Dynamic Feature Extensions to the Presence Information Data Format Location Object (PIDF-LO)
draft-singh-geopriv-pidf-lo-dynamic-05.txt

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Abstract

The Geopriv Location Object introduced by the Presence Information Data Format - Location Object (PIDF-LO), RFC 4119, defines a basic XML format for carrying geographical information of a presentity. The PIDF-LO specification made a subset of the functionality offered by the Geography Markup Language (GML) standard 3.0 mandatory to implement. This document defines child elements to the <location-info> element specified in RFC 4119 to carry temporal feature elements useful for tracking moving objects. Elements are defined that enable expression of speed, heading, acceleration and facing of the presentity.

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1. Introduction

The Presence Information Data Format - Location Object (PIDF-LO) (see RFC 4119 [RFC4119]) provides geographical location of a presentity. This corresponds to a physical location at a given instance of time. The PIDF-LO specification made a subset of the functionality offered by the Geography Markup Language (GML) standard 3.0 mandatory to implement. With the extensions defined in [I-D.ietf-geopriv-pdif-lo-profile] more guidelines to implementers are being provided with respect to a number of location shapes that have to be supported for usage within PIDF-LO.

The addition of rate of change information to the PIDF-LO enables a range of use cases. These use cases either directly use dynamic information, or use that information for smoother tracking of a position over time. For example, an application that continuously tracks a presentity could use velocity information to extrapolate positions in between times location information is measured. A shipping company could directly use speed to monitor trucks speed to ensure speed limits are observed.

2. Terminology

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in RFC 2119 [RFC2119].

3. Dynamic Elements

This document defines a new element, <Dynamic>, for the conveyance of dynamic information. Dynamic information MAY be included without any other location information being present. When dynamic information is associated with information about the instantaneous position of the presentity, the <Dynamic> element MUST be included in the same <location-info> element as the corresponding geodetic (or civic) location information. Dynamic information can be ignored if a recipient does not support this specification. The <Dynamic> element MUST include an "srsName" attribute that it set to "urn:ogc:def:crs:EPSG::4979". This document uses the application schema profile defined in [GeoShape] (reference the OGC shapes document) with the addition of "direction.xsd" (identified by the URN "urn:opengis:specification:gml:schema-xsd:direction:3.1.1").

The <Dynamic> element contains the following components:
speed:

Speed is the time rate of change in position of a presentity without regard for direction. The value for the <speed> element MUST be defined in meters per second and the 'uom' attribute MUST be set to "urn:ietf:params:ns:geopriv:dyanmic:uom#mps".

acceleration:

This element specifies the rate usually rapid at which something happens. The <acceleration> element also contains a 'uom' attribute that MUST be set to "urn:ietf:params:ns:geopriv:dyanmic:uom#mps2".

heading:

Heading is defined as the horizontal direction of one terrestrial point from another, expressed as the angular distance from a reference direction. It is usually measured from 000 degrees at the reference direction clockwise through 360 degrees.

orientation:

The <orientation> element describes the orientation of the presentity; the direction that the object is pointing.

The <heading> and <orientation> elements are of the type gml:DirectionPropertyType, which allows many variations. For use in this document, the <gml:DirectionVector> element MUST be used with the <gml:horizontalAngle> and <gml:verticalAngle> child elements. The <gml:horizontalAngle> element indicates an angle in degrees from Northing to Easting; <gml:verticalAngle> indicates an angle above the horizontal plane. Inclusion of a vertical angle is mandated by schema; setting the 'uom' attribute to "urn:ogc:def:uom:EPSG::9102" (unity) with a value of "0" indicates that the vertical angle is not known.

The <gml:horizontalAngle> and <gml:verticalAngle> elements MUST include a "uom" attribute set to "urn:ogc:def:uom:EPSG::9102".

4. XML Schema
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
   xmlns:gml="http://www.opengis.net/gml"
   xmlns:xs="http://www.w3.org/2001/XMLSchema"
   elementFormDefault="qualified"
   attributeFormDefault="unqualified">
   <xs:import namespace="http://www.opengis.net/gml"/>

   <xs:element name="Dynamic" type="dy:dyntype"
     substitutionGroup="gml:_Geometry"/>

   <xs:complexType name="dyntype">
     <xs:complexContent>
       <xs:extension base="gml:AbstractGeometryType">
         <xs:sequence>
           <xs:element name="orientation" minOccurs="0"
             type="gml:DirectionPropertyType"/>
           <xs:element name="speed" minOccurs="0"
             type="gml:MeasureType"/>
           <xs:element name="heading" minOccurs="0"
             type="gml:DirectionPropertyType"/>
           <xs:element name="acceleration" minOccurs="0"
             type="gml:MeasureType"/>
         </xs:sequence>
       </xs:extension>
     </xs:complexContent>
   </xs:complexType>
</xs:schema>

5. Example
Figure 1: Example of a dynamic extension

6. Security Considerations

This document defines additional location elements carried by PIDF-LO (see [RFC4119]). The security considerations of RFC 4119 [RFC4119] are applicable to this document.
7. IANA Considerations

This section registers a new XML namespace (as described in [RFC3688]) and a new XML schema.

7.1. Dynamic Feature Extensions Namespace Registration

Registrant Contact: IETF Geopriv Working Group, Hannes Tschofenig (hannes.tschofenig@nsn.com).

XML:

```xml
BEGIN
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN" "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="content-type" content="text/html;charset=iso-8859-1"/>
<title>Dynamic Feature Extensions Namespace</title>
</head>
<body>
<h1>Namespace for Dynamic Feature Extensions to PIDF-LO</h1>
<p>See <a href="[URL of published RFC]">RFCXXXX</a>.</p>
</body>
</html>
END
```

7.2. Dynamic Feature Extensions Schema Registration

Registrant Contact: IETF Geopriv Working Group, Hannes Tschofenig (hannes.tschofenig@nsn.com).

XML: The XML schema to be registered is contained in Section 4. Its first line is

```xml
<?xml version="1.0" encoding="UTF-8"?>
```

and its last line is

```xml
</xs:schema>
```
7.3. Units of Measure Registration

Placeholder for - urn:ietf:params:ns:geopriv:dynamic:uom#mps -
urn:ietf:params:ns:geopriv:dynamic:uom#mps2

8. Acknowledgements

We would like to thank Klaus Darilion, Cullen Jennings, Rohan Mahy,
Carl Reed, and Brian Rosen for their comments.

9. References

9.1. Normative References

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OpenGIS 03-105r1, available at:
http://portal.opengeospatial.org/files/?artifact_id=4700",
April 2004.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate

[RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688,

[RFC4119] Peterson, J., "A Presence-based GEOPRIV Location Object

[RFC4481] Schulzrinne, H., "Timed Presence Extensions to the
Presence Information Data Format (PIDF) to Indicate Status
Information for Past and Future Time Intervals", RFC 4481,
July 2006.

9.2. Informative References

[GeoShape] Thomson, M. and C. Reed, "GML 3.1.1 PIDF-LO Shape
Application Schema for use by the Internet Engineering
Task Force (IETF)", Candidate OpenGIS Implementation
Specification 06-142, Version: 0.0.9, December 2006.

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(work in progress), November 2008.
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