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**Intelligente Verkehrssysteme –
DATEX II Datenaustauschspezifikation für Verkehrsmanagement und
Verkehrsinformationen –
Teil 7: Gemeinsame Datenelemente;
Englische Fassung prEN 16157-7:2017**

Intelligent transport systems –
DATEX II data exchange specifications for traffic management and information –
Part 7: Common data elements;
English version prEN 16157-7:2017

Systèmes de transport intelligents –
Spécifications DATEX II d'échange de données pour la gestion du trafic et l'information
routière –
Partie 7: Éléments de données communs;
Version anglaise prEN 16157-7:2017

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Dieser Norm-Entwurf mit Erscheinungsdatum 2017-06-16 wird der Öffentlichkeit zur Prüfung und
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DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Nationales Vorwort

Dieses Dokument (prEN 16157-7:2017) wurde vom Technischen Komitee CEN/TC 278 „Intelligente Verkehrssysteme“ ausgearbeitet, dessen Sekretariat von NEN (Niederlande) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Gemeinschaftsarbeitsausschuss NA 052-02-71 GA „Intelligente Verkehrssysteme“ des DIN-Normenausschusses Automobiltechnik.

Der Entwurf ist derzeit zur Umfrage vorgelegt.

Dieser Normentwurf definiert eine gemeinsame Menge von Datenaustausch Spezifikationen um die Vision vom interoperablen Austausch von Verkehrs- und Reiseinformationsdaten über Grenzen hinweg zu ermöglichen.

Dieser Normentwurf basiert weiterhin auf einem Weißbuch der europäischen Kommission, welches die Koordination von Verkehrsmanagement und die Entwicklung von übergangslosen paneuropäischen Diensten festlegt.

Dieser Teil der Normenreihe beschäftigt sich mit gemeinsamen Datenelementen, die in mehr als nur einer Veröffentlichung verwendet werden. Die Norm legt wiederverwendbare Strukturen und Festlegungen von Informationen fest, die zu übertragbaren Informationen, die in den anderen Teilen dieser Normreihe beschrieben sind, ausgetauscht werden könnten. Die Elemente, die in diesem Dokument beschrieben werden, haben ihren eigenen gemeinsamen Namensraum.

Änderungen

Gegenüber DIN CEN/TS 16157-1 (DIN SPEC 91269):2011-12 wurden folgende Änderungen vorgenommen:

- a) vordefinierte Modellelemente wurden aus Teil 1 in diesen Teil überführt.

Nationaler Anhang NA (informativ)

Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach CEN/TS 16157-1 und die folgenden Begriffe.

3.1

Grunddaten

(en: basic data)

Daten, die entweder gemessene oder berechnete (bearbeitete) Daten sind

3.2

Datenwert

(en: data value)

Wert von etwas, dass gemessen oder berechnet werden kann

3.3

Erweiterung

(en: extension)

Datenmodellinhalt, der nicht Teil des DATEX II-Niveau A-Modells ist, und der im Containerpaket „Erweiterung“ (z. B. für projektspezifische Zwecke) ergänzt wird

3.4

Fehler

(en: fault)

Information über eine Fehlfunktion bezogen auf ein spezifisches Einrichtungsteil oder einen Prozess

3.5

allgemeine Veröffentlichung

(en: generic publication)

DATEX II-Veröffentlichung ohne vordefinierten Inhalt, welcher für Erweiterungen auf Veröffentlichungsniveau verwendet wird

3.6

Nutzdaten Veröffentlichung

(en: payload publication)

verkehrsbezogene Information oder zugehörige Leistungsinformationen, welche zu einem bestimmten Zeitpunkt erstellt wurden und über die DATEX II-Schnittstelle ausgetauscht werden können

Anmerkung 1 zum Begriff: Die Klasse „Nutzdaten Veröffentlichung“ ist die obere Ebene der Stammklasse für DATEX II Niveau A.

3.7

Gültigkeit

(en: validity)

spezifizierter Zeitraum in dem die ausgetauschten DATEX II-Informationen gültig sind

3.8

Wetterdaten

(en: weather data)

Informationssammlung bezogen auf gemessene oder abgeleitete (normalerweise verkehrsbezogene) Wetterbedingungen an einem festgelegten Ort

3.9

Fahrzeugcharakteristiken

(en: vehicle characteristics)

Parametersammlung die ein Fahrzeug charakterisieren

English Version

Intelligent transport systems - DATEX II data exchange
specifications for traffic management and information -
Part 7: Common data elements

Systèmes de transport intelligents - Spécifications
DATEX II d'échange de données pour la gestion du
trafic et l'information routière - Partie 7: Éléments de
données communs

Intelligente Verkehrssysteme - DATEX II
Datenaustauschspezifikation für Verkehrsmanagement
und Verkehrsinformation - Teil 7: Gemeinsame
Datenelemente

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 278.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 16157-7:2017) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document, together with prEN 16157-1, will supersede CEN/TS 16157-1:2011.

It covers the pre-defined model elements in the 'Common' namespace.

prEN 16157-7 is a part under the general title “*Intelligent transport systems — DATEX II data exchange specifications for traffic management and information*”, the other parts being:

- Part 1: Context and framework
- Part 2: Location referencing
- Part 3: Situation publication

Other parts will be developed in the future.

Introduction

This European Standard 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. Standardisation in this context is a vital constituent to ensure interoperability, reduction of risk, reduction of the cost base, promotion of open marketplaces and many social, economic and community benefits to be gained from 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 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 standardisation of DATEX II there is a real basis for common exchange between the actors of the traffic and travel information sector.

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

This European Standard supports a methodology that is extensible.

The European Committee for Standardisation (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.

This part of prEN 16157 is targeted to deal with the common data elements that are used in more than one publication. It specifies reused structures and definitions of information that may be exchanged to convey information described in the other parts of this EN. The elements described in this document have their own namespace "Common".

1 Scope

This European Standard specifies and defines component facets required to support 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 data content, data structure and relationships, communications specification.

This European Standard 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);
- Traffic and travel information in the case of Cooperative intelligent transport systems (C-ITS).

This European Standard 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 European Standard may be applicable for use by other actors.

This European Standard covers, at least, the following types of informational content:

- Road traffic event information – planned and unplanned occurrences both on the road network and in the surrounding environment;
- Information about operator initiated actions – including both advisory and mandatory measures;
- 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 information and advice relating to use of the road network.

This part of prEN 16157 specifies common informational structures, relationships, roles, attributes and associated data types required for publishing information within the DATEX II framework. This is specified as a DATEX II sub-model which is part of the DATEX II platform independent model, but this Part only covers common elements that are used by more than one publication. It excludes those elements that relate to location information which are specified in part 2 of prEN 16157.

2 Normative references

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

prEN 16157-1:2017, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and Framework*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions - Part 1: Country codes (ISO 3166-1)*

ISO 639-2, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 16157-1 and the following apply.

3.1

basic data

data that is either measured or calculated (elaborated) data

3.2

data value

value of something that can be measured or calculated

3.3

extension

data model content that is not part of the DATEX II Level A model and that is added in the container package "Extension" (e.g. for project specific purposes)

3.4

fault

information about a malfunction relating to a specific piece of equipment or process

3.5

generic publication

DATEX II publication without predefined content used to make extensions at the publication level

3.6

payload publication

traffic related information or associated management information created at a specific point in time that can be exchanged via a DATEX II interface.

Note 1 to entry: The "PayloadPublication" class is the top level root class for DATEX II Level A.

3.7

validity

time period specification for which the exchanged DATEX II information is valid

3.8

weather data

collection of information related to measured or derived (usually transport related) weather conditions at a specified location

3.9

vehicle characteristics

collection of parameters that characterise a vehicle

4 Abbreviations

For the purposes of this document, the following abbreviations apply.

GUID – Globally Unique identifier

UML – Unified Modeling Language

XMI – XML Metadata Interchange

XML – eXtensible Markup Language

XSD – XML Schema Definition

5 Conformance

The DATEX II platform independent data model of which the common data sub-model is a part, corresponds to the Level A model as defined in prEN 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 prEN 16157-1 and with the following requirements of this sub-model 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.

It is in principle possible to create models in accordance to clauses 6 and 7 of prEN 16157-1 (general and platform independent model related clauses) – even including the mapping to XML Schema Definition described in prEN 16157-1:2017, A.3 – that do not comply with clause 6 of this document. Nevertheless, note that such a model cannot claim full compliance with this European Standard and thus shall not work with tools requiring full compliance.

6 Predefined model elements

6.1 General

Besides regulations for the use of UML constructors and a UML profile providing additional meta information via tagged values and stereotypes, the DATEX II modelling methodology furthermore stipulates a certain top level model structure for all compliant UML models. These clauses are mainly motivated by the need to create a well-defined structure for DATEX II tools aiming at supporting users.

The types of attributes and the enumerations specific to this part are defined in the normative Annex A.

The XML subschema corresponding to this part of prEN 16157 is provided in the normative Annex B.

6.2 Top level model packages and classes

The following rules apply for top level model packages and classes:

- a) DATEX II compliant UML models shall have one single top level UML package named "D2Payload" of stereotype "D2Namespace".

- b) The DATEX II top level package "D2Payload" shall have four sub-packages with the following names:

- 1) "Common" of stereotype "D2Namespace"
- 2) "Extension" of stereotype "D2Namespace"
- 3) "LocationReferencing" of stereotype "D2Namespace"
- 4) "PayloadPublication" of stereotype "D2Package"

- c) The "PayloadPublication" package may contain several sub-packages of stereotype "D2Namespace".

prEN 16157-3 specifies the sub-package "Situation" and its content. The standardisation of further sub-packages may follow in the future.

- d) The usage of the "Extension" package for creating customised DATEX extensions is specified in prEN 16157-1.

- e) The "Common" package shall have three sub-packages with the following names:

- 1) "Classes" of stereotype "D2Package" - see 7
- 2) "DataTypes" of stereotype "D2Package" - see 6.3
- 3) "Enumerations" of stereotype "D2Package" - see 6.4

The further content of these packages is specified in the further chapters of this document.

- f) The "Common::Classes" package shall contain one abstract UML Class named "PayloadPublication" of stereotype "D2ModelRoot". It may contain further packages and classes.

- g) The tagged value "rootElement" of the DATEX II class "PayloadPublication" shall be set to "payload".

- h) The tagged value "modelBaseVersion" of the DATEX II class "PayloadPublication" shall be set to "3" which is current DATEX II model version identifier. The tagged value "version" of the DATEX II class "PayloadPublication" shall be set to "3.n" where "n" is the minor version number.

NOTE The model base version "3" denotes the third iteration of the second generation of DATEX specifications, denoted "DATEX II". The Arabic version number "3" is different from the Roman "II", used to give this generation a name that distinguishes it from the EDIFACT-based "DATEX" standard developed in the 1990s, finally resulting in the meanwhile withdrawn CEN ENs 13106:2000 and 13777:2000.

- i) The tagged values "extensionName" and "extensionVersion" of the DATEX II class "PayloadPublication" shall contain the name of the extension(s) contained in the model and a corresponding version identifier in the case that the "Extension" package is non-empty. These values shall be provided by the creator of the model - see also Figure 1.

These rules provide a well-defined entry structure into a DATEX II XML publication, which always starts at top level with one concrete instance of a class specialized from "PayloadPublication".

Tag	Value
definition	A payload publication of traffic related information or associated management information created at a specific point in time that can be exchanged via a DATEX II interface.
extensionName	
extensionVersion	
modelBaseVersion	3
version	3.0 <i>(minor version is exemplary only)</i>

Figure 1 — Tagged Values of top level class "PayloadPublication"

j) The class "PayloadPublication" shall have the following structure.

