# Implementing the Dynamic Host Configuration Protocol

This module describes the concepts and tasks you will use to configure Dynamic Host Configuration Protocol (DHCP).

**Note** For a complete description of the DHCP commands listed in this module, refer to the *Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Command Reference* publication.

### Feature History for Implementing the Dynamic Host Configuration Protocol

| Release | Modification |
|---|---|
| Release 3.7.2 | This feature was introduced . |

# Prerequisites for Configuring DHCP Relay Agent

The following prerequisites are required to configure a DHCP relay agent:

- You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
- A configured and running DHCP client and DHCP server
- Connectivity between the relay agent and DHCP server

# Information About DHCP Relay Agent

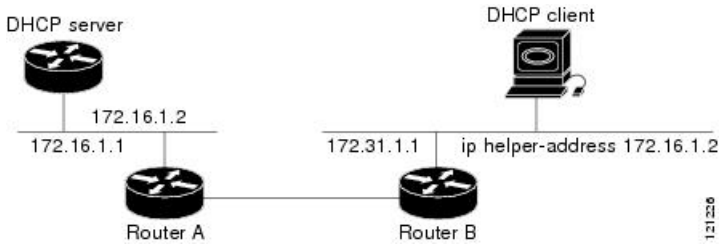
A DHCP relay agent is a host that forwards DHCP packets between clients and servers that do not reside on a shared physical subnet. Relay agent forwarding is distinct from the normal forwarding of an IP router where IP datagrams are switched between networks transparently.

DHCP clients use User Datagram Protocol (UDP) broadcasts to send DHCPDISCOVER messages when they lack information about the network to which they belong.

If a client is on a network segment that does not include a server, a relay agent is needed on that network segment to ensure that DHCP packets reach the servers on another network segment. UDP broadcast packets are not forwarded, because most routers are not configured to forward broadcast traffic. You can configure a DHCP relay agent to forward DHCP packets to a remote server by configuring a DHCP relay profile and configure one or more helper addresses in it. You can assign the profile to an interface or a VRF.

Figure 1: Forwarding UDP Broadcasts to a DHCP Server Using a Helper Address, on page 2 demonstrates the process. The DHCP client broadcasts a request for an IP address and additional configuration parameters on its local LAN. Acting as a DHCP relay agent, Router B picks up the broadcast, changes the destination address to the DHCP server's address and sends the message out on another interface. The relay agent inserts the IP address of the interface, on which the DHCP client's packets are received, into the gateway address (giaddr) field of the DHCP packet, which enables the DHCP server to determine which subnet should receive the offer and identify the appropriate IP address range. The relay agent unicasts the messages to the server address, in this case 172.16.1.2 (which is specified by the helper address in the relay profile).

***Figure 1: Forwarding UDP Broadcasts to a DHCP Server Using a Helper Address***




# Limitations for DHCPv6 Relay Feature

These are the limitations for implementing DHCPv6 relay feature:

- The multicast addresses are not supported. The **helper-address** command in DHCPv6 relay profile submode will only support global unicast IPv6 address as the helper address.
- Only one relay is supported between client and server with an exception of Lightweight DHCPv6 Relay Agent (LRDA) being present on the access side. That is, the Layer 3 relay packets are not supported.
- Only interface-id and remote-id DHCPv6 option code are added by a relay agent while forwarding the packet to a DHCPv6 server.

**Note** Configuring DHCPv6 option code is not supported in DHCPv6 relay profile submode.

# Secure ARP

In standalone DHCP sessions, the DHCP server adds an ARP entry when it assigns an IP address to a client. However, in IP subscriber sessions, DHCP server does not add an ARP entry. Although ARP establishes correspondences between network addresses, an untrusted device can spoof IP an address not assigned to it posing a security threat for IP subscriber sessions. You can enable the secure ARP feature and allow DHCP to add an ARP cache entry when DHCP assigns an IP address to a client. Secure ARP is disabled by default.

# How to Configure and Enable DHCP Relay Agent

This section contains the following tasks:

## Configuring and Enabling DHCP Relay Agent with DHCP MAC Address Verification

This section discusses how to configure and enable DHCP Relay Agent with DHCP MAC address verification.

### Configuration Example

```
Router# configure

Router(config)# dhcp ipv4
/* Configures DHCP for IPv4 and enters the DHCPv4 configuration submode. */

Router(config-dhcpv4)# profile client relay
/* Enables DHCP relay profile */

Router(config-dhcpv4)# client-mac-mismatch action drop
/* Enables MAC address verification. If MAC address in the DHCPv4 protocol header does not
 match the L2 header source MAC address in the DHCPv4 relay profile,
 the frame is dropped  */

Router(config-dhcpv4-relay-profile)# relay information option
/* Inserts the DHCP relay agent information option (option-82 field) in forwarded
BOOTREQUEST messages to a DHCP server. */

Router(config-dhcpv4-relay-profile)# relay information check
```

```
/* (Optional) Configures DHCP to check the validity of the relay agent information
option in forwarded BOOTREPLY messages. */

Router(config-dhcpv4-relay-profile)# relay information policy drop
/* (Optional) Configures the reforwarding policy for a DHCP relay agent;
that is, whether the relay agent will drop or keep (using the 'keep' keyword)
 the relay information. */

Router(config-dhcpv4-relay-profile)# relay information option allow-untrusted
/* (Optional) Configures the DHCP IPv4 Relay not to discard BOOTREQUEST packets that have
an existing
relay information option and the giaddr set to zero. */

Router(config-dhcpv4-relay-profile)# giaddr policy drop
/* Drops the packet that has an existing nonzero giaddr value. Use the 'replace' keyword
 to replace the existing giaddr value with a value that it generates (the default behavior).
  */

Router(config-dhcpv4-relay-profile)# helper-address vrf vrf1 10.1.1.1
/* Forwards UDP broadcasts, including DHCP. */

Router(config-dhcpv4-relay-profile)# commit

Router(config-dhcpv4-relay-profile)# exit
Router(config-dhcpv4)# vrf vrf1 relay profile client
Router(config-dhcpv4)# commit
/* Configures DHCP Relay on a VRF and commits the entire configuration. */
```

### Running Configuration

Confirm your configuration.

```
Router# show run
Thu May 11 09:00:57.839 IST
Building configuration...
!! IOS XR Configuration 0.0.0
!! Last configuration change at Thu May 11 09:00:54 2017 by annseque
!
dhcp ipv4
vrf vrf1 relay profile client
profile client relay
client-mac-match action drop
helper-address vrf vrf1 10.1.1.1
giaddr policy drop
relay information check
relay information option
relay information policy drop
relay information option allow-untrusted
!
!
```

### DHCP MAC Address Verification

Use the following show command to check if DHCP MAC address is being verified on the router.

```
Router# show dhcp ipv4 relay statistics raw all
packet_drop_mac_mismatch                      :         0
```

The output validates that the DHCP MAC address of the packets is verified.

# Configuring the DHCPv6 (Stateless) Relay Agent

Perform this task to specify a destination address to which client messages are forwarded and to enable Dynamic Host Configuration Protocol (DHCP) for IPv6 relay service on the interface.

