IPv6 Access Services: Stateless DHCPv6

The stateless Dynamic Host Configuration Protocol for IPv6 (DHCPv6) feature 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.

- Finding Feature Information, page 1
- Information About IPv6 Access Services: Stateless DHCPv6, page 1
- How to Configure IPv6 Access Services: Stateless DHCPv6, page 2
- Configuration Examples for IPv6 Access Services: Stateless DHCPv6, page 10
- Additional References, page 11
- Feature Information for IPv6 Access Services: Stateless DHCPv6, page 12

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 IPv6 Access Services: Stateless DHCPv6

Information Refresh Server Option

The DHCPv6 information refresh option can specify an upper boundary for the length of time a client should wait before refreshing 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.
SIP Server Options

Session initiation protocol (SIP) server options contain either a list of domain names or 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. The clients use these SNTP servers to synchronize their system time to that of the standard time servers. The server may list the SNTP servers in decreasing order of preference, but clients must treat the list of SNTP servers as an ordered list.

How to Configure IPv6 Access Services: Stateless DHCPv6

Configuring the Stateless DHCPv6 Function

The server maintains no state related to clients; for example, no prefix pools and records of allocation are maintained. Therefore, this function is "stateless" DHCPv6.

Configuring the Stateless DHCPv6 Server

SUMMARY STEPS

1. enable
2. configure terminal
3. ipv6 dhcp pool poolname
4. dns-server ipv6-address
5. domain-name domain
6. exit
7. interface type number
8. ipv6 dhcp server poolname [rapid-commit] [preference value] [allow-hint]
9. ipv6 nd other-config flag
10. end
### DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** | `enable` | Enables privileged EXEC mode.  
  - Enter your password if prompted. |
|  | **Example:**  
  Device> enable | |
| **Step 2** | `configure terminal` | Enters global configuration mode. |
|  | **Example:**  
  Device# configure terminal | |
| **Step 3** | `ipv6 dhcp pool poolname` | Configures a Dynamic Host Configuration Protocol for IPv6 (DHCPv6) configuration information pool and enters DHCPv6 pool configuration mode. |
|  | **Example:**  
  Device(config)# ipv6 dhcp pool dhcp-pool | |
| **Step 4** | `dns-server ipv6-address` | Specifies the Domain Name System (DNS) IPv6 servers available to a DHCPv6 client. |
|  | **Example:**  
  Device(config-dhcp)# dns-server 2001:DB8:3000:3000::42 | |
| **Step 5** | `domain-name domain` | Configures a domain name for a DHCPv6 client. |
|  | **Example:**  
  Device(config-dhcp)# domain-name example.com | |
| **Step 6** | `exit` | Exits DHCPv6 pool configuration mode, and returns the device to global configuration mode. |
|  | **Example:**  
  Device(config-dhcp)# exit | |
| **Step 7** | `interface type number` | Specifies an interface type and number, and places the device in interface configuration mode. |
|  | **Example:**  
  Device(config)# interface serial 3 | |
| **Step 8** | `ipv6 dhcp server poolname [rapid-commit] [preference value] [allow-hint]` | Enables DHCPv6 on an interface. |
|  | **Example:**  
  Device(config-if)# ipv6 dhcp server dhcp-pool | |
### Configuring the Stateless DHCPv6 Function

#### SUMMARY STEPS

1. enable  
2. configure terminal  
3. interface type number  
4. ipv6 address autoconfig [default]  
5. end

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **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 serial 3 |
| | Specifies an interface type and number, and places the device in interface configuration mode. |
### Enabling Processing of Packets with Source Routing Header Options

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `ipv6 source-route`
4. `end`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>enable</strong></td>
</tr>
<tr>
<td></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device&gt; enable</code></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><code>configure terminal</code></td>
</tr>
<tr>
<td></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device# configure terminal</code></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><code>ipv6 source-route</code></td>
</tr>
<tr>
<td></td>
<td>Enables processing of the IPv6 type 0 routing header.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><code>Device(config)# ipv6 source-route</code></td>
</tr>
</tbody>
</table>
Importing Stateless DHCPv6 Server Options

SUMMARY STEPS

1. enable
2. configure terminal
3. ipv6 dhcp pool poolname
4. import dns-server
5. import domain-name
6. end

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>enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td>ipv6 dhcp pool poolname</td>
<td>Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config)# ipv6 dhcp pool pool1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td></td>
</tr>
<tr>
<td>import dns-server</td>
<td>Imports the DNS recursive name server option to a DHCPv6 client.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config-dhcp)# import dns-server</td>
<td></td>
</tr>
</tbody>
</table>
### Command or Action | Purpose
---|---
**Step 5** | Import the domain search list option to a DHCPv6 client.
import domain-name
Example:
Router(config-dhcp)# import domain-name

**Step 6** | Returns to privileged EXEC mode.
end
Example:
Router(config-dhcp)# end

### Configuring the SNTP Server Option

**SUMMARY STEPS**

1. enable
2. configure terminal
3. ipv6 dhcp pool *poolname*
4. sntp address *ipv6-address*
5. end

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
**Step 1** | Enables privileged EXEC mode.
enable
Example:
Device> enable  • Enter your password if prompted.

