DHCP and IPoE Subscriber Management

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	cnBNG
Applicable Platform(s)	SMI
Feature Default Setting	Disabled - Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
Enhancement Introduced: The IPoE (DHCP) feature is NSO-integrated.	2021.04.0
First introduced.	2021.01.0

Feature Description

Note	This feature is Network Services Orchestrator (NSO) integrated.

A session represents the logical connection between the customer premise equipment (CPE) and the network resource. To enable a subscriber to access the network resources, the network has to establish a session with the subscriber. The Cloud Native Broadband Network Gateway (cnBNG) supports the following subscriber session types:

- IPoE (DHCP)

- PPP (PPPoE)

    For more information, see PPPoE Subscriber Management.

In an IPoE subscriber session, subscribers run IPv4 or IPv6 on the CPE device and connect to the BNG through a Layer-2 aggregation or Layer-3 routed network. The IP subscriber sessions that connect through a Layer-2 aggregation network are called L2-connected and sessions that connect through routed access network are called L3-connected or routed subscriber sessions. IPoE subscriber sessions are always terminated on BNG and then routed into the service provider network. IPoE relies on DHCP to assign the IP address.

On the BNG, the DHCPv4 or DHCPv6 trigger creation of these subscribers based on the First-Sign-Of-Life (FSOL) protocol. The IP sessions to the CPE can be either:

- Single stacked, that is, running only IPv4 or IPv6

- Dual stacked, that is, running both IPv4 and IPv6

The DHCP runs as a pod to handle the FSOL for the IPoE subscribers. It handles the DHCP packet encode and decode, IP address assignment, DHCP FSM handling, and DHCP feature and rule application for the IPoE sessions. The DHCP module handles both DHCPv4 and DHCPv6 control packets to bring up corresponding address family interface (AFI).

Note	In this release, only the DHCP server mode functionality is supported.

A common DHCP module handles the DHCP finite state machines (FSM) for both 5G subscribers (in SMF service) and wireline subscribers in the cnBNG. The network function (NF) specific DHCP module handles the NF specific functionality.

DHCP and IPoE Functionalities

The DHCP and IPoE Subscriber Management feature supports the following functionalities:

DHCP Server

The cnBNG CP implementation supports the DHCPv4 server mode. The DHCP server FSM handles the DHCP packets from client, IP allocation, and IP lease management.

The FSM handles the following Rx control packets:

- Discover

- Request (DORA request and renew request)

- Decline

- Inform

- Release

The DHCP server FSM sends the following control packets to the client based on the FSM states and events:

- Offer

- Ack (DORA Ack, Renew Ack and Inform Ack)

- Noack

The DHCP server implementation associates a DHCP profile to a group of subscribers. This server implementation supports the following functionalities:

- IP address allocation for the client from the configured pool in the DHCP profile.

- IP address lease allocation based on DHCP profile configuration.

- Passing Host configurations to the client using the following configurable DHCP options in the DHCP profile:

    - IP subnet mask (Option 1)

    - Boot filename (Option 67)

    - Domain name (Option 15)

    - NetBIOS node type (Option 46)

    - NetBIOS name server (Option 44)

    - Domain name server (Option 6)

    - Default router (Option 3)

    - Time server (Option 4)

Processing Option 82

cnBNG supports Option 82, which is the relay agent information option to figure out the sub-options. The various sub-options that the DHCP processes are:

- Circuit ID (Sub option 1)

- Remote ID (Sub option 2)

The circuit ID and remote ID field is passed to the Session Manager during session start trigger and the same is used for north-bound interactions.

DHCPv4 RADIUS Proxy

The cnBNG CP supports DHCP IPv4 RADIUS proxy for RADIUS-based authorization of DHCP leases. This is a RADIUS-based address assignment mechanism in which a DHCP server authorizes remote clients and allocates IP addresses, based on replies from a RADIUS server.

