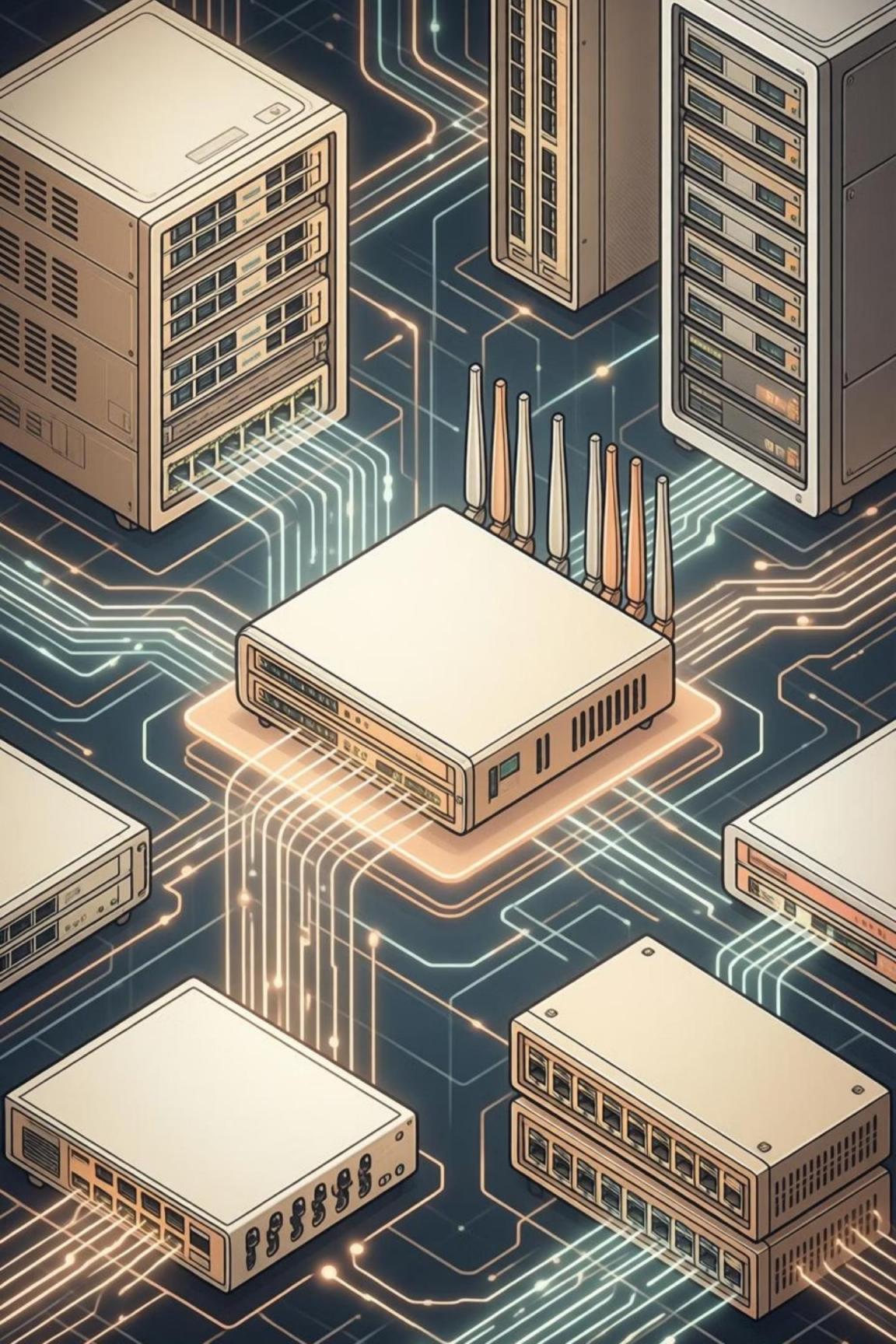


# ***Enterprise Network & VoIP Configuration***



## 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



## **Cisco Switches**

For network segmentation



