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GML Point Profile

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i. Preface

This document defines a profile of the Geography Markup Language (GML) for a point geometry. Attention is drawn to the fact that this is a profile of GML version 3.1.1.

ii. Document terms and definitions

This document uses the specification terms defined in Subclause 5.3 of [OGC 05-008]. In particular, the word "shall" (not "must") is the verb form used to indicate a requirement to be strictly followed to conform to this specification

iii. Document contributor contact points

All questions regarding this document should be directed to the editor or the contributors:

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iv. Revision history

Date	Release	Editor	Primary clauses modified	Description
4/1/05	.1	Percivall	NA	Very draft version of the profile
5/20/05	.2	Lake	Rework	Many changes to incorporate comments
6/22/05	.3	Reed	Put in template	Put in OGC Doc template
6/22/05	.3.1	Kyle, Whiteside	All	Schema name change to gmlPointProfile.xsd Formatting of code changed to Courier New 10 pt (normal in OGC documents)and other miscellaneous issues
7/6/05	.3.1	Reed	NA	Accept changes, fix some sentence structures, add some definitions

v. Changes to the OGC Abstract Specification

The OGC™ Abstract Specification does not require changes to accommodate the technical contents of this document.

vi. Future work

Improvements in this document are desirable. There will be a 30-day public comment period to solicit input and comments from the broader geospatial community.

Foreword

This document builds on an existing OGC Implementation Specification and does not replace any other OGC™ document. This document was defined and developed by the OGC membership. This document is a profile of GML version 3.1.1.

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

Introduction

This document defines a XML Schema for the location of a geographic point. This schema is a profile of the OGC Geography Markup Language (GML) using the point geometry. One purpose of this profile is to enable its use and reference in other specifications. In particular, this profile can be applied in other XML grammars which do not comply with the GML object-property-value model, and which do not define geographic features in a manner consistent with GML.

GML point profile

1 Scope

This profile includes gml:Point together with dependent elements and attributes from the gml namespace. In order to make the interpretation of the coordinate values of the point unambiguous, this profile requires the explicit identification of a Coordinate Reference System (CRS). This CRS is identified through the use of the "srsName" attribute. A default CRS is specified in this profile, however, any CRS reference may be used.

2 Conformance

Data using this profile shall produce an XML document compliant with gml:Point as defined in the schema:

http://dp.schemas.opengis.net/05-029r4/gml/3.1.1/profiles/point/0.4.0/gml311PointProfile.xsd

XML documents compliant with this profile shall import this gml point profile schema.

3 Normative references

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.

OGC 03-105r1, *OpenGIS Geography Markup Language (GML) Implementation Specification*, Version: 3.1.0,

OGC 04-092r4, *GML 3.1.1 schemas*

OGC 05-008, *OGC Web Services Common Specification*

OGC 05-010, URNs of definitions in ogc namespace, Recommendation Paper Version: 1.0

In addition to this document, this specification includes several normative XML Schema files. Following approval of this document, these schemas will be posted online at the URL: http://dp.schemas.opengis.net/05-029r4/gml/3.1.1/profiles/point/0.4.0/gml311PointProfile.xsd. These XML Schema files are also bundled with the present document. In the event of a discrepancy between the

bundled and online versions of the XML Schema files, the online files shall be considered authoritative.

4 Terms and definitions

For the purposes of this specification, the definitions specified in Clause 4 of the OWS Common Implementation Specification [OGC 05-008] shall apply. In addition, the following terms and definitions apply.

4.1
point
a point is defined by a single coordinate tuple, with the coordinate values being specified by the gml:pos property.

4.2
coordinate reference system

coordinate system that is related to the real world by a datum [ISO 19111]

4.3
coordinate system
set of mathematical rules for specifying how coordinates are to be assigned to points [ISO 19111]

4.4
geographic information
information concerning phenomena implicitly or explicitly associated with a location relative to the Earth [ISO 19101]

5 Conventions

The abbreviated terms used in this document include:

CRS Coordinate Reference System

GML Geography Markup Language

OGC Open Geospatial Consortium

6 Schema for gml:Point

A geometric point is defined in this GML profile by the following XML Schema fragment:

```
<element name="Point" type="gml:PointType"
substitutionGroup="gml:_GeometricPrimitive"/>
   <!-- ================================================ -->
   <complexType name="PointType">
      <annotation>
```



```
         <documentation>A Point is defined by a single coordinate
tuple.</documentation>
      </annotation>
      <complexContent>
         <extension base="gml:AbstractGeometricPrimitiveType">
            <sequence>
               <annotation>
                  <documentation>
GML v3.1 supports two different ways to specify the direct poisiton of
a point. 1. The "pos" element is of type DirectPositionType.. This
profile contains only the gml:pos property and is equivalent to a
restriction of gml:Point. </documentation>
               </annotation>
               <element ref="gml:pos"/>
            </sequence>
         </extension>
      </complexContent>
   </complexType>
```

NOTE This schema fragment is normative and excerpted from the full schema located at: http://dp.schemas.opengis.net/05-029r4/gml/3.1.1/profiles/point/0.4.0/gml311PointProfile.xsd

A Point is defined by a single coordinate tuple, with the coordinate values being specified by the gml:pos property. Data instances compliant with this profile shall use only the gml:pos property.

