespace: IVI		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91218][

Name	V2xFac_VcCodeType	
Kind	Structure	
Elements	roadSignClass	
	Type	V2xFac_VcClassType
	Comment	--
	roadSignCode	
	Type	uint8
	Comment	--
	vcOption	
	Type	V2xFac_VcOptionType
	Comment	--
	validity	
	Type	V2xFac_validity72Type
	Comment	--
	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
	presence	
	Type	V2xFac_VcCodePresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91219][

Name	V2xFac_validity72Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DTMType
	Size	8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91220][

Name	V2xFac_VcCodePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	validity	0x01	Bit 0 (LSB): Optional child present
	bit	value	0x02	Bit 1: Optional child present
	bit	unit	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()

[SWS_V2xFac_91221][

Name	V2xFac_VcOptionType		
Kind	Type		
Derived from	uint8		
Range	0..7	--	--

	none	0	--
	a	1	--
	b	2	--
	c	3	--
	d	4	--
	e	5	--
	f	6	--
	g	7	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91222][

Name	V2xFac_VehicleCharacteristicsFixValuesType	
Kind	Structure	
Elements	simpleVehicleType	
	Type	V2xFac_StationTypeType
	Comment	--
	euVehicleCategoryCode	
	Type	V2xFac_EuVehicleCategoryCodeType
	Comment	--
	iso3833VehicleType	
	Type	V2xFac_Iso3833VehicleTypeType
	Comment	--
	euroAndCo2value	
	Type	V2xFac_EnvironmentalCharacteristicsType
	Comment	--
	engineCharacteristics	
	Type	V2xFac_EngineCharacteristicsType
	Comment	--
	loadType	

	Type	V2xFac_LoadTypeType
	Comment	--
	usage	
	Type	V2xFac_VehicleRoleType
	Comment	--
	choice	
	Type	V2xFac_VehicleCharacteristicsFixValuesChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91223][

Name	V2xFac_VehicleCharacteristicsFixValuesChoiceType		
Kind	Enumeration		
Range	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_SIMPLE_VEHICLE_TYPE	0x01	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_EU_VEHICLE_CATEGORY_CODE	0x02	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_ISO3833VEHICLE_TYPE	0x03	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_EURO_AND_CO2VALUE	0x04	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_ENGINE_CHARACTERISTICS	0x05	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_LOAD_TYPE	0x06	--
	V2XFAC_VEHICLECHARACTERISTICSFIXVALUES_USAGE	0x07	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91224][

Name	V2xFac_VehicleCharacteristicsFixValuesCopy74Type

Kind	Structure	
Elements	simpleVehicleType	
	Type	V2xFac_StationTypeType
	Comment	--
	euVehicleCategoryCode	
	Type	V2xFac_EuVehicleCategoryCodeType
	Comment	--
	iso3833VehicleType	
	Type	V2xFac_Iso3833VehicleTypeType
	Comment	--
	loadType	
	Type	V2xFac_LoadTypeType
	Comment	--
	usage	
	Type	V2xFac_VehicleRoleType
	Comment	--
	choice	
	Type	V2xFac_VehicleCharacteristicsFixValuesChoiceType
	Comment	--
	simpleVehicleType	
	Type	V2xFac_StationTypeType
	Comment	--
	euVehicleCategoryCode	
	Type	V2xFac_EuVehicleCategoryCodeType
	Comment	--
	iso3833VehicleType	
	Type	V2xFac_Iso3833VehicleTypeType
	Comment	--
	euroAndCo2value	
	Type	V2xFac_EnvironmentalCharacteristicsType
	Comment	--

	engineCharacteristics	
	Type	V2xFac_EngineCharacteristicsType
	Comment	--
	loadType	
	Type	V2xFac_LoadTypeType
	Comment	--
	usage	
	Type	V2xFac_VehicleRoleType
	Comment	--
	choice	
	Type	V2xFac_VehicleCharacteristicsFixValuesChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91225][

Name	V2xFac_VehicleCharacteristicsFixValuesCopy75Type	
Kind	Structure	
Elements	simpleVehicleType	
	Type	V2xFac_StationTypeType
	Comment	--
	euVehicleCategoryCode	
	Type	V2xFac_EuVehicleCategoryCodeType
	Comment	--
	iso3833VehicleType	
	Type	V2xFac_Iso3833VehicleTypeType
	Comment	--
	loadType	
	Type	V2xFac_LoadTypeType
	Comment	--

	usage	
	Type	V2xFac_VehicleRoleType
	Comment	--
	choice	
	Type	V2xFac_VehicleCharacteristicsFixValuesChoiceType
	Comment	--
	simpleVehicleType	
	Type	V2xFac_StationTypeType
	Comment	--
	euVehicleCategoryCode	
	Type	V2xFac_EuVehicleCategoryCodeType
	Comment	--
	iso3833VehicleType	
	Type	V2xFac_Iso3833VehicleTypeType
	Comment	--
	euroAndCo2value	
	Type	V2xFac_EnvironmentalCharacteristicsType
	Comment	--
	engineCharacteristics	
	Type	V2xFac_EngineCharacteristicsType
	Comment	--
	loadType	
	Type	V2xFac_LoadTypeType
	Comment	--
	usage	
	Type	V2xFac_VehicleRoleType
	Comment	--
	choice	
	Type	V2xFac_VehicleCharacteristicsFixValuesChoiceType
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91226][

Name	V2xFac_VehicleCharacteristicsRangesType	
Kind	Structure	
Elements	comparisonOperator	
	Type	V2xFac_ComparisonOperatorType
	Comment	--
	limits	
	Type	V2xFac_limits76Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91227][

Name	V2xFac_limits76Type	
Kind	Structure	
Elements	numberOfAxles	
	Type	uint8
	Comment	--
	vehicleDimensions	
	Type	V2xFac_VehicleDimensionsType
	Comment	--
	vehicleWeightLimits	
	Type	V2xFac_VehicleWeightLimitsType
	Comment	--
	axleWeightLimits	
	Type	V2xFac_AxleWeightLimitsType
	Comment	--

	passengerCapacity	
	Type	V2xFac_PassengerCapacityType
	Comment	--
	exhaustEmissionValues	
	Type	V2xFac_ExhaustEmissionValuesType
	Comment	--
	dieselEmissionValues	
	Type	V2xFac_DieselEmissionValuesType
	Comment	--
	soundLevel	
	Type	V2xFac_SoundLevelType
	Comment	--
	choice	
	Type	V2xFac_limits76ChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91228][

Name	V2xFac_limits76ChoiceType		
Kind	Enumeration		
Range	V2XFAC_LIMITS76_NUMBER_OF_AXLES	0x01	--
	V2XFAC_LIMITS76_VEHICLE_DIMENSIONS	0x02	--
	V2XFAC_LIMITS76_VEHICLE_WEIGHT_LIMITS	0x03	--
	V2XFAC_LIMITS76_AXLE_WEIGHT_LIMITS	0x04	--
	V2XFAC_LIMITS76_PASSENGER_CAPACITY	0x05	--
	V2XFAC_LIMITS76_EXHAUST_EMISSION_VALUES	0x06	--
	V2XFAC_LIMITS76_DIESEL_EMISSION_VALUES	0x07	--
	V2XFAC_LIMITS76_SOUND_LEVEL	0x08	--
Description	Namespace: IVI		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91229][

Name	V2xFac_VehicleCharacteristicsRangesCopy78Type	
Kind	Structure	
Elements	comparisonOperator	
	Type	V2xFac_ComparisonOperatorType
	Comment	--
	limits	
	Type	V2xFac_limits76Type
	Comment	--
	comparisonOperator	
	Type	V2xFac_ComparisonOperatorType
	Comment	--
	limits	
	Type	V2xFac_limits76Type
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91230][

Name	V2xFac_WeightType	
Kind	Structure	
Elements	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91231][

Name	V2xFac_ZidType		
Kind	Type		
Derived from	uint8		
Range	1..32	--	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91232][

Name	V2xFac_ZoneType	
Kind	Structure	
Elements	segment	
	Type	V2xFac_SegmentType
	Comment	--
	area	
	Type	V2xFac_PolygonalLineType
	Comment	--
	computedSegment	
	Type	V2xFac_ComputedSegmentType
	Comment	--
	choice	
	Type	V2xFac_ZoneChoiceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91233][

Name	V2xFac_ZoneChoiceType		
Kind	Enumeration		
Range	V2XFAC_ZONE_SEGMENT	0x01	--
	V2XFAC_ZONE_AREA	0x02	--
	V2XFAC_ZONE_COMPUTED_SEGMENT	0x03	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91234][

Name	V2xFac_DTMType	
Kind	Structure	
Elements	year	
	Type	V2xFac_year80Type
	Comment	--
	month_day	
	Type	V2xFac_month_day83Type
	Comment	--
	pmd	
	Type	V2xFac_PMDType
	Comment	--
	hourMinutes	
	Type	V2xFac_hourMinutes84Type
	Comment	--
	dayOfWeek	
	Type	V2xFac_DayOfWeekType
	Comment	--
	period	
	Type	V2xFac_HoursMinutesType

	Comment	--
	presence	
	Type	V2xFac_DTMPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91235][

Name	V2xFac_year80Type	
Kind	Structure	
Elements	syr	
	Type	uint16
	Comment	--
	eyr	
	Type	uint16
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91236][

Name	V2xFac_month_day83Type	
Kind	Structure	
Elements	smd	
	Type	V2xFac_MonthDayType
	Comment	--
	emd	
	Type	V2xFac_MonthDayType
	Comment	--
Description	Namespace: IVI	

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91237][

Name	V2xFac_hourMinutes84Type	
Kind	Structure	
Elements	shm	
	Type	V2xFac_HoursMinutesType
	Comment	--
	ehm	
	Type	V2xFac_HoursMinutesType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91238][

Name	V2xFac_DTMPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	hourMinutes	0x01	Bit 0 (LSB): Optional child present
	bit	dayOfWeek	0x02	Bit 1: Optional child present
	bit	period	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91239][

Name	V2xFac_MonthDayType
Kind	Structure

Elements	month	
	Type	uint8
	Comment	--
	day	
	Type	uint8
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91240][

Name	V2xFac_PMDType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	national_holiday	0x01	--
	bit	even_days	0x02	--
	bit	odd_days	0x04	--
	bit	market_day	0x08	--
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91241][

Name	V2xFac_HoursMinutesType	
Kind	Structure	
Elements	hours	
	Type	uint8
	Comment	--
	mins	
	Type	uint8

	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91242][

Name	V2xFac_DayOfWeekType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	unused	0x01	--
	bit	monday	0x02	--
	bit	tuesday	0x04	--
	bit	wednesday	0x08	--
	bit	thursday	0x10	--
	bit	friday	0x20	--
	bit	saturday	0x40	--
	bit	sunday	0x80	--
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91243][

Name	V2xFac_EDTType	
Kind	Structure	
Elements	year	
	Type	V2xFac_year80Type
	Comment	--
	month_day	
	Type	V2xFac_month_day83Type
	Comment	--

	pmd	
	Type	V2xFac_PMDType
	Comment	--
	hourMinutes	
	Type	V2xFac_hourMinutes84Type
	Comment	--
	dayOfWeek	
	Type	V2xFac_DayOfWeekType
	Comment	--
	period	
	Type	V2xFac_HoursMinutesType
	Comment	--
	presence	
	Type	V2xFac_DTMPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91244][

Name	V2xFac_DFLType		
Kind	Type		
Derived from	uint8		
Range	1..8	--	--
	sDL	1	--
	sLT	2	--
	sRT	3	--
	lTO	4	--
	rTO	5	--
	cLL	6	--
	eRI	7	--

	oVL	8	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91245][

Name	V2xFac_VEDType	
Kind	Structure	
Elements	hei	
	Type	V2xFac_DistanceType
	Comment	--
	wid	
	Type	V2xFac_DistanceType
	Comment	--
	vln	
	Type	V2xFac_DistanceType
	Comment	--
	wei	
	Type	V2xFac_WeightType
	Comment	--
	presence	
	Type	V2xFac_VEDPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91246][