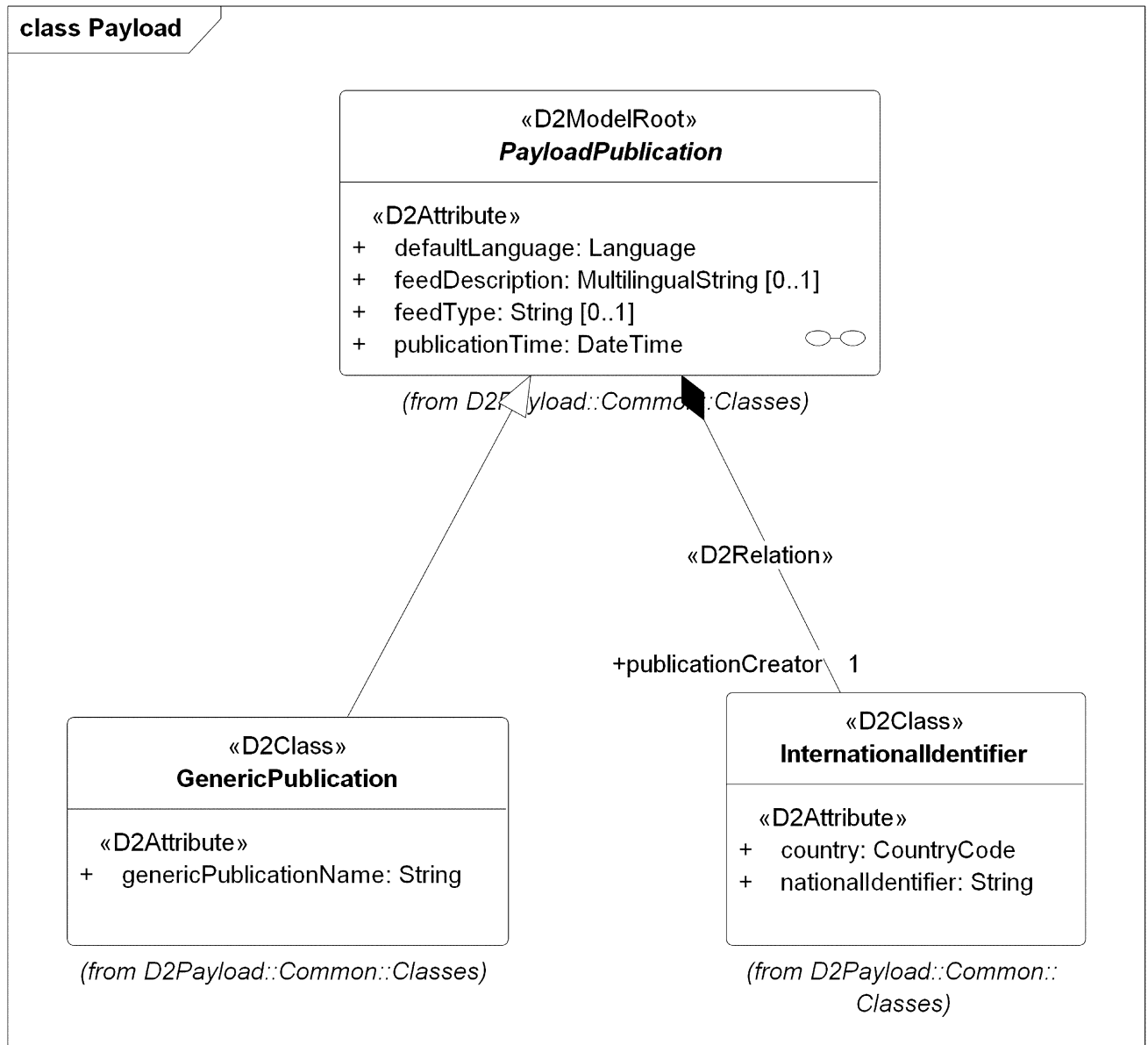


Figure 2 —Top level class "PayloadPublication"

The class "PayloadPublication" shall have a "D2Relation" composition to the "InternationalIdentifier" class.

The "GenericPublication" class (see Figure 2) is a specific realisable case of a "PayloadPublication" and used to make level B extensions at the publication level. Its attribute "genericPublicationName" is used to specify a name for any level B extended publication.

The "InternationalIdentifier" class (see Figure 2) shall provide an identifier/name whose range is specific to the particular country.

NOTE The possible upper case two-letter codes related to the "country" attribute of class "InternationalIdentifier" are specified in EN ISO 3166-1 and can be obtained from the Online Browsing Platform of ISO¹.

¹ <https://www.iso.org/obp/ui/#search/code/>.

- k) The "DataTypes" package shall have a two sub-packages named "Generic" and "Specific" of stereotype "D2Package".

6.3 Basic datatypes

The "DataTypes::Generic" package (as defined in 6.2 k) shall contain the following classes of stereotype "D2Datatype":

- "LongString", "Reference", "Boolean", "Date", "DateTime", "Float", "Integer", "Language", "MultilanguageString", "NonNegativeInteger", "String", "Time", "Url", "VersionedReference".

According definitions and XML Schema Definition mappings for these datatypes are described in A.3.

The "DataTypes::Specific" package (as defined in 6.2 k) shall contain the following classes of stereotype "D2Datatype":

- "AngleInDegrees", "AxlesPerHour", "ConcentrationKilogramsPerCubicMetre", "ConcentrationMicrogramsPerCubicMetre", "CountryCode", "CubicMetres", "Decimal", "IntensityKilogramsPerSquareMetre", "IntensityMillimetresPerHour", "KilometresPerHour", "MetresAsFloat", "MetresAsNonNegativeInteger", "Percentage", "Seconds", "TemperatureCelsius", "Tonnes", "VehiclesPerHour", "Year".

According definitions and XML Schema Definition mappings for these datatypes are described in A.3.

6.4 Enumerations

The "Enumerations" package shall contain the "D2Enumeration" stereotyped UML Classes with according definitions and XML Schema Definition mappings as described in A.4.

7 D2Package "Common::Classes"

7.1 The BasicData package

7.1.1 Overview of the BasicData package

This package describes data that is either measured or calculated, see Figure 3.

In the "Common" namespace, basic data values can be of type "WeatherData" (see 7.2).

NOTE Other namespaces may specialise this class with additional data types, such as for example "TrafficStatus", "TravelTimeData" or "TrafficData" from namespace "RoadTrafficData".

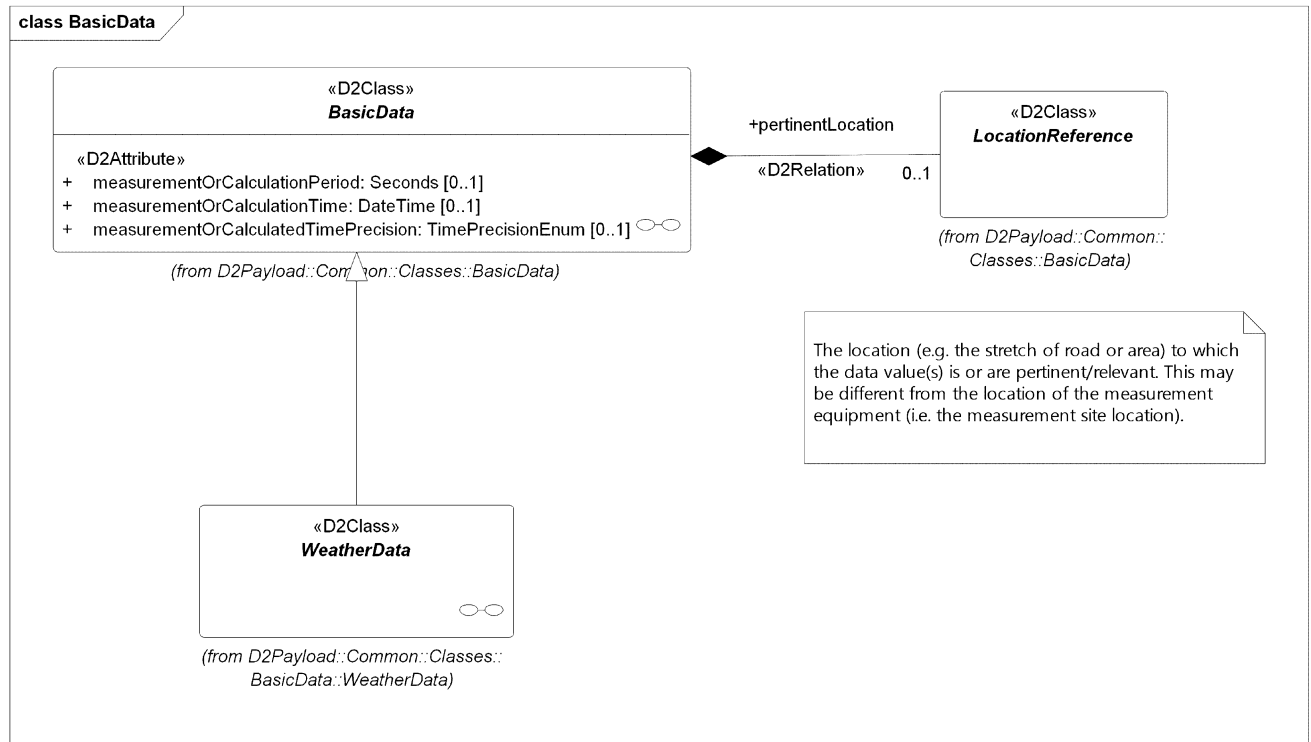


Figure 3 — The BasicData package class model

7.1.2 Semantics of the BasicData package

7.1.2.1 BasicData package semantics – general

The “BasicData” class is an abstract class i.e. shall be specialised by a type such as those identified above. Each Basic Data value may have a pertinent location (e.g. a stretch of road or an area) relevant for the data value(s). This may be different from the location of the measurement equipment (i.e. the measurement site location).

7.1.2.2 BasicData class

It is an abstract class. Data that is either measured or calculated (elaborated) at the same time or over the same time period.

7.1.2.3 LocationReference class

The “LocationReference” class shall be specialised with a specific location reference model to describe the location (e.g. the stretch of road or area) to which the data value(s) is or are pertinent/relevant.

NOTE The DATEX default location reference model that can be used here is specified in prEN 16157-2 (Location referencing).

7.2 The WeatherData package

7.2.1 Overview of the WeatherData package

(from “BasicData” package)

The package “WeatherData” shall comprise a collection of classes forming one possible specialisation of the “BasicData” structure (see 7.1).

Details are shown in Figure 4.

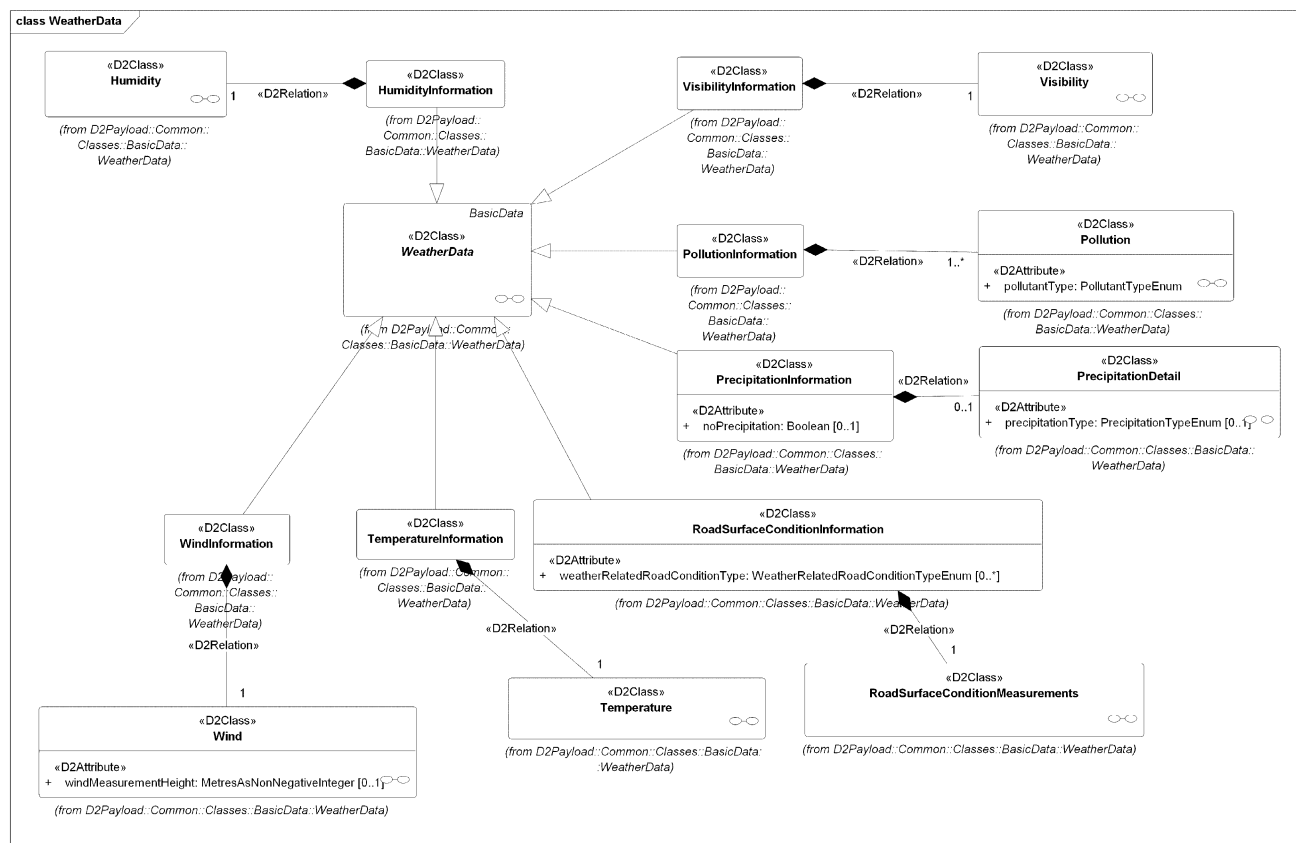


Figure 4 — The WeatherData package class model

7.2.2 Semantics of the WeatherData package

7.2.2.1 WeatherData package semantics – general

The aspects of weather or pollution measurements modelled in this package relate to humidity, temperature, visibility, wind, pollution, precipitation and road surface conditions. For all of these types, a wrapper class being a specialisation of the WeatherData class shall form a link to the specific class (for example: "WindInformation" class with composition to "Wind" class).

