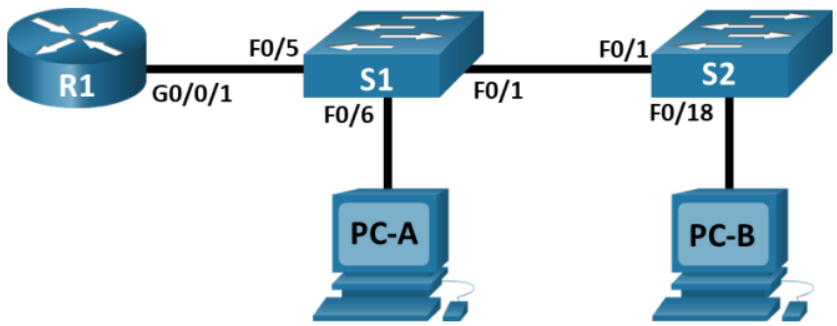
1 Objective

In this activity, you will use the router-on-a-stick method to implement inter-VLAN routing on a Cisco router. You will configure VLANs on switches, configure trunk links, and set up sub-interfaces on a router to route traffic between different VLANs. You will verify connectivity between devices in different VLANs.

2 Instructions

Topology



2.1 Rack Setup

The network topology consists of a router (R1) connected to a switch (S1), which is connected to another switch (S2). PC-A is connected to S1, and PC-B is connected to S2. The connections are as follows:

- R1's G0/0/1 interface is connected to S1's F0/5 interface.
- S1's F0/1 interface is connected to S2's F0/1 interface.
- PC-A is connected to S1's F0/6 interface.
- PC-B is connected to S2's F0/18 interface.

2.2 IP Configuration

Configure the devices with the following IPv4 addresses and subnet masks:

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0/1.10	192.168.10.1	255.255.255.0	N/A
	G0/0/1.20	192.168.20.1	255.255.255.0	N/A
	G0/0/1.30	192.168.30.1	255.255.255.0	N/A
	G0/0/1.1000	N/A	N/A	N/A
S1	VLAN 10	192.168.10.11	255.255.255.0	192.168.10.1
S2	VLAN 10	192.168.10.12	255.255.255.0	192.168.10.1
PC-A	NIC	192.168.20.3	255.255.255.0	192.168.20.1
PC-B	NIC	192.168.30.3	255.255.255.0	192.168.30.1

2.3 VLAN Configuration

Configure the following VLANs on the switches:

VLAN	Name	Interface Assigned
10	Management	S1: VLAN 10, S2: VLAN 10
20	Sales	S1: F0/6
30	Operations	S2: F0/18
999	Parking_Lot	S1: F0/2-4, F0/7-11; S2: F0/2-17, F0/19-23
1000	Native	N/A

2.4 Router and Switch Configuration

- **Basic Settings:** Configure hostnames (e.g., matrix_number_R1, matrix_number_S1, matrix_number_S2), console passwords, VTY passwords, encrypt passwords, and set MOTD banners on all devices similar to Lab Task 2.
- **Switch Configuration:**
  - Create the specified VLANs on both S1 and S2.
  - Configure the management interface (VLAN 10) with the assigned IP address and default gateway on S1 and S2.
  - Assign all unused ports to VLAN 999 (Parking_Lot), configure them as access ports, and shut them down.
  - Assign the used access ports (S1: F0/6, S2: F0/18) to their respective VLANs (VLAN 20 and VLAN 30).
  - Configure the link between S1 and S2 (F0/1 on both switches) as an 802.1Q trunk. Set the native VLAN to 1000 and allow VLANs 10, 20, 30, and 1000 across the trunk.
  - Configure the link between R1 and S1 (S1's F0/5) as an 802.1Q trunk with the same parameters as the trunk between S1 and S2.
- **Router Configuration:**
  - Activate the G0/0/1 interface.
  - Configure sub-interfaces on R1's G0/0/1 interface for VLANs 10, 20, and 30 using 802.1Q encapsulation. Assign the appropriate IP addresses to these sub-interfaces.
  - Configure a sub-interface for the native VLAN 1000, ensuring it is configured as native and does not have an IP address assigned. Include descriptions for each sub-interface.
- Save the configurations on all devices.

2.5 PC Configuration

- Configure PC-A and PC-B with the IPv4 addresses, subnet masks, and default gateways as specified in the IP Addressing Table. Disable the PC firewall if necessary for verification.

2.6 Connectivity Verification

- From PC-A, attempt to ping its default gateway (R1's G0/0/1.20 sub-interface).
- From PC-A, attempt to ping PC-B's IP address.
- From PC-A, attempt to ping S2's VLAN 10 management IP address.
- Use show commands on the switches (show vlan brief, show interfaces trunk) to verify VLAN and trunk configurations.
- Use show commands on the router (show ip interface brief) to verify the status and configuration of the physical interface and sub-interfaces.

3 Submission Instructions

Submit the following files:

- matrix_number_task3.pkt – The Packet Tracer simulation file.
- matrix_number_R1.txt – Router R1 configuration file.
- matrix_number_S1.txt – Switch S1 configuration file.
- matrix_number_S2.txt – Switch S2 configuration file.
- Screenshots showing successful pings from PC-A to its default gateway, PC-B, and S2. Include screenshots of the show command outputs used for verification on the router and switches.

Ver 1.0