Name	V2xFac_VEDPresenceType
Kind	Bitfield
Derived from	uint8

Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	hei	0x01	Bit 0 (LSB): Optional child present
	bit	wid	0x02	Bit 1: Optional child present
	bit	vln	0x04	Bit 2: Optional child present
	bit	wei	0x08	Bit 3: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91247][

Name	V2xFac_SPEType	
Kind	Structure	
Elements	spm	
	Type	uint8
	Comment	--
	mns	
	Type	uint8
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
	presence	
	Type	V2xFac_SPEPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91248][

Name	V2xFac_SPEPresenceType
Kind	Bitfield

Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	spm	0x01	Bit 0 (LSB): Optional child present
	bit	mns	0x02	Bit 1: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91249][

Name	V2xFac_ROIType		
Kind	Type		
Derived from	uint8		
Range	1..32	--	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91250][

Name	V2xFac_DBVType	
Kind	Structure	
Elements	value	
	Type	uint16
	Comment	--
	unit	
	Type	V2xFac_RSCUnitType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91251][

Name	V2xFac_DDDType	
Kind	Structure	
Elements	dcj	
	Type	uint8
	Comment	--
	der	
	Type	uint8
	Comment	--
	tpl	
	Type	uint8
	Comment	--
	ioList	
	Type	V2xFac_ioList94Type
	Comment	--
	presence	
	Type	V2xFac_DDDPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91252][

Name	V2xFac_ioList94Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DDD_IOType
	Size	8
	Comment	--

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91253][

Name	V2xFac_DDDPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	dcj	0x01	Bit 0 (LSB): Optional child present
	bit	der	0x02	Bit 1: Optional child present
	bit	tpl	0x04	Bit 2: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91254][

Name	V2xFac_DDD_IOType	
Kind	Structure	
Elements	drn	
	Type	uint8
	Comment	--
	dp	
	Type	V2xFac_dp96Type
	Comment	--
	dr	
	Type	V2xFac_dr97Type
	Comment	--
	rne	
	Type	uint16
	Comment	--

	stnId	
	Type	uint16
	Comment	--
	stnText	
	Type	V2xFac_StringType
	Comment	--
	dcp	
	Type	V2xFac_DistanceOrDurationType
	Comment	--
	ddp	
	Type	V2xFac_DistanceOrDurationType
	Comment	--
	presence	
	Type	V2xFac_DDD_IOPresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91255][

Name	V2xFac_dp96Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DestinationPlaceType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	

Available via	V2xFac.h

](
[SWS_V2xFac_91256][

Name	V2xFac_dr97Type	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_DestinationRoadType
	Size	4
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91257][

Name	V2xFac_DDD_IOPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	dp	0x01	Bit 0 (LSB): Optional child present
	bit	dr	0x02	Bit 1: Optional child present
	bit	rne	0x04	Bit 2: Optional child present
	bit	stnId	0x08	Bit 3: Optional child present
	bit	stnText	0x10	Bit 4: Optional child present
	bit	dcp	0x20	Bit 5: Optional child present
	bit	ddp	0x40	Bit 6: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91258][

Name	V2xFac_DestinationPlaceType	
Kind	Structure	
Elements	depType	
	Type	V2xFac_DDD_DEPType
	Comment	--
	depRSCode	
	Type	V2xFac_ISO14823CodeType
	Comment	--
	depBlob	
	Type	V2xFac_depBlob100Type
	Comment	--
	plnId	
	Type	uint16
	Comment	--
	plnText	
	Type	V2xFac_StringType
	Comment	--
	presence	
	Type	V2xFac_DestinationPlacePresenceType
	Comment	--
Description	Namespace: IVI	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91259][

Name	V2xFac_depBlob100Type		
Kind	Array	***Element type***	--
Size	--		
Description	Namespace: IVI		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91260][

Name	V2xFac_DestinationPlacePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	depRSCode	0x01	Bit 0 (LSB): Optional child present
	bit	depBlob	0x02	Bit 1: Optional child present
	bit	plnId	0x04	Bit 2: Optional child present
	bit	plnText	0x08	Bit 3: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91261][

Name	V2xFac_DestinationRoadType	
Kind	Structure	
Elements	derType	
	Type	V2xFac_DDD_DERType
	Comment	--
	ronId	
	Type	uint16
	Comment	--
	ronText	
	Type	V2xFac_StringType
	Comment	--
	presence	
	Type	V2xFac_DestinationRoadPresenceType
	Comment	--

Description	Namespace: IVI
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91262][

Name	V2xFac_DestinationRoadPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	ronId	0x01	Bit 0 (LSB): Optional child present
	bit	ronText	0x02	Bit 1: Optional child present
Description	Namespace: IVI			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91263][

Name	V2xFac_DDD_DERType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
	none	0	--
	nationalHighway	1	--
	localHighway	2	--
	tollExpresswayMotorway	3	--
	internationalHighway	4	--
	highway	5	--
	expressway	6	--
	nationalRoad	7	--
	regionalProvincialRoad	8	--
	localRoad	9	--
	motorwayJunction	10	--

	diversion	11	--
	rfu1	12	--
	rfu2	13	--
	rfu3	14	--
	rfu4	15	--
Description	Namespace: IVI		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91264][

Name	V2xFac_DDD_DEPType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
	none	0	--
	importantArea	1	--
	principalArea	2	--
	generalArea	3	--
	wellKnownPoint	4	--
	country	5	--
	city	6	--
	street	7	--
	industrialArea	8	--
	historicArea	9	--
	touristicArea	10	--
	culturalArea	11	--
	touristicRoute	12	--
	recommendedRoute	13	--
	touristicAttraction	14	--
	geographicArea	15	--
Description	Namespace: IVI		

Variation	--
Available via	V2xFac.h

]()

8.7.3.7 MAPEM and SPATEM specific Implementation DataTypes

[SWS_V2xFac_91266][

Name	V2xFac_MapemDataType	
Kind	Structure	
Elements	timeStamp	
	Type	V2xFac_MinuteOfTheYearType
	Comment	--
	msgIssueRevision	
	Type	V2xFac_MsgCountType
	Comment	--
	layerType	
	Type	V2xFac_LayerTypeType
	Comment	--
	layerID	
	Type	V2xFac_LayerIDType
	Comment	--
	intersections	
	Type	V2xFac_IntersectionGeometryListType
	Comment	--
	roadSegments	
	Type	V2xFac_RoadSegmentListType
	Comment	--
	dataParameters	
	Type	V2xFac_DataParametersType
	Comment	--
	restrictionList	
	Type	V2xFac_RestrictionClassListType
	Comment	--

	transactionId	
	Type	uint32
	Comment	--
	presence	
	Type	V2xFac_MapemDataPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91267][

Name	V2xFac_MapemDataPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	timeStamp	0x01	Bit 0 (LSB): Optional child present
	bit	layerType	0x02	Bit 1: Optional child present
	bit	layerID	0x04	Bit 2: Optional child present
	bit	intersections	0x08	Bit 3: Optional child present
	bit	roadSegments	0x10	Bit 4: Optional child present
	bit	dataParameters	0x20	Bit 5: Optional child present
	bit	restrictionList	0x40	Bit 6: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91268][

Name	V2xFac_SpatemDataType	
Kind	Structure	
Elements	timeStamp	
	Type	V2xFac_MinuteOfTheYearType

	Comment	--
	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	intersections	
	Type	V2xFac_IntersectionStateListType
	Comment	--
	transactionId	
	Type	uint32
	Comment	--
	presence	
	Type	V2xFac_SpatemDataPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91269][

Name	V2xFac_SpatemDataPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	timeStamp	0x01	Bit 0 (LSB): Optional child present
	bit	name	0x02	Bit 1: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91270][

Name	V2xFac_MapDataType
Kind	Structure

Elements	timeStamp	
	Type	V2xFac_MinuteOfTheYearType
	Comment	--
	msgIssueRevision	
	Type	V2xFac_MsgCountType
	Comment	--
	layerType	
	Type	V2xFac_LayerTypeType
	Comment	--
	layerID	
	Type	V2xFac_LayerIDType
	Comment	--
	intersections	
	Type	V2xFac_IntersectionGeometryListType
	Comment	--
	roadSegments	
	Type	V2xFac_RoadSegmentListType
	Comment	--
	dataParameters	
	Type	V2xFac_DataParametersType
	Comment	--
	restrictionList	
	Type	V2xFac_RestrictionClassListType
	Comment	--
	presence	
	Type	V2xFac_MapDataPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

[SWS_V2xFac_91271]⌈

Name	V2xFac_MapDataPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	timeStamp	0x01	Bit 0 (LSB): Optional child present
	bit	layerType	0x02	Bit 1: Optional child present
	bit	layerID	0x04	Bit 2: Optional child present
	bit	intersections	0x08	Bit 3: Optional child present
	bit	roadSegments	0x10	Bit 4: Optional child present
	bit	dataParameters	0x20	Bit 5: Optional child present
	bit	restrictionList	0x40	Bit 6: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

⌋()

[SWS_V2xFac_91272]⌈

Name	V2xFac_SPATType	
Kind	Structure	
Elements	timeStamp	
	Type	V2xFac_MinuteOfTheYearType
	Comment	--
	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	intersections	
	Type	V2xFac_IntersectionStateListType
	Comment	--
	presence	
	Type	V2xFac_SPATPresenceType
	Comment	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91273][

Name	V2xFac_SPATPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	timeStamp	0x01	Bit 0 (LSB): Optional child present
	bit	name	0x02	Bit 1: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91274][

Name	V2xFac_AdvisorySpeedType	
Kind	Structure	
Elements	type	
	Type	V2xFac_AdvisorySpeedTypeType
	Comment	--
	speed	
	Type	V2xFac_SpeedAdviceType
	Comment	--
	confidence	
	Type	V2xFac_SpeedConfidenceType
	Comment	--
	distance	
	Type	V2xFac_ZoneLengthType
	Comment	--
	class	

	Type	V2xFac_RestrictionClassIDType
	Comment	--
	presence	
	Type	V2xFac_AdvisorySpeedPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91275][

Name	V2xFac_AdvisorySpeedPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	speed	0x01	Bit 0 (LSB): Optional child present
	bit	confidence	0x02	Bit 1: Optional child present
	bit	distance	0x04	Bit 2: Optional child present
	bit	class	0x08	Bit 3: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91276][

Name	V2xFac_AdvisorySpeedListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_AdvisorySpeedType
	Size	16

	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91277][

Name	V2xFac_ComputedLaneType	
Kind	Structure	
Elements	referenceLaneId	
	Type	V2xFac_LaneIDType
	Comment	--
	offsetXaxis	
	Type	V2xFac_offsetXaxis106Type
	Comment	--
	offsetYaxis	
	Type	V2xFac_offsetYaxis107Type
	Comment	--
	rotateXY	
	Type	V2xFac_AngleType
	Comment	--
	scaleXaxis	
	Type	V2xFac_Scale_B12Type
	Comment	--
	scaleYaxis	
	Type	V2xFac_Scale_B12Type
	Comment	--
	presence	
	Type	V2xFac_ComputedLanePresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	

Available via	V2xFac.h

]()
[SWS_V2xFac_91278][

Name	V2xFac_offsetXaxis106Type	
Kind	Structure	
Elements	small	
	Type	V2xFac_DrivenLineOffsetSmType
	Comment	--
	large	
	Type	V2xFac_DrivenLineOffsetLgType
	Comment	--
	choice	
	Type	V2xFac_offsetXaxis106ChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91279][

