Static Routing With 2 Router Connections

Objective:

The objective of this lab is to demonstrate the implementation of static routing on Cisco routers to enable communication between two different subnets connected through a point-to-point WAN link.

Theory:

Static routing involves manually configuring routing entries in the routing table of each router. These entries map destination networks to the appropriate next-hop IP addresses or interfaces. Static routing is suitable for small networks with relatively stable topologies, as manual intervention is required to update the routing table whenever there are network changes.

Connections:

The network topology consists of the following components:

- Routers:
    - 2 Cisco routers (Router1 and Router2)

- Switches:
    - 2 switches (Switch1 and Switch2)

- End Devices:
    - 2 PCs (PC0 and PC1) connected to Switch1
    - 2 Laptops (Laptop2 and Laptop3) connected to Switch2

Interconnections:

- Router1 and Router2 are connected via a point-to-point WAN link using IP addresses 10.1.1.0/24.

- Router1 (192.168.10.100/24) is connected to Switch1 with subnet 192.168.10.0/24.

- Router2 (172.16.1.100/16) is connected to Switch2 with subnet 172.16.1.0/16.

- PC0 (192.168.10.10/24) and Laptop2 (192.168.10.11/24) are connected to Switch1.

- PC1 (172.16.1.10/16) and Laptop3 (172.16.1.11/16) are connected to Switch2.

IP Addressing:

- **Router**
    - Router1: LAN - 192.168.10.100/24, WAN - 10.1.1.0/24
    - Router2: LAN - 172.16.1.100/16, WAN - 10.1.1.0/24

- **Switch**
  - Switch1: 192.168.10.0/24
  - Switch2: 172.16.1.0/16
- **End Devices**
  - PC0: 192.168.10.10/24
  - Laptop2: 192.168.10.11/24
  - PC1: 172.16.1.10/16
  - Laptop3: 172.16.1.11/16

Default Gateways:

- Devices in the 192.168.10.0/24 subnet use Router1 (192.168.10.100/24) as the default gateway.

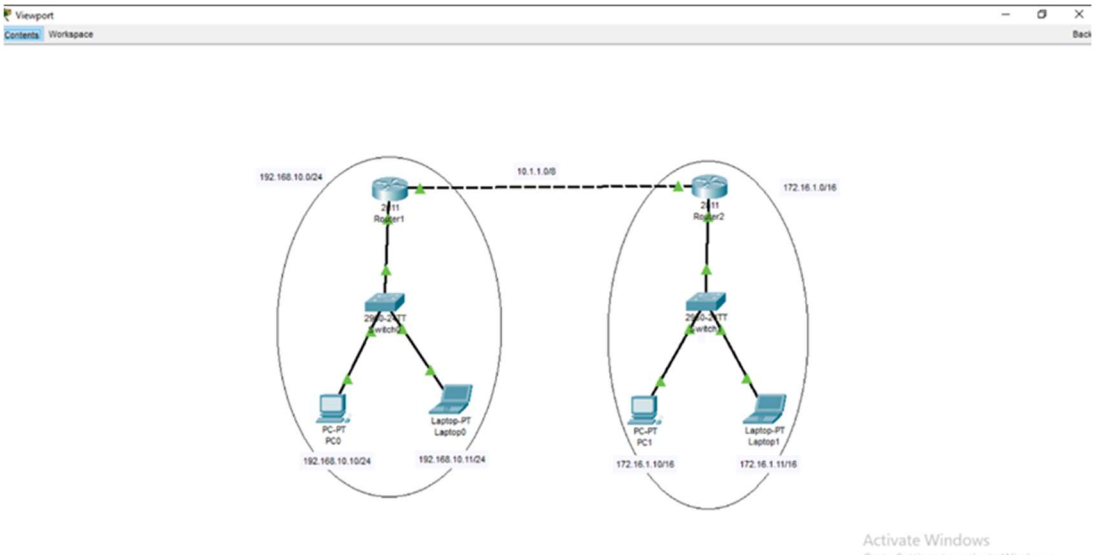
- Devices in the 172.16.1.0/16 subnet use Router2 (172.16.1.100/16) as the default gateway.

