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Relay-Supplied DHCPv6 Precedence Options
draft-reddy-mif-dhcpv6-precedence-ops-02

Abstract

Network configuration of hosts is currently relatively static with little consideration of dynamic network characteristics. The network infrastructure is aware of dynamic network characteristics. This specification extends DHCPv6 so that the DHCPv6 relay agent can influence a host's configuration.

Status of this Memo

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[1.](#) Introduction

DHCPv6 allows relatively static information to be configured in hosts, which is somewhat limiting. On a dynamic network, the DHCPv6 relay agent can observe characteristics of a network -- such as IPv6 multihoming which might be temporarily unavailable or need load balancing of traffic towards each upstream ISPs. By including additional information in relayed DHCPv6 messages, the DHCPv6 relay agent can influence the DHCPv6 server to provide answers that are better suited to the host's configuration on the network.

In this document we propose new DHCPv6 options to be added by the DHCPv6 relay agent when it generates a Relay-Forwarded message. [\[RFC6724\]](#) defines default address selection mechanisms for IPv6 that allow nodes to select appropriate address when faced with multiple source and/or destination addresses to choose between. An initial desire is to influence the DHCPv6 server's responses that modify the host's address policy table [\[I-D.ietf-6man-addr-select-opt\]](#) based on observed network characteristics.

[2.](#) 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 [\[RFC2119\]](#).

[3.](#) Usage Scenarios

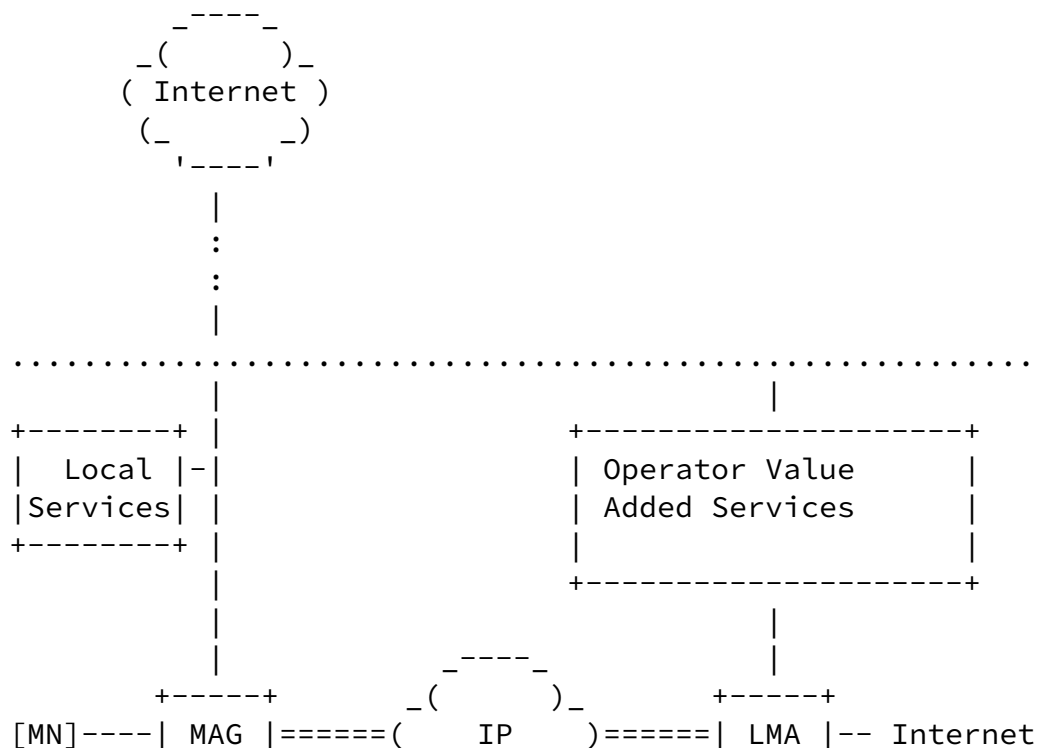
The DHCPv6 extension described in this document is useful with IPv6 multihoming and with IP address-based authentication.

[3.1.](#) IPv6 Multihoming

- o In Proxy Mobile IPv6 [\[RFC5213\]](#) where Mobile Node is assigned

prefixes from both local access network and home network. This will allow selected traffic to go through the Mobile Packet Core and the rest through the Local access Network. When DHCPv6 Relay Agent is co-located with the mobile access gateway, the proposal is for the relay agent to influence the DHCPv6 Server in the home network by adding the Address Selection option. The relay agent can add an Address Selection option to the DHCPv6 request suggesting the local access network address selection policy table overriding the default address selection parameters and policy table. The DHCPv6 server in the home network will merge the policy received in Address Selection option with it's own policy table as explained in [section 4.3](#) of

[[I-D.ietf-6man-addr-select-opt](#)]. This updated policy table will be provided to the DHCPv6 client (MN) in Address Selection option (OPTION_ADDRSEL_TABLE). When the DHCPv6 Server is co-located with the mobile access gateway, the DHCPv6 Server in the local access network will receive the policy table from the DHCPv6 server in the home network using DHCPv6 INFORMATION-REQUEST. The DHCPv6 server in local access network will merge the received policy table with it's local policy table. The following figure depicts this scenario.



