

Practical no -6: Setup a DHCP Server to Allocate Dynamic IPs (Cisco Packet Tracer)

Aim:

To configure a Cisco Router as a DHCP server so that it dynamically allocates IP addresses to client PCs in a network using Cisco Packet Tracer.

Requirements:

1. Cisco Packet Tracer software.
2. One router, one switch, and multiple PCs.
3. Proper cabling between devices.

Procedure:

Step 1: Network Topology

- Drag and drop:
 - 1 Router (e.g., 2911)
 - 1 Switch
 - 2–3 PCs
 - Connect:
 - Router ↔ Switch (straight cable)
 - PCs ↔ Switch (straight cables)
- Step 2: Assign IP on Router Interface** Click on Router → CLI tab, then enter:

```
Router> enable
Router# configure terminal
Router(config)# interface gig0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit
```

Step 3: Configure DHCP on Router

```
Router(config)# ip dhcp pool LAB-NET
Router(dhcp-config)# network 192.168.1.0 255.255.255.0
Router(dhcp-config)# default-router 192.168.1.1
Router(dhcp-config)# dns-server 8.8.8.8
Router(dhcp-config)# exit
```

Step 4: Exclude IP Addresses

Exclude addresses you don't want to assign dynamically (e.g., router's IP):

```
Router(config)# ip dhcp excluded-address 192.168.1.1
192.168.1.10
```

Step 5: Configure PCs On each PC:

- Open Desktop tab → IP Configuration.
- Select DHCP instead of Static.

Step 6: Verify DHCP Allocation

On PC → Command Prompt →

type:

ipconfig

Each PC should get a unique IP from the router in range 192.168.1.11 – 192.168.1.254.

Output:

PCs successfully receive dynamic IP addresses from the DHCP-enabled router.

Result/Conclusion:

Thus, a Cisco Router was configured as a DHCP Server in Packet Tracer, and PCs were automatically assigned IP addresses.

Viva Questions with Answers

1. Q: What is DHCP?
A: DHCP (Dynamic Host Configuration Protocol) is a network protocol that automatically assigns IP addresses and other network configurations (like gateway, DNS) to client devices.
2. Q: Why do we use DHCP instead of manual IP assignment?
A: DHCP reduces manual work, prevents IP conflicts, ensures centralized management, and makes it easy to scale large networks.
3. Q: What is the default port number used by DHCP?
A: DHCP uses UDP port 67 (server) and UDP port 68 (client).
4. Q: What are the different types of IP allocation in DHCP? A:
 - Dynamic Allocation: IP is leased temporarily and can change.
 - Automatic Allocation: Permanent assignment from a range.
 - Manual Allocation (Static Binding): Specific IP assigned to a specific device (based on MAC address).
5. Q: Explain the DHCP working process.

CLI COMMANDS

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface fastethernet 0/0

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit

Router(config)#ip dhcp pool LAB-NET

Router(dhcp-config)#network 192.168.1.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.1.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#exit

Router(config)#ip dhcp excluded-address 192.168.1.1 192.168.1.10

VERIFY CONNECTIVITY

Cisco Packet Tracer PC Command Line 1.0

C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:

Link-local IPv6 Address.....: FE80::205:5EFF:FE13:5872

IPv6 Address.....: ::

IPv4 Address.....: 192.168.1.11

Subnet Mask.....: 255.255.255.0

Default Gateway.....: ::

192.168.1.1

Bluetooth Connection:

Connection-specific DNS Suffix..:

Link-local IPv6 Address.....: ::

IPv6 Address.....: ::

IPv4 Address.....: 0.0.0.0

Subnet Mask.....: 0.0.0.0

Default Gateway.....: ::

0.0.0.0