Lab 11

Introduction to Switching and VLAN Configuration in Cisco Packet Tracer

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Objective

This lab introduces fundamental Layer 2 switching concepts. Students will:
- Understand how switches forward frames based on MAC addresses.
- Learn about VLANs and how they isolate traffic within a switch.
- Configure VLANs and assign switch ports to specific VLANs.
- Test network connectivity with and without VLAN separation.

Network Topology Diagram

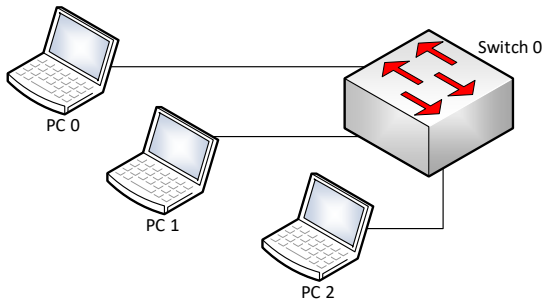


Figure 1: Switch Topology

Network Topology

Devices:
- 1 Switch (Switch0)
- 3 PCs (PC0, PC1, PC2)

Connections:
- PC0 → Switch0 Fa0/1
- PC1 → Switch0 Fa0/2
- PC2 → Switch0 Fa0/3

Step-by-Step Lab Procedure

Step 1: IP Configuration

Explanation:
Each PC needs a unique IP address to communicate within its network segment. We will assign PCs in the same VLAN to the same subnet, and those in different VLANs to different subnets.

Device	IP Address	Subnet Mask	VLAN
PC0	192.168.10.10	255.255.255.0	10
PC1	192.168.10.20	255.255.255.0	10
PC2	192.168.20.10	255.255.255.0	20

Configuration:
1. Click each PC.
2. Go to the Desktop tab → IP Configuration.
3. Enter the respective IP address and subnet mask.

Step 2: Create VLANs on the Switch

Explanation:
VLANs (Virtual LANs) logically segment a switch into separate networks. Devices in different VLANs cannot communicate with each other unless a router is used. We'll create two VLANs: VLAN 10 (STAFF) and VLAN 20 (STUDENT).

Configuration:

```
Switch> enable
Switch# configure terminal
Switch(config)# vlan 10
Switch(config-vlan)# name STAFF
Switch(config-vlan)# exit
Switch(config)# vlan 20
Switch(config-vlan)# name STUDENT
Switch(config-vlan)# exit
```

Step 3: Assign Ports to VLANs

Explanation:
Now that the VLANs exist, we must assign switch ports to them. Ports connected to PC0 and PC1 will be part of VLAN 10; the port for PC2 will be part of VLAN 20.

Configuration:

```
Switch(config)# interface range fa0/1 - 2
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 10
Switch(config-if-range)# exit

Switch(config)# interface fa0/3
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 20
Switch(config-if)# exit
```

Step 4: Verify VLAN Configuration

Explanation:
Check whether the VLANs and port assignments are correct using the `show vlan brief` command.

Command:
Switch# show vlan brief

Step 5: Test Connectivity

Explanation:
Use `ping` to test whether devices can communicate:
- PC0 and PC1 should successfully ping each other (same VLAN and subnet).
- PC0 or PC1 pinging PC2 should fail (different VLANs, no routing device present).

Commands on PC0:
1. Open Command Prompt.
2. Run:
   ping 192.168.10.20
   ping 192.168.20.10

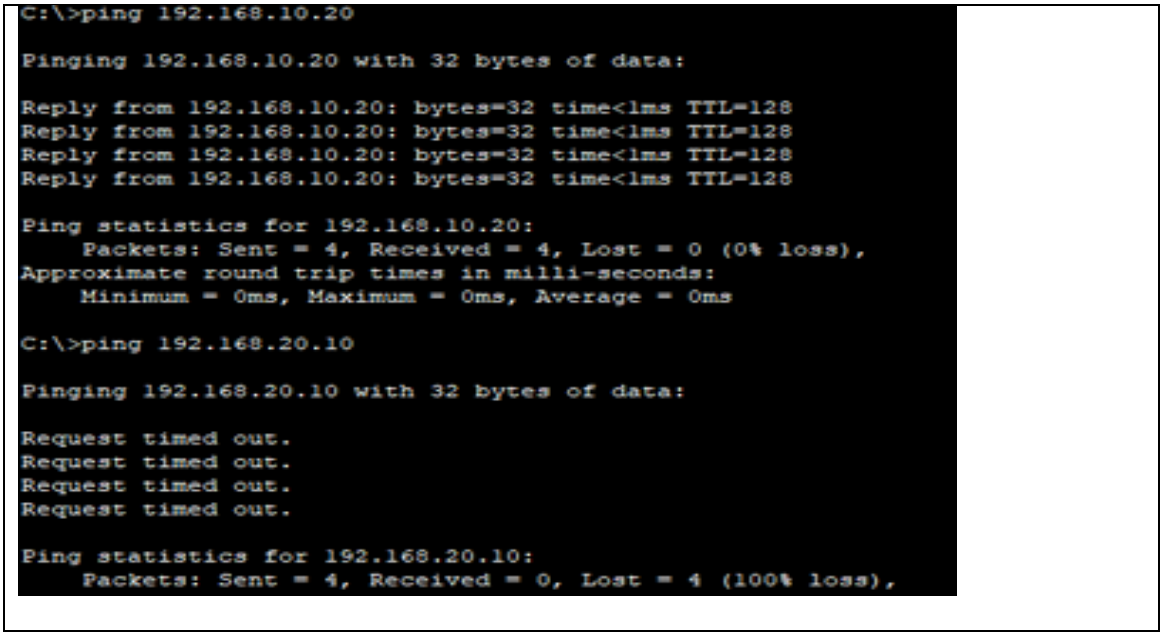
Lab Deliverables

1. Screenshot of `show vlan brief`

```
sh vlan bri

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/4, Fa0/5, Fa0/6, Fa0/7
                                                 Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                 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   STAFF                             active    Fa0/1, Fa0/2
20   STUDENT                           active    Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

2. Screenshot of ping results


C:\>ping 192.168.10.20
Pinging 192.168.10.20 with 32 bytes of data:
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Reply from 192.168.10.20: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.10.20:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.20.10
Pinging 192.168.20.10 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.20.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

END