



## **M4.2.5 Technical specifications**

Updates on the work of task 4.2.3

A report by NAPCORE SWG 4.2 TN-ITS

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Author(s)	Peter Schmitting, Stephen T'Siobbel
Co-author(s)	Frank Daems, Prisca Numbisi
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### Abstract

The present document offers a comprehensive overview of the efforts by TN-ITS and DATEX II experts to refine the Technical Specification (TS) of TN-ITS CEN TS 17268. It details the updates made to address gaps identified in the RTTI Delegated Regulation, as outlined in M4.2.4. Additionally, it explores the alignment of the TS with the DATEX II suite of specifications (CEN TS 16157 series) to ensure seamless integration. The document also highlights updates prompted by feedback from TN-ITS partners, collected during the NAPCORE project. The final chapter outlines the roadmap for the release of a new CEN Technical Specification for TN-ITS, designated as CEN TS 16157-14, planned for 2025.



## Abbreviations

Abbreviation	Meaning
CEN	European Committee for Standardisation (Comité Européen de Normalisation)
EC	European Commission
EU	European Union
DR	Delegated Regulation
INSPIRE	Infrastructure for Spatial Information in the European Community
ITS	Intelligent Transport Systems
MS	Member States
NAP	National Access Point
NAPCORE	National Access Point Coordination Organisation for Europe
OWL	Web Ontology Language
RTTI	Real-Time Traffic Information
SKOS	Simple Knowledge Organisation System
SWG	Sub Working Group
TC	Technical Committee
TN-ITS	Transport Network - Intelligent Transport Systems
TN-ITS GO	CEF PSA project (2019-2021) on TN-ITS deployment across Europe
TS	Technical Specification
WG	Working Group
WI	Work Item



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## 1. Introduction

NAPCORE Sub-Working Group 4.2 (SWG 4.2), Transport Network – Intelligent Transport Systems (TN-ITS), aims to boost the exchange of changes in static road attributes between authoritative sources and map and service providers across Europe. NAPCORE SWG 4.2 focuses on integrating TN-ITS standardisation activities within the scope of NAPCORE. Key actions include upgrading the technical specifications published as CEN TS 17268 in 2018, aligning and harmonizing them with other relevant mobility data standards, such as DATEX II.

Additionally, actions within this SWG work to enhance the reliability of the TN-ITS data chain and trust in the data, enabling the development of emerging applications and functional domains. The group also engages the EU Member States' community of experts in defining the strategy and growth of TN-ITS services and their assessment, ensuring the delivery of required standards. Another critical effort is promoting the dissemination of knowledge about data-sharing services and their benefits. This includes continued support for TN-ITS (e.g., websites, documentation portals) and educating and training TN-ITS users and experts at various levels and across different user groups in Europe, with participation open to both public and private organisations.

Task 4.2.3 addresses the evolution of TN-ITS technical specifications. This includes harmonizing across SWGs, exploring new data-sharing methods, establishing procedures and governance for maintaining the technical specifications, and providing support to service implementers, including tools and recommendations.

The present milestone builds on M4.2.4, released in December 2022, titled "Technical Specifications Updates – Supporting the RTTI Delegated Regulation with INSPIRE and TN-ITS." That report identified requirements for NAPs where TN-ITS and INSPIRE specifications are relevant and described how the TN-ITS specification can be used to meet these requirements and how it should be further developed to address both current and future needs.

## 2. Methodology

The methodology used to achieve the objectives of this report is illustrated in **Fehler! Verweisquelle konnte nicht gefunden werden..** It includes three key "input lines," which lead to proposed data requirements:

- Interpretation of the revised RTTI Delegated Regulation and identification of gaps, as presented in M4.2.4, released in December 2022.
- Interpretation of TN-ITS in relation to the DATEX II 16157 suite, particularly Part 11.
- Interpretation of change requests collected from the TN-ITS GO project and requests arising during the NAPCORE project. TN-ITS GO was a CEF PSA project (2018-2021) on deploying TN-ITS basic and advanced services in 16 EU member states. The deliverables can be found on the TN-ITS.EU website, see references.

Following this, the resulting data requirements were analysed and compared. Based on this analysis, proposals for change requests were developed, leading to the update of the technical specification.

This updated specification will be submitted to CEN TC278 for the publication of the revised version of CEN TS 16157-14, with the official publication expected in 2025.



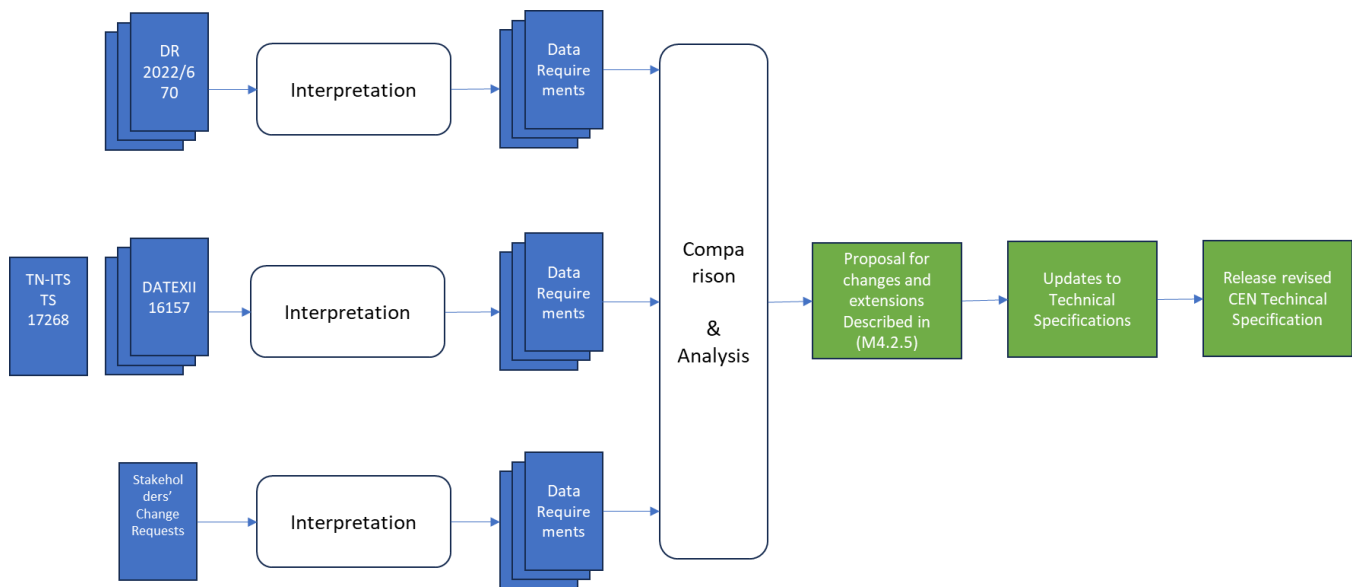


Figure 1 : Methodology adopted by T4.2.3

### 3. TN-ITS closing the gaps with the revised RTTI Delegated Regulation

#### 3.1. Introduction

The milestone M4.2.4 report “Supporting the RTTI delegated regulation with INSPIRE and TN-ITS” identified requirements from the EU Delegated Regulation 2022/670 (RTTI) where the TN-ITS specification is relevant, and how the TN-ITS specification should be further developed to fit current and future needs. To that end, 30+ suggestions are listed in M4.2.4 which have been analysed and acted upon as described in the subsequent chapters.

In addition to the changes implied by the delegated regulation, chapter 6 of M4.2.4 lists several proposed changes that had been collected from countries through the TN-ITS GO project and the continuous work in TN-ITS working groups. Note that additional national extensions that have been discussed during task 4.2.3 are presented in chapter 5 of the present report.

#### 3.2. Matrix representation

The suggestions made in M4.2.4 were analysed one-by-one and put into a matrix (see appendix 1 for complete excel sheet). The following information were included into the matrix:

- Topic  
The item to which the suggestion refers to.
- Clause  
The clause within M4.2.4 that holds the suggestion.
- Suggested extension  
Description of the suggestion.
- Target type  
The target type, e.g. code list, model.
- Target name  
The name of the type that is affected.
- Status  
Done, In Progress, Open



- Comment  
Description of the action taken on the suggestion.