### Configuration Example

To configure the DHCPv6 (stateless) relay agent, you must complete the following configurations:

1. Enable the DHCP IPv6 configuration mode.
2. Configure the DHCPv6 relay profile.
3. Configure helper addresses.
4. Specify the interface for the relay profile.

### Configuration

```
/* Enter the global configuration mode, and then enter the DHCP IPv6 configuration mode */
Router# configure terminal
Router(config)# dhcp ipv6
Router(config-dhcpv6)# profile test relay
Router(config-dhcpv6-relay-profile)# helper-address vrf default 2001:1::1
Router(config-dhcpv6-relay-profile)# !
Router(config-dhcpv6-relay-profile)# interface TenGigE0/0/0/0 relay profile test
Router(config-dhcpv6)# !
```

# Enabling DHCP Relay Agent on an Interface

This task describes how to enable the Cisco IOS XR DHCP relay agent on an interface.

**Note** On Cisco IOS XR software, the DHCP relay agent is disabled by default.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **interface type name relay profile** *profile-name*
4. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration submode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 3** | **interface type name relay profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# interface gigabitethernet 0/0/0 /0 relay profile client` | Attaches a relay profile to an interface. |
| **Step 4** | **commit** | |

# Enabling DHCPv6 Relay Agent on an Interface

This task describes how to enable the DHCPv6 relay agent on an interface.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv6**
3. **interface** *type interface-instance* **relay profile** *profile-name*
4. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure**<br>**Example:**<br>`RP/0/RSP0/CPU0:router# configure` | Enters global configuration mode. |
| **Step 2** | **dhcp ipv6**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv6` | Configures DHCP for IPv6 and enters the DHCPv6 configuration submode. |
| **Step 3** | **interface** *type interface-instance* **relay profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)# interface gigabitethernet 0/0/0/0 relay profile client` | Attaches a relay profile to an interface. |
| **Step 4** | **commit** | |

#### Enabling DHCPv6 Relay Agent on an Interface: Example

```
configure
dhcp ipv6
interface gigabitethernet 0/0/0/0 relay profile client
```

```
 !
end
```

# Disabling DHCP Relay on an Interface

This task describes how to disable the DHCP relay on an interface by assigning the none profile to the interface.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **interface** *type name* **none**
4. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration submode. |
| **Step 3** | **interface** *type name* **none**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# interface gigabitethernet 0/1/4/1 none` | Disables the DHCP relay on the interface. |
| **Step 4** | **commit** | |

# Enabling DHCP Relay on a VRF

This task describes how to enable DHCP relay on a VRF.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **vrf** *vrf-name* **relay profile** *profile-name*
4. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |

| | Command or Action | Purpose |
|---|---|---|
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration submode. |
| **Step 3** | **vrf** *vrf-name* **relay profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# vrf default relay profile client` | Enables DHCP relay on a VRF. |
| **Step 4** | **commit** | |

# Configuring the Relay Agent Information Feature

This task describes how to configure the DHCP relay agent information option processing capabilities.

A DHCP relay agent may receive a message from another DHCP relay agent that already contains relay information. By default, the relay information from the previous relay agent is replaced (using the replace option).

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **relay**
4. **relay information option**
5. **relay information check**
6. **relay information policy** {**drop** | **keep**}
7. **relay information option allow-untrusted**
8. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration submode . |
| **Step 3** | **profile** *profile-name* **relay**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile client relay` | Enters DHCP IPv4 profile relay submode . |

| | Command or Action | Purpose |
|---|---|---|
| **Step 4** | **relay information option**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# relay information option` | Enables the system to insert the DHCP relay agent information option (option-82 field) in forwarded BOOTREQUEST messages to a DHCP server.<br>• This option is injected by the relay agent while forwarding client-originated DHCP packets to the server. Servers recognizing this option can use the information to implement IP address or other parameter assignment policies. When replying, the DHCP server echoes the option back to the relay agent. The relay agent removes the option before forwarding the reply to the client.<br>• The relay agent information is organized as a single DHCP option that contains one or more suboptions. These options contain the information known by the relay agent.<br>The supported suboptions are:<br>• Remote ID<br>• Circuit ID<br>**Note** This function is disabled by default.<br>The port field of the default circuit-ID denotes the configured bundle-ID of the bundle. If circuit IDs require that bundles be unique, and because the port field is 8 bits, the low-order 8 bits of configured bundle IDs must be unique. To achieve this, configure bundle-IDs within the range from 0 to 255. |
| **Step 5** | **relay information check**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# relay information check` | (Optional) Configures DHCP to check the validity of the relay agent information option in forwarded BOOTREPLY messages. If an invalid message is received, the relay agent drops the message. If a valid message is received, the relay agent removes the relay agent information option field and forwards the packet.<br>• By default, DHCP does not check the validity of the relay agent information option field in DHCP reply packets, received from the DHCP server.<br>**Note** Use the **relay information check** command to reenable this functionality if the functionality has been disabled. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 6** | **relay information policy** {**drop** \| **keep**}<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp relay information policy drop` | (Optional) Configures the reforwarding policy for a DHCP relay agent; that is, whether the relay agent will drop or keep the relay information.<br>By default, the DHCP relay agent replaces the relay information option. |
| **Step 7** | **relay information option allow-untrusted**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# relay information option allow-untrusted` | (Optional) Configures the DHCP IPv4 Relay not to discard BOOTREQUEST packets that have an existing relay information option and the giaddr set to zero. |
| **Step 8** | **commit** | |

# Configuring Relay Agent Giaddr Policy

This task describes how to configure the DHCP relay agent's processing capabilities for received BOOTREQUEST packets that already contain a nonzero giaddr attribute.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile relay**
4. **giaddr policy** {**replace** | **drop**}
5. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enables the DHCP IPv4 configuration submode. |
| **Step 3** | **profile relay**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile client relay` | Enables profile relay submode. |
| **Step 4** | **giaddr policy** {**replace** \| **drop**}<br>**Example:** | Specifies the giaddr policy.<br>• replace—Replaces the existing giaddr value with a value that it generates. |

| | Command or Action | Purpose |
|---|---|---|
| | `RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# giaddr policy drop` | • drop—Drops the packet that has an existing nonzero giaddr value.<br><br>By default, the DHCP relay agent keeps the existing giaddr value. |
| **Step 5** | **commit** | |

# Configuring a DHCPv4 Relay Profile with Multiple Helper Addresses

You can configure up to 16 helper addresses for a DHCPv4 relay profile, as shown in the following example.

