**Hotel Network Design and Implementation**

**Problem:**

As a part of your end year networking project, you are required to design and implement Vic Modern Hotel network. The hotel has three floors; in the first floor there three departments (Reception, store and Logistics), in the second floor there are three departments (Finance, HR and Sales/Marketing), while the third floor hosts the IT and Admin.

Therefore, the following are part of the considerations during the design and implementation.

1. There should be three routers connecting each floor (all placed in the server room in IT department).

2. All routers should be connected to each other using serial DCE cable.

3. The network between the routers should be 10.10.10.0/30,10.10.10.4/30,10.10.10.8/30

4. Each floor is expected to have one switch (placed in the respective floor).

5. Each floor is expected to have WIFI networks connected to laptops and phones.

6. Each department is expected to have a printer.

7. Each department is expected to be in different VLAN with the following details

1st Floor:

- Reception- VLAN 80, Network of 192.168.8.0/24

- Store- VLAN 70, Network of 192.168.7.0/24

- Logistics- VLAN 60, Network of 192.168.6.0/24

2nd Floor:

- Finance- VLAN 50, Network of 192.168.5.0/24

- HR-VLAN 40, Network of 192.168.4.0/24

- Sales- VLAN 30, Network of 192.168.3.0/24

3rd Floor:

- Admin- VLAN 20, Network of 192.168.2.0/24

- IT-VLAN 10, Network of 192.168.1.0/24

8. Use OSPF as the routing protocol to advertise routes.

9. All devices in the network are expected to obtain IP address dynamically with their respective router configured as the DHCP server.

10. All the devices in the network are expected to communicate with each other.

11. Configure SSH in all the routers for remote login.

12. In IT department, add PC called Test-PC to port fa0/2 and use it to test remote log.

13. Configure port security to IT-dept switch to allow only Test-PC to access port fa0/2 (use sticky method to obtain mac-address with violation mode of shutdown.)

