OGC® DOCUMENT:

External identifier of this OGC® document:

OGC®
Making location count.

OGC POINTS OF INTEREST

STANDARD

APPROVED

Submission Date: XXX
Approval Date: XXX
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Table 2

OGC Points of Interest

Table 3

Copyright notice

Table 4

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Table 5

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<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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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

This standard defines XXXX.

Requirements for N standardization target types are considered:

- AAAA
- BBBB

Conformance with this standard shall be checked using all the relevant tests specified in Annex A (normative) of this document. The framework, concepts, and methodology for testing, and the criteria to be achieved to claim conformance are specified in the OGC Compliance Testing Policies and Procedures and the OGC Compliance Testing web site.

In order to conform to this OGC® interface standard, a software implementation shall choose to implement:

- Any one of the conformance levels specified in Annex A (normative).
- Any one of the Distributed Computing Platform profiles specified in Annexes TBD through TBD (normative).

All requirements-classes and conformance-classes described in this document are owned by the standard(s) identified.

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.

NOTE: Insert References here. If there are no references, leave this section empty.

References are to follow the Springer LNCS style, with the exception that optional information may be appended to references: DOIs are added after the date and web resource references may include an access date at the end of the reference in parentheses. See examples from Springer and OGC below.

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.

coordinate — sequence of n numbers designating the *position* of a *point* in n-dimensional space

[**SOURCE:** ISO19111]

coordinate set — individual parts of a coordinate

Example 1: coordinate pair of latitude and longitude values.

coordinate reference system — *coordinate system* that is related to an object by a *datum* (Definition List 5)

NOTE 1: Geodetic and vertical datums are referred to as reference frames.

NOTE 2: For geodetic and vertical *datums* (Definition List 5), the object will be the Earth. In planetary applications, geodetic and vertical reference frames may be applied to other celestial bodies.

[**SOURCE:** ISO19111, Clause 3.1.9]

coordinate system — set of mathematical rules for specifying how *coordinates* are to be assigned to *points*

[**SOURCE:** ISO19111, Clause 3.1.11]

datum

parameter or set of parameters that realize the *positions* of the origin, the scale, and the orientation of a *coordinate system* (Definition List 4)

[**SOURCE:** ISO19111, Clause 3.1.15]

geolocation — identification of the real world geographic *location* of an object

location particular *place* or *position*

NOTE 3: A *location* identifies a geographic *place*.

NOTE 4: *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 5: *Locations* can be a single point, a centroid, a minimum bounding rectangle, or a set of vectors.

NOTE 6: A *location* should be persistent over time and does not change.

NOTE 7: Multiple *POIs* may share the same *location*.

NOTE 8: When a *POI* physically moves it is understood to have acquired a new *location*.

[**SOURCE:** ISO19112, Clause 3.1.3]

place semantic description of a *location*

NOTE 9: A *place* is a human construct which typically has a coarse level of spatial granularity.

NOTE 10: A *place* is generally a larger scale administrative construct, either informally or formally defined.

NOTE 11: A *place* can be informally or colloquially defined, such as the Home Counties in the United Kingdom and the Bay Area in the United States.

NOTE 12: *Places* have spatial relationships; with parents, children, adjacencies and contained by semantics.

NOTE 13: *Places* have the same attribute set as *POIs*, although often with differing interpretations based on scale; for example, the address of a *Place* or its URI might refer to the address of the administrative or governing body of the *place*.

NOTE 14: A *place* typically contains multiple *POIs* and can also be coterminous with a *POI*. In the former case, a *place*, such as a city or a neighborhood, will contain multiple *POIs*. In the latter case, a *place* and a *POI* will occupy the same *position* and extent, such as in the case of Yellowstone National Park, which is both a *Place* and a *POI*.

Example 2: Countries, states, counties, districts, neighborhoods and postal codes or telephone area codes are all places.

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

[**SOURCE:** ISO19107]

point of interest

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

NOTE 15: A *POI* is typically identified by *name* rather than by an *address*.

NOTE 16: A *POI* is characterized by *type*, which may be used as a *reference point* or a target in a *location* based service request.

NOTE 17: A *POI* does not exclude the labeling, identification, and tracking of persons and other physical objects that have no permanent location.

