Serene Hotel Network Configuration

INDEX

1. Introduction

1.1) Overview

The Serene Oasis Network has been established to provide seamless communication across all 3 floors of the hotel. There are 8 departments

This documentation outlines the step-by-step process of configuring the network infrastructure, including routers, switches, VLANs, IP addressing, DHCP, wireless networks, and security measures.

It is also assumed that you have technical understanding, before reading this documentation.

1.2) Hardware Used

Routers: F1 [2911[1]], F2 [2901[2]], F3 [2901] (Cisco 2901, Cisco 2911)
Switches: SF1, SF2, SF3 (Cisco 2960-24TT)
Access Points: One per floor
Printers: 8
PCs: 8
Laptops, Cellular Devices, and Tablets for Wireless Testing

2. Physical Connections

2.1) Router Configurations

The routers are shut off, followed by the enabling of serial ports, and the installation of HWIC-2T modules on all 3 routers. For the purposes of this documentation, each router will be accompanied by its floor number. If you would like more information on the department documentation, please read the Serene Oasis Hotel Building Manual.

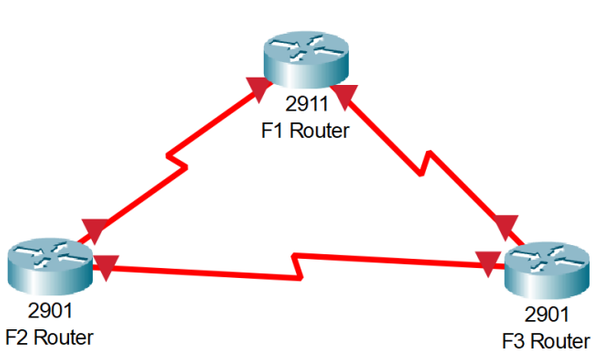


Figure 1.1) DCE Cables connecting the 3 routers together

[1] – Cisco 2911 used for Floor Router 1

[2] – Cisco 2901 used for Floor Router 2

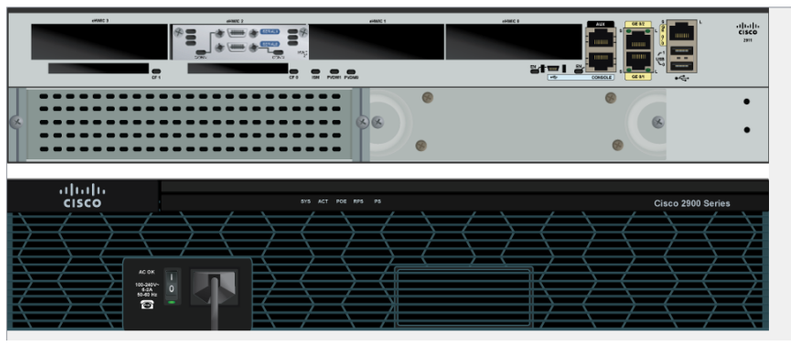


Figure 1.2) A snapshot from Router F1 (2911), showing the DCE connecting into the 2T.

2.2) DCE Cable Connections

Listed below are the DCE cable connections to each router.

F1 Serial0/2/0 => F3 Serial0/2/0
F1 Serial0/2/0 => F2 Serial0/1/0
F1 Serial0/2/0 => F2 Serial0/1/0
F2 Serial0/1/1 => F3 Serial0/2/1

2.3) Switch Connections

Introduced into this network configuration were three Cisco 2960-24TT switches. For the purposes of this documentation, they will be labelled SF1 (Switch Floor 1), SF2, and SF3 respectively. In this configuration, each of them were designated to their routers (F1, F2, and F3)

