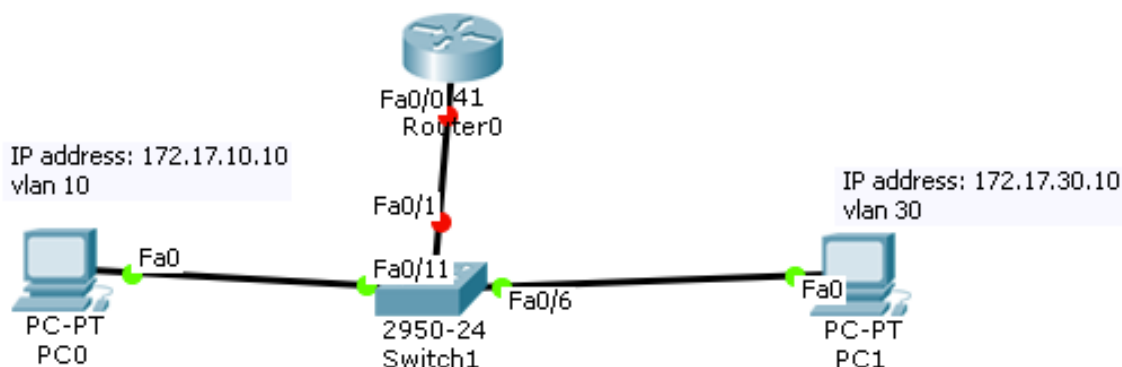


ASR Lab - Configuring Router-on-a-Stick Inter-VLAN Routing

Topology



Addressing Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
R1 (1841 model)	Fa0/0.10	172.17.10.1	255.255.255.0	N/A
	Fa0/0.30	172.17.30.1	255.255.255.0	N/A
PC0	NIC	172.17.10.10	255.255.255.0	172.17.10.1
PC1	NIC	172.17.30.10	255.255.255.0	172.17.30.1

Objectives

Part 1: Test Connectivity without Inter-VLAN Routing

Part 2: Add VLANs to a Switch

Part 3: Configure Subinterfaces

Part 4: Test Connectivity with Inter-VLAN Routing

Scenario

In this activity, you will check for connectivity prior to implementing inter-VLAN routing. You will then configure VLANs and inter-VLAN routing. Finally, you will enable trunking and verify connectivity between VLANs.

Part 1: Test Connectivity Without Inter-VLAN Routing

Step 1: Connect up cables as shown in above diagram. Configure the IP addresses, subnet masks and DG on PC0 and PC1. Ping between PC0 and PC1.

Because the two PCs are on separate networks and **R1** is not configured, the ping fails.

Part 2: Add VLANs to a Switch

Step 1: Create VLANs on S1.

Create VLAN 10 and VLAN 30 on **S1**.

Step 2: Assign VLANs to ports.

- a. Configure interface F0/6 and F0/11 as access ports and assign VLANs.
 - Assign **P0** to VLAN 10.
 - Assign **PC1** to VLAN 30.
 - Tip: S1(config)#interface fastEthernet 0/6
 - S1(config-if)#switchport access vlan 30
 - S1(config-if)#switchport mode access
 - Do similar configuration for P0 (adjusting the interface and vlan as necessary).

- b. Issue the **show vlan brief** command to verify VLAN configuration.

S1# **show vlan brief**

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/7, Fa0/8, Fa0/9 Fa0/10, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24,
10	VLAN0010	active	Fa0/11
30	VLAN0030	active	Fa0/6
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

Step 3: Test connectivity between PC0 and PC1.

From **PC0**, ping **PC1**. The pings should still fail. Why were the pings unsuccessful?

Part 3: Configure Subinterfaces

Step 1: Configure subinterfaces on R1 using the 802.1Q encapsulation.

- a. Create the subinterface Fa0/0.10.
- b. R1# Configure Terminal
- c. R1(config)# Interface Fa0/0.10
- d. R1(config-if)# encapsulation dot1q 10
- e. R1(config-if)# ip address xxxxxxxx xxxxxxxx
 - Set the encapsulation type to 802.1Q and assign VLAN 10 to the subinterface.
 - Refer to the **Address Table** and assign the correct IP address to the subinterface.
- f. **Now, Repeat step 1 but this time for the Fa0/0.30 subinterface.**
- g. **For example Create the subinterface Fa0/0.30.**
- h. R1# Configure Terminal
- i. R1(config)# Interface Fa0/0.30
- j. R1(config-if)# encapsulation dot1q 30
- k. R1(config-if)# ip address xxxxxxxx xxxxxxxx
 - Set the encapsulation type to 802.1Q and assign VLAN 30 to the subinterface.
 - Refer to the **Address Table** and assign the correct IP address to the subinterface.

Step 2: Verify Configuration.

- a. Use the **show ip interface brief** command to verify subinterface configuration. Both subinterfaces are down. Subinterfaces are virtual interfaces that are associated with a physical interface. Therefore, in order to enable subinterfaces, you must enable the physical interface that they are associated with.
- b. Enable the Fa0/0 interface.
- c. R1(config)#interface fastEthernet 0/0
- d. R1(config-if)#no shut
- e. Verify that the subinterfaces are now active.(**show ip int brief** command) – they should now be in a up up state.

Part 4: Test Connectivity with Inter-VLAN Routing

Step 1: Ping between PC1 and PC3.

From **PC0**, ping **PC1**. The pings should still fail.

Step 2: Enable trunking.

- a. On **S1**, issue the **show vlan** command. What VLAN is Fa0/1 assigned to? _____
- b. Because the router was configured with multiple subinterfaces assigned to different VLANs, the switch port connecting to the router must be configured as a trunk. Enable trunking on interface Fa0/1.
- c. S1(config)#interface fastEthernet 0/1

- d. S1(config-if)#switchport mode trunk
 - e. S1(config-if)#no shutdown
 - f. How can you determine that the interface is a trunk port using the **show vlan** command? Notice how fa0/1 no longer appears in list.
-
- g. Issue the **show interface trunk** command to verify the interface is configured as a trunk.

Step 3: Switch to Simulation mode to monitor pings.

- a. Switch to **Simulation** mode by clicking the **Simulation** tab or pressing **Shift+S**.
- b. Click **Capture/Forward** to see the steps the ping takes between **PC0** and **PC1**.
- c. You should see ARP requests and replies between **S1** and **R1**. Then ARP requests and replies between **R1** and **S3**. Then **PC1** can encapsulate an ICMP echo request with the proper data-link layer information and R1 will route the request to **PC1**.

Note: After the ARP process finishes, you may need to click Reset Simulation to see the ICMP process complete. You should now have successful connectivity between VLANs.