**Solution:**

**Floor-1-Router:**

Router>enable

Router#config terminal

Router(config)#hostname Floor-1-Router

Floor-1-Router(config)# no ip domain-lookup

Floor-1-Router(config)# service password-encryption

Floor-1-Router(config)# enable secret floor1

Floor-1-Router(config)# banner motd # Unauthorized access is prohibited. #

Floor-1-Router(config)#int se 0/3/0

Floor-1-Router(config-if)#no shutdown

Floor-1-Router(config-if)#clock rate 64000

Floor-1-Router(config-if)#ip address 10.10.10.1 255.255.255.252

Floor-1-Router(config-if)#exit

Floor-1-Router(config)#interface se 0/3/1

Floor-1-Router(config-if)#no shutdown

Floor-1-Router(config-if)#clock rate 64000

Floor-1-Router(config-if)#ip address 10.10.10.9 255.255.255.252

Floor-1-Router(config-if)#exit

Floor-1-Router(config)#interface gig 0/0

Floor-1-Router(config-if)#no shutdown

Floor-1-Router(config-if)#exit

Floor-1-Router(config)#do wr

Floor-1-Router(config)#exit

**#Inter Vlan Routing**

Floor-1-Router>en

Floor-1-Router#conf t

Floor-1-Router(config)#int gig0/0.80

Floor-1-Router(config-subif)#encapsulation dot1Q 80

Floor-1-Router(config-subif)#ip address 192.168.8.1 255.255.255.0

Floor-1-Router(config-subif)#exit

Floor-1-Router(config)#int gig0/0.70

Floor-1-Router(config-subif)#encapsulation dot1Q 70

Floor-1-Router(config-subif)#ip address 192.168.7.1 255.255.255.0

Floor-1-Router(config-subif)#exit

Floor-1-Router(config)#int gig0/0.60

Floor-1-Router(config-subif)#encapsulation dot1Q 60

Floor-1-Router(config-subif)#ip address 192.168.6.1 255.255.255.0

Floor-1-Router(config-subif)#exit

Floor-1-Router(config)#do wr

Floor-1-Router(config)#exit

**#Configure DHCP Server**

Floor-1-Router>en

Floor-1-Router#conf t

Floor-1-Router(config)#service dhcp

Floor-1-Router(config)#ip dhcp pool Reception

Floor-1-Router(dhcp-config)#network 192.168.8.0 255.255.255.0

Floor-1-Router(dhcp-config)#default-router 192.168.8.1

Floor-1-Router(dhcp-config)#dns-server 192.168.8.1

Floor-1-Router(dhcp-config)#exit

Floor-1-Router(config)#ip dhcp pool Store

Floor-1-Router(dhcp-config)#network 192.168.7.0 255.255.255.0

Floor-1-Router(dhcp-config)#default-router 192.168.7.1

Floor-1-Router(dhcp-config)#dns-server 192.168.7.1

Floor-1-Router(dhcp-config)#exit

Floor-1-Router(config)#ip dhcp pool Logistics

Floor-1-Router(dhcp-config)#network 192.168.6.0 255.255.255.0

Floor-1-Router(dhcp-config)#default-router 192.168.6.1

Floor-1-Router(dhcp-config)#dns-server 192.168.6.1

Floor-1-Router(dhcp-config)#exit

Floor-1-Router(config)#do wr

Floor-1-Router(config)#exit

**#Exclude IP addresses for static devices**

Floor-1-Router>en

Floor-1-Router#conf t

Floor-1-Router(config)#ip dhcp excluded-address 192.168.8.1

Floor-1-Router(config)#ip dhcp excluded-address 192.168.7.1

Floor-1-Router(config)#ip dhcp excluded-address 192.168.6.1

Floor-1-Router(config)#do wr

Floor-1-Router(config)#exit

**#Enable Routing Protocol**

Floor-1-Router>en

Floor-1-Router#conf t

Floor-1-Router(config)#router ospf 10

Floor-1-Router(config-router)#network 10.10.10.0 0.0.0.3 area 0

Floor-1-Router(config-router)#network 10.10.10.8 0.0.0.3 area 0

Floor-1-Router(config-router)#network 192.168.8.0 0.0.0.255 area 0

Floor-1-Router(config-router)#network 192.168.7.0 0.0.0.255 area 0

