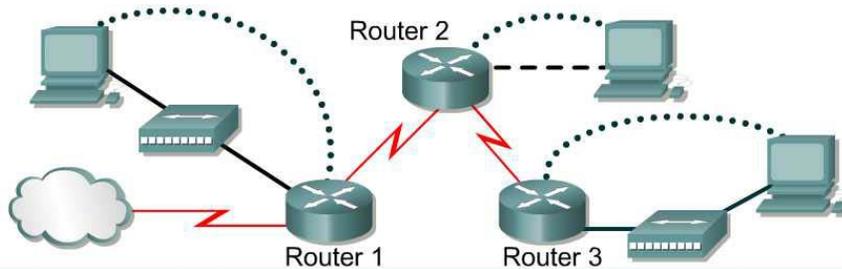


Lab 7.3.6 Default Routing with RIP and IGRP



Router designation	Router Name	Enable secret password	Enable/VTY/ and Console passwords	Routing protocol	RIP network statements
Router 1	Centre	class	cisco	RIP	192.168.2.0 192.168.3.0
Router 2	Boaz	class	cisco	RIP	192.168.1.0 192.168.2.0 192.168.4.0
Router 3	Mobile	class	cisco	RIP	192.168.1.0 192.168.5.0

Router designation	IP Host Table Entry	Fast Ethernet 0 address	Interface type Serial 0	Serial 0 address	Interface type Serial 1	Serial 1 address	Subnet mask all addresses
Router 1	Boaz Mobile	192.168.3.1	DTE	192.168.2.2	NA	No address	255.255.255.0
Router 2	Centre Mobile	192.168.4.1	DCE	192.168.1.1	DCE	192.168.2.1	255.255.255.0
Router 3	Boaz Centre	192.168.5.1	DTE	192.168.1.2	NA	No address	255.255.255.0

Note: The IP Host Table Entry column contents indicate the name(s) of the other router(s) in the IP host table.

Straight-through cable		Console (Rollover)	
Serial cable		Crossover cable	

Objective

- Configure a default route and use RIP to propagate this default information to other routers.
- Migrate the network from RIP to IGRP.
- Configure default routing to work with IGRP

Background/Preparation

In this lab, a default route will be configured and RIP used to propagate this default information to other routers. When this configuration is working properly, the network will be migrated from RIP to IGRP and default routing will be configured to work with that protocol as well.

Cable a network similar to the one in the diagram. Any router that meets the interface requirements displayed on the above diagram, such as 800, 1600, 1700, 2500, 2600 routers, or a combination, may be used. Please refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce a slightly different output. The following steps are intended to be executed on each router unless specifically instructed otherwise.

Start a HyperTerminal session as performed in the Establishing a HyperTerminal session lab.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all routers in this lab assignment before continuing.

Step 1 Configure the hostname and passwords on the routers

- a. On the routers, enter the global configuration mode and configure the hostname as shown in the chart. Then configure the console, virtual terminal and enable passwords. If there are problems doing this, refer to the Configuring router passwords lab. Next configure the interfaces and routing according to the chart. If there are problems doing this, refer to the Configuring Host Tables lab and the Configuring RIP lab. Make sure to copy the **running-config** to the **startup-config** on each router so the configuration will not be lost if the router is power recycled.

Step 2 Configure the hosts with the proper IP address, subnet mask and default gateway

- a. Test the configuration by pinging all interfaces from each host. If the pinging is not successful, troubleshoot the configuration.

Step 3 Check Basic Routing Configuration

- a. Enter **show ip protocol** command on each router.
- b. In the configuration, is RIP displayed? _____

Step 4 Verify connectivity

- a. To verify connectivity of the network just setup, ping all interfaces from each of the attached hosts. If all interfaces can not be pinged, correct the configuration until all interfaces can be pinged.

Step 5 Configure Centre as the connection to the Internet Service Provider (ISP)

- a. Configure Centre to simulate the existence of an outside network. The link between the company and its ISP is simulated by configuring a loopback interface with an IP address. Enter the following commands on the Centre router:

```
Centre(config)#interface loopback0
Centre(config-if)#ip address 172.16.1.1 255.255.255.255
```

Note: If 172.16.1.1 is pinged from the Centre console, the loopback interface replies.

- b. From the Boaz console, attempt to ping 172.16.1.1. This ping should fail because the 172.16.0.0/16 network is not in the Boaz routing table.
 - c. If no default route exists, what does a router do with a packet destined for a network that is not in its table?
-

Step 6 Setup up a default route on the Centre router

- a. A default route must be created on the Centre router pointed at the simulated ISP. Issue the following command on the Centre router in the configuration mode.

```
Centre(config)#ip route 0.0.0.0 0.0.0.0 loopback0
```

- b. This command statically configures the default route. The default route directs traffic destined for networks that are not in the routing table to the ISP WAN link or loopback 0.

