

CORE MODULE 2

Computer Networking

PRACTICAL

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Course	: -	ADIT (IBM)
Date	: -	19-10-2024
Module	: -	Core Module 2
Practical	: -	Computer Networking
Requirements/tools	: -	

- i) Hardware: -
 - i. Working PC with Hard disk installed
 - ii. Internet connection
- ii) Software: -
 - i. Windows operating system
 - ii. Cisco packet tracer

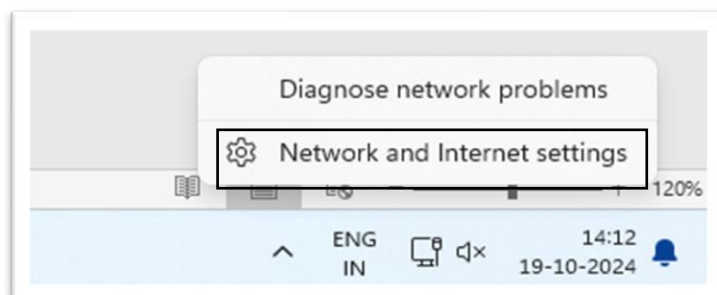
Question 2: - Configure a static IP address on a Windows computer. Outline the steps required to complete this task.

Solution: -

Steps:

1. Access Network Settings

- Open Network and Internet Settings:
 - Right-click the Network icon (Wi-Fi/Ethernet) located in the System Tray at the bottom-right corner of the desktop.
 - Select Open Network & Internet settings from the context menu.

