

Lab 6: Creating network topologies using Packet Tracer

Theory

a. Different Topologies

- **Ring Topology:** Devices are connected in a circular fashion, with each device having exactly two neighbors. Data travels in one direction around the ring, passing through each device until it reaches its destination.
- **Star Topology:** All devices are connected to a central hub or switch. Data is sent to the central device, which then forwards it to the intended recipient. This topology is easy to manage and scale but relies heavily on the central hub.
- **Mesh Topology:** Every device is connected to every other device in the network. This topology provides high redundancy and reliability, as multiple paths exist for data to travel between devices.

b. Component Used

- **Hardware:**
 - **Switch (2960 IOS15):** Used for connecting devices and managing data flow.

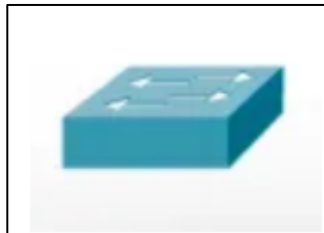


Fig: Switch (2960 IOS15)

- **End Devices (PC-PT):** Computers or servers that interact over the network.



Fig: PC-PT

- **Ethernet Cables (Copper straight through):** Used to connect devices to the switch.

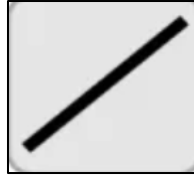


Fig: (Copper straight through)

- **Software:**

- **Cisco Packet Tracer:** A simulation tool for designing and testing network topologies.

c. Network Diagram of Topologies

- **Ring Topology**

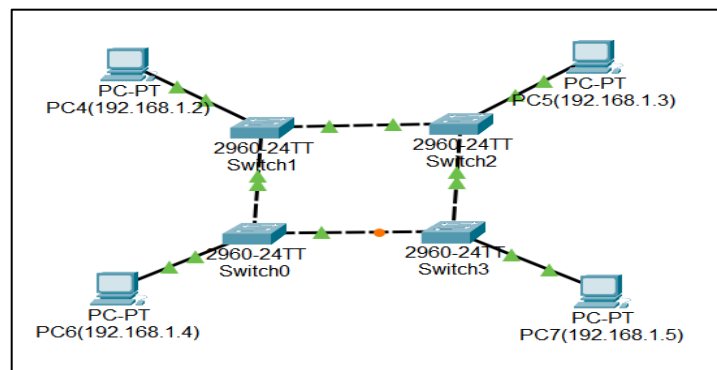


Fig: Ring topology

- **Star Topology:** Display devices connected to a central hub or switch.

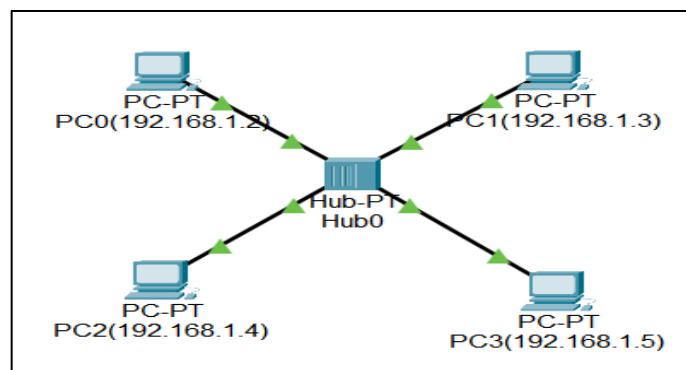


Fig: Star Topology

- **Mesh Topology:** Illustrate a fully interconnected network with multiple connections between devices.

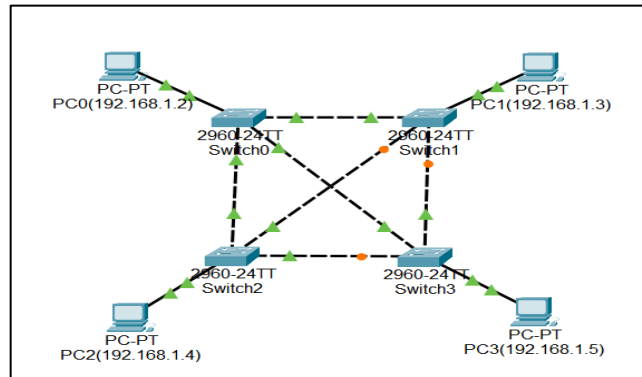


Fig: Mesh Topology

Implementation Sequence

Ring Topology:

Steps to create a ring topology are mentioned below:

Step 1: Select network devices that is four switches and four PCs from device-type selection panel and drop it on workspace.

