

GeoPriv  
Internet-Draft  
Expires: August 9, 2007

R. Marshall, Ed.  
TCS  
February 5, 2007

Requirements for a Location-by-Reference Mechanism used in Location  
Configuration and Conveyance  
draft-marshall-geopriv-lbyr-requirements-00

#### Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with [Section 6 of BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/lid-abstracts.txt>.

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

This Internet-Draft will expire on August 9, 2007.

#### Copyright Notice

Copyright (C) The IETF Trust (2007).

Abstract

This document defines terminology and enumerates requirements for a location-by-reference approach to location configuration and conveyance interactions useful for emergency call routing for voice-over-IP (VoIP) and general Internet multimedia systems, where Internet protocols are used end-to-end.

Table of Contents

- [1.](#) Introduction . . . . . [3](#)
- [2.](#) Requirements Terminology . . . . . [4](#)
- [3.](#) Terminology . . . . . [5](#)
  - [3.1.](#) Terms . . . . . [5](#)
  - [3.2.](#) Actors . . . . . [5](#)
  - [3.3.](#) Location . . . . . [5](#)
- [4.](#) Basic Actors . . . . . [7](#)
- [5.](#) High-Level Requirements . . . . . [9](#)
- [6.](#) Security Considerations . . . . . [11](#)
- [7.](#) IANA Considerations . . . . . [12](#)
- [8.](#) Contributors . . . . . [13](#)
- [9.](#) Acknowledgments . . . . . [14](#)
- [10.](#) References . . . . . [15](#)
  - [10.1.](#) Normative References . . . . . [15](#)
  - [10.2.](#) Informative References . . . . . [15](#)
- Author's Address . . . . . [17](#)
- Intellectual Property and Copyright Statements . . . . . [18](#)

## 1. Introduction

A mechanism for either (or both) location configuration and location conveyance may rely on either a location-by-value approach, containing and transporting location information along every leg of the signaling path, or alternatively, a different approach, using a location-by-reference technique, which may be used to reference a location with some identifier, and to de-reference the location when needed for a location-based decision.

This document uses as a baseline condition, the primary example of an emergency call, which includes a request for emergency services via a SIP-enabled end device, connecting through the Internet to an IP-enabled PSAP (Public Service Answering Point).

We first define terminology in [Section 3](#). The document then outlines baseline requirements ([Section 5](#)), around the referencing and dereferencing of location via some location identifier in lieu of the emergency caller's actual location.

Identification of the caller, as associated information to location or location reference, either in conveyance or configuration, is out of scope in this document.

Location-by-reference is a mechanism which is in use in VoIP 9-1-1 systems at the time of this writing, and justified based on the requirements listed in this document.

## 2. Requirements 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](#) [1], with the qualification that unless otherwise stated these words apply to the design of the location-by-reference mechanism, and not its implementation or application.

### [3.](#) Terminology

#### [3.1.](#) Terms

Location Reference Identifier (LRI): An identifier (could be of the form of any URI) which is designed to represent a location object.

Location Server (LS): A network host which is designed to store location and to provide that same location to appropriate location client requests.

Location-to Mapping Server (LMS): A network host which provides a URI mapping service based on an input location and service identifier.

Call Server/Proxy (CS/P): A network host which plays the role of a SIP Proxy.

#### [3.2.](#) Actors

de-reference protocol client: The term to describe the entity requesting a Location Object in exchange for a Location Reference

Identifier provided.

de-reference protocol server: The term to describe the entity providing a Location Object as an output based on a Location Reference Identifier input.

### [3.3.](#) Location

Location: A geographic identification assigned to a region or feature based on a specific coordinate system, or by other precise information such as a street number and name. It can be either a civic or geographic location.

Civic location: A described location based on some reference system, such a jurisdictions or postal delivery. A street address is a common example.

Geographic location: A reference to a point which is able to be located as described by a set of defined coordinates within a geographic coordinate system, such as latitude and longitude within the WGS-84 datum. For example, 2-D geographic location is defined as an (x,y) coordinate value pair according to the distance north or south of the equator and east or west of the prime meridian.

