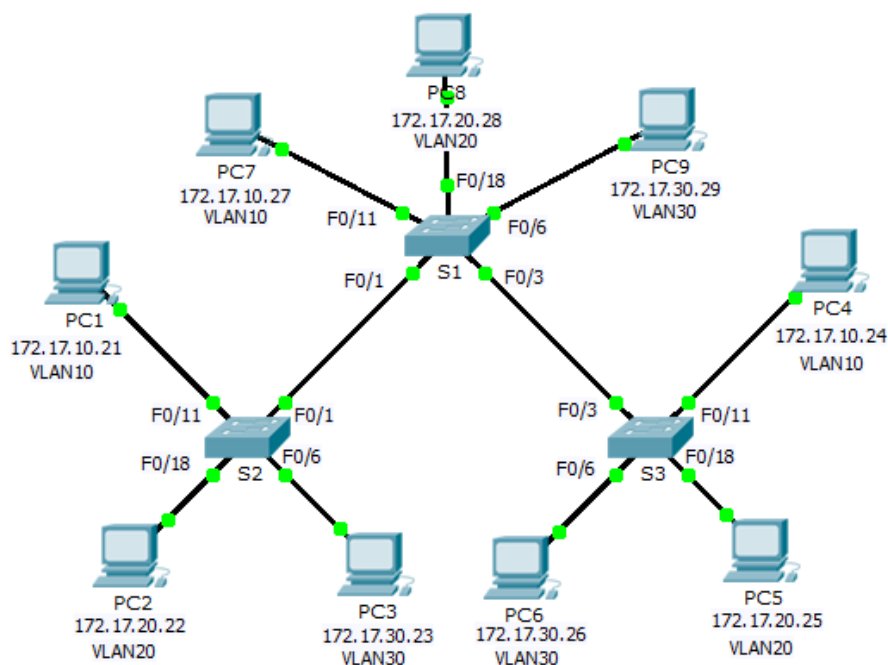


# Packet Tracer – Investigating a VLAN Implementation

## Topology



## Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	172.17.99.31	255.255.255.0	N/A
S2	VLAN 99	172.17.99.32	255.255.255.0	N/A
S3	VLAN 99	172.17.99.33	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.1
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.1
PC4	NIC	172.17.10.24	255.255.255.0	172.17.10.1
PC5	NIC	172.17.20.25	255.255.255.0	172.17.20.1
PC6	NIC	172.17.30.26	255.255.255.0	172.17.30.1
PC7	NIC	172.17.10.27	255.255.255.0	172.17.10.1
PC8	NIC	172.17.20.28	255.255.255.0	172.17.20.1
PC9	NIC	172.17.30.29	255.255.255.0	172.17.30.1

### Objectives

**Part 1: Observe Broadcast Traffic in a VLAN Implementation**

**Part 2: Observe Broadcast Traffic without VLANs**

**Part 3: Complete Reflection Questions**

### Background

In this activity, you will observe how broadcast traffic is forwarded by the switches when VLANs are configured and when VLANs are not configured.

### Part 1: Observe Broadcast Traffic in a VLAN Implementation

#### Step 1: Ping from PC1 to PC6.

- Wait for all the link lights to turn to green. To accelerate this process, click **Fast Forward Time** located in the bottom yellow tool bar.
- Click the **Simulation** tab and use the **Add Simple PDU** tool. Click on **PC1**, and then click on **PC6**.
- Click the **Capture/Forward** button to step through the process. Observe the ARP requests as they traverse the network. When the Buffer Full window appears, click the **View Previous Events** button.
- Were the pings successful? Why?
- Look at the Simulation Panel, where did **S3** send the packet after receiving it?

In normal operation, when a switch receives a broadcast frame on one of its ports, it forwards the frame out all other ports. Notice that **S2** only sends the ARP request out Fa0/1 to **S1**. Also notice that **S3** only sends the ARP request out F0/11 to **PC4**. **PC1** and **PC4** both belong to VLAN 10. **PC6** belongs to VLAN 30. Because broadcast traffic is contained within the VLAN, **PC6** never receives the ARP request from **PC1**. Because **PC4** is not the destination, it discards the ARP request. The ping from **PC1** fails because **PC1** never receives an ARP reply.

#### Step 2: Ping from PC1 to PC4.

- Click the **New** button under the Scenario 0 dropdown tab. Now click on the **Add Simple PDU** icon on the right side of Packet Tracer and ping from **PC1** to **PC4**.
- Click the **Capture/Forward** button to step through the process. Observe the ARP requests as they traverse the network. When the Buffer Full window appears, click the **View Previous Events** button.
- Were the pings successful? Why?
- Examine the Simulation Panel. When the packet reached **S1**, why does it also forward the packet to **PC7**?

## Part 2: Observe Broadcast Traffic without VLANs

### Step 1: Clear the configurations on all three switches and delete the VLAN database.

- a. Return to **Realtime** mode.
- b. Delete the startup configuration on all 3 switches. What command is used to delete the startup configuration of the switches?
- c. Where is the VLAN file stored in the switches?
- d. Delete the VLAN file on all 3 switches. What command deletes the VLAN file stored in the switches?

### Step 2: Reload the switches.

Use the **reload** command in privileged EXEC mode to reset all the switches. Wait for the entire link to turn green. To accelerate this process, click **Fast Forward Time** located in the bottom yellow tool bar.

### Step 3: Click Capture/Forward to send ARP requests and pings.

- a. After the switches reload and the link lights return to green, the network is ready to forward your ARP and ping traffic.
- b. Select **Scenario 0** from the drop down tab to return to Scenario 0.
- c. From **Simulation** mode, click the **Capture/Forward** button to step through the process. Notice that the switches now forward the ARP requests out all ports, except the port on which the ARP request was received. This default action of switches is why VLANs can improve network performance. Broadcast traffic is contained within each VLAN. When the **Buffer Full** window appears, click the **View Previous Events** button.

## Part 3: Complete Reflection Questions

1. If a PC in VLAN 10 sends a broadcast message, which devices receive it?
2. If a PC in VLAN 20 sends a broadcast message, which devices receive it?
3. If a PC in VLAN 30 sends a broadcast message, which devices receive it?
4. What happens to a frame sent from a PC in VLAN 10 to a PC in VLAN 30?
5. In terms of ports, what are the collision domains on the switch?
6. In terms of ports, what are the broadcast domains on the switch?

## Suggested Scoring Rubric

Activity Section	Question Location	Possible Points	Earned Points
Part 1: Observe Broadcast Traffic in a VLAN Implementation	Step 1d	6	
	Step 1e	5	
	Step 2c	6	
	Step 2d	5	
<b>Part 1 Total</b>		<b>22</b>	
Part 2: Observe Broadcast Traffic without VLANs	Step 1b	6	
	Step 1c	6	
	Step 1d	6	
<b>Part 2 Total</b>		<b>18</b>	
Part 3: Complete Reflection Questions	1	10	
	2	10	
	3	10	
	4	10	
	5	10	
	6	10	
<b>Part 3 Total</b>		<b>60</b>	
<b>Total Score</b>		<b>100</b>	