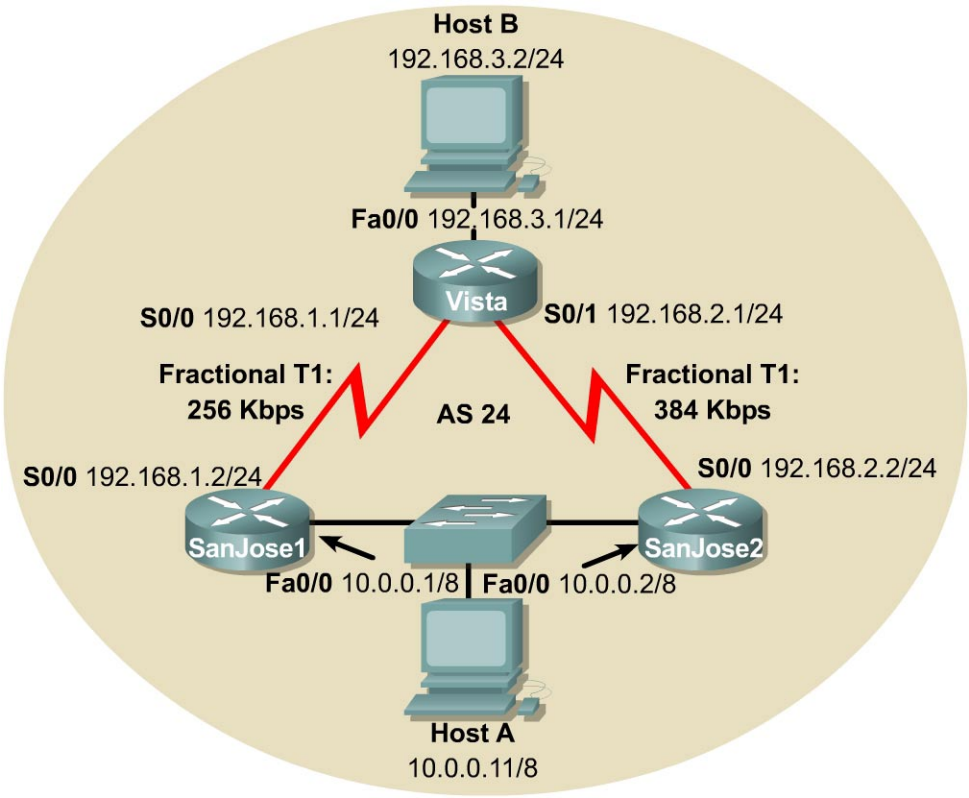
Lab 3.6.2 Configuring IGRP



Objective

In this lab, configure IGRP for unequal cost load balancing and tune IGRP timers to improve performance.

Scenario

International Travel Agency (ITA) has asked for IGRP to be implemented in its WAN.

Step 1

Build and configure the network according to the diagram. If the configuration files are used from the previous lab, remove all routing protocols.

> **Note:** Host A and Host B are not required to complete this lab, but they might be used in testing or as Telnet clients. If used, the Host A gateway may be either SanJose1 router or the SanJose2 router.

On all three routers, configure IGRP for Autonomous System 24, and enable updates on all active interfaces with the **`network`** command.

The IGRP metric includes bandwidth in its calculation. Manually configure the bandwidth of serial interfaces in order for metrics to be accurate. Use the following commands to configure the correct bandwidth settings for each serial interface:

```
SanJose1(config)#interface serial 0/0
SanJose1(config-if)#bandwidth 256

Vista(config)#interface serial 0/0
Vista(config-if)#bandwidth 256
Vista(config-if)#interface serial 0/1
Vista(config-if)#bandwidth 384

SanJose2(config-if)#interface serial 0/0
SanJose2(config-if)#bandwidth 384
```

Use the output from the **show interface** command to verify the correct bandwidth settings. Use **ping** and **show ip route** to verify full connectivity within the network.

Step 2

On Vista, configure unequal cost load balancing using the **variance 5** command.

Note: A default value of 1 is used for equal cost load balancing. The following are sample commands for Vista:

```
Vista(config)#router igrp 24
Vista(config-router)#variance 5
```

Use the **show ip route** command to verify that the routers are installing two unequal cost routes to the same destination:

```
Vista#show ip route
<output omitted>
I    10.0.0.0/8 [100/41072] via 192.168.1.2, 00:00:01, Serial0/0
                [100/28051] via 192.168.2.2, 00:00:00, Serial0/1
C    192.168.1.0/24 is directly connected, Serial0/0
C    192.168.2.0/24 is directly connected, Serial0/1
C    192.168.3.0/24 is directly connected, FastEthernet0/0
```

1. What has changed in the output of the **show ip route** command? How does the metric of the new route compare with that of the original route?

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Step 3

On any router, issue the **show ip protocols** command and check the IGRP invalid, holddown, and flush timers for IGRP.

Note: A route does not become invalid until after 270 seconds and is not flushed from the table until after more than 10 minutes or 630 seconds. Also, the maximum hop count is set at 100 by default.

In small networks, it is advised that the timers for IGRP be adjusted to speed up the convergence process.

Fast IGRP is a specific set of timer settings that result in improved convergence. To configure Fast IGRP, change the IGRP timers as follows:

- 15 seconds between updates
- 45 seconds for route expiration
- 0 seconds for holddown
- 60 seconds for flushing the route from the table

As part of this configuration disable the holddown timers completely. This is done so that after the route for a given network has been removed, a new route for that destination network will be accepted immediately. Finally, reduce the IGRP maximum hop count to a number appropriate to the ITA network.

Configure Fast IGRP by issuing the following commands on all three routers:

```
SanJose1(config-router)#timers basic 15 45 0 60
SanJose1(config-router)#no metric holddown
SanJose1(config-router)#metric maximum-hops 10
```

Verify the settings with the **show ip protocols** command.

Step 4

In this step, test the IGRP timer settings by simulating a link failure.

On SanJose1, enable **debug** so that any changes to the routing table will be reported to the console:

```
SanJose1#debug ip routing
```

If the connection is through Telnet, enter the **terminal monitor** so that the logging output is to the Telnet session.

With the connection to SanJose1 open, log into Vista. Do this on a separate workstation if necessary. On Vista, shut down the Fast Ethernet interface. This will cause the removal of 192.168.3.0 /24 from the Vista routing table.

```
Vista(config)#interface fastethernet 0/0
Vista(config-if)#shutdown
```

Use the **show ip route** command to verify that Vista no longer possesses a valid route to 192.168.3.0 /24.

Return to SanJose1 and issue the **show ip route** command.

Note: The route to 192.168.3.0 is still in the SanJose1 table, but it is flagged as possibly down.

2. How long will the wait be before this route is removed?

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To check the answer, wait for the **debug** output on SanJose1 to report that the route to 192.168.3.0 has been flushed.

3. If SanJose1 had been configured with default timers, how long would it have taken for the route to be flushed?

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Save the configuration files for the next lab.

