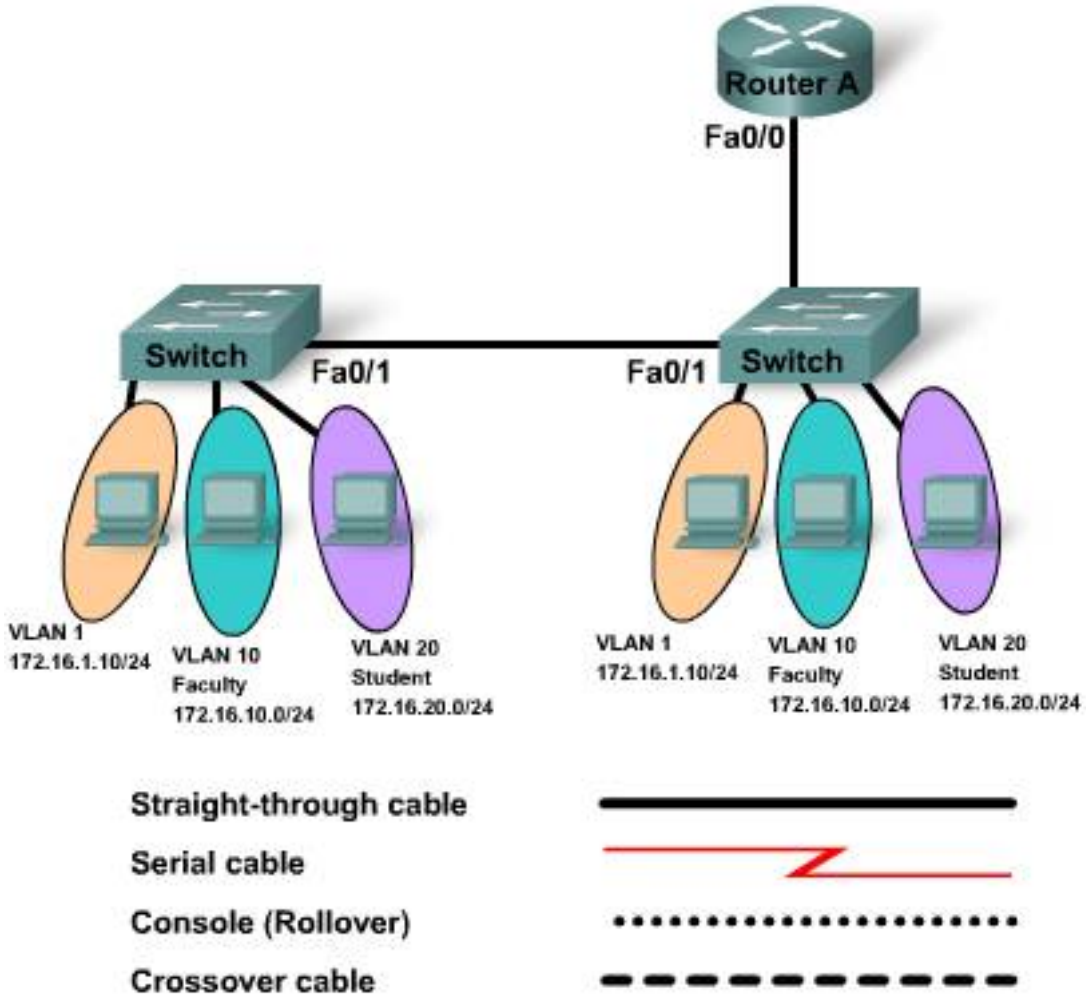
Lab 3.4.3 Part B: Configuring Inter-VLAN Routing



Device	Host Name / Interface	VLAN 10	VLAN 20	VLAN 1	IP Address	Trunk
Router A	RouterA					Fa0/0
Switch 1	Switch1	Fa0/5 – Fa0/6	Fa0/7 – Fa0/8	All Remaining Ports	172.16.1.2/24	Fa0/1, Fa0/2
Switch 2	Switch2	Fa0/5 – Fa0/6	Fa0/7 – Fa0/8	All Remaining Ports	172.16.1.3/24	Fa0/1
All device passwords: enable=cisco secret=class						

Objectives

- Configure two switches, one as a VTP server and the other as a VTP client.
- Configure three VLANs on the VTP server switch and propagate this information to the VTP client.
- Configure VLAN configuration on Router A.
- Configure inter-VLAN routing using a router-on-a-stick configuration.
- Verify connectivity between the VLANs.

