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Geodetic-Civic Address Translation Protocol  
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Abstract

This document explains how to map a geodetic datum to a civic address

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and vice versa. Server accepts an HTTP POST with one form of user specified location addresses and return whatever other form it has.

[Open Issue : re-frame this draft as more about the inclusion of a <presence> element in a HELD request, rather than about geocoding specifically, since there are other applications. E.g., we might provide a rough location in our request to help the server provide us with GPS assistance data.]

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## 1. Introduction

The growth of location-based services and increased access to real time sensor feeds, the ability to access and exchange real-time, dynamic geolocation information becomes more important. This draft describes how to convert civic addresses as defined in [\[RFC5139\]](#) to geodetic coordinates and vice versa.

An example of a simple Civic Address is 'Washington, DC'. Using a Gazetteer service to geocode the address, a geodetic coordinate of (40.8N, 73.9W) might be returned. Conversely, entering (40.8N, 73.9W) into a reverse geocoding service might return 'Washington DC'.

It is sending PIDF-LO (civic) to the server and getting a geodetic address back. To use it, look up your location's co-ordinates, and then enter them in the request. The corresponding response will return the civic address of the requested coordinates. In the same way the geodetic address obtained, if civic address information has provided in the request.

The Geodetic-civic address translation SHOULD return standard errors and status codes. The possible errors conditions are listed in the [Section 5](#).

## 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. Coordinate System Translation

### 3.1. Reverse Geocoding: Geodetic-Civic Translation

This method performs the conversion of a latitude/longitude pair into human-readable addresses. A reverse geocoder service is a network-accessible service that transforms a given position (geodetic coordinate) into a normalized description of a feature location (Address with Point), where the address may be defined as a street address, intersection address, place name or postal code. A reverse geocoding service could be a service supported in a location server.

The client or server sends a request to the location server/reverse geocoding service containing the position expressed as geodetic coordinates. If the address was successfully located, it sent back to the requester. The response is a civic address for the given

geodetic address, and the response encoding (format) is described in RFC [\[RFC5139\]](#). In case of ambiguous addresses, only the point for the best match is passed in the response.

#### [3.1.1.](#) Reverse Geocoder Service Requirements

The following requirements must be supported by the Reverse Geocoder Service.

Given a Position ADT, must be able to return one or more locations (i.e., Address ADTs with associated Point geometries), and optionally, the ranges of these locations from the given position, as it is defined in the Position ADT.

The form of the returned address(es) must be based upon the user's preference, as stated in the request. The user should be able to specify a preference of StreetAddress, StreetIntersection, or PositionOfInterest (Place and/or PostalCode). If not specified, the service should default to StreetAddress.

Must be capable of returning all location information of a preferred type within an area of interest (AOI ADT - a Circle, Polygon or Box).

Must be able to indicate the number of matches in the response (possibly zero) for a given request.

#### [3.1.2.](#) Example

POST /location HTTP/1.1  
Host: lis.example.com:49152  
Content-Type: application/held+xml  
Content-Length: 1043

```
<?xml version="1.0"?>
<xs:schema targetNamespace="urn:ietf:params:
xml:ns:pidf:geopriv10:civicAddr"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:geoAddr"
xmlns:xml="http://www.w3.org/XML/1998/namespace" >
<xs:import namespace="http://www.w3.org/XML/1998/namespace"
  schemaLocation="http://www.w3.org/2001/xml.xsd"/>
<locationRequest xmlns="urn:ietf:params:xml:ns:geopriv:held">
<locationType exact="true">civic</locationType>
  <presence xmlns="urn:ietf:params:xml:ns:pidf"
    entity="pres:3650n87934c@ls.example.com">
    <tuple id="b650sf789nd">
      <status>
        <geopriv xmlns="urn:ietf:params:xml:ns:pidf:geopriv10">
          <location-info>
            <Point xmlns="http://www.opengis.net/gml"
```

```
        srsName="urn:ogc:def:crs:EPSG::4326">
        <pos>-34.407 150.88001</pos>
    </Point>
</location-info>
<usage-rules/>
</geopriv>
</status>
<timestamp>2006-01-10T03:42:28+00:00</timestamp>
</tuple>
</presence>
</locationRequest>
```