Location-by-Value: The mechanism of representing location either in conveyance protocols or configuration protocols as fully specified, (i.e., including the actual location value itself).

Location-by-Reference: The mechanism of representing location either in conveyance protocols or configuration protocols as an identifier which refers to a fully specified location, (i.e., including a pointer to the actual location value itself).

#### [4.](#) Basic Actors

To support the referencing or de-referencing of a location, it is appropriate to describe a diagram consisting of network elements around which this might be done. These elements include, the UA (User Agent), CS/P (Call Server/Proxy), a LS (Location Server), and a PSAP UA.

This section outlines which entities will be considered in the reference de-reference scenarios discussed.

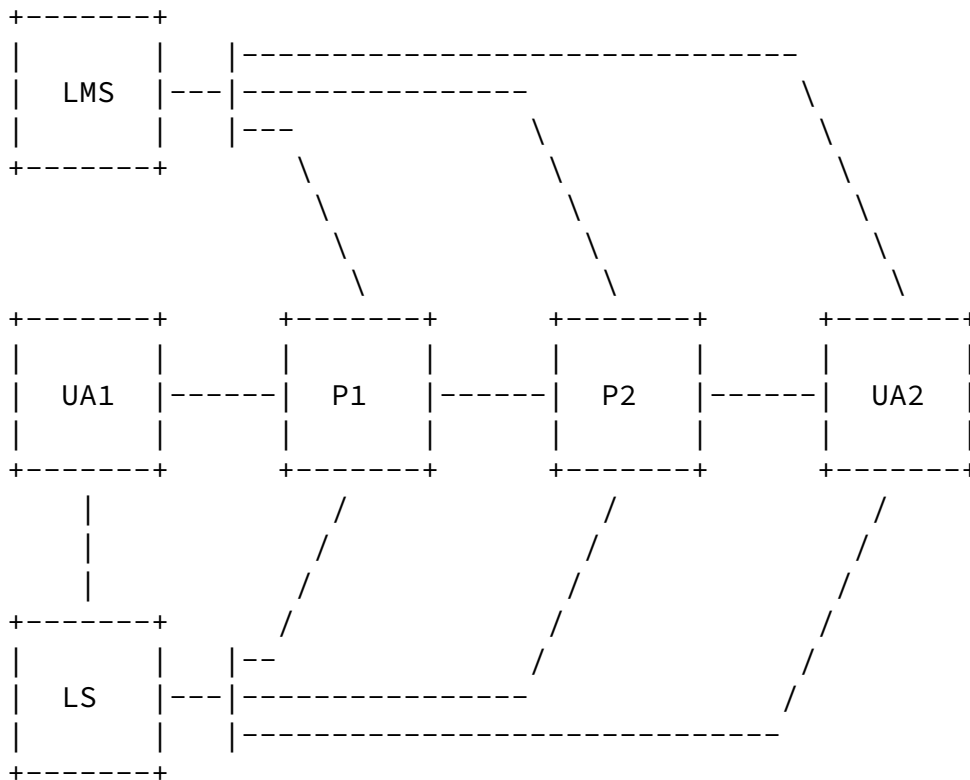


Figure 1: Framework for referencing or de-referencing location in a SIP session.

Figure 1 shows the interaction between the entities involved in the call, as to how location is referenced and subsequently de-referenced. The figure proposes that location reference is conveyed from the endpoint-to-endpoint via each middlebox (SIP Proxy), and undergoes a de-referencing operation at each step. The figure also depicts a LMS (Location-to-Mapping Server) element which is used to determine the next target destination, based on the de-referenced location.

At the PSAP, the end device also receives a location reference, (as



indicated in this figure), and executes a de-reference query.