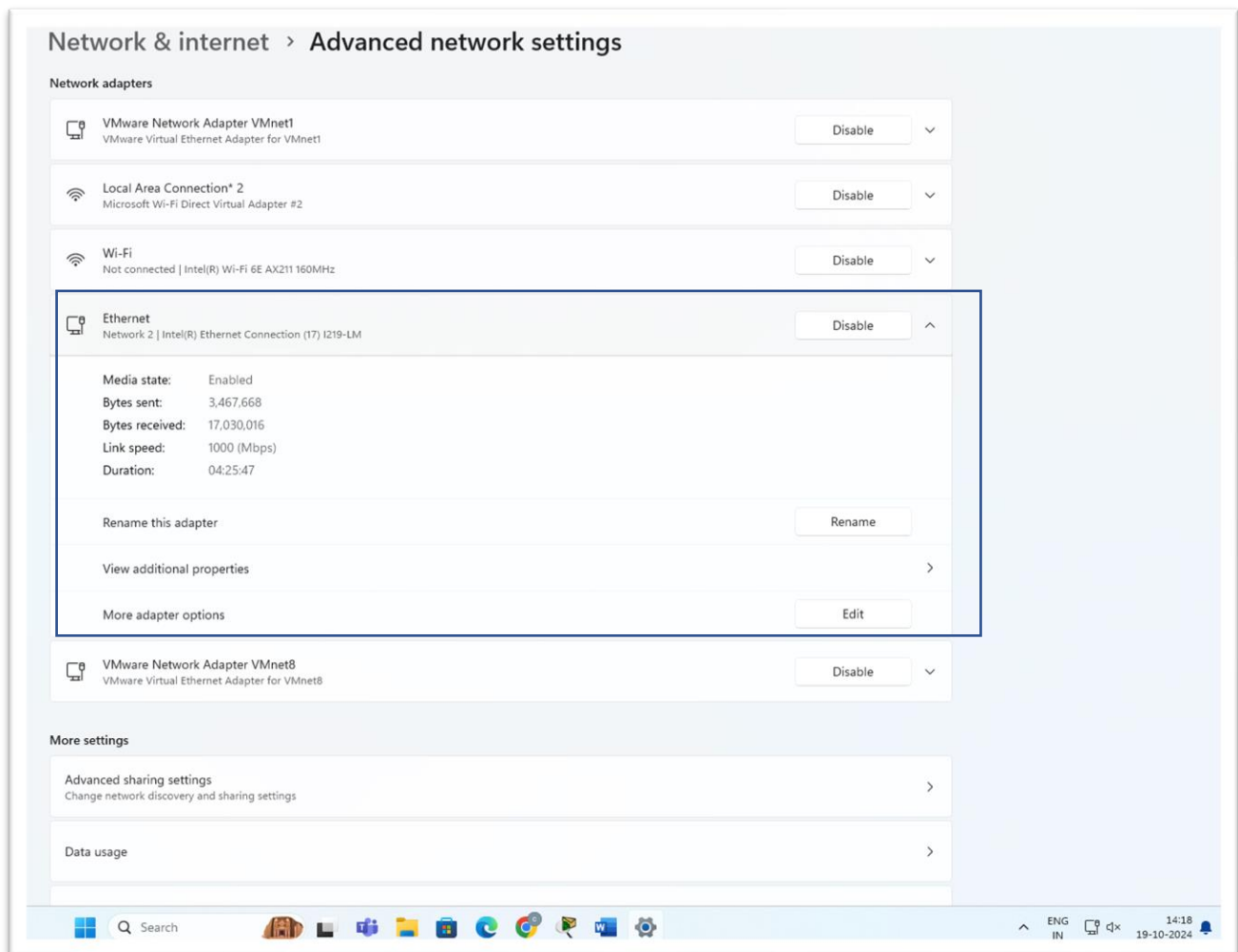


- Navigate to Advanced network settings:
 - In the Network & Internet window, scroll down to locate **Advanced network settings**.



2. Choose the Network Adapter

- Identify the Active Network Adapter:
 - In the Network Connections window, identify the network adapter that is currently connected (either Ethernet or Wi-Fi) in our case its Ethernet.

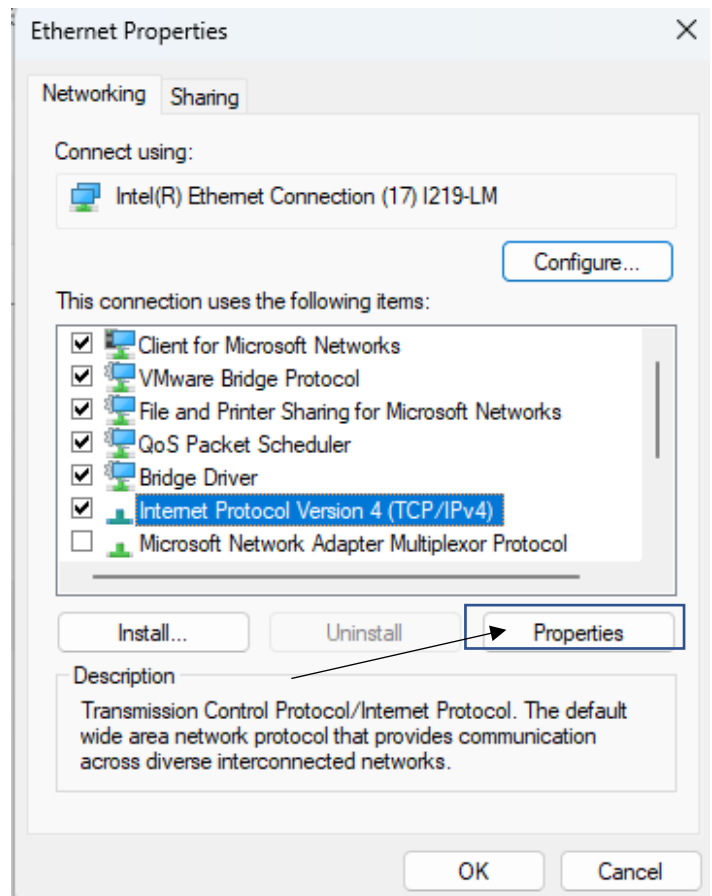
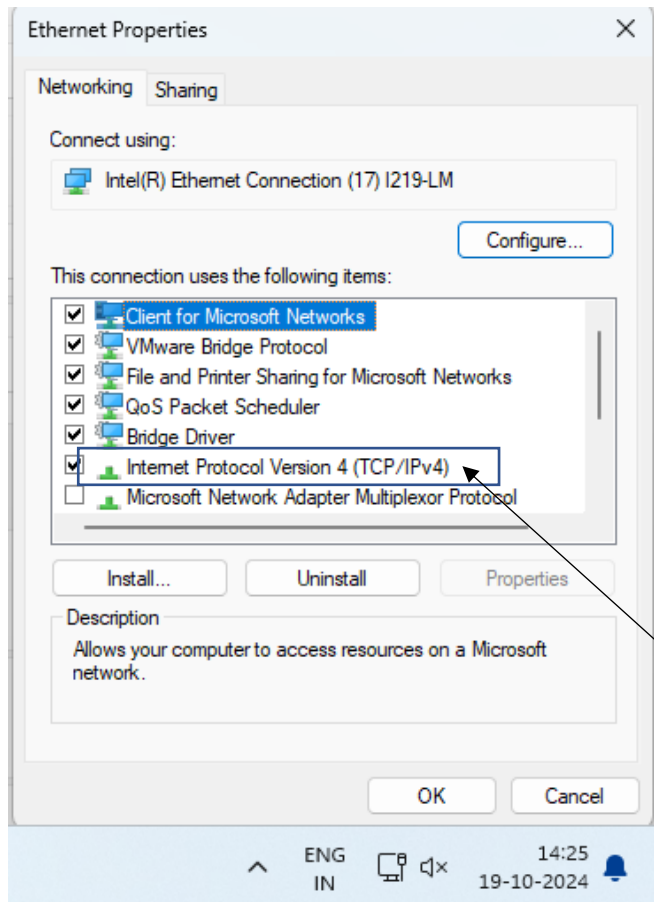