These are the steps involved in the address assignment mechanism:

- The DHCP server sends the DHCP client information to the RADIUS server.

- The RADIUS server returns all required information, primarily IPV4 address, to the DHCP server in the form of RADIUS attributes. The subnet mask is derived from the CP based on the static pool configuration. The IPv4 address sent from the RADIUS must be part of the static pool associated to the UP.

- The DHCP server translates the RADIUS attributes into DHCP options and sends this information back in a DHCP Offer message to the DHCP client.

If the IETF attribute, such as Framed-IP-Address is received from the RADIUS server, and if it is present in the user profile, then this attribute is used instead of allocating the IP address from the configured pool. The basic attributes that can come from the RADIUS server that are relevant for DHCP server options are:

- Framed IPv4 Address

- IPv4 Subnet Mask (derived in the CP from the static pool configuration)

- IPv4 Default gateway (derived in the CP from the static pool configuration)

Apart from these attributes, the dhcp-class name and address pool name attribute also can come from RADIUS. If the RADIUS sets the address pool name, then it uses this for IP allocation instead of the pool that is specified as part of the DHCP profile.

If the RADIUS server sends the dhcp-class attribute to the DHCP server, then that attribute value is used to decide other configuration parameters in the reply that is to be sent to the DHCP client. For example, if the DHCPv4 server profile has both Class A and Class B in it, and if RADIUS server sends a reply to the DHCP server with the class name as 'B', then Class B is used to send the options back to the DHCP client. Classes can be defined under DHCP profile. The parameters and options that can be configured under DHCP profile can be configured under class also.

Additional RADIUS server attributes are allowed, but not mandatory. If a RADIUS server user profile contains a required attribute that is empty and is not available via configuration as well, the DHCP server does not generate the DHCP options.

DHCPv6 Local Server for IPv6 Subscribers

The DHCPv6 server assigns IPv6 address and prefix and other configuration attributes (such as domain name, the domain name server address and SIP servers and so on) to requesting clients. On receiving a valid request, the server assigns the client IPv6 address or prefix, a lease for the assigned IPv6 address or prefix and other requested configuration parameters. The DHCP server FSM is implemented to handle the address allocation and lease management. The FSM would handle the following control packets from the client:

- Solicit

- Request

- Renew

- Rebind

- Decline

- Information-Request

- Release

The DHCPv6 server FSM sends the following control packets to the client based on the FSM states and events:

- Advertisement

- Reply (SARR Reply, Release Reply, Renew Reply, Rebind Reply and Information request Reply)

- Relay-Reply

The DHCPv6 server implementation associates a DHCPv6 profile to a group of subscribers. The server implementation caters to the following functionalities:

- IANA address and IAPD address allocation for the client from configured pool in DHCPv6 profile.

- IANA and IAPD address lease allocation based on DHCPv6 profile configuration.

- Passing Host configurations to client using below configurable DHCP options in DHCP profile

    - AFTR support (Option 64)

    - Preference option (Option 7)

    - Domain list (Option 24)

    - DNS server IPv6 address (Option 23)

The DHCPv6 server sends the following options to the Policy plane:

- interface-id (DHCP Option 18)

- remote-id (DHCP Option 37)

- vendor-class (DHCP Option 16)

- user-class (DHCP Option 15)

- client-id(DHCP Options 1)

DHCPv6 Server - Prefix Delegation

The DHCPv6 Prefix Delegation feature enables the DHCPv6 server to hand out network address prefixes to the requesting clients. The clients use these network prefixes to assign /128 addresses to the hosts on their network. The RFC-3633 and RFC-3769 is supported for prefix delegation. The DHCPv6 Prefix Delegation feature is enabled by default for cnBNG DHCPv6 server. No other configuration is required to enable the prefix delegation. The DHCPv6 option OPTION_IA_PD (25) and OPTION_IAPREFIX (26) support to meet the prefix delegation requirement.

Note

- Only one delegated prefix per subscriber and client is supported.

