



Lab Number: 07

Date: 2025/08/17

Title: Creating a LAN and testing the connectivity using Packet Tracer

Theory:

Network topology defines the arrangement of network devices and the communication paths between them. It outlines the physical or logical structure of a network. Understanding different topologies is crucial for designing network systems.

1. Different types of Network Topologies:

- i) Bus Topology
- ii) Ring Topology
- iii) Star Topology
- iv) Mesh Topology, etc.

i. Ring Topology

Ring topology is a network configuration where devices are connected in a circular manner, forming a closed loop. Each device is connected to exactly two other devices, creating a continuous pathway for data transmission.

Component Used

Hardware: Switches (4), Ethernet cables, End devices (4).

Software: Cisco Packet Tracer

Network Diagram

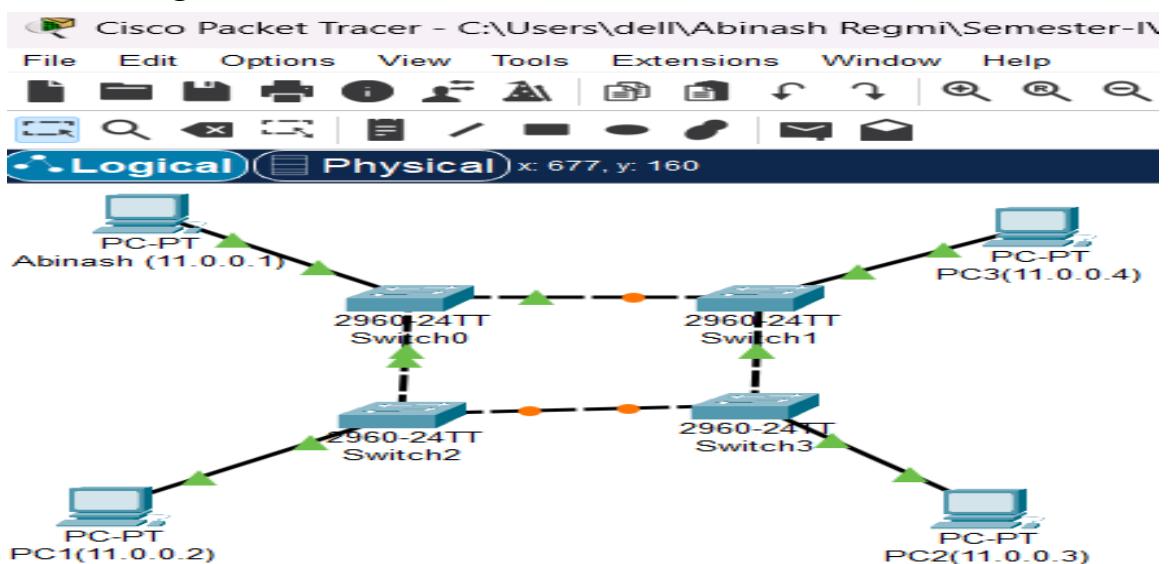


Fig: Network map for Ring Topology

Procedure

Here is the procedure for creating the Ring Topology shown in the image using Cisco Packet Tracer:

Step 1: Launch Cisco Packet Tracer

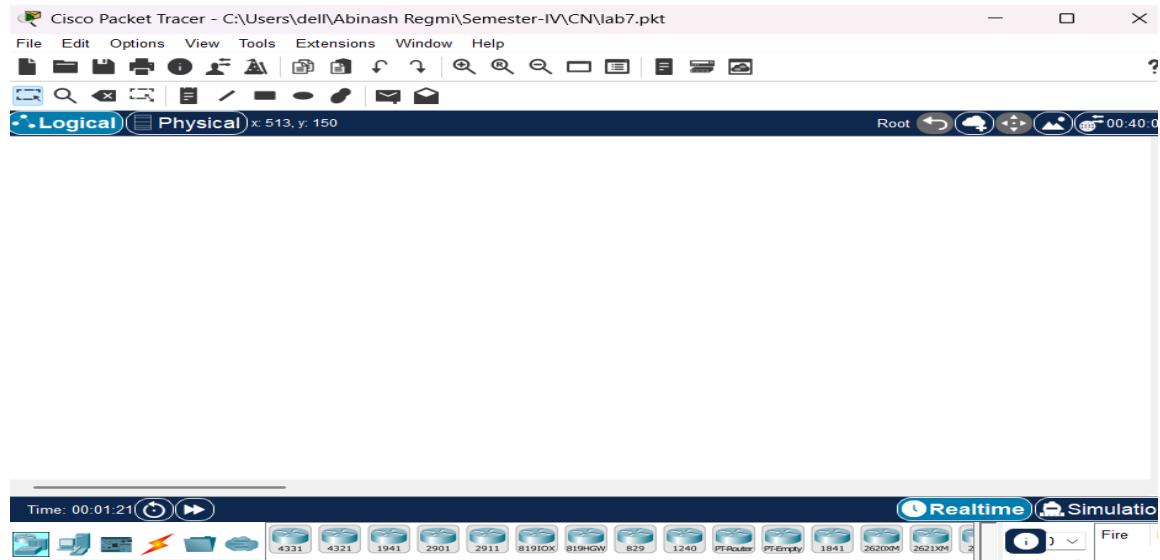


Fig: Workspace for network design

Step 2: Add the network devices to the workspace

- 2.1 From the Device-Type Selection box, choose the following devices and add them to the workspace:
- 2.2 Four 2690-24TT Switch
- 2.3 Four PCs (labeled Abinash, PC1, PC2, and PC3)

