SLOVENSKI STANDARD
SIST-TS CEN/TS 16157-5:2014

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Inteligentni transportni sistemi - Specifikacije za izmenjavo podatkov DATEX II pri upravljanju prometa in informiranju - 5. del: Merjeni in obdelani podatki za objavo

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 5: Measured and elaborated data publications

Intelligente Transportsysteme - DATEX II Datenaustausch Spezifikationen für Verkehrsmanagement und Informationen - Teil 5: Gemessene und ausgearbeitete Datenveröffentlichungen

Systèmes de transport intelligents - Spécifications Datex II d'échange de données pour la gestion du trafic et l'information routière - Partie 5 : Publication de données mesurées et de données calculées

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Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 5: Measured and elaborated data publications

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (CEN/TS 16157-5:2014) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

The CEN/TS 16157 series consists of the following parts, under the general title “Intelligent transport systems — DATEX II data exchange specifications for traffic management and information”:

- Part 1: Context and framework

- Part 2: Location referencing

- Part 3: Situation publication

- Part 4: VMS publication

- Part 5: Measured and Elaborated Data Publications

Other parts may be developed in the future.

As a user of the standard, attention is drawn to the resources of www.datex2.eu < http://www.datex2.eu/ > . This website contains related software tools and software resources that aid the implementation of the CEN/TS 16157 series DATEX II.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This Technical Specification defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers. Standardization in this context is a vital constituent to ensure that interoperability, reduction of risk, reduction of the cost base and promotion of open marketplace objectives are achieved that will lead to many social, economic and community benefits as a result of more informed travellers, network managers and transport operators.

Delivering European Transport Policy in line with the White Paper issued by the European Commission requires co-ordination of traffic management and the development of seamless pan European services. With the aim to support sustainable mobility in Europe, the European Commission has been supporting the development of information exchange mainly between the actors of the road traffic management domain for a number of years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent co-funding through the Euro-Regional projects. With this standardization of DATEX II there is a real basis for common exchange between the actors of the traffic and travel information sector.

This Technical Specification includes the framework and context for exchanges, the modelling approach, data content, data structure and relationships and communications specification.

This Technical Specification supports a methodology that is extensible.

The fifth part of this Technical Specification deals with the one or more publication sub-model(s) within the DATEX II model that support the exchange of measured and elaborated information. These publications are intended to support the exchange of information from the organization having the measures and creating elaborated data to other organizations providing ITS services or onward information exchange. It also includes the exchange of static information about measurement sites.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning procedures, methods and/or formats given in this document.

CEN takes no position concerning the evidence, validity and scope of patent rights.

1 Scope

This Technical Specification (CEN/TS 16157-5) specifies and defines component facets supporting the exchange and shared use of data and information in the field of traffic and travel.

The component facets include the framework and context for exchanges, the modelling approach, the data content, the data structure and relationships and the communications specification.

This Technical Specification is applicable to:

— Traffic and travel information which is of relevance to road networks (non urban and urban);

— Public transport information that is of direct relevance to the use of a road network (e.g. road link via train or ferry service).

This Technical Specification establishes specifications for data exchange between any two instances of the following actors:

— Traffic Information Centres (TICs);

— Traffic Control Centres (TCCs);

— Service Providers (SPs).

Use of this Technical Specification may be applicable for use by other actors.

This Technical Specification includes the following types of information content:

— Road traffic event information – planned and unplanned occurrences both on the road network and in the surrounding environment;

— Operator initiated actions;

— Road traffic measurement data, status data and travel time data;

— Travel information relevant to road users, including weather and environmental information;

— Road traffic management information and instructions relating to use of the road network.

This part of the CEN/TS 16157 series specifies the informational structures, relationships, roles, attributes and associated data types required for publishing measured and elaborated data within the Datex II framework. This is specified in three submodels, a DATEX II Measurement Site Table Publication submodel, a DATEX II Measured Data Publication submodel and a DATEX II Elaborated Data Publication submodel.

