Practical 1

Configure IP SLA Tracking and Path Control Topology

Prepare the routers and configure the router hostname and interface addresses.

Cable the network as shown in the topology diagram. Erase the startup configuration and reload each router to clear the previous configurations. Using the addressing scheme in the diagram, create the loopback interfaces and apply IP addresses to them as well as the serial interfaces on R1, ISP1, and ISP2. You can copy and paste the following configurations into your routers to begin. Note: Depending on the router model, interfaces might be numbered differently than those listed. You might need to alter them accordingly.

Router :

hostname R1

Router(config)#interface GigabitEthernet0/0

Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config)#interface GigabitEthernet0/1

Router(config-if)#ip address 10.0.0.2 255.0.0.0

Router(config)#interface GigabitEthernet0/0

Router(config-if)#ip address 10.0.0.3 255.0.0.0

Router(config)#interface GigabitEthernet0/1

Router(config-if)#ip address 10.0.0.4 255.0.0.0

Router(config)#interface GigabitEthernet0/0

Router(config-if)#ip address 10.0.0.5 255.0.0.0

Router(config)#interface GigabitEthernet0/1

Router(config-if)#ip address 10.0.0.6 255.0.0.0

Router(config)#interface GigabitEthernet0/0

Router(config-if)#ip address 10.0.0.7 255.0.0.0

Router(config)#interface GigabitEthernet0/1

Router(config-if)#ip address 10.0.0.8 255.0.0.0

Verify the configuration by using the show interfaces description command. The output from router R1 is shown here as an example. R1# show interfaces description Interface Status Protocol Description Fa0/0 admin down down GigabitEthernet0/0 admin down down GigabitEthernet0/1 up up R1 --> I GigabitEthernet0/2 up up R1 --> ISP2 Lo0 up up R1 LAN All four interfaces should be active. Troubleshoot if necessary

Router(config)#do sh ip int br

Interface IP-Address OK? Method Status Protocol

GigabitEthernet0/0 10.0.0.1 YES manual up up

GigabitEthernet0/1 17.0.0.2 YES manual up up

GigabitEthernet0/2 192.168.1.3 YES manual up up

Loopback1 1.1.1.1 YES manual up up

Vlan1 unassigned YES unset administratively down down

Router(config)#

Configuration of static routing method:

Router R1 establishes connectivity to the Internet through ISP1 using a default static route. • ISP1 and ISP2 have dynamic routing enabled between them, advertising their respective public address pools. • ISP1 and ISP2 both have static routes back to the ISP LAN

Note: For the purpose of this lab, the ISPs have a static route to an RFC 1918 private network address on the branch router R1. In an actual branch implementation, Network Address Translation (NAT) would be configured for all traffic exiting the branch LAN. Therefore, the static routes on the ISP routers would be pointing to the provided public pool of the branch office. This is covered in Lab 7-1, “Configure Routing Facilities to the Branch Office.” Implement the routing policies on the respective routers. You can copy and paste the following configurations

Router(config)#do sh ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 10.0.0.2 to network 0.0.0.0

1.0.0.0/32 is subnetted, 1 subnets

C 1.1.1.1/32 is directly connected, Loopback1

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 10.0.0.0/8 is directly connected, GigabitEthernet0/0

L 10.0.0.1/32 is directly connected, GigabitEthernet0/0

17.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 17.0.0.0/8 is directly connected, GigabitEthernet0/1

L 17.0.0.2/32 is directly connected, GigabitEthernet0/1

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/2
L 192.168.1.3/32 is directly connected, GigabitEthernet0/2
S* 0.0.0.0/0 [1/0] via 10.0.0.2
[1/0] via 17.0.0.1

Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Verify server reachability.

The Cisco IOS IP SLA feature enables an administrator to monitor network performance between Cisco devices (switches or routers) or from a Cisco device to a remote IP device. IP SLA probes continuously check the reachability of a specific destination, such as a provider edge router interface, the DNS server of the ISP, or any other specific destination, and can conditionally announce a default route only if the connectivity is verified

Router#ping 192.168.3.12

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.12, timeout is 2 seconds:
..!!.
Success rate is 40 percent (2/5), round-trip min/avg/max = 10/10/10 ms

Trace the route up to the server:

Router#
Router#traceroute 192.168.3.11
Type escape sequence to abort.
Tracing the route to 192.168.3.11

1 10.0.0.2 1 msec 1 msec 0 msec
2 11.0.0.2 1 msec 1 msec 0 msec
3 12.0.0.2 1 msec 1 msec 0 msec
Router#

Shows the interface table

Router>en
Router#sh ip int br
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 10.0.0.2 YES manual up up
GigabitEthernet0/1 11.0.0.1 YES manual up up
GigabitEthernet0/2 192.168.2.3 YES manual up up
Loopback1 2.2.2.1 YES manual up up
Vlan1 unassigned YES unset administratively down down
Router#

Check and verify the connectivity of the loop back interface

The loopback device is **a special, virtual network interface that your computer uses to communicate with itself**. It is used mainly for diagnostics and troubleshooting, and to connect to servers running on the local machine

C:\>ping 3.3.3.1
Pinging 3.3.3.1 with 32 bytes of data:
Reply from 3.3.3.1: bytes=32 time=21ms TTL=254
Reply from 3.3.3.1: bytes=32 time=31ms TTL=248
Reply from 3.3.3.1: bytes=32 time<1ms TTL=254
Reply from 3.3.3.1: bytes=32 time=53ms TTL=248
Ping statistics for 3.3.3.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round-trip times in milli-seconds:
Minimum = 0ms, Maximum = 53ms, Average = 26ms

show the static routes and also displays the packet traveling from any pc to the server

Configure the floating static route that will be implemented when tracking object 1 is active. To view routing table changes as they happen, first enable the debug ip routing command. Next, use the ip route 0.0.0.0 0.0.0.0 209.165.201.1 2 track 1 command to create a floating static default route

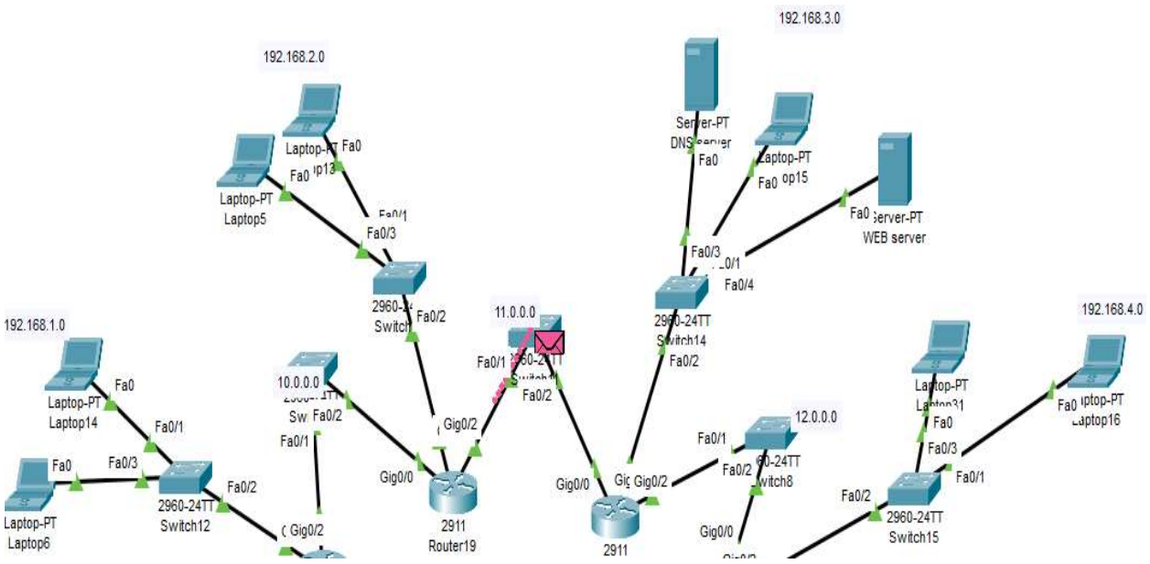
Router#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

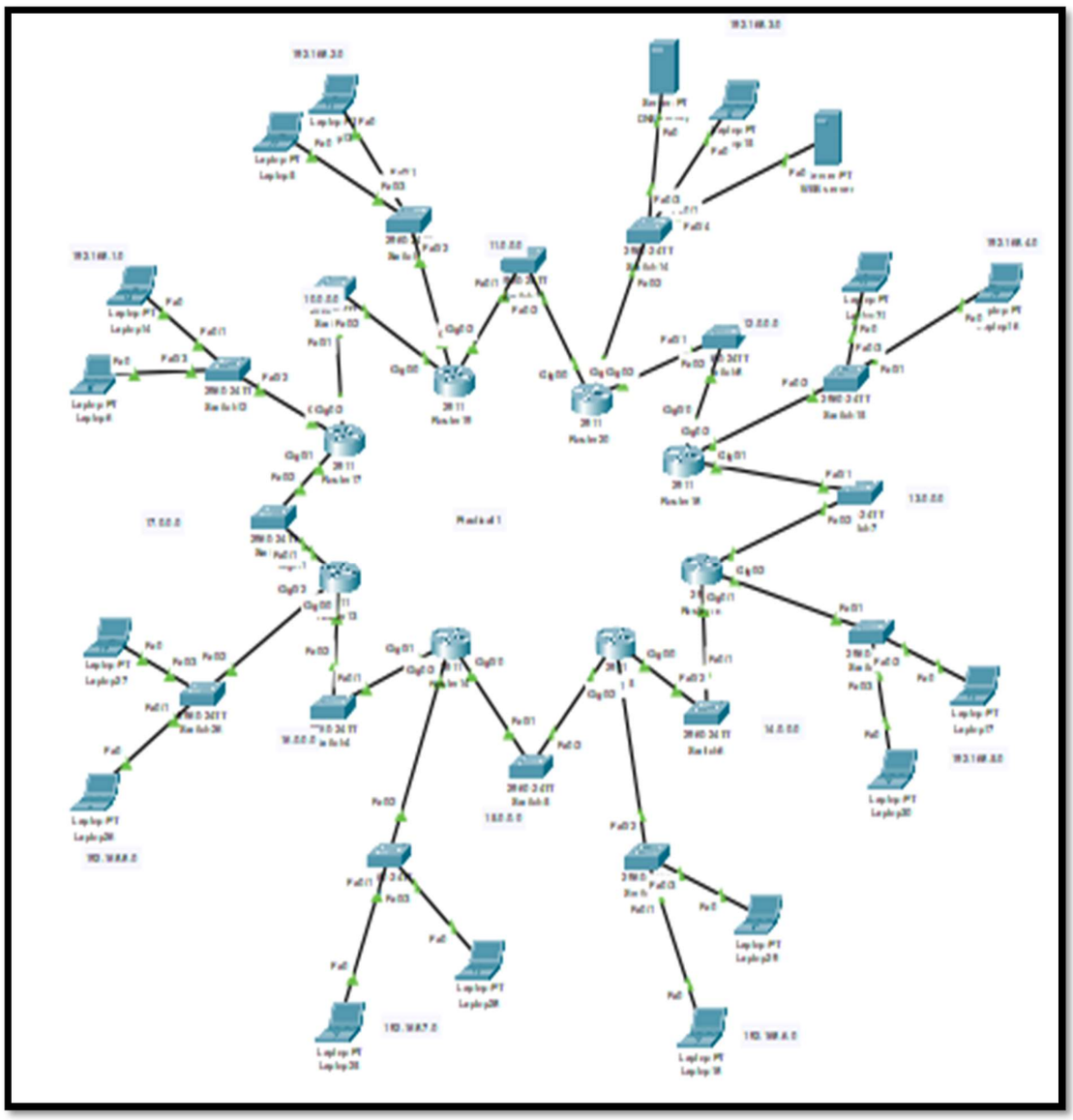
Gateway of last resort is 10.0.0.2 to network 0.0.0.0