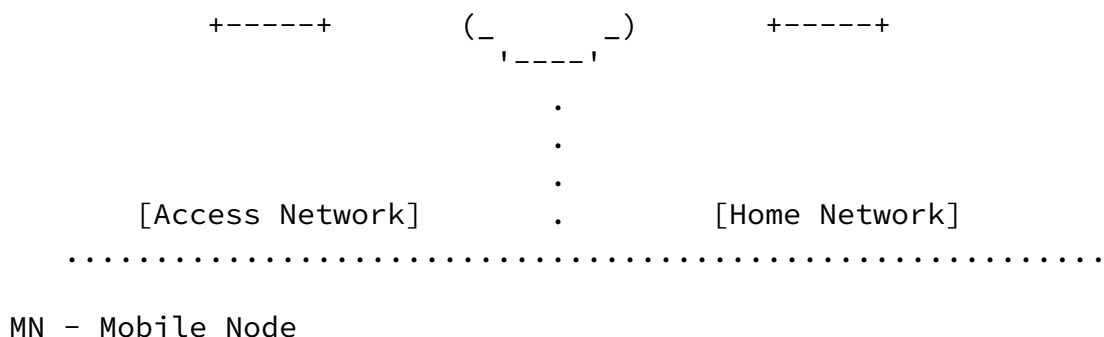


Figure 1: Proxy Mobile IPv6

[3.2.](#) Disabling IPv6 Temporary Addresses

[3.2.1.](#) Avoiding Excessive IP-Based Authentication

Some managed networks authenticate hosts with an authentication supplicant or for hosts lacking the supplicant perform address-based authentication. When Address-based authentication is used, re-

authentication occurs for each address obtained by the host, which can create a lot of authentication transactions. To reduce this chatter, it can be useful to disable IPv6 Privacy Addresses [[RFC4941](#)] on those hosts using address-based authentication. In a managed network, this option will ensure that temporary addresses are disabled for hosts without authentication supplicant. This way managed networks can conditionally disable temporary addresses for only a set of hosts.

The relay agent may be configured with the external prefixes that will be assigned to the host. In that case, the relay agent would use the Address Selection option. In the case where the relay agent is unaware of the external prefixes that will be assigned to the host, the relay agent uses the Relative Precedence option. Details for processing those options are described later in the document.

Whenever either of those options is used, a DHCPv6 server that understands those options will ignore the IA_TA options in the DHCPv6 request, effectively disabling the use of temporary addresses for that host.

[3.2.2.](#) Reducing Management Impact

In addition, there are known issues in managing privacy extensions in certain scenarios. These are described in managing privacy extensions [[I-D.gont-6man-managing-privacy-extensions](#)]. In such scenarios, conditionally disabling temporary addresses allows administrators to better manage deployments.

4. Options

To realize the functions described above, this document defines new DHCPv6 option Relay-Supplied Prefix and updates the Address Selection option defined in [[I-D.ietf-6man-addr-select-opt](#)]. These DHCPv6 options are added by the DHCPv6 relay agent when it relays a DHCPv6 message, and both MAY appear together in the same DHCPv6 message.