Name	V2xFac_offsetXaxis106ChoiceType		
Kind	Enumeration		
Range	V2XFAC_OFFSETXAXIS106_SMALL	0x01	--
	V2XFAC_OFFSETXAXIS106_LARGE	0x02	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91280][

Name	V2xFac_offsetYaxis107Type
Kind	Structure
Elements	small

	Type	V2xFac_DrivenLineOffsetSmType
	Comment	--
	large	
	Type	V2xFac_DrivenLineOffsetLgType
	Comment	--
	choice	
	Type	V2xFac_offsetYaxis107ChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91281][

Name	V2xFac_offsetYaxis107ChoiceType		
Kind	Enumeration		
Range	V2XFAC_OFFSETYAXIS107_SMALL	0x01	--
	V2XFAC_OFFSETYAXIS107_LARGE	0x02	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91282][

Name	V2xFac_ComputedLanePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	rotateXY	0x01	Bit 0 (LSB): Optional child present
	bit	scaleXaxis	0x02	Bit 1: Optional child present
	bit	scaleYaxis	0x04	Bit 2: Optional child present
Description	Namespace: MAPEM			
Variation	--			

Available via	V2xFac.h

]()
[SWS_V2xFac_91283][

Name	V2xFac_ConnectingLaneType	
Kind	Structure	
Elements	lane	
	Type	V2xFac_LaneIDType
	Comment	--
	maneuver	
	Type	V2xFac_AllowedManeuversType
	Comment	--
	presence	
	Type	V2xFac_ConnectingLanePresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91284][

Name	V2xFac_ConnectingLanePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	maneuver	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91285][

Name	V2xFac_ConnectionType
Kind	Structure

Elements	connectingLane	
	Type	V2xFac_ConnectingLaneType
	Comment	--
	remoteIntersection	
	Type	V2xFac_IntersectionReferenceIDType
	Comment	--
	signalGroup	
	Type	V2xFac_SignalGroupIDType
	Comment	--
	userClass	
	Type	V2xFac_RestrictionClassIDType
	Comment	--
	connectionID	
	Type	V2xFac_LaneConnectionIDType
	Comment	--
	presence	
	Type	V2xFac_ConnectionPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91286][

Name	V2xFac_ConnectionPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	remoteIntersection	0x01	Bit 0 (LSB): Optional child present
	bit	signalGroup	0x02	Bit 1: Optional child present
	bit	userClass	0x04	Bit 2: Optional child present
	bit	connectionID	0x08	Bit 3: Optional child present

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91287][

Name	V2xFac_ConnectionManeuverAssistType	
Kind	Structure	
Elements	connectionID	
	Type	V2xFac_LaneConnectionIDType
	Comment	--
	queueLength	
	Type	V2xFac_ZoneLengthType
	Comment	--
	availableStorageLength	
	Type	V2xFac_ZoneLengthType
	Comment	--
	waitOnStop	
	Type	V2xFac_WaitOnStoplineType
	Comment	--
	pedBicycleDetect	
	Type	V2xFac_PedestrianBicycleDetectType
	Comment	--
	presence	
	Type	V2xFac_ConnectionManeuverAssistPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91288][

Name	V2xFac_ConnectionManeuverAssistPresenceType

Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	queueLength	0x01	Bit 0 (LSB): Optional child present
	bit	availableStorageLength	0x02	Bit 1: Optional child present
	bit	waitOnStop	0x04	Bit 2: Optional child present
	bit	pedBicycleDetect	0x08	Bit 3: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91289][

Name	V2xFac_ConnectsToListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ConnectionType
	Size	16
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91290][

Name	V2xFac_DataParametersType	
Kind	Structure	
Elements	processMethod	
	Type	V2xFac_processMethod108Type
	Comment	--

	processAgency	
	Type	V2xFac_processAgency109Type
	Comment	--
	lastCheckedDate	
	Type	V2xFac_lastCheckedDate110Type
	Comment	--
	geoidUsed	
	Type	V2xFac_geoidUsed111Type
	Comment	--
	presence	
	Type	V2xFac_DataParametersPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91291][

Name	V2xFac_processMethod108Type		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91292][

Name	V2xFac_processAgency109Type		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..255	--	--
Description	Namespace: MAPEM		

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91293][

Name	V2xFac_lastCheckedDate110Type		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91294][

Name	V2xFac_geoidUsed111Type		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91295][

Name	V2xFac_DataParametersPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	processMethod	0x01	Bit 0 (LSB): Optional child present
	bit	processAgency	0x02	Bit 1: Optional child present
	bit	lastCheckedDate	0x04	Bit 2: Optional child present
	bit	geoidUsed	0x08	Bit 3: Optional child present
Description	Namespace: MAPEM			

Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91296][

Name	V2xFac_EnabledLaneListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LaneIDType
	Size	16
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91297][

Name	V2xFac_GenericLaneType	
Kind	Structure	
Elements	laneID	
	Type	V2xFac_LaneIDType
	Comment	--
	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	ingressApproach	
	Type	V2xFac_ApproachIDType
	Comment	--
	egressApproach	
	Type	V2xFac_ApproachIDType

	Comment	--
	laneAttributes	
	Type	V2xFac_LaneAttributesType
	Comment	--
	maneuvers	
	Type	V2xFac_AllowedManeuversType
	Comment	--
	nodeList	
	Type	V2xFac_NodeListXYType
	Comment	--
	connectsTo	
	Type	V2xFac_ConnectsToListType
	Comment	--
	overlays	
	Type	V2xFac_OverlayLaneListType
	Comment	--
	presence	
	Type	V2xFac_GenericLanePresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91298][

Name	V2xFac_GenericLanePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	name	0x01	Bit 0 (LSB): Optional child present
	bit	ingressApproach	0x02	Bit 1: Optional child present
	bit	egressApproach	0x04	Bit 2: Optional child present

	bit	maneuvers	0x08	Bit 3: Optional child present
	bit	connectsTo	0x10	Bit 4: Optional child present
	bit	overlays	0x20	Bit 5: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91299][

Name	V2xFac_IntersectionGeometryType	
Kind	Structure	
Elements	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	id	
	Type	V2xFac_IntersectionReferenceIDType
	Comment	--
	revision	
	Type	V2xFac_MsgCountType
	Comment	--
	refPoint	
	Type	V2xFac_Position3DType
	Comment	--
	laneWidth	
	Type	V2xFac_LaneWidthType
	Comment	--
	speedLimits	
	Type	V2xFac_SpeedLimitListType
	Comment	--
	laneSet	
	Type	V2xFac_LaneListType
	Comment	--

	preemptPriorityData	
	Type	V2xFac_PreemptPriorityListType
	Comment	--
	presence	
	Type	V2xFac_IntersectionGeometryPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91300][

Name	V2xFac_IntersectionGeometryPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	name	0x01	Bit 0 (LSB): Optional child present
	bit	laneWidth	0x02	Bit 1: Optional child present
	bit	speedLimits	0x04	Bit 2: Optional child present
	bit	preemptPriorityData	0x08	Bit 3: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91301][

Name	V2xFac_IntersectionGeometryListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_IntersectionGeometryType

	Size	32
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91302][

Name	V2xFac_IntersectionReferenceIDType	
Kind	Structure	
Elements	region	
	Type	V2xFac_RoadRegulatorIDType
	Comment	--
	id	
	Type	V2xFac_IntersectionIDType
	Comment	--
	presence	
	Type	V2xFac_IntersectionReferenceIDPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91303][

Name	V2xFac_IntersectionReferenceIDPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	region	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91304][

Name	V2xFac_IntersectionStateType	
Kind	Structure	
Elements	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	id	
	Type	V2xFac_IntersectionReferenceIDType
	Comment	--
	revision	
	Type	V2xFac_MsgCountType
	Comment	--
	status	
	Type	V2xFac_IntersectionStatusObjectType
	Comment	--
	moy	
	Type	V2xFac_MinuteOfTheYearType
	Comment	--
	timeStamp	
	Type	V2xFac_DSecondType
	Comment	--
	enabledLanes	
	Type	V2xFac_EnabledLaneListType
	Comment	--
	states	
	Type	V2xFac_MovementListType
	Comment	--
	maneuverAssistList	
	Type	V2xFac_ManeuverAssistListType
	Comment	--

	presence	
	Type	V2xFac_IntersectionStatePresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91305][

Name	V2xFac_IntersectionStatePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	name	0x01	Bit 0 (LSB): Optional child present
	bit	moy	0x02	Bit 1: Optional child present
	bit	timeStamp	0x04	Bit 2: Optional child present
	bit	enabledLanes	0x08	Bit 3: Optional child present
	bit	maneuverAssistList	0x10	Bit 4: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91306][

Name	V2xFac_IntersectionStateListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_IntersectionStateType
	Size	32
	Comment	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91307][

Name	V2xFac_LaneAttributesType	
Kind	Structure	
Elements	directionalUse	
	Type	V2xFac_LaneDirectionType
	Comment	--
	sharedWith	
	Type	V2xFac_LaneSharingType
	Comment	--
	laneType	
	Type	V2xFac_LaneTypeAttributesType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91308][

Name	V2xFac_LaneDataAttributeType	
Kind	Structure	
Elements	pathEndPointAngle	
	Type	V2xFac_DeltaAngleType
	Comment	--
	laneCrownPointCenter	
	Type	V2xFac_RoadwayCrownAngleType
	Comment	--
	laneCrownPointLeft	
	Type	V2xFac_RoadwayCrownAngleType

	Comment	--
	laneCrownPointRight	
	Type	V2xFac_RoadwayCrownAngleType
	Comment	--
	laneAngle	
	Type	V2xFac_MergeDivergeNodeAngleType
	Comment	--
	speedLimits	
	Type	V2xFac_SpeedLimitListType
	Comment	--
	choice	
	Type	V2xFac_LaneDataAttributeChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91309][

Name	V2xFac_LaneDataAttributeChoiceType		
Kind	Enumeration		
Range	V2XFAC_LANEDATAATTRIBUTE_PATH_END_POINT_ANGLE	0x01	--
	V2XFAC_LANEDATAATTRIBUTE_LANE_CROWN_POINT_CENTER	0x02	--
	V2XFAC_LANEDATAATTRIBUTE_LANE_CROWN_POINT_LEFT	0x03	--
	V2XFAC_LANEDATAATTRIBUTE_LANE_CROWN_POINT_RIGHT	0x04	--
	V2XFAC_LANEDATAATTRIBUTE_LANE_ANGLE	0x05	--
	V2XFAC_LANEDATAATTRIBUTE_SPEED_LIMITS	0x06	--
	V2XFAC_LANEDATAATTRIBUTE_REGIONAL	0x07	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91310][

Name	V2xFac_LaneDataAttributeListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LaneDataAttributeType
	Size	8
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91311][

Name	V2xFac_LaneListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_GenericLaneType
	Size	255
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91312][

Name	V2xFac_LaneTypeAttributesType
Kind	Structure

Elements	vehicle	
	Type	V2xFac_LaneAttributes_VehicleType
	Comment	--
	crosswalk	
	Type	V2xFac_LaneAttributes_CrosswalkType
	Comment	--
	bikeLane	
	Type	V2xFac_LaneAttributes_BikeType
	Comment	--
	sidewalk	
	Type	V2xFac_LaneAttributes_SidewalkType
	Comment	--
	median	
	Type	V2xFac_LaneAttributes_BarrierType
	Comment	--
	striping	
	Type	V2xFac_LaneAttributes_StripingType
	Comment	--
	trackedVehicle	
	Type	V2xFac_LaneAttributes_TrackedVehicleType
	Comment	--
	parking	
	Type	V2xFac_LaneAttributes_ParkingType
	Comment	--
	choice	
	Type	V2xFac_LaneTypeAttributesChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