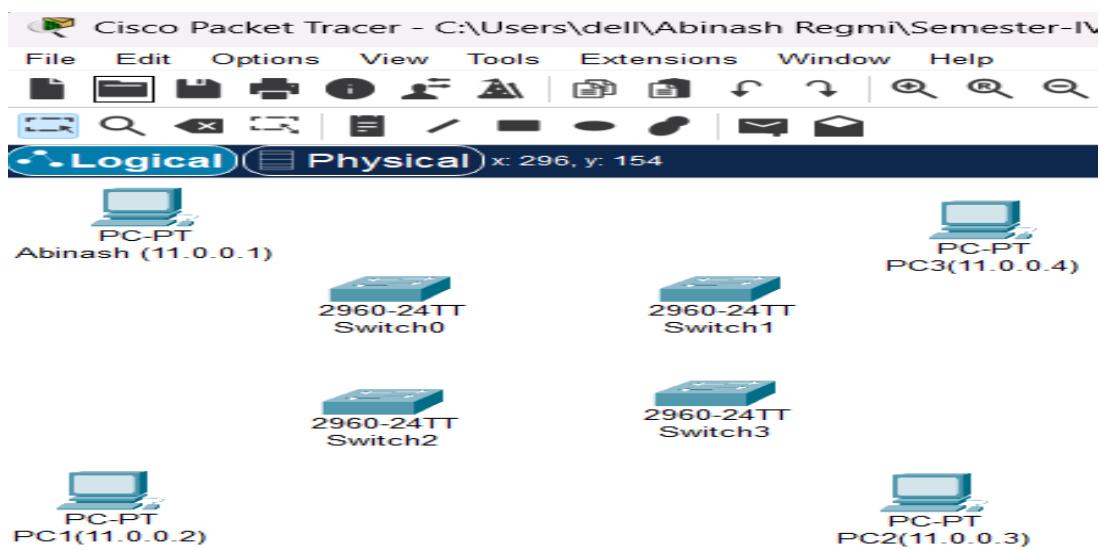


Fig: Switches and PC's for Ring Topology

Step 3: Connect the devices

- 3.1 Use the copper straight-through cable to connect each PC to one of the available ports on each switch and copper cross-over cable to connect between each switch.
- 3.2 Ensure that each connection is made properly.

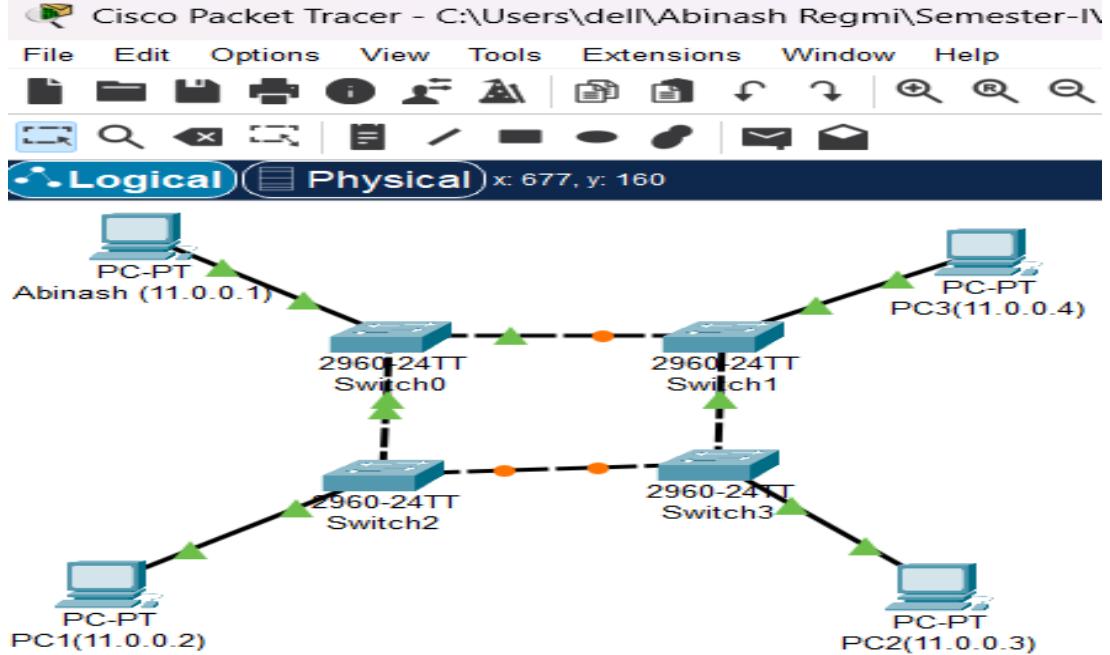


Fig: Connection between Switch and PC's

Step 4: Configure IP address

- 4.1 Right-click on each PC and select “IP Configuration”.
- 4.2 In the IP configuration window, enter the IP address as (11.0.0.1 to 11.0.0.4), subnet mask, and default gateway for each PC.

