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H. Schulzrinne
Columbia University
L. Liess
Deutsche Telekom
H. Tschofenig
Nokia Siemens Networks
B. Stark
AT&T
A. Kuett
Skype
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Location Hiding: Problem Statement and Requirements
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Abstract

The emergency services architecture developed in the IETF Emergency Context Resolution with Internet Technology (ECRIT) working group describes an architecture where location information is provided by access networks to end points in order to determine the correct dial string and information to route the call to a Public Safety Answering

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Point (PSAP). For determining the PSAP Uniform Resource Identifier (URI) the usage of the Location-to-Service Translation (LoST) Protocol is envisioned.

This document explores the architectural impact for the IETF emergency services architecture for situations where the Internet Access Provider (IAP) and/or the Internet Service Provider (ISP) are only willing to disclose limited or no location information.

This document provides a problem statement and lists requirements.

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1. Introduction

1.1. Emergency Services Architecture

The emergency services architecture developed in the IETF Emergency Context Resolution with Internet Technology (ECRIT) working group, see [[I-D.ietf-ecrit-framework](#)], describes an architecture where location information is provided by access networks to end points in order to determine the correct dial string and information to route the call to a Public Safety Answering Point (PSAP). The Location-to-Service Translation (LoST) Protocol [[I-D.ietf-ecrit-lost](#)] allows to determine the PSAP Uniform Resource Identifier (URI) for a specific geographical location together with a service URI [[I-D.ietf-ecrit-service-urn](#)]. The basic architecture is shown in Figure 1 of [[I-D.ietf-ecrit-framework](#)] and further detailed in the message flow in Figure 2 of [[I-D.ietf-ecrit-framework](#)].

For emergency services, location information is needed for two different purposes, namely for routing an emergency call to the PSAP that is responsible for a specific geographical region (and also for requested service, such as police or ambulance) and for dispatch of the emergency personell to the scene of an accident, crime or other types of incidents.

It is very important to note that this document only discusses location hiding in the context of location information that is need for call routing. ISPs have no interest or even legal basis for hiding location information from emergency services personnel.

1.2. Location Hiding

In some cases, Internet Access Providers (IAPs) and/or the Internet Service Providers (ISPs) are afraid that allowing users to access location information for non-emergency purposes or prior to an emergency call will incur additional server load and thus costs. Hence, they do not to disclose precise location information (at the

quality suitable for dispatch emergency personell by the PSAP operator) or not to disclose any location information.

In some other cases IAPs and ISPs may not want to make location information available without the ability to charge for it. This is a pure business decision.

1.3. Location by Reference

The work on the Location Configuration Protocol (LCP) indicated the need to provide the capability to obtain Location-by-References (LbyRs) in addition to Location-by-Value (LbyV) from a Location

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Information Server (LIS).

The LCP problem statement and requirements document can be found in [[I-D.ietf-geopriv-l7-lcp-ps](#)]. The requirements for obtaining an LbyR via the LCP and the corresponding dereferencing step can be found in [[I-D.ietf-geopriv-lbyr-requirements](#)].

HTTP Enabled Location Delivery (HELD), see [[I-D.ietf-geopriv-http-location-delivery](#)], is an instantiation of the LCP concept and allows LbyVs and LbyRs to be requested.

A location reference may already satisfy the requirement for location hiding if the PSAP has the appropriate credentials to resolve the reference. This requires a trust relationship between the PSAP and the ISP.

Unfortunately, a location reference is not compatible with LoST, as LoST requires an information value rather than a reference. Also, LoST servers may be operated by the VSP, which may not have a trust relationship with the ISP.

This document explores the architectural impact for the current architecture and lists requirements.

2. Terminology

The keywords "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](#)], with the important qualification that, unless otherwise stated, these terms apply to the design of an solution supporting location hiding, not its implementation or application.

This document reuses terminology from [[I-D.ietf-geopriv-l7-lcp-ps](#)].

[3.](#) Requirements

This section presents requirements.

[3.1.](#) High-Level Requirements

Req-A: There SHOULD be a way an access network can withhold detailed location information from any entity it wishes to, and specifically, the endpoint, and a VSP.

