# 1. Implement Inter VLAN Routing

Inter-VLAN routing is a method that allows communication between different VLANs (Virtual Local Area Networks) within a network. VLANs are used to segment a network into smaller, isolated broadcast domains to improve performance and security. However, by default, devices in separate VLANs cannot communicate with each other because each VLAN is treated as a separate network. Inter-VLAN routing enables data exchange between these segmented networks.

TOPOLOGY
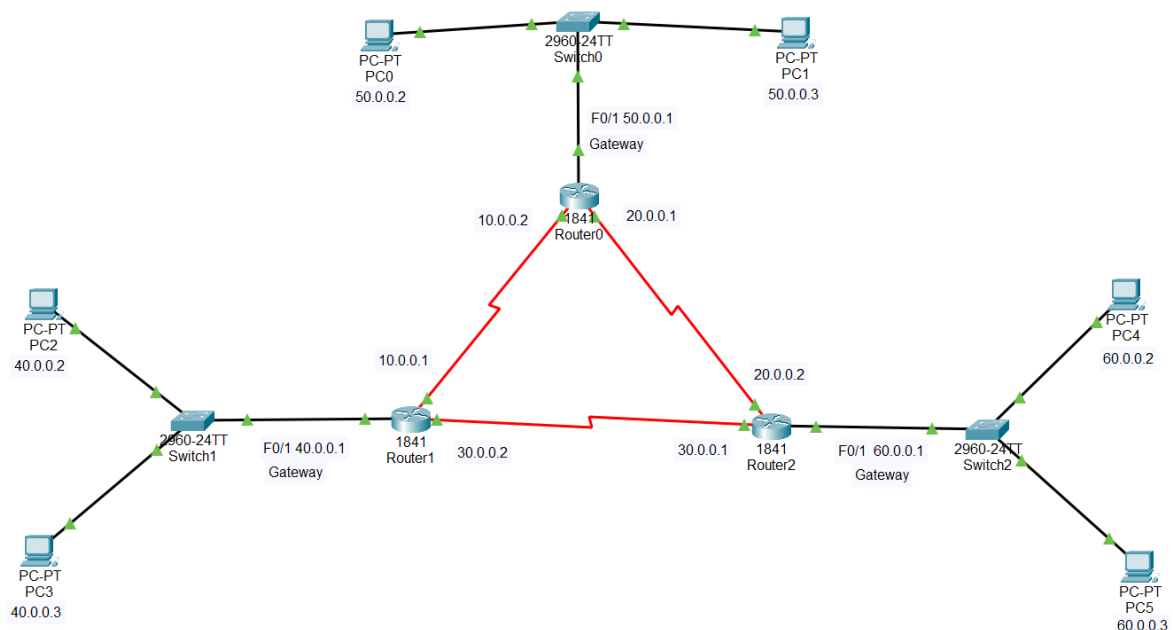
Click On Router 0,1,2 then RIP Add Networks
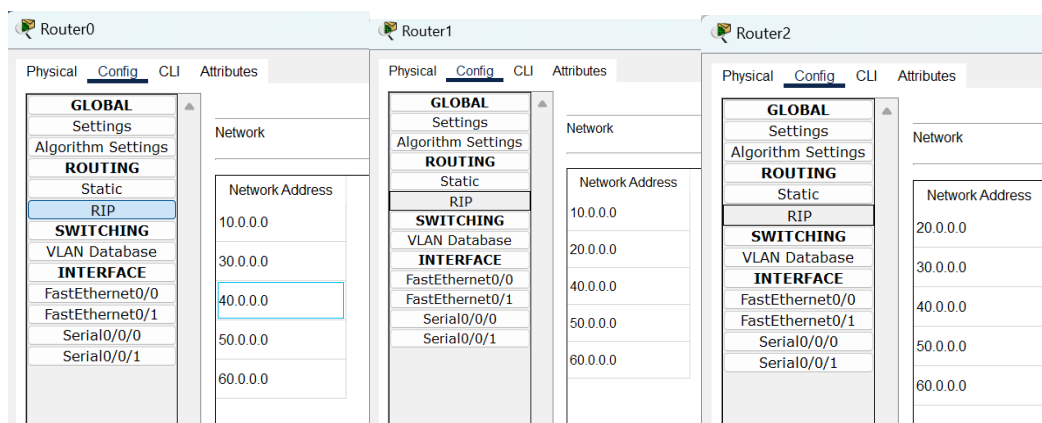
Then Click on any of <u>Switch</u> Go to the CLI Tab then Command it.

```
Switch>
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name Administration-Depertment
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name Operation-Depertment
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name HR-Depertment
Switch(config-vlan)#exit
Switch(config)#
Switch(config)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, 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   Administration-Depertment        active
20   Operation-Depertment             active
30   HR-Depertment                    active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
Switch#
```