- Only one OPTION_IAPREFIX is supported under one OPTION_IA_PD (25).

The cnBNG allocates addresses from the prefix pool configured under the DHCP profile.

DHCPv6 Server - Address Assignment

The DHCPv6 Address Assignment feature enables the DHCPv6 server to hand out /128 addresses to the clients. The cnBNG DHCPv6 server implementation supports the DHCPv6 OPTION_IA_NA(3) and OPTION IAADDR(5) to enable address assignment to the client.

Note

- Only one delegated prefix per subscriber and client is supported.

- Only one OPTION_IAPREFIX is supported under one OPTION_IA_PD (25).

The cnBNG allocates addresses from the prefix pool configured under the DHCP profile.

Prefix and Address Pool Support for IPv6

The cnBNG supports the configuring of the DHCPv6 address and prefix pool and associating it to the DHCPv4 and DHCPv6 server profiles. The address and prefix ranges is under the pool. cnBNG also supports downloading of the address and prefix pool name via the user profile on a per subscriber basis. The pool name downloaded via user profile is given priority over the pool name association via the DHCPv6 profile.

DHCPv6 Server with RADIUS-based Address Assignment

The cnBNG supports RADIUS-based address assignment, that is, the IANA address is downloaded as part of the user profile and is allocated to the client. Address from the user profile is given priority over the local configuration.

DHCPv6 Server with RADIUS-based Prefix Delegation

The cnBNG supports RADIUS-based prefix assignment, that is, the IAPD address is downloaded as part of the user profile and is allocated to the client. The delegated prefix from the user profile is given priority over the local configuration.

DHCPv6-provided IPv6 address of DNS server for IPv6 Subscribers

The cnBNG CP DHCPv6 server implementation supports the provision of DNS server information to clients via the DNS option (23). It supports a configuration of up to 8 DNS server ipv6 addressees via the DHCPv6 profile. The DHCPv6 server information is downloaded via the user profile on a per subscriber basis. The per subscriber DNS information in the user profile is given priority over the profile configuration.

DHCPv4 DHCPv6 Lease Timeout

The cnBNG CP provides the configuration to set the lease value under the DHCPv4 and DHCPv6 profile. This configuration determines the lease for the IP addresses allocated to the clients.

For DHCPv4 clients, the lease is set in the address time (T) option (option 51). By default, the renewal time is set as $(\frac{1}{2}) * T$ [option 58] and rebinding time is set as $(7/8) * T$ [option 59]. For DHCPv6 client, the lease is populated in the IA address and IA prefix option for the respective address types. By default, preferred time is set as $0.5 * T$ and valid time T2 is set as $0.8 * T$. By default, renewal time (T1) is set as $0.5 * T$ and rebinding time T2 is set as $0.8 * T$ in OPTION_IA_PD.

The cnBNG CP tracks the lease time allocated to the clients. Ideally the client should renew (Renew request) the lease at T1 to extend the lease. If renew is failing, the client uses the rebind (broadcast request message for DHCPv4 and rebind message for DHCPv6). If the cnBNG CP does not receive the lease renewal request from the client, the lease times out after T and the corresponding address is released to the pool and removed from the client session. This can lead to an update or disconnect to the Session Manager based on the other address states. The lease timeout is applicable to both IPv4 and IPv6 addresses.

IPv6 IPoE Sessions

The IPv6 subscribers run the IPv6 from the CPE device to the BNG router and are created using the DHCPv6 protocol. The IPv6 subscribers natively run IPv6 on the CPE device and are connected to the router via a Layer-2 network or through Layer-2 aggregation.

The IPv6 subscribers are supported when they are directly connect to the cnBNG UP or via a Layer-2 aggregator. The cnBNG CP DHCPv6 server treats only DHCPv6 SOLICIT message from the subscriber / client as FSOL (First Sign Of Life) packet in case of IPoE and initiates the subscriber session creation.