1.0.0.0/32 is subnetted, 1 subnets
C 1.1.1.1/32 is directly connected, Loopback1
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.0.0.0/8 is directly connected, GigabitEthernet0/0
L 10.0.0.1/32 is directly connected, GigabitEthernet0/0
17.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 17.0.0.0/8 is directly connected, GigabitEthernet0/1
L 17.0.0.2/32 is directly connected, GigabitEthernet0/1
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/2
L 192.168.1.3/32 is directly connected, GigabitEthernet0/2
S* 0.0.0.0/0 [1/0] via 10.0.0.2
[1/0] via 17.0.0.1

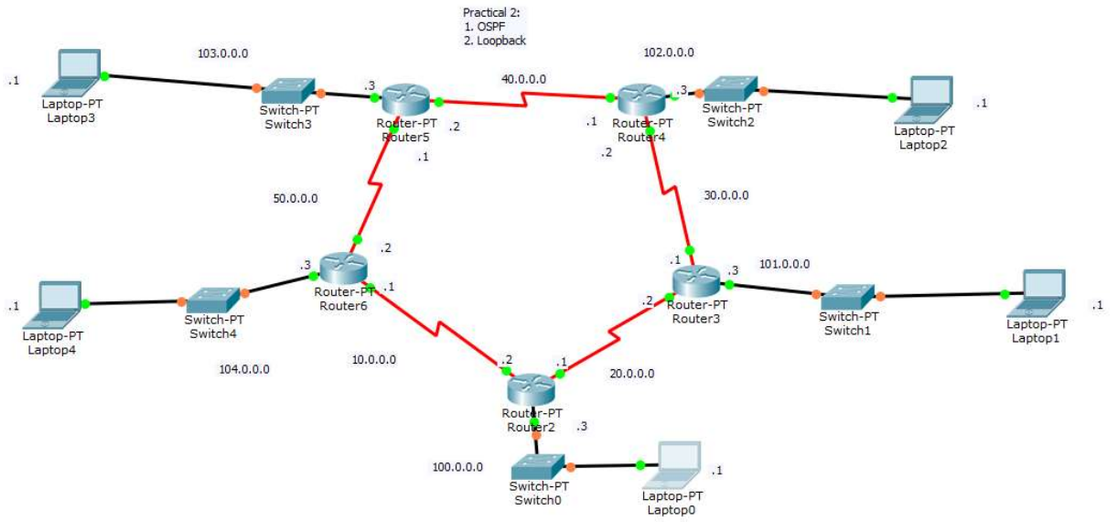
Repeat this procedure up to the last computer or laptop.
We can see the simulation of the packet is sending from the laptop 14 to the webserver



Topology of the network:



Practical 2
Using the AS_PATH Attribute



Configure PC and Router Gateway

Router 1

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 100.0.0.3 255.0.0.0
Router(config-if)#no shutdown

Router 2

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 101.0.0.3 255.0.0.0
Router(config-if)#no shutdown

Router 3

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 102.0.0.3 255.0.0.0
Router(config-if)#no shutdown

Router 4

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 103.0.0.3 255.0.0.0
Router(config-if)#no shutdown

Router 5

Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 104.0.0.3 255.0.0.0
Router(config-if)#no shutdown

Configure connection between Routers

Router 1

Router(config)#interface Serial3/0
Router(config-if)#no shutdown
Router(config-if)#ip address 10.0.0.2 255.0.0.0

Router(config)#interface Serial2/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router 2

Router(config)#interface Serial2/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0

Router(config)#interface Serial3/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0

```
Router(config-if)#no shutdown

Router 3
Router(config)#interface Serial2/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router 4
Router(config)#interface Serial2/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config)#interface Serial3/0
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router 5
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config)#interface Serial3/0
Router(config-if)#ip address 50.0.0.2 255.0.0.0
Router(config-if)#no shutdown
```

Loopback network in each router

```
Router 1
Router(config)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 1.1.1.1 255.255.255.255


Router 2
Router(config-if)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 2.2.2.2 255.255.255.255

Router 3
Router(config)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 3.3.3.3 255.255.255.255
```

Router 4
Router(config-if)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 4.4.4.4 255.255.255.255

Router 5
Router(config)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 5.5.5.5 255.255.255.255

OSPF Configuration
Ospf for each router where we add connected network to current router and loopback address associated with that router.
Router 1
Router(config)#router ospf 1
Router(config-router)#network 100.0.0.0 0.255.255.255 area 10
Router(config-router)#network 10.0.0.0 0.255.255.255 area 10
Router(config-router)#network 20.0.0.0 0.255.255.255 area 10
Router(config-router)#network 1.1.1.0 0.0.0.255 area 10

Router 2
Router(config)#router ospf 2
Router(config-router)#network 101.0.0.0 0.255.255.255 area 10
Router(config-router)#network 20.0.0.0 0.255.255.255 area 10
Router(config-router)#network 30.0.0.0 0.255.255.255 area 10
Router(config-router)#network 2.2.2.0 0.0.0.255 area 10

Router 3
Router(config)#router ospf 3
Router(config-router)#network 102.0.0.0 0.255.255.255 area 10
Router(config-router)#network 30.0.0.0 0.255.255.255 area 10
Router(config-router)#network 40.0.0.0 0.255.255.255 area 10
Router(config-router)#network 3.3.3.0 0.0.0.255 area 10

Router 4
Router(config)#router ospf 4
Router(config-router)#network 103.0.0.0 0.255.255.255 area 10
Router(config-router)#network 40.0.0.0 0.255.255.255 area 10
Router(config-router)#network 50.0.0.0 0.255.255.255 area 10
Router(config-router)#network 4.4.4.0 0.0.0.255 area 10

Router 5
Router(config)#router ospf 5
Router(config-router)#network 104.0.0.0 0.255.255.255 area 10
Router(config-router)#network 50.0.0.0 0.255.255.255 area 10
Router(config-router)#network 10.0.0.0 0.255.255.255 area 10
Router(config-router)#network 5.5.5.0 0.0.0.255 area 10

Router 1

```
Router(config-router)#do sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     1.0.0.0/32 is subnetted, 1 subnets
C       1.1.1.1 is directly connected, Loopback1
     2.0.0.0/32 is subnetted, 1 subnets
O       2.2.2.2 [110/65] via 20.0.0.2, 00:02:50, Serial2/0
     3.0.0.0/32 is subnetted, 1 subnets
O       3.3.3.3 [110/129] via 20.0.0.2, 00:02:22, Serial2/0
     4.0.0.0/32 is subnetted, 1 subnets
O       4.4.4.4 [110/129] via 10.0.0.1, 00:01:52, Serial3/0
     5.0.0.0/32 is subnetted, 1 subnets
O       5.5.5.5 [110/65] via 10.0.0.1, 00:01:28, Serial3/0
C    10.0.0.0/8 is directly connected, Serial3/0
C    20.0.0.0/8 is directly connected, Serial2/0
O    30.0.0.0/8 [110/128] via 20.0.0.2, 00:14:26, Serial2/0
O    40.0.0.0/8 [110/192] via 10.0.0.1, 00:10:50, Serial3/0
                [110/192] via 20.0.0.2, 00:10:50, Serial2/0
O    50.0.0.0/8 [110/128] via 10.0.0.1, 00:10:50, Serial3/0
C    100.0.0.0/8 is directly connected, FastEthernet0/0
O    101.0.0.0/8 [110/65] via 20.0.0.2, 00:14:26, Serial2/0
O    102.0.0.0/8 [110/129] via 20.0.0.2, 00:13:21, Serial2/0
O    103.0.0.0/8 [110/129] via 10.0.0.1, 00:10:50, Serial3/0
O    104.0.0.0/8 [110/65] via 10.0.0.1, 00:10:50, Serial3/0
```

Route 2

```
Router(config-router)#do sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     1.0.0.0/32 is subnetted, 1 subnets
O       1.1.1.1 [110/65] via 20.0.0.1, 00:06:07, Serial3/0
     2.0.0.0/32 is subnetted, 1 subnets
C       2.2.2.2 is directly connected, Loopback1
     3.0.0.0/32 is subnetted, 1 subnets
O       3.3.3.3 [110/65] via 30.0.0.2, 00:03:17, Serial2/0
     4.0.0.0/32 is subnetted, 1 subnets
O       4.4.4.4 [110/129] via 30.0.0.2, 00:02:46, Serial2/0
     5.0.0.0/32 is subnetted, 1 subnets
O       5.5.5.5 [110/129] via 20.0.0.1, 00:02:22, Serial3/0
O    10.0.0.0/8 [110/128] via 20.0.0.1, 00:15:26, Serial3/0
C    20.0.0.0/8 is directly connected, Serial3/0
C    30.0.0.0/8 is directly connected, Serial2/0
O    40.0.0.0/8 [110/128] via 30.0.0.2, 00:14:10, Serial2/0
O    50.0.0.0/8 [110/192] via 20.0.0.1, 00:11:44, Serial3/0
                [110/192] via 30.0.0.2, 00:11:44, Serial2/0
O    100.0.0.0/8 [110/65] via 20.0.0.1, 00:15:26, Serial3/0
C    101.0.0.0/8 is directly connected, FastEthernet0/0
O    102.0.0.0/8 [110/65] via 30.0.0.2, 00:14:20, Serial2/0
O    103.0.0.0/8 [110/129] via 30.0.0.2, 00:12:44, Serial2/0
O    104.0.0.0/8 [110/129] via 20.0.0.1, 00:11:44, Serial3/0
```

