VISHWAKARMA UNIVERSITY
Maximising Human Potential

Activity based

Project Report on

Computer Network

Project Module - II

Submitted to Vishwakarma University, Pune

Under the Initiative of

Contemporary Curriculum, Pedagogy, and Practice (C2P2)

By

Shyamal Sagar Patil

SRN No : 202200930

Roll No : 38

Div : B

Third Year Engineering

Department of Computer Engineering

Faculty of Science and Technology

Academic Year

2023-2024

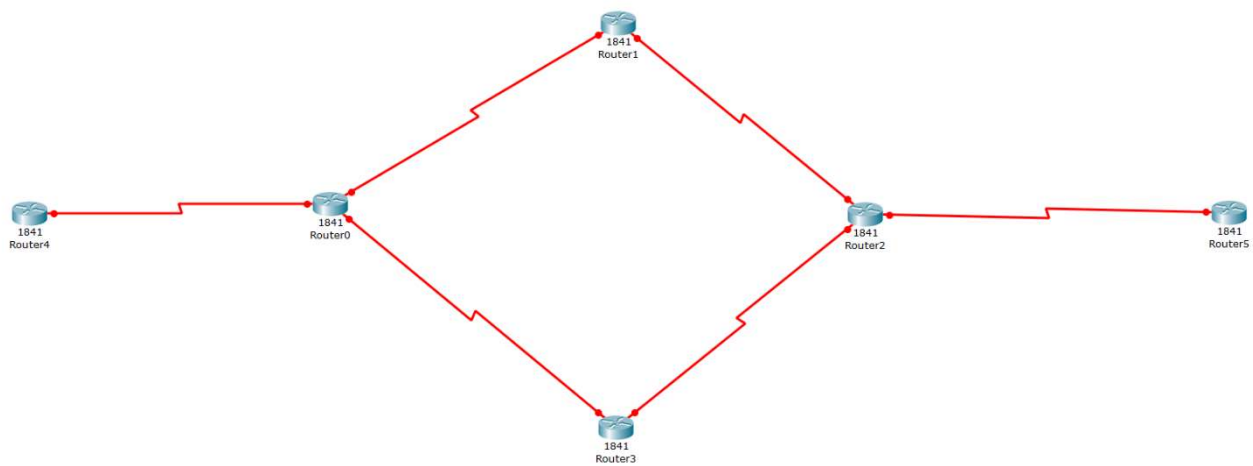## Design and develop a LAN & WAN network and implement OSPF protocol

Project Statement:

Implement OSPF Routing with single area for following network.

Select Class A IP addresses.

Problem Description:

    I.   Develop a LAN and WAN network for above mentioned diagram.

   II.   Implement OSPF routing.

 III.   Show successful communication in between different Network.

Project Module II

I.   **Configure all routers with IP addresses**

Router 0:

- Serial0/0/0: 20.0.0.3 with a subnet mask of 255.0.0.0

- Serial0/0/1: 40.0.0.2 with a subnet mask of 255.0.0.0

Router 1:

- Serial0/0/0: 30.0.0.3 with a subnet mask of 255.0.0.0

- Serial0/0/1: 50.0.0.2 with a subnet mask of 255.0.0.0

Router 2:

- Serial0/1/0: 10.0.0.3 with a subnet mask of 255.0.0.0

- Serial0/0/0: 20.0.0.2 with a subnet mask of 255.0.0.0

- Serial0/1/1: 30.0.0.2 with a subnet mask of 255.0.0.0

Router 3:

- Serial0/1/0: 40.0.0.3 with a subnet mask of 255.0.0.0

- Serial0/1/1: 60.0.0.2 with a subnet mask of 255.0.0.0

Router 4:

- Serial0/0/0: 10.0.0.2 with a subnet mask of 255.0.0.0

Router 5:

- Serial0/0/0: 60.0.0.3 with a subnet mask of 255.0.0.0

Each router's IP addresses are configured on their respective interfaces. The subnet masks for these IP addresses are set to 255.0.0.0, indicating that the entire first octet represents the network, and the remaining three octets can be used for host addresses within the network.