Floor-1-Router(config-router)#network 192.168.6.0 0.0.0.255 area 0

Floor-1-Router(config-router)#exit

Floor-1-Router(config)#do wr

Floor-1-Router(config)#exit

**#Configure SSH**

Floor-1-Router(config)# ip domain-name floor1.com

Floor-1-Router(config)# crypto key generate rsa

How many bits in the modulus [512]: 1024

Floor-1-Router(config)# ip ssh version 2

Floor-1-Router(config)# username floor1 privilege 15 secret floor1

Floor-1-Router(config)# line vty 0 4

Floor-1-Router(config)# transport input ssh

Floor-1-Router(config)# login local

Floor-1-Router(config)# ip ssh time-out 60

Floor-1-Router(config)# ip ssh authentication-retries 3

Floor-1-Router(config)# do wr

Floor-1-Router(config)#exit

**Floor-2-Router:**

Router>enable

Router#config terminal

Router(config)#hostname Floor-2-Router

Floor-2-Router(config)# no ip domain-lookup

Floor-2-Router(config)# service password-encryption

Floor-2-Router(config)# enable secret floor2

Floor-2-Router(config)# banner motd # Unauthorized access is prohibited. #

Floor-2-Router(config)#interface se 0/3/0

Floor-2-Router(config-if)#no shutdown

Floor-2-Router(config-if)#ip address 10.10.10.2 255.255.255.252

Floor-2-Router(config-if)#exit

Floor-2-Router(config)#interface se 0/3/1

Floor-2-Router(config-if)#no shutdown

Floor-2-Router(config-if)#ip address 10.10.10.5 255.255.255.252

Floor-2-Router(config-if)#exit

Floor-2-Router(config)#interface gig 0/0

Floor-2-Router(config-if)#no shutdown

Floor-2-Router(config-if)#exit

Floor-2-Router(config)#do wr

Floor-2-Router(config)#exit

**#Inter Vlan Routing**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-2-Router(config)#int gig0/0.50

Floor-2-Router(config-subif)#encapsulation dot1Q 50

Floor-2-Router(config-subif)#ip address 192.168.5.1 255.255.255.0

Floor-2-Router(config-subif)#exit

Floor-2-Router(config)#int gig0/0.40

Floor-2-Router(config-subif)#encapsulation dot1Q 40

Floor-2-Router(config-subif)#ip address 192.168.4.1 255.255.255.0

Floor-2-Router(config-subif)#exit

Floor-2-Router(config)#int gig0/0.30

Floor-2-Router(config-subif)#encapsulation dot1Q 30

Floor-2-Router(config-subif)#ip address 192.168.3.1 255.255.255.0

Floor-2-Router(config-subif)#exit

Floor-2-Router(config)#do wr

Floor-2-Router(config)#exit

**#Configure DHCP Server**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-2-Router(config)#service dhcp

Floor-2-Router(config)#ip dhcp pool Finance

Floor-2-Router(dhcp-config)#network 192.168.5.0 255.255.255.0

Floor-2-Router(dhcp-config)#default-router 192.168.5.1

Floor-2-Router(dhcp-config)#dns-server 192.168.5.1

Floor-2-Router(dhcp-config)#exit

Floor-2-Router(config)#ip dhcp pool HR

Floor-2-Router(dhcp-config)#network 192.168.4.0 255.255.255.0

Floor-2-Router(dhcp-config)#default-router 192.168.4.1

Floor-2-Router(dhcp-config)#dns-server 192.168.4.1

Floor-2-Router(dhcp-config)#exit

Floor-2-Router(config)#ip dhcp pool Sales

Floor-2-Router(dhcp-config)#network 192.168.3.0 255.255.255.0

Floor-2-Router(dhcp-config)#default-router 192.168.3.1

Floor-2-Router(dhcp-config)#dns-server 192.168.3.1

Floor-2-Router(dhcp-config)#exit

Floor-2-Router(config)#do wr

Floor-2-Router(config)#exit

**#Exclude IP addresses for static devices**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-2-Router(config)#ip dhcp excluded-address 192.168.5.1

