

IPv6 Access Services: DHCPv6 Prefix Delegation

The Dynamic Host Configuration Protocol for IPv6 (DHCPv6) prefix delegation feature can be used to manage link, subnet, and site addressing changes.

- Information About IPv6 Access Services: DHCPv6 Prefix Delegation, on page 1
- How to Configure IPv6 Access Services: DHCPv6 Prefix Delegation, on page 6
- Configuration Examples for IPv6 Access Services: DHCPv6 Prefix Delegation, on page 10
- Additional References, on page 14
- Feature Information for IPv6 Access Services: DHCPv6 Prefix Delegation, on page 15

Information About IPv6 Access Services: DHCPv6 Prefix Delegation

DHCPv6 Prefix Delegation

The IPv6 Access Services—DHCPv6 Prefix Delegation feature can be used to manage link, subnet, and site addressing changes. Dynamic Host Configuration Protocol for IPv6 (DHCPv6) can be used in environments to deliver stateful and stateless information, which are defined as follows:

- Stateful prefix delegation—Address assignment is centrally managed and clients must obtain configuration information such as address autoconfiguration and neighbor discovery that is not available through protocols.
- Stateless prefix delegation—Stateless configuration parameters do not require a server to maintain any dynamic state for individual clients, such as Domain Name System (DNS) server addresses and domain search list options.

Extensions to DHCPv6 also enable prefix delegation, through which an ISP can automate the process of assigning prefixes to a customer for use within the customer's network. The prefix delegation occurs between a provider edge (PE) device and customer premises equipment (CPE) using the DHCPv6 prefix delegation option. Once the ISP has delegated prefixes to a customer, the customer may further subnet and assign prefixes to the links in the customer's network.

Configuring Nodes Without Prefix Delegation

Stateless DHCPv6 allows DHCPv6 to be used for configuring a node with parameters that do not require a server to maintain any dynamic state for the node. The use of stateless DHCP is controlled by router advertisement (RA) messages multicasted by routers. The Cisco IOS XE DHCPv6 client will invoke stateless DHCPv6 when it receives an RA. The Cisco IOS XE DHCPv6 server will respond to a stateless DHCPv6 request with configuration parameters, such as the DNS servers and domain search list options.

Client and Server Identification

Each DHCPv6 client and server is identified by a DHCP unique identifier (DUID). The DUID is carried in client identifier and server identifier options. The DUID is unique across all DHCP clients and servers, and it is stable for any specific client or server. DHCPv6 uses DUIDs based on link-layer addresses for both the client and server identifier. The device uses the MAC address from the lowest-numbered interface to form the DUID. The network interface is assumed to be permanently attached to the device.

When a DHCPv6 client requests two prefixes with the same DUID but with different identity association identifiers (IAIDs) on two different interfaces, these prefixes are considered to be for two different clients, and the interface information is maintained for both.

Rapid Commit

The DHCPv6 client can obtain configuration parameters from a server either through a rapid two-message exchange (solicit, reply) or through a four-message exchange (solicit, advertise, request, and reply). By default, the four-message exchange is used. When the rapid-commit option is enabled by both the client and the server, the two-message exchange is used.

DHCPv6 Client, Server, and Relay Functions

The DHCPv6 client, server, and relay functions are mutually exclusive on an interface. When one of these functions is enabled and a user tries to configure a different function on the same interface, one of the following messages is displayed: “Interface is in DHCP client mode,” “Interface is in DHCP server mode,” or “Interface is in DHCP relay mode.”

The following sections describe these functions:

Client Function

The DHCPv6 client function can be enabled on individual IPv6-enabled interfaces.

Note You need APPX license package to enable the DHCPv6 client function on the device.

The DHCPv6 client can request and accept those configuration parameters that do not require a server to maintain any dynamic state for individual clients, such as DNS server addresses and domain search list options.

The DHCPv6 client can also request the delegation of prefixes. The prefixes acquired from a delegating device will be stored in a local IPv6 general prefix pool. The prefixes in the general prefix pool can then be referred to from other applications; for example, the general prefix pool can be used to number device downstream interfaces.

Server Selection

A DHCPv6 client builds a list of potential servers by sending a solicit message and by collecting advertise message replies from servers. These messages are ranked based on the preference value, and servers may add a preference option to their advertise messages explicitly stating their preference value. If the client needs to acquire prefixes from servers, only servers that have advertised prefixes are considered.

IAPD and IAID

An Identity Association for Prefix Delegation (IAPD) is a collection of prefixes assigned to a requesting device. A requesting device may have more than one IAPD; for example, one for each of its interfaces.