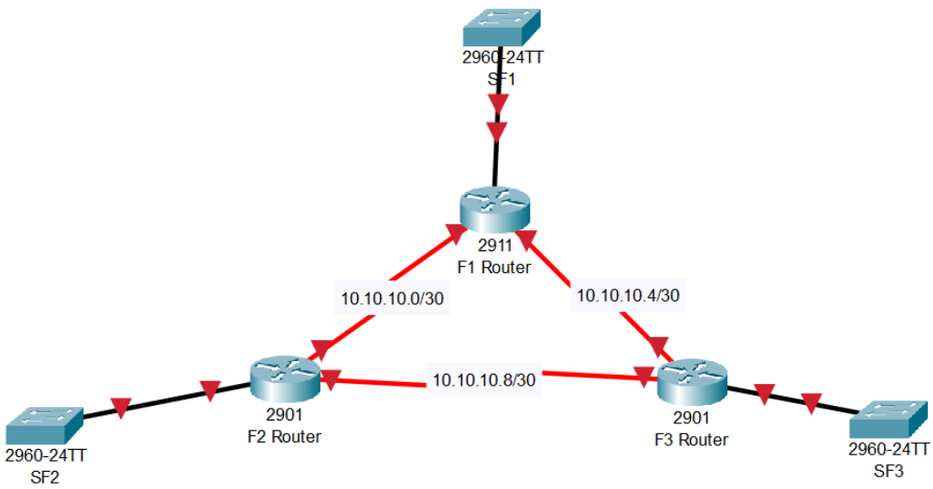


Figure 1.3) The switches connect to their router, along with labelling of the networks for guidance of what IPs and subnet will be assigned later.

2.4) Device Placements

8 printers and 8 PCs were placed in their respective departments, across three floors. Additionally, switches were connected to all devices on each floor, ensuring proper connections.

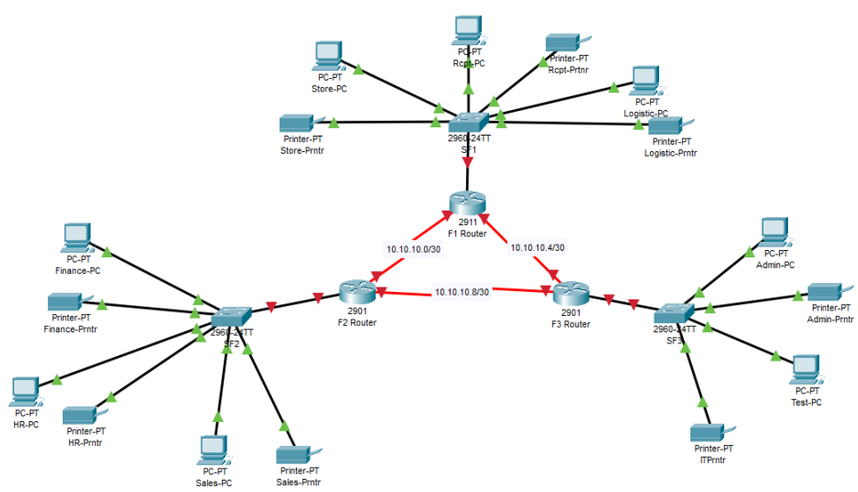


Figure 1.4) The switches now connected to the new devices

3. Network Configuration

3.1) Setting Clock Rates

After implementing the switches, it is time to configure the network via one access point on each floor; then connecting them to the switches.

Then, the next step is to enable the clock rates on the router interfaces, setting their rates to 64k.

```
Router>EN
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/2/0, changed state to down
Router(config-if)#int se0/2/1
Router(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/2/1, changed state to down
Router(config-if)#gig 0/0
                  ^
% Invalid input detected at '^' marker.

Router(config-if)#int gig 0/0
Router(config-if)#no sh

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
```

Figure 1.5) Step by step; entering privileged execution-mode, then global config, then entering configuration mode for each serial and disabling shutdown, making them operational. Setting clock-rates comes after.

After that, for the F1 Router, we set the clock-rate to 64,000 on all the serials. Then on F2, we set the clockrate on **int se/0/1/1** to 64,000 after setting no sh on 0/1/0 and 0/1/1; effectively turning the serials on.