The "WeatherData" class itself is an empty class being a specialisation of the "BasicData" class.

7.2.2.2 Humidity class

The "Humidity" class shall allow relative humidity measurements to be specified (see Figure 5).

Relative humidity measurements shall be expressed as a percentage. Note that each instance of a measurement may be accompanied by information about the measurement via the PercentageValue class which inherits a number of metadata attributes from the DataValue class.

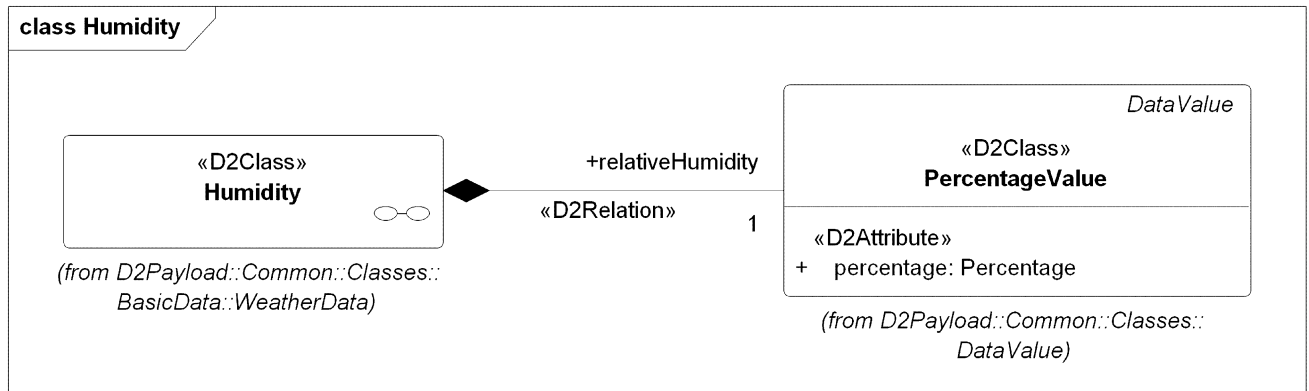


Figure 5 — The Humidity class model

7.2.2.3 Temperature class

The “Temperature” class shall allow a number of different atmospheric temperature measurements to be specified (see Figure 6).

Individual measurements of air temperature, dew point temperature, maximum temperature and minimum temperature may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the TemperatureValue class which inherits a number of metadata attributes from the DataValue class.

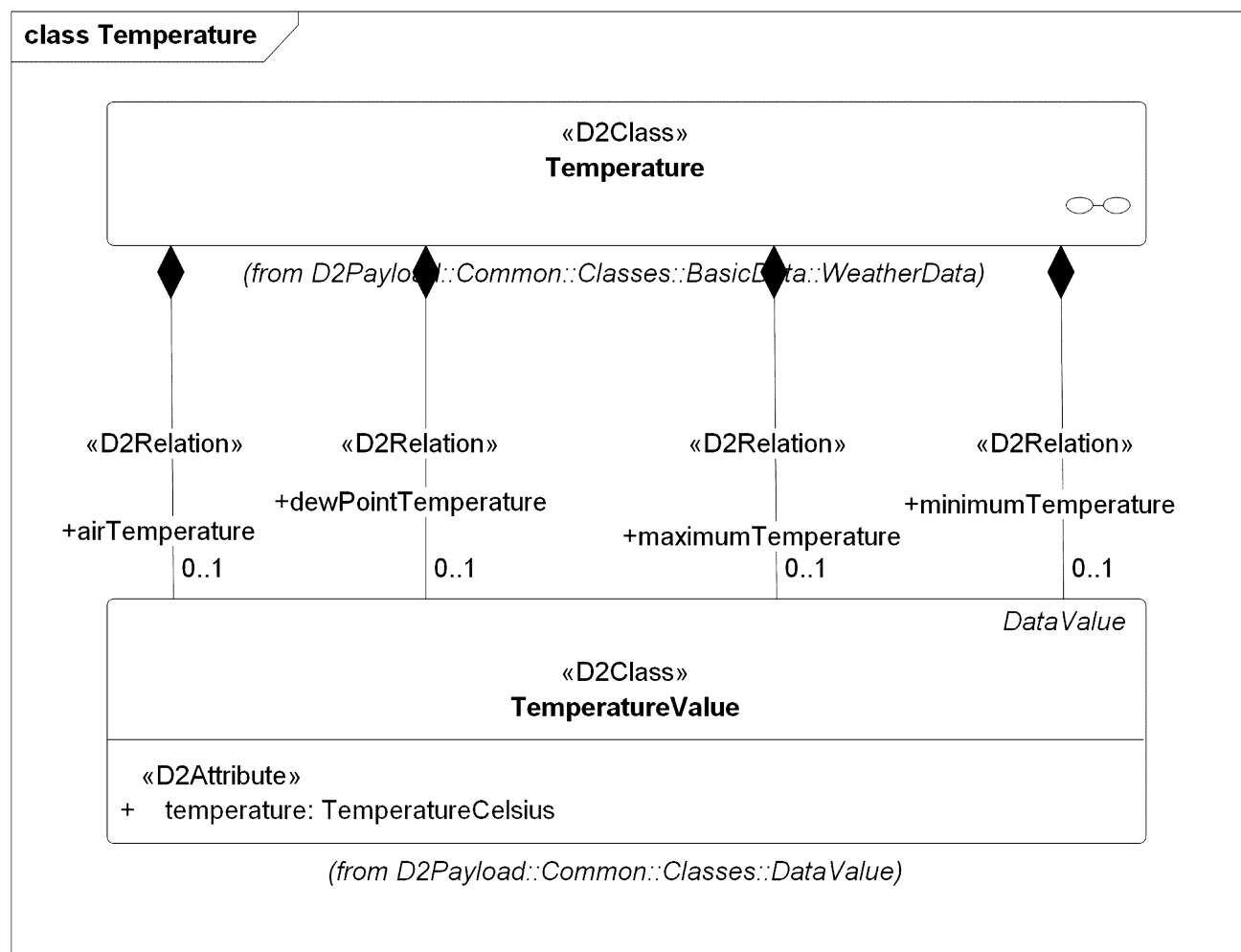


Figure 6 — The Temperature class model

7.2.2.4 Visibility class

The “Visibility” class shall allow minimum visibility distance measurements to be specified (see Figure 7).

Minimum visibility distance measurements shall be given in integer metres. Note that each instance of a measurement may be accompanied by information about the measurement via the IntegerMetreDistanceValue class which inherits a number of metadata attributes from the DataValue class.

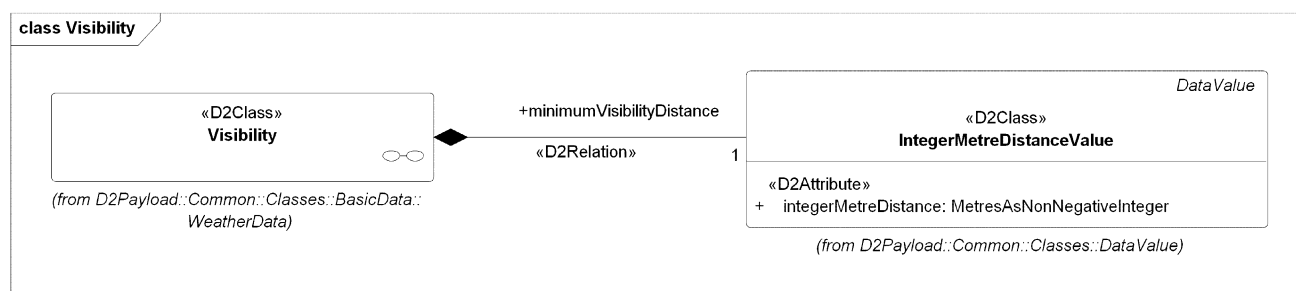


Figure 7 — The Visibility class model

7.2.2.5 Wind class

The "Wind" class shall allow a number of different measurements relating to wind to be specified (see Figure 8).

Individual measurements of wind speed, maximum wind speed and wind direction (both bearing and compass) may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the SpeedValue, DirectionBearingValue and DirectionCompassValue classes which inherit a number of metadata attributes from the DataValue class.

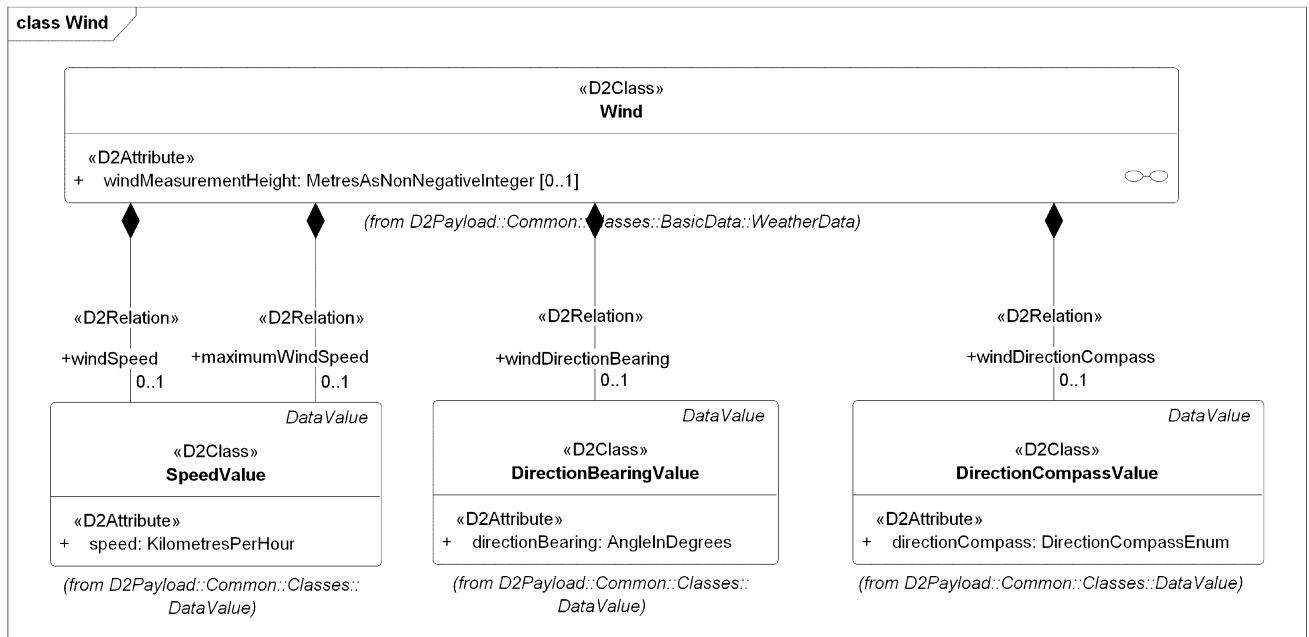


Figure 8 — The Wind class model

7.2.2.6 Pollution class

The "Pollution" class shall allow pollution concentration measurements to be specified (see Figure 9).

Pollution concentration measurements shall be given in micrograms per cubic metre. Note that each instance of a measurement may be accompanied by information about the measurement via the MicrogramsConcentrationValue class which inherits a number of metadata attributes from the DataValue class.

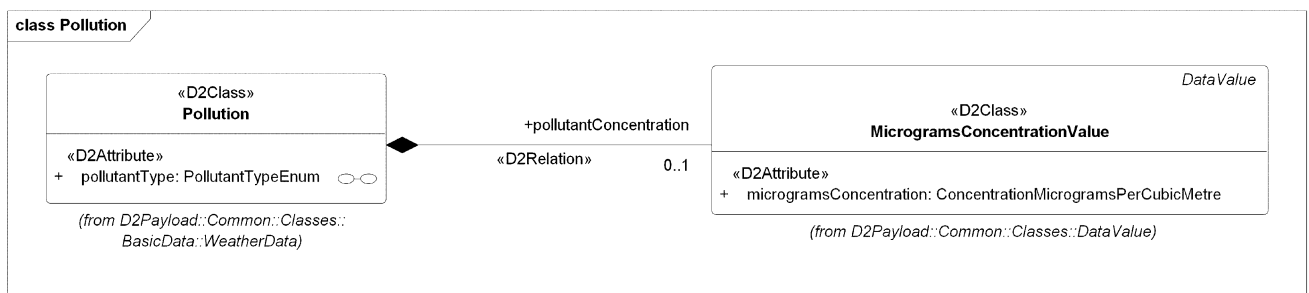


Figure 9 — The Pollution class model

7.2.2.7 PrecipitationDetail class

The “PrecipitationDetail” class shall allow measurements relating to precipitation to be specified (see Figure 10).

