Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Computer Networks (01CT0503)	**Aim: Hotel management networking (Guided Project)**	
Experiment No: 14	**Date: 18-11-2024**	**Enrolment No: 92200133021**

Objective:
To design and implement a secure and efficient network infrastructure for a three-floor hotel, ensuring seamless communication across departments and reliable access to essential resources.

Overview of the Hotel Network Design:

The hotel spans three floors, each hosting specific departments vital to the hotel's operations. Each floor's network requirements are distinct, demanding careful planning to ensure optimal performance, security, and connectivity. The network will utilize VLAN segmentation, OSPF routing, DHCP services, and SSH configuration to meet these needs.

Network Design Considerations:

1. **Router Placement and Connectivity:**
    - Three routers are deployed in the server room located in the IT department on the third floor.
    - Routers interconnect using serial DCE cables with the following network addresses:
        - **10.10.10.0/30**
        - **10.10.10.4/30**
        - **10.10.10.8/30**
2. **Switch Placement:**
    - Each floor has a dedicated switch connecting departmental devices.
    - Wi-Fi networks are also provided on each floor for mobile devices like laptops and phones.
3. **Departmental VLANs:**
   Each department is assigned a unique VLAN with its subnet for efficient traffic management and security.

1st Floor VLANs:

- Reception: VLAN 80 (192.168.8.0/24)
- Store: VLAN 70 (192.168.7.0/24)
- Logistics: VLAN 60 (192.168.6.0/24)

2nd Floor VLANs:

- Finance: VLAN 50 (192.168.5.0/24)
- HR: VLAN 40 (192.168.4.0/24)
- Sales: VLAN 30 (192.168.3.0/24)

3rd Floor VLANs:

- Admin: VLAN 20 (192.168.2.0/24)
- IT: VLAN 10 (192.168.1.0/24)

4. **DHCP Configuration:**
   Each router is configured as a DHCP server, dynamically assigning IP addresses to devices within the VLAN's subnet.
5. **Routing Protocol:**
   OSPF (Open Shortest Path First) is configured to enable efficient routing between the routers, ensuring all devices can communicate across the network.
6. **Peripheral Devices:**
   Each department is equipped with its own printer, accessible only to devices within its VLAN.
7. **Port Security:**
   Port security is implemented on the IT department's switch to restrict access to port fa0/1. Only a designated test PC is allowed to connect to this port for testing purposes.
8. **SSH Configuration:**
   SSH (Secure Shell) is enabled on all routers, allowing secure remote login for network administrators.

Implementation Steps:

1. **Physical Setup:**
   - Install and connect routers, switches, and access points as per the floor plan.
   - Connect routers with serial DCE cables using the specified subnets.
2. **VLAN Configuration:**
   - Assign VLANs to each department based on the provided details.
   - Configure switches with appropriate VLAN settings.
3. **Routing Configuration:**