Floor-2-Router(config)#ip dhcp excluded-address 192.168.4.1

Floor-2-Router(config)#ip dhcp excluded-address 192.168.3.1

Floor-2-Router(config)#do wr

Floor-2-Router(config)#exit

**#Enable Routing Protocol**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-2-Router(config)#router ospf 10

Floor-2-Router(config-router)#network 10.10.10.0 0.0.0.3 area 0

Floor-2-Router(config-router)#network 10.10.10.4 0.0.0.3 area 0

Floor-2-Router(config-router)#network 192.168.5.0 0.0.0.255 area 0

Floor-2-Router(config-router)#network 192.168.4.0 0.0.0.255 area 0

Floor-2-Router(config-router)#network 192.168.3.0 0.0.0.255 area 0

Floor-2-Router(config-router)#exit

Floor-2-Router(config)#do wr

Floor-2-Router(config)#exit

**#Configure SSH**

Floor-2-Router(config)# ip domain-name floor2.com

Floor-2-Router(config)# crypto key generate rsa

How many bits in the modulus [512]: 1024

Floor-2-Router(config)# ip ssh version 2

Floor-2-Router(config)# username floor2 privilege 15 secret floor2

Floor-2-Router(config)# line vty 0 4

Floor-2-Router(config)# transport input ssh

Floor-2-Router(config)# login local

Floor-2-Router(config)# ip ssh time-out 60

Floor-2-Router(config)# ip ssh authentication-retries 3

Floor-2-Router(config)# do wr

Floor-2-Router(config)#exit

**Floor-3-Router:**

Router>enable

Router#config terminal

Router(config)#hostname Floor-3-Router

Floor-3-Router(config)# no ip domain-lookup

Floor-3-Router(config)# service password-encryption

Floor-3-Router(config)# enable secret floor3

Floor-3-Router(config)# banner motd # Unauthorized access is prohibited. #

Floor-3-Router(config)#interface se 0/3/0

Floor-3-Router(config-if)#no shutdown

Floor-3-Router(config-if)#ip address 10.10.10.10 255.255.255.252

Floor-3-Router(config-if)#exit

Floor-3-Router(config)#interface se 0/3/1

Floor-3-Router(config-if)#no shutdown

Floor-3-Router(config-if)#clock rate 64000

Floor-3-Router(config-if)#ip address 10.10.10.6 255.255.255.252

Floor-3-Router(config-if)#exit

Floor-3-Router(config)#interface gig 0/0

Floor-3-Router(config-if)#no shutdown

Floor-3-Router(config-if)#exit

Floor-3-Router(config)#do wr

Floor-3-Router(config)#exit

**#Inter Vlan Routing**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-3-Router(config)#int gig0/0.20

Floor-3-Router(config-subif)#encapsulation dot1Q 20

Floor-3-Router(config-subif)#ip address 192.168.2.1 255.255.255.0

Floor-3-Router(config-subif)#exit

Floor-3-Router(config)#int gig0/0.10

Floor-3-Router(config-subif)#encapsulation dot1Q 10

Floor-3-Router(config-subif)#ip address 192.168.1.1 255.255.255.0

Floor-3-Router(config-subif)#exit

Floor-3-Router(config)#do wr

Floor-3-Router(config)#exit

**#Configure DHCP Server**

Floor-2-Router>en

Floor-2-Router#conf t

Floor-3-Router(config)#service dhcp

Floor-3-Router(config)#ip dhcp pool Admin

Floor-3-Router(dhcp-config)#network 192.168.2.0 255.255.255.0

Floor-3-Router(dhcp-config)#default-router 192.168.2.1

Floor-3-Router(dhcp-config)#dns-server 192.168.2.1

Floor-3-Router(dhcp-config)#exit

Floor-3-Router(config)#ip dhcp pool IT

Floor-3-Router(dhcp-config)#network 192.168.1.0 255.255.255.0

Floor-3-Router(dhcp-config)#default-router 192.168.1.1

Floor-3-Router(dhcp-config)#dns-server 192.168.1.1

Floor-3-Router(dhcp-config)#exit

Floor-3-Router(config)#do wr

Floor-3-Router(config)#exit

**#Exclude IP addresses for static devices**

Floor-3-Router>en

Floor-3-Router#conf t

Floor-3-Router(config)#ip dhcp excluded-address 192.168.2.1

Floor-3-Router(config)#ip dhcp excluded-address 192.168.1.1

Floor-3-Router(config)#do wr

Floor-3-Router(config)#exit

**#Enable Routing Protocol**

Floor-3-Router>en

Floor-3-Router#conf t

Floor-3-Router(config)#router ospf 10

Floor-3-Router(config-router)#network 10.10.10.8 0.0.0.3 area 0

Floor-3-Router(config-router)#network 10.10.10.4 0.0.0.3 area 0

Floor-3-Router(config-router)#network 192.168.2.0 0.0.0.255 area 0

Floor-3-Router(config-router)#network 192.168.1.0 0.0.0.255 area 0

Floor-3-Router(config-router)#exit

Floor-3-Router(config)#do wr

Floor-3-Router(config)#exit

**#Configure SSH**

Floor-3-Router(config)# ip domain-name floor3.com

Floor-3-Router(config)# crypto key generate rsa

How many bits in the modulus [512]: 1024

Floor-3-Router(config)# ip ssh version 2