[SWS_V2xFac_91313][

Name	V2xFac_LaneTypeAttributesChoiceType		
Kind	Enumeration		
Range	V2XFAC_LANETYPEATTRIBUTES_VEHICLE	0x01	--
	V2XFAC_LANETYPEATTRIBUTES_CROSSWALK	0x02	--
	V2XFAC_LANETYPEATTRIBUTES_BIKE_LANE	0x03	--
	V2XFAC_LANETYPEATTRIBUTES_SIDEWALK	0x04	--
	V2XFAC_LANETYPEATTRIBUTES_MEDIAN	0x05	--
	V2XFAC_LANETYPEATTRIBUTES_STRIPING	0x06	--
	V2XFAC_LANETYPEATTRIBUTES_TRACKED_VEHICLE	0x07	--
	V2XFAC_LANETYPEATTRIBUTES_PARKING	0x08	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91314][

Name	V2xFac_ManeuverAssistListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_ConnectionManeuverAssistType
	Size	16
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91315][

Name	V2xFac_MovementEventListType

Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_MovementEventType
	Size	16
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91316][

Name	V2xFac_MovementEventType	
Kind	Structure	
Elements	eventState	
	Type	V2xFac_MovementPhaseStateType
	Comment	--
	timing	
	Type	V2xFac_TimeChangeDetailsType
	Comment	--
	speeds	
	Type	V2xFac_AdvisorySpeedListType
	Comment	--
	presence	
	Type	V2xFac_MovementEventPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()

[SWS_V2xFac_91317][

Name	V2xFac_MovementEventPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	timing	0x01	Bit 0 (LSB): Optional child present
	bit	speeds	0x02	Bit 1: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91318][

Name	V2xFac_MovementListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_MovementStateType
	Size	255
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91319][

Name	V2xFac_MovementStateType	
Kind	Structure	
Elements	movementName	
	Type	V2xFac_DescriptiveNameType
	Comment	--

	signalGroup	
	Type	V2xFac_SignalGroupIDType
	Comment	--
	state_time_speed	
	Type	V2xFac_MovementEventListType
	Comment	--
	maneuverAssistList	
	Type	V2xFac_ManeuverAssistListType
	Comment	--
	presence	
	Type	V2xFac_MovementStatePresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91320][

Name	V2xFac_MovementStatePresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	movementName	0x01	Bit 0 (LSB): Optional child present
	bit	maneuverAssistList	0x02	Bit 1: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91321][

Name	V2xFac_Node_LLmD_64bType
Kind	Structure
Elements	lon

	Type	V2xFac_LongitudeType
	Comment	--
	lat	
	Type	V2xFac_LatitudeType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91322][

Name	V2xFac_Node_XY_20bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B10Type
	Comment	--
	y	
	Type	V2xFac_Offset_B10Type
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91323][

Name	V2xFac_Node_XY_22bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B11Type
	Comment	--
	y	
	Type	V2xFac_Offset_B11Type
	Comment	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91324][

Name	V2xFac_Node_XY_24bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B12Type
	Comment	--
	y	
	Type	V2xFac_Offset_B12Type
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91325][

Name	V2xFac_Node_XY_26bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B13Type
	Comment	--
	y	
	Type	V2xFac_Offset_B13Type
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91326][

Name	V2xFac_Node_XY_28bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B14Type
	Comment	--
	y	
	Type	V2xFac_Offset_B14Type
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91327][

Name	V2xFac_Node_XY_32bType	
Kind	Structure	
Elements	x	
	Type	V2xFac_Offset_B16Type
	Comment	--
	y	
	Type	V2xFac_Offset_B16Type
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91328][

Name	V2xFac_NodeAttributeSetXYType	
Kind	Structure	
Elements	localNode	
	Type	V2xFac_NodeAttributeXYListType
	Comment	--

	disabled	
	Type	V2xFac_SegmentAttributeXYListType
	Comment	--
	enabled	
	Type	V2xFac_SegmentAttributeXYListType
	Comment	--
	data	
	Type	V2xFac_LaneDataAttributeListType
	Comment	--
	dWidth	
	Type	V2xFac_Offset_B10Type
	Comment	--
	dElevation	
	Type	V2xFac_Offset_B10Type
	Comment	--
	presence	
	Type	V2xFac_NodeAttributeSetXYPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91329][

Name	V2xFac_NodeAttributeSetXYPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	localNode	0x01	Bit 0 (LSB): Optional child present
	bit	disabled	0x02	Bit 1: Optional child present
	bit	enabled	0x04	Bit 2: Optional child present
	bit	data	0x08	Bit 3: Optional child present

	bit	dWidth	0x10	Bit 4: Optional child present
	bit	dElevation	0x20	Bit 5: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91330][

Name	V2xFac_NodeAttributeXYListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_NodeAttributeXYType
	Size	8
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91331][

Name	V2xFac_NodeListXYType	
Kind	Structure	
Elements	nodes	
	Type	V2xFac_NodeSetXYType
	Comment	--
	computed	
	Type	V2xFac_ComputedLaneType
	Comment	--
	choice	
	Type	V2xFac_NodeListXYChoiceType

	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91332][

Name	V2xFac_NodeListXYChoiceType		
Kind	Enumeration		
Range	V2XFAC_NODELISTXY_NODES	0x01	--
	V2XFAC_NODELISTXY_COMPUTED	0x02	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91333][

Name	V2xFac_NodeOffsetPointXYType	
Kind	Structure	
Elements	node_XY1	
	Type	V2xFac_Node_XY_20bType
	Comment	--
	node_XY2	
	Type	V2xFac_Node_XY_22bType
	Comment	--
	node_XY3	
	Type	V2xFac_Node_XY_24bType
	Comment	--
	node_XY4	
	Type	V2xFac_Node_XY_26bType
	Comment	--
	node_XY5	
	Type	V2xFac_Node_XY_28bType

	Comment	--
	node_XY6	
	Type	V2xFac_Node_XY_32bType
	Comment	--
	node_LatLon	
	Type	V2xFac_Node_LLmD_64bType
	Comment	--
	choice	
	Type	V2xFac_NodeOffsetPointXYChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91334][

Name	V2xFac_NodeOffsetPointXYChoiceType		
Kind	Enumeration		
Range	V2XFAC_NODEOFFSETPOINTXY_NODE_XY1	0x01	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_XY2	0x02	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_XY3	0x03	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_XY4	0x04	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_XY5	0x05	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_XY6	0x06	--
	V2XFAC_NODEOFFSETPOINTXY_NODE_LAT_LON	0x07	--
	V2XFAC_NODEOFFSETPOINTXY_REGIONAL	0x08	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91335][

Name	V2xFac_NodeSetXYType

Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_NodeXYType
	Size	63
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91336][

Name	V2xFac_NodeXYType	
Kind	Structure	
Elements	delta	
	Type	V2xFac_NodeOffsetPointXYType
	Comment	--
	attributes	
	Type	V2xFac_NodeAttributeSetXYType
	Comment	--
	presence	
	Type	V2xFac_NodeXYPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91337][

Name	V2xFac_NodeXYPresenceType
Kind	Bitfield

Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	attributes	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91338][

Name	V2xFac_OverlayLaneListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_LaneIDType
	Size	5
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91339][

Name	V2xFac_Position3DType	
Kind	Structure	
Elements	lat	
	Type	V2xFac_LatitudeType
	Comment	--
	long	
	Type	V2xFac_LongitudeType
	Comment	--
	elevation	

	Type	V2xFac_ElevationType
	Comment	--
	presence	
	Type	V2xFac_Position3DPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91340][

Name	V2xFac_Position3DPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	elevation	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91341][

Name	V2xFac_PreemptPriorityListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_SignalControlZoneType
	Size	32
	Comment	--
Description	Namespace: MAPEM	
Variation	--	

Available via	V2xFac.h

]()
[SWS_V2xFac_91342][

Name	V2xFac_SignalControlZoneType
Kind	Structure
Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91343][

Name	V2xFac_RegulatorySpeedLimitType	
Kind	Structure	
Elements	type	
	Type	V2xFac_SpeedLimitTypeType
	Comment	--
	speed	
	Type	V2xFac_VelocityType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91344][

Name	V2xFac_RestrictionClassAssignmentType	
Kind	Structure	
Elements	id	
	Type	V2xFac_RestrictionClassIDType
	Comment	--
	users	
	Type	V2xFac_RestrictionUserTypeListType
	Comment	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91345][

Name	V2xFac_RestrictionClassListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RestrictionClassAssignmentType
	Size	254
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91346][

Name	V2xFac_RestrictionUserTypeListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RestrictionUserTypeType
	Size	16
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91347][

Name	V2xFac_RestrictionUserTypeType	
Kind	Structure	
Elements	basicType	
	Type	V2xFac_RestrictionAppliesToType
	Comment	--
	choice	
	Type	V2xFac_RestrictionUserTypeChoiceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

](
[SWS_V2xFac_91348][

Name	V2xFac_RestrictionUserTypeChoiceType		
Kind	Enumeration		
Range	V2XFAC_RESTRICTIONUSERTYPE_BASIC_TYPE	0x01	--
	V2XFAC_RESTRICTIONUSERTYPE_REGIONAL	0x02	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91349][

Name	V2xFac_RoadLaneSetListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_GenericLaneType

	Size	255
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91350][

Name	V2xFac_RoadSegmentListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RoadSegmentType
	Size	32
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91351][

Name	V2xFac_RoadSegmentReferenceIDType	
Kind	Structure	
Elements	region	
	Type	V2xFac_RoadRegulatorIDType
	Comment	--
	id	
	Type	V2xFac_RoadSegmentIDType
	Comment	--
	presence	
	Type	V2xFac_RoadSegmentReferenceIDPresenceType

	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91352][

Name	V2xFac_RoadSegmentReferenceIDPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	region	0x01	Bit 0 (LSB): Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91353][

Name	V2xFac_RoadSegmentType	
Kind	Structure	
Elements	name	
	Type	V2xFac_DescriptiveNameType
	Comment	--
	id	
	Type	V2xFac_RoadSegmentReferenceIDType
	Comment	--
	revision	
	Type	V2xFac_MsgCountType
	Comment	--
	refPoint	
	Type	V2xFac_Position3DType
	Comment	--
	laneWidth	

	Type	V2xFac_LaneWidthType
	Comment	--
	speedLimits	
	Type	V2xFac_SpeedLimitListType
	Comment	--
	roadLaneSet	
	Type	V2xFac_RoadLaneSetListType
	Comment	--
	presence	
	Type	V2xFac_RoadSegmentPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91354][

Name	V2xFac_RoadSegmentPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	name	0x01	Bit 0 (LSB): Optional child present
	bit	laneWidth	0x02	Bit 1: Optional child present
	bit	speedLimits	0x04	Bit 2: Optional child present
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91355][

Name	V2xFac_SegmentAttributeXYListType
Kind	Structure
Elements	count

	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_SegmentAttributeXYType
	Size	8
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91356][

Name	V2xFac_SpeedLimitListType	
Kind	Structure	
Elements	count	
	Type	uint8
	Comment	--
	values	
	Type	Array of V2xFac_RegulatorySpeedLimitType
	Size	9
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91357][

Name	V2xFac_TimeChangeDetailsType	
Kind	Structure	
Elements	startTime	
	Type	V2xFac_TimeMarkType
	Comment	--
	minEndTime	

	Type	V2xFac_TimeMarkType
	Comment	--
	maxEndTime	
	Type	V2xFac_TimeMarkType
	Comment	--
	likelyTime	
	Type	V2xFac_TimeMarkType
	Comment	--
	confidence	
	Type	V2xFac_TimeIntervalConfidenceType
	Comment	--
	nextTime	
	Type	V2xFac_TimeMarkType
	Comment	--
	presence	
	Type	V2xFac_TimeChangeDetailsPresenceType
	Comment	--
Description	Namespace: MAPEM	
Variation	--	
Available via	V2xFac.h	

