Lab Practical #05: Study the concept of VLAN using packet tracer

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Aim/Objective

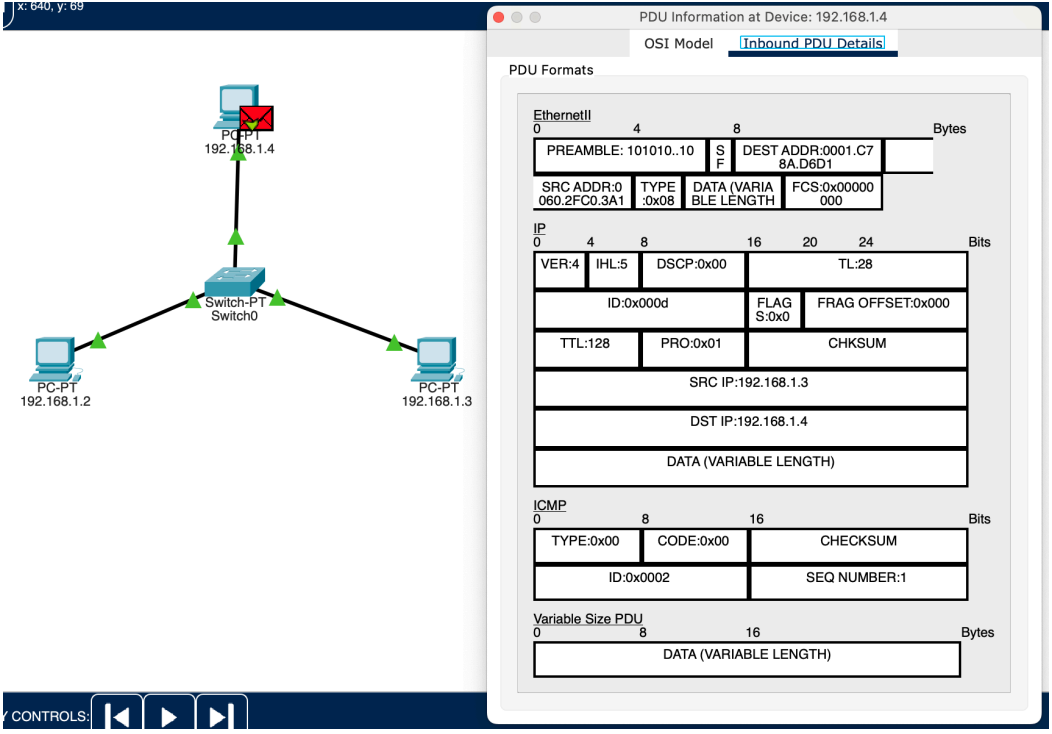
To implement different network structures in VLAN and VLAN trunking. Check connectivity between VLANs using ping command or PDU utility.

Theory

VLAN (Virtual LAN) logically segments a physical network into multiple broadcast domains. Devices in the same VLAN can communicate directly, while inter-VLAN communication requires routing.

Procedure

1. Basic VLAN Configuration



VLAN Configuration:

- VLAN 10 (Sales): PC1 (192.168.10.10/24), PC2 (192.168.10.11/24)
- VLAN 20 (IT): PC3 (192.168.20.10/24), PC4 (192.168.20.11/24)
- Switch: Catalyst 2960

Switch Commands:

```
enable
configure terminal
vlan 10
name Sales
vlan 20
name IT
interface fa0/1
switchport mode access
switchport access vlan 10
interface fa0/2
switchport mode access
switchport access vlan 10
interface fa0/3
switchport mode access
switchport access vlan 20
interface fa0/4
switchport mode access
switchport access vlan 20
```

Testing:

- Ping within VLAN 10: Successful
- Ping within VLAN 20: Successful

- Ping between VLANs: Failed (as expected)

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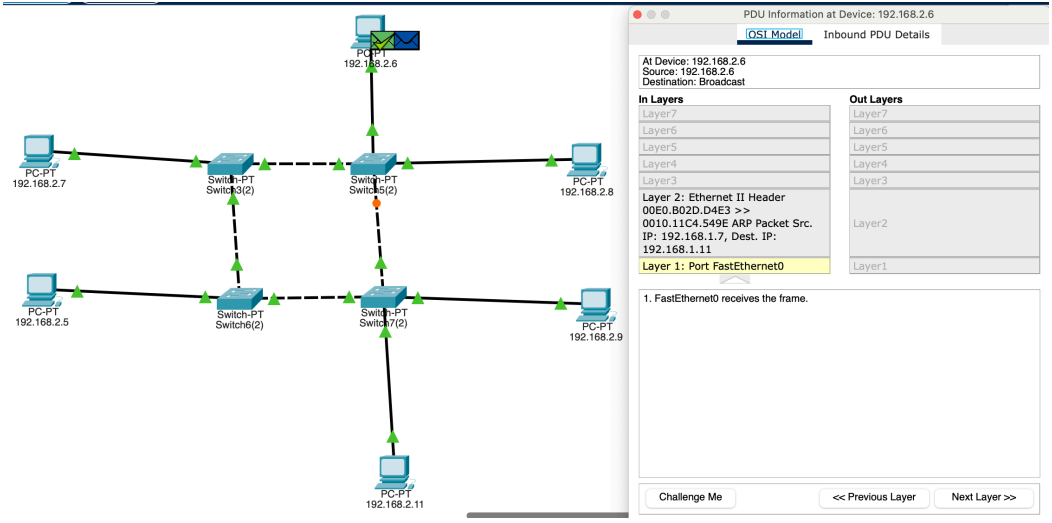
2. VLAN Trunking Configuration



Configuration:

- Switch1: VLAN 10 ports
- Switch2: VLAN 20 ports

- Trunk link between switches

Trunk Commands:

```
interface fa0/24
switchport mode trunk
switchport trunk allowed vlan 10,20
```

Testing: Inter-switch VLAN communication verified.

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3. Inter-VLAN Routing

Router Configuration:

```
interface fa0/0.10
encapsulation dot1q 10
ip address 192.168.10.1 255.255.255.0
interface fa0/0.20
encapsulation dot1q 20
ip address 192.168.20.1 255.255.255.0
```

Testing: Cross-VLAN ping successful through router.

Steps to Create VLANs in Packet Tracer

1. **Add Devices:** Place switches, PCs, router
2. **Configure VLANs:**
   - Switch CLI: `vlan [number]`, `name [name]`
3. **Assign Ports:**
   - `interface fa0/x`
   - `switchport access vlan [number]`
4. **Configure Trunk:**
   - `switchport mode trunk`
5. **Set IP Addresses:** Configure PCs with appropriate IPs
6. **Test:** Use ping or PDU utility

Conclusion

Successfully implemented VLANs with trunking and inter-VLAN routing. VLANs provide network segmentation, improved security, and better traffic management in enterprise networks.