



CHAPTER 11

About the DHCPv6 Lease Query Login Event Generator

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Introduction

This chapter describes the Service Control Management Suite (SCMS) Subscriber Manager (SM) DHCPv6 Lease Query Login Event Generator (LEG) software module.

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Information About the DHCPv6 Lease Query LEG

The Cisco Service Control Subscriber Manager DHCPv6 Lease Query LEG is a software module that handles pull-requests from different Cisco Service Control Engine (Cisco SCE) platforms in the network. The LEG queries the DHCPv6 server using a DHCPv6 Lease-Query transaction. The DHCPv6 Lease Query LEG can be run on the SM server.

To use DHCPv6 Lease Query LEG, SM must be configured in dual stack mode, so that the SM contains IPv6 management address as well.

Table 11-1 Subscriber Manager Management Interface Configuration in Dual Stack Mode

Configuration	DHCPv4 Lease Query LEG Only	DHCPv4 Lease Query LEG and DHCPv6 Lease Query LEG	DHCPv6 Lease Query LEG Only
SM Management Interface	IPv4	IPv4 and IPv6	IPv4 and IPv6

To use the DHCPv6 Lease Query LEG, the DHCPv6 server must conform to RFC 5007.



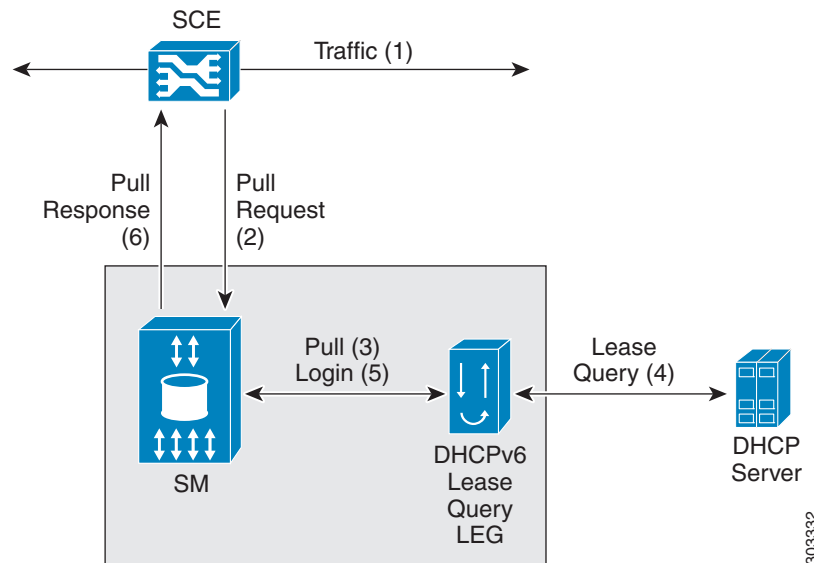
Note

DHCPv6 Lease Query LEG on Cisco SCE is not supported.

DHCPv6 Lease Query LEG Operation

Figure 11-1 represents the operation of the DHCPv6 Lease Query LEG.

Figure 11-1 DHCPv6 Lease Query LEG Operation - SM Installation



The subscriber's traffic (1) triggers a pull-request from the SCE (2). The SM receives the request for processing. If the SM does not find a subscriber with a matching IP address in the subscriber database, it passes the pull-request to the DHCPv6 Lease Query LEG (3). The LEG queries the DHCPv6 server. If the server finds a match for the IP address in its database, the server replies with the subscriber information (4). The LEG performs a login operation (5). This operation updates the subscriber database based on the received information and logs the subscriber into the SCE (6), which triggered the pull-request.

The DHCPv6 Lease Query LEG supports the active_active mode only when the lease information of the configured servers are shared between the configured servers. The LEG queries all the servers that are configured, and accepts the lease provided by the servers that respond first.



Note

An Internet Engineering Task Force (IETF) standard defines the DHCPv6 Lease-Query transaction. The LEG supports the RFC 5007 standard.

Information About the DHCPv6 Lease Query LEG Functionality

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The DHCPv6 Lease Query LEG Process

For the DHCPv6 Lease Query LEG to work, the Subscriber Manager and the DHCPv6 server should run on the IPv6 management address.

The DHCPv6 Lease Query LEG processes the DHCPv6 Lease Query transactions to the DHCPv6 server using the IPv6 address indicated in the pull request from Cisco SCE.

The DHCPv6 server replies whether there is an active lease (DHCPv6 LEASE QUERY REPLY message) for this IPv6 address and provides information about the subscriber associated with this IP address according to the list of options requested by the LEG.

