



# DHCPv6 Individual Address Assignment

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The Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Individual Address Assignment feature manages nonduplicate address assignment in the correct prefix based on the network where the host is connected.

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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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for Configuring DHCPv6 Address Assignment

By default, no Dynamic Host Configuration Protocol for IPv6 (DHCPv6) features are configured on the device.

When you configure DHCPv6 address assignment, remember that the specified interface must be one of these Layer 3 interfaces:

- Switch virtual interface (SVI): a VLAN interface created when you enter the **interface vlan *vlan-id*** command.

- EtherChannel port channel in Layer 3 mode: a port-channel logical interface created when you enter the **interface port-channel** *port-channel-number* command.

## Information About DHCPv6 Individual Address Assignment

### DHCPv6 Address Assignment

Dynamic Host Configuration Protocol for IPv6 (DHCPv6) enables DHCP servers to pass configuration parameters, such as IPv6 network addresses, to IPv6 clients. The DHCPv6 Individual Address Assignment feature manages nonduplicate address assignment in the correct prefix based on the network where the host is connected. Assigned addresses can be from one or multiple prefix pools. Additional options, such as the default domain and Domain Name System (DNS) name-server address, can be passed back to the client. Address pools can be assigned for use on a specific interface or on multiple interfaces, or the server can automatically find the appropriate pool.

## How to Configure DHCPv6 Individual Address Assignment

### Enabling the DHCPv6 Server Function on an Interface

Perform this task to enable the Dynamic Host Configuration Protocol for IPv6 (DHCPv6) server function on an interface. Note that to delete a DHCPv6 pool, you must use the **no ipv6 dhcp pool** *poolname* global configuration command. Use the **no** form of the DHCP pool configuration mode commands to change the DHCPv6 pool characteristics. To disable the DHCPv6 server function on an interface, use the **no ipv6 dhcp server** interface configuration command.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 dhcp pool** *poolname*
4. **address prefix** *ipv6-prefix* [**lifetime** {*valid-lifetime preferred-lifetime* | **infinite**}]
5. **link-address** *ipv6-prefix*
6. **vendor-specific** *vendor-id*
7. **suboption number** {**address** *ipv6-address* | **ascii** *ascii-string* | **hex** *hex-string*}
8. **exit**
9. **exit**
10. **interface** *type number*
11. **ipv6 dhcp server** [*poolname* | **automatic**] [**rapid-commit**] [**preference** *value*] [**allow-hint**]
12. **end**
13. Do one of the following:
  - **show ipv6 dhcp pool**
  - **show ipv6 dhcp interface**
14. **copy running-config startup-config**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device(config)# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ipv6 dhcp pool</b> <i>poolname</i>  <b>Example:</b> Device(config)# ipv6 dhcp pool engineering	Enters DHCP for IPv6 pool configuration mode, and defines the name of the IPv6 DHCP pool.
<b>Step 4</b>	<b>address prefix</b> <i>ipv6-prefix</i> [ <b>lifetime</b> { <i>valid-lifetime preferred-lifetime</i>   <b>infinite</b> }]	(Optional) Specifies an address prefix for address assignment.