Requesting server to send the civic address of the latitude/longitude pair given in the request.

```
HTTP/1.1 200 OK
Server: Example LIS
Date: Tue, 10 Jan 2006 03:42:29 GMT
Expires: Tue, 10 Jan 2006 03:42:29 GMT
Cache-control: private
Content-Type: application/held+xml
Content-Length: 1062
```

```
<locationResponse xmlns="urn:ietf:params:xml:ns:geopriv:held">
  <presence xmlns="urn:ietf:params:xml:ns:pidf"
    entity="pres:3650n87934c@ls.example.com">
    <tuple id="b650sf789nd">
      <status>
        <geopriv xmlns="urn:ietf:params:xml:ns:pidf:geopriv10">
          <location-info>
```

```

    <ca:civicAddress
      xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
      xml:lang="en-au">
      <ca:country>AU</ca:country>
      <ca:A1>NSW</ca:A1>
      <ca:A3>Wollongong</ca:A3>
      <ca:A4>Gwynneville</ca:A4>
      <ca:STS>Northfield Avenue</ca:STS>
      <ca:LMK>University of Wollongong</ca:LMK>
      <ca:FLR>2</ca:FLR>
      <ca:NAM>Andrew Corporation</ca:NAM>
      <ca:PC>2500</ca:PC>
      <ca:BLD>39</ca:BLD>
      <ca:SEAT>WS-183</ca:SEAT>
      <ca:POBOX>U40</ca:POBOX>
    </ca:civicAddress>
  </location-info>
  <usage-rules/>
</geopriv>
</status>
<timestamp>2006-01-10T03:42:28+00:00</timestamp>
</tuple>
</presence>
</locationResponse>

```

The given response is the result for a civic address request, where the geodetic address is -34.407 150.88001.

The civic address includes the header fields that are defined in [\[RFC5139\]](#). We recommend that if a national or regional standard (and

schema) exists for encoding addresses, such as the US national address coding standard, that this schema be supported in the response. See also [draft-ietf-geopriv-civic-address-recommendations-03](#).

One thing that needs explanation is accuracy, which is a measure of how accurately the system is returning location information. It allows to specify whether it is 'exact', 'neighborhood' etc.

However, it is worth specifying how much deviation from the requested location in terms of meters. If client sends a request with geodetic address and there is no mapping found in the server, server could return civic address which is close by. Also specify how much deviation from the requested location in terms of meters.

### [3.2.](#) Geocoding: Civic-Geodetic Translation

A geocoding service is a network-accessible service that transforms a description of a location, such as a place name, street address or postal code, into a normalized description of the location with a Point geometry (geodetic coordinate). A geocoding service could be a service supported in a location server to parse the given civic address and get response back.

The server will attempt to find the closest addressable location within a certain tolerance; if no match is found, the server will usually return a status code, unknown addresses.

#### [3.2.1.](#) Geocoder Service Requirements

The following requirements must be supported by the Geocoder Service.

Given a Civic Address, must be capable of using an address matching Geocoding algorithm to determine a position (geodetic coordinate) for the specified address.

Must be capable of performing geocoding using an incomplete address and return the complete set of address information (i.e., a normalized address).

Must be able to indicate the number of matches in the response (possibly zero) for a particular address supplied in the geocoding request.

Must be capable of processing one or more addresses in a single geocoding request.



code.

May return the centroid of a zip code if an address is not complete.

May return an altitude if the service supports this capability.

#### [3.2.2.](#) Example

```
POST /location HTTP/1.1
Host: lis.example.com:49152
Content-Type: application/held+xml
Content-Length: 1484
```

```
<?xml version="1.0"?>
<xs:schema targetNamespace="urn:ietf:params:
xml:ns:pidf:geopriv10:geodeticAddr"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
xmlns:xml="http://www.w3.org/XML/1998/namespace" >
<xs:import namespace="http://www.w3.org/XML/1998/namespace"
  schemaLocation="http://www.w3.org/2001/xml.xsd"/>
<locationRequest xmlns="urn:ietf:params:xml:ns:geopriv:held">
  <locationType >geodetic</locationType>
  <presence xmlns="urn:ietf:params:xml:ns:pidf"
    entity="pres:3650n87934c@ls.example.com">
    <tuple id="b650sf789nd">
      <status>
        <geopriv xmlns="urn:ietf:params:xml:ns:pidf:geopriv10">
          <location-info>
            <ca:civicAddress
              xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
              xml:lang="en-au">
              <ca:country>AU</ca:country>
              <ca:A1>NSW</ca:A1>
              <ca:A3>Wollongong</ca:A3>
              <ca:A4>Gwynneville</ca:A4>
              <ca:STS>Northfield Avenue</ca:STS>
              <ca:LMK>University of Wollongong</ca:LMK>
              <ca:FLR>2</ca:FLR>
              <ca:NAM>Andrew Corporation</ca:NAM>
              <ca:PC>2500</ca:PC>
              <ca:BLD>39</ca:BLD>
              <ca:SEAT>WS-183</ca:SEAT>
              <ca:POBOX>U40</ca:POBOX>
            </ca:civicAddress>
          </location-info>
          <usage-rules/>
        </geopriv>
      </status>
      <timestamp>2006-01-10T03:42:28+00:00</timestamp>
    </tuple>
  </presence>
</locationRequest>
```

