

## Task 10

### a) Configure DHCP Server in the Network using packet tracer software.

#### DHCP server:

**DHCP server** (Dynamic Host Configuration Protocol server) is a network service that automatically assigns IP addresses and other network configuration details (like subnet mask, default gateway, and DNS servers) to devices on a network. This eliminates the need for manually configuring these settings for each device, simplifying network management and reducing the chances of configuration errors.

#### Key Features of a DHCP Server

##### 1. Automatic IP Address Assignment:

- The DHCP server dynamically assigns IP addresses to devices (like computers, phones, printers) when they connect to the network.
- Ensures that no two devices are assigned the same IP address, avoiding conflicts.

##### 2. Centralized Network Management:

- Administrators configure the IP address pool and other settings on the DHCP server, and all devices receive their configurations from it.

##### 3. Efficient Reuse of IP Addresses:

- DHCP leases IP addresses for a specific time period. When a device disconnects or doesn't renew its lease, the IP address is returned to the pool and can be reassigned.

##### 4. Provides Additional Configuration:

- In addition to IP addresses, a DHCP server can provide:
  - Subnet mask
  - Default gateway
  - DNS server addresses
  - Other parameters like NTP servers and domain names.

##### 5. DHCP Pool

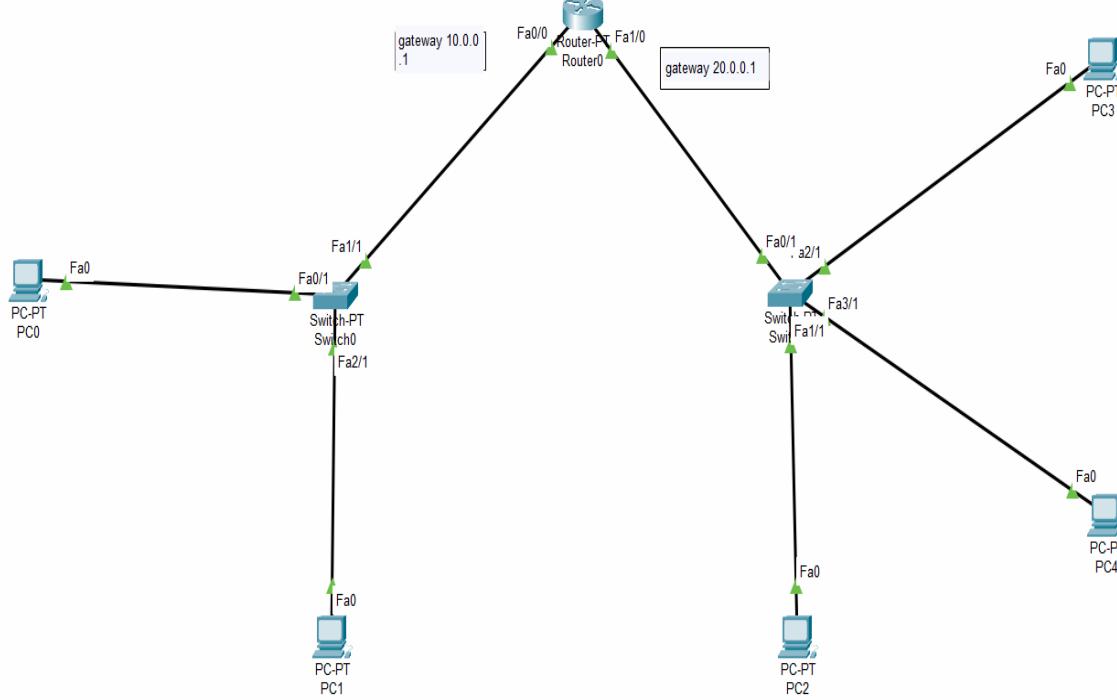
**DHCP pool** refers to a range of IP addresses defined on a DHCP server that are available to be assigned dynamically to devices (clients) on a network. This pool ensures that the DHCP server can allocate unique IP addresses to devices that request them.