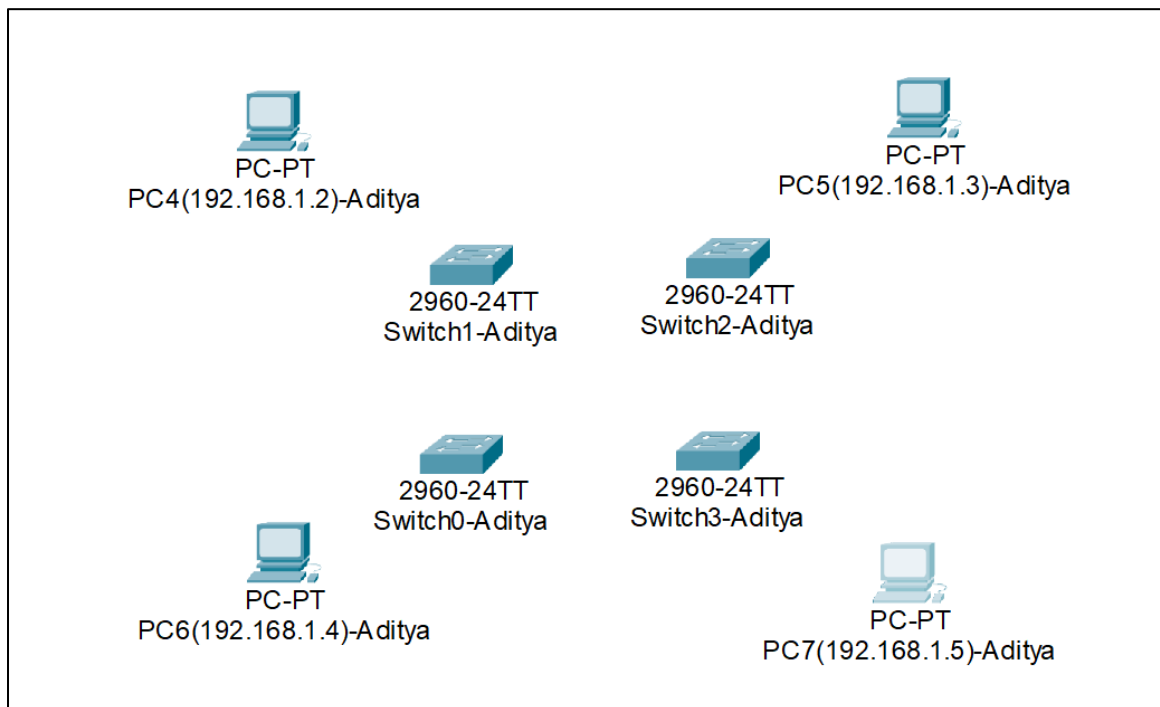


Fig: Selection of required devices for ring topology

Step 2: Now, using the copper straight-through cable connect each PC to one the available port the switch.

