ECCS-3631
Networks and Data Communications

Module 3-4
VLAN Configuration

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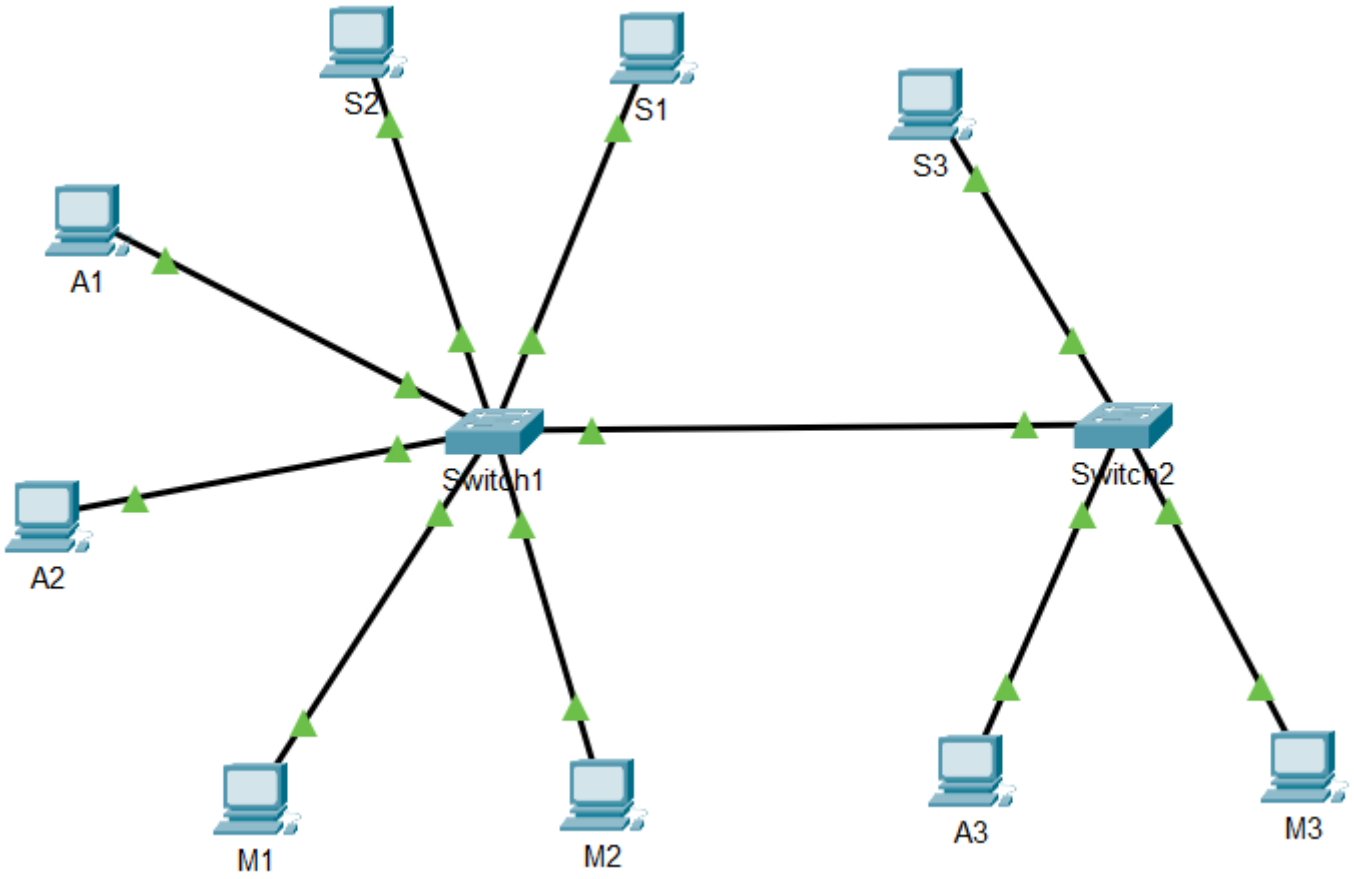
VLAN Network

- Consider the following VLAN Network:
- Three VLANs: Accounting, Marketing, Sales



VLAN Information

Addressing Scheme for the VLAN Network Diagram is shown in the following table. Subnet mask is 255.255.255.0 throughout the network.

