1.0 Introduction

Suggest adding GML (Geography Markup Language) and GeoJSON to the following sentence: "To achieve these goals, this document describes a generic data model and one normative format. This format is based on XML and is likely insufficient to cover all POI use cases, therefore, it is expected that the data model will be mapped to other formats, such as JSON, RDF, or HTML."

2.0 Terminology

First, there are a number of terms that should be added to the Terminology section. This is because certain terms are used later in the document and either not defined or defined in later sections.

FYI, Point of Interest is defined in the OGC Open Location Services standard as:

A location (with a fixed position) where one can find a place, product or service, typically identified by name rather than by address and characterized by type, which may be used as a reference point or a target in a location based service request, e.g., as the destination of a route.

The definition for "Location" should be harmonized with ISO standards terms and definitions. Also, a specified coordinate reference system (WGS 84) should not be mentioned in a definition. The specification and handling of CRS should be later in the document. So, the definition of Location becomes:

Location: Identifiable geographic place [ISO 19112]. Typically a location is a physically fixed point, typically on the surface of the Earth, though locations can be relative to other, non-earth centric coordinate reference systems. Locations can be a single point, a centroid, a minimum bounding rectangle, or a set of vectors. A location should be persistent over time and does not change.

Other definitions that should be added:

Coordinate: one of a sequence of n numbers designating the position of a point in n-dimensional space [ISO 19111]

Coordinate Reference System: coordinate system that is related to an object by a datum [ISO 19111]

Coordinate System: set of mathematical rules for specifying how coordinates are to be assigned to points [ISO 19111]

Datum: parameter or set of parameters that define the position of the origin, the scale, and the orientation of a coordinate system [ISO 19111]

Carl Reed

Comment: As agreed to by ESRI, AutoDesk, Intergraph, Webraska, NAVTEK, deCarta, TeleAtlas, Oracle and others. Consistent with the ISO 19133 definition.

Carl Reed

Comment: I am not sure that this should be in the definition. Also, locations are never truly persistent. AS we saw in the case of the recent Japanese earthquake, the entire country shifted with a maximum shift of 8 feet on the northeast coasr. This screws up the entire geodetic system and hence many applications will need to be recalibrated.

Carl Reed

Comment: ISO 19111 is actually a joint document between the OGC and ISO. The contents were written by some of the top industry geodesy experts, including folks from the petroleum and defense industries.

Geolocation: The identification of the real world geographic location of an object.

Point: 0-dimensional geometric primitive, representing a position. [ISO 19107]

Position: data type that describes a point or geometry potentially occupied by an object or person. [ISO 19133]

Route: sequence of links and / or partial links that describe a path, usually between two positions, within a network [ISO 19133]

There may be more.

Section 6 provides great detail with examples for each of the operations.

3.0 Data Model

3.1 Georeference – While geo-reference is a valid term, geo-reference typically indicates that a geometry or an image has coordinate reference system metadata. The suggested term is geolocation as this term is used extensively in other standards work, including the work of the W3C.

3.1.1 Center

Perhaps this should be called "centroid". Centroid is a well known and well understood term in the geospatial (and spatial) industries. Further, Center has other uses in various other standards, such as in HTML 5 center refers to the center of a text string. This is the typical usage of the term "center" also in the cartography and mapping industries.

The definition of a centroid is on the http://www.w3.org/2010/POI/wiki/Terminology. Centroid works for any geometric figure in 2 or 3 dimensions.

This change does not change the intent of the clause.

BIG SIDEBAR

Instead of "System" we would recommend using "coordinate reference system" or "CRS for short. WGS 84 can still be the default.

WGS-84 – The spec needs to be clear about a proper reference for WGS-84 (i.e., the parameters). Most everyone now references EPSG 4326. There is an online EPSG registry. http://www.epsg-registry.org/. Some suggested wording is:

*Geographic locations in PoI are defined using **[WGS 84]** (World Geodetic System 1984), equivalent to EPSG (European Petroleum Survey Group) code 4326 (2 dimensions). PoI does not assign responsibilities for coordinate transformations from and to other Coordinate Reference Systems.*

Carl Reed
Comment: The current draft uses geo-reference. This is inconsistent with the work in the IETF, NENA, and other standards organizations (including W3C previous work!) as well as many location provisioning communities (such as determining a device location bases on IP latency). http://en.wikipedia.org/wiki/Geolocation has a good overview.

Carl Reed
Comment: The current draft define "point" in section 4.3.1. The definition should be removed from that section.

Lat/long: Somewhere in the document, you need to define what is meant by latitude and longitude. Further, if a coordinate reference system other than WGS 84 2d or 3d is used, then the coordinates most likely will not be expressed as lat/long. This is a minor point but something to consider.

Anyway, the following is a definition of latitude and longitude as used in a number of international standards (ISO, OGC, IETF, OMA, and OASIS are all very similar). All are based on ISO 6709. 6709 also addresses altitude. More on that below. The reason for providing a definition is to insure that ambiguity of encoding variance is minimized.

FYI, the W3C standard WebVideo uses 6709:2008. 6709:2008 includes XML encoding examples.

Altitude: Need a slight change:

*The altitude measure is in meters above mean sea level per the **[WGS- 84]** datum.*

3.1.3 Address

The "Address" element appears somewhat similar to what is specified in other international standards that are used to encode civic address information.

Both the IETF and OASIS have defined a civic address encoding/format. The IETF "civicLoc" definition was driven by requirements from the 911 and emergency response community. The OASIS CIQ/xAL format was driven by business requirements. The following information on address is based on the IETF work, which is specified as mandatory for the Next Generation 911 architecture and deployment. The IETF work has also been harmonized/extended to be consistent with a number of international addressing standards as well as the very recent US Address Data Model (FGDC).

