CHAPTER 24

DHCP

This chapter provides information and commands concerning the following topics:

- Configuring DHCP
- Verifying and troubleshooting DHCP configuration
- Configuring a DHCP helper address
- DHCP client on a Cisco IOS Software Ethernet interface
- Configuration example: DHCP

Configuring DHCP

`Router(config)#ip dhcp pool internal`	Creates a DHCP pool called internal.
`Router(dhcp-config)#network 172.16.10.0 255.255.255.0`	Defines the range of addresses to be leased.
`Router(dhcp-config)#default-router 172.16.10.1`	Defines the address of the default router for the client.
`Router(dhcp-config)#dns-server 172.16.10.10`	Defines the address of the Domain Name System (DNS) server for the client
`Router(dhcp-config)#netbios-name-server 172.16.10.10`	Defines the address of the NetBIOS server for the client.
`Router(dhcp-config)#domain-name fakedomainname.ca`	Defines the domain name for the client.
`Router(dhcp-config)# lease 14 12 23`	Defines the lease time to be 14 days, 12 hours, 23 minutes.
`Router(dhcp-config)#lease infinite`	Sets the lease time to infinity; the default time is 1 day.
`Router(dhcp-config)#exit`	Returns to global configuration mode.
`Router(config)#ip dhcp excluded-address 172.16.10.1 172.16.10.9`	Specifies the range of addresses not to be leased out to clients.

`Router(config)#service dhcp`	Enables the DHCP service and relay features on a Cisco IOS router.
`Router(config)#no service dhcp`	Turns the DHCP service off. DHCP service is on by default in Cisco IOS Software.

Verifying and Troubleshooting DHCP Configuration

`Router#show ip dhcp binding`	Displays a list of all bindings created
`Router#show ip dhcp binding` *w.x.y.z*	Displays the bindings for a specific DHCP client with an IP address of *w.x.y.z*
`Router#clear ip dhcp binding` *a.b.c.d*	Clears an automatic address binding from the DHCP server database
`Router#clear ip dhcp binding *`	Clears all automatic DHCP bindings
`Router#show ip dhcp conflict`	Displays a list of all address conflicts recorded by the DHCP server
`Router#clear ip dhcp conflict` *a.b.c.d*	Clears address conflict from the database
`Router#clear ip dhcp conflict *`	Clears conflicts for all addresses
`Router#show ip dhcp database`	Displays recent activity on the DHCP database
`Router#show ip dhcp server statistics`	Displays a list of the number of messages sent and received by the DHCP server
`Router#clear ip dhcp server statistics`	Resets all DHCP server counters to 0
`Router#debug ip dhcp server {events | packets | linkage | class}`	Displays the DHCP process of addresses being leased and returned

Configuring a DHCP Helper Address

`Router(config)#interface fastethernet 0/0`	Moves to interface configuration mode.
`Router(config-if)#ip helper-address 172.16.20.2`	DHCP broadcasts will be forwarded as a unicast to this specific address rather than be dropped by the router.

NOTE: The **ip helper-address** command will forward broadcast packets as a unicast to eight different UDP ports by default:

- TFTP (port 69)
- DNS (port 53)
- Time service (port 37)
- NetBIOS name server (port 137)
- NetBIOS datagram server (port 138)
- Boot Protocol (BOOTP) client and server datagrams (ports 67 and 68)
- TACACS service (port 49)

If you want to close some of these ports, use the **no ip forward-protocol udp** *x* command at the global configuration prompt, where *x* is the port number you want to close. The following command stops the forwarding of broadcasts to port 49:

```
Router(config)#no ip forward-protocol udp 49
```

If you want to open other UDP ports, use the **ip forward-helper udp** *x* command, where *x* is the port number you want to open:

```
Router(config)#ip forward-protocol udp 517
```

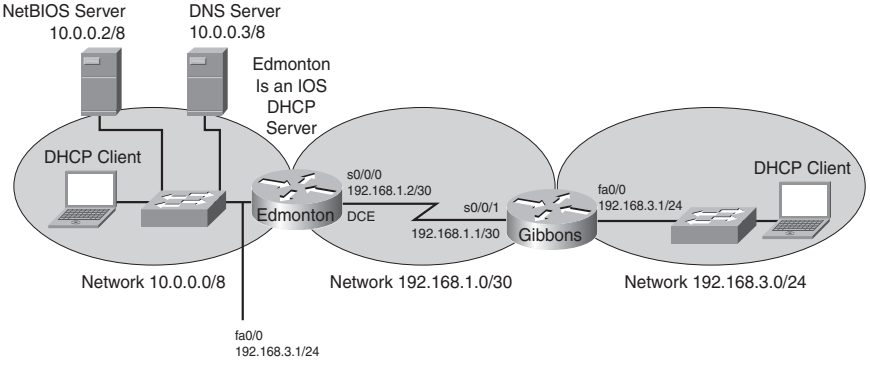
DHCP Client on a Cisco IOS Software Ethernet Interface

`Router(config)#interface fastethernet 0/0`	Moves to interface configuration mode
`Router(config-if)#ip address dhcp`	Specifies that the interface acquire an IP address through DHCP

Configuration Example: DHCP

Figure 24-1 illustrates the network topology for the configuration that follows, which shows how to configure DHCP services on a Cisco IOS router using the commands covered in this chapter.

