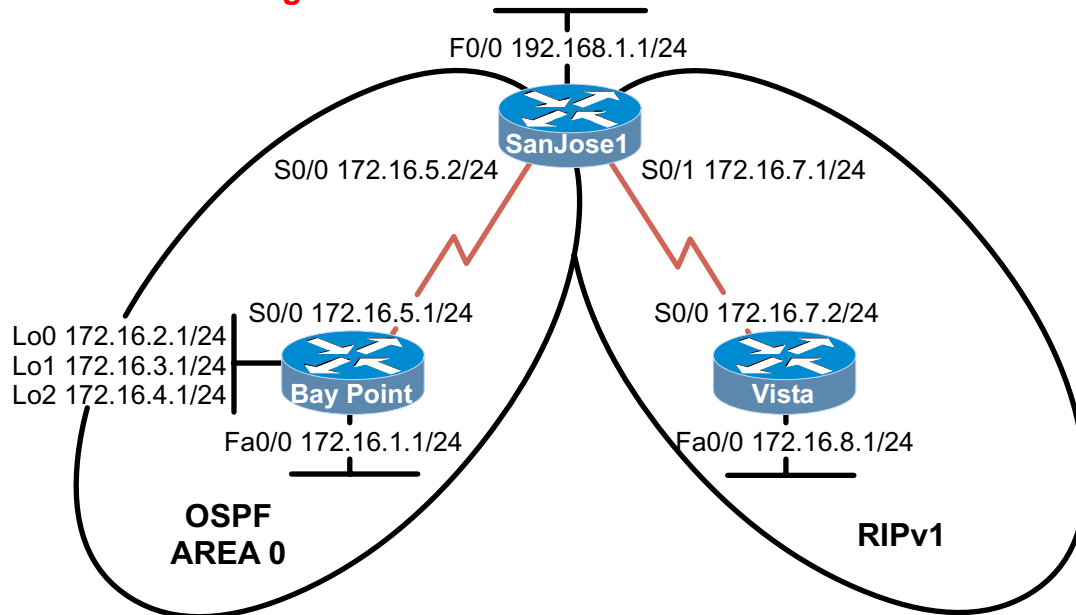


7.5.3 Redistributing RIP and OSPF



Objective

In this lab, you configure mutual redistribution between RIPv1 and OSPF.

Scenario

International Travel Agency is adding two new sites to the San Jose campus. Baypointe uses OSPF, and Vista supports only RIPv1 until you upgrade hardware. You have been asked to configure mutual redistribution between the two protocols on the ASBR, SanJose1. Routers in the RIPv1 domain should learn about OSPF networks, and routers in the OSPF domain should learn about RIPv1 networks.

Step 1

Build and configure the network according to the diagram. Configure the loopback interfaces with the IP addresses according to the map. The loopbacks will simulate networks within each routing domain. Configure OSPF on Baypointe for all connected networks, and RIPv1 on Vista for all connected networks. Do not configure routing on SanJose1 yet.

Use `show running-config` to verify your work.

Step 2

Configure routing on SanJose1's serial interfaces. Use the following commands to configure SanJose1 routing processes:

```
SanJose1(config)#router rip
SanJose1(config-router)#network 172.16.0.0
SanJose1(config-router)#passive-interface serial0/0
SanJose1(config-router)#passive-interface fastethernet0/0
SanJose1(config-router)#router ospf 1
SanJose1(config-router)#network 172.16.5.0 0.0.0.3 area 0
```

1. Why are the **passive interface** statements applied to Serial0/0 and FastEthernet0/0 in RIP?

There are no other RIP hosts on those networks. Periodic RIP updates should be turned off on all RIP-enabled interfaces that do not require them.

2. Why isn't it necessary to configure any passive interfaces in the OSPF configuration?

Updates are sent and acknowledged between OSPF neighbors. If no OSPF adjacencies are formed on a network, no OSPF updates are sent.

