

Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: March 31, 2007

H. Schulzrinne
Columbia U.
J. Polk
Cisco
H. Tschofenig
Siemens
September 27, 2006

A Dynamic Host Configuration Protocol (DHCP) based Location-to-Service
Translation Protocol (LoST) Discovery Procedure
draft-polk-ecrit-dhc-lost-discovery-01.txt

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 March 31, 2007.

Copyright Notice

Copyright (C) The Internet Society (2006).

Abstract

The Location-to-Service Translation Protocol (LoST) describes an XML-based protocol for mapping service identifiers and geospatial or civic location information to service contact Uniform Resource Locators (URLs). LoST servers can be located anywhere but a

placement closer to the end host, e.g., in the access network, is desirable. Such a LoST server placement provides benefits in disaster situations with intermittent network connectivity regarding the resiliency of emergency service communication.

This document describes how a LoST client can discover a LoST server using the Dynamic Host Configuration Protocol (DHCP).

Table of Contents

1.	Introduction	3
2.	Terminology	3
3.	Domain Name Encoding	3
4.	LoST Server DHCPv4 Option	4
5.	LoST Server DHCPv6 Option	4
6.	Example	5
7.	IANA Considerations	5
7.1.	IANA Consideration for DHCPv4 Option	6
7.2.	IANA Consideration for DHCPv6 Option	6
8.	Security Considerations	6
9.	Acknowledgements	6
10.	References	6
10.1.	Normative References	6
10.2.	Informative References	7
	Authors' Addresses	8
	Intellectual Property and Copyright Statements	9

1. Introduction

The Location-to-Service Translation Protocol (LoST) [[I-D.ietf-ecrit-lost](#)] describes an XML-based protocol for mapping service identifiers and geospatial or civic location information to service contact Uniform Resource Locators (URLs).

In order to interact with a LoST server, the LoST client finally needs to know its IP address. Several mechanisms can be used to learn this address, including manual configuration. In environments where the access network itself either deploys a LoST server or knows a third party that operates a LoST server DHCP can provide the end host with a domain name. This domain name is then used as input to the DNS-based resolution mechanism described in LoST [[I-D.ietf-ecrit-lost](#)] that reuses the URI-enabled NAPTR specification (see [[I-D.daigle-unaptr](#)]).

This document specifies a DHCPv4 and a DHCPv6 option that allows LoST clients to discover local LoST servers.

[Section 2](#) provides terminology. [Section 4](#) describes the DHCPv4 option while [Section 5](#) describes the DHCPv6 option, with the same functionality. IANA and Security Considerations complete the document in [Section 7](#) and [Section 8](#).

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](#)].

Within this document, we use terminology from [[I-D.ietf-ecrit-requirements](#)] and [[I-D.ietf-ecrit-lost](#)].

3. Domain Name Encoding

This section describes the encoding of the domain name used in the DHCPv4 option shown in [Section 4](#) and also used in the DHCPv6 option shown in [Section 5](#).

The domain name is encoded according to [Section 3.1 of RFC 1035](#) [RFC1035] whereby each label is represented as a one octet length field followed by that number of octets. The domain name ends with the null label of the root, a domain name is terminated by a length byte of zero. The high order two bits of every length octet must be

zero, and the remaining six bits of the length field limit the label to 63 octets or less. To simplify implementations, the total length of a domain name (i.e., label octets and label length octets) is restricted to 255 octets or less.

[RFC 1035](#) [RFC1035] encoding was chosen to accommodate future internationalized domain name mechanisms.

For DHCPv4 only: If the length of the domain name exceeds the maximum permissible within a single option (i.e., 254 octets), then the domain name MUST be represented in the DHCP message as specified in [\[RFC3396\]](#).

4. LoST Server DHCPv4 Option

The LoST server DHCPv4 option carries a DNS ([RFC 1035](#) [RFC1035]) fully-qualified domain name to be used by the LoST client to locate a LoST server.

The DHCP option for this encoding has the following format:

Code	Len	LoST Server Domain Name					
TBD	n	s1	s2	s3	s4	s5	...

Figure 1: LoST FQDN DHCPv4 Option

Code: OPTION_LOST (TBD1)

Len: Length of the 'LoST Server Domain Name' field in octets; variable.

LoST server Domain Name: The domain name of the LoST server for the client to use.

The encoding of the domain name is described in [Section 3](#).

Only a single domain name MUST be present in the DHCPv4 option.

5. LoST Server DHCPv6 Option

This document defines a DHCPv6 options to carry a domain name.

The DHCPv6 option has the format shown in Figure 3.

