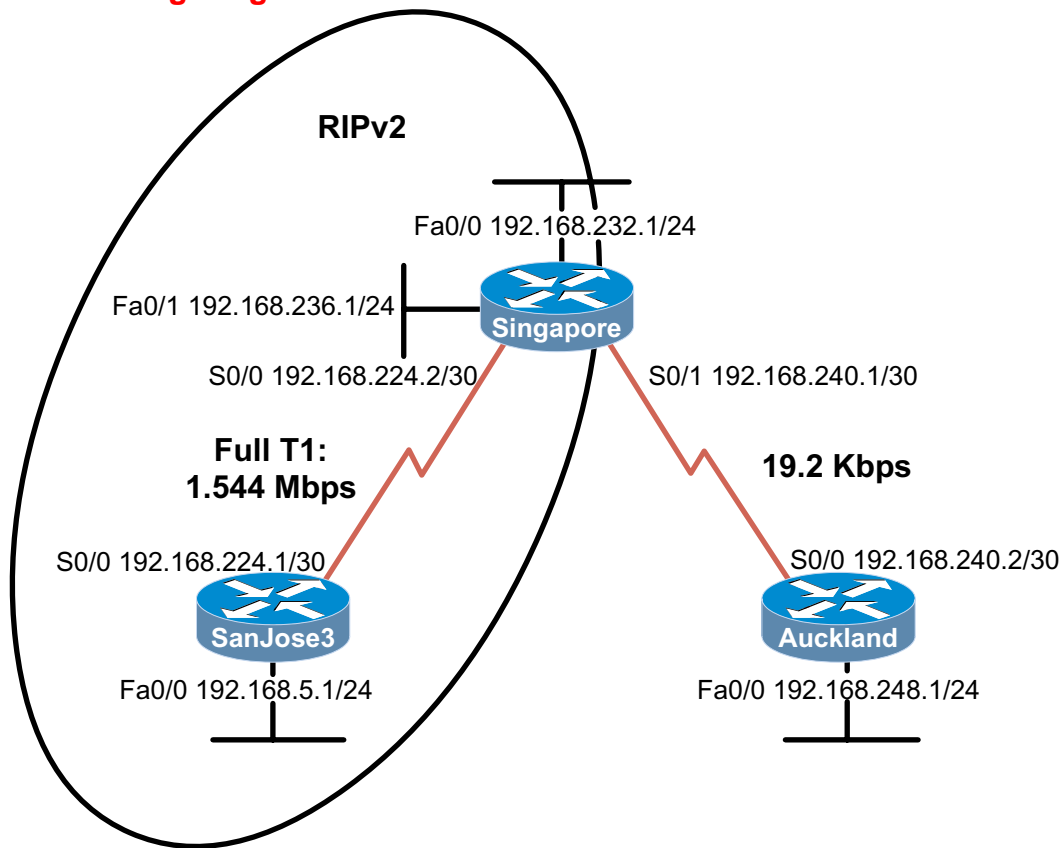


7.5.1 Configuring Distribute Lists and Passive Interfaces



Objective

In this lab, you configure a combination of advanced routing features to optimize routing. These features include distribute lists, passive interfaces, default routes, and route redistribution.

Scenario

International Travel Agency (ITA) uses RIPv2 for dynamic routing. You do a performance analysis to determine whether RIPv2 is optimized.

A very slow 19.2 Kbps link is used to connect Singapore and Auckland until you can provision a faster link. To reduce traffic, you would like to avoid dynamic routing on this link.

You notice that one of the LANs with enterprise servers is near saturation. To reduce traffic, you decide to filter RIPv2 updates from entering SanJose3's 192.168.5.0/24 Ethernet LAN because the updates serve no purpose.

ITA has a large research and development division in Singapore. The R&D engineers are on LAN 192.168.232.0 /24. The R&D managers on the 192.168.236.0 /24 LAN need access to this experimental network, but you also want this LAN to be "invisible" to the rest of the company. Also, the two R&D LANs have many UNIX hosts that need to exchange RIPv2 updates with the Singapore router.

Step 1

Build and configure the network according to the diagram, but do not configure RIPv2 yet.

Use ping to verify your work and test connectivity between the serial interfaces. (*Note:* Auckland should not be able to ping SanJose3 until you have made additional configurations.)

Step 2

On SanJose3, configure RIPv2 to advertise both connected networks, as shown here:

```
SanJose3(config)#router rip
SanJose3(config-router)#version 2
SanJose3(config-router)#network 192.168.224.0
SanJose3(config-router)#network 192.168.5.0
```

No routers or hosts on SanJose3's Ethernet LAN need RIPv2 advertisements. However, if you don't include the 192.168.5.0 network in the RIPv2 configuration, SanJose3 will not advertise the network to Singapore. However, you can configure FastEthernet 0/0 as a passive interface, keeping FastEthernet 0/0 from sending RIPv2 updates. Use the following commands:

```
SanJose3(config)#router rip
SanJose3(config-router)#passive-interface fastethernet0/0
```

RIPv2 updates will no longer be sent via E0.