After you configure routing, check SanJose1's routing table:

```
SanJose1#show ip route

Gateway of last resort is not set

    172.16.0.0/16 is variably subnetted, 7 subnets, 3 masks
R       172.16.8.0/24 [120/1] via 172.16.7.2, 00:00:18, Serial0/1
O       172.16.4.1/32 [110/65] via 172.16.5.1, 00:03:20, Serial0/0
C       172.16.5.0/30 is directly connected, Serial0/0
C       172.16.7.0/24 is directly connected, Serial0/1
O       172.16.1.0/24 [110/65] via 172.16.5.1, 00:03:20, Serial0/0
O       172.16.3.1/32 [110/65] via 172.16.5.1, 00:03:20, Serial0/0
O       172.16.2.1/32 [110/65] via 172.16.5.1, 00:03:20, Serial0/0
C       192.168.1.0/24 is directly connected, FastEthernet0/0
```

SanJose1 should learn about Baypointe's connected networks via OSPF and Vista's connected network via RIPv1. Troubleshoot, if necessary.

Now check Baypointe's table:

```
BayPointe#show ip route

Gateway of last resort is not set

    172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
C       172.16.4.0/24 is directly connected, Loopback2
C       172.16.5.0/30 is directly connected, Serial0/0
C       172.16.1.0/24 is directly connected, FastEthernet0/0
C       172.16.2.0/24 is directly connected, Loopback0
C       172.16.3.0/24 is directly connected, Loopback1
```

No dynamically learned routes should be present. Finally, check Vista's table:

```
Vista#show ip route

Gateway of last resort is not set

    172.16.0.0/24 is subnetted, 2 subnets
C       172.16.8.0 is directly connected, FastEthernet0/0
C       172.16.7.0 is directly connected, Serial0/0
```

3. Has Vista learned about any routes via RIPv1? Why?

Vista is directly connected to all RIPv1 networks, and redistribution has not been configured.

Step 3

Configure redistribution on SanJose1 so that OSPF routes are injected into the RIPv1 process. Use the following commands to configure redistribution on SanJose1:

```
SanJose1(config)#router rip
SanJose1(config-router)#redistribute ospf 1
SanJose1(config-router)#default-metric 2
```

1. What is the default-metric command used for? Do you have to use it?
-

Check the routing table of Vista in the RIPv1 domain:

```
Vista#show ip route

Gateway of last resort is not set

      172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C       172.16.8.0/24 is directly connected, FastEthernet0/0
R       172.16.4.1/32 [120/2] via 172.16.7.1, 00:00:20, Serial0/0
C       172.16.7.0/24 is directly connected, Serial0/0
R       172.16.1.0/24 [120/2] via 172.16.7.1, 00:00:20, Serial0/0
R       172.16.3.1/32 [120/2] via 172.16.7.1, 00:00:20, Serial0/0
R       172.16.2.1/32 [120/2] via 172.16.7.1, 00:00:20, Serial0/0
```

2. Has Vista learned about any of the networks from the OSPF side?
-

Creating a seed metric can minimize routing loops or black holes in your network. RIP can't differentiate between internal and external (redistributed) routes. When a network's route is redistributed without a default metric, the network appears to be adjacent to the autonomous system. Elevating the external default metric above any internal routes is a crude but effective way of differentiating between internal and external routes.

3. What is the metric for each of these routes?
-

The metric should be 2.

Step 4

Configure redistribution on SanJose1 so that RIPv1 routes are injected into the OSPF process. Use the following commands to configure mutual redistribution on SanJose1:

```
SanJose1(config)#router ospf 1
SanJose1(config-router)#redistribute rip
SanJose1(config-router)#default-metric 10
```

Check the routing table of Baypointe in the OSPF domain. Baypointe has not learned about any of the networks from the RIPv1 side.

1. Why hasn't Baypointe learned about any of the networks from the RIPv1 side?
-
-

Baypointe should not have any new routes in its routing table. That's because OSPF will not redistribute routes to RIP subnets unless explicitly configured with the subnets keyword. Return to SanJose1 and enter the following configuration:

```
SanJose1(config)#router ospf 1
SanJose1(config-router)#redistribute rip subnets
```

After you enter these commands, check Baypointe's table again:

```
BayPointe#show ip route

Gateway of last resort is not set

      172.16.0.0/16 is variably subnetted, 7 subnets, 2 masks
O E2   172.16.8.0/24 [110/10] via 172.16.5.2, 00:00:07, Serial0/0
C       172.16.4.0/24 is directly connected, Loopback2
C       172.16.5.0/30 is directly connected, Serial0/0
O E2   172.16.7.0/24 [110/10] via 172.16.5.2, 00:00:07, Serial0/0
C       172.16.1.0/24 is directly connected, FastEthernet0/0
C       172.16.2.0/24 is directly connected, Loopback0
C       172.16.3.0/24 is directly connected, Loopback1
```

2. Has Baypointe learned about the routes from the RIPv1 domain? What is the metric for these routes?

The metric should be 10.