Individual measurements of intensity and depth of precipitation may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the PrecipitationIntensityValue and FloatingPointMetreDistanceValue classes which inherit a number of metadata attributes from the DataValue class.

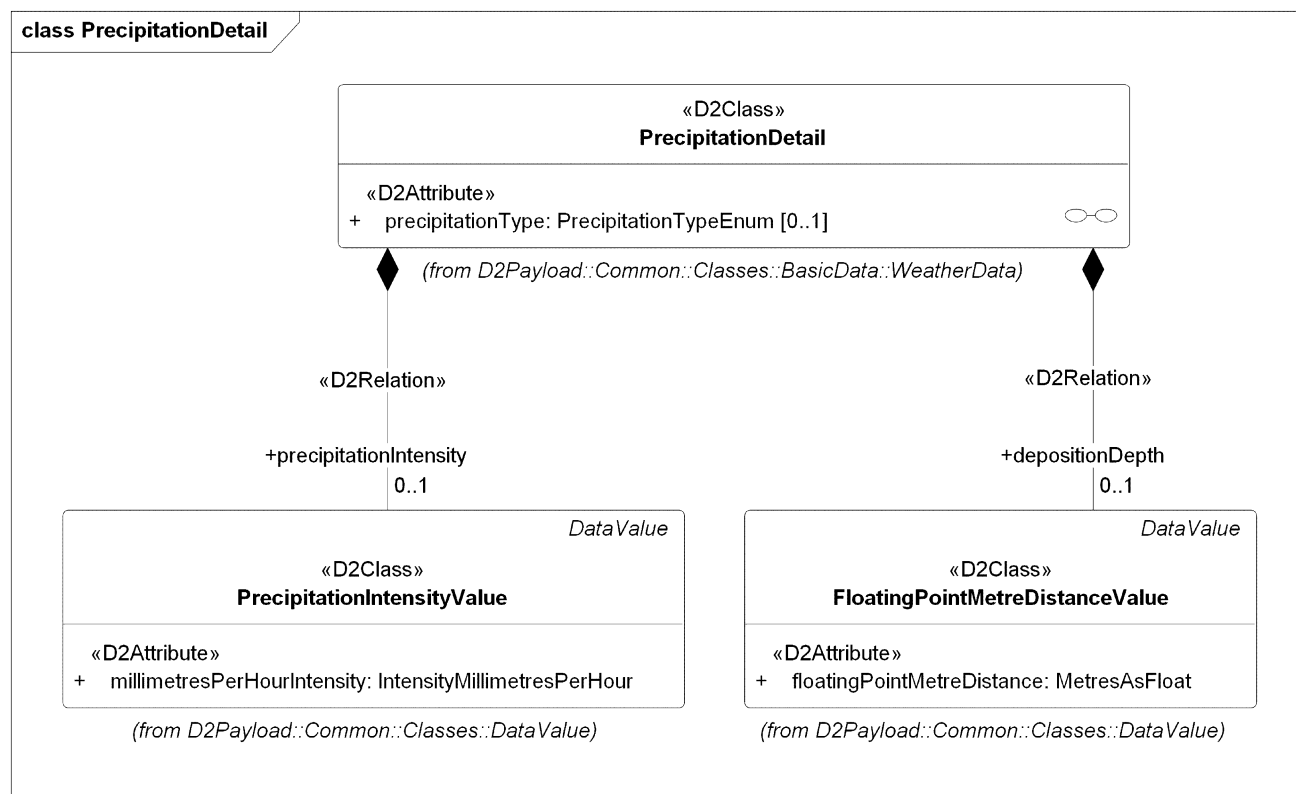


Figure 10 — The PrecipitationDetail class model

7.2.2.8 RoadSurfaceConditionMeasurements class

The “RoadSurfaceConditionMeasurements” class shall allow road surface condition measurements which are related specifically to the weather to be specified (see Figure 11).

Individual measurements of road surface temperature, road surface protection temperature, de-icing application rate, de-icing concentration, depth of snow, water film thickness and friction may be specified. Note that each instance of a measurement may be accompanied by information about the measurement via the TemperatureValue, ApplicationRateValue, KilogramsConcentrationValue , FloatingPointMetre-DistanceValue and FrictionValue classes which inherit a number of metadata attributes from the DataValue class.

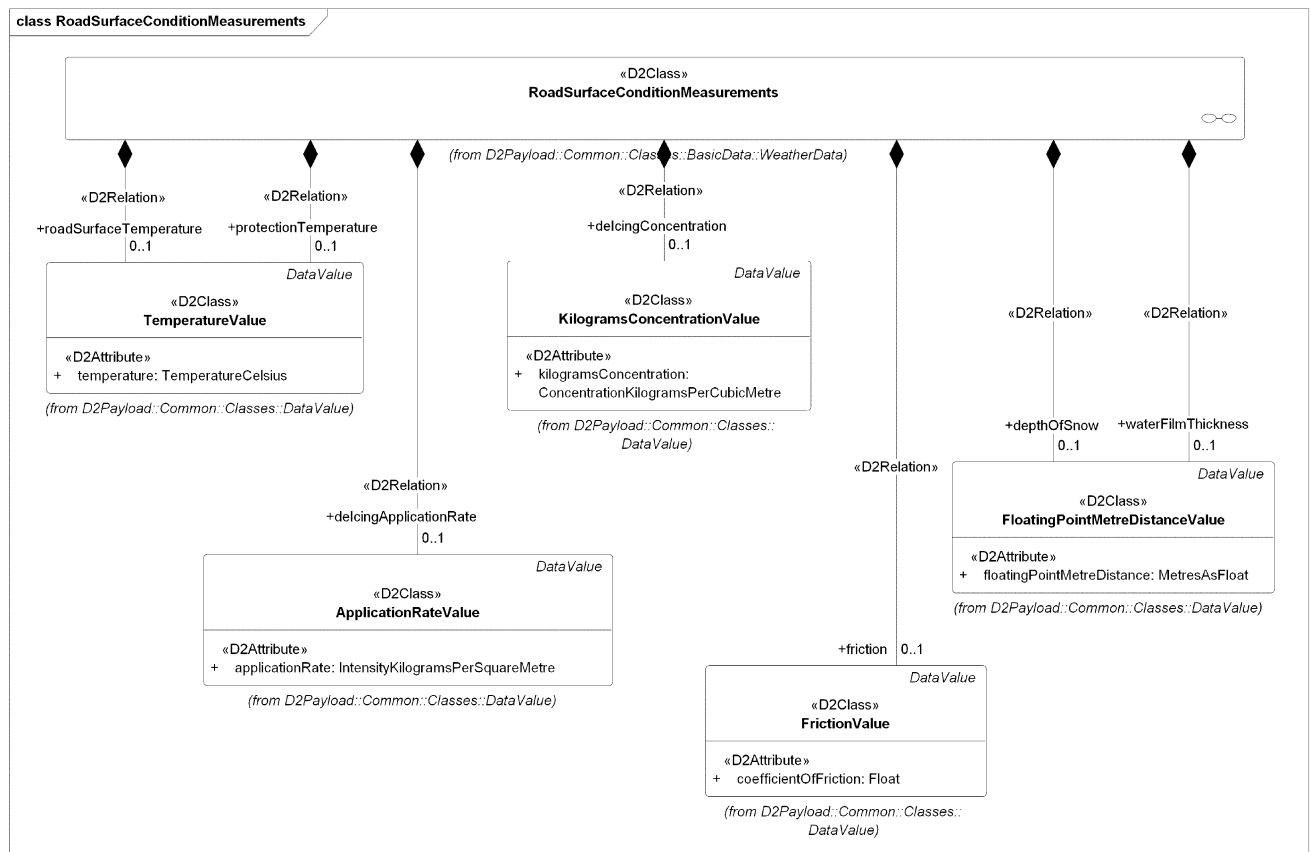


Figure 11 — The RoadSurfaceConditionMeasurements class model

7.3 The DataValue package

7.3.1 Overview of the DataValue package

This package describes data values of something that can be measured or calculated - see Figure 12.

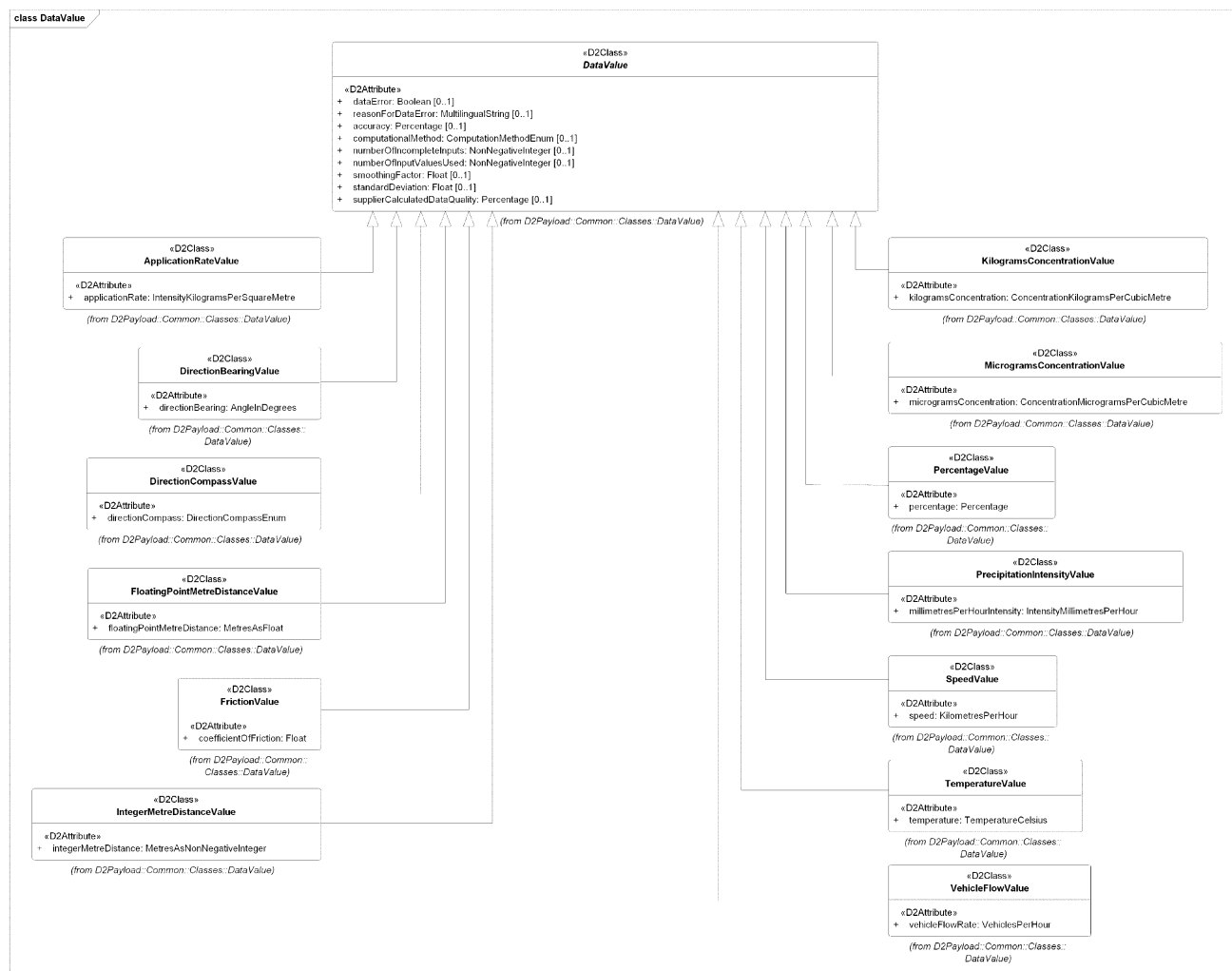


Figure 12 — The DataValue package class model

7.3.2 Semantics of the DataValue package

7.3.2.1 DataValue package semantics – general

This package contains types for data values and adds additional quality and error information to these types.

7.3.2.2 ApplicationRateValue class

A measured or calculated value of the application rate of a substance.

7.3.2.3 DataValue class

The “DataValue” class is an abstract class i.e. shall be specialised by other classes such as those given in this package. It provides the following quality and error information for each specialised data value:

- Information on data error and reason for it;
- Accuracy and computation method;
- Number of input values used and number of incomplete inputs;
- Smoothing factor and standard deviation;

— Information on supplier calculated data quality (in percent).

7.3.2.4 DirectionBearingValue class

A measured or calculated value of direction as a bearing.

7.3.2.5 DirectionCompassValue class

A measured or calculated value of direction as a point of the compass.

7.3.2.6 FloatingPointMetreDistanceValue class

A measured or calculated value of distance in metres in a floating point format.

7.3.2.7 FrictionValue class

A measured or calculated value of road surface friction.

7.3.2.8 IntegerMetreDistanceValue class

A measured or calculated value of distance in whole metres.