**Note:**

DNS automatically assigns IP addresses so, **don't assign IP's to the PCs** in static way

**Follow step-by-step instructions:**

**Step 1: Build network (**don't assign IP's to the PCs**)**



**Step 2: Configure the Router for DHCP**

Router>en

Router#conf t

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

**// Define DHCP Pools for Each Network://**

**//For 10.0.0.0 network//**

```
Router(config)#ip dhcp pool lan1
```

```
Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#

```

//For **20.0.0.0** network//

```
Router(dhcp-config)#ip dhcp pool lan2
Router(dhcp-config)#network 20.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#

```

**//Exclude Router IPs from DHCP Pool:** Prevent the router's interface IPs from being allocated by DHCP.//

```
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1
Router(config)#ip dhcp excluded-address 20.0.0.1
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

```

```
Router#wr memory
Building configuration...
[OK]
```

### **Step 3: Configure Router Interfaces**

```
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
```

**//Assign IP addresses to the router interfaces://**

```
Router(config)#int fa0/0
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut
```

```
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
```

```
Router(config-if)#int fa1/0
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to
up

Router(config-if)#
Router(config-if)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

## Step 4: Configure PCs to Use DHCP

1. Click on each PC (**PC0, PC1, PC2, etc.**).
2. Go to the **Desktop** tab.
3. Open the **IP Configuration** window.
4. Select **DHCP**. The PC should automatically receive an IP address from the router.

## Step 5: Verify the Configuration

Go back to the router's CLI and verify DHCP bindings:  
This will display the list of IPs leased to PCs.

```
Router#sh ip dhcp binding
IP address Client-ID/ Lease expiration Type
Hardware address
10.0.0.2 0060.2F70.9394 -- Automatic
10.0.0.3 0090.21AD.BB03 -- Automatic
20.0.0.2 00E0.F739.0313 -- Automatic
20.0.0.3 0003.E413.8ADD -- Automatic
20.0.0.4 0001.4237.29AD -- Automatic
Router#
```

Router0

Physical Config **CLI** Attributes

---

```

Router(config)#ip dhcp pool lan1
Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp pool lan2
Router(dhcp-config)#network 20.0.0.0 255.0.0.0
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1
Router(config)#ip dhcp excluded-address 20.0.0.1
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr memory
Building configuration...
[OK]
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip add 10.0.0.1 255.0.0.0
Router(config-if)#no shut

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

Router(config-if)#int fal/0
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

