- Lab 5 : Routing and switching
- Lecturer : Prof. Oumaima FADI
- T.A: Prof. Abdoulghaniyu HARAZEEM

Lab 5 – Routing and switching

Objective:

The goal of this lab is to set up a network containing Virtual local area networks and learn how to perform the necessary network configurations.

We will focus on the following:

- Create VLANs on the switch
- Assign switch ports to VLANs
- Configure trunk link between switch and router
- Configure router subinterfaces for inter-VLAN routing
- Test and verify connectivity

Instructions:

1. The lab report must be submitted one week after the session in electronic format to Moodle platform
2. The lab must be done in class in groups of maximum 2 students.
3. Groups should remain the same for both reports and upcoming labs.

1. SIMPLE VLAN NETWORK SETUP

Requirement

2 PCs, 2 switch, 1 Router

Selection of the End Devices

1. Select ‘End Devices’
2. Select and drag 2 ‘PCs’
3. Select and drag 2‘Switch’
4. Select drag and drop ‘Router’

Connecting the Devices

Note: Cross-Over Cables are used for Connection between the same devices, while Straight-through Cables are used for connections between different devices

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2. Ip table & topology

Ports	Assignment	Network
S1 F0/1	802.1Q Trunk	N/A
S2 F0/1	802.1Q Trunk	N/A
S1 F0/5	802.1Q Trunk	N/A
S1 F0/6	VLAN 10 – Students	192.168.10.0/24
S2 F0/18	VLAN 20 – Faculty	192.168.20.0/24

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/1.1	192.168.1.1	255.255.255.0	N/A
	G0/1.10	192.168.10.1	255.255.255.0	N/A
	G0/1.20	192.168.20.1	255.255.255.0	N/A
	Lo0	209.165.200.225	255.255.255.224	N/A
S1	VLAN 1	192.168.1.11	255.255.255.0	192.168.1.1
S2	VLAN 1	192.168.1.12	255.255.255.0	192.168.1.1
PC-A	NIC	192.168.10.3	255.255.255.0	192.168.10.1
PC-B	NIC	192.168.20.3	255.255.255.0	192.168.20.1

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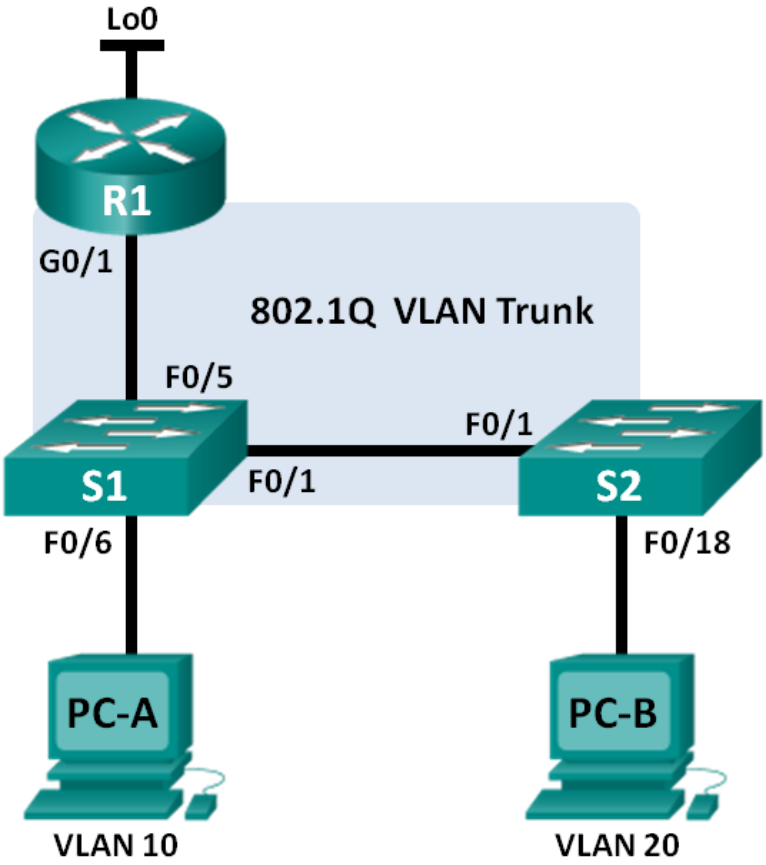

3. Configure Switches with VLANs and Trunking

You will configure the switches with VLANs and trunking.

Step 1: Configure VLANs on S1.

a. On S1, configure the VLANs and names listed in the Switch Port Assignment Specifications table. Write the commands you used in the space provided.

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b. On S1, configure the interface connected to R1 as a trunk. Also configure the interface connected to S2 as a trunk. Write the commands you used in the space provided.

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c. On S1, assign the access port for PC-A to VLAN 10. Write the commands you used in the space provided.

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Step 2: Configure VLANs on Switch 2.

a. On S2, configure the VLANs and names listed in the Switch Port Assignment Specifications table.

b. On S2, verify that the VLAN names and numbers match those on S1. Write the command you used in the space provided.

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c. On S2, assign the access port for PC-B to VLAN 20.

d. On S2, configure the interface connected to S1 as a trunk.

4. Configure Trunk-Based Inter-VLAN Routing

you will configure R1 to route to multiple VLANs by creating subinterfaces for each VLAN. This method of inter-VLAN routing is called router-on-a-stick.

Step 1: Configure a subinterface for VLAN 1.

a. Create a subinterface on R1 G0/1 for VLAN 1 using 1 as the subinterface ID. Write the command you used in the space provided.

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b. Configure the subinterface to operate on VLAN 1. Write the command you used in the space provided.

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c. Configure the subinterface with the IP address from the Address Table. Write the command you used in the space provided.

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Step 2: Configure a subinterface for VLAN 10.

a. Create a subinterface on R1 G0/1 for VLAN 10 using 10 as the subinterface ID.

b. Configure the subinterface to operate on VLAN 10.

c. Configure the subinterface with the address from the Address Table.

Step 3: Configure a subinterface for VLAN 20.

a. Create a subinterface on R1 G0/1 for VLAN 20 using 20 as the subinterface ID.

b. Configure the subinterface to operate on VLAN 20.

c. Configure the subinterface with the address from the Address Table.

Step 4: Enable the G0/1 interface.

Enable the G0/1 interface. Write the commands you used in the space provided.

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Step 5: Verify connectivity.

Enter the command to view the routing table on R1. What networks are listed?

_____

From PC-A, is it possible to ping the default gateway for VLAN 10? _____

From PC-A, is it possible to ping PC-B? _____

From PC-A, is it possible to ping Lo0? _____

From PC-A, is it possible to ping S2? _____

If the answer is **no** to any of these questions, troubleshoot the configurations and correct any errors.

Reflection

What are the advantages of trunk-based or router-on-a-stick inter-VLAN routing?

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