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Req-B: The ISP/IAP MUST support the ability of the endpoint or the VSP to route emergency calls.

Req-C: The VSP MUST be able to validate that a call purported to be an emergency call is being routed to a bona fide URI, which is denoted by being a URI in LoST for the designated emergency service.

Req-D: Precise location information must be conveyed (either LbyR or LbyV) to the PSAP.

[3.2.](#) Detailed Requirements

Req-1: A business or trust relationship between an ISP and a VSP MUST NOT be assumed.

Req-2: A solution MUST consider deployment scenarios where a VSP is outside the jurisdiction of the PSAP.

Req-3: The solution MUST offer automated discovery of servers and other behavior, i.e., no manual configuration can be assumed.

Req-4: The steps needed by the endpoint for emergency calling SHOULD be no different when location is withheld vs. when location is not withheld. In particular, user agents cannot require additional configuration to discover which particular environment (hiding or no hiding) they find themselves in.

Req-5: The solution SHOULD work for non-SIP entities, without the ISP/IAP having to support these protocols.

Req-6: The solution MUST work if PSAP boundaries have holes.

Req-7: The solution MUST NOT assume the existence of Emergency Service Routing Proxies (ESRPs) per country, state and city.

Req-8: The solution MUST consider that service boundaries for different emergency services may differ, but they overlap at the location of the caller.

Req-9: UAs MUST NOT have to deduce the desired behavior by trial-and-error operations, such as LbyR resolutions, fail, as failures add latency during call setup. The solution MUST NOT significantly increase call setup latency.

Req-10: The solution MUST allow the end host to determine PSAP/ESRP URLs prior to the call, for all emergency services.

Req-11: The solution MUST allow UAs to discover at least their dial string ahead of the emergency call.

Req-12: The solution MUST have minimal impact on UAs.

Req-13: The solution MUST NOT interfere with the use of LoST for non-emergency services.

Req-14: Deleted

Req-15: Calls may reach a PSTN gateway, rather than the PSAP directly.

3.3. Desirable Properties

- o The solution MUST NOT shift effort(externality), i.e., the convenience of the location-hiding ISP MUST NOT impose a burden on user agents or non-hiding ISPs/IAPs and SHOULD NOT impose a burden on VSPs.
- o The solution SHOULD minimize the impact on LoST, SIP conveyance [[I-D.ietf-sip-location-conveyance](#)] and DHCP.
- o The solution SHOULD NOT rely on DHCP for LoST configuration, as the information in the DHCP server provided by the ISP may not reach the UA, due to NATs.

4. IANA Considerations

This document does not require actions by IANA.

5. Security Considerations

This document does not raise additional security consideration beyond those mentioned in [[I-D.ietf-geopriv-l7-lcp-ps](#)] and discussed in this document.

6. Acknowledgments

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- o Brian Rosen (br@brianrosen.net)
- o Richard Barnes (rbarnes@bbn.com)
- o Marc Linsner (mlinsner@cisco.com)
- o Ted Hardie (hardie@qualcomm.com)

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Authors' Addresses

Henning Schulzrinne
Columbia University
Department of Computer Science
450 Computer Science Building
New York, NY 10027
US

Phone: +1 212 939 7004
Email: hgs+ecrit@cs.columbia.edu
URI: <http://www.cs.columbia.edu>

Laura Liess
Deutsche Telekom Networks
Deutsche Telekom Allee 7
Darmstadt, Hessen 64295
Germany

Phone:
Email: Laura.Liess@t-systems.com
URI: <http://www.telekom.de>

Hannes Tschofenig
Nokia Siemens Networks
Linnoitustie 6
Espoo 02600
Finland

Phone: +358 (50) 4871445
Email: Hannes.Tschofenig@gmx.net
URI: <http://www.tschofenig.priv.at>

Barbara Stark
AT&T
725 W Peachtree St, NE
Atlanta, GA 30308
USA

Phone: +1 404 499 7026
Email: barbara.stark@att.com

Andres Kuett
Skype

Email: andres.kytt@skype.net

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