

MAP Data

Dutch Profile version 2.1



Over deze publicatie

De internationale ontwikkeling van Smart Mobility zorgt voor flinke vernieuwingen in verkeer, vervoer en mobiliteit. Dit raakt direct ook de verkeersregelinstallaties in de Nederlandse steden en provincies en op rijkswegen. Als verkeersregelinstallaties kunnen communiceren met voertuigen en weggebruikers kunnen weggebruikers worden geïnformeerd over actuele fasewisselingen van verkeersregelinstallaties en hierop hun rijgedrag vroegtijdig aanpassen, kunnen doelgroepen als openbaar vervoer, nood- en hulpdiensten en vrachtwagens conform beleidswensen van overheden worden geprioriteerd en kan data van voertuigen zelf worden gebruikt voor betere netwerkregelingen. Dit bevordert doorstroming, bereikbaarheid, verkeersveiligheid en duurzaamheid, legt de basis voor connected en automated driving en speelt in op een digitale samenleving waarin data en connectiviteit bijdragen aan economisch aantrekkelijke en duurzame steden.

Voor het effectief, veilig en leveranciers- en overheidsonafhankelijk communiceren van intelligente verkeersregelinstallaties (iVRI's) met voertuigen en weggebruikers hebben bedrijven en overheden in het Innovatiepartnership Talking Traffic binnen internationale standaarden gezamenlijk specificaties en koppelvlakken voor iVRI's vastgelegd. Eenduidig gebruik door alle overheden en betrokken bedrijven van deze uniforme afspraken binnen internationale standaarden is noodzakelijk voor interoperabiliteit en een goede en betrouwbare werking. Deze standaarden zijn daarom vastgesteld door de landelijke publiek-private Strategic Committee 'Borgen en beheren iVRI standaarden en producten'. Na vaststelling gelden deze standaarden voor alle bedrijven en overheden die in Nederland (willen gaan) werken aan iVRI's t.b.v. intelligente mobiliteit. Vanuit de rol van onafhankelijk en landelijk kennisinstituut verzamelt CROW deze landelijk vastgestelde standaarden en stelt deze transparant ter beschikking aan overheden, adviesbureaus en leveranciers.

About this publication

The international developments in Smart Mobility technology are boosting innovations for traffic, transportation and mobility. This has a direct effect on traffic control systems in Dutch cities and provinces, as well as national highways. When traffic controllers are able to communicate with vehicles and road users, the latter can be informed about real-time phase changes in traffic lights, enabling them to anticipate and adjust driving behaviour accordingly. Also, special interest groups, such as emergency services, public transport and freight carriers, can be prioritized in line with public policy guidelines. The data provided by vehicles themselves can be utilised to improve network-based traffic control programmes. This has a positive effect on flow, accessibility, traffic safety and sustainability, laying out the fundamentals for connected and automated driving and preparing for a digital society in which data and connectivity contribute to economically viable and sustainable cities.

In order to let intelligent traffic controllers (iVRI) communicate with vehicles and road users in an effective, safe and platform independent way, businesses and governments have created and recorded common specifications and interfaces for iVRI technology. These are compliant to international standards and developed within the framework of the Talking Traffic Innovation partnership. The unambiguous use of these uniform agreements, within international standards, by all governmental bodies and businesses is necessary for interoperability and a good and reliable operation. These standards are adopted by the national public-private Strategic Committee 'Ensuring and maintaining iVRI standards and products'. After adoption, these standards apply to all businesses and governmental bodies in the Netherlands that work, or plan to work, on iVRI technology for intelligent mobility purposes. Being an independent national knowledge institute, CROW collects these national standards and provides them to governments, consultants and suppliers in a transparent way.



Praktische kennis
direct toepasbaar

MAP Data

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1 Introduction

1.1 Purpose of this Document

This document provides the Dutch Profile for the MapData (MAP) message. It offers an interpretation of data elements and describes the use of them as extension to the standards.

1.2 MapData (MAP) Message

The MapData (MAP) message is used to convey many types of geographic road information. At the current time its primary use is to convey one or more intersection lane geometry maps within a single message. The map message content includes such items as complex intersection descriptions, road segment descriptions, high speed curve outlines (used in curve safety messages), and segments of roadway (used in some safety applications). A given single MapData message may convey descriptions of one or more geographic areas or intersections. The contents of this message involve defining the details of indexing systems that are in turn used by other messages to relate additional information (for example, the signal phase and timing via the Signal Phase and Timing (SPAT) message) to events at specific geographic locations on the roadway. The SPAT message is used to convey the current status of one or more signalized intersections. Along with the MapData message (which describes a full geometric layout of an intersection) the receiver of this message can determine the state of the signal phasing and when the next expected phase will occur.

1.3 Assumptions

The following standards have been used to prepare this profile.

- SAE J2735, Dedicated Short Range Communications (DSRC) Message Set Dictionary, March 2016
- ISO TS19091, Intelligent transport systems – Cooperative ITS – Using V2I and I2V communications for applications related to signalized intersections, 2016(E)
- ETSI 103 301, Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services, V1.1.1 (2016-11)
- ETSI TS102 894-2, Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary, V1.2.1 (2014-09)

1.4 Legend

Chapter 2 contains the actual profile describing how the data frames (DFs) and data elements (DEs) shall be used for the implementation of the MapData (MAP) message.

The description of the DFs and DEs can be found in aforementioned standards. The description of the DEs and DFs in this document build upon the descriptions in these standards.

The font style of the name of DEs and DFs indicates the status as defined in the standards:

- **Bold**: required by the standard;
- *Italic*: these are optional in the standard;
- Underlined: one of these can be chosen (OR);

The status in the profile is indicated in a separate column by means of one of the following labels:

- **Mandatory**. This DF or DE is mandatory in the standard and is thus always provided.
- **Profiled**. This DF or DE is mandatory in the profile although optional in the standard. It is therefore assumed that this DF or DE will always be provided.
- **Conditional**. This DF or DE is mandatory in specific conditions and not used in other conditions. The conditions are provided in the profile.
- **Optional**. This DF or DE is optional in the standard as well as in the profile.
- **Used**. This DF or DE is a choice in the standard and used in the profile. It is therefore assumed that this DF or DE can be provided.
- **Not used**. This DF or DE is optional or a choice in the standard but not used in the profile. A response to the use of this DF or DE is therefore not guaranteed, but as the message is compliant with the ASN.1 specification, the message is valid.

- Future use. This DF or DE is not relevant for use cases currently in scope and therefore not profiled in the current version of the profile.
- Bold. Applies to attributes in an enumeration or bitstring and indicates the attribute shall be assigned if applicable. All non-bold attributes are optional.

1.5 Document history

Version	Date	Changes
0.1	22-03-2017	Document and table structure (Martijn Harmenzon)
0.2	27-03-2017	Contribution from Eric Koenders
0.3	04-04-2017	Review and contributions from Jaap Vreeswijk. First draft
0.4	11-04-2017	Version including comments WG meeting 7 th of April
0.5	14-04-2017	Version including new comments from subWG
0.6	19-04-2017	Version including comments WG meeting 14 th of April
0.7	26-04-2017	Version including comments WG meeting 21 st of April
0.8	12-05-2017	Version with new comments, input WG meeting 12 th of May
1.0	15-05-2017	Final version for broader review
1.0	23-05-2017	Minor textual changes
1.1	15-06-2017	Minor revisions which are tracked in Annex c + summary of MAP profile added in Annex A.
1.2	29-06-2017	Final revised version for approval
2.1	22-03-2018	Added: corrections, clarifications and interpretation.

