23-1 DHCP Configuration - Answer Key

In this lab you will perform a DHCP configuration for a small campus network. You will configure a router's outside interface as a DHCP client. You will then set up DCHP services, using a Cisco router first and then an external DHCP server. The external DHCP server is inside the campus LAN but outside the router.

Note that the external DHCP server at 10.10.20.10 will not be used until the last part of the lab.

Cisco DHCP Client

1) You have not acquired a static public IP address from the Internet service provider. Configure the outside interface FastEthernet 0/0 on R1 to receive its IP address using DHCP. The Service Provider is already configured and you have no access to it.

```
R1(config)#interface f0/0
R1(config-if)#ip address dhcp
R1(config-if)#no shutdown
```

2) Verify that R1 received its public IP address via DHCP (you may need to wait a few minutes for the address to be assigned).

```
%DHCP-6-ADDRESS_ASSIGN: Interface FastEthernet0/0 assigned
DHCP address 203.0.113.2, mask 255.255.255.0, hostname R1

R1#sh ip int brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 203.0.113.2 YES DHCP up up
FastEthernet0/1 unassigned YES unset administratively down down
FastEthernet1/0 unassigned YES unset administratively down down
FastEthernet1/1 unassigned YES unset administratively down down
Vlan1 unassigned YES unset administratively down down
```

3) What is the IP address of R1's DHCP server?

The DHCP server is at 203.0.113.1. We can get this information by viewing the DHCP lease information.

```
R1#show dhcp lease
Temp IP addr: 203.0.113.2 for peer on Interface:
FastEthernet0/0
Temp sub net mask: 255.255.255.0
DHCP Lease server: 203.0.113.1 , state: Bound
DHCP Transaction id: 64B8EE07
Lease: 86400 secs, Renewal: 43200 secs, Rebind: 75600 secs
Temp default-gateway addr: 203.0.113.1
Next timer fires after: 11:53:13
Retry count: 0 Client-ID:cisco-0001.63C2.9701-Fa0/0
Client-ID hex dump: 636973636F2D303030312E363343322E
93730312D4661302F30
Hostname: R1
```

Cisco DHCP Server

4) Enable the DHCP service on R1 so it gives out IP addresses to the PCs in the 10.10.10.0/24 subnet. Leave IP addresses 10.10.10.1 – 10 free to be assigned to servers and printers. 10.10.20.10 is the DNS server.

In this lab environment where the DHCP server will send an offer to the clients immediately, enter the default router and DNS server commands before the network command to ensure clients get all their IP settings.

```
R1(config)#ip dhcp excluded-address 10.10.10.1 10.10.10.10
R1(config)#ip dhcp pool Flackbox
R1(dhcp-config)#default-router 10.10.10.1
R1(dhcp-config)#dns-server 10.10.20.10
R1(dhcp-config)#network 10.10.10.0 255.255.255.0
```

5) In later versions of Packet Tracer, you must manually configure the client PCs as DHCP clients. Click on each PC, go to the "Desktop" tab, select "IP Configuration" at the top, and enable "DHCP".
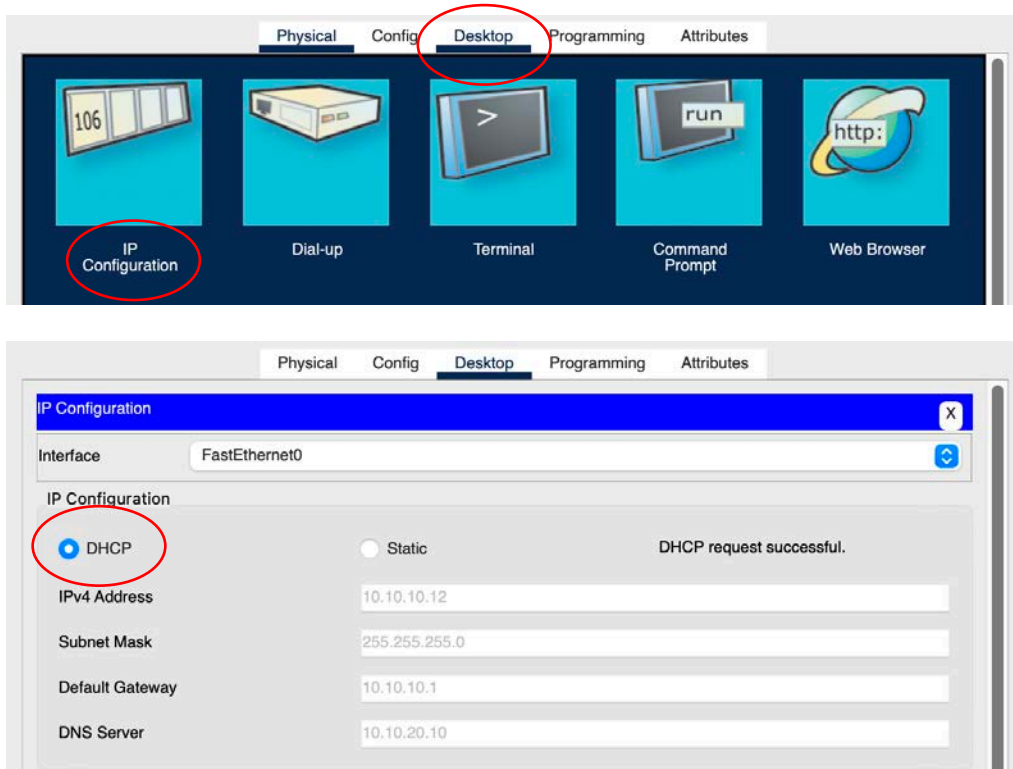
6) Verify the clients received their IP information via DHCP.

