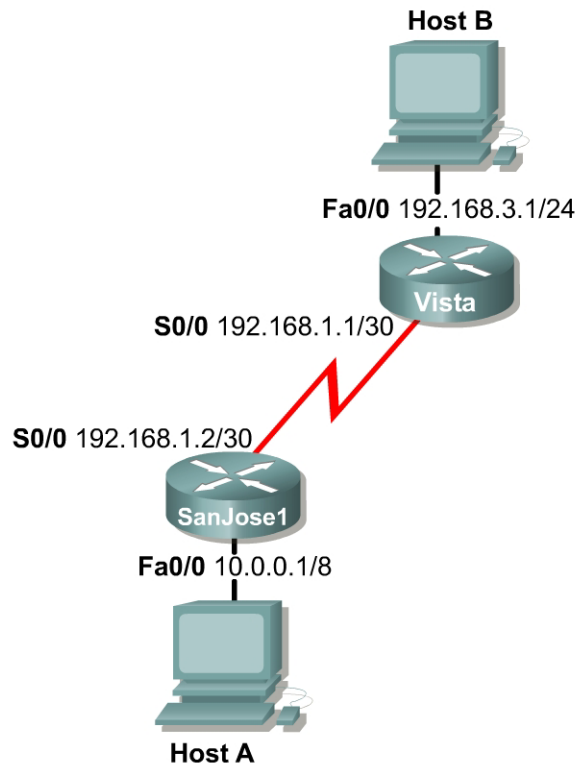


## Lab 4.4.2 RIP v2 MD5 Authentication



### Objective

In this lab configure RIP v2 authentication.

### Scenario

RIP v1 is running between SanJose1 and Vista. Currently, there is no authentication between the two routers. RIP v2 must be used to provide authentication. The default authentication in every RIP v2 packet is plain text authentication. However, the Cisco IOS implementation of RIP v2 provides a higher level of security with MD5 authentication. After viewing the default authentication, the routers will be upgraded to MD5 authentication.

### Step 1

Build the network according to the diagram. Configure the routers with RIP v1 and advertise all networks. Test connectivity and routing between the routers. Troubleshoot the network if required.

### Step 2

Verify that RIP v1 is running. Debug commands can be very useful when verifying RIP operation. Type in the `debug ip rip` command on each router. The following is sample output of the `debug ip rip` on Vista.

```

00:30:58: RIP: sending v1 update to 255.255.255.255 via Serial0/0
(192.168.1.1)
00:30:58: RIP: build update entries
00:30:58:      network 192.168.3.0 metric 1
00:30:58: RIP: sending v1 update to 255.255.255.255 via Loopback0
(192.168.3.1)
00:30:58: RIP: build update entries
00:30:58:      network 10.0.0.0 metric 2
00:30:58:      network 192.168.1.0 metric 1
00:30:58: RIP: received v1 update from 192.168.1.2 on Serial0/0
00:30:58:      10.0.0.0 in 1 hops
00:31:24: RIP: received v1 update from 192.168.1.2 on Serial0/0
00:31:24:      10.0.0.0 in 1 hops

```

Stop all previous debugs.

1. What version of RIP are the routers running?

2. Which show command could be used to verify the version of RIP running?

### Step 3

Configure RIP v2 on SanJose1 and Vista.

```

Vista(config)#router rip
Vista(config-router)#version 2

SanJose1(config)#router rip
SanJose1(config-router)#version 2

```

Again, use the **debug ip rip** command to verify that RIP v2 is running on SanJose1.

```

00:42:03: RIP: received v2 update from 192.168.1.1 on Serial0/0
00:42:03:      192.168.3.0/24 via 0.0.0.0 in 1 hops
00:42:04: RIP: sending v2 update to 224.0.0.9 via Serial0/0 (192.168.1.2)
00:42:04: RIP: build update entries
00:42:04:      10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
00:42:04: RIP: sending v2 update to 224.0.0.9 via Loopback0 (10.0.0.1)
00:42:04: RIP: build update entries
00:42:04:      192.168.1.0/24 via 0.0.0.0, metric 1, tag 0
00:42:04:      192.168.3.0/24 via 0.0.0.0, metric 2, tag 0
00:42:04: RIP: ignored v2 packet from 10.0.0.1 (sourced from one of our
address

```

3. What version of RIP updates are being sent and received?

Notice that RIP is no longer using broadcasts on 255.255.255.255 to send updates. RIP v2 uses the multicast address 224.0.0.9 for sending routing messages. RIP v2 also supports classless interdomain routing/variable-length subnet mask (CIDR/VLSM) by providing the subnet mask information to its neighbors.