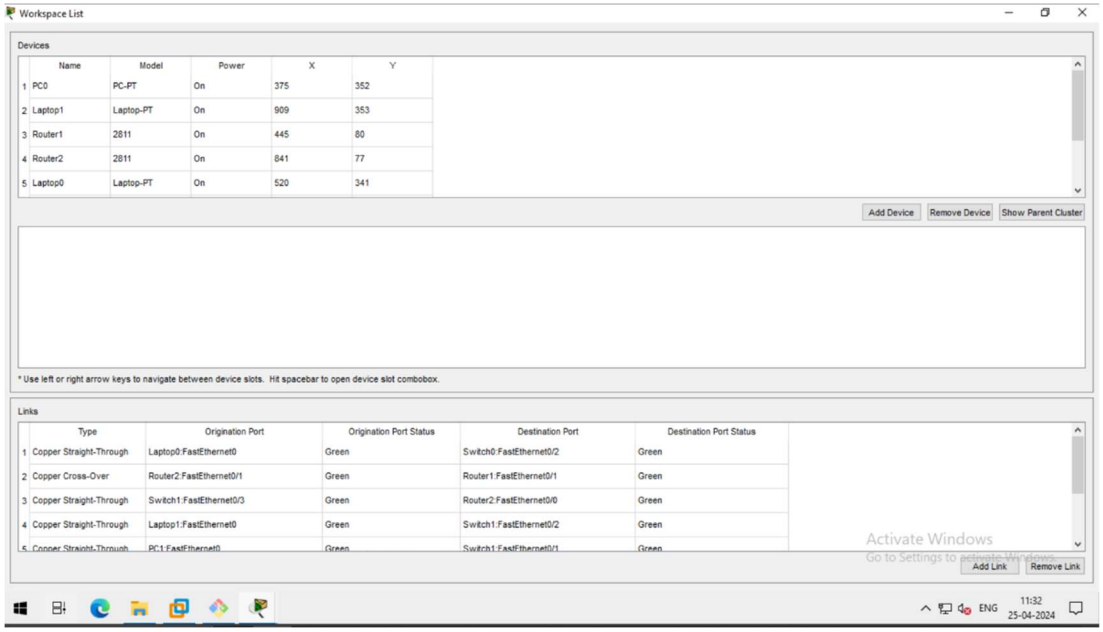
LAN Interfaces:

- **Router1**: fa0/0 (192.168.10.100/24)

- **Router2**: fa0/0 (172.16.1.100/16)

The connections between the routers and switches are likely made using Ethernet cables, while the WAN link between the routers may use dedicated serial cables depending on the specific implementation.