Note: To come back to the start mode simply type Ctrl + Z then type (show vlan brief)

Better Understanding to Copy Past

Switch>

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#vlan 10

Switch(config-vlan)#name Administration-Depertment

Switch(config-vlan)#exit

Switch(config)#vlan 20

Switch(config-vlan)#name Operation-Depertment

Switch(config-vlan)#exit

Switch(config)#vlan 30

Switch(config-vlan)#name HR-Depertment

Switch(config-vlan)#exit
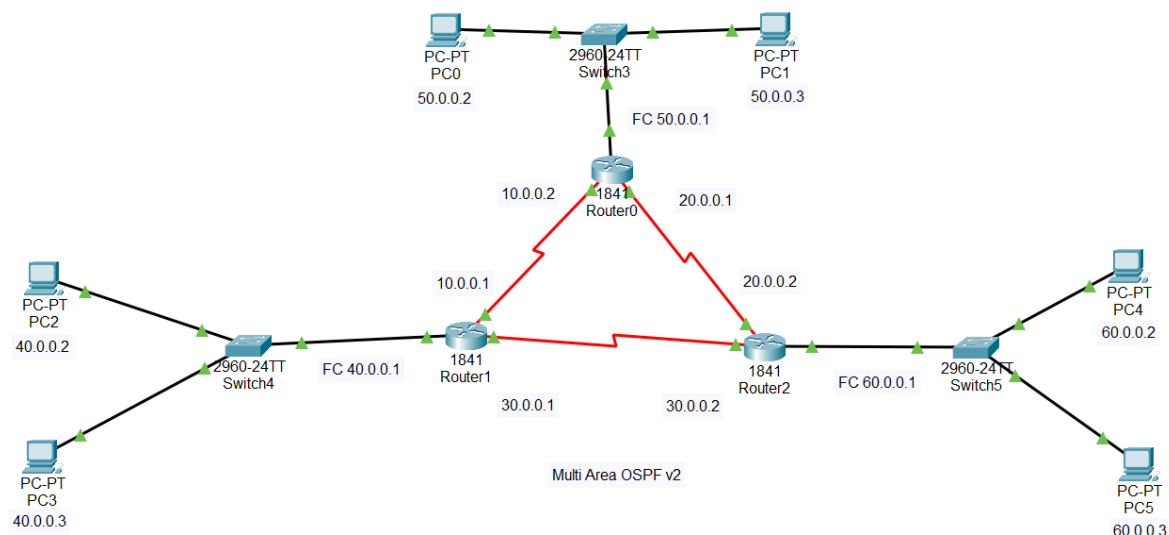
Switch(config)#

Switch(config)#^Z

Switch#

%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief

2. Implement OSPF

Open Shortest Path First (OSPF) is a link-state routing protocol that is used to find the best path between the source and the destination router using its own Shortest Path First). OSPF was developed by Internet Engineering Task Force (IETF) as one of the Interior Gateway Protocol (IGP), i.e, the protocol which aims at moving the packet within a large autonomous system or routing domain. Implement Multi-Area OSPFv2. Implementing Multi-Area OSPFv2 refers to configuring Open Shortest Path First version 2 (OSPFv2) in a network with multiple OSPF areas to optimize routing and network scalability. OSPF is an Interior Gateway Protocol (IGP) used to dynamically route IP packets within an Autonomous System (AS). Multi-Area OSPFv2 helps improve OSPF's performance and reduces the complexity and overhead of routing in larger networks.