2 Map Data Message (MAP)

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
Header container (ItsPduHeader - ETSI TS 102 894-2 V1.2.1)					
	protocol-Version	Version of the protocol.	Mandatory	A fixed number to identify the current version of the message contents.	1
	messageID	Indicates the type of message.	Mandatory	A number to identify MAP messages	5
	stationID	This is the ID of the station broadcasting the message.	Mandatory	The numerical presentation of the combination of the hexadecimal representation of the RoadRegulatorID and the IntersectionID (which is a multiple of ten).	Set by application.

Level 0: MapData						
0.1	<i>timestamp</i> [MinuteOfTheYear]	The MinuteOfTheYear data element expresses the number of elapsed minutes of the current year in the time system being used (typically UTC time).		Not Used	Because map data is static, the transmission latency is not relevant.	-
0.2	msgIssueRevision [MsgCount]	The msgIssueRevision data element is used to provide a revision related to the issued standard, to be able to identify the compatibility.		Mandatory	Other than the IntersectionGeometry, this element is used to indicate the revision number of the defining standard. 0 = ISO/TS 19091:2016(E)	0
0.3	<i>layerType</i> [LayerType]	The LayerType data element is used to uniquely identify the type of information to be found in a layer of a geographic map fragment such as an intersection.		Optional	This profile assumes that MapData is always used to describe intersections. In that case LayerType is intersectionData.	Set by application
0.4	<i>layerID</i> [LayerID]	The LayerID data element is used to uniquely identify the layers of a geographic map fragment such as an intersection. Used to identify the number of MapData messages needed to describe the complete topology.		Conditional	Mandatory in profile if two MapData messages are needed. Then the LayerID of the first is set to 21, and the second to 22. If the complete topology fits into one MapData message, this field is not used.	Set by application
0.5	<i>intersections</i> [Intersection-GeometryList] (1..32)	The IntersectionGeometry-List data frame consists of a list of Intersection-Geometry entries.	IntersectionGeometry A complete description of an intersection's roadway geometry and its allowed navigational paths (independent of any additional regulatory restrictions that may apply over time or from user classification).	Conditional	Mandatory in profile in case of intersection. The MapData message is always used to transfer the intersection topology. Therefore the geometry is mandatory. One IntersectionGeometry for each independent conflict area. That is: <ul style="list-style-type: none"> If controlled: having own stop lines and signal heads for all conflicting directions. Lanes between conflict areas are not connecting-lanes (volgrichting) of another intersection. 	See level 1

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
0.6	<i>roadSegments</i> [<i>RoadSegmentList</i>] (1..32)	The RoadSegmentList data frame consists of a list of RoadSegment entries.	RoadSegment The RoadSegment data frame is a complete description of a RoadSegment including its geometry and its allowed navigational paths (independent of any additional regulatory restrictions that may apply over time or from user classification) and any current disruptions such as a work zone or incident event.	Future Use		See level 2
0.7	<i>dataParameters</i> [<i>DataParameters</i>]	The DataParameters data frame is used to provide basic (static) information on how a map fragment was processed or determined.		Mandatory	-	-
			<i>processMethod</i>	Not used	-	
			<i>processAgency</i>	Mandatory	Used to indicate the last editor of the MapData.	Set by application
			<i>lastCheckedDate</i>	Mandatory	Used to indicate the date the source data was last checked. Conform ISO 8601.	Set by application
			<i>geoidUsed</i>	Not used	-	
0.8	<i>restrictionList</i> [<i>RestrictionClassList</i>] (1..254)	The RestrictionClassList data frame is used to enumerate a list of user classes which belong to a given assigned index.	RestrictionClassAssignment The RestrictionClass-Assignment data frame is used to assign (or bind) a single RestrictionClassID data element to a list of all user classes to which it applies. A collection of these bindings is conveyed in the RestrictionClassList data frame in the MAP message to travelers. The established index is then used in the lane object of the MAP message, in the ConnectTo data frame, to qualify to whom a signal group ID applies when it is sent by the	Conditional	When restrictions are used within the intersection topology their restriction classes must be defined here.	See level 3

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
	<i>regional</i> [REGION.Reg-MapData]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.	Not Used	The European extension 'MapData-addGrpC' provides "SignalHeadLocation" which defines the XYZ position of a signal head within an intersection and the related signal group identifier.	-

Level 1: IntersectionGeometryList → IntersectionGeometry						
1.1	<i>name</i> [Descriptive-Name]	The DescriptiveName data element is used to provide a human readable and recognizable name for the IntersectionGeometry data frame.		Profiled	Mandatory in Dutch profile as opposed to standard. Human readable and recognizable for road authority. Maximum 63 characters. Shorter is better. Name of the intersection as known by road authority, e.g. "xp31.a" and identical to the name provide under controlledIntersection > name. Refer to the document 'Addendum VRA en geregeld Kruisingsvlak Identificatie, Partnership Talking Traffic, June 28, 2017, the Netherlands'.	Set by application
1.2	id [Intersection-ReferenceID]	The IntersectionReference-ID is a globally unique value set, consisting of an optional RoadRegulatorID and a required IntersectionID assignment, providing an unique mapping to the intersection MAP.	<i>region</i> [RoadRegulatorID]	Profiled	Mandatory in Dutch profile as opposed to standard. For each road operator a RoadRegulatorID is provided in the document 'Addendum VRA en geregeld Kruisingsvlak Identificatie 20170728'.	Set by application
			id [IntersectionID]	Mandatory	The identifier shall be defined by the road operator.	Set by application
1.3	revision [MsgCount]	The MsgCount data element is used to provide a sequence number within a stream of messages with the same DSRCmsgID and from the same sender. Depending on the application the sequence number may change with every message or may remain		Mandatory	The revision number must be increased by 1 each time the MapData of this intersection changes. The revision numbers of SPAT and MAP must be the same as an indication that the right MAP	Set by application

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
]	fixed during a stream of messages when the content within each message has not changed from the prior message sent.		version is used.		
1.4	refPoint [Position3D]	The Position3D data frame provides a precise location in the WGS-84 coordinate system, from which short offsets may be used to create additional data using a flat earth projection centred on this location.	Mandatory	Serves to decode the offsets, the centre of an intersection (conflict area) is used.	See level 12	
1.5	<i>laneWidth</i> <i>[LaneWidth]</i>	The LaneWidth data element conveys the width of a lane in units of 1 cm.	Mandatory	Mandatory in profile as opposed to standard. The default lane width is 3 meters.	300	
1.6	<i>speedLimits</i> <i>[SpeedLimitList]</i> <i>(1..9)</i>	The SpeedLimitList data frame consists of a list of SpeedLimit entries.	RegulatorySpeedLimit The RegulatorySpeedLimit data frame is used to convey a regulatory speed about a lane, lanes, or roadway segment.	Profiled	Mandatory in profile as opposed to standard. The global speed limit used within this intersection. Can be overridden on GenericLane level. If one limit applies to all vehicles, only one value is used, with SpeedLimitType set to vehicleMaxSpeed. An additional value may be used for other types.	See level 4
1.7	[laneSet] LaneList (1..255)	The LaneList data frame consists of a list of GenericLane entries.	GenericLane The GenericLane data frame is used for all types of lanes, e.g. motorized vehicle lanes, crosswalks, medians. The GenericLane describes the basic attribute information of the lane.	Mandatory	All lanes relevant for traffic shall be described, also lanes without a SignalGroup. The 'multipleLanesTreatedAsOneLane' as part of LaneSharing shall not be used. Only lanes fully independent from the intersection (e.g. parallel road) may be excluded.	See level 5
1.8	<i>preemptPriorityData</i> <i>[PreemptPriorityList]</i> <i>(1..32)</i>	The PreemptPriorityList data frame consists of a list of RegionalSignalControl-Zone entries.	SignalControlZone	Not Used	Not defined yet in the standards.	-
1.9	<i>regional</i> <i>[REGION.Reg-IntersectionGeometry]</i>	The element is used for additional "regional information", as defined in ISO/PDTS 19091.		Not used	No extension are defined in standard.	-