II. **Configure different routes with OSPF routing**

1. Router 0 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 20.0.0.0 0.255.255.255 area 1

Router(config-router)# network 40.0.0.0 0.255.255.255 area 1

2. Router 1 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 30.0.0.0 0.255.255.255 area 1

Router(config-router)# network 50.0.0.0 0.255.255.255 area 1

3. Router 2 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 10.0.0.0 0.255.255.255 area 1

Router(config-router)# network 20.0.0.0 0.255.255.255 area 1

Router(config-router)# network 30.0.0.0 0.255.255.255 area 1

4. Router 3 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 40.0.0.0 0.255.255.255 area 1

Router(config-router)# network 60.0.0.0 0.255.255.255 area 1

5. Router 4 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 10.0.0.0 0.255.255.255 area 1

6. Router 5 Configuration:

Router(config)# router ospf 1

Router(config-router)# network 60.0.0.0 0.255.255.255 area 1

The above configurations set up OSPF on each router, and they advertise their directly connected networks to OSPF.

III. Activate different route

To activate different routes using OSPF

1. Router 0 Configuration:
Assuming you want to activate routes to networks 40.0.0.0/8 and 60.0.0.0/8:

Router(config)# router ospf 1
Router(config-router)# network 40.0.0.0 0.255.255.255 area 0
Router(config-router)# network 60.0.0.0 0.255.255.255 area 0

2. Router 1 Configuration:
Assuming you want to activate routes to networks 10.0.0.0/8:
Router(config)# router ospf 1
Router(config-router)# network 10.0.0.0 0.255.255.255 area 0

3. Router 2 Configuration:
No additional configurations are needed, as Router 2 is already advertising routes to networks 10.0.0.0/8, 20.0.0.0/8, and 30.0.0.0/8.

4. Router 3 Configuration:
No additional configurations are needed, as Router 3 is already advertising routes to networks 40.0.0.0/8 and 60.0.0.0/8.

5. Router 4 Configuration:
Assuming you want to activate routes to networks 20.0.0.0/8 and 30.0.0.0/8:
Router(config)# router ospf 1
Router(config-router)# network 20.0.0.0 0.255.255.255 area 0
Router(config-router)# network 30.0.0.0 0.255.255.255 area 0

6. Router 5 Configuration:
No additional configurations are needed, as Router 5 is already advertising routes to network 60.0.0.0/8.

IV.   **Save all configuration in router**

To save the configurations on the routers, you can use the "write memory" or "copy running-config startup-config" command.

1. Router 0:

Router0# write memory

2. Router 1:

Router1# write memory

3. Router 2:

Router2# write memory

4. Router 3:

Router3# write memory

5. Router 4:

Router4# write memory

6. Router 5:

Router5# write memory

These commands will save the running configurations to the startup configurations, ensuring that your configurations are retained even after a router reboot.

V.   In project report copy all the codes

Router 1:

Router 1 Configuration

- Initial IP Configuration
Router(config)# interface Serial0/0/0
Router(config-if)# ip address 30.0.0.3 255.0.0.0
Router(config-if)# no shutdown

Router(config-if)# interface Serial0/0/1
Router(config-if)# ip address 50.0.0.2 255.0.0.0
Router(config-if)# no shutdown

- OSPF Configuration
Router(config)# router ospf 1
Router(config-router)# network 30.0.0.2 0.255.255.255 area 1
Router(config-router)# network 50.0.0.3 0.255.255.255 area 1

- Save Configuration
Router(config-router)# do write

Router 2:

Router 2 Configuration

- Initial IP Configuration
Router(config)# interface Serial0/1/0
Router(config-if)# ip address 10.0.0.3 255.0.0.0
Router(config-if)# no shutdown

