

Birzeit University

Faculty of Engineering and Technology
Electrical and Computer Engineering Department
Computer Networks Lab course

Switching and VLANs --- Part 2

Switch Virtual Interface - SVI

Introduction

This experiment is the second episode of VLANs. We discussed the first concept of VLANs which was Router on Stick. In this experiment we will go further by discussing another VLAN concept that is called Switch Virtual Interface by using a special kind of switches which is called layer 3 switch.

Theory

- How does a 3rd layer switch work?

A layer 3 switch (as the name indicates) has some capabilities that are not found in an ordinary one. It can perform routing in parallel with switching.

For a quick overview about the relation between routers, switches, and 3rd layer switch please read the following article:

<http://searchnetworking.techtarget.com/tip/Layer-3-switches-explained> (PRELAB)

- Inter VLAN routing
- Switch Virtual Interface

Pre lab

Read the experiment carefully and test your understanding by the following questions:

- How does a 3rd layer switch work?
- What kind of cables should be connected between a 3rd layer switch and a normal one?
- What is a switch virtual interface?

Scenario

We will modify our RoS scenario from last experiment to include a 3rd layer switch. Our new topology will be as follows:

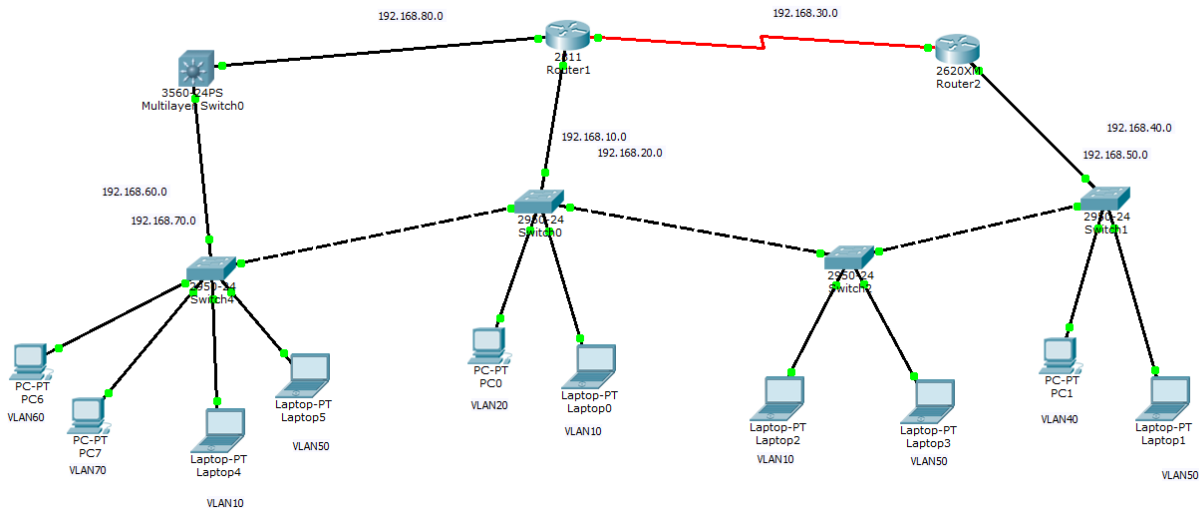


Figure -1-

Concepts & Configuration

Step 1: Adding the needed hardware to our topology

We need to add the following devices for our new topology:

- 1- Layer 3 switch: it would act as a **router** when connected with Router 1 (serial cable) and as a **switch** when connected with Switch 4 (trunk). This device would configure a **Switch Virtual Interface** SVI, for all the VLANs that it would act as a gateway for.
- 2- Normal switch: this device would act as the normal switches we used last experiment.
- 3- PCs: we need to add four PCs, two of them will be added to test new VLANs (60 and 70) and the other two will be added to extend two VLANs from our last topology.

Step 2: 3rd layer switch Configuration

We will configure this device as follows:

- 1- Switch to Router link: we need to connect this switch to router 1 via straight through cable, but in order for a 3rd layer switch port to work as a router port, we have to use the following command:
Switch(conf-if)#no switchport

This command enables the interface to work as a router interface. It takes an IP address and Subnet mask. For more details look at Figure -2-

```
interface FastEthernet0/1
no switchport
ip address 192.168.80.1 255.255.255.0
duplex auto
speed auto
```

Figure -2-

- 2- Enable routing on the switch: for this kind of switch, we need to enable its ability to route packets as its default configuration would not do that. This can be done using the following command:

```
Switch(config)# ip routing
```

- 3- Create the needed VLANs: we need to create our new VLANs on this switch as on a normal one, and then assign some ports for these VLANs

```
Switch#VLAN 60
```

```
Switch(conf-if)#switchport access vlan 60
```

```
Switch#VLAN 70
```

```
Switch(conf-if)#switchport access vlan 60
```

- 4- Switch Virtual Interfaces: we need to configure two SVIs on this switch to act as default gateways for the new VLANs. This can be done as follows:

```
Switch(config)#interface vlan60
```

```
Switch(conf-if)#ip address 192.168.60.1 255.255.255.0
```

After that, you will get a configuration like Figure 3.

```
interface Vlan60
ip address 192.168.60.1 255.255.255.0
!
interface Vlan70
ip address 192.168.70.1 255.255.255.0
```

Figure -3-

- 5- Routing: 3rd layer switch should be able to do some routing so it can forward packets all over the topology. You can use the same rip commands used in the previous experiment to achieve this task. Look at figure 4.

```
Gateway of last resort is not set
```

```
R   192.168.10.0/24 [120/1] via 192.168.80.2, 00:00:22, FastEthernet0/1
R   192.168.20.0/24 [120/1] via 192.168.80.2, 00:00:22, FastEthernet0/1
R   192.168.30.0/24 [120/1] via 192.168.80.2, 00:00:22, FastEthernet0/1
R   192.168.40.0/24 [120/2] via 192.168.80.2, 00:00:22, FastEthernet0/1
R   192.168.50.0/24 [120/2] via 192.168.80.2, 00:00:22, FastEthernet0/1
C   192.168.60.0/24 is directly connected, Vlan60
C   192.168.70.0/24 is directly connected, Vlan70
C   192.168.80.0/24 is directly connected, FastEthernet0/1
```

Figure -4-

Step 3: Normal Switch Configuration

You have to configure the normal switch using the same commands you learnt last experiment meeting the following terms:

- 1- It has to include four VLANs: 60,70,10,50.
- 2- It has to include ports defined for each one of these VLANs.
- 3- It has to be connected with the 3rd layer switch via a trunk cable.
- 4- It has to be connected with switch 0 using another trunk cable.
- 5- Able to forward traffic between hosts on the same VLAN.

You have to test your topology so that every host is able to ping other hosts on different VLANs and switches.

Prepared By: Muawiya Assali

Cisco Certified Instructor