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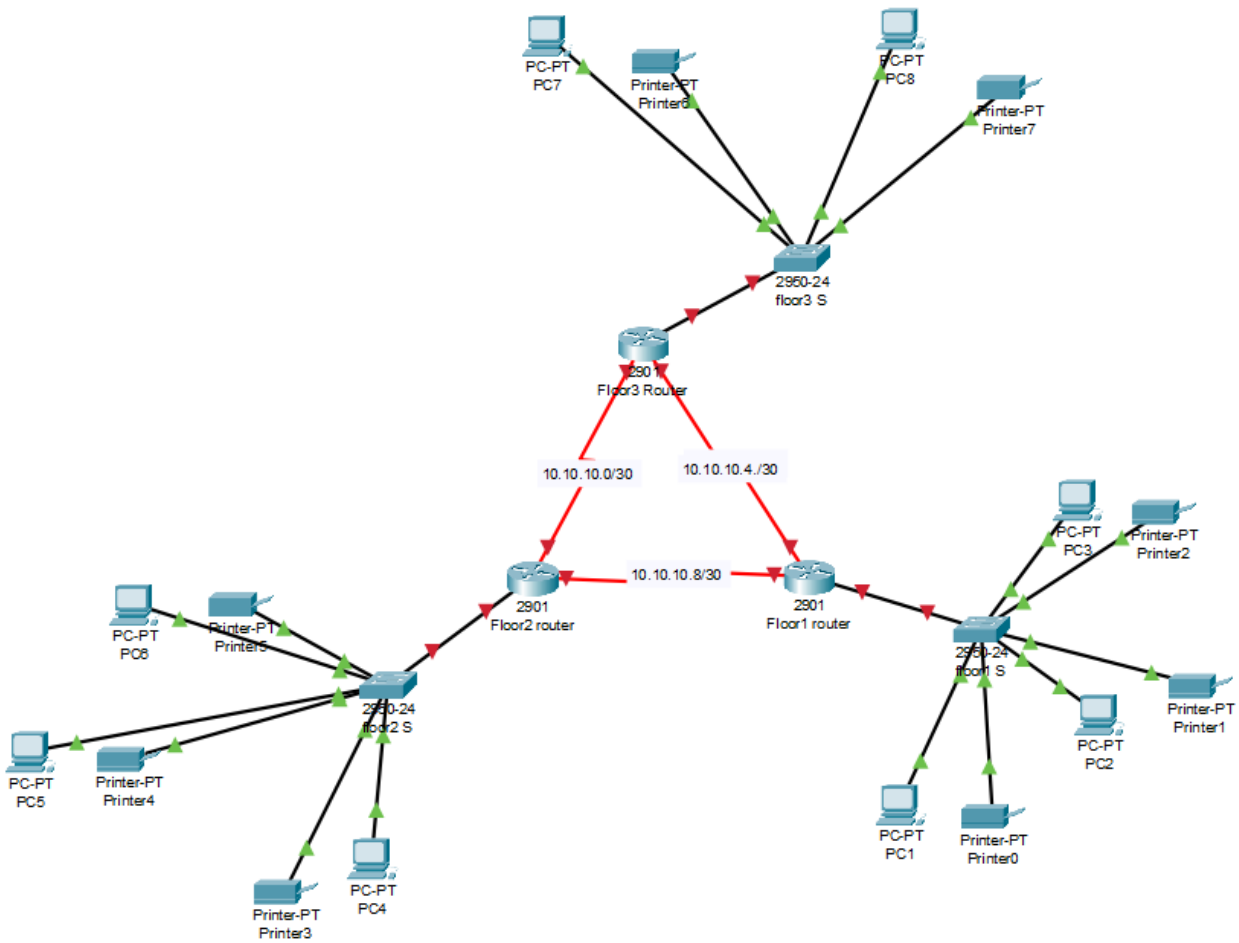
- Configure OSPF on all routers to advertise VLAN subnets and interconnect the network.

4. **DHCP Server Setup:**
   - Configure each router to provide dynamic IP addressing for its connected VLANs.

Firstly we set up the connection between router switch pc and printers at each floor on each department.



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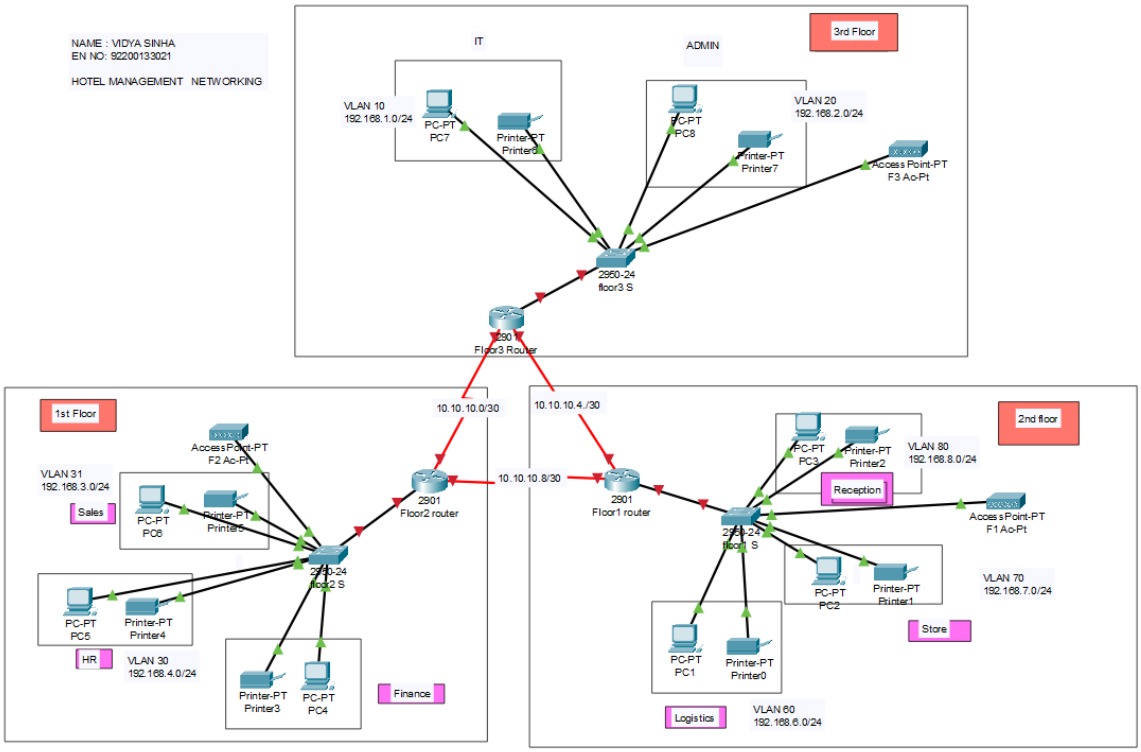

