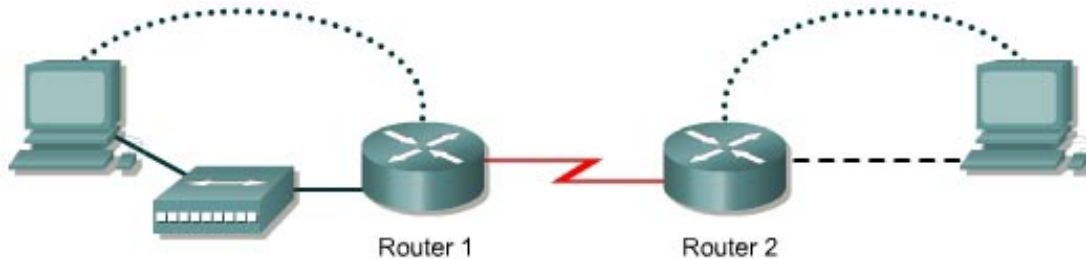


### Lab 9.3.7 Troubleshooting Routing Issues with Debug



Router Designation	Router Name	Fast Ethernet 0 Address	Interface type	Serial 0 Address	Subnet mask for both interfaces	Enable secret password	Enable, VTY and console password
Router 1	GAD	192.168.1.1	DCE	192.168.2.1	255.255.255.0	class	cisco
Router 2	BHM	192.168.3.1	DTE	192.168.2.2	255.255.255.0	class	cisco

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

#### Objective

- Utilize a systematic OSI troubleshooting process to diagnose routing problems.
- Use various show commands to gather information.
- Use `debug` commands and logging.

#### Background/Preparation

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, passwords and interfaces on the Gadsden router

- a. On the Gadsden router, 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 is a problem doing this, refer to the Configuring Router Passwords lab. Configure interfaces as shown in the table.

## Step 2 Configure the routing protocol on the Gadsden router

- a. Go to the proper command mode and enter the following:

```
GAD(config)#router rip
GAD(config-router)#network 192.168.1.0
GAD(config-router)#network 192.168.2.0
GAD(config-router)version 2
GAD(config-router)#exit
GAD(config)#exit
```

## Step 3 Save the Gadsden router configuration

```
GAD#copy running-config startup-config
Destination filename [startup-config]? [Enter]
```

## Step 4 Configure the hostname, passwords and interfaces on the Birmingham router

- a. On the Birmingham router, enter the global configuration mode and configure the hostname as shown in the chart. Then configure the console, virtual terminal and enable passwords. Finally, configure the interfaces on each router.

## Step 5 Configure the routing protocol on the Birmingham router

- a. Go to the proper command mode and enter the following:

```
BHM(config)#router rip
BHM(config-router)#network 192.168.2.0
BHM(config-router)#network 192.168.1.0
BHM(config-router)#version 1
BHM(config-router)#exit
BHM(config)#exit
```

## Step 6 Save the Birmingham router configuration

```
BHM#copy running-config startup-config
Destination filename [startup-config]? [Enter]
```

## Step 7 Gather Facts by asking and listening

- a. After asking around, it was found that a network associate on the night shift changed some of the routing parameters on the routers for a circuit between the Gadsden office and the Birmingham office. Unfortunately, proper procedure was not followed and no documentation was created on these changes.

### Step 8 Gather facts (test basic functionality)

Verify that the internetwork is not functioning by pinging the LAN interfaces.

- a. From GAD, is it possible to ping the BHM router FastEthernet interface? \_\_\_\_\_
- b. From BHM, is it possible to ping the GAD router FastEthernet interface? \_\_\_\_\_

### Step 9 Gather Facts by starting testing to isolate the problem

- a. This confirmed that there is no reachability between Gadsden and Birmingham. Even though it is suspected that there is a routing issue, the temptation to go right to testing routing is resisted. Instead good scientific troubleshooting method is followed.
- b. First start at the Physical layer, and confirm the WAN link circuit is up. From the Gadsden router, issue the `show interfaces serial 0` command to confirm that the line and protocol is up.
- c. Are they both up? \_\_\_\_\_
- d. Now that it is known that the line and protocol are both up, test the Data Link layer. From the Gadsden router, issue the `show CDP neighbor` command to confirm that the BHM router is a neighbor to the GAD router serial 0 interface.
- e. Is BHM shown as a neighbor on interface serial 0? \_\_\_\_\_

### Step 10 Examine the routing table

- a. It looks like the Data Link layer is good. Time to move up and examine the Network layer. Check the GAD routing table to see if there is a route to the BHM LAN. To do this, issue the `show ip route` command on the Gadsden router.
- b. Is the route there? \_\_\_\_\_
- c. Are there any RIP routes? \_\_\_\_\_

### Step 11 Examine the routing protocol status

- a. After examining the routing tables, it is discovered that there is no route to the Birmingham Ethernet LAN. So use the `show ip protocol` command to view the routing protocol status. From the Gadsden router, type the following:

```
GAD#show ip protocol
```

- b. What networks is RIP routing? \_\_\_\_\_
- c. Are these the correct networks? \_\_\_\_\_

### Step 12 Gather Facts to identify the exact problem

- a. Now that a routing issue has been confirmed, the exact source of the routing problem needs to be discovered so it can be corrected. To observe the routing exchange between the routers will use the `debug ip rip` command.
- b. From a GAD console, type the `debug ip packet` command and watch the output for a minute or two.
- c. Record a sample of output from GAD or BHM

\_\_\_\_\_

\_\_\_\_\_

- d. Are there routing updates being passed? \_\_\_\_\_
- e. What is happening to the routing updates from Birmingham? \_\_\_\_\_

- f. Type `undebug a11` to stop the output.

### Step 13 Consider the possibilities

- a. From the information discovered through the troubleshooting process, what are the possible problems?
- 

### Step 14 Create an action plan

- a. How can the problem be corrected?
- 

### Step 15 Implement the action plan

- a. Try the solution that was proposed in the previous step.

### Step 16 Observe the results

- a. Now it is necessary to confirm that the solution has solved the problem. This is done by reversing the tests that have been previously performed.
- b. Observe the routing exchange between the routers using the `debug ip rip` command and watch the output for a minute or two.
- c. Type `undebug a11` to stop the output.
- d. Check the GAD routing table to see if there is a route to BHM using the `show ip route`.
- e. Are there any RIP routes? \_\_\_\_\_
- f. Is the route to BHM there? \_\_\_\_\_
- g. Just to confirm everything is working from the Gadsden router try to ping the LAN interface of the BHM router. Was it successful? \_\_\_\_\_
- h. If this does not correct the problem, then repeat the process.
- i. If the tests were successful, document the changes and back up the configuration.

Upon completion of the previous steps, log off by typing `exit` and turn the router off.

## 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(config)#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.

<b>Router Interface Summary</b>					
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>					