

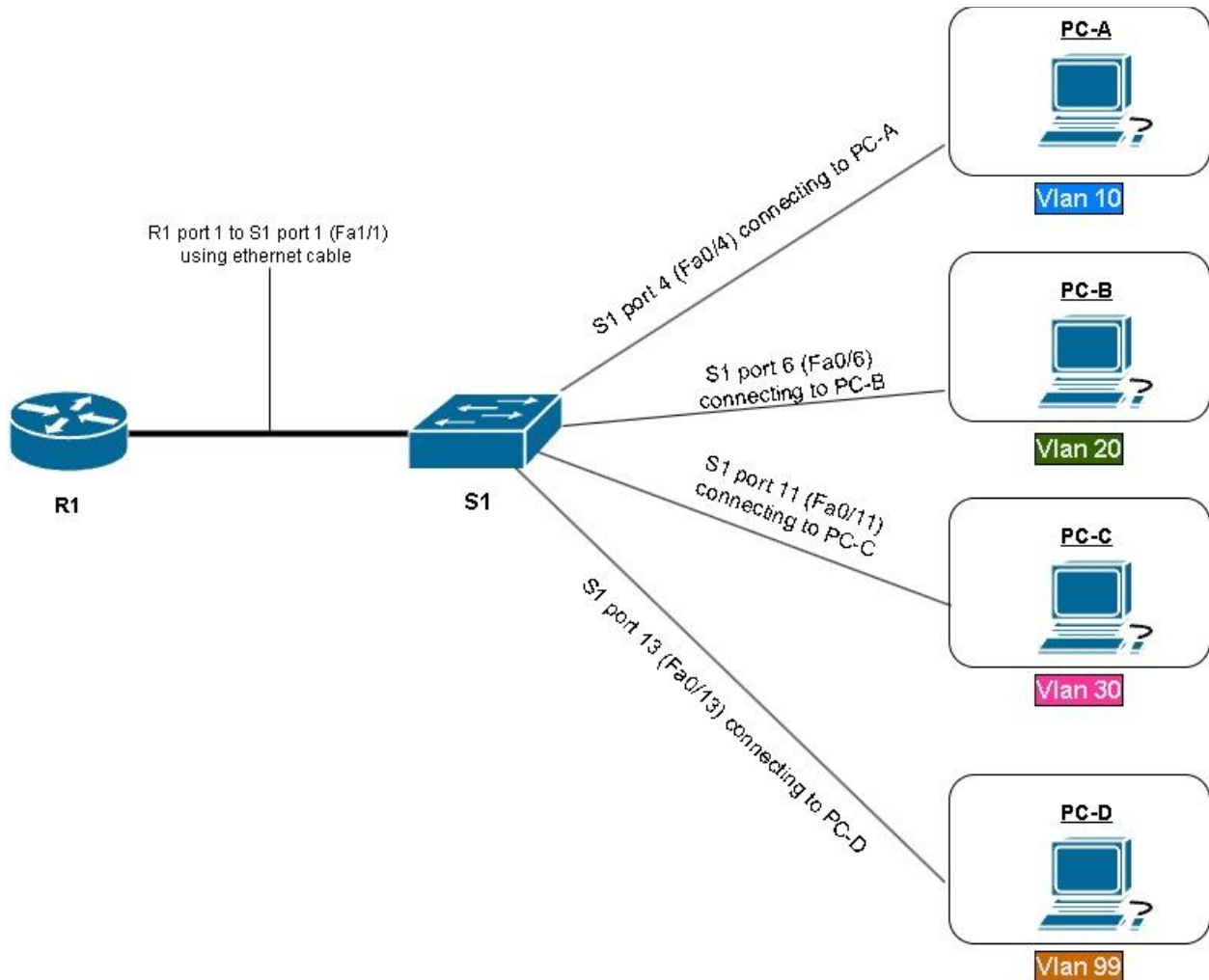
## CMIT 351 Project 2

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### Part 1: Design the Local Area Network



### Part 2: Create the basic switch configurations

#### 2.1 Cable the network

All cabling used in this setup are ethernet cables and the connections are:

1. Port 1 on router 1(R1) was connected to port 1 on switch 1(S1).

2. PC-A connection port was connected to port 4 on switch 1(S1).
3. PC-B connection port was connected to port 6 on switch 1(S1).
4. PC-C connection port was connected to port 11 on switch 1(S1).
5. PC-D connection port was connected to port 13 on switch 1(S1).

## 2.2. Configure the basic switch functions

To start, the commands below must be implemented for both the router and the switch. In step 3, substitute R1 for S1 when configuring switch 1 (S1):

1. You must get into Exec mode by typing en in the command line interface (CLI) of the router.
2. After, type in conf t to enter configuration mode of the router.
3. Rename the router to **R1** by typing: hostname R1.
4. To enable the password for the router, type enable secret class to set the password to class.
5. Then change the password for the “line configuration 0” by first getting into the interface by typing line con 0.
6. After, type: password cisco to set the password to cisco.
7. Next, set the password for line vty 0 15. Type line vty 0 15 to get into that interface.
8. Type password cisco to set the password for line vty.
9. Type exit to end configuration mode. (Or you can type end to return back to the main config terminal.)
10. To set the Message Of The Day (MOTD), get back into configuration mode by typing conf t. (If already in configuration mode, skip this step).
11. Type banner Unauthorized access is strictly prohibited. to change the MOTD.
12. To set synchronous logging in line con 0, get into the interface by typing line con 0.
13. Type logging synchronous to change the logging.
14. Type exit to exit configuration mode and exit again to return to user mode. (Or you may type end to return to the main terminal)
15. The router should now be configured to the settings required.