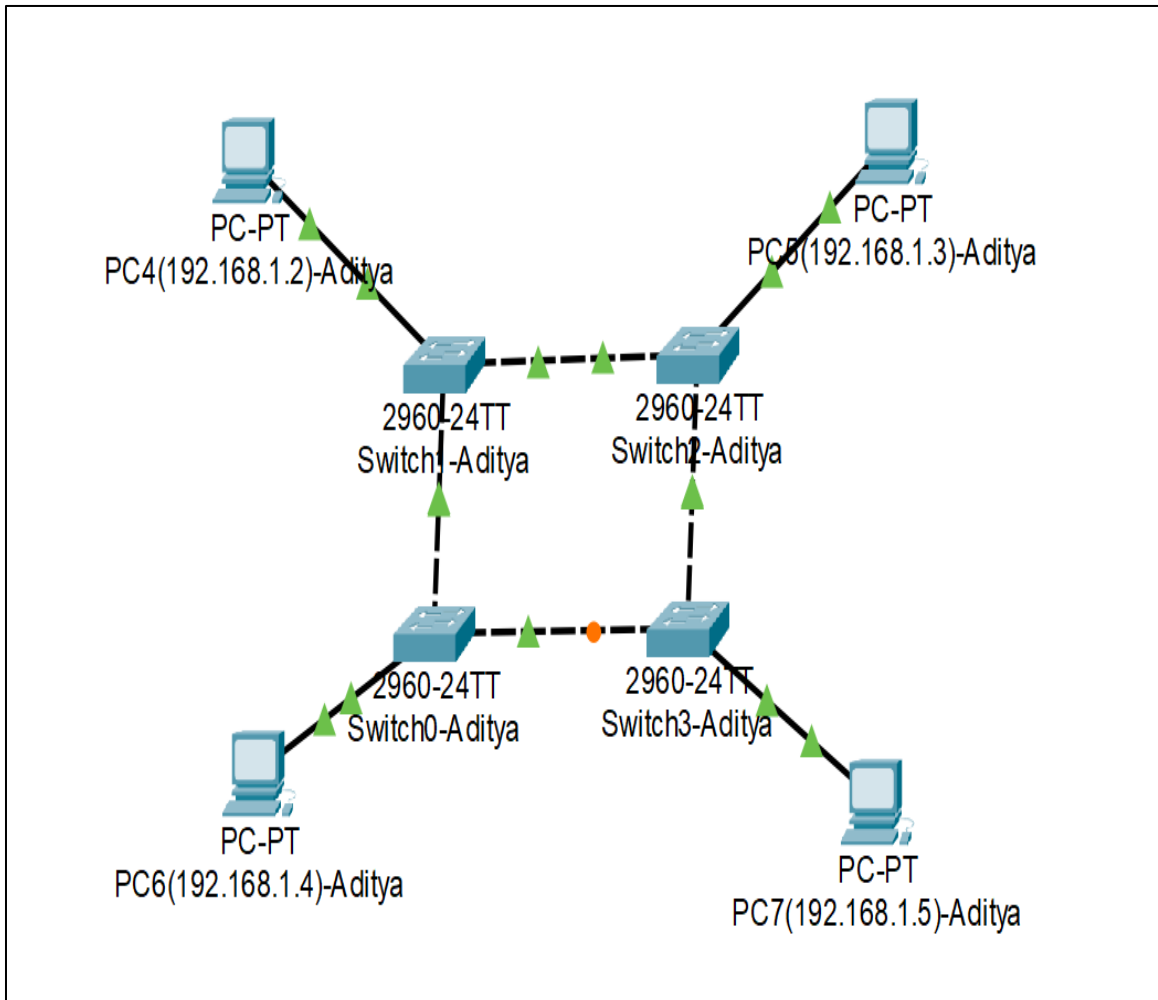


Fig: Connection between PCs' and switches

Step 3: Now assign unique IP address to each device as follows:

