



# OGC (OGC POINTS OF INTEREST)

---

**STANDARD**

**DRAFT**

**Version:** 1.0

**Submission Date:** 2029-03-30

**Approval Date:** 2029-03-30

**Publication Date:** 2022-08-03

**Editor:** Charles Heazel, Matthew Brian, John Purss

**Notice for Drafts:** This document is not an OGC Standard. This document is distributed for review and comment. This document is subject to change without notice and may not be referred to as an OGC Standard.

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

## License Agreement

Permission is hereby granted by the Open Geospatial Consortium, ("Licensor"), free of charge and subject to the terms set forth below, to any person obtaining a copy of this Intellectual Property and any associated documentation, to deal in the Intellectual Property without restriction (except as set forth below), including without limitation the rights to implement, use, copy, modify, merge, publish, distribute, and/or sublicense copies of the Intellectual Property, and to permit persons to whom the Intellectual Property is furnished to do so, provided that all copyright notices on the intellectual property are retained intact and that each person to whom the Intellectual Property is furnished agrees to the terms of this Agreement.

If you modify the Intellectual Property, all copies of the modified Intellectual Property must include, in addition to the above copyright notice, a notice that the Intellectual Property includes modifications that have not been approved or adopted by LICENSOR.

THIS LICENSE IS A COPYRIGHT LICENSE ONLY, AND DOES NOT CONVEY ANY RIGHTS UNDER ANY PATENTS THAT MAY BE IN FORCE ANYWHERE IN THE WORLD. THE INTELLECTUAL PROPERTY IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE DO NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE INTELLECTUAL PROPERTY WILL MEET YOUR REQUIREMENTS OR THAT THE OPERATION OF THE INTELLECTUAL PROPERTY WILL BE UNINTERRUPTED OR ERROR FREE. ANY USE OF THE INTELLECTUAL PROPERTY SHALL BE MADE ENTIRELY AT THE USER'S OWN RISK. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR ANY CONTRIBUTOR OF INTELLECTUAL PROPERTY RIGHTS TO THE INTELLECTUAL PROPERTY BE LIABLE FOR ANY CLAIM, OR ANY DIRECT, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM ANY ALLEGED INFRINGEMENT OR ANY LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR UNDER ANY OTHER LEGAL THEORY, ARISING OUT OF OR IN CONNECTION WITH THE IMPLEMENTATION, USE, COMMERCIALIZATION OR PERFORMANCE OF THIS INTELLECTUAL PROPERTY.

This license is effective until terminated. You may terminate it at any time by destroying the Intellectual Property together with all copies in any form. The license will also terminate if you fail to comply with any term or condition of this Agreement. Except as provided in the following sentence, no such termination of this license shall require the termination of any third party end-user sublicense to the Intellectual Property which is in force as of the date of notice of such termination. In addition, should the Intellectual Property, or the operation of the Intellectual Property, infringe, or in LICENSOR's sole opinion be likely to infringe, any patent, copyright, trademark or other right of a third party, you agree that LICENSOR, in its sole discretion, may terminate this license without any compensation or liability to you, your licensees or any other party. You agree upon termination of any kind to destroy or cause to be destroyed the Intellectual Property together with all copies in any form, whether held by you or by any third party.

Except as contained in this notice, the name of LICENSOR or of any other holder of a copyright in all or part of the Intellectual Property shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Intellectual Property without prior written authorization of LICENSOR or such copyright holder. LICENSOR is and shall at all times be the sole entity that may authorize you or any third party to use certification marks, trademarks or other special designations to indicate compliance with any LICENSOR standards or specifications. This Agreement is governed by the laws of the Commonwealth of Massachusetts. The application to this Agreement of the United Nations Convention on Contracts for the International Sale of Goods is hereby expressly excluded. In the event any provision of this Agreement shall be deemed unenforceable, void or invalid, such provision shall be modified so as to make it valid and enforceable, and as so modified the entire Agreement shall remain in full force and effect. No decision, action or inaction by LICENSOR shall be construed to be a waiver of any rights or remedies available to it.

None of the Intellectual Property or underlying information or technology may be downloaded or otherwise exported or reexported in violation of U.S. export laws and regulations. In addition, you are responsible for complying with any local laws in your jurisdiction which may impact your right to import, export or use the Intellectual Property, and you represent that you have complied with any regulations or registration procedures required by applicable law to make this license enforceable.

Suggested additions, changes and comments on this document are welcome and encouraged. Such suggestions may be submitted using the online change request form on OGC web site: [http://portal.opengeospatial.org/public\\_ogc/change\\_request.php](http://portal.opengeospatial.org/public_ogc/change_request.php)

## Copyright notice

Copyright © 2022 Open Geospatial Consortium  
To obtain additional rights of use, visit <http://www.ogc.org/legal/>

## Note

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

# CONTENTS

---

I.	ABSTRACT .....	vi
II.	KEYWORDS .....	vi
III.	PREFACE .....	vii
IV.	SECURITY CONSIDERATIONS .....	viii
V.	SUBMITTING ORGANIZATIONS .....	ix
2.	CONFORMANCE .....	11
2.1.	Conceptual Models .....	11
2.2.	Implementation Specifications .....	11
2.3.	Conformance Classes .....	12
1.	SCOPE .....	2
3.	NORMATIVE REFERENCES .....	6
4.	TERMS AND DEFINITIONS .....	8
5.	CONVENTIONS .....	12
5.1.	Identifiers .....	12
5.2.	UML Notation .....	12
6.	POI .....	18
6.1.	Class Model .....	18
6.2.	Geometry .....	21
6.3.	POI Data Dictionary .....	23
6.4.	ISO Data Dictionary .....	26
7.	MEDIA TYPES FOR ANY DATA ENCODING(S) .....	76
	ANNEX A (INFORMATIVE) REVISION HISTORY .....	78
	BIBLIOGRAPHY .....	80

# LIST OF TABLES

---

Table 1 .....	23
Table 2 .....	24
Table 3 .....	24
Table 4 .....	25
Table 5 .....	26
Table 6 .....	27
Table 7 .....	27
Table 8 .....	28
Table 9 .....	29
Table 10 .....	30
Table 11 .....	31
Table 12 .....	32
Table 13 .....	33
Table 14 .....	33
Table 15 .....	34
Table 16 .....	35
Table 17 .....	36
Table 18 .....	37
Table 19 .....	38
Table 20 .....	39
Table 21 .....	39
Table 22 .....	40
Table 23 .....	41
Table 24 .....	42
Table 25 .....	43
Table 26 .....	43
Table 27 .....	45
Table 28 .....	45
Table 29 .....	46
Table 30 .....	47
Table 31 .....	48
Table 32 .....	49
Table 33 .....	50
Table 34 .....	51
Table 35 .....	52
Table 36 .....	53
Table 37 .....	54
Table 38 .....	55
Table 39 .....	56

Table 40 .....	56
Table 41 .....	57
Table 42 .....	59
Table 43 .....	60
Table 44 .....	60
Table 45 .....	61
Table 46 .....	61
Table 47 .....	62
Table 48 .....	63
Table 49 .....	63
Table 50 .....	64
Table 51 .....	65
Table 52 .....	65
Table 53 .....	66
Table 54 .....	66
Table 55 .....	67
Table 56 .....	67
Table 57 .....	68
Table 58 .....	68
Table 59 .....	69
Table 60 .....	70
Table 61 .....	70
Table 62 .....	71
Table 63 .....	71
Table 64 .....	72
Table 65 .....	72
Table 66 .....	73
Table A.1 .....	78

## LIST OF FIGURES

---

Figure 1 .....	2
Figure 2 .....	3
Figure 3 – UML notation (see ISO TS 19103, Geographic information - Conceptual schema language). .....	13
Figure 4 – Example UML diagram demonstrating the UML notation and coloring scheme used throughout the CityGML Standard. ....	16
Figure 5 – Feature Model .....	19
Figure 6 – POI UML Model .....	20
Figure 7 – Geometry Model .....	22

I

## ABSTRACT

---

<Insert Abstract Text here>

II

## KEYWORDS

---

The following are keywords to be used by search engines and document catalogues.

ogcdoc, OGC document, API, openapi, html

## PREFACE

---

**NOTE:** Insert Preface Text here. Give OGC specific commentary: describe the technical content, reason for document, history of the document and precursors, and plans for future work.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

## SECURITY CONSIDERATIONS

---

No security considerations have been made for this document.

## SUBMITTING ORGANIZATIONS

---

The following organizations submitted this Document to the Open Geospatial Consortium (OGC):

- Organization One
- Organization Two

2

# CONFORMANCE

---

# CONFORMANCE

**NOTE:** this text was lifted from CityGML. It needs to be modified to address POI

This standard defines a Conceptual Model which is independent of any encoding or formatting techniques. The Standardization Targets for this standard are:

1. Conceptual Models (extended versions of this conceptual model)
2. Implementation Specifications (encodings of this conceptual model)

## 2.1. Conceptual Models

A Conceptual Model standardization target is a version of the POI Conceptual Model (CM) tailored for a specific user community. This tailoring can include:

1. Omission of one or more of the optional UML packages
2. Reduction of the multiplicity for an attribute or association
3. Restriction on the valid values for an attribute
4. Additional concepts documented through ADEs.

Of these options, actions #1, #2, and #3 can be performed when creating an implementation specification. Only action #4 requires an extension of the POI conceptual model. These extensions are accomplished using the ADE mechanism described in Section 10 Application Domain Extensions (ADE).

Extensions of the CityGML Conceptual Model conform with the ADE Conformance Class.

## 2.2. Implementation Specifications

Implementation Specifications define how a Conceptual Model should be implemented using a specific technology. Conformant Implementation Specifications provide evidence that they are an accurate representation of the Conceptual Model. This evidence should include implementations of the abstract tests specified in Annex A (normative) of this document.

Since this standard is agnostic to the implementing technologies, the specific techniques to be used for conformance testing cannot be specified. Implementation Specifications need to

provide evidence of conformance which is appropriate for the implementing technologies. This evidence should be provided as an annex to the Implementation Specification document.

## 2.3. Conformance Classes

---

This standard identifies seventeen (17) conformance classes. One conformance class is defined for each package in the UML model. Each conformance class is defined by one requirements class. The tests in Annex A are organized by Requirements Class. So an implementation of the Core conformance class must pass all tests specified in Annex A for the Core requirements class.

Of these seventeen conformance classes, only the Core conformance class is mandatory. All other conformance classes are optional. In the case where a conformance class has a dependency on another conformance class, that conformance class should also be implemented.