Various potential interactions between the entities depicted in Figure 1 are described below:

1. Location information might be generated by the end host itself, in which case it may then request reference identifier based on the location that it generated and provided to the LS.
2. Alternately, location information might be either generated, provisioned, or stored by the LS (Location Server), and represented to the end device as a location reference, via a location configuration protocol (e.g., using DHCP or some L7LCP (Layer 7 Location Configuration Protocol)).
3. The location reference is only useful to mask the actual location, but must be de-referenced in order to be useful for location-based routing. Once the location is de-referenced at the LS and returned to the requestor, it can then be used as input to a location-to-mapping service (e.g., LoST). The mapping server returns a URI which can be used to establish the signaling to the next target destination. This returned target identifier may be the URI of the next SIP Proxy (or any other element along the routing path), or may be the URI of the appropriate IP-based PSAP.
4. The PSAP, consistent with the figure, may choose to de-reference the location identifier, once it is received, in order to view the location, and to request subsequent location-based actions.

## 5. High-Level Requirements

Below, we summarize high-level design requirements needed for a location-by-reference mechanism.

Rq1. Location Conveyance By Value (LbyV): The conveyance protocol MUST support the conveyance of location information in its fully-contained form, i.e., a PIDF-LO. (I know this isn't a requirement for LbyR, but is included for balance.)

Rq2. Location Conveyance By Reference (LbyR): The conveyance protocol MAY support the conveyance of a location information reference identifier, in the form of 'any URI', which can be used to de-reference the location into its fully-contained form, (e.g., a PIDF-LO).

Rq3. Location Conveyance Duality: The location conveyance protocol MAY support both location value and location reference identifier in the same message.

Rq4. Private Location Reference Id.: The dereferencing protocol MUST support the encryption of a location reference identifier.

Rq5. Public Location Reference Id.: The dereferencing protocol MAY convey a location reference identifier in plaintext.

Rq6. Location Reference Expiry: There MUST exist, a location reference uri format that includes a specified, finite period of validity.

Motivation: Location references are not intended to represent a location forever, and the identifier eventually may need to be recycled, or may be subject to a specific window of validity, after which the location reference fails to yield a location, or the location is determined to be kept confidential. An expiry timer for a location reference ensures that the location reference becomes invalid based on configuration.

Rq7. de-reference Protocol Transport: The de-reference protocol MUST support TCP/IP and MAY support UDP/IP.

Rq8. LRI Distribution: The location reference standard MUST allow construction of location references that can be distributed to and de-referenced by multiple parties, and MAY support references that are restricted to a single de-referencer"

Rq9'. de-reference Protocol Authentication: The dereferencing protocol MUST support both client-side and server-side authentication.

Motivation: It is reasonable to expect implementations of authentication to vary. Some implementations may choose to support both client-side and server-side authentication, might support one only, or may support neither.

Rq10. Location Privacy: The de-reference protocol MUST support the application of privacy rules to the dissemination of a requested location object. The entity that receives requests through the de-reference protocol MUST obey all privacy rules that apply to a requested location object.

Rq11. De-referenced PIDF-LO Result: The dereferencing of an LRI MUST result in a well-formed PIDF-LO.

Motivation: This is in order to ensure adequate privacy rules can be adhered to, since the PIDF-LO format comprises the necessary structures to maintain location privacy.

Rq12. Expiry of de-referenced Location: The de-referenced location, in PIDF-LO format, MUST include a configurable expiry timer to signal the point after which the PIDF-LO contained location is no longer considered usable.

Motivation: Once the location is de-referenced, it would be difficult to keep it from being passed around further 'as a plain old PIDF-LO', hence a timer expiry is specified. (This technique does not prevent would-be 'black-hats' from reusing the PIDF-LO, but provides some additional functionality within a proper use context.

Rq13. De-reference Protocol Selection: Location by reference systems MUST support at least one, and MAY support multiple dereferencing protocols.

## [6.](#) Security Considerations

Threats and security requirements are discussed in a separate document document [\[11\]](#).

