

Introduction to DHCP Relay

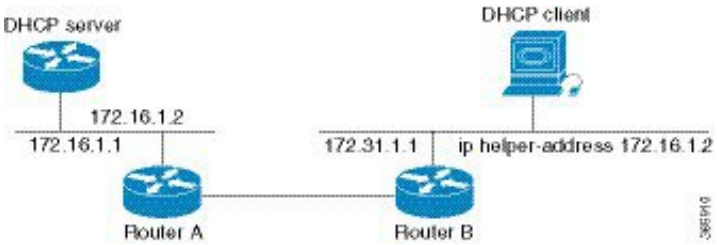
A DHCP relay agent is a host that forwards DHCP packets between clients and servers that do not reside on a shared physical subnet. Relay agent forwarding is distinct from the normal forwarding of an IP router where IP datagrams are switched between networks transparently.

DHCP clients use User Datagram Protocol (UDP) broadcasts to send DHCPDISCOVER messages when they lack information about the network to which they belong.

If a client is on a network segment that does not include a server, a relay agent is needed on that network segment to ensure that DHCP packets reach the servers on another network segment. UDP broadcast packets are not forwarded, because most routers are not configured to forward broadcast traffic. You can configure a DHCP relay agent to forward DHCP packets to a remote server by configuring a DHCP relay profile and configure one or more helper addresses in it. You can assign the profile to an interface or a VRF.

The figure below demonstrates the process. The DHCP client broadcasts a request for an IP address and additional configuration parameters on its local LAN. Acting as a DHCP relay agent, Router B picks up the broadcast, changes the destination address to the DHCP server's address and sends the message out on another interface. The relay agent inserts the IP address of the interface, on which the DHCP client's packets are received into the gateway address (giaddr) field of the DHCP packet, which enables the DHCP server to determine which subnet should receive the offer and identify the appropriate IP address range. The relay agent unicasts the messages to the server address, in this case 172.16.1.2 (which is specified by the helper address in the relay profile).

Figure 1: Forwarding UDP Broadcasts to a DHCP Server Using a Helper Address



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Configuring and Enabling the DHCP Relay Agent

Configuration Example

```
Router# configure
/* Enters the global configuration mode */

Router(config)# dhcp ipv4
/* Configures DHCP for IPv4 and enters the DHCPv4 configuration submode. */

Router(config-dhcpv4)# profile r1 relay
/* Enables DHCP relay profile */

Router(config-dhcpv4-relay-profile)# helper-address vrf A 10.10.10.1 giaddr 40.1.1.2
Router(config-dhcpv4-relay-profile)# broadcast-flag policy check
/* Configures VRF addresses for forwarding UDP broadcasts, including DHCP. */

Router(config-dhcpv4-relay-profile)# relay information option vpn
Router(config-dhcpv4-relay-profile)# relay information option vpn-mode rfc
/* Inserts the DHCP relay agent information option (option-82 field) in forwarded BOOTREQUEST
 messages to a DHCP server. */


Router(config-dhcpv4-relay-profile)# relay information option allow-untrusted
/* (Optional) Configures the DHCP IPv4 Relay not to discard BOOTREQUEST packets
that have an existing relay information option and the giaddr set to zero. */

Router(config-dhcpv4-relay-profile)# exit
Router(config-dhcpv4)# interface BVI 1 relay profile r1
Router(config-dhcpv4)# commit
/* Configures DHCP relay on a BVI interface and commits the configuration */
```

Running Configuration

```
Router#show running-config
Tue May 23 10:56:14.463 IST
Building configuration...
!! IOS XR Configuration 0.0.0
!! Last configuration change at Tue May 23 10:56:08 2017 by annseque
!
dhcp ipv4
 vrf vrf1 relay profile client
 profile r1 relay
  helper-address vrf A 10.10.10.1 giaddr 40.1.1.2
  broadcast-flag policy check
  relay information option vpn
  relay information option vpn-mode rfc
  relay information option allow-untrusted
 !
```