



# CHAPTER 14

## Configuring DHCP Features

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This chapter describes how to configure DHCP features on the Catalyst 2350 switch.



**Note**

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For complete syntax and usage information for the commands used in this chapter, see the command reference for this release, and see the “DHCP Commands” section in the *Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services, Release 12.2*.

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This chapter consists of these sections:

- [Understanding DHCP Features, page 14-1](#)
- [Configuring DHCP Features, page 14-2](#)

## Understanding DHCP Features

DHCP is widely used in LAN environments to dynamically assign host IP addresses from a centralized server, which significantly reduces the overhead of administration of IP addresses. DHCP also helps conserve the limited IP address space because IP addresses no longer need to be permanently assigned to hosts; only those hosts that are connected to the network consume IP addresses.

See these sections:

- [DHCP Server, page 14-1](#)
- [DHCP Relay Agent, page 14-2](#)
- [Cisco IOS DHCP Server Database, page 14-2](#)

For information about the DHCP client, see the “*Configuring DHCP*” section of the “*IP Addressing and Services*” section of the *Cisco IOS IP Configuration Guide, Release 12.2*.

## DHCP Server

The DHCP server assigns IP addresses from specified address pools on a switch or router to DHCP clients and manages them. If the DHCP server cannot give the DHCP client the requested configuration parameters from its database, it forwards the request to one or more secondary DHCP servers defined by the network administrator.

## DHCP Relay Agent

A DHCP relay agent is a device that forwards DHCP packets between clients and servers. Relay agents forward requests and replies between clients and servers when they are not on the same physical subnet. Relay agent forwarding is different from the normal Layer 2 forwarding, in which IP datagrams are switched transparently between networks. Relay agents receive DHCP messages and generate new DHCP messages to send on output interfaces.

## Cisco IOS DHCP Server Database

During the DHCP-based autoconfiguration process, the designated DHCP server uses the Cisco IOS DHCP server database. It has IP addresses, *address bindings*, and configuration parameters, such as the boot file.

An address binding is a mapping between an IP address and a MAC address of a host in the Cisco IOS DHCP server database. You can manually assign the client IP address, or the DHCP server can allocate an IP address from a DHCP address pool. For more information about manual and automatic address bindings, see the “Configuring DHCP” chapter of the *Cisco IOS IP Configuration Guide, Release 12.2*.

## Configuring DHCP Features

These sections contain this configuration information:

- [Default DHCP Configuration, page 14-2](#)
- [Configuring the DHCP Server, page 14-3](#)
- [Configuring the DHCP Relay Agent, page 14-3](#)
- [Specifying the Packet Forwarding Address, page 14-3](#)
- [Enabling the Cisco IOS DHCP Server Database, page 14-4](#)

## Default DHCP Configuration

Table 14-1 shows the default DHCP configuration.

**Table 14-1** Default DHCP Configuration

Feature	Default Setting
DHCP server	Enabled in Cisco IOS software, requires configuration <sup>1</sup>
DHCP relay agent	Enabled <sup>2</sup>
DHCP packet forwarding address	None configured
Checking the relay agent information	Enabled (invalid messages are dropped) <sup>2</sup>
DHCP relay agent forwarding policy	Replace the existing relay agent information <sup>2</sup>

1. The switch responds to DHCP requests only if it is configured as a DHCP server.

2. The switch relays DHCP packets only if the IP address of the DHCP server is configured on the SVI of the DHCP client.

## Configuring the DHCP Server

The switch can act as a DHCP server. By default, the Cisco IOS DHCP server and relay agent features are enabled on your switch but are not configured. These features are not operational.

For procedures to configure the switch as a DHCP server, see the “Configuring DHCP” section of the “IP addressing and Services” section of the *Cisco IOS IP Configuration Guide, Release 12.2*.

## Configuring the DHCP Relay Agent

Beginning in privileged EXEC mode, follow these steps to enable the DHCP relay agent on the switch:

	Command	Purpose
Step 1	<code>configure terminal</code>	Enter global configuration mode.
Step 2	<code>service dhcp</code>	Enable the DHCP server and relay agent on your switch. By default, this feature is enabled.
Step 3	<code>end</code>	Return to privileged EXEC mode.
Step 4	<code>show running-config</code>	Verify your entries.
Step 5	<code>copy running-config startup-config</code>	(Optional) Save your entries in the configuration file.

To disable the DHCP server and relay agent, use the **no service dhcp** global configuration command.

See the “Configuring DHCP” section of the “IP Addressing and Services” section of the *Cisco IOS IP Configuration Guide, Release 12.2* for these procedures:

- Checking (validating) the relay agent information
- Configuring the relay agent forwarding policy

## Specifying the Packet Forwarding Address

If the DHCP server and the DHCP clients are on different networks or subnets, you must configure the switch with the **ip helper-address** *address* interface configuration command. The general rule is to configure the command on the Layer 3 interface closest to the client. The address used in the **ip helper-address** command can be a specific DHCP server IP address, or it can be the network address if other DHCP servers are on the destination network segment. Using the network address enables any DHCP server to respond to requests.

Beginning in privileged EXEC mode, follow these steps to specify the packet forwarding address:

	Command	Purpose
Step 1	<code>configure terminal</code>	Enter global configuration mode.
Step 2	<code>interface vlan <i>vlan-id</i></code>	Create a switch virtual interface by entering a VLAN ID, and enter interface configuration mode.
Step 3	<code>ip address <i>ip-address subnet-mask</i></code>	Configure the interface with an IP address and an IP subnet.

	Command	Purpose
Step 4	<b>ip helper-address</b> <i>address</i>	Specify the DHCP packet forwarding address.  The helper address can be a specific DHCP server address, or it can be the network address if other DHCP servers are on the destination network segment. Using the network address enables other servers to respond to DHCP requests.  If you have multiple servers, you can configure one helper address for each server.
Step 5	<b>exit</b>	Return to global configuration mode.
Step 6	<b>interface range</b> <i>port-range</i>  or <b>interface</b> <i>interface-id</i>	Configure multiple physical ports that are connected to the DHCP clients, and enter interface range configuration mode.  or Configure a single physical port that is connected to the DHCP client, and enter interface configuration mode.
Step 7	<b>switchport mode access</b>	Define the VLAN membership mode for the port.
Step 8	<b>switchport access vlan</b> <i>vlan-id</i>	Assign the ports to the same VLAN as configured in Step 2.
Step 9	<b>end</b>	Return to privileged EXEC mode.
Step 10	<b>show running-config</b>	Verify your entries.
Step 11	<b>copy running-config startup-config</b>	(Optional) Save your entries in the configuration file.

To remove the DHCP packet forwarding address, use the **no ip helper-address** *address* interface configuration command.

## Enabling the Cisco IOS DHCP Server Database

For procedures to enable and configure the Cisco IOS DHCP server database, see the “DHCP Configuration Task List” section in the “Configuring DHCP” chapter of the *Cisco IOS IP Configuration Guide, Release 12.2*.