Figure 24-4 Network Topology for DHCP Configuration



Edmonton Router

`router>enable`	Moves to privileged mode
`router#configure terminal`	Moves to global configuration mode
`router(config)#host Edmonton`	Sets the host name
`Edmonton(config)#interface fastethernet 0/0`	Moves to interface configuration mode
`Edmonton(config-if)#description LAN Interface`	Sets the local description of the interface
`Edmonton(config-if)#ip address 10.0.0.1 255.0.0.0`	Assigns an IP address and netmask
`Edmonton(config-if)#no shutdown`	Enables the interface
`Edmonton(config-if)#interface serial 0/0/0`	Moves to interface configuration mode
`Edmonton(config-if)#description Link to Gibbons Router`	Sets the local description of the interface
`Edmonton(config-if)#ip address 192.168.1.2 255.255.255.252`	Assigns an IP address and netmask
`Edmonton(config-if)#clock rate 56000`	Assigns the clock rate to the DCE cable on this side of link
`Edmonton(config-if)#no shutdown`	Enables the interface
`Edmonton(config-if)#exit`	Returns to global configuration mode
`Edmonton(config)#router eigrp 10`	Enables the EIGRP routing process for autonomous system 10
`Edmonton(config-router)#network 10.0.0.0`	Advertises the 10.0.0.0 network
`Edmonton(config-router)#network 192.168.1.0`	Advertises the 192.168.1.0 network
`Edmonton(config-router)#exit`	Returns to global configuration mode
`Edmonton(config)#service dhcp`	Verifies that the router can use DHCP services and that DHCP is enabled
`Edmonton(config)#ip dhcp pool 10network`	Creates a DHCP pool called 10network

`Edmonton(dhcp-config)#network 10.0.0.0 255.0.0.0`	Defines the range of addresses to be leased
`Edmonton(dhcp-config)#default-router 10.0.0.1`	Defines the address of the default router for clients
`Edmonton(dhcp-config)#netbios-name-server 10.0.0.2`	Defines the address of the NetBIOS server for clients
`Edmonton(dhcp-config)#dns-server 10.0.0.3`	Defines the address of the DNS server for clients
`Edmonton(dhcp-config)#domain-name fakedomainname.ca`	Defines the domain name for clients
`Edmonton(dhcp-config)#lease 12 14 30`	Sets the lease time to be 12 days, 14 hours, 30 minutes
`Edmonton(dhcp-config)#exit`	Returns to global configuration mode
`Edmonton(config)#ip dhcp excluded-address 10.0.0.1 10.0.0.5`	Specifies the range of addresses not to be leased out to clients
`Edmonton(config)#ip dhcp pool 192.168.3network`	Creates a DHCP pool called the 192.168.3network
`Edmonton(dhcp-config)#network 192.168.3.0 255.255.255.0`	Defines the range of addresses to be leased
`Edmonton(dhcp-config)#default-router 192.168.3.1`	Defines the address of the default router for clients
`Edmonton(dhcp-config)#netbios-name-server 10.0.0.2`	Defines the address of the NetBIOS server for clients
`Edmonton(dhcp-config)#dns-server 10.0.0.3`	Defines the address of the DNS server for clients
`Edmonton(dhcp-config)#domain-name fakedomainname.ca`	Defines the domain name for clients
`Edmonton(dhcp-config)#lease 12 14 30`	Sets the lease time to be 12 days, 14 hours, 30 minutes
`Edmonton(dhcp-config)#exit`	Returns to global configuration mode
`Edmonton(config)#exit`	Returns to privileged mode
`Edmonton#copy running-config startup-config`	Saves the configuration to NVRAM

Gibbons Router

`router>enable`	Moves to privileged mode.
`router#configure terminal`	Moves to global configuration mode.
`router(config)#host Gibbons`	Sets the host name.
`Gibbons(config)#interface fastethernet 0/0`	Moves to interface configuration mode.
`Gibbons(config-if)#description LAN Interface`	Sets the local description of the interface.
`Gibbons(config-if)#ip address 192.168.3.1 255.255.255.0`	Assigns an IP address and netmask.
`Gibbons(config-if)#ip helper-address 192.168.1.2`	DHCP broadcasts will be forwarded as a unicast to this address rather than be dropped.
`Gibbons(config-if)#no shutdown`	Enables the interface.
`Gibbons(config-if)#interface serial 0/0/1`	Moves to interface configuration mode.
`Gibbons(config-if)#description Link to Edmonton Router`	Sets the local description of the interface.
`Gibbons(config-if)#ip address 192.168.1.1 255.255.255.252`	Assigns an IP address and netmask.
`Gibbons(config-if)#no shutdown`	Enables the interface.
`Gibbons(config-if)#exit`	Returns to global configuration mode.
`Gibbons(config)#router eigrp 10`	Enables the EIGRP routing process for autonomous system 10.
`Gibbons(config-router)#network 192.168.3.0`	Advertises the 192.168.3.0 network.
`Gibbons(config-router)#network 192.168.1.0`	Advertises the 192.168.1.0 network.
`Gibbons(config-router)#exit`	Returns to global configuration mode.
`Gibbons(config)#exit`	Returns to privileged mode.
`Gibbons#copy running-config startup-config`	Saves the configuration to NVRAM.