MIT World Peace University

Computer Networks
Second Year B. Tech, Semester 3

Configuration of a Virtual LAN

Practical Report
Assignment 3

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Contents

1 Aim and Objectives

To Design and configure a virtual LAN using Packet Tracer and To understand the concept of VLAN and implement it using packet tracer.

2 Devices

2.1 Devices Used

1. 1 Generic Switch
2. 2 Switch 2960 with 24 LAN Ports
3. 6 Generic PCs
4. 4 Laptops

2.2 Device Info and IP Addresses

No	Device Name	Model	IP
1	Switch0	2950-24	-
2	PC0 - CS	PC-PT	192.168.0.1
3	PC1 - ECE	PC-PT	192.168.0.5
4	PC2 MECH	PC-PT	192.168.0.2
5	Switch1	2950-24	-
6	PC3 CS	PC-PT	192.168.0.3
7	PC4 PH	PC-PT	192.168.0.4
8	Switch2	2950-24	-
9	Laptop0 CS	Laptop-PT	192.168.0.6
10	Laptop1 PH	Laptop-PT	192.168.0.9
11	Laptop2 MECH	Laptop-PT	192.168.0.8
12	Laptop3 ECE	Laptop-PT	192.168.0.7
13	PC5 ECE	PC-PT	192.168.0.10

3 Cables

1. Straight LAN Cable to connect unlike Devices
2. Crossover LAN Cable to connect like Devices

4 Procedure to Configure VLAN

1. Create a Simple network with a switch and a few PCs
2. Create as many other networks you want, connect a few PCS or laptops to it. Use a generic Switch.
3. Name the PCs and Laptops according to some virtual division you want to make, be it different divisions of a single institution, wings in a hospital or anything.

4. Connect the switches to each toher using a crossover cable, and the PCs to the switch using a Straight cable.

5. Click on the Switch and open its terminal, or GUI, where you can add the VLAN name and Number. Add the VLANS respective to the ones you have in your network, to all the switches either via its GUI or terminal using commands given below.

6. Select Each interface and set its particular VLAN. You can do this in the terminal for each switch or with the GUI.

5 Commands

```
# enable
# configure terminal
# exitverbatim
# vlan 20 name Mechanical
# vlan 10 name CS
# vlan 30 name Pharma
# terminal Show VLAN
# vlan database
# interface F0/2
# switchport access vlan <VLAN_NO>
# exit
# interface F0/1 // the one connected to another switch
# switchport mode trunk
```

6 Output

6.1 Switch 1

```
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/7, Fa0/8, Fa0/9
                                                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
10   CS                               active    Fa0/6, Fa0/10
11   ECE                              active    Fa0/3
12   MECH                             active    Fa0/4
13   PH                               active    Fa0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
```

```
11   enet  100011     1500  -      -      -        -    -         0      0
12   enet  100012     1500  -      -      -        -    -         0      0
13   enet  100013     1500  -      -      -        -    -         0      0
1002 fddi  101002     1500  -      -      -        -    -         0      0
1003 tr    101003     1500  -      -      -        -    -         0      0
1004 fdnet 101004     1500  -      -      -        ieee -         0      0
1005 trnet 101005     1500  -      -      -        ibm  -         0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

6.2 Switch 2

```
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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
10   CS                               active    Fa0/5
11   ECE                              active    Fa0/6
12   MECH                             active    Fa0/4
13   PH                               active    Fa0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -         0      0
10   enet  100010     1500  -      -      -        -    -         0      0
11   enet  100011     1500  -      -      -        -    -         0      0
12   enet  100012     1500  -      -      -        -    -         0      0
13   enet  100013     1500  -      -      -        -    -         0      0
1002 fddi  101002     1500  -      -      -        -    -         0      0
1003 tr    101003     1500  -      -      -        -    -         0      0
1004 fdnet 101004     1500  -      -      -        ieee -         0      0
1005 trnet 101005     1500  -      -      -        ibm  -         0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

