OGC® DOCUMENT:

External identifier of this OGC® document:

OGC®
Making location count.

OGC POINTS OF INTEREST

STANDARD

APPROVED

Submission Date: XXX
Approval Date: XXX
Publication Date:

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Open Geospatial Consortium
Submission Date: <yyyy-mm-dd>
Approval Date: <yyyy-mm-dd>
Publication Date: <2022-07-24>
External identifier of this OGC® document: http://www.opengis.net/doc/IS/poi/1.0
Internal reference number of this OGC® document: 21-049
Version: 0.1
Category: OGC® Implementation Standard
Editor: Matthew Brian John Purss

Table 2

OGC Points of Interest

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Copyright notice

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Table 5

Document type:	OGC® Standard
Document subtype:	
Document stage:	Draft
Document language:	English

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i. Abstract

<Insert Abstract Text here>

ii. Keywords

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

ogcdoc, OGC document, poi, gazetteer, pointsofinterest, placesofinterest

iii. 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.

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iv. Security Considerations

No security considerations have been made for this Standard.

v. Submitting organizations

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

Organization name(s)

vi. Submitters

All questions regarding this submission should be directed to the editor or the submitters:

Table 6

Name	Affiliation

II SECURITY CONSIDERATIONS

No security considerations have been made for this document.

2

CONFORMANCE

2 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

1 SCOPE

This document describes a data model and XML[1] 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[1], JSON and RDF[2].

Here is an example of a simple POI serialized in XML[1]:

```
<?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"
```

[1] Are we going to bother with an XML Schema or move straight to JSON?

[2] 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[3]:

```
{
 "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"
  },
  {
```

[3]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

3 NORMATIVE REFERENCES

There are no normative references in this document.

The following normative documents contain provisions that, through reference in this text, constitute provisions of this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

4

TERMS AND DEFINITIONS

4 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:** ISO19112, Clause 3.1.3]

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

[**SOURCE:** ISO19107]

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:** ISO19133]

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:**]

Unresolved directive in 21-049.adoc — include::21-049/sections/clause_5_conventions.adoc[]

5

POI

5 POI

5.1. 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.

