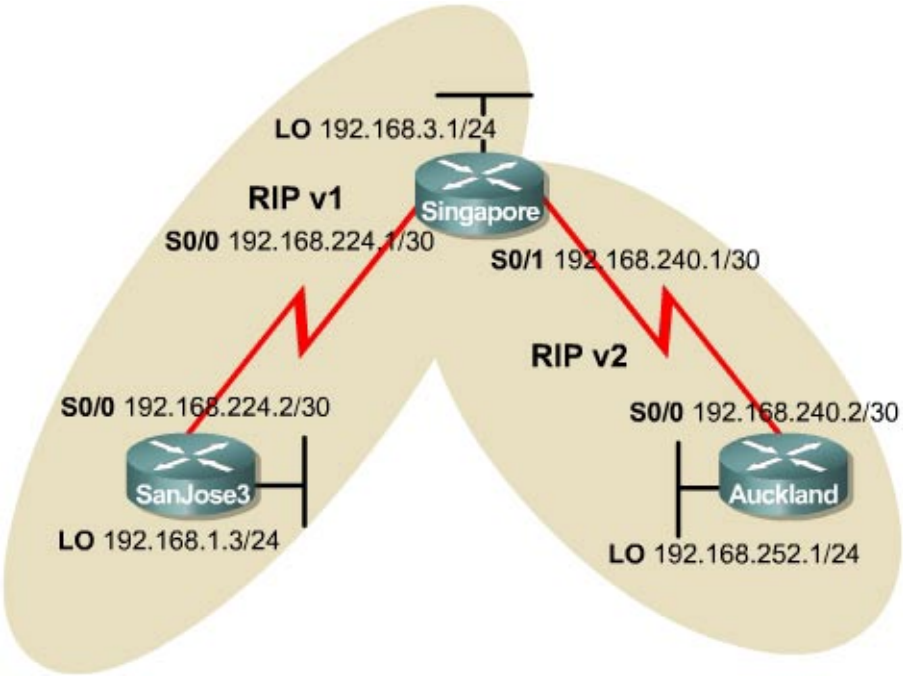
Lab 4.4.1 Routing between RIP v1 and RIP v2



Objective

In this lab, configure RIP v1 and RIP v2 routing protocols. RIP v2 will be configured to accept RIP v1 updates.

Scenario

RIP v1 is presently running between SanJose3, Singapore, and Auckland. New routers that support RIP v2 and variable-length subnet mask (VLSM) have been installed at the Singapore and Auckland headquarters. However, an upgrade of the SanJose3 router, which presently does not support RIP v2 will be installed at a later time. RIP v2 will have to be configured between Auckland and Singapore. Singapore will then need to be configured to receive RIP v1 updates so the SanJose3 router will be able to communicate with Auckland.

Step 1

Build the network according to the diagram and configure all routers with RIP v1. Test connectivity between the routers and troubleshoot as necessary. A **`ping`** should be successful from one end of the network to the other.

Step 2

Verify that RIP v1 is running. There are several commands that could be used to verify RIP v1 is enabled and running. Two of the commands are shown below:

```
SanJose3#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 14 seconds
```



```
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is
  Incoming update filter list for all interfaces is
  Redistributing: rip
  Default version control: send version 1, receive any version
    Interface         Send  Recv  Triggered RIP  Key-chain
    Serial0/0         1     1 2
  Routing for Networks:
    192.168.1.0
    192.168.224.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    192.168.224.2         120      00:00:22
Distance: (default is 120)
```

The **debug router rip** command can be used to check the type of updates the router is receiving and sending.

```
SanJose3#debug ip rip
RIP protocol debugging is on
00:21:28: RIP: sending v1 update to 255.255.255.255 via Serial0/0
(192.168.224.1
00:21:28: RIP: sending v1 update to 255.255.255.255 via Loopback0
(192.168.1.3)
00:21:28: RIP: build update entries
00:21:28:       network 192.168.3.0 metric 2
00:21:28:       network 192.168.224.0 metric 1
00:21:28:       network 192.168.240.0 metric 2
00:21:28:       network 192.168.252.0 metric 3
00:21:41: RIP: received v1 update from 192.168.224.2 on Serial0/0
00:21:41:      192.168.3.0 in 1 hops
00:21:41:      192.168.240.0 in 1 hops
00:21:41:      192.168.252.0 in 2 hops
```

Notice that all RIP v1 updates are sent using broadcast addresses through all the interfaces. The advertisements are also classful. That is, no mask information is carried in a RIP v1 update. RIP v1 does not support classless interdomain routing (CIDR) and VLSM.

