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DHCPv6 through Tunnels
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Abstract

The host configuration protocol DHCPv6 [RFC3315] relies on link-local addresses as source addresses and multicast addresses for destination addresses. However, some tunnel links (e.g., 6rd [RFC5969]) do not have IPv6 link-local addresses and do not support IPv6 multicast addresses. Taking 6rd as an example, this document specifies how DHCPv6 is used across such tunnel links.

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1. Introduction

Various tunnel techniques are used to deploy IPv6 over IPv4, such as 6rd. The source tunnel end-point typically generates its IPv6 global address and for some tunnel techniques such as 6rd, generates a prefix for the downstream network. By some means, the source tunnel end-point always knows the IPv6 address of the other tunnel end-point.

The source tunnel end-point often need more configuration data for itself and its downstream network, such as DNS, SIP, NTP IPv6 server addresses or else. Therefore, the source tunnel end-point needs to send DHCPv6 requests over its IPv6 upstream link, the tunnel link.

As specified in the DHCPv6 specification [[RFC3315](#)], "...The client MUST use a link-local address assigned to the interface for which it is requesting configuration information as the source address in the header of the IP datagram." and "...Unless otherwise specified in this document, or in a document that describes how IPv6 is carried over a specific type of link (for link types that do not support multicast), a client sends DHCP messages to the All_DHCP_Relay_Agents_and_Servers".

However, link-local addresses and even multicast addresses are not supported over some tunnel links such as 6rd [[RFC5969](#)] .

Taking 6rd as an example, this document describes how DHCPv6 service can be provided across such tunnel links .

2. Conventions

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](#)].

3. Using DHCPv6 over Tunnel Links

There are two problems to be solved with regards to providing DHCPv6 service over a 6rd link:

- o A DHCPv6 client uses an IPv6 link-local address as the source address when requesting configuration information [[RFC3315](#)]. Link-local addressing is not supported on an 6rd link.
- o A DHCPv6 client sends a request to the All_DHCP_Relay_Agent_and_Servers multicast address. 6rd as specified in [[RFC5969](#)] does not support IPv6 multicast.

This document describes a possible solution to the above two problems which doesn't require any change to the DHCPv6 protocol [[RFC3315](#)]. The basic idea of this solution is to send DHCPv6 requests via a local DHCPv6 relay on the 6rd CE.

The 6rd CE MUST support a local DHCPv6 client and relay. The DHCPv6 client running on the 6rd CE's virtual tunnel interface MUST send DHCPv6 messages through a local DHCPv6 relay that encapsulates the client message and forwards it to a DHCPv6 server or relay using one of the 6rd CE's global unicast addresses as the source address.

The 6rd CE DHCPv6 relay agent SHOULD use the 6rd BR IPv6 anycast address as the destination address, [section 20 of \[RFC3315\]](#). If the 6rd link supports multicast [[I-D.ietf-mboned-auto-multicast](#)] the 6rd CE DHCPv6 relay MAY use the All_DHCP_Servers [[RFC3315](#)] as the destination address of Relay-forward messages.

The 6rd BRs in the 6rd domain MUST be configured as DHCPv6 relays or servers on their 6rd virtual interfaces.

The 6rd CE SHOULD behave according to [[I-D.ietf-v6ops-ipv6-cpe-router](#)]. In particular it operates a DHCPv6 client on the WAN side (6rd virtual) interface and as a DHCPv6 server on the LAN-side interface(s).

4. IANA Considerations

This specification does not require any IANA actions.

5. Security Considerations

There are no new security considerations pertaining to this document.

6. Acknowledgements

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7. References

7.1. Normative References

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7.2. Informative References

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