The CityGML Conceptual Model is defined by the CityGML UML model. This standard is a representation of that UML model in document form. In the case of a discrepancy between the UML model and this document, the UML model takes precedence.

1

# SCOPE

---

# SCOPE

---

This document describes a data model and XML<sup>1</sup> syntax for representing information about points of interest (POI).

In the most broad terms, a “point of interest” is a location about which information of general interest is available. A POI can be as simple as a set of coordinates and an identifier, or more complex such as a three dimensional model of a building with names in various languages, information about open and closed hours, and a civic address. POI data has many uses including navigation systems, mapping, geocaching, location-based social networking games, and augmented reality browsers.

POI data has traditionally been exchanged in proprietary formats by various transport mechanisms. This specification defines a flexible, lightweight, extensible POI data model. This will enable content publishers to effectively describe and efficiently serve and exchange POI data.

To achieve these goals, this document describes a generic data model that may be instantiated in a variety of serializations, including XML<sup>1</sup>, JSON and RDF<sup>2</sup>.

Here is an example of a simple POI serialized in XML<sup>1</sup>:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<poi id="http://www.rajsingh.org/pois/45343489">
<label term="primary">
<value>Boston</value>
</label>
<description term="source" href="http://en.wikipedia.org/wiki/Boston">
<value>Boston is the capital of and largest city in Massachusetts, and is one
of the oldest
    cities in the United States. The largest city in New England, Boston is
regarded as the
    unofficial "Capital of New England" for its economic and cultural impact on
the entire
    New England region. The city proper had a population of 617,594 according to
the 2010
    U.S. Census.
</value>
<author id="http://en.wikipedia.org" term="publisher" type="text/plain">
    <value>Wikipedia</value>
</author>
</description>
<category term="city" scheme="http://www.usgs.gov/placetypes">
<value>seat of a first-order administrative division</value>
</category>
<link term="canonical" href="http://www.rajsingh.org/pois/45343489.xml"
    type="text/xml" scheme="http://www.iana.org/assignments/link-relations/link-
relations.xml"/>
<link term="related" href="http://en.wikipedia.org/wiki/Boston"
```

---

<sup>1</sup>Are we going to bother with an XML Schema or move straight to JSON?

<sup>2</sup>Are we going to specify an RDF encoding?

```

  type="text/html" scheme="http://www.iana.org/assignments/link-relations/link-
relations.xml"/>
<link term="related" href="http://www.geonames.org/maps/google_42.358_-71.06.
html"
  type="text/html" scheme="http://www.iana.org/assignments/link-relations/link-
relations.xml"/>
<location>
<point term="centroid">
  <Point srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
    <posList>42.358 -71.06</posList>
  </Point>
</point>
</location>
</poi>
```

**Figure 1**

Here is an example of a simple POI serialized in **JSON**<sup>3</sup>:

```
{
  "poi_id": {
    "value": "45343489",
    "href": "http://www.rajsingh.org/pois/45343489"
  },
  "label": {
    "type": "primary",
    "value": "Boston"
  },
  "description": {
    "type": "source",
    "value": "Boston is the capital of and largest city in Massachusetts, and
is one of the oldest cities in the United States. The largest city in New
England, Boston is regarded as the unofficial \"Capital of New England\" for its
economic and cultural impact on the entire New England region. The city proper
had a population of 617,594 according to the 2010 U.S. Census.",
    "href": "http://en.wikipedia.org/wiki/Boston",
    "author": "Wikipedia"
  },
  "category": {
    "type": "city",
    "value": "seat of a first-order administrative division",
    "href": "http://www.usgs.gov/placetypes"
  },
  "links": [
    {
      "href": "http://www.rajsingh.org/pois/45343489.json",
      "rel": "canonical",
      "type": "application/json",
      "title": "Canonical POI Reference",
      "hreflang": "en"
    },
    {
      "href": "http://en.wikipedia.org/wiki/Boston",
      "rel": "related",
      "type": "text/html",
      "title": "Wikipedia Reference",
      "hreflang": "en"
    }
  ]
}
```

---

<sup>3</sup>What are we missing in this JSON schema representation?

