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Client Link-layer Address Option in DHCPv6
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Abstract

This document specifies the format and mechanism that is to be used for encoding client link-layer address in DHCPv6 relay forward messages by defining a new DHCPv6 Client Link-layer Address option.

Requirements Language

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 [RFC2119].

Status of this Memo

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1. Introduction

This specification defines an optional mechanism and the related DHCPv6 option to allow first hop DHCPv6 relay agent directly connected to the client to populate client link-layer address in the DHCPv6 messages being sent towards the server.

2. Problem Background and Scenario

DHCPv4 protocol specification [RFC2131] provides a way to specify the client hardware address in the DHCPv4 message header. DHCPv4 message header has 'htype' and 'chaddr' fields to specify client hardware address type and hardware address respectively. The client hardware address thus learnt can be used by DHCPv4 server and relay in different ways. In some of the deployments DHCPv4 servers use 'chaddr' as a customer identifier and a key for lookup in the client lease database.

With the incremental deployment of IPv6 to existing IPv4 networks, effectively an enablement of dual-stack, there will be devices that act as both DHCPv4 and DHCPv6 clients. In service provider deployments, a typical DHCPv4 implementation will use the client hardware address as one of the keys to build DHCP client lease database. In dual stack scenarios it is desirable for the operator to associate DHCPv4 and DHCPv6 messages as belonging to the same client interface based on an identifier that is already used by that operator such as the client hardware address.

Currently, the DHCPv6 protocol specification [RFC3315] does not define a way for DHCP clients to specify client link-layer address in the DHCPv6 message sent towards DHCPv6 Server. Similarly DHCPv6 Relay or Server cannot glean client link-layer address from the contents of DHCPv6 message received. DHCPv6 protocol specification mandates all clients to prepare and send DUID as the client identifier option in all the DHCPv6 message exchange. However none of these methods provide a simple way to extract client's link-layer address. This presents a problem to an operator who is using an existing DHCPv4 system with the client hardware address as the customer identifier, and desires to correlate DHCPv6 assignments using the same identifier. Modifying the system to use DUID based correlation across DHCPv4 and DHCPv6 is possible, but it requires a modification of the DHCPv4 system and associated back-ends.

Providing an option in DHCPv6 relay forward messages to carry client link-layer address explicitly will help above mentioned scenarios. For e.g. it can be used along with other identifiers to associate DHCPv4 and DHCPv6 messages from a dual stack client. Further, having

client link-layer address in DHCPv6 will help in proving additional information in event debugging and logging related to the client at relay and server. The proposed option may be used in wide range of networks, two notable deployment models are service provider and enterprise network environments.

3. DHCPv6 Client Link-layer Address Option

The format of the DHCPv6 Client Link-layer Address option is shown below.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| OPTION_CLIENT_LINKLAYER_ADDR  |           option-length       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    hardware type (16 bits)    |                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               |
|               link-layer address (variable length)            |
|                                                               |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

option-code: OPTION_CLIENT_LINKLAYER_ADDR (TBD)
option-length: 2 + length of link-layer address
hardware type: Client Link-layer address type. The hardware type MUST be a valid hardware type assigned by the IANA, as described in [RFC0826]
link-layer address: Client Link-layer address.

4. DHCPv6 Relay Agent Behavior

DHCPv6 Relay agents which receive messages originating from clients (for example Solicit and Request, but not, for example, Relay Forward or Advertise) MAY include the link-layer source address of the received DHCPv6 message in Client Link-layer Address option in relayed DHCPv6 Relay Forward messages. The DHCPv6 Relay agent behavior can depend on configuration that decides whether Client Link-layer Address option needs to be processed and included.

5. DHCPv6 Server Behavior

If DHCPv6 Server is configured to store or use client link-layer address, it SHOULD look for the client link-layer address option in

the RELAY-FORW DHCP message of the DHCPv6 Relay agent closest to the

client. This specification does not specify the mechanism for DHCPv6 Server to find out link-layer address of the directly connected clients as a DHCP option as it can obtain it directly from the link-layer source address of the received DHCPv6 message.

There is no requirement that a server return this option and its data in a downstream DHCP message.

6. IANA Considerations

IANA is requested to assign an option code to OPTION_CLIENT_LINKLAYER_ADDR from the "DHCPv6 and DHCPv6 options" registry (http://www.iana.org/assignments/dhcpv6-parameters/dhcpv6-parameters.xml).

7. Security Considerations

Security issues related DHCPv6 are described in section 23 of [RFC3315].

8. Acknowledgements

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9. Normative References

[RFC0826] Plummer, D., "Ethernet Address Resolution Protocol: Or converting network protocol addresses to 48.bit Ethernet address for transmission on Ethernet hardware", STD 37, RFC 826, November 1982.

[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.

[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.

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