# Design and Implement a Small Office Network

# Team Information

**Code:SHR1\_ISS2\_S1e**

**Team Members:**

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# Project Description

This project aims to design and implement a robust, scalable, and secure business network for a company's operations using Cisco Packet Tracer. The objective is to create an efficient network infrastructure that supports multiple departments while ensuring high performance, data integrity, and security.

The network design follows a hierarchical approach, utilizing core routers, multilayer switches, and VLAN segmentation to optimize data flow and manage traffic across various departments. The network is divided into several VLANs, including Sales, HR, Finance, ICT, Administration, and the Server Room. Each VLAN has its own IP address range, ensuring clear segmentation and enhanced security.

**Key Features of the Project:**

1. **Hierarchical Network Design**: The implementation uses a structured multi-layer network with core, distribution, and access layers to ensure scalability and easy management.
2. **VLAN Segmentation**: Virtual Local Area Networks (VLANs) are used to isolate traffic between departments, enhancing both performance and security by minimizing unnecessary data broadcasting.
3. **Redundancy and Fault Tolerance**: The network features redundant paths with multiple core routers and links to provide failover capabilities, reducing downtime and ensuring consistent connectivity.
4. **Advanced Security Measures**: Security features include SSH for secure remote management, Access Control Lists (ACLs) for traffic filtering, Port Security to prevent unauthorized device connections, and proper encryption techniques.
5. **Efficient IP Addressing Scheme**: A well-organized IP addressing plan has been implemented, using private IP ranges for each VLAN, facilitating network scalability and ease of troubleshooting.

**Technologies Implemented:**

* **Routing Protocols**: Configured dynamic routing with OSPF to ensure optimized data routing between different network segments.
* **DHCP and DNS Services**: Automated IP address allocation and domain name resolution are handled by dedicated DHCP and DNS servers.
* **Network Address Translation (NAT)**: Used to translate private IP addresses to a public IP for internet access, conserving IP address space.

The implementation of this network aims to address the growing needs of the company's IT infrastructure, ensuring that all departments have secure, reliable, and efficient access to resources. The design not only supports current operational requirements but also allows for future growth and expansion.

This project demonstrates a comprehensive understanding of CCNA-level networking principles, including VLAN configuration, IP subnetting, network security, and dynamic routing protocols. The result is a high-performance business network ready to handle the demands of a modern enterprise.