- Open more adapter options:
 - click on edit button in more adapter options menu.



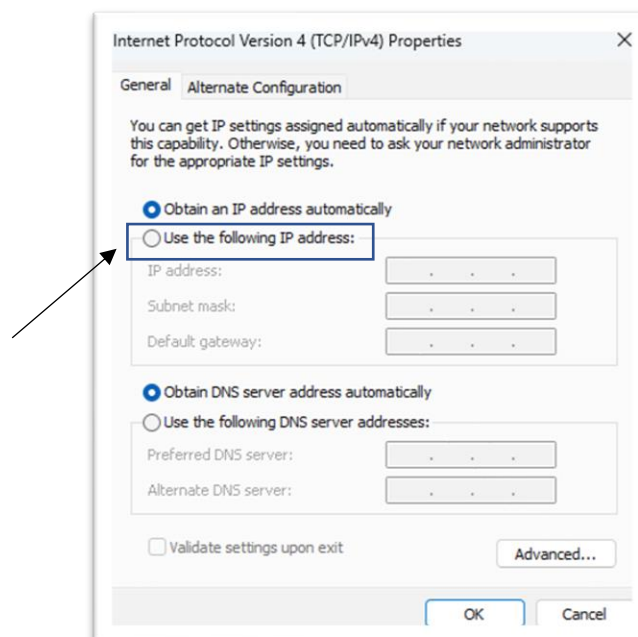
3. Access IPv4 Settings

- Locate Internet Protocol Version 4 (TCP/IPv4):
 - In the Properties window, scroll through the list of items until you find Internet Protocol Version 4 (TCP/IPv4).
 - Select it, then click the Properties button.



4. Configure Static IP Address

- Select Manual IP Configuration:
 - In the Internet Protocol Version 4 (TCP/IPv4) Properties window, select the option Use the following IP address to switch from DHCP (automatic) to manual IP assignment.



- Lets check our current IP address using CMD just type

ipconfig

```
Command Prompt
C:\Users\nayan>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : Dlink
    IPv6 Address. . . . . : fd01::ff35:b189:5b55:ff11
    Temporary IPv6 Address. . . . . : fd01::b0fc:28d7:12f9:4348
    Link-local IPv6 Address . . . . . : fe80::4695:9c31:8d55:bbf9%10
    IPv4 Address. . . . . : 192.168.8.63
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::5ad5:6eff:feed:e446%10
                                192.168.8.1

Wireless LAN adapter Wi-Fi:

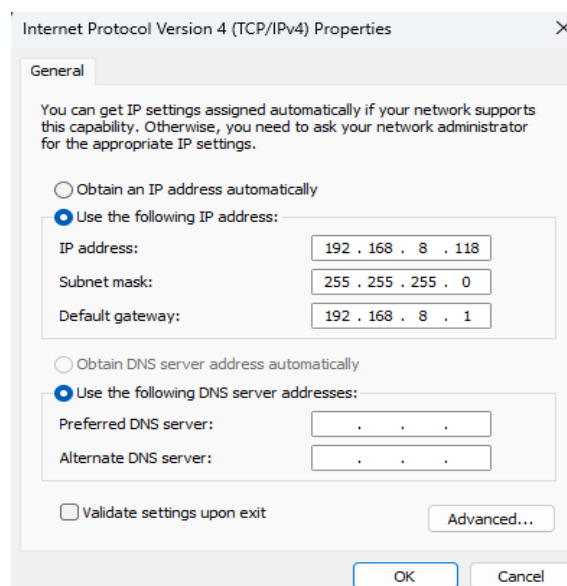
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : mshome.net
```