```
"href": "http://www.geonames.org/maps/google_42.358_-71.06.html",
"rel": "related",
"type": "text/html",
"title": "Map of Boston",
"hreflang": "en"
}
],
"location": {
"geometry": {
"type": "Point",
"coordinates": [42.358, -71.06]
},
}
}
```

Figure 2

3

# NORMATIVE REFERENCES

---

## NORMATIVE REFERENCES

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

T. Berners-Lee, R. Fielding, L. Masinter: RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*. Internet Engineering Task Force (2005). <https://raw.githubusercontent.com/relaton/relaton-data-ietf/master/data/reference.RFC.3986.xml>

ISO: ISO 19103, *Geographic information – Conceptual schema language*. International Organization for Standardization, Geneva <https://www.iso.org/standard/56734.html>

ISO: ISO 19107, *Geographic information – Spatial schema*. International Organization for Standardization, Geneva <https://www.iso.org/standard/66175.html>

ISO: ISO 19108, *Geographic information – Temporal schema*. International Organization for Standardization, Geneva <https://www.iso.org/standard/26013.html>

ISO: ISO 19109, *Geographic information – Rules for application schema*. International Organization for Standardization, Geneva <https://www.iso.org/standard/59193.html>

ISO: ISO 19111, *Geographic information – Referencing by coordinates*. International Organization for Standardization, Geneva <https://www.iso.org/standard/74039.html>

Cliff Kottman and Carl Reed: OGC 08-126, *Topic 5 – Features*. Open Geospatial Consortium (2009). [https://portal.ogc.org/files/?artifact\\_id=29536](https://portal.ogc.org/files/?artifact_id=29536)

OGC: *The OpenGIS™ Abstract Specification Topic 8: Relationships Between Features*, OGC document 99-108r2

OGC: *The OpenGIS™ Abstract Specification Topic 10: Feature Collections*, OGC document 99-110

4

# TERMS AND DEFINITIONS

---

## TERMS AND DEFINITIONS

No terms and definitions are listed in this document.

This document uses the terms defined in [OGC Policy Directive 49](#), which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word "shall" (not "must") is the verb form used to indicate a requirement to be strictly followed to conform to this Standard and OGC documents do not use the equivalent phrases in the ISO/IEC Directives, Part 2.

This document also uses terms defined in the OGC Standard for Modular specifications ([OGC 08-131r3](#)), also known as the 'ModSpec'. The definitions of terms such as standard, specification, requirement, and conformance test are provided in the ModSpec.

For the purposes of this document, the following additional terms and definitions apply.

location                    particular *place or position*

**NOTE 1:** A *location* identifies a geographic *place*.

**NOTE 2:** *Locations* are physically fixed points, typically on the surface of the Earth, although *locations* can be relative to other, non-earth centric coordinate reference systems.

**NOTE 3:** *Locations* can be a single point, a centroid, a minimum bounding rectangle, or a set of vectors.

**NOTE 4:** A *location* should be persistent over time and does not change.

**NOTE 5:** Multiple *POIs* may share the same *location*.

**NOTE 6:** When a *POI* physically moves it is understood to have acquired a new *location*.

[**SOURCE:** , Clause 3.1.3]

point                    0-dimensional geometric primitive, representing a *position*

[**SOURCE:** ]

point of interest

*location* where one can find a *place*, product or service

**NOTE 7:** A *POI* is typically identified by *name* rather than by an *address*.

**NOTE 8:** A *POI* is characterized by *type*, which may be used as a *reference point* or a target in a *location* based service request.

**NOTE 9:** A *POI* does not exclude the labeling, identification, and tracking of persons and other physical objects that have no permanent location.

**Example :** destination of a route; such as, Boston

position                    data type that describes a *point* or *geometry* potentially occupied by an object or person

**[SOURCE: ]**

application schema                    A set of conceptual schema for data required by one or more applications. An application schema contains selected parts of the base schemas presented in the ORM Information Viewpoint.

Designers of application schemas may extend or restrict the types defined in the base schemas to define appropriate types for an application domain. Application schemas are information models for a specific information community.

codelist                    A value domain including a code for each permissible value.

conceptual model                    model that defines concepts of a universe of discourse

**[SOURCE: ]**

conceptual schema                    1. formal description of a conceptual model [ISO 19101-1:2014, 4.1.6]  
    2. base schema. Formal description of the model of any geospatial information. Application schemas are built from conceptual schemas.

OGC Definitions Register at <http://www.opengis.net/def/glossary/term/ConceptualSchema>

Implementation Specification Specified on the OGC Document Types Register at <http://www.opengis.net/def/doc-type/is>

Platform (Model Driven Architecture)                    the set of resources on which a system is realized.

**[SOURCE: ]**

Platform Independent Model:

a model that is independent of a specific platform

**[SOURCE: ]**

Platform Specific Model:

a model of a system that is defined in terms of a specific platform

[SOURCE: ]

5

# CONVENTIONS

---

## 5.1. Identifiers

The normative provisions in this document are denoted by the URI

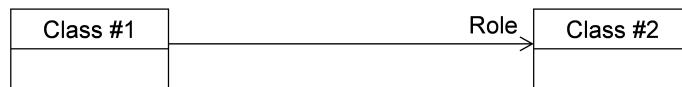
<http://www.opengis.net/spec/POI/1d.0>

All requirements and conformance tests that appear in this document are denoted by partial URIs relative to this base.

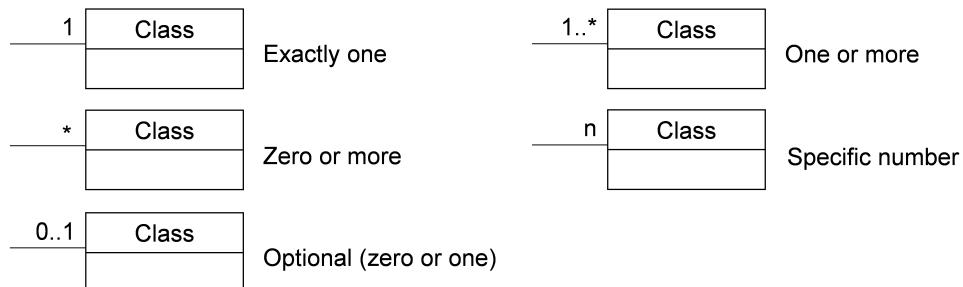
## 5.2. UML Notation

The POI Conceptual Model (CM) Standard is presented in this document through diagrams using the Unified Modeling Language (UML) static structure diagram (see Booch et al. 1997). The UML notations used in this standard are described in the diagram in Figure 3.

### Association between classes



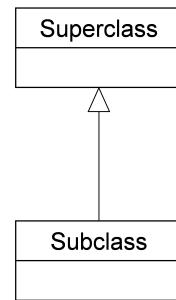
### Association cardinality



### Aggregation between classes



### Class inheritance



### Composition between classes



**Figure 3 – UML notation (see ISO TS 19103, Geographic information - Conceptual schema language).**

All associations between model elements in the POI Conceptual Model are uni-directional. Thus, associations in the model are navigable in only one direction. The direction of navigation is depicted by an arrowhead. In general, the context an element takes within the association is indicated by its role. The role is displayed near the target of the association. If the graphical representation is ambiguous though, the position of the role has to be drawn to the element the association points to.

The following stereotypes are used in this model:

- «ApplicationSchema» denotes a conceptual schema for data required by one or more applications. In the POI Conceptual Model, every module is defined as a separate application schema to allow for modularization.
- «FeatureType» represents features that are similar and exhibit common characteristics. Features are abstractions of real-world phenomena and have an identity.

- «TopLevelFeatureType» denotes features that represent the main components of the conceptual model. Top-level features may be further semantically and spatially decomposed and substructured into parts.
- «Type» denotes classes that are not directly instantiable, but are used as an abstract collection of operation, attribute and relation signatures. The stereotype is used in the POI Conceptual Model only for classes that are imported from the ISO standards 19107, 19109, 19111, and 19123.
- «ObjectType» represents objects that have an identity, but are not features.
- «DataType» defines a set of properties that lack identity. A data type is a classifier with no operations, whose primary purpose is to hold information.
- «Enumeration» enumerates the valid attribute values in a fixed list of named literal values. Enumerations are specified in the POI Conceptual Model.
- «BasicType» defines a basic data type.
- «CodeList» enumerates the valid attribute values. In contrast to Enumeration, the list of values is open and, thus, not given inline in the POI UML Model. The allowed values can be provided within an external code list.
- «Union» is a list of attributes. The semantics are that only one of the attributes can be present at any time.
- «Property» denotes attributes and association roles. This stereotype does not add further semantics to the conceptual model, but is required to be able to add tagged values to the attributes and association roles that are relevant for the encoding.
- «Version» denotes that the value of an association role that ends at a feature type is a specific version of the feature, not the feature in general.

In order to enhance the readability of the POI UML diagrams, classes are depicted in different colors. The following coloring scheme is applied:

**Class defined in this Requirements Class**

Classes painted in yellow belong to the Requirements Class which is subject of discussion in that clause of the standard in which the UML diagram is given. For example, in the context of [rc\_core\_section], which introduces the CityGML Core module, the yellow color is used to denote classes that are defined in the CityGML Core Requirements Class. Likewise, the yellow classes shown in the UML diagram in [rc\_building-model\_section] are associated with the *Building* Requirements Class that is subject of discussion in that chapter.

**Class defined in another Requirements Class**

Classes painted in blue belong to a Requirements Class different to that associated with the yellow color. In order to explicitly denote to which Requirements Class these classes belong, their class names are preceded by the UML package name of that Requirements Class. For example, in the context of the *Building* Requirements Class, classes from the *CityGML Core* and the *Construction* Requirements Classes are painted in blue and their class names are preceded by *Core* and *Construction*, respectively.

**Class defined in ISO 19107,  
ISO 19111 or ISO 19123**

Classes painted in green are defined in the ISO standards 19107, 19111, or 19123. Their class names are preceded by the UML package name, in which the classes are defined.

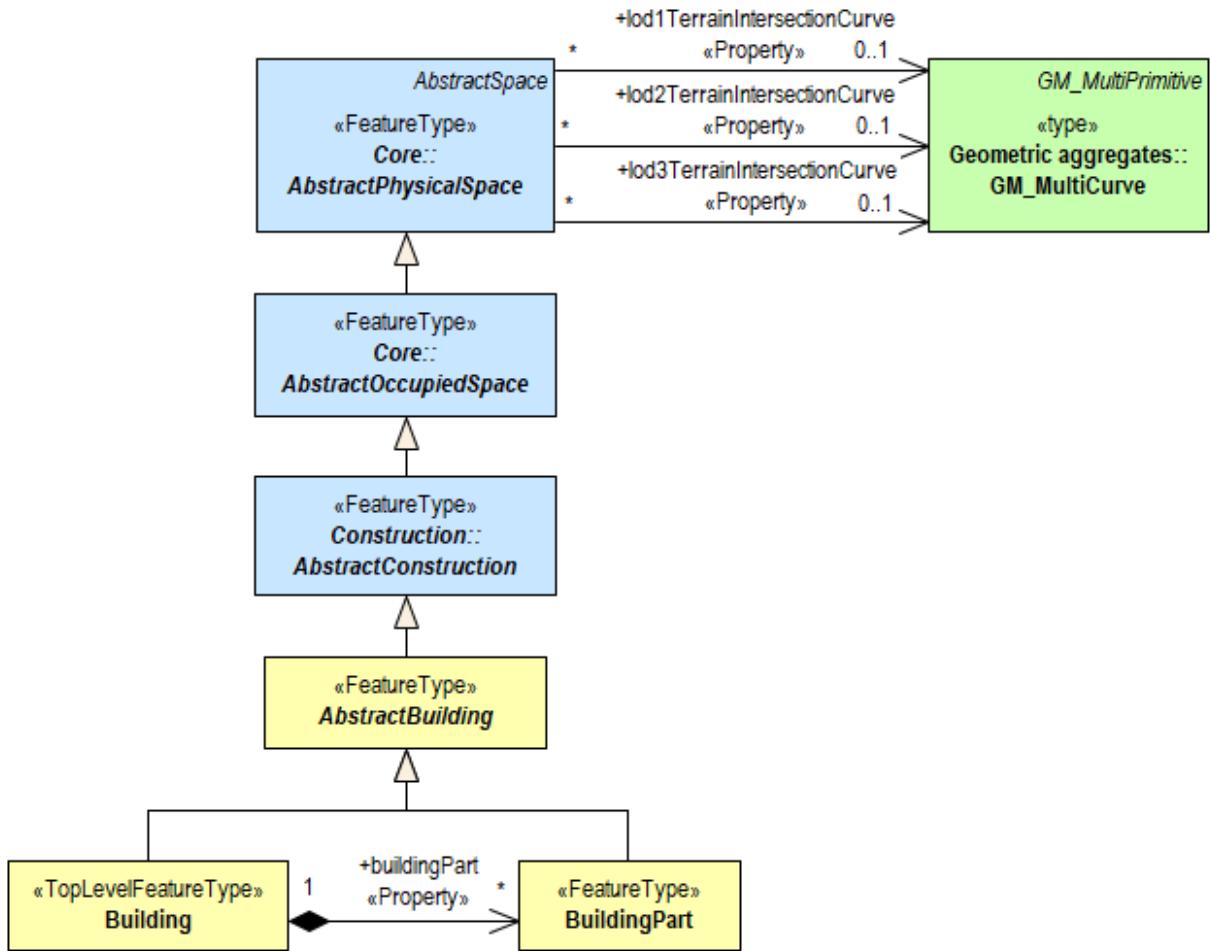
**Class defined in ISO 19109**

Classes painted in grey are defined in the ISO standard 19109. In the context of this standard, this only applies to the class *AnyFeature*. *AnyFeature* is an instance of the metaclass *FeatureType* and acts as super class of all classes in the CityGML UML model with the stereotype «FeatureType». A metaclass is a class whose instances are classes.

**Notes and OCL constraints**

The color white is used for notes and Object Constraint Language (OCL) constraints that are provided in the UML diagrams.

The example UML diagram in Figure 4 demonstrates the UML notation and coloring scheme used throughout this standard. In this example, the yellow classes are associated with the *CityGML Building* module, the blue classes are from the *CityGML Core* and *Construction* modules, and the green class depicts a geometry element defined by ISO 19107.



