Usman Institute of Technology
Department of Computer Science - Semester IV

# CS-222 Data Communication and Computer Networks

Lab Manual Spring 2021

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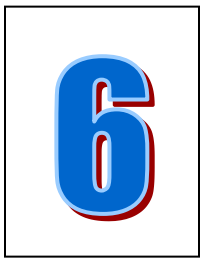

## OBJECTIVE: SEGREGATING COMMUNICATING DEVICES BY USING VLAN

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Semester : _____ Section: _____

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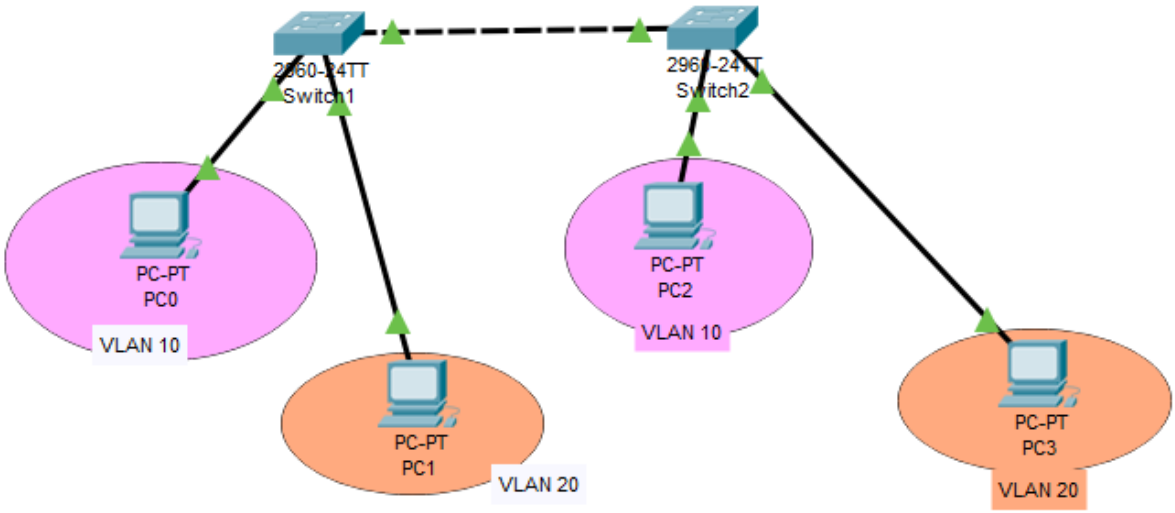
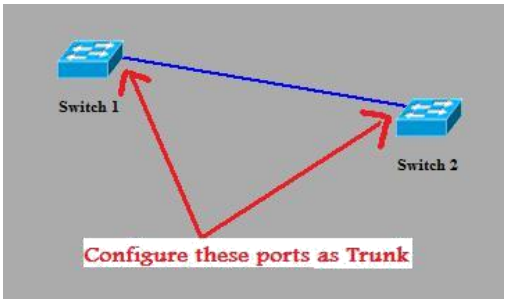
# LAB # 06: SEGREGATING COMMUNICATING DEVICES BY USING VLAN

Given below is a pictorial representation of a network being separated by using VLAN here you can see though PC0 and PC1 exist at the same location but they are separated as they are placed in different virtual LANs by doing so PC0 would be able to communicate with PC2 as they are in same VLAN (VLAN10) but won't be able to communicate PC1 as it exists in different VLAN. We will perform this task on CISCO PACKET TRACER




Here first we will configure the two switches and then will allocate IP addresses to PCs, statically.

- Select 2900 series switch.
- VLAN1 exist by default
- Create a another VLAN (VLAN 10 and 20)
- Name them
- Configure ports that are used to connect two switches together.
- Configure them as trunks
- Trunk defines that this link will carry data of both the virtual LANs to and from the two switches.
- Shown below are the 2 ports that will be configured as Trunk.



## Configuration steps for creating new VLANs (Switch 1):

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name faculty
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name student
Switch(config-vlan)#
```

## Assign VLANs to interfaces (Switch 1):

**(As VLAN 10 is assigned to interface fa0/1 and VLAN 20 is assigned to interface fa0/2)**

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface fa0/1
Switch(config-if)#switcp
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit

Switch(config)#interface fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#

*Important Note: Use the **switchport access vlan** command to assign the port or range of ports into access ports. A port in access mode can have only one VLAN configured on the interface which can carry traffic for only one VLAN.*

**In the following example we assigning vlan 10 to the following range of ports : port fa0/5 to fa0/6**

Switch#confi t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#**interface range fa0/5-6**
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10

Switch(config-if-range)#exit
There is another port mode:
**Trunk Port** - The frames received on the interface are assumed to have VLAN tags. Trunk ports are for links between switches or other network devices and are capable of carrying traffic for multiple VLANs.
In our case port fa0/3 of both switches are linked between switches so we will configure fa0/3 as trunk in Switch 1 and 2.

Switch(config)#interface fa0/3
Switch(config-if)#switchport mode trunk

**Now, Check the status of VLANs using show VLAN command**

```
Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/4, 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   faculty                          active    Fa0/1, Fa0/5, Fa0/6
20   student                          active    Fa0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

# Assigning IP address to VLAN:

The IP address is configured under a logical interface, known as the VLAN. Usually, the default VLAN 1 acts like the switch's own NIC for connecting into a LAN to send IP packets. Here are the steps to configure an IP address under VLAN:

- *enter the VLAN configuration mode with the interface vlan vlan_number global configuration command.*
- *assign an IP address with the ip address IP_ADDRESS SUBNET_MASK interface subcommand.*
- *enable the VLAN interface with the no shutdown interface subcommand.*

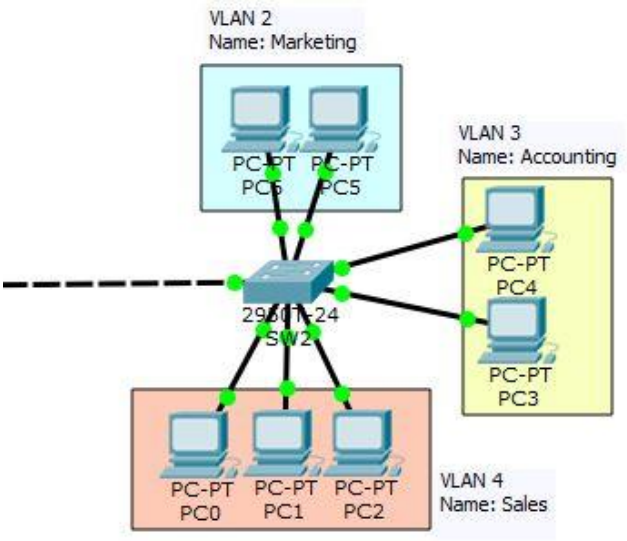
```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#
Switch(config)#int vlan 10
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

Switch(config-if)#ip
Switch(config-if)#ip address 10.0.0.1 255.0.0.0
Switch(config-if)#
```

Repeat above steps to Configure switch 2.

**Lab Task:**

Use Packet Tracer to complete the following network shown below by connecting another switch *SW1* and create VLANs in both switches and assign VLANs to the ports:

VLAN 2 to FastEthernet Port 5-10
VLAN 3 to FastEthernet Port 11-15
VLAN 4 to FastEthernet Port 16-20
VLAN 5 to FastEthernet Port 21




Attach Screenshot of complete topology, show VLAN status, also show communication between devices at same VLANs and between different VLANs.