Lets configure the routers

ROUTER 1 (Floor 3 router)

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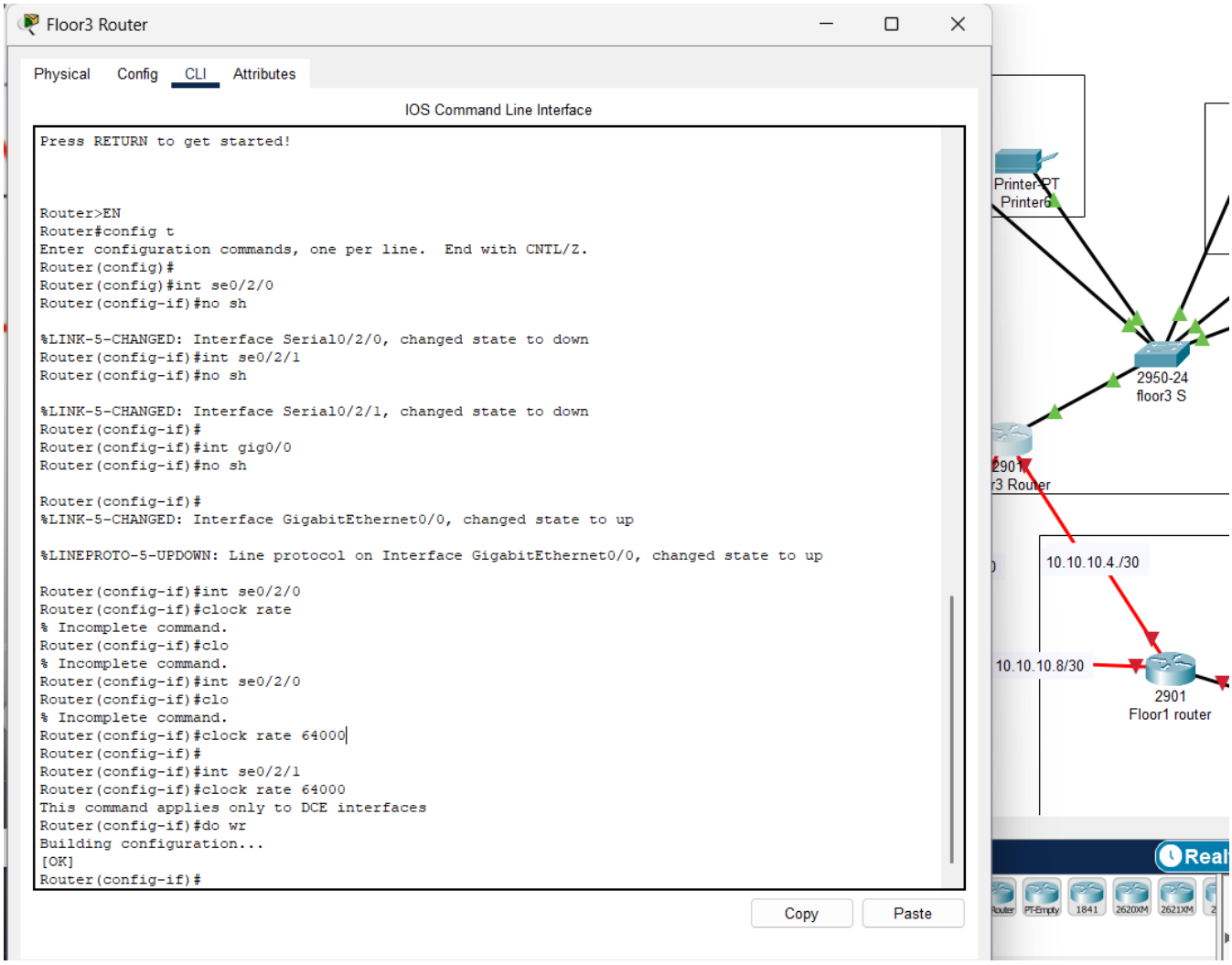