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>Device(config-dhcpv6)# address prefix 2001:1000::0/64 lifetime infinite</pre>	<ul style="list-style-type: none"> <li>This address must be in hexadecimal, using 16-bit values between colons.</li> <li><b>lifetime</b> <i>valid-lifetime preferred-lifetime</i>—Specifies a time interval (in seconds) that an IPv6 address prefix remains in the valid state.</li> </ul>
<b>Step 5</b>	<p><b>link-address</b> <i>ipv6-prefix</i></p> <p><b>Example:</b></p> <pre>Device(config-dhcpv6)# link-address 2001:1001::0/64</pre>	<p>(Optional) Specifies a link-address IPv6 prefix.</p> <ul style="list-style-type: none"> <li>When an address on the incoming interface or a link address in the packet matches the specified IPv6 prefix, the server uses the configuration information pool.</li> </ul>
<b>Step 6</b>	<p><b>vendor-specific</b> <i>vendor-id</i></p> <p><b>Example:</b></p> <pre>Device(config-dhcpv6)# vendor-specific 9</pre>	<p>(Optional) Enters DHCPv6 vendor-specific configuration mode with the vendor-specific identification number.</p>
<b>Step 7</b>	<p><b>suboption</b> <i>number</i> {<b>address</b> <i>ipv6-address</i>   <b>ascii</b> <i>ascii-string</i>   <b>hex</b> <i>hex-string</i>}</p> <p><b>Example:</b></p> <pre>Device(config-dhcpv6-vs)# suboption 1 address 1000:235D::1</pre>	<p>(Optional) Enters a vendor-specific suboption number.</p>
<b>Step 8</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config-dhcpv6-vs)# exit</pre>	<p>Returns to DHCP pool configuration mode.</p>
<b>Step 9</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config-dhcpv6)# exit</pre>	<p>Returns to global configuration mode.</p>
<b>Step 10</b>	<p><b>interface</b> <i>type number</i></p> <p><b>Example:</b></p> <pre>Device(config)# interface fastethernet 0/0</pre>	<p>Enters interface configuration mode, and specifies the interface to configure.</p>
<b>Step 11</b>	<p><b>ipv6 dhcp server</b> [<i>poolname</i>   <b>automatic</b>] [<b>rapid-commit</b>] [<b>preference</b> <i>value</i>] [<b>allow-hint</b>]</p>	<p>Enables the DHCPv6 server function on an interface.</p>

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>Device(config-if)# ipv6 dhcp server rapid-commit</pre>	
<b>Step 12</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config-if)# end</pre>	Returns to privileged EXEC mode.
<b>Step 13</b>	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• <b>show ipv6 dhcp pool</b></li> <li>• <b>show ipv6 dhcp interface</b></li> </ul> <p><b>Example:</b></p> <pre>Device# show ipv6 dhcp pool</pre>	Verifies DHCPv6 pool configuration or verifies that the DHCPv6 server function is enabled on an interface.
<b>Step 14</b>	<p><b>copy running-config startup-config</b></p> <p><b>Example:</b></p> <pre>Device# copy running-config startup-config</pre>	(Optional) Saves your entries in the configuration file.

## Enabling the DHCPv6 Client Function on an Interface

Perform this task to enable the Dynamic Host Configuration Protocol for IPv6 (DHCPv6) client function on an interface. To disable the DHCPv6 client function, use the **no ipv6 address dhcp** interface configuration command. To remove the DHCPv6 client request, use the **no ipv6 address dhcp client request vendor** interface configuration command.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ipv6 address dhcp** [**rapid-commit**]
5. **ipv6 address dhcp client request vendor**
6. **end**
7. **show ipv6 dhcp interface**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface <i>type number</i></b>  <b>Example:</b> Device(config)# interface fastethernet 0/0	Enters interface configuration mode, and specifies the interface to configure.
<b>Step 4</b>	<b>ipv6 address dhcp [rapid-commit]</b>  <b>Example:</b> Device(config-if)# ipv6 address dhcp rapid-commit	Enables the interface to acquire an IPv6 address from the DHCPv6 server.
<b>Step 5</b>	<b>ipv6 address dhcp client request vendor</b>  <b>Example:</b> Device(config-if)# ipv6 address dhcp client request vendor	(Optional) Enables the interface to request the vendor-specific option.
<b>Step 6</b>	<b>end</b>  <b>Example:</b> Device(config-if)# end	Returns to privileged EXEC mode.
<b>Step 7</b>	<b>show ipv6 dhcp interface</b>  <b>Example:</b> Device# show ipv6 dhcp interface	Verifies that the DHCPv6 client is enabled on an interface.

# Configuration Examples for DHCPv6 Individual Address Assignment

## Examples: Configuring the DHCPv6 Server Function

In the following example, Dynamic Host Configuration Protocol for IPv6 (DHCPv6) clients are connected to the DHCPv6 server on Ethernet interface 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 Domain Name System (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 Ethernet 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
```

The following example from the **show ipv6 dhcp** command shows the DHCP unique identifier (DUID) of the device:

```
Device# show ipv6 dhcp
```

```
This device's DHCPv6 unique identifier(DUID): 000300010002FCA5DC1C
```

In the following example, the **show ipv6 dhcp binding** command shows information about two clients, including their DUIDs, IAPDs, prefixes, and preferred and valid lifetimes:

```
Device# show ipv6 dhcp binding
```

```
Client: FE80::202:FCFF:FEA5:DC39 (Ethernet2/1)
  DUID: 000300010002FCA5DC1C
  IA PD: IA ID 0x00040001, T1 0, T2 0
  Prefix: 3FFE:C00:C18:11::/68
  preferred lifetime 180, valid lifetime 12345
  expires at Nov 08 2002 02:24 PM (12320 seconds)
Client: FE80::202:FCFF:FEA5:C039 (Ethernet2/1)
  DUID: 000300010002FCA5C01C
  IA PD: IA ID 0x00040001, T1 0, T2 0
  Prefix: 3FFE:C00:C18:1::/72
  preferred lifetime 240, valid lifetime 54321
  expires at Nov 09 2002 02:02 AM (54246 seconds)
  Prefix: 3FFE:C00:C18:2::/72
  preferred lifetime 300, valid lifetime 54333
  expires at Nov 09 2002 02:03 AM (54258 seconds)
  Prefix: 3FFE:C00:C18:3::/72
  preferred lifetime 280, valid lifetime 51111
```

In the following example, the **show ipv6 dhcp database** command provides information on the binding database agents TFTP, NVRAM, and flash:

```
Device# show ipv6 dhcp database
```

```
Database agent tftp://172.19.216.133/db.tftp:
  write delay: 69 seconds, transfer timeout: 300 seconds
  last written at Jan 09 2003 01:54 PM,
```

```

    write timer expires in 56 seconds
    last read at Jan 06 2003 05:41 PM
    successful read times 1
    failed read times 0
    successful write times 3172
    failed write times 2
Database agent nvram:/dhcpv6-binding:
    write delay: 60 seconds, transfer timeout: 300 seconds
    last written at Jan 09 2003 01:54 PM,
        write timer expires in 37 seconds
    last read at never
    successful read times 0
    failed read times 0
    successful write times 3325
    failed write times 0
Database agent flash:/dhcpv6-db:
    write delay: 82 seconds, transfer timeout: 3 seconds
    last written at Jan 09 2003 01:54 PM,
        write timer expires in 50 seconds
    last read at never
    successful read times 0
    failed read times 0
    successful write times 2220
    failed write times 614

```

## Example: Configuring the DHCPv6 Client Function

In the following example, this Dynamic Host Configuration Protocol for IPv6 (DHCPv6) client has three interfaces. Ethernet interface 0/0 is the upstream link to a service provider, which has a DHCPv6 server function enabled. The Fast Ethernet interfaces 0/0 and 0/1 are links to local networks.

The upstream interface, Ethernet interface 0/0, has the DHCPv6 client function enabled. Prefixes delegated by the provider are stored in the general prefix called `prefix-from-provider`.

The local networks, Fast Ethernet interfaces 0/0 and 0/1, both assign interface addresses based on the general prefix called `prefix-from-provider`. The bits on the left of the addresses come from the general prefix, and the bits on the right of the addresses are specified statically.

```

interface Ethernet 0/0
  description uplink to provider DHCP IPv6 server
  ipv6 dhcp client pd prefix-from-provider
!
interface FastEthernet 0/0
  description local network 0
  ipv6 address prefix-from-provider ::5:0:0:0:100/64
!
interface FastEthernet 0/1
  description local network 1
  ipv6 address prefix-from-provider ::6:0:0:0:100/64

```

## Additional References

### Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	<i>IPv6 Configuration Guide</i>
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>



Related Topic	Document Title
IPv6 commands	<a href="#">Cisco IOS IPv6 Command Reference</a>
Cisco IOS IPv6 features	<a href="#">IPv6 Feature Mapping</a>

### Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	<i>IPv6 RFCs</i>

### Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for DHCPv6 Individual Address Assignment

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for DHCPv6 Individual Address Assignment**

Feature Name	Releases	Feature Information
DHCPv6 Individual Address Assignment	Cisco IOS XE Release 3.2SE	<p>The DHCPv6 Individual Address Assignment feature manages nonduplicate address assignment in the correct prefix based on the network where the host is connected.</p> <p>The following commands were introduced or modified: <b>clear ipv6 dhcp bindings</b>, <b>debug ipv6 dhcp</b>, <b>ipv6 address dhcp</b>, <b>ipv6 dhcp pool</b>, <b>show ipv6 dhcp bindings</b>, <b>show ipv6 dhcp interface</b>, <b>show ipv6 dhcp pool</b>.</p>