Network Project Documentation

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Enterprise Network Design and Configuration Portfolio

This document presents a detailed overview of an enterprise-level network designed by Mustafa Fadol. The project demonstrates professional-level understanding of Cisco network infrastructure, hierarchical design, and secure configuration using industry-standard protocols and best practices.

1. Project Overview

The enterprise network is designed to provide scalability, flexibility, redundancy, and high security. It includes multiple departments, core routing, Layer 3 distribution switching, and access layer devices. The network implements VLANs, DHCP, DNS, web services, SSH, and access control lists (ACLs).

Departments:

- Accounting
- Research
- Logistics
- Marketing
- Human Resource
- Management
- Business
- Finance
- Server Room

2. Core Layer

The core layer consists of four Cisco 2901 routers connected in a full-mesh topology using serial DCE cables. This ensures maximum redundancy and fault tolerance. Each router connects to two Layer 3 switches for resilience. Key configurations include OSPF routing, SSH access, password encryption, and ACL-based management control.

3. Distribution Layer

The distribution layer is composed of four Cisco Catalyst 3650 Layer 3 switches. They aggregate connections from the core routers and serve as gateways for multiple VLANs and departments. Each switch provides inter-VLAN routing and DHCP services for its connected departments.

4. Access Layer

The access layer includes Layer 2 switches and end-user devices such as PCs, printers, and wireless access points. Each department is assigned a unique VLAN and IP subnet to segment traffic and improve security. Servers, including DNS, DHCP, and Web, are located in the Server Room VLAN for centralized management.

5. Security and Network Services

Security measures implemented across the network include SSH remote management, encrypted passwords, and ACLs restricting administrative access to specific hosts. VLAN segmentation limits broadcast domains. Spanning Tree Protocol (PVST) ensures loop-free redundancy, and OSPF provides dynamic routing between routers and Layer 3 switches.

6. Skills Demonstrated

- Enterprise network design and documentation
- Cisco router and switch configuration (IOS commands)
- OSPF dynamic routing protocol implementation
- VLAN segmentation and DHCP server configuration
- Access Control Lists (ACLs) and SSH security setup
- Spanning Tree Protocol (STP) configuration
- DNS and Web server integration
- IPv4 addressing and subnetting
- Troubleshooting and redundancy planning

7. Conclusion

This network project demonstrates a complete enterprise-grade infrastructure implemented using Cisco technologies. It highlights Mustafa Fadol’s technical proficiency in designing, configuring, and securing large-scale network environments suitable for professional deployment.