7 Schema for gml:pos

The gml:pos property in this profile is defined by the following schema fragment.

```
   <element name="pos" type="gml:DirectPositionType">

   <complexType name="DirectPositionType">
      <annotation>
         <documentation>
DirectPosition instances hold the coordinates for a position within
some coordinate reference system (CRS). Since DirectPositions, as data
types, will often be included in larger objects (such as geometry
elements) that have references to CRS, the "srsName" attribute will in
general be missing, if this particular DirectPosition is ncluded in a
larger element with such a reference to a CRS. In this case, the CRS is
implicitly assumed to take on the value of the containing object's CRS.

In this profile the gml:SRSReferenceGroup is omitted from the
gml:DirectPosition and this is equivalent to a restriction of
gml:DIrectPositionType in GML v3.1. In this profile the
SRSReferenceGroup is attached ONLY to the gml:Point.
</documentation>
      </annotation>
      <simpleContent>
         <extension base="gml:doubleList"/>
      </simpleContent>
   </complexType>

   <simpleType name="doubleList">
```

```
      <annotation>
         <documentation>
XML List based on XML Schema double type. An element of this type
contains a space-separated list of double values
         </documentation>
      </annotation>
      <list itemType="double"/>
   </simpleType>
```

NOTE This schema fragment is normative and excerpted from the full schema located at: http://dp.schemas.opengis.net/05-029r4/gml/3.1.1/profiles/point/0.4.0/gml311PointProfile.xsd

8 Requirements specific to this Point Profile

Use of gml:Point in this profile shall comply with GML 3.1. Any data instance compliant with this profile shall additionally comply with the following:

- gml:Point shall only use the gml:pos property to specify the Point's coordinate values.
- gml:Point shall include only srsName. The SRSNameGroup attributes cannot appear on the gml:pos property.

Any consumer of data instances compliant with this profile shall be able to interpret the following OGC URN.

urn:ogc:def:crs:EPSG:6.6:4326

This URN is to be interpreted as well known (i.e. not requiring resolution), however, the exact meaning can be obtained by looking up the EPSG Code 4326 in the Version 6.6 EPSG Coordinate Reference System Database

An informative description of this CRS is as follows:

- First coordinate is geographic latitude in degrees
- Second coordinate is geographic longitude in degrees
- Uses the WGS84 Datum (EPSG 6326)

Note that in GML, the values of coordinates are always XML Schema doubles and all angles are in decimal degrees.

For information on the GML types referenced above see these clauses of GML 3.1:

9.2.1.2 gml:PointType, gml:Point

9.1.3.1 gml:DirectPositionType, gml:pos

9.1.2.2 SRSReferenceGroup

7.3.4.1 gml:doubleList

NOTE The name “srsName” has been chosen deliberately. In the current version of GML “crsName” would be more appropriate, however, in future versions other types of spatial reference systems, i.e. those using geographic identifiers, may also be supported by GML.

Annex A
(informative)

Example use of point profile

```
<gml:Point srsName="urn:ogc:def:crs:EPSG:6.6:4326">
   <gml:pos>45.256 -110.45</gml:pos>
</gml:Point>
```

The typical size would be 90 bytes per point with no compression.

Annex B
(informative)

Use of this profile in non-GML documents

A primary objective of this profile is to allow non-GML documents to use the GML encoding for geometric points.

In many cases these non-GML documents will be defined by an XML Schema document. This XML Schema document shall import the GML Point Profile schema located at**:**

http://dp.schemas.opengis.net/05-029r4/gml/3.1.1/profiles/point/0.4.0/gml311PointProfile.xsd

A sample XML Schema follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.myphotos.org"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:my="http://www.myphotos.org"
xmlns:gml="http://www.opengis.net/gml"
elementFormDefault="qualified" attributeFormDefault="unqualified">

<xs:import namespace="http://www.opengis.net/gml"
schemaLocation="gmlPointProfile.xsd"/>
   <xs:element name="PhotoCollection">
      <xs:complexType>
         <xs:sequence>
            <xs:element name="items">
               <xs:complexType>
                  <xs:sequence>
                     <xs:element ref="my:Item" maxOccurs="unbounded" />
                  </xs:sequence>
               </xs:complexType>
            </xs:element>
         </xs:sequence>
      </xs:complexType>
   </xs:element>

   <xs:element name="Item">
      <xs:complexType>
         <xs:sequence>
            <xs:element name="name" type="xs:string"/>
            <xs:element name="description" type="xs:string"/>
            <xs:element name="where" type="xs:string"/>
            <xs:element name="position">
               <xs:complexType name="">
                  <xs:sequence>
                     <xs:element ref="gml:Point"/>
                  </xs:sequence>
               </xs:complexType>
```

```
            </xs:element>
         </xs:sequence>
      </xs:complexType>
   </xs:element>

</xs:schema>
```

Notice that this example could be realized without creating a new schema by using a GML feature collection with the feature members being GML observations.

A example XML instance document using the above schema is:

```
<?xml version="1.0" encoding="UTF-8"?>
<PhotoCollection xmlns="http://www.myphotos.org"
xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.myphotos.org
 MyPhotoExample.xsd">
   <items>
      <Item>
         <name>Stanley Park</name>
         <description>A rather bad shot of the park from the
city</description>
         <where>Vancouver</where>
         <position>
            <gml:Point srsDimension="2"
srsName="urn:ogc:def:crs:EPSG:6.6:4326">
               <gml:pos>49.27 -123.11</gml:pos>
            </gml:Point>
         </position>
      </Item>
      <Item>
         <name>Stanley Park</name>
         <description>A much better shot of the park from the
city</description>
         <where>Vancouver</where>
         <position>
            <gml:Point srsDimension="2"
srsName="urn:ogc:def:crs:EPSG:6.6:4326">
      <gml:pos>49.27 -123.11</gml:pos>
            </gml:Point>
         </position>
      </Item>
   </items>
</PhotoCollection>
```