Hotel Network Design Documentation

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1. Project Overview

This project simulates the network infrastructure for a three-floor hotel using Cisco Packet Tracer. The design prioritizes a segmented, secure, and scalable network by incorporating VLANs to separate departments, utilizing DHCP for efficient IP management, and implementing secure remote access via SSH. The primary goal was to create a robust and manageable network that supports the hotel's operational needs across all floors.

2. Network Layout and Structure

The hotel network is logically separated by floor, with each floor having its own switch, router, and dedicated VLANs for different departments. This segmented design enhances security and improves performance.

- First Floor:
  - ✓ VLAN 80 - Reception: Dedicated for front-desk operations.
  - ✓ VLAN 70 - Store: For managing hotel supplies and inventory.
  - ✓ VLAN 60 - Logistics: To handle hotel logistics and deliveries.
  - ✓ Each VLAN includes a PC, a printer, and shares a wireless access point.

- Second Floor:
  - ✓ VLAN 30 - Sales: For the sales department.
  - ✓ VLAN 40 - HR: For human resources.
  - ✓ VLAN 50 - Finance: For the finance department.
  - ✓ Each VLAN includes a PC, a printer, and shares a wireless access point.

- Third Floor:
  - ✓ VLAN 10 - IT: For network administration and support.
  - ✓ VLAN 20 - Admin: For general administrative tasks.
  - ✓ Each VLAN includes a PC, a printer, and shares a wireless access point.

3. IP Addressing Scheme

A clear and consistent IP addressing scheme was implemented to manage the network. DHCP servers were configured to automatically assign IP addresses to devices within their respective VLANs.

Department	VLAN ID	Network Address	Default Gateway	DHCP Range
IT	10	192.168.10.0/24	192.168.10.1	192.168.10.10 - 192.168.10.100
Admin	20	192.168.20.0/24	192.168.20.1	192.168.20.10 - 192.168.20.100
Sales	30	192.168.30.0/24	192.168.30.1	192.168.30.10 - 192.168.30.100
HR	40	192.168.40.0/24	192.168.40.1	192.168.40.10 - 192.168.40.100
Finance	50	192.168.50.0/24	192.168.50.1	192.168.50.10 - 192.168.50.100
Logistics	60	192.168.60.0/24	192.168.60.1	192.168.60.10 - 192.168.60.100
Store	70	192.168.70.0/24	192.168.70.1	192.168.70.10 - 192.168.70.100
Reception	80	192.168.80.0/24	192.168.80.1	192.168.80.10 - 192.168.80.100

4. Technical Features Implemented

The project demonstrates proficiency in several key networking technologies:

- VLAN Configuration: Each department is isolated on its own VLAN, reducing broadcast traffic and enhancing security

- Inter-VLAN Routing: The network is configured to allow seamless communication between departments, demonstrating the use of a Layer 3 device for routing traffic between different VLANs.

- RIP (Routing Information Protocol): This dynamic routing protocol was used to enable communication between the routers on each floor, ensuring that traffic can be routed between the different building levels.

- DHCP & DNS: Centralized DHCP servers automatically assign IP addresses to devices, and a simulated DNS server provides name resolution.

- SSH & Port Security: SSH was configured for secure remote management of network devices. Port Security with Sticky MAC was implemented to restrict unauthorized device access on switch ports.

- Wireless Access: Wireless access points were deployed on each floor to provide Wi-Fi connectivity for guests and staff.

5. Skills and Validation

This project showcases a practical understanding of fundamental CCNA-level skills. The successful implementation was verified through extensive testing to ensure all features function as designed.

- VLANs and Subnetting: The IP addressing scheme and VLAN configuration demonstrate a solid grasp of network segmentation.

- Routing Protocols: The successful configuration and verification of RIP routing show an understanding of dynamic routing principles.

- Network Security: The use of SSH and Port Security highlights an ability to implement basic but critical network security measures.

- Layer 2 & Layer 3 Cisco IOS Commands: The project required the use of numerous Cisco IOS commands to configure switching (Layer 2) and routing (Layer 3) protocols.

6. Conclusion

All validation tests confirmed the network's functionality: devices within the same VLAN could communicate, inter-VLAN routing was successful, DHCP was working, and RIP routes were exchanged correctly. SSH and Port Security were also verified to be functioning as intended.