Each IAPD is identified by an IAID. The IAID is chosen by the requesting device and is unique among the IAPD IAIDs on the requesting device. IAIDs are made consistent across reboots by using information from the associated network interface, which is assumed to be permanently attached to the device.

Server Function

The DHCPv6 server function can be enabled on individual IPv6-enabled interfaces.

The DHCPv6 server can provide configuration parameters that do not require the server to maintain any dynamic state for individual clients, such as DNS server addresses and domain search list options. The DHCPv6 server may be configured to perform prefix delegation.

All the configuration parameters for clients are independently configured into DHCPv6 configuration pools, which are stored in the NVRAM. A configuration pool can be associated with a particular DHCPv6 server on an interface when it is started. Prefixes that are to be delegated to clients may be specified either as a list of preassigned prefixes for a particular client or as IPv6 local prefix pools that are also stored in the NVRAM. The list of manually configured prefixes or IPv6 local prefix pools can be referenced and used by DHCPv6 configuration pools.

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. Automatic bindings can be stored permanently in the database agent, such as a remote TFTP server or a local NVRAM file system.

Configuration Information Pool

A DHCPv6 configuration information pool is a named entity that includes information about available configuration parameters and policies that the control assignment of the parameters to clients from the pool. A pool is configured independently and is associated with the DHCPv6 service through the CLI.

Each configuration pool can contain the following configuration parameters and operational information:

- Prefix delegation information, which includes:
  - A prefix pool name and associated preferred and valid lifetimes
  - A list of available prefixes for a particular client and associated preferred and valid lifetimes
- A list of IPv6 addresses of DNS servers
- A domain search list, which is a string containing domain names for the DNS resolution

DHCP for IPv6 Address Assignment

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 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.

Prefix Assignment

A prefix-delegating router (DHCPv6 server) selects prefixes to be assigned to a requesting router (DHCPv6 client) upon receiving a request from the client. The server can select prefixes for a requesting client by using static and dynamic assignment mechanisms. Administrators can manually configure a list of prefixes and associated preferred and valid lifetimes for an IAPD of a specific client that is identified by its DUID.

When the delegating router receives a request from a client, it checks if there is a static binding configured for the IAPD in the client's message. If a static binding is present, the prefixes in the binding are returned to the client. If no such binding is found, the server attempts to assign prefixes for the client from other sources.

The Cisco IOS XE DHCPv6 server can assign prefixes dynamically from an IPv6 local prefix pool. When the server receives a prefix request from a client, it attempts to obtain unassigned prefixes from the pool. After the client releases the previously assigned prefixes, the server returns them to the pool for reassignment.

An IPv6 prefix delegating router can also select prefixes for a requesting router based on an external authority such as a RADIUS server using the Framed-IPv6-Prefix attribute.

Automatic Binding

Each DHCPv6 configuration pool has an associated binding table. The binding table contains records of all prefixes in the configuration pool that have been explicitly delegated to clients. Each entry in the binding table contains the following information:

- Client DUID.
- Client IPv6 address.
- A list of IAPDs associated with the client.
- A list of prefixes delegated to each IAPD.
- Preferred and valid lifetimes for each prefix.
- The configuration pool to which this binding table belongs.
- The network interface on which the server that is using the pool is running.

A binding table entry is automatically created whenever a prefix is delegated to a client from the configuration pool, and the entry is updated when the client renews, rebinds, or confirms the prefix delegation. A binding table entry is deleted when the client voluntarily releases all the prefixes in the binding, the valid lifetimes of all prefixes have expired, or administrators run the **clear ipv6 dhcp binding** command.

Binding Database

Each permanent storage to which the binding database is saved is called the database agent. A database agent can be a remote host, such as an FTP server, or a local file system, such as the NVRAM.

Automatic bindings are maintained in the RAM and can be saved to some permanent storage so that information about configurations, such as prefixes assigned to clients, is not lost after a system reload. The bindings are stored as text records for easy maintenance. Each record contains the following information:

- DHCPv6 pool name from which the configuration was assigned to the client.