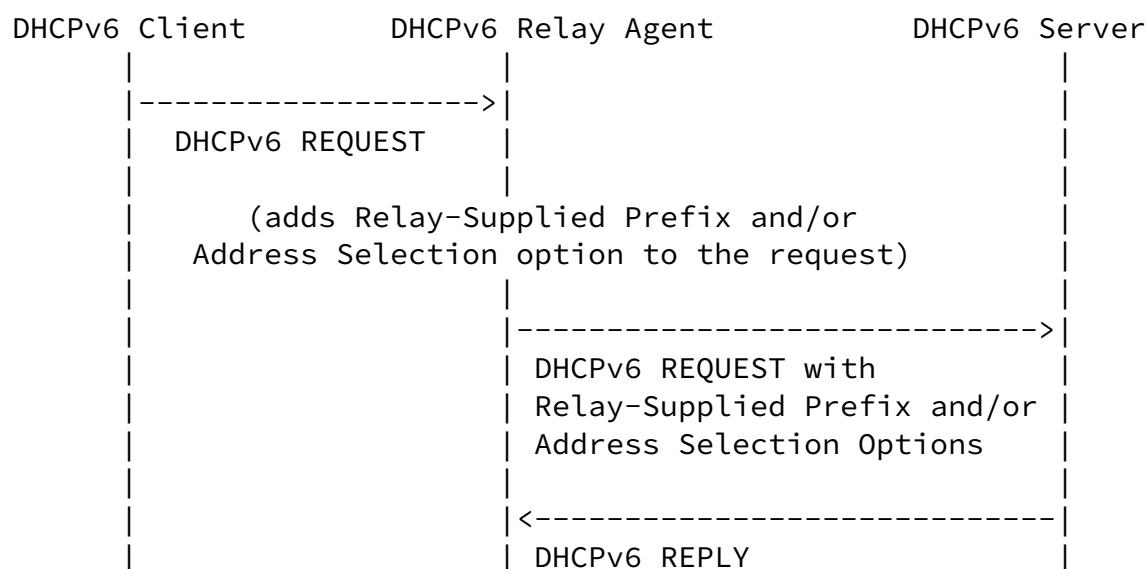




Figure 2: Message Flow, Relay Agent adding Option

Relay-Supplied Prefix option carries host and network information observed by the DHCPv6 relay agent such as host does not support 802.1x supplicant and will be subjected to web-authentication. The Address Selection option allows prioritizing among a list of prefixes the DHCPv6 relay agent expects the DHCPv6 server to provide to the host.

4.1. Address Selection option

The layout of the Address Selection option is below:

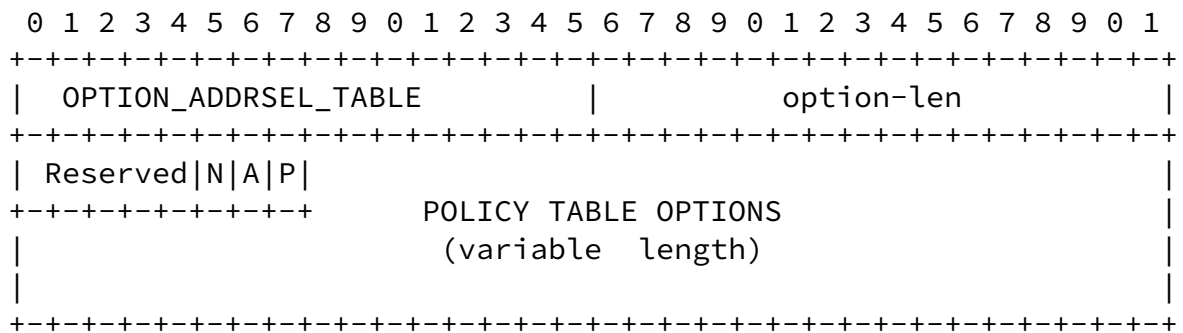


Figure 3: Option Type 1 message format

The fields are described below:

option-code : OPTION_ADDRSEL_TABLE defined in
[[I-D.ietf-6man-addr-select-opt](#)]

option-len: Option Length

Reserved: Must be 0 and ignored by the server.

N: A value of 1 indicates that the relay agent wants the DHCPv6

server to ignore any IA_TA options in the DHCPv6 request, as if the IA_TA options were not present. This effectively disables privacy extensions [RFC4941]. A value of 0 indicates the IA_TA options, if present in the DHCPv6 request, are processed normally by the DHCPv6 server. This value has no impact on destination prefixes.

A: This flag **MUST** be set to 0 and ignored by the DHCPv6 server

P: This flag MUST be set to 0 and ignored by the DHCPv6 server.

Prefix Table Options: Zero or more Address Selection Policy Table options defined in [\[I-D.ietf-6man-addr-select-opt\]](#).

4.2. Relay-Supplied Prefix Option

The Relay-Supplied Prefix option is defined below:

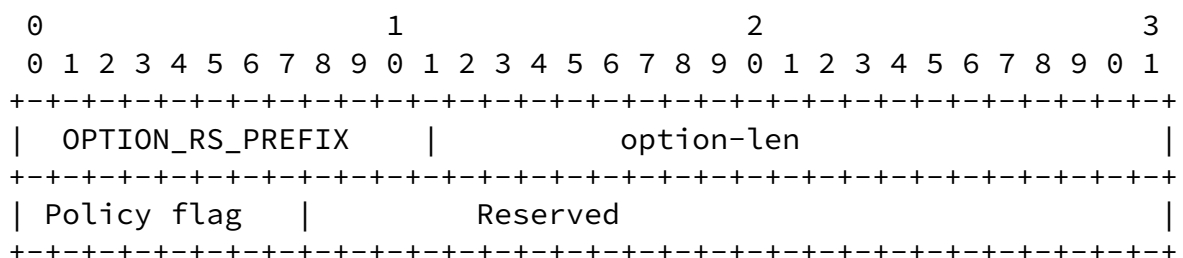


Figure 4: Option Type 2 message format

option-len: Length of the option.

