# Inter-VLAN Routing

**Aim:** To Study the Inter-VLAN routing on a layer-3 switch

**Theory:** VLANs are used to segment switched Layer 2 networks for a variety of reasons. Regardless of the reason, hosts in one VLAN cannot communicate with hosts in another VLAN unless there is a router or a Layer 3 switch to provide routing services.

Inter-VLAN routing is the process of forwarding network traffic from one VLAN to another VLAN.
There are three inter-VLAN routing options:

1) Legacy Inter-VLAN routing: This is a legacy solution. It does not scale well.
2) Router-on-a-Stick: This is an acceptable solution for a small- to medium-sized network.
3) Layer 3 switch using switched virtual interfaces (SVIs): This is the most scalable solution for medium to large organizations.

## Inter-VLAN Routing on a Layer 3 Switch

The modern method of performing inter-VLAN routing is to use Layer 3 switches and switched virtual interfaces (SVI). An SVI is a virtual interface that is configured on a Layer 3 switch

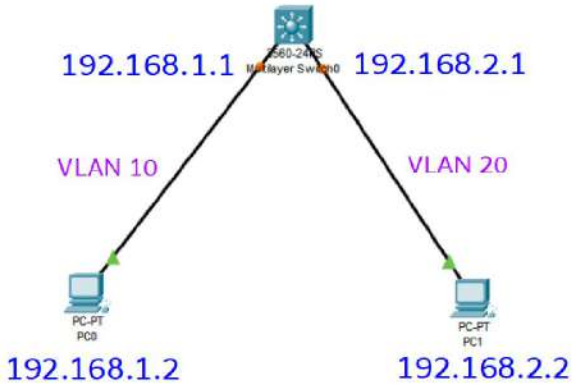
Inter-VLAN SVIs are created the same way that the management VLAN interface is configured. The SVI is created for a VLAN that exists on the switch. Although virtual, the SVI performs the same functions for the VLAN as a router interface would. Specifically, it provides Layer 3 processing for packets that are sent to or from all switch ports associated with that VLAN.

The following are advantages of using Layer 3 switches for inter-VLAN routing:

1) They are much faster than router-on-a-stick because everything is hardware switched and routed.
2) There is no need for external links from the switch to the router for routing.
3) They are not limited to one link because Layer 2 Ether Channels can be used as trunk links between the switches to increase bandwidth.
4) Latency is much lower because data does not need to leave the switch to be routed to a different network.
5) They are more commonly deployed in a campus LAN than routers.

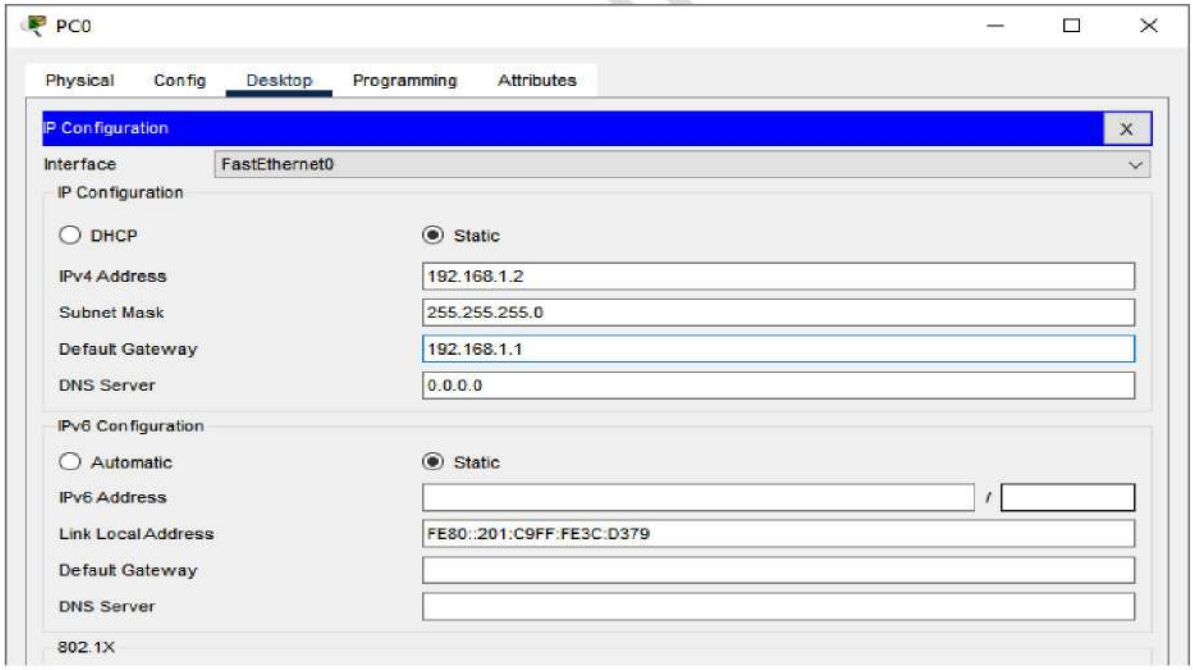
The only disadvantage is that Layer 3 switches are more expensive than Layer 2 switches, but they can be less expensive than a separate Layer 2 switch and router.

