LAB EXPERIMENT-07: Implementation of RIP Version 1

Aim:

To create a linear network topology using Cisco Packet Tracer and configure RIP Version 1 for routing, enabling connectivity between multiple routers and computers.

Requirements:

1. Cisco Packet Tracer software.
2. Three routers and three computers.
3. Ethernet cables for connections.
4. IP addressing scheme for the routers and computers.

Procedure:

1. Open Packet Tracer:
   - Launch Cisco Packet Tracer on your computer.
2. Create a Network:
   - Drag three routers onto the workspace and connect them in a linear topology using serial links.
   - Connect a computer to each router using Ethernet cables.
3. Configure IP Addresses:

- Assign appropriate IP addresses to each router interface and the connected computers.

4. Enable RIP Version 1:

- Access the CLI of each router.

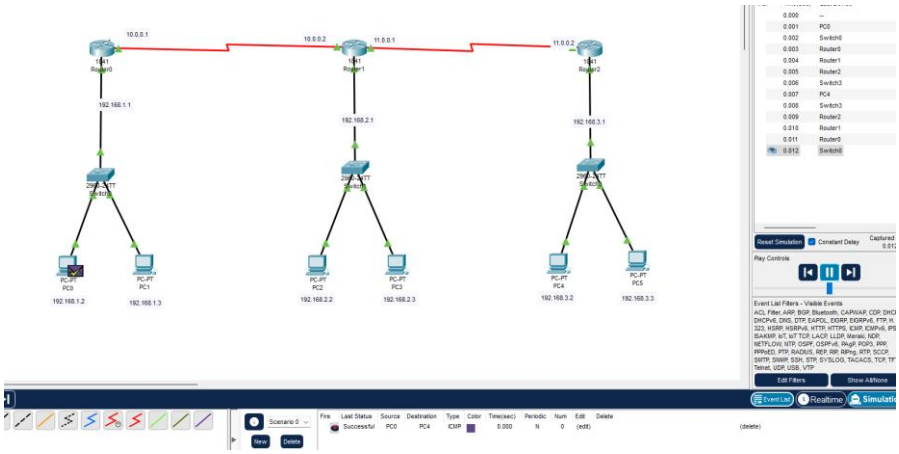
- Enable RIP routing using commands: `router rip` and `version 1`.

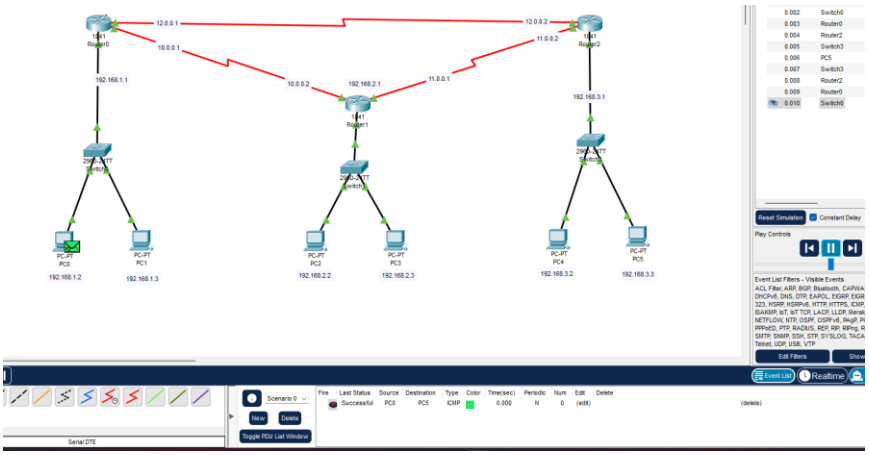
- Advertise connected networks using the command: `network <network address>`.

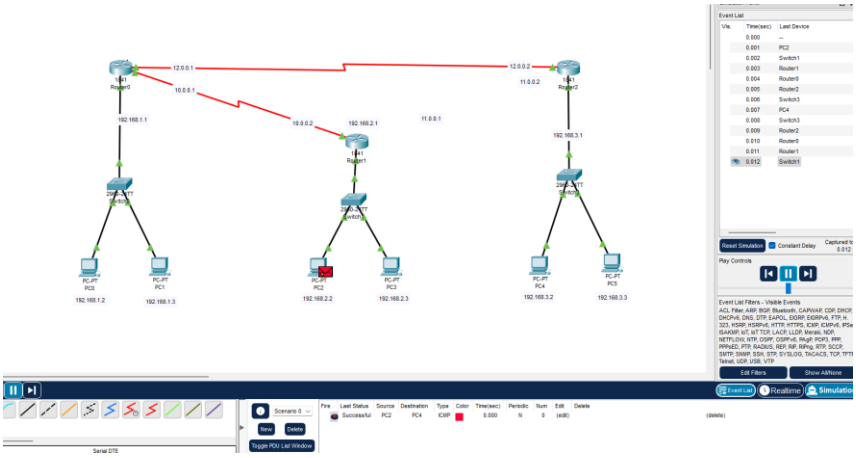
5. Test Connectivity:

- Use the `ping` command to test connectivity between the computers to ensure successful communication.

