Design and Implementation of a

Virtual Local Area Network with using Cisco Operating System

Final Simulation

Network Topology and Cisco IOS Configuration Commands

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Create VLAN-2 and Assign FastEthernet0/1-3 to VLAN-2

```
Switch>
Switch> enable
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# hostname SW1
SW1(config)# vlan 2
SW1(config-vlan)# name VLAN-2
SW1(config-vlan)# exit
SW1(config)# interface range FastEthernet0/1-3
SW1(config-if-range)# switchport mode access
SW1(config-if-range)# switchport access vlan 2
SW1(config-if-range)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console
SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Create VLAN-3 and Assign FastEthernet0/4-5 to VLAN-3

```
SW1>
SW1> enable
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# vlan 3
SW1(config-vlan)# name VLAN-3
SW1(config-vlan)# exit
SW1(config)# interface range FastEthernet0/4-5
SW1(config-if-range)# switchport mode access
SW1(config-if-range)# switchport access vlan 3
SW1(config-if-range)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console
SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Create VLAN-99 (Management VLAN) and Assign FastEthernet0/24 to VLAN-99

```
SW1>
SW1> enable
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# vlan 99
SW1(config-vlan)# name VLAN-99
SW1(config-vlan)# exit
SW1(config)# interface FastEthernet0/24
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 99
SW1(config-if)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console
SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Assign IP Address to FastEthernet0/24 (VLAN-99) for Telnet or SSH

```
SW1>
SW1> enable
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# interface vlan 99
SW1(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

SW1(config-if)#ip address 192.168.99.2 255.255.255.0
SW1(config-if)#no shutdown
SW1(config-if)#
```

Assign Password to VTY for Telnet Connection
Assign Password for Privileged EXEC Mode

```
SW1>
SW1> enable
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# line vty 0 15
SW1(config-line)# password cisco
SW1(config-line)# login
SW1(config-line)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# enable secret cisco
SW1(config)# exit
SW1#
%SYS-5-CONFIG_I: Configured from console by console
```

Create VLAN-4 (Wireless VLAN) and assign FastEthernet0/6-7 to VLAN-4

```
Switch>
Switch> enable
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# vlan 4
SW1(config-vlan)# name VLAN-4
SW1(config-vlan)# exit
SW1(config)# interface range FastEthernet0/6-7
SW1(config-if-range)# switchport mode access
SW1(config-if-range)# switchport access vlan 4
SW1(config-if-range)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console
SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Similar Process Repeated for Switch 2

- Switch Name Change

- Create VLAN-2, VLAN-3 and VLAN-4

- Ports Assigned to VLANs

Create Trunk Link Between Switches

```
SW1>
SW1> enable
Password:
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# interface GigabitEthernet0/1
SW1(config-if)# switchport mode trunk

SW1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed
state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed
state to up

SW1(config-if)# switchport trunk allowed vlan 1-99
SW1(config-if)# end
SW1#
%SYS-5-CONFIG_I: Configured from console by console
```

Same Process Repeated for Switch 2

```
SW1>
SW1> enable
Password:
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# vlan 90
SW1(config-vlan)# name VLAN-Native
SW1(config-vlan)#exit
SW1(config)#^Z
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Same Process Repeated for Switch 2

```
SW1>
SW1> enable
Password:
SW1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)# interface GigabitEthernet0/1
SW1(config-if)# switchport trunk native vlan 90
SW1(config-if)# ^Z
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on
GigabitEthernet0/1 (90), with SW2 GigabitEthernet0/1 (1).

SW1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW1# exit
```

Same Process Repeated for Switch 2

```
%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/1 on
VLAN0090. Port consistency restored.