Router(config-if)# interface Serial0/0/0
Router(config-if)# ip address 20.0.0.2 255.0.0.0
Router(config-if)# no shutdown

Router(config-if)# interface Serial0/1/1
Router(config-if)# ip address 30.0.0.2 255.0.0.0
Router(config-if)# no shutdown

- OSPF Configuration
Router(config)# router ospf 1
Router(config-router)# network 10.0.0.2 0.255.255.255 area 1
Router(config-router)# network 20.0.0.3 0.255.255.255 area 1
Router(config-router)# network 30.0.0.3 0.255.255.255 area 1

- Save Configuration
Router(config-router)# do write

Router 3:

Router 3 Configuration

- Initial IP Configuration

Router(config)# interface Serial0/1/0

Router(config-if)# ip address 40.0.0.3 255.0.0.0

Router(config-if)# no shutdown

Router(config-if)# interface Serial0/1/1

Router(config-if)# ip address 60.0.0.2 255.0.0.0

Router(config-if)# no shutdown

- OSPF Configuration

Router(config)# router ospf 1

Router(config-router)# network 40.0.0.2 0.255.255.255 area 1

Router(config-router)# network 50.0.0.2 0.255.255.255 area 1

Router(config-router)# network 60.0.0.3 0.255.255.255 area 1

- Save Configuration

Router(config-router)# do write

Router 4:

Router 4 Configuration

- Initial IP Configuration

Router(config)# interface Serial0/0/0

Router(config-if)# ip address 10.0.0.2 255.0.0.0

Router(config-if)# no shutdown

- OSPF Configuration

Router(config)# router ospf 1

Router(config-router)# network 10.0.0.0 0.255.255.255 area 1

- Save Configuration

Router(config-router)# do write

Router 5:

Router 5 Configuration

- Initial IP Configuration

Router(config)# interface Serial0/0/0

Router(config-if)# ip address 60.0.0.3 255.0.0.0

Router(config-if)# no shutdown

- OSPF Configuration

Router(config)# router ospf 1

Router(config-router)# network 60.0.0.2 0.255.255.255 area 1

- Save Configuration

Router(config-router)# do write

Router 6:

Router 6 Configuration

- Initial IP Configuration
Router(config)# interface Serial0/0/0
Router(config-if)# ip address 20.0.0.3 255.0.0.0
Router(config-if)# no shutdown

- OSPF Configuration
Router(config)# router ospf 1
Router(config-router)# network 20.0.0.2 0.255.255.255 area 1

- Save Configuration
Router(config-router)# do write

Conclusion :

In conclusion, the provided configuration and network setup involve six routers interconnected through various interfaces. The network is built using OSPF (Open Shortest Path First) routing protocol to enable efficient routing and connectivity between the routers.

Here's what we've learned from this project:

1. Router Configuration: We have configured six routers with specific IP addresses and interfaces. This includes setting up the IP addresses for each router and enabling the interfaces. Configuring routers is essential for establishing network connectivity.

2. OSPF Routing: The OSPF routing protocol has been implemented to allow routers to dynamically discover and share routing information. OSPF helps in finding the best paths to different networks within the network infrastructure.

3. Network Subnetting: The project demonstrates IP subnetting by dividing the IP address space into network and host portions. Subnetting allows for efficient IP address allocation and management within the network.

4. Hardware and Cabling: We've also discussed the physical infrastructure, including the roles of routers, switches, various cable types, and hardware interfaces. Understanding these components is crucial for building a robust network.

5. Configuration Saving: We've learned how to save router configurations. This is essential to ensure that configurations are not lost in case of a router reboot or power outage.

6. Systematic Documentation: The project emphasizes the importance of documenting configurations systematically, making it easier to manage and troubleshoot the network in the future.

Overall, this project serves as a practical demonstration of setting up a network with multiple routers, implementing routing protocols, and understanding the essential components of a network infrastructure. The knowledge gained can be applied to real-world network setups, helping in building and maintaining robust and efficient networks.