Step 3

Now configure RIPv2 on Singapore. At this point, enable RIPv2 only on the 192.168.224.0 /30 network so that Singapore can exchange routing information with SanJose3:

```
Singapore(config)#router rip
Singapore(config-router)#version 2
Singapore(config-router)#network 192.168.224.0
```

After you enter this RIPv2 configuration on Singapore, check SanJose3's routing table with the **show ip route** command. Note that SanJose3 has not learned any routes via RIPv2:

```
SanJose3#show ip route
<output omitted>
C    192.168.5.0/24 is directly connected, FastEthernet0/0
C    192.168.224.0/24 is directly connected, Serial0/0
```

1. Why hasn't SanJose3 learned about 192.168.232.0 /24 and 192.168.236.0 /24?

RIP has not been configured on Singapore to advertise the Ethernet networks. Also, RIP will not advertise a route for 192.168.224.0/30 out interface serial 0/0, where the network resides.

Step 4

After you review network requirements, you decide to enable RIPv2 on Singapore's FastEthernet 0/0 and FastEthernet 0/1 so that UNIX hosts on these LANs can receive routing information:

```
Singapore(config)#router rip
Singapore(config-router)#version 2
Singapore(config-router)#network 192.168.232.0
Singapore(config-router)#network 192.168.236.0
```

RIPv2 is now sending updates to these networks, as required by the UNIX hosts. Check SanJose3's table again:

```
SanJose3#show ip route

Gateway of last resort is not set

    192.168.224.0/30 is subnetted, 1 subnets
C       192.168.224.0 is directly connected, Serial0/0
C       192.168.5.0/24 is directly connected, FastEthernet0/0
R       192.168.232.0/24 [120/1] via 192.168.224.2, 00:00:13,
        Serial0/0
R       192.168.236.0/24 [120/1] via 192.168.224.2, 00:00:09,
        Serial0/0
```

The **network** command enables RIP updates on interfaces within that major network and advertises those networks out all other RIP-enabled interfaces. SanJose3 now has routes to 192.168.232.0 /24 (which is good) and 192.168.236.0 /24 (which is bad). Remember that you want to keep this network invisible to the rest of the company.

Step 5

To stop Singapore from sending updates about 192.168.236.0 /24 (without disabling RIPv2 for that network), you can remove it from outgoing updates with the **distribute-list** command. Distribute lists allow you to filter the contents of incoming or outgoing routing updates.

Because you want to filter 192.168.236.0 /24 from outgoing updates to all their routers, use the following commands:

```
Singapore(config)#access-list 1 deny 192.168.236.0
Singapore(config)#access-list 1 permit any
Singapore(config)#router rip
Singapore(config-router)#distribute-list 1 out
```

Verify that this filter has been applied by issuing the **show ip protocols** command on Singapore.

```
Singapore#show ip protocol
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 4 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is 1
  Incoming update filter list for all interfaces is
  Redistributing: rip
  Default version control: send version 2, receive version 2
    Interface        Send  Recv  Triggered RIP  Key-chain
  FastEthernet0/0    2     2
  Serial0/0          2     2
  FastEthernet0/1    2     2
  Routing for Networks:
    192.168.224.0
    192.168.232.0
    192.168.236.0
  Passive Interface(s):
    Serial0/1
  Routing Information Sources:
    Gateway          Distance      Last Update
    192.168.224.1      120          00:00:03
  Distance: (default is 120)
```

1. According to the output of this command, which interface is the outgoing update filter list applied to?

You should see that the list is applied to all RIP-enabled interfaces.

With the distribute list configured on Singapore, return to SanJose3 and flush the routing table with the **clear ip route *** command. Wait at least 5 seconds, and then use **show ip route** to check SanJose3's table:

```
SanJose3#show ip route

Gateway of last resort is not set

    192.168.224.0/30 is subnetted, 1 subnets
C       192.168.224.0 is directly connected, Serial0/0
C       192.168.5.0/24 is directly connected, FastEthernet0/0
R       192.168.232.0/24 [120/1] via 192.168.224.2, 00:00:01,
        Serial0/0
```

2. Is the route to 192.168.236.0 /24 in SanJose3's table? Is the route to 192.168.232.0 /24 in SanJose3's table?

The distribute list should have removed 192.168.236.0/24 from further RIP updates. 192.168.232.0/24 should be the only RIP route in SanJose3's table at this point.

Step 6

SanJose3's table is almost complete, but it does not yet include a route to 192.168.240.0 /30, which is directly connected to Singapore. You could enter a **network** command in Singapore's RIPv2 configuration so that it will advertise this network. Of course, you do not want RIPv2 updates sent out the 19.2 Kbps link, so you would have to place Singapore's S0/0 into passive mode. But there is another alternative. You can configure Singapore to redistribute connected networks into RIPv2. Enter the following commands on Singapore:

```
Singapore(config)#router rip
Singapore(config-router)#redistribute connected
Singapore(config-router)#no auto-summary
```

When you issue these commands, Singapore imports all directly connected routes into the RIP process. Thus, 192.168.240.0 /30 will be redistributed into RIPv2 and sent to SanJose3 as part of each RIPv2 update. Verify your configuration by issuing the following command on Singapore:

```
Singapore #show ip route 192.168.240.1
Routing entry for 192.168.240.0/30
  Known via "connected", distance 0, metric 0 (connected,
    via interface)
  Redistributing via rip
  Advertised by rip
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0
    Route metric is 0, traffic share count is 1
```

The output of this command should confirm that this connected route is being redistributed and advertised by RIPv2.

