Experiment No.: 05

Experiment Name: Configuring Basic Virtual Local Area Network (VLAN) in a Network Topology.

Objective:

- To learn computer networking protocols
- To learn basics of VLAN
- To configure a network using VLAN

Introduction:

A Virtual Local Area Network (VLAN) is a subnetwork which can group together collections of devices on separate physical Local Area Networks (LANs). A LAN is a group of computers and devices that share a communications line or wireless link to a server within the same geographical area.

VLANs make it easy for network administrators to partition a single switched network to match the functional and security requirements of their systems without having to run new cables or make major changes in their current network infrastructure. VLANs are often set up by larger businesses to re-partition devices for better traffic management. VLANs are also important because they can help improve the overall performance of a network by grouping together devices that communicate most frequently. It also provides security on larger networks by allowing a higher degree of control over which devices have access to each other. VLANs tend to be flexible because they are based on logical connections, rather than physical.

There are Three types of VLANs:

- Protocol VLAN - which has traffic handled based on its protocol. A switch will segregate or forward traffic based on the traffics protocol.

- Static VLAN - also referred to as port-based VLAN, needs a network administrator to assign the ports on a network switch to a virtual network; while:

- Dynamic VLAN - allows a network administrator just to define network membership based on device characteristics, as opposed to switch port location.
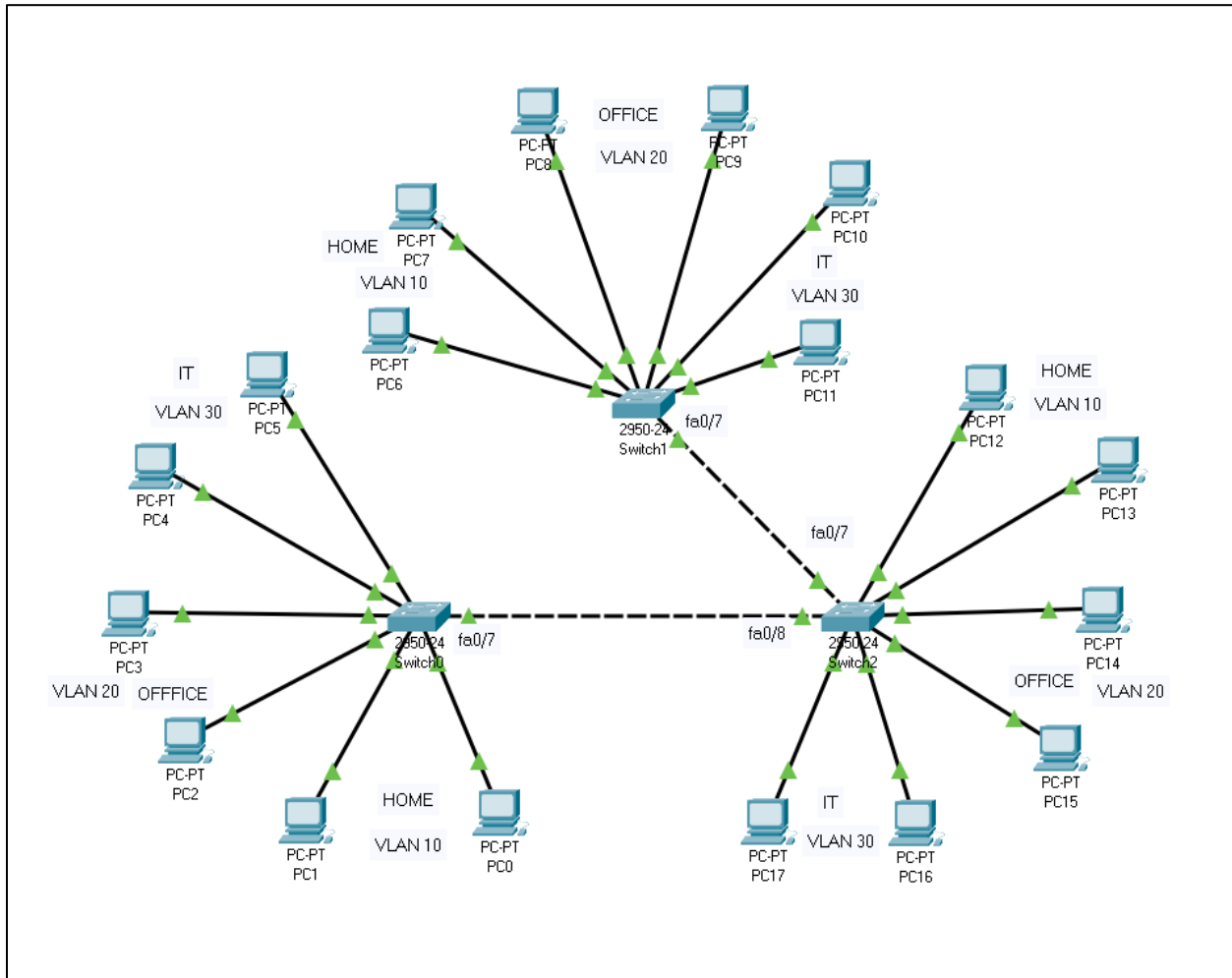
Topology:

Fig 1: A Virtual Local Area Network (VLAN) Design

Command:

1. **Home PC Configuration: (VLAN 10)**

   PC-PT PC0:

   IP Address: 192.168.10.1

   PC-PT PC1:

   IP Address: 192.168.10.2

   PC-PT PC2:

   IP Address: 192.168.10.3

   PC-PT PC3:

   IP Address: 192.168.10.4

   PC-PT PC4:

   IP Address: 192.168.10.5

   PC-PT PC5:

   IP Address: 192.168.10.6

2. **Office PC Configuration: (VLAN 20)**

   PC-PT PC6:

