

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;

* There should be three routers connecting each floor (all placed in the server room in IT department).
* All routers should be connected to each other using serial DCE cable.
* The network between the routers should be 10.10.10.0/30,10.10.10.4/30 and 10.10.10.8/30.
* Each floor is expected to have one switch (placed in the respective floor).
* Each floor is expected to have WIFI networks connected to laptops and phones.
* Each department is expected to have a printer.
* 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

* Use OSPF as the routing protocol to advertise routes.
* All devices in the network are expected to obtain IP address dynamically with their respective router configured as the DHCP server.
* All the devices in the network are expected to communicate with each other.
* Configure SSH in all the routers for remote login.
* In IT department, add PC called Test-PC to port fa0/1 and use it to test remote login.
* Configure port security to IT-dept switch to allow only Test-PC to access port fa0/1 (use sticky method to obtain mac-address with violation mode of shutdown.)

**Technologies Implemented**

1. Creating a network topology using Cisco Packet Tracer.
2. Hierarchical Network Design.
3. Connecting Networking devices with Correct cabling.
4. Creating VLANs and assigning ports VLAN numbers.
5. Subnetting and IP Addressing.
6. Configuring Inter-VLAN Routing (Router on a stick).

**COMMANDS**

**First Floor**

First-Floor-Router>

First-Floor-Router>enable

First-Floor-Router#configure terminal

First-Floor-Router(config)#interface gigabitEthernet 0/1.80

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

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

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

First-Floor-Router(config)#interface gigabitEthernet 0/1.70

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

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

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

First-Floor-Router(config)#interface gigabitEthernet 0/1.60

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

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

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

First-Floor-Router(config)#do wr

**Second Floor**

Second-Floor-Router>enable

Second-Floor-Router#configure terminal

Second-Floor-Router(config)#

Second-Floor-Router(config)#interface GigabitEthernet 0/1.30

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

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

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

Second-Floor-Router(config)#interface gigabitEthernet 0/1.40

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

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

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

Second-Floor-Router(config)#interface gigabitEthernet 0/1.50

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

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

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

Second-Floor-Router(config)#do wr

**Third Floor**

Third-Floor-Router>enable

Third-Floor-Router#configure terminal

Third-Floor-Router(config)#interface gigabitEthernet 0/1.10

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

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

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

Third-Floor-Router(config)#interface gigabitEthernet 0/1.20

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

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

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

Third-Floor-Router(config)#do wr

1. Configuring DHCP Server (Router as the DHCP Server).

**COMMANDS**

**First Floor**

First-Floor-Router>

First-Floor-Router>enable

First-Floor-Router#configure terminal

First-Floor-Router(config)#

First-Floor-Router(config)#service dhcp

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

First-Floor-Router(config)#do wr

**Second Floor**

Second-Floor-Router>enable

Second-Floor-Router#configure terminal

Second-Floor-Router(config)#service dhcp

Second-Floor-Router(config)#ip dhcp pool Sales&Marketing

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

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

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

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

Second-Floor-Router(config)#ip dhcp pool HumanResource

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

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

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

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

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

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

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

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

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

Second-Floor-Router(config)#do wr

**Third Floor**

Third-Floor-Router>enable

Third-Floor-Router#configure terminal

Third-Floor-Router(config)#service dhcp

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

Third-Floor-Router(dhcp-config)#net 192.168.1.0 255

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

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

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