Router 3

```
Router(config-router)#do sh ip  route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     1.0.0.0/32 is subnetted, 1 subnets
O       1.1.1.1 [110/129] via 30.0.0.1, 00:06:45, Serial3/0
     2.0.0.0/32 is subnetted, 1 subnets
O       2.2.2.2 [110/65] via 30.0.0.1, 00:04:22, Serial3/0
     3.0.0.0/32 is subnetted, 1 subnets
C       3.3.3.3 is directly connected, Loopback1
     4.0.0.0/32 is subnetted, 1 subnets
O       4.4.4.4 [110/65] via 40.0.0.2, 00:03:24, Serial2/0
     5.0.0.0/32 is subnetted, 1 subnets
O       5.5.5.5 [110/129] via 40.0.0.2, 00:03:00, Serial2/0
O    10.0.0.0/8 [110/192] via 30.0.0.1, 00:12:22, Serial3/0
                [110/192] via 40.0.0.2, 00:12:22, Serial2/0
O    20.0.0.0/8 [110/128] via 30.0.0.1, 00:14:58, Serial3/0
C    30.0.0.0/8 is directly connected, Serial3/0
C    40.0.0.0/8 is directly connected, Serial2/0
O    50.0.0.0/8 [110/128] via 40.0.0.2, 00:13:22, Serial2/0
O    100.0.0.0/8 [110/129] via 30.0.0.1, 00:14:58, Serial3/0
O    101.0.0.0/8 [110/65] via 30.0.0.1, 00:14:58, Serial3/0
C    102.0.0.0/8 is directly connected, FastEthernet0/0
O    103.0.0.0/8 [110/65] via 40.0.0.2, 00:13:32, Serial2/0
O    104.0.0.0/8 [110/129] via 40.0.0.2, 00:12:22, Serial2/0
```

Route 4

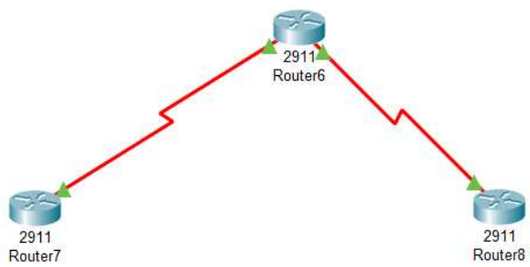
```
Router(config-router)#do sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     1.0.0.0/32 is subnetted, 1 subnets
O       1.1.1.1 [110/129] via 50.0.0.2, 00:07:20, Serial2/0
     2.0.0.0/32 is subnetted, 1 subnets
O       2.2.2.2 [110/129] via 40.0.0.1, 00:04:57, Serial3/0
     3.0.0.0/32 is subnetted, 1 subnets
O       3.3.3.3 [110/65] via 40.0.0.1, 00:04:30, Serial3/0
     4.0.0.0/32 is subnetted, 1 subnets
C       4.4.4.4 is directly connected, Loopback1
     5.0.0.0/32 is subnetted, 1 subnets
O       5.5.5.5 [110/65] via 50.0.0.2, 00:03:35, Serial2/0
O    10.0.0.0/8 [110/128] via 50.0.0.2, 00:12:57, Serial2/0
O    20.0.0.0/8 [110/192] via 40.0.0.1, 00:12:57, Serial3/0
                [110/192] via 50.0.0.2, 00:12:57, Serial2/0
O    30.0.0.0/8 [110/128] via 40.0.0.1, 00:14:07, Serial3/0
C    40.0.0.0/8 is directly connected, Serial3/0
C    50.0.0.0/8 is directly connected, Serial2/0
O    100.0.0.0/8 [110/129] via 50.0.0.2, 00:12:57, Serial2/0
O    101.0.0.0/8 [110/129] via 40.0.0.1, 00:14:07, Serial3/0
O    102.0.0.0/8 [110/65] via 40.0.0.1, 00:14:07, Serial3/0
C    103.0.0.0/8 is directly connected, FastEthernet0/0
O    104.0.0.0/8 [110/65] via 50.0.0.2, 00:12:57, Serial2/0
```

Router 5

```
Router(config-router)#do sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     1.0.0.0/32 is subnetted, 1 subnets
O       1.1.1.1 [110/65] via 10.0.0.2, 00:08:23, Serial2/0
     2.0.0.0/32 is subnetted, 1 subnets
O       2.2.2.2 [110/129] via 10.0.0.2, 00:06:01, Serial2/0
     3.0.0.0/32 is subnetted, 1 subnets
O       3.3.3.3 [110/129] via 50.0.0.1, 00:05:33, Serial3/0
     4.0.0.0/32 is subnetted, 1 subnets
O       4.4.4.4 [110/65] via 50.0.0.1, 00:05:02, Serial3/0
     5.0.0.0/32 is subnetted, 1 subnets
C       5.5.5.5 is directly connected, Loopback1
C    10.0.0.0/8 is directly connected, Serial2/0
O    20.0.0.0/8 [110/128] via 10.0.0.2, 00:14:00, Serial2/0
O    30.0.0.0/8 [110/192] via 50.0.0.1, 00:14:00, Serial3/0
                [110/192] via 10.0.0.2, 00:14:00, Serial2/0
O    40.0.0.0/8 [110/128] via 50.0.0.1, 00:14:00, Serial3/0
C    50.0.0.0/8 is directly connected, Serial3/0
O    100.0.0.0/8 [110/65] via 10.0.0.2, 00:14:00, Serial2/0
O    101.0.0.0/8 [110/129] via 10.0.0.2, 00:14:00, Serial2/0
O    102.0.0.0/8 [110/129] via 50.0.0.1, 00:14:00, Serial3/0
O    103.0.0.0/8 [110/65] via 50.0.0.1, 00:14:00, Serial3/0
C    104.0.0.0/8 is directly connected, FastEthernet0/0
```

Practical 3

Configuring IBGP and EBGP Sessions, Local preference and MED



Assigning IP addresses:

Router7:
Router(config)#interface Serial0/3/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router6:
Router(config)#interface Serial0/3/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface Serial0/3/1
Router(config-if)#ip address 11.0.0.1 255.0.0.0
Router(config-if)#no shutdown

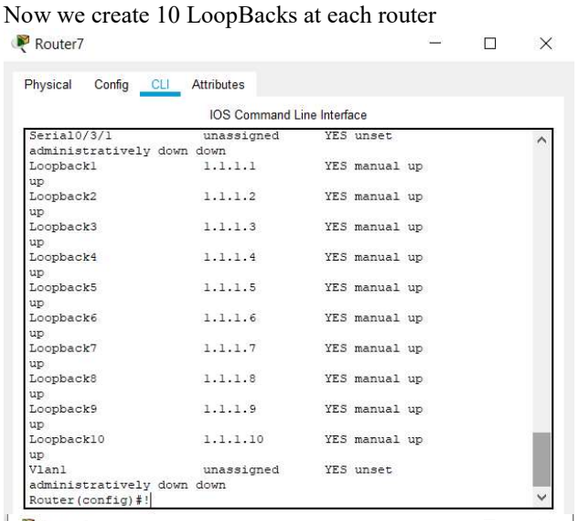
Router8:
Router(config)#interface Serial0/3/1
Router(config-if)#ip address 11.0.0.2 255.0.0.0
Router(config-if)#no shutdown

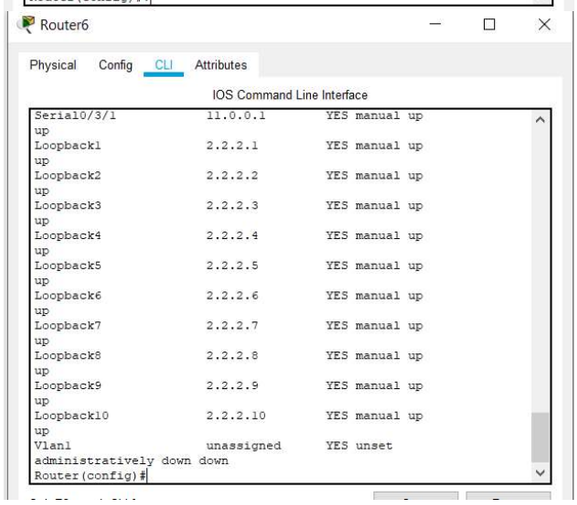
Configuring the routers using Enhanced Interior Gateway Routing (EIGRP) protocol:
Router7:
Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0

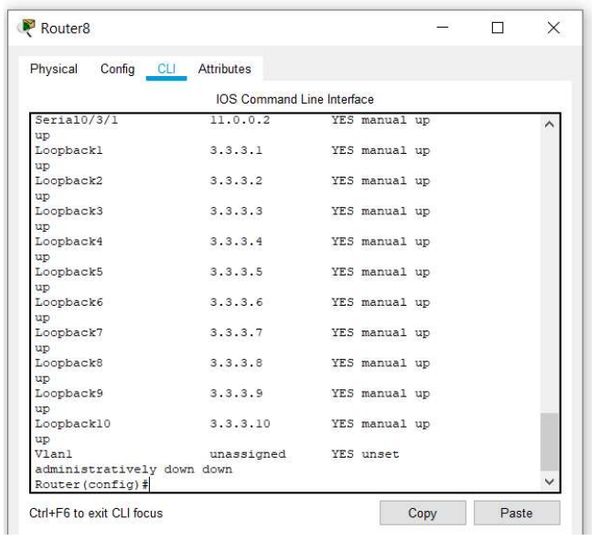
Router6:
Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0
Router(config-router)#network 11.0.0.0

Router8:
Router(config)#router eigrp 1
Router(config-router)#network 11.0.0.0

Now we create 10 LoopBacks at each router







Configuring loopbacks using EIGRP protocol through 0.0.0.0 network:

Router7:
Router(config)#router eigrp 1
Router(config-router)#network 0.0.0.0

Router6:
Router(config)#router eigrp 1
Router(config-router)#network 0.0.0.0

Router8:
Router(config)#router eigrp 1
Router(config-router)#network 0.0.0.0

Practical 4

Secure the Management Plane

Secure plane:

We AAA model to assign security to the plane.

```
Router(config)#username admin password 123456
Router(config)#aaa new-model
Router(config)#aaa authentication login default local
```

```
User Access Verification

Username: admin
Password:
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/
Z.
Router(config)#
```

Telnet:

Telnet is a protocol used to virtually access the network

```
Router(config)#username admin password 123456
Router(config)#aaa new-model
Router(config)#aaa authentication login default local
Router(config)#
Router(config)#line vty 0 15
Router(config-line)#ex
```

```
User Access Verification

Username: admin
Password:
Router>en
Password:
Router#conf t
Enter configuration commands, one per line.  End with CNTL/
Z.
Router(config)#
```

Laptop50

Physical Config Desktop Programming Attributes

Command Prompt

```
User Access Verification

Username: admin
Password:
Router>en
Password:
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#do sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/3/0
L       10.0.0.2/32 is directly connected, Serial0/3/0
     11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       11.0.0.0/8 is directly connected, Serial0/3/1
L       11.0.0.1/32 is directly connected, Serial0/3/1
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0
L       192.168.2.3/32 is directly connected, GigabitEthernet0/0

Router(config)#
```

SSH service

SSH is a protocol that provides authentication and encrypts connection between two network end points.