1.1 Conformance

The platform independent sub-models defined by this Part specify a DATEX II Measurement Site Table Publication, a DATEX II Measured Data Publication and a DATEX II Elaborated Data Publication except for those elements that relate to location information which are specified in CEN/TS 16157-2. The DATEX II platform independent data model these three publication sub-models are a part of which, corresponds to the Level A model as defined in CEN/TS 16157-1.

Conformance with this Part shall require platform independent models from which platform specific models are generated to comply with the UML modelling rules defined in CEN/TS 16157-1 and with the following requirements of the sub-models which are expressed in this Part:

— comply with all stipulated minimum and maximum multiplicity requirements for UML elements and relationships;

— comply with all definitions, types and ordering;

— employ optional elements as specified;

— comply with all expressed constraints.

It should be noted that conformance of a publication service with all the structural requirements stated above does not necessarily ensure that the informational content of that service will be semantically comprehensible.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 16157-1:2011, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework*

CEN/TS 16157-2:2011, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing*

CEN/TS 16157-3:2011, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation Publication*

ISO/IEC 19501:2005, *Information technology — Open Distributed Processing — Unified Modeling Language (UML) Version 1.4.2*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 16157-1, CEN/TS 16157-2, CEN/TS 16157-3 and in the following list shall apply.

3.1
elaborated data
data which is derived/computed from one or more measurements over a period of time

Note 1 to entry: It may be a current value or a forecast value predicted from historical measurements.

3.2
measured data
quantitative data measured against a quantified scale (possibly using standard units of measure)

Note 1 to entry: In comparison to Elaborated Data, measured data can be considered to represent presentation of more directly observed measurements

3.3
measurement
collection of quantitative data

Note 1 to entry: A measurement is made by comparing a quantity with a standard unit. Since this comparison cannot be perfect, measurements inherently include error.

3.4
measurement site
location from where a stream of measured data may be derived

Note 1 to entry: It can be a point, a linear road section or an area. Linear sections may even be specified as itineraries or predefined location sets, e.g. for travel time routes which comprise one or more different roads.

3.5
Site Measurements
A measurement data set derived from a specific measurement site

4 Symbols and abbreviated terms

For the purposes of this document, the abbreviation of terms given in CEN/TS 16157-1, CEN/TS 16157-2, CEN/TS 16157-3 and in the following list shall apply.

PCU Passenger Car Unit

5 UML notation

The UML notation used in these Technical Specifications shall be as described in ISO/IEC 19501. A short summary explaining the notation used in this part of the CEN/TS 16157 series is provided in Annex A of CEN/TS 16157-1.

6 The Measurement Site Table Publication model

6.1 Overview of the Measurement Site Table Publication model

The Measurement Site Table Publication model comprises a top-level package, “MeasurementSiteTablePublication” which utilizes some classes from the “ReusableClasses” package and the “GroupOfLocations” package. This package is one of a number which are immediately subordinate to the “PayloadPublication” package and hence forms the top of the hierarchy in the Measurement Site Table Publication sub-model.

The “MeasurementSiteTablePublication” package models Measurement Site Tables comprising a number of sets of data, each describing the location from where a stream of measured data may be derived. Each location is known as a “measurement site” which can be a point, a linear road section or an area.

Each “MeasurementSiteTablePublication” instance shall contain one or more instances of a “MeasurementSiteTable”, each table containing a number of “MeasurementSiteRecords”. Each “MeasurementSiteRecord” shall be described by a location and specific characteristics.

Each “MeasurementSite” instance contains zero or more “Measurements” that have different characteristics like e.g. traffic flow, speed,…

6.2 The “MeasurementSiteTablePublication” Package

6.2.1 Overview of the “MeasurementSiteTablePublication” Package

The “MeasurementSiteTablePublication” package shall comprise a sub-model for defining publishable measurement site tables which comprise records defining the measurement sites (see Figure 1). Each publication may contain one or more tables, allowing logical partitioning of measurement sites information as deemed most appropriate for recipients of measured data information by the supplier (e.g. by road designation or other geographic criteria or by type of measurement site, etc.)