Turn off debugging.

## Step 4

Authentication will be configured on SanJose1 and Vista. The key is defined first.

```
Vista(config)#key chain private
Vista(config-keychain)#key 1
Vista(config-keychain-key)#key-string 234

SanJose1(config)#key chain private
SanJose1(config-keychain)#key 1
SanJose1(config-keychain-key)#key-string 234
```

Enable the authentication on the interfaces.

```
Vista(config)#interface serial 0/0
Vista(config-if)#ip rip authentication key-chain private

SanJose1(config)#interface serial 0/0
SanJose1(config-if)#ip rip authentication key-chain private
```

Execute the `debug ip rip` command again on Vista and examine the output.

```
01:10:31: RIP: sending v2 update to 224.0.0.9 via Serial0/0 (192.168.1.1)
01:10:31: RIP: build update entries
01:10:31:      192.168.3.0/24 via 0.0.0.0, metric 1, tag 0
01:10:31: RIP: sending v2 update to 224.0.0.9 via Loopback0 (192.168.3.1)
01:10:31: RIP: build update entries
01:10:31:      10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
01:10:31:      192.168.1.0/24 via 0.0.0.0, metric 1, tag 0
01:10:31: RIP: ignored v2 packet from 192.168.3.1 (sourced from one of our
addre
sses)
01:10:35: RIP: received packet with text authentication 234
01:10:35: RIP: received v2 update from 192.168.1.2 on Serial0/0
01:10:35:      10.0.0.0/8 via 0.0.0.0 in 1 hops
```

## Step 5

The Cisco implementation of RIP v2 supports MD5 authentication. This provides a higher level of security over clear text. Both router interfaces need to be configured with MD5 authentication. The key number and key string must match on both sides, or authentication will fail.

```
Vista(config)#interface serial0/0
Vista(config-if)#ip rip authentication mode md5
```

Examine the debug output on Vista before applying the MD5 authentication on the SanJose1 router.

```
1:21:11: RIP: ignored v2 packet from 192.168.1.2 (invalid authentication)
01:21:28: RIP: sending v2 update to 224.0.0.9 via Serial0/0 (192.168.1.1)
01:21:28: RIP: build update entries
01:21:28:      192.168.3.0/24 via 0.0.0.0, metric 1, tag 0
01:21:28: RIP: sending v2 update to 224.0.0.9 via Loopback0 (192.168.3.1)
01:21:28: RIP: build update entries
01:21:28:      10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
01:21:28:      192.168.1.0/24 via 0.0.0.0, metric 1, tag 0
```

Clear the routing table on Vista. Type the command `show ip route`.

4. Is the RIP route still there? Why or why not? **Note:** It may take several moments for the correct result to be displayed.
- 

Enable MD5 authentication on SanJose1.

```
SanJose1(config)#interface serial0/0
SanJose1(config-if)#ip rip authentication mode md5
```

Examine the **debug** output:

```
01:30:06: RIP: sending v2 update to 224.0.0.9 via Loopback0 (10.0.0.1)
01:30:06: RIP: build update entries
01:30:06:      192.168.1.0/24 via 0.0.0.0, metric 1, tag 0
01:30:06:      192.168.3.0/24 via 0.0.0.0, metric 2, tag 0
01:30:06: RIP: ignored v2 packet from 10.0.0.1 (sourced from one of our
addresses)
01:30:11: RIP: received packet with MD5 authentication
01:30:11: RIP: received v2 update from 192.168.1.1 on Serial0/0
01:30:11:      192.168.3.0/24 via 0.0.0.0 in 1 hops
```

Display the routing table.

5. Is the RIP route there?
- 

If a route is missing, troubleshoot.

6. Use the **show ip rip database** command to verify that RIP v2 is being routed. List three other commands used in this context.
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