Design and Implementation of an Hotel System Network Design (Project #3)

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;

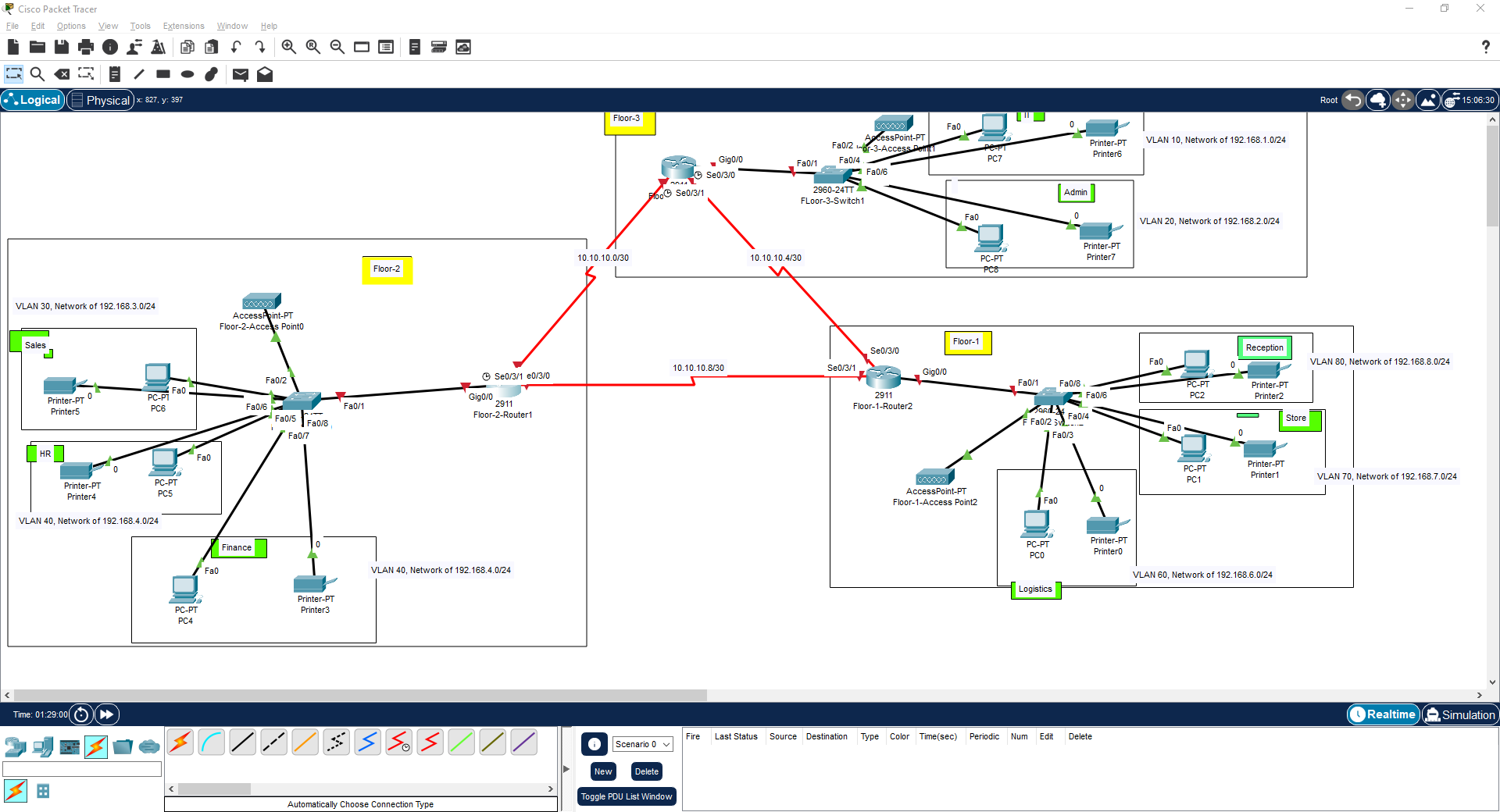
* There should be three routers connecting each floor (all placed in the server room in IT department).
* All routers should be connected to each other using serial DCE cable.
* The network between the routers should be 10.10.10.0/30,10.10.10.4/30 and 10.10.10.8/30.
* Each floor is expected to have one 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).
7. Configuring DHCP Server (Router as the DHCP Server).
8. Configuring SSH for secure Remote access.
9. Configuring switchport security or Port-Security on the switches.
10. Configuring WLAN or wireless network (Cisco Access Point).
11. Host Device Configurations.
12. Test and Verifying Network Communication.

Solution:



Click on 3rd Floor Router open CLI for configuration

**Router>** enable

**Router#** conf t

Enter configuration commands, one per line. End with CNTL/Z.