]()
[SWS_V2xFac_91358][

Name	V2xFac_TimeChangeDetailsPresenceType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	startTime	0x01	Bit 0 (LSB): Optional child present
	bit	maxEndTime	0x02	Bit 1: Optional child present
	bit	likelyTime	0x04	Bit 2: Optional child present
	bit	confidence	0x08	Bit 3: Optional child present
	bit	nextTime	0x10	Bit 4: Optional child present

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91359][

Name	V2xFac_AdvisorySpeedTypeType		
Kind	Enumeration		
Range	none	0	--
	greenwave	1	--
	ecoDrive	2	--
	transit	3	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91360][

Name	V2xFac_AllowedManeuversType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	maneuverStraightAllowed	0x01	--
	bit	maneuverLeftAllowed	0x02	--
	bit	maneuverRightAllowed	0x04	--
	bit	maneuverUTurnAllowed	0x08	--
	bit	maneuverLeftTurnOnRedAllowed	0x10	--
	bit	maneuverRightTurnOnRedAllowed	0x20	--
	bit	maneuverLaneChangeAllowed	0x40	--
	bit	maneuverNoStoppingAllowed	0x80	--
	bit	yieldAllwaysRequired	0x100	--
	bit	goWithHalt	0x200	--
	bit	caution	0x400	--

	bit	reserved1	0x800	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91361][

Name	V2xFac_AngleType		
Kind	Type		
Derived from	uint16		
Range	0..28800	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91362][

Name	V2xFac_ApproachIDType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91363][

Name	V2xFac_DeltaAngleType		
Kind	Type		
Derived from	sint16		
Range	-150..150	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91364][

Name	V2xFac_DescriptiveNameType		
Kind	Type		
Derived from	V2xFac_StringType		
Range	1..63	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91365][

Name	V2xFac_DrivenLineOffsetLgType		
Kind	Type		
Derived from	sint16		
Range	-32767..32767	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91366][

Name	V2xFac_DrivenLineOffsetSmType		
Kind	Type		
Derived from	sint16		
Range	-2047..2047	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91367][

Name	V2xFac_DSecondType
Kind	Type

Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91368][

Name	V2xFac_ElevationType		
Kind	Type		
Derived from	sint16		
Range	-4096..61439	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91369][

Name	V2xFac_IntersectionIDType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91370][

Name	V2xFac_IntersectionStatusObjectType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	manualControlIsEnabled	0x01	--
	bit	stopTimeIsActivated	0x02	--

	bit	failureFlash	0x04	--
	bit	preemptIsActive	0x08	--
	bit	signalPriorityIsActive	0x10	--
	bit	fixedTimeOperation	0x20	--
	bit	trafficDependentOperation	0x40	--
	bit	standbyOperation	0x80	--
	bit	failureMode	0x100	--
	bit	off	0x200	--
	bit	recentMAPmessageUpdate	0x400	--
	bit	recentChangeInMAPassignedLanesIDsUsed	0x800	--
	bit	noValidMAPisAvailableAtThisTime	0x1000	--
	bit	noValidSPATisAvailableAtThisTime	0x2000	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91371][

Name	V2xFac_LaneAttributes_BarrierType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	median_RevocableLane	0x01	--
	bit	median	0x02	--
	bit	whiteLineHashing	0x04	--
	bit	stripedLines	0x08	--
	bit	doubleStripedLines	0x10	--
	bit	trafficCones	0x20	--
	bit	constructionBarrier	0x40	--
	bit	trafficChannels	0x80	--
	bit	lowCurbs	0x100	--
	bit	highCurbs	0x200	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91372][

Name	V2xFac_LaneAttributes_BikeType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	bikeRevocableLane	0x01	--
	bit	pedestrianUseAllowed	0x02	--
	bit	isBikeFlyOverLane	0x04	--
	bit	fixedCycleTime	0x08	--
	bit	biDirectionalCycleTimes	0x10	--
	bit	isolatedByBarrier	0x20	--
	bit	unsignalizedSegmentsPresent	0x40	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91373][

Name	V2xFac_LaneAttributes_CrosswalkType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	crosswalkRevocableLane	0x01	--
	bit	bicyleUseAllowed	0x02	--
	bit	isXwalkFlyOverLane	0x04	--
	bit	fixedCycleTime	0x08	--
	bit	biDirectionalCycleTimes	0x10	--
	bit	hasPushToWalkButton	0x20	--

	bit	audioSupport	0x40	--
	bit	rfSignalRequestPresent	0x80	--
	bit	unsignalizedSegmentsPresent	0x100	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91374][

Name	V2xFac_LaneAttributes_ParkingType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	parkingRevocableLane	0x01	--
	bit	parallelParkingInUse	0x02	--
	bit	headInParkingInUse	0x04	--
	bit	doNotParkZone	0x08	--
	bit	parkingForBusUse	0x10	--
	bit	parkingForTaxiUse	0x20	--
	bit	noPublicParkingUse	0x40	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91375][

Name	V2xFac_LaneAttributes_SidewalkType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	sidewalk_RevocableLane	0x01	--
	bit	bicyleUseAllowed	0x02	--
	bit	isSidewalkFlyOverLane	0x04	--

	bit	walkBikes	0x08	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91376][

Name	V2xFac_LaneAttributes_StripingType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	stripeToConnectingLanesRevocableLane	0x01	--
	bit	stripeDrawOnLeft	0x02	--
	bit	stripeDrawOnRight	0x04	--
	bit	stripeToConnectingLanesLeft	0x08	--
	bit	stripeToConnectingLanesRight	0x10	--
	bit	stripeToConnectingLanesAhead	0x20	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91377][

Name	V2xFac_LaneAttributes_TrackedVehicleType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	spec_RevocableLane	0x01	--
	bit	spec_commuterRailRoadTrack	0x02	--
	bit	spec_lightRailRoadTrack	0x04	--
	bit	spec_heavyRailRoadTrack	0x08	--
	bit	spec_otherRailType	0x10	--
Description	Namespace: MAPEM			

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91378][

Name	V2xFac_LaneAttributes_VehicleType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	isVehicleRevocableLane	0x01	--
	bit	isVehicleFlyOverLane	0x02	--
	bit	hovLaneUseOnly	0x04	--
	bit	restrictedToBusUse	0x08	--
	bit	restrictedToTaxiUse	0x10	--
	bit	restrictedFromPublicUse	0x20	--
	bit	hasIRbeaconCoverage	0x40	--
	bit	permissionOnRequest	0x80	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91379][

Name	V2xFac_LaneConnectionIDType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91380][

Name	V2xFac_LaneDirectionType

Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	ingressPath	0x01	--
	bit	egressPath	0x02	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91381][

Name	V2xFac_LaneIDType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91382][

Name	V2xFac_LaneSharingType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	overlappingLaneDescriptionProvided	0x01	--
	bit	multipleLanesTreatedAsOneLane	0x02	--
	bit	otherNonMotorizedTrafficTypes	0x04	--
	bit	individualMotorizedVehicleTraffic	0x08	--
	bit	busVehicleTraffic	0x10	--
	bit	taxiVehicleTraffic	0x20	--
	bit	pedestriansTraffic	0x40	--
	bit	cyclistVehicleTraffic	0x80	--

	bit	trackedVehicleTraffic	0x100	--
	bit	pedestrianTraffic	0x200	--
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

]()
[SWS_V2xFac_91383][

Name	V2xFac_LayerIDType		
Kind	Type		
Derived from	uint8		
Range	0..100	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91384][

Name	V2xFac_LayerTypeType		
Kind	Enumeration		
Range	none	0	--
	mixedContent	1	--
	generalMapData	2	--
	intersectionData	3	--
	curveData	4	--
	roadwaySectionData	5	--
	parkingAreaData	6	--
	sharedLaneData	7	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91385][

Name	V2xFac_MergeDivergeNodeAngleType		
Kind	Type		
Derived from	sint16		
Range	-180..180	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91386][

Name	V2xFac_MinuteOfTheYearType		
Kind	Type		
Derived from	uint32		
Range	0..527040	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91387][

Name	V2xFac_MovementPhaseStateType		
Kind	Enumeration		
Range	unavailable	0	--
	dark	1	--
	stop_Then_Proceed	2	--
	stop_And_Remain	3	--
	pre_Movement	4	--
	permissive_Movement_Allowed	5	--
	protected_Movement_Allowed	6	--
	permissive_clearance	7	--
	protected_clearance	8	--
	caution_Conflicting_Traffic	9	--
Description	Namespace: MAPEM		

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91388][

Name	V2xFac_MsgCountType		
Kind	Type		
Derived from	uint8		
Range	0..127	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91389][

Name	V2xFac_NodeAttributeXYType		
Kind	Enumeration		
Range	reserved	0	--
	stopLine	1	--
	roundedCapStyleA	2	--
	roundedCapStyleB	3	--
	mergePoint	4	--
	divergePoint	5	--
	downstreamStopLine	6	--
	downstreamStartNode	7	--
	closedToTraffic	8	--
	safeIsland	9	--
	curbPresentAtStepOff	10	--
	hydrantPresent	11	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](

[SWS_V2xFac_91390]⌈

Name	V2xFac_Offset_B10Type		
Kind	Type		
Derived from	sint16		
Range	-512..511	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91391]⌈

Name	V2xFac_Offset_B11Type		
Kind	Type		
Derived from	sint16		
Range	-1024..1023	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91392]⌈

Name	V2xFac_Offset_B12Type		
Kind	Type		
Derived from	sint16		
Range	-2048..2047	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91393]⌈

Name	V2xFac_Offset_B13Type		
Kind	Type		
Derived from	sint16		
Range	-4096..4095	--	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91394][

Name	V2xFac_Offset_B14Type		
Kind	Type		
Derived from	sint16		
Range	-8192..8191	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91395][

Name	V2xFac_Offset_B16Type		
Kind	Type		
Derived from	sint16		
Range	-32768..32767	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91396][

Name	V2xFac_PedestrianBicycleDetectType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	value	0x00	false if 0, true otherwise
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](
[SWS_V2xFac_91397][

Name	V2xFac_RestrictionAppliesToType		
Kind	Enumeration		
Range	none	0	--
	equippedTransit	1	--
	equippedTaxis	2	--
	equippedOther	3	--
	emissionCompliant	4	--
	equippedBicycle	5	--
	weightCompliant	6	--
	heightCompliant	7	--
	pedestrians	8	--
	slowMovingPersons	9	--
	wheelchairUsers	10	--
	visualDisabilities	11	--
	audioDisabilities	12	--
	otherUnknownDisabilities	13	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91398][

Name	V2xFac_RestrictionClassIDType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](

[SWS_V2xFac_91399]⌈

Name	V2xFac_RoadRegulatorIDType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91400]⌈

Name	V2xFac_RoadSegmentIDType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91401]⌈

Name	V2xFac_RoadwayCrownAngleType		
Kind	Type		
Derived from	sint8		
Range	-128..127	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

⌋()

[SWS_V2xFac_91402]⌈

Name	V2xFac_Scale_B12Type		
Kind	Type		
Derived from	sint16		
Range	-2048..2047	--	--