PC4: 192.168.1.2

PC5: 192.168.1.3

PC6: 192.168.1.4

PC7: 192.168.1.5

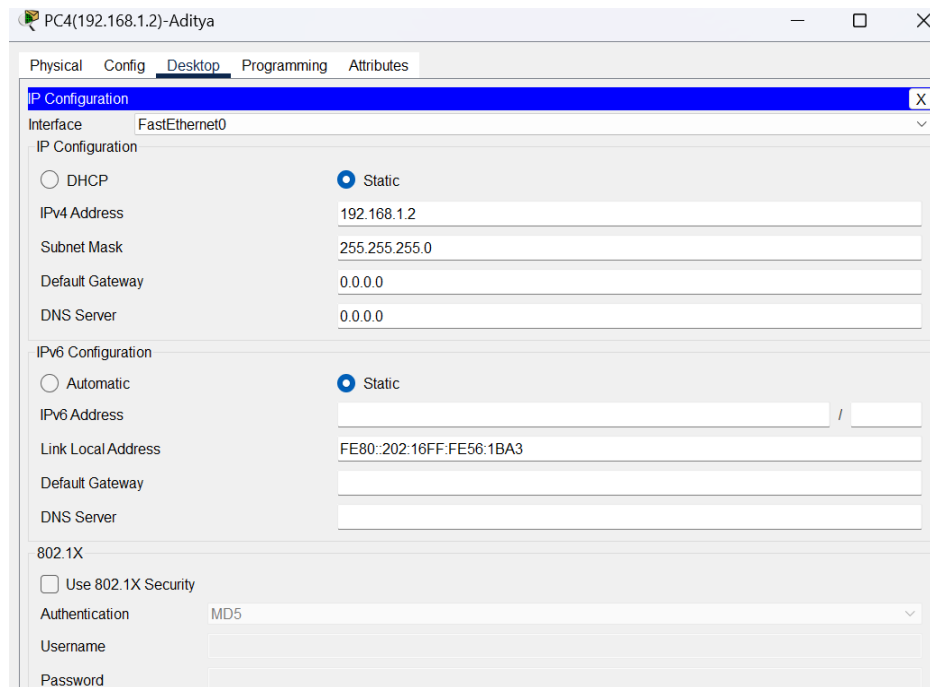


Fig: IP configuration

Step 4: Ping each device from every node on the network to check connectivity. If replies are received, the connection is successfully established between the PCs.

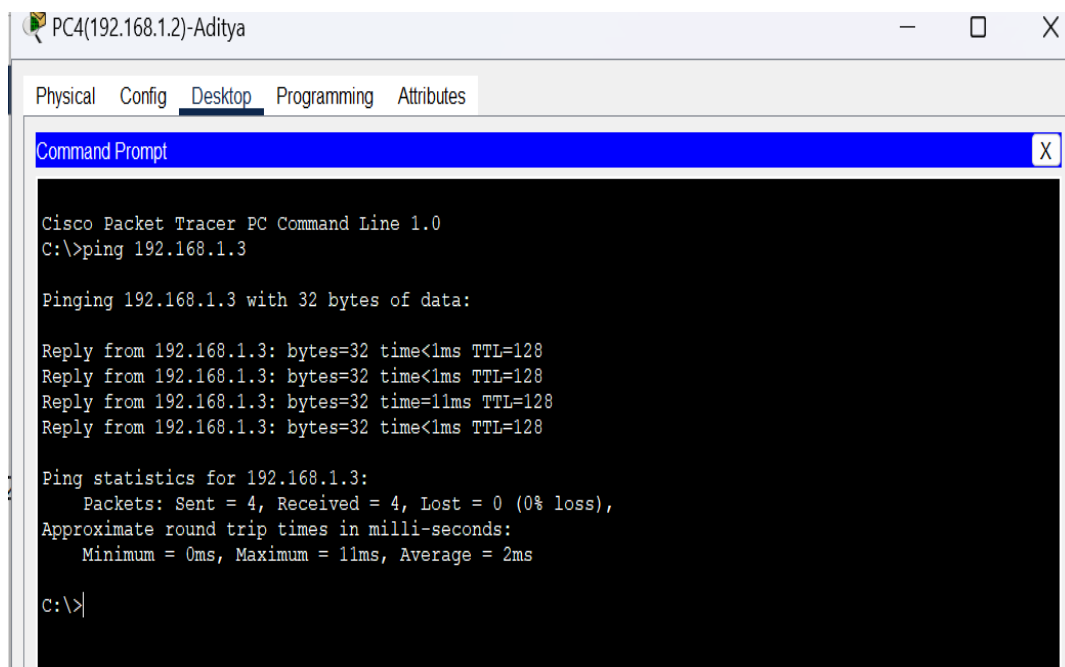


Fig: Testing connection between PC4 and PC5

Star Topology:

Steps to create a star topology are mentioned below:

Step 1: Select network devices that is one hub and four PCs from device-type selection panel and drop it on workspace.