Background / Preparation

This lab focuses on the basic configuration of the Cisco 1841 or comparable router using Cisco IOS commands. The information in this lab applies to other routers; however, command syntax may vary. Depending upon the router model, the interfaces may differ. For example, on some routers Serial 0 may be Serial 0/0 or S0/0/0 and Ethernet 0 may be FastEthernet 0/0. The Cisco Catalyst 2960 switch comes preconfigured and only needs to be assigned basic security information before being connected to a network.

The following resources are required:

- Two Cisco 2960 switches or other comparable switches
- One router with Fast Ethernet interface to connect to switch
- One Windows-based PC with a terminal emulation program
- One RJ-45-to-DB-9 connector console cable to configure the router and switches
- One straight-through Ethernet cable to connect from the router to Switch 1
- One crossover Ethernet cable to connect Switch 1 to Switch 2

NOTE: Make sure the router and all the switches have been erased and have no startup configurations. For instructions, refer to the end of this lab. Instructions are provided for both the switch and router.

NOTE: SDM Enabled Routers – If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. Contact your instructor if necessary.

Step 1: Connect the equipment

a. Connect the router Fa0/0 interface with a straight-through cable to Switch 1 Fa0/2 interface.

b. Connect Switch 1 Fa0/1 port to the Fa0/1 port on Switch 2 using a crossover cable.

c. Connect a PC with a console cable to perform configurations on the router and switches.

Step 2: Perform basic configurations on the router

a. Connect a PC to the console port of the router to perform configurations using a terminal emulation program.

b. Configure Router A with a hostname and console, Telnet, and privileged passwords according to the table diagram.

Step 3: Configure VLAN trunking on the router

Configure Router A Fa0/0 interface to trunk for VLAN 1, VLAN 10, and VLAN 20 with 802.1Q encapsulation.

```
RouterA(config)#interface fa0/0
RouterA(config-if)#no shutdown
RouterA(config-if)#interface fa0/0.1
RouterA(config-subif)#encapsulation dot1Q 1
RouterA(config-subif)#ip address 172.16.1.1 255.255.255.0
RouterA(config-subif)#exit
RouterA(config)#interface fa0/0.10
RouterA(config-subif)#encapsulation dot1Q 10
RouterA(config-subif)#ip address 172.16.10.1 255.255.255.0
RouterA(config-subif)#exit
RouterA(config)#interface fa0/0.20
RouterA(config-subif)#encapsulation dot1Q 20
RouterA(config-subif)#ip address 172.16.20.1 255.255.255.0
RouterA(config-subif)#end
```

Step 4: .Configure Switch 1

a. Configure Switch 1 with a hostname and console, Telnet, and privileged passwords according to the table diagram.

b. Configure Switch 1 with the VLAN 1 IP address of 172.16.1.2/24.

c. On Switch 1, create VLAN 10, named **Faculty**, and VLAN 20, named **Students**.

```
Switch1(config)#vlan 10
Switch1(config-vlan)#name Faculty
Switch1(config-vlan)#exit
Switch1(config)#vlan 20
Switch1(config-vlan)#name Students
Switch1(config-vlan)#exit
Switch1(config)#
```

d. Configure Switch 1 with the default gateway address of 172.16.1.1.

e. Configure Switch 1 with the interfaces Fa0/5 and Fa0/6 on VLAN 10.

```
Switch1(config)#interface fa0/5
Switch1(config-if)#switchport mode access
Switch1(config-if)#switchport access vlan 10
Switch1(config-if)#exit
Switch1(config)#interface fa 0/6
Switch1(config-if)#switchport mode access
Switch1(config-if)#switchport access vlan 10
Switch1(config-if)#exit
```

f. Configure Switch 1 with the interfaces Fa0/7 and Fa0/8 on VLAN 20.

```
Switch1(config)#interface fa0/7
Switch1(config-if)#switchport mode access
Switch1(config-if)#switchport access vlan 20
Switch1(config-if)#exit
Switch1(config)#interface fa0/8
Switch1(config-if)#switchport mode access
Switch1(config-if)#switchport access vlan 20
Switch1(config-if)#end
```

g. Configure all other interfaces on Switch 1 in VLAN 1. By default, there is only a single VLAN for all ports. You cannot rename or delete VLAN 1. Therefore, no further configuration is necessary. To prove this, issue the command **show vlan brief**.

