Overall Enterprise Network Scenario

Project Title: VLAN-Based Enterprise Network with OSPF, DHCP & Wireless WFH Access

Scenario Overview

This project represents a real-world enterprise network connecting two geographically separated offices (Delhi and Mumbai) using a WAN serial link. The design incorporates VLAN-based segmentation, inter-VLAN routing, dynamic routing using OSPF, centralized and distributed DHCP services, and a SOHO home router providing wireless access to a remote Work From Home (WFH) user.

Delhi Office – Enterprise LAN

The Delhi site represents the main enterprise LAN. Two VLANs are created to logically separate departments. Inter-VLAN routing is implemented using Router-on-a-Stick on the Delhi router. DHCP pools are configured on the router to automatically assign IP addresses to end devices in each VLAN.

- VLAN 10: 192.168.0.0/24 (Gateway: 192.168.0.1)
- VLAN 20: 172.16.0.0/24 (Gateway: 172.16.0.1)

WAN Connectivity (Delhi ↔ Mumbai)

Both enterprise routers are connected using a point-to-point WAN serial link. This link is used exclusively for inter-site communication and routing.

- WAN Network: 10.0.0.0/30
- Delhi Router: 10.0.0.1
- Mumbai Router: 10.0.0.2

OSPF Dynamic Routing

OSPF (Single Area) is configured on both enterprise routers. It dynamically advertises all internal networks, including VLAN networks, WAN network, and the Mumbai-side LAN network, ensuring full end-to-end reachability.

Mumbai Office – Enterprise Edge

The Mumbai router acts as the enterprise edge device. It runs OSPF and provides DHCP services to directly connected devices, including a SOHO home router.
• Interface IP towards Home Router: 150.0.0.1
• Network: 150.0.0.0/24

Home Router – SOHO & WFH Scenario

A home router is directly connected to the Mumbai enterprise router. The home router WAN interface receives its IP address automatically via DHCP from the Mumbai router. The home router performs NAT and provides wireless access to a laptop, simulating a Work From Home user.

Wireless Client

A laptop connects wirelessly (Wi-Fi) to the home router. The laptop receives an IP address automatically via DHCP from the home router and accesses enterprise resources through NAT and OSPF-routed paths.

End-to-End Traffic Flow

1. Wireless Laptop → Home Router (Wi-Fi)
2. Home Router performs NAT
3. Home Router → Mumbai Router (150.0.0.1)
4. Mumbai Router → Delhi Router (OSPF via WAN)
5. Delhi Router → VLAN 10 / VLAN 20 networks

Conclusion

This project accurately simulates a modern enterprise network with VLAN-based segmentation, dynamic routing, centralized and distributed DHCP, and secure wireless access for remote users. The design reflects real MNC infrastructure and is suitable for CCNA, Network Engineer, NOC, and Linux Administrator roles.