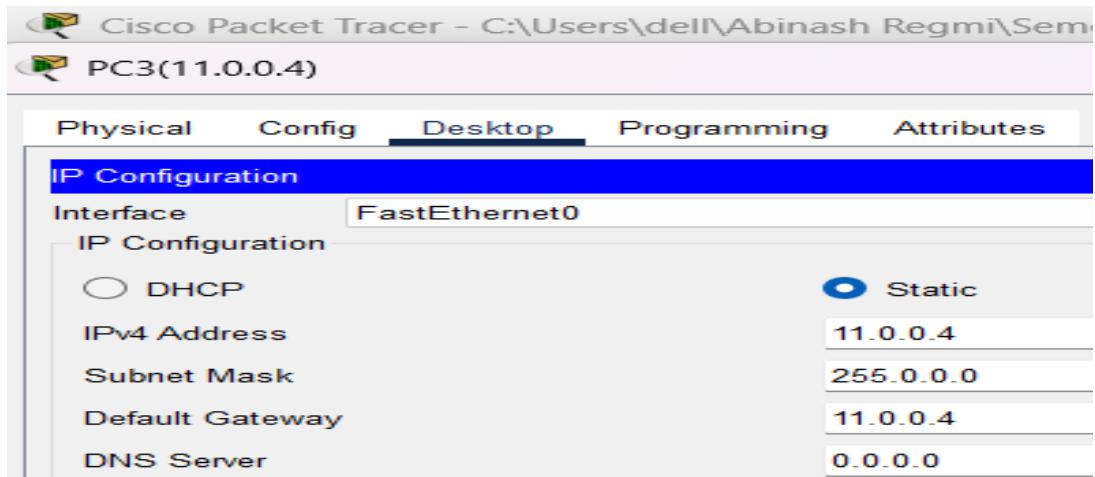
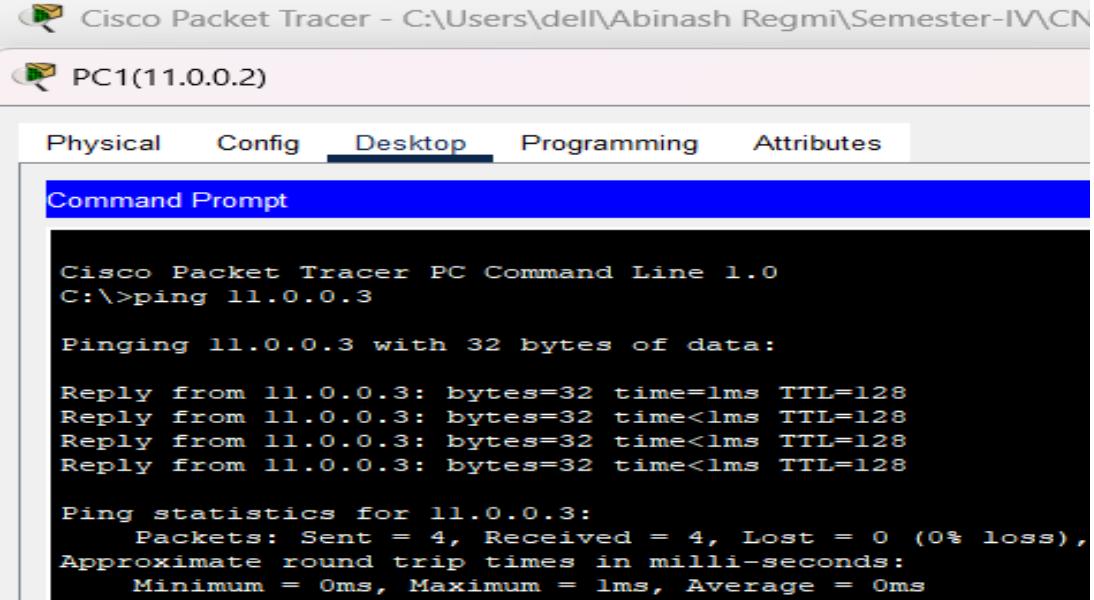


Fig: IP configuration

Step 5: Verify connectivity:

- 5.1 To test whether the network is working, you can ping other devices on the network from each PC.
- 5.2 To ping another device, open a command prompt on the PC and type “ping” <IP address of the other device>”.
- 5.3 If the ping is successful, you should see replies from the other device.



The screenshot shows the Cisco Packet Tracer interface. The title bar reads "Cisco Packet Tracer - C:\Users\dell\Abinash Regmi\Semester-IV\CN\". Below it, a node labeled "PC1(11.0.0.2)" is selected. The main window has tabs: Physical, Config, Desktop (which is selected), Programming, and Attributes. A blue header bar says "Command Prompt". The terminal window displays the following output:

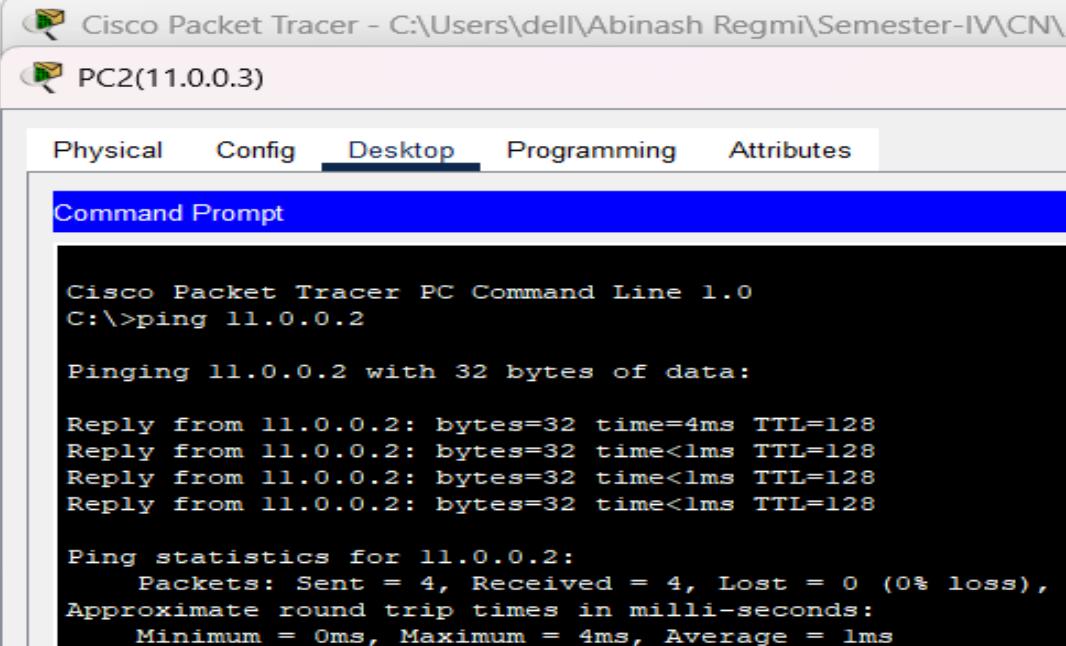
```
Cisco Packet Tracer PC Command Line 1.0
C:>ping 11.0.0.3

Pinging 11.0.0.3 with 32 bytes of data:

Reply from 11.0.0.3: bytes=32 time=1ms TTL=128
Reply from 11.0.0.3: bytes=32 time<1ms TTL=128
Reply from 11.0.0.3: bytes=32 time<1ms TTL=128
Reply from 11.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 11.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Fig: Connectivity test between PC1 and PC2



The screenshot shows the Cisco Packet Tracer interface. The title bar reads "Cisco Packet Tracer - C:\Users\dell\Abinash Regmi\Semester-IV\CN\". Below it, a node labeled "PC2(11.0.0.3)" is selected. The main window has tabs: Physical, Config, Desktop (which is selected), Programming, and Attributes. A blue header bar says "Command Prompt". The terminal window displays the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:>ping 11.0.0.2

Pinging 11.0.0.2 with 32 bytes of data:

Reply from 11.0.0.2: bytes=32 time=4ms TTL=128
Reply from 11.0.0.2: bytes=32 time<1ms TTL=128
Reply from 11.0.0.2: bytes=32 time<1ms TTL=128
Reply from 11.0.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 11.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms
```

Fig: Connectivity test between PC2 and PC1

ii. Star Topology

Star Topology is a network configuration where all devices are connected to a central hub or switch. This central device acts as a communication hub for all connected devices.

