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Subscriber-ID Suboption for the DHCP Relay Agent Option
<draft-ietf-dhc-subscriber-id-07.txt>

Status of this Memo

This Internet-Draft will expire on March 4, 2005.

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Abstract

This memo defines a new Subscriber-ID suboption for the Dynamic Host Configuration Protocol's (DHCP) relay agent information option. The suboption allows a DHCP relay agent to associate a stable "Subscriber-ID" with DHCP client messages in a way that is independent of the client and of the underlying physical network infrastructure.

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1. 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 RFC 2119 [1].

2. Introduction

DHCP (RFC 2131 [2]) provides IP addresses and configuration information for IPv4 clients. It includes a relay agent capability, in which processes within the network infrastructure receive broadcast messages from clients and forward them to DHCP servers as unicast messages. In network environments like DOCSIS data-over-cable and xDSL, for example, it has proven useful for the relay agent to add information to the DHCP message before forwarding it, using the relay agent information option (RFC 3046 [3]).

Servers that recognize the relay agent option echo it back in their replies, and some of the information that relays add may be used to help an edge device efficiently return replies to clients. The information that relays supply can also be used in the server's decision making about the addresses and configuration parameters that the client should receive.

In many service provider environments it's desirable to associate some provider-specific information with clients' DHCP messages. This is often done using the relay agent information option. RFC 3046 defines Remote-ID and Circuit-ID sub-options that are used to carry such information. The values of those suboptions, however, are usually based on some network resource, such as an IP address of a network access device, an ATM Virtual Circuit identifier, or a DOCSIS cable-modem identifier. As a result, the values carried in these suboptions are dependent on the physical network configuration. If a client connects to the service provider network through different paths, different values are carried in network-dependent suboptions.

3. The Subscriber-ID Suboption

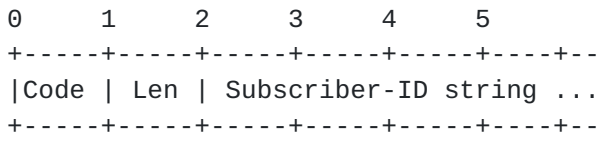
In complex service provider environments, there is a need to connect a customer's DHCP configuration with the customer's administrative information. The Subscriber-ID suboption carries a value that can be independent of the physical network configuration through which the subscriber is connected. This value complements, and might well be used in addition to, the network-based relay agent option suboptions discussed in Section 2. The "subscriber-id" assigned by the provider is intended to be stable as customers connect through different paths, and as network changes occur.

The Subscriber-ID information allows the service provider to assign/ activate subscriber-specific actions, e.g. assignment of host IP address and subnet mask, DNS configuration, trigger accounting, etc. This suboption is de-coupled from the access network's physical structure, so subscriber moves from one access-point to another, for example, would not require reconfiguration at the service provider's DHCP servers.

The Subscriber-ID is an ASCII string; the encoding of the string is defined in Section 3.1. The semantic contents of the Subscriber-ID string are of course provider-specific. This specification does not establish any semantic requirements on the data in the string.

3.1 Suboption Format

This memo defines a new DHCP relay agent option suboption that carries a "Subscriber-ID" value. The value is an ASCII string. The suboption takes a form similar to many other relay information option suboptions:



The Code for the suboption is TBD.

The one-octet Len field is the length of the ID string, in octets. The minimum length of the ID string is 1 octet.

The "Subscriber-ID" is an NVT ASCII [4] string. The string MUST NOT be NULL terminated since the length is specified in the "Len" field.

4. Relay Agent Behavior

DHCP relay agents MAY be configured to include a Subscriber-ID suboption if they include a relay agent information option in relayed DHCP messages. The subscriber-id strings themselves are assigned and configured through mechanisms that are outside the scope of this memo.

5. DHCP Server Behavior

This suboption provides additional information to the DHCP server. The DHCP server, if it is configured to support this option, may use this information in addition to other relay agent option data and

other options included in the DHCP client messages in order to assign an IP address and/or other configuration parameters to the client. There is no special additional processing for this suboption.

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 RFC 3118 [5]. Potential exposures to attack are discussed in section 7 of the DHCP protocol specification in RFC 2131 [2].

The DHCP relay agent option depends on a trusted relationship between the DHCP relay agent and the server, as described in section 5 of RFC 3046. Fraudulent relay agent option data could potentially lead to theft-of-service or exhaustion of limited resources (like IP addresses) by unauthorized clients. A host that tampered with relay agent data associated with another host's DHCP messages could deny service to that host, or interfere with its operation by leading the DHCP server to assign it inappropriate configuration parameters.

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 authentication for relay agent options via the Authentication Suboption [6] or IPSec [7] SHOULD be deployed as well.

There are several data in a DHCP message that convey information that may identify an individual host on the network. These include the chaddr, the client-id option, and the hostname and client-fqdn options. Depending on the type of identifier selected, the Subscriber-ID suboption may also convey information that identifies a specific host or a specific user on the network. In practice, this information isn't exposed outside the internal service-provider network, where DHCP messages are usually confined. Administrators who configure data that's going to be used in DHCP Subscriber-ID suboptions should be careful to use identifiers that are appropriate for the types of networks they administer. If DHCP messages travel outside the service-provider's own network, or if the suboption values may become visible to other users, that may raise privacy concerns for the access provider or service provider.

7. IANA Considerations

IANA has assigned a value of <TBD> from the DHCP Relay Agent Information Option [3] suboption codes for the Subscriber-ID Suboption described in this document.

8. Acknowledgements

This document is the result of work done within Cisco Systems. Thanks especially to Andy Sudduth for his review comments.

Normative References

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, March 1997.

[2] Droms, R., "Dynamic Host Configuration Protocol", RFC 2131, March 1997.

[3] Patrick, M., "DHCP Relay Agent Information Option", RFC 3046, January 2001.

[4] Postel, J. and J. Reynolds, "TELNET Protocol Specification", RFC 854, May 1983.

Informative References

[5] Droms, R. and W. Arbaugh, "Authentication for DHCP Messages", RFC 3118, June 2001.

[6] Stapp, M., "The Authentication Suboption for the DHCP Relay Agent Option (draft-ietf-dhc-auth-suboption-*.txt)", August 2004.

[7] Droms, R., "Authentication of Relay Agent Options Using IPSec (draft-ietf-dhc-relay-agent-ipsec-*.txt)", November 2003.

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