Result:







Conclusion:

By configuring a linear network topology and implementing RIP Version 1, routers can dynamically share routing information, facilitating communication across the network. The successful ping results confirm the correct setup of the network and routing protocol.

LAB EXPERIMENT-08: Implementation of RIP Version 2

Aim:

To configure a linear network topology using Cisco Packet Tracer, implement RIP Version 2 routing, and test connectivity between computers.

Requirements:

1. Cisco Packet Tracer software.
2. Three routers and three computers.
3. Ethernet cables for connecting devices.
4. Basic understanding of IP addressing and RIP routing.

Procedure:

1. Open Packet Tracer:
   - Launch Cisco Packet Tracer on your computer.
2. Create a Network:
   - Drag three routers onto the workspace and connect them linearly.
   - Connect one computer to each router using Ethernet cables.
3. Configure IP Addresses:
   - Assign IP addresses to each interface on the routers and computers.

4. Enable RIP Version 2:
   - Access the CLI of each router.

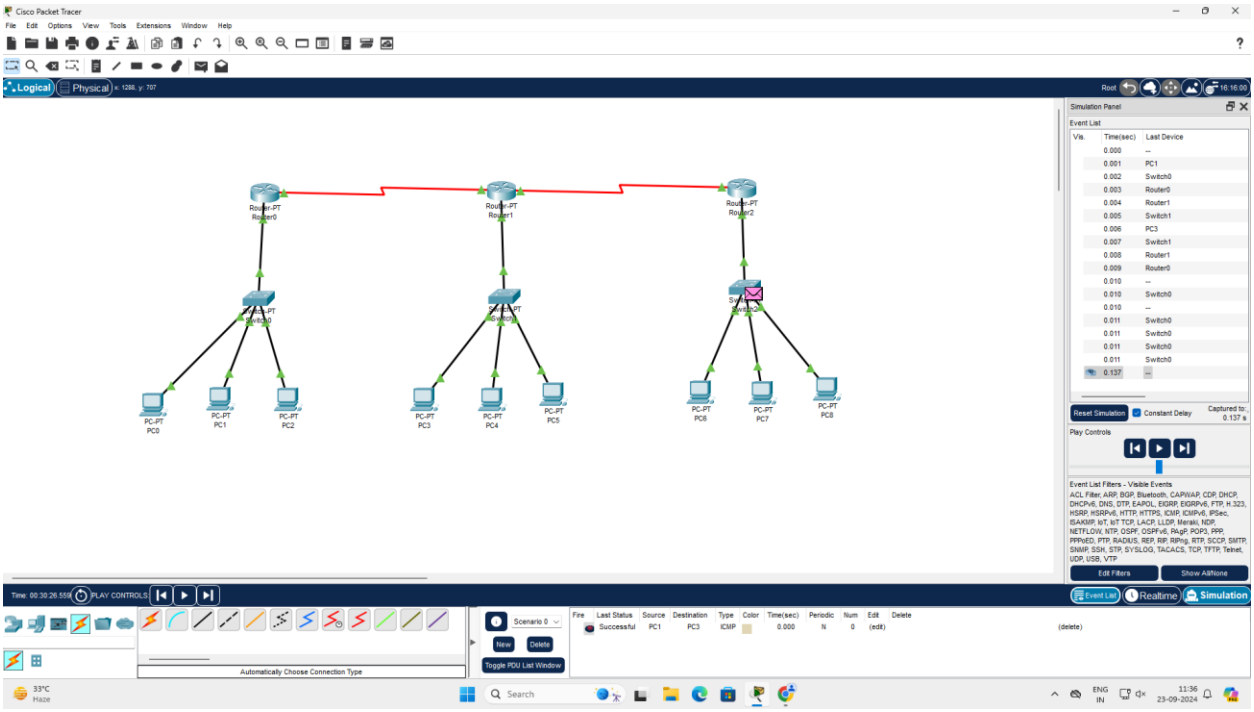
- Enable RIP routing using commands: `router rip` and `version 2`.