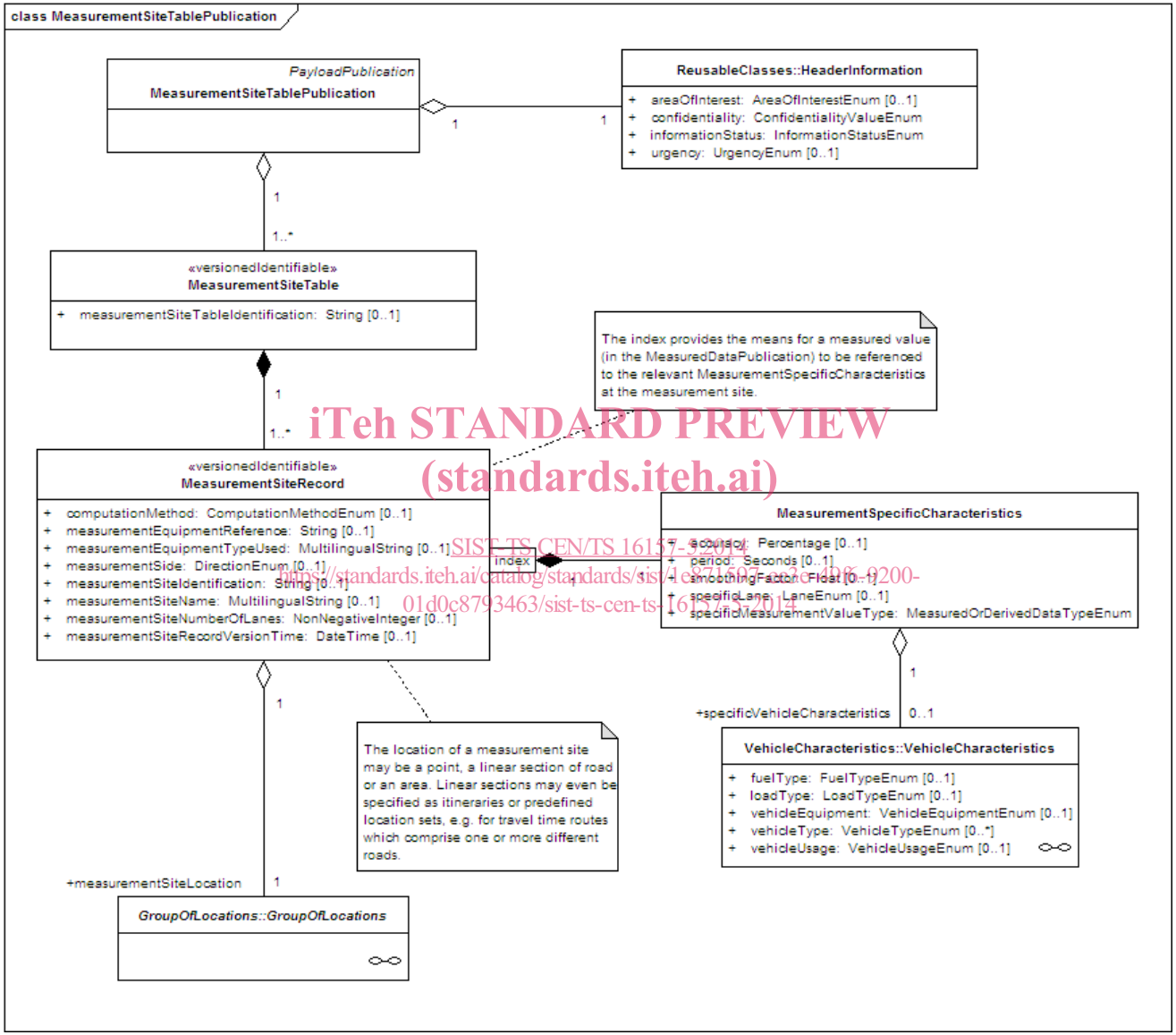

Figure 1 — The "MeasurementSiteTablePublication" package class model

6.2.2 Semantics of the "MeasurementSiteTablePublication" Package

6.2.2.1 "MeasurementSiteTablePublication" package semantics - general

The "MeasurementSiteTablePublication" class is a specific realizable case of a "PayloadPublication". Each "MeasurementSiteTablePublication" may contain any number of separate measurement site tables.