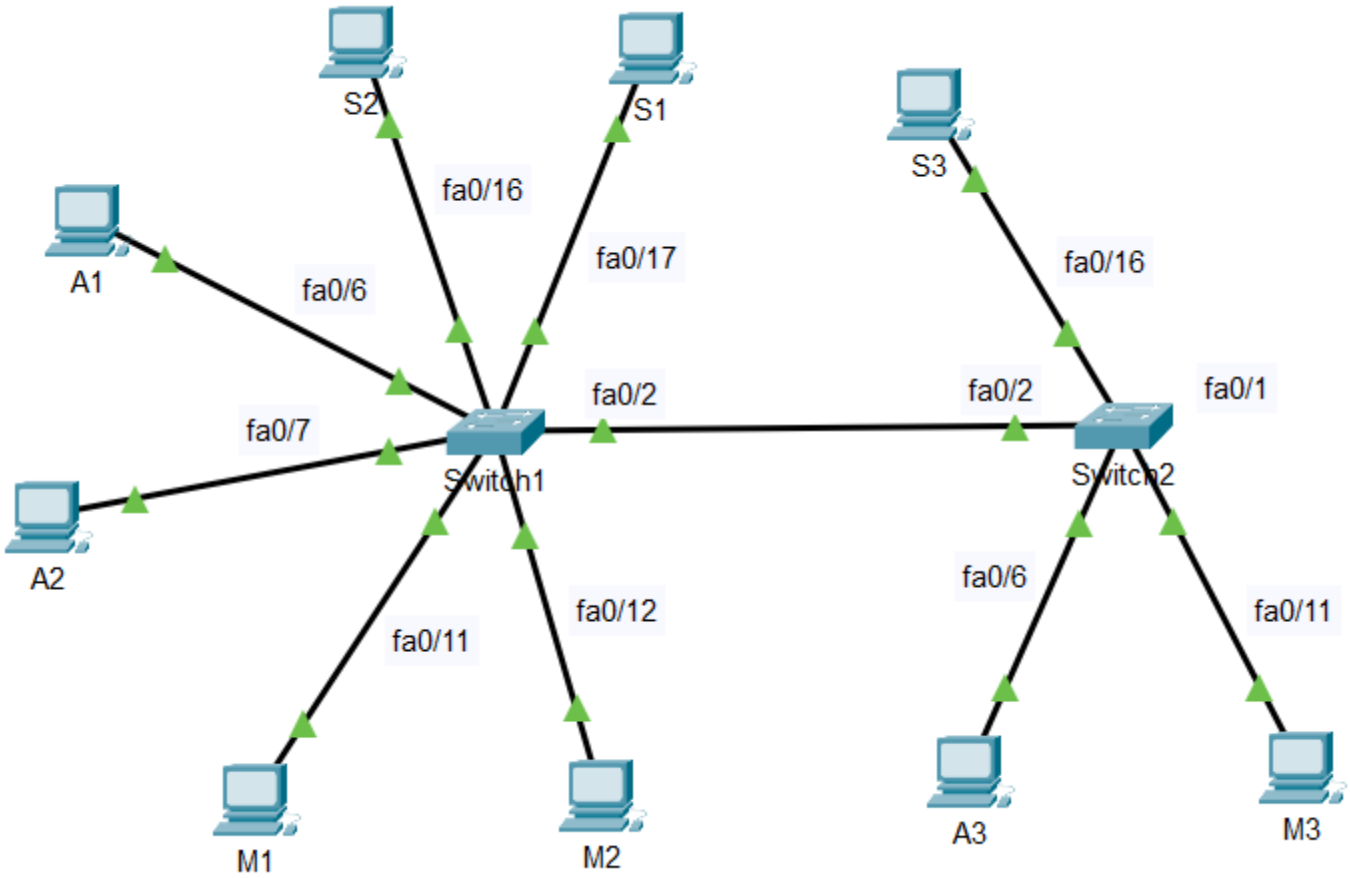
Hostname	Interface	VLAN Name	VLAN ID	IP Address	Default Gateway
A1		Accounting	VLAN 10	192.168.10.1	192.168.10.100
A2		Accounting	VLAN 10	192.168.10.2	192.168.10.100
A3		Accounting	VLAN 10	192.168.10.3	192.168.10.100
M1		Marketing	VLAN 20	192.168.20.1	192.168.20.100
M2		Marketing	VLAN 20	192.168.20.2	192.168.20.100
M3		Marketing	VLAN 20	192.168.20.3	192.168.20.100
S1		Sales	VLAN 30	192.168.30.1	192.168.30.100
S2		Sales	VLAN 30	192.168.30.1	192.168.30.100
S3		Sales	VLAN 30	192.168.30.1	192.168.30.100