1. Enter the DHCPv4 configuration mode.

```
RP/0/RSP0/CPU0:router(config)# dhcp ipv4
```

2. Configure the DHCPv4 relay profile.

```
RP/0/RSP0/CPU0:router(config-dhcpv4)# profile helper relay
```

3. Configure helper addresses.

   You can configure up to 16 IPv4 addresses.

```
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 1.1.1.1
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 2.2.2.2
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 3.3.3.3
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 4.4.4.4
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 5.5.5.5
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 6.6.6.6
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 7.7.7.7
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 8.8.8.8
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 9.9.9.9
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 10.10.10.10
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 11.11.11.11
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 12.12.12.12
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 13.13.13.13
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 14.14.14.14
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 15.15.15.15
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# helper-address vrf default 16.16.16.16
```

4. Confirm your configuration.

```
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# show configuration
Thu Feb  2 13:49:15.605 IST
Building configuration...
!! IOS XR Configuration 0.0.0
dhcp ipv4
 profile helper relay
  helper-address vrf default 1.1.1.1
  helper-address vrf default 2.2.2.2
  helper-address vrf default 3.3.3.3
  helper-address vrf default 4.4.4.4
  helper-address vrf default 5.5.5.5
  helper-address vrf default 6.6.6.6
```

```
  helper-address vrf default 7.7.7.7
  helper-address vrf default 8.8.8.8
  helper-address vrf default 9.9.9.9
  helper-address vrf default 10.10.10.10
  helper-address vrf default 11.11.11.11
  helper-address vrf default 12.12.12.12
  helper-address vrf default 13.13.13.13
  helper-address vrf default 14.14.14.14
  helper-address vrf default 15.15.15.15
  helper-address vrf default 16.16.16.16
 !
!
end
```

5. Commit your configuration.

```
RP/0/RSP0/CPU0:router(config-dhcpv4-relay-profile)# commit
```

6. Exit the configuration mode and verify the configured helper addresses.

```
RP/0/RSP0/CPU0:router# show dhcp ipv4 relay profile name helper
...
Profile: helper
Helper Addresses:
        1.1.1.1, vrf default
        2.2.2.2, vrf default
        3.3.3.3, vrf default
        4.4.4.4, vrf default
        5.5.5.5, vrf default
        6.6.6.6, vrf default
        7.7.7.7, vrf default
        8.8.8.8, vrf default
        9.9.9.9, vrf default
        10.10.10.10, vrf default
        10.10.10.11, vrf default
        10.10.10.13, vrf default
        10.10.10.14, vrf default
        10.10.10.15, vrf default
        10.10.10.16, vrf default
        10.10.10.17, vrf default
Information Option: Disabled
Information Option Allow Untrusted: Disabled
Information Option VPN: Disabled
Information Option VPN Mode: RFC
Information Option Policy: Replace
Information Option Check: Disabled
GIADDR Policy: Keep
Broadcast-flag Policy: Ignore
VRF References:
Interface References:
```

You have successfully configured multiple DHCPv4 relay helper addresses.

# Configuring a DHCP Proxy Profile

The DHCP proxy performs all the functions of a relay and also provides some additional functions. The DHCP proxy conceals DHCP server details from DHCP clients. The DHCP proxy modifies the DHCP replies such that the client considers the proxy to be the server. In this state, the client interacts with the proxy as if it is the DHCP server.

This task describes how to configure and enable the DHCP proxy profile.

**SUMMARY STEPS**

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **proxy**
4. **helper-address** [**vrf** *vrf- name* ] *address* [ **giaddr** *gateway-address* ]
5. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration submode . |
| **Step 3** | **profile** *profile-name* **proxy**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile client proxy` | Enters DHCP IPv4 profile proxy submode. |
| **Step 4** | **helper-address** [**vrf** *vrf- name* ] *address* [ **giaddr** *gateway-address* ]<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-proxy-profile)# helper-address vrf1 10.10.1.1` | Forwards UDP broadcasts, including DHCP.<br>• The value of the *address* argument can be a specific DHCP server address or a network address (if other DHCP servers are on the destination network segment). Using the network address enables other servers to respond to DHCP requests.<br>• For multiple servers, configure one helper address for each server. |
| **Step 5** | **commit** | |

# Configuring DHCPv6 Relay Binding Database Write to System Persistent Memory

Perform this task to configure the DHCPv6 relay binding database write to the system persistent memory. This helps to recover the DHCPv6 relay binding table after a system reload. The file names used for a full persistent file write are *dhcpv6_srpb_{nodeid}_odd* and *dhcpv6_srpb_{nodeid}_even*. The *nodeid* is the actual node ID of the node where the file is written. The incremental file is named the same way as the full file, with a *_inc* appended to it.

**Note** With IOS XR Release 6.6.3, DHCPv6 client binding record format written to system persistent memory is changed. Due to this, when you upgrade IOS XR Software from versions lower to 6.6.3 to version 6.6.3 or above, the DHCPv6 process fails to restore the client bindings from the system persistent memory during router reload, and the router losses all the client bindings.

## SUMMARY STEPS

1. **configure**
2. **dhcp ipv6**
3. **database** [**relay**] [ **full-write-interval** *full-write-interval*] [**incremental-write-interval** *incremental-write-interval*]
4. **commit**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure**<br>**Example:**<br>`RP/0/RSP0/CPU0:router# configure` | Enters global configuration mode. |
| **Step 2** | **dhcp ipv6**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv6` | Configures DHCP for IPv6 and enters the DHCPv6 configuration mode. |
| **Step 3** | **database** [**relay**] [ **full-write-interval** *full-write-interval*] [**incremental-write-interval** *incremental-write-interval*]<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)# database relay full-write-interval 20 incremental-write-interval 10` | Configures the DHCPv6 relay binding table write to the system persistent memory and specifies the time interval at which the full write and incremental file write are to be performed. The range, in minutes, for *full-write-interval* and *incremental-write-interval* is from 0 to 1440. The default value is 10 for *full-write-interval* and 1 for *incremental-write-interval*.<br>The DHCP mode should be set as **relay**. |
| **Step 4** | **commit** | |

### Configuring DHCPv6 relay binding database write to system persistent memory: Example

```
configure
dhcp ipv6
database relay full-write-interval 15 incremental-write-interval 5
!
end
```

# DHCPv4 Server

DHCP server accepts address assignment requests and renewals and assigns the IP addresses from predefined groups of addresses contained within Distributed Address Pools (DAPS). DHCP server can also be configured to supply additional information to the requesting client such as subnet mask, domain-name, the IP address of the DNS server, the default router, and other configuration parameters. DHCP server can accept broadcasts from locally attached LAN segments or from DHCP requests that have been forwarded by other DHCP relay agents within the network.

The DHCP proxy performs all the functions of a relay and also provides some additional functions. The DHCP proxy conceals DHCP server details from DHCP clients. The DHCP proxy modifies the DHCP replies such that the client considers the proxy to be the server. In this state, the client interacts with the proxy as if it is the DHCP server.

### DHCP IPv4 service based mode selection

As part of DHCP IPv4 service based mode selection feature, a new mode called DHCP base is introduced. If an interface is configured in the DHCP base mode, then the DHCP selects either the DHCP proxy or the DHCP server mode to process the client request by matching option 60 (class-identifier) value of the client request with the configured value under the DHCP base profile.

For example:

```
dhcp ipv4
profile DHCP_BASE base
  match option 60 41424344 profile DHCP_PROXY proxy
  match option 60 41424355 profile DHCP_SERVER server
  default profile DEFAULT_PROFILE server
  relay information authenticate inserted
   !
profile DHCP_PROXY proxy
  helper-address vrf default 10.10.10.1 giaddr 0.0.0.0
!
profile DHCP_SERVER server
  lease 1 0 0
  pool IP_POOL
!
profile DEFAULT_PROFILE server
  lease 1 0 0
  pool IP_POOL
!
!
interface gigabitEthernet 0/0/0/0 base profile DHCP_BASE
```

The pool is configured under server-profile-mode and server-profile-class-sub-mode. The class-based pool selection is always given priority over profile pool selection.