**Router(config)#** interface

**Router(config)#** interface se0/3/0

**Router(config-if)#** no shutdown

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down

**Router(config-if)#** interface se0/3/1

**Router(config-if)#** no shutdown

%LINK-5-CHANGED: Interface Serial0/3/1, changed state to down

**Router(config-if)#** interface gig0/0

**Router(config-if)#** no shutdown

**Router(config-if)#**

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

**Router(config-if)#**

* + **Setting Clock rate**
  + **Chose interface like se0/3/0**

**Router(config-if)#** interface se0/3/0

**Router(config-if)#** clock rate ?

Speed (bits per second

1200

2400

4800

9600

19200

38400

56000

64000

72000

125000

128000

148000

250000

500000

800000

1000000

1300000

2000000

4000000

<300-4000000> Choose clockrate from list above

**Router(config-if)#** clock rate 64000 🡪 Clock rate setting required because cable used Serial DCE

**Router(config-if)#**

**Router(config-if)#** interface se0/3/1

**Router(config-if)#** clock rate 64000

**Router(config-if)#** do write

|  |
| --- |
| **Repeat same Process in Router 1 and Router 2** |

**Switch Configuration Vlan of Every Switch**

**Click on Switch Floor 1, Open CLI**

**Switch>**

**Switch> en**

**Switch# configure terminal**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Switch(config)# interface range fa0/7-8**

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 80**

**Switch(config-if-range)# interface range fa0/5-6**

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 70**

**Switch(config-if-range)#**

**Switch(config-if-range)# interface range fa0/3-4**

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 60**

|  |
| --- |
| **To Save The Configuration** |

**Switch(config-if-range)# do write**

**Switch(config-if-range)# interface range fa0/1**

**Switch(config-if-range)# switchport mode trunk**

**Switch(config-if-range)# do write**

* + **Click on Switch Floor 2, Open CLI**

**Switch>**

**Switch> en**

**Switch# configure terminal**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Switch(config)# interface range fa0/6-8**

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 30**

**Switch(config-if-range)# interface range fa0/4-5**

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 40**

**Switch(config-if-range)#**

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

**Switch(config-if-range)# switchport mode access**

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

**% Access VLAN does not exist. Creating vlan 50**

|  |
| --- |
| **To Save The Configuration** |

**Switch(config-if-range)# do write**

**Switch(config-if-range)# interface range fa0/1**

**Switch(config-if-range)# switchport mode trunk**

**Switch(config-if-range)# do write**

* + **Click on Switch Floor 1, Open CLI**

**Switch>**

**Switch> en**

**Switch# configure terminal**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Switch(config)# interface range fa0/2-4**

**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)# interface range fa0/5-6**

**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)#**

|  |
| --- |
| **To Save The Configuration** |

**Switch(config-if-range)# do write**

**Switch(config-if-range)# interface range fa0/1**

**Switch(config-if-range)# switchport mode trunk**

**Switch(config-if-range)# do write**

**Setting IP Address to the Router to Router**

**Click on Third Floor Router**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# interface se0/3/0**

**Router(config-if)# ip address 10.10.10.6 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)# interface se0/3/1**

**Router(config-if)# ip address 10.10.10.2 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)#**

**Click on First Floor Router**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# interface se0/3/0**

**Router(config-if)# ip address 10.10.10.5 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)# interface se0/3/1**

**Router(config-if)# ip address 10.10.10.9 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)#**

**Click on Third Floor Router**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# interface se0/3/0**

**Router(config-if)# ip address 10.10.10.1 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)# interface se0/3/1**

**Router(config-if)# ip address 10.10.10.10 255.255.255.252**

**Router(config-if)# do write**

**Building configuration...**

**[OK]**

**Router(config-if)#**

**Configure IP Address Vlan to the Router to switch**

* + **Click First Floor Router and goes to CLI mode**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# int gig0/0.80**

