LAB NO: 9

Design of VLANs on Cisco Router

Objective:

To design and configure Virtual Local Area Networks (VLANs) on a Cisco switch, enabling network segmentation and controlling broadcast domains to improve network performance, security, and manageability.

Apparatus Required:

- Cisco Packet Tracer software
- PCs or laptops to test VLAN connectivity
- Ethernet cables for connecting devices to the switch
- A Cisco Switch with multiple ports (Switch PT)

Theory:

A Virtual Local Area Network (VLAN) is a network within a network that logically segments different devices into separate groups, despite being on the same physical infrastructure. VLANs reduce broadcast traffic, enhance security, and make network management easier. Each VLAN functions as an independent LAN. Communication between different VLANs requires the use of a Layer 2 device, such as a switch.

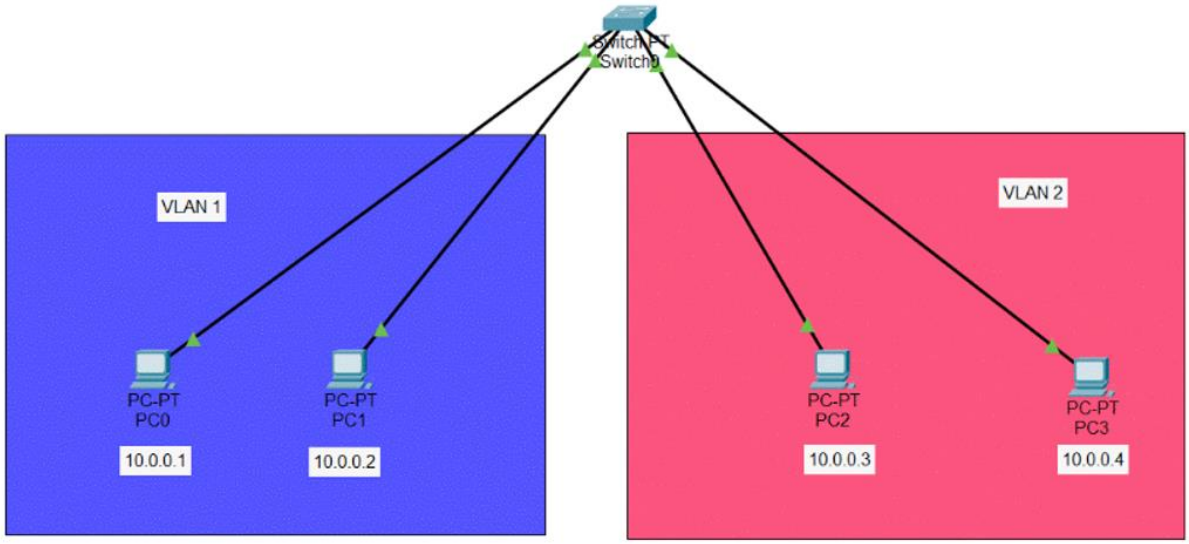
In this experiment, VLANs will be designed and implemented on a Cisco switch to isolate LANs in a network.

Network Topology:

The network is segmented into two VLANs:

- VLAN 1 (for accounting department)
- VLAN 2 (for sales department)

Each VLAN will be assigned to specific switch ports, and PCs will be connected to these ports for testing.



Procedure:

Step 1: Basic Switch Setup

Access the Switch CLI:

- Connect the switch through the console.
- Enter the privileged mode to start the configuration.

```
Switch>en
Switch#enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 1
Switch(config-vlan)#exit
Switch(config)#vlan 2
Switch(config-vlan)#exit
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#switchport access vlan 1
Switch(config-if)#exit
Switch(config)#interface fastEthernet 1/1
Switch(config-if)#switchport access vlan 1
Switch(config-if)#exit
Switch(config)#interface fastEthernet 2/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface fastEthernet 3/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#
Switch(config)#
```

Step 2: Create VLANs on the Switch

Create VLAN 1 and VLAN 2 and assign appropriate names to these VLANs.

Step 3: Assign VLANs to Switch Ports

- Assign specific switch ports to the VLANs created. For example, assign ports fa 0/1 fa 1/1 to VLAN 1, and ports fa 2/1 and fa 3/1 to VLAN 2.

Step 4: Connect PCs to the Switch Ports

- Connect PC1 and PC2 to the switch ports assigned to VLAN 1.
- Connect PC3 and PC4 to the switch ports assigned to VLAN 2.

Assign IP Addresses to PCs:

PC1 and PC2 (VLAN 1):

- IP address: 10.0.0.1, 10.0.0.2
- Subnet mask: 255.255.255.0
- Default gateway: (Leave empty for now as no routing is configured)

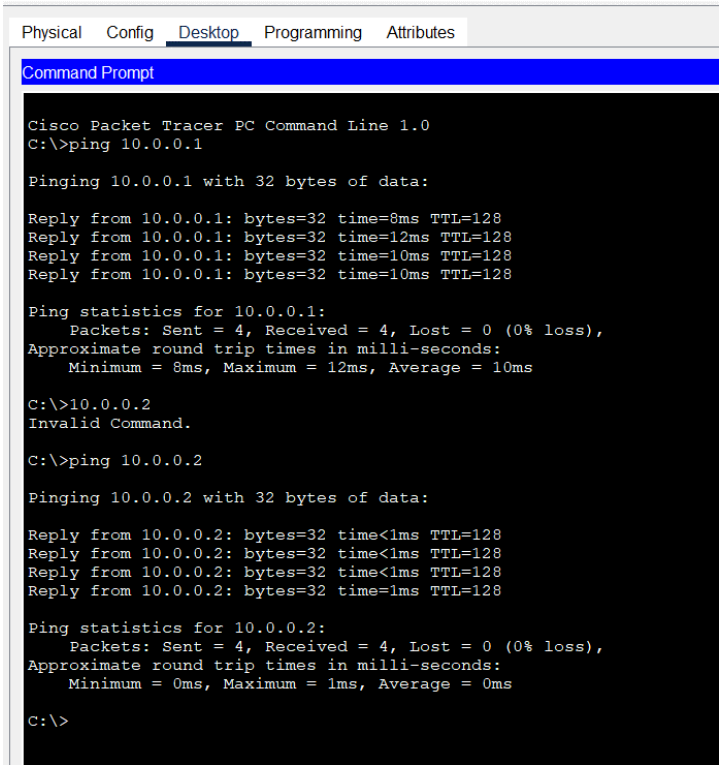
PC3 and PC4 (VLAN 2):

- IP address: 10.0.0.3, 10.0.0.4
- Subnet mask: 255.255.255.0
- Default gateway: (Leave empty for now as no routing is configured)

Step 5: Testing VLAN Communication

Ping Test within the Same VLAN:

- Ping between the PCs within VLAN 1 (PC1 and PC2) to check communication.
- Ping between the PCs within VLAN 2 (PC3 and PC4) to verify communication.


Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=8ms TTL=128
Reply from 10.0.0.1: bytes=32 time=12ms TTL=128
Reply from 10.0.0.1: bytes=32 time=10ms TTL=128
Reply from 10.0.0.1: bytes=32 time=10ms TTL=128
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 12ms, Average = 10ms
C:\>10.0.0.2
Invalid Command.
C:\>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>