   IP Address: 192.168.20.1

   PC-PT PC7:

   IP Address: 192.168.20.2

   PC-PT PC8:

   IP Address: 192.168.20.3

   PC-PT PC9:

   IP Address: 192.168.20.4

   PC-PT PC10:

   IP Address: 192.168.20.5

   PC-PT PC11:

   IP Address: 192.168.20.6

3. **IT PC Configuration: (VLAN 30)**

    PC-PT PC12:

        IP Address: 192.168.30.1

    PC-PT PC13:

        IP Address: 192.168.30.2

    PC-PT PC14:

        IP Address: 192.168.30.3

    PC-PT PC15:

        IP Address: 192.168.30.4

    PC-PT PC16:

        IP Address: 192.168.30.5
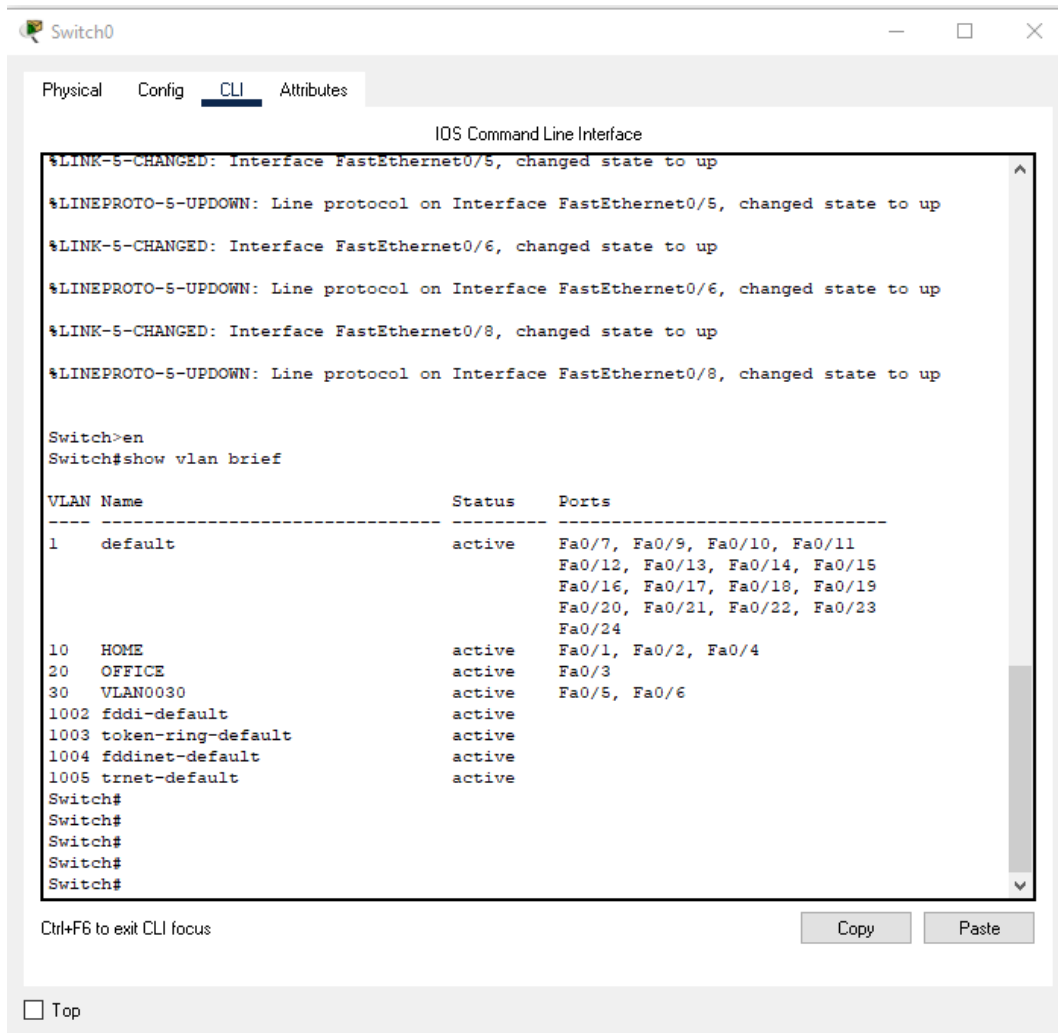
    PC-PT PC17:

        IP Address: 192.168.30.6

4. **Switch Configuration: (Switch 0, Switch 1, Switch 2)**

```
> en                              # int fa0/4
# configure terminal              # switchport access vlan 20
# vlan 10                         # switchport mode access
# name HOME                       # exit
# vlan 20                         # int fa0/5
# name OFFICE                     # switchport access vlan 30
# vlan 30                         # switchport mode access
# name IT                         # exit
                                  # int fa0/6
# int fa0/1                       # switchport access vlan 30
# switchport access vlan 10       # switchport mode access
# switchport mode access          # exit
# exit                            # int fa0/7
# int fa0/2                       # switchport mode trunk
# switchport access vlan 10       # exit
# switchport mode access          # int fa0/8
# exit                            # switchport mode trunk
# int fa0/3                       # exit
# switchport access vlan 20       # interface range fa0/1-6
# switchport mode access          # switchport mode access
# exit                            # exit
```

Result & Analysis:

Fig 2: Showing VLAN Brief

Conclusion:

In this experiment we configure a Virtual Local Area Network (VLAN). VLANs have huge functionality than even a LAN segment because they allow for increased data security and logical partition. A VLAN acts as a single LAN although it only makes up a segment. This means that the broadcast domain of a VLAN is the VLAN itself, rather than each network segment. Additionally, the partitions do not have to be defined by the physical location of the network devices. They can be grouped instead by department, project team, or any other logical organizational principle.