The DHCPv4 server profile class sub-mode supports configuring DHCP options except few (0, 12, 50, 52, 53, 54, 58, 59, 61, 82, and 255 ).

# Configuring DHCPv4 Server Profile

Perform this task to configure the DHCPv4 Server.

## SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **server**
4. **bootfile** *boot-file-name*
5. **broadcast-flag policy** *unicast-always*
6. **class** *class-name*
7. **exit**
8. **default-router** *address1 address2 ... address8*
9. **lease** {**infinite** | *days minutes seconds* }
10. **limit lease** {**per-circuit-id** | **per-interface** | **per-remote-id** } *value*
11. **netbios-name server** *address1 address2 ... address8*
12. **netbios-node-type** {**number** | **b-node** | **h-node** | **m-node** | **p-node** }
13. **option** *option-code* {**ascii** *string* | **hex** *string* | **ip** *address*}
14. **pool** *pool-name*
15. **requested-ip-address-check disable**
16. **commit**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # dhcp ipv4`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode. |
| **Step 3** | **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile TEST server`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Enters the server profile configuration mode. |
| **Step 4** | **bootfile** *boot-file-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# bootfile b1` | Configures the boot file. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 5** | **broadcast-flag policy** *unicast-always*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# broadcast-flag policy unicast-always` | Configures the broadcast-flag policy to unicast-always. |
| **Step 6** | **class** *class-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# class Class_A`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile-class)` | Creates and enters server profile class configuration submode. |
| **Step 7** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile-class)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Exits the server profile class submode. |
| **Step 8** | **default-router** *address1 address2 ... address8*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# default-router 10.20.1.2` | Configures the name of the default-router or the IP address. |
| **Step 9** | **lease** { **infinite** \| *days minutes seconds* }<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# lease infinite` | Configures the lease for an IP address assigned from the pool. |
| **Step 10** | **limit lease** { **per-circuit-id** \| **per-interface** \| **per-remote-id** } *value*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# limit lease per-circuit-id 23` | Configures the limit on a lease per-circuit-id, per-interface, or per-remote-id. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 11** | **netbios-name server** *address1 address2 ... address8*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# netbios-name-server 10.20.3.5` | Configures the NetBIOS name servers. |
| **Step 12** | **netbios-node-type** { **number** \| **b-node** \| **h-node** \| **m-node** \| **p-node** }<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# netbios-node-type p-node` | Configures the type of NetBIOS node. |
| **Step 13** | **option** *option-code* { **ascii** *string* \| **hex** *string* \| **ip** *address* }<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# option 23 ip 10.20.34.56` | Configures the DHCP option code. |
| **Step 14** | **pool** *pool-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# pool pool1` | Configures the Distributed Address Pool Service (DAPS) pool name. |
| **Step 15** | **requested-ip-address-check disable**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# requested-ip-address-check disable` | Validates a requested IP address. |
| **Step 16** | **commit** | |

# Configuring Multiple Classes with a Pool

Perform this task to configure multiple classes with a pool.

### SUMMARY STEPS

1. **configure**

2. **dhcp ipv4**
3. **profile** *profile-name* **server**
4. **pool** *pool-name*
5. **class** *class-name*
6. **pool** *pool_name*
7. **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* | **hex** *hexString* ]
8. **exit**
9. **class** *class-name*
10. **pool** *pool_name*
11. **match vrf** *vrf-name*
12. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # dhcp ipv4`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode. |
| **Step 3** | **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile TEST server`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Enters the server profile configuration mode. |
| **Step 4** | **pool** *pool-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# pool POOL_TEST`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Configures the Distributed Address Pool Service(DAPS) pool name. |
| **Step 5** | **class** *class-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# class Class_A`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Creates and enters the server profile class. |

| | Command or Action | Purpose |
|---|---|---|
| | | |
| **Step 6** | **pool** *pool_name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# pool pool_A`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Configures the pool name. |
| **Step 7** | **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* \| **hex** *hexString* ]<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# match option 60 hex abcd`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | The DHCP server selects a pool from a class by matching options in the received DISCOVER packet with the match option. If none of the classes match, then pools configured under the profile mode are selected. The DHCP server requests DAPS to allocate an address from that pool. |
| **Step 8** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Exits the server profile class submode. |
| **Step 9** | **class** *class-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# class Class_B`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Creates and enters the server profile class. |
| **Step 10** | **pool** *pool_name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# pool pool_B`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Configures the pool name. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 11** | **match vrf** *vrf-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# match vrf VRF1`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | The DHCP server selects a pool from a class by matching the options in the received DISCOVER packet with the match command. If none of the classes match, then pools configured under the profile mode are selected. The DHCP server requests DAPS to allocate an address from that pool. |
| **Step 12** | **commit** | |

# Configuring a server profile DAPS with class match option

Perform this task to configure a server profile DAPS with class match option.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **server**
4. **pool** *pool-name*
5. **class** *class-name*
6. **pool***pool_name*
7. **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* | **hex** *hexString* ]
8. **exit**
9. **exit**
10. **profile** *profile-name* **server**
11. **dns-server** *address1 address2 ... address8*
12. **pool** *pool_name*
13. **class** *class-name*
14. **pool***pool_name*
15. **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* | **hex** *hexString* ]
16. **exit**
17. **exit**
18. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # dhcp ipv4` | Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| | `RP/0/RSP0/CPU0:router(config-dhcpv4)#` | |
| **Step 3** | **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile ISP1 server`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Enters the server profile configuration mode. |
| **Step 4** | **pool** *pool-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# pool ISP1_POOL`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Configures the Distributed Address Pool Service(DAPS) pool name. |
| **Step 5** | **class** *class-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# class ISP1_CLASS`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Creates and enters the server profile class. |
| **Step 6** | **pool***pool_name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# pool ISP1_CLASS_POOL`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Configures the pool name. |
| **Step 7** | **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* \| **hex** *hexString* ]<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# match option 60 hex PXEClient_1`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | The DHCP server selects a pool from a class by matching the options in the received DISCOVER packet with the match option. If none of the classes match, then pools configured under the profile mode will be selected. The DHCP server requests the DAPS to allocate an address from that pool. |
| **Step 8** | **exit**<br>**Example:** | Exits the server profile class sub mode. |

| | Command or Action | Purpose |
|---|---|---|
| | ```RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# exit RP/0/RSP0/CPU0:router(config-dhcpv4-server-prfile)#``` | |
| **Step 9** | **exit**<br>**Example:**<br>```RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# exit RP/0/RSP0/CPU0:router(config-dhcpv4)#``` | Exits the server profile sub mode. |
| **Step 10** | **profile** *profile-name* **server**<br>**Example:**<br>```RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile ISP2 server RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#``` | Enters the server profile configuration mode. |
| **Step 11** | **dns-server** *address1 address2 ... address8*<br>**Example:**<br>```RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# dns-server 10.20.3.4 RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#``` | Configures the name of the DNS server or the IP address |
| **Step 12** | **pool** *pool_name*<br>**Example:**<br>```RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# pool ISP2_POOL RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#``` | Configures the pool name. |
| **Step 13** | **class** *class-name*<br>**Example:**<br>```RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# class ISP2_CLASS RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#``` | Creates and enters the server profile class. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 14** | **pool***pool_name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# pool ISP2_CLASS_POOL`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | Configures the pool name. |
| **Step 15** | **match option** *option* [ **sub-option** *sub-option*] [ **ascii** *asciiString* \| **hex** *hexString* ]<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# match option 60 hex PXEClient_2`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)#` | The DHCP server selects a pool from a class by matching the options in the received DISCOVER packet with the match option. If none of the classes match, then pools configured under the profile mode will be selected. The DHCP server requests the DAPS to allocate an address from that pool. |
| **Step 16** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-class)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Exits the server profile class sub mode. |
| **Step 17** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Exits the server profile sub mode. |
| **Step 18** | **commit** | |