**Figure 4 – Example UML diagram demonstrating the UML notation and coloring scheme used throughout the CityGML Standard.**

6

# POI

---

## 6.1. Class Model

---

A Point of Interest (POI) is a Feature. Therefore, it is important to understand what a POI inherits from the OGC Feature model.

The OGC Feature Model is defined in ISO 19109:2015 Geographic Information – Rules for application schema. A UML model showing applicable portions of the General Feature Model is provided in Figure 1.

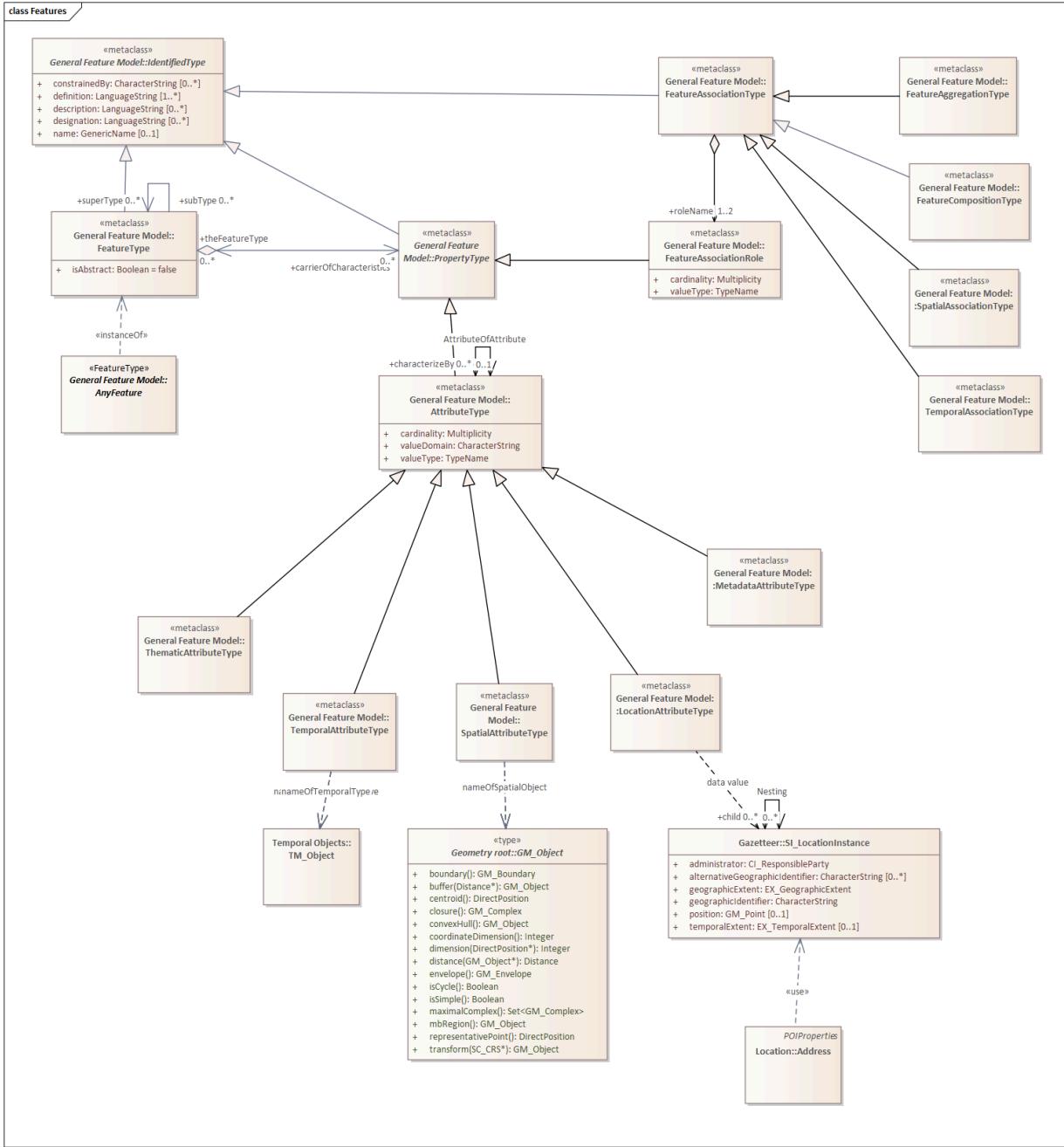


Figure 5 – Feature Model

The most relevant classes defined by this model are described below:

**FeatureType:** This class describes how a feature class shall be constructed in an Application Schema. In accordance with the conformance clause of the standard, instances of this class are instantiated as feature classes in an Application Schema

**AnyFeature:** The class AnyFeature is an instance of the «metaclass» FeatureType (ISO 19109). It represents the set of all classes which are feature types.

In an implementation this abstract class shall be substituted by a concrete class representing a feature type from an application schema associated with a domain of discourse (ISO 19109, ISO 19101).

### AttributeType: characteristic of a feature

In this Standard we extend the General Feature Model to support the concept of a Point of Interest.

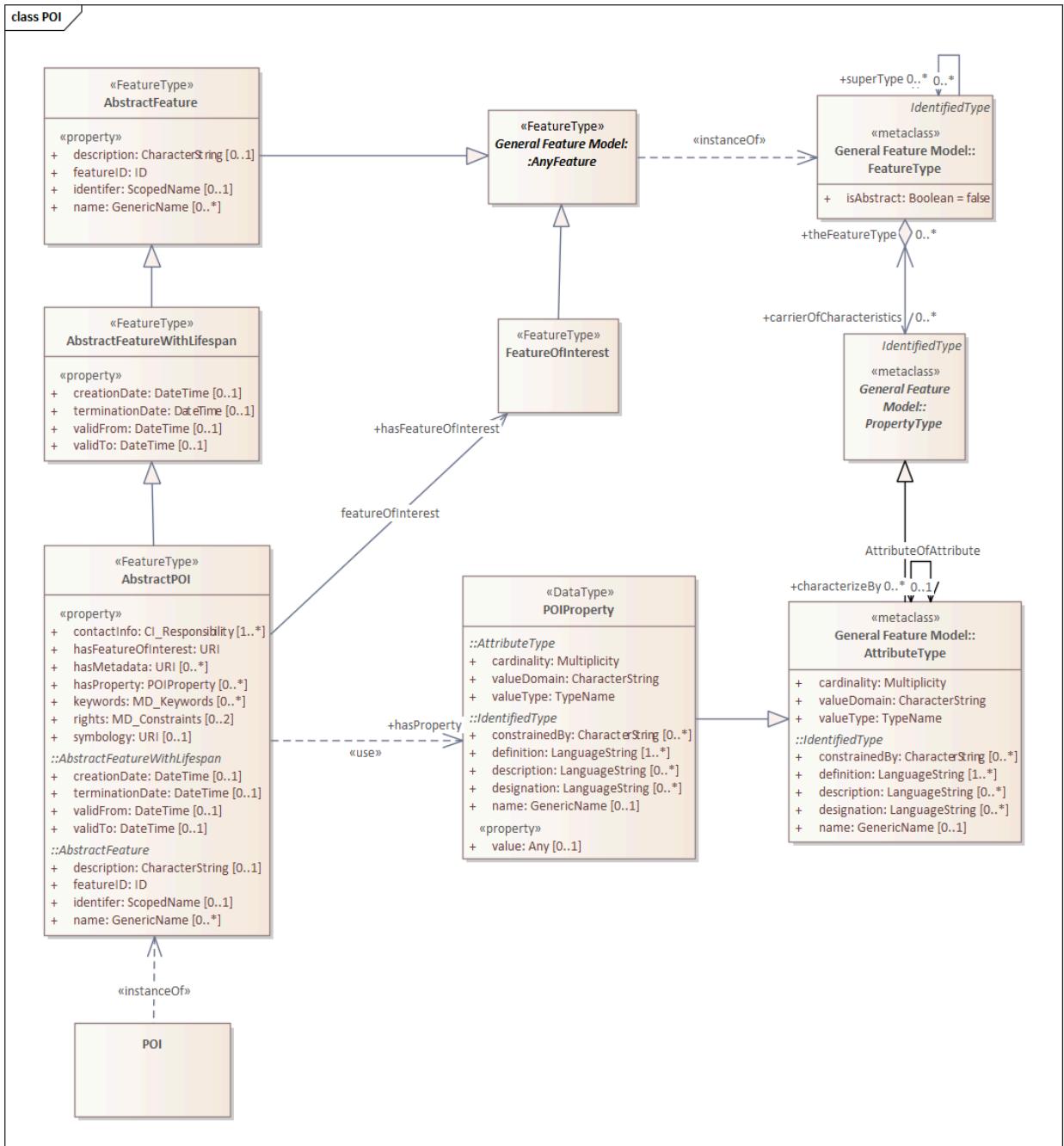


Figure 6 – POI UML Model

**AbstractFeature:** The root Feature class for this standard. This class has been borrowed from the CityGML 3.0 Conceptual Model.

**AbstractFeatureWithLifespan:** Adds temporality to AbstractFeature. This class was copied from the CityGML 3.0 Conceptual Model.

**AbstractPOI:** The abstract model for a Point of Interest. All POI instances will contain these attributes.

**POIPROPERTY:** The abstract model for a Property of a Feature of Interest which is to be represented in a POI.

**POI:** A POI instance.

**FeatureOfInterest:** This is an OGC Feature which has been defined independently from the POI. Conceptually, the purpose of the POI is to provide a user friendly synopsis of this Feature.

## 6.2. Geometry

---

The OGC Geometry model is defined in ISO 19107:2003 – Geographic Information – Spatial schema. While there is a new version of this standard, it has not been widely implemented. So the 2003 version has been used in this Standard.

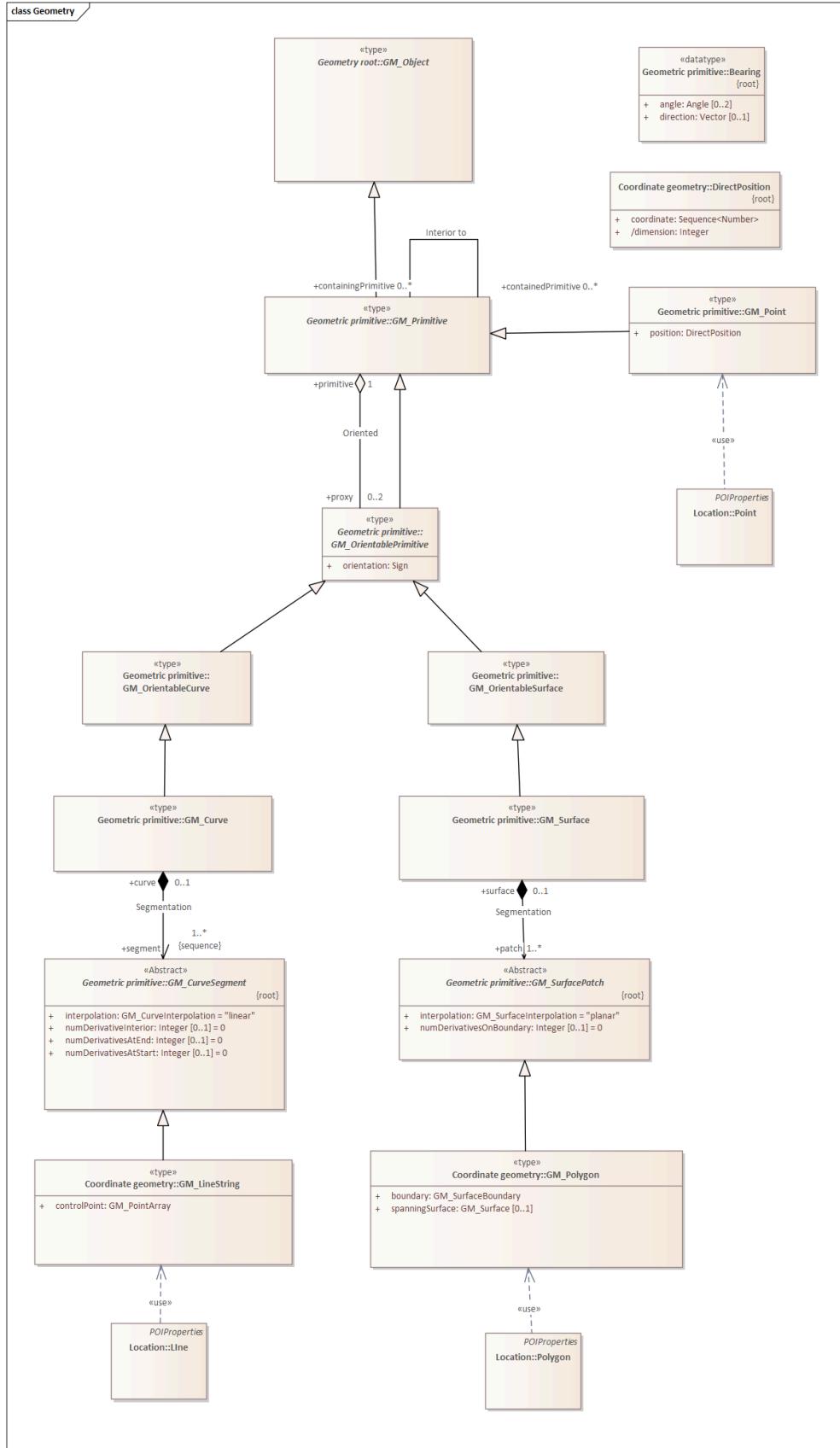


Figure 7 – Geometry Model

**GM\_Object:** Root class for all OGC geometries.

**GM\_Point:** The geometric primitive for Points

**GM\_LineString:** The geometric primitive for line strings.

**GM\_Polygon:** The geometric primitive for areas.

## 6.3. POI Data Dictionary

---

The POI UML model is the normative definition of the POI Conceptual Model. The Data Dictionary tables in this section were software generated from the UML model. As such, this section provides a normative representation of the POI Conceptual Model.

Table 1

### AbstractFeature

Definition:	AbstractFeature is the abstract superclass of all feature types within the POI Model.	
Subclass of:	<--section,>>	
Stereotype:	«FeatureType»	
<hr/>		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
<hr/>		
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
description «property»	CharacterString [0..1]	Provides further information on the feature.
featureID «property»	ID	Specifies the unique identifier of the feature that is valid in the instance document within which it occurs.
identifier «property»	ScopedName [0..1]	Specifies the unique identifier of the feature that is valid globally.
name «property»	GenericName [0..*]	Specifies the name of the feature.

Note: Unless otherwise specified, all attributes and role names have the stereotype «Property».

**Table 2**

**AbstractFeatureWithLifespan**

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
creationDate «property»	DateTime [0..1]	Indicates the date at which a POI feature was added to the containing model.
terminationDate «property»	DateTime [0..1]	Indicates the date at which a POI feature was removed from the containing model.
validFrom «property»	DateTime [0..1]	Indicates the date at which a POI feature started to exist in the real world.
validTo «property»	DateTime [0..1]	Indicates the date at which a POI feature ended to exist in the real world.

Note: Unless otherwise specified, all attributes and role names have the stereotype «Property».

**Table 3**

**AbstractPOI**

Definition:	A POI is defined as having the following conceptual properties: <ul style="list-style-type: none"> <li>• a globally unique ID</li> <li>• labels</li> <li>• descriptions</li> <li>• location</li> <li>• tags/keywords/categories</li> <li>• links to related information</li> <li>• time</li> <li>• authors</li> <li>• rights</li> <li>• metadata</li> </ul> <p>While a POI may be near meaningless without a label and location, from a computational perspective there are use cases in which any of these properties should be optional. Therefore, the only mandatory characteristic of a POI is that it have a globally unique identification property in the format of a URI.</p>
Subclass of:	<--section,>
Stereotype:	«FeatureType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
hasProperty	POIProperty []	
hasFeature OfInterest	FeatureOfInterest []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
contactInfo «property»	CI_Responsibility [1..*]	
hasFeature OfInterest «property»	URI	
hasMetadata «property»	URI [0..*]	
hasProperty «property»	POIProperty [0..*]	
keywords «property»	MD_Keywords [0..*]	
rights «property»	MD_Constraints [0..2]	
symbology «property»	URI [0..1]	

Note: Unless otherwise specified, all attributes and role names have the stereotype «Property».

**Table 4**

**FeatureOfInterest**

Definition:	
Subclass of:	<--section,>
Stereotype:	«FeatureType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
describedBy	FeatureModel []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attributes and role names have the stereotype «Property».

Table 5

POIProperty

Definition:	
Subclass of:	<--section,>
Stereotype:	«DataType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
value «property»	Any [0..1]	

Note: Unless otherwise specified, all attributes and role names have the stereotype «Property».

## 6.4. ISO Data Dictionary

---

The POI UML model is the normative definition of the POI Conceptual Model. The Data Dictionary tables in this section were software generated from the UML model. As such, this section provides a normative representation of the POI Conceptual Model.

### 6.4.1. Citation and responsible party information

**Table 6**

**CI\_Address**

TARGET CLASS AND MULTIPLICITY		
ROLE NAME	ATTRIBUTE	DEFINITION
ROLE NAME	ATTRIBUTE	DEFINITION
	administrativeArea	CharacterString [0..1] state, province of the location
	city	CharacterString [0..1] city of the location
	country	CharacterString [0..1] country of the physical address
	deliveryPoint	CharacterString [0..*] address line for the location Example Street number and name, suite number, etc
	electronicMailAddress	CharacterString [0..*] address of the electronic mailbox of the responsible organisation or individual
	postalCode	CharacterString [0..1] ZIP or other postal code

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 7**

**CI\_Citation**

Definition:	standardized resource reference
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
alternateTitle	CharacterString [0..*]	short name or other language name by which the cited information is known. Example: DCW as an alternative title for Digital Chart of the World
citedResponsible Party	CI_Responsibility [0..*]	roles, name, contact, and position information for an individual or organisation that is responsible for the resource
date	CI_Date [0..*]	reference date for the cited resource
edition	CharacterString [0..1]	version of the cited resource
editionDate	DateTime [0..1]	date of the edition
graphic	MD_BrowseGraphic [0..*]	citation graphic or logo for cited party
identifier	MD_Identifier [0..*]	value uniquely identifying an object within a namespace
ISBN	CharacterString [0..1]	international Standard Book Number
ISSN	CharacterString [0..1]	international Standard Serial Number
onlineResource	CI_OnlineResource [0..*]	online reference to the cited resource
otherCitation Details	CharacterString [0..*]	other information required to complete the citation that is not recorded elsewhere
presentation Form	CI_PresentationForm Code [0..*]	mode in which the resource is represented
series	CI_Series [0..1]	information about the series, or aggregate resource, of which the resource is a part
title	CharacterString	name by which the cited resource is known

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 8

#### CI\_Contact

Definition:	information required to enable contact with the responsible person and/or organisation
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
address	CI_Address [0..*]	physical and email address at which the organisation or individual may be contacted
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
contactInstructions	CharacterString [0..1]	supplemental instructions on how or when to contact the individual or organisation
contactType	CharacterString [0..1]	type of contact
hoursOfService	CharacterString [0..*]	time period (including time zone) when individuals can contact the organisation or individual
onlineResource	CI_OnlineResource [0..*]	on-line information that can be used to contact the individual or organisation
phone	CI_Telephone [0..*]	telephone numbers at which the organisation or individual may be contacted

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 9

#### CI\_Date

Definition:	reference date and event used to describe it
Subclass Of:	<--section,>
Stereotype:	«DataType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
date	DateTime	reference date for the cited resource
dateType	CI_DateTypeCode	event used for reference date

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 10

#### CI\_DateTypeCode

Definition:	identification of when a given event occurred
Subclass Of:	<--section,>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
adopted	<<undefined>	date identifies when resource was adopted
creation	<<undefined>	date identifies when the resource was brought into existence
deprecated	<<undefined>	date identifies when resource was deprecated
distribution	<--section,>	date identifies when an instance of the resource was distributed
expiry	<--section,>	date identifies when resource expires
inForce	<<undefined>	date identifies when resource became in force
lastRevision	<--section,>	date identifies when resource was last reviewed
lastUpdate	<--section,>	date identifies when resource was last updated
nextUpdate	<--section,>	date identifies when resource will be next updated

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
publication	<<undefined>>	date identifies when the resource was issued
released	<<section,>>	the date that the resource shall be released for public access
revision	<<undefined>>	date identifies when the resource was examined or re-examined and improved or amended
superseded	<<undefined>>	date identifies when resource was superseded or replaced by another resource