Sends a civic address to the server.

```
HTTP/1.1 200 OK
Server: Example LIS
Date: Tue, 10 Jan 2006 03:42:29 GMT
Expires: Tue, 10 Jan 2006 03:42:29 GMT
Cache-control: private
Content-Type: application/held+xml
Content-Length: 619

<locationResponse xmlns="urn:ietf:params:xml:ns:geopriv:held">
  <presence xmlns="urn:ietf:params:xml:ns:pidf"
    entity="pres:3650n87934c@ls.example.com">
    <tuple id="b650sf789nd">
      <status>
        <geopriv xmlns="urn:ietf:params:xml:ns:pidf:geopriv10">
          <location-info>
            <Point xmlns="http://www.opengis.net/gml"
              srsName="urn:ogc:def:crs:EPSG::4326">
              <pos>-34.407 150.88001</pos>
            </Point>
          </location-info>
          <usage-rules/>
        </geopriv>
      </status>
      <timestamp>2006-01-10T03:42:28+00:00</timestamp>
    </tuple>
  </presence>
</locationResponse>
```

Hence, the corresponding response from the server.

Result for a civic address request contains each individual response. More than one result may be returned if the given address is ambiguous. Possible values, from most specific to most general are: address, street, zip, city, state, country etc. <warning>: If the exact address was not found, the closest available match will be noted here.

#### [4.](#) The Accuracy

Location translation service returns an Accuracy value within each returned address. This value indicates the resolution of the given result, but not necessarily the correctness of the result. For example, a civic address of "111 8th Avenue, New York, NY" may return 8 (Address) level accuracy, indicating that the given address is on the order of resolution of a street address. A civic address for

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"France" would only return 1 (Country) level accuracy.

The following table lists the accuracy values returned by the Geo-Civic address translation service. Note that these accuracy values only indicate the expected resolution.

##### Value Description

0 Unknown accuracy.

1 Country level accuracy.

2 Region (state, province, prefecture, etc.) level accuracy.

3 Sub-region (county, municipality, etc.) level accuracy.

4 Town (city, village) level accuracy.

5 Post code (zip code) level accuracy.

6 Street level accuracy.

7 Intersection level accuracy.

8 Address level accuracy.

9 Premise (building name, property name, shopping center, etc.) level accuracy.

Consider an example for <locationResponse> with accuracy information.

HTTP/1.1 200 OK  
Server: Example LIS  
Date: Tue, 10 Jan 2006 03:42:29 GMT  
Expires: Tue, 10 Jan 2006 03:42:29 GMT  
Cache-control: private  
Content-Type: application/held+xml  
Content-Length: 957

```
<locationResponse xmlns="urn:ietf:params:xml:ns:geopriv:held">
  <presence xmlns="urn:ietf:params:xml:ns:pidf"
    entity="pres:3650n87934c@ls.example.com">
    <tuple id="b650sf789nd">
      <status>
        <geopriv xmlns="urn:ietf:params:xml:ns:pidf:geopriv10">
          <location-info accuracy = "9">
            <ca:civicAddress
              xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
              xml:lang="en-au">
              <ca:country>AU</ca:country>
              <ca:A1>NSW</ca:A1>
              <ca:A3>Wollongong</ca:A3>
              <ca:A4>Gwynneville</ca:A4>
              <ca:STS>Northfield Avenue</ca:STS>
              <ca:LMK>University of Wollongong</ca:LMK>
              <ca:FLR>2</ca:FLR>
```

```
<ca:NAM>Andrew Corporation</ca:NAM>
<ca:PC>2500</ca:PC>
<ca:BLD>39</ca:BLD>
<ca:SEAT>WS-183</ca:SEAT>
<ca:POBOX>U40</ca:POBOX>
</ca:civicAddress>
</location-info>
<usage-rules/>
</geopriv>
</status>
<timestamp>2006-01-10T03:42:28+00:00</timestamp>
</tuple>
</presence>
</locationResponse>
```

## [5.](#) The Error Codes

There may occur few errors during the request processing. For example the parameters passed to the server did not match as

expected. This document should re-use the HELD error codes. In particular, the server should always return a 200/OK, possibly with a HELD `<error>` element. In addition to HELD errors codes, following is a list of error codes that you may encounter.

`accessDenied`: You do not have permission to access this resource.

`internaleError`: An internal problem prevents from returning data.

`notDefined`: The address translation process failed due to an error not covered by the definition of any other error code in this interface.

For each error, you'll receive an XML response of the following form.

```
HTTP/1.1 200 OK
Server: Example LIS
```

Expires: Tue, 10 Jan 2006 03:49:20 GMT  
Cache-control: private  
Content-Type: application/held+xml  
Content-Length: 182

```
<?xml version="1.0"?>
<error xmlns="urn:ietf:params:xml:ns:geopriv:held"
  code="locationUnknown">
  <message xml:lang="en">Unable to determine location
  </message>
</error>
```

## [6.](#) Security Considerations

TBD

## [7.](#) IANA Considerations

TBD

## [8.](#) References

### [8.1.](#) Normative References

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