Lab 67. DNS

Lab Objective:

The objective of this lab exercise is for you to learn and understand how configure a DNS entry on a generic server and then test it from a host device.
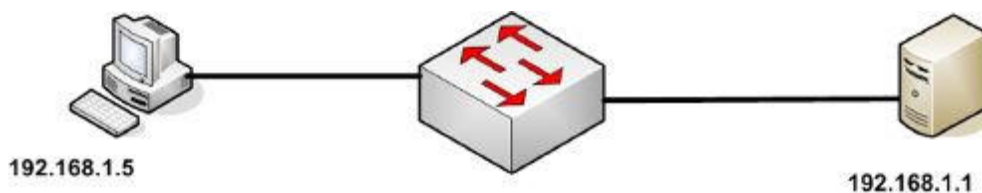
Lab Purpose:

As I'm sure you learned in your Network+ study guide or video course, DNS allows you to use hostnames in the browser address bar instead of an IP address. You can see how to do this in this lab.

Lab Tool:

Packet Tracer

Lab Topology:

Please use the following topology to complete this lab exercise:

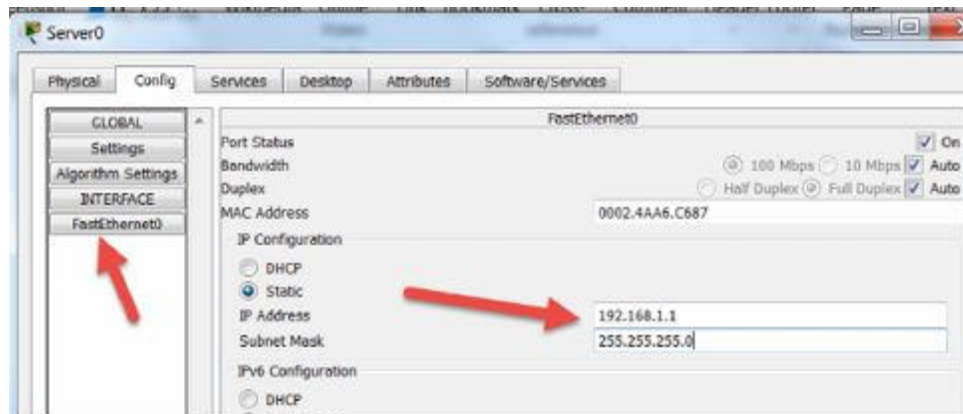192.168.1.5   192.168.1.1

Lab 67. Configuration and Verification

Task 1:

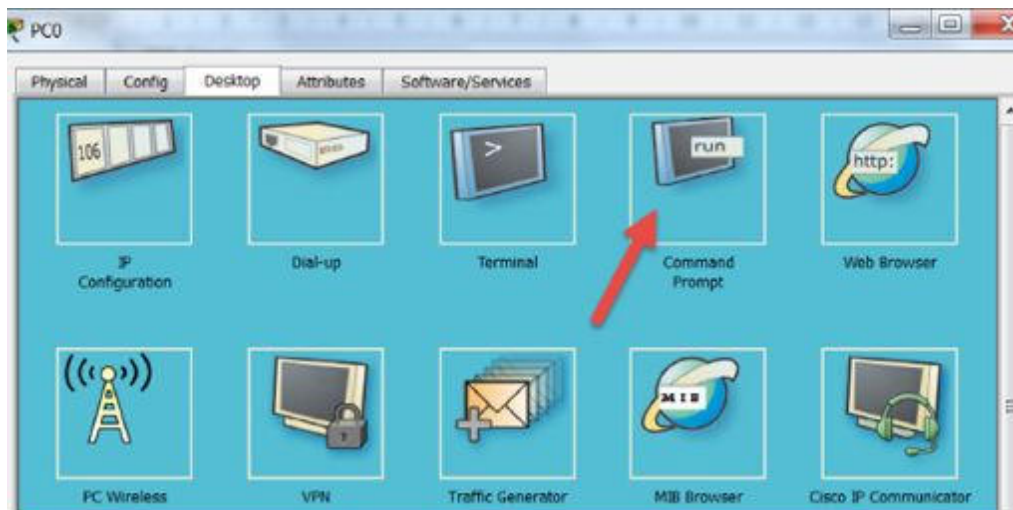Drag your generic host PC and server onto the canvass and connect the Ethernet ports to any ports on any generic or Cisco switch. You can then add IP addresses via the IP configuration utility. On the PC:
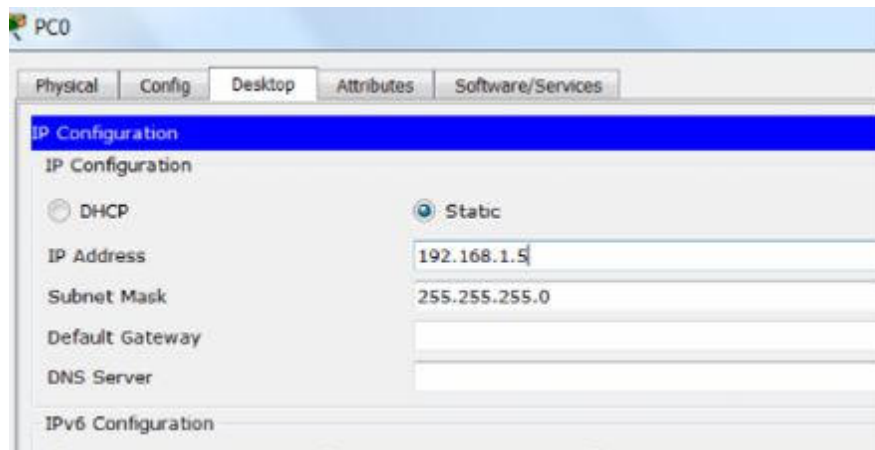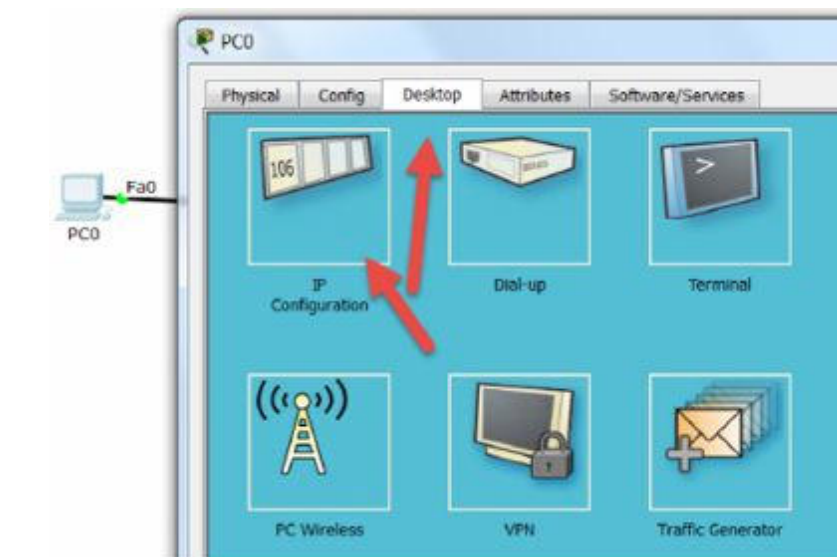
On the server:

Ensure you can ping the server from the PC.
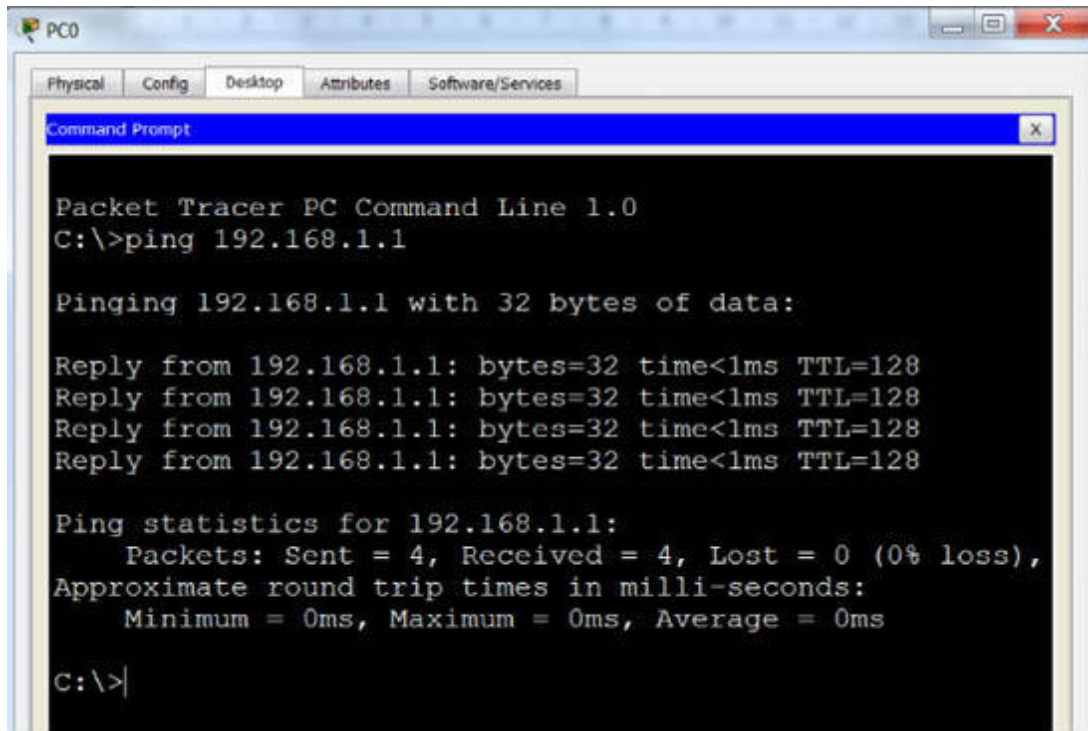
Task 2:
Test on the PC if you can reach the web URL www.mypage.com
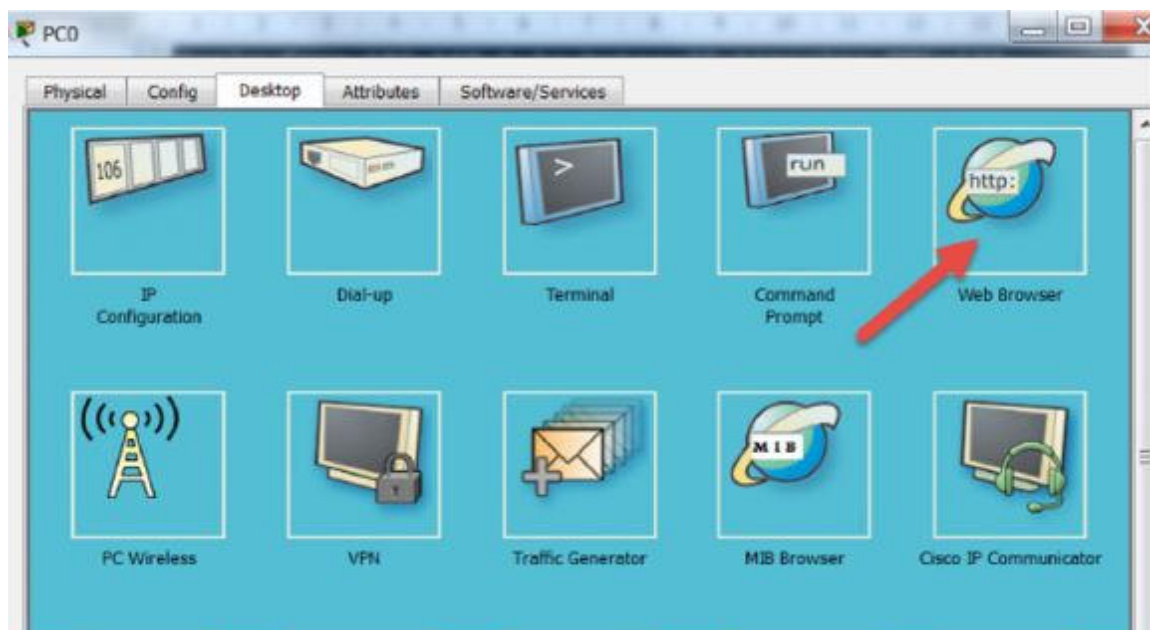
The PC can't resolve this name because there is no DNS entry.
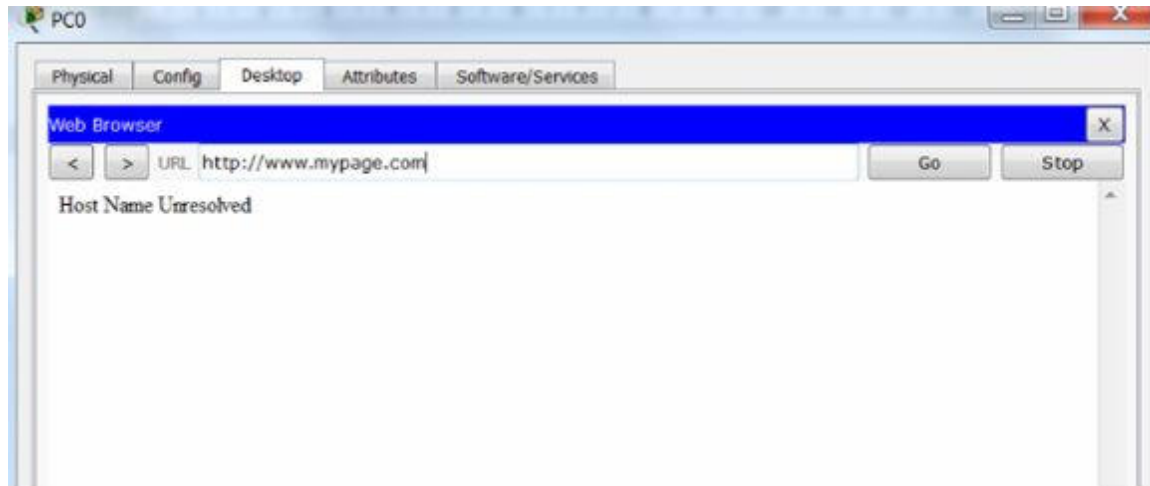
Task 3:

Create a DNS record on the server for this URL and associate it with the servers own IP address. Use the 'DNS' service, add the url **www.mypage.com** and hit the 'add' button. Ensure DNS is turned on.
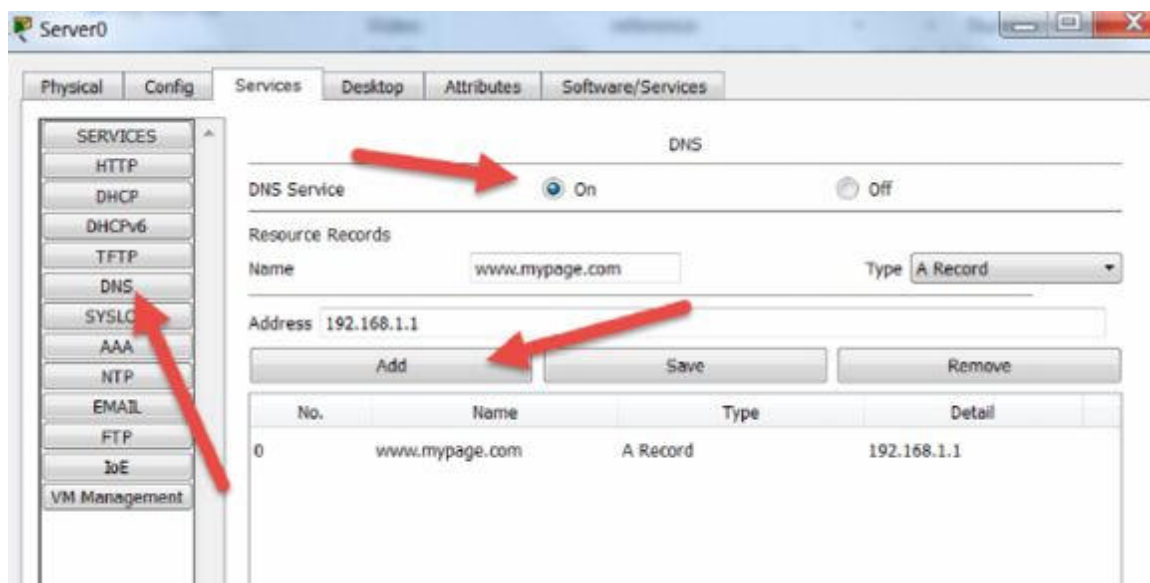
You have now created an A record for the domain.