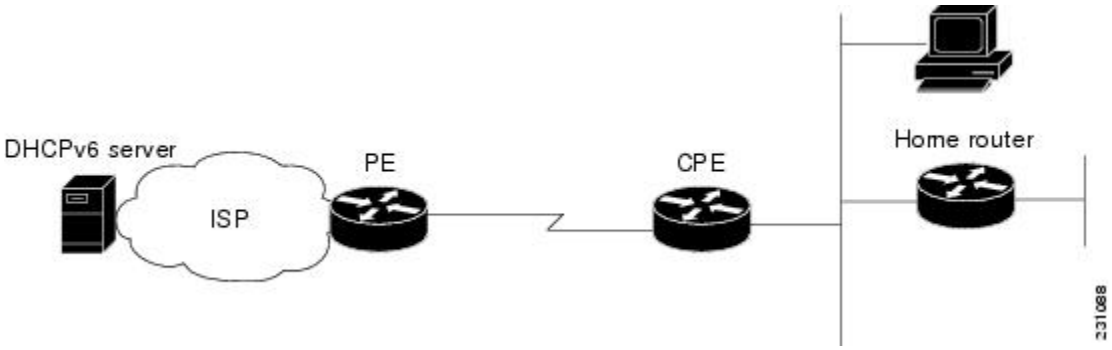
- Interface identifier from which the client requests were received.
- The client IPv6 address.
- The client DUID.
- IAID of the IAPD.
- Prefix delegated to the client.
- The prefix length.
- The prefix preferred lifetime in seconds.
- The prefix valid lifetime in seconds.
- The prefix expiration time stamp.
- Optional local prefix pool name from which the prefix was assigned.

DHCPv6 Server Stateless Autoconfiguration

Hierarchical DHCPv6 for stateless configuration parameters allows a stateless or stateful DHCPv6 client to export configuration parameters (DHCPv6 options) to a local DHCPv6 server pool. The local DHCPv6 server can then provide the imported configuration parameters to other DHCPv6 clients.

The figure below shows a typical broadband deployment.

Figure 1: Broadband Topology



The CPE interface towards the PE can be a stateless or stateful DHCPv6 client. In either case, the ISP-side DHCPv6 server may provide configuration parameters such as DNS server addresses, domain names, and Simple Network Time Protocol (SNTP) servers to the DHCP client on the CPE. Such information can be specific to ISPs.

In addition to being a DHCPv6 client (for example, towards the ISP), the CPE may act as a DHCPv6 server to the home network. For example, neighbor discovery followed by a stateless or stateful DHCPv6 client can occur on the link between the CPE and the home devices (such as the home router or PC). In some cases, the information to be provided to the home network is the same as that obtained from the ISP-side DHCPv6 server. Because this information can be dynamically changed, it cannot be hard-configured in the CPE's configuration. Therefore, the DHCPv6 component on the CPE allows automatic importing of configuration parameters from the DHCPv6 client to the DHCPv6 server pool.

DHCPv6 supports the following options for IPv6 on the server:

Information Refresh Server Option

The DHCPv6 information refresh option can specify a maximum limit for the length of time a client should wait before refreshing the information retrieved from DHCPv6. This option is used with stateless DHCPv6 because there are no addresses or other entities with lifetimes that can tell the client when to contact the DHCPv6 server to refresh its configuration.

NIS- and NIS+-Related Server Options

Users can configure the network information service (NIS) or NIS plus (NIS+) address or domain name of a DHCPv6 server using NIS- and NIS+-related options, and then import that information to the DHCPv6 client.

SIP Server Options

Session Initiation Protocol (SIP) server options contain either a list of domain names or a list of IPv6 addresses that can be mapped to one or more SIP outbound proxy servers. One option carries a list of domain names, and the other option carries a list of 128-bit IPv6 addresses.

SIP is an application-layer control protocol that can establish, modify, and terminate multimedia sessions or calls. A SIP system has several logical components: user agents, proxy servers, redirect servers, and registrars. User agents may contain SIP clients; proxy servers always contain SIP clients.

SNTP Server Option

The SNTP server option provides a list of one or more IPv6 addresses of SNTP servers available to the client for synchronization. Clients use these SNTP servers to synchronize their system time to that of the standard time servers. The DHCPv6 server may list the SNTP servers in decreasing order of preference, but clients treat the list of SNTP servers as an ordered list.

