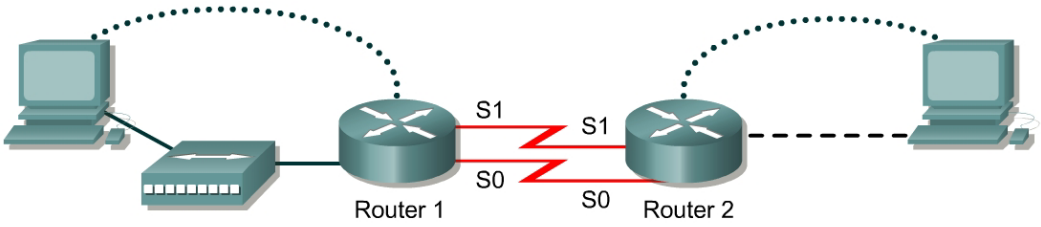
Lab 9.2.6 Troubleshooting Using `ping` and `telnet` – Instructor Version 2500



Router designation	Router Name	Enable secret password	Enable/VTY/ and Console passwords	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	192.168.16.0	192.168.13.0

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	BHM	192.168.14.1	DCE	192.168.15.1	DCE	192.168.15.2	255.255.255.0
Router 2	GAD	192.168.16.1	DTE	192.168.13.1	DTE	192.168.13.2	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	– – – –

NOTE: This graphic is incorrect. Router 1, serial 1 should be 192.168.13.1 and Router 2, serial 0 should be 192.168.15.2

Objective

- Use knowledge of OSI Layers 1, 2 and 3 to diagnose network configuration errors.
- Use ping and telnet utilities in testing.

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: Work in teams of 2. Team member 1 should cable and configure the routers and workstations according to the chart. This will introduce some errors. Team member 2 should test the configuration using physical inspection, ping and Telnet.

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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 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 go on to Step 3.

b. Advise the instructor that the configuration is operational. The instructor will introduce fault(s) in the configuration to diagnose and repair.

Step 3 Check the connections

a. Review the physical connections on the standard lab setup.

b. Check all physical devices, cables, and connections.

Step 4 Troubleshoot

a. Troubleshoot induced network problems.

b. Use the commands **`ping`** and **`telnet`** to discover problems.

Step 5 List the findings

a. Write down the problems as they are encountered.

b. Write down what was done to correct the problems.

c. Have the instructor verify that all problems were corrected.

Answers vary. Suggested problems are below:

Problem #	Problem Discovered	Solution	Instructor Verification
1	Could not ping any hosts	IP address is wrong	
2	Can ping hosts *X*, *Y* but not *Z*	Subnet is wrong	
3	Line protocol down on serial interface	No clockrate set.	
4	Line protocol down on serial interface	DCE and DTE are reversed.	
5	When using Telnet, the message “Password required none set” appears.	No password set on VTY	

Step 6 Perform the lab again with Team members 1 and 2 switching roles

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

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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)#reloadRouter#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.

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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)	
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.					

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```
BHM#show running-config
Building configuration...

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname BHM
!
enable secret 5 $1$aSAZ$tA5JwOOhP8chL0s3LJYMi.
!
ip subnet-zero
!
interface Ethernet0
 ip address 192.168.16.1 255.255.255.0
 no ip directed-broadcast
!
interface Serial0
 ip address 192.168.15.2 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
!
interface Serial1
ip address 192.168.13.2 255.255.255.0
no ip directed-broadcast
no ip route-cache
!
router rip
 network 192.168.13.0
 network 192.168.15.0
 network 192.168.16.0
!
no ip classless
no ip http server
!
!
line con 0
 password cisco
 login
 transport input none
line aux 0
line vty 0 4
 password cisco
 login
!
end
```


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```
GAD#show running-config
Building configuration...

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname GAD
!
enable secret 5 $1$yOU1$wXUASjW8rYzUxoAqRDmg8.
!
ip subnet-zero
!
interface Ethernet0
 ip address 192.168.14.1 255.255.255.0
 no ip directed-broadcast
!
interface Serial0
 ip address 192.168.15.1 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 clockrate 56000
!
interface Serial1
 ip address 192.168.13.1 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 clockrate 56000
!
router rip
 network 192.168.13.0
 network 192.168.14.0
 network 192.168.15.0
!
no ip classless
ip http server
!
line con 0
 exec-timeout 0 0
 password cisco
 login
 transport input none
line aux 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
end
```