**Router(config-subif)# encapsulation dot1Q 80**

**Router(config-subif)# ip address 192.168.8.1 255.255.255.0**

**Router(config-subif)# do write**

**Router(config-subif)# exit**

**Router(config)# int gig0/0.70**

**Router(config-subif)# encapsulation dot1Q 70**

**Router(config-subif)# ip address 192.168.7.1 255.255.255.0**

**Router(config-subif)# do write**

**Router(config-subif)# exit**

**Router(config)# int gig0/0.60**

**Router(config-subif)# encapsulation dot1Q 60**

**Router(config-subif)# ip address 192.168.6.1 255.255.255.0**

**Router(config-subif)# do write**

**DHCP conf in Router Floor 1**

**Router(config)# service dhcp**

**Router(config)# ip dhcp pool reception**

**Router(dhcp-config)# network 192.168.8.0 255.255.255.0**

**Router(dhcp-config)# default-router 192.168.8.1**

**Router(dhcp-config)# dns-server 192.168.8.1**

**Router(dhcp-config)# ex**

**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)# ex**

**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)# do write**

**Router(dhcp-config)# ex**

**DHCP conf in Router Floor 2**

**Router(config)# service dhcp**

**Router(config)# ip dhcp pool Finance**

**Router(dhcp-config)# network 192.168.4.0 255.255.255.0**

**Router(dhcp-config)# default-router 192.168.4.1**

**Router(dhcp-config)# dns-server 192.168.4.1**

**Router(dhcp-config)# ex**

**Router(config)# ip dhcp pool HR**

**Router(dhcp-config)# network 192.168.3.0 255.255.255.0**

**Router(dhcp-config)# default-router 192.168.3.1**

**Router(dhcp-config)# dns-server 192.168.3.1**

**Router(dhcp-config)# ex**

* + **Click second Floor Router and goes to CLI mode**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# int gig0/0.50**

**Router(config-subif)# encapsulation dot1Q 50**

**Router(config-subif)# ip address 192.168.4.1 255.255.255.0**

**Router(config-subif)# do write**

**Router(config-subif)# exit**

**Router(config)# int gig0/0.40**

**Router(config-subif)# encapsulation dot1Q 40**

**Router(config-subif)# ip address 192.168.3.1 255.255.255.0**

**Router(config-subif)# do write**

**Router(config-subif)# exit**

**Router(config)# int gig0/0.30**

**Router(config-subif)# encapsulation dot1Q 30**

**Router(config-subif)# ip address 192.168.5.1 255.255.255.0**

**Router(config-subif)# do write**

**Configuration OSPF Protocol To Communicate with Router to Router and different Network**

* + **Click On Floor-1- Router**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# router ospf 10**

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

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

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

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

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

**Router(config-router)# do write**

**Building configuration...**

**[OK]**

**Router(config-router)#**

* + **Click On Floor-2- Router**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# router ospf 10**

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

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

**Router(config-router)#**

**00:56:45: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/3/1 from LOADING to FULL, Loading Done**

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

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

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

**Router(config-router)# do write**

**Building configuration...**

**[OK]**

**Router(config-router)# ex**

**Router(config)#**

* + **Click On Floor-3- Router**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# router ospf 10**

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

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

**Router(config-router)#**

**00:56:45: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/3/1 from LOADING to FULL, Loading Done**

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

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

**Configuration of SSH in Router**

* + **Select Floor-3-Router 3**

**Router>**

**Router> en**

**Router# conf t**

|  |
| --- |
| **Changes Router name** |

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# hostname Floor-3-Router**

|  |
| --- |
| **set domain name** |

**Floor-3-Router(config)# ip domain-name anuj**

**Floor-3-Router(config)# username anuj**

|  |
| --- |
| **set username & Password** |

**Floor-3-Router(config)# username anuj password anuj**

**Floor-3-Router(config)#**

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

**The name for the keys will be: Floor-3-Router.anuj**

**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.**

|  |
| --- |
| **You have to enter manually in bits** |

**How many bits in the modulus [512]: 1024**

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

**Floor-3-Router(config)#**

**Floor-3-Router(config)# line vty 0 15**

**\*Mar 1 3:3:45.884: %SSH-5-ENABLED: SSH 1.99 has been enabled**

**Floor-3-Router(config-line)# login local**

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

**Floor-3-Router(config-line)#**

**Floor-3-Router(config-line)# do write**

**Building configuration...**

**[OK]**

**Floor-3-Router(config-line)#**

* + **Select Floor-2-Router 2**

Router>

Router> en

Router# conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# hostname Floor-2-Router

Floor-2-Router(config)# ip domain name anuj

Floor-2-Router(config)# username anuj password anuj

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

The name for the keys will be: Floor-2-Router.anuj

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]

Floor-2-Router(config)# line vty 0 15

\*Mar 1 4:29:12.193: %SSH-5-ENABLED: SSH 1.99 has been enabled

Floor-2-Router(config-line)# login local

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

Floor-2-Router(config-line)# do write

Building configuration...

[OK]

Floor-2-Router(config-line)#

* + **Select Floor-1-Router 2**

**Router>**

**Router> en**

**Router# conf t**

**Enter configuration commands, one per line. End with CNTL/Z.**

**Router(config)# hostname Floor-1-Router**

**Floor-1-Router(config)# ip domain name anuj**

**Floor-1-Router(config)# username anuj password anuj**

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

**The name for the keys will be: Floor-1-Router.anuj**

**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]**

**Floor-1-Router(config)# line vty 0 15**

**\*Mar 1 4:34:27.166: %SSH-5-ENABLED: SSH 1.99 has been enabled**

**Floor-1-Router(config-line)# login local**

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

**Floor-1-Router(config-line)# do write**

**Building configuration...**

**[OK]**

**Floor-1-Router(config-line)# exit**

**Floor-1-Router(config)#**

**To Login in SSh from Test PC use command**

**Ssh -l {domain name} {ip address of destination}**

**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.)**