Our current IPv4 Address is 192.168.8.63

subnet mask 255.255.255.0

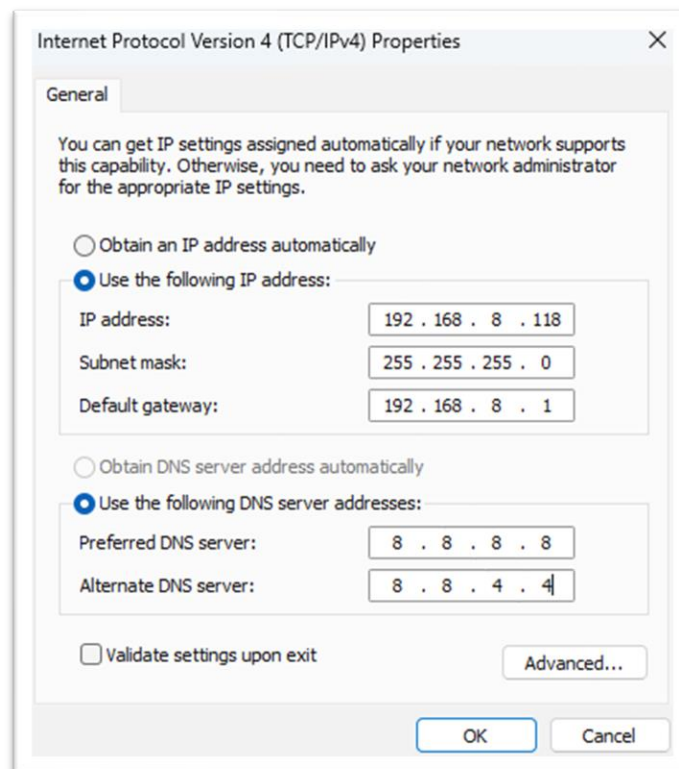
And accordingly, our subnet mask is 255.255.255.0

- Input the IP Address:
 - IP address: Enter a static IP address 192.168.8.118
 - Default gateway: Enter the gateway IP address 192.168.8.1
 - Subnet mask: Input the correct subnet mask 255.255.255.0



5. Configure DNS Server Addresses

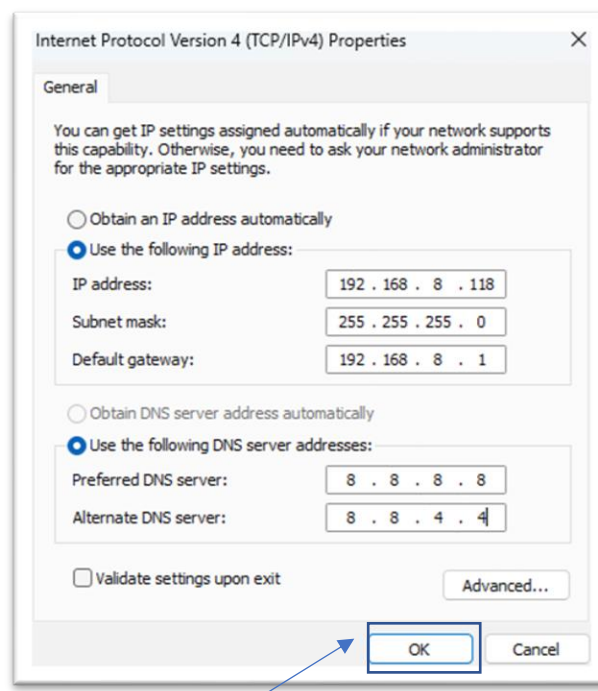
- Manual DNS Configuration:
 - Preferred DNS server: Enter the preferred DNS server 8.8.8.8
 - Alternate DNS server: Enter the alternate DNS server 8.8.4.4



The screenshot shows the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box with the 'General' tab selected. The dialog box contains instructions on how to obtain IP settings. Under the 'Use the following IP address:' section, the IP address is set to 192.168.8.118, the subnet mask is 255.255.255.0, and the default gateway is 192.168.8.1. Under the 'Use the following DNS server addresses:' section, the preferred DNS server is 8.8.8.8 and the alternate DNS server is 8.8.4.4. There is a checkbox for 'Validate settings upon exit' and an 'Advanced...' button. At the bottom are 'OK' and 'Cancel' buttons.

6. Verify Settings

- Check for Errors:
 - Double-check all the inputs to ensure accuracy.
- Apply Settings:
 - Click OK to save your settings, then click Close on the adapter's Properties window.



This screenshot is identical to the one above, showing the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box with the 'General' tab. However, a blue arrow points to the 'OK' button at the bottom right of the dialog box, indicating the next step in the process.