### **3.3. Action taken on suggestions from M4.2.4**

#### **3.3.1. Code lists**

The suggestions related to code lists proposed the addition of new values to existing code lists, in particular *RoadFeatureType* and *RoadFeaturePropertyType* and the creation of new code lists for the definition of previously uncovered information elements.

Examples:

- M4.2.4 states in chapter 5.1.4 that CEN TS 17268 has no code values for providing gradients and suggests adding them. Consequently, the code value *gradient* has been added to the code list *RoadFeatureType* and the code values *horizontalGradient* and *verticalGradient* to the code list *RoadFeaturePropertyType*.
- M4.2.4 states in chapter 5.1.10 that CEN TS 17268 lacks code values for providing information about delivery areas and suggests adding a new feature type value for delivery area, alongside a feature property type value for area type and a code list for area type values. The code value *deliveryArea* has been added to the code list *RoadFeatureType* and the code value *deliveryAreaType* to the code list *RoadFeaturePropertyType*. Furthermore, a new code list *DeliveryAreaType* has been created and preliminary filled with the following code values:
  - *transferPoint*,
  - *unservicedBoxes*,
  - *depot*,
  - *loadingZone*.
 Further code values may be added based on suggestions from NAPCORE partners and during the standardisation process in the CEN TC278 working group.

#### **3.3.2. Model**

M4.2.4 identified that conditions in TN-ITS are related to individual features, not individual properties. Therefore, different features are needed. If conditions could be related to the properties instead, only one feature would be required, with one occurrence of the property. The suggestion therefore is to add conditions to the *GenericRoadFeatureProperty* data type. This change has been accepted and will be incorporated into the new version of the TN-ITS model.

This measure will reduce the number of required features, e.g. for coding the feature type codes *tollStation* from four to one.

#### **3.3.3. General**

M4.2.4 contains technology considerations (see chapter 8) which lead to several general suggestions.

- The TN-ITS model should be provided in an official OWL Ontology for use in the Semantic web. RDF should be an alternative structure for providing information through TN-ITS, in parallel with the existing GML format.
- Implementation schemas, for example, GML (XML) schemas, should be excluded from the CEN document. Instead, only URIs to implementation schemas should be provided in the document.



- Code lists should be excluded from the CEN document. Instead, only URIs to code lists or a code list registry should be provided in the document.
- Code lists should be described as SKOS Concept Schemes for use in the semantic web, based on a structure similar to the INSPIRE Registry and the suggested structure from ISO/TC 211 GOM.

### 3.4. Implemented updates to the TN-ITS Technical Specifications

#### 3.4.1. Code lists

In addition to the examples given in chapter 3.3.1 above, a complete list of all code list modifications and extension based on the suggestion from M4.2.4 is given below

#### New entries in code list *RoadFeatureTypeCode*

M4.2.4 chapter 5.1.2, new code value *gradient*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="gradient">
    <gml:description>Gradient of...</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">gradient</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 5.1.5, new code value *junction*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="junction">
    <gml:description>Connection facilitating the movement of traffic through a crossing between two or more roads</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">junction</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 5.1.6, new code values *roadNumber* and *roadName*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="roadNumber">
    <gml:description>The official number of the road</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">roadNumber</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

<gml:dictionaryEntry>
  <gml:Definition gml:id="roadName">
    <gml:description>The official name of the road</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">roadName</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 5.1.9, new code value *refuelPoint*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="refuelPoint">
    <gml:description>Refuel point is an element in an infrastructure that supplies different kind of liquid fuels for refilling vehicles</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">refuelPoint</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 5.1.10, new code value *deliveryArea*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="deliveryArea">
    <gml:description>Area with e.g., storage and transfer points, pick-up points or loading zones</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">deliveryArea</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 5.2.1, new code value *accessRestriction*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="accessRestriction">
    <gml:description>Permanent, legal or physical restrictions for accessing road segments</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">accessRestriction</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

M4.2.4 chapter 6.2.1, new code value *roadLength*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="roadLength">
    <gml:description>Road length</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">roadLength</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```



#### M4.2.4 chapter 6.2.2, new code value *roadSurfaceCategory*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="roadSurfaceCategory">
    <gml:description>State of the surface of a road segment e.g., a road is paved or unpaved</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">roadSurfaceCategory</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.4, new code value *lane*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="lane">
    <gml:description>Generic type for lane, can be extended with laneNumber and laneUsage properties</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">lane</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.5, new code value *roadClassification*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="roadClassification">
    <gml:description>Classification of road, can be extended with carryCapacity property and national values</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">roadClassification</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.6, new code value *barrier*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="barrier">
    <gml:description>Physical barrier</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">barrier</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.7, new code value *uTurnPossible*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="uTurnPossible">
    <gml:description>U turns allowed</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">uTurnPossible</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.8, new code value *fullStopMandatory*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="fullStopMandatory">
    <gml:description>Intersection where a full stop is mandatory</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">fullStopMandatory</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

### New entries in code list *RoadFeaturePropertyType*

#### M4.2.4 chapter 5.1.2, new code value *width*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="width">
    <gml:description>The width value</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCodeExtensions">width</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 5.1.4, new code values *horizontalGradient* and *verticalGradient*

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="horizontalGradient">
    <gml:description>Horizontal gradient value</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCodeExtensions">horizontalGradient</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
<gml:dictionaryEntry>
  <gml:Definition gml:id="verticalGradient">
    <gml:description>Vertical gradient value</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCodeExtensions">verticalGradient</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 5.1.5, new code values *junctionNumber* and *junctionName*



```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="junctionNumber">
    <gml:description>Identifier for a junction, number</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">junctionNumber</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="junctionName">
    <gml:description>Identifier for a junction, name</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">junctionName</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.1.6, new code value *officialNumber*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="officialNumber">
    <gml:description>Official number</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">officialNumber</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.1.8, new code value *areaName*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="areaName">
    <gml:description>Identifier for a service and rest area, name</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">areaName</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.1.9, new code values *fuelType* and *operatorName*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="fuelType">
    <gml:description>Type of fuel used by a vehicle; proposed values are in codelist FuelTypeCode</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">fuelType</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="operatorName">
    <gml:description>Identifier for a payment operator, name</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">operatorName</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.1.10, new code value *deliveryAreaType*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="deliverAreaType">
    <gml:description>Type of delivery area</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">deliverAreaType</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.2.1, new code value *accessRestrictionType*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="accessRestrictionType">
    <gml:description>Type of restrictions for accessing road segments, see values in codelist AccessRestrictionTypeCode</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">accessRestrictionType</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 5.2.5, new code values *maximumWeightPerDoubleAxle* and *maximumWeightPerTripleAxle*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="maximumWeightPerDoubleAxle">
    <gml:description>The maximum weight per double axle allowed</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">maximumWeightPerDoubleAxle</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="maximumWeightPerTripleAxle">
    <gml:description>The maximum weight per triple axle allowed</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">maximumWeightPerTripleAxle</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```

#### M4.2.4 chapter 6.2.2, new code value *roadSurfaceCategoryType*

```

▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="roadSurfaceCategoryType">
    <gml:description>Type of surface category of road segments, see values in codelist RoadSurfaceCategoryTypeCode</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">roadSurfaceCategoryType</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>

```



#### M4.2.4 chapter 6.2.3, new code value *authority*

```
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="authority">
    <gml:description>Maintenance authority</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">authority</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.4, new code values *laneNumber* and *laneUsage*

```
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="laneNumber">
    <gml:description>Lane number</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">laneNumber</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="laneUsage">
    <gml:description>Lane usage type, see values in codelist LaneUsageCode</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">laneUsage</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.5, new code value *carryCapacity*

```
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="carryCapacity">
    <gml:description>Carry capacity of roads and bridges</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">carryCapacity</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