TOPOLOGY

Note: Click on the Router then go to the Physical Tab then turn off switch and take WIC 2T then turn on Switch
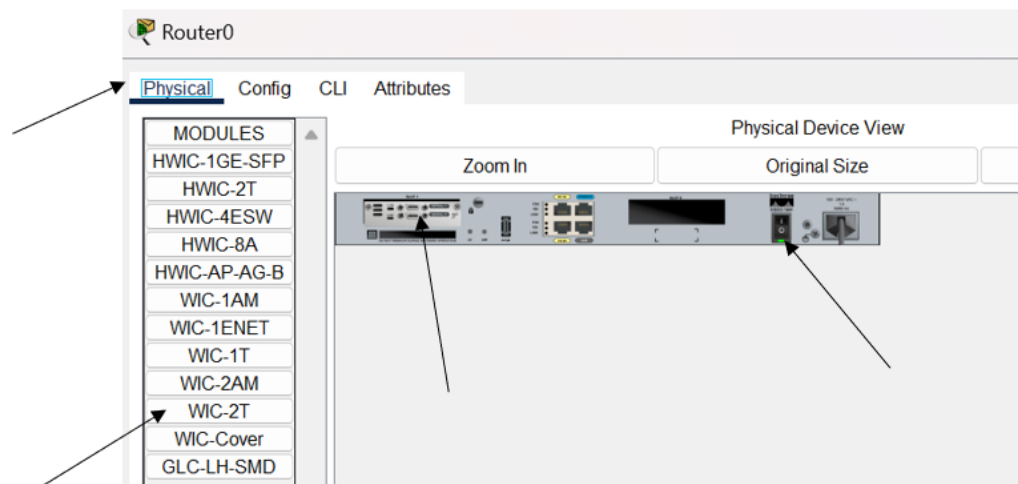
Then Click on Respective Routers then go to CLI tab then execute commands

Router 0

```
Router(config-if)#
Router(config-if)#exit
Router(config)#router ospf 2
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 20.0.0.0 0.255.255.255 area 0
Router(config-router)#network 50.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
00:23:03: %OSPF-5-ADJCHG: Process 2, Nbr 40.0.0.1 on Serial0/1/0 from LOADING to FULL, Loading
Done

00:25:18: %OSPF-5-ADJCHG: Process 2, Nbr 60.0.0.1 on Serial0/1/1 from LOADING to FULL, Loading
Done
```

Router 1

```
% Invalid input detected at '^' marker.

Router(config)#router ospf 2
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
00:23:12: %OSPF-5-ADJCHG: Process 2, Nbr 50.0.0.1 on Serial0/1/router ospf 2
Router(config-router)#network 40.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
```

Router 2

```
Router(config-if)#exit
Router(config)#router ospf 2
Router(config-router)#network 20.0.0.0 0.255.255.255 area 0
Router(config-router)#network 20.0.0.0 0.255.255.255 area 0
00:25:06: %OSPF-5-ADJCHG: Process 2, Nbr 50.0.0.1 on Serial0/1/0 from LOADING to FULL, Loading
Done

Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#network 60.0.0.0 0.255.255.255 area 0
Router(config-router)#exit
Router(config)#
```

3. Implement BGP Communities

BGP stands for Border Gateway Protocol. It's a protocol used to exchange routing information between different networks on the internet. Specifically, it's a path vector protocol, and its main role is to ensure that data knows how to travel from one network to another through the most efficient path.

BGP is critical for the inter-domain routing (between different organizations' or ISPs' networks) because it helps maintain a global routing table. BGP is used by Internet Service Providers (ISPs), large enterprises, and other organizations to manage how data packets are routed across the internet.

There are two versions of BGP in use:

- BGP-4: The most commonly used version today.

- iBGP (Internal BGP): Used within an Autonomous System (AS).

- eBGP (External BGP): Used between different ASes.