Port Assignment is shown in the following table:

Ports	Assignment	VLAN ID	Network Address
fa0/6-0/10	VLAN 10 – Accounting	VLAN 10	192.168.10.0
fa0/11-0/15	VLAN 20 – Marketing	VLAN 20	192.168.20.0
fa0/15-0/20	VLAN 30 – Sales	VLAN 30	192.168.30.0

Assign Port Numbers on Switch

- Assign the Switch Port Numbers where the Host will be connected



1- Perform Basic Switch Configuration

Perform basic switch configuration. Change hostname and disable ip domain-lookup using

```
Switch(config)#hostname Switch1
Switch1(config)#no ip domain-lookup
```

2- Disable all Switch Ports

Disable all switch ports. By default, the switch ports are enable (ON), it is the best practice to disable all switch ports. First use show running-config to see all ports are enabled, and then use the following:

```
Switch(config)#interface range fa0/1-24
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit

Switch(config)#interface range gig0/1-2
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit
```

2- Disable all Switch Ports

Disable all switch ports. By default, the switch ports are enable (ON), it is the best practice to disable all switch ports. First use show running-config to see all ports are enabled, and then use the following:

```
Switch(config)#interface range fa0/1-24
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit

Switch(config)#interface range gig0/1-2
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit
```

3- Enable Required Switch Ports

Re-enable the switch ports that you would like to use for each switch, using the following set of commands:

```
Switch1(config)#interface range fa0/2,fa0/6,fa0/7,fa0/11,fa0/12,fa0/16,fa0/17
Switch1(config-if-range)#no shutdown
Switch1(config-if-range)#end
```

```
Switch2(config)#interface range fa0/1,fa0/2,fa0/6,fa0/11,fa0/16
Switch2(config-if-range)#no shutdown
Switch2(config-if-range)#end
```

4- Verify Ports using Running-Config

Use show running-config on each switch to make sure the required switch ports are now enabled.

5- Create VLANs and name them

Create VLAN and name VLANs on each switch using the following set of commands:

```
Switch(config)#vlan 10
Switch(config-vlan)#name Accounting
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Marketing
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Sales
Switch(config-vlan)#exit
```

6- Verify VLANs

Verify that VLANs have been created in each switch using the following:

```
Switch#show vlan brief
```

Verify: ports are currently assigned to the VLANs you have created.

Observe that all the switch ports are under default VLAN

7- Assign Switch Ports to VLAN

Assign switch ports to each VLAN according the Ports Assignment table:

```
Switch(config)#interface range fa0/6-10
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#exit
Switch(config)#interface range fa0/11-15
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#interface range fa0/16-20
Switch(config-if-range)#switchport access vlan 30
Switch(config-if-range)#end
```

8- Verify VLAN Ports Assignment

Verify the VLAN ports assignment on Switch using the following:

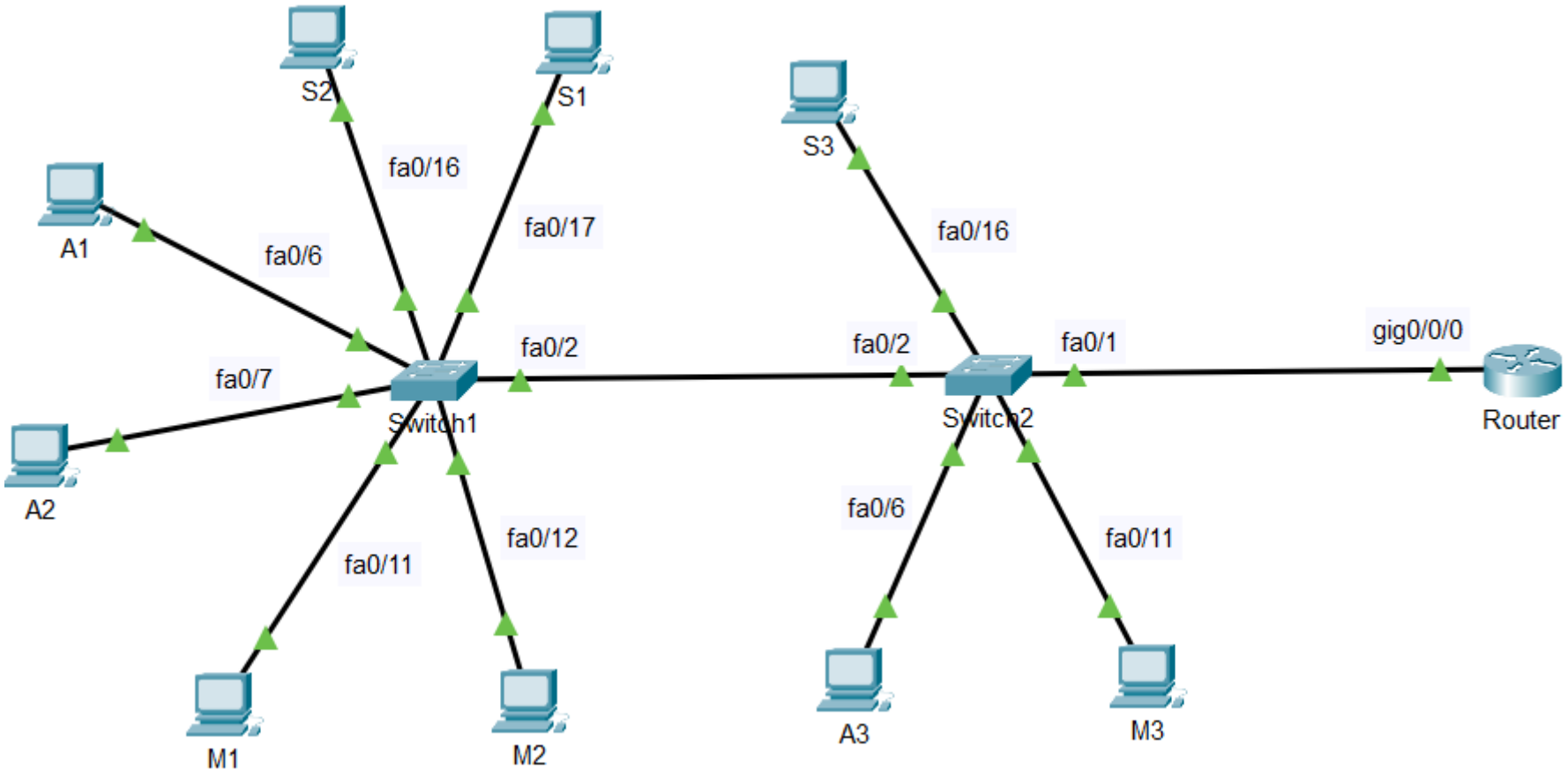
```
Switch#show vlan brief
```

Verify: ports are currently assigned to the VLANs you have created.

Observe that all the switch ports are under default VLAN

Inter-VLAN Routing

- Consider the following VLANs connecting through a Router:



VLAN Information

Addressing Scheme for the VLAN Network Diagram is shown in the following table. Subnet mask is 255.255.255.0 throughout the network.