#### M4.2.4 chapter 6.2.6, new code value *barrierType*

```
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="barrierType">
    <gml:description>Type of physical barrier, see values in codelist BarrierTypeCode</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeaturePropertyTypeCode">barrierType</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

### New code lists with current dictionary entries

#### M4.2.4 chapter 5.1.9 *PaymentMethod*

- *cashBillsOnly*
- *cashCoinsAndBills*
- *cashCoinsOnly*
- *MobileAccount*
- *paymentCreditCard*
- *paymentDebitCard*
- *paymentValueCard*
- *prepay*
- *tolltag*

#### M4.2.4 chapter 5.1.10 *DeliveryAreaType*

- *transferPoint*
- *unservicedBoxes*
- *depot*
- *loadingZone*

#### M4.2.4 chapter 5.2.1 *AccessRestrictionType*

- *forbiddenLegally*
- *physicallyImpossible*
- *private*



- *publicAccess*
- *seasonal*
- *toll*

M4.2.4 chapter 6.2.2 *RoadSurfaceCategoryType*

- *paved*
- *unpaved*

M4.2.4 chapter 6.2.4 *LaneUsage*

- *busLane*
- *cycleLane*

M4.2.4 chapter 6.2.6 *BarrierType*

- *lockedWithKey*
- *permanent*
- *remoteControl*

**3.4.2. Model**

M4.2.4 describes in chapter 5.1.7 (referred to also in chapters 5.2.8 and 5.3.3) a possible improvement of the model which would be the introduction of relations between conditions and properties in addition to the existing relation between conditions and features. The proposed changes are illustrated in the figure below.

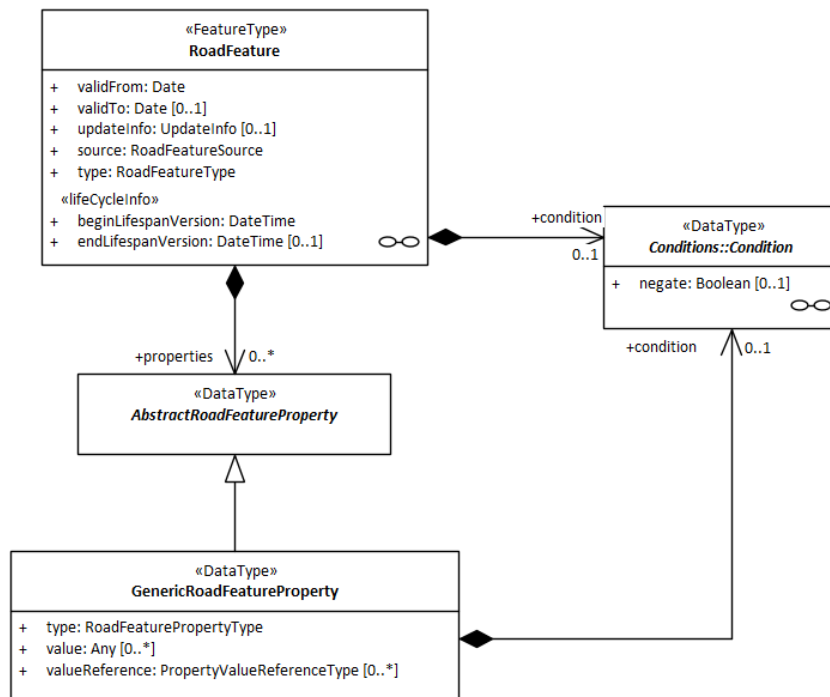


Figure 2 : Conditional properties

This suggestion is accepted and will be incorporated into the next version of the TN-ITS model.



### 3.4.3. General

The suggestion to exclude implementation schemas from the CEN document and to only describe URIs to the implementation schemas has been accepted by the TN-ITS management group. However, the removal of all code list information from the CEN technical specification's annex A has been rejected by the TN-ITS management group as it may contain extra information that is not included in the codes. It is understood that URIs to code lists or a code list registry has to be provided to allow a dynamic evolution of the code lists' content. A note should be included giving the code lists in the code list registry precedence over the "hard-coded" descriptions in annex A of the CEN technical specification. Both decisions taken are in line with the DATEX II approach.

The TN-ITS model is now provided in an official OWL Ontology for use in the semantic web and is found at: <https://github.com/ERTICO-TN-ITS/TN-ITS-Open/tree/master/OWL>

### 3.5. Open changes and timeline

The remaining work on the TN-ITS specification consists mainly of the following items:

- Completion of new code lists with additional values
- Addition of the *Conditions* data type to the *GenericRoadFeatureProperty* data type, see chapter 3.3.2
- Further investigation on the suggestion to describe code list as SKOS Concept Schemes for use in the semantic web. To that end, the EU document "[Guidelines for the Use of Code Lists](#)" is currently under study.

The timeline for the above work will be aligned with the standardisation efforts as described in chapter 6 of the present report.



## 4. The merger of TN-ITS and DATEX

### 4.1. Overview

The NAPCORE project seeks to coordinate and harmonise more than 30 mobility data platforms across Europe, fostering a seamless network to enhance road efficiency and safety. This ambitious goal also aims at aligning data exchange standards. A dedicated task was defined in the NAPCORE project for each SWG to achieve this alignment.

As of 2022 both TN-ITS and DATEX II coordination teams have initiated coordination calls leading to an alignment meeting on 15/02/2023 in Utrecht. Following in-depth assessment by TN-ITS, including a detailed SWOT analysis several steps forward were defined:

- A Technical Team would further explore the integration of TN-ITS into DATEX II family of standards. Dr. Kaltwasser proposed a technical route to develop TN-ITS into making it CEN TS 16157 Part “X” by 1) reusing Common (Part 1) and Traffic regulations (Part 11) – to achieve convergence, next, 2) “part X” will be the wrapper – how to get data elements in application profile (wrapper) taking care to avoid constraints. Therefore, DATEX can show how the tool chain in DATEX II for modelling up to creating a profile schema works. A reference webinar was available, yet a 1-to-1 meeting was to be organised. A discussion on Code list (TN-ITS) and Enumerations (DATEX) – for supporting extensions, followed and were to be addressed in a follow-up workshop in March 2023.
- A Governance Team would address the approach towards the merger of the data standards. Elements to be discussed and decided upon, these included technical and non-technical topics, the former looking for example at common technical tools to maintain the specifications (Bugzilla, GitHub, etc.), the latter looking into aspects of governance (cooperation agreement, Declaration of Lisbon, webpages, communications, etc.). It was also stated that a sustainable choice will be to look beyond the lifespan of the NAPCORE project.

A significant milestone for this purpose is the “The Declaration of Lisbon”, defined and signed by the chairs of NAPCORE, TN-ITS and DATEX II in May 2023, where the TN-ITS and DATEX II standards take it to the next level and commit to merging. This merger encompasses the alignment and harmonisation of the Technical Specifications as well as the governance structure. This milestone M4.2.5 focuses on the first part.

Table 1 : Overview of meetings advancing the technical alignment of DATEX II and TN-ITS under NAPCORE

Date	Event type	Results
2022.06.17	Meeting - Brussels	First bilateral alignment between the mobility data standards: setting the scena and definition of work items
2022.09.16	Online meeting	Task 4.1.1 and Task 4.2.1 alignment: on communication, data aspects (quality, cyber security), the future of both standards, regulatory and standardisation aspects
2023.02.15	Meeting - Utrecht (NL)	Discussion and decision on the strategic and technical route to follow towards the merger.
2023.03.20	Governance and Brand workshop	Three scenarios presented for the alignment. Common objectives formulated. SWOTs for independent (loosely aligned)/merger/fusion approaches discussed. Key drivers for both standards identified.
2023.03.23	Online meeting on technical alignment	DATEX II demonstrations on modelling and schema generation. Two scenarios on harmonisation formulated and discussed. Exchange mechanisms were addressed.



2023.04.14	Online meeting on technical alignment	Review input Governance meeting. Discussion of tools used by the different standards. DATEX XMI import assessed. Set focus on Part 11 Traffic Regulation. Address alternative merging scenarios. Establish relation to DATEX 4 activities. Plan for next steps.
2023.05.24	ITS Lisbon congress (PT)	Presentation of the Declaration of Lisbon.
2023.06.23	Online meeting on technical alignment	In depth TN-ITS specifications overview. Technical merger scenarios discussion, continued.
2023.08.10	Online meeting on technical alignment	In depth TN-ITS specifications overview. Technical merger scenarios discussion, continued.
2023.08.04	Online Governance and Branding meeting	Comments on version Cooperation Agreement. Discussion on path towards standardisation, future organisation and METR.
2023.09.08	Online meeting	Discuss table on model comparison – Part 11 vs; TN-ITS (excel Victoria)
2023.09.20	Meeting Cyprus (CY)	Discussion at DATEX TB: comparison of data models TN-ITS/DATEXII Part11: similarities and 4 types of differences (cases), code lists, location referencing; conclusion of the technical task force.
2023.10.20	Online meeting on technical alignment	Continue discussion table on model comparison – Part 11 vs; TN-ITS (excel Victoria)
2023.10.22	Meeting – Vienna (AT)	Discussion merger at DATEX Technical Board.
2023.11.29	Meeting Brussels	Consolidation of work. Status of merger; High level roadmap.
2024.02.05	Online meeting	Governance: elements table discussed, includes technical elements/tools
2024.03.12	Online meeting	Decision on TN-ITS name (Part 14). TN-ITS tools purchase.
2024.03.19	Meeting Rome / Online (IT)	DATEX technical Board: status 16157: P11; traffic sign mapping
2024.04.03	Meeting Brussels (BE)	Governance focus. Timeline for technical work. Discuss timing for standardisation.
2024.04.19	Workshop - online	DATEX-TN-ITS technical alignment Part11/Part14: Workshop: Part 11 - Modelling of Requirements from Backlog.
2024.06.10	Online Governance and Branding meeting	Governance: elements table discussed, includes technical elements/tools.
2024.06.18	Meeting online	DATEX Technical Board on Part 7 Common/Time validity etc.
2024.07.09	Online meeting on technical alignment	T4.2.3 meeting addressing Gaps with revised RTTI DR.
2024.09.16	ITS World Congress Dubai	Session on standardisation (SIS 80)
2024.10.09	DATEX User Forum	Session on TN-ITS Specifications and Standardisation
2024.11.07	Mobility Data Days Torino	Session on the DATEX TN-ITS merger

The detailed timeline of events in the table above demonstrates a structured and deliberate approach to aligning the TN-ITS and DATEX data specification initiatives. It reflects the involvement of teams across governance, technical, and strategic areas, as well as their progress over time. The timeline reveals a well-orchestrated, multi-phase approach, where the teams have successfully navigated