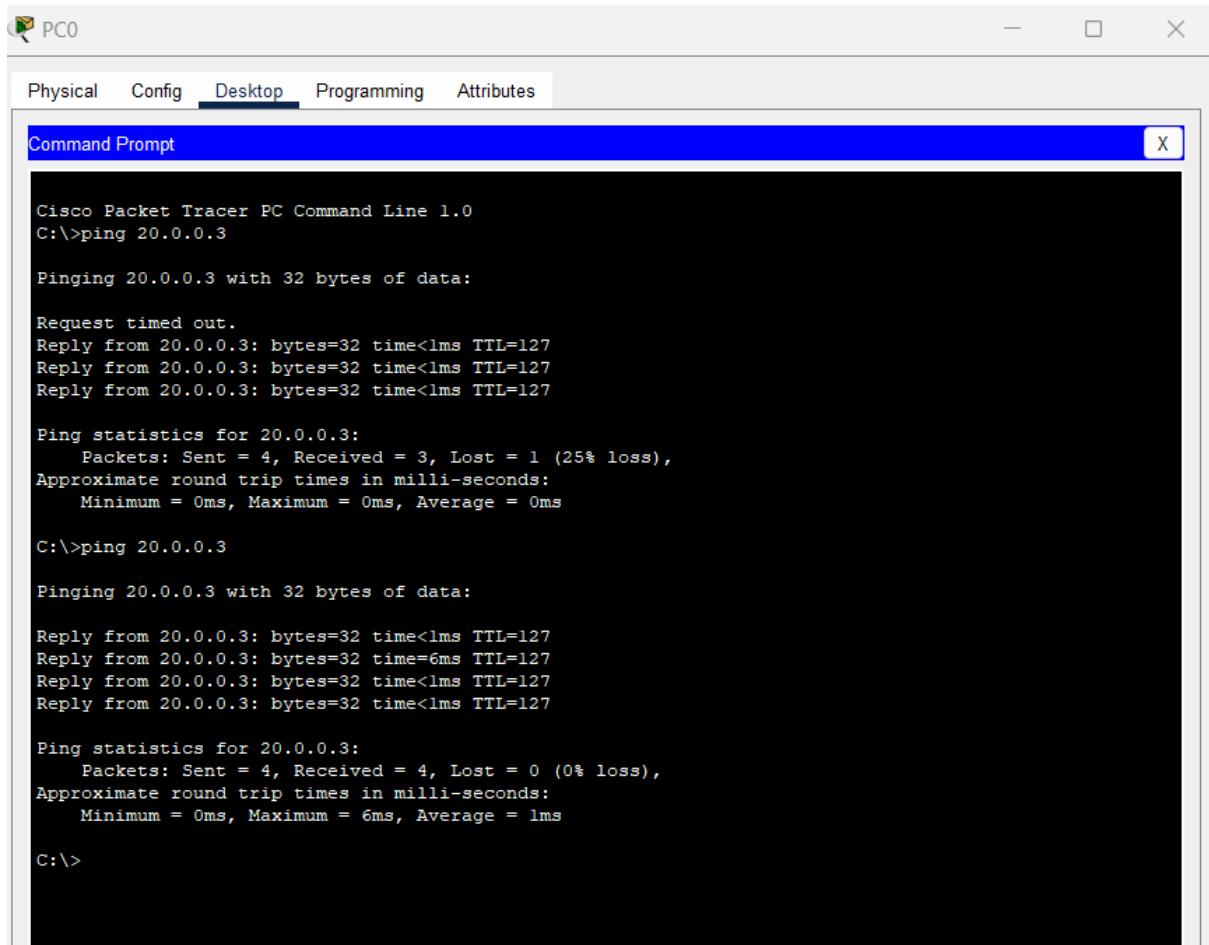
Router(config-if)#
Router(config-if)#ex
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#sh ip dhcp binding
IP address      Client-ID/          Lease expiration      Type
                  Hardware address
10.0.0.2        00E0.2F70.9394    --
10.0.0.3        0090.21AD.BB03    --
20.0.0.2        00E0.F739.0313    --
20.0.0.3        0003.E413.8ADD   --
20.0.0.4        0001.4237.29AD   --
Router#
Router#

```

## Step 6: Test Connectivity

ping 20.0.0.3 (from PC0)



The screenshot shows a Windows-style application window titled "PC0". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. Below the tabs is a title bar labeled "Command Prompt" with a close button "X". The main area of the window displays the output of a Cisco Packet Tracer command-line interface. The output shows two ping sessions. The first session pings 20.0.0.3 and shows 1 packet loss (25% loss). The second session pings 20.0.0.3 and shows 0 packet loss (0% loss). Both sessions have a minimum round-trip time of 0ms and an average of 0ms.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.3: bytes=32 time<lms TTL=127
Reply from 20.0.0.3: bytes=32 time<lms TTL=127
Reply from 20.0.0.3: bytes=32 time<lms TTL=127

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Reply from 20.0.0.3: bytes=32 time<lms TTL=127
Reply from 20.0.0.3: bytes=32 time=6ms TTL=127
Reply from 20.0.0.3: bytes=32 time<lms TTL=127
Reply from 20.0.0.3: bytes=32 time<lms TTL=127

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>
```

Just for Reference network picture of PCs, IP s automatically assigned.

