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Client Preferred Prefix option for DHCPv6
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Abstract

This document describes the Client Preferred Prefix option by which the client can specify its preferred prefixes on which the addresses need to be allocated by the server.

1. Introduction

Scenario 1: The client's link has multiple prefixes of different scopes and the administrator policy on the server insists that the addresses need to be allocated on site-local prefixes only. The client will not be able to communicate with a node that belongs to a different site, as the server allocates only site-local addresses in IAs.

Scenario 2: The client's link has two prefixes: site-local and global. The administrator policy insists that addresses need to be allocated on both the prefixes. All the nodes on a link will not communicate with external sites and thus all of them do not require global addresses. However, the server allocates addresses on both the prefixes. So, the client needs to send the release message to release the unwanted addresses, which requires extra transactions.

Scenario 3: The node has used the stateless autoconf and learned about prefixes. Say, the link has two prefixes 3ffe::/64 and 3fff::/64 and the link has been subnetted to two sets with these prefixes. Now, suddenly the RAs say to use stateful autoconf. It depends up on the dhcpv6 configuration whether the node will get both the prefixes or not. It will be worser if the node using 3ffe::/64 has to renumber to 3fff::/64 unnecessarily, though both the prefixes are valid in the link.

Scenario 4: In a highly secured environment where there is only a known IPv6 prefix by specific entities provided the knowledge of that prefix out of band not over a network. The entity will request this prefix as a DHCPv6 client and will provide secret security parameter to the DHCPv6 server. The server then provides a complete address for that prefix. The entity client now can use that address for communications with nodes that accept no other prefix on the network. The applications for this are special operations for entities like the Military, Law Enforcement, Fire Departments, and Doctors.

To overcome the problems described in the above Scenarios, the client can specify its preferred prefixes to the server using Client Preferred Prefix option.

2. Requirements

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in RFC 2119 [2]

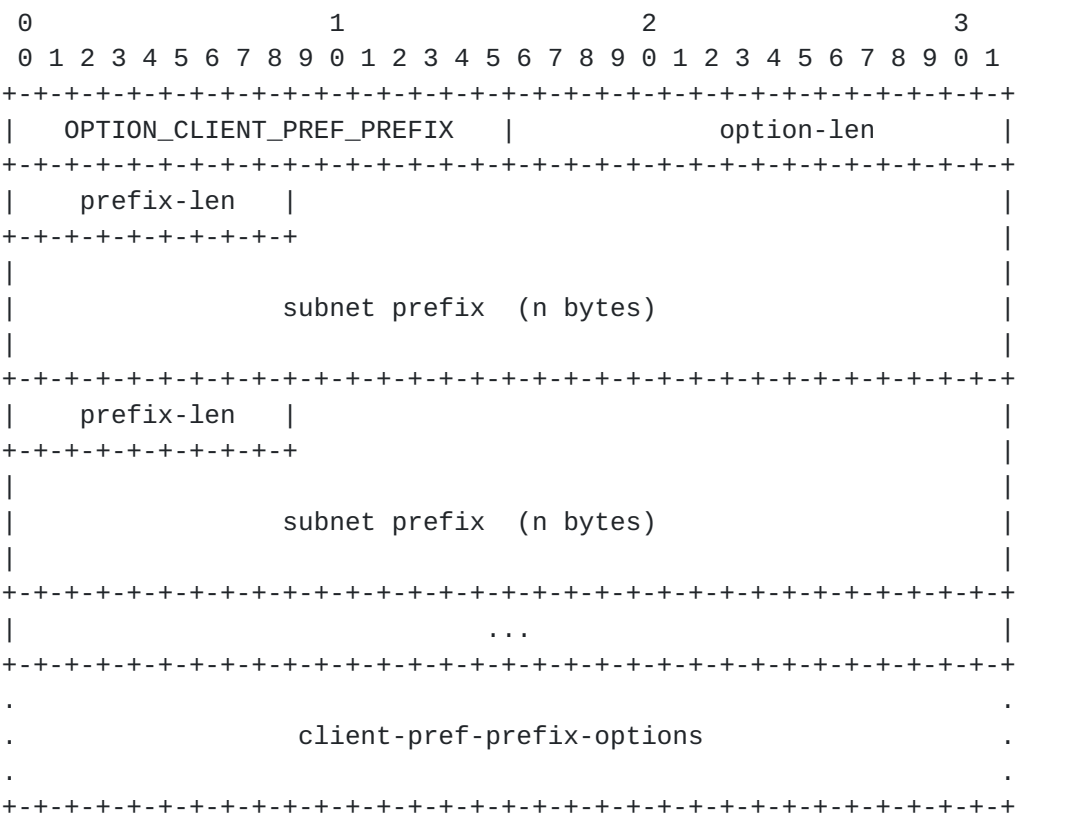
3. Terminology

This document uses terminology specific to IPv6 and DHCPv6 as defined in section "Terminology" of the DHCP specification.

4. Client Preferred Prefix option

Client Preferred Prefix option is used by the client to specify its preferred prefixes to the server.

The format of the Client Preferred Prefix option is as shown below:



option-code: OPTION_CLIENT_PREF_PREFIX (tbd)

option-len: total length of the prefix-len and subnet prefix lists and its encapsulated options.

prefix-len: prefix length of the subnet address.

subnet prefix: 'n' bytes of subnet prefix, where 'n' is minimum number of bytes required to refer 'prefix-len' bits of the prefix.

client-pref-prefix-options: options associated with Client Preferred Prefix option.

5. Server Behavior

If the server policy doesn't support client preferred prefix option, then it can either send reply with OptionUnsupported in the encapsulated error code option in client preferred prefix option or allocate addresses based on its original policy. The server behavior SHOULD be configurable by the administrator.

If the server policy supports client preferred prefix option and if this option contains one or more prefixes which are not valid for the

client's link, then, the server MUST send the reply with error code NotOnLink.

If the server policy supports client preferred prefix option and all the prefixes in this option are valid for the client's link, then the server MUST allocate addresses only on the prefixes specified in client preferred prefix option encapsulated in the IAs.

6. Client Behavior

If the client has received OptionUnsupported error, it can either choose the next server to send request, till the server list gets exhausted or it can start the configuration exchange as specified in Section 18.1.1 of [1] without the client preferred prefix option.

If the server list has exhausted then, it MUST start the configuration exchange as specified in Section 18.1.1 of [1] without the client preferred prefix option.

If the client has received the addresses with the prefixes that were not specified in client preferred prefix option, it can release the unwanted addresses.

7. Appearance of these options

Client Preferred Prefix option MUST occur only in Request and Reply messages. This option MUST occur in Reply messages only if it encapsulates the Error code option.

Client Preferred Prefix option MUST occur only as an encapsulated option in the IA or IA_TA option.

Client Preferred Prefix option MUST only have Error code option as the encapsulated option.

8. Security Considerations

Since, this option can occur only in IA or IA_TA option, all the IA-relevant security considerations are applicable to this option too.

To avoid attacks through this option, the DHCP client SHOULD use authenticated DHCP (see section "Authentication of DHCP messages" in the DHCPv6 specification [1]).

9. IANA Considerations

IANA is requested to assign an option code to this option from the option-code space defined in section "DHCPv6 Options" of the DHCPv6 specification [1].

10. Normative Reference

[1] Bound, J., Carney, M., Perkins, C., Lemon, T., Volz, B. and R. Droms (ed.), "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", draft-ietf-dhc-dhcpv6-28 (work in progress), November 2002.

11. Informative Reference

[2] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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