Components Used

Hardware: Switches (1), Ethernet cables, End devices (5).

Software: Cisco Packet Tracer

Network Diagram

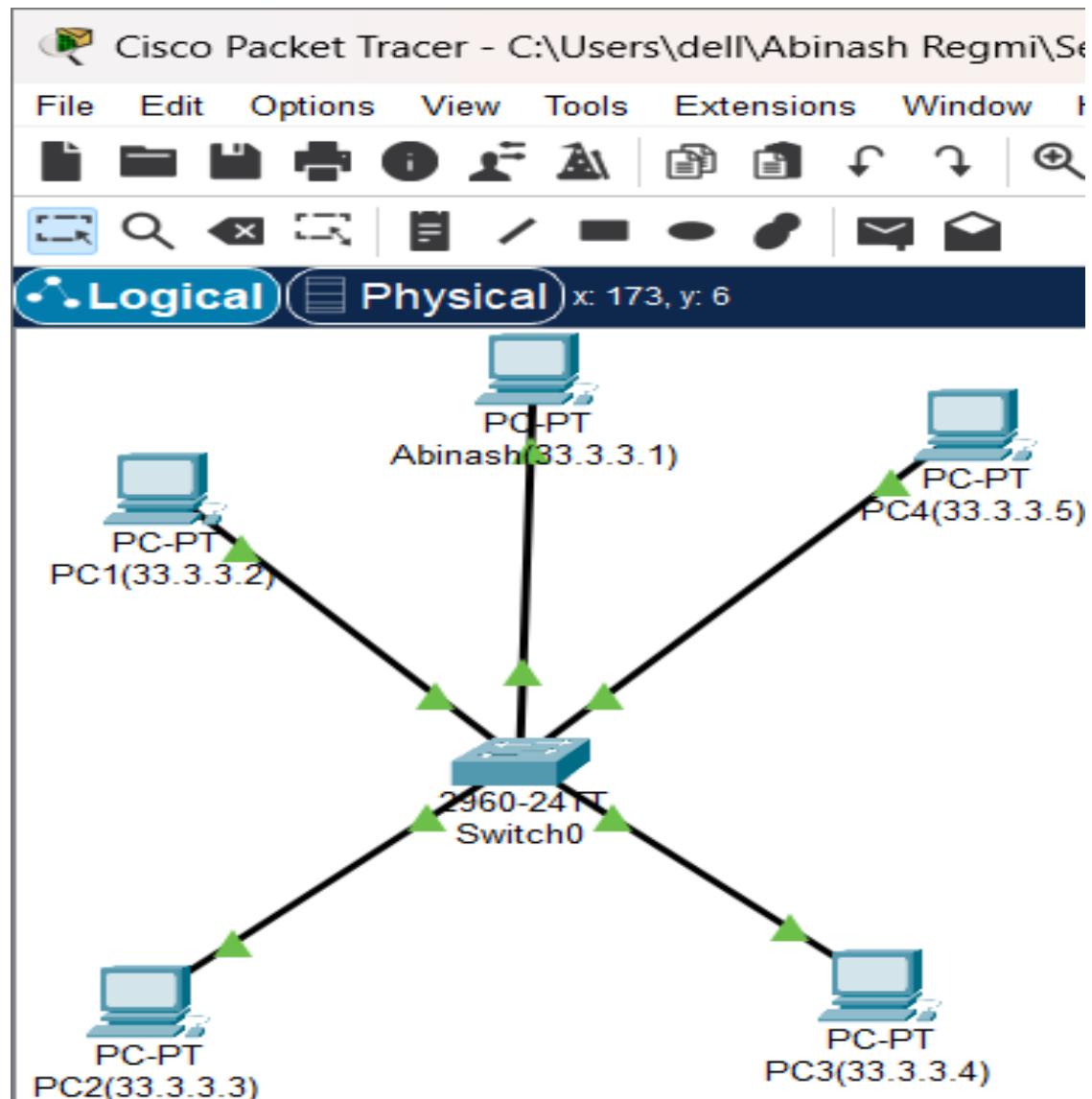


Fig: Network Map for Star Topology

Procedure

Here is the procedure for creating the Star Topology shown in the image using Cisco Packet Tracer:

Step 1: Launch Cisco Packet Tracer

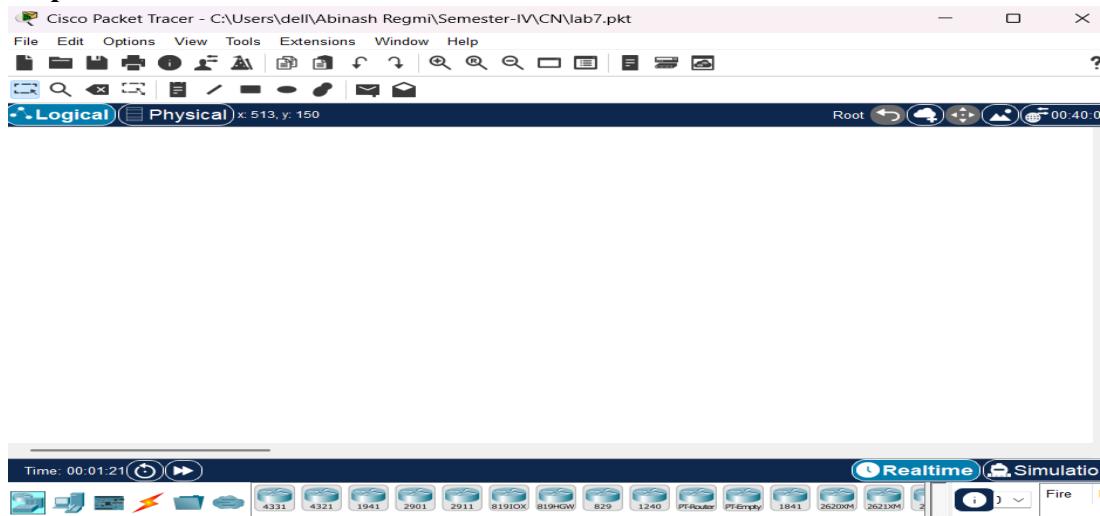


fig: Workspace for network design

Step 2: Add the network devices to the workspace

- 2.1 From the Device-Type Selection box, choose the following devices and add them to the workspace:
- 2.2 One 2690-24TT Switch
- 2.3 Five PC's (labeled Abinash, PC1, PC2, PC3 and PC4)