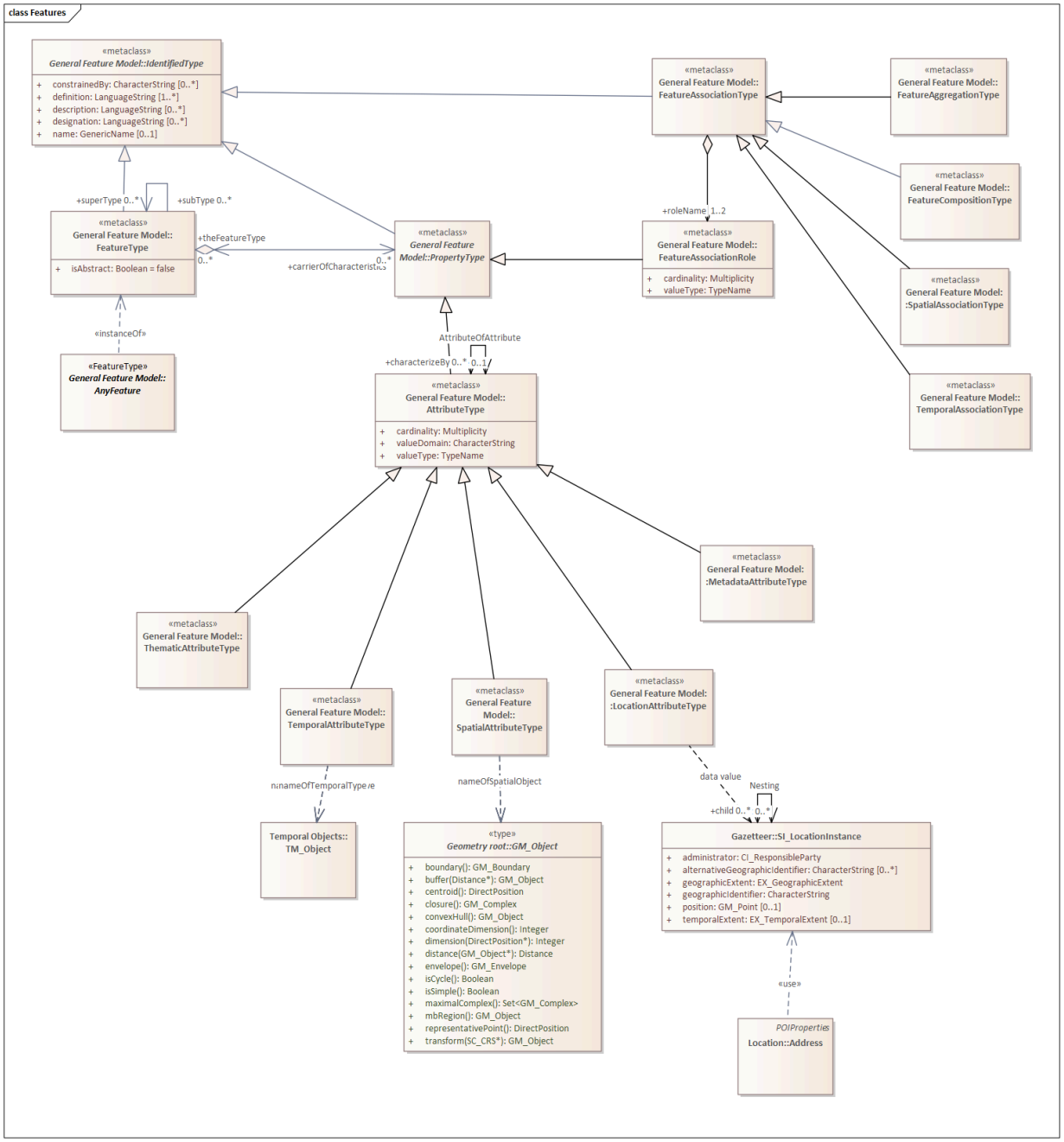

Figure 3 — Feature Model

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 instanciated 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.