The original IETF document is RFC 4119 "A Presence-based GEOPRIV Location Object Format". This document provides the original definition of a "location object". There are two forms: civic and geodetic. Geodetic is coordinates.

This document was significantly enhanced in RFC 5491 "GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations." (http://tools.ietf.org/html/rfc5491) and in RFC 5139, "Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO)"

And finally there is "Specifying Civic Address Extensions in PIDF-LO (draft-ietf-geopriv-local-civic-01)
http://tools.ietf.org/html/draft-ietf-geopriv-local-civic-01

All of the above is by way of background information. The following is what should be considered to prevent ambiguity and to be consistent with international standards best practice. FYI, the following codes are in an IANA registry (known as CAtypes)

Label	Description	Example
country	The country is identified by the two-letter ISO 3166 code.	US
A1	national subdivisions (state, region, province, prefecture)	New York
A2	county, parish, gun (JP), district (IN)	King's County
A3	city, township, shi (JP)	New York
A4	city division, borough, city district, ward, chou (JP)	Manhattan
A5	neighborhood, block	Morningside Heights
A6	street	Broadway
PRD	Leading street direction	N, W
POD	Trailing street suffix	SW
STS	Street suffix	Avenue, Platz, Street
HNO	House number, numeric part only.	123
HNS	House number suffix	A, 1/2
LMK	Landmark or vanity address	Low Library
LOC	Additional location information	Room 543
FLR	Floor	5
NAM	Name (residence, business or office occupant)	Joe's Barbershop

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|                      |                      |                      |
| PC                   | Postal code          | 10027-0401           |
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There are more in the other RFC's as the list was extended to meet additional requirements. I am not suggesting that all of these are needed but that the names and meanings should be the same across standards.

3.1.4 Route

I would suggest changing the definition to:

Route: A sequence of links and / or partial links that describe a path, usually between two positions, within a network [ISO 19133 and OGC Open Location Services Interface Standard).

3.1.5 Area

The definition provided in this clause suggests that we are actually talking about a polygon geometry. The OGC/ISO definition of polygon is:

Polygon: Planar surface defined by 1 exterior boundary and 0 or more interior boundaries.

This is the abstract definition, which should be up in the Terminology section. A more "implementation" oriented definition would be (paraphrased from GeoJSON):

A polygon is a closed LineString with 4 or more coordinate positions. The first and last positions are equivalent (they represent equivalent points).

GeoJSON uses geometry as defined in ISO 19107, which is the source for many of the definitions I have used in this document. ISO 19107 is also the abstract geometry model used in OGC Simple Features (see below) and the OGC Geography Markup Language.

3.1.8 Relative

This topic has cause years of discussion in both the OGC and the IETF WRT location services. The latest thinking with input from the OGC on this topic is captured in the draft internet standard "Relative Location Representation" (draft-ietf-geopriv-relative-location-01)

http://tools.ietf.org/html/draft-ietf-geopriv-relative-location-01

Again, this document probably has way more information than is required in the PoI spec but sure would be good to be consistent where possible.

Also, in the current document Distance From and Bearing to need to be well defined. An interesting issue is that bearing and distance are used different in land systems versus water body navigation!

3.3 Relationship Primitives

These section should perhaps simply reference the OGC/ISO Simple Features Interface standard, section 6.1.15 – Relational Operators.

Relational operators: The relational operators are Boolean methods that are used to test for the existence of a specified topological spatial relationship between two geometric objects as they would be represented on a map. [OGC Simple Features Interface standard and ISO 19125]. There are 9 operators that were originally defined by Max Egenhofer and well document:

EGENHOFER, M.J. AND HERRING, J. A mathematical framework for the definition of topological relationships. Proceedings of the Fourth International Symposium on Spatial Data Handling, Columbus, OH, pp. 803-813

These operators are defined and used consistently in the OGC Simple Features Interface Standard (which is implemented in just about all commercial and open source database products), SQL-MM, GeoSPARQL, WS-Search/CQL and other standards.

Based on the above operators the following methods are defined on Geometry:
Equals (anotherGeometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object is spatially equal to another Geometry.
Disjoint (another Geometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object is spatially disjoint from anotherGeometry.
Intersects (another Geometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object spatially intersects another Geometry.
Touches (another Geometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object spatially touches another Geometry.
Crosses (another Geometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object spatially crosses another Geometry.
Within (another Geometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object is spatially within another Geometry.
Contains (another rGeometry: Geometry): Integer — Returns 1 (TRUE) if this geometric object spatially contains another Geometry.
Overlaps (Another Geometry: Geometry) Integer — Returns 1 (TRUE) if this geometric object spatially overlaps another Geometry.
Relate (another Geometry: Geometry, intersectionPatternMatrix: String): Integer — Returns 1 (TRUE) if this geometric object is spatially related to another Geometry, by testing for intersections between the interior, boundary and exterior of the two geometric objects.

Section 6 of the OGC SF standard provides great detail with examples and diagrams for each of the operations.

3.9 Time Primitive

We would encourage the use of the ISO Time standard as the basis for expressing time in this spec. This is ISO 8601 and is the standard basis for every time element we are aware of in standards work. http://en.wikipedia.org/wiki/ISO_8601

4.3 Representing Coordinates

Please see all of our comment above.

4.3.1 Point

Please see comments above.

Etc.

As to examples, perhaps using GML also?