In the routing table, you will see the redistributed routes tagged with the characters "E2."

3. What do these characters mean?

Recall that Type 2 (E2) routes originated outside the OSPF AS and were redistributed into OSPF using Type 5 or Type 7 LSA.

Step 5

Look carefully at Baypointe's table.

1. Is there a route to 192.168.1.0 /24?
2. Does Vista have a route to 192.168.1.0 /24?
3. Why is this route missing from Baypointe's table?

Interface FastEthernet0/0 on SanJose1 is not enabled for either OSPF or RIPv1.

You can complete Baypointe's table by configuring SanJose1 to redistribute connected routes into OSPF:

```
SanJose1(config)#router ospf 1
SanJose1(config-router)#redistribute connected subnets
```

4. What will be the seed metric for redistributed connected routes?

The OSPF default metric was previously set to 10.

Also, configure SanJose1's RIPv1 process to redistribute the connected route:

```
SanJose1(config)#router rip
SanJose1(config-router)#redistribute connected
```

Check the routing tables a final time. Baypointe and SanJose1 should contain all routes.

```
BayPointe#show ip route
```

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

```

    172.16.0.0/16 is variably subnetted, 7 subnets, 2 masks
O E2   172.16.8.0/24 [110/10] via 172.16.5.2, 00:02:00, Serial0/0
C       172.16.4.0/24 is directly connected, Loopback2
C       172.16.5.0/30 is directly connected, Serial0/0
O E2   172.16.7.0/24 [110/20] via 172.16.5.2, 00:01:08, Serial0/0
C       172.16.1.0/24 is directly connected, FastEthernet0/0
C       172.16.2.0/24 is directly connected, Loopback0
C       172.16.3.0/24 is directly connected, Loopback1
O E2   192.168.1.0/24 [110/20] via 172.16.5.2, 00:01:08, Serial0/0
```

```
SanJose1#show ip route
```

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

```

    172.16.0.0/16 is variably subnetted, 7 subnets, 3 masks
R       172.16.8.0/24 [120/1] via 172.16.7.2, 00:00:07, Serial0/1
O       172.16.4.1/32 [110/65] via 172.16.5.1, 00:04:06, Serial0/0
C       172.16.5.0/30 is directly connected, Serial0/0
C       172.16.7.0/24 is directly connected, Serial0/1
O       172.16.1.0/24 [110/65] via 172.16.5.1, 00:04:06, Serial0/0
O       172.16.3.1/32 [110/65] via 172.16.5.1, 00:04:06, Serial0/0
O       172.16.2.1/32 [110/65] via 172.16.5.1, 00:04:06, Serial0/0
C       192.168.1.0/24 is directly connected, FastEthernet0/0
```

```
Vista#show ip route
```

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

```

    172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C       172.16.8.0/24 is directly connected, FastEthernet0/0
R       172.16.4.1/32 [120/2] via 172.16.7.1, 00:00:22, Serial0/0
C       172.16.7.0/24 is directly connected, Serial0/0
R       172.16.1.0/24 [120/2] via 172.16.7.1, 00:00:22, Serial0/0
R       172.16.3.1/32 [120/2] via 172.16.7.1, 00:00:22, Serial0/0
R       172.16.2.1/32 [120/2] via 172.16.7.1, 00:00:22, Serial0/0
R       192.168.1.0/24 [120/1] via 172.16.7.1, 00:00:22, Serial0/0
```

Vista will not have a route to 172.16.5.0/30, because 172.16.0.0 is variably subnetted and RIPv1 does not support VLSM. The /32 networks you see are allowed by the **ip classless** command to support default networks in RIP and IGRP.