Note Routed subscribers are not supported.

Dual Stack IPv6/IPv4 over IPoE

The cnBNG CP supports dual-stack IPoE subscribers, that is, both IPv4 and IPv6 address allocation for the same subscriber. In this release, cnBNG supports up to one IPv4 address, one IANA address, and one IAPD address.

Subscriber Termination over Non-default VRF

The cnBNG CP DHCPv4 and DHCPv6 servers are VRF aware. The DHCPv4 and DHCPv6 servers support the access interface in either default VRF or non-default VRF. The following table shows the VRF combination supported by DHCPv6 server.

Table 3: DHCP Supported VRF Combinations

Client Access Interface	Subscriber Interface	DHCPv6 Supported
Default VRF	Default VRF	Supported
Default VRF	Non-default VRF	Supported
Non-default VRF	Non-default VRF	Supported

DHCPv4 Raw Option Support

The cnBNG DHCP Profile configuration enables the operator to configure specific DHCPv4 options, under the DHCPv4 profile. The option value can range from 1 to 255. The option value can be either an ascii string or a hexadecimal string.

DHCPv4 and DHCPv6 Class Support

The cnBNG DHCP Profile configuration enables the operator to configure classes of DHCP options and to selectively associate them during the session setup. The DHCP Options class are selected based on certain

matching DHCP options received from access network against the configured class key parameters. The DHCP Options class can also be selected based on the class name received from Policy plane. The priority is always given to the DHCP class name that the Policy plane provides. However, if the Policy plane does not provide a class name, then class selection depends on the operator-configured key parameters. The operator can configure multiple DHCP option classes for DHCPv4 and DHCPv6 separately.

The DHCP Profile consist of profile elements. Each of the DHCPv4 and DHCPv6 profiles contain the 'default' DHCP options list and zero or more classes of DHCP options of corresponding DHCP version.

The DHCPv4 and DHCPv6 Options Class contains a list of DHCP options and the "Match-Info" holds the information about the keys to be matched to select that class. The operator can also specify under Match-Info" the class selection that should match 'any' or 'all' the key parameters of that class.

If the DHCP Option class does not match an ongoing session or any requested DHCP Options is not found in the selected class, then the requested option is selected from the 'default' DHCP Options of that profile.

How it Works

This section provides a brief of how the DHCP and IPoE Subscriber Management feature works.

Call Flows

This section includes the following call flow.

cnBNG IPoE Call Flow

For IPoE session establishment, the BNG User Plane (UP) sends the DHCP packets to the BNG Control Plane (CP) using the GTP-U protocol. The following figure shows the DHCP packet call-flow and session programming between the BNG-UP and BNG-CP for IPoE session establishment.
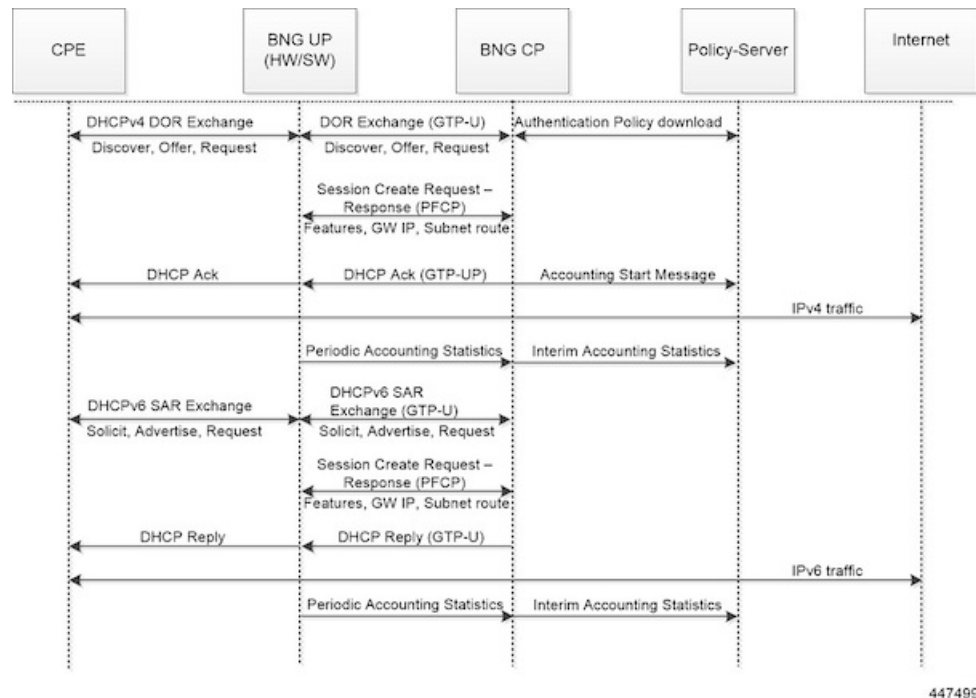
Figure 1: cnBNG IPoE Call Flow