Example 3: 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]

route — sequence of *links* and / or partial *links* that describe a *path*, usually between two *positions*, within a *network*

[**SOURCE:**]

5

CONVENTIONS

5 CONVENTIONS

This sections provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of XML schema, or special notes regarding how to read the document.

5.1. Identifiers

The normative provisions in this standard are denoted by the URI

`http://www.opengis.net/spec/{standard}/{m.n}`

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

6

POI CONCEPTUAL MODEL (INFORMATIVE)

6 POI CONCEPTUAL MODEL (INFORMATIVE)

6.1. Overview

This clause specifies the underlying POI conceptual model for which an encoding can be created. It defines the mandatory requirements for encoding and the necessary semantics of how that encoding should be interpreted.

6.2. Core Conceptual Model

The Point of Interest data model consists of a **POI** object and a **POIS** grouping object. Each POI has a number of properties described in the **POIProperties** object for capturing descriptive information, along with a **Location** object describing its location and a **Position** object describing its geometry and positional accuracy. In order to maximize the flexibility with which POI, POIs and their sub-entities can be described, each inherit its properties from a single common object. In practical terms, this allows properties such as update time, authorship, links and other categorizations to be described at multiple levels of granularity within the data model.

Figure 3

The classes of the core data model are described in more detail below.

6.3. POI

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.

6.4. Labels and Descriptions

Labels (place names) and descriptions are largely self-explanatory properties. A place may have multiple labels, as it may be known differently by different people, in different languages or in different times or contexts. Multiple descriptions are important for the same reasons.

6.5. Location

The most common way of expressing the location of a POI is as a point defined by latitude and longitude coordinates in decimal degrees. This specification enhances that basic definition, allowing a POI's location to be determined by either a point, line, polygon or civic address. A POI may also use more than one location definition property to more clearly specify multiple locational concepts, such as a building's address, boundary, centroid, and entrance. A POI is most useful when its location is well-known, but this is not always possible, so the model supports the ability to express location relative to other POIs. This feature may be used alone, or in addition to, an absolute location.

6.6. Categories

Tagging, or categorizing a POI is a common practice in wide use by personal navigation systems, government gazetteers such as the USGS Geographic Names Information System, and businesses like Yelp!. Therefore the POI specification supports structured categorization, where the identifying term comes from a dictionary — or registry of terms — and it also supports "free" tagging, where the identifying term is simply that — a word or phrase with no reference to a structured information model.

6.7. Links

Links to related information allow a POI reference content that may exist in external repositories, such as images, web pages, maps, reviews, 3D models, and even other POI data repositories.

6.8. Time

Time plays an important role as no place stays the same forever. A POI may have a start time and/or an end time. The POI data record (and also all its child properties) may also have start, end and last updated time stamps.

6.9. Authors and Rights

Identifying authors and licensing terms are important aspects of any information sharing system. These two are so important that they are separated from any more universal metadata definition system used by the following mechanism.

6.10. Metadata

Metadata and provenance is a such a broad, generic area of work that one approach could not work for all POIs. Therefore, if a POI contains metadata it must also define the metadata information model it uses.

6.11. Property Inheritance

In many cases, POI information is nested in a heirarchical system. Any property of a POI applies to all its child properties, unless that property is re-defined in the child. For example, if a POI has an author property of “A”, and the POI has a description property of “D”, the author of D is A, unless D has an author property itself. Then the author of D is whatever D defines it to be. One useful feature of inheritance is that if only one property of a POI has a different author, it is easy to express that fact precisely without adding a lot of duplicative author information to every property in the POI.

6.12. POIS

Multiple POIs may be grouped into a POIS object, which serves only as a container object such that a group of POIs can inherit properties — for example authorship, licensing or categorization. The POIS object is expected to be useful only as a dynamic aggregation mechanism when information is being shared between systems. It is not expected to be of any particular use as a way to permanently model POI information in a database.

Following sections provide additional detail on the properties described above.

7

POI

7 POI

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.