technical, organisational, and strategic challenges to advance toward a unified vision for TN-ITS and DATEX.

The alignment process showcases strong collaboration across multiple teams. Governance efforts focused on defining objectives, evaluating alignment scenarios, and addressing regulatory and standardisation pathways. At the same time, technical teams worked on harmonising tools and processes, including schema generation, data modelling, and issue tracking. The teams leveraged cross-platform learning to adopt best practices, such as TN-ITS integrating DATEX's open publication model. In addition, transparency and inclusivity were prioritised through engagement with stakeholders via international congresses and forums see table 1, ensuring a comprehensive and collaborative approach to the merger.

The alignment progressed in a structured and phased manner. Initial efforts in 2022 were focused on setting foundational goals, defining work items, and identifying strategic priorities. By early 2023, technical and governance considerations were addressed, and clear routes for collaboration were established. Significant progress in technical harmonisation followed, with advancements in schema generation, data model comparisons, and tool compatibility. Simultaneously, governance and branding workshops refined alignment scenarios, exploring different merger options. The team's engagement with the broader community through congresses and presentations, see table 1, further reinforced progress and stakeholder involvement.

By 2024, the focus shifted to consolidating work, with key decisions on naming, tools, and roadmaps for standardisation. The final stages emphasised completing technical alignment, closing remaining gaps, and establishing governance structures. Community outreach continued through global forums, highlighting the importance of collaboration and transparency in driving the initiatives toward a unified vision.

Throughout the process, the teams demonstrated steady, coordinated progress across strategic, technical, and governance domains. They successfully addressed key challenges, such as harmonising tools, aligning data models, and refining workflows for technical specifications. Strategic alignment was achieved through a phased approach that built on early foundations and refined objectives. Technical harmonisation, such as integrating repositories and tools was initiated and complemented by governance discussions that clarified roles and ensured organisational readiness for a merger. Transparent communication with the broader mobility data community further reinforced the process, incorporating stakeholder feedback. This collaborative approach has positioned the initiatives for seamless integration while preserving their individual strengths.



# DATEX II / TN-ITS MERGER

- First alignment meeting Brussels June 2022
- Second alignment meeting Utrecht Februari 2023
- Declaration of Lisbon May 2023
- WG Governance & Branding
- WG Technical
- Standardisation steps



Figure 3 : Pictures from the alignment meetings – status 2023

## 4.2. History: towards the Declaration of Lisbon

The NAPCORE project seeks to coordinate and harmonise more than 30 mobility data platforms across Europe, fostering a seamless network to enhance road efficiency and safety. This ambitious goal also aims at aligning data exchange standards. The Declaration of Lisbon represents a significant milestone for this purpose, where the TN-ITS and DATEX II standards owners take it to the next level and commit to merging. The importance of the merger is testified by a number of key representatives.

“When we launched the NAPCORE project with the aim of enhancing cooperation among Member States, one of our goals was to bring together diverse communities working on different aspects of mobility. Today, this vision has materialised into a cooperation agreement, and beyond that, the merging of two significant initiatives to create a unified product. Ultimately, this will simplify and enhance data reuse, benefiting end-users and road users alike,” states Gilles Carabin, Policy Officer at the European Commission.

“NAPCORE was established to standardise and harmonise data frameworks. At the outset, we didn’t dare to hope that, rather than just aligning, DATEX II and TN-ITS would decide to merge into a single standard. This is a monumental achievement for NAPCORE, and I’m thrilled to see it come to fruition,” shares Timo Hoffmann, NAPCORE Secretary General.

TN-ITS and DATEX II will jointly develop, deploy, and oversee the integration of their technical standards, creating a streamlined framework that promotes user adoption and strengthens stakeholder engagement, all in alignment with EU policies.

“There are two key aspects of the mobility market. From the perspective of data providers, such as public authorities, the integration clarifies the format required for data provision. On the data user side, it enables greater automation by offering machine-readable data, allowing systems to automatically process and utilise the information,” explains Christian Kleine, President of TN-ITS.



“The true value of unifying data standards lies in having a single, universal language for Europe’s entire data distribution system, particularly from the perspective of road operators. Whether it’s for map updates, dynamic navigation, or safety messages, we now have consistency. There is no ambiguity—we all speak the same language across Europe,” emphasises Bard de Vries, Chair of the DATEX II Change Management Board.

The 2023 Declaration of Lisbon states:

DATEX II and TN-ITS have identified a strategic need and a joint objective to align and harmonize the two standards, in order to support current and future European road and traffic management services in a coherent way. Therefore DATEX II and TN-ITS declare that they will, in the context of NAPCORE, together :

- develop and deploy the merging of the two technical standards
- setup a sustainable governance of the resulting standard
- facilitate user adoption to support relevant EU policies
- support stakeholder engagement communities



Figure 4 : Signing of the Declaration of Lisbon

### 4.3. Overview of model and data type comparison and next steps

During the technical work on the merging of the DATEX II and TN-ITS specifications, it was determined in the early stage that the outside wrapper, i.e., how to get data elements into application is different between DATEX II and TN-ITS. These differences will be specified in a future version of CEN TS 16157—1 “Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework”.

The model elements however have an overlap or are similar (e.g. VehicleCharacteristics) but there are differences in names, role names, definitions, multiplicities etc. Therefore, an analysis of these



differences has been conducted which led to the following five cases (full comparison excel sheet in the appendix):

- **Case 1:** Same semantics apply but definitions differ without contradicting each other.  
**Example:** Vehicle type “caravan”
  - DATEX II definition: Caravan
  - TN-ITS definition: Non-motorised trailer for towing, intended for human occupancy**Next steps:** DATEX II plans taking over the TN-ITS definitions and to update of CEN TS 16157-11 (Publication of machine interpretable traffic regulations) and/or CEN EN 16157-7 (Common data elements) respectively.  
**Case 1** represents the majority of the identified cases (61/92).
- **Case 2:** Same semantics apply but definitions are in conflict.  
**Example:** Vehicle type “lightCommercialVehicle”
  - DATEX II definition: Vehicles for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes (class N1)
  - TN-ITS definition: Road vehicle, typically under 2 tonnes gross weight, primarily intended for the transport of goods**Next steps:** Compilation of a list and agreement on good, common solution on a case-by-case basis. Where consensus can be found the result will be fed into oncoming revisions of CEN TS 17268 (to become new CEN TS 16157-14) and CEN TS 16157-11 or the update of CEN EN 16157-7.  
Eight **case 2** occurrences have been identified.
- **Case 3:** Same semantics apply but different names are used.  
**Example 1:** Dataset
  - DATEX II definition: overtakingBan
  - TN-ITS definition: prohibitionOfOvertaking**Example 2:** Conditions
  - DATEX II definition: ValidityCondition
  - TN-ITS definition: TimeCondition**Next steps:** Compilation of a list and agreement on good, common solution on a case-by-case basis. Where consensus can be found the result will be fed into oncoming revisions of CEN TS 17268 (to become new CEN TS 16157-14) and CEN TS 16157-11 or the update of CEN EN 16157-7.  
17 **case 3** occurrences have been identified.
- **Case 4:** Same model elements but different multiplicities apply.  
**Example:** GrossweightCharacteristic
  - DATEX II definition: Multiplicity = [0..2]
  - TN-ITS definition: Multiplicity = [0..\*]**Next steps:** A further analysis will be performed with the objective of determining common multiplicity values.  
Two **case 4** occurrences have been identified.
- **Case 5:** Same attributes but different data types apply.  
**Example:** Data type “SpecialDay”, attribute “publicEvent”
  - DATEX II definition: Defined as PublicEventTypeEnum