Description	Namespace: MAPEM
Variation	--
Available via	V2xFac.h

]()
[SWS_V2xFac_91403][

Name	V2xFac_SegmentAttributeXYType		
Kind	Enumeration		
Range	reserved	0	--
	doNotBlock	1	--
	whiteLine	2	--
	mergingLaneLeft	3	--
	mergingLaneRight	4	--
	curbOnLeft	5	--
	curbOnRight	6	--
	loadingzoneOnLeft	7	--
	loadingzoneOnRight	8	--
	turnOutPointOnLeft	9	--
	turnOutPointOnRight	10	--
	adjacentParkingOnLeft	11	--
	adjacentParkingOnRight	12	--
	adjacentBikeLaneOnLeft	13	--
	adjacentBikeLaneOnRight	14	--
	sharedBikeLane	15	--
	bikeBoxInFront	16	--
	transitStopOnLeft	17	--
	transitStopOnRight	18	--
	transitStopInLane	19	--
	sharedWithTrackedVehicle	20	--
	safeIsland	21	--
	lowCurbsPresent	22	--
	rumbleStripPresent	23	--

	audibleSignalingPresent	24	--
	adaptiveTimingPresent	25	--
	rfSignalRequestPresent	26	--
	partialCurbIntrusion	27	--
	taperToLeft	28	--
	taperToRight	29	--
	taperToCenterLine	30	--
	parallelParking	31	--
	headInParking	32	--
	freeParking	33	--
	timeRestrictionsOnParking	34	--
	costToPark	35	--
	midBlockCurbPresent	36	--
	unEvenPavementPresent	37	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91404][

Name	V2xFac_SignalGroupIDType		
Kind	Type		
Derived from	uint8		
Range	0..255	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91405][

Name	V2xFac_SpeedAdviceType
Kind	Type
Derived from	uint16

Range	0..500	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91406][

Name	V2xFac_SpeedLimitTypeType		
Kind	Enumeration		
Range	unknown	0	--
	maxSpeedInSchoolZone	1	--
	maxSpeedInSchoolZoneWhenChildrenArePresent	2	--
	maxSpeedInConstructionZone	3	--
	vehicleMinSpeed	4	--
	vehicleMaxSpeed	5	--
	vehicleNightMaxSpeed	6	--
	truckMinSpeed	7	--
	truckMaxSpeed	8	--
	truckNightMaxSpeed	9	--
	vehiclesWithTrailersMinSpeed	10	--
	vehiclesWithTrailersMaxSpeed	11	--
	vehiclesWithTrailersNightMaxSpeed	12	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91407][

Name	V2xFac_TimeIntervalConfidenceType		
Kind	Type		
Derived from	uint8		
Range	0..15	--	--
Description	Namespace: MAPEM		

Variation	--
Available via	V2xFac.h

](
[SWS_V2xFac_91408][

Name	V2xFac_TimeMarkType		
Kind	Type		
Derived from	uint16		
Range	0..36001	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91409][

Name	V2xFac_VelocityType		
Kind	Type		
Derived from	uint16		
Range	0..8191	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

](
[SWS_V2xFac_91410][

Name	V2xFac_WaitOnStoplineType			
Kind	Bitfield			
Derived from	uint8			
Elements	***Kind***	***Name***	***Mask***	***Description***
	bit	value	0x00	false if 0, true otherwise
Description	Namespace: MAPEM			
Variation	--			
Available via	V2xFac.h			

](

[SWS_V2xFac_91411][

Name	V2xFac_ZoneLengthType		
Kind	Type		
Derived from	uint16		
Range	0..10000	--	--
Description	Namespace: MAPEM		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91424][

Name	V2xFac_EssMobileFrictionType		
Kind	Type		
Derived from	uint8		
Range	0..101	--	--
Description	Namespace: NTCIP		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91425][

Name	V2xFac_EssPrecipRateType		
Kind	Type		
Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: NTCIP		
Variation	--		
Available via	V2xFac.h		

]()

[SWS_V2xFac_91426][

Name	V2xFac_EssPrecipSituationType		
Kind	Enumeration		
Range	other	1	--

	unknown	2	--
	noPrecipitation	3	--
	unidentifiedSlight	4	--
	unidentifiedModerate	5	--
	unidentifiedHeavy	6	--
	snowSlight	7	--
	snowModerate	8	--
	snowHeavy	9	--
	rainSlight	10	--
	rainModerate	11	--
	rainHeavy	12	--
	frozenPrecipitationSlight	13	--
	frozenPrecipitationModerate	14	--
	frozenPrecipitationHeavy	15	--
Description	Namespace: NTCIP		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91427][

Name	V2xFac_EssPrecipYesNoType		
Kind	Enumeration		
Range	precip	1	--
	noPrecip	2	--
	error	3	--
Description	Namespace: NTCIP		
Variation	--		
Available via	V2xFac.h		

]()
[SWS_V2xFac_91428][

Name	V2xFac_EssSolarRadiationType
Kind	Type

Derived from	uint16		
Range	0..65535	--	--
Description	Namespace: NTCIP		
Variation	--		
Available via	V2xFac.h		

]()

8.7.4 Ports

8.7.4.1 V2xFac_V2xFac_DenBs
[SWS_V2xFac_00102][

Name	V2xFac_DenBs		
Kind	ProvidedPort	***Interface***	V2xFacDenBs
Description	Service port for DEN specific service requests		
Variation	--		

]()

8.7.4.2 V2xFac_V2xFac_V2xApplRxIndication_CAM
[SWS_V2xFac_00104][

Name	V2xFac_V2xApplRxIndication_CAM		
Kind	ProvidedPort	***Interface***	V2xApplRxIndicationCam
Description	Port for delivering received CAMs to application layer		
Variation	--		

]()

8.7.4.3 V2xFac_V2xFac_V2xApplRxIndication_DENM
[SWS_V2xFac_00233][

Name	V2xFac_V2xApplRxIndication_DENM		
Kind	ProvidedPort	***Interface***	V2xApplRxIndicationDenm
Description	Port for delivering received DENMs to application layer		
Variation	--		

]()

8.7.4.4 V2xFac_V2xFac_Vdp
[SWS_V2xFac_00105][

Name	V2xFac_Vdp		
Kind	RequiredPort	***Interface***	V2xFacVdp

Description	Port for retrieving data from VDP application
Variation	--

]()

8.7.4.5 V2xFac_V2xFac_V2xApplRxIndication_IVIM [SWS_V2xFac_91605]

Name	V2xFac_V2xApplRxIndication_IVIM		
Kind	ProvidedPort	***Interface***	V2xApplRxIndicationIvim
Description	Port for delivering received IVIMs to application layer		
Variation	--		

]()

8.7.4.6 V2xFac_V2xFac_ V2xApplRxIndication_MAPEM [SWS_V2xFac_91602]

Name	V2xFac_V2xApplRxIndication_MAPEM		
Kind	ProvidedPort	***Interface***	V2xApplRxIndicationMapem
Description	Port for delivering received MAPEMs to application layer		
Variation	--		

]()

8.7.4.7 V2xFac_V2xFac_ V2xApplRxIndication_SPATEM [SWS_V2xFac_91608]

Name	V2xFac_V2xApplRxIndication_SPATEM		
Kind	ProvidedPort	***Interface***	V2xApplRxIndicationSpatem
Description	Port for delivering received SPATEMs to application layer		
Variation	--		

]()