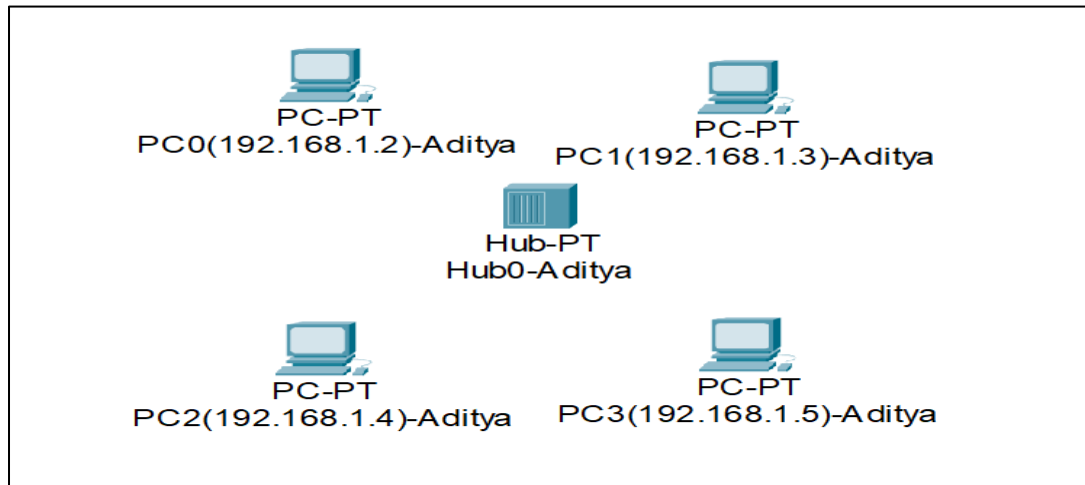


Fig: Selection of required devices for star topology

Step 2: Now, using the copper straight-through cable connect each PC to one of the available port of the hub.

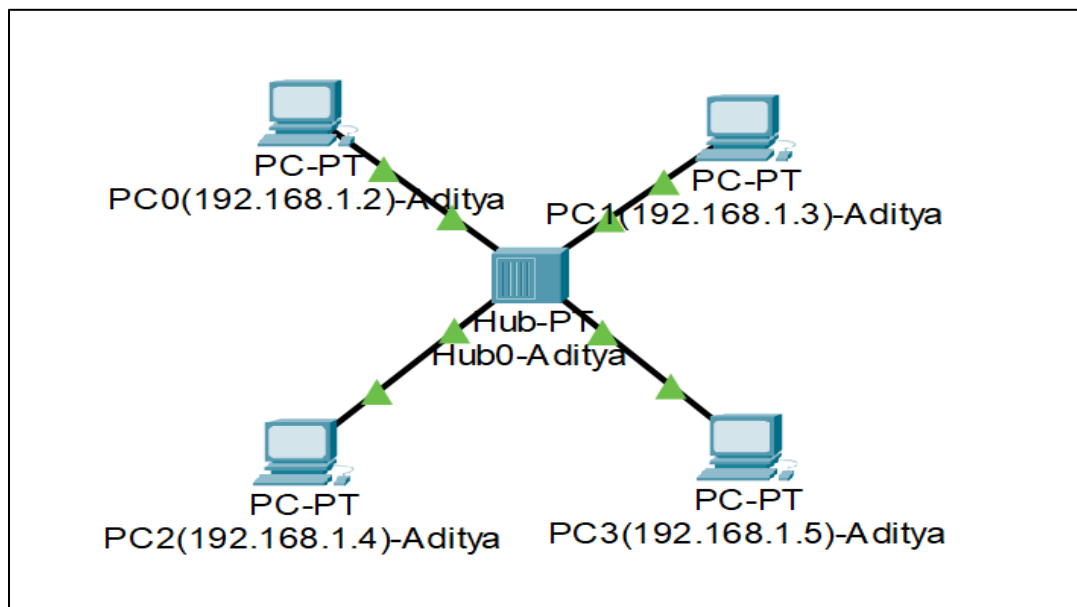


Fig: Connection between PC's and switch

Step 3: Now assign unique IP address to each device as follows:

PC0: 192.168.1.2

PC1: 192.168.1.3

PC2: 192.168.1.4

PC3: 192.168.1.5

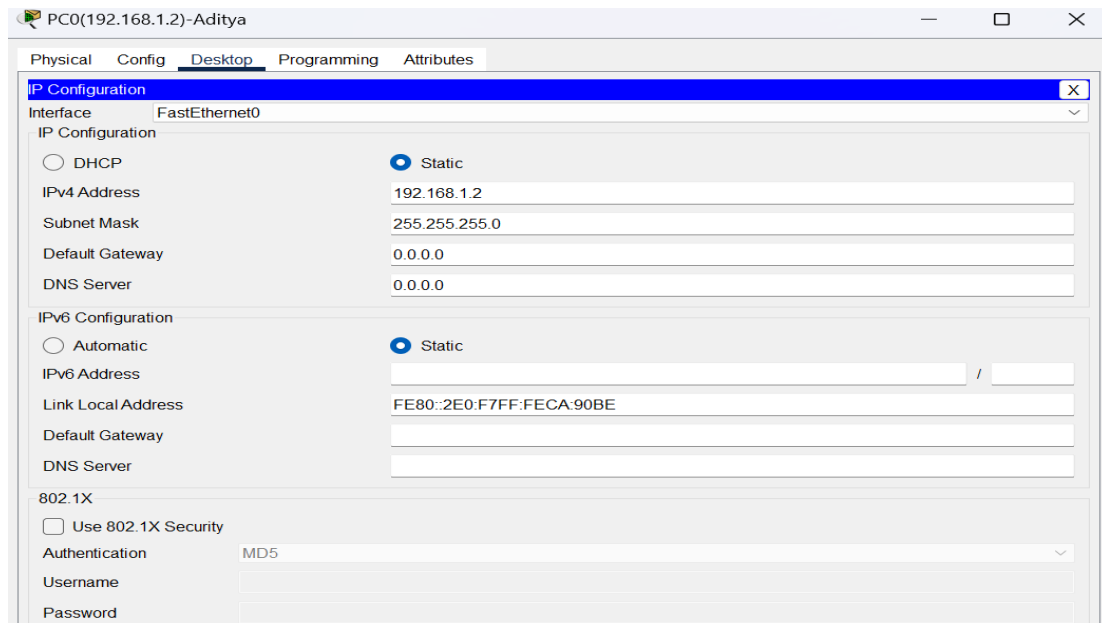


Fig: IP Configuration

Step 4: Ping each device from every node on the network to check connectivity. If replies are received, the connection is successfully established between the PCs.

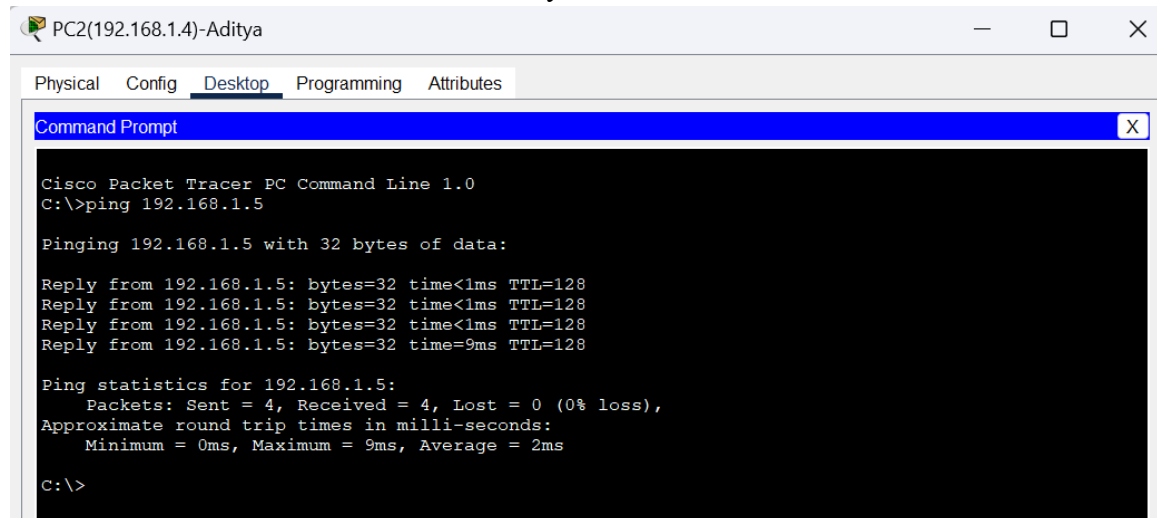


Fig: Testing connection between PC2 and PC3

Mesh Topology:

Steps to create a mesh topology are mentioned below:

Step 1: Select network devices that is four switches and four PCs from device-type selection panel and drop it on workspace.