How to Configure IPv6 Access Services: DHCPv6 Prefix Delegation

Configuring the DHCPv6 Server Function

Configuring the DHCPv6 Configuration Pool

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 dhcp pool** *poolname*
4. **domain-name** *domain*
5. **dns-server** *ipv6-address*
6. **prefix-delegation** *ipv6-prefix* / *prefix-length client-duid* [**iaid** *iaid*] [*lifetime*]
7. **prefix-delegation pool** *poolname* [**lifetime** *valid-lifetime preferred-lifetime*]
8. **exit**
9. **interface** *type number*

10. **ipv6 dhcp server** *poolname* [**rapid-commit**] [**preference** *value*] [**allow-hint**]
11. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 dhcp pool** *poolname* **Example:** `Device(config)# ipv6 dhcp pool pool1`	Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.
Step 4	**domain-name** *domain* **Example:** `Device(config-dhcp)# domain-name example.com`	Configures a domain name for a DHCPv6 client.
Step 5	**dns-server** *ipv6-address* **Example:** `Device(config-dhcp)# dns-server 2001:DB8:3000:3000::42`	Specifies the DNS IPv6 servers available to a DHCPv6 client.
Step 6	**prefix-delegation** *ipv6-prefix* / *prefix-length client-duid* [**iaid** *iaid*] [*lifetime*] **Example:** `Device(config-dhcp)# prefix-delegation 2001:DB8:1263::/48 0005000400F1A4D070D03`	Specifies a manually configured numeric prefix to be delegated to a specified client's IAPD.
Step 7	**prefix-delegation pool** *poolname* [**lifetime** *valid-lifetime preferred-lifetime*] **Example:** `Device(config-dhcp)# prefix-delegation pool pool1 lifetime 1800 60`	Specifies a named IPv6 local prefix pool from which prefixes are delegated to DHCPv6 clients.

	Command or Action	Purpose
Step 8	**exit** **Example:** `Device(config-dhcp)# exit`	Exits DHCPv6 pool configuration mode, and returns the device to global configuration mode.
Step 9	**interface** *type number* **Example:** `Device(config)# interface serial 3`	Specifies an interface type and number, and enters interface configuration mode.
Step 10	**ipv6 dhcp server** *poolname* [**rapid-commit**] [**preference** *value*] [**allow-hint**] **Example:** `Device(config-if)# ipv6 dhcp server pool1`	
Step 11	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Configuring a Binding Database Agent for the Server Function

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 dhcp database** *agent* [**write-delay** *seconds*] [**timeout** *seconds*]
4. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**ipv6 dhcp database** *agent* [**write-delay** *seconds*] [**timeout** *seconds*] **Example:** `Device(config)# ipv6 dhcp database tftp://10.0.0.1/dhcp-binding`	Specifies DHCPv6 binding database agent parameters.
Step 4	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Configuring the DHCPv6 Client Function

General prefixes can be defined dynamically from a prefix received by a DHCPv6 prefix delegation client. The delegated prefix is stored in a general prefix.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ipv6 dhcp client pd** {*prefix-name* | **hint** *ipv6-prefix*} [**rapid-commit**]
5. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Device(config)# interface fastethernet 0/0/0`	Specifies an interface type and number, and enters interface configuration mode.

	Command or Action	Purpose
Step 4	**ipv6 dhcp client pd** {*prefix-name* | **hint** *ipv6-prefix*} [**rapid-commit**] **Example:** `Device(config-if)# ipv6 dhcp client pd dhcp-prefix`	Enables the DHCPv6 client process and enables a request for prefix delegation through a specified interface.
Step 5	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Deleting Automatic Client Bindings from the DHCPv6 Binding Table

SUMMARY STEPS

1. **enable**
2. **clear ipv6 dhcp binding** [*ipv6-address*] [**vrf** *vrf-name*]

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**clear ipv6 dhcp binding** [*ipv6-address*] [**vrf** *vrf-name*] **Example:** `Device# clear ipv6 dhcp binding`	Deletes automatic client bindings from the DHCPv6 binding table.

Configuration Examples for IPv6 Access Services: DHCPv6 Prefix Delegation

Example: Configuring the DHCPv6 Server Function

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
!

 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 DUID of the device:

```
Router# 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:

```
Router# show ipv6 dhcp binding

Client: FE80::202:FCFF:FEA5:DC39 (GigabitEthernet2/1/0)
  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 (GigabitEthernet2/1/0)
  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:

```
Router# 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 Configuration Pool

In the following example, the **show ipv6 dhcp pool** command provides information on the configuration pool named svr-p1, including the static bindings, prefix information, the DNS server, and the domain names found in the svr-p1 pool:

