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Specifying Unsafe Areas in LoST Service Boundary
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Abstract

This document describes how to specify unsafe areas in LoST for emergency services, such as police, mountain, marine and fire.

Internet-Draft

LoST Unsafe Areas

July 2008

Table of Contents

| | | |
|----------------------|--|-------------------|
| 1. | Introduction | 3 |
| 2. | Terminology used in this document | 3 |
| 3. | LoST extensions | 3 |
| 3.1. | Request unsafe areas | 4 |
| 3.2. | Specifying unsafe areas in the response | 4 |
| 3.3. | Additional information about the <unsafeArea> | 6 |
| 4. | Security Considerations | 6 |
| 5. | IANA Considerations | 6 |
| 6. | References | 6 |
| 6.1. | Normative References | 6 |
| 6.2. | Informative References | 6 |
| | Authors' Addresses | 7 |
| | Intellectual Property and Copyright Statements | 8 |

1. Introduction

The Location-to-Service Translation Protocol (LoST) describes a protocol for mapping service identifiers and location information to URLs of the service instance. The region of a service instance can also be provided in one or more serviceBoundary elements.

According to the research of patterns of crime, the spatial differentiation of crimes occurred in the city is obvious. There are a few pretty dangerous areas with high crime rate in many big cities, which may be identified and published by police departments. For example monthly crime hot spots identified by phoenix police department [[Monthly Violent](#)].

This document helps to find out unsafe areas in the service region. These unsafe areas are the one where frequent crime (e.g. theft, robbery, pickpockets), accidents or some other incidents are happening. There may be more than one unsafe area in a service region, and of course, may be zero.

When the user enters in to an unsafe area where frequent pickpockets are happening, the user's device will prompt him the warning "many pick-pockets are in this area, especially at bus stops" and the seriousness of the problem. So that he can take necessary precautions to handle the given situation after entering in this area. To achieve this task, we add new elements named unsafeArea, note, and rank in the <findServiceResponse>. the unsafe area is requested by the client, using the 'unsafeArea' attribute in the <findService> request with the value set to "value" or "reference".

The LoST client's device can prompt a user when he enters in to an area which has or might have a natural disaster threats like flood, snowslide, landslip, wild fire etc, or when he drives in to an accident prone area. Sailing or swimming people can also find out the dangerous areas with submerged rocks or sharks.

[2.](#) Terminology used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

[3.](#) LoST extensions

The LoST client can ask the server to return unsafe areas. And we introduce a new attribute in LoST request `<findService>` named

Sun & George

Expires January 2, 2009

[Page 3]

Internet-Draft

LoST Unsafe Areas

July 2008

'unsafeArea' for this purpose.

We introduce new elements in LoST response `<findServiceResponse>` named, `<unsafeArea>`, `<note>` and `<rank>` to describe the unsafe areas and its information.

[3.1.](#) Request unsafe areas

The new attribute 'unsafeArea' in LoST request `<findService>` indicates the LoST client wants to get the unsafe areas information of the determined service instance.

```
<?xml version="1.0" encoding="UTF-8"?>
<findService
  xmlns="urn:ietf:params:xml:ns:lost1"
  xmlns:p2="http://www.opengis.net/gml"
  serviceBoundary="value"
  recursive="true"
  unsafeArea="value">

  <location id="6020688f1ce1896d" profile="geodetic-2d">
    <p2:Point id="point1" srsName="urn:ogc:def:crs:EPSG::4326">
      <p2:pos>37.775 -122.422</p2:pos>
    </p2:Point>
  </location>
  <service>urn:service:sos.police</service>
```

```
</findService>
```

Figure 1: A <findService> query

[3.2.](#) Specifying unsafe areas in the response

The new element <unsafeArea> is used to specify the dangerous areas in the service region. A <unsafeArea> element contains at least one <areaBoundary> element. An area boundary circumscribes the unsafe region. It has the similar semantics with serviceBoundary element.

And he gets the response with the <unsafeArea> details:

```
<?xml version="1.0" encoding="UTF-8"?>
<findServiceResponse xmlns="urn:ietf:params:xml:ns:lost1"
  xmlns:p2="http://www.opengis.net/gml">
```

```
<mapping
  expires="2007-01-01T01:44:33Z"
  lastUpdated="2006-11-01T01:00:00Z"
  source="authoritative.example"
  sourceId="7e3f40b098c711dbb6060800200c9a66">

  <displayName xml:lang="en">
    New York City Police Department
  </displayName>
  <service urn:service:sos.police</service>
  <serviceBoundary profile="geodetic-2d">
    <p2:Polygon srsName="urn:ogc:def::crs:EPSG::4326">
      <p2:exterior>
        <p2:LinearRing>
          <p2:pos>37.775 -122.4194</p2:pos>
          <p2:pos>37.555 -122.4194</p2:pos>
          <p2:pos>37.555 -122.4264</p2:pos>
          <p2:pos>37.775 -122.4264</p2:pos>
          <p2:pos>37.775 -122.4194</p2:pos>
        </p2:LinearRing>
      </p2:exterior>
    </p2:Polygon>
```

```

</serviceBoundary>
<uri>sip:nypd@example.com</uri>
<uri>xmpp:nypd@example.com</uri>
<serviceNumber>911</serviceNumber>
<unsafeArea>
  <areaBoundary profile="geodetic-2d">
    <p2:Circle srsName="urn:ogc:def:crs:EPSG::4326">
      <p2:pos>37.565 -122.4224</p2:pos>
      <p2:radius uom="urn:ogc:def:uom:EPSG::9001">
        250.12
      </p2:radius>
    </p2:Circle>
  </areaBoundary>
  <rank>5</rank>
  <note>robbery often happens in the night</note>
</unsafeArea>
</mapping>
<path>
  <via source="resolver.example"/>
  <via source="authoritative.example"/>
</path>
<locationUsed id="6020688f1ce1896d"/>
</findServiceResponse>

```

Figure 2: A <findServiceResponse>

[3.3.](#) Additional information about the <unsafeArea>

The new element <note> can be used to specify the additional information about the unsafe area. It could be some suggestion or warning text about this area. This <note> message in the response may be prompted when the LoST client enters in to the given unsafe area, together with the seriousness, i.e. the <rank> element. The value of the <rank> element is a number from 1 to 5, 5 means the most serious situation.

[4.](#) Security Considerations

TBD

[5.](#) IANA Considerations

TBD

[6.](#) References

[6.1.](#) Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

[6.2.](#) Informative References

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Winterbottom, J., Thomson, M., and H. Tschofenig, "GEOPRIV PIDF-LO Usage Clarification, Considerations and Recommendations", [draft-ietf-geopriv-pdif-lo-profile-11](#) (work in progress), February 2008.

[Monthly_Violent]

Police Headquarters, Phoenix,
"http://phoenix.gov/POLICE/ucr_monthly_violent.pdf".

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