Check SanJose3's routing table:

```
SanJose3#show ip route

Gateway of last resort is not set

  192.168.224.0/30 is subnetted, 1 subnets
C       192.168.224.0 is directly connected, Serial0/0
  192.168.240.0/30 is subnetted, 1 subnets
R       192.168.240.0 [120/1] via 192.168.224.2, 00:00:02,
    Serial0/0
C       192.168.5.0/24 is directly connected, FastEthernet0/0
R       192.168.232.0/24 [120/1] via 192.168.224.2, 00:00:02,
    Serial0/0
```

SanJose3 should now have RIPv2 routes to both 192.168.240.0 /30 and 192.168.232.0 /24.

Step 7

With routing between Singapore and SanJose3 almost complete, you will turn your attention to Auckland. Because you are avoiding dynamic routing on Auckland's WAN link, you decide to use a static route.

Auckland is a stub network. It has only one exit point to the rest of the world. In this situation, you can configure a static default route that will work for all nonlocal traffic:

```
Auckland(config)#ip route 0.0.0.0 0.0.0.0 192.168.240.1
```

Verify that Auckland is using a default route. First, from SanJose3's console, enter the **debug ip packet** command. Leave SanJose3's console session open while you return to Auckland. From Auckland's console, ping SanJose3's FastEthernet 0/0 at 192.168.5.1.

```
SanJose3#debug ip packet
IP packet debugging is on
00:53:31: IP: s=192.168.240.2 (Serial0/0), d=192.168.5.1, len 100,
      rcvd 4
00:53:31: IP: s=192.168.5.1 (local), d=192.168.240.2 (Serial0/0),
      len 100, sending
```

These pings should be successful. *Note:* SanJose3's debug output reports that the pings have been received and replied to.

Next, ping SanJose3 using extended **ping** commands. (You invoke extended ping by typing ping and pressing Enter in privileged mode.) Using extended commands, source the ping from Auckland's FastEthernet 0/0 address, 192.168.248.1:

```
Auckland#ping
Protocol [ip]: ip
Target IP address: 192.168.5.1
Repeat count [5]: 5
Datagram size [100]: 100
Timeout in seconds [2]: 2
Extended commands [n]: y
Source address or interface: 192.168.248.1
Type of service [0]: 0
Set DF bit in IP header? [no]: no
Validate reply data? [no]: no
Data pattern [0xABCD]: 0xABCD
Loose, Strict, Record, Timestamp, Verbose[none]: none
Sweep range of sizes [n]: n
```

1. Were these pings successful?

Check the **debug ip packet** output on SanJose3:

```
SanJose3#debug ip packet
IP packet debugging is on
00:56:53: IP: s=192.168.248.1 (Serial0/0), d=192.168.5.1, len 100,
      rcvd 4
00:56:53: IP: s=192.168.5.1 (local), d=192.168.248.1, len 100,
      unroutable
```

2. You should see that the pings (ICMP echo requests) arrived. Why didn't SanJose3 respond?

3. Check SanJose3's routing table. Does SanJose3 have a route to the 192.168.248.0/24 network?

At this point, SanJose3 does not have a route to network 192.168.248.0/24 or a default route for unknown destinations.

Step 8

In order for Singapore and SanJose3 to route to 192.168.248.0 /24, you must configure a static route. You have decided to configure the static route on Singapore and then let Singapore propagate this route to other routers (SanJose3) dynamically. (This will save you from the task of entering a static route on every router.) Enter the following command on Singapore:

```
Singapore(config)#ip route 192.168.248.0 255.255.255.0
192.168.240.2
```

This command configures a static route for the 192.168.248.0 /24 network using Auckland's S0 as the next hop.

In order for Singapore to dynamically update SanJose3 with this information, you must configure RIPv2 to redistribute static routes on Singapore. Issue the following commands:

```
Singapore(config)#router rip
Singapore(config-router)#redistribute static
```

Finally, check SanJose3's table:

```
SanJose3#show ip route

Gateway of last resort is not set

    192.168.224.0/30 is subnetted, 1 subnets
C       192.168.224.0 is directly connected, Serial0/0
    192.168.240.0/30 is subnetted, 1 subnets
R       192.168.240.0 [120/1] via 192.168.224.2, 00:00:01,
        Serial0/0
C       192.168.5.0/24 is directly connected, FastEthernet0/0
R       192.168.232.0/24 [120/1] via 192.168.224.2, 00:00:02,
        Serial0/0
R       192.168.248.0/24 [120/1] via 192.168.224.2, 00:00:02,
        Serial0/0
```

It should now be complete. Verify connectivity with an extended ping from SanJose3 FastEthernet 0/0 to Auckland's FastEthernet 0/0.