unavailable	<<undefined>>	date identifies when resource became not available or obtainable
validityBegins	<<section,>>	time at which the data is considered to become valid. Note: There could be quite a delay between creation and validity begins
validityExpires	<<section,>>	time at which the data is no longer considered to be valid

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 11

CI\_Individual

Definition:	information about the party if the party is an individual
Subclass Of:	<<section,>>
Stereotype:	
Constraint:	count (name + positionName) > 0 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
CI_Organisation []		
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
positionName	CharacterString [0..1]	position of the individual in an organisation

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 12**

**CI\_OnLineFunctionCode**

Definition:	function performed by the resource	
Subclass Of:	<--section,>	
Stereotype:	«CodeList»	
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
browseGraphic	<<undefined>	browse graphic provided
browsing	<<undefined>	online browsing provided
complete Metadata	<<undefined>	complete metadata provided
download	<<undefined>	online instructions for transferring data from one storage device or system to another
emailService	<<undefined>	online email service provided
fileAccess	<<undefined>	online file access provided
information	<<undefined>	online information about the resource
offlineAccess	<<undefined>	online instructions for requesting the resource from the provider
order	<<undefined>	online order process for obtaining the resource
search	<<undefined>	online search interface for seeking out information about the resource
upload	<<undefined>	online resource upload capability provided

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 13**

**CI\_OnlineResource**

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
applicationProfile	CharacterString [0..1]	name of an application profile that can be used with the online resource
description	CharacterString [0..1]	detailed text description of what the online resource is/does
function	CI_OnLineFunction Code [0..1]	code for function performed by the online resource
linkage	CharacterString	location (address) for on-line access using a Uniform Resource Locator/ Uniform Resource Identifier address or similar addressing scheme such as <a href="http://www.statkart.no/isotc211">http://www.statkart.no/isotc211</a>
name	CharacterString [0..1]	name of the online resource
protocol	CharacterString [0..1]	connection protocol to be used e.g. http, ftp, file, http get KVP, http POST, etc...
protocolRequest	CharacterString [0..1]	protocol used by the accessed resource(to be used mainly for POST requests). Example POST/XML: <GetFeature service="WFS" version="2.0.0" outputFormat="application/gml+xml; version=3.2" xmlns="http://www.opengis.net/wfs/2.0" xmlns:xsi="http:// www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http:// www.opengis.net/wfs/2.0http://schemas.opengis.net/wfs/2.0.0/wfs. xsd"> <Query typeNames="Roads"/> </GetFeature>

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 14**

**CI\_Organisation**

Definition:	information about the party if the party is an organisation
Subclass Of:	<--section,>
Stereotype:	
Constraint:	count (name + logo) > 0 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
logo	MD_BrowseGraphic [0..*]	Graphic identifying organization

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 15

#### CI\_Party

Definition:	information about the individual and/or organisation of the party
Subclass Of:	<--section,>
Stereotype:	«abstract»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
CI_Responsibility	[]	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
contactInfo	CI_Contact [0..*]	contact information for the party
name	CharacterString [0..1]	name of the party (individual or organization)

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 16**

**CI\_PresentationFormCode**

Definition:	mode in which the data is represented	
Subclass Of:	<--section,>	
Stereotype:	«CodeList»	
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
audioDigital	<<undefined>	digital audio recording
audioHardcopy	<<undefined>	audio recording delivered by analog media, such as a magnetic tape
diagramDigital	<<undefined>	information represented graphically by charts such as pie chart, bar chart, and other type of diagrams and recorded in digital format
diagram Hardcopy	<<undefined>	information represented graphically by charts such as pie chart, bar chart, and other type of diagrams and printed on paper, photographic material, or other media
documentDigital	<<undefined>	digital representation of a primarily textual item (can contain illustrations also)
document Hardcopy	<<undefined>	representation of a primarily textual item (can contain illustrations also) on paper, photographic material, or other media
imageDigital	<<undefined>	likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and stored in digital format
imageHardcopy	<<undefined>	likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and reproduced on paper, photographic material, or other media for use directly by the human user
mapDigital	<<undefined>	map represented in raster or vector form

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
mapHardcopy	<<undefined>	map printed on paper, photographic material, or other media for use directly by the human user
modelDigital	<<undefined>	multi-dimensional digital representation of a feature, process, etc.
modelHardcopy	<<undefined>	3-dimensional, physical model
multimediaDigital	<<undefined>	information representation using simultaneously various digital modes for text, sound, image
multimedia Hardcopy	<<undefined>	information representation using simultaneously various analog modes for text, sound, image
physicalObject	<<section,>>	a physical object. Eg. Rock or mineral sample, microscope slide
profileDigital	<<undefined>	vertical cross-section in digital form
profileHardcopy	<<undefined>	vertical cross-section printed on paper, etc.
tableDigital	<<undefined>	digital representation of facts or figures systematically displayed, especially in columns
tableHardcopy	<<undefined>	representation of facts or figures systematically displayed, especially in columns, printed on paper, photographic material, or other media
videoDigital	<<undefined>	digital video recording
videoHardcopy	<<undefined>	video recording on film

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 17

**CI\_Responsibility**

Definition:	information about the party and their role
Subclass Of:	<<section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
extent	EX_Extent [0..*]	spatial or temporal extent of the role
role	CI_RoleCode	function performed by the responsible party

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 18

**CI\_RoleCode**

Definition:	function performed by the responsible party
Subclass Of:	<--section,>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
author	<--section,>	party who authored the resource
coAuthor	<--section,>	party who jointly authors the resource
collaborator	<--section,>	party who assists with the generation of the resource other than the principal investigator
contributor	<--section,>	party contributing to the resource
custodian	<--section,>	party that accepts accountability and responsibility for the resource and ensures appropriate care and maintenance of the resource
distributor	<--section,>	party who distributes the resource
editor	<--section,>	party who reviewed or modified the resource to improve the content
funder	<--section,>	party providing monetary support for the resource

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
mediator	<<section,>>	a class of entity that mediates access to the resource and for whom the resource is intended or useful
originator	<<section,>>	party who created the resource
owner	<<section,>>	party that owns the resource
pointOfContact	<<section,>>	party who can be contacted for acquiring knowledge about or acquisition of the resource
principal Investigator	<<section,>>	key party responsible for gathering information and conducting research
processor	<<section,>>	party who has processed the data in a manner such that the resource has been modified
publisher	<<section,>>	party who published the resource
resourceProvider	<<section,>>	party that supplies the resource
rightsHolder	<<section,>>	party owning or managing rights over the resource
sponsor	<<section,>>	party who speaks for the resource
stakeholder	<<section,>>	party who has an interest in the resource or the use of the resource
user	<<section,>>	party who uses the resource

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 19

CI\_Series

Definition:	information about the series, or aggregate resource, to which a resource belongs
Subclass Of:	<<section,>>
Stereotype:	«DataType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
-----------	-------------------------------	------------

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
issue Identification	CharacterString [0..1]	information identifying the issue of the series
name	CharacterString [0..1]	name of the series, or aggregate resource, of which the resource is a part
page	CharacterString [0..1]	details on which pages of the publication the article was published

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 20

#### CI\_Telephone

Definition:	telephone numbers for contacting the responsible individual or organisation
Subclass Of:	<--section,>
Stereotype:	«DataType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
number	CharacterString	telephone number by which individuals can contact responsible organisation or individual
numberType	CI_TelephoneTypeCode [0..1]	type of telephone responsible organisation or individual

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 21

#### CI\_TelephoneTypeCode

Definition:	type of telephone
-------------	-------------------

Subclass Of: <<section,>>

Stereotype: «CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
facsimile	<<section,>>	telephone provides facsimile service
sms	<<section,>>	telephone provides sms service
voice	<<section,>>	telephone provides voice service

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

#### 6.4.1.1. Constraint information

Table 22

MD\_ClassificationCode

Definition: name of the handling restrictions on the resource

Subclass Of: <<section,>>

Stereotype: «CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
confidential	<<undefined>>	available for someone who can be entrusted with information
forOfficial UseOnly	<<undefined>>	unclassified information that may be exempt from mandatory release to the public

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
limited Distribution	<<section,>>	desimination limited by designating body
protected	<<section,>>	compromise of the information could cause damage
restricted	<<undefined>	not for general disclosure
secret	<<undefined>	kept or meant to be kept private, unknown, or hidden from all but a select group of people
sensitive ButUnclassified	<<undefined>	although unclassified, requires strict controls over its distribution
topSecret	<<undefined>	of the highest secrecy
unclassified	<<undefined>	available for general disclosure

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 23

**MD\_Constraints**

Definition:	restrictions on the access and use of a resource or metadata
