

**Configuring DHCP IPv4
Using Cisco IOS**

CIT 167

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Part 1: Configure a Router as a DHCP Server

i) Configure the excluded addresses

I ran logged into R2, went to global configuration, and ran `ip dhcp excluded-address 192.168.10.1 192.168.10.10` to block off the lowest 10 address on the R1 network. I then ran `ip dhcp excluded-address 192.168.30.1 192.168.30.10` to block off the lowest 10 addresses on the R3. See Fig. 1a.

ii) Create a DHCP pool on R2 for the R1 LAN

I created dhcp pools by going to global config, and typing `ip dhcp pool R1-LAN`. I set the network, default-router, and dns-server. See Fig. 1b for R1-LAN configuration.

iii) Create a DHCP pool on R2 for the R3 LAN

a I created the dhcp pool for R3 by going to global config for R2, and typing `ip dhcp pool R3-LAN`. I then configured the network, default-router, and dns-server. See Fig. 1c for R3-LAN configuration.

```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip dhcp exc
R2(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.10
R2(config)#ip dhcp exc
R2(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.10
R2(config)#
```

(a) Creating the excluded addresses

```
R2(config)#ip dhcp pool R1-LAN
R2(dhcp-config)#network 192.168.10.0 255.255.255.0
R2(dhcp-config)#default-router 192.168.10.1
R2(dhcp-config)#dns-server 192.168.20.254
R2(dhcp-config)#
```

(b) Configuring R1-LAN

```
R2(config)#ip dhcp pool R3-LAN
R2(dhcp-config)#network 192.168.30.0 255.255.255.0
R2(dhcp-config)#default-router 192.168.30.1
R2(dhcp-config)#dns-server 192.168.20.254
R2(dhcp-config)#
```

(c) Configuring R3-LAN

Figure 1: Configurations for Part 1

Part 2: Configure DHCP Relay

i) Configure R1 and R3 as a DHCP relay agent

I went to R1 and R3, went into Global configurations and went to Interface G0/0 on each. For R1 I ran `ip dhcp helper-address 10.1.1.2` (Fig. 2a), because that was the address for the interface s0/0/0 connecting to R2. For R3 I ran the command `ip helper-address 10.2.2.2` (Fig. 2b), because that was the address connecting R3 to R2 on the s0/0/1 interface.

ii) Set PC1 and PC2 to receive IP addressing information from DHCP

I went into the Ip configuration for PC-1 and PC-2 and set their IPv4 addressing to come from DHCP, and allowed them to gain access from the server. See Fig. 2c and Fig. 2d.

```

R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int g0/0
R1(config-if)#ip dhcp helper-address
R1(config-if)#ip help
R1(config-if)#ip helper-address 10.1.1.2
R1(config-if)#

```

(a) Configuring R1 as a DHCP agent

IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static DHCP request successful.
IP Address	192.168.20.11
Subnet Mask	255.255.255.0
Default Gateway	192.168.20.1
DNS Server	192.168.20.254

(c) Configuring And applying DHCP addressing to PC-1

```

R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int g0/0
R3(config-if)#ip help
R3(config-if)#ip helper-address 10.2.2.2
R3(config-if)#

```

(b) Configuring R3 as a DHCP agent

IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static DHCP request successful.
IP Address	192.168.20.11
Subnet Mask	255.255.255.0
Default Gateway	192.168.20.1
DNS Server	192.168.20.254

(d) Configuring and applying DHCP addressing to PC-2

Figure 2: Configuring DHCP Relay

Part 3: Configure R2 as a DHCP Client

I went in to global config mode on R2, and configured interface G0/1 for DHCP by running the command `ip address dhcp` and then `no shut`. See Fig. 3.

```

R2#configure terminal
R2(config)#interface g0/1
R2(config-if)#ip address dhcp
R2(config-if)#no shutdown
R2(config-if)#
R2#show ip interface g0/1
Interface g0/1 is up, line protocol is up
R2#show ip dhcp binding
IP Address      Client-ID/
              Hardware address
192.168.10.11   0800.4645.1478
192.168.30.11   0804.8A97.2535
R2#