Floor-3-Router(config)# username floor3 privilege 15 secret floor3

Floor-3-Router(config)# line vty 0 4

Floor-3-Router(config)# transport input ssh

Floor-3-Router(config)# login local

Floor-3-Router(config)# ip ssh time-out 60

Floor-3-Router(config)# ip ssh authentication-retries 3

Floor-3-Router(config)# do wr

Floor-3-Router(config)#exit

**Floor-1-Switch:**

Switch>enable

Switch#config terminal

Switch(config)#hostname Floor-1-Switch

Floor-1-Switch(config)#vlan 80

Floor-1-Switch(config-vlan)#name Reception

Floor-1-Switch(config-vlan)#exit

Floor-1-Switch(config)#vlan 70

Floor-1-Switch(config-vlan)#name Store

Floor-1-Switch(config-vlan)#exit

Floor-1-Switch(config)#vlan 60

Floor-1-Switch(config-vlan)#name Logistics

Floor-1-Switch(config-vlan)#exit

Floor-1-Switch(config)#interface range fa0/2-3, fa0/24

Floor-1-Switch(config-if-range)#switchport mode access

Floor-1-Switch(config-if-range)#switchport access vlan 80

Floor-1-Switch(config-if-range)#exit

Floor-1-Switch(config)#interface range fa0/4-5

Floor-1-Switch(config-if-range)#switchport mode access

Floor-1-Switch(config-if-range)#switchport access vlan 70

Floor-1-Switch(config-if-range)#exit

Floor-1-Switch(config)#interface range fa0/6-7

Floor-1-Switch(config-if-range)#switchport mode access

Floor-1-Switch(config-if-range)#switchport access vlan 60

Floor-1-Switch(config-if-range)#exit

Floor-1-Switch(config)#interface fa 0/1

Floor-1-Switch(config-if)#switchport mode trunk

Floor-1-Switch(config-if)#do wr

Floor-1-Switch(config-if)#exit

Floor-1-Switch(config)#exit

**Floor-2-Switch:**

Switch>enable

Switch#config terminal

Switch(config)#hostname Floor-2-Switch

Floor-2-Switch(config)#vlan 50

Floor-2-Switch(config-vlan)#name Finance

Floor-2-Switch(config-vlan)#exit

Floor-2-Switch(config)#vlan 40

Floor-2-Switch(config-vlan)#name HR

Floor-2-Switch(config-vlan)#exit

Floor-2-Switch(config)#vlan 30

Floor-2-Switch(config-vlan)#name Sales

Floor-2-Switch(config-vlan)#exit

Floor-2-Switch(config)#interface range fa0/2-3

Floor-2-Switch(config-if-range)#switchport mode access

Floor-2-Switch(config-if-range)#switchport access vlan 50

Floor-2-Switch(config-if-range)#exit

Floor-2-Switch(config)#interface range fa0/4-5, fa0/24

Floor-2-Switch(config-if-range)#switchport mode access

Floor-2-Switch(config-if-range)#switchport access vlan 40

Floor-2-Switch(config-if-range)#exit

Floor-2-Switch(config)#interface range fa0/6-7

Floor-2-Switch(config-if-range)#switchport mode access

Floor-2-Switch(config-if-range)#switchport access vlan 30

Floor-2-Switch(config-if-range)#exit

Floor-2-Switch(config)#interface fa 0/1

Floor-2-Switch(config-if)#switchport mode trunk

Floor-2-Switch(config-if)#exit

Floor-2-Switch(config)#do wr

Floor-2-Switch(config)#exit

**Floor-3-Switch:**

Switch>enable

Switch#config terminal

Switch(config)#hostname Floor-3-Switch

Floor-3-Switch(config)#vlan 20

Floor-3-Switch(config-vlan)#name Admin

Floor-3-Switch(config-vlan)#exit

Floor-3-Switch(config)#vlan 10

Floor-3-Switch(config-vlan)#name IT

Floor-3-Switch(config-vlan)#exit

Floor-3-Switch(config)#interface range fa0/4-5, fa0/24

Floor-3-Switch(config-if-range)#switchport mode access

Floor-3-Switch(config-if-range)#switchport access vlan 20

Floor-3-Switch(config-if-range)#exit

Floor-3-Switch(config)#interface range fa0/2-3

Floor-3-Switch(config-if-range)#switchport mode access

Floor-3-Switch(config-if-range)#switchport access vlan 10

Floor-3-Switch(config-if-range)#exit

Floor-3-Switch(config)#interface fa 0/1

Floor-3-Switch(config-if)#switchport mode trunk

Floor-3-Switch(config-if)#exit

Floor-3-Switch(config)#do wr

Floor-3-Switch(config)#exit

**#port security on the IT-dept switch to allow only Test-PC to access port Fa0/2 using the sticky method to learn the MAC address and with the violation mode set to shutdown**

Floor-3-Switch>en

Floor-3-Switch#conf t

Floor-3-Switch(config)#int fa0/2

Floor-3-Switch(config-if)#switchport port-security

Floor-3-Switch(config-if)#switchport port-security mac-address sticky

Floor-3-Switch(config-if)#switchport port-security maximum 1

Floor-3-Switch(config-if)#switchport port-security violation shutdown

Floor-3-Switch(config-if)#exit

Floor-3-Switch(config)#do wr

Floor-3-Switch(config)#exit

**Result**