Level 2: RoadSegmentList → RoadSegment						
2.1	<i>name</i> <i>[Descriptive-Name</i> <i>]</i>	The DescriptiveName data element is used to provide a human readable and recognizable name for the RoadSegment data frame.		Future Use	For application at intersections, the RoadSegmentList is not used.	-
2.2	id	The RoadSegmentReferenceID	<i>region</i>	Future Use	For application at intersections, the	-

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
	[RoadSegment-ReferenceID]	data frame is used to convey the RoadSegmentID which is unique to a given road segment of interest, and also the RoadRegulatorID assigned to the region in which it is operating (when required).	<i>[RoadRegulatorID]</i> The RoadRegulatorID is a globally unique identifier assigned to an entity responsible for assigning Intersection IDs in the region over which it has such authority.		RoadSegmentList is not used.	
id [RoadSegmentID] The RoadSegmentID is used to uniquely define a section of roadway within a country or region.			Future Use	For application at intersections, the RoadSegmentList is not used.	-	
2.3	revision [MsgCount]	The MsgCount data element is used to provide a sequence number within a stream of messages with the same DSRCmsgID and from the same sender. Depending on the application the sequence number may change with every message or may remain fixed during a stream of messages when the content within each message has not changed from the prior message sent.	Future Use	For application at intersections, the RoadSegmentList is not used.	-	
2.4	refPoint [Position3D]	The Position3D data frame provides a precise location in the WGS-84 coordinate system, from which short offsets may be used to create additional data using a flat earth projection centered on this location.	Future Use	For application at intersections, the RoadSegmentList is not used.	-	
2.5	<i>laneWidth</i> <i>[LaneWidth]</i>	The LaneWidth data element conveys the width of a lane.	Future Use	For application at intersections, the RoadSegmentList is not used.	-	
2.6	<i>speedLimits</i> <i>[SpeedLimitList]</i> <i>(1..9)</i>	The SpeedLimitList data frame consists of a list of SpeedLimit entries.	RegulatorySpeedLimit The RegulatorySpeedLimit data frame is used to convey a regulatory speed about a lane, lanes, or roadway segment.	Future Use	For application at intersections, the RoadSegmentList is not used.	-
2.7	roadLaneSet [RoadLaneSetList] (1..255)	The RoadLaneSetList data frame consists of a list of GenericLane entries used to describe a segment of roadway.	GenericLane The GenericLane data frame is used for all types of lanes, e.g. motorized vehicle lanes,	Future Use	For application at intersections, the RoadSegmentList is not used.	-

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		crosswalks, medians. The GenericLane describes the basic attribute information of the lane.			
2.8	<i>regional</i> [REGION.Reg-RoadSegment]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.	Future Use	For application at intersections, the RoadSegmentList is not used. No extensions are defined in the standard.	-

Level 3: RestrictionClassList → RestrictionClassAssignment					
3.1	id [RestrictionClassID]	The RestrictionClass data element defines an intersection-unique value to convey data about classes of users. The mapping used varies with each intersection and is defined in the MAP message if needed. The defined mappings found there are used to determine when a given class is meant. The typical use of this element is to map additional movement restrictions or rights (in both the MAP and SPAT messages) to special classes of users (trucks, high sided vehicles, special vehicles etc.). There is the general presumption that in the absence of this data, any allowed movement extends to all users.	Mandatory	A number is defined for each restriction class required for the intersection.	Set by application Starts at 0
3.2	users [Restriction-UserTypeList] (1..16)	The RestrictionUserTypeList data frame consists of a list of RestrictionUserType entries.	Conditional	Lists all users where this RestrictionClass applies to. For example busses and taxis.	See level 12

Level 4/11: SpeedLimitList → RegulatorySpeedLimit					
4.1	type [SpeedLimitType]	The SpeedLimitType data element relates the type of speed limit to which a given speed refers.	Mandatory	Types: <ul style="list-style-type: none"> unknown, maxSpeedInSchoolZone, maxSpeedInSchoolZoneWhenChildrenArePresent, maxSpeedInConstructionZone, vehicleMinSpeed, vehicleMaxSpeed, vehicleNightMaxSpeed, truckMinSpeed, truckMaxSpeed, truckNightMaxSpeed, vehiclesWithTrailersMinSpeed, 	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
				<ul style="list-style-type: none"> vehiclesWithTrailersMaxSpeed, vehiclesWithTrailersNightMaxSpeed <p>Only vehicleMaxSpeed is mandatory, all other types are optional.</p>	
4.2	speed [Velocity]	This data element represents the velocity of an object, typically a vehicle speed or the recommended speed of travel along a roadway, expressed in unsigned units of 0.02 meters per second. When used with motor vehicles it may be combined with the transmission state to form a data frame for use.	Mandatory	The maximum speed in m/s in units of 0.02 m/s.	Set by application

Level 5: LaneList → GenericLane					
5.1	laneID [LaneID]	The LaneID data element conveys an assigned index that is unique within an intersection. It is used to refer to that lane by other objects in the intersection map data structure. Lanes may be ingress (inbound traffic) or egress (outbound traffic) in nature, as well as barriers and other types of specialty lanes.	Mandatory	Each lane gets a unique number within the intersection. It is tempting to use the Dutch lane numbering scheme here, but the value is limited to 255. Therefore LaneIDs typically are numbered continuously starting at 1, but other methods are permitted (incl. skipping one number) as long as no additional meaning is put on the number which cannot be guaranteed. It is assumed that receivers of the MAP message always derive the Lane ID's from the latest received MAP message.	Set by application Start at 1
5.2	<i>name</i> [DescriptiveName]	The DescriptiveName data element is used to provide a human readable and recognizable name for the GenericLane data frame.	Profiled	Mandatory in profile as opposed to standard. It is suggested to use the number of signal head or, otherwise (incl. egress lanes) a random name/number. The shorter, the better. In case multiple signal heads serve one lane, the signal head for regular (motorised) traffic is used.	Set by application
5.3	<i>ingressApproach</i> [ApproachID]	The ApproachID data element is used to relate the index of an approach, either ingress or egress within the subject lane.	Profiled	Mandatory in profile for ingress lanes as opposed to standard. Number used to group all ingress lanes of an arm into one group. This value is used to find all other lanes of an arm when driving on one of them, for example before the road fans out. Cycling and pedestrians lanes have the same ApproachID as the approach they cross (therefore should be excluded to find all vehicle driving lanes). Pedestrian lanes which relate to both an ingress and egress approach (e.g. crossing without	Start at 1.