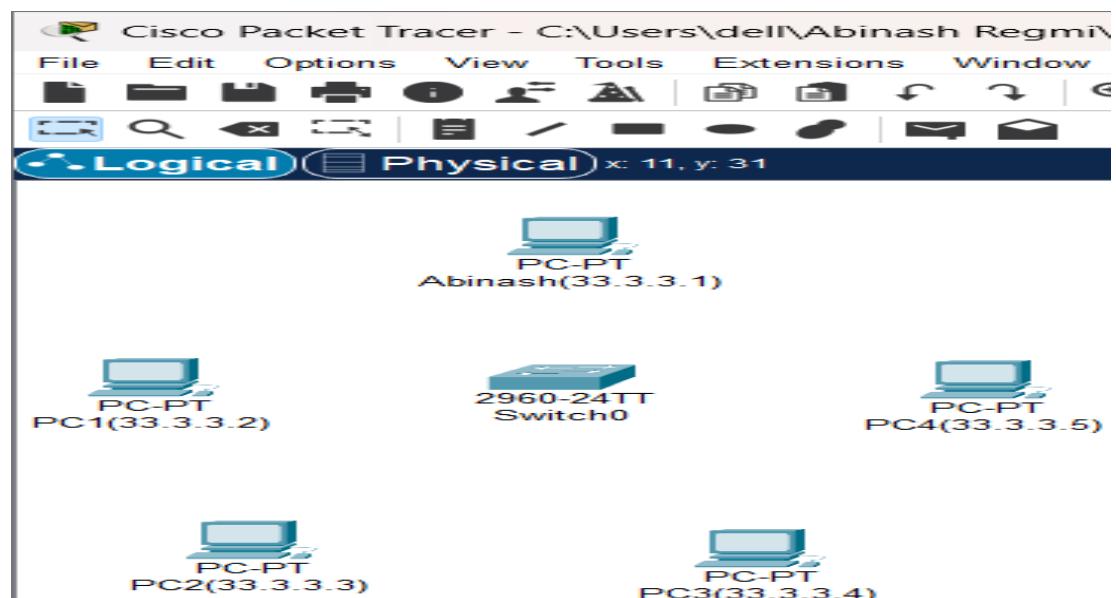


Fig: Switches and PCs for Star Topology

Step 3: Connect the devices

- 3.1 Use the copper straight-through cable to connect each PC to one of the available ports on the switch
- 3.2 Ensure that each connection is made properly.

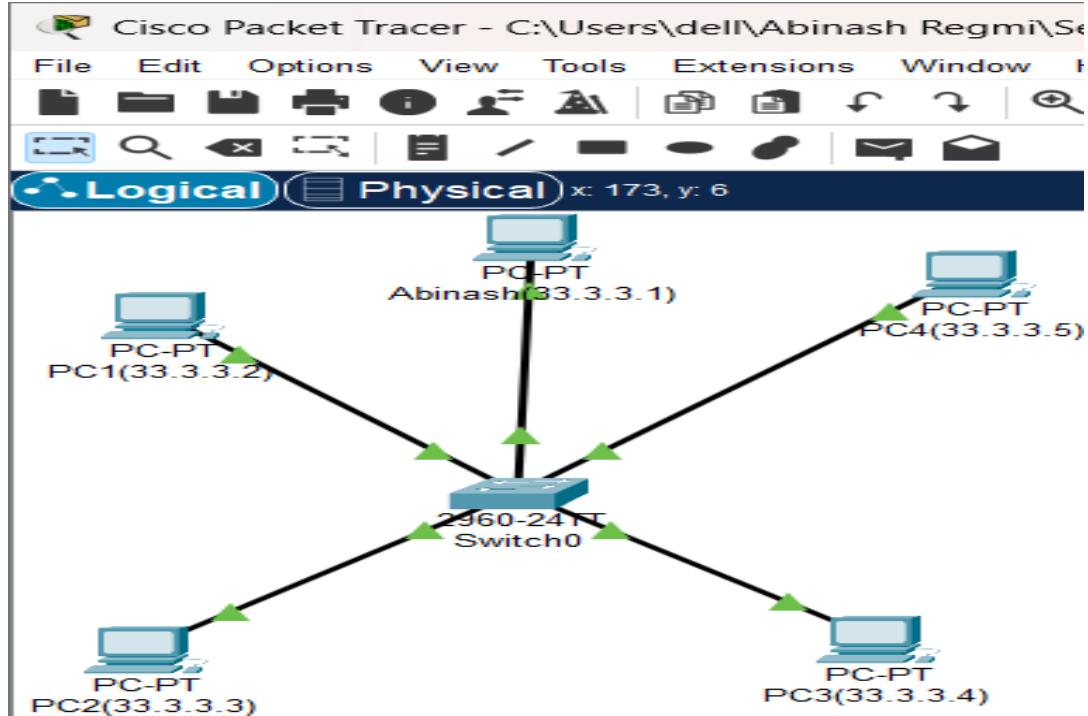


Fig: Connection between Switch and PC's

Step 4: Configure IP addresses

- 4.1 Right-click on each PC and select “IP Configuration”.
- 4.2 In the IP Configuration window, enter the IP address as (33.3.3.1 to 33.3.3.5), subnet mask, and default gateway for each PC.