  - TN-ITS definition: Defined as CharacterString[0..1]**Next steps:** A further analysis will be performed with the objective of determining a common solution.  
Four **case 5** occurrences have been identified.



In addition to the above cases, an analysis of the location referencing concepts needs to be performed as there are overlaps and diverging concepts between the current TN-ITS specification and the DATEX II concepts in CEN EN 16157-2 (Location referencing). The objective is to determine interoperability profiles.

#### **4.4. Technical elements under joint governance**

Starting in mid-June 2022, the coordination team responsible for aligning TN-ITS and DATEX within the NAPCORE project began addressing both technical and non-technical topics.

Non-technical topics include efforts to harmonise the appearance of platform websites, identify joint dissemination and communication opportunities, and develop standardised training materials. These initiatives aim to create a unified and cohesive experience for stakeholders engaging with both platforms.

Technical topics, as summarised in the table below, are primarily focused on aligning tools and processes for the development, maintenance, and publication of technical specifications. The alignment is expected to streamline workflows and foster interoperability between TN-ITS and DATEX. Key areas of focus include:

- **Bug Reporting and Tracking:** DATEX migrated from Bugzilla to GitHub, while TN-ITS relies on email and GitHub. The goal is to unify these approaches by integrating TN-ITS into the DATEX issue-tracking system, ensuring a centralised environment for reporting and handling issues, including feature requests.
- **Schema File Conversion:** DATEX employs proprietary tools for converting UML to schema files, whereas TN-ITS uses ShapeChange. A common toolkit is envisioned for both, with implementation slated for Phase 2 under NAPCORE's work plan.
- **Publication of Digital Files:** While DATEX openly publishes its digital files, including UML as Platform Independent Models (PIM), TN-ITS currently hosts its files on a less accessible webpage and GitHub, excluding UML. The target is to adopt the DATEX approach by making all relevant files openly accessible, supported by NAPCORE and CEN convenors.
- **Repository Management:** DATEX stores UML in SVN and plans to migrate to GitHub, while TN-ITS uses GitHub and SharePoint. The strategy is to integrate Part 14 into DATEX's documentation management framework, ensuring a cohesive repository structure.
- **Data Modelling and Profiling:** Both platforms use Enterprise Architect (EA) for conceptual data modelling, a practice that will continue. However, profiling, which involves creating subsets of specifications, is still underdeveloped in TN-ITS. The future may see TN-ITS adopting profiling methods aligned with DATEX, especially for specific use cases, such as ISA (Intelligent Speed Assistance).
- **Exchange Specifications:** DATEX employs standardised mechanisms for data exchange, including platform-independent functional standards and platform-specific SOAP interfaces, with Open API and message brokers under consideration. TN-ITS, by contrast, primarily uses XML files and REST APIs. The alignment effort will investigate opportunities for TN-ITS to integrate advanced elements such as trust and authentication.



- Feature Updates and Release Notes: Both platforms use GitHub for feature updates, but their release note processes differ. DATEX includes notes in Apaches' subversion (SVN) and publishes them on its website, while TN-ITS stores notes in its repository. By 2024 - 2025, these processes are expected to be harmonised under the DATEX framework.

The table below highlights a target scenario for the TN-ITS toolchain, which aims to be realised by the end of NAPCORE or during a follow-up initiative. These efforts will ensure that TN-ITS (CEN TS 16157 Part 14) aligns with the DATEX suite of technical specifications and European Norms and supports the broader objectives of interoperability and efficiency across the platforms.

Table 2 : Target scenario overview for TN-ITS toolchain

Topic	Definition	DATEX	TN-ITS	Target TN-ITS as CEN TS 16157: Part 14
Bug reporting	Method	Bugzilla, now migrated to GitHub	via email & GitHub	TN-ITS to be integrated in the DATEX Issue Track (moving to GitHub)
Bug tracking	Registering & handling known issues	Bugzilla, now migrated to GitHub	MS Word & GitHub	See above, one environment, issues: feature request & issues
Schema files	Conversion from UML to Schema files	Proprietary tool	ShapeChange tool	Common toolkit and use in Phase 2, work item in NAPCORE X
Publication	Digital files related to the specifications	On website (open), including UML (as PIM)	On 'hidden' webpage and on GitHub, excluding UML	Follow DATEX approach (free & open UML), supported by NAPCORE and CEN convenors (L. Blaive, J. Harrod Booth)
Repository	Hosted reference sources	UML is part of SVN (to move to GitHub), Master is in second repository (with figures)	GitHub & Sharepoint	Part 14 to be part of DATEX Documentation management Idea Transfer or Linked to DATEX GitHub - Paal and Peter S (migrate or start from scratch)
Data modelling	Conceptual data modelling	Enterprise Architect (EA)	Enterprise Architect	Continue as is on EA, preferred by CEN
Profiling	Subset of specification	A publication	Not available yet	TN-ITS has only have one today; TN-ITS could be a DATEX profile e.g. in Phase 2
Profiling	Data categories	Reference profiles - make specific for Use Cases	Not available yet	Possible for TN-ITS (e.g. ISA use cases), to be discussed
Exchange specification	Mechanism for data exchange / (publishing/hosting data)	Standardised exchange mechanism (2 standards - Platform Independent (functionals) platform specific (SOAP interfaces) Open API in roadmap Considering message brokers (MQTT) - including trust & authenticity	Websites hosting of XML files & Rest API	TN-ITS to investigate opportunities for alignment, including elements as trust/authentication (idem public transport data) (broader than TN-ITS and DATEX) (related to WG2 General NAP architecture) G. Christou. aligning with M. Massi. (4.2.7)
Feature updating	Feature update request	GitHub/CMB/TB	GitHub/Board	See row 2 and 3; refer to "issues"
Release notes	Procedure on sharing updates of specifications	Included in Subversion SVN, published on D2 website	Included in repository (specs), for the code lists	Align the process to be integrated in DATEX: target 2024/2025



## 5. National updates

### 5.1. Introduction

Chapter 6 of the milestone M4.2.4 report suggested extensions of the TN-ITS code lists that have been collected from countries through the TN-ITS GO project and the continuous work in TN-ITS working groups. Some of the suggestions were already covered by the requirements of the RTTI Delegated Regulation. The following chapters elaborate on the Swedish suggestion of adding code points for physical barriers and inputs received from the Flemish Ministry of Mobility and Public Works (MOW).

### 5.2. Sweden: Physical barriers

As described in M4.2.4 chapter 6.2.6, there is a significant difference between a legal restriction and a physical barrier as a legal restriction maybe ignored in a case of emergency, while a physical barrier makes the passage impossible. The difference whether it is possible to pass through a road section blocked by a physical barrier, can now be transmitted through the new code list barrier *BarrierType* (see chapter 3.3.1 above).

The code list values currently allow the description of the property of the physical barrier indicating whether it is permanently locked or whether there are ways to open it e.g., with keys or via a remote control. The current set of values may be extended to cover additional properties in accordance with suggestions that may be received by the TN-ITS (and NAPCORE) partners.

Beyond the Swedish suggestion for inclusion of physical barrier code points into the TN-ITS specification, further barriers exist, that block vehicles based on their ground clearance or axle distance. Sump busters are devices installed within a bus route to limit that thoroughfare to buses discouraging traffic from entering a lane by promising to destroy the oil pan of any vehicle with insufficient ground clearance to get over it. Bus traps (also called car traps) are metal grates placed over a ditch or pit in the road with tines (sides) spaced far enough apart that small (shorter axle) vehicles fall between the tines but close enough that larger-diameter-wheeled vehicles, such as buses, can pass. Although the use of sump busters is controversial as it may lead to accidents and the use of bus traps has been discontinued by most authorities, it may still be useful to extend the *BarrierType* code list with corresponding values.

### 5.3. Flanders: Road signs and bicycle network

The Flemish Ministry of Mobility and Public Works (MOW) is running a TN-ITS implementation during which a number of additional requirements were identified. These include generally applicable extensions to the TN-ITS code lists but also national extensions in relation particular road signs.

#### 5.3.1. Road signs

MOW suggested to add an entry to the code list *RoadFeaturePropertyTypeCode* that contains information about the direction a road sign is actually facing. This led to the inclusion of code point *roadSignBearing*. This is of relevance beyond the national context.