%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/1 on
VLAN0001. Port consistency restored.
```

VOIP Building with Switch 2 (Voice VLAN)

```
SW2>
SW2> enable
Password:
SW2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)# vlan 5
SW2(config-vlan)# name VLAN-5-Voice
SW2(config-vlan)#^Z
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)# int FastEthernet0/5
SW2(config-if)# switchport mode access
SW2(config-if)# switchport access vlan 5
SW2(config-if)#^Z
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW2# exit
```

Trunk Link Building between Switch 2 and Router

```
SW2>
SW2> enable
Password:
SW2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)# interface GigabitEthernet0/2
SW2(config-if)# switchport mode trunk
SW2(config-if)# switchport trunk allowed vlan 1-99
SW2(config-if)# switchport trunk native vlan 90
SW2(config-if)#exit
SW2(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW2# exit
```

Router Configuration

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface FastEthernet0/0.1
Router(config-subif)# encapsulation dot1Q 1
Router(config-subif)# ip address 192.168.1.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.2
Router(config-subif)# encapsulation dot1Q 2
Router(config-subif)# ip address 192.168.2.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.3
Router(config-subif)# encapsulation dot1Q 3
Router(config-subif)# ip address 192.168.3.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.4
Router(config-subif)# encapsulation dot1Q 4
Router(config-subif)# ip address 192.168.4.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.5
Router(config-subif)# encapsulation dot1Q 5
Router(config-subif)# ip address 192.168.5.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.90
Router(config-subif)# encapsulation dot1Q 90
Router(config-subif)# ip address 192.168.90.1 255.255.255.0
Router(config-subif)# interface FastEthernet0/0.99
Router(config-subif)# encapsulation dot1Q 99
Router(config-subif)# ip address 192.168.99.1 255.255.255.0
Router(config-subif)# end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface FastEthernet0/0
Router(config-if)# no shutdown

Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Create VOIP Pool in Router

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ip dhcp pool VOIP
Router(dhcp-config)# network 192.168.5.0 255.255.255.0
Router(dhcp-config)# default-router 192.168.5.1
Router(dhcp-config)# option 150 ip 192.168.5.1
Router(dhcp-config)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router(config)#ip dhcp excluded-address 192.168.5.1
Router(config)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

Configure Telephony Service in Router

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#telephony-service
Router(config-telephony)#max-dn 10
Router(config-telephony)#max-ephones 10
Router(config-telephony)#ip source-address 192.168.5.1 port 2000
Router(config-telephony)#auto assign 1 to 9
Router(config-telephony)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

Configure VOIP Ports in Switch 2

```
SW2>
SW2> enable
Password:
SW2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)# interface FastEthernet0/5
SW2(config-if)# switchport mode access
SW2(config-if)# no switchport access vlan 5
SW2(config-if)# switchport voice vlan 5
SW2(config-if)# interface FastEthernet0/6
SW2(config-if)# switchport mode access
SW2(config-if)# switchport voice vlan 5
SW2(config-if)#^Z
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
SW2#
```

Assing IP Address and Phone Number to VOIP Phones

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ephone-dn 1
Router(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone_dsp DN 1.1,
changed state to up
Router(config-ephone-dn)#number 35001
Router(config-ephone-dn)#
%IPPHONE-6-REGISTER: ephone-1 IP:192.168.5.2 Socket:2 DeviceType:Phone has
registered.

Router(config-ephone-dn)#ephone-dn 2
Router(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone_dsp DN 2.1,
changed state to up
Router(config-ephone-dn)#number 35002
Router(config-ephone-dn)#
%IPPHONE-6-REGISTER: ephone-2 IP:192.168.5.3 Socket:2 DeviceType:Phone has
registered.

Router(config-ephone-dn)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

Adding New PC's on VOIP Phones Ports

```
SW2>
SW2> enable
Password:
SW2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)# vlan 6
SW2(config-vlan)# name VLAN-6
SW2(config-vlan)# exit
SW2(config)# interface range FastEthernet0/5-6
SW2(config-if-range)# switchport mode access
SW2(config-if-range)# switchport access vlan 6
SW2(config-if-range)#^Z
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
SW2#
```

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

Router(config)# interface FastEthernet0/0.6
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.6, changed
state to up

Router(config-subif)# encapsulation dot1Q 6
Router(config-subif)# ip address 192.168.6.1 255.255.255.0
Router(config-subif)# end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface FastEthernet0/0
Router(config-if)# no shutdown
Router(config-if)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```