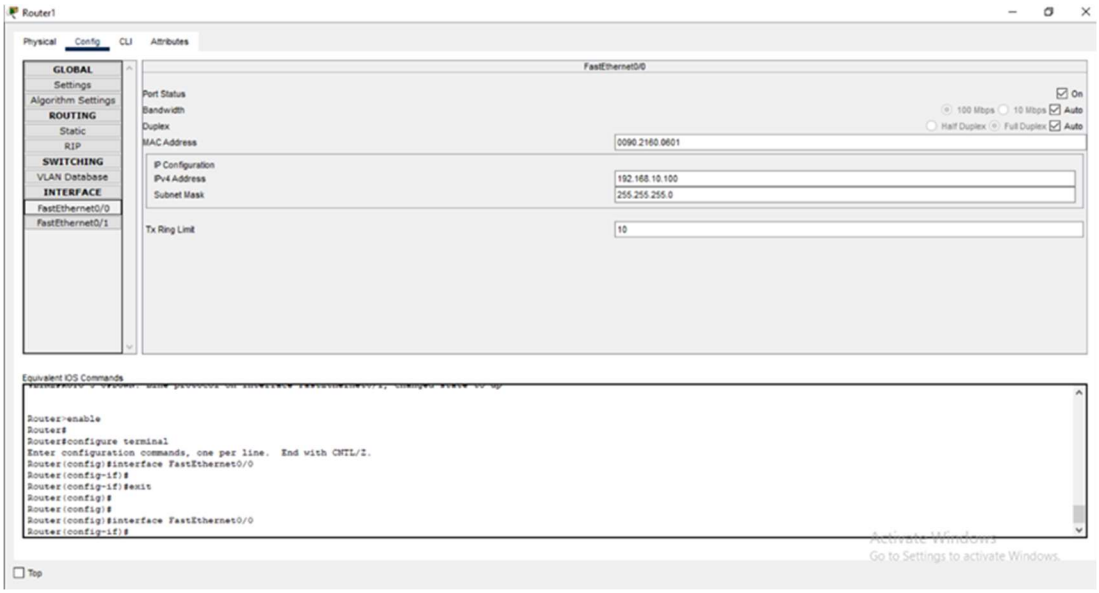


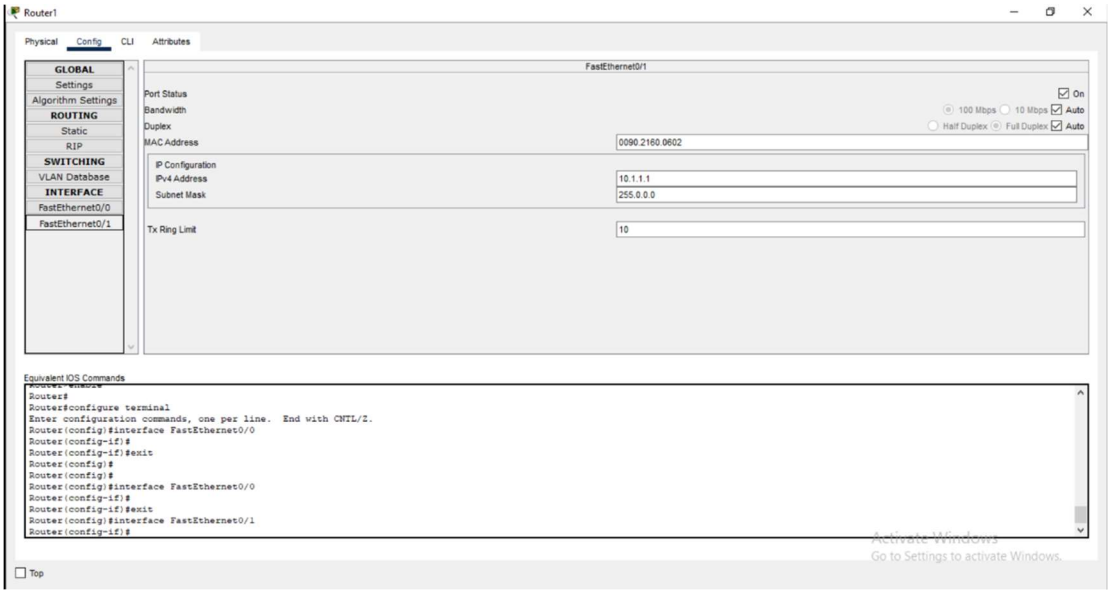
Configuration:

To enable communication between the two subnets, static routes need to be configured on each router, pointing to the appropriate next-hop IP address for reaching the other subnet.

On Router1, the following static route would be configured:

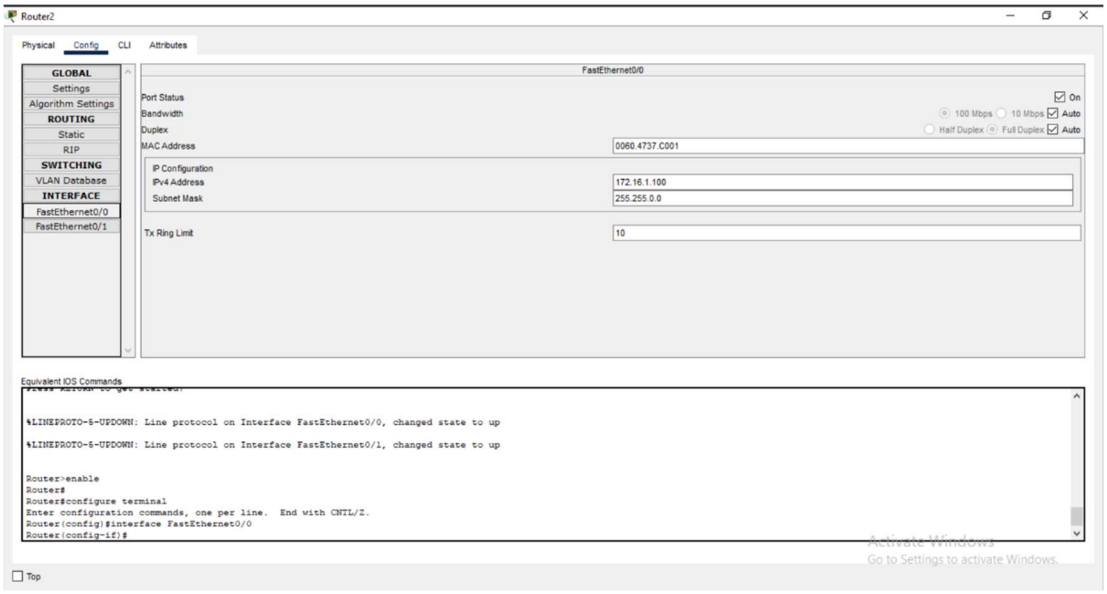
Router1(config)# ip route 172.16.1.0 255.255.0.0 10.1.1.0

