



SUPERIOR UNIVERSITY

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Project Documentation

Name = Muhammad waleed

Roll no = SU92-BSSEM-F22-105

Section = 5B

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Submitted by = Sir Rasikh Ali

Project Documentation: Superior University City Campus Management System

Project Overview

The Superior University City Campus Management System aims to implement an efficient, scalable, and secure network infrastructure. The design utilizes 4 routers, 8 switches, and incorporates key networking technologies such as DHCP, VLANs, DNS, and Routing. This system is tailored to handle the administrative and academic requirements of the campus, ensuring smooth connectivity and resource management.

Network Design Objectives

- **Scalability:** Support for future expansion of users and devices.
- **Security:** Implement VLANs to segregate network traffic and secure sensitive data.
- **Reliability:** Provide redundant routing paths and robust network configurations.
- **Efficiency:** Automate IP addressing using DHCP and centralize name resolution using DNS.

Network Topology

Devices

- **Routers:** 4 (Core and distribution layer connectivity)
- **Switches:** 8 (Access layer connectivity)
- **Servers:** DHCP, DNS, File Servers, Application Servers
- **Client Devices:** Faculty, Administrative Staff, and Student PCs

Logical Topology

- **Core Router:** Connects to all distribution routers and provides backbone connectivity.
- **Distribution Layer:** Three routers for department-wise segmentation (e.g., Admin, Academic, Labs).
- **Access Layer:** 8 switches connect end-user devices, divided among buildings and floors.

Network Configuration

1. VLAN Configuration

VLANs are used to segment network traffic for security and efficiency:

- **VLAN 10:** Administration
- **VLAN 20:** Faculty
- **VLAN 30:** Students
- **VLAN 40:** Labs

2. DHCP Configuration

The DHCP server dynamically assigns IP addresses to devices in each VLAN.

- **Subnet for Admin VLAN (10):** 192.168.10.0/24
- **Subnet for Faculty VLAN (20):** 192.168.20.0/24
- **Subnet for Students VLAN (30):** 192.168.30.0/24
- **Subnet for Labs VLAN (40):** 192.168.40.0/24

3. DNS Configuration

The DNS server resolves domain names to IP addresses, centralizing name resolution.

- Domain: **superior.edu**
- Example Records:

- **admin.superior.edu** -> 192.168.10.10
- **faculty.superior.edu** -> 192.168.20.20

4. Routing Configuration

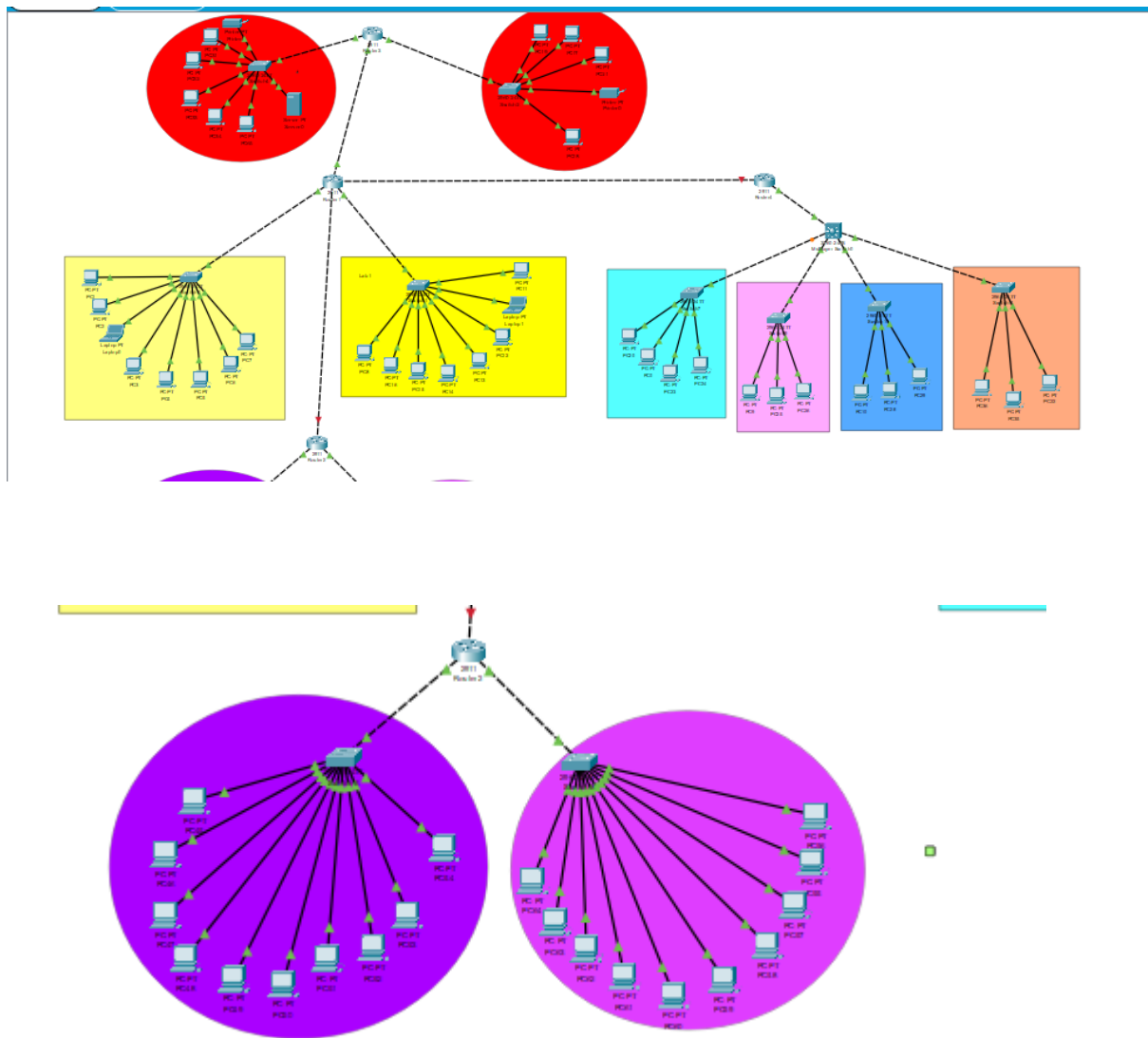
Dynamic routing protocols ensure seamless inter-VLAN and inter-department communication. **OSPF** is used for efficient routing.

- Router Interfaces:
 - **Admin Router:** Interfaces for VLANs 10, 20
 - **Academic Router:** Interfaces for VLANs 30, 40

Implementation Steps

1. **Physical Installation:**
 - Deploy 4 routers at core and distribution layers.
 - Place 8 switches across access layers, with uplinks to routers.
2. **Initial Configuration:**
 - Set up VLANs on switches.
 - Configure IP addressing on routers and switches.
3. **Service Deployment:**
 - Install and configure DHCP and DNS servers.
 - Enable OSPF routing on routers.
4. **Testing:**
 - Verify IP allocation for all VLANs.
 - Test inter-VLAN communication.
 - Check DNS resolution for domain names.

Network diagram :



Conclusion

The Superior University City Campus Management System provides a robust and secure network infrastructure, leveraging DHCP, VLANs, DNS, and routing technologies. This system is scalable to meet future campus needs and ensures efficient management of resources.