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
				safe island), have both the ingressApproachID and egressApproachID assigned (again the same ApproachID's as the approaches they cross). All bicycle lanes (separated from vehicle lanes) in one quadrant of an intersection have the same ingressApproachID which is unique within the intersection. Bicycle lanes at safe islands have the ApproachID set in the same manner as pedestrian lanes, i.e. the ingress or egress ApproachID of the approach they cross.		
5.4	<i>egressApproach</i> [ApproachID]	The ApproachID data element is used to relate the index of an approach, either ingress or egress within the subject lane.	Profiled	Mandatory in profile for egress lanes as opposed to standard. Number used to group all egress lanes of an arm into one group. This value is used to find all other lanes of an arm when driving on one of them, for example before the road fans out. Pedestrians lanes have the same ApproachID as the approach they cross (therefore should be excluded to find all vehicle driving lanes). Pedestrian lanes which relate to both an ingress and egress approach (e.g. crossing without safe island), have both the ingressApproachID and egressApproachID assigned (again the same ApproachID's as the approaches they cross). All bicycle lanes (separated from vehicle lanes) in one quadrant of an intersection have the same ingressApproachID which is unique within the intersection. Bicycle lanes at safe islands have the ApproachID set in the same manner as pedestrian lanes, i.e. the ingress or egress ApproachID of the approach they cross.	Start at 1.	
5.5	laneAttributes [LaneAttributes]	The LaneAttributes data frame holds all of the constant attribute information of any lane object (as well as denoting the basic lane type itself) within a single structure. Constant attribute information are those values which do not change	directionalUse [LaneDirection]	Mandatory	Set according to the layout of the intersection. Typically used for pedestrian lanes or bidirectional bicycle paths. Bitstring (size = 2), with bits as defined: Ingresspath (0) Egresspath (1)	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		over the path of the lane, such as the direction of allowed travel. Other lane attribute information can change at or between each node.			
		<p>outwards away from the intersection. Therefore, the ingress direction is from the end of the path to the stop line and the egress direction is from the stop line outwards.</p> <p>sharedWith [LaneSharing]The LaneSharing data element is used to denote the presence of other user types (travel modes) who have an equal right to access and use the lane. The typical use is to alert the user of the MAP data that additional traffic of another mode may be present in the same spatial lane.</p>	Mandatory	<p>To be filled according to the allowed traffic.</p> <p>With bits as defined: overlappingLaneDescriptionProvided (0) multipleLanesTreatedAsOneLane (1) -- not permitted in profile as all lanes shall be described. otherNonMotorizedTrafficTypes (2) individualMotorizedVehicleTraffic (3) -- includes all motorized traffic including busses and taxis, i.e. normal operation. Shall not be used in combination with bits 4 and 5. busVehicleTraffic (4) taxiVehicleTraffic (5) pedestriansTraffic (6) cyclistVehicleTraffic (7) trackedVehicleTraffic (8) pedestrianTraffic (9) use 6 instead (error)</p>	Set by application
		<p>laneType [LaneTypeAttributes] The LaneTypeAttributes data frame is used to hold attribute information specific to a given lane type. It is typically used in the LaneAttributes data frame as part of an overall description of a lane object.</p>	Mandatory	To be filled according to the allowed traffic.	See level 6
		<p><i>regional</i> <i>[REGION.Reg-LaneAttributes]</i> The element is used for additional "regional information".</p>	Not Used	The element is used for additional "regional information", as defined in ISO/PDTS 19091.	-

Standard			Profile				
Level	Field	Meaning	Status	Content	Value		
				<p>computed [ComputedLane]</p> <p>The ComputedLane data frame is used to contain information needed to compute one lane from another (hence the name). The new lane is expressed as an X,Y offset from the first point of the source lane. Any attribute information found within the node of the source lane list cannot be changed and must be reused.</p> <p>A lane path computed by translating the data defined by another lane</p>	Not used	The chance lanes have exactly the same shape is very small, except for multi-lane roads. Moreover, all lanes shall described individually (also see row 1.7).	See level 8
5.8	<i>connectsTo</i> <i>[ConnectsToList]</i> <i>(1..16)</i>	The ConnectsToList data structure is used in the generic lane descriptions to provide a sequence of other defined lanes to which each lane connects beyond its stop point.	<p>Connection</p> <p>The Connection data structure is used in the ConnectsToList data frame to provide data about how the stop line at the end of a single lane connects to another lane beyond its stop point.</p>	Profiled	<p>Mandatory in profile as opposed to standard, for ingress lanes with a signal group.</p> <ul style="list-style-type: none"> Each ingress lane of an intersection must be connected to an egress lane of the current intersection or an ingress lane of the (another) intersection. All egress lanes of the intersection should be described, either as egress lane of the current intersection OR as ingress lane of another intersection if this intersection is described within the same MAP. It is not allowed to connect to ingress lanes of another intersection which is not described in this MAP. Pedestrian lanes are defined as bi-directional ingress lanes, the Connection connects to the ingress lane at the other side of the road. In case the Connection connects one ingress lane to another ingress lane (e.g. of another intersection), it is notable that the first node of 	See level 9	

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
				the 1st ingress lane and the last node of the 2nd ingress lane must be connected (as opposed to only first nodes in case of ingress-egress connections).		
5.9	<i>overlays</i> [<i>OverlayLaneList</i>] (1..5)	The OverlayLaneList data frame is a sequence of lane IDs which refers to lane objects that overlap or overlay the current lane's spatial path.	LaneID The LaneID data element conveys an assigned index that is unique within an intersection. It is used to refer to that lane by other objects in the intersection map data structure. Lanes may be ingress (inbound traffic) or egress (outbound traffic) in nature, as well as barriers and other types of specialty lanes.	Not used	Out of scope.	-
5.10	<i>Regional</i> [<i>REGION.Reg-GenericLane</i>] (1..4)	The element REGION.Reg-GenericLane is used for additional "regional information", as defined in ISO/PDTS 19091.		Not used	'ConnectionTrajectory-addGrpC' can be used to describe the path across the conflict area of the intersection. Also used to describe attributes which are located on a ConnectionTrajectory.	-
			addGrpC [ConnectionTrajectory-addGrpC] 'ConnectionTrajectory-addGrpC' can be used to describe the path across the conflict area of the intersection.	Not used	As regional is limited to 4, a maximum of 4 connectionTrajectories can be provided for each lane. Therefore, connectionTrajectory shall be reserved for connections for motorised traffic, complex turning manoeuvres and connections of which the NodeAttributes are essential. In case an ingress lane connects to more than 4 egress lanes, the most right egress lanes must be defined first.	See level 13