Table 4: cnBNG IPoE Call Flow Description

Step	Description
1	The subscriber running IPv4 or IPv6 stack on the CPE device connects to the BNG-UP via DHCPv4, DHCv6, or DHCPv4 and DHCPv6.
2	The BNG-UP forwards the DHCP(v4/v6) request packets received from the CPE to the BNG-CP over the GTPU protocol. It then returns the DHCP response packets received from the BNG-CP to the CPE device.
3	The BNG-CP performs the subscriber authentication via the Policy Server before establishing a subscriber session on the BNG-UP.
4	After the BNG-CP successfully establishes a session on the BNG-UP, the BNG-UP initiates the Accounting Start and trigger Session Establishment Success (DHCPv4 Ack / DHCPv6 Reply) message towards the CPE via the BNG-UP.
5	The subscriber on the CPE device initiates the data traffic (DHCPv4 / DHCPv6) via the BNG-UP or BNG-CP towards the Internet.
6	The BNG-UP forwards the periodic accounting information to the BNG-CP and the BNG-CP triggers periodic accounting towards the Policy server.

Standard Compliance

The DHCP and IPoE Subscriber Management feature caters to the DHCP server requirements only. The DHCP Server implementation is aligned with the following standards:

- RFC 2131 Dynamic Host Configuration Protocol

- RFC 2132 DHCP Options and BOOTP Vendor Extensions [Subset of options]

- RFC 3046 DHCP Relay Agent Information Option

- RFC 3004 The User Class Option for DHCP

- RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)

- RFC 3633 IPv6 Prefix Options for Dynamic Host Configuration Protocol(DHCP)version 6

- RFC 3646 DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)

- RFC 4649 Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Relay Agent Remote-ID Option

- RFC 6334 Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Option for Dual-Stack Lite

Limitations and Restrictions

The DHCP and IPoE Subscriber Management feature has the following limitations in this release:

- Only Layer 2 connected subscribers are supported.

- DHCPv6 addresses and prefixes do not get released at IPv6CP disconnect.

- For DHCPv4 sessions, subnet mask and default gateway are derived from the IPAM pool configuration and IP pool split logic. The first subnet route, subnet mask, and default gateway IP is derived from the

IPAM and pushed to the UP for each chunk of the pool. Subnet mask and default gateway cannot be assigned via the AAA configuration.

- For DHCPv4 sessions, subnet selection is not supported. The IP is selected from the mapped IP pool. Subnet selection cannot be controlled via the AAA gateway IP, giaddr, or subnet selection suboption.

- For DHCPv4 sessions, requested IP option (option 50) that helps in requesting specific IP is not supported. However on client reboot (discover in bound state), the already assigned IP is retained.

- DHCP Inform packet and DHCPv6 Information Request packet handling for unbound sessions are not supported. That is, the client cannot get only the host configurations without requesting for IP assignment via BNG.