- c. Unless IOS version 12.1 is used, RIP automatically propagates statically defined default routes. Therefore, depending on the IOS version, RIP may need to be explicitly configured to propagate this 0.0.0.0/0 route. Enter these commands on the Centre router in the proper command mode:

```
Centre(config)#router rip
Centre(config-router)#default-information originate
```

Step 7 Verify the routing tables

- Now check the routing tables of Mobile and Boaz using the `show ip route` command. Verify that they both have received and installed a route to 0.0.0.0/0 in their tables.
- On Boaz, what is the metric of this route? _____
- On Mobile, what is the metric of this route? _____
- Mobile and Boaz still do not have routes to 172.16.0.0/16 in their tables. From Boaz, `ping 172.16.1.1`. This ping should be successful.
- Why does the ping to 172.16.1.1 work, even though there is no route to 172.16.0.0/16 in the Boaz routing table? _____
- Check to be sure that Mobile can also ping 172.16.1.1. Troubleshoot, if necessary.

Step 8 Migrate the network from RIP to IGRP

- a. With default routing now working, it is necessary to migrate the network from RIP to IGRP for testing purposes. Issue the following command on all three routers:

```
Mobile(config)#no router rip
```

Note: With a normal migration, the IGRP routing protocol would be configured prior to removing the RIP routing protocol. IGRP routes would then replace the RIP routes in the routing table since they have a lower administrative distance and then RIP could then be safely removed.

- b. With RIP removed from each router's configuration, configure IGRP on all three routers using AS 24, as shown:

```
Mobile(config)#router igrp 24
Mobile(config-router)#network 192.168.1.0
Mobile(config-router)#network 192.168.5.0
...
Boaz(config)#router igrp 24
Boaz(config-router)#network 192.168.1.0
Boaz(config-router)#network 192.168.2.0
Boaz(config-router)#network 192.168.4.0
...
Centre(config)#router igrp 24
Centre(config-router)#network 192.168.2.0
Centre(config-router)#network 192.168.3.0
```

- c. Use `ping` and `show ip route` to verify that IGRP is working properly. Do not worry about the 172.16.1.1 loopback address on Centre yet.

Step 9 Check Centre's routing table for the static default route

- a. Check the Centre routing table. The static default route to 0.0.0.0/0 should still be there. To propagate this route with RIP, the `default-information originate` command was issued. Depending on the IOS version, this might not be necessary. The `default-information originate` command is not available in an IGRP configuration. Therefore, it may be necessary to use a different method to propagate default information in IGRP.

On Centre, issue the following commands:

```
Centre(config)#router igrp 24
Centre(config-router)#network 172.16.0.0
Centre(config-router)#exit
Centre(config)#ip default-network 172.16.0.0
```

- b. These commands configure IGRP to update its neighbor routers about the network 172.16.0.0/16, which includes the simulated ISP link or loopback 0. Not only will IGRP advertise this network, but the `ip default-network` command also will flag this network as a candidate default route. This will be shown by an asterisk in the routing table. When a network is flagged as a default, that flag stays with the route as it passed from neighbor to neighbor by IGRP.
- c. Check the routing tables of Mobile and Boaz. If they do not yet have the 172.16.0.0/16 route with an asterisk, it may be necessary to wait for another IGRP update. This may take up to 90 seconds. Issue the `clear ip route *` command on all three routers in order to force them to immediately send new updates.
- d. When the 172.16.0.0/16 route appears as a candidate default in all three routing tables, proceed to the next step.

Step 10 Create a second loopback interface on Centre to test the default route

- a. Because the 172.16.0.0/16 network is known explicitly by Mobile and Boaz, it will be necessary to create a second loopback interface on Centre to test the default route. Issue the following commands on Centre:

```
Centre(config)#interface loopback1
Centre(config-if)#ip address 10.0.0.1 255.0.0.0
```

This loopback interface simulates another external network.

- b. Return to Mobile and check its routing table using the `show ip route` command.
 - c. Is there a route to the 10.0.0.0/8 network? _____
From Mobile, ping 10.0.0.1. This ping should be successful.
 - d. If there is no route to 10.0.0.0/8 and no route to 0.0.0.0/0, why does this ping succeed?
-

Erasing and reloading the router

Enter into the privileged exec mode by typing **enable**.

If prompted for a password, enter **class**. If “class” does not work, ask the instructor for assistance.

```
Router>enable
```

At the privileged exec mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?  
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged exec mode, enter the command **reload**.

```
Router#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

The router is ready for the assigned lab to be performed.

Router Interface Summary					
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2	Interface #5
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)			
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
1700	FastEthernet 0 (FA0)	FastEthernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)	
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
2600	FastEthernet 0/0 (FA0/0)	FastEthernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)	
<p>In order to find out exactly how the router is configured, look at the interfaces. This will identify the type of router as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in IOS command to represent the interface.</p>					