Are all other switch ports in VLAN 1? _____

Which switch ports are in VLAN 10? _____

Which switch ports are in VLAN 20? _____

h. Issue the command **show vlan**.

What difference is noticed between the two commands **show vlan brief** and **show vlan**?

_____

_____

Step 5: Configure VLAN trunking on Switch 1

a. Configure trunking between Switch 1 and Switch 2 with 802.1 encapsulation using port Fa0/1 on both switches.

```
Switch1(config)#int fa0/1
Switch1(config-if)#switchport mode trunk
Switch1(config-if)#exit
```

b. Configure trunking between Switch 1 and Router A with 802.1 encapsulation using port Fa0/2 on Switch 1.

```
Switch1(config)#int fa0/2
Switch1(config-if)#switchport mode trunk
Switch1(config-if)#end
Switch1#
```

c. From Switch 1, issue the command **show interfaces trunk**.

Which interfaces on Switch 1 are in trunk mode? _____

Which VLANs are allowed and active in the management domain? _____

Step 6: Configure VTP on Switch 1

a. Configure Switch 1 as part of VTP domain Group 1.

```
Switch1(config)#vtp domain Group1
Changing VTP domain name from NULL to Group1
```

b. Configure Switch 1 as the VTP server and Switch 2 as the VTP client.

```
Switch1(config)#vtp mode server
Device mode already VTP SERVER.
Switch1(config)#end
```

Step 7: Configure Switch 2

a. Configure Switch 2 with a hostname and console, Telnet, and privileged passwords according to the table diagram.

b. Configure Switch 2 with the VLAN 1 IP address of 172.16.1.3/24.

c. Configure Switch 2 with the default gateway address of 172.16.1.1.

d. Configure Switch 2 with the interfaces Fa0/5 and Fa0/6 on VLAN 10.

```
Switch2(config)#interface fa0/5
Switch2(config-if)#switchport mode access
```



```
Switch2(config-if)#switchport access vlan 10
Switch2(config-if)#exit
Switch2(config)#interface fa 0/6
Switch2(config-if)#switchport mode access
Switch2(config-if)#switchport access vlan 10
Switch2(config-if)#exit
```

e. Configure Switch 2 with the interfaces Fa0/7 and Fa0/8 on VLAN 20.

```
Switch2(config)#interface fa0/7
Switch2(config-if)#switchport mode access
Switch2(config-if)#switchport access vlan 20
Switch2(config-if)#exit
Switch2(config)#interface fa0/8
Switch2(config-if)#switchport mode access
Switch2(config-if)#switchport access vlan 20
Switch2(config-if)#exit
```

Step 8: Configure VLAN trunking on Switch 2

```
Switch2(config)#int fa0/1
Switch2(config-if)#switchport mode trunk
Switch2(config-if)#exit
```

Step 9: Configure VTP on Switch 2

```
Switch2(config)#vtp mode client
```

From Switch 2, verify that all VLANs have been propagated across the domain by issuing the command **`show vtp status`**.

What is the VTP version used on Switch 2? _____

What is the maximum VLANs supported locally? _____

What VTP operating mode is used on Switch 2? _____

What is the VTP domain name? _____

How did Switch 2 learn the domain name and VLAN information? _____

_____

Step 10: Verify connectivity

The router and switches should be able to ping the interfaces of the other devices.

a. From each device, issue a ping to all interfaces.

Are the router pings successful? _____

b. From Switch 1, ping to all other devices.

Are Switch 1 pings successful? _____

c. From Switch 2, ping to all other devices.

Are Switch 2 pings successful? _____
If the ping is not successful, verify the connections and configurations again. Check to ensure that all cables are correct and that connections are seated. Check the router and switch configurations.

Step 11: Reflection

a. Why would VLANs be configured in a network?

_____

_____

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b. Why would a VLAN benefit from trunking?

_____

_____

c. Why should VTP be used?

_____

_____

d. Which device provides connectivity between different VLANs?

_____

e. What are some benefits of VLANs?

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