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Customer Edge Router Identification Option
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Abstract

Addressing mechanisms supporting DHCPv6 Prefix Delegation in home networks such as those described in CableLabs' eRouter specification and the HIPnet Internet-Draft require identification of the customer edge router (CER) as the demarcation between the customer network and the service provider network. This document reserves a DHCPv6 option to identify the CER.

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1. Introduction

Some addressing mechanisms supporting DHCPv6 Prefix Delegation in home networks such as those described in [I-D.grundemann-homenet-hipnet] and [EROUTER] require identification of the customer edge router as the demarcation between the customer network and the service provider network. For prefix delegation purposes, it is desirable for other routers within the home to know which device is the CER so that the customer home network only requests a single prefix from the ISP DHCPv6 server, and efficiently distributes this prefix within the home. CER-ID is a 128-bit string that optionally represents an IPV6 address, or another arbitrary number. The CER-ID maybe treated as a hint to be used with border detection methods. This document reserves a DHCPv6 option to be used to identify the CER.

1.1. 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].

2. CER Identification Option

A Customer Edge Router (CER) sets the CER_ID to the IPv6 address of its LAN interface. If it has more than one LAN IPv6 address, it selects one of its LAN or other non-WAN IPv6 addresses to be used as the CER_ID. An ISP server does not respond with the CER_ID or sets

the CER_ID to ::. Such a response or lack of response indicates to the DHCPv6 client that it is the CER.

The format of the CER Identification option is:

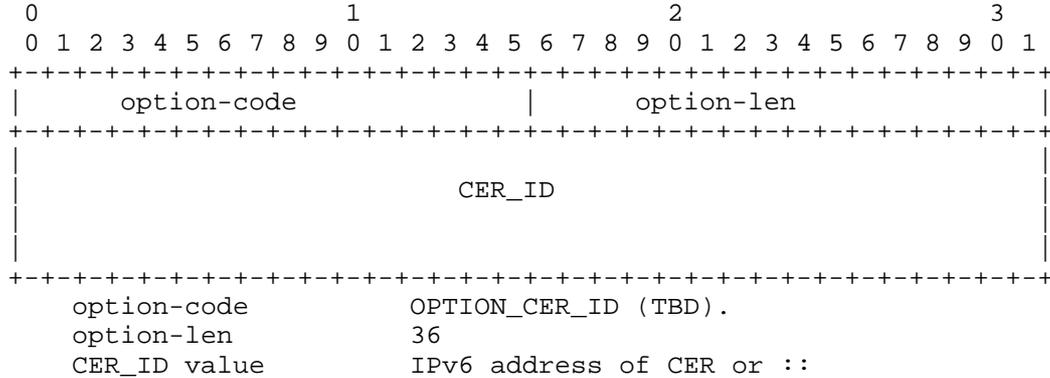


Figure 1.

A DHCPv6 client SHOULD include the CER Identification option code in an Option Request option [RFC3315] in its DHCP Solicit messages.

The DHCPv6 server MAY include the CER Identification option in any response it sends to a client that has included the CER Identification option code in an Option Request option. The CER Identification option is sent in the main body of the message to client, not as a sub-option in, e.g., an IA_NA, IA_TA [RFC3315]option.

When sending the CER Identification option, the DHCPv6 server MUST set the CER_ID value to either one of its IPv6 addresses, another identifier, or ::. If a device does not receive the CER Identification Option or receives a CER ID of :: from the DHCPv6 server, it MUST include one of its Globally Unique IPv6 addresses (unless another identifier is used), in the CER_ID value in response to DHCPv6 messages received by its DHCPv6 server that contains the CER Identification option code in an Option Request option. If the device has only one LAN interface, it SHOULD use its LAN IPv6 address as the CER_ID value. If the device has more than one LAN interface, it SHOULD use the lowest Globally Unique address.

3. CER-ID Compatibility

CER-ID explicitly indicates that a gateway is, or is not, the demarcation point between public and private networks by containing a reachable IPv6 address, other identifier or a double colon '::'

(double colon indicates that the CER-ID sender is NOT the edge router), and as a complement, can be applied to various border definitions and detection methods such as:

- o I.D. Draft-IETF-Homenet-Arch-16 [I-D.ietf-homenet-arch]
- o I.D. Draft-Grundemann-homenet-HIPnet-01 [I-D.grundemann-homenet-hipnet]
- o I.D. Draft-IETF-Kline-Homenet-Default-Perimeter-01 [I-D.kline-default-perimeter]
- o Others, including manual configuration

4. IANA Considerations

IANA is requested to assign an option code from the "DHCP Option Codes" Registry for OPTION_CER_ID. IANA is also requested to maintain a list of authentication options.

5. Security Considerations

The security of a home network is an important consideration. Both the HIPNet [I-D.grundemann-homenet-hipnet] and Homenet [I-D.ietf-homenet-arch] approaches change the operational model of the home network vs. today's IPv4-only paradigm. Specifically, these networks eliminate NAT inside the home network (and only enable it for IPv4 at the edge router, if required), support global addressability of devices, and thus need to consider firewall and/or filter support in various home routers. As the security profile of these home routers can shift based on their position in the network (e.g., edge vs. internal), security can be severely compromised if routers misidentify their border and mistakenly reduce or eliminate firewall rules. If the CER-ID option is used as part of the border detection algorithm, it becomes a natural, but not the only place to enact firewall, NAT, Prefix Delegation and other functions in the home network. Further security is provided using the mechanisms defined in RFC 3315, DHCP for IPv6.

6. Acknowledgements

7. References

7.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, 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.

7.2. Informative References

[EROUTER] CableLabs, "CableLabs IPv4 and IPv6 eRouter Specification (CM-SP-eRouter-I12-131120)", April 2014.

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