

# Activity based Project 1 Report on

Computer Networks

# Submitted to Vishwakarma University, Pune Under the Initiative of



**Contemporary Curriculum, Pedagogy, and Practice (C2P2)**

**By**

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# Second Year Engineering

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**C2P2 Project-1 Problem Statement :**

**Create an efficient and scalable LAN using OSPF Protocol**

**Project Problem Description**

The goal of this project is to create an efficient and scalable Local Area Network (LAN) using the Open Shortest Path First (OSPF) routing protocol. The network comprises two main segments connected by two routers configured in OSPF Area 0 (backbone area). Each router connects to a switch, which links to multiple PCs in different subnets. The objective is to enable successful communication between all devices in the network by establishing reliable routes using OSPF, a dynamic routing protocol known for fast convergence and scalability.

**I. Physical Infrastructure**

1. Hardware Interfaces
   * Routers: Cisco routers (with interfaces such as Serial0/2/0 and FastEthernet0/0).
   * Switches: Cisco Catalyst switches used to connect PCs within the LANs.
   * PCs: Connected to switches within each LAN.
2. Cabling
   * Ethernet Cables: Connect PCs to switches and switches to routers within each LAN.
   * Serial Cable: Connects the Serial interfaces of routers to create the WAN link.

**II. Network Configuration**

1. IP Address Allocation
   * 192.168.10.0/24: For the first LAN, with a default gateway of 192.168.10.1.
   * 192.168.30.0/24: For the second LAN, with a default gateway of 192.168.30.1.
   * 192.168.20.0/24: For the WAN link between the two routers.
2. Subnet Mask
   * 255.255.255.0 (24 bits for network and 8 bits for host) for all subnets.
3. Default Gateway
   * PC0 and PC1: 192.168.10.1
   * PC2 and PC3: 192.168.30.1

**III. Hardware Details**

1. Router
   * Role: Routers are responsible for directing traffic between LANs and connecting them over the WAN.
   * Configuration: Configured with IP addresses on Serial and Fast Ethernet interfaces and enabled OSPF routing.
2. Switches
   * Role: Switches are used to connect multiple PCs within a single LAN, enabling local traffic.
   * Configuration: Connected to router Fast Ethernet interfaces.
3. Cables
   * Ethernet Cables: Connect switches to PCs and to router Fast Ethernet ports.
   * Serial Cables: Connect routers over the WAN link.
4. Interfaces
   * Serial Interfaces: For WAN connection between routers (e.g., Serial0/2/0).
   * Fast Ethernet Interfaces: For LAN connections (e.g., FastEthernet0/0).

**Router 1 configurationA screenshot of a computer program

Description automatically generated**

**Router 2 configuration**

**A screenshot of a computer program

Description automatically generated**

**LAN using OSPF Protocol**

**A diagram of a network

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**Runtime Simulation:**

**A screenshot of a graph

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**Conclusion**

In this project, we successfully designed and implemented a scalable and efficient LAN using the OSPF routing protocol. By configuring OSPF in a multi-area setup, we optimized the network for quick convergence and reliable routing. The hierarchical nature of OSPF allowed for organized routing, and our configuration enabled seamless communication across network segments. This project demonstrated the effectiveness of OSPF in managing routing in a complex network environment, highlighting its suitability for enterprise-scale networks that require high performance and scalability.