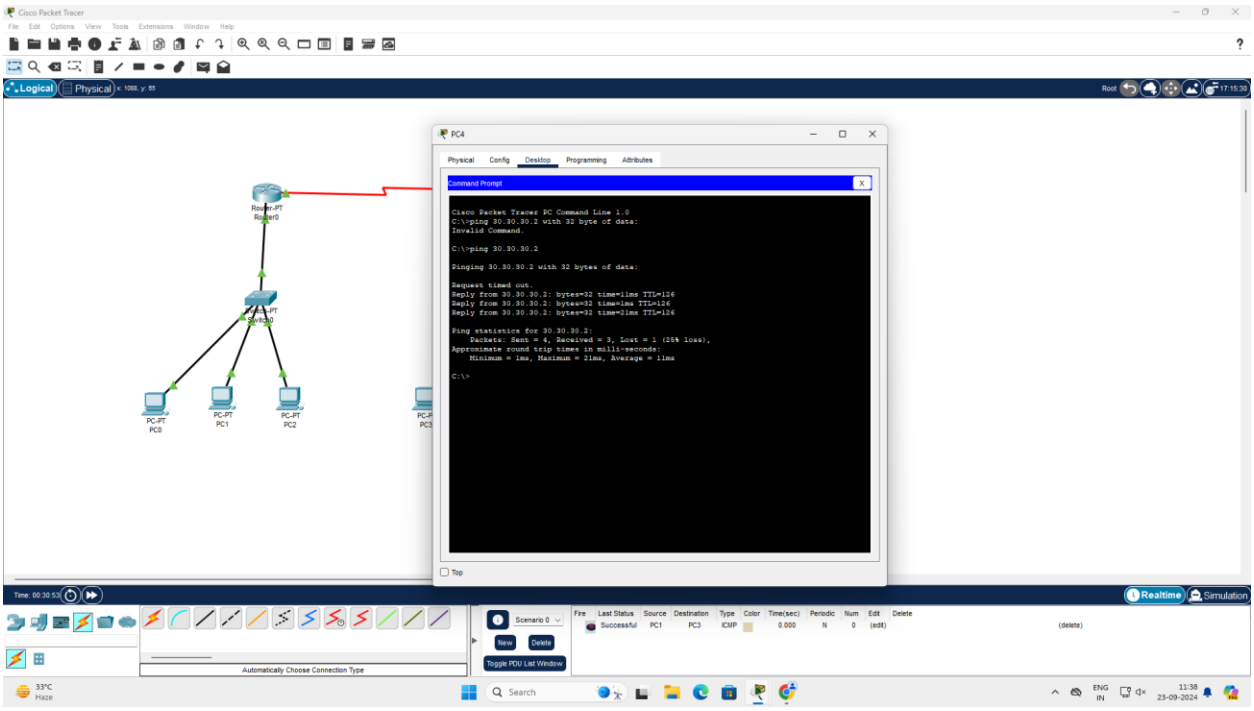
- Advertise connected networks with the command: `network <network address>`.

5. Test Connectivity:

- Use the ping command to verify connectivity between the computers.

Result:





Conclusion:

The network was successfully configured with RIP Version 2 routing, enabling communication between computers connected to different routers, as verified by successful ping tests.

LAB EXPERIMENT-09: Implementation of Single Area OSPF

Aim:

To set up a triangular network topology in Cisco Packet Tracer and configure OSPF (Open Shortest Path First) for dynamic routing, ensuring connectivity between three routers and connected computers.

Requirements:

1. Software: Cisco Packet Tracer.

2. Devices: Three routers and three computers.

3. Cables: Ethernet cables.

Procedure:

1. Open Packet Tracer: Launch Cisco Packet Tracer.

2. Create a Network:

   - Drag three routers onto the workspace and connect them in a triangular topology.

   - Connect one computer to each router using Ethernet cables.

3. Configure IP Addresses:

   - Assign unique IP addresses to each interface on the routers and connected computers.

4. Enable OSPF:

   - Access the CLI of each router.

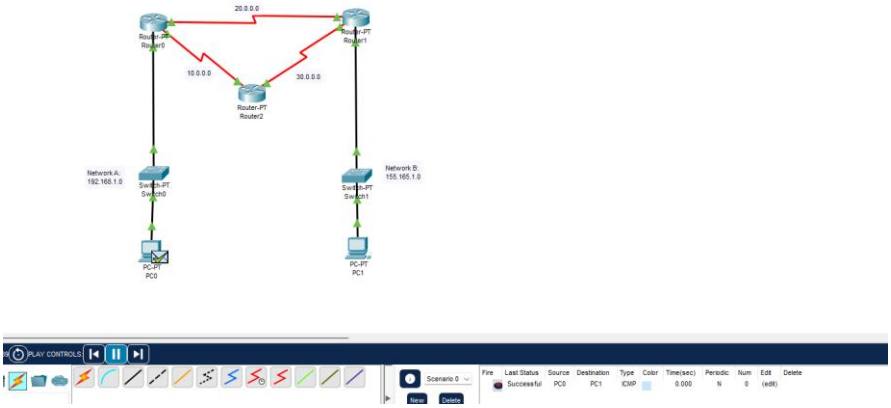
   - Configure OSPF: `router ospf 1`.

