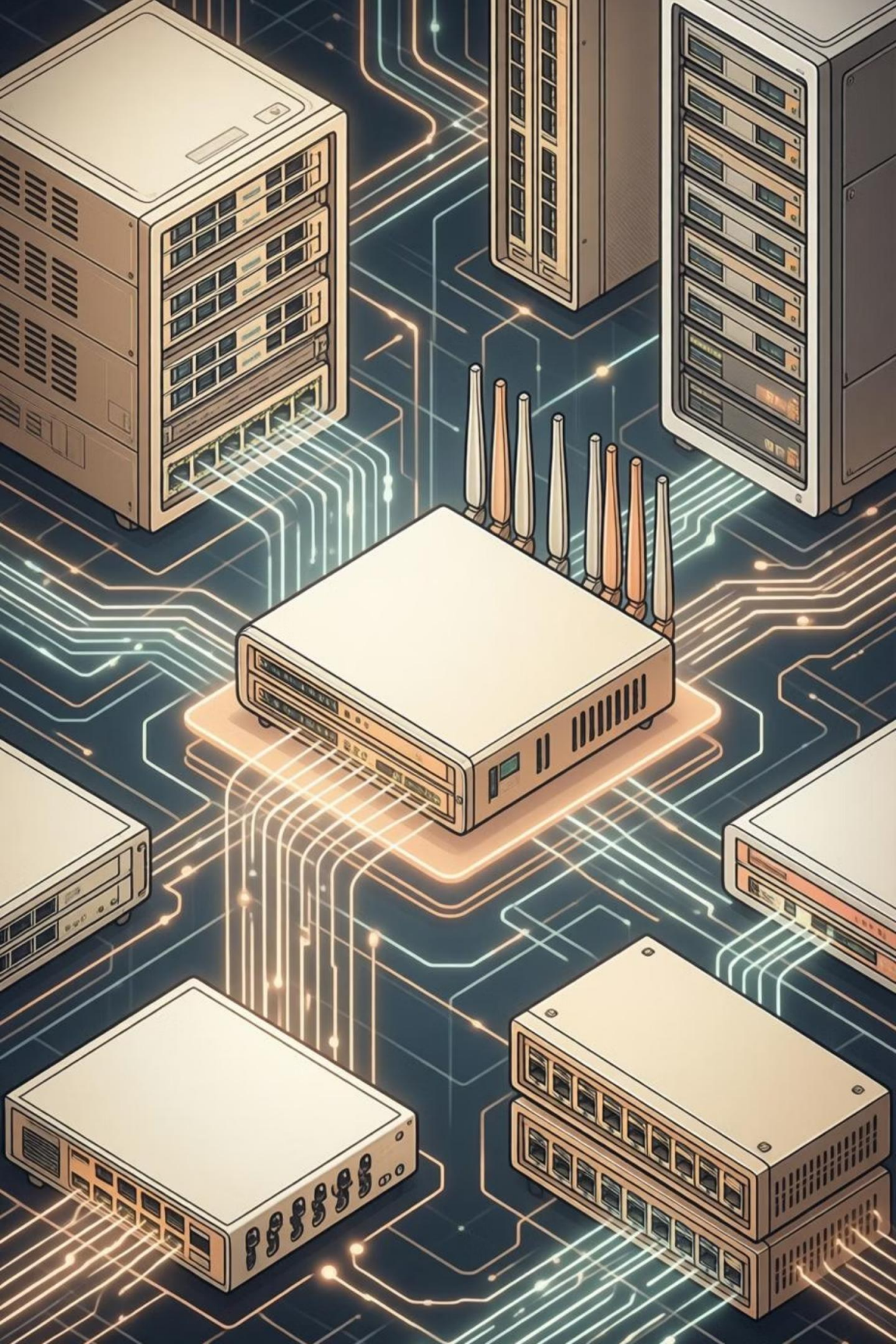


Enterprise Network & VoIP Configuration



Project Overview

Designing a Robust Enterprise Network

This project focuses on configuring an enterprise-level network with secure routing, VLAN segmentation, dynamic routing, and IP Telephony services using Cisco devices.



Multi-Department Network Architecture

We designed a network supporting HR, Sales, Finance, and ICT departments, integrating both data and voice communication.

HR Department

Human Resources

Sales Department

Sales Operations

Finance Department

Financial Management

ICT Department

IT Infrastructure

Key Network Components

Our setup leverages essential Cisco hardware and software for a comprehensive solution.



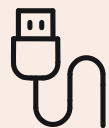
Cisco Routers

For secure routing



IP Phones

For voice communication



Copper Cables

Physical connections



Cisco Switches

For network segmentation



PCs

End-user devices



Packet Tracer

Simulation tool

VLAN Configuration: Separating Traffic

VLANs are crucial for segmenting voice and data traffic, enhancing network efficiency and security.

Data VLANs

- VLAN 20
- VLAN 50

Voice VLAN

- VLAN 100



Trunk ports connect routers and switches, while access ports are assigned to end devices and IP phones.

Router Configuration Essentials

Each router is meticulously configured to ensure secure and efficient network operations.

Hostname & Passwords

Unique hostname, console, and enable passwords for security.

MOTD Banner

Message of the Day banner for network access information.

Password Encryption

Enhanced security through password encryption.

SSH Remote Access

Secure Shell for encrypted remote management.

Inter-VLAN Routing

Using dot1Q for efficient communication between VLANs.

DHCP & IP Helper Configuration

Dynamic Host Configuration Protocol (DHCP) simplifies IP address management for Voice VLANs.



- DHCP services enabled for Voice VLANs.
- Option 150 provides TFTP server address to IP phones for configuration.
- IP helper-address configured on router sub-interfaces to forward DHCP requests.



OSPF Dynamic Routing

OSPF (Open Shortest Path First) ensures dynamic and efficient routing across all departments.



OSPF Process ID 10

Initiates dynamic routing.



Dynamic Routing Information

Routers exchange data automatically.



Full Connectivity

Ensures seamless communication across all subnets.

IP Telephony (VoIP) Configuration

Cisco Call Manager Express enables robust voice communication within the enterprise.

- Cisco Call Manager Express configured on the router.
- Max ephones: 20
- Directory numbers: 401 - 410
- IP phones automatically register and receive extension numbers.



Project Advantages & Conclusion

This project successfully demonstrates a scalable, secure, and efficient enterprise network with VoIP services.

Efficient Communication

Seamless voice and data.

Secure Remote Access

SSH for protected connections.

Scalable Design

Network can grow with needs.

Reduced Broadcast Traffic

VLANs optimize network performance.

Centralized VoIP

Simplified IP telephony management.

Unique point compared to a previous networking project?

The uniqueness of this project lies in the integration of VoIP services with data networking using VLAN separation, DHCP Option 150, and Cisco Call Manager Express, which is not implemented in basic networking projects