7. Test Network Connection

- Reboot the Adapter (Optional):
 - Right-click on the network adapter and select Disable. After a few seconds, right-click and choose Enable.
- Test Connectivity:
 - Open Command Prompt (Windows + R, type cmd, press Enter).
 - Run: ping 192.168.1.1
 - If the ping is successful, the connection is working.

```
Microsoft Windows [Version 10.0.22631.3737]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nayan>ping 192.168.8.1

Pinging 192.168.8.1 with 32 bytes of data:
Reply from 192.168.8.1: bytes=32 time<1ms TTL=64
Reply from 192.168.8.1: bytes=32 time<1ms TTL=64
Reply from 192.168.8.1: bytes=32 time<1ms TTL=64
Reply from 192.168.8.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.8.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\nayan>
```

- Again, type ipconfig to check that the new IP has been assigned

```
Command Prompt

Reply from 192.168.8.1: bytes=32 time<1ms TTL=64
Reply from 192.168.8.1: bytes=32 time<1ms TTL=64
Reply from 192.168.8.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.8.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\nayan>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : DLink
    IPv6 Address. . . . . : fd01::ff35:b189:5b55:ff11
    Temporary IPv6 Address. . . . . : fd01::b0fc:28d7:12f9:4348
    Link-local IPv6 Address . . . . . : fe80::4695:9c31:8d55:bbf9%1
    0
    IPv4 Address. . . . . : 192.168.8.118
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::5ad5:6eff:feed:e446%1
    0
                                192.168.8.1

Wireless LAN adapter Wi-Fi:
```

Conclusion:

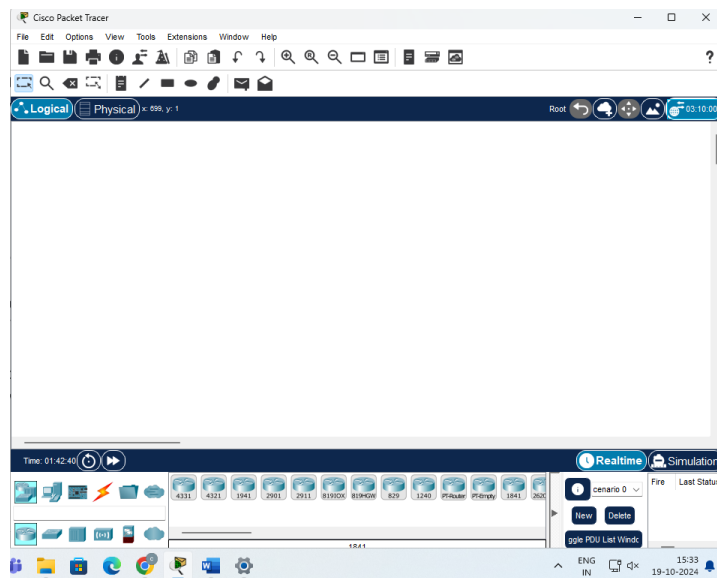
We have successfully configured static IP address on a windows computer

Question 3: Set up a basic home network using a router. Describe how to connect multiple devices and ensure they can communicate with each other.

Solution:

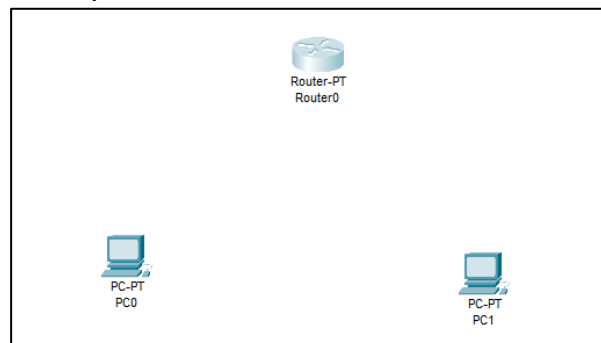
Step 1: Open Cisco Packet Tracer

- Launch the **Cisco Packet Tracer** application on the computer.
- We can see a blank workspace where we can build our network.