Task 4:

Using the web browser on the PC, enter the domain name
www.mypage.com and it should resolve this time.
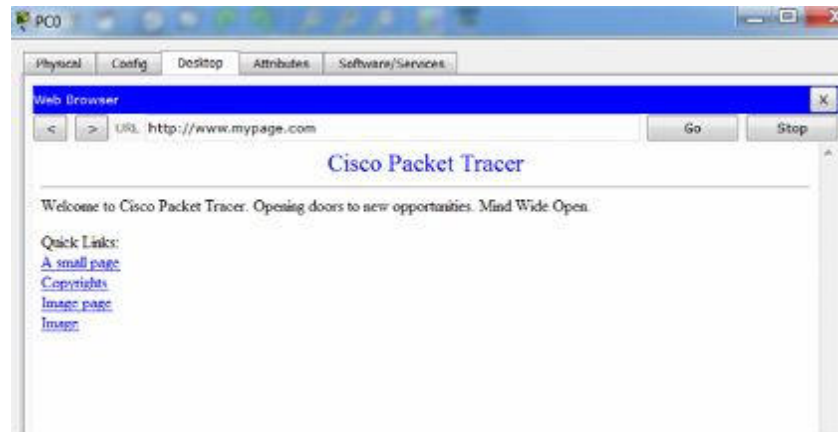
Notes:

You can also input the DNS server IP address on the host if you wish
but the lab should work without doing this (in Packet Tracer).

Lab 68. Configuring the Cisco IOS DHCP Server

Lab Objective:
The objective of this lab exercise is for you to learn and understand how to configure the Cisco IOS DHCP server.

Lab Purpose:
Configuring the Cisco IOS DHCP server is a fundamental skill. DHCP (Dynamic Host Configuration Protocol) provides dynamic addressing information to hosts on a network. Typically, physical DHCP servers (such as Microsoft Windows servers) are used to provide addressing information to DHCP clients (which are devices that request configuration via DHCP). However, Cisco IOS routers can also be configured to act as DHCP servers and provide dynamic addressing to DHCP clients. As a Cisco engineer, as well as in the Cisco CCNA exam, you will be expected to know how to configure the Cisco IOS DHCP server.

IMPORTANT NOTE: In order to test DHCP functionality, you will need a workstation DHCP client configured to receive IP addressing information via DHCP. If you do not have a DHCP client, feel free to substitute it with another Cisco IOS router configured as a DHCP client by using the `ip address dhcp` command on the interface connected to the DHCP router.

Lab Topology:

Please use the following topology to complete this lab exercise:
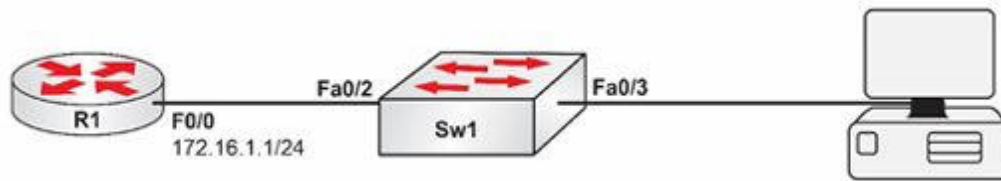
Task 1:

Configure the hostnames on R1 and Sw1 as illustrated in the topology.

Task 2:

Configure VLAN50 named DHCP_VLAN on Sw1. Assign the FastEthernet0/2 and FastEthernet0/3 interfaces on Sw1 to this VLAN. Ensure that the ports immediately transition to the Spanning Tree Forwarding state.

Task 3:

Configure R1 as a Cisco IOS DHCP server with the following settings:

- DHCP pool name: CCNA-DHCP-POOL
- DHCP network: 172.16.1.0/24
- DNS server: 10.1.1.254
- WINS server: 10.2.2.254
- Default gateway: 172.16.1.1
- DNS domain: howtonetwork.net
- DHCP lease time: 5 days 30 minutes

Some of the options above are not available in Packet Tracer, so you may want to use GNS3.

Ensure that you exclude the IP address of the router interface from the DHCP pool.

Task 4:

Verify your DHCP configuration on the connected workstation (or other DHCP client) and verify that your Cisco IOS DHCP server is showing a leased DHCP address.

