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 |
| R1 | 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 |
| 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

## Add VLANs to a Switch

### Create VLANs on S1.

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

Open configuration window

S1(config)# **vlan 10**

S1(config-vlan)# **vlan 30**

### Assign VLANs to ports.

* + - 1. 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.

S1(config-vlan)# **int f0/11**

S1(config-if)# **switchport mode access**

S1(config-if)# **switchport access vlan 10**

S1(config-if)# **int fa0/6**

S1(config-if)# **switchport mode access**

S1(config-if)# **switchport access vlan 30**

* + - 1. Issue the **show vlan brief** command to verify VLAN configuration.

S1# **show vlan brief**

VLAN Name Status Ports

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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

Close configuration window

### Test connectivity between PC1 and PC3.

From **PC1**, ping **PC3**.

#### Question:

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

Type your answers here.

The pings were not successful. The PCs are on different IP networks and require a router or a Layer 3 switch to provide communication between them.

## Configure Subinterfaces

### Configure subinterfaces on R1 using the 802.1Q encapsulation.

Open configuration window

* + - 1. 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**

* + - 1. Repeat for the G0/0.30 subinterface.

R1(config-subif)# **int g0/0.30**

R1(config-subif)# **encapsulation dot1Q 30**

R1(config-subif)# **ip address 172.17.30.1 255.255.255.0**

### Verify Configuration.

* + - 1. 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.
      2. Enable the G0/0 interface. Verify that the subinterfaces are now active.

Close configuration window

## Test Connectivity with Inter-VLAN Routing

### Ping between PC1 and PC3.

#### Question:

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

Type your answers here.

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

### Enable trunking.

Open configuration window

* + - 1. On **S1**,issue the **show vlan** command.

#### Question:

What VLAN is G0/1 assigned to?

Type your answers here.

VLAN 1

* + - 1. 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.

S1(config-if)# **int g0/1**

S1(config-if)# **switchport mode trunk**

#### Question:

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

Type your answers here.

The interface is no longer listed in the command output.

* + - 1. Issue the **show interface trunk** command to verify that the interface is configured as a trunk.

Close configuration window

### Test Connectivity

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

#### Question:

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

Type your answers here.

They use the address of the subinterface.

end of document

# Answer scripts

# Switch S1

vlan 10

vlan 30

interface f0/11

switchport mode access

switchport access vlan 10

interface f0/6

switchport mode access

switchport access vlan 30

interface g0/1

switchport mode trunk

# Router R1

Interface g0/0

no shutdown

interface g0/0.10

encapsulation dot1Q 10

ip address 172.17.10.1 255.255.255.0

no shutdown

int g0/0.30

encapsulation dot1Q 30

ip address 172.17.30.1 255.255.255.0