3.2) VLAN Setup

Now it is time to setup the VLANs. We start at the first-floor switch to configure the VLANs for the three departments, VLAN 60, 70, and 80. (Figure 1.6)

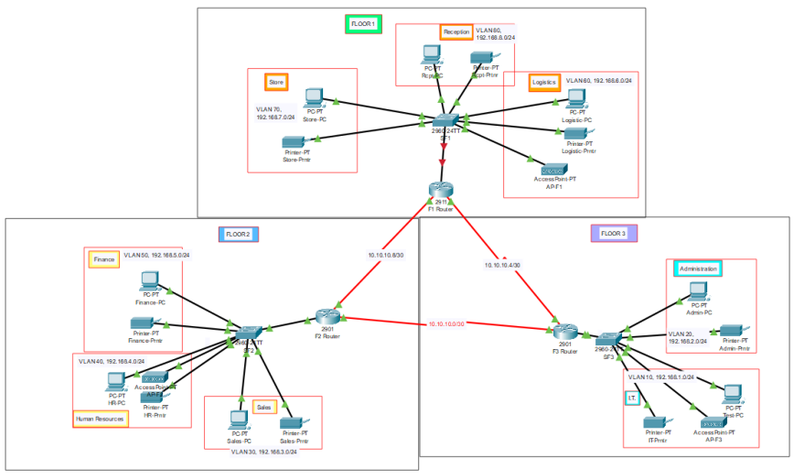
```
Switch>
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 80
% Access VLAN does not exist. Creating vlan 80
Switch(config-if-range)#int range fa0/4-5
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)#int range fa0/6-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 60
% Access VLAN does not exist. Creating vlan 60
Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

Figure 1.6) Gaining entry to switchport, setting the mode to access, and then accessing each VLAN, creating it in the process.
(as an additional note, after doing this, I set the switchport mode to trunk on fa0/1); rinse and repeat this for all 3 switches.

3.3) IP Address Assignments

The next step in the process, was for me to configure the networks and IP addresses, starting on the first router [se0/2/0]; going into it and setting the IP address to 10.10.10.5/255.255.255.252. It wasn't 10.10.10.4 because that is a network. There can only be two hosts, so the subnet is 255.255.255.252.

The first valid host will take 10.10.10.5, and then the second will take 10.10.10.6.
The first-floor router will also take the IP of 10.10.10.6/255.255.255.252 to se0/2/1.
At this point, the network looks like the below figure (Figure 1.7)



3.4) DHCP and OSPF Configuration

The next step is to configure the DHCP server. Since there are multiple VLANs; we configure via Inter-VLAN-routing. Below is an example of configuring inter-VLAN-routing on the F1 router.

```
Router>int gig0/0.80
                ^
% Invalid input detected at '^' marker.

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)#ex
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)#ex
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 wr
Building configuration...
[OK]
Router(config-subif)#ex
Router(config)#
```

Figure 1.8 and 1.9 (above and below) -> Setting up the Inter-VLAN Routing (top) and setting up the DHCP Servers (below)

Physical Config CLI Attributes

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0.40, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.40, changed state to
up

Router(config-subif)#encapsulation dot1Q 40
Router(config-subif)#ip address 192.168.4.1 255.255.255.0
Router(config-subif)#ex
Router(config)#int gig0/0.50
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.50, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.50, changed state to
up

Router(config-subif)#encapsulation dot1Q 50
Router(config-subif)#ip address 192.168.5.1 255.255.255.0
Router(config-subif)#ex
Router(config)#do wr
Building configuration...
[OK]
Router(config)#service dhcp
Router(config)#ip dhcp pool Finance
Router(dhcp-config)#network 192.168.5.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.5.1
Router(dhcp-config)#dns-server 192.168.5.1
Router(dhcp-config)#ex
Router(config)#ip dhcp pool HR
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)#do wr
Building configuration...
[OK]
Router(config)#ip dhcp pool Sales
Router(dhcp-config)#
```

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The next step after this is to configure so that all the devices in the networks can communicate. We start on router 1 and open the shortest path first (OSPF).

```
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 wr
Building configuration...
[OK]
Router(config-router)#
```

Figure 2.0) Setting the OSPF on Router 1; then connecting the networks together so that they may communicate with each other.

