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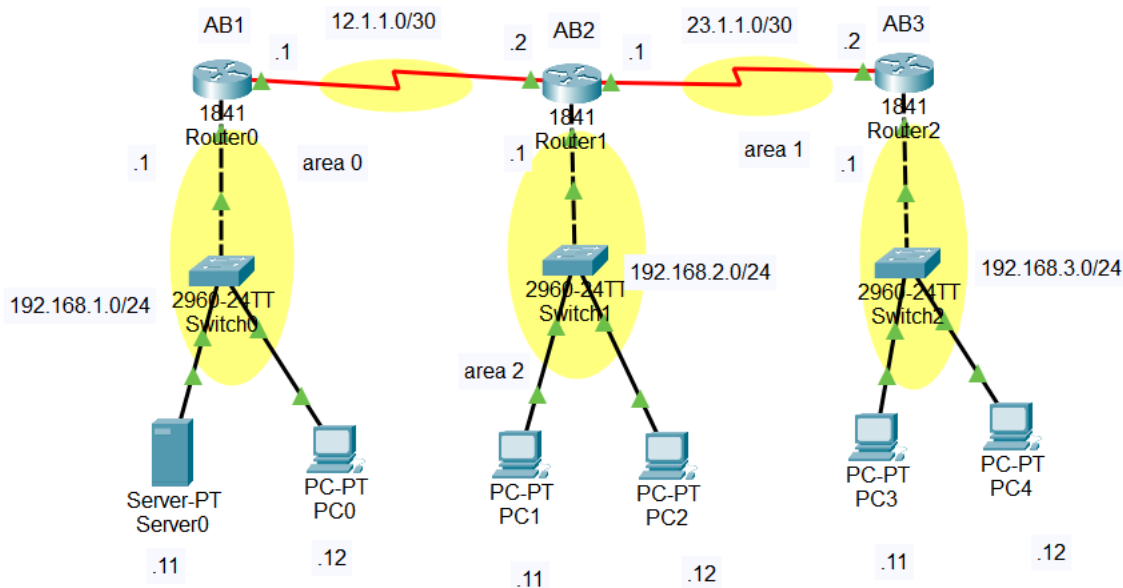
IP LAB – 4

Configuring Routing using RIP and OSPF

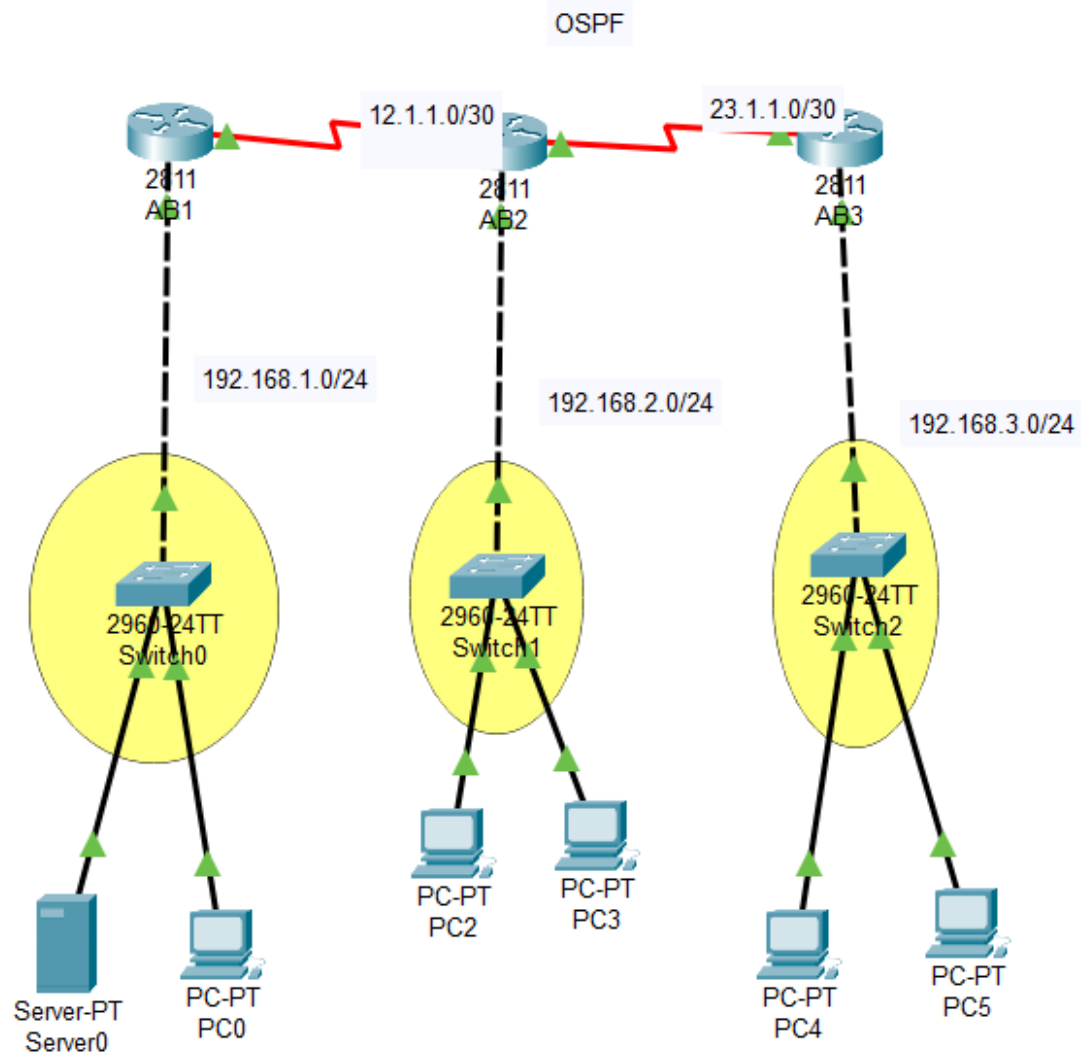## Configuring Routing using RIP and OSPF