- For DHCPv6 session, multihop relay forward DHCPv6 message is not supported (as in physical BNG).

- For DHCPv4 session, broadcast flag check, and discovery, offer, request, and acknowledgement (DORA) unicast is not supported.

- If DHCP client initiated packet options like requested options (option 55 for IPv4, ORO option 6 for IPv6), circuit-id, remote-id, user class, vendor class changes in the packet over the session lifecycle, the cnBNG server behaviour is not defined. cnBNG assumes that the client will not change these options over the lifecycle of session. The client should also maintain the same values for attributes like remote-id, vendor class, user class for both IPv4 and IPv6 afi (AFI). In case these value are required to be changed, it is recommended to clear the session and bring it up again.

- Client reboot scenarios do not tear down the session in cnBNG in the following scenarios: If the Discover message is received in the Bound state or Solicit message is received for the already bound IANA, cnBNG does not tear down the existing session. Instead, the already allocated IP is assigned to the subscriber. In this case, fresh lease is assigned to the client. This is a difference in behaviour from physical BNG where on receiving Discover message in Bound state, IPv4 stack is brought down and new IP is assigned.

- No parity support for RADIUS attribute formatting with ASR 9000. The supported RADIUS attribute list and formatting would be updated based on feedback from customer. For example, some attributes like remote-id format is different for IPv4 and IPv6 clients. Hence, the value going to the Policy Plane differs based on whether the IPv4 or IPv6 afi comes up first.

- Change of Authorization (CoA) for DHCP consumed RADIUS attributes are not supported.

- RFC recommended DHCPv4/v6 packet validations are not supported.

- A common DHCP class attribute is used for class specification for DHCPv4 and DHCPv6 stack via AAA attribute. The attribute is dhcp-class.

- Framed route is not supported.

- Manual pod restart is not supported or entertained. Pod restart can lead to inconsistencies between the CP pods with regard to session count and session state. To recover the inconsistent sessions, the **clear** command must be used explicitly.

- After subscriber is up, if the subscriber is deleted from the cnBNG CP (for reasons like admin clear or Pod) the subscriber is not notified. Therefore, the client must be explicitly rebooted for re-establishing the session. However, if the client is not rebooted explicitly, on receiving the Renew request. cnBNG ignores the renew request. Because the subscriber will retry till the lease expiry, renegotiation (with Discover and Solicit) occurs when the lease time is expired. Therefore, the subscriber loses connectivitiy till lease expiry (as session is already cleared in CP & UP) and explicit client reboot is required.

Configuring the DHCP and IPoE Subscriber Management Feature

This section describes how to configure the DHCP and IPoE Subscriber Management feature.

Configuring the DHCP and IPoE Subscriber Management feature involves the following steps:

1. Configure the IPv4 DHCP Profile

2. Configure the IPv4 DHCP Class

3. Configure the IPv6 DHCP Profile

4. Configure the IPv6 DHCP Class

Configuring the IPv4 DHCP Server Profile

Use the following commands to configure the IPv4 DHCP server profile.

```
configure
  profile dhcp  dhcp_profile_name
  ipv4
  server { boot-filename boot_filename } | { dns-servers dns_server } | {
domain-name  domain_name} |
  { netbios-name-server netbios_name_server } | { netbios-node-type {
broadcast-node | hexadecimal | hybrid-node | mixed-node | peer-to-peer-node
 } |
  { next-server ipv4_address } | { ntp-servers ipv4_address } | { pool-name
ipam_pool_name} |
  { option-codes option_codes_range { ascii-string  value | force insert {
true | false } | hex-string value|
  { ip-address ip_address  } | { lease { days  value| hoursvalue| minutesvalue}

  exit
exit
```

NOTES:

- **profile dhcp** *dhcp_profile_name*: Specifies the DHCP profile name.

- **ipv4**: Enters IPv4 configuration mode.