```

(a) Configuring G0/0 for DHCP

```

R2#show ip int brief
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  192.168.20.1  YES manual  up          up
GigabitEthernet0/1  209.165.209.231 YES DHCP    up          up
Serial0/0/0       10.1.1.2        YES manual  up          up
Serial0/0/1       10.2.2.2        YES manual  up          up
Serial0/1/0       unassigned      YES unset   down        down
Serial0/2/1       unassigned      YES unset   down        down
Vlan1            unassigned      YES unset   administratively down down
R2#

```

(b) G0/0 show ip int brief

Figure 3: Configuring R2 as a DHCP client

Part 4: Verify DHCP and Connectivity

i) Verify DHCP Bindings

The output of the `show ip dhcp bindings` on R2 is shown in Fig. ??

```

R2#show ip dhcp binding
IP address      Client-ID/
              Hardware address
192.168.10.11   0800.4645.1478
192.168.30.11   0804.8A97.2535
R2#

```

Figure 4: Verifying the DHCP Bindings on R2

ii) Verifying Configurations

You Can see the output of PC-1 pinging, PC-2, the DHCP server, and the cisco website in Fig. 5a. You can see the output of PC-2 pinging PC-1, the DHCP server, and the cisco website in Fig. 5b.

iii) The End Verified

```

C:\>ping 192.168.30.11

Pinging 192.168.30.11 with 32 bytes of data:

Request timed out.
Reply from 192.168.30.11: bytes=32 time=2ms TTL=125
Reply from 192.168.30.11: bytes=32 time=10ms TTL=125
Reply from 192.168.30.11: bytes=32 time=21ms TTL=125

Ping statistics for 192.168.30.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 21ms, Average = 13ms

C:\>ping 192.168.20.254

Pinging 192.168.20.254 with 32 bytes of data:

Request timed out.
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.20.254:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 209.165.202.158

Pinging 209.165.202.158 with 32 bytes of data:

Request timed out.
Reply from 209.165.202.158: bytes=32 time=10ms TTL=125
Reply from 209.165.202.158: bytes=32 time=15ms TTL=125
Reply from 209.165.202.158: bytes=32 time=13ms TTL=125

Ping statistics for 209.165.202.158:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 15ms, Average = 12ms

```

(a) PC-1 Pinging the Network and web

```

C:\>ping 192.168.10.11

Pinging 192.168.10.11 with 32 bytes of data:

Reply from 192.168.10.11: bytes=32 time=17ms TTL=125
Reply from 192.168.10.11: bytes=32 time=2ms TTL=125
Reply from 192.168.10.11: bytes=32 time=2ms TTL=125
Reply from 192.168.10.11: bytes=32 time=10ms TTL=125

Ping statistics for 192.168.10.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 17ms, Average = 7ms

C:\>ping 192.168.20.254

Pinging 192.168.20.254 with 32 bytes of data:

Reply from 192.168.20.254: bytes=32 time=2ms TTL=126
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126
Reply from 192.168.20.254: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.20.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>ping 209.165.202.158

Pinging 209.165.202.158 with 32 bytes of data:

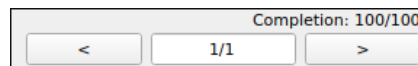
Reply from 209.165.202.158: bytes=32 time=2ms TTL=125
Reply from 209.165.202.158: bytes=32 time=1ms TTL=125
Reply from 209.165.202.158: bytes=32 time=11ms TTL=125
Reply from 209.165.202.158: bytes=32 time=14ms TTL=125

Ping statistics for 209.165.202.158:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 14ms, Average = 7ms

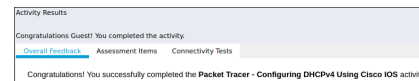
```

(b) PC-2 Pinging the network and web

Figure 5: Confirming the configuration of the network



(a) Complete



(b) Complete

Score	: 100/100	
Item Count	: 21/21	
Component	Items/Total	Score
DHCPv4 Client Configuration	7/7	40/40
DHCPv4 Relay Configuration	2/2	10/10
DHCPv4 Server Configuration	12/12	50/50

(c) Complete

Figure 6: The end complete