# Configuring Server Profile without daps pool match option

Perform this task to configure a server profile without daps pool match option.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **server**
4. **dns-server** *address1  address2 ... address8*
5. **exit**

6. **profile** *profile-name* **server**
7. **dns-server** *address1  address2 ... address8*
8. **exit**
9. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # dhcp ipv4`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Enables DHCP for IPv4 and enters DHCP IPv4 configuration mode. |
| **Step 3** | **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile ISP1 server`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Enters the server profile configuration mode. |
| **Step 4** | **dns-server** *address1  address2 ... address8*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# dns-server ISP1.com`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Configures the name of the DNS server or IP address. |
| **Step 5** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Exits the server profile sub mode. |
| **Step 6** | **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4 )# profile ISP2 server`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Enters the server profile configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| | | |
| **Step 7** | **dns-server** *address1 address2 ... address8*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# dns-server ISP2.com`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)#` | Configures the name of the DNS server or IP address. |
| **Step 8** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)#` | Exits the server profile sub mode. |
| **Step 9** | **commit** | |

# Configuring an address pool for each ISP on DAPS

Perform this task to configure an address pool for each ISP on Distributed Address Pool Service(DAPS).

### SUMMARY STEPS

1. **configure**
2. **pool vrf** [ **all** | *vrf-name*] { **ipv4** | **ipv6** } *pool-name*
3. **network** *address*
4. **exit**
5. **pool vrf** [ **all** | *vrf-name*] { **ipv4** | **ipv6** } *pool-name*
6. **network** *address*
7. **exit**
8. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **pool vrf** [ **all** | *vrf-name*] { **ipv4** | **ipv6** } *pool-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # pool vrf ISP_1 ipv4 ISP1_POOL` | Configures an IPv4 pool for the specifed VRF or all vrfs. |

| | Command or Action | Purpose |
|---|---|---|
| | `RP/0/RSP0/CPU0:router(config-pool-ipv4)#` | |
| **Step 3** | **network** *address*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)# network 10.10.10.0`<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)#` | Specifies network for allocation. |
| **Step 4** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)# exit`<br>`RP/0/RSP0/CPU0:router(config)#` | Exits the pool ipv4 configuration submode. |
| **Step 5** | **pool vrf** [ **all** \| *vrf-name*] { **ipv4** \| **ipv6** } *pool-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # pool vrf ISP_2 ipv4 ISP2_POOL`<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)#` | Configures an IPv4 pool for the specifed VRF or all vrfs. |
| **Step 6** | **network** *address*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)# network 20.20.20.0`<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)#` | Specifies network for allocation. |
| **Step 7** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-pool-ipv4)# exit`<br>`RP/0/RSP0/CPU0:router(config)#` | Exits the pool ipv4 configuration submode. |
| **Step 8** | **commit** | |

# DHCPv4 Client

The Dynamic Host Configuration Protocol (DHCP) client functionality enables the router interfaces to dynamically acquire the IPv4 address using DHCP.

The DHCP provides configuration parameters to Internet hosts. DHCP consists of two components:

- a protocol to deliver host-specific configuration parameters from a DHCP server to a host.
- a mechanism to allocate network addresses to hosts.

DHCP is built on a client-server model, where designated DHCP server hosts allocate network addresses, and deliver configuration parameters to dynamically configured hosts.

A relay agent is required if the client and server are not on the same Layer 2 network. The relay agent usually runs on the router, and is required because the client device does not know its own IP address initially. The agent sends out a Layer 2 broadcast to find a server that has this information. The router relays these broadcasts to the DHCP server, and forwards the responses back to the correct Layer 2 address so that the correct device gets the correct configuration information.

DHCP has the ability to allocate IP addresses only for a configurable period of time, called the lease period. If the client is required to retain this IP address for a longer period beyond the lease period, the lease period must be renewed before the IP address expires. The client renews the lease based on configuration that was sent from the server. The client unicasts a REQUEST message using the IP address of the server. When a server receives the REQUEST message and responds with an ACK message. The lease period of the client is extended by the lease time configured in the ACK message.

### Restrictions and Limitations

- DHCP client can be enabled only on management interfaces.
- Either DHCP or static IP can be configured on an interface.

## Enabling DHCP Client on an Interface

The DHCPv4 or DHCPv6 client can be enabled at an interface level. The DHCP component receives a notification when DHCPv4 or DHCPv6 is enabled or disabled on an interface.

```
Router# configure
Router(config)# interface MgmtEth rack/slot/CPU0/port
Router(config)# interface interface_name ipv6 address dhcp
```

# DHCPv6 Relay Agent Notification for Prefix Delegation

DHCPv6 relay agent notification for prefix delegation allows the router working as a DHCPv6 relay agent to find prefix delegation options by reviewing the contents of a DHCPv6 RELAY-REPLY packet that is being relayed by the relay agent to the client. When the relay agent finds the prefix delegation option, the relay agent extracts the information about the prefix being delegated and inserts an IPv6 subscriber route matching the prefix delegation information onto the relay agent. Future packets destined to that prefix via relay are forwarded based on the information contained in the prefix delegation. The IPv6 subscriber route remains in the routing table until the prefix delegation lease time expires or the relay agent receives a release packet from the client releasing the prefix delegation.

The relay agent automatically does the subscriber route management.

The IPv6 routes are added when the relay agent relays a RELAY-REPLY packet, and the IPv6 routes are deleted when the prefix delegation lease time expires or the relay agent receives a release message. An IPv6 subscriber route in the routing table of the relay agent can be updated when the prefix delegation lease time is extended.

This feature leaves an IPv6 route on the routing table of the relay agent. This registered IPv6 address allows unicast reverse packet forwarding (uRPF) to work by allowing the router doing the reverse lookup to confirm that the IPv6 address on the relay agent is not malformed or spoofed. The IPv6 route in the routing table of the relay agent can be redistributed to other routing protocols to advertise the subnets to other nodes. When the client sends a DHCP_DECLINE message, the routes are removed.