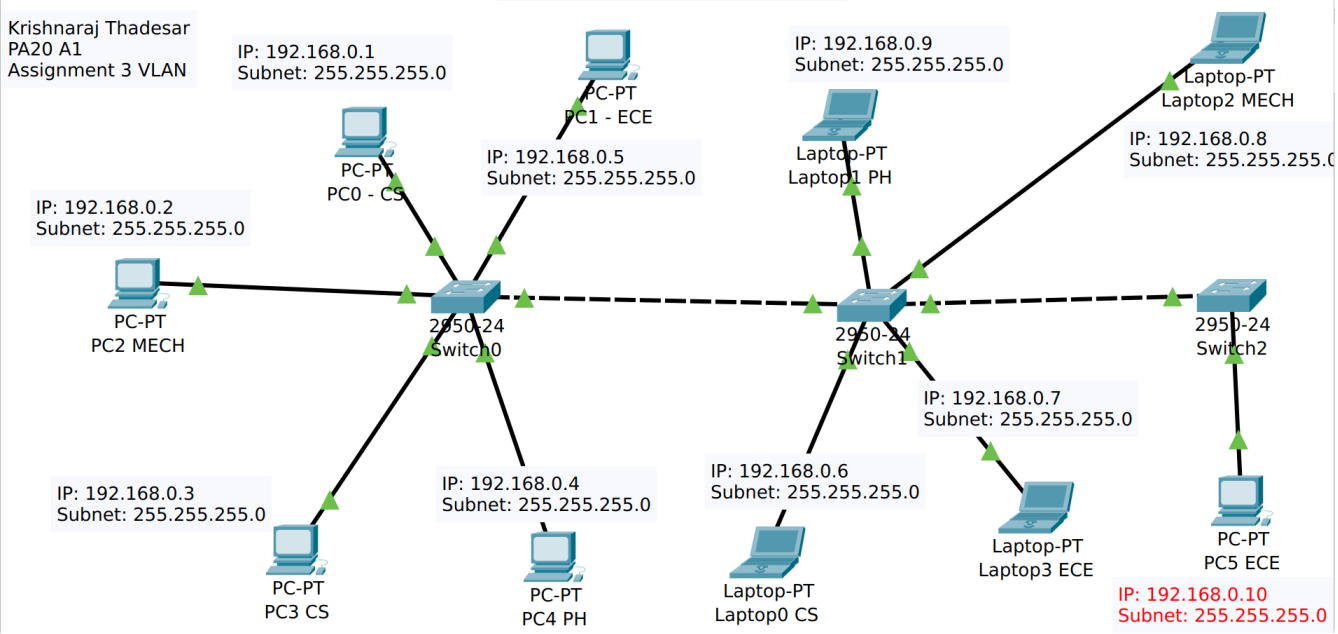
6.3 Switch 3

```
Switch#show vlan

VLAN Name                                Status    Ports
---- ----------------------------------- --------- -------------------------------
1    default                             active    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
10   CS                                  active    Fa0/3, Fa0/6
11   ECE                                 active    Fa0/7
12   MECH                                active    Fa0/4
13   PH                                  active    Fa0/2, Fa0/5
1002 fddi-default                        active
1003 token-ring-default                  active
1004 fddinet-default                     active
1005 trnet-default                       active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
11   enet  100011     1500  -      -      -        -    -        0      0
12   enet  100012     1500  -      -      -        -    -        0      0
13   enet  100013     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

7 Platform

Operating System: Arch Linux x86-64
IDEs or Text Editors Used: Visual Studio Code
Programs Used: Cisco Packet Tracer v8.2

8 Connection Screenshot



9 Conclusion

A Virtual Local Area Network was implemented successfulyl with 3 switches and 4 Virtual LANS. The Concept and its uses were understood.

20/6/22

Assignment - 3

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VLAN

Theory:

→ What is VLAN?

It is a logical overlay network that groups together a subset of devices that share a physical LAN, isolating traffic to each group.

→ Collision Domain

It is a network segment connected by a shared medium or through repeaters where simultaneous data transmissions collide with one another.

→ Broadcast Domain

It is a logical division of a computer network in which all nodes can reach each other by broadcast at the data link layer.

(*) → Collision Domain & Network domain in networking device. (Hub, Switch & Router)

— A network collision occurs when more than one device tries to send a packet on a network segment at the same time.

(*) Access port and Trunk port

— The purpose of a tagged or trunked port is to pass traffic for multiple VLANs.

— An untagged or access port accepts traffic for any single VLAN.

(*) FAQ's

(1.) What is the need of VLAN?

VLANS allow networking administrators to automatically limit access to a specified group of users by dividing workstations into different isolated LAN segments. When users move their workstations, admins don't need

reconfigure the network or change VLAN group.

(Q.2) What is the difference between VLAN access and trunk mode.

→ A trunk mode allows you to send all signals for router or signal access across a singh trunk link. In contrast to an access port, a trunk mode must be tagged is order to allow signals to get correct endpoints.

(Q.3) Enlist diffent network simulators like Cisco Packet tracer.

→ Boson Netsim
→ GINS 3
→ VIRL
→ EVENG

(Q.4) Differentiate LAN vs VLAN.

	LAN	VLAN
→	Local Area Network	→ Virtual LAN.
→	Cost of LAN is high	→ Costs less
→	Latency is high	→ Latency is low
→	Devices used = Hubs, router Switches	→ Devices — Bridges and Switches
→	Less efficient	→ greater Efficiency.