



## CHAPTER 5

# Configuring the DHCP Relay

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This chapter describes how Dynamic Host Configuration Protocol (DHCP) servers provide configuration parameters to DHCP clients. DHCP supplies network settings, including the host IP address, the default gateway, and a DNS server. When DHCP clients and associated servers do not reside on the same IP network or subnet, a DHCP relay agent can transfer DHCP messages between them. The DHCP relay agent operates as the interface between DHCP clients and the server. It listens for client requests and adds vital configuration data, such as the client's link information, which is needed by the server to allocate the address for the client. When the DHCP server responds, the DHCP relay agent forwards the reply back to the DHCP client.



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**Note**

The ACE does not support DHCP relay for DHCP packets received on shared VLANs between contexts.

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This chapter contains the following major sections:

- [DHCP Server and Client Overview](#)
- [DHCP Relay Configuration Quick Start](#)
- [Configuring the DHCP Relay Agent](#)
- [Viewing DHCP Relay Configuration and Statistics](#)

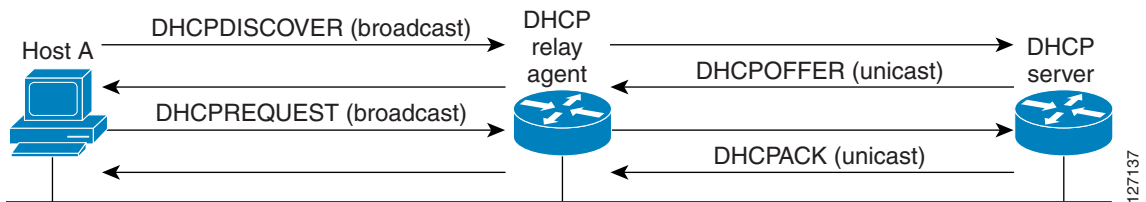
## DHCP Server and Client Overview

DHCP provides a framework for passing configuration information dynamically to hosts on a TCP/IP network. A DHCP client is an Internet host using DHCP to obtain configuration parameters such as an IP address.

A DHCP relay agent is any host that forwards DHCP packets between clients and servers. Relay agents are used to forward requests and replies between clients and servers when they are not on the same physical subnet. Relay agent forwarding is distinct from the normal forwarding of an IP router, where IP datagrams are switched between networks somewhat transparently. By contrast, relay agents receive DHCP messages and then generate a new DHCP message to send on another interface.

Figure 5-1 shows the basic steps that occur when a DHCP client requests an IP address from a DHCP server. The client, Host A, sends a DHCPDISCOVER broadcast message to locate a DHCP server. A relay agent forwards the packets between the DHCP client and server. A DHCP server offers configuration parameters (such as an IP address, a MAC address, a domain name, and a lease for the IP address) to the client in a DHCPOFFER unicast message.

**Figure 5-1** DHCP Request for an IP Address from a DHCP Server



# DHCP Relay Configuration Quick Start

Table 5-1 provides a quick overview of the steps required to configure the DHCP relay function on the ACE. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI command, see the sections following Table 5-1.

**Table 5-1** DHCP Relay Configuration Quick Start

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## Task and Command Example

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1. If you are operating in multiple contexts, observe the CLI prompt to verify that you are operating in the desired context. If necessary, log directly in to, or change to, the correct context.

```
host1/Admin# changeto c1  
host1/C1#
```

The rest of the examples in this table use the Admin context unless otherwise specified. For details on creating contexts, see the *Cisco Application Control Engine Module Virtualization Configuration Guide*.