- Advertise the connected networks using: `network <network address> area 0`.

5. Test Connectivity:

- Use the `ping` command on each computer to test connectivity between all devices.

Result:



Conclusion:

The successful implementation of OSPF allows dynamic routing in the network, enabling the computers connected to different routers to communicate with each other effectively. The triangular topology setup ensures redundancy and efficient data routing.

LAB EXPERIMENT-10: Implementation of Multi Area OSPF

Aim:

To set up a network in Cisco Packet Tracer with four routers forming two separate OSPF areas, including an Area 0 backbone, and establish connectivity between connected computers.

Requirements:

- Cisco Packet Tracer software
- Four routers
- Four computers
- Ethernet cables
- IP addressing plan

Procedure:

1. Open Packet Tracer
   - Launch Cisco Packet Tracer on your computer.
2. Create a Network
   - Drag four routers onto the workspace.
   - Connect routers to form two OSPF areas (Area 0 backbone and another area).
   - Connect a computer to each router using Ethernet cables.
3. Configure IP Addresses
   - Assign IP addresses to router interfaces and computers.

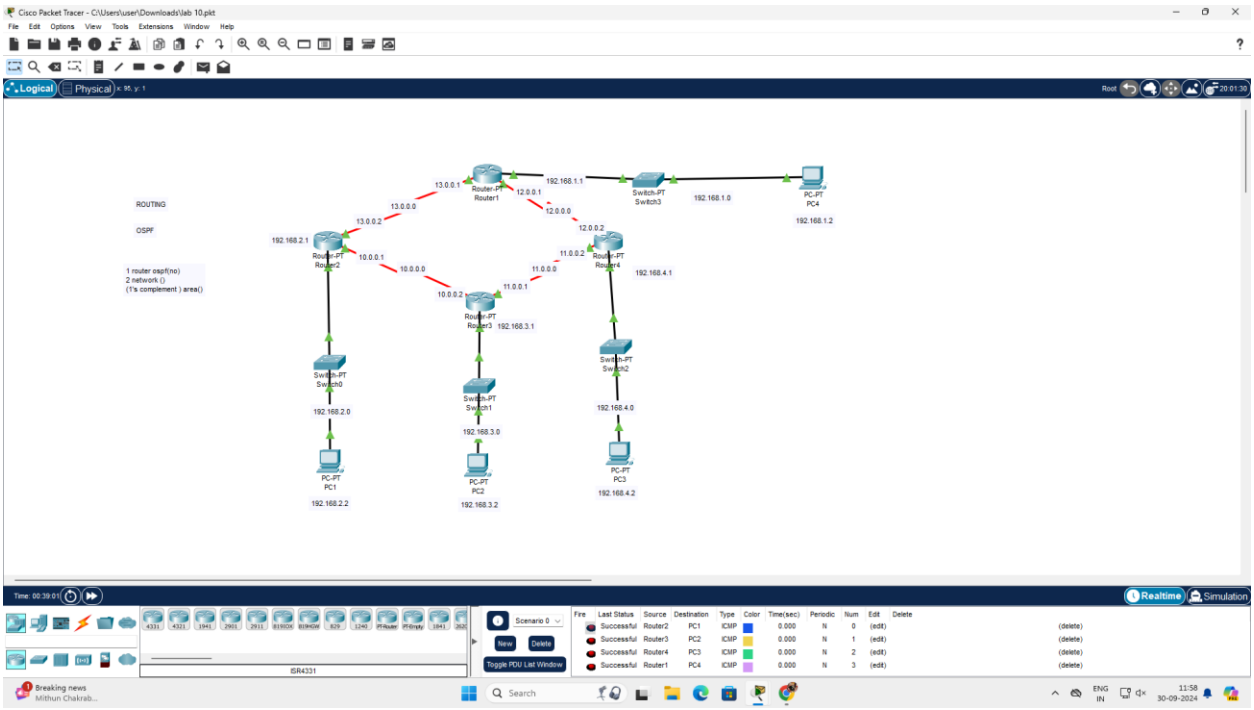
4. Enable OSPF Configuration

- Access the CLI of each router.
- For Area 0 routers:
  - `router ospf 1`
  - `network <network address> area 0`
- For other routers:
  - `router ospf 1`
  - `network <network address> area 1`

5. Test Connectivity

- Use the `ping` command to check connectivity between the computers.