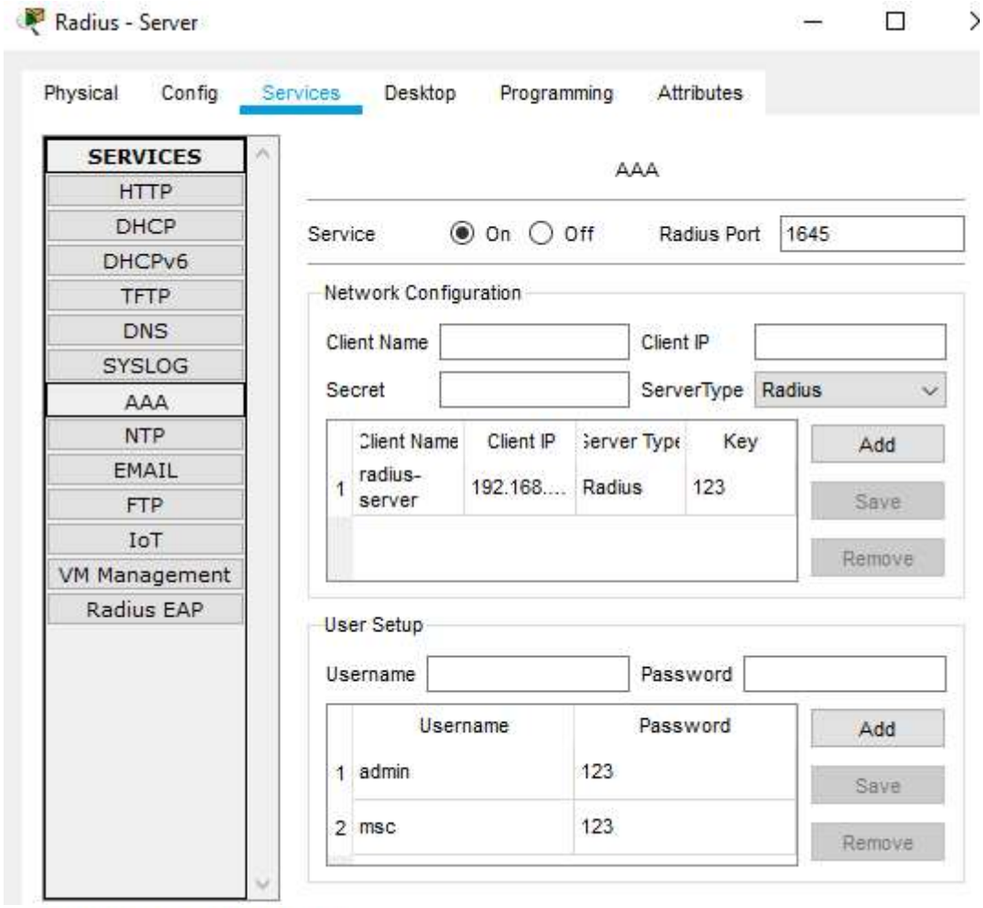
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname ssh-service
ssh-service(config)#ip domain name abcd.com
ssh-service(config)#cry
ssh-service(config)#crypto key generate rsa
The name for the keys will be: ssh-service.abcd.com
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]:
% Generating 512 bit RSA keys, keys will be non-exportable...[OK]

ssh-service(config)#
*Mar 1 0:43:37.47: RSA key size needs to be at least 768 bits for ssh version 2
*Mar 1 0:43:37.47: %SSH-5-ENABLED: SSH 1.5 has been enabled
ssh-service(config)#
ssh-service(config)#
ssh-service(config)#

ssh-service(config)#
ssh-service(config)#username admin password 123456
ssh-service(config)#aaa new-model
ssh-service(config)#aaa authentication login default local
ssh-service(config)#
ssh-service(config)#line vty 0 15
ssh-service(config-line)#tr
ssh-service(config-line)#transport input ssh
ssh-service(config-line)#
ssh-service(config-line)#
```

```
User Access Verification

Username: admin
Password:
ssh-service>en
ssh-service#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ssh-service(config)#
```

Command Prompt

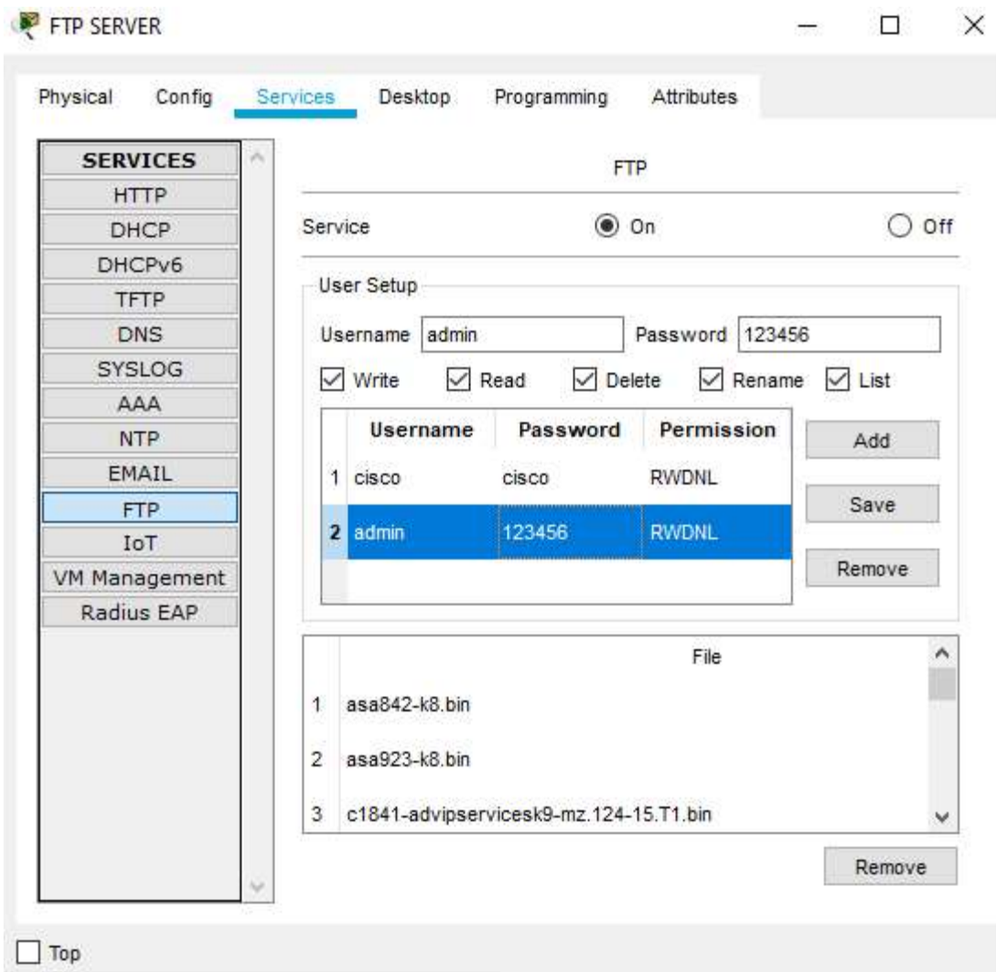
```
Packet Tracer PC Command Line 1.0
C:\>ssh -l admin 192.168.3.3

Password:
ssh-service>en
% No password set.
ssh-service>en
Password:
ssh-service#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ssh-service(config)#do sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       11.0.0.0/8 is directly connected, Serial0/3/1
L       11.0.0.2/32 is directly connected, Serial0/3/1
     12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       12.0.0.0/8 is directly connected, Serial0/3/0
L       12.0.0.1/32 is directly connected, Serial0/3/0
     192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, GigabitEthernet0/0
L       192.168.3.3/32 is directly connected, GigabitEthernet0/0

ssh-service(config)#
```

Radius server



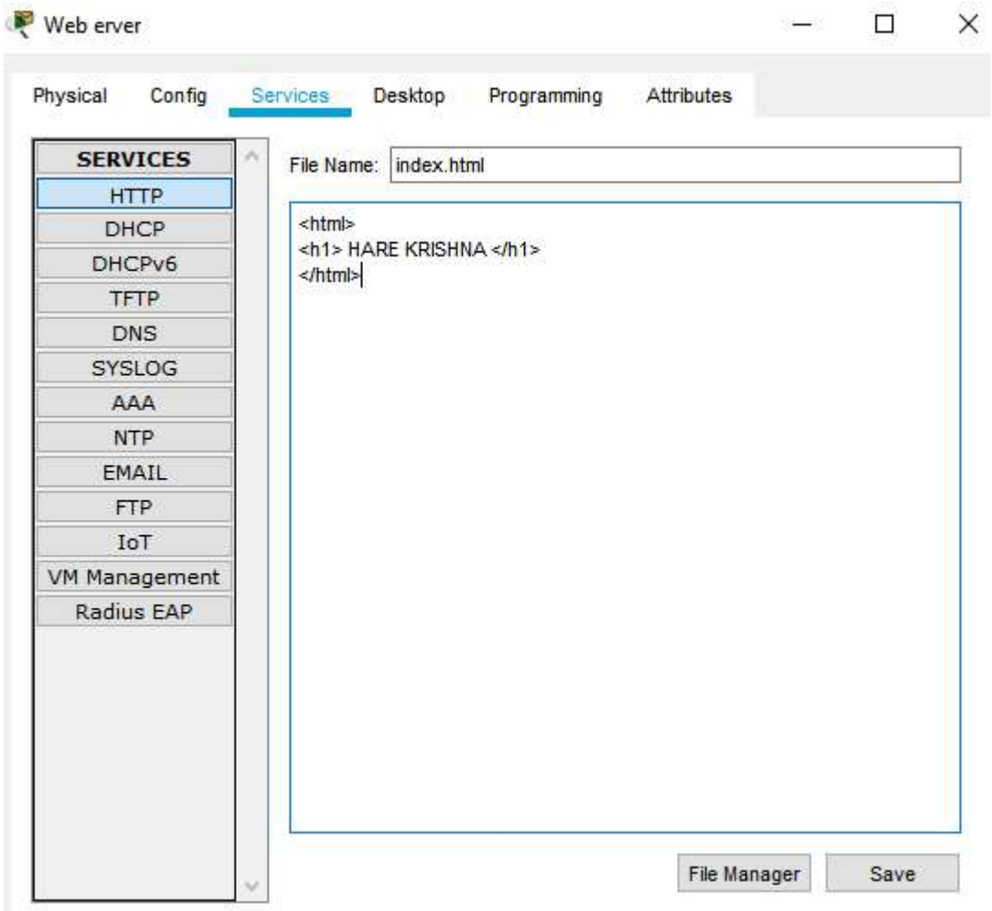