Refer the image attached for the network architecture. And Use RIP and OSPF to configure the routing. All end devices should communicate with each other. Analyze the packets using simulation mode. This will be considered as the result.

Steps

☐ Examine the Image: Carefully analyse the provided image of the network.

☐ Device Identification: Recognize and identify each device in the network, such as routers, switches, servers, and computers. Pay attention to their placement and how they are connected in the image.

☐ Assemble Equipment: Gather the required equipment, including routers, switches, and cables, to replicate the network setup.

☐ Assign IP Addresses: Refer to the LANs shown in the diagram and assign IP addresses and subnet masks accordingly.

☐ Set Up the Devices: Position the devices according to their locations in the image. Ensure they are powered on and prepared for connection.

☐ Connect the Devices: Start linking the devices according to the mapped connections identified earlier.

☐ Check Connectivity: After setting up the network, test the connectivity between the devices to ensure data transmission is func

OSPF

12.1.1.0/30   23.1.1.0/30

2811   2811   2811
AB1   AB2   AB3

192.168.1.0/24
                    192.168.2.0/24
                                        192.168.3.0/24

2960-24TT   2960-24TT   2960-24TT
Switch0   Switch1   Switch2

PC-PT   PC-PT
PC2   PC3

PC-PT   PC-PT
Server-PT   PC0   PC4   PC5
Server0   PC-PT

PC-PT
PC4

tioning correctly.

☐ Network Documentation: Record the details of the network setup, including the devices used, their connections, and any additional specifics. This documentation will be useful for future maintenance or modifications.

DOCUMENTATION:

☐ The network consists of three routers. These routers communicate using a /30 network, while /24 networks are utilized for their internal connections. The 192.168.1.0/24 network and 12.1.1.0/30 network belong to area 0. The 192.168.3.0/24 network and 231.1.0/30 network are in area 1. The 192.168.2.0/24 network is part of area 2.

☐ In total, the network includes 3 routers, 3 switches, 5 PCs, and 1 server.