Result:



Conclusion:

By completing this setup, OSPF was successfully implemented, establishing dynamic routing between routers across different OSPF areas, allowing for communication between connected devices.

LAB EXPERIMENT-11: PPP Configuration

Aim:

To set up a network using Cisco Packet Tracer, configure routers with Point-to-Point Protocol (PPP), and verify connectivity between two computers.

Requirements:

- Cisco Packet Tracer software.
- Two routers, two computers.
- Serial and Ethernet cables.

Procedure:

1. Open Packet Tracer:

   - Launch Cisco Packet Tracer.

2. Create a Network:

   - Drag two routers onto the workspace and connect them using a serial cable.

   - Connect a computer to each router using Ethernet cables.

3. Configure IP Addresses:

   - Assign appropriate IP addresses to the router interfaces and computers.

4. Configure PPP:

   - Open the Command-Line Interface (CLI) for each router.

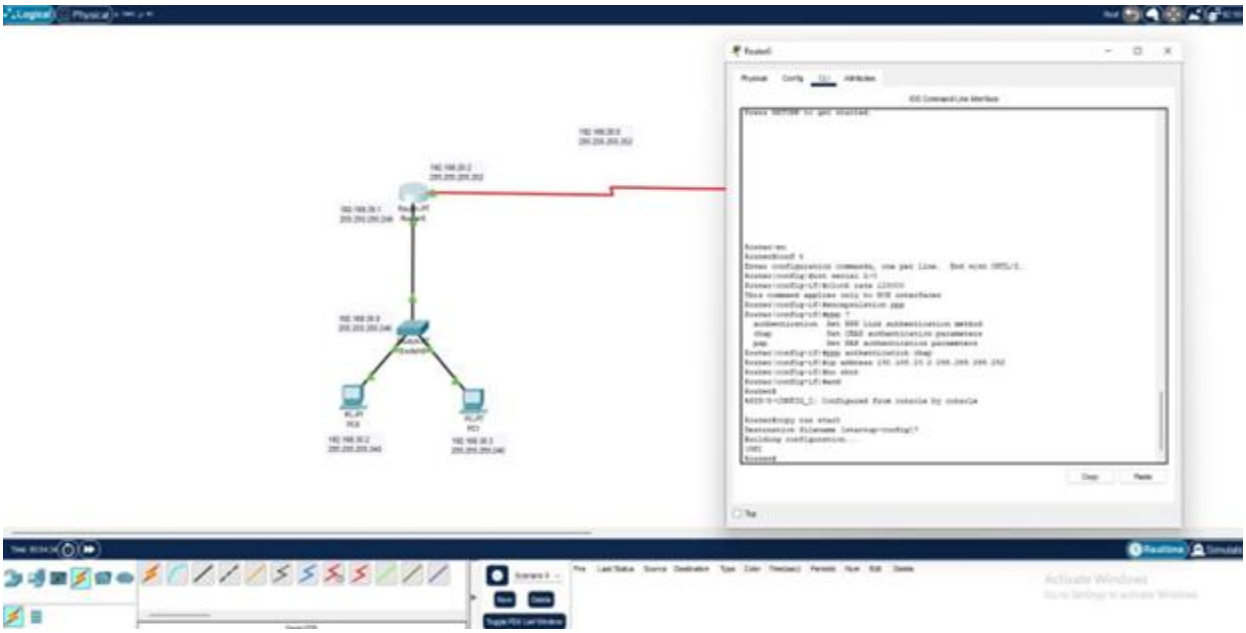
   - Enter the serial interface configuration mode (`interface serial 0/0/0`).

   - Set the encapsulation to PPP (`encapsulation ppp`).

5. Test Connectivity:

   - Use the `ping` command to test the network connection between the computers.

Result:



Conclusion:

The network setup and configuration of PPP were successful, with connectivity verified using ping commands. This demonstrates the ability to configure basic networking and serial connections in Cisco Packet Tracer.

LAB EXPERIMENT-12: HDLC Configuration

Aim:

To create a network in Cisco Packet Tracer using two routers, configure IP addresses, enable HDLC encapsulation, and test connectivity between two computers.

Requirements:

- Cisco Packet Tracer software

- Two routers

- Two computers

- Serial and Ethernet cables

Procedure:

1. Open Packet Tracer:

   - Launch Cisco Packet Tracer.

2. Create a Network:

   - Drag two routers onto the workspace and connect them with a serial connection.