Marshall

Expires August 9, 2007

[Page 11]

---

Internet-Draft

GEOPRIV LbyR Requirements

February 2007

## [7.](#) IANA Considerations

This document does not require actions by the IANA.

Marshall

Expires August 9, 2007

[Page 12]

---

Internet-Draft

GEOPRIV LbyR Requirements

February 2007

## [8.](#) Contributors

[TBD]

The contributors can be reached at:

Name            user@example.com

Marshall

Expires August 9, 2007

[Page 13]

---

Internet-Draft

GEOPRIV LbyR Requirements

February 2007

## [9.](#) Acknowledgments

[TBD]

Marshall

Expires August 9, 2007

[Page 14]

---

Internet-Draft

GEOPRIV LbyR Requirements

February 2007

## [10.](#) References

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



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

## 10.2. Informative References

- [2] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and E. Schooler, "SIP: Session Initiation Protocol", [RFC 3261](#), June 2002.
- [3] Charlton, N., Gasson, M., Gybels, G., Spanner, M., and A. van Wijk, "User Requirements for the Session Initiation Protocol (SIP) in Support of Deaf, Hard of Hearing and Speech-impaired Individuals", [RFC 3351](#), August 2002.
- [4] Cuellar, J., Morris, J., Mulligan, D., Peterson, J., and J. Polk, "Geopriv Requirements", [RFC 3693](#), February 2004.
- [5] Polk, J., Schnizlein, J., and M. Linsner, "Dynamic Host Configuration Protocol Option for Coordinate-based Location Configuration Information", [RFC 3825](#), July 2004.
- [6] Peterson, J., "Common Profile for Instant Messaging (CPIM)", [RFC 3860](#), August 2004.
- [7] Schulzrinne, H., "The tel URI for Telephone Numbers", [RFC 3966](#), December 2004.
- [8] Hellstrom, G. and P. Jones, "RTP Payload for Text Conversation", [RFC 4103](#), June 2005.
- [9] Peterson, J., "A Presence-based GEOPRIV Location Object Format", [RFC 4119](#), December 2005.
- [10] Schulzrinne, H. and J. Polk, "Communications Resource Priority for the Session Initiation Protocol (SIP)", [RFC 4412](#), February 2006.
- [11] Taylor, T., "Security Threats and Requirements for Emergency Call Marking and Mapping", [draft-ietf-ecrit-security-threats-03](#) (work in progress), July 2006.
- [12] Schulzrinne, H. and R. Marshall, "Requirements for Emergency Context Resolution with Internet Technologies", [draft-ietf-ecrit-requirements-12](#) (work in progress),

August 2006.

- [13] Hardie, T., "LoST: A Location-to-Service Translation Protocol", [draft-hardie-ecrit-lost-00](#) (work in progress), March 2006.
- [14] Schulzrinne, H., "Dynamic Host Configuration Protocol (DHCPv4 and DHCPv6) Option for Civic Addresses Configuration Information", [draft-ietf-geopriv-dhcp-civil-09](#) (work in progress), January 2006.
- [15] Wijk, A. and G. Gybels, "Framework for real-time text over IP using the Session Initiation Protocol (SIP)", [draft-ietf-sipping-toip-07](#) (work in progress), August 2006.

Internet-Draft

GEOPRIV LbyR Requirements

February 2007

Author's Address

Roger Marshall (editor)  
TeleCommunication Systems, Inc.  
2401 Elliott Avenue  
2nd Floor  
Seattle, WA 98121  
US

Phone: +1 206 792 2424

Email: [rmarshall@telecomsys.com](mailto:rmarshall@telecomsys.com)

URI: <http://www.telecomsys.com>

### Full Copyright Statement

Copyright (C) The IETF Trust (2007).

This document is subject to the rights, licenses and restrictions contained in [BCP 78](#), and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

### Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in [BCP 78](#) and [BCP 79](#).

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at

<http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at [ietf-ipr@ietf.org](mailto:ietf-ipr@ietf.org).

#### Acknowledgment

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).