The DHCPv6 Lease Query LEG supports up to two redundant DHCPv6 servers. The LEG identifies a server failure by counting the consecutive requests that time out. After a configurable threshold of timed-out requests, the LEG starts to send the requests to the recently activated server, which was previously in standby. The LEG does not return to the failed server until the activated server fails.

When installing the DHCPv6 Lease Query LEG on the Subscriber Manager server, the LEG runs with the privileges assigned to the pcube user on this machine. On UNIX platforms, because only the super user (root) can open ports under 1024, the LEG cannot open the DHCPv6 ports. To solve this problem, a simple application is supplied with the LEG, which forwards the DHCPv6 packets from the LEG to the DHCPv6 servers and back. This application is the DHCP Forwarder, which is described in the “[DHCP Forwarder Application](#)” chapter.

**Note**

The trigger for the DHCPv6 Lease Query LEG to send a query to the DHCPv6 server is unknown subscriber traffic followed by a pull request from Cisco SCE. Therefore, if a subscriber's package is changed in the DHCPv6 server, the Subscriber Manager receives the new package information only when the subscriber logs in the next time.

DHCPv6 Lease Query Transaction

The DHCPv6 Lease Query transaction is a DHCPv6 transaction where the client (LEG) sends a DHCPv6 LEASE QUERY message (as per RFC 5007) to the server, indicating the information it wants to query. The LEG uses the Query by IPv6 address method to retrieve the configured options and IPv6 address details from the DHCPv6 server. The DHCPv6 server replies whether there is an active lease (DHCPv6 LEASE QUERY REPLY message) for the IPv6 address, and provides information on the subscriber associated with the IPv6 address, based on the list of options requested by the LEG.

The following is a detailed description of the attributes extracted from the DHCPv6 LEASE QUERY REPLY message.

IPv6 Address Option

The server reply message contains the following Identity Association for Non-temporary Address (IA_NA) details:

- IPv6 address—An IPv6 address.
- preferred-lifetime—The preferred lifetime for the IPv6 address in the option, expressed in units of seconds.(After this timeframe the assigned address is deprecated.)
- valid-lifetime—The valid lifetime for the IPv6 address in the option, in seconds. After this timeframe, the assigned address becomes invalid. This is the LEASE TIME for the IP address.
- IA Addr-options—Options associated with this address.

**Note**

IA_NA address is treated as a prefix by the Subscriber Manager. For details, see the [“DHCPv6 Subscriber Manager Integration Configuration”](#) chapter.

IPv6 Prefix Option

The server reply message may contain the Identity Association for Prefix Delegation (IA_PD) address details. These provide the IPv6 prefix details of a subscriber. The following fields are available:

- preferred-lifetime—The recommended preferred lifetime for the IPv6 prefix in the option, expressed in seconds.
- valid-lifetime—The valid lifetime of the IPv6 prefix in the option, expressed in units of seconds. This is the actual LEASE TIME of the prefix.
- prefix-length—Length of this prefix, in bits.
- IPv6-prefix—An IPv6 prefix.
- prefix-options—Options associated with this prefix.

The following is a detailed description of the attributes from the DHCPv6 Lease Query Reply:

- Subscriber IP—The subscriber IPv6 prefix retrieved from OPTION_IAPREFIX (26).
- Lease time—The assigned IP is added to the Subscriber Manager database with a lease time taken from option 26, which contains lifetime and valid lifetime values. Valid lifetime is the lease time for the assigned prefix.
- Subscriber ID—The REMOTE_ID (37) option is used by default to get the Subscriber ID. The OPTION_VENDOR_OPTS (17) option can also be used as the Subscriber ID. Details of the Subscriber ID should be available in the DHCPv6 relay message as per RFC 5007.
- Policy—The OPTION_VENDOR_OPTS (17) is used to get the policy information. Multiple instances of the vendor-specific information option may appear in a DHCPv6 Lease Query Reply message. Each suboption is interpreted according to the options defined by vendor details.

After extracting the preceding information, the LEG logs the subscriber into the Subscriber Manager.

Installation and Usage

The DHCPv6 Lease Query LEG is part of the SM installation package. The SM installation package also includes configuration files and the Command-Line Utility of the LEG.

For information about using the DHCPv6 Lease Query LEG on the SM, see the [DHCPv6 Subscriber Manager Integration Configuration](#) chapter. For information about installing and using the DHCP Forwarder application see the [DHCP Forwarder Application Enhancements for DHCPv6](#) chapter.