7.3.2.9 KilogramsConcentrationValue class

A measured or calculated value of concentration of a substance in kilograms per unit volume.

7.3.2.10 MicrogramsConcentrationValue class

A measured or calculated value of concentration of a substance in micrograms per unit volume.

7.3.2.11 PercentageValue class

A measured or calculated value expressed as a percentage.

7.3.2.12 PrecipitationIntensityValue class

A measured or calculated value of the accumulation rate of precipitation.

7.3.2.13 SpeedValue class

A measured or calculated value of speed.

7.3.2.14 TemperatureValue class

A measured or calculated value of temperature.

7.3.2.15 VehicleFlowValue class

A measured or calculated value of the flow rate of vehicles.

7.4 The Fault package

7.4.1 Overview of the Fault package

This package describes information about faults - see Figure 13.

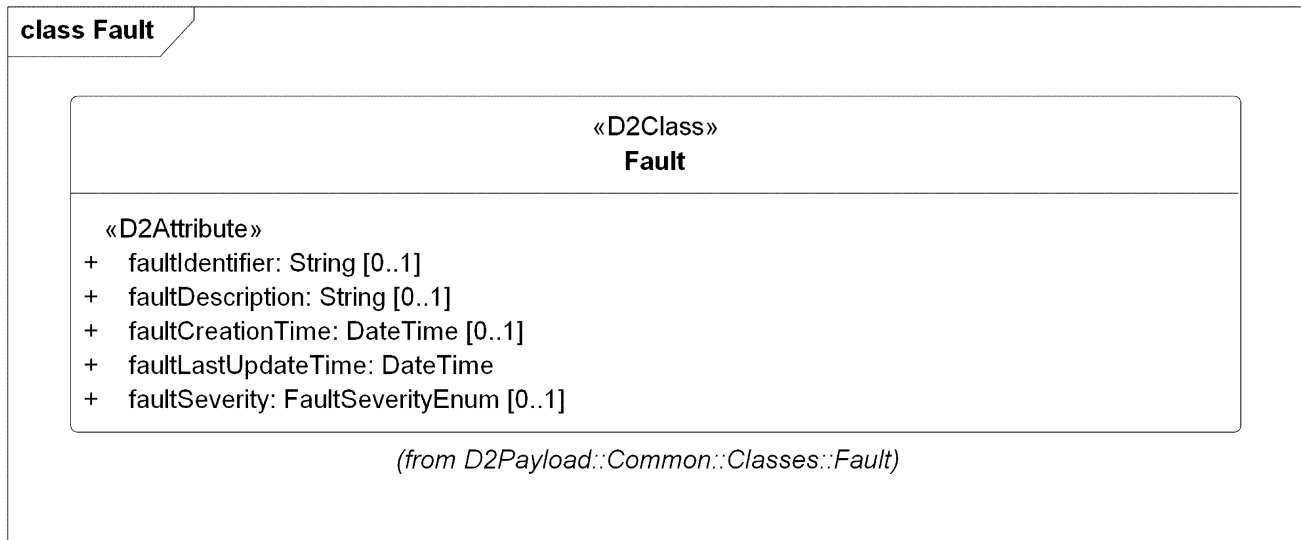


Figure 13 — The Fault package class model

7.4.2 Semantics of the Fault package

7.4.2.1 Fault package semantics – general

This package describes information about faults.

7.4.2.2 Fault class

The "Fault" class specifies information about a fault relating to a specific piece of equipment or process.

7.5 The Validity package

7.5.1 Overview of Validity package

The package, "Validity", shall comprise a sub-model for defining the temporal validity of a situation element (for instance described in a "SituationRecord" instance), or the impact of such a situation element, where validity in this context means the time period in which the real world event, activity, action or impact being described actually occurs or is predicted to occur (see Figure 14).

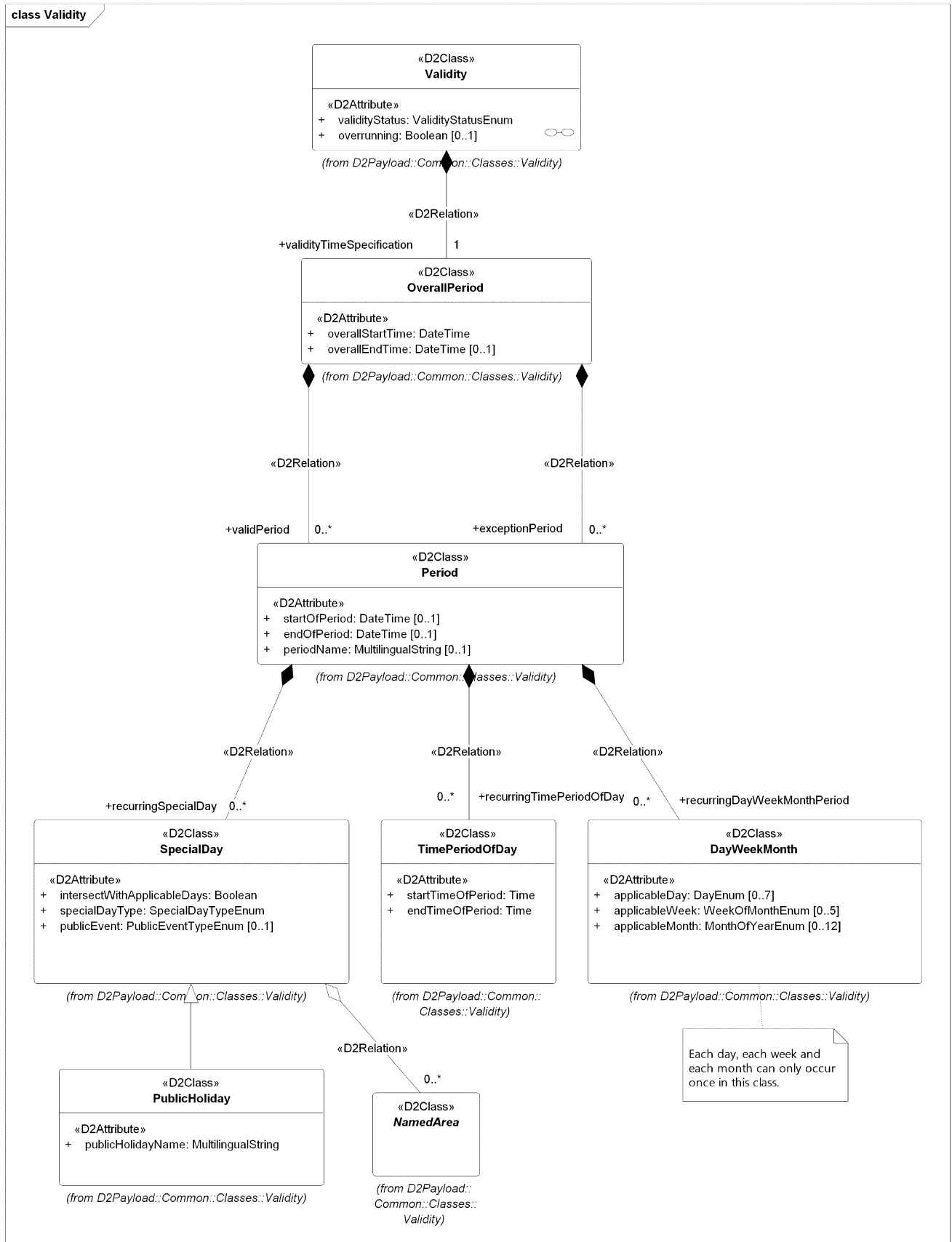


Figure 14 — The Validity package class model

7.5.2 Semantics of the Validity package

7.5.2.1 Validity package semantics – general

The temporal validity of a situation element (for example defined by a “SituationRecord”) or its impact can be very simple with just overall start and end times, or complex having several valid and invalid periods within a period defined by overall start and end times. The temporal validity may also be temporarily suspended or active regardless of the validity time specification (i.e. the validity time specification is temporarily overridden).

7.5.2.2 Validity class

The “Validity” class shall allow a supplier to identify whether the temporal validity specified in the remainder of the package is currently overridden and whether the validity period is overrunning that previously stated.

Attribute “validityStatus” shall specify whether the temporal validity is specified by the remainder of this package or not. If not, it shall be specified as being “active” (i.e. temporarily valid regardless of the validity time specification in the remainder of this package) or “suspended” (i.e. temporarily invalid regardless of the validity time specification in the remainder of this package).

Attribute “overrunning” may be used to specify whether the validity period is overrunning its expected duration as defined in previous versions of the publication, or even in current version.

7.5.2.3 OverallPeriod class

The “OverallPeriod” class shall be used to specify the bounding start and end times of the validity period, within which there may be any number of valid and invalid (exception) periods. There shall be at least an overall start time specified here.

7.5.2.4 Period class

The “Period” class may be used to specify either a single valid or invalid (exception) period or a set of repeating valid or invalid periods within a specified period. Hence each period shall be specified as either a single time period, or as a number of recurring time periods within a single time period.

There may be any number of these valid and invalid (exception) periods within the overall validity period. The overall validity period defined in the “OverallPeriod” class by the “startOfPeriod” and “endOfPeriod” attributes shall strictly bound (i.e. override) any periods defined in this class.

Note that where an invalid (exception) period overlaps (intersects) a valid period the validity shall be regarded as invalid.

7.5.2.5 DayWeekMonth class

The “DayWeekMonth” class may be used to allow recurring periods to be specified in terms of days of the week, weeks of the month and months of the year. The recurring periods are defined by the intersection of each of these values.

This class shall be used with an association that has a role name of “recurringDayWeekMonthPeriod” identifying that it is used for specifying recurring periods.

Attribute “applicableDay” may be used to identify in which day of the week the period resides. Note that where this recurring period is specified in conjunction with a “TimePeriodOfDay” (via the role name “recurringTimePeriodOfDay”) and that specifies a period which spans midnight then this “applicableDay” value relates to the start time of that period.

Attribute “applicableMonth” may be used to identify in which month of the year the period resides.

Attribute “applicableWeek” may be used to identify in which week of the year the period resides.

7.5.2.6 TimePeriodOfDay class

The “TimePeriodOfDay” class may be used to allow recurring periods to be specified in terms of start and end time within a day. The recurring periods are defined by the intersection of each of these values.

This class shall be used with an association that has a role name of “recurringTimePeriodOfDay” identifying that it is used for specifying recurring periods.

7.5.2.7 SpecialDay class

The “SpecialDay” class may be used to allow recurring periods to be specified in terms of special days. It is also possible to specialise this class with the “PublicHoliday” class.

This class shall be used with an association that has a role name of “recurringSpecialDay” identifying that it is used for specifying recurring periods.

The special day shall be defined using an enumeration and optional an associated event. It is possible to attach a named area to the “SpecialDay” class.

Attribute “intersectionWithApplicableDays” specifies, whether the intersection or union of days is defined.

7.5.2.8 NamedArea class

The “NamedArea” class shall be an abstract hook class to hook in a model for a named area.

7.5.2.9 PublicHoliday class

The “PublicHoliday” class may be used to specialise the “SpecialDay” class representing a public holiday.

7.6 The Vehicle package

7.6.1 Overview of the Vehicle package

The package “Vehicle” shall comprise a sub-model for defining information about an individual vehicle (see Figure 15).

