# Advanced Enterprise Network Project Proposal

1. Introduction

This project proposal outlines an advanced enterprise network design solution, focusing on a mixed routing architecture to deliver optimal performance, reliability, and scalability. The design integrates both static and OSPF routing protocols, managed switches, and dedicated servers to support a robust and efficient IT infrastructure. This document is based on the 'Advanced Enterprise Network' presentation and incorporates the provided network topology diagram.

2. Network Topology

The following diagram illustrates the proposed advanced enterprise network topology, showcasing the interconnected routers, switches, workstations, and servers, along with their respective VLAN assignments and IP addressing schemes.
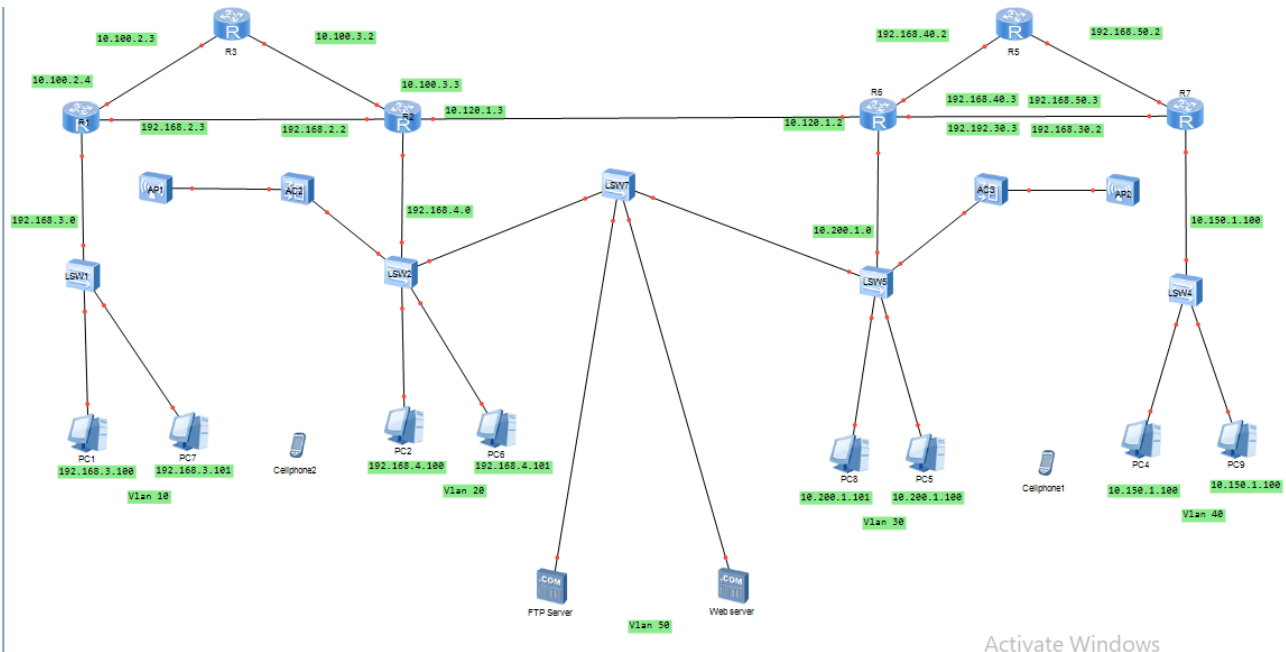
2.1. Mixed Routing Architecture

The proposed network architecture utilizes a mixed routing approach, combining the reliability of static routing with the adaptability of OSPF protocols. This hybrid design ensures both predictable traffic flows and dynamic network resilience for enterprise operations.

- **Six Routers:** Configured with dual routing protocols for optimal performance.

- **North Routers (3):** Implement static routing, providing predictable traffic paths and manual route control for applications requiring consistent performance.

- **Right Routers (3):** Implement OSPF dynamic routing, offering automatic topology discovery, fast convergence capabilities, and adaptive path selection for resilient network operations and failure recovery.

- **Servers (2):** One FTP server and one Web server are included to provide essential services.

- **Managed Switches (5):** Provide segmented connectivity for ten workstations, enhancing network organization and efficiency.

2.2. Router Configuration Details

- **North Routers:** Three routers are configured with static routing protocols. This provides predictable traffic paths, manual route control, and deterministic network behavior for critical business applications requiring consistent performance.

- **Right Routers:** Three routers implement OSPF dynamic routing. This offers automatic topology discovery, fast convergence capabilities, and adaptive path selection for resilient network operations and failure recovery.

- **Routing Integration:** A strategic combination of static and OSPF protocols ensures optimal traffic distribution while maintaining network stability through redundant pathways and protocol-specific advantages.

- **Access Control List (ACL):** ACL protocol is used to identify and direct users who are allowed to use servers and also prevent some users from using servers according to company policy.

2.3. Switch Infrastructure Overview

The comprehensive configuration details for the five-switch access layer provide connectivity for eight workstations with VLAN segmentation, traffic management, and redundant uplink connections to the router infrastructure. The table below summarizes the key aspects of each switch:

Switch ID	Port Count	Connected Devices	VLAN Config	Uplink Speed	Bandwidth Util	Status
SW-01	24 Ports	2 Workstations	VLAN 10	1 Gbps	28%	Active
SW-02	24 Ports	2 Workstations	VLAN 20	1 Gbps	32%	Active
SW-03	24 Ports	2 Workstations	VLAN 30	1 Gbps	1 Gbps	Active
SW-04	24 Ports	2 Workstations	VLAN 40	1 Gbps	35%	Active
SW-05	24 Ports	2 Servers	VLAN 50	1 Gbps	30%	Active

2.4. Network Hierarchy Architecture

The network design follows a hierarchical architecture, which simplifies management, improves fault isolation, and enhances scalability. The layers are defined as follows:

- **Router Layer:** Comprises six routers providing dual routing protocols with static and OSPF, forming the backbone of the network and handling inter-VLAN routing and WAN connectivity.

- **Distribution Layer:** Consists of five managed switches responsible for traffic aggregation and VLAN segmentation. This layer ensures efficient traffic flow and implements policies for quality of service and security.

- **Access Layer:** Connects eight workstations distributed across the switch infrastructure, providing optimal connectivity for end-user devices.

- **Service Layer:** Features centralized ACL protocol and configuration management, along with WLAN services for wireless communications, ensuring secure and managed access for all devices.

3. Conclusion

This project proposal presents an advanced enterprise network architecture designed for optimal performance, security, and scalability. By integrating a mixed routing approach, a robust switch infrastructure, and a hierarchical design, the proposed solution is well-suited to meet the evolving demands of a modern business environment. The inclusion of dedicated servers and comprehensive access control mechanisms further enhances the network's reliability and security. This design not only addresses current operational needs but also provides a flexible and future-proof foundation for continued growth and technological advancements.