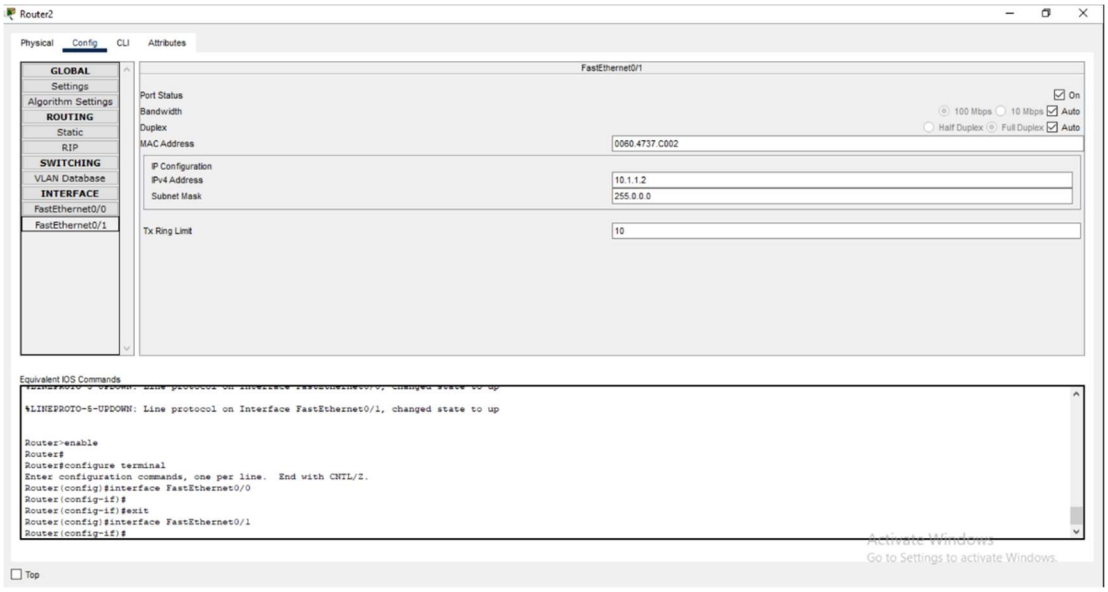




On Router2, the following static route would be configured:

Router2(config)# ip route 192.168.10.0 255.255.255.0 10.1.1.0



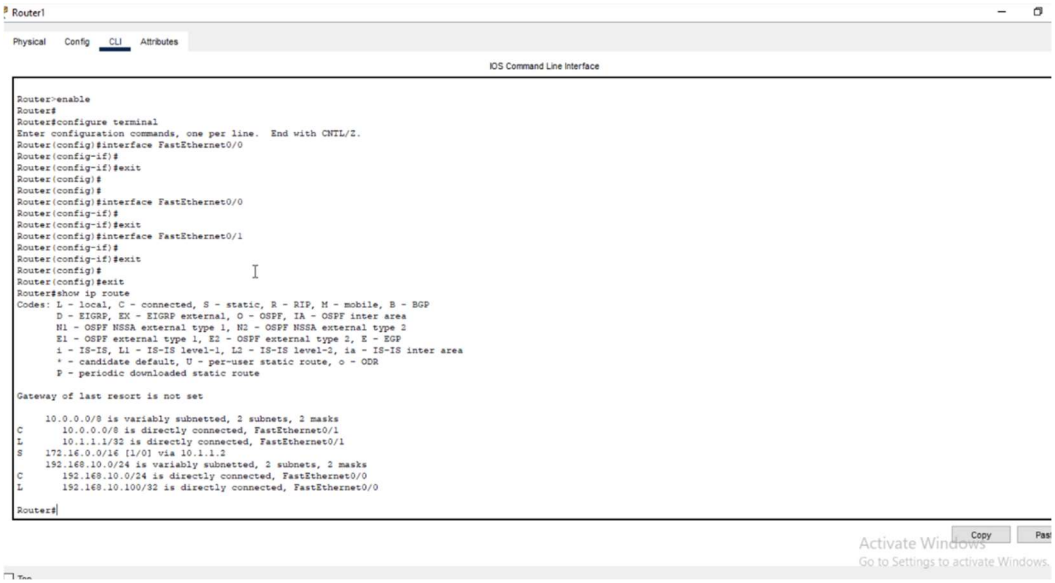


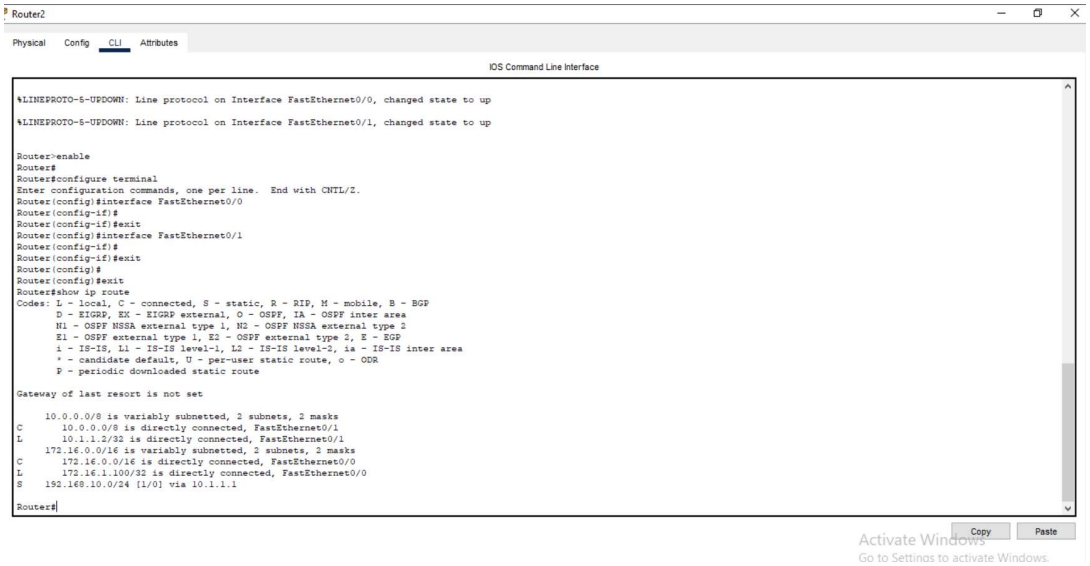
After each Router configuration, need to save the configuration from the settings.

These static routes inform the routers about the path to reach the remote subnet through the next-hop IP address on the WAN link.

Verification:

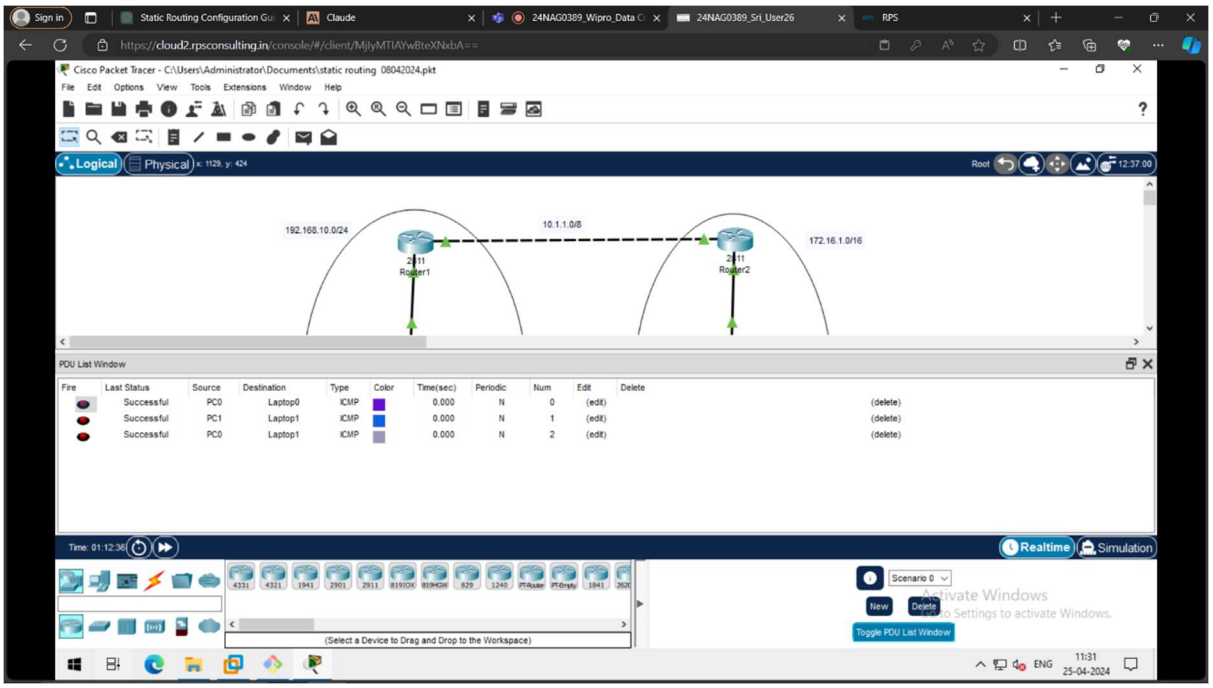
After configuring the static routes, you can verify the routing table using the "show ip route" command on each router. The output will display the configured static routes along with the directly connected networks.