# Configuring DHCPv6 Stateful Relay Agent for Prefix Delegation

Perform this task to configure Dynamic Host Configuration Protocol (DHCP) IPv6 relay agent notification for prefix delegation.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv6**
3. **profile** *profile-name* **proxy**
4. **helper-address** *ipv6-address* **interface** *type interface-path-id*
5. **exit**
6. **interface** *type interface-path-id* **proxy**
7. **profile** *profile-name*
8. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv6**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config) # dhcp ipv6`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)#` | Enables DHCP for IPv6 and enters DHCP IPv6 configuration mode. |
| **Step 3** | **profile** *profile-name* **proxy**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)# profile downstream proxy`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-profile)#` | Enters the proxy profile configuration mode. |
| **Step 4** | **helper-address** *ipv6-address* **interface** *type interface-path-id* | Configure the DHCP IPv6 relay agent. |

| | Command or Action | Purpose |
|---|---|---|
| | **Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-profile)# helper-address 2001:db8::1 GigabitEthernet 0/1/0/1`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-profile)` | |
| **Step 5** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-profile)# exit`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)#` | Exits from the profile configuration mode. |
| **Step 6** | **interface** *type interface-path-id* **proxy**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6)# interface GigabitEthernet 0/1/0/0 proxy`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-if)#` | Enables IPv6 DHCP on an interface and acts as an IPv6 DHCP stateful relay agent. |
| **Step 7** | **profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-if)# profile downstream`<br>`RP/0/RSP0/CPU0:router(config-dhcpv6-if)#` | Enters the profile configuration mode. |
| **Step 8** | **commit** | |

# Enabling Secure ARP

Secure ARP is disabled by default; this task describes how to enable secure ARP.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. Do one of the following:
   - **profile** *profile-name* **proxy**
   - **profile** *profile-name* **server**
4. **secure-arp**
5. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 configuration mode. |
| **Step 3** | Do one of the following:<br>• **profile** *profile-name* **proxy**<br>• **profile** *profile-name* **server**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile profile1 server` | Enters DHCP IPv4 profile proxy or server submode. |
| **Step 4** | **secure-arp**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-server-profile)# secure-arp` | Enables secure ARP. |
| **Step 5** | **commit** | |

# Configuration Examples for the DHCP Relay Agent

This section provides the following configuration examples:

## DHCP Relay Profile: Example

The following example shows how to configure the Cisco IOS XR relay profile:

```
dhcp ipv4
 profile client relay
  helper-address vrf foo 10.10.1.1
 !
! ...
```

## DHCP Relay on an Interface: Example

The following example shows how to enable the DHCP relay agent on an interface:

```
dhcp ipv4
 interface GigabitEthernet 0/1/1/0 relay profile client
!
```

## DHCP Relay on a VRF: Example

The following example shows how to enable the DHCP relay agent on a VRF:

```
dhcp ipv4
 vrf default relay profile client
!
```

## Relay Agent Information Option Support: Example

The following example shows how to enable the relay agent and the insertion and removal of the DHCP relay information option:

```
dhcp ipv4
 profile client relay
relay information option

 !
!
```

## Relay Agent Giaddr Policy: Example

The following example shows how to configure relay agent giaddr policy:

```
dhcp ipv4
 profile client relay
  giaddr policy drop
 !
!
```

# Implementing DHCP Snooping

## Prerequisites for Configuring DHCP Snooping

The following prerequisites are required example shows how to configure DHCP IPv4 snooping relay agent broadcast flag policy:

- You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
- A Cisco ASR 9000 Series Router running Cisco IOS XR software.
- A configured and running DHCP client and DHCP server.

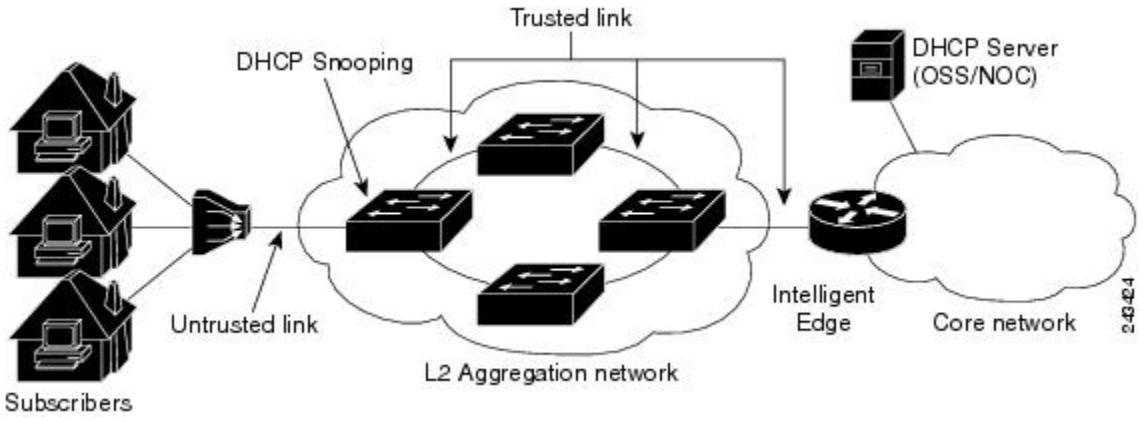
# Information about DHCP Snooping

DHCP Snooping features are focused on the edge of the aggregation network. Security features are applied at the first point of entry for subscribers. Relay agent information option information is used to identify the subscriber's line, which is either the DSL line to the subscriber's home or the first port in the aggregation network.

The central concept for DHCP snooping is that of trusted and untrusted links. A trusted link is one providing secure access for traffic on that link. On an untrusted link, subscriber identity and subscriber traffic cannot be determined. DHCP snooping runs on untrusted links to provide subscriber identity. Figure 2: DHCP Snooping in an Aggregation Network, on page 33 shows an aggregation network. The link from the DSLAM to the aggregation network is untrusted and is the point of presence for DHCP snooping. The links connecting the switches in the aggregation network and the link from the aggregation network to the intelligent edge is considered trusted.

**Note** Enabling both DHCP relay on a BVI and DHCP snooping in a bridge domain that has a BVI can result in duplicate DHCP messages from the DHCP client to the DHCP server.

***Figure 2: DHCP Snooping in an Aggregation Network***




## Trusted and Untrusted Ports

On trusted ports, DHCP BOOTREQUEST packets are forwarded by DHCP snooping. The client's address lease is not tracked and the client is not bound to the port. DHCP BOOTREPLY packets are forwarded.

When the first DHCP BOOTREQUEST packet from a client is received on an untrusted port, DHCP snooping binds the client to the bridge port and tracks the clients's address lease. When that address lease expires, the client is deleted from the database and is unbound from the bridge port. Packets from this client received on this bridge port are processed and forwarded as long as the binding exists. Packets that are received on another bridge port from this client are dropped while the binding exists. DHCP snooping only forwards DHCP BOOTREPLY packets for this client on the bridge port that the client is bound to. DHCP BOOTREPLY packets that are received on untrusted ports are not forwarded.

## DHCP Snooping in a Bridge Domain

To enable DHCP snooping in a bridge domain, there must be at least two profiles, a trusted profile and an untrusted profile. The untrusted profile is assigned to the client-facing ports, and the trusted profile is assigned

to the server-facing ports. In most cases, there are many client facing ports and few server-facing ports. The simplest example is two ports, a client-facing port and a server-facing port, with an untrusted profile explicitly assigned to the client-facing port and a trusted profile assigned to the server-facing port.