Router 2

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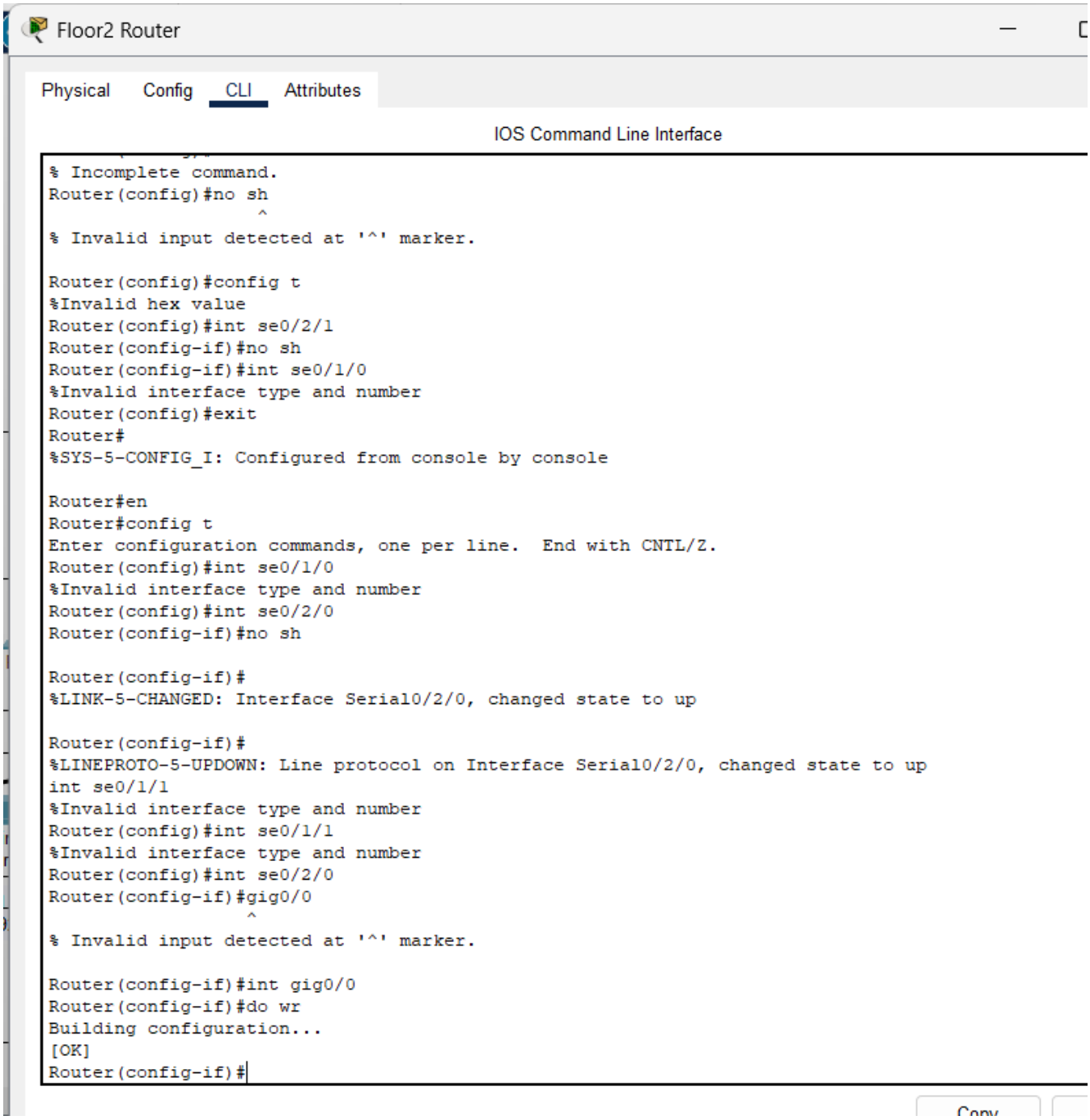