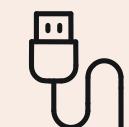
## **IP Phones**

For voice communication



## **PCs**

End-user devices



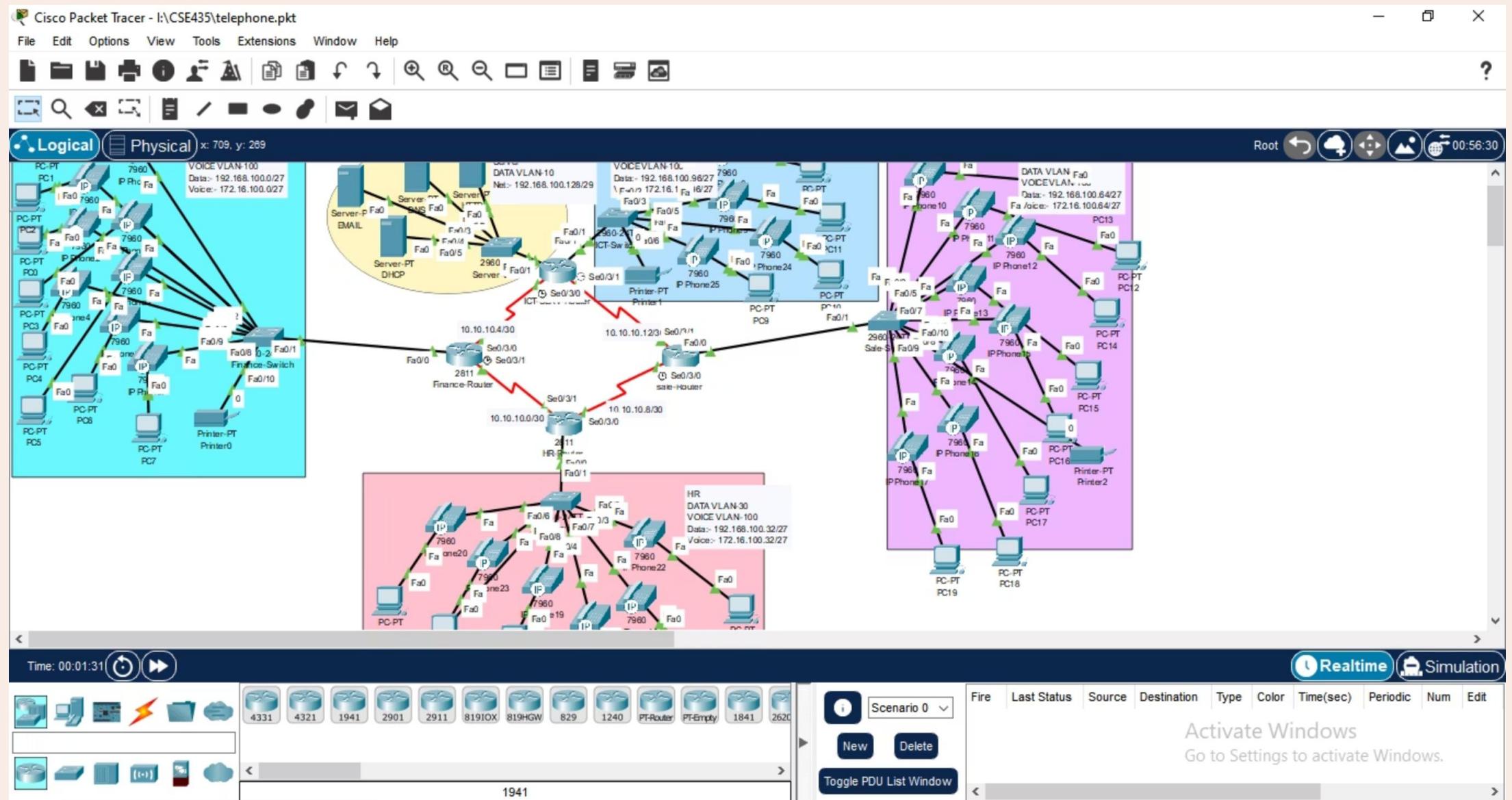
## **Copper Cables**

Physical connections