6.2.2.2 "MeasurementSiteTablePublication" Class

The "MeasurementSiteTablePublication" class is the base class for containing the published measurement site tables.

6.2.2.3 "HeaderInformation" Class

Each instance of a "MeasurementSiteTablePublication" shall have associated metadata contained in an instance of the "HeaderInformation" class which allows the supplier of the "MeasurementSiteTablePublication" to specify how the recipient should treat the information contained in it. This class is already defined in CEN/TS 16157-3.

6.2.2.4 "MeasurementSiteTable" Class

An identifiable versioned instance of the "MeasurementSiteTable" class shall contain any logical collection of "MeasurementSiteRecords".

6.2.2.5 "MeasurementSiteRecord" Class

An identifiable versioned instance of the "MeasurementSiteRecord" class shall contain the characteristics information relating to a specific Measurement Site.

Each record shall be located by a "GroupOfLocations" class. This class belongs to the "GroupOfLocations" package already described in CEN/TS 16157-2.

Each record shall have one indexed "MeasurementSpecificCharacteristics" sub-record for containing the characteristics of each individual measure. The index provides the means for a measured value (in the MeasuredDataPublication) to be referenced to the relevant MeasurementSpecificCharacteristics at the measurement site. Each measure can concern specific vehicles which are described by a "VehicleCharacteristics" class.

6.2.2.6 "MeasurementSpecificCharacteristics" Class

An instance of the "MeasurementSpecificCharacteristics" class contains characteristics which are specific to an individual measurement type (specified in a known order) at the given measurement site.

6.2.2.7 “VehicleCharacteristics” Class

The characteristics of a vehicle, e.g. lorry of gross weight greater than 30 tonnes.

The “VehicleCharacteristics” class is defined in the “VehicleCharacteristics” package which is already described in CEN/TS 16157-3.

7 The Measured Data Publication model

7.1 Overview of the Measured Data Publication model

The Measured Data Publication model shall comprise a top-level package, “MeasuredDataPublication” and one sub-package “BasicData” from the “ReusableClasses” package. The “MeasuredDataPublication” top-level package shall be one of a number which shall be immediately subordinate to the “PayloadPublication” package and hence shall form the top of the hierarchy in the Measured Data Publication model.

7.2 The “MeasuredDataPublication” Package

7.2.1 Overview of the “MeasuredDataPublication” Package

The “MeasuredDataPublication” package shall comprise the sub-model for defining a publication containing one or more measurement data sets, each set being composed of a number of measure values measured at a single measurement site.