Router 3

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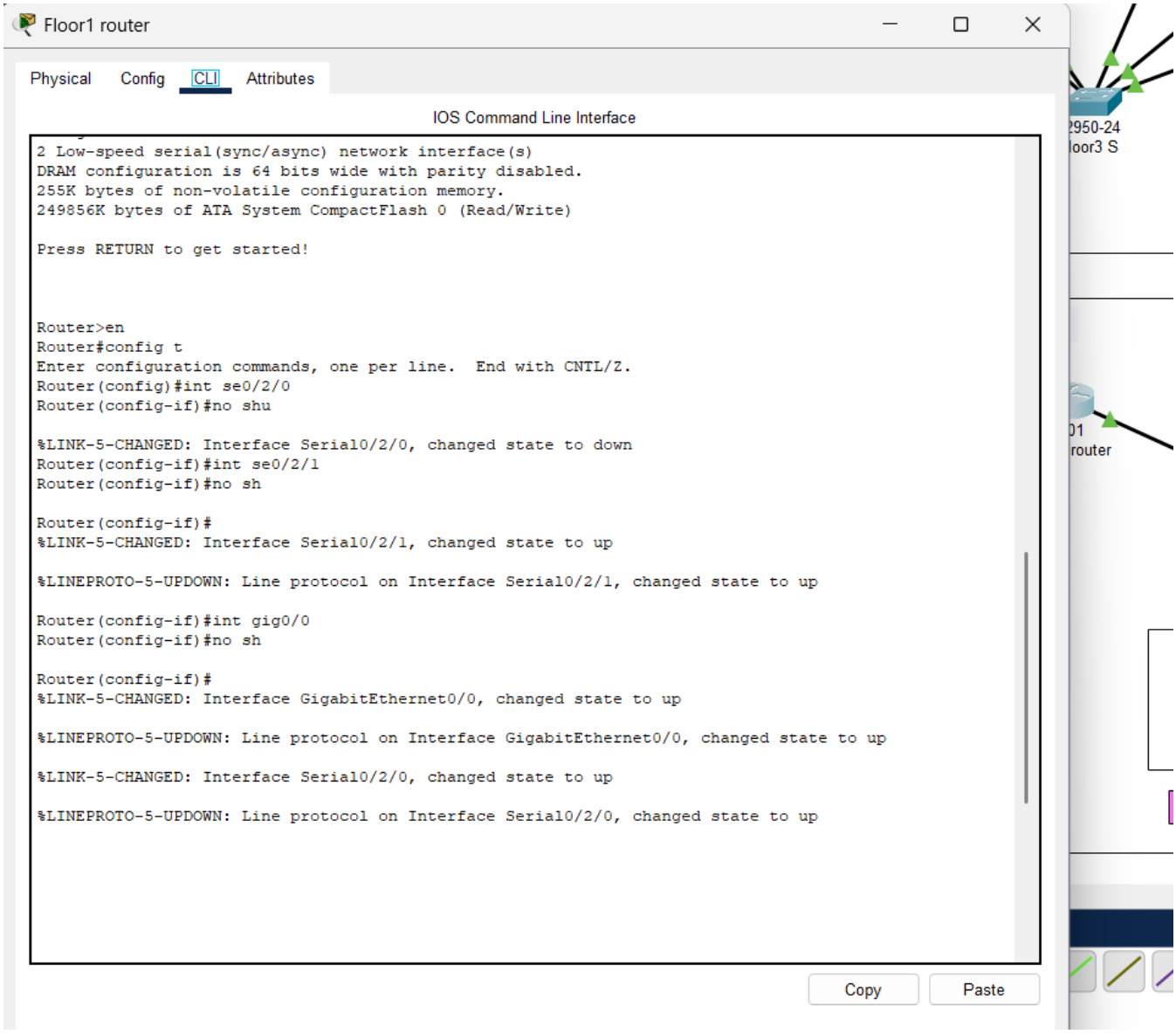

