

DHC
Internet-Draft
Expires: December 10, 2006

K. Kinnear
M. Normoyle
M. Stapp
Cisco Systems, Inc.
June 8, 2006

DHCPv4 Relay Agent Flags Suboption
draft-ietf-dhc-relay-agent-flags-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 December 10, 2006.

Copyright Notice

Copyright (C) The Internet Society (2006).

Abstract

This memo defines a new suboption of the DHCP relay agent information option that allows the DHCP relay to specify flags for the forwarded packet. One flag is defined to indicate whether the DHCP relay received the packet via a unicast or broadcast packet. This information may be used by the DHCP server to better serve clients based on whether their request was originally broadcast or unicast.

Table of Contents

- [1. Introduction](#) [3](#)
- [2. Requirements Terminology](#) [3](#)
- [3. The Flags Suboption](#) [4](#)
- [4. DHCP Relay Agent Behavior](#) [4](#)
- [5. DHCP Server Behavior](#) [5](#)
- [6. Security Considerations](#) [5](#)
- [7. IANA Considerations](#) [5](#)
- [8. Acknowledgements](#) [5](#)
- [9. References](#) [6](#)
 - [9.1. Normative References](#) [6](#)
 - [9.2. Informative References](#) [6](#)
- [Authors' Addresses](#) [7](#)
- [Intellectual Property and Copyright Statements](#) [8](#)

1. Introduction

Any time a client's DHCP packet is broadcast, a local DHCP relay will process its request and forward it on to the DHCP server. When the DHCP relay performs this function, it can be configured to use the DHCP relay agent information option to forward additional information to the DHCP server, which the server may then use to alter its processing algorithms. Once the lease has been granted, however, future DHCP DHCPREQUEST/RENEWAL messages are unicast directly to the DHCP Server. [[RFC2131](#)] [[RFC2132](#)] [[RFC3046](#)]

In general, DHCP servers may also make subtle (and sometimes not so subtle) changes in their processing algorithms depending on whether or not the DHCP server received the message as a unicast packet from the DHCP client directly, a broadcast packet from the DHCP client on a locally connected network, or a unicast packet from a DHCP Relay Agent which has forwarded on a packet broadcast from a DHCP client connected to a network local to the DHCP Relay Agent.

In some situations, DHCP Clients may unicast their DHCPREQUEST/RENEW packets to the DHCP Relay Agent, which will forward the packet on to the DHCP server. In these cases, the DHCP server cannot tell whether the packet was broadcast or unicast by the DHCP client, and so it may be unable to process the DHCP client packets in the manner that it would if it knew whether the original DHCP packet was broadcast or unicast.

The purpose of the suboption described in this document is to allow the DHCP relay to specify flags for the forwarded packet. These flags can be used to describe DHCP client attributes that are useful to the DHCP server, but can only be detected by the local DHCP relay. The DHCP server can use the information provided by the DHCP relay to improve its processing algorithms.

One flag is defined to indicate whether the DHCP relay received the packet via a unicast or broadcast packet. This allows the DHCP

server to know if a packet forwarded on by a DHCP Relay Agent was broadcast or unicast to the DHCP Relay Agent.

2. Requirements Terminology

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](#)].

Kinnear, et al.

Expires December 10, 2006

[Page 3]

Internet-Draft

Relay Agent Flags Suboption

June 2006

3. The Flags Suboption

The Flags suboption provides an extensible suboption definition for several possible flags. The first flag defined is the unicast flag.

The format of the suboption is:

```

      0                               1                               2
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|   Code   |   Length   |   Flags   |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
```

Code The suboption code. (TBD, to be assigned by IANA).

Length The suboption length, 1 octet.