Level 6: LaneTypeAttributes						
6.1	<u>vehicle</u> [<u>LaneAttributes-Vehicle</u>]	The LaneAttributes-Vehicle data element relates specific properties found in a vehicle lane type. This data element provides a means to denote that the use of a lane is restricted to certain vehicle types.		Used	Containing attributes of vehicle lane type. <ul style="list-style-type: none"> • isVehicleRevocableLane (0) • isVehicleFlyOverLane (1) • hovLaneUseOnly (2) • restrictedToBusUse (3) 	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
				<ul style="list-style-type: none"> • restrictedToTaxiUse (4) • restrictedFromPublicUse (5) -- e.g. driveway of emergency vehicle station • hasIRbeaconCoverage (6) • permissionOnRequest (7) 	
6.2	crosswalk [LaneAttributes-Crosswalk]	The LaneAttributes-Crosswalk data element relates specific properties found in a crosswalk lane type.	Used	Containing attributes of crosswalk lane type. <ul style="list-style-type: none"> • crosswalkRevocableLane (0) • bicycleUseAllowed (1) • isXwalkFlyOverLane (2) – dan beschrijven we die niet • fixedCycleTime (3) • biDirectionalCycleTimes (4) • hasPushToWalkButton (5) • audioSupport (6) -- 'rateltikker' • rfSignalRequestPresent (7) -- 'radio device to request extended green' • unsignalizedSegmentsPresent (8) 	Set by application
6.3	bikeLane [LaneAttributes-Bike]	The LaneAttributes-Bike data element relates specific properties found in a bicycle lane type.	Used	Containing attributes of bike lane type. <ul style="list-style-type: none"> • bikeRevocableLane (0) • pedestrianUseAllowed (1) • isBikeFlyOverLane (2) • fixedCycleTime (3) • biDirectionalCycleTimes (4) • isolatedByBarrier (5) • unsignalizedSegmentsPresent (6) 	Set by application
6.4	sideWalk [LaneAttributes-Sidewalk]	The LaneAttributes-Sidewalk data element relates specific properties found in a sidewalk lane type.	Not Used	Containing attributes of sidewalk lane type. Sidewalks are not considered in the profile.	Set by application
6.5	median [LaneAttributes-Barrier]	The LaneAttributes-Barrier data element relates specific properties found in a Barrier or Median lane type (a type of lane object used to separate traffic lanes).	Not Used	Containing attributes of barrier lane type. Barriers are not considered in the profile.	Set by application
6.6	striping [LaneAttributes-Striping]	The LaneAttributes-Striping data element relates specific properties found in various types of ground striping lane types. This includes various types of painted lane ground striping and iconic information needs to convey information in a complex	Not Used	Containing attributes of striping lane type. Striping is not considered in the profile.	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		intersection. Typically, this consists of visual guidance for drivers to assist them to connect across the intersection to the correct lane. Such markings are typically used with restraint and only under conditions when the geometry of the intersection makes them more beneficial than distracting.			
6.7	trackedVehicle [LaneAttributesTrackedVehicle]	The LaneAttributes-TrackedVehicle data element relates specific properties found in a tracked vehicle lane types (trolley and train lanes). The term "rail vehicle" can be considered synonymous. In this case, the term does not relate to vehicle types with tracks or treads.	Used	Containing attributes of tracked vehicle lane type. <ul style="list-style-type: none"> spec-RevocableLane (0) spec-commuterRailRoadTrack (1) spec-lightRailRoadTrack (2) -- i.e. - tram spec-heavyRailRoadTrack (3) -- i.e. train spec-otherRailType (4) -- i.e. trolleybus 	Set by application
6.8	parking [LaneAttributes-Parking]	The LaneAttributes-Parking data element relates specific properties found in a vehicle parking lane type.	Not Used	Containing attributes of parking lane type. Parking is not considered in the profile.	Set by application

Level 7: NodeSetXY → NodeXY						
7.1	delta [NodeOffsetPointXY]	The NodeOffsetPointXY data frame presents a structure to hold different sized data frames for a single node point in a lane.	node-XY1 [Node-XY-20b]	Used	Applied as appropriate, subject to distance to previous node point.	Set by application.
			A 20-bit node type with offset values from the last point in X and Y. Node is within 5.11m of last node.			
			node-XY2 [Node-XY-22b]	Used	Applied as appropriate, subject to distance to previous node point.	Set by application.
		A 22-bit node type with offset values from the last point in X and Y. Node is within 10.23m of last node.				
		node-XY3 [Node-XY-24b]	Used	Applied as appropriate, subject to distance to previous node point.	Set by application.	
		A 24-bit node type with offset values from the last point in X and Y. Node is within 20.47m of				

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		point at which it is used.		<p>(1) stopline</p> <p>(2) roundedCapStyleA</p> <p>(3) roundedCapStyleB</p> <p>(4) mergePoint</p> <p>(5) divergePoint</p> <p>(6) downstreamStopLine</p> <p>(7) downstreamStartNode</p> <p>(8) closedToTraffic</p> <p>-- nice to have</p> <p>(9) safelIsland</p> <p>(10) curbPresentAtStepOff</p> <p>(11) hydrantPresent</p> <p>Desired extension (not used in this version of the profile):</p> <p>(12) yield</p> <p>-- used to indicate presence of yield marking on the pavement, relevant when the intersection controller is off or in case of amber flashing.</p>	
		<p><i>disabled</i> [SegmentAttributeXYList] (1..8)</p> <p>The disabled data frame consists of a list of SegmentAttribute-XY entries. Attribute states which are disabled at this node point.</p>	Conditional	<p>Mandatory in profile as opposed to standard, if available and when applicable. Attributes are enabled/disabled as seen from the order of the nodes. i.e. inside out from the intersection. The functional logic, however, should be provided as seen from the direction of driving (e.g. mergingLaneLeft indicates the presence of another lane on the left side of the current lane, as seen from the driving direction). For bidirectional lanes, the order of the nodes defines the direction which must be considered the 'driving direction' for defining SegmentAttributes.</p> <p>Up to 8 segment attributes can be described out of the following types:</p> <p>(0) reserved</p> <p>(1) doNotBlock</p> <p>(2) whiteLine</p>	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
				<p>-- nice to have for segments longer than 15 meters. If set, the whiteLine is present at the left hand side of the lane.</p> <p>(3) mergingLaneLeft -- used to indicate that a lane change to the left lane is possible and allowed.</p> <p>(4) mergingLaneRight -- used to indicate that a lane change to the right lane is possible and allowed.</p> <p>(5) curbOnLeft (6) curbOnRight (7) loadingzoneOnLeft (8) loadingzoneOnRight (9) turnOutPointOnLeft (10) turnOutPointOnRight</p> <p>-- 9/10: in case a lane overlaps with a conflict area caused by a small side road</p> <p>(11) adjacentParkingOnLeft (12) adjacentParkingOnRight (13) adjacentBikeLaneOnLeft (14) adjacentBikeLaneOnRight</p> <p>-- 13/14: in case of shared lane but with marked bicycle part.</p> <p>(15) sharedBikeLane -- bicycle street</p> <p>(16) bikeBoxInFront -- 16: typical use OFOS</p> <p>(17) transitStopOnLeft (18) transitStopOnRight</p> <p>-- nice to have</p> <p>(19) transitStopInLane -- nice to have</p> <p>(20) sharedWithTrackedVehicle (21) safeIsland (22) lowCurbsPresent (23) rumbleStripPresent (24) audibleSignalingPresent (25) adaptiveTimingPresent</p>	