```
User Access Verification

Username: admin
Password:
radius-server>en
radius-server#ex

User Access Verification

Username: msc
Password:
radius-server>en
radius-server#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
radius-server(config)#
```

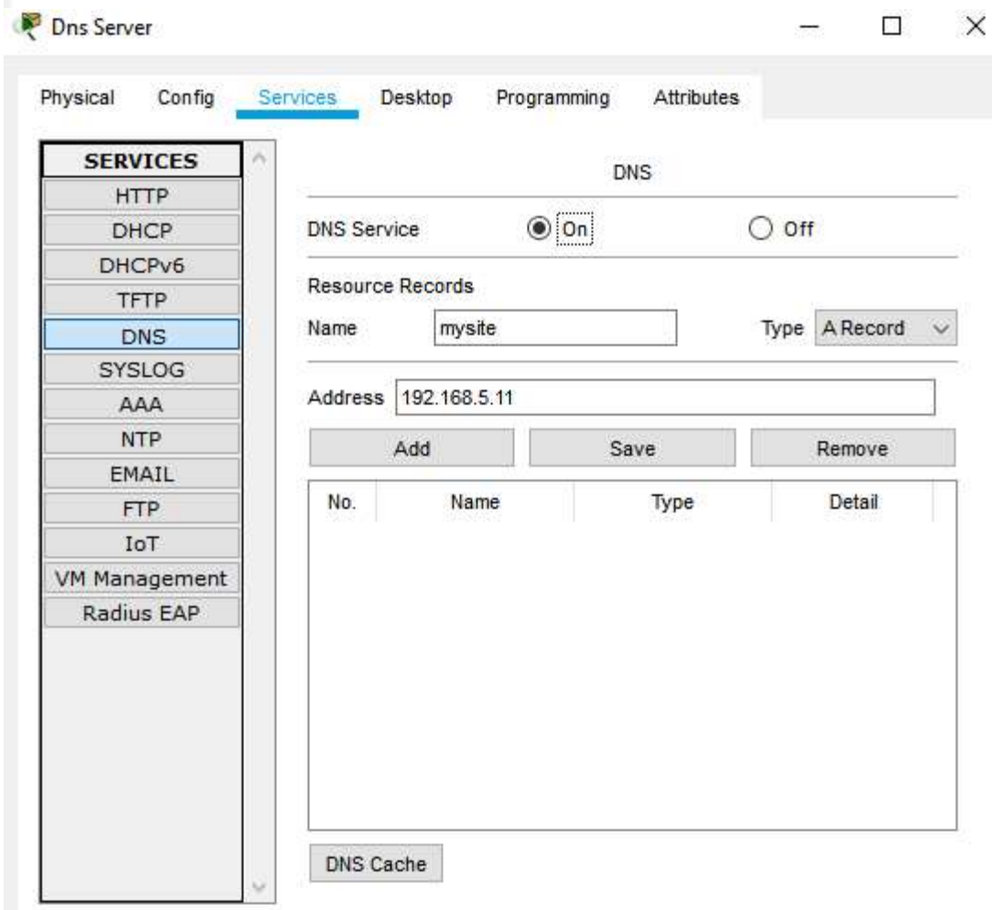
FTP SERVER

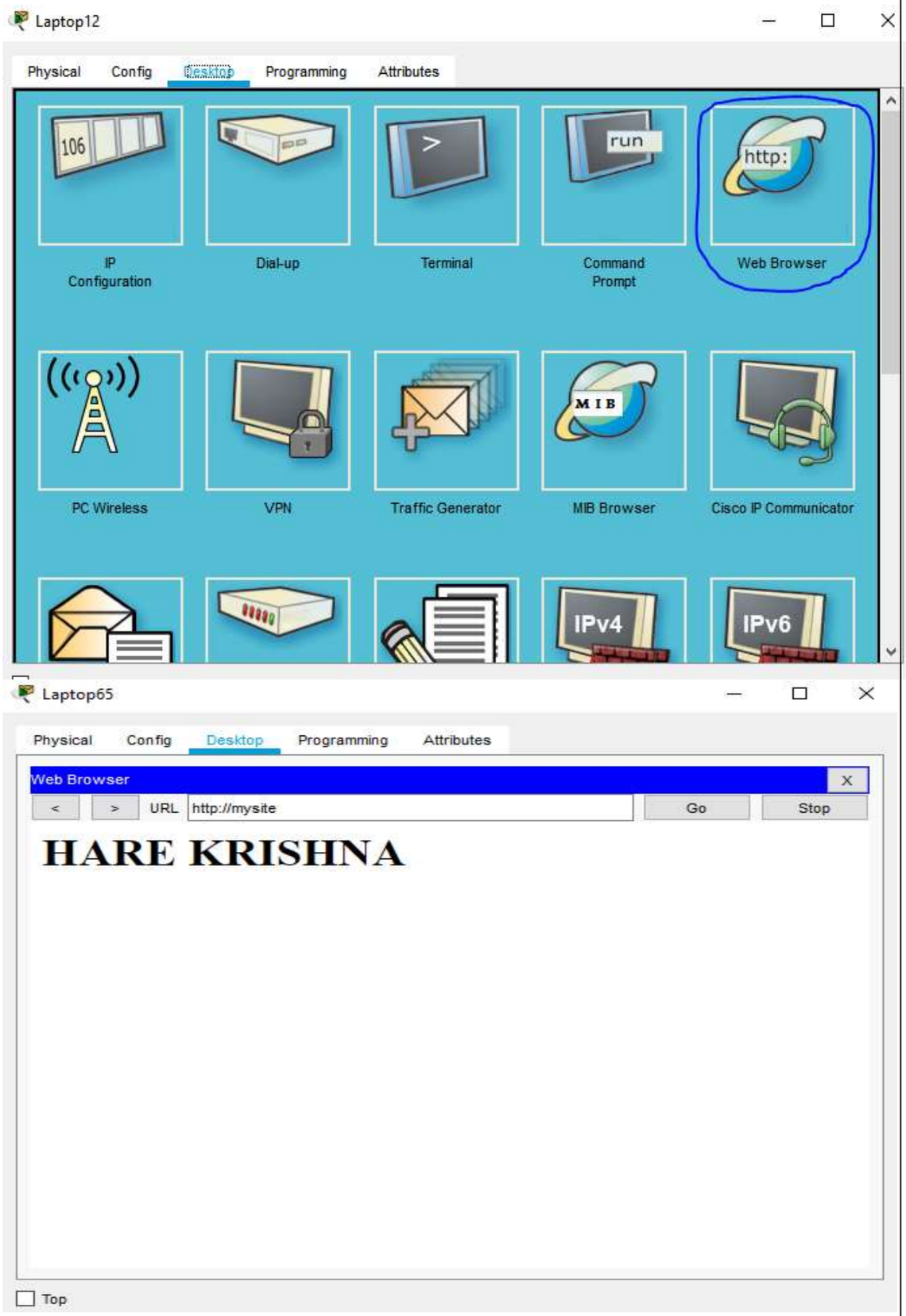