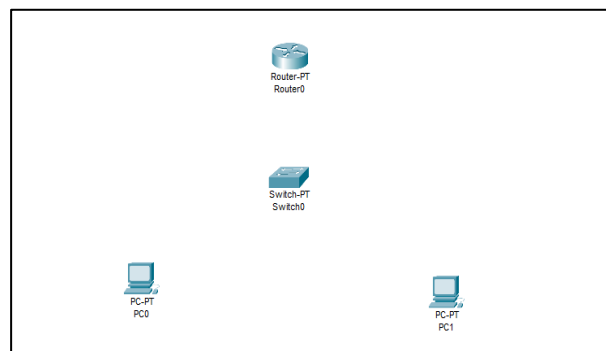


Step 2: Add Devices to the Workspace

- **Router:** From the device list at the bottom, select a **Router**. Drag and drop it onto the workspace.
 - let's choose a basic router like the **PT- Router**.
- **PCs (End Devices):** Select **End Devices** from the bottom toolbar and drag **PCs** onto the workspace. Add at least two **PCs**.

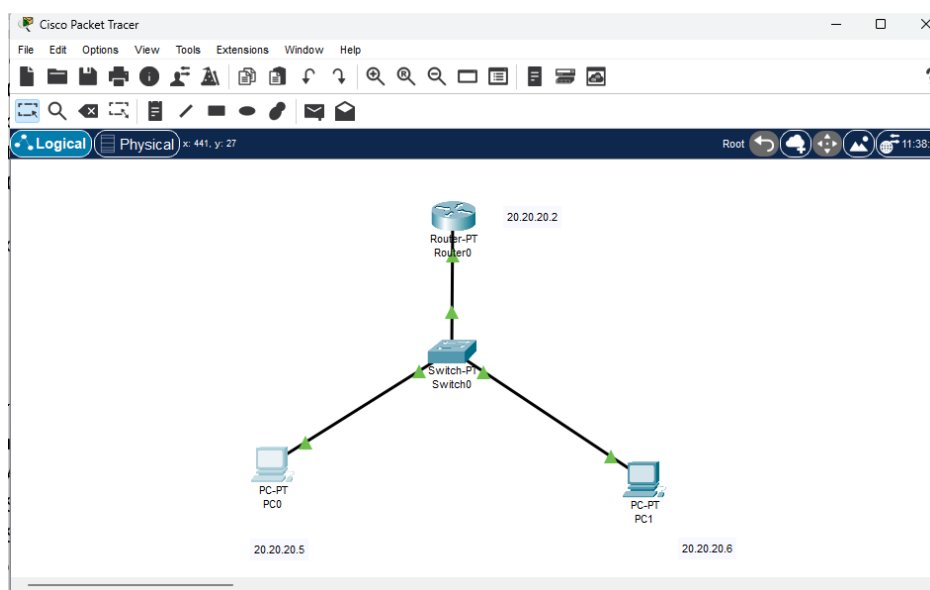


- **Switch (optional):** If we plan to connect multiple devices, you can add a **Switch** between the router and the devices to distribute the connections.



Step 3: Connect the Devices Using Cables

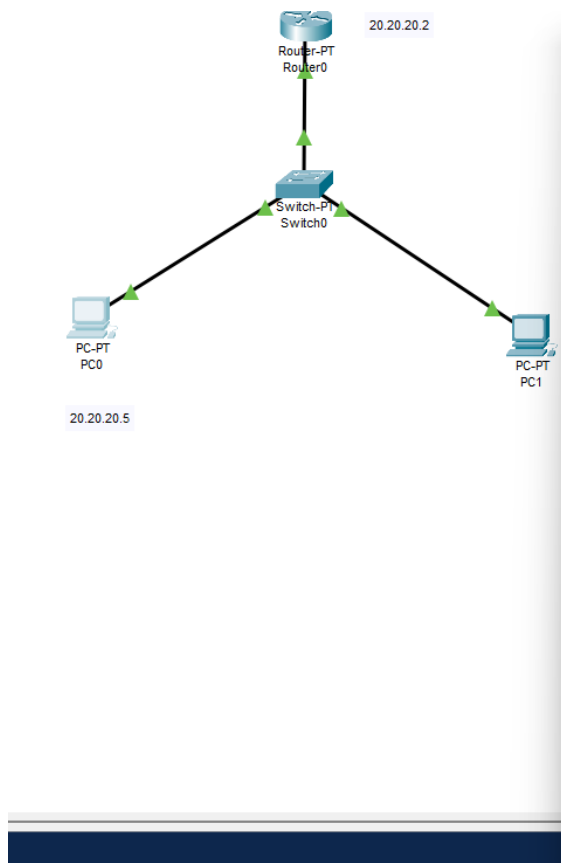
- To connect the devices, click the **Lightning Bolt** icon from the bottom toolbar to select the appropriate cables.
 - **Connect Router to Switch:** Use a **copper straight-through cable**. Click on the router, choose the **FastEthernet** port (e.g., **FastEthernet 0/0**), then click on the switch and select a port (e.g., **FastEthernet 0/1**).
 - **Connect Switch to PCs:** Use a **copper straight-through cable** to connect each **PC** to the switch. Select the **FastEthernet 0** port on the PC and connect it to any available FastEthernet port on the switch.