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
				(26) rfSignalRequestPresent (27) partialCurbIntrusion (28) taperToLeft (29) taperToRight (30) taperToCenterLine -- 28-30 shall only be used with merging point (not diverging points). (31) parallelParking (32) headInParking (33) freeParking (34) timeRestrictionsOnParking (35) costToPark (36) midBlockCurbPresent (37) unEvenPavementPresent Desired extension, not part of this profile: (38) isolatedByBarrier	
		<i>enabled</i> <i>[SegmentAttributeXYList]</i> <i>(1..8)</i> The enabled data frame consists of a list of SegmentAttribute-XY entries which are enabled at this node point and which remain enabled until disabled or the lane ends.	Conditional	Mandatory in profile as opposed to standard, if applicable. Up to 8 segment attributes can be described. See previous.	Set by application
		<i>data</i> <i>[LaneDataAttributeList]</i> <i>(1..8)</i> The LaneDataAttributeList data frame consists of a list of LaneDataAttribute entries. Attributes which require an additional data values some of these are local to the node point, while others persist with	Conditional	Mandatory in profile as opposed to standard, if applicable. Only used to indicate speedLimits, if they are different than the global speed limit of the Intersection. The new speedLimit provided persists with the provided values for all nodes unless changed again. Note that changes must be provided based on the order of the nodes, i.e. inside out from the intersection.	See level 10

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		the provided values until changed and this is indicated in each entry.			
		<i>dWidth</i> [Offset-B10] A value added to the current lane width at this node and from this node onwards.	Conditional	Only used for motorised traffic lanes. Mandatory in case the smallest width of the lane is < 2,75m. The current lane width is defined on the top level (default 3 meters). Widths smaller than 2,75m shall be measured accurately and the dWidth is provided at the first node of the lane only.	Set by application.
		<i>dElevation</i> [Offset-B10] A value added to the current Elevation (i.e. the elevation at the previous node) which applies at this node and from this node onwards.	Optional	The current elevation is defined on the top level as part of the reference position. Recommended if the road gradient, compared to the previous node, is more than 2%, which is considered the minimum gradient which affects the road capacity. Note that changes must be provided based on the order of the nodes, i.e. inside out from the intersection.	Set by application.
		<i>regional</i> [REGION.Reg-NodeAttributeSetXY]	Not used	The element is used for additional "regional information", as defined in ISO/PDTS 19091. 'Control-addGrpC', allows to specify public transport specific points (sign-in, sign-out etc.; PtvRequestType). This is not used because cooperative intersections should track the public transport vehicles continuously.	-

Level 8: NodeSetXY → ComputedLane					
8.1	referenceLaneId [LaneID]	The LaneID data element conveys an assigned index that is unique within an intersection. It is used to refer to that lane by other objects in the intersection map data structure. Lanes may be ingress (inbound traffic) or egress (outbound traffic) in nature, as well as barriers and other types of specialty lanes.	Not used	ComputedLane is not used in the profile.	-
8.2	offsetXaxis	A path X offset value for translations of the path's points when creating translated lanes. The values found in the reference lane are all offset based on the X and Y values from the coordinates of the	<u>small</u> [DrivenLineOffsetSm] The DrivenLineOffsetSmall data element is an integer value expressing the offset in a defined axis from a reference	Not used	ComputedLane is not used in the profile.

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
		defined axis from a reference lane number from which a computed lane is offset. The measurement is taken from the reference lane center line to the new center line, independent of any width values.			
8.4	<i>rotateXY</i> [Angle]	The data element Angle is used to describe an angular measurement in units of degrees. This data element is often used as a heading direction when in motion.	Not used	ComputedLane is not used in the profile.	-
8.5	<i>scaleXaxis</i> [Scale-B12]	Value for translations or zooming of the path's points. The values found in the reference lane are all expanded or contracted based on the X and Y and width values from the coordinates of the reference lane's initial path point. The Z axis remains untouched.	Not used	ComputedLane is not used in the profile.	-
8.6	<i>scaleYaxis</i> [Scale-B12]	Value for translations or zooming of the path's points. The values found in the reference lane are all expanded or contracted based on the X and Y and width values from the coordinates of the reference lane's initial path point. The Z axis remains untouched.	Not used	ComputedLane is not used in the profile.	-
8.7	<i>regional</i> [REGION.Reg-ComputedLane]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.	Not used	Subject to ISO/PDTS 19091. No extensions are defined in the standard.	-

Level 9: ConnectsToList → Connection						
9.1	connectingLane [ConnectingLane]	The ConnectingLane data frame ties a single lane to a single maneuver needed to reach it from another lane. It is typically used to connect the allowed maneuver from the end of a lane to the outbound lane so that these can be mapped to the SPAT message to which both lanes apply.	lane [LaneID] The LaneID data element conveys an assigned index that is unique within an intersection. It is used to refer to that lane by other objects in the intersection map data structure. Lanes may be ingress (inbound traffic) or egress (outbound traffic) in nature, as well as barriers and other types of specialty lanes.	Mandatory	LaneID expresses the lane the current lane connects to. If IntersectionReferenceID is filled, the lane belongs to another intersection.	Set by application

Standard			Profile				
Level	Field	Meaning	Status	Content	Value		
				<i>maneuver</i> [AllowedManeuvers]	Profiled	Mandatory in profile as opposed to standard. Used to describe the allowed movements related to the signal head. SignalGroupID and Restrictions apply to this movement only. <ul style="list-style-type: none"> • maneuverStraightAllowed (0) • maneuverLeftAllowed (1) • maneuverRightAllowed (2) • maneuverUTurnAllowed (3) • maneuverLeftTurnOnRedAllowed (4) • maneuverRightTurnOnRedAllowed (5) • maneuverLaneChangeAllowed (6) • maneuverNoStoppingAllowed (7) • yieldAllwaysRequired (8) • goWithHalt (9) • caution (10) • reserved1 (11)- 	Set by application
9.2	remoteIntersection [Intersection-ReferenceID]	The IntersectionReference-ID is a globally unique value set, consisting of an optional RoadRegulatorID and a required IntersectionID assignment, providing a unique mapping to the intersection MAP.			Conditional	In case remoteIntersection is used it means that the connectingLane is part of another intersection (within the same MAP).	Set by application
			region [RoadRegulatorID]	Profiled	IntersectionReferenceID is mandatory if the ConnectingLane is part another intersection. RoadRegulatorID is mandatory in profile as opposed to standard.	Set by application	
			id [IntersectionID]	Mandatory	If the lane connects to another intersection the IntersectionID is mandatory.	Set by application	
			The IntersectionID is used within a region to uniquely define an intersection within that country or region.				

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
9.3	<i>signalGroup</i> [SignalGroupID]	The SignalGroupID data element is an index used to map between the internal state of one or more signal controllers and a common numbering system that can represent all possible combinations of active states (movements and phases). All possible movement variations are assigned a unique value within the intersection. The SignalGroupID data element is used to match the signal group send by the SPAT message for this lane/maneuver.	Conditional	Mandatory if the lane is controlled by a signal. Please note that the range for the SignalGroupID is such that the common Dutch number scheme could contain too high numbers. Therefore SignalGroupIDs must be numbered continuously starting at 1 (see SPAT profile). 0=unknown	Set by application
9.4	<i>userClass</i> [RestrictionClassID]	The RestrictionClass data element defines an intersection-unique value to convey data about classes of users. The typical use of this element is to map additional movement restrictions or rights (in both the MAP and SPAT messages) to special classes of users (trucks, high sided vehicles, special vehicles etc.).	Conditional	Mandatory if Connection or AdvisorySpeed (SPaT) is valid for a specific class only, for example public transport.	Set by application
9.5	<i>connectionID</i> [LaneConnectionID]	The LaneConnectionID data entry is used to state a connection index for a lane to lane connection. It is used to relate this connection and any dynamic clearance data sent in the SPAT.	Mandatory	Mandatory in profile as opposed to standard. Can be used to uniquely identify one connection, for example to support a priority request. To each Connection a unique (within intersection) LaneConnectionID must be added. LaneConnectionIDs typically are numbered continuously starting at 0, but other methods are permitted (incl. skipping one number) as long as no additional meaning is put on the number which cannot be guaranteed. It is assumed that users of the connectionID (e.g. when creating a SRM) always derive the connectionID from the latest received MAP message (as opposed to static configuration).	Set by application