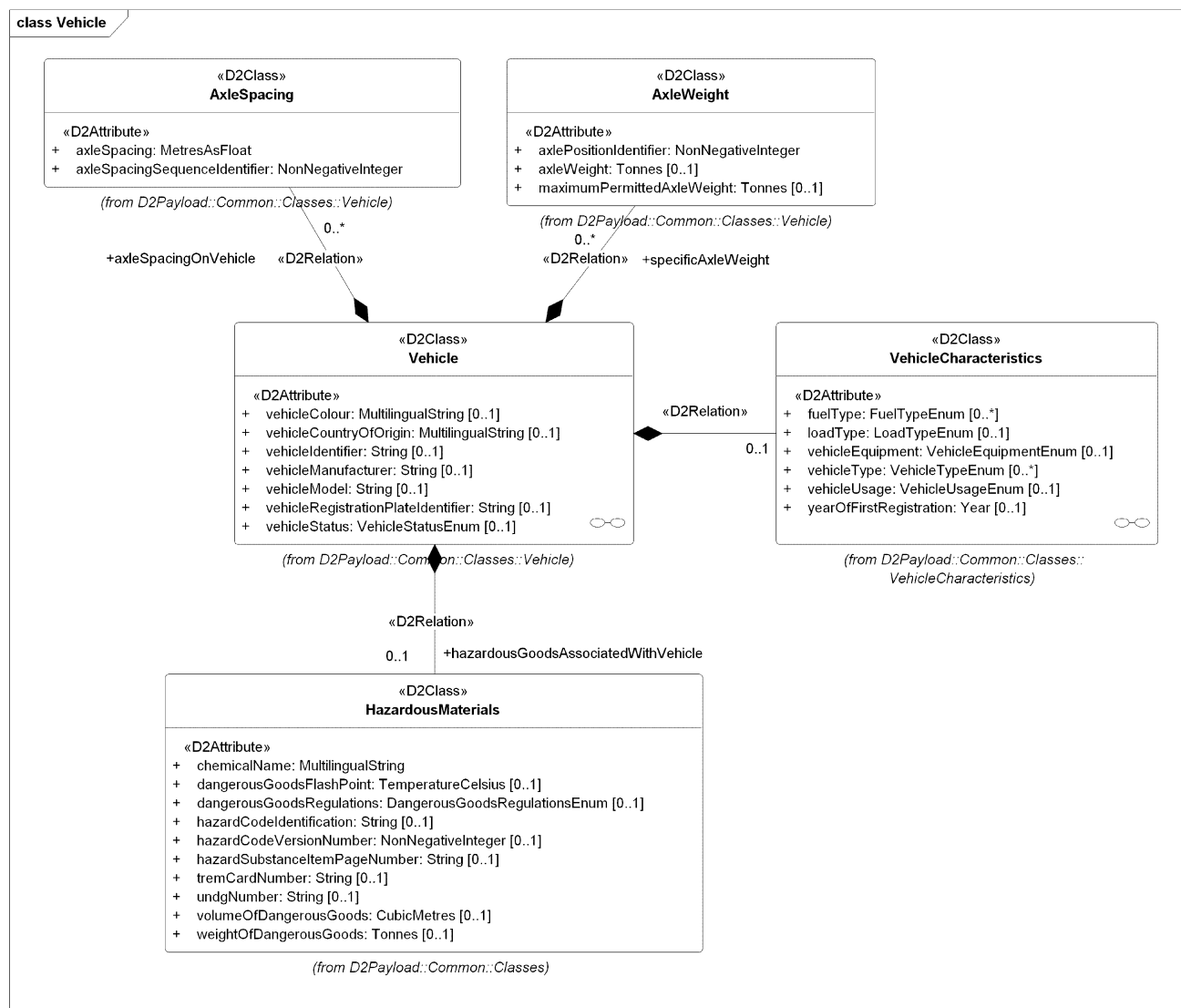


Figure 15 — The Vehicle package class model

7.6.2 Semantics of the Vehicle package

7.6.2.1 Vehicle package semantics – general

The information that is modelled in the “Vehicle” package shall identify details of an individual vehicle and the load which it may be carrying.

7.6.2.2 Vehicle class

An instance of the “Vehicle” class shall allow a supplier to identify the specific details relating to a single individual vehicle and its load.

7.6.2.3 AxleSpacing class

The “AxleSpacing” class may be used to allow a supplier to identify the spacing between adjacent sets of axles on a specific vehicle, indexed from the front of the vehicle.

Attribute “axleSpacingSequenceIdentifier” shall identify which axle spacing is being specified, e.g. a value of ‘1’ indicates that the “axleSpacing” value relates to the distance between the front axle and the next axle from the front of the vehicle.

7.6.2.4 AxleWeight class

The “AxleWeight” class may be used to allow a supplier to identify the actual weight and the maximum permitted weight on a specified axle on a specific vehicle.

Attribute “axlePositionIdentifier” shall identify to which axle the specified weight values relate, e.g. a value of ‘1’ indicates that it is the front axle weight that is being specified.

7.7 The VehicleCharacteristics package

7.7.1 Overview of the VehicleCharacteristics package

The package “VehicleCharacteristics” shall comprise a sub-model for defining the characteristics of vehicles (see Figure 16).

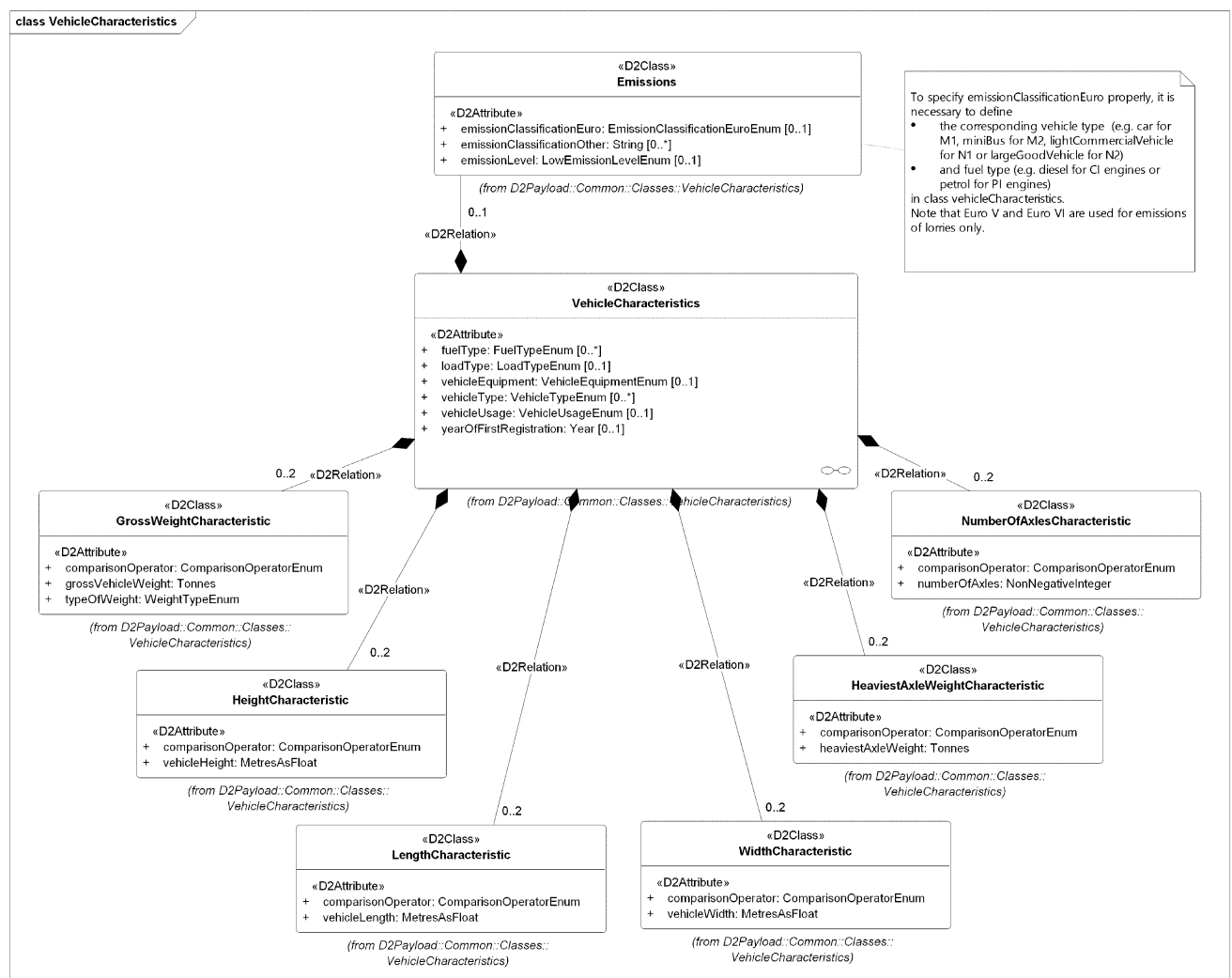


Figure 16 — The VehicleCharacteristics package class model

7.7.2 Semantics of the VehicleCharacteristics package

7.7.2.1 VehicleCharacteristics package semantics – general

The information that is modelled in the “VehicleCharacteristics” package shall identify a set of vehicle characteristics, some of whose values can be specified using comparative operators (e.g. greater than ‘x’ but less than ‘y’).

7.7.2.2 VehicleCharacteristics class

An instance of the “VehicleCharacteristics” class shall allow a supplier to identify a base set of vehicle characteristics.

7.7.2.3 Emissions class

The “Emissions” class may be used to specify a vehicle emission level either by Euro-norm, by self-defined emission categories or by a low emission level flag.

7.7.2.4 GrossWeightCharacteristics class

The “GrossWeightCharacteristics” class may be used to allow a supplier to identify the actual gross weight of a vehicle. By providing two instances of this class a supplier can specify the gross weight as being between a lower and upper limit.

7.7.2.5 HeightCharacteristic class

The “HeightCharacteristic” class may be used to allow a supplier to identify the actual height of a vehicle. By providing two instances of this class a supplier can specify the height as being between a lower and upper limit.

7.7.2.6 LengthCharacteristic class

The “LengthCharacteristic” class may be used to allow a supplier to identify the actual length of a vehicle. By providing two instances of this class a supplier can specify the length as being between a lower and upper limit.

7.7.2.7 WidthCharacteristic class

The “WidthCharacteristic” class may be used to allow a supplier to identify the actual width of a vehicle. By providing two instances of this class a supplier can specify the width as being between a lower and upper limit.

7.7.2.8 HeaviestAxleWeightCharacteristic class

The “HeaviestAxleWeightCharacteristic” class may be used to allow a supplier to identify the actual heaviest axle weight of a vehicle. By providing two instances of this class a supplier can specify the heaviest axle weight as being between a lower and upper limit.

7.7.2.9 NumberOfAxlesCharacteristic class

The “NumberOfAxlesCharacteristic” class may be used to allow a supplier to identify the actual number of axles on a vehicle. By providing two instances of this class a supplier can specify the number of axles as being between a lower and upper limit.

7.8 Other classes of the Common::Classes package

7.8.1 GlobalReference class

The “GlobalReference” class (see Figure 17) shall provide a versioned reference to an object that may be in another publication from another publisher.

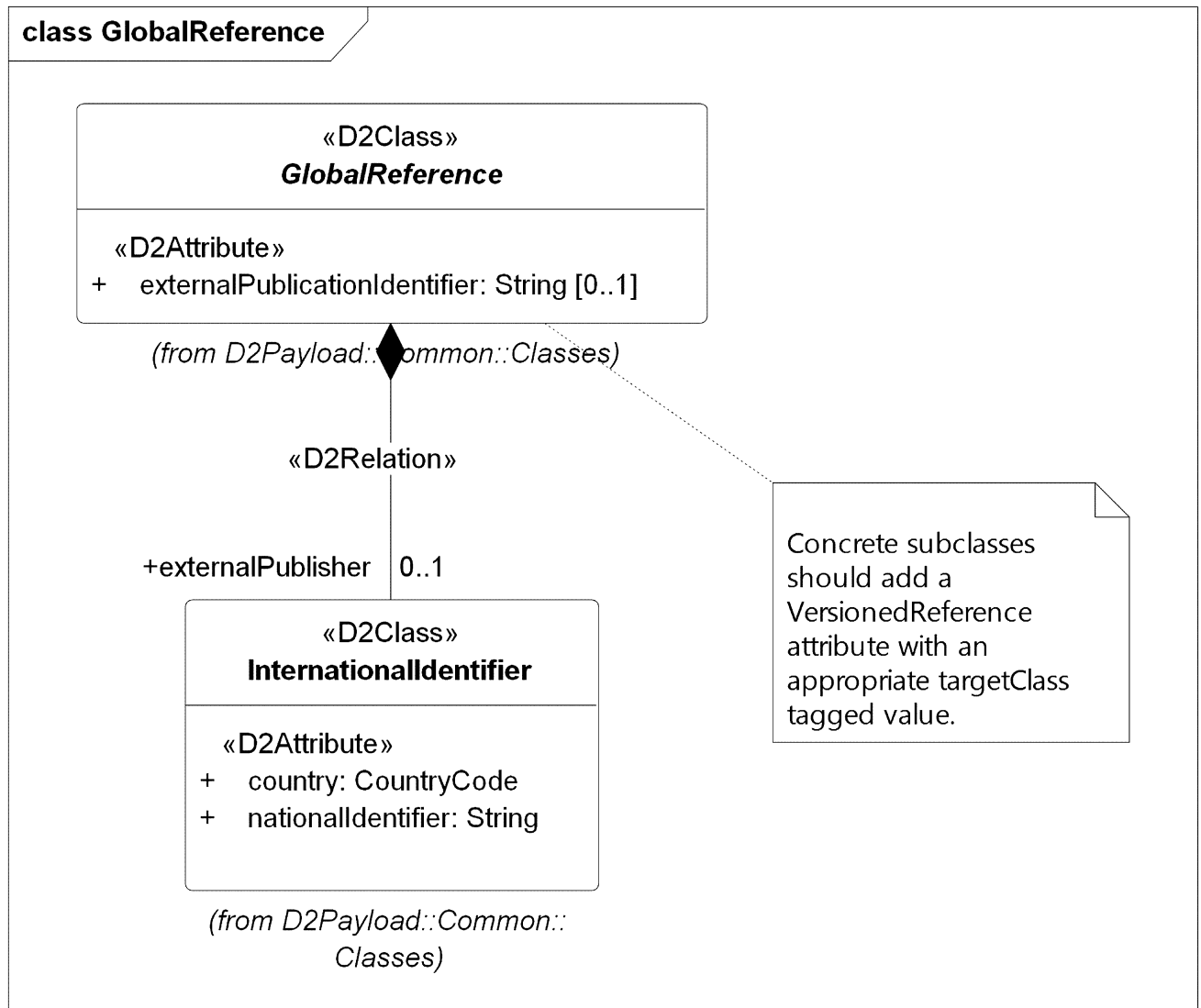


Figure 17 — The GlobalReference class model

7.8.2 GroupOfVehiclesInvolved class

The "GroupOfVehiclesInvolved" (see Figure 18) class may be used for describing a group of vehicles involved having common characteristics and/or status.

