DHCP Relay Agent Assignment Notification Option
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Abstract

The DHCP Relay Agent Assignment Notification option is sent from a
DHCP server to a DHCP relay agent to inform the relay agent of IPv6
addresses that have been assigned or IPv6 prefixes that have been
delegated to DHCP clients.

1. Introduction

The DHCP Relay Agent Assignment Notification option encapsulates
address and prefix options to indicate that an address or prefix has
been assigned. The option may also carry other information required
by the network element for configuration related to the assigned
address or prefix.

For example, a network administrator uses the DHCP Relay Agent
Assignment Notification option to inform a relay agent of a prefix
that has been delegated through DHCP PD to a DHCP client. The relay
agent notifies the network element on which the it is implemented of
the delegation information so the network element can add routing
information about the delegated prefix into the appropriate routing
protocols.

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 RFC 2119 [1].

The term "DHCP" in this document refers to DHCP for IPv6, as defined
in RFC 3315 [2]. The terms "DHCP prefix delegation" and "DHCP PD"
refer DHCP for IPv6 prefix delegation, as defined in RFC 3633 [3]

Additional terms used in the description of DHCP and DHCP prefix
delegation are defined in RFC 3315 and RFC 3633. In this document
"assigning" an IPv6 prefix is equivalent to "delegating" a prefix.

3. Option semantics

The DHCP Relay Agent Assignment Notification option carries
information about assigned IPv6 addresses and prefixes. It
encapsulates an IA Address option (RFC 3315) or an IA Prefix option
(RFC 3633), and possibly other options that carry other information
related to the assigned IPv6 address or prefix.

The DHCP server MAY include this option in a Reply message sent to a
client that includes assigned addresses and/or prefixes. If the DHCP
server does include this option in a Reply message, it MUST include
it in the option area of the Relay-reply message sent to the relay
agent intended as the recipient of the option.

The DHCP server is responsible for synchronizing any state created by
a node through the use of the Assignment Notification option. For

example, if a DHCP server receives a Release message for a delegated
prefix, it causes the node to delete any state associated with that
prefix by sending an Assignment Notification option containing an IA
Prefix option with the released prefix and a valid lifetime of zero.

A relay agent that receives this option SHOULD pass the information
to the node in which the relay agent is instantiated. The node MAY
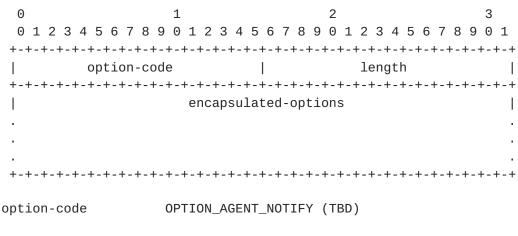make use of the information received from the relay agent.

If a node creates state based on the information included in this
option, it MUST remove that state when the lifetime as specified in
the option expires.

Examples of use:

o Populate an ACL with an assigned IPv6 address if the network
   device in which the relay agent is instantiated implements a
   security policy limiting IPv6 forwarding to devices that have
   obtained an address through DHCP
o Inject routing information into a routing infrastructure about a
   delegated prefix on behalf of a requesting router

4. Option format

The DHCP Relay Agent Assignment Notification Option has the following
format:

```
 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-code          |            length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     encapsulated-options                      |
.                                                               .
.                                                               .
.                                                               .
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

option-code   OPTION_AGENT_NOTIFY (TBD)

length   length of encapsulated options, in octets

encapsulated-options DHCP options to be delivered by the Relay Agent
                     Assignment Notification option

5. Encapsulating DHCP options in the DHCP Relay Agent Assignment
   Notification Option

   The contents of options encapsulated in the DHCP Relay Agent
   Assignment Notification option are interpreted according to the use
   of those options in the node on which the relay agent is implemented.
   For the purposes of address and prefix assignment, the uses of the
   DHCP IA Address and IA Prefix options are defined in this document.

   Note that the contents of these options are not necessarily the same
   as in the corresponding options sent to the DHCP client. For
   example, the node that receives the information from these options
   may be instructed to use the information for a shorter period of time
   than the client by setting a shorter valid-lifetime in the this
   option.

5.1. IA Address option

   The fields in an IA Address option (OPTION_IAADDR, option code 5) are
   used as follows:

   IPv6 address The IPv6 address assigned in this DHCP message

   preferred-lifetime Not used at the time this document was published

   valid-lifetime The expiration lifetime of the information carried in
      this IA Address option, expressed in units of seconds; the
      expiration-lifetime is a relative time, giving the duration
      relative to the current time of the information in this IA Address
      option; if the valid-lifetime is 0, the information is no longer
      valid.

   IAaddr-options Not used

5.2. IA Prefix option

   The fields in an IA Prefix option (OPTION_IAPREFIX, option code 28)
   are used as follows:

   preferred-lifetime Not used

   valid-lifetime The expiration lifetime of the information carried in
      this IA Prefix option, expressed in units of seconds; the
      expiration-lifetime is a relative time, giving the duration
      relative to the current time of the information in this IA Prefix
      option; if the valid-lifetime is 0, the information is no longer
      valid.

prefix-length length for this prefix in bits

IPv6-prefix The IPv6 prefix assigned in this DHCP message

IAprefix-options Not used at the time this document was published

6. Requesting assignment information from the DHCP server

If a relay agent requires the DHCP server to provide information
about assigned addresses and prefixes, it MUST include an Option
Request option, requesting the Assignment Notification option, as
described in section 22.7 of RFC 3315.

7. IANA considerations

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

8. Security considerations

Security issues related to DHCP are described in RFC 3315 and RFC
3633.

The DHCP Relay Agent Assignment Notification Option may be used to
mount a denial of service attack by causing a node to incorrectly
populate an ACL or incorrectly configure routing protocol information
for a delegated prefix. This option may also be used to insert
invalid prefixes into the routing infrastruture or add invalid IP
addresses to ACLs in nodes. Communication between a server and a
relay agent, and communication between relay agents, can be secured
through the use of IPSec, as described in section 21.1 of RFC 3315.

9. Normative References

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

[2] Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C., and M.
     Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)",
     RFC 3315, July 2003.

[3] Troan, O. and R. Droms, "IPv6 Prefix Options for Dynamic Host

Configuration Protocol (DHCP) version 6", [RFC 3633](),
December 2003.

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