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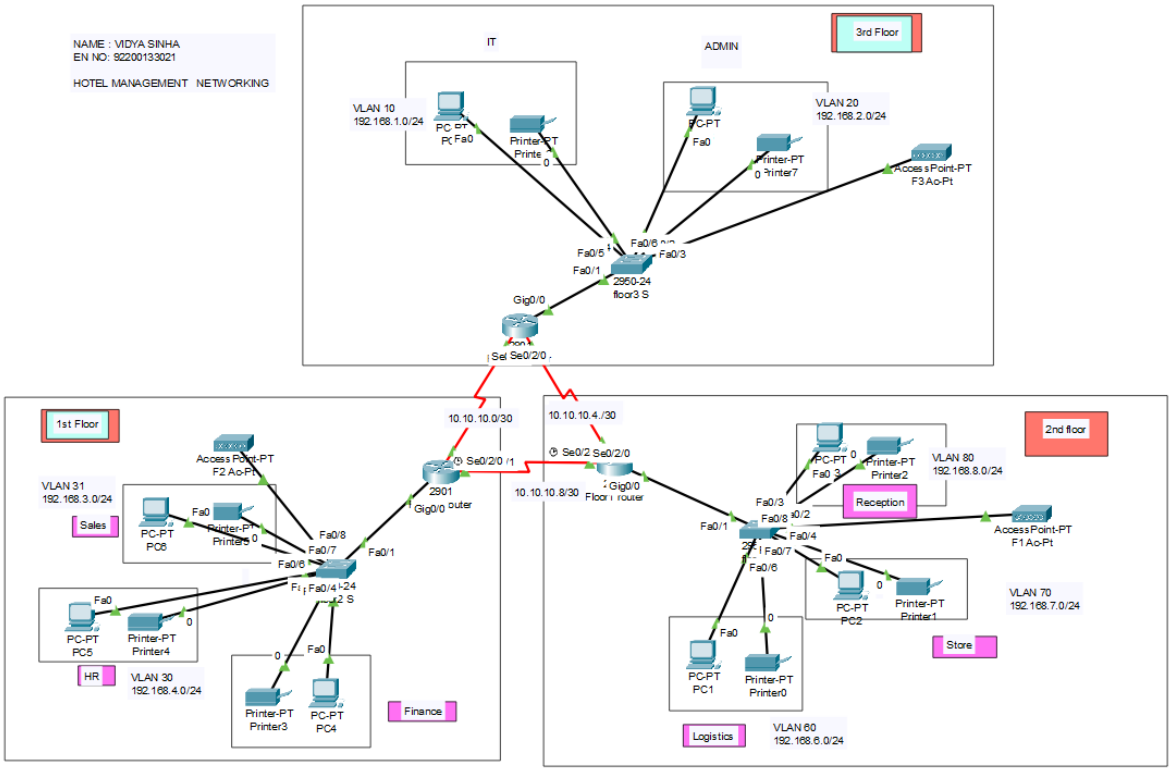

Now you can see all the routers and switches are configured.

Lets configure VLAN on every switch on each floor.

Switch 1

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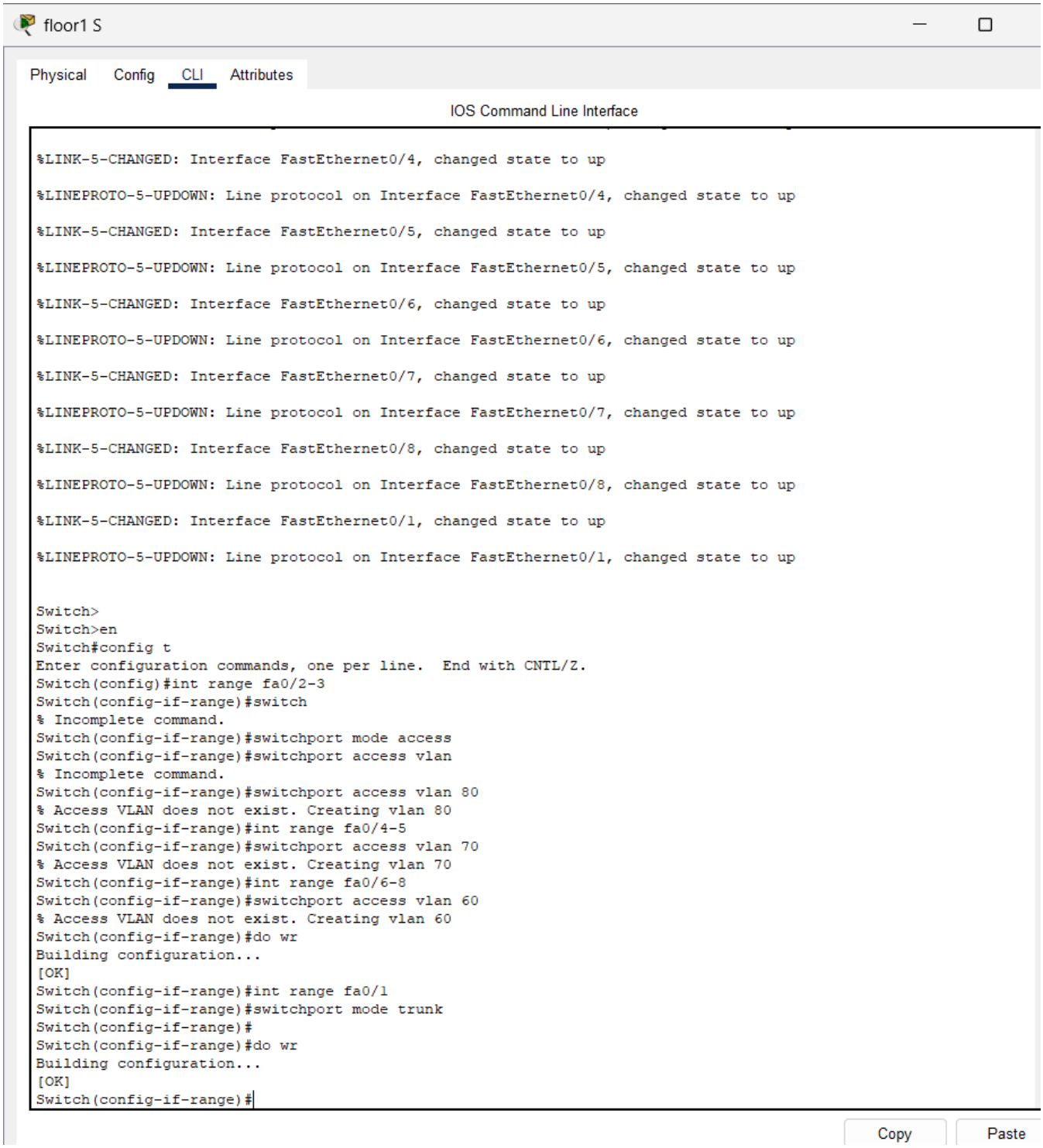