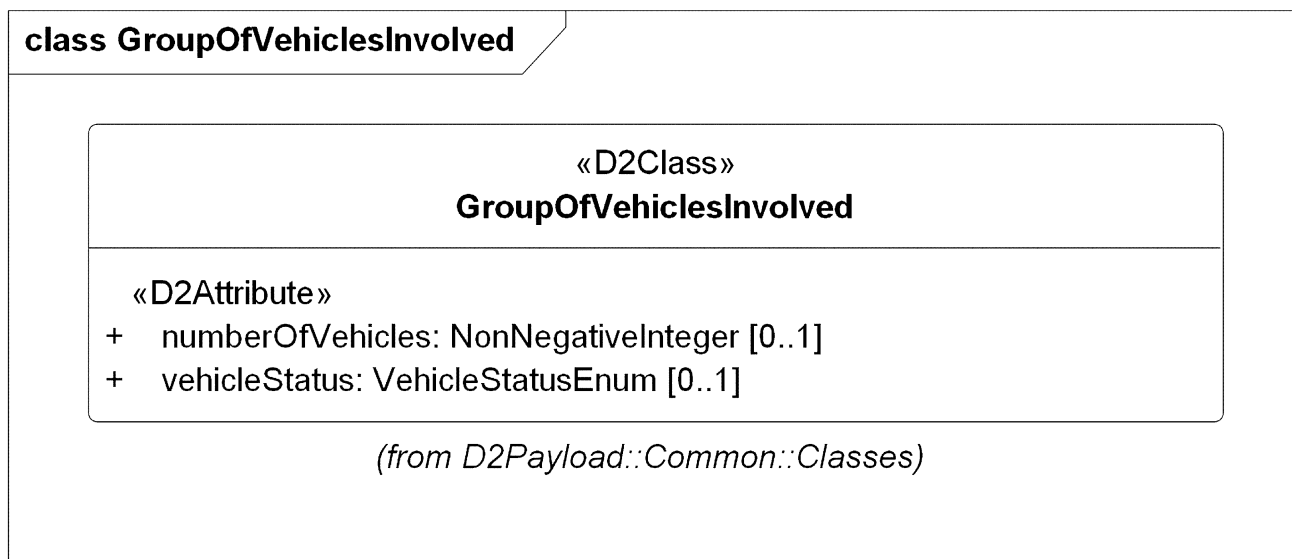


Figure 18 — The GroupOfVehiclesInvolved class model

7.8.3 HazardousMaterials class

The “HazardousMaterials” class (see Figure 19) may be used to allow a supplier to identify the actual details of any hazardous material or dangerous goods that the vehicle is carrying or at least is thought to be carrying.

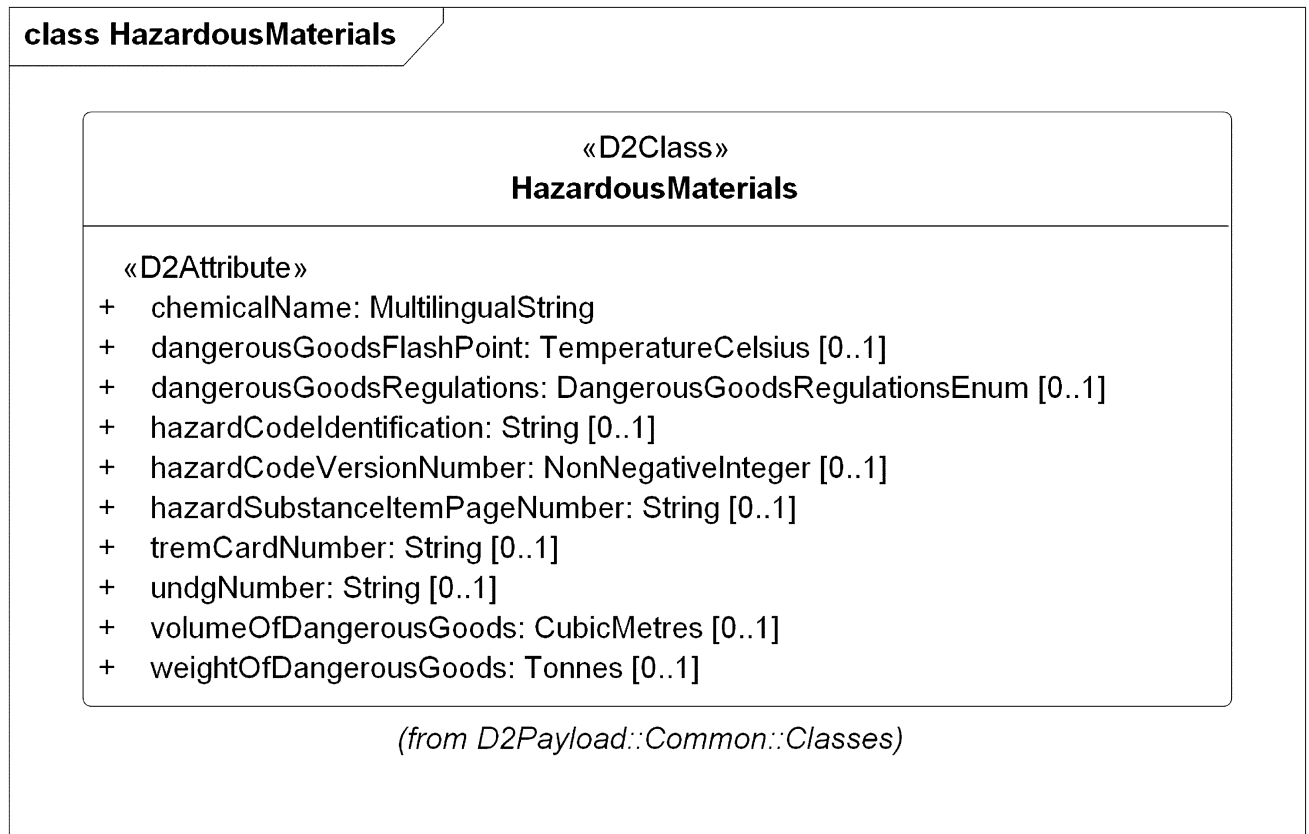


Figure 19 — The HazardousMaterials class model

7.8.4 HeaderInformation class

The “HeaderInformation” class (see Figure 20) shall specify management information relating to the data contained within a publication.

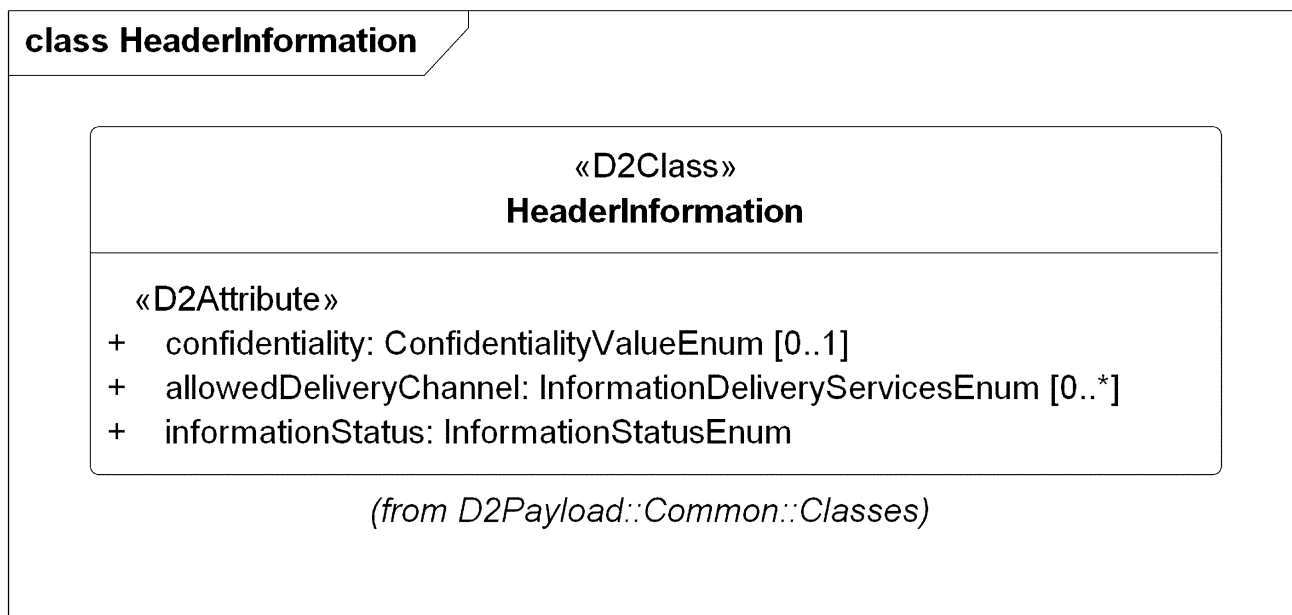


Figure 20 — The HeaderInformation class model

7.8.5 Source class

Language independent textual code or identifier for the organisation or the equipment which has produced the information.

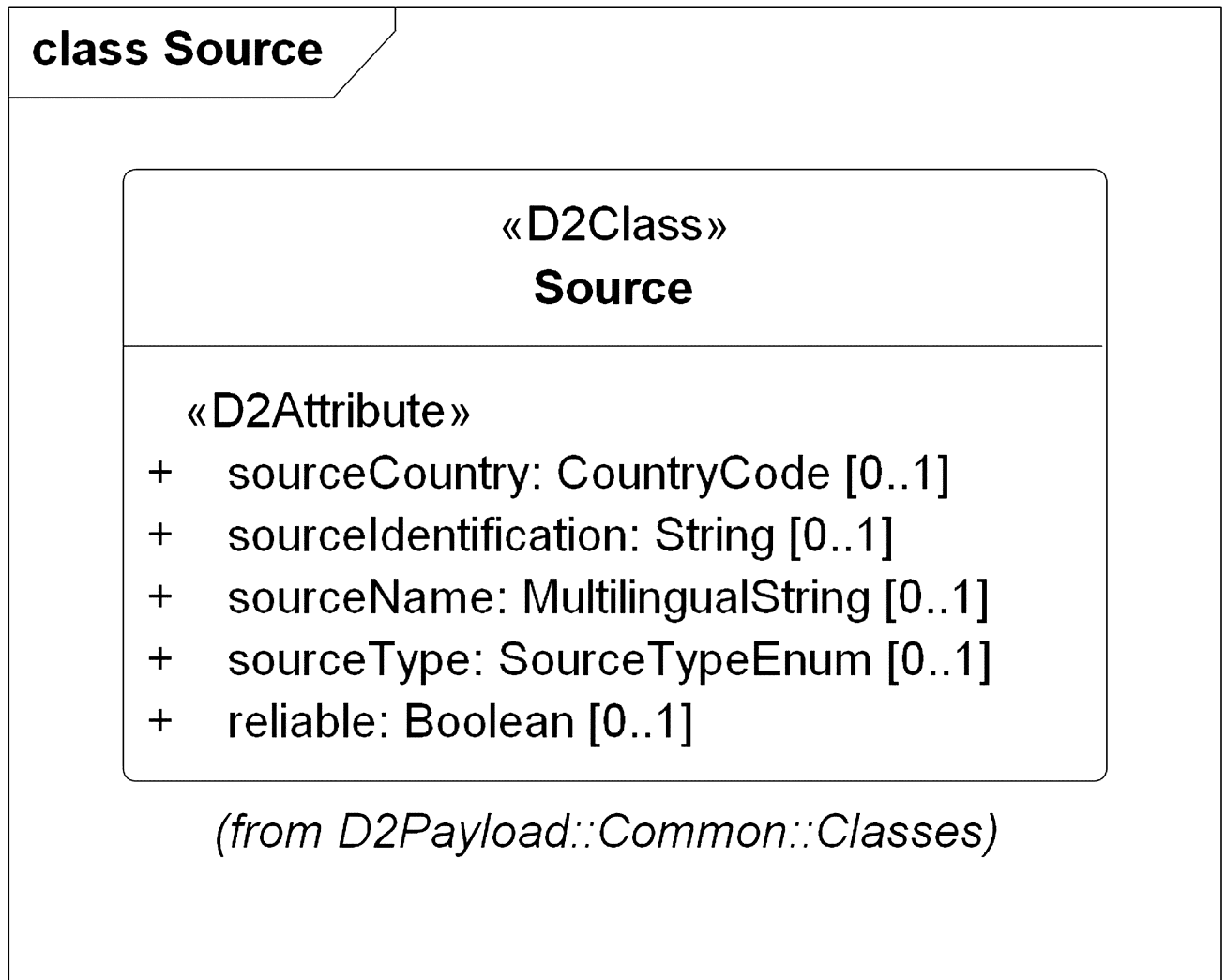


Figure 21 — The Source class model

7.8.6 UrlLink class

The "UrlLink" class (see Figure 22) may provide details of a Uniform Resource Locator (URL) address pointing to a resource available on the Internet from where further relevant information may be obtained.