Step 4: Assign IP Addresses to PCs

- Click on **PC0**, go to the **Desktop** tab, and select **IP Configuration**.
 - Assign an **IP address** to the PC0 (20.20.20.5).
 - Set the **Subnet Mask** to **255.0.0.0**.
 - Set the **Default Gateway** to the router's IP address (20.20.20.1).

Repeat this process for **PC1**, assigning it a different IP address (20.20.20.6), but using the same default gateway



PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 20.20.20.5

Subnet Mask: 255.0.0.0

Default Gateway: 20.20.20.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::290:CFF:FE64:7D3A

Default Gateway:

DNS Server:

802.1X

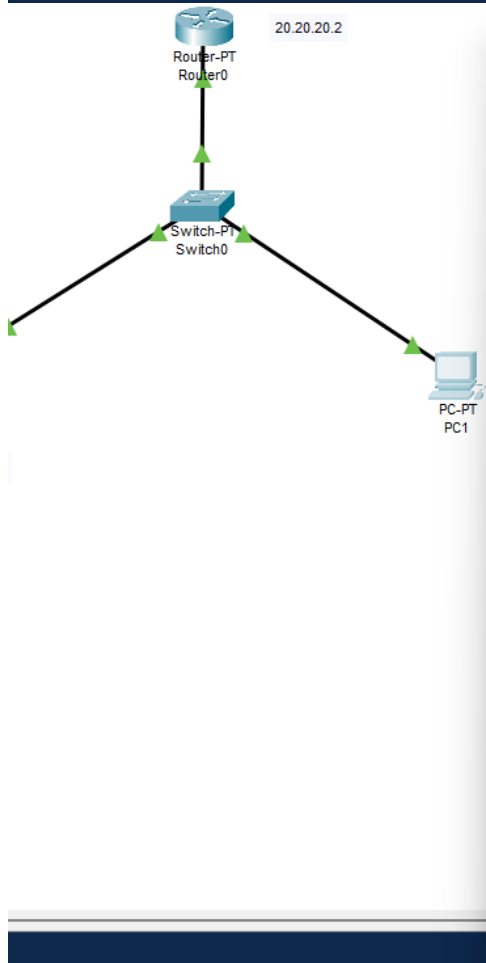
☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top



PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 20.20.20.6

Subnet Mask: 255.0.0.0

Default Gateway: 20.20.20.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2D0:BAFF:FE75:A43B

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

Step 5: Configure the Router

- Click on the **Router**, go to the Config and click on Fast Ethernet 0/0 and enter the IP address (**20.20.20.2**)

This sets the IP address for the router's interface that connects to the PCs.

The screenshot shows the configuration window for Router0. The 'Config' tab is selected, and the 'FastEthernet0/0' interface is chosen from the left-hand menu. The interface configuration is displayed on the right, showing the following settings:

- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 00E0.8FE3.B652
- IP Configuration:
 - IPv4 Address: 20.20.20.2
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

Below the configuration window, the 'Equivalent IOS Commands' are listed:

```
Router(config)#interface FastEthernet1/0
Router(config-if)#shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to administratively down
ip address
% Incomplete command.
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 20.20.20.2 255.0.0.0
Router(config-if)#
```

At the bottom of the window, there is a 'Top' button and a system tray with icons for Windows, settings, network, and a clock showing 15:55 on 19-10-2024.

Step 6: Verify Connectivity

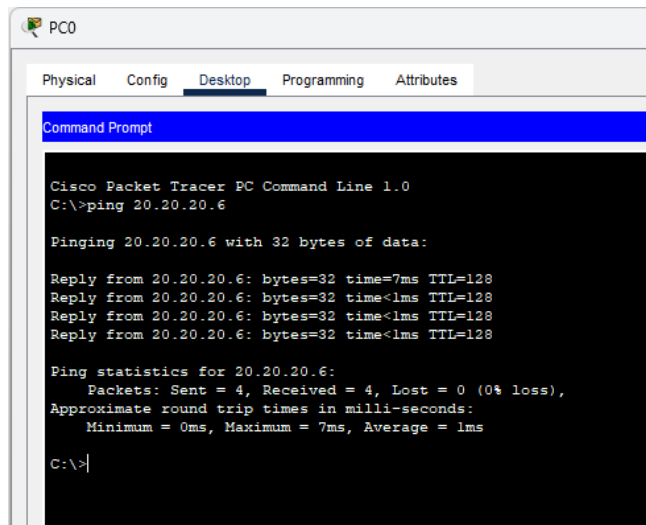
- To check if the devices can communicate, use the **ping** command from the PCs:
 - Go to **PC0**, open the **Command Prompt** from the Desktop tab.