Level 10: LaneDataAttributeList → LaneDataAttribute					
10.1	<u>pathEndPointAngle</u> [DeltaAngle]	The DeltaAngle data element provides the final angle used in the last point of the lane path. Used to "cant" the stop line of the lane.	Not used	Too detailed for day-1 use.	-
10.2	<u>laneCrownPointCenter</u> [RoadwayCrownAngle]	The RoadwayCrownAngle data element relates the gross tangential angle of the roadway surface with respect to the local horizontal axis and is measured at the indicated part of the lane. Its typical use is to relate data used in speed warning and traction calculations for the lane segment or roadway segment in which the measurement is taken.	Not used	Too detailed for day-1 use.	-
10.3	<u>laneCrownPointLeft</u>	The RoadwayCrownAngle data element relates the gross	Not used	Too detailed for day-1 use.	-

Standard			Profile			
Level	Field	Meaning	Status	Content	Value	
	[RoadwayCrownAngle]	tangential angle of the roadway surface with respect to the local horizontal axis and is measured at the indicated part of the lane. Its typical use is to relate data used in speed warning and traction calculations for the lane segment or roadway segment in which the measurement is taken.				
10.4	laneCrownPointRight [RoadwayCrownAngle]	The RoadwayCrownAngle data element relates the gross tangential angle of the roadway surface with respect to the local horizontal axis and is measured at the indicated part of the lane. Its typical use is to relate data used in speed warning and traction calculations for the lane segment or roadway segment in which the measurement is taken.	Not used	Too detailed for day-1 use.	-	
10.5	laneAngle [MergeDiverge-NodeAngle]	The angle at which another lane path meets the current lanes at the node point. Typically found in the node attributes and used to describe the angle of the departing or merging lane.	Not used	Too detailed for day-1 use.	-	
10.6	speedLimits [SpeedLimitList] (1..9)	The SpeedLimitList data frame consists of a list of SpeedLimit entries.	RegulatorySpeedLimit	Profiled	Mandatory if speed limit differs from the general speed limit defined at top level (e.g. for side road as opposed to main road). For bicycle and pedestrian lanes, no speedLimits will be provided (or corrected), therefore should be ignored here. The implication is that speedLimit for these lanes (i.e. the base value defined several levels up) is false for these lane types.	See level 4/11
10.7	regional [REGION.Reg- LaneDataAttribute]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.		Not used	Regional extensions to the standard are defined to indicate Height and Weight restrictions.	-
			addGrpC [LaneDataAttribute-addGrpC]	Not uses	Regional extensions to the standard are defined to indicate Height and Weight restrictions.	See level 14

Level 11: RestrictionUserTypeList → RestrictionUserType						
11.1	basicType [RestrictionAppliesTo]	The RestrictionAppliesTo data element provides a short list of common vehicle types which may have one or more special movements at an intersection, i.e. the movement is restricted to the indicated types only. In general, these movements are not visible to other traffic with signal heads, but the SPAT data reflects the state of the movement. Various restricted movements at an intersection can be expressed using this element to indicate where the movement applies.		Used	Out of a set of most commonly used types: (0) none (1) equippedTransit (2) equippedTaxis (3) equippedOther (4) emissionCompliant (5) equippedBicycle (6) weightCompliant (7) heightCompliant	Set by application

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
				(8) pedestrians (9) slowMovingPersons (10) wheelchairUsers (11) visualDisabilities (12) audioDisabilities (13) otherUnknownDisabilities	
11.2	<u>regional</u> [REGION.Reg- RestrictionUserType]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.		Not used	Regional extensions to the standard are defined to indicate emission and fuel restrictions.
		<i>addGrpC</i> [RestrictionUserType-addGrpC] 'RestrictionUserType-addGrpC' can be used to set EmissionType as a user restriction, i.e. the restricted users are allowed to use a movement or lane. Emission types are euro1...euro6.	Not used	Regional extensions to the standard are defined to indicate emission and fuel restrictions.	See level 15
Level 12: Position3D					
12.1	lat [Latitude]	The geographic latitude of an object, expressed in 1/10th integer micro degrees, as a 31 bit value, and with reference to the horizontal datum then in use. The value 900000001 shall be used when unavailable.	Mandatory		Set by application
12.2	long [Longitude]	The geographic longitude of an object, expressed in 1/10th integer micro degrees, as a 32-bit value, and with reference to the horizontal datum then in use. The value 1800000001 shall be used when unavailable.	Mandatory		Set by application
12.3	<i>elevation</i> [Elevation]	The data element represents the geographic position above or below the reference ellipsoid (typically WGS-84). The number has a resolution of 1 decimetre and represents an asymmetric range of positive and negative values.	Not used	DE is replaced by ETSI altitude in REGION-Reg-Position3D.	-

Standard			Profile		
Level	Field	Meaning	Status	Content	Value
12.4	<i>regional</i> [REGION.Reg-Position3D]	The element is used for additional "regional information", as defined in ISO/PDTS 19091.	Conditional	Altitude as described in ETSI TS 102 894-2 V1.2.1 (2014-09). Altitude ::= SEQUENCE { altitudeValue AltitudeValue, altitudeConfidence AltitudeConfidence } Mandatory in profile as opposed to standard if the road gradient within the scope of the intersection is more than 2%. altitudeConfidence is not used in profile, therefore indicated as unavailable = 15.	Set by application

Level 13: REGION.Reg-GenericLane → ConnectionTrajectory-addGrpC

13.1	nodes [NodeSetXY] (2..63)	The NodeSetXY data frame consists of a list of Node entries. A ConnectionTrajectory is made up of two or more XY node points and any attributes defined in those nodes.	Not used	Each ConnectionTrajectory is described by a list of nodes, with the first and last node overlapping one node of the connecting lanes. Simple ConnectionTrajectories can be adequately described with only two node points, while ConnectionTrajectories with curvature may require more points. The center line obtained when connecting the nodes must never differ more than 1/4th of the lanewidth from the actual center line of the lane.	See level 6
13.2	<i>connectionID</i> [LaneConnectionID]	The LaneConnectionID data entry is used to state a connection index for a lane to lane connection. It is used to relate this connection and any dynamic clearance data sent in the SPAT.	Not used	Desired extension to the standard, therefore not part of this profile and the ASN.1. Used to relate the node-path of the ConnectionTrajectory to the ConnectsTo [Connection].	-

Level 14: REGION.Reg-LaneDataAttribute → LaneDataAttribute-addGrpC

14.1	<i>maxVehicleHeight</i> [VehicleHeight]	Provides the maximum allowed height of vehicles on the road.	Not used	Desired extension to the standard, therefore not part of this profile and the ASN.1. -	-
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Standard			Profile		
Level	Field	Meaning	Status	Content	Value
14.2	<i>maxVehicleWeight</i> [VehicleMass]	Provides the maximum allowed weight of vehicles on the road.	Not used	Desired extension to the standard, therefore not part of this profile and the ASN.1.	-