4. Wireless Network Setup

4.1) Access Point Setup

The next step is to configure the access points. In this simulation I brought a Laptop, a Cellular Device, and a Tablet.

We start on Floor 2, by configuring the SSID (name) and passwords. It is fairly straight-forward and just involves connecting selecting the WPA2-PSK option and entering the password; then getting the devices to connect to the access point.

After that, the next step is to configure SSH for the remote logins. You change the hostname, then the domain name, and then you generate a username and password. Generate RSA keys, 1024 bits; and then configure 16 virtual teletype lines; login local and then transport ssh input. I repeated this for the next two routers. **(Figure 2.1 Below)**

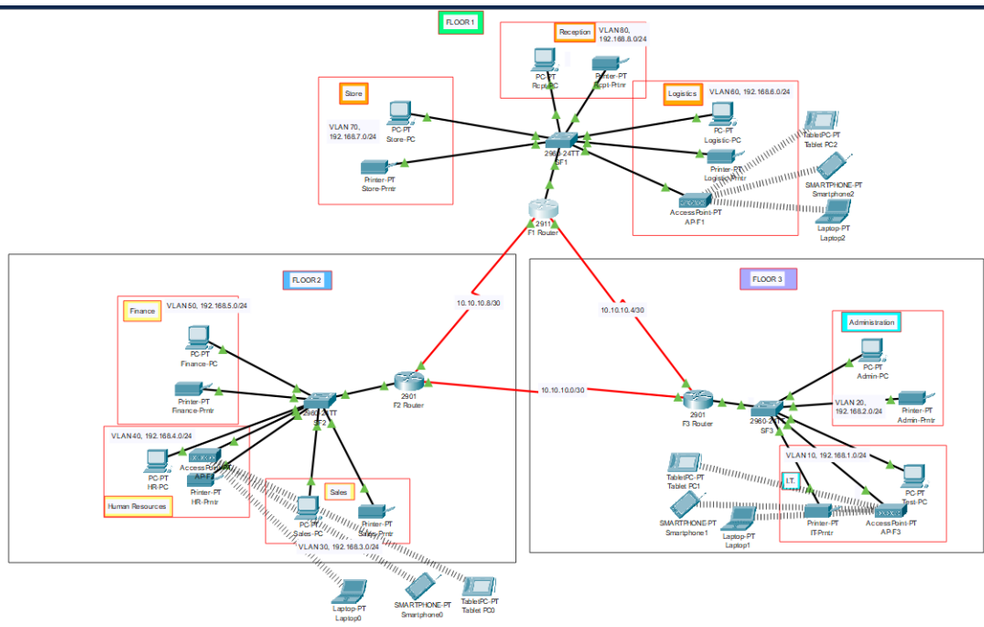
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname F3-Router
F3-Router(config)#ip domain-name serena
F3-Router(config)#username serena password serene
F3-Router(config)#crypto key generate rsa
The name for the keys will be: F3-Router.serena
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]

F3-Router(config)#line vty 0 15
*Mar 1 5:53:38.695: %SSH-5-ENABLED: SSH 1.99 has been enabled
F3-Router(config-line)#login local
F3-Router(config-line)#transport input ssh
F3-Router(config-line)#
```

Additionally, “Test-PC” from the IT department was configured to be the only computer to be able to access port fa0/1; using the sticky method. To do this, we access the F3 switch and configure it using switchport port-security and its sub-methods.

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int fa0/2
Switch(config-if)#switchport port-security
Switch(config-if)#switchport port-security maximum 1
Switch(config-if)#switchport port-security mac-address sticky
Switch(config-if)#switchport port-security violation shutdown
Switch(config-if)#do wr
Building configuration...
[OK]
Switch(config-if)#
```

Figure 2.2) Applying port-security methods to ensure “Test-PC” can only access port fa0/1

5. Conclusion



In conclusion, the Hotel Network Configuration setup is simple, but is a cautionary tale of how a network setup can grow hairy, depending on the building structure, and organization setup.

So the takeaway is that it is important to write out the structure of the network first, before acting forward.

!! Thank you for reading this documentation !! 😊