2. Enter configuration mode by entering **config**.

```
host1/Admin# config  
Enter configuration commands, one per line. End with CNTL/Z  
host1/Admin(config)#
```

3. Enable the DHCP relay agent to accept DHCP requests from clients on the associated context or VLAN interface.

```
host1/Admin(config)# ip dhcp relay enable
```

4. Specify the IP address of a DHCP server to which the DHCP relay agent forwards client requests.

```
host1/Admin(config)# ip dhcp relay server 192.168.20.1
```

5. (Optional) Configure a relay agent information reforwarding policy on the DHCP server to identify what the DHCP server should do if a forwarded message already contains relay information.

```
host1/Admin(config)# ip dhcp relay information policy replace
```

6. (Optional) Save your configuration changes to flash memory.

```
host1/Admin(config)# exit  
host1/Admin# copy running-config startup-config
```

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# Configuring the DHCP Relay Agent

This section describes how to configure the DHCP relay agent on the ACE. When you configure the ACE as a DHCP relay agent, it is responsible for forwarding the requests and responses that are negotiated between the DHCP clients and the server. By default, the DHCP relay agent is disabled. You must configure a DHCP server when you enable the DHCP relay agent.

You can configure the DHCP relay agent at both the context and VLAN interface levels of the ACE as follows:

- If you configure the DHCP relay agent at the context level, the configuration applies to all interfaces associated with the context.
- If you configure the DHCP relay agent at the VLAN interface level, the configuration applies to that particular interface only; the remaining interfaces revert to the context level configuration.

This section contains the following topics:

- [Enabling the DHCP Relay](#)
- [Specifying the DHCP Server IP Address](#)
- [Configuring a Relay Agent Information Reforwarding Policy](#)

## Enabling the DHCP Relay

You can accept DHCP requests from clients on the associated context or VLAN interface and enable the DHCP relay agent by using the **ip dhcp relay enable** command. The DHCP relay starts forwarding packets to the DHCP server address specified in the **ip dhcp relay server** command for the associated VLAN interface or context.

The syntax of this command is as follows:

```
ip dhcp relay enable
```

For example, to enable the DHCP relay to all interfaces associated with a context, enter:

```
host1/Admin(config)# ip dhcp relay enable
```

For example, to enable the DHCP relay at the VLAN interface level, enter:

```
host1/Admin(config)# interface vlan 50  
host1/Admin(config-if)# ip dhcp relay enable
```

To disable the DHCP relay for all interfaces associated with a context, enter:

```
host1/Admin(config)# no ip dhcp relay enable
```

To disable the DHCP relay on the VLAN interface, enter:

```
host1/Admin(config-if)# no ip dhcp relay enable
```

## Specifying the DHCP Server IP Address

You can set the IP address of a DHCP server to which the DHCP relay agent forwards client requests by using the **ip dhcp relay server** command.

The syntax of this command is as follows:

```
ip dhcp relay server ip_address
```

The *ip\_address* argument specifies the IP address of the DHCP server. Enter the address in dotted-decimal IP notation (for example, 192.168.20.1).

For example, to set the IP address of a DHCP relay server to all interfaces associated with a context, enter:

```
host1/Admin(config)# ip dhcp relay enable  
host1/Admin(config)# ip dhcp relay server 192.168.20.1
```

For example, to set the IP address of a DHCP relay server at the VLAN interface level, enter:

```
host1/Admin(config)# interface vlan 50  
host1/Admin(config-if)# ip dhcp relay enable  
host1/Admin(config-if)# ip dhcp relay server 192.168.20.1
```

To remove the IP address of a DHCP server, enter:

```
host1/Admin(config-if)# no ip dhcp relay server 192.168.20.1
```

## Configuring a Relay Agent Information Reforwarding Policy

You can configure the DHCP relay agent to identify the action to perform if a forwarded message already contains relay information by using the **ip dhcp relay information policy** command in configuration mode. By default, the reforwarding policy is to drop the DHCP relay packet.

**Note**

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You cannot set the relay agent information reforwarding policy at the VLAN interface level; you can only globally set this function for all interfaces associated with a context.

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The syntax of this command is as follows:

```
ip dhcp relay information policy {keep | replace}
```

The keywords are as follows:

- **keep**—Indicates that existing information is left unchanged on the DHCP relay agent.
- **replace**—Indicates that existing information is overwritten on the DHCP relay agent.