```
▼<gml:dictionaryEntry>
  ▼<gml:Definition gml:id="roadSignBearing">
    <gml:description>The bearing of a road sign in degrees : N is 0, E is 90, S is 180, W is 270</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelist/RoadFeaturePropertyTypeCode">roadSignBearing</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

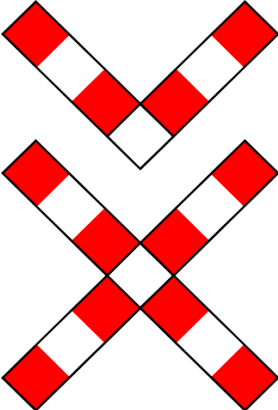
In addition to the road signs listed in the Graphic data dictionary (GDD as specified in ISO 14823-1:2024), MOW presented a list of road signs that are deployed in the Flemish road network. It was decided to create an additional code list to cater for national road signs or national variations of GDD



defined road signs. This code list is named *RoadSignTypeCode\_NationalExtensions* and carries at the time of writing the present report only the MOW requested extension but is open to future extensions originating from other national road authorities.

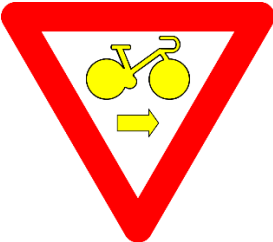
Following some examples of the Flemish road signs now coded in *RoadSignTypeCode\_NationalExtensions*.

**Warning signs (A- class)**



A47: Railroad crossing (multiple tracks)

**Priority signs (B-code)**



B22: Bike may pass a yellow or red light to turn right, after yield

**Prohibitory signs (C- class)**



B48: Use of cruise control forbidden

The first step to define where 'automated' driving is allowed that will be very useful in Automate Drive L3-L4 to pre-alert vehicles to switch back over to the driver.



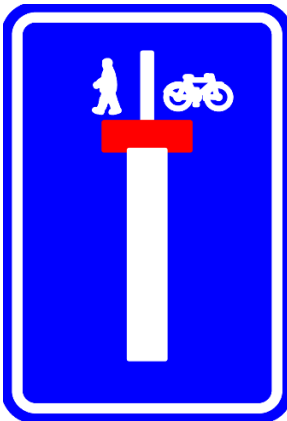
### Parking signs (E- class)



E9c: Parking reserved for trucks

Truck parking is a major problem all over Europe and generates serious safety risks on overcrowded highway truck parkings. Additional (centralised) information sources like these panels can help relieve the problem.

### Indicatory signs (F- class)

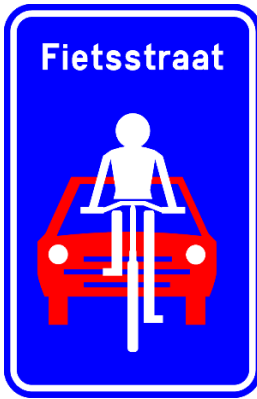


F45b: Dead end, except for pedestrians and cyclists



F99c: Start of a road or part of a road reserved for farm vehicles, pedestrians, cyclists horse riders and drivers of speed pedelecs

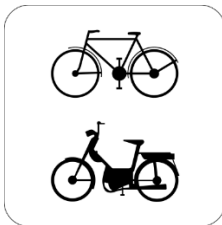




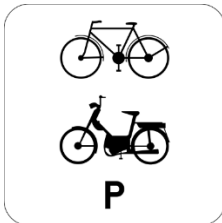
F111: Cycle street

### Additional signs (M-class)

The 'M' class road signs (i.e. sub-signs) are important to determine among other things for which transport mode the main road sign is applicable. In a digital service only the information that is of relevance to a car driver/cyclist/speed pedelec rider/pedestrian needs/can be shown to add value. The "M" class has received most recent additions for making the environment future-proof for new non-motorised two-wheeler categories, as there is currently a significant increase in uptake.



M8: For bicyclists and mopeds



M17: For bicyclists and speed pedelecs, both directions

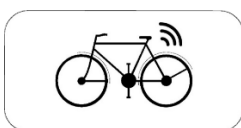


M21: For (non-)motorised personal transporters

Shared mobility services will need to know what part of street signs are explicitly aimed at them. Although the initial "integration" of shared mobility services was relatively "free" in terms of responsibilities taken by the providers, the common practice now is that the mobility service providers become responsible for correct situational use, requiring this type of information.



M22: For shared (non-)motorised personal transporters



M23: For bike-share bicycles



### 5.3.2. *Bicycle network*

In Flanders, a comprehensive network of cycle highways, also known as bike freeways or fast cycling routes, provides high-quality, direct paths for inter-city cycling. Serving as a backbone for regional connectivity, these highways integrate with other cycling routes to form an extensive network spanning Flanders and the Brussels region.

Although cycle highways do not currently have a distinct legal status, their infrastructure defines the applicable legal framework and traffic design. Clear signage from the highway code indicates the legal status of individual sections.

To enhance navigability, signposts have been installed along many cycle highways. These include directional signs, ground markings, and, in several locations, overview maps detailing the full route. A consistent visual identity is maintained across all these elements, featuring the logo of the cycle highways: a blue triangle with a white "F."



It is most likely that such concepts will be adopted also in other countries/regions. To allow coding for bicycle networks, a preliminary code point has been included into TN-ITS code lists.

In *RoadFeatureTypeCode* the new code value *cyclingNetwork* has been added.

```
<gml:dictionaryEntry>
  <gml:Definition gml:id="cyclingNetwork">
    <gml:description>Official classification for a cycling network</gml:description>
    <gml:identifier codeSpace="http://spec.tn-its.eu/codelists/RoadFeatureTypeCode">cyclingNetwork</gml:identifier>
  </gml:Definition>
</gml:dictionaryEntry>
```

Further attributes may be added later to categorise cycling network e.g., determining whether it is regional, national or international.



## 6. Standardisation actions

### 6.1. Context

The TN-ITS specification has been published 2018 by CEN TC278 as:

- CEN TS 17268:2018 “Intelligent transport systems — ITS spatial data — Data exchange on changes in road attributes”



CEN, the European Committee for Standardisation (Comité européen de normalisation), is an association that brings together the National Standardisation Bodies of 34 European countries. CEN TC 278 manages the preparation of standards in the field of Intelligent Transport Systems (ITS) in Europe. It serves as a platform for European stakeholders to exchange knowledge, information, best practices and experiences in ITS. The Working Group (WG) responsible for the development of CEN TS 17268 was WG7 which deals with ITS spatial data. Note that the DATEX II specifications in the CEN 16157 series have been published under the responsibility of WG8 (Road traffic data).

### 6.2. New Work Item creation

In 2023 the decision was taken to revise CEN TS 17268 and publish a new release. Therefore, a new work item was proposed in a CEN WI proposal form which is shown below.

During the proceedings of the merge of DATEX II with TN-ITS, the decision was taken to make the TN-ITS specification part of the CEN 16157 series as its part 14 and to align the title with the wording used for the DATEX II documents. The following new title for the TN-ITS specification has been agreed upon.

- CEN TS16157-14: “Intelligent transport systems - DATEX II data exchange specifications for road and traffic information - Part 14: TN-ITS road attribute update exchanges”

Consequently, the name of the WI under preparation will be changed to reflect this agreement.