**Step 2** | Enters global configuration mode.
configure terminal
Example:
Device# configure terminal

**Step 3** | Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.
ipv6 dhcp pool *poolname*
Example:
Device(config)# ipv6 dhcp pool pool1
### Configuring the Stateless DHCPv6 Function

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 4</strong></td>
<td>Specifies the SNTP server list to be sent to the client.</td>
</tr>
<tr>
<td>sntp address ipv6-address</td>
<td>Device(config-dhcp)# sntp address 2001:DB8:2000:2000::33</td>
</tr>
</tbody>
</table>

**Example:**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Command or Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returns to privileged EXEC mode.</td>
<td>end</td>
</tr>
<tr>
<td>Device(config-dhcp)# end</td>
<td><strong>Step 5</strong></td>
</tr>
</tbody>
</table>

---

**Importing SIP Server Information**

**SUMMARY STEPS**

1. enable
2. configure terminal
3. ipv6 dhcp pool poolname
4. import sip address
5. import sip domain-name
6. end

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>enable</td>
<td>- Enter your password if prompted.</td>
</tr>
<tr>
<td>Example:</td>
<td>Router&gt; enable</td>
</tr>
</tbody>
</table>

**Step 2** | Enters global configuration mode. |
| configure terminal | |
| Example: | Router# configure terminal |

**Step 3** | Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode. |
| ipv6 dhcp pool poolname | |
| Example: | Router(config)# ipv6 dhcp pool pool1 |
### Purpose

**Step 4**

Imports the SIP server IPv6 address list option to the outbound SIP proxy server.

**Command or Action**

- `import sip address`

**Example:**

```
Router(config-dhcp)# import sip address
```

**Step 5**

Imports a SIP server domain-name list option to the outbound SIP proxy server.

**Command or Action**

- `import sip domain-name`

**Example:**

```
Router(config-dhcp)# import sip domain-name
```

**Step 6**

Returns to privileged EXEC mode.

**Command or Action**

- `end`

**Example:**

```
Router(config-dhcp)# end
```

---

### Importing the SNTP Server Option

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `ipv6 dhcp pool poolname`
4. `import sntp address ipv6-address`
5. `end`

**DETAILED STEPS**

**Step 1**

Enables privileged EXEC mode.

**Command or Action**

- `enable`

**Example:**

```
Device> enable
```

- Enter your password if prompted.

**Step 2**

Enters global configuration mode.

**Command or Action**

- `configure terminal`

**Example:**

```
Device# configure terminal
```
### Configuration Examples for IPv6 Access Services: Stateless DHCPv6

#### Example: Configuring the Stateless DHCPv6 Function

The following example shows how to use the DHCPv6 function to configure clients with information about the name lookup system. The server is configured with a DHCP pool, which contains the name lookup information that is to be passed to clients. It does not need to contain a prefix pool. This DHCP pool is attached to the access link to customers (GigabitEthernet0/0/0) using the `ipv6 dhcp server` command. The access link also has the `ipv6 nd other-config-flag` command enabled. RA messages sent from this interface will inform clients that they should use DHCPv6 for "other" (for example, nonaddress) configuration information.

```plaintext
ipv6 dhcp pool dhcp-pool
  dns-server 2001:DB8:A:B::1
  dns-server 2001:DB8:3000:3000::42
  domain-name example.com
!
interface GigabitEthernet0/0/0
description Access link down to customers
ipv6 address 2001:DB8:1234:42::1/64
ipv6 nd other-config-flag
ipv6 dhcp server dhcp-pool
```

The client has no obvious DHCPv6 configuration. However, the `ipv6 address autoconfig` command on the uplink to the service provider (GigabitEthernet 0/0/0) causes the following two events:

- Addresses are autoconfigured on the interface, based on prefixes in RA messages received from the server.

---

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 3</strong> ipv6 dhcp pool <em>poolname</em></td>
<td>Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config)# ipv6 dhcp pool pool1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> import sntp address <em>ipv6-address</em></td>
<td>Imports the SNTP server option to a DHCPv6 client.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-dhcp)# import sntp address 2001:DB8:2000:2000::33</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Device(config-dhcp)# end</td>
<td></td>
</tr>
</tbody>
</table>
• If received RA messages have the "other configuration" flag set, the interface will attempt to acquire the other (for example, nonaddress) configuration from any DHCPv6 servers.

Additional References

Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 addressing and connectivity</td>
<td>IPv6 Configuration Guide</td>
</tr>
<tr>
<td>Cisco IOS commands</td>
<td>Cisco IOS Master Commands List, All Releases</td>
</tr>
<tr>
<td>IPv6 commands</td>
<td>Cisco IOS IPv6 Command Reference</td>
</tr>
<tr>
<td>Cisco IOS IPv6 features</td>
<td>Cisco IOS IPv6 Feature Mapping</td>
</tr>
</tbody>
</table>

Standards and RFCs

<table>
<thead>
<tr>
<th>Standard/RFC</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFCs for IPv6</td>
<td>IPv6 RFCs</td>
</tr>
</tbody>
</table>

MIBs

<table>
<thead>
<tr>
<th>MIB</th>
<th>MIBs Link</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
</tr>
</tbody>
</table>
Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></td>
</tr>
</tbody>
</table>

Feature Information for IPv6 Access Services: Stateless DHCPv6

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>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 Access Services: Stateless DHCPv6</td>
<td>Cisco IOS XE Release 2.5</td>
<td>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 following commands were introduced or modified: dns-server, domain-name, import dns-server, import domain-name, import sip address, import sip domain-name, import sntp address, ipv6 address autoconfig, ipv6 dhcp pool, ipv6 dhcp server, ipv6 nd other-config-flag, ipv6 source-route, sntp address.</td>
</tr>
<tr>
<td></td>
<td>Cisco IOS XE Release 3.9S</td>
<td>--------------------------------------------------------------------------------------</td>
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