HOTEL NETWORK DESIGN AND CONFIGURATION REPORT

1. OBJECTIVE
   - ✓ The main objective of this project was to design and configure a detailed network of a small hotel with inter-vlan routing, centralized DHCP to dynamically assign all different department with IP addresses, port-security, SSH, VLANs, OSPF as the routing protocol and all other basic settings including usernames, passwords, banner MOTD, and line console. This project simulates real-world experience of configuring routing protocols, basic device security and assigning IP addresses from a centralized server.

2. NETWORK DESIGN

   Topology overview
   - ✓ 3 router connected to each other using a DCE cable.
   - ✓ 3 switches and each one in a different department.
   - ✓ A standalone DHCP server

   VLANs and Subnets

VLAN NAME	VLAN ID	SUBNET	DEFAULT GATEWAY
IT	10	192.168.1.0/24	192.168.1.1/24
ADMIN	20	192.168.2.0/24	192.168.2.1/24
SERVER	30	192.168.3.0/24	192.168.3.1/24
MARKETING	40	192.168.4.0/24	192.168.4.1/24
HR	50	192.168.5.0/24	192.168.5.1/24
FINANCE	60	192.168.6.0/24	192.168.6.1/24
LOGISTICS	70	192.168.7.0/24	192.168.7.1/24
STORE	80	192.168.8.0/24	192.168.8.1/24
RECEPTION	90	192.168.9.0/24	192.168.9.1/24
		10.10.10.0/30	
		10.10.10.4/30	
		10.10.10.8/30	

   Devices:
   - ✓ Routers: handles the routing protocols, inter-vlan routing
   - ✓ Layer 2 switches: manages Vlans and port-security
   - ✓ Pcs: simulated users in different departments assigned to different VLANs
   - ✓ DHCP server: handles all IP address assignment

3. CONFIGURATIONS

   Switch configurations
   - ✓ VLANs created for all departments
   - ✓ Ports assigned to VLANs based on departments and location
   - ✓ Trunk port configured to allow different VLANs to use the same interface connecting layer 2 switches to routers.

   Routers:
   - ✓ Subinterfaces created for each VLAN using the 802.1q encapsulation to allow communication between departments.
   - ✓ OSPF routing protocol configured to identify paths to reach different subnets
   - ✓ Default gateways assigned for inter-vlan routing
   - ✓ Serial interfaces configured to communication between routers
   - ✓ Clock rate configured since DCE cable are in use to allow data exchange between routers

   DHCP SERVER

- ✓ All DHCP pools configured to dynamically assign IP addresses to different departments as per VLAN assignment.

4. TESTING AND VALIDATION

Steps taken:

- ✓ Verified VLAN assignment by checking switch configuration using the "show vlan brief".
- ✓ Tested DHCP functionality by confirming IP address assignment to devices on the network.
- ✓ Used ping and tracert to test connectivity with and between VLANs and departments.
- ✓ Used commands such "show ip route", "show running-config" to troubleshoot the network.

Results:

- ✓ All devices with the same VLAN and different VLANs communicated successfully.
- ✓ Inter-vlan connectivity functioned as expected.
- ✓ Routes were clearly discovered with use of OSPF protocol.
- ✓ Port-security is functioning as expected.
- ✓ DHCP server successfully issued IP addresses across the entire network.
- ✓ Remote login is working perfectly.
- ✓ Banner message of the day is displayed on all devices.
- ✓ All devices require username and a password to login.

5. OBSERVATIONS and IMPROVEMENTS

Observations:

- ✓ Configuring and designing the network was a test of acquired skills, but straightforward on the other hand.
- ✓ OSPF, inter-vlan and VLAN tagging were the keys to ensure communications across different departments.

Potential improvements;

- ✓ Practice more on troubleshooting and keep improving on making mistakes.
- ✓ Add network monitoring for visibility.

6. CONCLUSION

- ✓ This project is a successful demonstration of design and configuring a network that has different departments. It shows skills implementation on different protocols and basic network settings such as OSPF, port-security, introducing a centralized DHCP on a network, inter-vlan using a router-on-a-stick method, and SSH for remote log. This lab provided more hands-on experience with foundational networking skills and troubleshooting