## 2.3 Configure the Computers

At each computer, get into the ethernet adapter properties and change the IPv4 settings described below:

1. **PC-A** would have an IP address of 192.168.10.3, Subnet of 255.255.255.0 with a default gateway of 192.168.10.1.
2. **PC-B** would have an IP address of 192.168.20.4, Subnet of 255.255.255.0 with a default gateway of 192.168.20.1.
3. **PC-C** would have an IP address of 192.168.30.5, Subnet of 255.255.255.0 with a default gateway of 192.168.30.1.
4. **PC-D** would have an IP address of 192.168.40.6, Subnet of 255.255.255.0 with a default gateway of 192.168.40.1.

## 2.4 Test and Validate Connectivity

- From computer A, I would ping 192.168.20.4 (PC-B) that resulted in a timeout request.

- From computer B, I would ping 192.168.30.5 (PC-C), but resulted in a “request timed out”.
- I would do the same with computer C to ping 192.168.40.6 (PC-D) with the results also ending in “request timed out”.

### Part 3: Define the VLANs

The commands below apply to both router 1(R1) and switch 1(S1) when setting up VLANs for Students, Faculty, Management and Containment:

- Get into Exec mode by typing *enable* in the command line interface.
- Get into global configuration mode by entering *conf t*.
- Create VLAN 10 by typing *vlan 10*. After it is created, enter *name Students* to create the name of VLAN 10.
- Next is to create VLAN 20. Type *vlan 20* to create that vlan.
- After, enter the command *name Faculty* to create the name for VLAN 20.
- Next up is VLAN 30. Type *vlan 30* to create it and type: *name Management* to create the name for VLAN 30.
- Finally, create VLAN 99 by typing *vlan 99*. Type: *name Containment* to label VLAN 99 to containment.

### Part3b: Define the Router Sub-interfaces

Defining the interfaces of the VLANs on each switch as directed are as follows:

Switch 1:

VLAN 10

1. From Configuration mode, type *int fa0/4* to be in that interface.
2. Ensure the interface is in access mode by typing *switchport mode access*. Then assign it to VLAN 10 by entering *switchport access vlan 10*.
3. Type *exit* to exit out of that interface.

VLAN 20

1. From configuration mode, go into interface 6 typing *int fa0/6*.
2. Ensure the interface is in access mode by typing *switchport mode access*. Then assign it to VLAN 20 by entering *switchport access vlan 20*.
3. Type *exit* to exit out of that interface.

VLAN 30

1. From configuration mode, go into interface 11 typing *int fa0/11*.
2. Ensure the interface is in access mode by typing *switchport mode access*. Then assign it to VLAN 30 by entering *switchport access vlan 30*.
3. Type *exit* to exit out of that interface.

VLAN 99

1. From Configuration mode, type *int range fa0/2-3* to be in that interface range.
2. Ensure the interface is in access mode by typing *switchport mode access*. Then assign it to VLAN 99 by entering *switchport access vlan 99*.
3. Type *exit* to exit out of that interface.

4. You would also apply this to interfaces 5, 7-10, 12-24, starting with step 1 again but typing int fa0/5 for interface 5, int range fa0/7-10 for interface ranges 7-10, int range fa0/12-24 for interface ranges 12-24 instead. Then follow steps 2 and 3 to complete this VLAN setup.

#### Router 1:

To set the interface/sub-interface up, the PC's must be identifiable to the router. Router is Layer-3 so adding the IP address will help make this possible:

1. From the main terminal window, type en to be in exec mode.
2. Type conf t to start configuring the router terminal.
3. Add PC-A's IP from the "configuring the computers" steps above. To do this, get into interface 4 by typing int e0/4. From there, type: ip address 192.168.10.3 255.255.255.0. This will assign interface 4 that IP address.
4. After, type no shutdown to change the state of the interface to active.
5. Type exit to get out of that interface.
6. You will repeat steps 3 -5 for PC-B and PC-C. PC-B uses interface 6, so substitute e0/4 with e0/6 followed by: ip address 192.168.20.4 255.255.255.0 and the same with PC-C with e0/11 and typing: ip address 192.168.30.5 255.255.255.0.
7. Once completed, type end to get back to the main configuration terminal.

### **Part 4: Implement VLAN Trunking**

#### **4.1**

1. If you aren't already in the configuration terminal, type conf t to get into it.
2. Set encapsulations on interfaces by getting into the specific interface first.
3. To do this, sub-interface 10 would be e0/0.10. After, type: encapsulation dot1q 10.
4. Then type: ip address 192.168.10.3 255.255.255.0.
5. Type exit to get out of that interface.
6. Next would be sub-interface 20, typing: e0/0.20. Again, typing encapsulation dot1q 20.
7. After, type: ip address 192.168.20.4 255.255.255.0.
8. Type exit to get out of that interface.
9. The last sub-interface, 30 would be e0/0.30. Follow the next command, encapsulation dot1q 30.
10. Lastly, type: ip address 192.168.30.5 255.255.255.0.
11. Type end to get back to the main configuration terminal.

#### Trunking:

\*The router (R1) has the ability to automatically configure itself into trunking mode\*

1. On switch 1 (S1) main terminal, type en to enter exec mode.
2. Type conf t to enter configuration mode.
3. Get into interface 1 by typing int fa0/1.
4. Type: switchport mode trunk to change the interface to trunking mode and disabling dynamic mode.

\*You are able to double check the implementation of the network using the show running-config command and show ip interface command.

## 4.2

- Using the ping command from PC-A, B and C were all able to communicate using their assigned IP addresses because of encapsulation on the sub-interfaces. PC-D was not able to communicate and had a timeout due to not being encapsulated in the sub-interface like the other PC's.