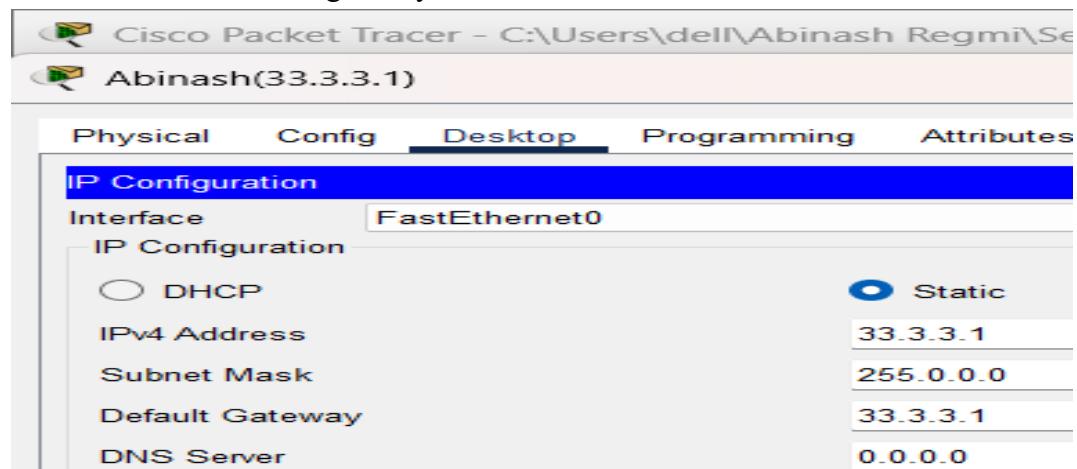


Fig: IP configuration

Step 5: Verify connectivity:

5.1 To test whether the network is working, you can ping other devices on the network from each PC.

5.2 To ping another device, open a command prompt on the PC and type “ping” <IP address of the other device>”.

5.3 If the ping is successful, you should see replies from the other device.

The screenshot shows the Cisco Packet Tracer interface. At the top, there are two nodes: 'Abinash(33.3.3.1)' and 'PC2(33.3.3.3)'. Below them is a toolbar with tabs: Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is selected. A window titled 'Command Prompt' is open, showing the output of a ping command. The text in the window is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 33.3.3.3

Pinging 33.3.3.3 with 32 bytes of data:

Reply from 33.3.3.3: bytes=32 time<1ms TTL=128

Ping statistics for 33.3.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Fig: Connectivity test between Abinash and PC2

The screenshot shows the Cisco Packet Tracer interface. At the top, there are two nodes: 'PC2(33.3.3.3)' and 'Abinash(33.3.3.1)'. Below them is a toolbar with tabs: Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is selected. A window titled 'Command Prompt' is open, showing the output of a ping command. The text in the window is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 33.3.3.1

Pinging 33.3.3.1 with 32 bytes of data:

Reply from 33.3.3.1: bytes=32 time<1ms TTL=128
Reply from 33.3.3.1: bytes=32 time<1ms TTL=128
Reply from 33.3.3.1: bytes=32 time<1ms TTL=128
Reply from 33.3.3.1: bytes=32 time=6ms TTL=128