New Work Item Proposal	
* to be attached to the CIB	
TC 278 – Intelligent transport systems	
Secretariat: NEN	Proposal documented in N xx
Date of circulation:	Closing date for voting:
Decision reference:	Decision date:

### Proposal

#### 0. This proposal relates to

- the adoption of a New Work Item in the committee's work programme (stage 10.99)
- the adoption of a Preliminary Work Item in the committee's work programme (stage 00.60)
- the activation of a Preliminary Work Item in the committee's work programme (stage 10.99): PWI XXXXXX

#### 1. Deliverable



- European Standard (EN)
- Technical Specification (TS)
- Technical Report (TR)

**2. This item corresponds to**

- A new project
- An amendment to the EN XXX
- The revision of EN XXX
- The conversion of TS XXX into an EN XXX
- The revision of TS 17268
- The revision of TR XXX

**2.1 - Only for WIs of CEN/TCs (not applicable to CEN-CLC/JTCs WIs): if this item corresponds to an amendment/revision of an EN indicate if:**

- the scope will change (weighted vote required - select the right option in the CIB)
- the scope will not change (simple majority vote required - select the right option in the CIB)

**3. Explain the purpose and give a justification for this proposal (max 4000 characters). This text should provide information on technical topics to be discussed.**

The proposal concerns the revision of CEN/TS 17268 that addresses the exchange of information on changes of static road attributes. In this context static means that the attributes are of a mostly permanent nature, even though they or their characteristics may sometimes change over time. The focus is in general on safety-related road attributes based on regulations but may extend to other road and transport related features.

It is important that digital maps for ITS are highly up-to-date for attributes and geometry that are critical in terms of safety and efficiency and support a wide range of ITS applications in the areas of navigation, driver assistance, cooperative driving and automated driving. .

This document facilitates a solution to retrieve information on changes from the road authorities/road operators. This requires digital storage and maintenance on their side and the flagging of changes. With governments becoming more digital, systems for such digital storage and maintenance are increasingly available; however, there is and will be a proliferation of solutions that differ in terms of data model application and approach. Therefore, a common exchange framework is needed, enabling creations of plugins to existing (legacy) systems for extraction of information on changes on road attributes.

CEN/TS 17268 is closely linked with priority action b of the 2010/40/EC Directive (the "ITS" Directive) and cited in the Commission Delegated Regulation 2022/670 supplementing the Directive for this priority action.

Note: in case the WI is based on documents from other organisations than ISO/IEC, please specify it here

**4. Titles**

English title: Intelligent transport systems - ITS spatial data - Data exchange on changes in road attributes

French title: Systèmes de transport intelligents - Données spatiales STI - Échange de données sur les modifications d'attributs routiers  
(Optional)

German title: Intelligente Verkehrssysteme - Räumliche ITS-Daten - Datenaustausch zu Änderungen von Straßenattributen  
(Optional)

**5. Scope of the proposed work item (max 4000 characters)**



This document defines the content specification for the exchange of road-related static spatial data, and especially updates thereof. Based on the content specification, this document defines also a physical exchange format (structure and encoding) for the actual data exchange. In addition, it defines web services that are needed to make the coded data on updates available. Exchange of dynamic information is not in the scope of this document.

Although the focus of this document is on providing information on updates, the technology described in this document in principle also enables the exchange of full datasets, either concerning the whole road network in a coverage area, including all geometry and all attributes, or a subset, concerning for instance all instances of one or more specific attributes.

## 6. Digital aspects

- The deliverable is intended to be developed using the Online Collaborative Authoring platform
- The deliverable is intended to include non-Word/PDF content, e.g. audio files, XML schemas, machine-readable formats or software.

Please provide details of the non-Word/PDF content:

XML-based files representing implementations of the data model

- None of the above.

If yes to either of these questions, CCMC will contact you for feasibility and organisational aspects.

## 7. Stakeholder categories immediately affected by the proposal

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> Industry and commerce | <input type="checkbox"/> Societal consumer groups     | <input checked="" type="checkbox"/> Standards application    |
| <input checked="" type="checkbox"/> SMEs                  | <input type="checkbox"/> Labour                       | <input type="checkbox"/> Non-governmental organisation (NGO) |
| <input checked="" type="checkbox"/> Government            | <input type="checkbox"/> Academic and research bodies | <input type="checkbox"/> Environmental stakeholders          |
| <input checked="" type="checkbox"/> Consumers             |   |  |
| <input type="checkbox"/> None of the above categories     |   |  |

## 8. How will these Stakeholders benefit from or be impacted by the proposed deliverable?

New market creation, cost reduction, chance of market access, development of industry and service quality improvement

## 9. Document developed in drafting body

- Existing drafting body (*please give name and title*):

CEN/TC 278/WG 7 – ITS spatial data

- New drafting body (*please give name and title*):

## 10. Proposed Project Leader (including contact details) - *Optional*



Mr Peter Schmitting  
ERTICO - ITS EUROPE p.schmitting@mail.ertico.com

#### 11. United Nations Sustainable Development Goals (SDGs)

Please select any United Nations Sustainable Development Goals (SDGs) that this document will support. For more information, please visit the SDG section of the CEN website (currently under development).

- GOAL 1: No Poverty
- GOAL 2: Zero Hunger
- GOAL 3: Good Health and Well-being
- GOAL 4: Quality Education
- GOAL 5: Gender Equality
- GOAL 6: Clean Water and Sanitation
- GOAL 7: Affordable and Clean Energy
- GOAL 8: Decent Work and Economic Growth
- GOAL 9: Industry, Innovation and Infrastructure
- GOAL 10: Reduced Inequality
- GOAL 11: Sustainable Cities and Communities
- GOAL 12: Responsible Consumption and Production
- GOAL 13: Climate Action
- GOAL 14: Life Below Water
- GOAL 15: Life on Land
- GOAL 16: Peace and Justice Strong Institutions
- (N/A) GOAL 17: Partnerships to achieve the Goal
- None of the above

Proposed rationale for the selected SDG(s)- (optional):

#### 12. Accessibility aspects

See CEN-CENELEC Guide 6:2014 'Guide for addressing accessibility in standard'

- Accessibility aspects are relevant for this NWI (please indicate which ones):

See the 'protocol' to help you decide when accessibility following a Design for All approach is relevant:  
<https://www.cenelec.eu/areas-of-work/cen-cenelec-topics/accessibility/design-for-all/>

- Accessibility aspects are not relevant for this NWI

Please provide a written explanation detailing why accessibility aspects do not apply to the current proposed WI:  
The technical specification specifies a data model that will be used to exchange different mapmakers to update their products that are eventually used by driving assistance systems and connected and automated vehicles. There is no direct interaction with humans

#### 13. Environmental aspects



- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Discharges to soil                            | <input type="checkbox"/> Discharges to water      | <input checked="" type="checkbox"/> Emission to air    |
| <input type="checkbox"/> Heat  | <input type="checkbox"/> Noise/Vibration          | <input type="checkbox"/> Use of land                   |
| <input type="checkbox"/> Radiation                                     | <input checked="" type="checkbox"/> Use of energy | <input type="checkbox"/> Other effects on biodiversity |
| <input type="checkbox"/> Use of material                               | <input type="checkbox"/> Use of water             | <input type="checkbox"/> Waste                         |
| <input type="checkbox"/> Risk to the environment from accidents/misuse |   | <input type="checkbox"/> Chemicals                     |

Other:

None of the above.

*Please provide a written explanation detailing why these environmental aspects do not apply to the current proposed WI:*

CEN/TS 17268 concerns a structured approach for exchange of road data. No environmental aspects are directly related to this. However, some pieces of exchanged data (speed limits, longitudinal gradients etc) may feed ITS applications that can have a positive impact on the environment.

#### 14. How do you plan to address these environmental aspects?

- Bring in environmental expertise to the WG
- Contact EHD for help/support (cen.ehd@cenelec.eu) and/or use examples from Environmental Framework <https://www.cenelec.eu/areas-of-work/cen-cenelec-topics/environment-and-sustainability/environmental-helpdesk-and-trainings/>
- Use of environmental checklist and guides (please visit the dedicated section in the CEN website <https://boss.cen.eu/reference-material/guidancedoc/pages/environment/>)
- Other: **Not relevant**

#### 15. Vienna Agreement (parallel procedure)

No or Vienna Agreement with CEN lead proposed

Yes – Vienna Agreement Parallel with ISO Lead

ISO project reference:

ISO project ID:

ISO/TC:



**16. The project is based on**

No document from another organisation

An ISO or ISO/IEC document (not covered by a parallel procedure)

Identical

Non-identical

ISO/IEC project reference:

ISO/IEC project ID:

Publication date:

A document from another organisation than ISO or ISO /IEC:

Note: Please explain the purpose and give a justification for this proposal in Section 3.