```
C:\>ftp 192.168.3.10
Trying to connect...192.168.3.10
Connected to 192.168.3.10
220- Welcome to PT Ftp server
Username:admin
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>
ftp>
ftp>
```

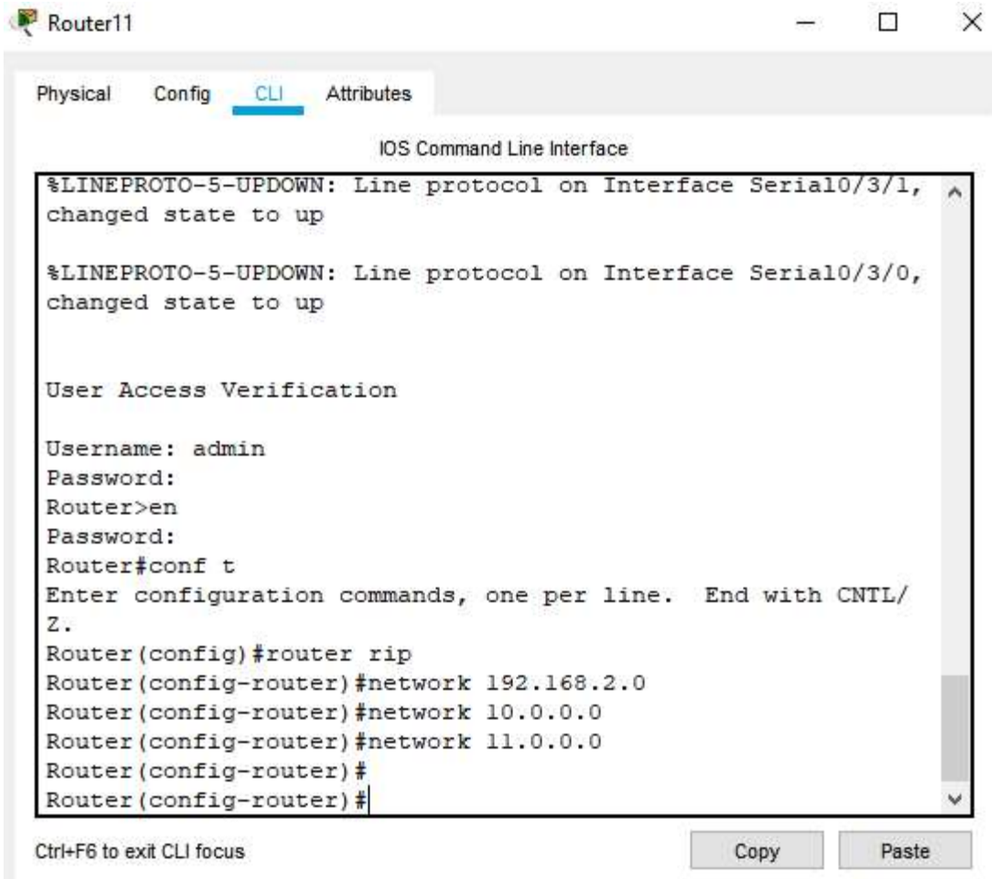
Web server and DNS server


Web erver
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
File Name:
index.html
<html>
<h1> HARE KRISHNA </h1>
</html>
File Manager
Save

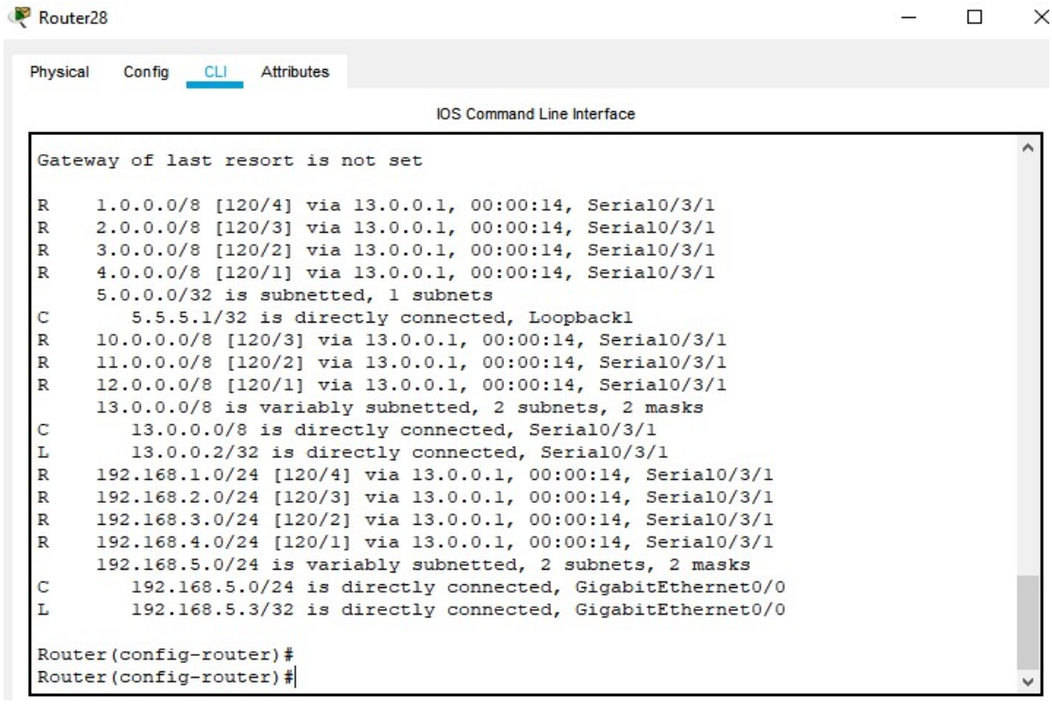

Dns Server
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DNS
DNS Service
On
Off
Resource Records
Name
mysite
Type
A Record
Address
192.168.5.11
Add
Save
Remove
No.
Name
Type
Detail
DNS Cache



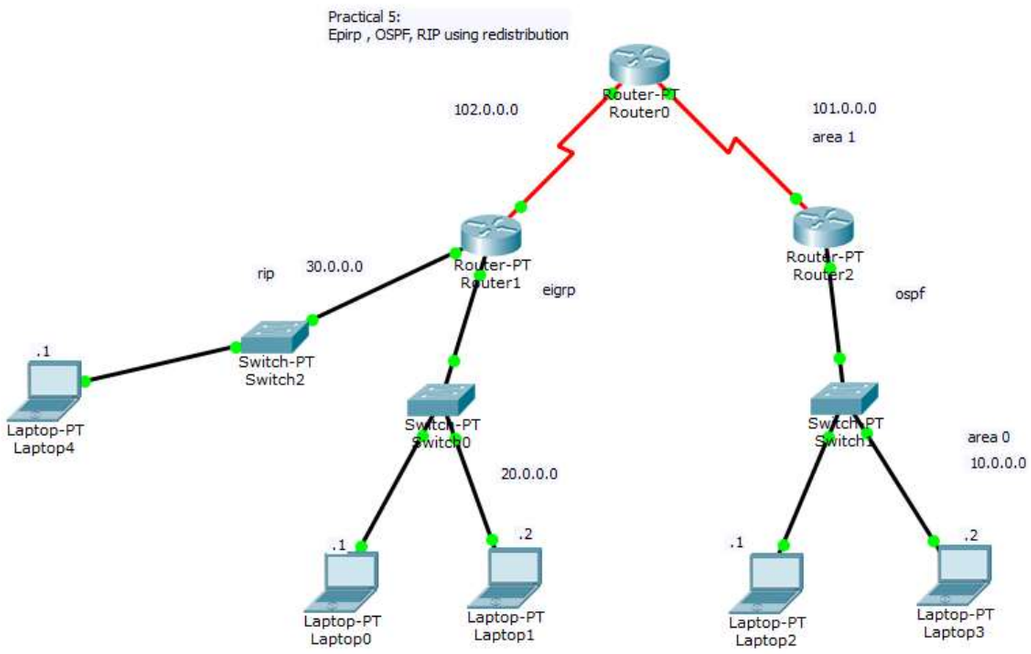
RIP Protocol configuration with loopback interfaces
Follow this same procedure in all the routers.




```
Router(config-if)#ip address 1.1.1.1 255.255.255.255
Router(config-if)#
Router(config-if)#router rip
Router(config-router)#network 1.1.1.0
Router(config-router)#

Router(config-router)#
Router(config-router)#do sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     192.168.5.3     YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Serial0/3/0            unassigned      YES unset  administratively down down
Serial0/3/1            13.0.0.2        YES manual up                    up
Loopback1              5.5.5.1         YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
Router(config-router)#
```



Practical 5
Configure and Verify Path Control using PBR



Commands

Configuring Network 10.0.0.0
Router 1
Router(config)#interface FastEthernet0/0
Router(config-if)# ip address 10.0.0.3 255.0.0.0

Configuring Network 20.0.0.0
Router 2
Router(config)#interface FastEthernet0/0
Router(config-if)# ip address 20.0.0.3 255.0.0.0

Configuring Network 30.0.0.0
Router 2
Router(config)#interface FastEthernet0/1
Router(config-if)# ip address 30.0.0.3 255.0.0.0

Configuring Network 101.0.0.0
Main Router
Router(config)#interface Serial2/0
Router(config-if)#ip address 101.0.0.1 255.0.0.0

Router 1
Router(config)#interface Serial2/0
Router(config-if)#ip address 101.0.0.2 255.0.0.0

Configuring Network 102.0.0.0
Main Router
Router(config)#interface Serial3/0
Router(config-if)#ip address 102.0.0.1 255.0.0.0

Router 2
Router(config)#interface Serial3/0
Router(config-if)#ip address 102.0.0.2 255.0.0.0

OSPF
Router 1
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 101.0.0.0 0.255.255.255 area 1

Router 2
Router(config)#int lo 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ip address 1.1.1.1 255.255.255.255

EIGRP
Router(config)#route eigrp 1
Router(config-router)#network 20.0.0.0
Router(config-router)#network 102.0.0.0
Router(config-router)#network 1.1.1.0

OSPF and EIGRP on Router0
Router(config-router)#router ospf 1
Router(config-router)#net
Router(config-router)#network 101.0.0.0 0.255.255.255 area 1

Router(config)#router eigrp 1
Router(config-router)#network 102.0.0.0

Redistribute
Router(config)#route eigrp 1
Router(config-router)#redistribute ospf 1 metric 1 1 255 255 1

Router(config-router)#redistribute ospf 1 metric 1 1 255 255 1
Router(config-router)#redistribute eigrp 1 subnets tag 1

RIP
Router 2
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 102.0.0.0

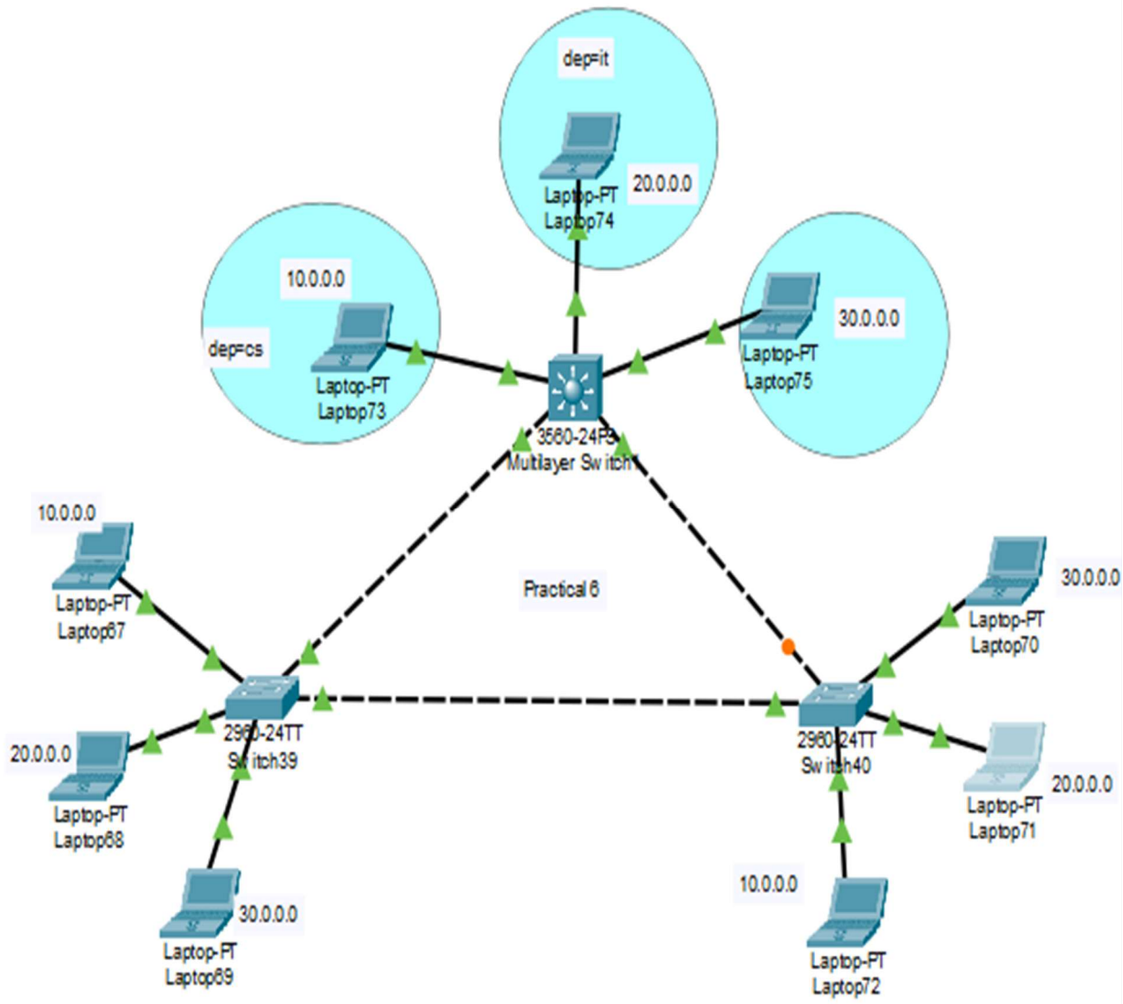
RIP on Router0
Router(config)#router rip
Router(config-router)#network 102.0.0.0

Redistribute
Router(config)#router rip
Router(config-router)#redistribute ospf 1 metric 1 match nssa-external 1 nssa-external 2

Router(config)#router ospf 1
Router(config-router)#redistribute rip subnets tag 1

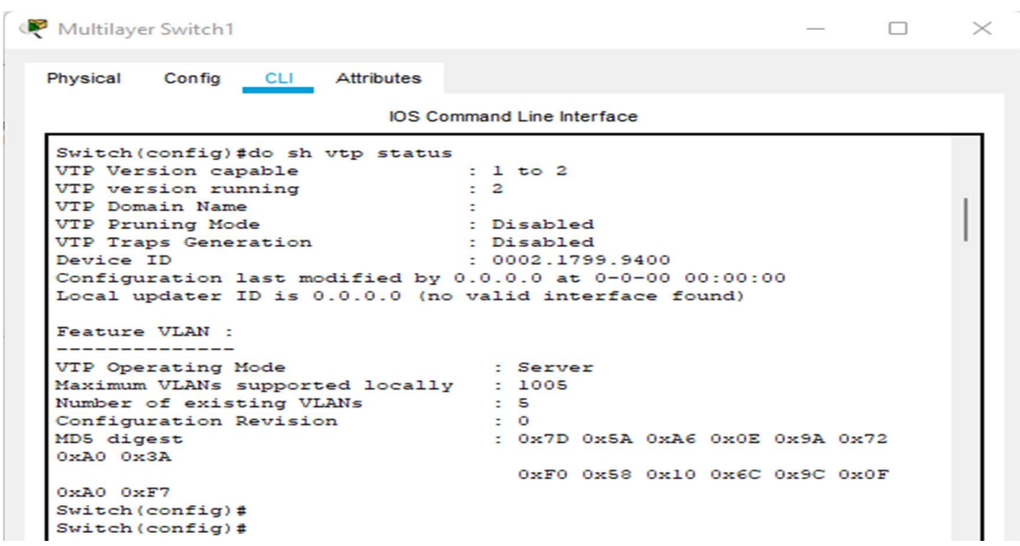
Practical 6:

IP Service Level Agreements and Remote SPAN in a Campus Environment



Multilayer Switch:

We assign the the domain name and Create VLANs.



Create vlan in Multilayered Switch:

```
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#
Switch(config-vlan)#do sh vtp status
VTP Version capable             : 1 to 2
VTP version running             : 2
VTP Domain Name                 : abcd.com
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 000A.F3AE.5400
Configuration last modified by 0.0.0.0 at 3-1-93 00:01:29
Local updater ID is 0.0.0.0 (no valid interface found)

Feature VLAN :
--------------
VTP Operating Mode                : Server
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 8
Configuration Revision            : 6
MD5 digest                        : 0xCE 0x84 0x3E 0x9A 0x6D 0x54
0xF0 0xD5
                                    0x87 0xBA 0xCD 0x7D 0xD8 0xB2
0xF8 0x2E
Switch(config-vlan)#
```

Ctrl+F6 to exit CLI focus Copy Paste

Multilayer Switch1

Physical Config CLI Attributes

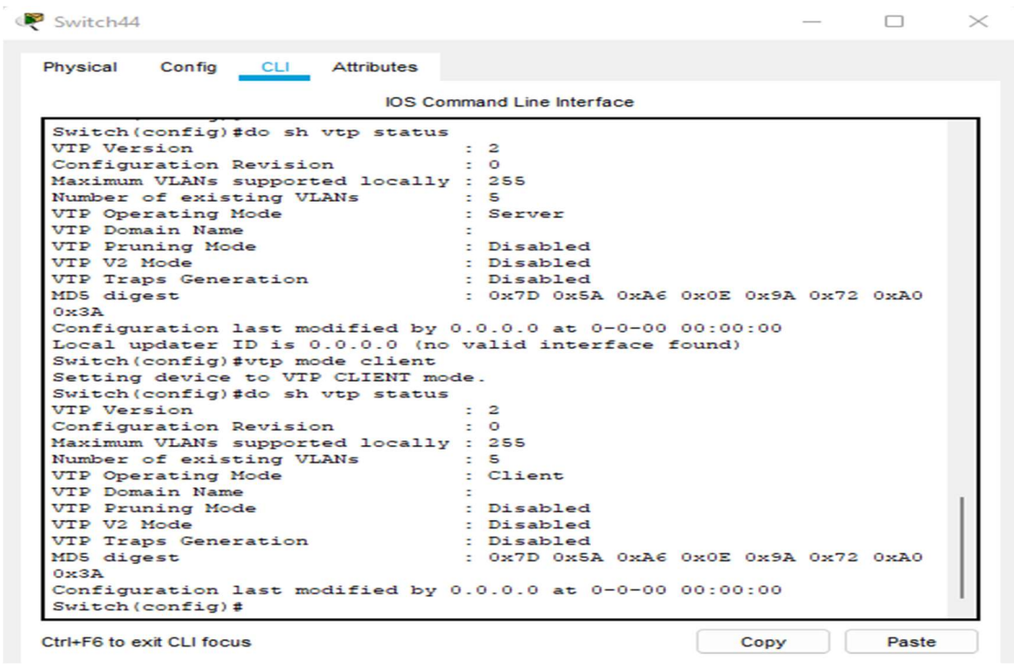
IOS Command Line Interface

```
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#
Switch#en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int fa0/3
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/5
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    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   cs                                active    Fa0/3
20   it                                active    Fa0/4
30   maths                             active    Fa0/5
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch(config-if)#
```

Ctrl+F6 to exit CLI focus Copy Paste

Switch Configuration:

WE change the mode to client and trunk the interfaces.




```
Switch(config)#int range fa0/1-2
Switch(config-if-range)#vtp mode trunk
                       ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#sw
Switch(config-if-range)#switchport mod
Switch(config-if-range)#switchport mode trunk


Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to up

Switch(config-if-range)#
```

```
Switch(config)#
Switch(config)#
Switch(config)#int fa0/3
Switch(config-if)#sw
Switch(config-if)#switchport ac
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/5
Switch(config-if)#switchport access vlan 30
Switch(config-if)#
```

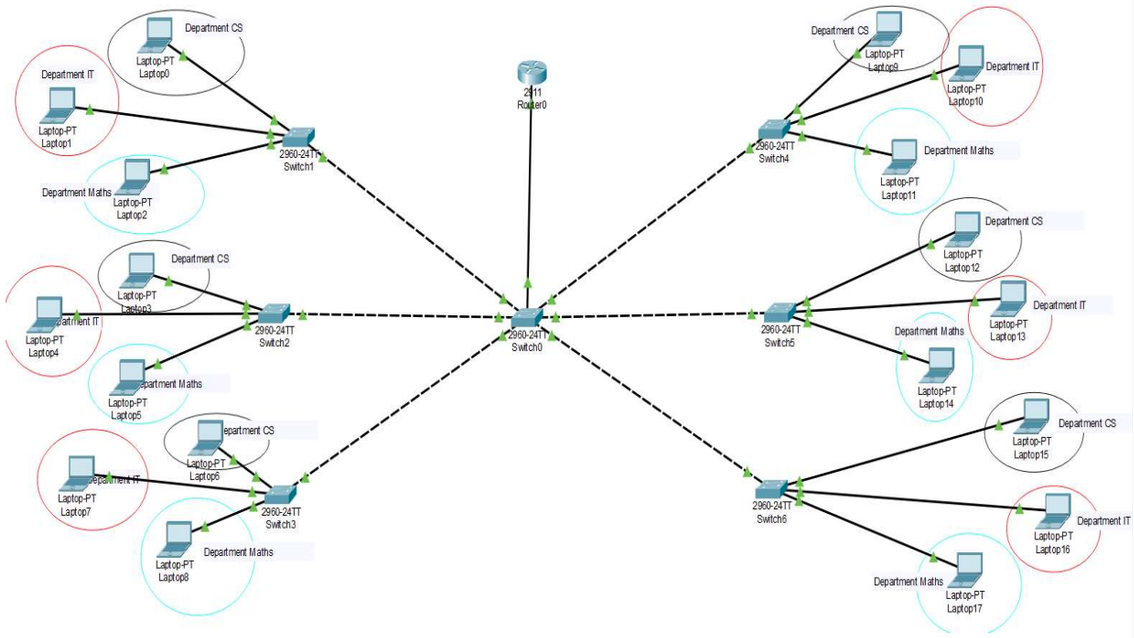
Ctrl+F6 to exit CLI focus | Copy | Paste

IOS Command Line Interface