Ping statistics for 33.3.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms
```

Fig: Connectivity test between PC2 and Abinash

iii. Mesh Topology

Mesh topology is a network configuration where every device is connected to every other device. This creates a highly interconnected network with multiple paths for data transmission.

Component Used

Hardware: Switches (4), Ethernet cables, End devices (4).

Software: Cisco Packet Tracer

Network Diagram

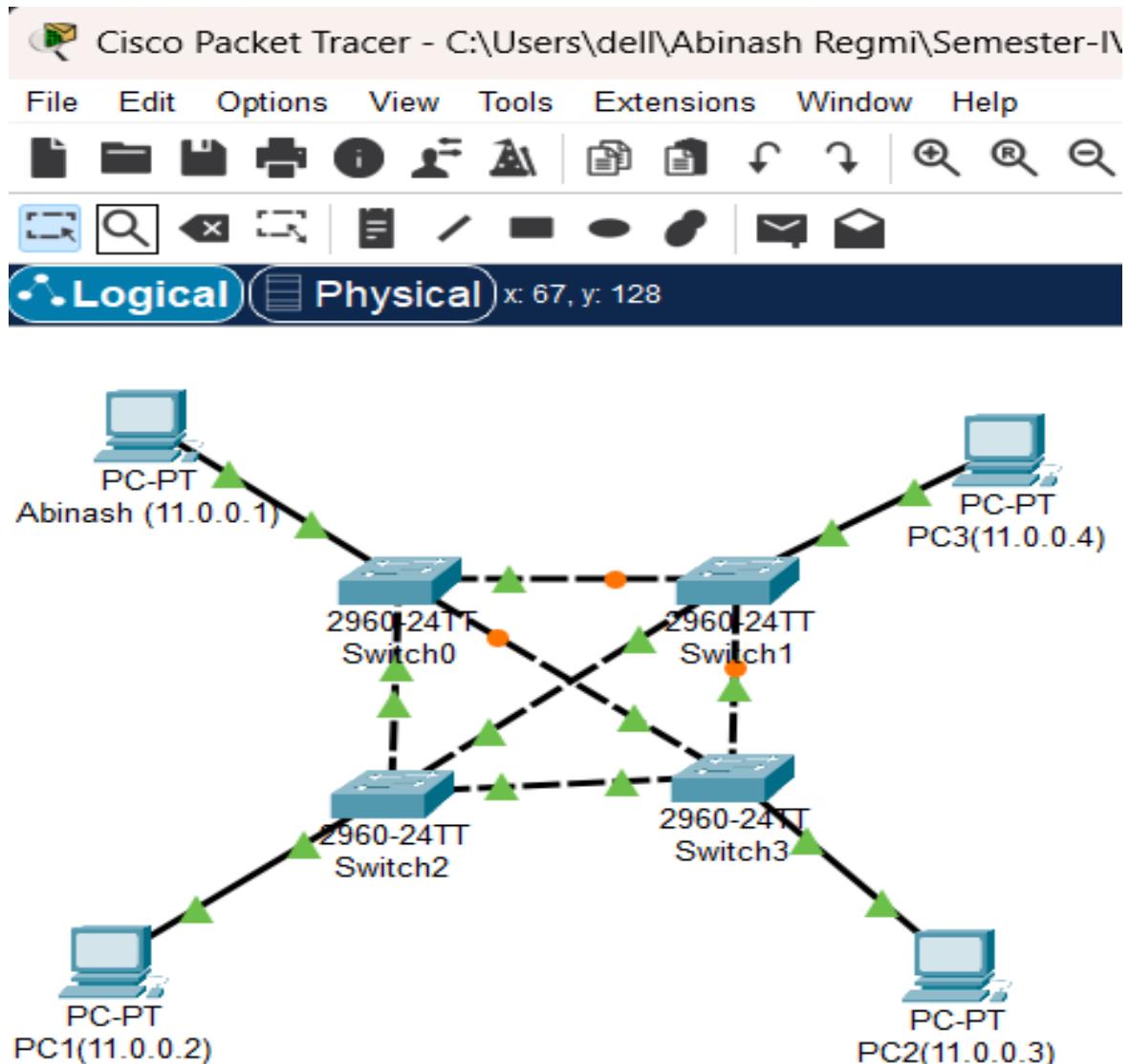


Fig: Network Map for Mesh Topology

Procedure

Here is the procedure for creating the Mesh Topology shown in the image using Cisco Packet Tracer.

Step 1: Launch Cisco Packet Tracer

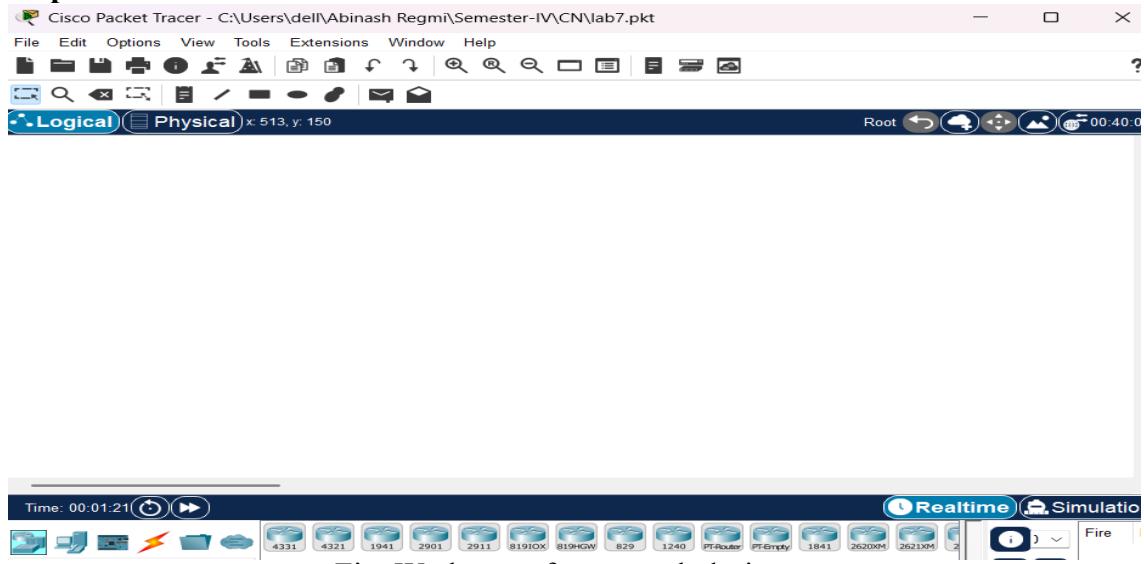


Fig: Workspace for network design

Step 2: Add the network devices to the workspace

- 2.1 From the Device-Type Selection box, choose the following devices and add them to the workspace:
- 2.2 Four 2690-24TT Switch
- 2.3 Four PCs (labeled Abinash, PC1, PC2, and PC4)

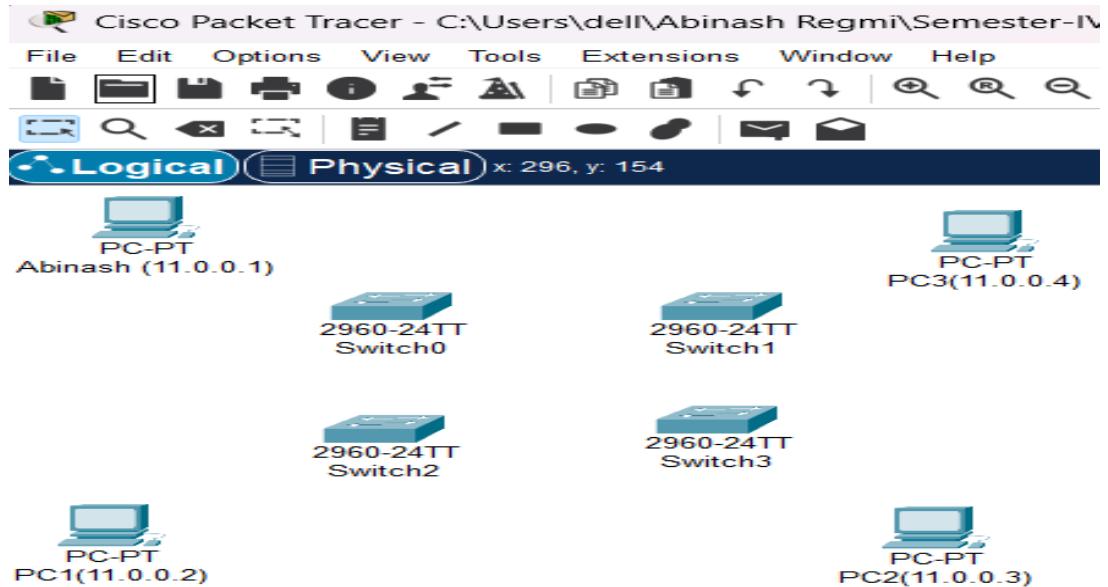


Fig: Switches and PCs for Mesh Topology

Step 3: Connect the devices

3.1 Use the copper straight-through cable to connect each PC to one of the available ports on each switch and copper cross-over cable to connect between each adjacent and diagonal switches.

3.2 Ensure that each connection is made properly.

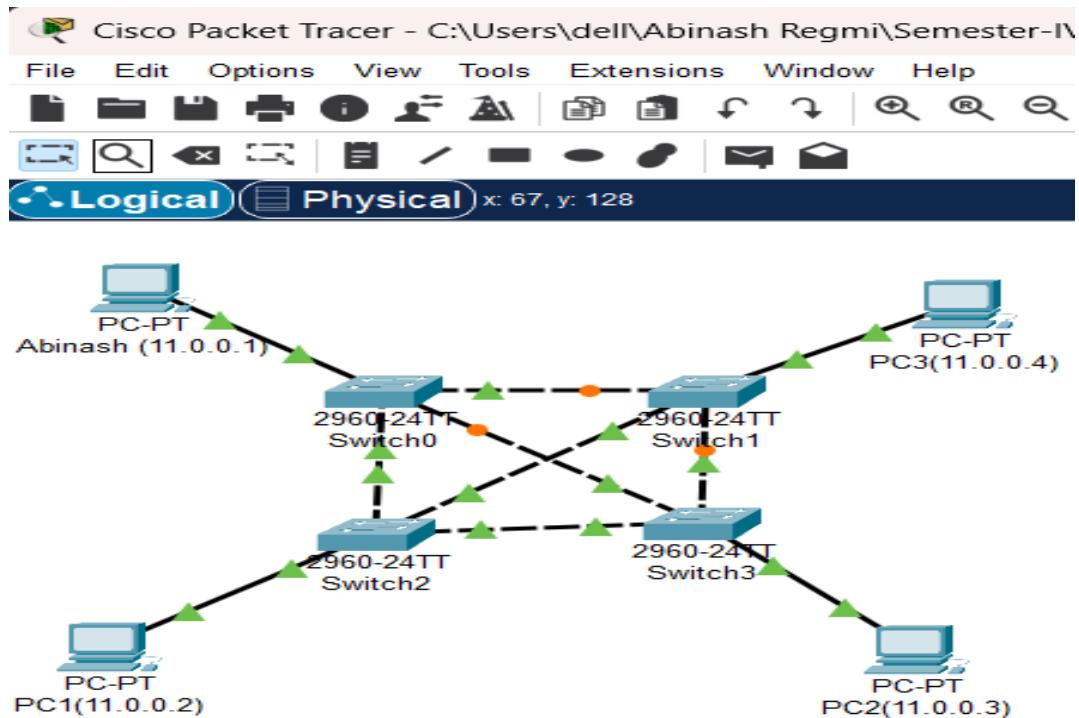


Fig: Connection between Switch and PC's

Step 4: Configure IP addresses

4.1 Right-click on each PC and select “IP Configuration”.

4.2 In the IP Configuration window, enter the IP address as (11.0.0.1 to 11.0.0.4), subnet mask, and default gateway for each PC.

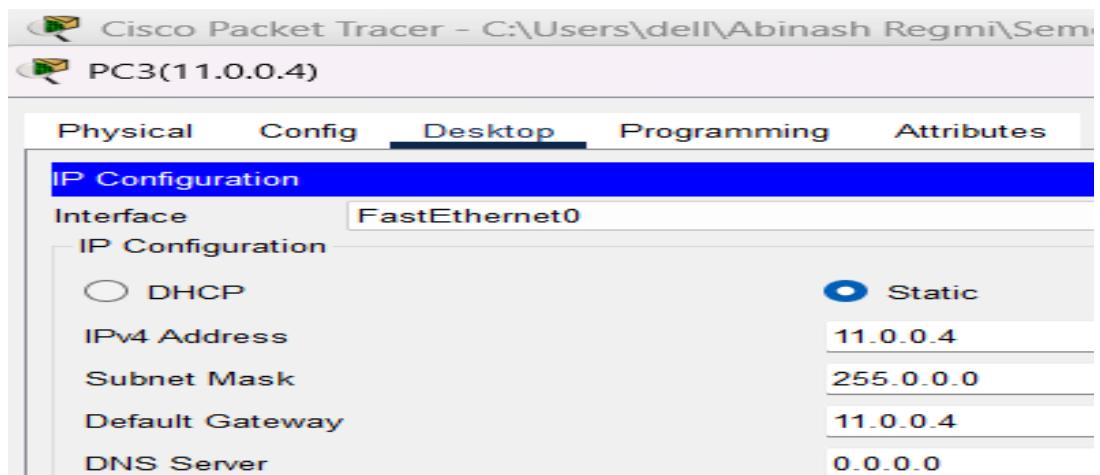


Fig: IP configuration