2. Type the following command to ping the other PC:

ping 20.20.20.6

we should receive successful ping replies if the connection is established.

- Similarly, ping from **PC1** to **PC0** to ensure both devices can communicate.



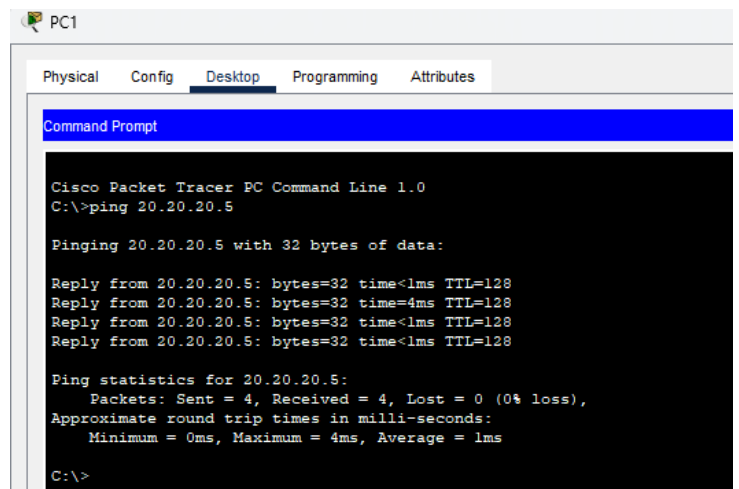
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.20.20.6

Pinging 20.20.20.6 with 32 bytes of data:

Reply from 20.20.20.6: bytes=32 time=7ms TTL=128
Reply from 20.20.20.6: bytes=32 time<1ms TTL=128
Reply from 20.20.20.6: bytes=32 time<1ms TTL=128
Reply from 20.20.20.6: bytes=32 time<1ms TTL=128

Ping statistics for 20.20.20.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 7ms, Average = 1ms

C:\>
```



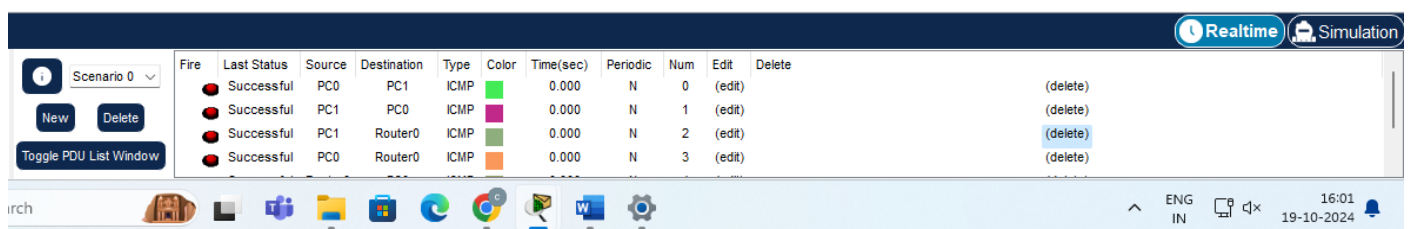
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 20.20.20.5

Pinging 20.20.20.5 with 32 bytes of data:

Reply from 20.20.20.5: bytes=32 time<1ms TTL=128
Reply from 20.20.20.5: bytes=32 time=4ms TTL=128
Reply from 20.20.20.5: bytes=32 time<1ms TTL=128
Reply from 20.20.20.5: bytes=32 time<1ms TTL=128

Ping statistics for 20.20.20.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>
```



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP	Green	0.000	N	0	(edit)	(delete)
	Successful	PC1	PC0	ICMP	Purple	0.000	N	1	(edit)	(delete)
	Successful	PC1	Router0	ICMP	Green	0.000	N	2	(edit)	(delete)
	Successful	PC0	Router0	ICMP	Orange	0.000	N	3	(edit)	(delete)

Step 7: Save the Network Configuration (Optional)

- If you want to save your network setup for future use:
 - Click on **File** in the top menu and select **Save As** to save your project.