```
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#do sh vtp status
VTP Version : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 5
VTP Operating Mode : Client
VTP Domain Name : abcd.com
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x3C 0x16 0xC6 0x3A 0x95 0xFA 0x9F
0x58
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
```

Practical No. 7
Inter-VLAN Routing

Topology Network :



Addressing Table

Device	IP address	Gateway
Laptop0	**10.0.0.1**	**10.0.0.3**
Laptop1	**20.0.0.1**	**20.0.0.3**
Laptop2	**30.0.0.1**	**30.0.0.3**
Laptop3	**10.0.0.2**	**10.0.0.3**
Laptop4	**20.0.0.2**	**20.0.0.3**
Laptop5	**30.0.0.2**	**30.0.0.3**
Laptop6	**10.0.0.4**	**10.0.0.3**
Laptop7	**20.0.0.4**	**20.0.0.3**
Laptop8	**30.0.0.4**	**30.0.0.3**
Laptop9	**10.0.0.5**	**10.0.0.3**
Laptop10	**20.0.0.5**	**20.0.0.3**
Laptop11	**30.0.0.5**	**30.0.0.3**
Laptop12	**10.0.0.6**	**10.0.0.3**
Laptop13	**20.0.0.6**	**20.0.0.3**
Laptop14	**30.0.0.6**	**30.0.0.3**
Laptop15	**10.0.0.7**	**10.0.0.3**
Laptop16	**20.0.0.7**	**20.0.0.3**
Laptop17	**30.0.0.7**	**30.0.0.3**

In each switch of the above topology of network, we assign VLAN 10, VLAN 20, and VLAN 30 given the names cs, it, maths simultaneously. After creating the VLANs We give access of VLANs to particular interfaces.

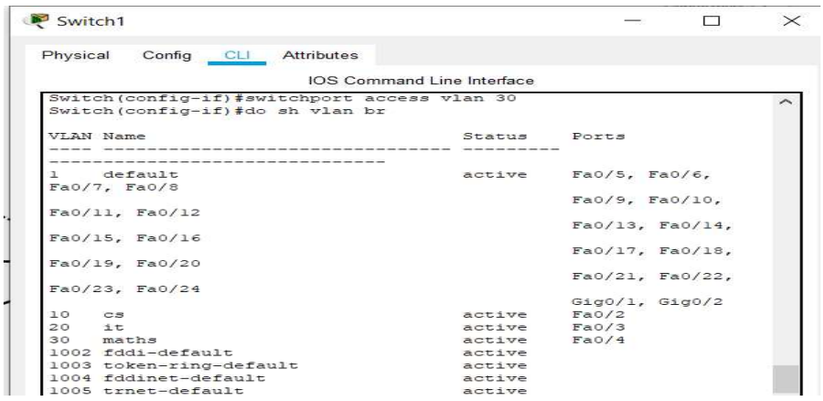
Switch1:

Creating VLANs for Switch-

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it

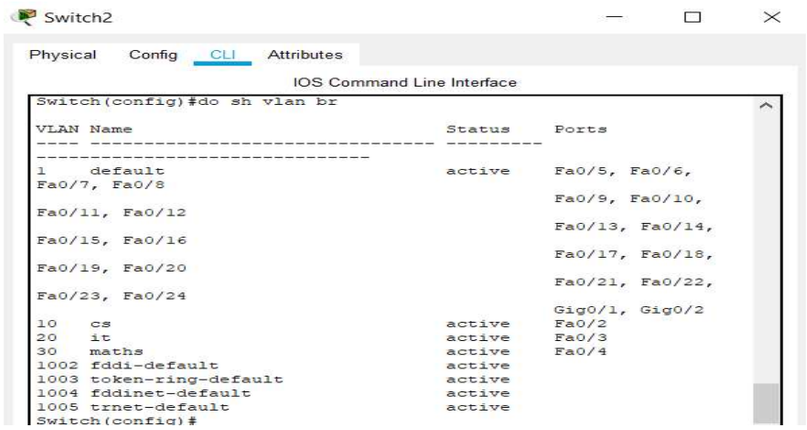
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#

Accessing VLANs through interfaces-
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br



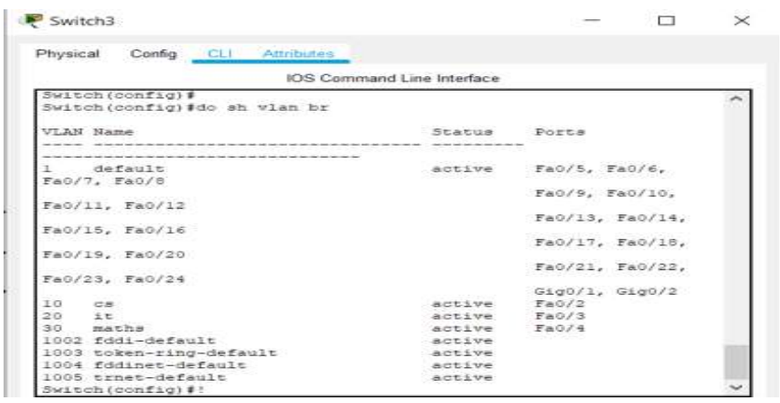
Switch2:
Creating VLANs for Switch-
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#

Accessing VLANs through interfaces-
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br



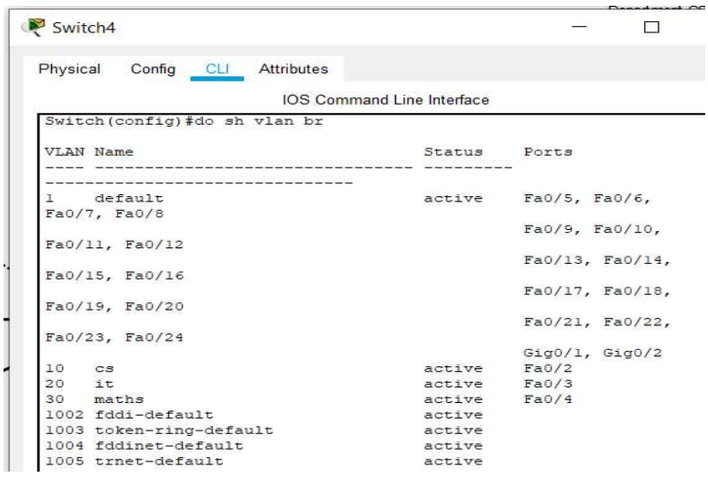
Switch3:
Creating VLANs for Switch-
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#

Accessing VLANs through interfaces-
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br



Switch4:
Creating VLANs for Switch-
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#

Accessing VLANs through interfaces-
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br



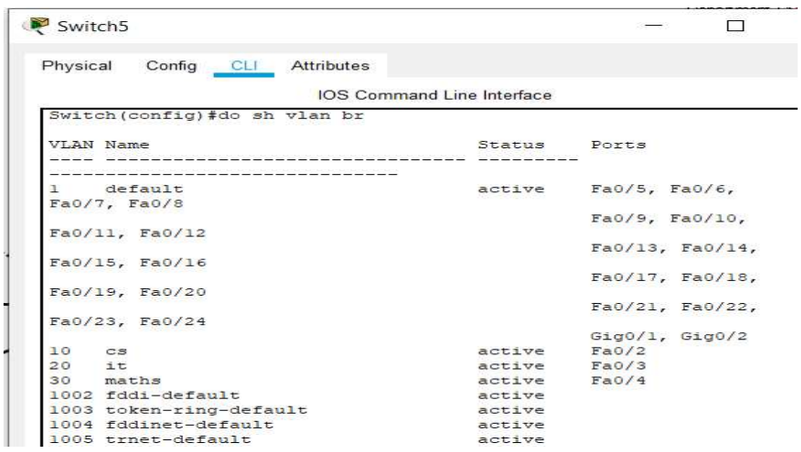
Switch5:

Creating VLANs for Switch-

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#

Accessing VLANs through interfaces-

Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br



Switch6:

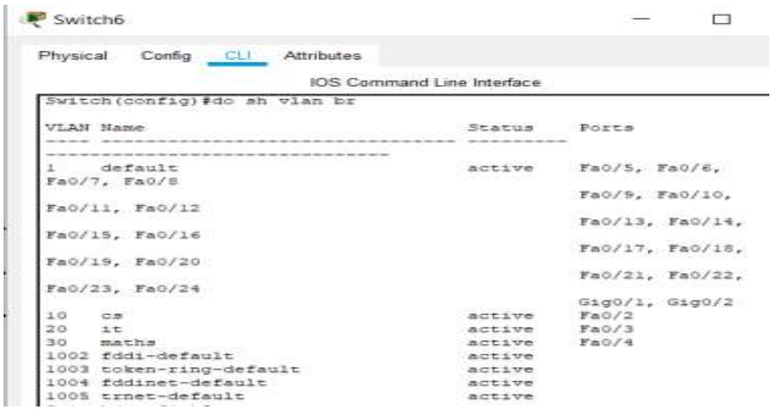
Creating VLANs for Switch1-

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com

```
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#
```

Accessing VLANs through interfaces-

```
Switch(config)#int fa0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport access vlan 30
Switch(config-if)#do sh vlan br
```



At the Switch present at the centre of the topology I.e. Switch0 we create the VLANs. The ports of the network are then trunk.

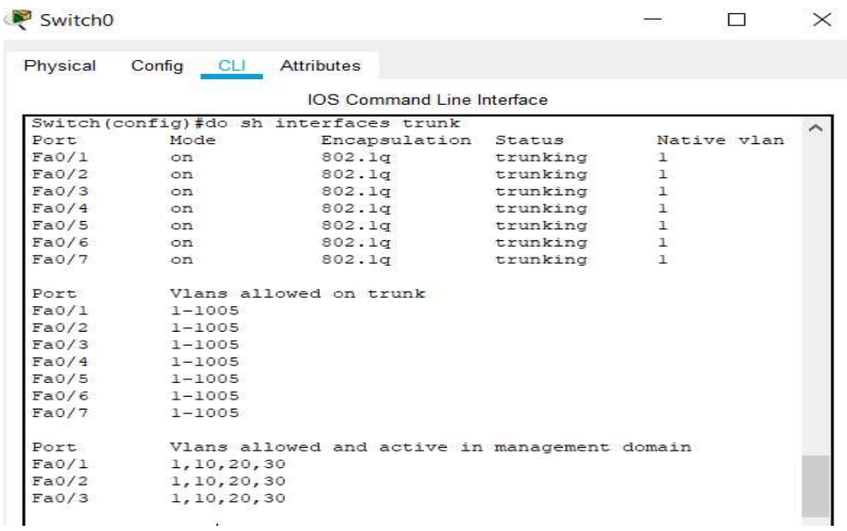
Switch0:

Creating VLANs for Switch-

```
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain abcd.com
Changing VTP domain name from NULL to abcd.com
Switch(config)#vlan 10
Switch(config-vlan)#name cs
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name it
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name maths
Switch(config-vlan)#
```

Trunking the the Ports :-

```
Switch(config)#int range fa0/1-7
Switch(config-if-range)#switchport mode trunk
Switch(config-if-range)#do sh interfaces trunk
```



Using Encapsulation method:-

Router0
Router(config)#int gig0/0.10
Router(config-subif)#int gig0/0.20
Router(config-subif)#ip address 10.0.0.3 255.0.0.0
Router(config-subif)#int gig0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 20.0.0.3 255.0.0.0
Router(config-subif)#int gig0/0.30
Router(config-subif)#encapsulation dot1Q 30
Router(config-subif)#ip address 30.0.0.3 255.0.0.0

```
Router(config)#do sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, GigabitEthernet0/0.10
L       10.0.0.3/32 is directly connected, GigabitEthernet0/0.10
     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.0.0.0/8 is directly connected, GigabitEthernet0/0.20
L       20.0.0.3/32 is directly connected, GigabitEthernet0/0.20
     30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, GigabitEthernet0/0.30
L       30.0.0.3/32 is directly connected, GigabitEthernet0/0.30

Router(config)#do ip sh int br
ip sh int br
   ^
% Invalid input detected at '^' marker.

Router(config)#do sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.10  10.0.0.3        YES manual up                    up
GigabitEthernet0/0.20  20.0.0.3        YES manual up                    up
GigabitEthernet0/0.30  30.0.0.3        YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
Router(config)#!
```