Turn **debug** off if it is enabled and check that a route to 192.168.1.0 exists in the routing tables of the Singapore and Auckland routers.

Step 3

The next step is to configure RIP v2 on the Singapore and Auckland routers.

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

Auckland(config)#router rip
Auckland(config-router)#version 2
```

Issue a **show running-config** command on either Singapore or Auckland and notice that RIP version 1 was replaced by RIP version 2. Issue the **clear ip route *** command to flush the routing table.

Check the routing table of the Singapore and Auckland routers.

1. Is there still a route to 192.168.1.0 on either router?

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By default, RIP v1 will accept RIP v2 updates. However, RIP v2 will not accept RIP v1 updates. Therefore, RIP v2 must be configured to accept RIP v1 updates.

When **debug ip rip** is issued on the SanJose3 and Singapore routers, it is possible to view RIP v1 accepting RIP v2 updates and RIP v2 ignoring RIP v1 updates. A sample output is shown below.

```
SanJose3#debug ip rip
RIP protocol debugging is on
01:12:28: RIP: received v2 update from 192.168.224.2 on Serial0/0
01:12:28:      192.168.3.0/24 via 0.0.0.0 in 1 hops
01:12:28:      192.168.240.0/24 via 0.0.0.0 in 1 hops
01:12:28:      192.168.252.0/24 via 0.0.0.0 in 2 hops
01:12:32: RIP: sending v1 update to 255.255.255.255 via
Serial0/0(192.168.224.1)
01:12:32: RIP: build update entries
01:12:32:       network 192.168.1.0 metric 1
01:12:32: RIP: sending v1 update to 255.255.255.255 via Loopback0
(192.168.1.3)
01:12:32: RIP: build update entries
01:12:32:       network 192.168.3.0 metric 2
01:12:32:       network 192.168.224.0 metric 1
01:12:32:       network 192.168.240.0 metric 2
01:12:32:       network 192.168.252.0 metric 3

Singapore#debug ip rip
RIP protocol debugging is on
01:49:40: RIP: sending v2 update to 224.0.0.9 via Serial0/0 (192.168.224.2)
01:49:40: RIP: build update entries
01:49:40:       192.168.3.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40:       192.168.240.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40:       192.168.252.0/24 via 0.0.0.0, metric 2, tag 0
01:49:40: RIP: sending v2 update to 224.0.0.9 via Serial0/1 (192.168.240.1)
01:49:40: RIP: build update entries
01:49:40:       192.168.3.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40:       192.168.224.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40: RIP: sending v2 update to 224.0.0.9 via Loopback0 (192.168.3.1)
01:49:40: RIP: build update entries
01:49:40:       192.168.224.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40:       192.168.240.0/24 via 0.0.0.0, metric 1, tag 0
01:49:40:       192.168.252.0/24 via 0.0.0.0, metric 2, tag 0
01:49:40: RIP: ignored v2 packet from 192.168.3.1 (sourced from one of our
addre
sses)
01:49:45: RIP: received v2 update from 192.168.240.2 on Serial0/1
01:49:45:      192.168.252.0/24 via 0.0.0.0 in 1 hops
01:40:45: RIP: ignored v1 packet from 192.168.224.1 (illegal version)
```

Step 4

Configure RIP v2 to accept RIP v1 updates.

```
Singapore(config-if)#interface serial 0/0
Singapore(config-if)#ip rip receive version 1
```

Issue the **clear ip route *** command to flush the routing table. Check the Singapore and Auckland routing tables again.

2. Is there a route for network 192.168.1.0?

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Enable the **debug ip rip** command on Singapore to see RIP v2 now accepting RIP v1 updates. A sample output is shown below.

```
Singapore#debug ip rip
RIP protocol debugging is on
02:05:09: RIP: received v1 update from 192.168.224.1 on Serial0/0
02:05:09:      192.168.1.0 in 1 hops
02:05:22: RIP: received v2 update from 192.168.240.2 on Serial0/1
02:05:22:      192.168.252.0/24 via 0.0.0.0 in 1 hops
02:05:33: RIP: sending v2 update to 224.0.0.9 via Serial0/0 (192.168.224.2)
```

3. Remember that RIP v1 updates are sent through a broadcast. How are RIP v2 updates sent?

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4. What are the steps to verify that RIP v2 supports CIDR/VLSM by examining the **debug ip rip** output?

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