Switch 2

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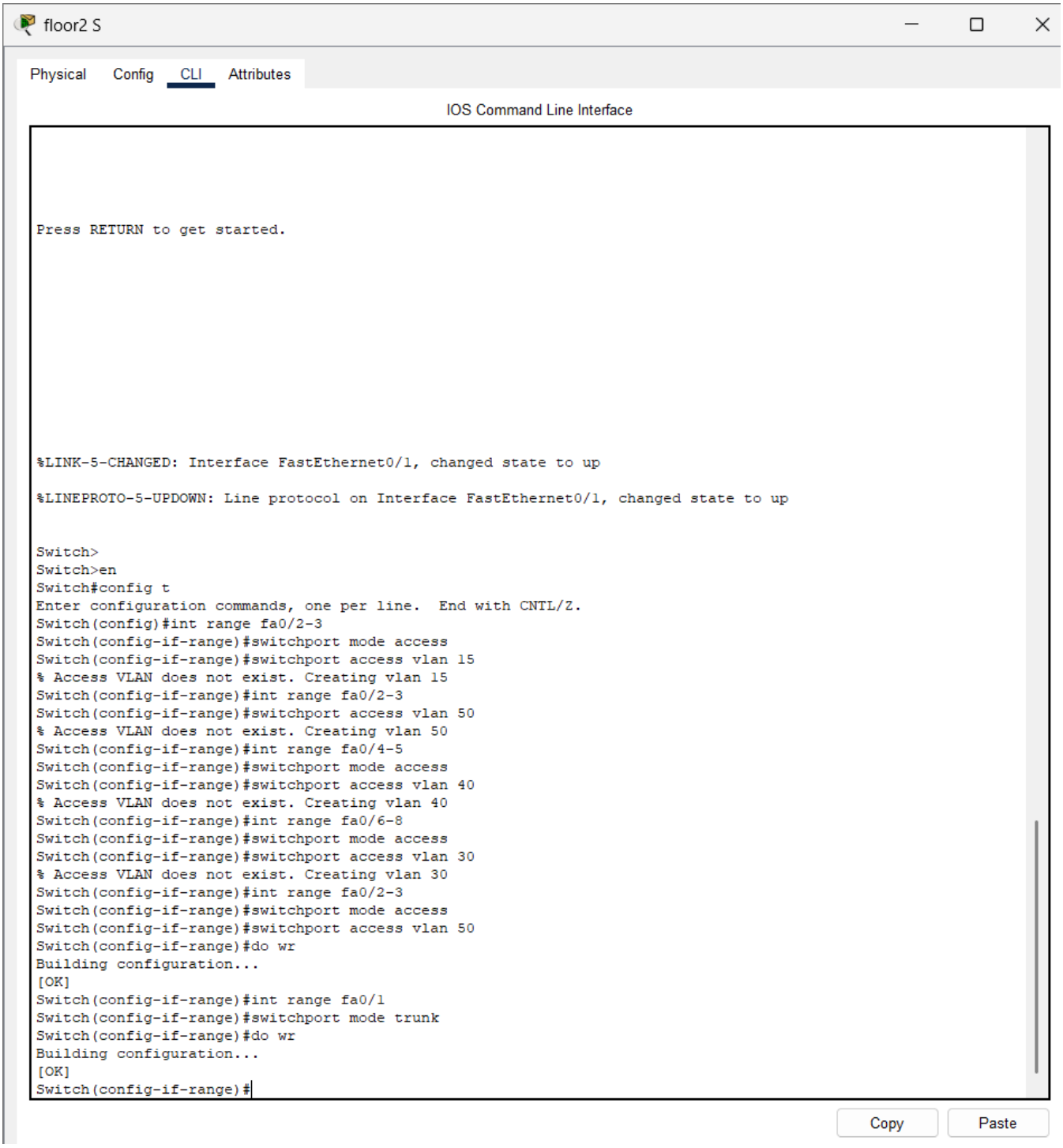