TOPOLOGY

Implement BGP Communities
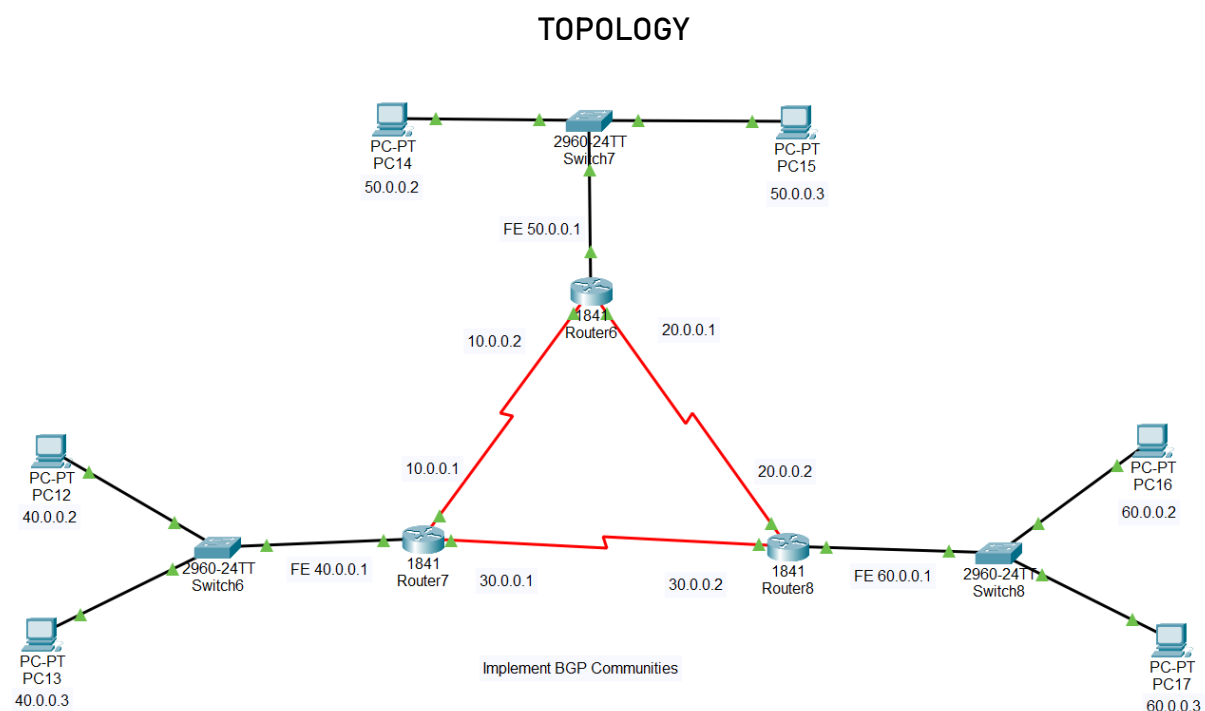
Hence Consider the

Router 7 is 100

Router 6 is 200

Router 8 is 300

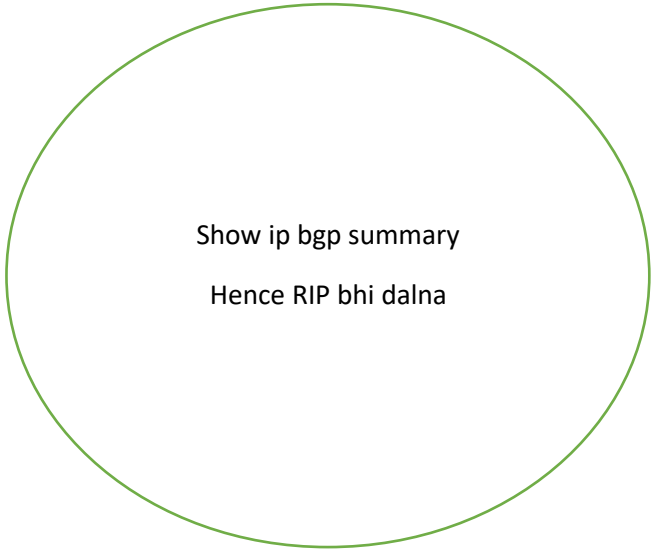After that click on each Respective router then

Router 7

```
Router(config-if)#
Router(config-if)#en
% Ambiguous command: "en"
Router(config)#router bgp 100
Router(config-router)#network 10.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#neighbor 10.0.0.2 remote-as 200
Router(config-router)#exit
Router(config)#
```

Router 6

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 200
Router(config-router)#network 50.0.0.0
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#neighbor 20.0.0.2 remote-as 300
Router(config-router)#exit
Router(config)#
```

Router 8

Show ip bgp summary

Hence RIP bhi dalna

4. Implement IPv4 ACLs
a) Standard ACL
b) Extended ACL