   - Connect one computer to each router using Ethernet cables.

3. Configure IP Addresses:

   - Assign appropriate IP addresses to each router's interfaces and computers.

4. Configure HDLC:

   - Access the Command Line Interface (CLI) of each router.

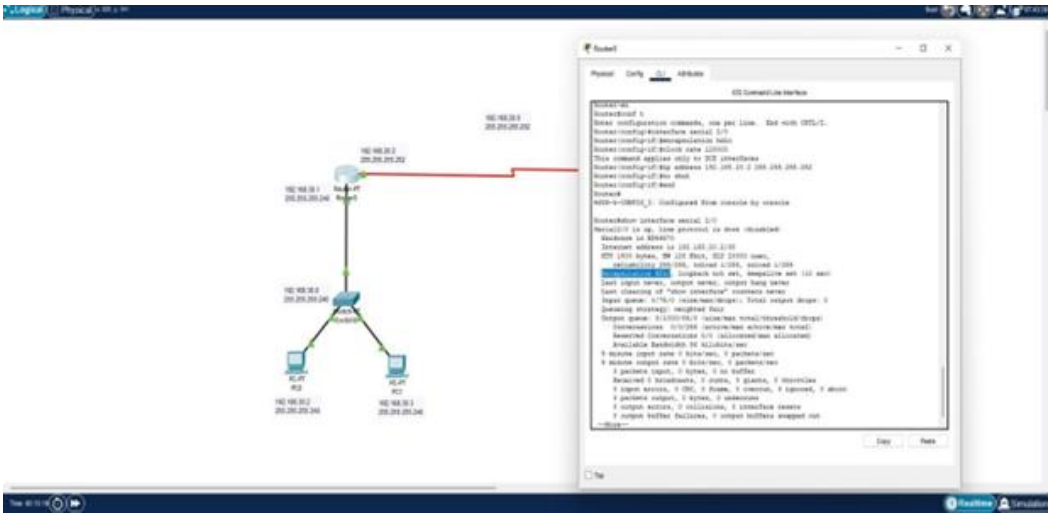
   - Enter interface configuration mode for the serial interface (e.g., `interface serial 0/0/0`).

   - Enable HDLC encapsulation by using the command `encapsulation hdlc`.

5. Test Connectivity:

   - Use the `ping` command to verify connectivity between the computers.

Result:



Conclusion:

Successfully configured a network using two routers, enabled HDLC encapsulation on the serial interfaces, and confirmed communication between computers through successful ping tests.

LAB EXPERIMENT-13: Implementation of BGP

Aim:

To configure a basic network topology in Cisco Packet Tracer, enabling Border Gateway Protocol (BGP) between two routers in different autonomous systems (AS) and testing connectivity.

Requirements:

- Cisco Packet Tracer software
- Two routers (Router1 and Router2)
- Two computers (PC1 and PC2)
- Ethernet cables for connectivity
- Basic knowledge of BGP and IP addressing

Procedure:

1. Create Network Topology:

- Launch Cisco Packet Tracer and drag two routers and two computers onto the workspace.

- Connect each computer to its respective router using Ethernet cables.

- Establish a connection between the two routers using a serial or Ethernet link.

2. Configure IP Addresses:

- Assign IP addresses to router interfaces and computers. Example:

  - Router1 (AS 100): 192.168.1.1 on Serial/Ethernet 0/0/0

  - Router2 (AS 200): 192.168.1.2 on Serial/Ethernet 0/0/0

- Configure the computers with appropriate IPs in their subnets.

3. Enable BGP on Routers:

- Router1 (AS 100):

  - Enable BGP and configure Router2 as a neighbor (remote AS 200).

  - Advertise the connected networks.

- Router2 (AS 200):

  - Enable BGP and configure Router1 as a neighbor (remote AS 100).