Switch 3

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floor3 S

Physical Config CLI Attributes

IOS Command Line Interface

```
Model number: WS-C2950-24
System serial number: FHK0610Z0WC

Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE(fc1)
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 18-May-05 22:31 by jharirba

Press RETURN to get started!


%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up


Switch>
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#int range fa0/4-6
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#switchport mode trunk
Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

Copy Paste

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```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.5 255.255.255.252
Router(config-if)#int se0/2/1
Router(config-if)#ip address 10.10.10.9 255.255.255.252
```

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.6 255.255.255.252
Router(config-if)#int se0/2/1
Router(config-if)#ip address 10.10.10.2 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
```

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/1/0
%Invalid interface type and number
Router(config)#/0^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
^Z
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.1 255.255.255.252
Router(config-if)#int se0/1/1
%Invalid interface type and number
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0, changed state to up

Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.10 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
```

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IOS Command Line Interface

```
Router(config-subif)#enc
Router(config-subif)#encapsulation d
Router(config-subif)#encapsulation dot1Q 80
Router(config-subif)#ip add
Router(config-subif)#ip address 192.168.8.1 255.255.255.0
Router(config-subif)#
Router(config-subif)#
Router(config-subif)#
Router(config-subif)#ex
Router(config)#
Router(config)#
Router(config)#int gig0/0.70
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.70, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.70, changed state to
up
```

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IOS Command Line Interface

```
Router(config-subif)#
Router(config-subif)#ex
Router(config)#
Router(config)#
Router(config)#int gig0/0.70
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.70, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.70, changed state to
up

Router(config-subif)#enc
Router(config-subif)#encapsulation d
Router(config-subif)#encapsulation dot1Q 70
Router(config-subif)#ip address 192.168.7.1 255.255.255.0
Router(config-subif)#ex
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#int gig0/0.60
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.60, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.60, changed state to
up

Router(config-subif)#enc
Router(config-subif)#encapsulation d
Router(config-subif)#encapsulation dot1Q 60
Router(config-subif)#ip address 192.168.6.1 255.255.255.0
Router(config-subif)#
```

Now lets configure DHCP server for router 1, 2 , 3

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```
[OK]
Router(config-subif)#ex
Router(config)#
Router(config)#
Router(config)#
Router(config)#serv
Router(config)#service dh
Router(config)#service dhcp
Router(config)#ip dhc
Router(config)#ip dhcp poo
Router(config)#ip dhcp pool Reception
Router(dhcp-config)#netw
Router(dhcp-config)#network 192.168.8.0 255.255.255.0
Router(dhcp-config)#def
Router(dhcp-config)#default-router 192.168.8.1
Router(dhcp-config)#dns
Router(dhcp-config)#dns-server 192.168.8.1
Router(dhcp-config)#ex
```

```
Router(config)#
Router(config)#
Router(config)#ip dhc
Router(config)#ip dhcp p
Router(config)#ip dhcp pool Store
Router(dhcp-config)#network 192.168.7.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.7.1
Router(dhcp-config)#dns-server 192.168.7.1
Router(dhcp-config)#
Router(dhcp-config)#
Router(dhcp-config)#
Router(dhcp-config)#ex
Router(config)#
Router(config)#
Router(config)#
Router(config)#ip dh
Router(config)#ip dhcp POO
Router(config)#ip dhcp POOl Logistics
Router(dhcp-config)#network 192.168.6.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.6.1
Router(dhcp-config)#dns-server 192.168.6.1
Router(dhcp-config)#ex
Router(config)#
Router(config)#
Router(config)#do wr
```

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Conclusion:

The design and implementation of the hotel network infrastructure ensure a fully operational system that supports seamless communication and resource sharing across all departments. By segmenting the network using VLANs, the design enhances both traffic management and security, creating isolated yet interconnected environments for each department. Dynamic IP allocation via DHCP and OSPF routing further ensure reliable connectivity and efficient inter-floor communication.

By implementing this network infrastructure, the hotel ensures efficient communication, robust security, and seamless access to essential services for guests and staff. The segmented STICK VLAN, DHCP, Passwords and routing configuration, facilitate smooth operations across different departments while maintaining network integrity and security