# Packet Tracer - Configure Router-on-a-Stick Inter-VLAN Routing

## 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 | |
| PC1 | NIC | 172.17.10.10 | 255.255.255.0 | 172.17.10.1 |
| PC2 | NIC | 172.17.30.10 | 255.255.255.0 | 172.17.30.1 |

## Objectives

**Part 1: Add VLANs to a Switch**

**Part 2: Configure Subinterfaces**

**Part 3: Test Connectivity with Inter-VLAN Routing**

## Scenario

In this activity, you will configure VLANs and inter-VLAN routing. You will then enable trunk interfaces and verify connectivity between VLANs.

## Instructions

## Part 1: 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 interfaces F0/6 and F0/11 as access ports and assign VLANs.

   - Assign the port connected to **PC1** to VLAN 10.
   - Assign the port connected to **PC3** to VLAN 30.

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, Gig0/1, Gig0/2
    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**.

Were the pings successful? Why did you get this result?

**Not successful because the PCs are on different IP networks and require a router or a Layer 3 switch to provide communication**

## Part 2: 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.

    ```
    R1(config)# int g0/0.10
    R1(config-subif)# encapsulation dot1Q 10
    R1(config-subif)# ip address 172.17.10.1 255.255.255.0
    ```

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 3: Test Connectivity with Inter-VLAN Routing

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

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

**The switch is not yet configured with a trunk port that is connected to the router.**

### Step 2: Enable trunking.

a.  On **S1**, issue the **show vlan** command.

    What VLAN is G0/1 assigned to?

    **VLAN1**

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 G0/1.

How can you determine that the interface is a trunk port using the **show vlan** command?

**. The interface is no longer listed in the command output.**

c.   Issue the **show interface trunk** command to verify that the interface is configured as a trunk.

## Step 3: Test Connectivity

If the configurations are correct, PC1 and PC3 should be able to ping their default gateways and each other.

What addresses do PC1 and PC3 use as their default gateway addresses?

**They use the address of the subinterface.**