## Assigning Profiles to a Bridge Domain

Because there are normally many client-facing ports and a small number of server-facing ports, the operator assigns the untrusted profile to the bridge domain. This configuration effectively assigns an untrusted profile to every port in the bridge domain. This action saves the operator from explicitly assigning the untrusted profile to all of the client-facing ports. Because there also must be server-facing ports that have trusted DHCP snooping profiles, in order for DHCP snooping to function properly, this untrusted DHCP snooping profile assignment is overridden to server-facing ports by specifically configuring trusted DHCP snooping profiles on the server-facing ports. For ports in the bridge domain that do not require DHCP snooping, all should have the **none** profile assigned to them to disable DHCP snooping on those ports.

## Relay Information Options

You can configure a DHCP snooping profile to insert the relay information option (option 82) into DHCP client packets only when it is assigned to a client port. The **relay information option allow-untrusted** command addresses what to do with DHCP client packets when there is a null giaddr and a relay-information option already in the client packet when it is received. This is a different condition than a DHCP snooping trusted/untrusted port. The **relay information option allow-untrusted** command determines how the DHCP snooping application handles untrusted relay information options.

# How to Configure DHCP Snooping

This section contains the following tasks:

## Enabling DHCP Snooping in a Bridge Domain

The following configuration creates two ports, a client-facing port and a server-facing port. In Step 1 through Step 8, an untrusted DHCP snooping profile is assigned to the client bridge port and trusted DHCP snooping profile is assigned to the server bridge port. In Step 9 through Step 18, an untrusted DHCP snooping profile is assigned to the bridge domain and trusted DHCP snooping profiles are assigned to server bridge ports.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv4**
3. **profile** *untrusted-profile-name* **snoop**
4. **exit**
5. **dhcp ipv4**
6. **profile** *profile-name* **snoop**
7. **trusted**
8. **exit**
9. **l2vpn**
10. **bridge group** *group-name*
11. **bridge-domain** *bridge-domain-name*
12. **interface** *type interface-path-id*
13. **dhcp ipv4 snoop profile** *untrusted-profile-name*

14. **interface** *type interface-path-id*
15. **dhcp ipv4 snoop profile** *trusted-profile-name*
16. **exit**
17. **exit**
18. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 profile configuration submode. |
| **Step 3** | **profile** *untrusted-profile-name* **snoop**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile untrustedClientProfile snoop` | Configures an untrusted DHCP snooping profile for the client port. |
| **Step 4** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# exit` | Exits DHCP IPv4 profile configuration mode. |
| **Step 5** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enables DHCP for IPv4 and enters DHCP IPv4 profile configuration mode. |
| **Step 6** | **profile** *profile-name* **snoop**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile trustedServerProfile snoop` | Configures a trusted DHCP snooping profile for the server port. |
| **Step 7** | **trusted**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcv4)# trusted` | Configures a DHCP snoop profile to be trusted. |
| **Step 8** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcv4)# exit` | Exits DHCP IPv4 profile configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 9** | **l2vpn**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# l2vpn` | Enters l2vpn configuration mode. |
| **Step 10** | **bridge group** *group-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group ccc` | Creates a bridge group to contain bridge domains and enters l2vpn bridge group configuration submode. |
| **Step 11** | **bridge-domain** *bridge-domain-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain ddd` | Establishes a bridge domain. |
| **Step 12** | **interface** *type interface-path-id*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface gigabitethernet 0/1/0/0` | Identifies an interface. |
| **Step 13** | **dhcp ipv4 snoop profile** *untrusted-profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# dhcp ipv4 snoop profile untrustedClientProfile` | Attaches an untrusted DHCP snoop profile to the bridge port. |
| **Step 14** | **interface** *type interface-path-id*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# gigabitethernet 0/1/0/1` | Identifies an interface. |
| **Step 15** | **dhcp ipv4 snoop profile** *trusted-profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# dhcp ipv4 snoop profile trustedServerProfile` | Attaches a trusted DHCP snoop profile to the bridge port. |
| **Step 16** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# exit` | Exits the l2vpn bridge group bridge-domain interface configuration submode. |
| **Step 17** | **exit**<br>**Example:** | Exits the l2vpn bridge group bridge-domain configuration submode. |

| | Command or Action | Purpose |
|---|---|---|
| | `RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# exit` | |
| **Step 18** | **commit** | |

## Disabling DHCP Snooping on a Specific Bridge Port

The following configuration enables DHCP to snoop packets on all bridge ports in the bridge domain ISP1 except for bridge port GigabitEthernet 0/1/0/1 and GigabitEthernet 0/1/0/2. DHCP snooping is disabled on bridge port GigabitEthernet 0/1/0/1. Bridge port GigabitEthernet 0/1/0/2 is the trusted port that connects to the server. In this example, no additional features are enabled, so only DHCP snooping is running.

### SUMMARY STEPS

1. **configure**
2. **l2vpn**
3. **bridge group** *group-name*
4. **bridge-domain** *bridge-domain-name*
5. **dhcp ipv4 snoop profile** *profile-name*
6. **interface** *type interface-path-id*
7. **dhcp ipv4 none**
8. **interface** *type interface-path-id*
9. **dhcp ipv4 snoop profile** *profile-name*
10. **exit**
11. **exit**
12. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **l2vpn**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# l2vpn` | Enters l2vpn configuration submode. |
| **Step 3** | **bridge group** *group-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group GRP1` | Creates a bridge group to contain bridge domains and enters l2vpn bridge group configuration submode. |
| **Step 4** | **bridge-domain** *bridge-domain-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain ISP1` | Establishes a bridge domain and enters l2vpn bridge group bridge-domain configuration submode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 5** | **dhcp ipv4 snoop profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dhcp ipv4 snoop profile untrustedClientProfile` | Attaches the untrusted DHCP snooping profile to the bridge domain. |
| **Step 6** | **interface** *type interface-path-id*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface gigabitethernet 0/1/0/1` | Identifies an interface and enters l2vpn bridge group bridge-domain interface configuration submode. |
| **Step 7** | **dhcp ipv4 none**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-if)# dhcp ipv4 none` | Disables DHCP snooping on the port. |
| **Step 8** | **interface** *type interface-path-id*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface gigabitethernet 0/1/0/2` | Identifies an interface and enters l2vpn bridge group bridge-domain interface configuration submode. |
| **Step 9** | **dhcp ipv4 snoop profile** *profile-name*<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dhcp ipv4 snoop profile trustedServerProfile` | Attaches the trusted DHCP snooping profile to a port. |
| **Step 10** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bd-bg)# exit` | Exits l2vpn bridge-domain bridge group interface configuration submode. |
| **Step 11** | **exit**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg)# exit` | Exits l2vpn bridge-domain submode. |
| **Step 12** | **commit** | |

## Using the Relay Information Option

This task shows how to use the relay information commands to insert the relay information option (option 82) into DHCP client packets and forward DHCP packets with untrusted relay information options.