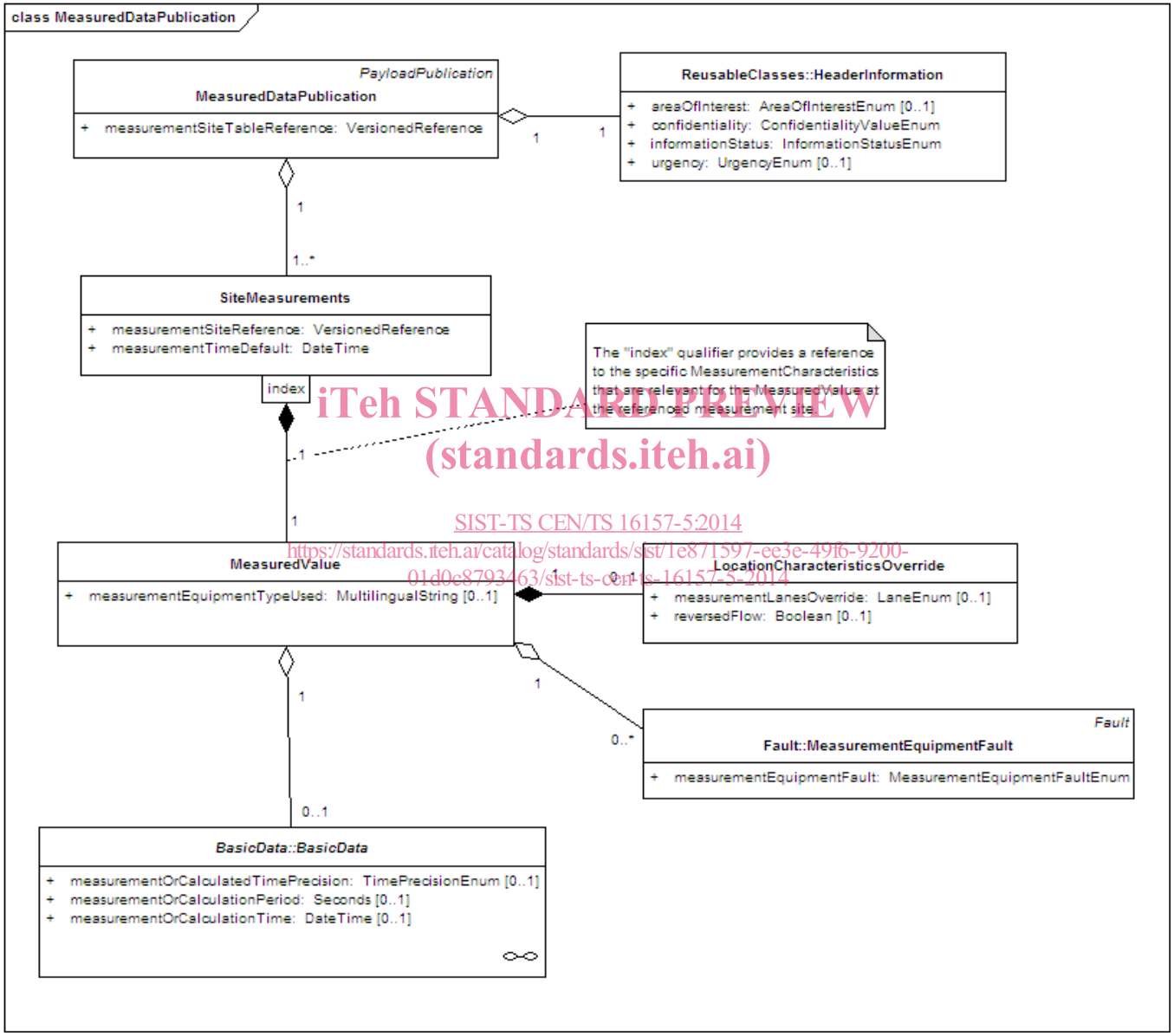

Figure 2 — The “MeasuredDataPublication” package class model

7.2.2 Semantics of the “MeasuredDataPublication” Package

7.2.2.1 “MeasuredDataPublication” package semantics - general

The “MeasuredDataPublication” class shall be the only entry point of the package and shall be a specific realizable case of a “PayloadPublication”. Each “MeasuredDataPublication” shall contain one or more measurement data sets, each set being measured at a single measurement site.

7.2.2.2 “MeasuredDataPublication” Class

The “MeasuredDataPublication” class shall be the base class for containing the published measured data.

7.2.2.3 “HeaderInformation” Class

Each instance of a “MeasuredDataPublication” shall have associated metadata contained in an instance of the “HeaderInformation” class which shall allow the supplier of the publication to specify how the recipient of the “MeasuredDataPublication” should treat the information contained in it. This class is already defined in CEN/TS 16157-3.

7.2.2.4 “SiteMeasurements” Class

The “SiteMeasurements” class shall contain a measurement data set derived from a specific measurement site.

Each measurement site, at a given time, has an indexed “MeasurementValue”. The “index” qualifier provides a reference to the specific MeasurementCharacteristics that are relevant for the MeasuredValue at the referenced measurement site.

7.2.2.5 “MeasuredValue” Class

The “MeasuredValue” class contains optional characteristics for the specific measured value (indexed to correspond with the defined characteristics of the measurement at the referenced measurement site) which override the static characteristics defined in the MeasurementSiteTable.

7.2.2.6 “LocationCharacteristicsOverride” Class

The “LocationCharacteristicsOverride” class may contain location characteristics which override values set in the referenced measurement point.

7.2.2.7 “MeasurementEquipmentFault” Class

The “MeasurementEquipmentFault” class contains details of a fault which is being reported for the related measurement equipment.