☐ Now, let's gather all the necessary equipment and connect everything together. The final network setup is illustrated below:

Configuration

1. Router 1.

```
interface FastEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/3/1
 ip address 12.1.1.1 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 192.168.1.0 0.0.0.255 area 0
 network 12.1.1.0 0.0.0.3 area 0
```

2. Router 2

```
interface FastEthernet0/0
 ip address 192.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 ip address 23.1.1.2 255.255.255.252
!
interface Serial0/3/1
 ip address 12.1.1.2 255.255.255.252
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 12.1.1.0 0.0.0.3 area 0
 network 192.168.2.0 0.0.0.255 area 1
 network 23.1.1.0 0.0.0.3 area 3
!
```

3. Router 3

```
interface FastEthernet0/0
 ip address 192.168.3.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 ip address 23.1.1.1 255.255.255.252
 clock rate 2000000
!
interface Serial0/3/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 23.1.1.0 0.0.0.3 area 3
 network 192.168.3.0 0.0.0.255 area 3
!
```

4. This should enable OSPF between all the routers.

```
Gateway of last resort is not set

      12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
:        12.1.1.0/30 is directly connected, Serial0/3/1
.        12.1.1.2/32 is directly connected, Serial0/3/1
      23.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
:        23.1.1.0/30 is directly connected, Serial0/3/0
.        23.1.1.2/32 is directly connected, Serial0/3/0
)     192.168.1.0/24 [110/65] via 12.1.1.1, 00:11:07, Serial0/3/1
      192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
:        192.168.2.0/24 is directly connected, FastEthernet0/0
.        192.168.2.1/32 is directly connected, FastEthernet0/0
)     192.168.3.0/24 [110/65] via 23.1.1.1, 00:11:02, Serial0/3/0
```

5. Now we assign all the pc's their respective ip addresses and default gateways

6. We Test the connection by pinging the 192.168.3.2 from the 192.168.1.3.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: FE80::290:2BFF:FE22:7733
    IPv6 Address....................: ::
    IPv4 Address....................: 192.168.2.2
    Subnet Mask.....................: 255.255.255.0
    Default Gateway.................: ::
                                      12.1.1.2

Bluetooth Connection:

    Connection-specific DNS Suffix..:
    Link-local IPv6 Address.........: ::
    IPv6 Address....................: ::
    IPv4 Address....................: 0.0.0.0
    Subnet Mask.....................: 0.0.0.0
    Default Gateway.................: ::
                                      0.0.0.0

