Lab – Topic 12

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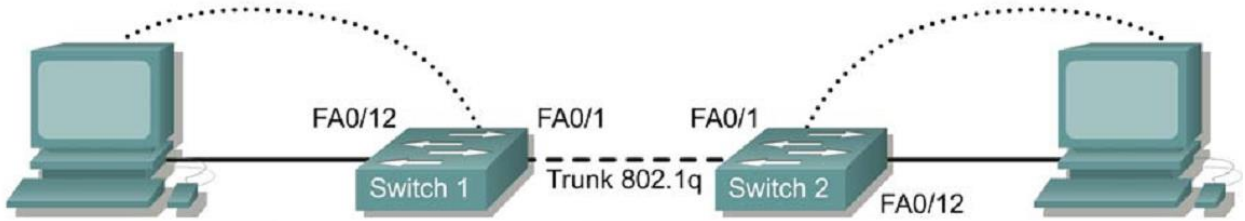
Lab 9.1.5b Trunking with 802.1q



Switch Designation	Switch Name	VLAN 1 IP Address	Subnet Mask	VLAN Names and Numbers	Switch Port Assignments
Switch 1	Switch_A	192.168.1.2	255.255.255.0	VLAN 1 Native VLAN 10 Accounting VLAN 20 Marketing VLAN 30 Engineering	fa0/2 - 0/3 fa0/4 - 0/6 fa0/7 - 0/9 fa0/10 - 0/12
Switch 2	Switch_B	192.168.1.3	255.255.255.0	VLAN 1 Native VLAN 10 Accounting VLAN 20 Marketing VLAN 30 Engineering	fa0/2 - 0/3 fa0/4 - 0/6 fa0/7 - 0/9 fa0/10 - 0/12

Objective

- Create a basic switch configuration and verify it.
- Create multiple VLANs, name them, and assign multiple member ports to them.
- Create a 802.1q trunk line between the two switches to allow communication between paired VLANs
- Test the VLANs functionality by moving a workstation from on VLAN to another.

Background/Preparation

Trunking changes the formatting of the packets. The ports need to be in agreement as to which format is being used to transmit data on the trunk or no data will be passed. If there is different trunking encapsulation on the two ends of the link they will not able to communicate. Similar situation will occur if one of the ports is configured in trunking mode (unconditionally) and the other one is in access mode (unconditionally).

When managing a switch, the Management Domain is always VLAN 1. The Network Administrator's workstation must have access to a port in the VLAN 1 Management Domain. All ports are assigned to VLAN 1 by default. This lab will also help demonstrate how VLANs can be used to separate traffic and reduce broadcast domains.

Cable a network similar to the one in the above diagram.

Step 1 Configure the switch

Configure the hostname, and the management LAN (VLAN 1) settings. These values are shown in the chart. **Do not configure VLANs and trunking yet.**

Step 2 Configure the hosts attached to the switch

Configure the IP address, subnet mask and default gateway on each host. Be sure to choose addresses that are on the same subnet as the switch.

Step 3 Verify connectivity

a. To verify that hosts and switch are correctly configured, ping the switch IP address from the hosts.

b. Were the pings successful? _____

c. If the answer is no, troubleshoot the hosts and switch configurations.

Step 4 Display the VLAN interface information

a. On Switch_A, type the command show vlan at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

Note: There should be an entry for VLAN 1 and the default VLANs (1002+). If other VLANs appear, they could be deleted (refer to the Lab Exercise: Deleting VLAN Configurations).

Step 5 Create and name three VLANs

a. Enter the following commands to create and name three VLANs:

```
Switch_A#configure terminal
Switch_A(config)#vlan 10
Switch_A(config-vlan)#name Accounting
Switch_A(config-vlan)#vlan 20
Switch_A(config-vlan)#name Marketing
Switch_A(config-vlan)#vlan 30
Switch_A(config-vlan)#name Engineering
Switch_A(config-vlan)#end
```

b. Use the **show vlan** command to verify that the VLANs have been created correctly.

Step 6 Assign ports to a VLAN 10

Assigning ports to VLANs must be done from the interface mode. Enter the following commands to add ports 0/4 to 0/6 to VLAN 10:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/4
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/5
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/6
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#end
```

Step 7 Assign ports to VLAN 20

Enter the following commands to add ports 0/7 to 0/9 to VLAN 20:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/7
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/8
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/9
```

```
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#end
```

Step 8 Assign ports to VLAN 30

Enter the following commands to add ports 0/10 to 0/12 to VLAN 30:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/10
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/11
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#end
```

Step 9 Create VLANs on Switch_B

Repeat Step 5 through 8 on Switch_B to create its VLANs

Step 10 Display the VLAN interface information

a. On both switches, type the command **show vlan** at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

b. Are ports 0/10 through 0/12 assigned to VLAN 30?

_____

Step 11 Test the VLANs

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? _____

b. Why? _____

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? _____

d. Why? _____

Step 12 Create the trunk

On both switches, Switch_A and Switch_B, type the following command at the FastEthernet 0/1 interface command prompt. Note that it is not necessary to specify the encapsulation on a 2950, since it only supports 802.1Q.

```
Switch_A(config)#interface fastethernet 0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#end

Switch_B(config)#interface fastethernet 0/1
Switch_B(config-if)#switchport mode trunk
Switch_B(config-if)#end
```

Step 13 Verify the trunk

a. To verify that port Fast Ethernet 0/1 has been established as a trunk port, type **`show interface fastethernet 0/1 switchport`** at the Privileged EXEC mode prompt.

b. What type of trunking encapsulation is shown on the output results?

_____

c. According to the output with **`show interface fastethernet 0/1 switchport`** on Switch_B, is there a difference from the Administrative Trunking Encapsulation from the Operational Trunking Encapsulation?

_____

d. On the fragment "Trunking VLANs Enable" from the output, what does the word "ALL" mean?

_____

e. What would happen if the two ports of the trunk were using different encapsulation?

_____

f. Explain._____

Step 14 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? _____

b. Why? _____

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? _____

d. Why? _____

Step 15 Move host

Move the host in Switch_A from port 0/12 to port 0/8. Wait until the port LED goes green and then go to the next step.

Step 16 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/12.

a. Was the ping successful?_____

b. Why? _____

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful?_____

d. Why? _____

Step 17 Move host

Move the host in Switch_B from port 0/12 to port 0/7. Wait until the port LED goes green and then go to the next step.

Step 18 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/7.

a. Was the ping successful?_____

b. Why? _____

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful?_____

d. Why? _____

Step 19 Move host

Move the host in Switch_A from port 0/8 to port 0/2. Wait until the port LED goes green and then go to the next step.

Step 20 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/7.

a. Was the ping successful?_____

b. Why? _____

Ping from the host in Switch_A port 0/2 to the switch IP 192.168.1.2.

c. Was the ping successful?_____

d. Why? _____

Step 21 Move host

Move the host in Switch_B from port 0/7 to port 0/3. Wait until the port LED goes green and then go to the next step.

Step 22

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/3.

a. Was the ping successful?_____

b. Why? _____

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.2.

c. Was the ping successful?_____

d. Why? _____

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.3.

e. Was the ping successful?_____

f. Why? _____

g. What conclusions can be drawn from the testing that was just performed in regards to VLAN membership and VLANs across a trunk?

_____

_____

_____