Annex A (normative)

Data Dictionary

A.1 Overview

This data dictionary identifies the definitions and characteristics of the different classes, attributes, association roles, data types and enumerations appearing in the common data model defined in 7 and 8. The data dictionary is specified in three parts, one for packages, one for <<D2Datatypes>> and one for <<D2Enumerations>>, each ordered alphabetically.

The first part of the data dictionary is partitioned into sub-Clauses which relate to each of the UML model packages and each sub-Clause defines the contained classes, their attributes and any roles defined for associations between the classes within that package.

The Data Dictionary tables use the following columns:

- 1) Column **Class name**: it provides the symbolic name (Upper Camel Case) given to the corresponding class.
- 2) Column **Role name**: it provides the symbolic name (Lower Camel Case) given to the corresponding role of an association.
- 3) Column **Attribute name**: it provides the symbolic name (Lower Camel Case) given to the corresponding attribute of a class.
- 4) Column **Enumerated value name**: It provides the symbolic name (Lower Camel Case) given to the corresponding enumerated value.
- 5) Column **Designation**: it provides the corresponding name in natural language of the corresponding class, attribute, role or enumeration value.
- 6) Column **Definition**: it provides a comprehensive definition detailing the class, attribute or role.
- 7) Column **Stereotype**: it provides a statement of the stereotype that is assigned to the class - see prEN 16157-1:2017, 6.2 for further details.
- 8) Column **Abstract**: it provides a statement as to whether the class is abstract (non realisable) or concrete (realisable).
- 9) Column **Multiplicity**: it provides a statement of the allowed multiplicity for the attribute or role.
- 10) Column **Target**: It provides the name of the class which is at the end of the association to which the role applies.

11) Column Type: it provides the name of the class used to define the data type relating to the attribute of the Overview

A.2 Data Dictionary for "Common"

A.2.1 "BasicData" package

A.2.1.1 "BasicData" package location

D2Payload/Common/Classes/BasicData

A.2.1.2 "BasicData" package classes

Table A.1— Classes of the "BasicData" package

Class name	Designation	Definition	Stereotype	Abstract
BasicData	Basic data	Data that is either measured or calculated at the same time or over the same time period.	D2Class	yes
LocationReference	Location reference	Generic class to hook in location referencing models.	D2Class	yes

A.2.1.3 "BasicData" package association roles

Table A.2— Associations of the "BasicData" package

Class name	Role name	Designation	Definition	Multiplicity	Target
BasicData	pertinentLocation	Pertinent location	The location (e.g. the stretch of road or area) to which the data value(s) is or are pertinent/relevant. This may be different from the location of the measurement equipment (i.e. the measurement site location).	0..1	LocationReference

A.2.1.4 "BasicData" package attributes

Table A.3— Attributes of the "BasicData" package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
BasicData	measurementOrCalculatedTimePrecision	Measurement or calculated precision	The precision to which the time of measurement or calculation is given.	0..1	TimePrecisionEnum
	measurementOrCalculationPeriod	Measurement or calculation period	The time elapsed between the beginning and the end of the sampling or measurement period. This item may differ from the unit attribute; e.g. an hourly flow can be estimated from a 5-minute measurement period.	0..1	Seconds
	measurementOrCalculationTime	Measurement or calculation time	Point in time at which this specific value or set of values has been measured or calculated. It may also be a future time at which a data value is predicted.	0..1	DateTime

A.2.2 "Classes" package

A.2.2.1 "Classes" package location

D2Payload/Common/Classes

A.2.2.2 "Classes" package classes

Table A.4— Classes of the "Classes" package

Class name	Designation	Definition	Stereotype	Abstract
GenericPublication	Generic publication	A publication used to make level B extensions at the publication level.	D2Class	no
GlobalReference	Global reference	A versioned reference to an object that may be in another publication from another publisher.	D2Class	yes
GroupOfVehiclesInvolved	Group of vehicles involved	Group of the vehicles involved having common characteristics and/or status.	D2Class	no
HazardousMaterials	Hazardous materials	Details of hazardous materials.	D2Class	no
HeaderInformation	Header information	Management information relating to the data contained within a publication.	D2Class	no
InternationalIdentifier	International identifier	An identifier/name whose range is specific to the particular country.	D2Class	no
PayloadPublication	Payload publication	A payload publication of traffic related information or associated management information created at a specific point in time that can be exchanged via a DATEX II interface.	D2ModelRoot	yes
Source	Source	Details of the source from which the information was obtained.	D2Class	no
UrlLink	URL link	Details of a Uniform Resource Locator (URL) address pointing to a resource available on the Internet from where further relevant information may be obtained.	D2Class	no

A.2.2.3 "Classes" package association roles

Table A.5— Associations of the "Classes" package

Class name	Role name	Designation	Definition	Multiplicity	Target
GlobalReference	externalPublisher	External publisher	Identifier for an external DATEX II publisher	0..1	InternationalIdentifier
PayloadPublication	publicationCreator	Publication creator		1..1	InternationalIdentifier

A.2.2.4 "Classes" package attributes

Table A.6— Attributes of the "Classes" package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
GenericPublication	genericPublicationName	Generic publication name	The name of the generic publication.	1..1	String
GlobalReference	externalPublicationIdentifier	External publication identifier	Identifier for an external DATEX II publication	0..1	String
GroupOfVehiclesInvolved	numberOfVehicles	Number of vehicles	The number of vehicles of this group that are involved.	0..1	NonNegativeInteger
	vehicleStatus	Vehicle status	Vehicle status.	0..1	VehicleStatusEnum
HazardousMaterials	chemicalName	Chemical name	The chemical name of the hazardous substance carried by the vehicle.	1..1	MultilingualString
	dangerousGoodsFlashPoint	Dangerous goods flash point	The temperature at which the vapour from a hazardous substance will ignite in air.	0..1	TemperatureCelsius

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	dangerousGoodsRegulations	Dangerous goods regulations	The code defining the regulations, international or national, applicable for a means of transport.	0..1	DangerousGoodsRegulationsEnum
	hazardCodeIdentification	Hazard code identification	The dangerous goods description code.	0..1	String
	hazardCodeVersionNumber	Hazard code version number	The version/revision number of date of issuance of the hazardous material code used.	0..1	NonNegativeInteger
	hazardSubstanceItemPageNumber	Hazard substance item page number	A number giving additional hazard code classification of a goods item within the applicable dangerous goods regulation.	0..1	String
	tremCardNumber	Trem card number	The identification of a transport emergency card giving advice for emergency actions.	0..1	String
	undgNumber	UNDG number	A unique serial number assigned within the United Nations to substances and articles contained in a list of the dangerous goods most commonly carried.	0..1	String
	volumeOfDangerousGoods	Volume of dangerous goods	The volume of dangerous goods on the vehicle(s) reported in a traffic/travel situation.	0..1	CubicMetres
	weightOfDangerousGoods	Weight of dangerous goods	The weight of dangerous goods on the vehicle(s) reported in a traffic/travel situation.	0..1	Tonnes
HeaderInformation	allowedDeliveryChannel	Allowed delivery channel	The allowed delivery channel.	0..*	InformationDeliveryServicesEnum

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	confidentiality	Confidentiality	The extent to which the related information may be circulated, according to the recipient type.	0..1	ConfidentialityValueEnum
	informationStatus	Information status	The status of the related information (real, test, exercise ...).	1..1	InformationStatusEnum
InternationalIdentifier	country	Country	EN ISO 3166-1 two-character country code.	1..1	CountryCode
	nationalIdentifier	National identifier	Identifier or name unique within the specified country.	1..1	String
PayloadPublication	defaultLanguage	Default language	The default language used throughout the payload publication.	1..1	Language
	feedDescription	Feed description	A description of the information which is to be found in the publications originating from the particular feed (URL).	0..1	MultilingualString
	feedType	Feed type	A classification of the information which is to be found in the publications originating from the particular feed.	0..1	String
	publicationTime	Publication time	Date/time at which the payload publication was created.	1..1	DateTime
Source	reliable	Reliable	An indication as to whether the source deems the associated information to be reliable/correct. "True" indicates it is deemed reliable.	0..1	Boolean
	sourceCountry	Source country	EN ISO 3166-1 two-character country code of the source of the information.	0..1	CountryCode

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	sourceIdentification	Source identification	Language independent textual code or identifier for the organisation or the equipment that has produced the information.	0..1	String
	sourceName	Source name	The name of the organisation which has produced the information relating to this version of the information.	0..1	MultilingualString
	sourceType	Source type	Information about the technology used for measuring the data or the method used for obtaining qualitative descriptions relating to this version of the information.	0..1	SourceTypeEnum
UrlLink	urlLinkAddress	URL link address	A Uniform Resource Locator (URL) address pointing to a resource available on the Internet from where further relevant information may be obtained.	1..1	Url
	urlLinkDescription	URL link description	Description of the relevant information available on the Internet from the URL link.	0..1	MultilingualString
	urlLinkType	URL link type	Details of the type of relevant information available on the Internet from the URL link.	0..1	UrlLinkTypeEnum

A.2.3 "DataValue" package

A.2.3.1 "DataValue" package location

D2Payload/Common/Classes/DataValue

A.2.3.2 "DataValue" package classes

Table A.7— Classes of the "DataValue" package

Class name	Designation	Definition	Stereotype	Abstract
ApplicationRateValue	Application rate value	A measured or calculated value of the application rate of a substance.	D2Class	no
DataValue	Data value	A data value of something that can be measured or calculated. Any provided meta-data values specified in the attributes override any specified generic characteristics such as defined for a specific measurement in the MeasurementSiteTable.	D2Class	yes
DirectionBearingValue	Direction bearing value	A measured or calculated value of direction as a bearing.	D2Class	no
DirectionCompassValue	Direction compass value	A measured or calculated value of direction as a point of the compass.	D2Class	no
FloatingPointMetreDistanceValue	Floating point metre distance value	A measured or calculated value of distance in metres in a floating point format.	D2Class	no
FrictionValue	Friction value	A measured or calculated value of road surface friction.	D2Class	no
IntegerMetreDistanceValue	Integer metre distance value	A measured or calculated value of distance in whole metres.	D2Class	no
KilogramsConcentrationValue	Kilograms concentration value	A measured or calculated value of concentration of a substance in kilograms per unit volume.	D2Class	no
MicrogramsConcentrationValue	Micrograms concentration value	A measured or calculated value of concentration of a substance in micrograms per unit volume.	D2Class	no
PercentageValue	Percentage value	A measured or calculated value expressed as a percentage.	D2Class	no
PrecipitationIntensityValue	Precipitation intensity value	A measured or calculated value of the accumulation rate of precipitation.	D2Class	no
SpeedValue	Speed value	A measured or calculated value of speed.	D2Class	no
TemperatureValue	Temperature value	A measured or calculated value of temperature.	D2Class	no
VehicleFlowValue	Vehicle flow value	A measured or calculated value of the flow rate of vehicles.	D2Class	no

A.2.3.3 "DataValue" package association roles

There are no defined association roles in the "DataValue" package.

A.2.3.4 "DataValue" package attributes

Table A.8— Attributes of the "DataValue" package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
ApplicationRateValue	applicationRate	Application rate	A value of the rate of application of a substance expressed in kilogrammes per square metre.	1..1	IntensityKilogramsPerSquareMetre
DataValue	accuracy	Accuracy	The extent to which the value is expected to be free from error, measured as a percentage of the data value. 100% means fully accurate.	0..1	Percentage
	computationalMethod	Computational method	Method of computation which has been used to compute this data value.	0..1	ComputationMethodEnum
	dataError	Data error	Indication of whether the value is deemed to be erroneous by the supplier (true = erroneous). If not present, the data value is assumed to be ok. This may be used when automatic fault detection information relating to sensors is available.	0..1	Boolean
	numberOfIncompleteInputs	Number of incomplete inputs	The number of inputs detected but not completed during the sampling or measurement period; e.g. vehicles detected entering but not exiting the detection zone.	0..1	NonNegativeInteger
	numberOfInputValuesUsed	Number of input values used	The number of input values used in the sampling or measurement period to determine the data value.	0..1	NonNegativeInteger