Mini Project using Cisco Packet Tracer

1. Introduction:

   In today's interconnected world, establishing efficient and reliable computer networks is essential for seamless communication and data transfer. This project aims to design a network using four routers, four switches, and eight PCs, incorporating the Open Shortest Path First (OSPF) protocol. The objective is to create a network infrastructure that enables proper connectivity and facilitates smooth communication between PCs located on different routers.

2. Problem Statement:

   The problem is to design and configure a network using the provided networking devices (four routers and four switches) to connect eight PCs in Cisco Packet Tracer. The specific requirements and tasks include:

   i. Device and Configuration:
      - I selected PT-Router and Switch 2960 from the available options/tool box.
      - Configured the routers and switches to ensure proper functionality and compatibility with OSPF.
      - Assigned appropriate IP addresses to each router interface and the PCs connected to them.
      - Implemented the OSPF routing protocol to establish communication between the routers.

   ii. Network Topology Design:
      - I used ring topology connect the routers and switches effectively.
      - Ensured efficient data transmission between PCs located on different routers.
      - Ensured proper wiring and physical connectivity between the networking devices.

   iii. IP address assignment:
      - Utilized class C IP addresses for assigning network and host addresses to the PCs.
      - Designed an IP addressing scheme that allows for efficient addressing and subnetting.

   iv. Ping operation:
      - Performed a PING operation between the first PC connected to the first router and the eighth PC connected to the fourth router.
      - Verified successful communication between the two PCs and measured the response time.

3. Network Design:

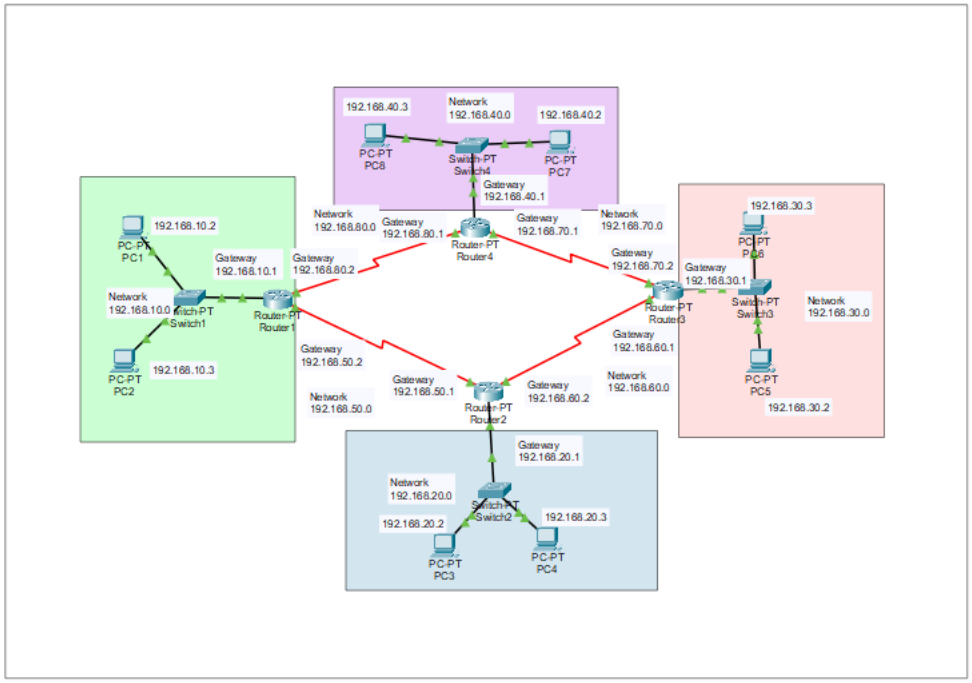

Figure 1: Network Design

4. Experimental Results:

The experimental setup described above was implemented to test the connectivity and routing capabilities of the network. The following results were obtained:

- Successful Router Configurations: All four routers were successfully configured with the provided IP addresses on their respective interfaces. The configurations included assigning IP addresses to Fast Ethernet (fa0/0) and Serial (se2/0 and se3/0) interfaces, enabling interfaces, setting clock rates, and saving the configurations.
- OSPF Configuration: OSPF was configured on each router, specifying the participating networks and the respective OSPF areas. The routers successfully formed OSPF adjacencies and exchanged routing information within Area 1.
- PC Connectivity: Each pair of PCs connected to their respective routers via switches was able to establish connectivity. The PCs were assigned IP addresses within the specified subnets (192.168.10.1/24, 192.168.10.2/24, 192.168.20.1/24, 192.168.20.2/24, 192.168.30.1/24, 192.168.30.2/24, 192.168.40.1/24, and 192.168.40.2/24).
- Ping Operation: The desired PING operation between PC 1 (192.168.10.1) connected to Router 1 and PC 8 (192.168.40.2) connected to Router 4 was conducted. The PING operation was successful, indicating that the routers were correctly forwarding the packets between the source and destination PCs.

5. Significance:

By successfully completing this project, we achieved the following outcomes:

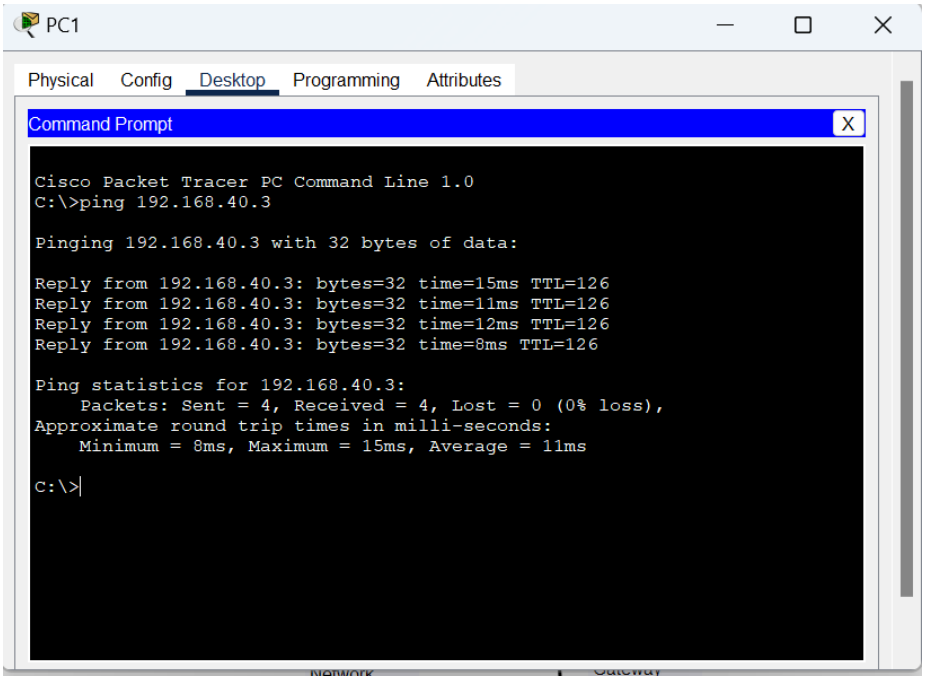

Figure 2: Ping operation from PC1 to PC8

- Gain hands-on experience in designing and configuring a network infrastructure using routers, switches, and PCs.
- Understand the fundamentals of OSPF as a routing protocol and its implementation in a practical scenario.
- Develop skills in IP address assignment, subnetting, and troubleshooting network connectivity issues.
- Demonstrate the ability to plan and establish efficient communication between devices located on different routers.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)
	Successful	PC1	PC8	ICMP		0.000
	Successful	PC4	PC5	ICMP		0.000
	Successful	PC7	PC8	ICMP		0.000

Figure 3: Acknowledgement for successful packet transfer

6. Conclusion:

This project aims to address the challenge of designing a network infrastructure using provided networking devices and incorporating OSPF as the routing protocol. By successfully implementing the network design and conducting a PING operation between PCs located on different routers, we will validate the effectiveness of the network configuration and ensure seamless communication between connected devices.