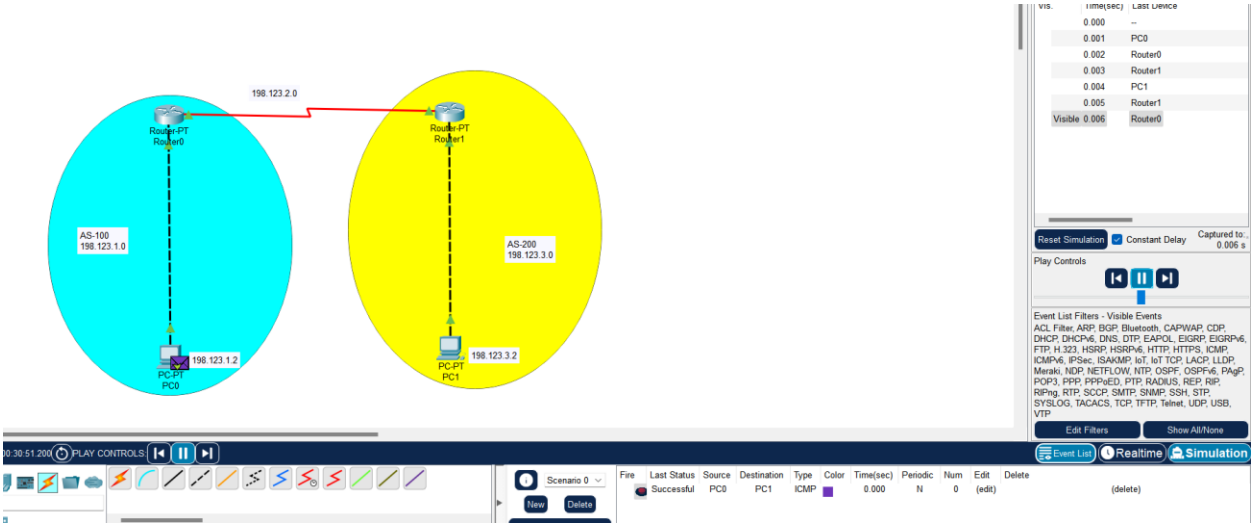
  - Advertise the connected networks.

4. Test Connectivity:

- Use the ping command from PC1 to PC2 to verify connectivity.

- Check BGP routes on both routers using `show ip bgp` to confirm route learning.

Result:



Conclusion:

The configuration demonstrates successful BGP peering between two routers in separate autonomous systems, enabling communication between devices across different networks. Connectivity was verified, and BGP routes were observed to be exchanged correctly.

LAB EXPERIMENT-14: Implementation of EIGRP

Aim:

To design and implement a triangular network topology using three routers and enable Enhanced Interior Gateway Routing Protocol (EIGRP) to establish communication among the connected devices.

Requirements:

1. Software: Cisco Packet Tracer.

2. Devices: Three routers and three computers.

3. Cables: Ethernet cables for connections.

4. IP Addressing: IP addresses assigned to each router interface and computer as per the subnet scheme.

Procedure:

1. Create Network Topology:

   - Open Cisco Packet Tracer and drag three routers onto the workspace.

- Connect each router in a triangular topology and attach a computer to each router.

2. Configure IP Addresses:

- Access the CLI of each router and computer.

- Assign IP addresses to router interfaces and computers, ensuring devices within the same network are in the same subnet.

3. Enable EIGRP:

- On each router, enter configuration mode and enable EIGRP using `router eigrp 1`.

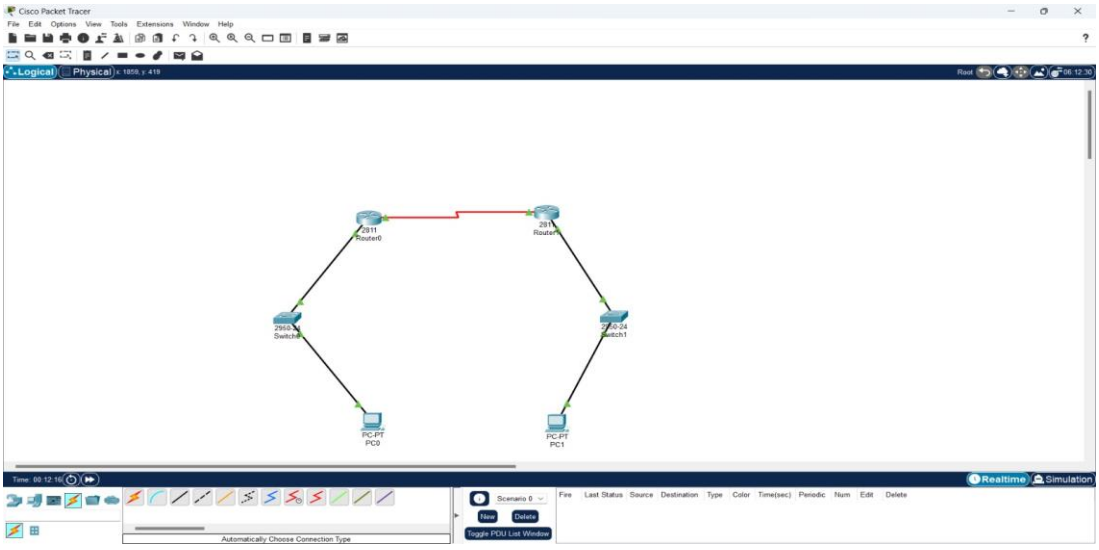
- Advertise the connected networks using the `network` command.