Step 5: Verify connectivity:

5.1 To test whether the network is working, you can ping other devices on the network from each PC.

5.2 To ping another device, open a command prompt on the PC and type “ping <IP address of the other device>”.

5.2 If the ping is successful, you should see replies from the other device.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 11.0.0.3

Pinging 11.0.0.3 with 32 bytes of data:

Reply from 11.0.0.3: bytes=32 time<1ms TTL=128
Reply from 11.0.0.3: bytes=32 time<1ms TTL=128
Reply from 11.0.0.3: bytes=32 time<1ms TTL=128
Reply from 11.0.0.3: bytes=32 time=1ms TTL=128

Ping statistics for 11.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Fig: Connectivity test between Abinash and PC2

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 11.0.0.1

Pinging 11.0.0.1 with 32 bytes of data:

Reply from 11.0.0.1: bytes=32 time=8ms TTL=128
Reply from 11.0.0.1: bytes=32 time<1ms TTL=128
Reply from 11.0.0.1: bytes=32 time<1ms TTL=128
Reply from 11.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 11.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 8ms, Average = 2ms
```

Fig: Connectivity test between PC2 and Abinash

Conclusion

Creating different topologies in Cisco Packet Tracer provides a hands-on understanding of how devices within a network topology are interconnected and how they communicate with each other. Through this process, we can simulate the design and configuration of different topologies, including the placement and connection of key components such as switches, and end devices. Testing the connectivity within the simulated environment allows to ensure that the network is properly configured, with data flowing smoothly between devices.