## **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***

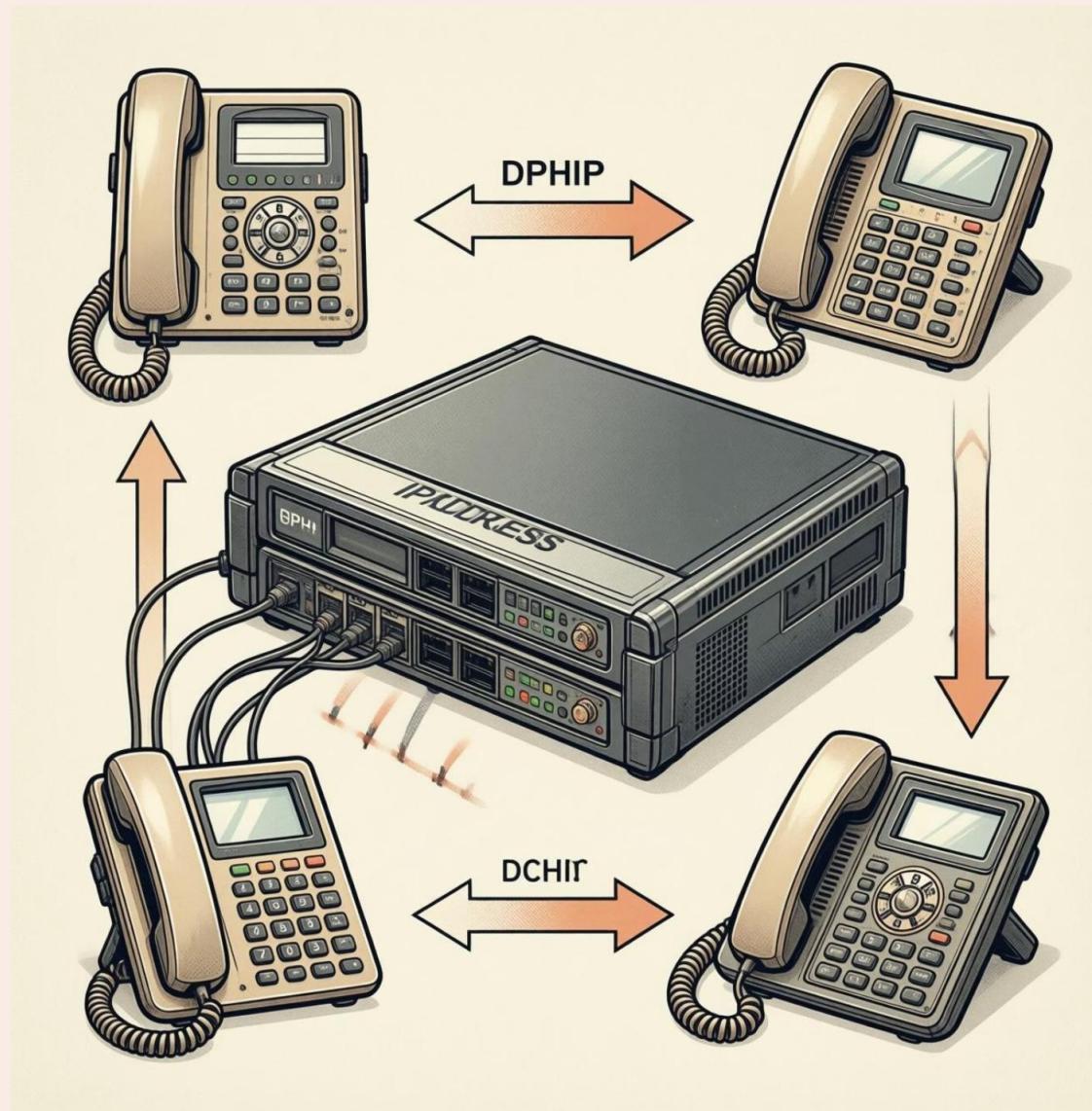
Secure Shell for encrypted remote management.

## ***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