Lab 68. Configuration and Verification

Task 1:

For reference information on configuring hostnames, please refer to earlier labs.

Task 2:

```
Sw1#config t
Enter configuration commands, one per line.  End with CTRL/Z.
Sw1(config)#vlan50
Sw1(config-vlan)#name DHCP_VLAN
Sw1(config-vlan)#exit
Sw1(config)#interface range fastethernet0/2 – 3
Sw1(config-if-range)#switchport mode access
Sw1(config-if-range switchport access vlan50
Sw1(config-if-range)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single host.
Connecting hubs, concentrators, switches, bridges, etc... to this interface when
portfast is enabled, can cause temporary bridging loops.
Use with CAUTION

%Portfast will be configured in 2 interfaces due to the range command
but will only have effect when the interfaces are in a non-trunking mode.
Sw1(config-if-range)#no shutdown
Sw1(config-if-range)#end
Sw1#
```

Task 3:

```
R1#config t
```

Enter configuration commands, one per line. End with CTRL/Z.
R1(config)#ip dhcp pool CCNA-DHCP-POOL
R1(dhcp-config)#network 172.16.1.0 255.255.255.0
R1(dhcp-config)#dns-server 10.1.1.254
R1(dhcp-config)#netbios-name-server 10.2.2.254
R1(dhcp-config)#default-router 172.16.1.1
R1(dhcp-config)#domain-name howtonetwork.net
R1(dhcp-config)#lease 5 0 30
R1(dhcp-config)#exit
R1(config)#ip dhcp excluded-address 172.16.1.1

R1#show ip dhcp pool CCNA-DHCP-POOL

Pool CCNA-DHCP-POOL :
Utilization mark (high/low) : 100 / 0
Subnet size (first/next) : 0 / 0
Total addresses : 254
Leased addresses : 0
Excluded addresses : 1
Pending event : none

1 subnet is currently in the pool
Current index IP address range Leased/Excluded/Total
172.16.1.1 172.16.1.1 - 172.16.1.254 0 / 1 / 254

Task 4:

I used another router as a DHCP client, as you can see below. If you use a host, then configure it to obtain the IP address via DHCP.

Router(config)#int f0/0
Router(config-if)#ip address dhcp
Router(config-if)#no shut
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%DHCP-6-ADDRESS_ASSIGN: Interface FastEthernet0/0 assigned DHCP
address 172.16.1.2, mask 255.255.255.0, hostname Router3

Router#show ip dhcp binding

```
IP address   Client-ID/      Lease expiration         Type
             Hardware address
172.16.1.2   0060.47BC.7A01   --                       Automatic
```

The ipconfig /all command on a Windows-based workstation would show the following:

```
Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . : howtonetwork.net
        Description . . . . . . . . . . . : Broadcom NetXtreme 57xx Gigabit Cont
roller
        Physical Address. . . . . . . . . : 00-1D-09-D4-02-38
        Dhcp Enabled. . . . . . . . . . . : Yes
        Autoconfiguration Enabled . . . . : Yes
        IP Address. . . . . . . . . . . . : 172.16.1.2
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 172.16.1.1
        DHCP Server . . . . . . . . . . . : 172.16.1.1
        DNS Servers . . . . . . . . . . . : 10.1.1.254
        Primary WINS Server . . . . . . . : 10.2.2.254
        Lease Obtained. . . . . . . . . . : Sunday, April 19, 2009 10:02:13 PM
        Lease Expires . . . . . . . . . . : Friday, April 24, 2009 10:32:13 PM
Ethernet adapter Local Area Connection:

        Media State . . . . . . . . . . . : Media disconnected
        Description . . . . . . . . . . . : Bluetooth Personal Area Network
        Physical Address. . . . . . . . . : 00-21-86-42-0A-8A

C:\>
```

NOTE: If you have configured another Cisco IOS device as a DHCP client to test your configuration, you should see the following output:

```
Router#show ip dhcp pool

Pool CCNA-DHCP-POOL :
Utilization mark (high/low)   : 100 / 0
Subnet size (first/next)      : 0 / 0
Total addresses               : 254
Leased addresses              : 1
Excluded addresses            : 1
Pending event                 : none

1 subnet is currently in the pool
Current index       IP address range            Leased/Excluded/Total
172.16.1.1          172.16.1.1 - 172.16.1.254     1    / 1  / 254
```

Lab 69. Troubleshooting and Configuring DHCP (Client-Server Router-Based)

Lab Objective:

The objective of this lab exercise is for you to learn how to implement DHCP in a Cisco router both as a DHCP server and a DHCP client.