```
Router# show ipv6 dhcp pool

DHCPv6 pool: svr-p1
  Static bindings:
    Binding for client 000300010002FCA5C01C
      IA PD: IA ID 00040002,
        Prefix: 3FFE:C00:C18:3::/72
                preferred lifetime 604800, valid lifetime 2592000
      IA PD: IA ID not specified; being used by 00040001
        Prefix: 3FFE:C00:C18:1::/72
                preferred lifetime 240, valid lifetime 54321
        Prefix: 3FFE:C00:C18:2::/72
                preferred lifetime 300, valid lifetime 54333
        Prefix: 3FFE:C00:C18:3::/72
                preferred lifetime 280, valid lifetime 51111
  Prefix from pool: local-p1, Valid lifetime 12345, Preferred lifetime 180
  DNS server: 2001:DB8:1001::1
  DNS server: 2001:DB8:1001::2
  Domain name: example1.net
  Domain name: example2.net
  Domain name: example3.net
Active clients: 2
Current configuration : 22324 bytes
!
! Last configuration change at 14:59:38 PST Tue Jan 16 2001
! NVRAM config last updated at 04:25:39 PST Tue Jan 16 2001 by bird
!
hostname Router
!
ip cef
ipv6 unicast-routing
ipv6 cef
ipv6 cef accounting prefix-length
!
!
interface GigabitEthernet0/0/0
 ip address 10.4.9.11 255.0.0.0
 media-type 10BaseT
 ipv6 address 2001:DB8:C18:1::/64 eui-64
```

Example: Configuring the DHCPv6 Client Function

This DHCPv6 client has three interfaces: Gigabit Ethernet interface 0/0/0 is the upstream link to a service provider, which has a DHCPv6 server function enabled. The Fast Ethernet interfaces 0/0/0 and 0/1/0 are links to local networks.

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

Example: Configuring a Database Agent for the Server Function

The DHCPv6 server is configured to store table bindings to the file named dhcp-binding on the server at address 10.0.0.1 using the TFTP protocol. The bindings are saved every 120 seconds.

```
ipv6 dhcp database tftp://10.0.0.1/dhcp-binding write-delay 120
```

The following example shows how to specify DHCP for IPv6 binding database agent parameters and store binding entries in bootflash:

```
ipv6 dhcp database bootflash
```

Example: Displaying DHCP Server and Client Information on the Interface

The following is sample output from the **show ipv6 dhcp interface** command. In the first example, the command is used on a router that has an interface acting as a DHCPv6 server. In the second example, the command is used on a router that has an interface acting as a DHCPv6 client:

```
Router1# show ipv6 dhcp interface

 is in server mode
  Using pool: svr-p1
  Preference value: 20
  Rapid-Commit is disabled

Router2# show ipv6 dhcp interface

 is in client mode
  State is OPEN (1)
  List of known servers:
    Address: FE80::202:FCFF:FEA1:7439, DUID 000300010002FCA17400
```

```
Preference: 20
  IA PD: IA ID 0x00040001, T1 120, T2 192
    Prefix: 3FFE:C00:C18:1::/72
            preferred lifetime 240, valid lifetime 54321
            expires at Nov 08 2002 09:10 AM (54319 seconds)
    Prefix: 3FFE:C00:C18:2::/72
            preferred lifetime 300, valid lifetime 54333
            expires at Nov 08 2002 09:11 AM (54331 seconds)
    Prefix: 3FFE:C00:C18:3::/72
            preferred lifetime 280, valid lifetime 51111
            expires at Nov 08 2002 08:17 AM (51109 seconds)
  DNS server: 2001:DB8:1001::1
  DNS server: 2001:DB8:1001::2
  Domain name: example1.net
  Domain name: example2.net
  Domain name: example3.net
Prefix name is cli-p1
Rapid-Commit is enabled
```

Additional References

Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	*IPv6 Configuration Guide*
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
IPv6 commands	*Cisco IOS IPv6 Command Reference*
Cisco IOS IPv6 features	Cisco IOS IPv6 Feature Mapping

Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	*IPv6 RFCs*

MIBs

MIB	MIBs Link
	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for IPv6 Access Services: DHCPv6 Prefix Delegation

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 IPv6 Access Services: DHCPv6 Prefix Delegation

Feature Name	Releases	Feature Information
IPv6 Access Services: DHCPv6 Prefix Delegation		The DHCPv6 Prefix Delegation feature can be used to manage link, subnet, and site addressing changes. DHCPv6 can be used in environments to deliver stateful and stateless information. The following commands were introduced or modified: **clear ipv6 dhcp binding**, **dns-server**, **domain-name**, **ipv6 dhcp client pd**, **ipv6 dhcp database**, **ipv6 dhcp pool**, **ipv6 dhcp server**, **prefix-delegation**, **prefix-delegation pool**, **show ipv6 dhcp**, **show ipv6 dhcp binding**, **show ipv6 dhcp interface**, **show ipv6 dhcp pool**.