We use the following topology to study Inter-VLAN routing

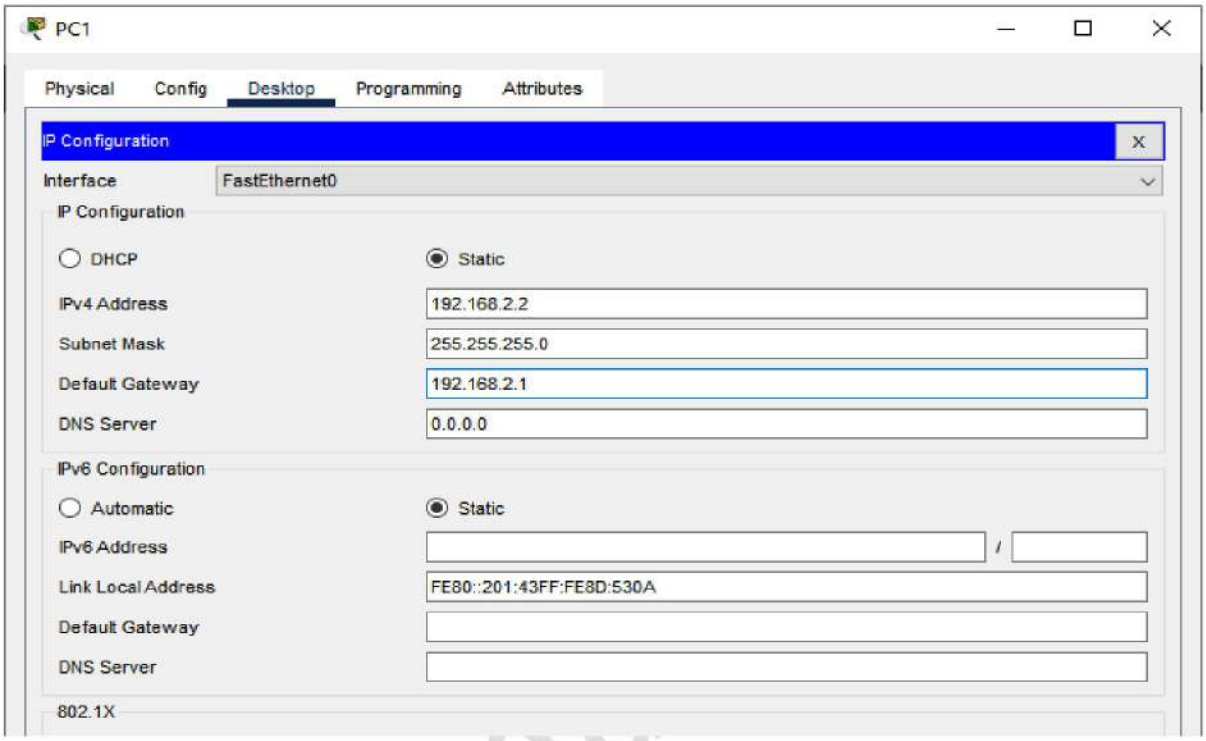



We Configure the IP addresses on the PC

PC0 :



PC1:



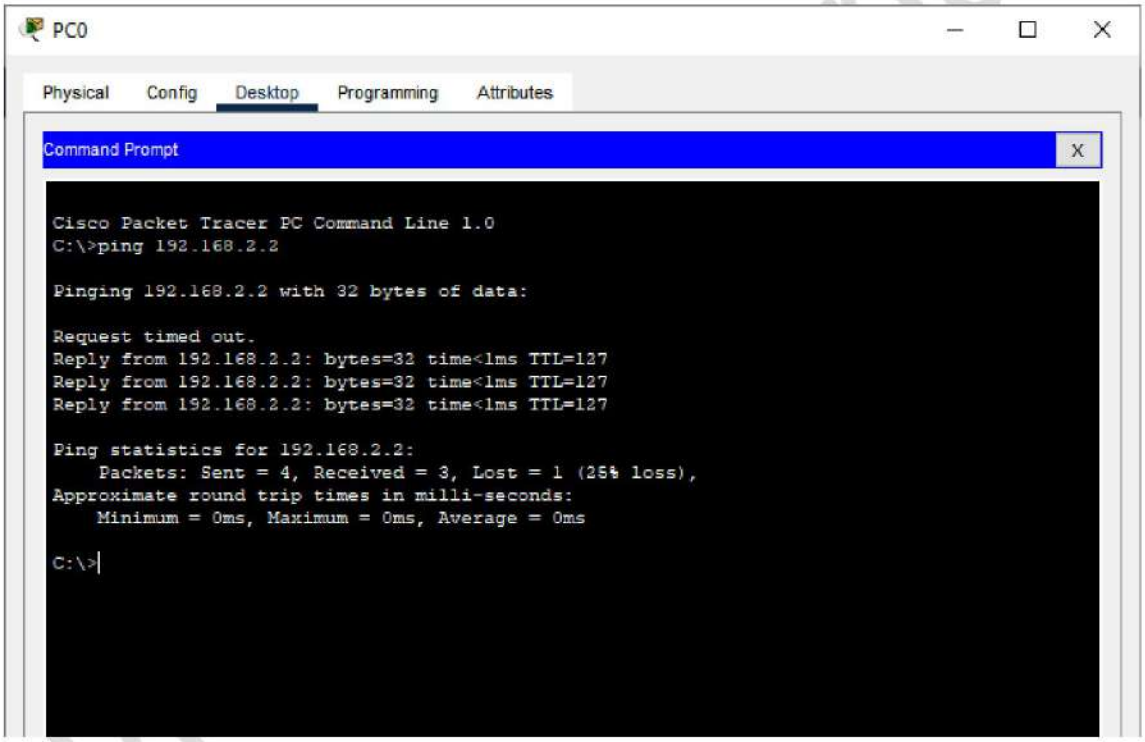

Now we configure the Multilayer switch using the following command in the CLI mode

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name smile
Switch(config-vlan)#exit
Switch(config)#
Switch(config)#vlan 20
Switch(config-vlan)#name cisco
Switch(config-vlan)#exit
Switch(config)#
Switch(config)#interface vlan 10
Switch(config-if)#
Switch(config-if)#ip address 192.168.1.1 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#
```

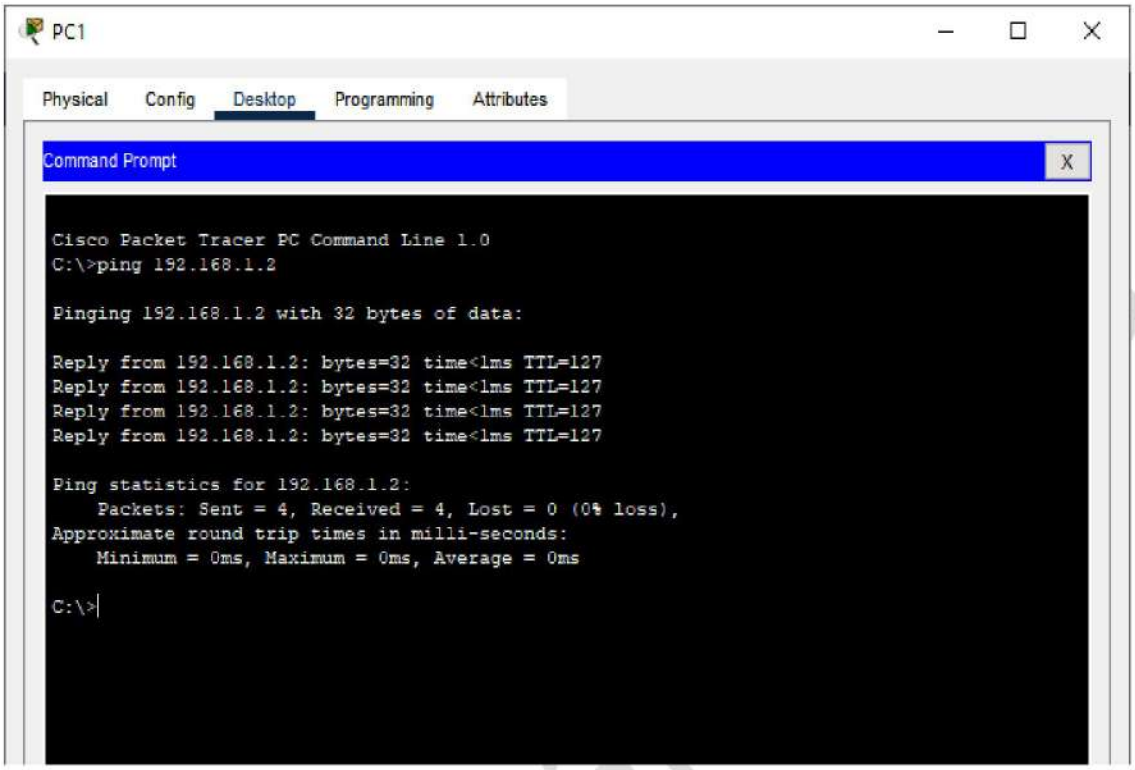
```
Switch(config)#interface vlan 20
Switch(config-if)#
Switch(config-if)#ip address 192.168.2.1 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#exit
Switch#
Switch#show ip interface brief
Switch(config)#ip routing
```

**Output:**

Now we ping PC1 from PC0 to check the connectivity



Similarly ping PC0 from PC1




Both the Pings are successful; hence the Inter-VLAN routing has been configured and verified

For Video demonstration of the given practical click on the link or scan the QR-code

https://youtu.be/Vaq9mgTM6-8?si=QcVxHVv5TBLO2t6b