Policy flag: 8-bit unsigned integer.

Reserved: Must be 0 and ignored by the server.

The Policy Flag is defined below, and the actions taken by the DHCPv6 server based on this flag are described in [Section 6](#).

Value	Name	Description
0x01	IPV6_DIS_TEMP_ADDR	Disable IPv6 Temporary Address

Figure 5: Policy flag Values

5. Relay Agent Behaviour

DHCPv6 relay agents that implement this specification MUST be configurable for sending the Address Selection option and the Relay-Supplied Prefix option. Relay agents SHOULD have separate configuration for each option to determine if it is to be added to DHCPv6 request. A relay agent will include these options in the option payload of a Request message. DHCPv6 relay agent should set Address Selection option when there is a need to change the label/precedence value for prefixes in scenario's discussed in [Section 3.1](#) and/or disable IPv6 temporary addresses for the host.

Discussion: To reduce end-user configuration of the DHCPv6 relay agent, the DHCPv6 relay agent can use the mechanism specified in [\[RFC3633\]](#) to automatically learn the IPv6 prefixes that will be delegated to DHCPv6 clients. DHCPv6 relay agent in future can use leasequery-like capability discussed in [section 3.2](#) of RFC [\[RFC5007\]](#) to learn the prefix information from DHCPv6 server.

DHCPv6 relay agent should set Relay-Supplied Prefix option when it receives DHCPv6 request from a host with specific characteristics like authenticated using address based mechanism. Relative Precedence option is used when the relay agent is unaware of the external prefixes to be assigned to the host.

6. DHCPv6 Server Behaviour

Upon receiving a DHCPv6 request containing the Address Selection option or the Relay-Supplied Prefix Option, the DHCPv6 server processing is described below:

6.1. Address Selection option

Address Selection option - The DHCPv6 server should send a reply to the host with the prefixes received from DHCPv6 relay agent along with Precedence. The DHCPv6 server will merge the policy received in Address Selection option with it's own policy table as explained in section 4.3 of [\[I-D.ietf-6man-addr-select-opt\]](#).

If the option has "N" bit set to 1, the server SHOULD ignore the IA_TA options in the DHCPv6 request, effectively disabling the use of temporary addresses for that prefix. The DHCPv6 server will ignore the "N" bit for destination prefixes.

Note : If DHCPv6 servers receives both options with conflicting flags IPV6_DIS_TEMP_ADDR and "N" bit then it SHOULD treat it as mis-configuration on the relay agent and discard these options.

[6.2.](#) Relay-Supplied Prefix Option

The Relay-Supplied Prefix Option contains flags that defines the characteristics of the host.

1. IPV6_DIS_TEMP_ADDR - This flag indicates that Temporary IPv6 address allocation is to be disabled for the host. The DHCPv6 server should ignore any IA_TA options in the DHCPv6 request.

[7.](#) Security Considerations

Relay-Supplied Prefix is exchanged only between the DHCPv6 relay agent and DHCPv6 server and Address Selection option can originate either from the server or the relay agent, [section 21.1 of \[RFC3315\]](#) provides details on securing DHCPv6 messages sent between servers and relay agents. And, [section 23 of \[RFC3315\]](#) provides general DHCPv6 security considerations.

It is possible for a DHCPv6 client to include the Relay-Supplied Prefix option or the Address Selection options, which would be received by a DHCPv6 server. This would cause the DHCPv6 client to receive a different DHCPv6 response than it would have otherwise received. .

[8.](#) IANA Considerations

IANA is requested to assign option code to OPTION_RS_PREFIX from the option-code space as defined in section "DHCPv6 Options" of [\[RFC3315\]](#).

[9.](#) Change History

[Note to RFC Editor: Please remove this section prior to publication.]

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[9.1.](#) Changes from [draft-reddy-mif-dhcpv6-precedence-ops-00](#) to -01

- o Added Proxy Mobile IPv6 with traffic offload use-case in [Section 3.1](#).
- o Updated [Section 3.2.1](#) to highlight the ability to disable temporary addresses selectively.

[9.2.](#) Changes from [draft-reddy-mif-dhcpv6-precedence-ops-01](#) to -02

- o Updated usecase in [section 3.1](#)
- o Changed Absolute Precedence Option

[10.](#) References

[10.1.](#) Normative References

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[RFC6724] Thaler, D., Draves, R., Matsumoto, A., and T. Chown, "Default Address Selection for Internet Protocol Version 6 (IPv6)", [RFC 6724](#), September 2012.

[10.2.](#) Informative References

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