Level 15: REGION.Reg-RestrictionUserType → RestrictionUserType-addGrpC					
15.1	<i>emission</i> [EmissionType]	Toxis emission type euro1 to euro6.	Not used	-	-
1.2	<i>fuelType</i> [FuelType]	Provides the type of fuel used by a vehicle.	Not used	Desired extension to the standard, therefore not part of this profile and the ASN.1.	-

Annex A: Summary of MAP profile

bold = mandatory/used

bold-italic = conditional

italic = optional

~~strikethrough~~ = not used

red = desired extensions

Timestamp [MinuteOfTheYear]

msgIssueRevision [MsgCount]

layerType [LayerType]

layerID [LayerID]

intersections [Intersection-GeometryList]

IntersectionGeometry

name [Descriptive-Name]

id [Intersection-ReferenceID]

region [RoadRegulatorID]

id [IntersectionID]

revision [MsgCount]

refPoint [Position3D]

lat [Latitude]

long [Longitude]

~~elevation [Elevation]~~

regional [REGION.Reg-Position3D]

addGrpC [Position3D-AddGrpC]

altitude [Altitude]

altitudeValue [AltitudeValue]

~~altitudeConfidence [AltitudeConfidence]~~

laneWidth [LaneWidth]

```

speedLimits [SpeedLimitList]
  RegulatorySpeedLimit
    type [SpeedLimitType]
    speed [Velocity]
laneSet [LaneList]
  GenericLane
    laneID [LaneID]
    name [DescriptiveName]
    ingressApproach [ApproachID]
    egressApproach [ApproachID]
    laneAttributes [LaneAttributes]
      directionalUse [LaneDirection]
      sharedWith [LaneSharing]
      laneType [LaneTypeAttributes]
        vehicle [LaneAttributes-Vehicle]
        crosswalk [LaneAttributes-Crosswalk]
        bikeLane [LaneAttributes-Bike]
        sidewalk [LaneAttributes-Sidewalk]
        median [LaneAttributes-Barrier]
        striping [LaneAttributes-Striping]
        trackedVehicle [LaneAttributesTrackedVehicle]
        parking [LaneAttributes-Parking]
      regional [REGION.Reg-LaneAttributes]
    maneuvers [AllowedManeuvers]
  nodeList [NodeListXY]
    nodes [NodeSetXY]
      NodeXY
        delta [NodeOffsetPointXY]
        node-XY1 [Node-XY-20b]

```

node-XY2 [Node-XY-22b]
 node-XY3 [Node-XY-24b]
 node-XY4 [Node-XY-26b]
 node-XY5 [Node-XY-28b]
 node-XY6 [Node-XY-32b]
 node-LatLon [Node-LLmD-64b]
 regional [REGION.Reg-NodeOffsetPointXY]

attributes [NodeAttributeSetXY]

localNode [NodeAttributeXYList]
disabled [SegmentAttributeXYList]
enabled [SegmentAttributeXYList]
data [LaneDataAttributeList]

LaneDataAttribute

~~pathEndPointAngle [DeltaAngle]~~
~~laneCrownPointCenter [RoadwayCrownAngle]~~
~~laneCrownPointLeft [RoadwayCrownAngle]~~
~~laneCrownPointRight [RoadwayCrownAngle]~~
~~laneAngle [MergeDiverge-NodeAngle]~~

speedLimits [SpeedLimitList]

RegulatorySpeedLimit

type [SpeedLimitType]
speed [Velocity]

~~regional [REGION.Reg-LaneDataAttribute]~~
~~addGrpC [LaneDataAttribute-AddGrpC]~~

maxVehicleHeight [VehicleHeight]
maxVehicleWeight [VehicleMass]

dWidth [Offset-B10]
dElevation [Offset-B10]
 regional [REGION.Reg-NodeAttributeSetXY]

```

computed {ComputedLane}
  referenceLaneId {LaneID}
  offsetXaxis
    small {DrivenLineOffsetSm}
    large {DrivenLineOffsetLg}
  offsetYaxis
    small {DrivenLineOffsetSm}
    large {DrivenLineOffsetLg}
  rotateXY {Angle}
  scaleXaxis {Scale-B12}
  scaleYaxis {Scale-B12}
  regional {REGION.Reg-ComputedLane}
connectsTo {ConnectsToList}
  Connection
    connectingLane {ConnectingLane}
    lane {LaneID}
    maneuver {AllowedManeuvers}
    remoteIntersection {Intersection-ReferenceID}
    region {RoadRegulatorID}
    id {IntersectionID}
    signalGroup {SignalGroupID}
    userClass {RestrictionClassID}
    connectionID {LaneConnectionID}
overlays {OverlayLaneList}
  laneID
regional {REGION.Reg-GenericLane}
  addGrpC {ConnectionTrajectory-AddGrpC}
  nodes {NodeSetXY}
  connectionId {LaneConnectionID}

```

```

preemptPriorityData [PreemptPriorityList]
regional [REGION.Reg-IntersectionGeometry]
roadSegments [RoadSegmentList]
dataParameters [DataParameters]
  -----processMethod [ProcessMethod]
  processAgency [ProcessAgency]
  lastCheckedDate [LastCheckedDate]
  geoidUsed [GeoidUsed]
restrictionList [RestrictionClassList]
  RestrictionClassAssignment
    id [RestrictionClassID]
    users [RestrictionUserTypeList]
      RestrictionUserType
        basicType [RestrictionAppliesTo]
        regional [REGION.RestrictionUserType]
          addGrpC [RestrictionUserType-AddGrpC]
            emission [EmissionType]
              fuelType [Fueltype]
regional [REGION.Reg-MapData]

```

Annex B: Bit string example

A bit string is an arbitrarily long array of bits. Specific bits can be identified by parenthesized integers and assigned names. As an example, the bit string for the data element LaneSharing is shown in Figure 1.

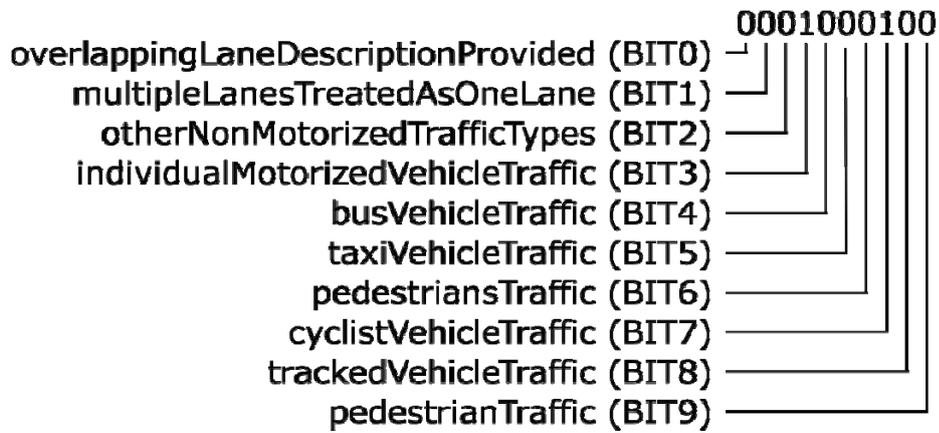


Figure 1 Bit string example

The example shows the 10 bit sting '0001000100', where BIT3 and BIT7 are set from left to right. This indicates that user types individualMotorizedVehicleTraffic and cyclistVehicleTraffic can access and use the respective lane.

Annex C: Members subWG NL profile

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Eric Koenders – Dynniq

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Eddy Verhoeven – Siemens

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