9 Sequence diagrams

9.1 CAM Generation and Transmission

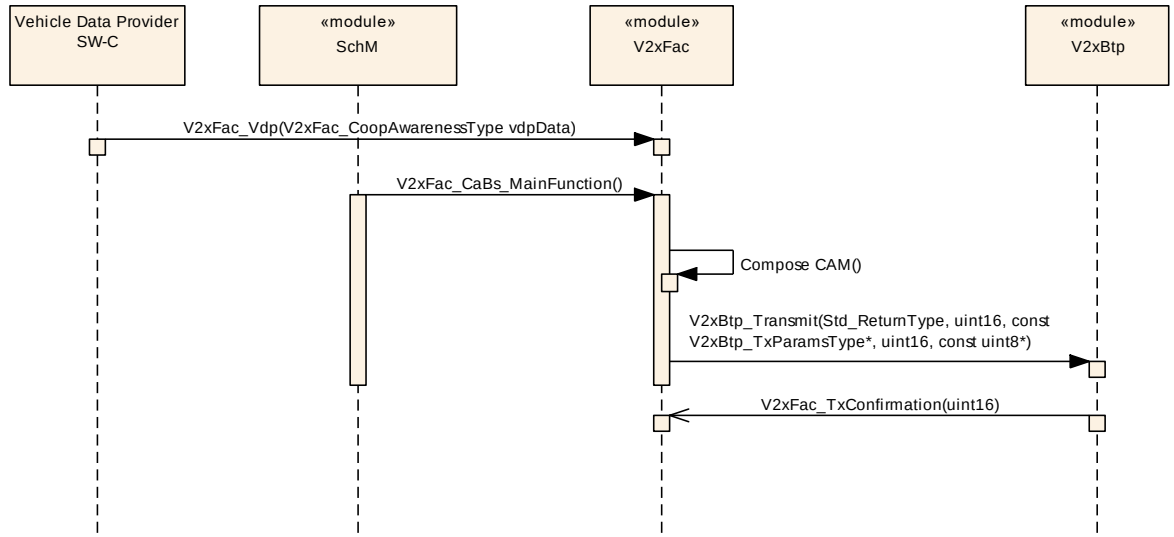


Figure 9.1 CAM Generation and Transmission

9.2 CAM Reception

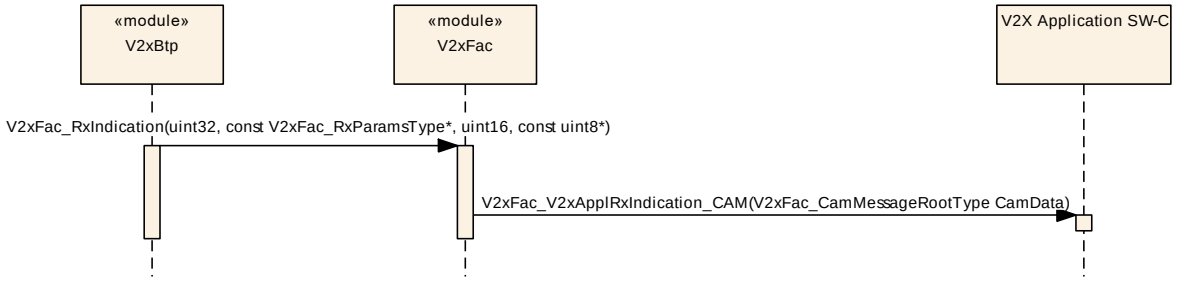


Figure 9.2 CAM Reception

9.3 DENM Generation and Transmission

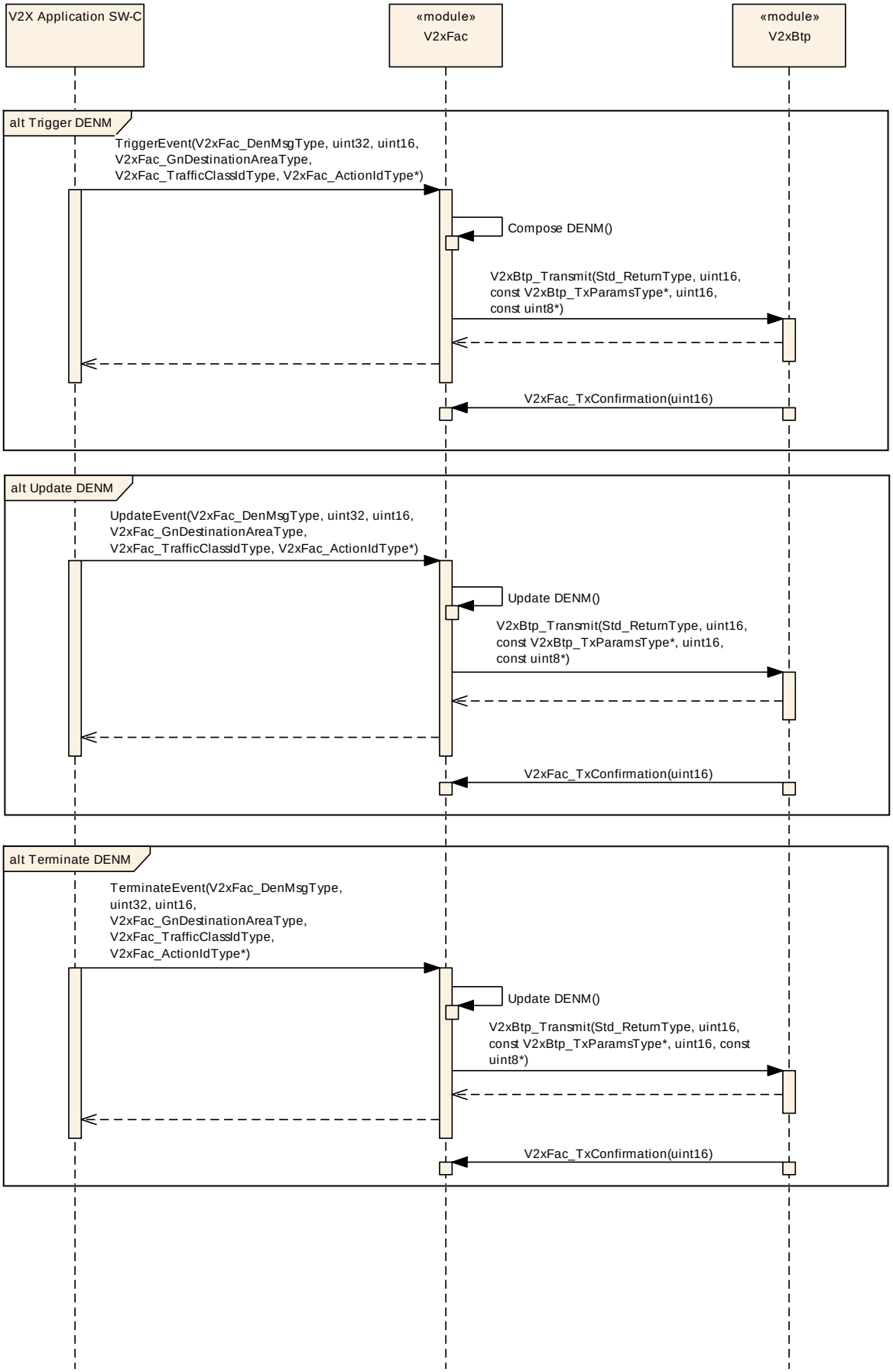

V2X Application SW-C
«module»
V2xFac
«module»
V2xBtp
alt Trigger DENM
TriggerEvent(V2xFac_DenMsgType, uint32, uint16,
V2xFac_GnDestinationAreaType,
V2xFac_TrafficClassIdType, V2xFac_ActionIdType*)
Compose DENM()
V2xBtp_Transmit(Std_ReturnType, uint16,
const V2xBtp_TxParamsType*, uint16,
const uint8*)
V2xFac_TxConfirmation(uint16)
alt Update DENM
UpdateEvent(V2xFac_DenMsgType, uint32, uint16,
V2xFac_GnDestinationAreaType,
V2xFac_TrafficClassIdType, V2xFac_ActionIdType*)
Update DENM()
V2xBtp_Transmit(Std_ReturnType, uint16,
const V2xBtp_TxParamsType*, uint16,
const uint8*)
V2xFac_TxConfirmation(uint16)
alt Terminate DENM
TerminateEvent(V2xFac_DenMsgType,
uint32, uint16,
V2xFac_GnDestinationAreaType,
V2xFac_TrafficClassIdType,
V2xFac_ActionIdType*)
Update DENM()
V2xBtp_Transmit(Std_ReturnType, uint16,
const V2xBtp_TxParamsType*, uint16, const
uint8*)
V2xFac_TxConfirmation(uint16)

Figure 9.3 DENM Generation and Transmission

9.4 DENM Reception

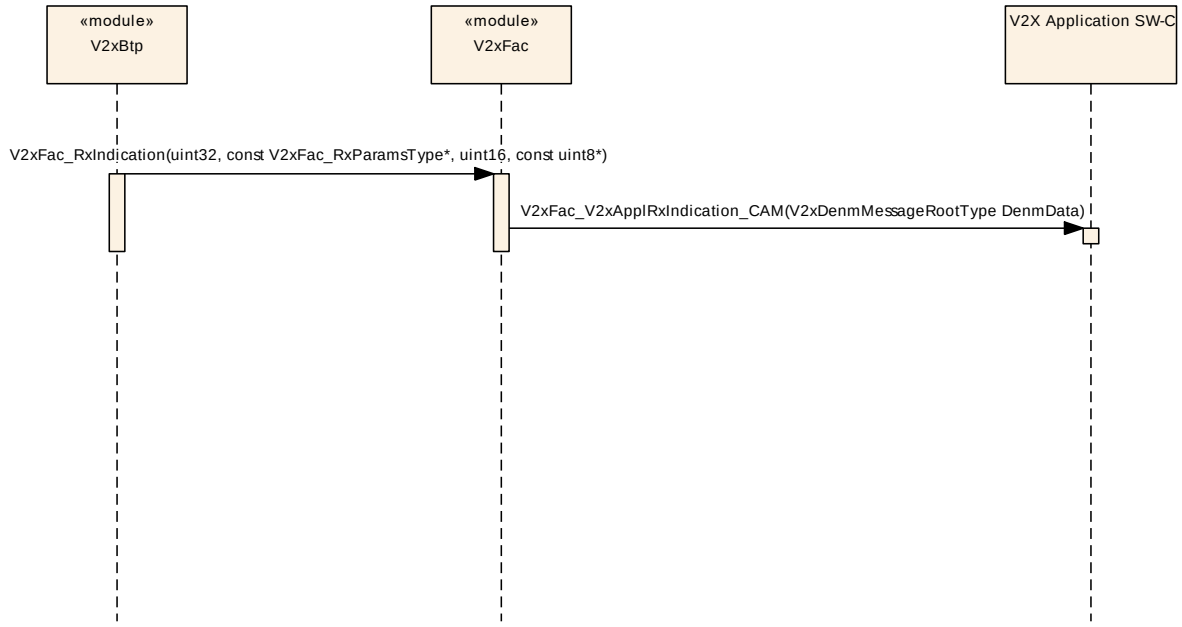


Figure 9.4 DENM Reception

9.5 IVIM Reception

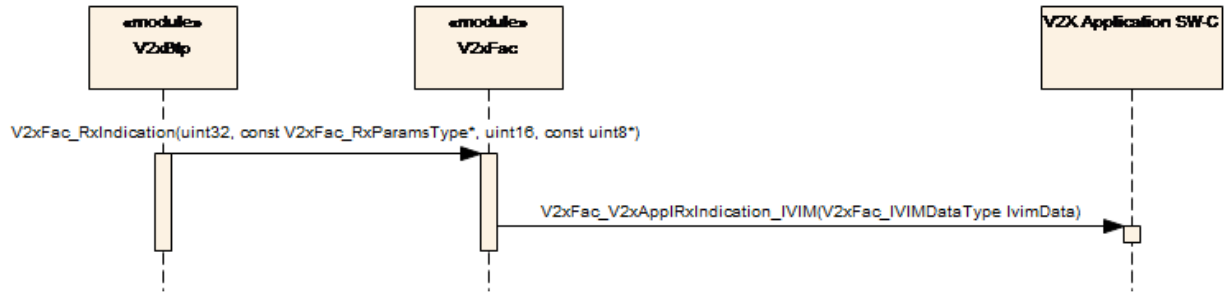


Figure 9.5 IVIM Reception

MAPEM Reception

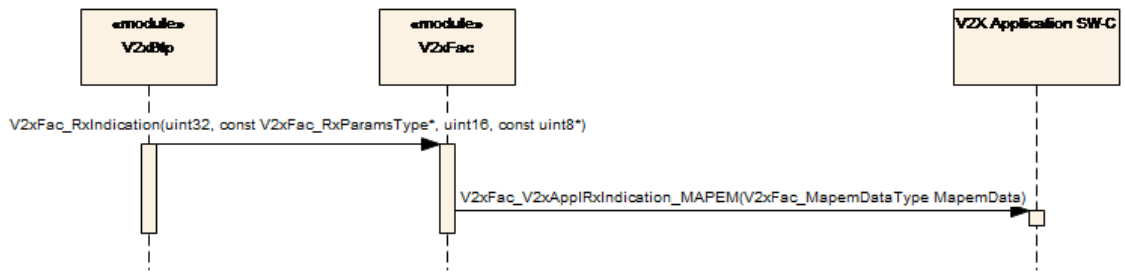


Figure 9.6 MAPEM Reception

9.7 SPATEM Reception

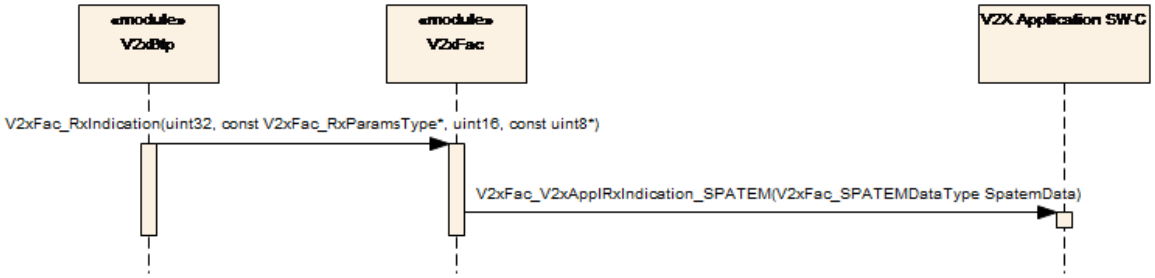


Figure 9.7 SPATEM Reception

10 Configuration specification

Chapter 10.1 specifies the structure (containers) and the parameters of the module V2xFac.

Chapter 10.2 specifies additionally published information of the module V2xFac.

10.1 Containers and configuration parameters

The following chapters summarize all configuration parameters. The detailed meanings of the parameters describe Chapter 7 and Chapter 8.

