

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.

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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

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 dhcp-pool`	Configures a Dynamic Host Configuration Protocol for IPv6 (DHCPv6) configuration information pool and enters DHCPv6 pool configuration mode.
Step 4	**dns-server** *ipv6-address* **Example:**	Specifies the Domain Name System (DNS) IPv6 servers available to a DHCPv6 client.

	Command or Action	Purpose
	`Device(config-dhcp)# dns-server 2001:DB8:3000:3000::42`	
Step 5	**domain-name** *domain* **Example:** `Device(config-dhcp)# domain-name example.com`	Configures a domain name for a DHCPv6 client.
Step 6	**exit** **Example:** `Device(config-dhcp)# exit`	Exits DHCPv6 pool configuration mode, and returns the device to global configuration mode.
Step 7	**interface** *type number* **Example:** `Device(config)# interface serial 3`	Specifies an interface type and number, and places the device in interface configuration mode.
Step 8	**ipv6 dhcp server** *poolname* [**rapid-commit**] [**preference** *value*] [**allow-hint**] **Example:** `Device(config-if)# ipv6 dhcp server dhcp-pool`	Enables DHCPv6 on an interface.
Step 9	**ipv6 nd other-config flag** **Example:** `Device(config-if)# ipv6 nd other-config flag`	Sets the “other stateful configuration” flag in IPv6 router advertisements (RAs).
Step 10	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

Configuring the Stateless DHCPv6 Client

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ipv6 address autoconfig** [**default**]
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 serial 3`	Specifies an interface type and number, and places the device in interface configuration mode.
Step 4	**ipv6 address autoconfig** [**default**] **Example:** `Device(config-if)# ipv6 address autoconfig`	Enables automatic configuration of IPv6 addresses using stateless autoconfiguration on an interface and enables IPv6 processing on the interface.
Step 5	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC 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

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
	`Device> enable`	
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 source-route** **Example:** `Device(config)# ipv6 source-route`	Enables processing of the IPv6 type 0 routing header.
Step 4	**end** **Example:** `Device(config-if)# end`	Returns to privileged EXEC mode.

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

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 dhcp pool** *poolname* **Example:**	Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.

	Command or Action	Purpose
	`Router(config)# ipv6 dhcp pool pool1`	
Step 4	**import dns-server** **Example:** `Router(config-dhcp)# import dns-server`	Imports the DNS recursive name server option to a DHCPv6 client.
Step 5	**import domain-name** **Example:** `Router(config-dhcp)# import domain-name`	Imports the domain search list option to a DHCPv6 client.
Step 6	**end** **Example:** `Router(config-dhcp)# end`	Returns to privileged EXEC mode.

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

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:**	Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.

	Command or Action	Purpose
	`Device(config)# ipv6 dhcp pool pool1`	
Step 4	**sntp address** *ipv6-address* **Example:** `Device(config-dhcp)# sntp address 2001:DB8:2000:2000::33`	Specifies the SNTP server list to be sent to the client.
Step 5	**end** **Example:** `Device(config-dhcp)# end`	Returns to privileged EXEC mode.

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

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 dhcp pool** *poolname* **Example:** `Router(config)# ipv6 dhcp pool pool1`	Configures a DHCPv6 configuration information pool and enters DHCPv6 pool configuration mode.

	Command or Action	Purpose
Step 4	**import sip address** **Example:** `Router(config-dhcp)# import sip address`	Imports the SIP server IPv6 address list option to the outbound SIP proxy server.
Step 5	**import sip domain-name** **Example:** `Router(config-dhcp)# import sip domain-name`	Imports a SIP server domain-name list option to the outbound SIP proxy server.
Step 6	**end** **Example:** `Router(config-dhcp)# end`	Returns to privileged EXEC mode.

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

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.

	Command or Action	Purpose
Step 4	**import sntp address** *ipv6-address* **Example:** `Device(config-dhcp)# import sntp address 2001:DB8:2000:2000::33`	Imports the SNTP server option to a DHCPv6 client.
Step 5	**end** **Example:** `Device(config-dhcp)# end`	Returns to privileged EXEC mode.

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.

```
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.
- 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

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: 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 1: Feature Information for IPv6 Access Services: Stateless DHCPv6

Feature Name	Releases	Feature Information
IPv6 Access Services: Stateless DHCPv6	Cisco IOS XE Release 2.5 Cisco IOS XE Release 3.9S	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**.