DHCP for IPv6 Broadband

The DHCP for IPv6 Broadband feature highlights the DHCP enhancements that support IPv6 broadband deployments. This feature briefly explains the different ways a delegating device selects prefixes for a requesting device, enabling accounting messages on a device, and forced release of delegated prefix bindings associated with a PPP virtual interface when the PPP virtual interface is terminated.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information About DHCP for IPv6 Broadband

Prefix Delegation

An IPv6 prefix delegating device selects IPv6 prefixes to be assigned to a requesting device upon receiving a request from the client. The delegating device might select prefixes for a requesting device in the following ways:

- Dynamic assignment from a pool of available prefixes.
- Dynamic assignment from a pool name obtained from the RADIUS server.
- Assignment of prefix obtained from the RADIUS server.
Contrary to IPv4 address assignment, an IPv6 user will be assigned a prefix, not a single address. Typically the Internet service provider (ISP) assigns a 64- or 48-bit prefix.

**Accounting Start and Stop Messages**

PPP calls a registry to allow DHCPv6 to append the delegated prefix information to accounting start and stop messages. When accounting is configured for a DHCPv6 pool, accounting interim packets are sent to broadband sessions after binding is provided from the pool.

**Forced Release of a Binding**

The DHCPv6 server maintains an automatic binding table in memory to track the assignment of some configuration parameters, such as prefixes between the server and its clients. The automatic bindings can be stored permanently in the database agent, which can be, for example, a remote TFTP server or local NVRAM file system.

DHCPv6 invokes a routine when the virtual interface used by PPP terminates. This routine automatically releases any delegated prefix bindings associated with the PPP virtual interface that is being terminated.

When a PPP virtual interface terminates, the routine runs through the full table of DHCPv6 bindings checking for the matching interface. Because PPP uses a virtual interface, this subroutine clears any related lease information when the PPP connection terminates.

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**Note**

In IPv6 broadband deployment using DHCPv6, you must enable release of prefix bindings associated with a PPP virtual interface using the `ipv6 dhcp binding track ppp` command. This ensures that DHCPv6 bindings are tracked together with PPP sessions, and in the event of DHCP REBIND failure, the client initiates DHCPv6 negotiation again.

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**How to Configure DHCP for IPv6 Broadband**

**Enabling the Sending of Accounting Start and Stop Messages**

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `ipv6 dhcp pool poolname`
4. `accounting mlist`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>enable</code></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td><code>Device&gt; enable</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
</tbody>
</table>
### Removing Delegated Prefix Bindings

Perform this task to release any delegated prefix bindings associated with the PPP virtual interface that is being terminated.

#### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `interface type number`
4. `ipv6 dhcp bindings track ppp`

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| 1     | `enable`          | Enables privileged EXEC mode.  
|       | Example:          | • Enter your password if prompted. |
|       | Device> enable    |         |
| 2     | `configure terminal` | Enters global configuration mode. |
|       | Example:          |         |
|       | Device# configure terminal |         |
| 3     | `interface type number` | Specifies an interface type and number, and places the router in interface configuration mode. |
|       | Example:          |         |
|       | Device(config)# interface VirtualAccess2.2 |         |
**PurposeCommand or Action**

<table>
<thead>
<tr>
<th>Step 4</th>
<th>ipv6 dhcp bindings track ppp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Device(config-if)# ipv6 dhcp bindings track ppp</td>
<td>Releases any delegated prefix leases associated with the PPP virtual interface that is being terminated.</td>
</tr>
</tbody>
</table>

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**Configuration Examples for DHCP for IPv6 Broadband**

**Example: Enabling the Sending of Accounting Start and Stop Messages**

This example shows how to enable a device to send accounting start and stop messages.

```
Device(config)# ipv6 dhcp pool pool1
Device(config-dhcp)# accounting list1
```

**Example: Configuration for a Prefix Allocated from a Local Pool**

DHCPv6 clients are connected to the DHCPv6 server on Gigabit Ethernet interface 0/0/0. The server is configured to use parameters from the DHCP pool called dhcp-pool. This pool provides clients with the IPv6 address of a DNS server and the domain name to be used. It also specifies that prefixes can be delegated from the prefix pool called client-prefix-pool1. The prefixes delegated will have valid and preferred lifetimes of 1800 and 600 seconds respectively. The prefix pool named client-prefix-pool1 has a prefix of length /40 from which it will delegate (sub) prefixes of length /48.

```
ipv6 dhcp pool dhcp-pool
  prefix-delegation pool client-prefix-pool1 lifetime 1800 600
dns-server 2001:DB8:3000:3000::42
domain-name example.com
!
interface GigabitEthernet0/0/0
description downlink to clients
ipv6 address FEC0:240:104:2001::139/64
ipv6 dhcp server dhcp-pool
!
ipv6 local pool client-prefix-pool1 2001:DB8:1200::/40 48
```

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**Additional References**

**Related Documents**

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
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<tbody>
<tr>
<td>IPv6 addressing and connectivity</td>
<td>IPv6 Configuration Guide</td>
</tr>
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</table>
Feature Information for DHCP for IPv6 Broadband

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.
### Table 1: Feature Information for DHCP for IPv6 Broadband

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP Enhancements to Support IPv6 Broadband Deployments</td>
<td>Cisco IOS XE Release 2.5</td>
<td>The feature highlights the DHCP enhancements that support IPv6 broadband deployments, such as, the different ways a delegating device selects prefixes for a requesting device, enabling accounting messages on a device, and forced release of delegated prefix bindings associated with a PPP virtual interface when the PPP virtual interface is terminated. The following commands were introduced or modified: <code>accounting</code>, <code>ipv6 dhcp bindings track ppp</code>, <code>ipv6 dhcp pool</code>.</td>
</tr>
<tr>
<td>DHCPv6 Prefix Delegation RADIUS VSA</td>
<td>Cisco IOS XE Release 2.5</td>
<td>When the user requests a prefix from the prefix delegator, typically the NAS, the prefix is allocated using DHCPv6.</td>
</tr>
<tr>
<td>DHCP Accounting Attribute</td>
<td>Cisco IOS XE Release 3.13S</td>
<td>The DHCP Accounting Attribute feature allows DHCPv6 to append delegated prefix information to accounting start and stop messages.</td>
</tr>
</tbody>
</table>