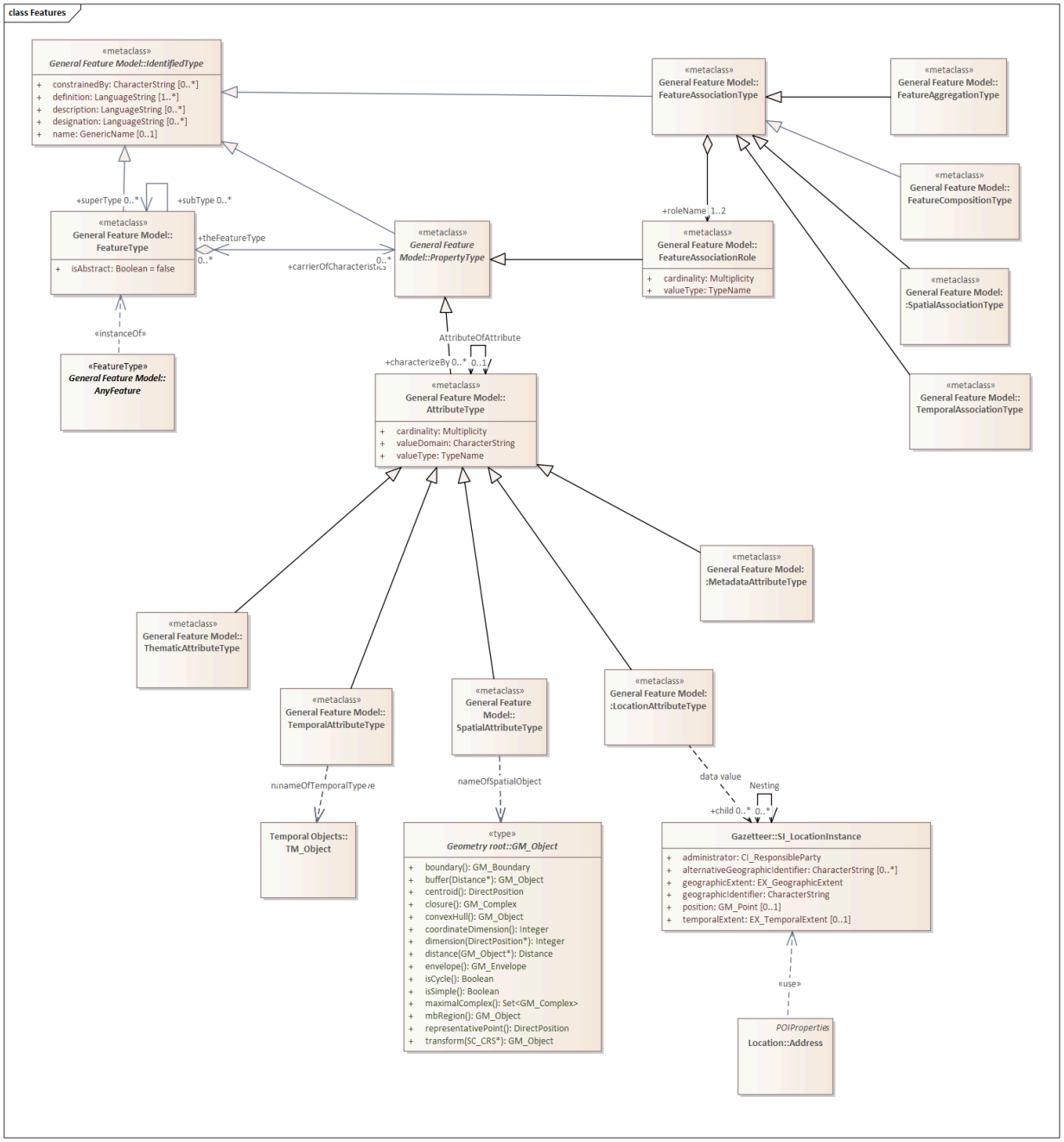

Figure 4 — Feature Model

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

FeatureType: describe

AnyFeature: describe

PropertyType: describe

AttributeType: describe

SpatialAttributeType: do we want to restrict GM_Object to just points, lines, and areas?