4. Test Connectivity:

- Use the `ping` command to test connectivity between computers.

- Verify EIGRP routes using the `show ip route` command.

Result:



Conclusion:

The successful configuration and implementation of EIGRP in a triangular network topology ensure efficient routing and connectivity across the network, validating the design and configuration.

LAB EXPERIMENT-15: Telnet Configuration

Aim:

To configure a basic network topology using Cisco Packet Tracer, enabling Telnet access to a router from a computer.

Requirements:

- Cisco Packet Tracer software installed on your computer.

- Basic knowledge of networking concepts (IP addressing, routers, and Telnet).

- A router (e.g., 2911) and a computer device in Cisco Packet Tracer.

Procedure:

1. Open Cisco Packet Tracer:

   - Launch the software on your computer.

2. Create the Network Topology:

   - Add Devices:

     - Drag a router (e.g., 2911) and a computer onto the workspace.

   - Connect Devices:

     - Use the Copper Straight-Through cable.

     - Connect the computer’s Fast Ethernet port to the router’s Gigabit Ethernet interface.

3. Configure IP Addresses:

- Access the Router CLI:
  - Click on the router and select the CLI tab.
- Assign IP Address to Router:

  Router> enable

  Router# configure terminal

  Router(config)# interface GigabitEthernet0/0

  Router(config-if)# ip address 192.168.1.1 255.255.255.0

  Router(config-if)# no shutdown

  Router(config-if)# exit
- Configure Computer's IP Address:
  - Go to the computer's Desktop tab, select IP Configuration, and set:
    - IP Address: `192.168.1.2`
    - Subnet Mask: `255.255.255.0`

4. Enable Telnet on the Router:

- Configure VTY Lines:

  Router(config)# line vty 0 4

  Router(config-line)# password cisco

  Router(config-line)# login

  Router(config-line)# exit
  - Set Hostname and Enable Logging:

  Router(config)# hostname Router1

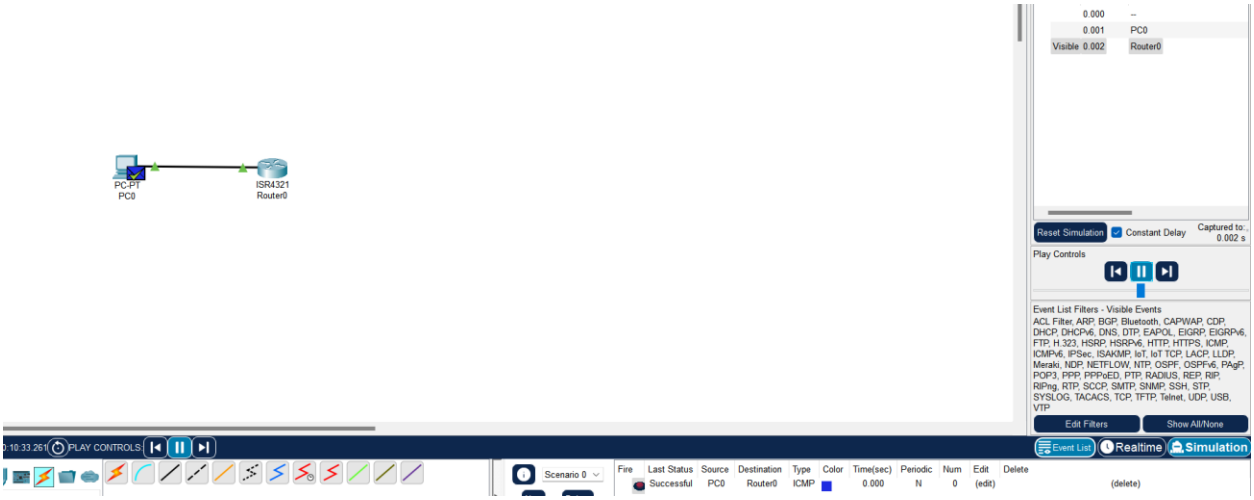
  Router1(config)# logging synchronous

5. Test Telnet Connectivity:

- Open Command Prompt:
  - On the computer, access the Command Prompt.
- Use Telnet Command:

  telnet 192.168.1.1
- Enter Password:
  - Type `cisco` when prompted.
- Verify Access:
  - Use `show ip interface brief` to check interface status.

Result:



Conclusion:

This procedure successfully sets up a basic network topology in Cisco Packet Tracer, allowing remote access to the router via Telnet. Users can

troubleshoot connectivity issues by ensuring correct device connections, proper IP address configuration, and firewall settings.