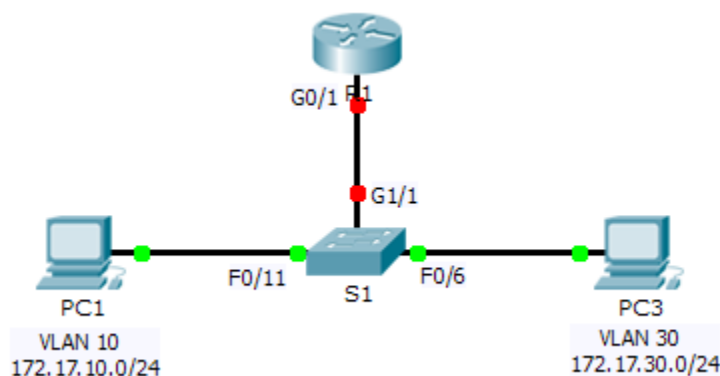


# Packet Tracer – Configuring Router-on-a-Stick Inter-VLAN Routing

## Topology



## Addressing Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
R1	G0/0.10	172.17.10.1	255.255.255.0	N/A
	G0/0.30	172.17.30.1	255.255.255.0	N/A
PC1	NIC	172.17.10.10	255.255.255.0	172.17.10.1
PC3	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: Ping between PC1 and PC3.

Wait for switch convergence or click **Fast Forward Time** a few times. When the link lights are green for **PC1** and **PC3**, ping between **PC1** and **PC3**. Because the two PCs are on separate networks and **R1** is not configured, the ping fails.

### Step 2: Switch to Simulation mode to monitor pings.

- Switch to Simulation mode by clicking the **Simulation** tab or pressing **Shift+S**.
- Click **Capture/Forward** to see the steps the ping takes between **PC1** and **PC3**. Notice how the ping never leaves **PC1**. What process failed and why?

## Part 2: Add VLANs to a Switch

### Step 1: Create VLANs on S1.

Return to **Realtime** mode and create VLAN 10 and VLAN 30 on **S1**.

### Step 2: Assign VLANs to ports.

- Configure interface F0/6 and F0/11 as access ports and assign VLANs.
  - Assign **PC1** to VLAN 10.
  - Assign **PC3** to VLAN 30.
- 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, Gig1/1, Gig1/2
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 PC1 and PC3.

From **PC1**, ping **PC3**. 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 G0/0.10.
  - 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.
- b. Repeat for the G0/0.30 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 G0/0 interface. Verify that the subinterfaces are now active.

## Part 4: Test Connectivity with Inter-VLAN Routing

### Step 1: Ping between PC1 and PC3.

From **PC1**, ping **PC3**. The pings should still fail.

### Step 2: Enable trunking.

- a. On **S1**, issue the **show vlan** command. What VLAN is G1/1 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 G1/1.
- c. How can you determine that the interface is a trunk port using the **show vlan** command?
- d. 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 **PC1** and **PC3**.
- 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 **PC3**.

**Note:** After the ARP process finishes, you may need to click Reset Simulation to see the ICMP process complete.

## Suggested Scoring Rubric

Packet Tracer scores 60 points. The four questions are worth 10 points each.