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address................: 0000.0CA0.A359
   Link-local IPv6 Address.........:
FE80::200:CFF:FEA0:A359
   IP Address......................: 10.10.10.12
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: 10.10.10.1
   DNS Servers.....................: 10.10.20.10
   DHCP Servers....................: 10.10.10.1
   DHCPv6 IAID.....................: 28262
   DHCPv6 Client DUID..............:
00-01-00-01-61-91-76-98-00-00-0C-A0-A3-59
```

7) Verify the clients can ping the DNS server by its hostname 'DNSserver' (it might take some time for DNS to resolve the hostname).

```
C:\>ping dnsserver

Pinging 10.10.20.10 with 32 bytes of data:

Reply from 10.10.20.10: bytes=32 time<1ms TTL=127
Reply from 10.10.20.10: bytes=32 time=1ms TTL=127
Reply from 10.10.20.10: bytes=32 time<1ms TTL=127
Reply from 10.10.20.10: bytes=32 time=1ms TTL=127

Ping statistics for 10.10.20.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

8) On R1, verify both clients received an IP address via DHCP.

```
R1#show ip dhcp binding
IP address        Client-ID/               Lease expiration        Type
                  Hardware address
10.10.10.12       0000.0CA0.A359           --                      Automatic
10.10.10.11       0002.164E.D116           --                      Automatic
```

9) Cleanup – remove the DHCP server configuration on R1. You will use an external DHCP server instead in the next section.

```
R1(config)#no ip dhcp excluded-address 10.10.10.1 10.10.10.10
R1(config)#no ip dhcp pool Flackbox
```

10) Enter the command 'ipconfig /release' on the PCs to release their IP addresses.

```
C:\>ipconfig /release

   IP Address......................: 0.0.0.0
   Subnet Mask.....................: 0.0.0.0
   Default Gateway.................: 0.0.0.0
   DNS Server......................: 0.0.0.0
```

11) Enter the command 'ipconfig /renew' on the PCs and verify they can no longer obtain an IP address via DHCP

```
C:\>ipconfig /renew
DHCP request failed.
```

External DHCP Server

12) The server at 10.10.20.10 has been configured as a DHCP server with a scope of IP addresses for the 10.10.10.0/24 subnet, but the PCs there are not receiving IP addresses. Why is this?

DHCP requests use broadcast traffic. R1 is not forwarding the requests on to the DHCP server as routers do not forward broadcast traffic by default.

13) Configure the network to allow the PCs to receive their IP addresses from the DHCP server.

On the interface where they are received, configure the router to forward DHCP requests to the server.

```
R1(config)#interface f0/1
R1(config-if)#ip helper-address 10.10.20.10
```

14) Verify the clients received their IP information via DHCP.

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address................: 0000.0CA0.A359
   Link-local IPv6 Address.........:
FE80::200:CFF:FEA0:A359
   IP Address......................: 10.10.10.101
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: 10.10.10.1
   DNS Servers.....................: 10.10.20.10
   DHCP Servers....................: 10.10.20.10
   DHCPv6 IAID.....................: 28262
   DHCPv6 Client DUID..............:
00-01-00-01-61-91-76-98-00-00-0C-A0-A3-59
```