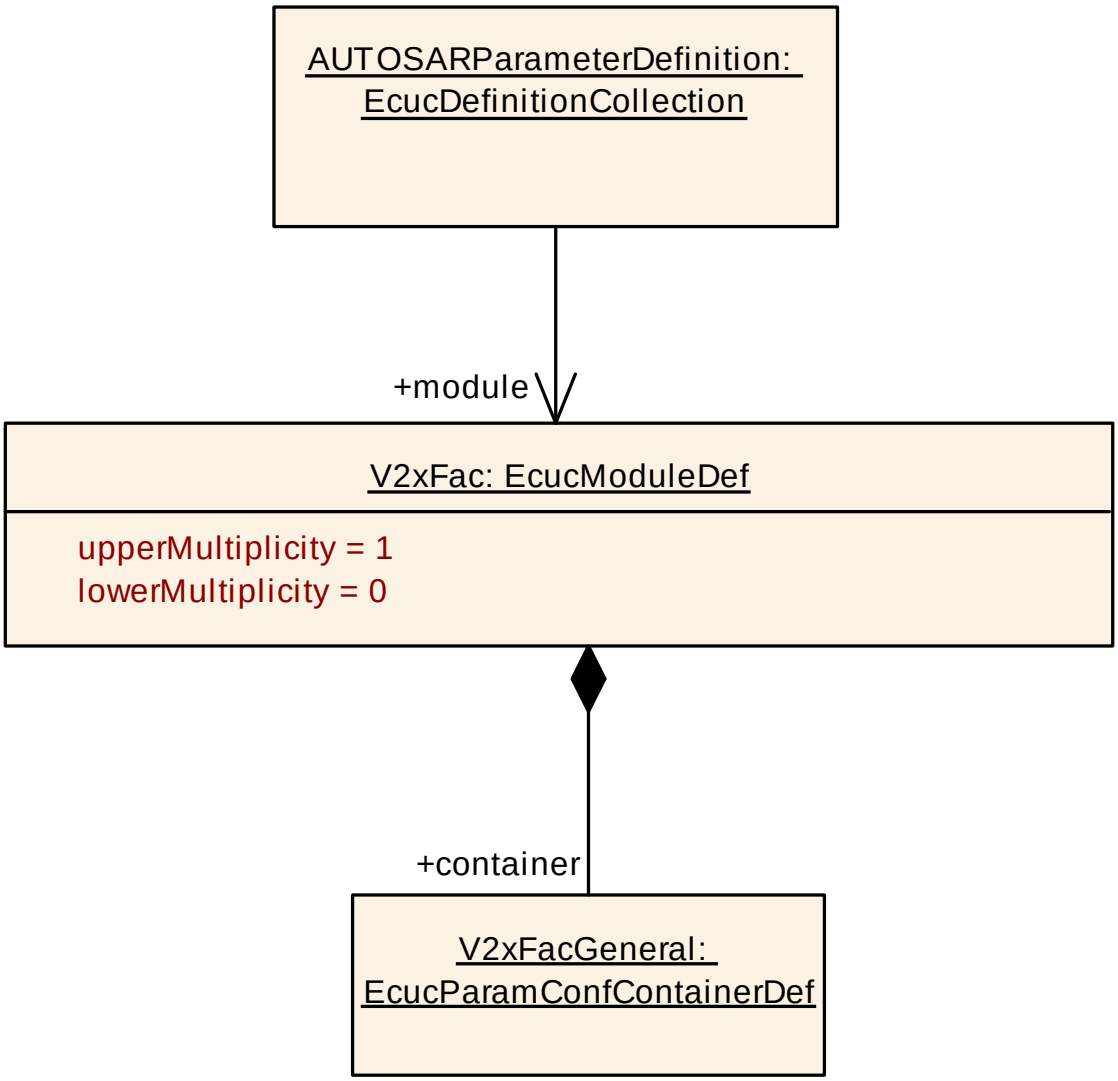
10.1.1 Variants

[SWS_V2xFac_00238] [The V2xFsc module only supports VARIANT-PRE-COMPILE] (SRS_BSW_00345)

10.1.2 V2xFac

SWS Item	**ECUC_V2xFac_00001 :**
Module Name	*V2xFac*
Module Description	Configuration of the V2xFac module.
Post-Build Variant Support	false
Supported Config Variants	VARIANT-PRE-COMPILE

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
V2xFacGeneral	1	This container contains the general configuration parameters of the Vehicle-2-X Basic Transport.



10.1.3 V2xFacGeneral

SWS Item	**ECUC_V2xFac_00002 :**
Container Name	V2xFacGeneral
Parent Container	V2xFac
Description	This container contains the general configuration parameters of the Vehicle-2-X Basic Transport.
Configuration Parameters	

SWS Item	**ECUC_V2xFac_00006 :**
Name	V2xFacCaBsMainFunctionPeriod
Parent Container	V2xFacGeneral
Description	This parameter defines the schedule period of V2xFac_CaBs_MainFunction.Unit: [s]
Multiplicity	1
Type	EcucFloatParamDef
Range	]0 .. INF[
Default value	0.1

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_V2xFac_00005 :**		
Name	V2xFacDenBsMainFunctionPeriod		
Parent Container	V2xFacGeneral		
Description	This parameter defines the schedule period of V2xFac_DenBs_MainFunction.Unit: [s]		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	0.1		
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_V2xFac_00004 :**		
Name	V2xFacDevErrorDetect		
Parent Container	V2xFacGeneral		
Description	Switches the Default Error Tracer (Det) detection and notification ON or OFF. • true: enabled (ON) • false: disabled (OFF)		
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_V2xFac_00008 :**		
Name	V2xFacIviSMainFunctionPeriod		
Parent Container	V2xFacGeneral		
Description	This parameter defines the schedule period of V2xFac_IviS_MainFunction.Unit: [s]		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	0.1		
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_V2xFac_00009 :**

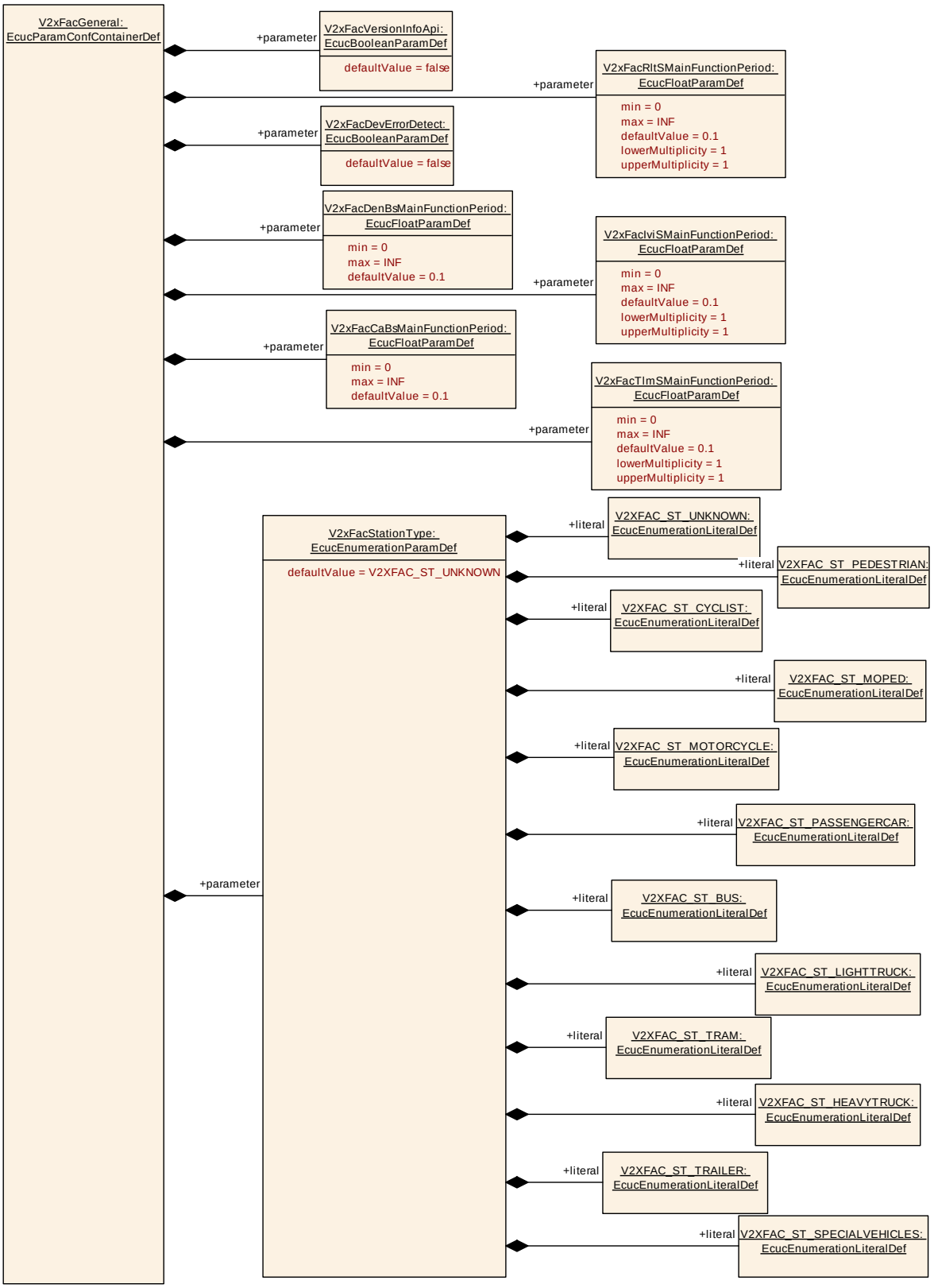
Name	V2xFacRltSMainFunctionPeriod		
Parent Container	V2xFacGeneral		
Description	This parameter defines the schedule period of V2xFac_RltS_MainFunction.Unit: [s]		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	0.1		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_V2xFac_00007 :**		
Name	V2xFacStationType		
Parent Container	V2xFacGeneral		
Description	This configuration value defines the station type information of the originating ITS-S, RoadSideUnit (15) not supported by AUTOSAR.		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	V2XFAC_ST_BUS	--	
	V2XFAC_ST_CYCLIST	--	
	V2XFAC_ST_HEAVYTRUCK	--	
	V2XFAC_ST_LIGHTTRUCK	--	
	V2XFAC_ST_MOPED	--	
	V2XFAC_ST_MOTORCYCLE	--	
	V2XFAC_ST_PASSENGERCAR	--	
	V2XFAC_ST_PEDESTRIAN	--	
	V2XFAC_ST_SPECIALVEHICLES	--	
	V2XFAC_ST_TRAILER	--	
	V2XFAC_ST_TRAM	--	
	V2XFAC_ST_UNKNOWN	--	
Default value	V2XFAC_ST_UNKNOWN		
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_V2xFac_00010 :**		
Name	V2xFacTlmSMainFunctionPeriod		
Parent Container	V2xFacGeneral		
Description	This parameter defines the schedule period of V2xFac_TlmS_MainFunction. Unit: [s]		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	0.1		
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_V2xFac_00003 :**		
Name	V2xFacVersionInfoApi		
Parent Container	V2xFacGeneral		
Description	Enable/disables the API for reading the version information of the V2xFac Module. • true: enabled (ON) • false: disabled (OFF)		
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		

No Included Containers


V2xFacGeneral: EcucParamConfContainerDef
+parameter
V2xFacVersionInfoApi: EcucBooleanParamDef
defaultValue = false
V2xFacRltSMainFunctionPeriod: EcucFloatParamDef
min = 0
max = INF
defaultValue = 0.1
lowerMultiplicity = 1
upperMultiplicity = 1
V2xFacDevErrorDetect: EcucBooleanParamDef
defaultValue = false
V2xFacDenBsMainFunctionPeriod: EcucFloatParamDef
min = 0
max = INF
defaultValue = 0.1
V2xFacIviSMainFunctionPeriod: EcucFloatParamDef
min = 0
max = INF
defaultValue = 0.1
lowerMultiplicity = 1
upperMultiplicity = 1
V2xFacCaBsMainFunctionPeriod: EcucFloatParamDef
min = 0
max = INF
defaultValue = 0.1
V2xFacTlmSMainFunctionPeriod: EcucFloatParamDef
min = 0
max = INF
defaultValue = 0.1
lowerMultiplicity = 1
upperMultiplicity = 1
V2xFacStationType: EcucEnumerationParamDef
defaultValue = V2XFAC_ST_UNKNOWN
+literal
V2XFAC_ST_UNKNOWN: EcucEnumerationLiteralDef
V2XFAC_ST_PEDESTRIAN: EcucEnumerationLiteralDef
V2XFAC_ST_CYCLIST: EcucEnumerationLiteralDef
V2XFAC_ST_MOPED: EcucEnumerationLiteralDef
V2XFAC_ST_MOTORCYCLE: EcucEnumerationLiteralDef
V2XFAC_ST_PASSENGERCAR: EcucEnumerationLiteralDef
V2XFAC_ST_BUS: EcucEnumerationLiteralDef
V2XFAC_ST_LIGHTTRUCK: EcucEnumerationLiteralDef
V2XFAC_ST_TRAM: EcucEnumerationLiteralDef
V2XFAC_ST_HEAVYTRUCK: EcucEnumerationLiteralDef
V2XFAC_ST_TRAILER: EcucEnumerationLiteralDef
V2XFAC_ST_SPECIALVEHICLES: EcucEnumerationLiteralDef

11 Not applicable requirements