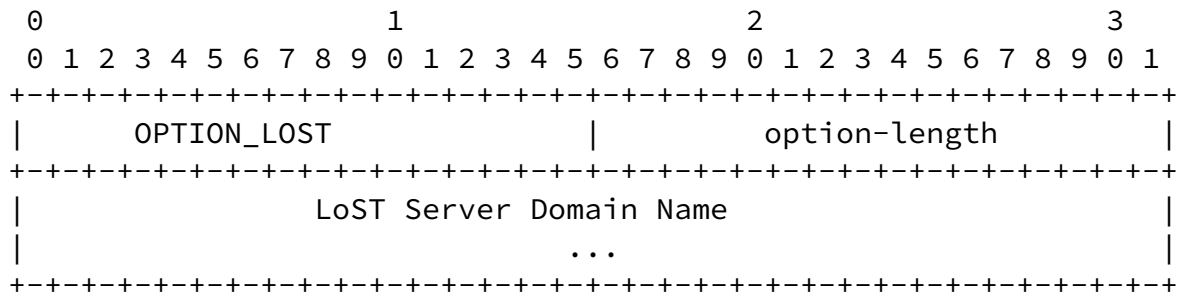


Figure 3: DHCPv6 Option for LoST Server Domain Name List

option-code: OPTION_LOST (TBD2)

option-length: Length of the 'LoST Server Domain Name' field in octets; variable.

LoST server Domain Name: The domain name of the LoST server for the client to use.

A DHCPv6 client may request a LoST server domain name in an Options Request Option (ORO) as described in [\[RFC3315\]](#).

The encoding of the domain name is described in [Section 3](#).

Only a single domain name MUST be present in the DHCPv6 option.

6. Example

This section shows an example of a DHCPv4 option where the DHCP server wants to offer the "example.com" domain name to the client as input to the U-NAPTR LoST discovery procedure. This domain name would be encoded as follows:

```
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|TBD|13 | 7 |'e'|'x'|'a'|'m'|'p'|'l'|'e'| 3 |'c'|'o'|'m'| 0 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
```

Figure 5: Example for a LoST FQDN DHCPv4 Option

7. IANA Considerations

7.1. IANA Consideration for DHCPv4 Option

The following DHCPv4 option code for the Location-to-Service Translation Protocol (LoST) server option must be assigned by IANA:

Option Name	Value	Described in
OPTION_LOST	TBD	Section 4

7.2. IANA Consideration for DHCPv6 Option

IANA is requested to assign the following DHCPv6 option codes for the Location-to-Service Translation Protocol (LoST) options:

Option Name	Value	Described in
OPTION_LOST	TBD	Section 5

[8.](#) Security Considerations

If an adversary manages to modify the response from a DHCP server or insert its own response, a LoST client could be led to contact a rogue LoST server under the control of the adversary or be given an invalid address. These threats are documented in [\[I-D.ietf-ecrit-security-threats\]](#). The security considerations in [\[RFC2131\]](#), [\[RFC2132\]](#) and [\[RFC3315\]](#) are applicable to this document.

[9.](#) Acknowledgements

The authors would like to thank Andrew Newton and Leslie Daigle for their draft review. We would like to particularly thank Andrew Newton for the simplifications he proposed.

[10.](#) References

[10.1.](#) Normative References

[I-D.ietf-ecrit-lost]
 Hardie, T., "LoST: A Location-to-Service Translation Protocol", [draft-ietf-ecrit-lost-01](#) (work in progress), September 2006.

[RFC1035] Mockapetris, P., "Domain names - implementation and

Schulzrinne, et al. Expires March 31, 2007 [Page 6]

Internet-Draft DHCP-based LoST Discovery September 2006

specification", STD 13, [RFC 1035](#), November 1987.

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

[RFC2131] Droms, R., "Dynamic Host Configuration Protocol", [RFC 2131](#), March 1997.

- [RFC2132] Alexander, S. and R. Droms, "DHCP Options and BOOTP Vendor Extensions", [RFC 2132](#), March 1997.
- [RFC3315] Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C., and M. Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", [RFC 3315](#), July 2003.

10.2. Informative References

- [I-D.daigle-unaptr]
Daigle, L., "Domain-based Application Service Location Using URIs and the Dynamic Delegation Discovery Service (DDDS)", [draft-daigle-unaptr-00](#) (work in progress), June 2006.
- [I-D.ietf-ecrit-requirements]
Schulzrinne, H. and R. Marshall, "Requirements for Emergency Context Resolution with Internet Technologies", [draft-ietf-ecrit-requirements-12](#) (work in progress), August 2006.
- [I-D.ietf-ecrit-security-threats]
Taylor, T., "Security Threats and Requirements for Emergency Call Marking and Mapping", [draft-ietf-ecrit-security-threats-03](#) (work in progress), July 2006.
- [RFC3319] Schulzrinne, H. and B. Volz, "Dynamic Host Configuration Protocol (DHCPv6) Options for Session Initiation Protocol (SIP) Servers", [RFC 3319](#), July 2003.
- [RFC3361] Schulzrinne, H., "Dynamic Host Configuration Protocol (DHCP-for-IPv4) Option for Session Initiation Protocol (SIP) Servers", [RFC 3361](#), August 2002.
- [RFC3396] Lemon, T. and S. Cheshire, "Encoding Long Options in the Dynamic Host Configuration Protocol (DHCPv4)", [RFC 3396](#), November 2002.

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>

James Polk
Cisco
2200 East President George Bush Turnpike
Richardson, Texas 75082
US

Email: jmpolk@cisco.com

Hannes Tschofenig
Siemens
Otto-Hahn-Ring 6
Munich, Bavaria 81739
Germany

Phone: +49 89 636 40390
Email: Hannes.Tschofenig@siemens.com
URI: <http://www.tschofenig.com>

Full Copyright Statement

Copyright (C) The Internet Society (2006).

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 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.

Acknowledgment

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