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

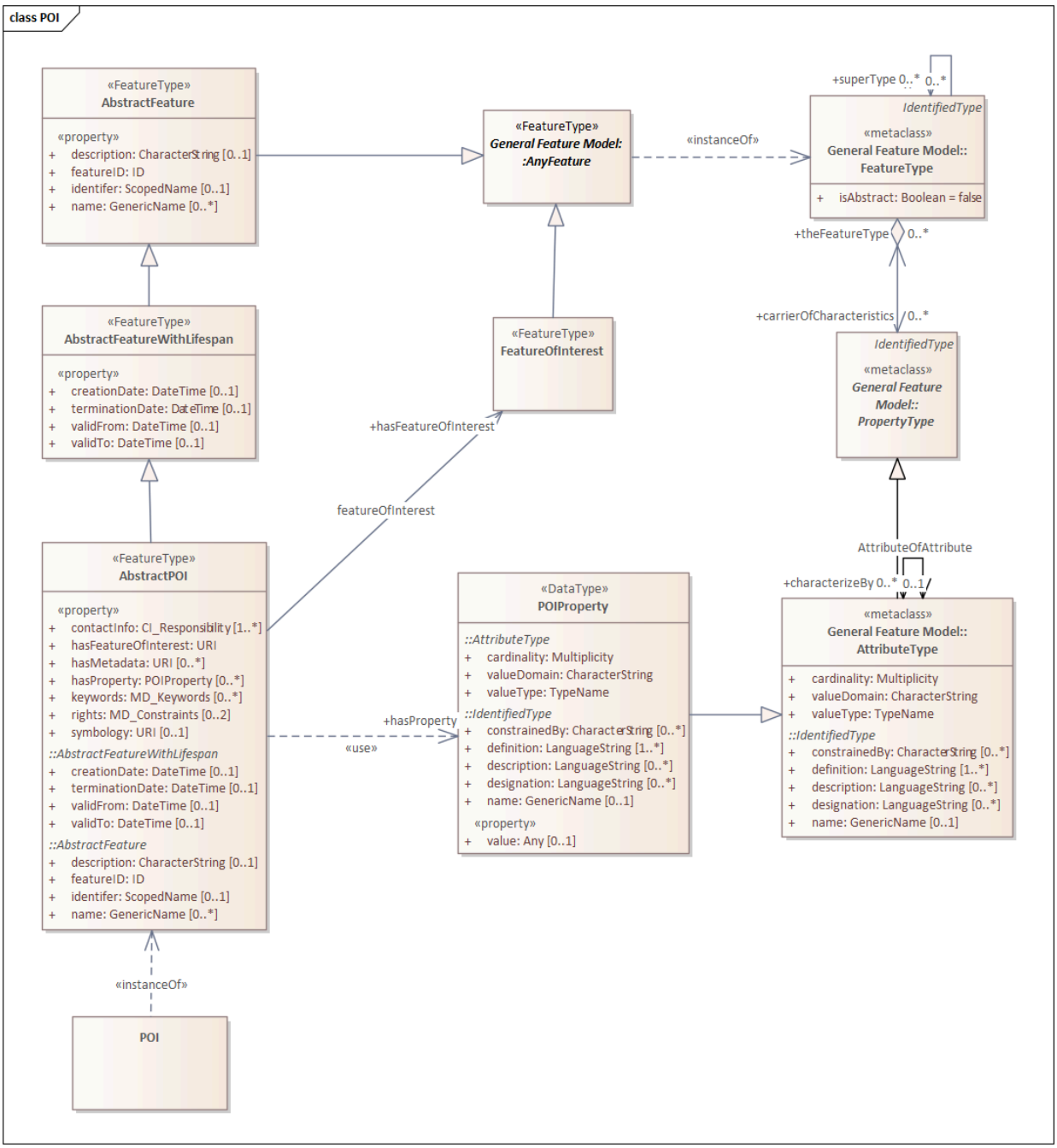

Figure 5 — POI UML Model

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.

POI: A POI instance. This class inherits everything from the AbstractPOI, identifies the associated FeatureOfInterest, then adds attributes from the Feature of Interest.

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 syopsys of this Feature.

FeatureModel: The data model for the FeatureOfInterest. This class identifies and describes all of the attributes of the FeatureOfInterest.

DataRecord: A collection of data entities, each identified by a field name. This class is being used as a summation of the FeatureModel of the Feature of Interest. It should be populated from the Feature of Interest properties. But the exact means of that population is out of scope for this standard.

AbstractDataComponent: The Abstract root class of all data components in the SWE Common data model. All entities in a DataRecord are descended from AbstractDataComponent. Of the attributes inherited, the definition attribute is of particular interest. This attribute associates a external Web-accessible Definition with each entity. This attribute should be made mandatory for a POI.

