Department of Computer Science and Engineering
Jahangirnagar University
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Laboratory Report

CSE-402: Computer Networks Laboratory

Submitted by

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Submitted to

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Experiment 03
Experiment Name: VLSI configuration with 3-layer switch and router

Objectives:

This Experiment provides the configuration and troubleshooting steps applicable to the creation of Layer 3 interfaces. VLANs divide broadcast domains in a LAN environment. Whenever hosts in one VLAN need to communicate with hosts in another VLAN, the traffic must be routed between them. This is known as inter-VLAN routing. On Catalyst switches it is accomplished by the creation of Layer 3 interfaces (switch virtual interfaces (SVIs)).The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Introduction:

A VLAN (virtual LAN) abstracts the idea of the local area network (LAN) by providing data link connectivity for a subnet. 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.
dot1q protocol: IEEE **802.1Q**, often referred to as **Dot1q**, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames.

Circuit:

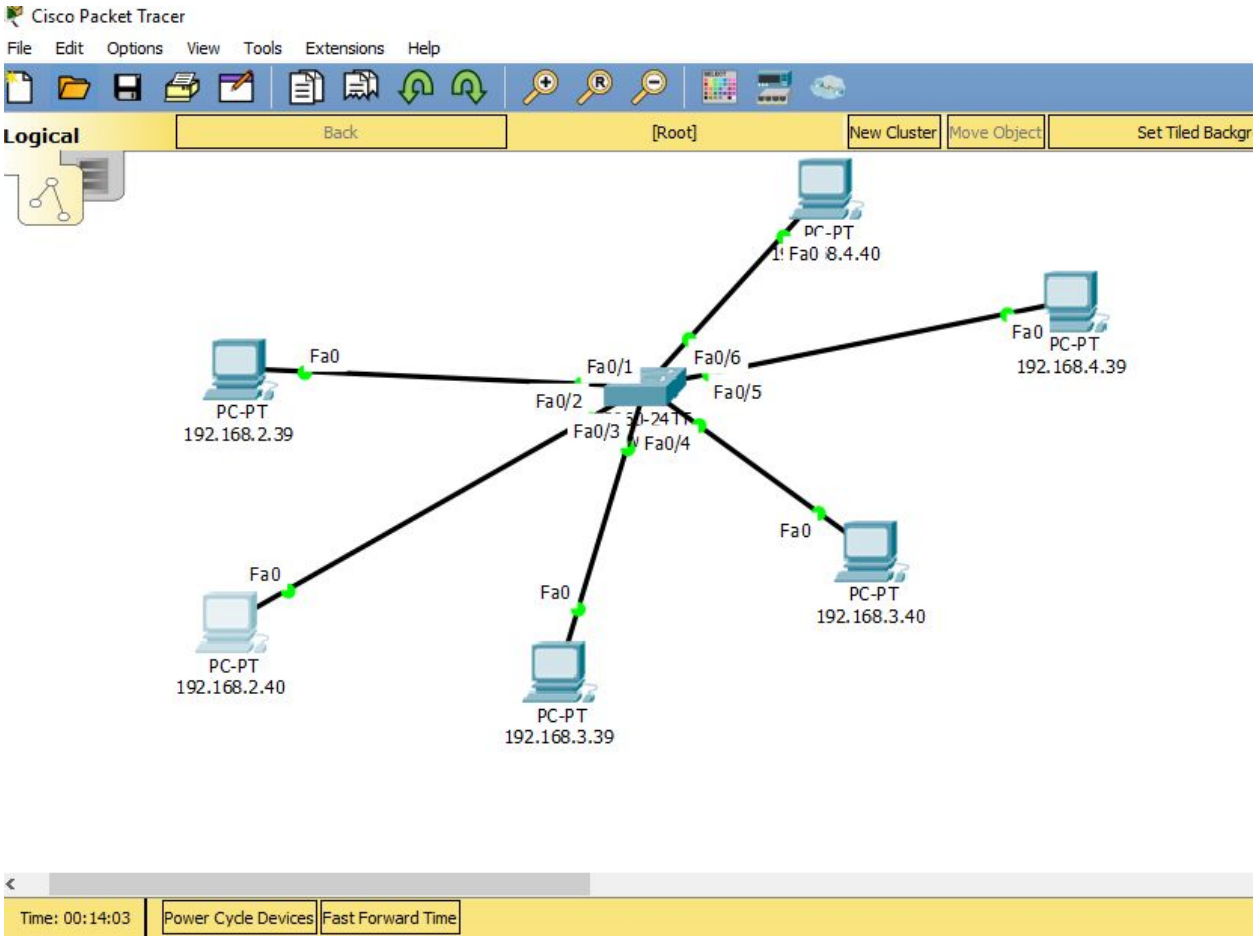

Figure1: VLAN Configuration with switch

IOS Command Line Interface:

Switch>en
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 10 name A
VLAN 10 added:
Name: A
Switch(vlan)#vlan 20 name B

```
VLAN 20 added:
    Name: B
Switch(vlan)#vlan 30 name C
VLAN 30 added:
    Name: C
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int fa0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan brief

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, Gig0/1, Gig0/2
10   A                    active    Fa0/1, Fa0/2
20   B                    active    Fa0/3, Fa0/4
30   C                    active    Fa0/5, Fa0/6
1002 fddi-default                 active
1003 token-ring-default                active
1004 fddinet-default              active
1005 trnet-default                active
Switch#
Switch#
```

Result:

Now apply ping on PC of IP 192.168.2.63 to PC 192.168.2.63 of same VLAN 10 will be success. But to the PC 192.168.3.63 of different VLAN, the ping will fail as shown below. Similarly you can verify the ICMP packet under simulation mode.

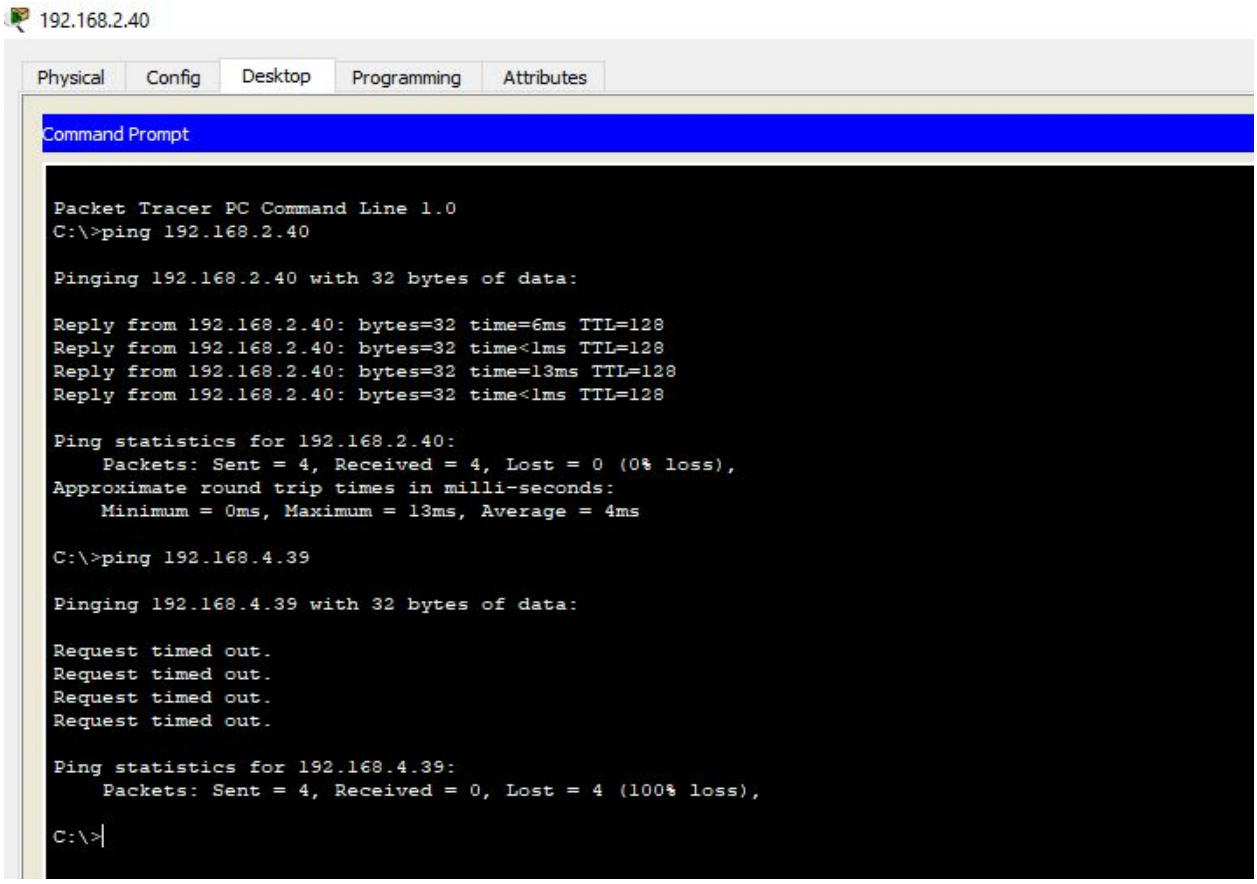

Figure 2: Ping Command

Circuit:

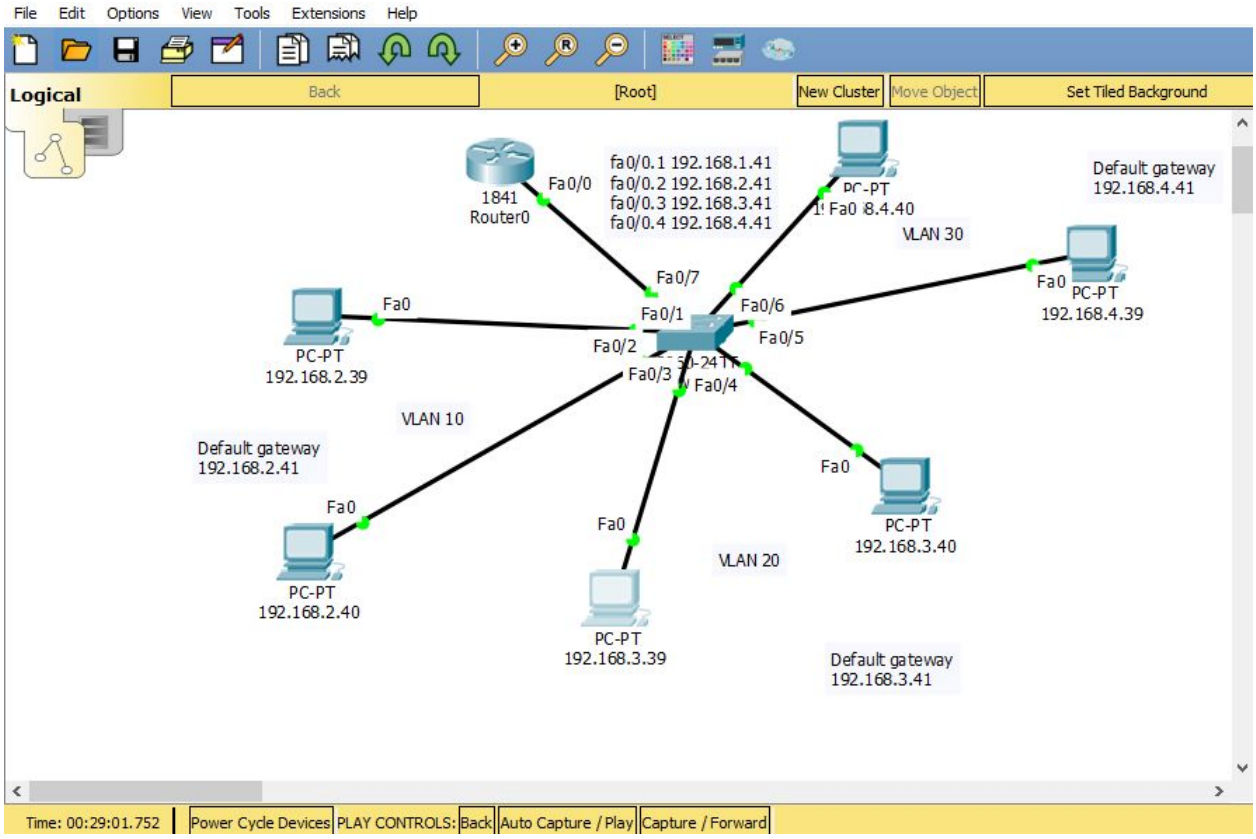

Figure 3. Configuration of 3 layer switch and router

IOS Command Line Interface:

Switch>en
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
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documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 10 name A
VLAN 10 added:
Name: A

```
Switch(vlan)#vlan 20 name B
VLAN 20 added:
    Name: B
Switch(vlan)#vlan 30 name C
VLAN 30 added:
    Name: C
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int fa0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#int fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#sh vlan brief

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, Gig0/1, Gig0/2
10   A                    active    Fa0/1, Fa0/2
20   B                    active    Fa0/3, Fa0/4
30   C                    active    Fa0/5, Fa0/6
1002 fddi-default                 active
1003 token-ring-default               active
1004 fddinet-default              active
1005 trnet-default                active
Switch#
Switch#
```

Result:

When we use router and configure default gateways then we overcome the transmission of data between two different networks.

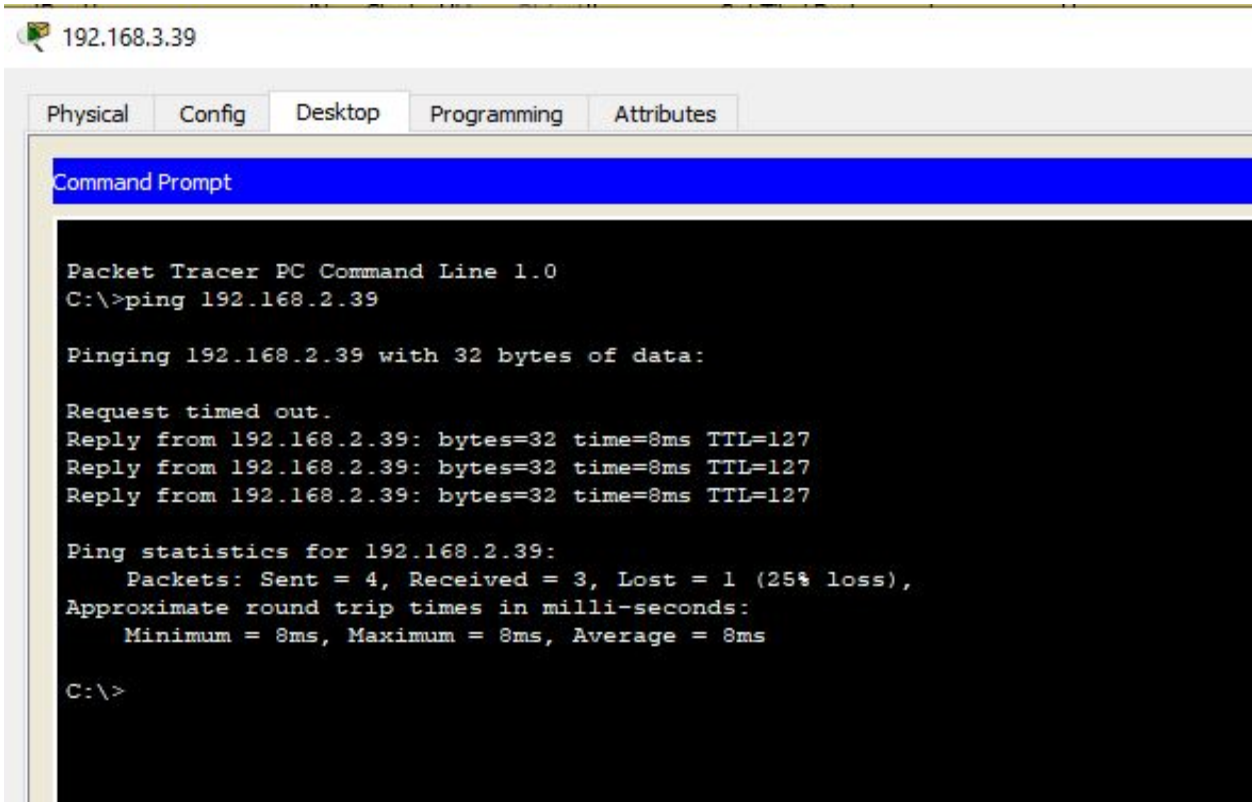

Figure 4. ping command