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

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

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

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

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

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

Third-Floor-Router(config)#do wr

1. Router OSPF Configuration

**First Floor**

First-Floor-Router>

First-Floor-Router>enable

First-Floor-Router#configure terminal

First-Floor-Router(config)#

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

First-Floor-Router(config-router)#network 10.10.10.4 255.255.255.252 area 0

First-Floor-Router(config-router)#network 10.10.10.8 255.255.255.252 area 0

First-Floor-Router(config-router)#network 192.168.8.0 255.255.255.0 area 0

First-Floor-Router(config-router)#network 192.168.7.0 255.255.255.0 area 0

First-Floor-Router(config-router)#network 192.168.6.0 255.255.255.0 area 0

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

First-Floor-Router(config)#do wr

**Second Floor**

Second-Floor-Router>

Second-Floor-Router>enable

Second-Floor-Router#configure terminal

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

Second-Floor-Router(config-router)#network 10.10.10.8 255.255.255.252 area 0

Second-Floor-Router(config-router)#network 10.10.10.0 255.255.255.252 area 0

Second-Floor-Router(config-router)#network 192.168.3.0 255.255.255.0 area 0

Second-Floor-Router(config-router)#network 192.168.4.0 255.255.255.0 area 0

Second-Floor-Router(config-router)#network 192.168.5.0 255.255.255.0 area 0

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

Second-Floor-Router(config)#do wr

**Third Floor**

Third-Floor-Router>

Third-Floor-Router>enable

Third-Floor-Router#configure terminal

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

Third-Floor-Router(config-router)#network 10.10.10.0 255.255.255.252 area 0

Third-Floor-Router(config-router)#network 10.10.10.4 255.255.255.252 area 0

Third-Floor-Router(config-router)#network 192.168.1.0 255.255.255.0 area 0

Third-Floor-Router(config-router)#network 192.168.2.0 255.255.255.0 area 0

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

Third-Floor-Router(config)#do wr

1. Configuring SSH for secure Remote access.

**First Floor**

First-Floor-Router>

First-Floor-Router>enable

First-Floor-Router#configure terminal

First-Floor-Router(config)#ip domain-name admin

First-Floor-Router(config)#username admin password admin@123

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

The name for the keys will be: First-Floor-Router.admin

Choose the size of the key modulus in the range of 360 to 4096 for your

General Purpose Keys. Choosing a key modulus greater than 512 may take

a few minutes.

How many bits in the modulus [512]: 1024

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

First-Floor-Router(config)#line vty 0 15

\*Mar 1 2:22:49.524: %SSH-5-ENABLED: SSH 1.99 has been enabled

First-Floor-Router(config-line)#login local

First-Floor-Router(config-line)#transport input ssh

First-Floor-Router(config-line)#exit

First-Floor-Router(config)#do wr

**Second Floor**

Second-Floor-Router>

Second-Floor-Router>enable

Second-Floor-Router#configure terminal

Second-Floor-Router(config)#

Second-Floor-Router(config)#ip domain-name admin

Second-Floor-Router(config)#username admin password admin@123

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

The name for the keys will be: Second-Floor-Router.admin

Choose the size of the key modulus in the range of 360 to 4096 for your

General Purpose Keys. Choosing a key modulus greater than 512 may take

a few minutes.

How many bits in the modulus [512]: 1024

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

Second-Floor-Router(config)#line vty 0 15

Second-Floor-Router(config-line)#login local

Second-Floor-Router(config-line)#transport input ssh

Second-Floor-Router(config-line)#do wr

**Third Floor**

Third-Floor-Router>

Third-Floor-Router>enable

Third-Floor-Router#configure terminal

Third-Floor-Router(config)#ip domain-name admin

Third-Floor-Router(config)#username admin password admin@123

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

The name for the keys will be: Third-Floor-Router.admin

Choose the size of the key modulus in the range of 360 to 4096 for your

General Purpose Keys. Choosing a key modulus greater than 512 may take

a few minutes.

How many bits in the modulus [512]: 1024

% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

Third-Floor-Router(config)#

\*Mar 1 3:20:48.172: %SSH-5-ENABLED: SSH 1.99 has been enabled

Third-Floor-Router(config)#

Third-Floor-Router(config)#line vty 0 15

Third-Floor-Router(config-line)#login local

Third-Floor-Router(config-line)#transport input ssh

Third-Floor-Router(config-line)#do wr

1. Configuring switchport security or Port-Security on the switches.

Admin&IT>enable

Admin&IT#configure terminal

Admin&IT(config)#

Admin&IT(config)#interface range fastEthernet 0/17-24

Admin&IT(config-if-range)#switchport port-security maximum 1

Admin&IT(config-if-range)#switch port-security mac-address sticky

Admin&IT(config-if-range)#switch port-security violation shutdown

Admin&IT(config-if-range)#exit

Admin&IT(config)#do wr

1. Configuring WLAN or wireless network (Cisco Access Point).
2. Host Device Configurations.
3. Test and Verifying Network Communication.