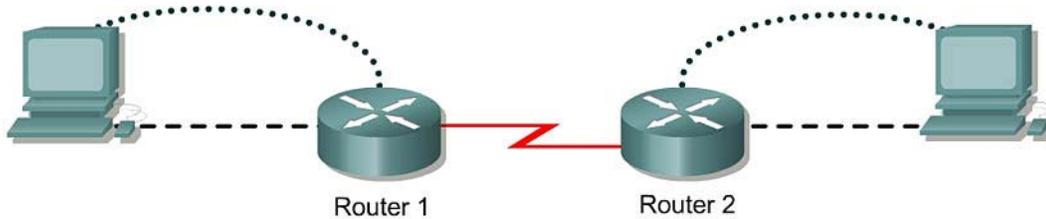


Lab 4.2.5a Connectivity Tests – Ping



Router designation	Router Name	Enable secret password	Enable, VTY and console password	Routing protocol	RIP network statements	
Router 1	GAD	class	cisco	RIP	192.168.14.0	192.168.15.0
Router 2	BHM	class	cisco	RIP	192.168.15.0	192.168.16.0

Router designation	IP host name	Fast Ethernet 0 address	Interface type Serial 0	Serial 0 address	Interface type Serial 1	Serial 1 address	Subnet mask all addresses
Router 1	GAD	192.168.14.1	DCE	192.168.15.1	NA	No address	255.255.255.0
Router 2	BHM	192.168.16.1	DTE	192.168.15.2	NA	No address	255.255.255.0

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

Objective

- Use the `ping` command to send ICMP datagrams to target host.
- Verify that the network layer between source and destination is working properly.
- Retrieve information to evaluate the path-to-host reliability.
- Determine delays over the path and whether the host can be reached or is functioning.
- Use the extended `ping` command to increase number of packets.

Background/Preparation

The `ping` command is a good tool for troubleshooting Layers 1 through 3 of the OSI model and diagnosing basic network connectivity. Using `ping` sends an ICMP packet to the specified device (workstation, server, router or switch) and then waits for a reply. The IP address or host name can be pinged. In order to ping the host name of a router, there must be a static host lookup table in the router or a DNS server for name resolution to IP addresses.

Cable a network similar to the one in the diagram. Any router that meets the interface requirements may be used. Possible routers include 800, 1600, 1700, 2500, 2600 routers, or a combination. 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 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 GAD and BHM routers

- a. If there are any difficulties configuring hostname or passwords, refer to the Configuring Router Passwords lab. If there are any difficulties configuring interfaces or the routing protocol, refer to the Configuring Host Tables lab. This lab requires that IP hostnames are configured.
- b. This lab requires that IP hostnames are configured.
- c. Verify the routers configurations by performing a **show running-config** on each router. If not correct, fix any configuration errors and verify.

Step 2 Login to Router 1 and verify the connection to Router 2

- a. Login to the GAD router.
- b. Verify the connection between the two routers. Ping the Serial 0 interface of the BHM router. If the ping is not successful, return to Step 1 and troubleshoot the configuration.

Step 3 Display information about host to Layer 3 address mappings

- a. Enter **show host** at the router prompt.

The router will display information about host to Layer 3 (IP) address mappings, how this information was acquired, and the age of the entry.

- b. List host names and the IP addresses listed for each one.

Host name	IP Address

Step 4 Use the ping command

- a. Enter **ping xxx.xxx.xxx.xxx** where xxx.xxx.xxx.xxx is the previous listed IP address.
- b. Repeat with all IP addresses listed.
- c. The router sends an Internet Control Message Protocol (ICMP) packet to verify the hardware connection and network layer address. The PC is acting as the console to the router, pinging from one router to another router.
- d. Did the IP addresses ping? _____
- e. List four important pieces of information received back from issuing the **ping** command.

Step 5 Examine the results of the ping command

- a. Look at the example of the `ping` command generated by a router.

```
lab-b#ping 192.168.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 210.93.105.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 68/68/168 ms
```

What does the exclamation point (!) indicate? _____

- b. What does the period (.) indicate? _____

- c. What does the `ping` command test for? _____

Step 6 Configure the workstations

- a. The configuration for the host connected to the GAD Router is:

```
IP Address      192.168.14.2
IP subnet mask  255.255.255.0
Default gateway 192.168.14.1
```

- b. The configuration for the host connected to the BHM Router is:

```
IP Address      192.168.16.2
IP subnet mask  255.255.255.0
Default gateway 192.168.16.1
```

Step 7 Ping from the workstation

- a. From Windows go to **Start > Programs > Accessories > Command Prompt**. This will open a Command Prompt window.
- b. To test that the TCP/IP stack and default gateway on the workstation are configured and working properly, use the MS DOS window to ping the routers by issuing the following command:

```
C:\> ping 192.168.14.1
```

The ping should respond with successful results. If not, check the configurations on the host and directly connected router.

Step 8 Test Layer 3 connectivity

- a. Using the command prompt enter `ping` and the IP address of all routers interfaces. This will test Layer 3 connectivity between the workstation and the routers.
- b. Is the output from the workstation `ping` command the same as the output from the `ping` command from a router?

Step 9 From the Host, telnet to the directly connected router

- a. Telnet to the connected router. Type `telnet` and the default gateway IP address of the router.

```
C:\>telnet 192.168.14.1
```

- b. The password prompt will appear, enter `cisco`.

Step 10 Perform an extended ping

- a. Enter into the privileged EXEC mode. Type `enable` and then the password `class`.

Type **ping** and press **Enter**. Fill out the rest of the prompts as shown following:

```
Protocol [ip]:
Target IP address: 192.168.16.1
Repeat count [5]: 50
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 50, 100-byte ICMP Echos to 192.168.16.1, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (50/50), round-trip min/avg/max = 32/32/40
ms
GAD#
```

b. Notice how fast the ping response is. What was the average response time? _____

Step 11 Perform another extended ping

a. Type **ping** and press **Enter**. Fill out the rest of the prompts as shown following.

During the ping, remove the crossover cable from the BHM FastEthernet port after 10 pings have responded.

```
Protocol [ip]:
Target IP address: 192.168.16.1
Repeat count [5]: 50
Datagram size [100]: 1500
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 50, 1500-byte ICMP Echos to 192.168.16.1, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!U.U.....!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 72 percent (36/50), round-trip min/avg/max =
432/434/464 ms
GAD#
```

b. What does the output from this extended ping say? _____

c. Try doing this with a standard ping, can the cable be removed before the ping is over?

d. What was the result of increasing the datagram size in the extended ping? _____

Step 12 Perform an extended ping from the host

a. Exit the Telnet session and return to the host MS-DOS prompt. Type **ping** and press **Enter**.

b. Does the extended ping work the same way on the router as on the host? _____

At the MS-dos prompt type:

```
C:\>ping 192.168.16.1 -n 25
```

There should be 25 responses from the command.

c. Experiment with other combinations of the extended ping commands on both the router and the host.

Upon completion of the previous steps, logoff by typing **exit**. 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.

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>					