Definition: A Web-accessible definition for a property of the Feature of Interest as represented in the POI. This could be a simple text definition, an ontology, or any other semantic representation appropriate for the implementing technology. Definitions are derived from the FeatureModel for the Feature of Interest.

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.

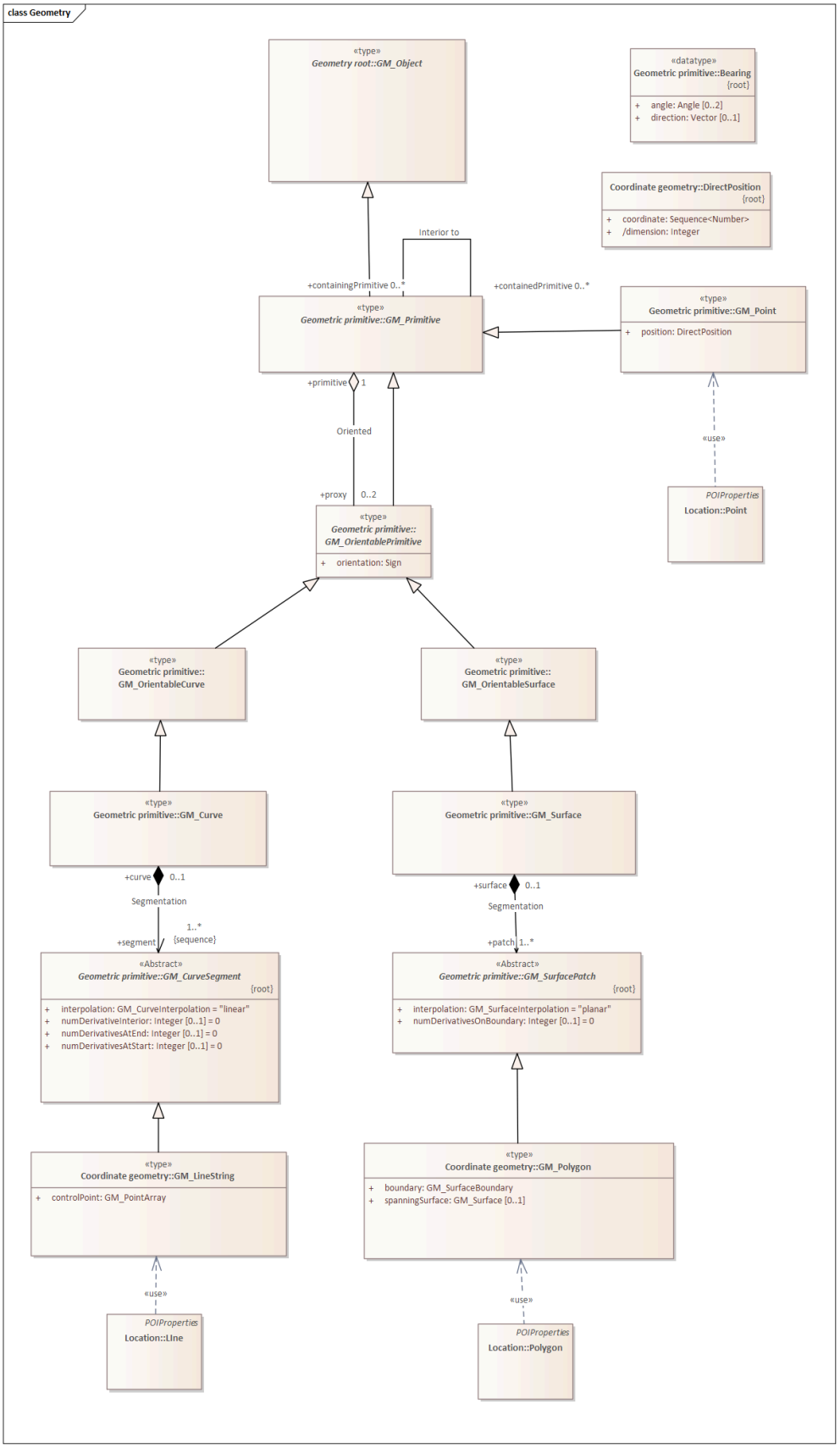

Figure 6 — Geometry Model

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.

8

MEDIA TYPES FOR ANY DATA ENCODING(S)

8 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

C

ANNEX C (INFORMATIVE) REVISION HISTORY

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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