Lab Purpose:

Configuring DHCP is a very important task for every network engineer, as this protocol is in charge of the assignment of IP addresses. In this lab, you will learn the steps required to both provide and learn an IP address via DHCP. As a Cisco engineer, as well as in the Cisco CCNA exam, you will be expected to know how to implement DHCP in your network.

Lab Topology:

Please use the following topology to complete this lab exercise:

NOTE: R1 will be the DHCP server and R2 will be configured as a DHCP client to obtain an IP address on its Gig0/0 interface.

Task 1:

Configure the hostnames on R1 and R2 as illustrated in the topology.

Task 2:
Configure the IP addresses on the Gig0/0 interface of R1 as illustrated in the topology.

NOTE: R2 will obtain the IP of its Gigabit interface via DHCP.

Task 3:
Configure a DHCP pool on R1 to provide an IP address to the different devices connected on its interface Gig0/0 with the following settings:

- DHCP pool name: Pool-1
- DHCP subnet: 192.168.10.0/24
- DHCP DNS server: 4.2.2.2
- DHCP default gateway: 192.168.10.1

NOTE: Make sure you exclude the 192.168.10.1 address from the DHCP pool.

Task 4:
Configure R2 interface Gig0/0 to obtain its IP address via DHCP.

Task 5:
Confirm the assignment of the IP address on both the DHCP client and DHCP server running the following commands:

On the DHCP server:

- `show ip dhcp pool` (to check the DHCP configuration)
- `show ip dhcp binding` (to check the database of IPs provided and the clients that have obtained each of those IPs)

On the DHCP client:

- show ip interface brief (to confirm that it gets an IP and it's obtained via DHCP)

Task 6:
Now break the lab in a few ways. Start from the beginning (reload the routers):

- Don't exclude the IP address.
- Miss off the ip address dhcp command on the host.
- Configure the wrong network range.
- Configure the correct network range but with the subnet of 255.255.255.252 (so you only have two host addresses).

Lab 69. Configuration and Verification

Task 1:

For reference information on configuring hostnames, please refer to earlier labs.

Task 2:

```
R1#conf t
Enter configuration commands, one per line.  End with CTRL/Z.
R1(config)#int gig0/0
R1(config-if)#no shutdown
R1(config-if)#ip add 192.168.10.1 255.255.255.0
R1(config-if)#end
```

Task 3:

```
R1#config t
R1(config)#ip dhcp pool Pool-1
R1(dhcp-config)#network 192.168.10.0 255.255.255.0
R1(dhcp-config)#dns-server 4.2.2.2
R1(dhcp-config)#default-router 192.168.10.1
R1(dhcp-config)#exit
R1(config)#ip dhcp excluded-address 192.168.10.1
```

Task 4:

```
R2#config t
Enter configuration commands, one per line.  End with CTRL/Z.
R2(config)#int gig0/0
R2(config-if)#ip address dhcp
```

R2(config-if)#exit

Task 5:
On the server side:

    R1#sh ip dhcp pool

    Pool Pool-1 :
    Utilization mark (high/low)   : 100 / 0
    Subnet size (first/next)   : 0 / 0
    Total addresses   : 254
    Leased addresses   : 1
    Pending event   : none
    1 subnet is currently in the pool :
    Current index   IP address range   Leased addresses
    192.168.10.3   192.168.10.1 - 192.168.10.254   1

    R1#sh ip dhcp binding

    Bindings from all pools not associated with VRF:
    IP address   Client-ID/   Lease expiration   Type
         Hardware address/
         User name
    192.168.10.2 0063.6973.636f.2d63. Mar 02 2002 08:14 PM   Automatic
         3030.322e.3235.6362.
         2e30.3030.302d.4661.
         302f.30

On the client side:

    R2#show ip interface brief
    Interface   IP-Address   OK? **Method** Status   Protocol
    FastEthernet0/0   192.168.10.2   YES **DHCP**   up   up