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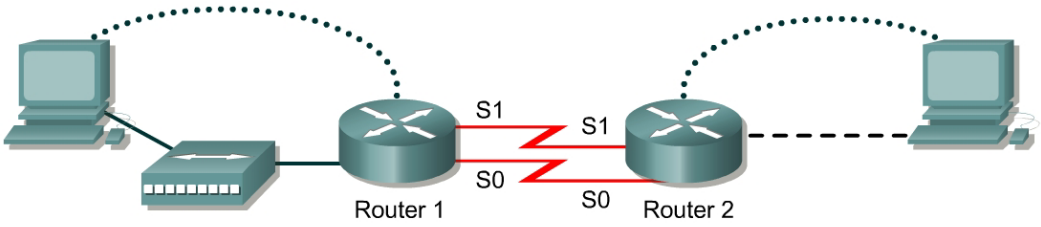
Lab 9.2.6 Troubleshooting Using `ping` and `telnet` – Instructor Version 2600



Router designation	Router Name	Enable secret password	Enable/VTY/ and Console passwords	Routing protocol	RIP network statements	
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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	BHM	192.168.14.1	DCE	192.168.15.1	DCE	192.168.15.2	255.255.255.0
Router 2	GAD	192.168.16.1	DTE	192.168.13.1	DTE	192.168.13.2	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	– – – –

NOTE: This graphic is incorrect. Router 1, serial 1 should be 192.168.13.1 and Router 2, serial 0 should be 192.168.15.2.

Objective

- Use knowledge of OSI Layers 1, 2 and 3 to diagnose network configuration errors.
- Use ping and telnet utilities in testing.

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Note: Work in teams of 2. Team member 1 should cable and configure the routers and workstations according to the chart. This will introduce some errors. Team member 2 should test the configuration using physical inspection, ping and Telnet.

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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 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 go on to Step 3.

b. Advise the instructor that the configuration is operational. The instructor will introduce fault(s) in the configuration to diagnose and repair.

Step 3 Check the connections

a. Review the physical connections on the standard lab setup.

b. Check all physical devices, cables, and connections.

Step 4 Troubleshoot

a. Troubleshoot induced network problems.

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Answers vary. Suggested problems are below.

Problem #	Problem Discovered	Solution	Instructor Verification
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4	Line protocol down on serial interface	DCE and DTE are reversed.	
5	When using Telnet, the message “Password required none set” appears.	No password set on VTY	

Step 6 Perform the lab again with Team members 1 and 2 switching roles

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

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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)#reloadRouter#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.

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Router Interface Summary					
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2	Interface #5
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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)	
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.					

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Router Outputs

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Current configuration:
!
version 12.0
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service timestamps log uptime
no service password-encryption
!
hostname BHM
!
enable secret 5 $1$aSAZ$tA5JwOOhP8chL0s3LJYMi.
!
ip subnet-zero
!
interface FastEthernet0/0
 ip address 192.168.16.1 255.255.255.0
 no ip directed-broadcast
!
interface Serial0/0
 ip address 192.168.15.2 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
!
interface Serial0/1
ip address 192.168.13.2 255.255.255.0
no ip directed-broadcast
no ip route-cache
!
router rip
 network 192.168.13.0
 network 192.168.15.0
 network 192.168.16.0
!
no ip classless
no ip http server
!
!
line con 0
 password cisco
 login
 transport input none
line aux 0
line vty 0 4
 password cisco
 login
!
end
```


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```
GAD#show running-config
Building configuration...

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
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hostname GAD
!
enable secret 5 $1$yOU1$wXUASjW8rYzUxoAqRDmg8.
!
ip subnet-zero
!
interface FastEthernet0/0
 ip address 192.168.14.1 255.255.255.0
 no ip directed-broadcast
!
interface Serial0/0
 ip address 192.168.15.1 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 clockrate 56000
!
interface Serial0/1
 ip address 192.168.13.1 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 clockrate 56000
!
router rip
 network 192.168.13.0
 network 192.168.14.0
 network 192.168.15.0
!
no ip classless
ip http server
!
line con 0
 exec-timeout 0 0
 password cisco
 login
 transport input none
line aux 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
end
```


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