For example, to set the relay agent information reforwarding policy to replace existing information for all interfaces associated with a context, enter:

```
host1/Admin(config)# ip dhcp relay information policy replace
```

To restore the default relay information policy to drop the DHCP relay packet, enter:

```
host1/Admin(config)# no ip dhcp relay information policy replace
```

# Viewing DHCP Relay Configuration and Statistics

You can view configuration information and statistics collected for the DHCP relay agent by using the **show ip dhcp relay** command. There are three **show** commands for DHCP relay:

- **show ip dhcp relay conf**—Displays the DHCP configuration information.
- **show ip dhcp relay information policy**—Displays the relay agent information reforwarding policy status.
- **show ip dhcp relay statistics**—Displays the DHCP relay statistics.

The output of this command increments until you enter the **clear ip dhcp relay statistics** command.

For example, to display the configured status of the relay agent information reforwarding policy, enter:

```
host/Admin# show ip dhcp relay information policy
DHCP Relay reforwarding policy configured = REPLACE
```

To clear all of the DHCP relay statistics information, use the **clear ip dhcp relay statistics** command. For example, enter:

```
host1/Admin# clear ip dhcp relay statistics
```

[Table 5-2](#) describes the fields in the **show ip dhcp relay conf** command output.

**Table 5-2** *Field Descriptions for the show ip dhcp relay conf Command Output*

Field	Description
Context level configuration	Configuration information for the DHCP relay agent at the context level.
Status	Operating status of the DHCP server at the context level: Enabled or Disabled.
Server	IP address of the DHCP server at the context level.

**Table 5-2** *Field Descriptions for the show ip dhcp relay conf Command Output (continued)*

Field	Description
Interface level configuration	Configuration information for the DHCP relay agent at the VLAN interface level.
VLAN	Assigned interface VLAN number.
Interface ID	Interface ID for the VLAN.
Status	Operating status of the DHCP server at the VLAN interface level: Enabled or Disabled.
Server	IP address of the DHCP server at the VLAN interface level.

Table 5-3 describes the fields in the **show ip dhcp relay statistics** command output.

**Table 5-3** *Field Descriptions for the show ip dhcp relay statistics Command Output*

Field	Description
Context level configuration	Statistics for the DHCP relay agent at the context level.
Number of BOOTREQUEST packets relayed	Incremented number of forwarded BOOTREQUEST packets to a DHCP server.
Number of DHCPDISCOVER packets relayed	Incremented number of forwarded DHCPDISCOVER packets to a DHCP server.
Number of DHCPREQUEST packets relayed	Incremented number of forwarded DHCPREQUEST packets to a DHCP server.
Number of DHCPDECLINE packets relayed	Incremented number of forwarded DHCPDECLINE packets to a DHCP server.



**Table 5-3** *Field Descriptions for the show ip dhcp relay statistics Command Output (continued)*

<b>Field</b>	<b>Description</b>
Number of DHCPRELEASE packets relayed	Incremented number of forwarded DHCPRELEASE packets to a DHCP server.
Number of DHCPINFORM packets relayed	Incremented number of forwarded DHCPINFORM packets to a DHCP server.
Number of BOOTREPLY packets relayed	Incremented number of forwarded BOOTREPLY packets to a DHCP server.
Number of DHCPOFFER packets relayed	Incremented number of forwarded DHCPOFFER packets to a DHCP server.
Number of DHCPACK packets relayed	Incremented number of forwarded DHCPACK packets to a DHCP server.
Number of DHCPNAK packets relayed	Incremented number of forwarded DHCPNAK packets to a DHCP server.
Number of failures while relaying	Number of failures that occurred while the DHCP relay agent forwarded packets to a DHCP server.
Interface level configuration	Statistics for the DHCP relay agent at the VLAN interface level.

■ Viewing DHCP Relay Configuration and Statistics