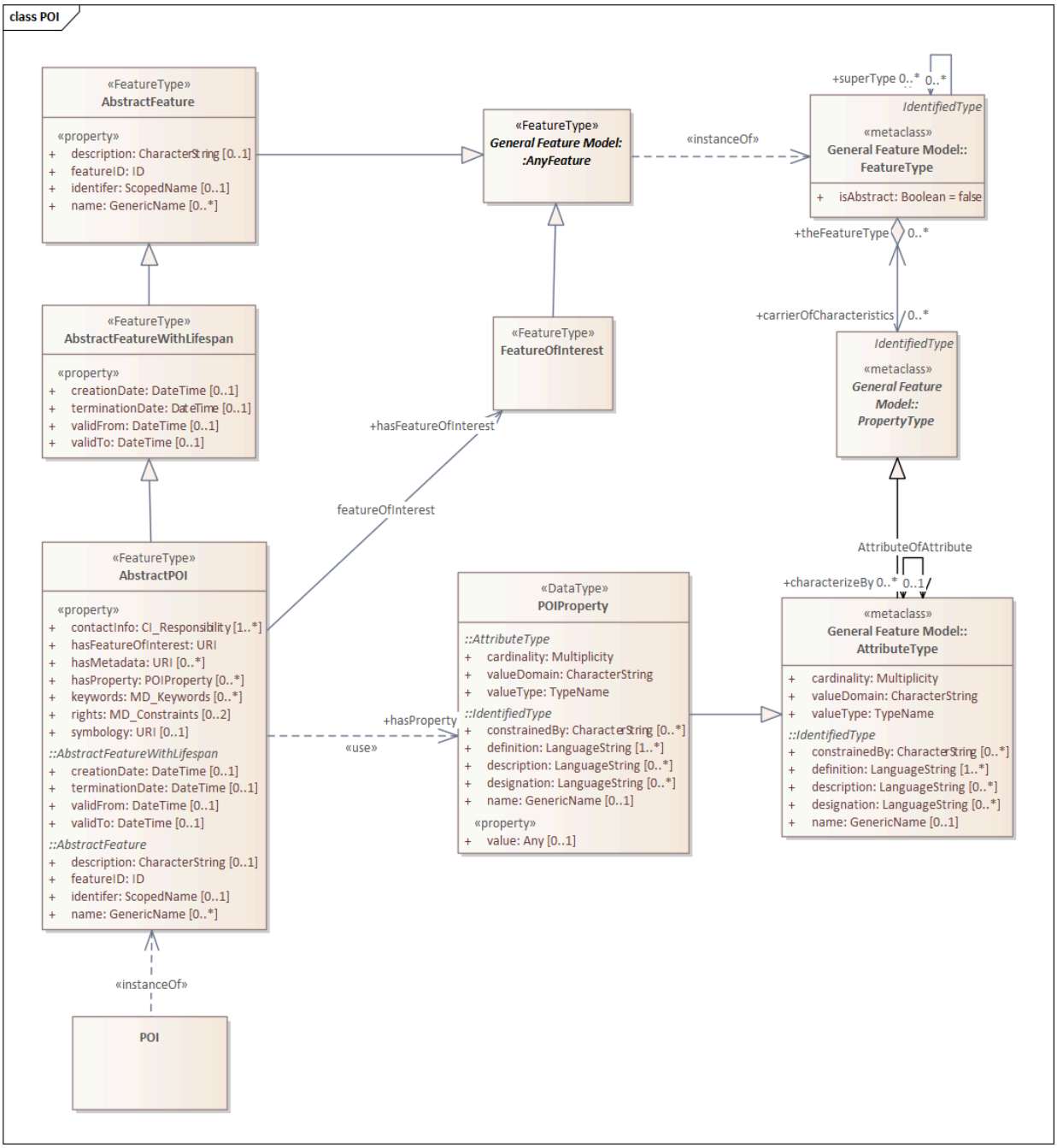

Figure 4 — POI UML Model

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 synopsys of this Feature.

5.2. 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.