Subclass Of:	<<section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
MD_Identification []		
MD_Metadata []		
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
constraint ApplicationScope	MD_Scope [0..1]	Spatial and temporal extent of the application of the constraint restrictions
graphic	MD_BrowseGraphic [0..*]	graphic /symbol indicating the constraint

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
reference	CI_Citation [0..*]	citation/URL for the limitation or constraint, eg. copyright statement, license agreement, etc
releasability	MD_Releasability [0..1]	information concerning the parties to whom the resource can or cannot be released
responsibleParty	CI_Responsibility [0..*]	party responsible for the resource constraints
useLimitation	CharacterString [0..*]	limitation affecting the fitness for use of the resource or metadata. Example, "not to be used for navigation"

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 24

#### MD\_LegalConstraints

Definition:	restrictions and legal prerequisites for accessing and using the resource or metadata
Subclass Of:	<--section,>
Stereotype:	
Constraint:	otherConstraints: only documented if accessConstraints or useConstraints = "other Restrictions" (Invariant);
Constraint:	If MD_LegalConstraints used then count of (accessConstraints + useConstraints + other Constraints + useLimitation + releasability ) > 0 (Invariant);

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
accessConstraints	MD_RestrictionCode [0..*]	access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource or metadata
otherConstraints	CharacterString [0..*]	other restrictions and legal prerequisites for accessing and using the resource or metadata
useConstraints	MD_RestrictionCode [0..*]	constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations or warnings on using the resource or metadata

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 25

**MD\_Releasability**

Definition:	information about resource release constraints
Subclass Of:	<--section,>
Stereotype:	
Constraint:	count (addressee + statement) > 0 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
addressee	CI_Responsibility [0..*]	party to which the release statement applies
dissemination Constraints	MD_RestrictionCode [0..*]	component in determining releasability
statement	CharacterString [0..1]	release statement

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 26

**MD\_RestrictionCode**

Definition:	limitation(s) placed upon the access or use of the data
Subclass Of:	<--section,>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
confidential	<<undefined>	not available to the public contains information that could be prejudicial to a commercial, industrial, or national interest
copyright	<<undefined>	exclusive right to the publication, production, or sale of the rights to a literary, dramatic, musical, or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor
in-confidence	<<section,>>	with trust
intellectual PropertyRights	<<undefined>	rights to financial benefit from and control of distribution of non-tangible property that is a result of creativity
licence	<<undefined>	formal permission to do something
licence Distributor	<<undefined>	formal permission required for a person or an entity to commercialize or distribute the resource
licenceEndUser	<<undefined>	formal permission required for a person or an entity to use the resource and that may differ from the person that orders or purchases it
licence Unrestricted	<<undefined>	formal permission not required to use the resource
otherRestrictions	<<undefined>	limitation not listed
patent	<<undefined>	government has granted exclusive right to make, sell, use or license an invention or discovery
patentPending	<<undefined>	produced or sold information awaiting a patent
private	<<section,>>	protects rights of individual or organisations from observation, intrusion, or attention of others
restricted	<<undefined>	withheld from general circulation or disclosure
sensitive ButUnclassified	<<section,>>	although unclassified, requires strict controls over its distribution.
statutory	<<undefined>	prescribed by law
trademark	<<undefined>	a name, symbol, or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer
unrestricted	<<section,>>	no constraints exist

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 27

MD\_SecurityConstraints

Definition:	handling restrictions imposed on the resource or metadata for national security or similar security concerns	
Subclass Of:	<--section,>	
Stereotype:		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
classification	MD_ClassificationCode	name of the handling restrictions on the resource or metadata
classification System	CharacterString [0..1]	name of the classification system
handling Description	CharacterString [0..1]	additional information about the restrictions on handling the resource or metadata
userNote	CharacterString [0..1]	explanation of the application of the legal constraints or other restrictions and legal prerequisites for obtaining and using the resource or metadata

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

#### 6.4.2. Identification information

Table 28

DS\_AssociationTypeCode

Definition:	justification for the correlation of two resources
Subclass Of:	<--section,>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
collectiveTitle	<<section,>>	common title with holdings note NOTE: title identifies elements of a series collectively, combined with information about what volumes are available at the source cited
crossReference	<<section,>>	reference from one resource to another
dependency	<<section,>>	associate through a dependency
isComposedOf	<<section,>>	reference to resources that are parts of this data set
largerWork Citation	<<section,>>	reference to a master resource of which this one is a part
partOfSeamless Database	<<section,>>	part of same structured set of data held in a computer
revisionOf	<<section,>>	resource is a revision of associated resource
series	<<section,>>	associated through a common heritage such as produced to a common product specification
stereoMate	<<section,>>	part of a set of imagery that when used together, provides three-dimensional images

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 29

DS\_InitiativeTypeCode

Definition:	type of aggregation activity in which resources are related
Subclass Of:	<<section,>>
StereoType:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
campaign	<<undefined>	series of organized planned actions
collection	<<undefined>	accumulation of resources assembled for a specific purpose
exercise	<<undefined>	specific performance of a function or group of functions
experiment	<<undefined>	process designed to find if something is effective or valid
investigation	<<undefined>	search or systematic inquiry
mission	<<undefined>	specific operation of a data collection system
operation	<<undefined>	action that is part of a series of actions
platform	<<undefined>	vehicle or other support base that holds a sensor
process	<<undefined>	method of doing something involving a number of steps
program	<<undefined>	specific planned activity
project	<<undefined>	organized undertaking, research, or development
sensor	<<undefined>	device or piece of equipment which detects or records
study	<<undefined>	examination or investigation
task	<<undefined>	piece of work
trial	<<undefined>	process of testing to discover or demonstrate something

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 30

**MD\_AssociatedResource**

Definition:	associated resource information
Subclass Of:	<--section,>

Stereotype:

Constraint: count of (name + metadataReference) > 0 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
associationType	DS_AssociationType Code	type of relation between the resources
initiativeType	DS_InitiativeTypeCode [0..1]	type of initiative under which the associated resource was produced
metadata Reference	CI_Citation [0..1]	reference to the metadata of the associated resource
name	CI_Citation [0..1]	citation information about the associated resource

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 31

#### MD\_DataIdentification

Definition: information required to identify a resource

Subclass Of: <--section,>

Stereotype:

Constraint: defaultLocale documented if resource includes textual information (Invariant):

Constraint: defaultLocale.PT\_Locale.characterEncoding default value is UTF-8 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
defaultLocale	PT_Locale [0..1]	language and character set used within the resource

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
environmentDescription	CharacterString [0..1]	description of the resource in the producer's processing environment, including items such as the software, the computer operating system, file name, and the dataset size
otherLocale	PT_Locale [0..*]	alternate localised language(s) and character set (s) used within the resource
supplementalInformation	CharacterString [0..1]	any other descriptive information about the resource

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 32

#### MD\_Identification

Definition:	basic information required to uniquely identify a resource or resources
Subclass Of:	<--section,>
Stereotype:	«abstract»
Constraint:	(MD_Metadata.metadataScope.MD_MetadataScope.resourceScope) = 'dataset' implies count(extent.geographicElement.EX_GeographicBoundingBox + extent.geographicElement.EX_GeographicDescription) >= 1 (Invariant):
Constraint:	(MD_Metadata.metadataScope.MD_Scope.resourceScope) = ('dataset' or 'series') implies topicCategory is mandatory (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
resourceMaintenance	MD_MaintenanceInformation [0..*]	information about the frequency of resource updates, and the scope of those updates
associatedResource	MD_AssociatedResource [0..*]	associated resource information
resourceSpecificUsage	MD_Usage [0..*]	basic information about specific application(s) for which the resource(s) has/have been or is being used by different users
	MD_Metadata []	

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
abstract	CharacterString	brief narrative summary of the content of the resource(s)
additional Documentation	CI_Citation [0..*]	other documentation associated with the resource EXAMPLE Related articles, publications, user guides, data dictionaries.
citation	CI_Citation	citation for the resource(s)
credit	CharacterString [0..*]	recognition of those who contributed to the resource(s)
extent	EX_Extent [0..*]	spatial and temporal extent of the resource
pointOfContact	CI_Responsibility [0..*]	identification of, and means of communication with, person(s) and organisation(s) associated with the resource(s)
processingLevel	MD_Identifier [0..1]	code that identifies the level of processing in the producers coding system of a resource eg. NOAA level 1B
purpose	CharacterString [0..1]	summary of the intentions with which the resource(s) was developed
spatial Representation Type	MD_Spatial RepresentationType Code [0..*]	method used to spatially represent geographic information
spatialResolution	MD_Resolution [0..*]	factor which provides a general understanding of the density of spatial data in the resource or describes the range of resolutions in which a digital resource may be used NOTE: this element should be repeated when describing upper and lower range