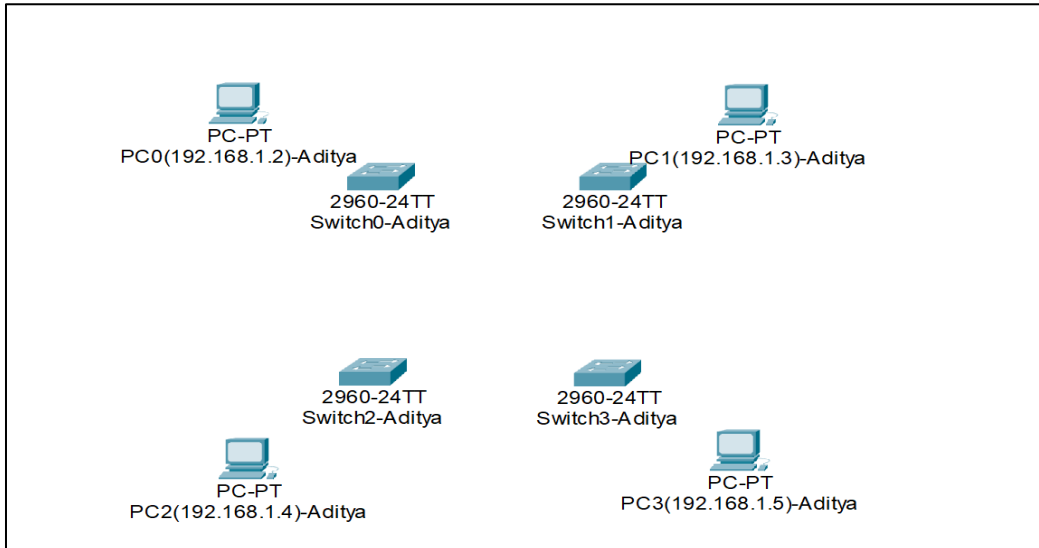


Fig: Selection of required devices for mesh topology

Step 2: Now, using the copper straight-through cable connect each PC to one of the available port the switch.

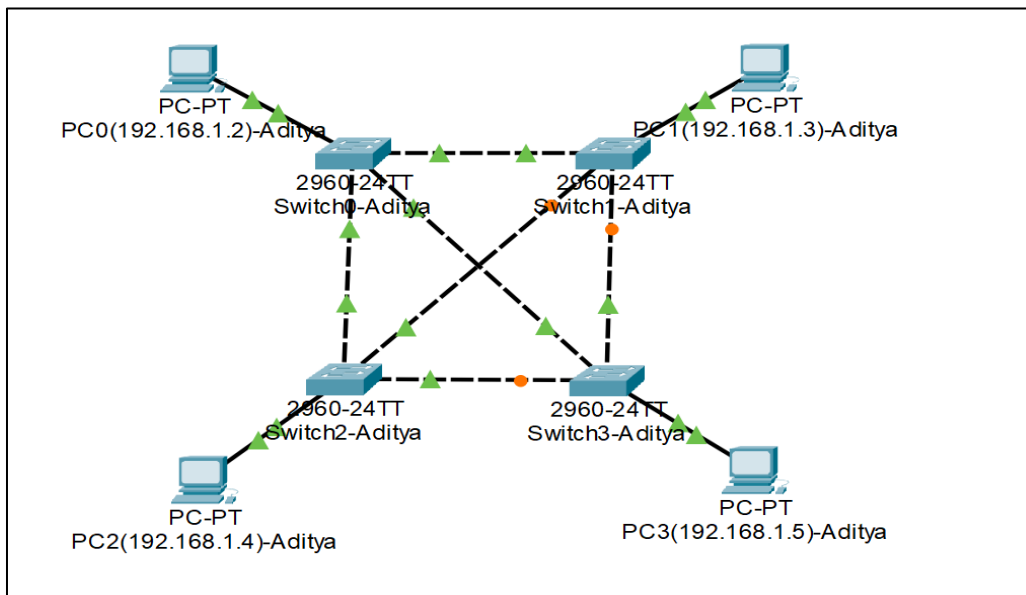


Fig: Connection between switches and PC in mesh topology

Step 3: Now assign unique IP address to each device as follows:

PC0: 192.168.1.2

PC1: 192.168.1.3

PC2: 192.168.1.4

PC3: 192.168.1.5

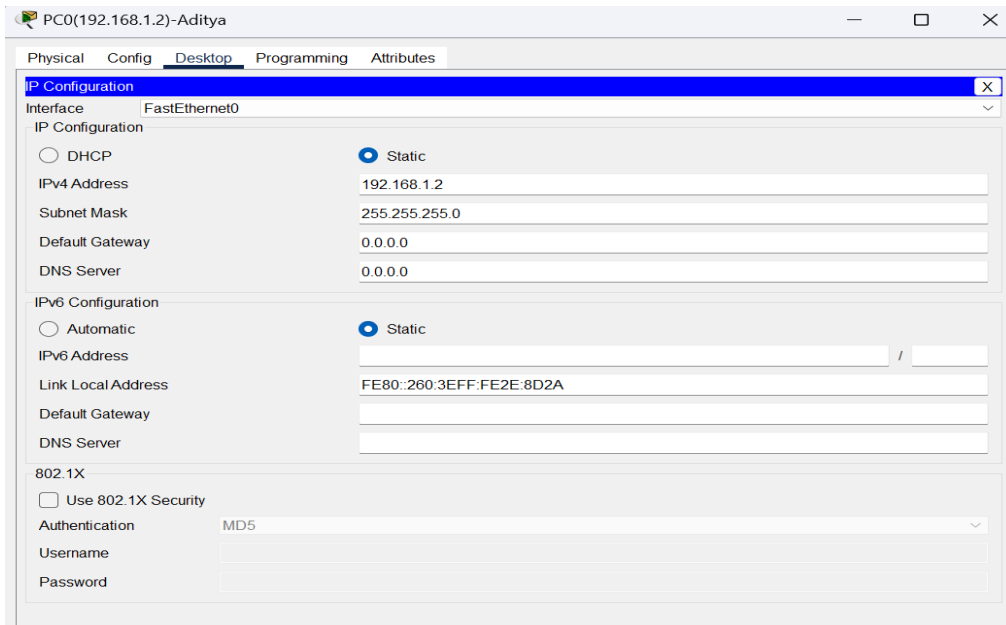


Fig: IP Configuration

Step 4: Ping each device from every node on the network to check connectivity. If replies are received, the connection is successfully established between the PCs.

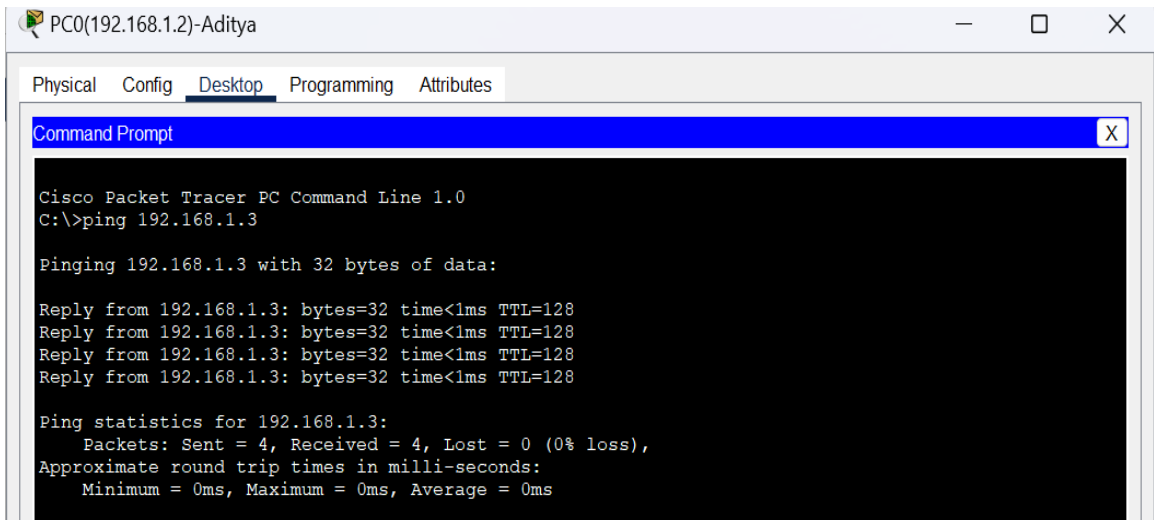


Fig: Testing connection between PC0 and PC1

Conclusion:

In this lab, we implemented and tested ring, star, and mesh topologies using Cisco Packet Tracer. Each topology was set up and verified for connectivity, highlighting their practical use, strengths, and limitations in network design.