Flags The Relay Agent flags for this forwarded packet.

```

      0 1 2 3 4 5 6 7
+---+---+---+---+---+---+
|U|   MBZ   |
+---+---+---+---+---+---+
```

U: UNICAST flag

```

unicast = 1
broadcast = 0
```

MBZ: MUST BE ZERO (reserved for future use)

[4.](#) DHCP Relay Agent Behavior

A DHCP relay agent MUST include this suboption in every Relay Agent Information Option [[RFC3046](#)] it adds to a forwarded DHCP request. In this way, the DHCP server can distinguish a request forwarded from a DHCP relay agent which does not support the relay-agent-flags suboption from a request forwarded by a DHCP relay agent which supports the relay-agent-flags suboption and which received the request that is being forwarded in a broadcast packet.

To put this another way, A DHCP relay agent which supports the relay-agent-flags suboption MUST always include it in every relay-agent-information-option that it inserts into packets which it forwards on to the DHCP server, whether the packet it is forwarding was received as a broadcast or as a unicast. This is because the DHCP server will be dealing with DHCP relay agents that support the relay-agent-flags

Kinnear, et al.

Expires December 10, 2006

[Page 4]

Internet-Draft

Relay Agent Flags Suboption

June 2006

suboption as well as DHCP relay agents that do not support the relay-agent-flags suboption.

[5.](#) DHCP Server Behavior

This option provides additional information to the DHCP server. The DHCP server MAY use this information to make processing decisions regarding the DHCP Client's packet which it is processing. For instance, knowledge of the broadcast or unicast reception of a packet by a DHCP relay agent is important when making the processing decisions required to implement Load Balancing [[RFC3074](#)].

The option length is one octet. If the DHCP server receives a relay-agent-flags suboption that is longer than one octet, it MUST evaluate the first octet.

[6.](#) Security Considerations

Message authentication in DHCP for intradomain use where the out-of-band exchange of a shared secret is feasible is defined in [[RFC3118](#)].

Potential exposures to attack are discussed in [section 7](#) of the DHCP protocol specification in [[RFC2131](#)].

The DHCP Relay Agent option depends on a trusted relationship between the DHCP relay agent and the server, as described in [section 5 of \[\[RFC3046\]\(#\)\]](#). While the introduction of fraudulent relay-agent options can be prevented by a perimeter defense that blocks these options unless the relay agent is trusted, a deeper defense using the authentication option for relay agent options [[RFC4030](#)] SHOULD be deployed as well.

[7.](#) IANA Considerations

IANA is requested to assign a suboption number for the Flags Suboption from the DHCP Relay Agent Information Option [[RFC3046](#)] suboption number space.

[8.](#) Acknowledgements

Thanks to David Hankins for realizing the problems created by the server-id-override option draft and for helping us understand the value of finally solving this problem in a way that has general applicability.

Kinnear, et al. Expires December 10, 2006 [Page 5]

Internet-Draft Relay Agent Flags Suboption June 2006

[9.](#) References

[9.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), 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.
- [RFC3046] Patrick, M., "DHCP Relay Agent Information Option", [RFC 3046](#), January 2001.

[RFC3118] Droms, R. and W. Arbaugh, "Authentication for DHCP Messages", [RFC 3118](#), June 2001.

[RFC4030] Stapp, M. and T. Lemon, "The Authentication Suboption for the Dynamic Host Configuration Protocol (DHCP) Relay Agent Option", [RFC 4030](#), March 2005.

9.2. Informative References

[RFC3074] Volz, B., Gonczi, S., Lemon, T., and R. Stevens, "DHC Load Balancing Algorithm", [RFC 3074](#), February 2001.

Kinnear, et al.

Expires December 10, 2006

[Page 6]

Internet-Draft

Relay Agent Flags Suboption

June 2006

Authors' Addresses

Kim Kinnear
Cisco Systems, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
US

Phone: +1 978 936 0000
Email: kkinnear@cisco.com

Marie Normoyle
Cisco Systems, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
US

Phone: +1 978 936 0000
Email: mnormoyle@cisco.com

Mark Stapp
Cisco Systems, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
US

Phone: +1 978 936 0000
Email: mjs@cisco.com

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.

Disclaimer of Validity

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.

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.

Acknowledgment

Funding for the RFC Editor function is currently provided by the Internet Society.