status	MD_ProgressCode [0..*]	status of the resource(s)
temporal Resolution	TM_Duration [0..*]	smallest resolvable temporal period in a resource
topicCategory	MD_TopicCategory Code [0..*]	main theme(s) of the resource

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 33

#### MD\_KeywordClass

Definition:	specification of a class to categorize keywords in a domain-specific vocabulary that has a binding to a formal ontology
Subclass Of:	<--section,>

Stereotype:

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
	MD_Keywords []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
className	CharacterString	character string to label the keyword category in natural language
conceptIdentifier	URI [0..1]	URI of concept in ontology specified by the ontology attribute; this concept is labeled by the className: CharacterString.
ontology	CI_Citation	a reference that binds the keyword class to a formal conceptualization of a knowledge domain for use in semantic processing NOTE: Keywords in the associated MD_Keywords keyword list must be within the scope of this ontology

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 34

#### MD\_Keywords

Definition:	keywords, their type and reference source NOTE: When the resource described is a service, one instance of MD_Keyword shall refer to the service taxonomy defined in ISO 19119, 8.3)
Subclass Of:	<--section,>
Stereotype:	
Constraint:	When the resource described is a service, one instance of MD_Keyword shall refer to the service taxonomy defined in ISO 19119 (Invariant):

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
	MD_Identification []	

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
keyword	CharacterString [1..*]	commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject
thesaurusName	CI_Citation [0..1]	name of the formally registered thesaurus or a similar authoritative source of keywords
type	MD_KeywordType Code [0..1]	subject matter used to group similar keywords

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 35

**MD\_KeywordTypeCode**

Definition:	methods used to group similar keywords
Subclass Of:	<<section,>>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
dataCentre	<<undefined>>	keyword identifies a repository or archive that manages and distributes data
discipline	<<undefined>>	keyword identifies a branch of instruction or specialized learning
featureType	<<undefined>>	keyword identifies a resource containing or about a collection of feature instances with common characteristics
instrument	<<undefined>>	keyword identifies a device used to measure or compare physical properties
place	<<undefined>>	keyword identifies a location
platform	<<undefined>>	keyword identifies a structure upon which an instrument is mounted
process	<<undefined>>	keyword identifies a series of actions or natural occurrences

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
product	<<undefined>	keyword identifies a type of product
project	<<undefined>	keyword identifies an endeavour undertaken to create or modify a product or service
service	<<undefined>	keyword identifies an activity carried out by one party for the benefit of another
stratum	<<undefined>	keyword identifies the layer(s) of any deposited substance or levels within an ordered system
subTopic Category	<<undefined>	refinement of a topic category for the purpose of geographic data classification
taxon	<<section,>>	keyword identifies a taxonomy of the resource
temporal	<<undefined>	keyword identifies a time period related to the resource
theme	<<undefined>	keyword identifies a particular subject or topic

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 36

**MD\_ProgressCode**

Definition:	status of the resource
Subclass Of:	<<section,>>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
accepted	<<section,>>	agreed to by sponsor
completed	<<undefined>	has been completed
deprecated	<<section,>>	resource superseded and will become obsolete, use only for historical purposes

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
final	<<undefined>	progress concluded and no changes will be accepted
historicalArchive	<<undefined>	stored in an offline storage facility
notAccepted	<<undefined>	rejected by sponsor
obsolete	<<undefined>	no longer relevant
onGoing	<<undefined>	continually being updated
pending	<<undefined>	committed to, but not yet addressed
planned	<<undefined>	fixed date has been established upon or by which the resource will be created or updated
proposed	<<undefined>	suggested that development needs to be undertaken
required	<<undefined>	needs to be generated or updated
retired	<<undefined>	item is no longer recommended for use. It has not been superseded by another item
superseded	<<undefined>	replaced by new
tentative	<<undefined>	provisional changes likely before resource becomes final or complete
under Development	<<undefined>	currently in the process of being created
valid	<<undefined>	acceptable under specific conditions
withdrawn	<<undefined>	removed from consideration

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 37

#### MD\_RepresentativeFraction

Definition:	derived from ISO 19103 Scale where MD_RepresentativeFraction.denominator = 1 / Scale.measure And Scale.targetUnits = Scale.sourceUnits
Subclass Of:	<--section,>

Stereotype: «DataType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
denominator	Integer	the number below the line in a vulgar fraction

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 38

#### MD\_Resolution

Definition: level of detail expressed as a scale factor, a distance or an angle

Subclass Of: <--section,>

Stereotype: «Union»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
angularDistance	Angle	Angular sampling measure
distance	Distance	horizontal ground sample distance
equivalentScale	MD_RepresentativeFraction	level of detail expressed as the scale of a comparable hardcopy map or chart
levelOfDetail	CharacterString	brief textual description of the spatial resolution of the resource
vertical	Distance	Vertical sampling distance

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 39**

**MD\_SpatialRepresentationTypeCode**

MD_SpatialRepresentationTypeCode		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
grid	<<undefined>	grid data is used to represent geographic data
stereoModel	<<undefined>	three-dimensional view formed by the intersecting homologous rays of an overlapping pair of images
textTable	<<undefined>	textual or tabular data is used to represent geographic data
tin	<<undefined>	triangulated irregular network
vector	<<undefined>	vector data is used to represent geographic data
video	<<undefined>	scene from a video recording

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

**Table 40**

**MD\_Usage**

MD_Usage	
Definition:	brief description of ways in which the resource(s) is/are currently or has been used
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
additional Documentation	CI_Citation [0..*]	publications that describe usage of data
identifiedIssues	CI_Citation [0..1]	citation of a description of known issues associated with the resource along with proposed solutions if available
response	CharacterString [0..*]	response to the user-determined limitations E.G.. ‘this has been fixed in version x’
specificUsage	CharacterString	brief description of the resource and/or resource series usage
usageDateTime	TM_Primitive [0..*]	date and time of the first use or range of uses of the resource and/or resource series
userContactInfo	CI_Responsibility [0..*]	identification of and means of communicating with person(s) and organisation(s) using the resource(s)
userDetermined Limitations	CharacterString [0..1]	applications, determined by the user for which the resource and/or resource series is not suitable

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 41

MD\_TopicCategoryCode

Definition:	high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. NOTE 1 Can be used to group keywords as well. Listed examples are not exhaustive. NOTE 2: It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate.
Subclass Of:	<<section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
farming	<<section,>>	rearing of animals and/or cultivation of plants Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock
biota	<<section,>>	flora and/or fauna in natural environment Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat
boundaries	<<section,>>	legal land descriptions Examples: political and administrative boundaries
climatology	<<section,>>	
Meteorology	<<section,>>	
Atmosphere	<<section,>>	processes and phenomena of the atmosphere Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation
economy	<<section,>>	economic activities, conditions and employment Examples: production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas
elevation	<<section,>>	height above or below a vertical datum Examples: altitude, bathymetry, digital elevation models, slope, derived products
environment	<<section,>>	environmental resources, protection and conservation Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape
geoscientific Information	<<section,>>	information pertaining to earth sciences Examples: geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion
health	<<section,>>	health, health services, human ecology, and safety Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services
imageryBase	<<section,>>	base maps Examples: land cover, topographic maps, imagery, unclassified images, annotations
MapsEarthCover		
intelligence	<<section,>>	military bases, structures, activities Examples: barracks, training grounds, military transportation, information collection
Military		
inlandWaters	<<section,>>	inland water features, drainage systems and their characteristics Examples: rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrographic charts
location	<<section,>>	positional information and services Examples: addresses, geodetic networks, control points, postal zones and services, place names
oceans	<<section,>>	features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tidal waves, coastal information, reefs

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
planningCadastre	<-->	information used for appropriate actions for future use of the land Examples: land use maps, zoning maps, cadastral surveys, land ownership
society	<-->	characteristics of society and cultures Examples: settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information
structure	<-->	man-made construction Examples: buildings, museums, churches, factories, housing, monuments, shops, towers
transportation	<-->	means and aids for conveying persons and/or goods Examples: roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways
utilities Communication	<-->	energy, water and waste systems and communications infrastructure and services Examples: hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks
extraTerrestrial	<-->	region more than 100 km above the surface of the Earth
disaster	<-->	Information related to disasters Examples: site of the disaster, evacuation zone, disaster-prevention facility, disaster relief activities

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

### 6.4.3. Name types

Table 42