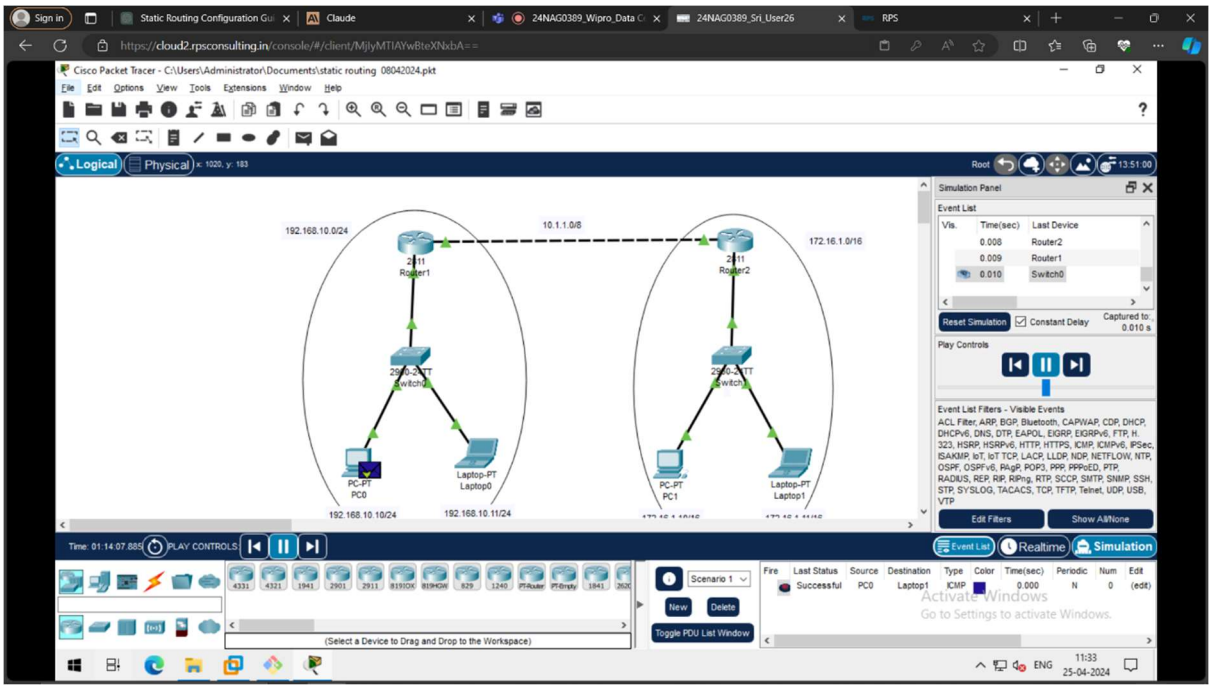




Connectivity between the end devices in different subnets can be tested using tools like ping

Output:





Conclusion:

By implementing static routing on the two routers, communication between the different subnets is enabled, allowing devices in one subnet to communicate with devices in the other subnet through the configured next-hop IP addresses. Static routing is a simple and effective solution for small networks with stable topologies, but it may not be suitable for large or dynamic networks where routing protocols like OSPF or EIGRP are preferred for their scalability and automatic route updates.