Department of Computer Science and Engineering
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Laboratory Report 8

CSE 4412 : Data Communication and Networking Lab

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Experiment No 8

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Title: Understanding the concept of VLAN and configuration of VLAN to multiple user groups in different locations.

Objective:
1. Understand VLAN
2. Configuration of VLAN

Devices Used In the Experiment:
1. Cisco Packet Tracer

Theory:

VLAN Definition
VLAN or Virtual Local Area Network is a custom network created to group network devices from multiple networks into one logical network. The purpose of VLAN is to separate networks so that when a broadcast is sent from a host, it only reaches devices available on the same VLAN. On the other hand, if VLAN is not used, a broadcast from host will reach all network devices which can increase CPU overhead of each network device and reduce network security. VLAN is widely useful when we need to share resources within a limited area such as school, office, laboratory, etc.

Usage of VLAN:
Explain the usage of VLAN with an example with three different user groups situated in three different levels of an office building.

Suppose we have a software development office that consists of three floors. The first floor is the business analysts, the second floor is the software developers and the third floor is the software testers. We configure switches on each floor to set ports where the devices of each team are connected to their respective VLANs. For instance, first-floor ports connected to devices business analysts are assigned to analyst VLAN. Similarly,

second-floor ports are assigned to the developer VLAN. Also, third-floor ports are assigned to tester VLAN. Now, these VLANs will help in file sharing and communication within each floor. Analysts will be able to communicate and share resources with each other using their own VLAN without the fear of any interference or security concerns. The same goes for the other two floors.

Diagram of the experiment:

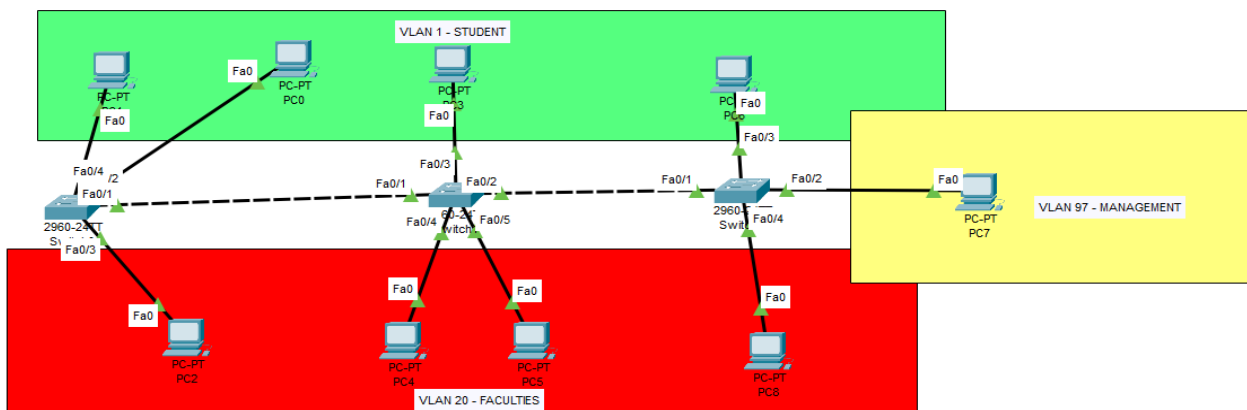(Take a screenshot of your lab task from packet tracer and paste here)

Fig: Diagram of the entire experiment

Configuration of different Switches:

Commands for configuring VLAN

Switch 0

```
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name FACULTIES
Switch(config-vlan)#int fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 1
Switch(config-if)#int fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 1
Switch(config-if)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#exit
Switch#
```

Switch 1

```
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name FACULTIES
Switch(config-vlan)#int range fa0/3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 1
Switch(config-if-range)#int range fa0/4-5
Switch(config-if-range)#swithcport mode access
                             ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport mode access
Switch(config-if-range)#swithcport access vlan 20
                             ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#exit
Switch#

Switch(config)#int range fa0/1-2
Switch(config-if-range)#switchport mode trunk
Switch(config-if-range)#exit
```

Switch 2

```
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 20
Switch(config-vlan)#name FACULTIES
Switch(config-vlan)#vlan 97
Switch(config-vlan)#name MANAGEMENT
Switch(config-vlan)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 1
Switch(config-if)#int fa0/2
Switch(config-if)#swithcport access vlan 97
                       ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport access vlan 97
Switch(config-if)#int fa0/4
Switch(config-if)#swithcport mode access
                       ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#exit
Switch#
```

```
Switch(config)#int fa0/1
Switch(config-if)#swithcport mode trunk
                   ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
```

Observation:

The screenshots of *show vlan* command in two switches are shown below:

Switch 0

```
VLAN Name                            Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/2, 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
20   FACULTIES                        active    Fa0/3
```

Switch 1

```
VLAN Name                            Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/3, 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
20   FACULTIES                        active    Fa0/4, Fa0/5
```

Switch 2

```
VLAN Name                            Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/3, 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
20   FACULTIES                        active    Fa0/4
97   MANAGEMENT                       active    Fa0/2
```

To see the interface with trunk access use ***show running-config***

Switch 0

```
interface FastEthernet0/1
 switchport mode trunk
```

Switch 1

```
interface FastEthernet0/1
 switchport mode trunk
!
interface FastEthernet0/2
 switchport mode trunk
```

Switch 2

```
interface FastEthernet0/1
 switchport mode trunk
```

Challenges:

The access part of each port of every switch has to be done carefully and appropriately. We need to remember the VLAN connection of each port to make sure every PC is set to its appropriate VLAn.