Hostname	Interface	VLAN Name	VLAN ID	IP Address	Default Gateway
A1		Accounting	VLAN 10	192.168.10.1	192.168.10.100
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A3		Accounting	VLAN 10	192.168.10.3	192.168.10.100
M1		Marketing	VLAN 20	192.168.20.1	192.168.20.100
M2		Marketing	VLAN 20	192.168.20.2	192.168.20.100
M3		Marketing	VLAN 20	192.168.20.3	192.168.20.100
S1		Sales	VLAN 30	192.168.30.1	192.168.30.100
S2		Sales	VLAN 30	192.168.30.2	192.168.30.100
S3		Sales	VLAN 30	192.168.30.3	192.168.30.100
Switch1		Management	VLAN 99	192.168.99.1	192.168.99.100
Switch2		Management	VLAN 99	192.168.99.2	192.168.99.100
Router	gig0/0/0.1			192.168.1.100	
Router	gig0/0/0.10			192.168.10.100	
Router	gig0/0/0.20			192.168.20.100	
Router	gig0/0/0.30			192.168.30.100	
Router	gig0/0/0.99			192.168.99.100	

VLAN Information

Port Assignment is shown in the following table:

Ports	Assignment	VLAN ID	Network Address
fa0/1-0/5	802.1Q Trunks (Native VLAN 99)	VLAN 99	192.168.99.0
fa0/6-0/10	VLAN 10 – Accounting	VLAN 10	192.168.10.0
fa0/11-0/15	VLAN 20 – Marketing	VLAN 20	192.168.20.0
fa0/15-0/20	VLAN 30 – Sales	VLAN 30	192.168.30.0

5- Create VLANs and Management VLAN

Create VLAN and name VLANs on each switch using the following set of commands:

```
Switch(config)#vlan 10
Switch(config-vlan)#name Accounting
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Marketing
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name Sales
Switch(config-vlan)#exit
Switch(config)#vlan 99
Switch(config-vlan)#name management
Switch(config-vlan)#end
```

9- Configure Trunking

Configure trunking in fa0/1-5 ports on the Switch using:

```
Switch1(config)#interface range fa0/1-5
Switch1(config-if-range)#switchport mode trunk
Switch1(config-if-range)#switchport trunk native vlan 99
Switch1(config-if-range)#end

Switch2(config)#interface range fa0/1-5
Switch2(config-if-range)#switchport mode trunk
Switch2(config-if-range)#switchport trunk native vlan 99
Switch2(config-if-range)#end
```

Management VLAN

- Management VLAN is **only used to manage the switches on your network**. If you have a layer 2 switch you give the IP to management VLAN to manage it remotely. If you don't give any IP to management VLAN, you don't lose anything. It's just that you will not be able to manage the switch remotely.

- By default, this is also VLAN 1. A good security practice is to separate management and user data traffic.

10- Management VLAN

Assign the IP address to the management VLAN on Switch using:

```
Switch1(config)#interface vlan 99
Switch1(config-if)#ip address 192.168.99.1 255.255.255.0
Switch1(config-if)#no shutdown
Switch1(config-if)#end

Switch2(config)#interface vlan 99
Switch2(config-if)#ip address 192.168.99.2 255.255.255.0
Switch2(config-if)#no shutdown
Switch2(config-if)#end
```

11- Inter-VLAN Routing

Perform basic router configuration. Change hostname and disable ip domain-lookup using

```
Router(config)#hostname Router
Router(config)#no ip domain-lookup
```

Now configure the router with encapsulation dot1Q to link all VLANs, as follows:

```
Router(config)#interface gig0/0/0
Router(config-if)#no shutdown
Router(config-if)#exit

Router(config)#interface gig0/0/0.1
Router(config-subif)#encapsulation dot1q 1
Router(config-subif)#ip address 192.168.1.100 255.255.255.0
Router(config-subif)#exit

Router(config-if)#interface gig0/0/0.10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.10.100 255.255.255.0
Router(config-subif)#exit
```

11- Inter-VLAN Routing

```
Router(config)#interface gig0/0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.20.100 255.255.255.0
Router(config-subif)#exit

Router(config)#interface gig0/0/0.30
Router(config-subif)#encapsulation dot1Q 30
Router(config-subif)#ip address 192.168.30.100 255.255.255.0
Router(config-subif)#exit


Router(config)#interface gig0/0/0.99
Router(config-subif)#encapsulation dot1q 99 native
Router(config-subif)#ip address 192.168.99.100 255.255.255.0
Router(config-subif)#exit
Router(config)#
```

12- Verify Trunking

Verify that the trunks have been configured using:

```
Switch#show interface trunk
```

Verify the encapsulation shown in the output of the switch.

13- Verify Connectivity

Use Ping utility to verify the connectivity across all VLANs