#### GenericName

Definition:	Generic Name is the abstract class for all names in a NameSpace. Each instance of a Generic Name is either a LocalName or a ScopedName. A LocalName references a local object directly accessible from the NameSpace. A ScopedName is a composite of a LocalName for locating another NameSpace and a GenericName valid in that NameSpace.
Subclass Of:	<-->
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
scope	NameSpace [1]	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 43

**LocalName**

Definition: A LocalName references a local object directly accessible from the NameSpace.

Subclass Of: <--section,>

Stereotype:

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 44

**MemberName**

Definition: A MemberName is a LocalName that references either an attribute slot in a record or record Type or an attribute, operation, or association role in an object instance or type description in some form of schema.

Subclass Of: <--section,>

Stereotype:

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
aName	CharacterString	The stored value "aName" is the returned value for the "aName()" operation.
attributeType	TypeName	The allowable type for this member.

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 45

#### NameSpace

Definition:	A Name Space is a domain in which "names" given by character strings (possibly under local constraints constraints enforced by the Name Space) can be mapped to objects via a get Object operation. Examples include objects which form a Name Space for their attributes, operations and associations, or Schemas that form Name Spaces for their included data types or classes. Not all methods for NameSpaces need to be made publicly accessible.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
acceptableClassList	TypeName	
isGlobal	Boolean	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 46

#### ScopedName

Definition:	ScopedName is a composite of a LocalName for locating another NameSpace and a Generic Name valid in that NameSpace. ScopedName contains a LocalName as head and a Generic Name, which might be a LocalName or a ScopedName, as tail.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 47

#### TypeName

Definition:	A TypeName is a LocalName that references either a recordType or object type in some form of schema. The stored value "aName" is the returned value for the "aName()" operation. This is the types name.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
aName	CharacterString	The stored value "aName" is the returned value for the "aName()" operation.

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

## 6.4.4. Primitive types

### 6.4.4.1. Date and Time

Table 48

Date

Definition:		
Subclass Of: <--section,>		
Stereotype:		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
century	CharacterString	
day	CharacterString	
month	CharacterString	
year	CharacterString	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 49

DateTime

Definition:
Subclass Of: <--section,>

Stereotype:

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 50

Time

Definition:		
Subclass Of: <--section,>		
Stereotype:		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
hour	CharacterString	
minute	CharacterString	
second	CharacterString	
timeZone	CharacterString	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

#### 6.4.4.2. Numerics

Table 51

Decimal

Definition:	The usually finite representation of a decimal number. It differs from the common binary Real implementation in that it can represent 1/10 (one-tenth) without error, while binary real representation can only represent powers of 1/2 (one-half) exactly. Since many currencies are decimal, these representations are preferred in dealing with such moneys. This is also true for mile markers, which are often given in decimals. Can be thought of as an integer part followed by a fractional part given in multiples of powers of 1/10 (tenths).
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 52

Integer

Definition:	An exact integer value, with no fractional part.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 53

**Number**

Definition:	The base type for all number data, giving the basic algebraic operations. Since all concrete types have finite representations, some part of this algebra for most types exhibit some inaccuracy. For example, Integers cannot divide very well, and reals and decimals cannot avoid certain types of inaccuracies that depend on their representation semantics.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 54

**Real**

Definition:	The common binary Real finite implementation using base 2. Since such reals can approximate any measure where absolute accuracy is not possible, this form of numeric is most often used for measures. In cases where absolute accuracy is needed, such as currencies, then a decimal representation may be preferred (assuming the currency is decimal, such as the US dollar, British pound, etc.). Where there are no subunits possible, Integer numbers may be preferred. Can be thought of as an integer part followed by a fractional part given in multiples of powers of 1/2 (halves).
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 55

**UnlimitedInteger**

Definition:	— Infinite if and only if value is not specified {[ isInfinte = True ] = [ value = Null ]} — value is either infinite or non-negative {value <> Null implies value >= 0}	
Subclass Of:	<--section,>	
Stereotype:		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
isInfinite	Boolean	
value	Integer [0..1]	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 56

**Vector**

Definition:	an ordered set of numbers called coordinates that represent a position in a coordinate system. The coordinates may be in a space of any number of dimensions, as for instance in an “nth degree” polynomial spline. Example (123, 514, 150)	
Subclass Of:	<--section,>	
Stereotype:		
ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
coordinates	Number [1..*]	list of numbers representing the vector
dimension	Integer	dimension in Euclidian space

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

#### 6.4.4.3. Text

Table 57

CharacterSetCode

Definition:	
Subclass Of:	<<section,>>
Stereotype:	«CodeList»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
ISO10646-1	<<undefined>	
ISO10646-2	<<undefined>	
ISO8859	<<undefined>	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 58

Character


Definition:	symbol from a standard character-set.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 59

#### CharacterString

Definition:	Characterstring is a family of datatypes which represent strings of symbols from standard character-sets. Semantics of CharacterString is in accordance with ISO/IEC 11404:2007 clause 10.1.5.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
	CharacterString []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
characterSet	CharacterSetCode	character set of the string
maxLength	Integer	maximum length of all instances of CharacterString
size	Integer	number of characters in the string
value	Character [0..*]	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

[[Sequence<Character>-section]]

Table 60

Sequence<Character>

Definition:
Subclass Of: <--section,>
Stereotype:

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

#### 6.4.4.4. Truth

Table 61

ContinuousTruth

Definition:	Any of the interpretations of truth as a continuous range of possible values, usually expressed as a measure.
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
-----------	-----------------------------	------------

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 62

DiscreteTruth

Definition:	
Subclass Of:	<--section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 63

Probability

Definition:	Continuous truth as a probability. The value (between 0.0 and 1.0) is a measure of belief (in the single occurrence case), or a measure of the distribution of occurrences (in the set case). The fine details of the semantics is the scope of probability and statistics, and the reader is directed towards his text of choice.
Subclass Of:	<--section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
value	Real	

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 64

Truth

Definition:	The root or truth classification trees. The only constant between the subclasses here is that 1.0 is TRUE, and 0.0 is FALSE. This makes Probability work nicely. Other algebraic tricks may be more appropriate to other version of “truth calculus”, but for consistency sake, this value mapping should always be available. For example, the following semantic mappings to simple Booleans always work: {truthValue() > 0} = possibly true {truthValue() = 0} = never true {truth Value() < 1} = possibly false {truthValue() = 1} = never false {truthValue() < 1}AND{truth Value() > 0} = uncertain
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 65

Boolean

Definition:	boolean is the mathematical datatype associated with two-valued logic
Subclass Of:	<--section,>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
	DiscreteTruth []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
true	<<section,>>	one of two possible values of Boolean denoting the primitive value of true
false	<<section,>>	one of two possible values of Boolean denoting the primitive value of false

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

Table 66

### Logical

Definition:	Handy for a weak sort of 3 valued logic, where truth or falsity is not attributable to all well-formed statements.
Subclass Of:	<<section,>>
Stereotype:	

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION
	DiscreteTruth []	
ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
TRUE	<<undefined>	
FALSE	<<undefined>	
MAYBE	<<undefined>	The interpretation of MAYBE is a point of semantic variation. One opinion would have it be interpreted as UNKNOWN, implying that certainty exist, but we just don't know what it is at the moment. This is not always appropriate. Even in such a black and white world, a logical when used as a static (class-wide) attribute, would be three valued: always true, always false, and sometimes. Thus, MAYBE can be interpreted as "maybe true, maybe not." In such cases a probability

ATTRIBUTE	VALUE TYPE AND MULTIPLICITY	DEFINITION
		<p>statement might be more appropriate, just not always available. Equivalent to STEP's and SQL's Unknown.</p>

Note: Unless otherwise specified, all attribute and role names have the stereotype «Property»

7

## MEDIA TYPES FOR ANY DATA ENCODING(S)

---

## MEDIA TYPES FOR ANY DATA ENCODING(S)

---

A section describing the MIME-types to be used is mandatory for any standard involving data encodings. If no suitable MIME type exists in <http://www.iana.org/assignments/media-types/index.html> then this section may be used to define a new MIME type for registration with IANA.

Unresolved directive in 21-049.adoc – include::21-049./sections/clause\_12\_security\_considerations.adoc[]

A

# ANNEX A (INFORMATIVE) REVISION HISTORY

---

# ANNEX A

## (INFORMATIVE)

## REVISION HISTORY

Table A.1

DATE	RELEASE	EDITOR	PRIMARY CLAUSES MODIFIED	DESCRIPTION
2021-06-17	0.0.1	Matthew Purss	all	initial version
2021-07-08	0.0.1	Matthew Purss	Clause 1	initial scope text inserted from original POI draft standard
2021-07-09	0.0.1	Matthew Purss	Clause 4	initial terms inserted from original POI draft standard (and reformatted to meet formal definition requirements)



# BIBLIOGRAPHY

---



## BIBLIOGRAPHY

---