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=126
Reply from 192.168.3.2: bytes=32 time=11ms TTL=126
Reply from 192.168.3.2: bytes=32 time=12ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 6ms
```
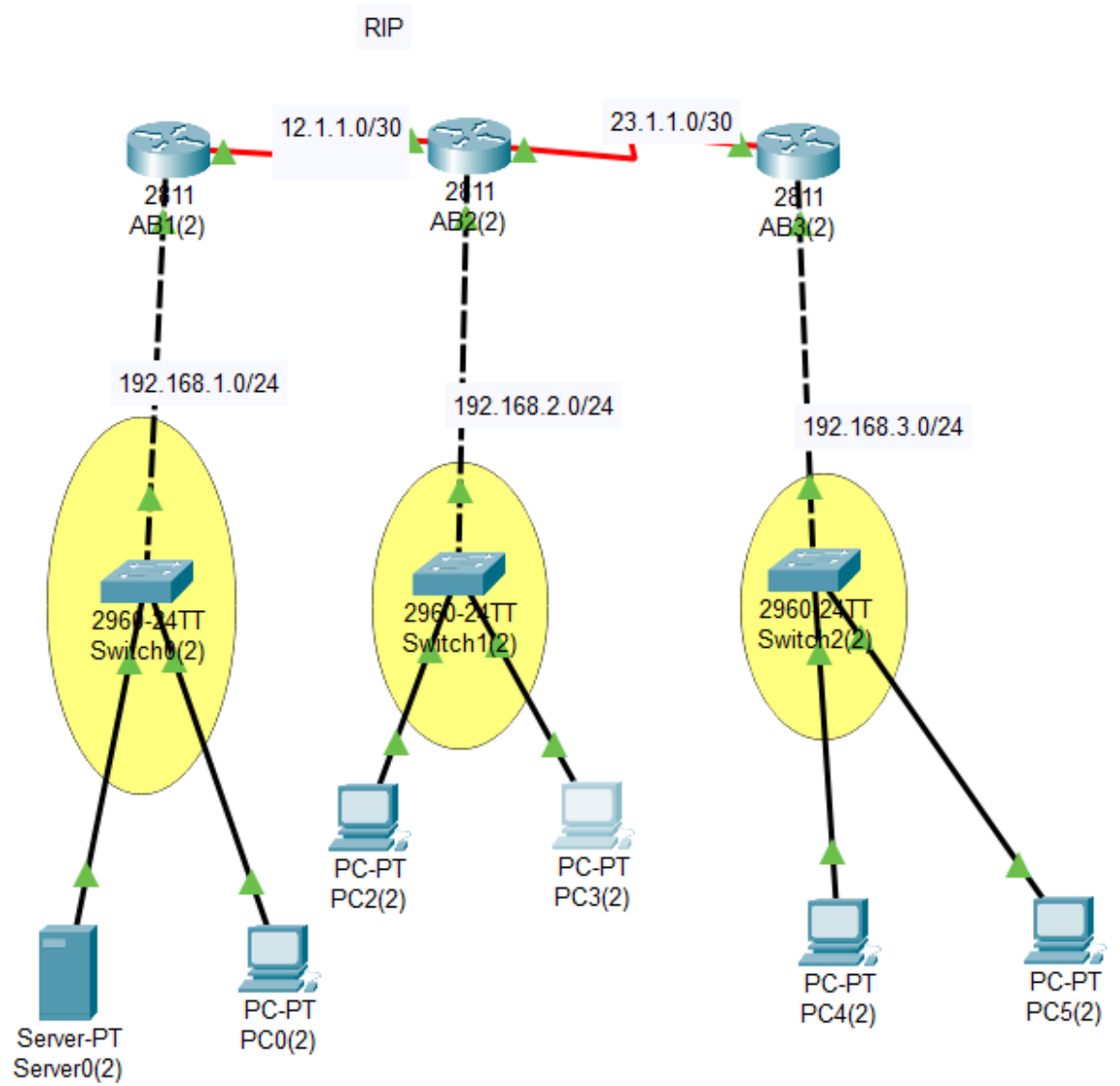
```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=11ms TTL=126
Reply from 192.168.1.3: bytes=32 time=13ms TTL=126
Reply from 192.168.1.3: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 6ms
```

9.Now let us configure, RIP. First we copy and paste the same network as before and use the command "no router ospf 1" on all routers to remove any existing OSPF configurations.

RIP

12.1.1.0/30   23.1.1.0/30

2811   2811   2811
AB1(2)   AB2(2)   AB3(2)

192.168.1.0/24
192.168.2.0/24
192.168.3.0/24

2960-24TT   2960-24TT   2960-24TT
Switch0(2)   Switch1(2)   Switch2(2)

PC-PT   PC-PT
PC2(2)   PC3(2)

PC-PT   PC-PT
PC0(2)   PC4(2)   PC5(2)

Server-PT
Server0(2)

<u>Configuration</u>
7. Router 1.

```
interface FastEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/3/1
 ip address 12.1.1.1 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 network 12.0.0.0
 network 192.168.1.0
!
```

8. Router 2

```
interface FastEthernet0/0
 ip address 192.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 ip address 23.1.1.2 255.255.255.252
!
interface Serial0/3/1
 ip address 12.1.1.2 255.255.255.252
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 network 12.0.0.0
 network 23.0.0.0
 network 192.168.2.0
!
```

9. Router 3

```
interface FastEthernet0/0
 ip address 192.168.3.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/3/0
 ip address 23.1.1.1 255.255.255.252
 clock rate 2000000
!
interface Serial0/3/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 network 23.0.0.0
 network 192.168.3.0
!
```

10. We Test the connection by pinging the 192.168.3.2 from the 192.168.1.3

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: FE80::290:2BFF:FE22:7733
   IPv6 Address....................: ::
   IPv4 Address....................: 192.168.2.2
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: ::
                                     12.1.1.2

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: ::
   IPv6 Address....................: ::
   IPv4 Address....................: 0.0.0.0
   Subnet Mask.....................: 0.0.0.0
   Default Gateway.................: ::
                                     0.0.0.0

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=126
Reply from 192.168.3.2: bytes=32 time=11ms TTL=126
Reply from 192.168.3.2: bytes=32 time=12ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 6ms
```

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=11ms TTL=126
Reply from 192.168.1.3: bytes=32 time=13ms TTL=126
Reply from 192.168.1.3: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 6ms
```

11. We have successfully recreated the network using both OSPF and RIP .