- **server { boot-filename** *boot_filename* **}** | **{ dns-servers** *dns_server* **}** | **{ domain-name** *domain_name*} |**{ netbios-name-server** *netbios_name_server* **}** | **{ netbios-node-type { broadcast-node** | **hexadecimal** | **hybrid-node** | **mixed-node** | **peer-to-peer-node }** |**{ next-server** *ipv4_address* **}** | **{ ntp-servers** *ipv4_address* **}** | **{ pool-name**ipam_pool_name**}** |**{ option-codes** *option_codes_range* **{ ascii-string** *value* | **force insert { true** | **false }** | **hex-string**value|**{ ip-address**ip_address **}** | **{ lease { days** *value*| **hours**value| **minutes**value**}**: Specifies the IPv4 server details.

    - **boot-filename**boot_filename: Configures the boot file.

    - **dns-servers**dns_server: Specifies the Domain Name System (DNS) IPv4 servers available to a DHCP for an IPv4 client.

    - **domain-name**domain_name: Specifies the domain name for the IPv4 client.

- **netbios-name-server***netbios_name_server*: Configures the NetBIOS name servers.

- **netbios-node-type { broadcast-node | hexadecimal | hybrid-node | mixed-node | peer-to-peer-node }**: Configures the NetBIOS node as a broadcast, hexadecimal, hybrid, mixed, or peer-to-peer node. The valid values for each of these nodes are:

  - **broadcast-node**: 0x1 B-node

  - **hexadecimal**: Operator provided custom 1 byte hex value

  - **hybrid-node**: 0x8 H-node

  - **mixed-node**: 0x4 M-node

  - **peer-to-peer-node**: 0x2 P-node

- **next-server***ipv4_address*: Specifies the TFTP-server IP address for the client to use.

- **pool-name***ipam_pool_name*: Specifies the IP Address Management (IPAM) assigned pool name.

- **option-codes option_codes_range { ascii-string** *value* **| force insert { true | false } | hex-string** *value* **| ip-address** *ip_address* **}**: Specifies the values for the ASCII string of length 128, force insert, hex string of length 128, or IP address (IPv4 IP address).

- **lease { days** *value* **| hours** *value* **| minutes** *value* **}**: Specifies the lease time duration in the number of days, hours, and minutes. The number of lease days supported is from 0 to 365. The number of leave hours supported ranges from 0 to 23 and minutes from 0 to 59.

Configuring the IPv4 DHCP Class

Use the following commands to configure the IPv4 DHCP class.

```
configure
  profile dhcp dhcp_profile_name
  ipv4
  classdhcp_class_name
  matches { match { dhcpv4-circuit-id { ascii  value | hex value } |
dhcpv4-remote-id { ascii  value |
    hex value } | dhcpv4-vendor-class { ascii  value | hex  value } |
dhcpv4-user-class { ascii  value |
    hex value } } | match-type { all match_key_value| any match_key_value} }
  end
```

NOTES:

- **profile dhcp** *dhcp_profile_name*: Specifies the DHCP profile name.

- **ipv4**: Enters IPv4 configuration mode.

- **class** *dhcp_class_name*: Creates a proxy profile class (DHCP), which can be used to enter the proxy profile class sub-configuration mode.

- **matches { match { dhcpv4-circuit-id { ascii** *value* **| hex** *value* **} | dhcpv4-remote-id { ascii** *value* **| hex** *value* **} | dhcpv4-vendor-class { ascii** *value* **| hex** *value* **} | dhcpv4-user-class { ascii** *value* **| hex** *value* **} } | match-type { all** *match_key_value* **| any** *match_key_value* **} }**: Specifies the list of match keys

and values. The match values supported are DHCPv4 circuit ID, DHCPv4 remote ID, DHCPv4 vendor class, and DHCPv4 user class. Each of the values must specify either an ASCII or hexadecimal value.

match-type { all | any }: Specifies if the match value should apply to any of the specified keys or to all the keys.