**SUMMARY STEPS**

1. **configure**
2. **dhcp ipv4**
3. **profile** *profile-name* **snoop**
4. **relay information option**
5. **relay information option allow-untrusted**
6. **commit**

**DETAILED STEPS**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure** | |
| **Step 2** | **dhcp ipv4**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv4` | Enters DHCP IPv4 profile configuration submode. |
| **Step 3** | **profile** *profile-name* **snoop**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4)# profile untrustedClientProfile snoop` | Configures an untrusted DHCP snooping profile for the client port. |
| **Step 4** | **relay information option**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-snoop-profile)# relay information option` | Enables the system to insert the DHCP relay information option field in forwarded BOOTREQUEST messages to a DHCP server. |
| **Step 5** | **relay information option allow-untrusted**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-dhcpv4-snoop-profile)# relay information option allow-untrusted` | Configures DHCP IPv4 relay not to discard BOOTREQUEST packets that have an existing relay information option and the giaddr set to zero. |
| **Step 6** | **commit** | |

# Configuration Examples for DHCP Snooping

This section provides the following configuration examples:

## Assigning a DHCP Profile to a Bridge Domain: Example

The following example shows how to enable DHCP snooping in a bridge domain:

```
l2vpn
 bridge group GRP1
  bridge-domain ISP1
```

```
  dhcp ipv4 profile untrustedClientProfile snoop
```

## Disabling DHCP Snooping on a Specific Bridge Port: Example

The following example shows how to disable DHCP snooping on a specific bridge port:

```
interface gigabitethernet 0/1/0/1
 dhcp ipv4 none
```

## Configuring a DHCP Profile for Trusted Bridge Ports: Example

The following example shows how to configure a DHCP profile for trusted bridge ports:

```
dhcp ipv4 profile trustedServerProfile snoop
 trusted
```

## Configuring an Untrusted Profile on a Bridge Domain: Example

The following example shows how to attach a profile to a bridge domain and disable snooping on a bridge port.

```
l2vpn
 bridge group GRP1
  bridge-domain ISP1
   dhcp ipv4 profile untrustedClientProfile snoop
    interface gigabitethernet 0/1/0/1
     dhcp ipv4 none
```

## Configuring a Trusted Bridge Port: Example

The following example shows ow to assign a trusted DHCP snooping profile to a bridge port:

```
l2vpn
 bridge group GRP1
  bridge-domain ISP1
   interface gigabitethernet 0/1/0/2
    dhcp ipv4 profile trustedServerProfile snoop
```

# DHCPv6 Proxy Binding Table Reload Persistency

The Cisco IOS-XR Dynamic Host Configuration Protocol (DHCP) application is responsible for maintaining the DHCP binding state for the DHCP leases allocated to clients by the DHCP application. These binding states are learned by the DHCP application (proxy/relay/snooping). DHCP clients expect to maintain a DHCP lease regardless of the events that occur to the DHCP application.

**Note** From Release 6.2.2 onwards, 200K sessions are supported on a proxy or server running DHCPv6.

This feature enables the DHCP application to maintain bind state through the above events:

- Process restart – Local checkpoint
- RP failover – Hot standby RP through checkpoint
- LC IMDR – Local checkpoint
- LC OIR – Shadow table on RP
- System restart – Bindings saved on local disk

# Configuring DHCPv6 Proxy Binding Database Write to System Persistent Memory

Perform this task to configure the DHCPv6 binding database write to the system persistent memory. This helps to recover the DHCPv6 binding table after a system reload. The file names used for a full persistent file write are *dhcpv6_srpb_{nodeid}_odd* and *dhcpv6_srpb_{nodeid}_even*. The *nodeid* is the actual node ID of the node where the file is written. The incremental file is named the same way as the full file, with a *_inc* appended to it.

**Note** From Release 6.2.2 onwards, 200K sessions are supported on a proxy or server running DHCPv6.

### SUMMARY STEPS

1. **configure**
2. **dhcp ipv6**
3. **database** [**proxy**] [ **full-write-interval** *full-write-interval*] [**incremental-write-interval** *incremental-write-interval*]
4. **commit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure**<br>**Example:**<br>`RP/0/RSP0/CPU0:router# configure` | Enters global configuration mode. |
| **Step 2** | **dhcp ipv6**<br>**Example:**<br>`RP/0/RSP0/CPU0:router(config)# dhcp ipv6` | Configures DHCP for IPv6 and enters the DHCPv6 configuration mode. |
| **Step 3** | **database** [**proxy**] [ **full-write-interval** *full-write-interval*] [**incremental-write-interval** *incremental-write-interval*]<br>**Example:** | Configures the DHCPv6 binding table write to the system persistent memory and specifies the time interval at which the full write and incremental file write are to be performed. The range, in minutes, for *full-write-interval* and |

| | Command or Action | Purpose |
|---|---|---|
| | `RP/0/RSP0/CPU0:router(config-dhcpv6)# database proxy full-write-interval 20 incremental-write-interval 10` | *incremental-write-interval* is from 0 to 1440. The default value is 10 for *full-write-interval* and 1 for *incremental-write-interval*.<br>The DHCP mode should be set as **proxy**. |
| **Step 4** | **commit** | |

### Configuring DHCP binding database write to system persistent memory: Example

```
 configure
 dhcp ipv6
 database proxy full-write-interval 15 incremental-write-interval 5
 !
end
```

# DHCP Session MAC Throttle

The ASR9K router supports the DHCP session MAC throttle feature. This feature limits the number of DHCP client requests reaching the ASR9K, based on the MAC address of the DHCP clients. This feature is supported for the DHCPv4 proxy, the DHCPv4 server, and the DHCPV6 proxy. The feature prevents a DHCP client from sending multiple DISCOVER packets to the ASR9K router, within short periods of time. This, in turn, prevents that client from impacting the session establishment of other DHCP clients.

**Note** From Release 6.2.2 onwards, 200K sessions are supported on a proxy or server running DHCPv6.

A unique throttle entry is created in the system for each unique MAC address received on any interface where the profile is attached.

To configure the DHCP session MAC throttle feature, use the **sessions mac throttle** command in the respective DHCP profile configuration mode.

### Configuring DHCP Session MAC Throttle: Example

```
dhcp ipv4
 profile p1 server
  sessions mac throttle 300 60 40
 !
 interface GigabitEthernet0/0/0/0 server profile p1
!
```

# Additional References

The following sections provide references related to implementing the Cisco IOS XR DHCP relay agent and DHCP snooping features.

### Related Documents

| Related Topic | Document Title |
|---|---|
| Cisco IOS XR<br>DHCP commands | *DHCP Commands* module in the *IP Addresses and Services Command Reference for Cisco ASR 9000 Series Routers* |
| Getting started material | *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide* |
| Information about user groups and task IDs | *Configuring AAA Services* module in the *System Security Configuration Guide for Cisco ASR 9000 Series Routers* |

### Standards

| Standards | Title |
|---|---|
| No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature. | — |

### MIBs

| MIBs | MIBs Link |
|---|---|
| — | To locate and download MIBs, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: https://mibs.cloudapps.cisco.com/ITDIT/MIBS/servlet/index |

### RFCs

| RFC | Title |
|---|---|
| RFC 2131 | *Dynamic Host Configuration Protocol* |

### Technical Assistance

| Description | Link |
|---|---|
| The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. | http://www.cisco.com/techsupport |