EXPERIMENT#4: Inter-VLAN Routing (PART I)

Objective:

Your task is to configure the network such that PC-A in VLAN 2 can ping PC-B in VLAN 3 across the switches. In the topology shown in Figure 1, you can always swap the PCs for routers and use the fast Ethernet interfaces to connect to the switches.

1. Configure SwitchA to trunk with SwitchB through Router1 using 802.1q
2. Configure port fa1/1 to be in the correct VLANs on both switches
3. Configure Router1's fa0/0 and fa1/0 interfaces with two sub-interfaces in the correct VLANs and with correct IP addresses (.1 in respective subnets)
4. Configure the PCs with respective Gateway addresses (address of the sub-interface on Router1)
5. Ping from PC-A to PC-B.

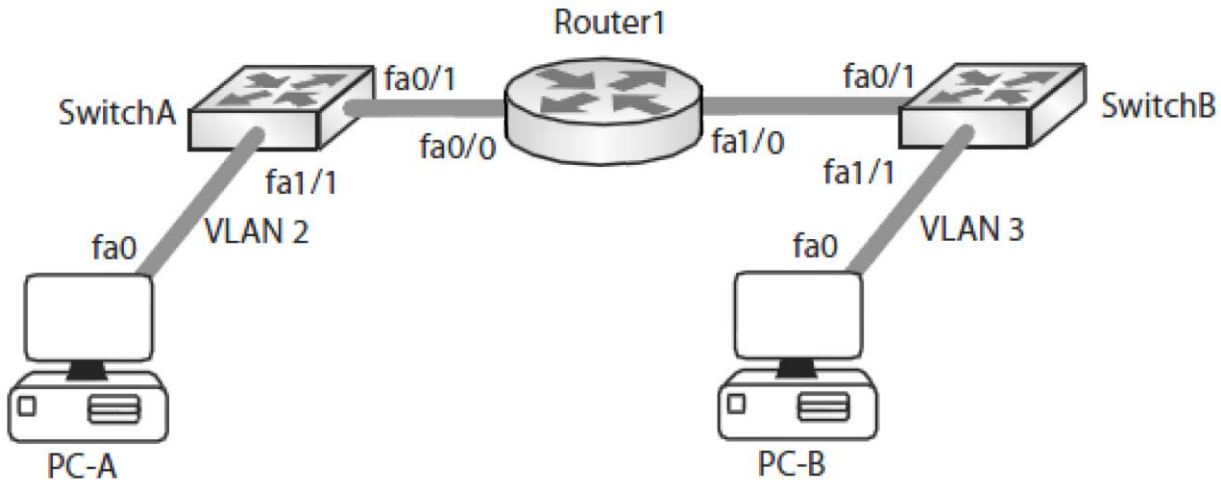

Figure 1

Vlan 2 – 192.168.2.0/24, PC-A 192.168.2.2/24

Vlan 3 – 192.168.3.0/24, PC-B 192.168.3.2/24

Tools and Materials:

In a real life Scenario:
Two Workstations with terminal Program (such as putty), two Cisco switches, One Cisco Router, four Straight-through RJ45 cables

For Lab Purpose:
Cisco Packet Tracer Software

Instructions:

1. To configure SwitchA for trunking on relevant ports. We need trunking ports because they can carry multiple VLAN information. Do the following:

```
Switch#configure terminal
Switch#(config)#hostname SwitchA
SwitchA(config)#interface fa0/1
SwitchA(config-if-range)#switchport trunk encapsulation dot1q
SwitchA(config-if-range)#switchport mode trunk

Switch#show interface trunk

Port Mode Encapsulation Status Native vlan
Fa0/1 on 802.1q trunking 1
```

2. To configure SwitchB for trunking, do the following:

```
Switch#config t
Switch#(config)#hostname SwitchB
SwitchB(config)#int fa0/1
SwitchB(config-if)#switchport trunk encapsulation dot1q
SwitchB(config-if)#switchport mode trunk
```

3. Access ports are used to connect hosts to the switch. They should actually be access ports by default, but it is useful to know the command. To configure the access ports, do the following.

```
SwitchA(config)#interface fa1/1
SwitchA(config-if)#switchport mode access
SwitchA(config-if)#switchport access vlan 2

SwitchB(config)#interface fa1/1
SwitchB(config-if)#switchport mode access
SwitchB(config-if)#switchport access vlan 3
```

Please note--we have put the interfaces into the respective VLANs 2 and 3 with the above commands. Also, if VLAN 2 or 3 is not already created on the switch you may refer to previous experiment to see how those can be created

```
SwitchB(config-if)#switchport access vlan 2
% Access VLAN does not exist. Creating vlan 2
```
You can see from earlier lab that we create vlans with the: "Switch(config)#vlan 2" command.

4. To configure the router port, we need to add sub-interfaces and configure dot1q encapsulation so the interface can trunk the VLANs. Do the following:

```
Router#config t
Router(config)#hostname Router1
Router1(config)#interface fa0/0
Router1(config-if)#no shut
Router1(config-if)#interface fa0/0.2
Router1(config-subif)#encapsulation dot1q 2
Router1(config-subif)#ip address 192.168.2.1 255.255.255.0
Router1(config-subif)#interface fa1/0.3
Router1(config-subif)#encapsulation dot1q 3
Router1(config-subif)#ip address 192.168.3.1 255.255.255.0
```

(Please note—interface fa0/0.2 is used for VLAN 2. We have also added the correct VLAN number after the "dot1q" command.

5. (Optional) Depending on the Operating System of the PCs, configure their gateway to be 192.168.2.1 and 192.168.3.1, respectively.

6. Now ping 192.168.3.2 from PC-A (or RouterA if you are using routers):

```
PCA
C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Reply from 192.168.3.2: bytes=32 time=1ms TTL=127
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Reply from 192.168.3.2: bytes=32 time=1ms TTL=127
Reply from 192.168.3.2: bytes=32 time=2ms TTL=127

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 1ms
```