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**17. Please indicate whether the proposed project is linked to a specific European Research and Innovation Project**

No

Yes

Research and/or Innovation project code:

Research and/or Innovation project acronym:

Research and/or Innovation project title:

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**18. Track**

Enquiry + Formal Vote (for EN)

Vote on TS or TR by correspondence

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**19. Please provide the target dates for the below key stages.**

**19.1 – For ENs**

This section applies only to WIs for homegrown CEN standards (excluding ISO adoptions), WIs under VA with CEN lead only and homegrown standards developed by a CEN-CLC/JTC (with CEN lead). This section does not apply to the adoption of PWIs. For JTCs also add the durations in week.

<u>Project start date (10.99)</u>	<u>Dispatch of 1<sup>st</sup> WD (20.60)</u>	<u>Dispatch of ENQ (30.99)</u>	<u>Dispatch of FV draft (45.99)</u>
yyyy-mm-dd	It is half the number of weeks planned for ENQ (30.99)  For CEN/TC: automatically calculated via Working Area  For JTC: date will be added by CCMC	yyyy-mm-dd  For JTC only: to indicate the duration in weeks from 10.99 10.99 + X weeks	yyyy/mm/dd  For JTC only: to indicate the duration in weeks from 40.60 <u>40.60 + X weeks</u>

**19.2 – For TSs and TRs**

<u>Project start date (10.99)</u>	<u>Dispatch of 1<sup>st</sup> WD (20.60)</u>	<u>Dispatch of draft for Vote (30.99)</u>
2023-12-15	2024-05-01	2024-12-15



<b>20. Related standardisation request(s) (formerly mandate):</b>		
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes ( <i>please specify</i> ):		
<b>21. Related directive(s)/regulation(s)</b>		
<input type="checkbox"/> No		
<input checked="" type="checkbox"/> Yes	Directive/ Regulation reference 2010/40/EU	Candidate for citation in Official Journal?  <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes
<b>22. Relation to other legislation or established public policy.</b>		
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>Please specify which legislation or established public policy is/are in relation with the proposed project:</i>		
<b>23. Is the proposed project covered by Intellectual Property Rights (IPR)?</b>		
<i>Please indicate whether there is any knowledge of items covered by IPR(s), for instance patents, copyright, trademark, etc.</i>		
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>Please provide full information about these items and the identified IPR(s):</i>		
<b>24. Commitment This section applies only to CEN-CLC/JTC To be completed for NWI request to be approved by CEN and CENELEC BTs.</b>		
The following members ( <u>at least five</u> ) are committed to participate in the development of the project:		

### 6.3. Roadmap

The new work item proposal has been adopted in “Decision 023-2023 Adoption PWI CEN/TS 17268 result WG 7” as published in document “CEN/TC 278 N 4899”. The document (see full version in appendix) shows an approval rate of 100% of all voting national members. An early comment from the French SDO AFNOR states: “Standard to take into account: - EN ISO 14823-1 (new version to be published) It is also necessary to use the updated versions of the ISO/TC 211 standards already referenced in the previous version of CEN/TS 17268.”

The next step in the standardisation process is now to produce a stable draft of the revised TN-ITS specification and to activate the adopted WI. Afterwards “the clock starts ticking” and the timetable as shown in the below figure applies.



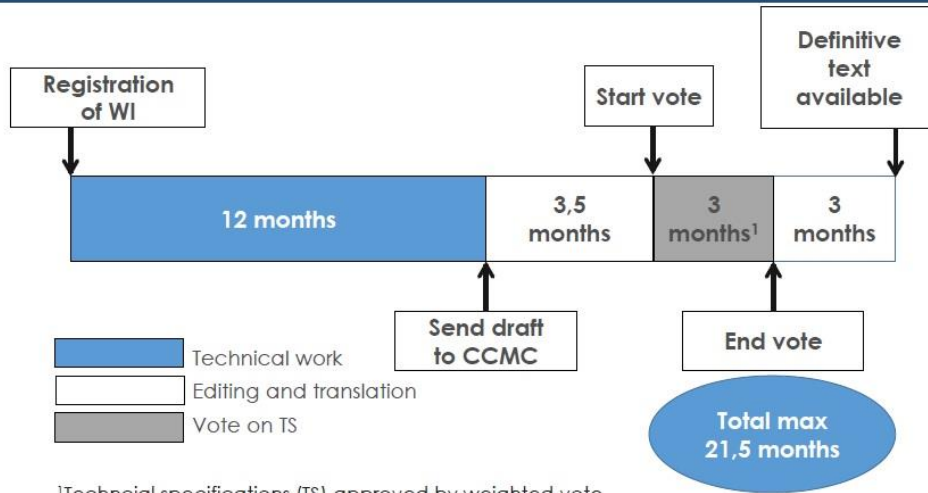


Figure 5 : CEN roadmap for technical specifications

## 7. Conclusions

The present report provides insights into the activities undertaken by TN-ITS and DATEX II experts to update the technical specifications (TS) of TN-ITS, known as CEN TS17268. It outlines the methodology followed to achieve the intended outcomes.

The milestone report begins by discussing the updates implemented to address gaps identified in the revised RTTI Delegated Regulation, as recommended in M4.2.4.

Next, it focuses on aligning the technical specifications with the DATEX II suite of standards (CEN 16157). This alignment was a strategic decision to harmonise TN-ITS specifications with the DATEX II 16157 series, particularly with Part 11: Traffic Regulations.

Finally, the document details updates to the technical specifications based on requests from TN-ITS partners, which were collected during the NAPCORE project. The final chapter outlines the steps taken towards the release of a new official CEN Technical Specification for TN-ITS as DATEX 16157: Part 14, scheduled for publication in 2025.



## 8. References

1. TN-ITS Platform: [www.tn-its.eu](http://www.tn-its.eu) (Accessed: 01 November 2024)
2. TN-ITS GitHub: <https://github.com/ERTICO-TN-ITS/TN-ITS-Open>(Accessed: 01 November 2024)
3. DATEXII Platform: [www.datex2.eu](http://www.datex2.eu) (Accessed: 01 November 2024)
4. M4.2.4 Technical specifications Updates Supporting the RTTI delegated regulation with INSPIRE and TN-ITS (2023), NAPCORE
5. EC. (2015). DR EU No 962/2015 – Real-Time Traffic Information (RTTI). Available at: [http://data.europa.eu/eli/reg\\_del/2015/962/oj](http://data.europa.eu/eli/reg_del/2015/962/oj)
6. INSPIRE. (2022). INSPIRE Consolidated UML Model. Available at: <https://inspire.ec.europa.eu/data-model/approved/r4618-ir/html/index.htm> (Accessed: 10 August 2022)
7. DATEX II Docs. (No date b). DATEX II v3.3 Downloads. Available at: <https://docs.datex2.eu/downloads/modelv33.html> (Accessed: 10 August 2022)
8. TN-ITS GO (2019-2021). Deliverables can be found on <https://tn-its.eu/deliverables/> (Accessed: 10 March 2025).
9. ISO 14823-1:2024: Intelligent transport systems — Graphic data dictionary — Part 1: Specification
10. CEN TS 17268:2018: Intelligent transport systems — ITS spatial data — Data exchange on changes in road attributes
11. CEN TS 16157-1:2018: Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework
12. CEN EN 16157-2:2018: Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing
13. CEN EN 16157-7:2018: Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 7: Common data elements
14. CEN TS 16157-11:2021: Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 11: Publication of machine interpretable traffic regulations



## Appendixes

Appendix 1: M4.2.4 RTTI implementation suggestion matrix:



M4.2.4 matrix.xlsx

Appendix 2: DATEX II / TN-ITS model and data type comparison



Mapping TN-ITS  
and DATEX II.xlsx

Appendix 3: Adoption of new WI for revised TN-ITS specification



CEN-TC 278-WG  
7\_CEN-TC 278 N 489