Configuring the IPv6 DHCP Server Profile

Use the following commands to configure the IPv6 DHCP server profile.

```
configure
  profile dhcp  dhcp_profile_name
    ipv6
      server { aftr-name value | dns-servers dns_server
      | domain-name domain_name| iana-pool-name ipam_pool_name
      | iapd-pool-name  ipam_pool_name| lease { days  value | hours  value |
minutes  value }
      | preference value }
```

NOTES:

- **profile dhcp** *dhcp_profile_name*: Specifies the DHCP profile name.

- **ipv6**: Enters IPv6 configuration mode.

- **server { aftr-name** *value* | **dns-servers** *dns_server*| **domain-name** *domain_name*| **iana-pool-name** *ipam_pool_name*|**iapd-pool-name** *ipam_pool_name*|**lease { days** *value*|**hours** *value*|**minutes** *value* **} | preference** *value* **}**: Specifies the IPv6 server details.

    - **aftr-name** *value*: Specifies the FQDN string.

    - **dns-servers** *dns_server*: Specifies the Domain Name System (DNS) IPv4 servers available to a DHCP for an IPv4 client.

    - **domain-name** *domain_name*: Specifies the domain name for the IPv4 client.

    - **iana-pool-name** *ipam_pool_name*: Specifies the Internet Assigned Numbers Authority (IANA) pool name.

    - **iapd-pool-name** *ipam_pool_name*: Specifies the Identity Association for Prefix Delegation (IAPD) pool name.

    - **lease { days** *value*|**hours** *value*|**minutes** *value* **}**: Specifies the lease time duration in the number of days, hours, and minutes. The number of lease days supported is from 0 to 365. The number of leave hours supported ranges from 0 to 23 and minutes from 0 to 59.

    - **preference** *value*: Specifies the DHCP server preference. The preference value ranges from 1 to 255.

Configuring the IPv6 DHCP Class

Use the following commands to configure the IPv6 DHCP class.

```
configure
  profile dhcp  dhcp_profile_name
```

```
    ipv6
      class  dhcp_class_name
        server { aftr-name value| dns-servers dns_server| domain-name
domain_name|
        iana-pool-name ipam_pool_name| iapd-pool-name ipam_pool_name|lease {
days value|
        hours  value | minutes  value } preference  value
        end
```

NOTES:

- **profile dhcp** *dhcp_profile_name*: Specifies the DHCP profile name.

- **ipv6**: Enters IPv6 configuration mode.

- **class** *dhcp_class_name*: Creates a proxy profile class (DHCP), which can be used to enter the proxy profile class sub-configuration mode.

- **server { aftr-name** *value* | **dns-servers** *dns_server*| **domain-name** *domain_name*| **iana-pool-name** *ipam_pool_name*|**iapd-pool-name** *ipam_pool_name*|**lease { days** *value*|**hours** *value*|**minutes** *value* **}** | **preference** *value* **}**: Specifies the IPv6 class server details.

  - **aftr-name** *value*: Specifies the FQDN string.

  - **dns-servers** *dns_server*: Specifies the Domain Name System (DNS) IPv6 servers available to a DHCP for an IPv6client.

  - **domain-name** *domain_name*: Specifies the domain name for the IPv6 client.

  - **iana-pool-name** *ipam_pool_name*: Specifies the Internet Assigned Numbers Authority (IANA) pool name.

  - **iapd-pool-name** *ipam_pool_name*: Specifies the Identity Association for Prefix Delegation (IAPD) pool name.

  - **lease { days** *value*|**hours** *value*|**minutes** *value* **}**: Specifies the lease time duration in the number of days, hours, and minutes. The number of lease days supported is from 0 to 365. The number of leave hours supported ranges from 0 to 23 and minutes from 0 to 59.

  - **preference** *value*: Specifies the DHCP server preference. The preference value ranges from 1 to 255.