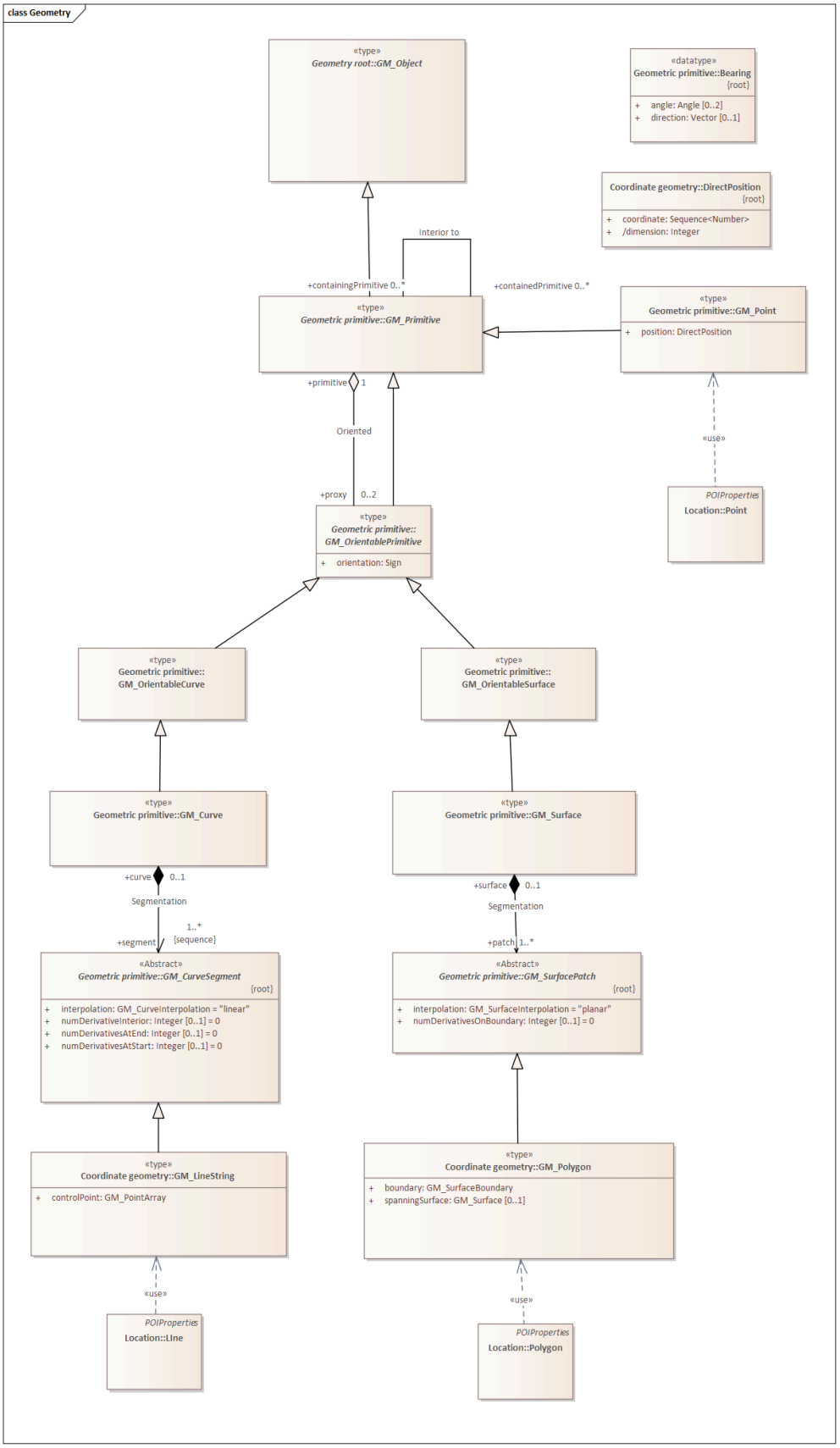

Figure 5 — Geometry Model

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.

5.3. 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 7

AbstractFeature

Definition:	AbstractFeature is the abstract superclass of all feature types within the PoI Model.
Subclass of:	<<section,>>
Stereotype:	«FeatureType»

ROLE NAME	TARGET CLASS AND MULTIPLICITY	DEFINITION

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.
identifer «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 8

AbstractFeatureWithLifespan

Definition:	AbstractFeatureWithLifespan is the base class for all PoI features. This class allows the optional specification of the real-world and database times for the existence of each feature.
Subclass of:	<<←section,>>
Stereotype:	«FeatureType»

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 9

AbstractPOI

Definition:	A POI is defined as having the following conceptual properties: · a globally unique ID · labels · descriptions · location · tags/keywords/categories · links to related information · time · authors · rights · metadata 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.
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 10

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 11

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

MEDIA TYPES FOR ANY DATA ENCODING(S)

6 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.

A

ANNEX A (INFORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)

A

ANNEX A (INFORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)

NOTE: Ensure that there is a conformance class for each requirements class and a test for each requirement (identified by requirement name and number)

A.1. Conformance Class A

A.1.1. Requirement 1

REQUIREMENT A.1	
/req/req-class-a/req-name-1	
Test purpose	Verify that…
Test method	Inspect…

A.1.2. Requirement 2

B

ANNEX B (INFORMATIVE) TITLE

B

ANNEX B (INFORMATIVE) TITLE

NOTE: Place other Annex material in sequential annexes beginning with “B” and leave final two annexes for the Revision History and Bibliography

C

ANNEX C (INFORMATIVE) REVISION HISTORY

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Table C.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)

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