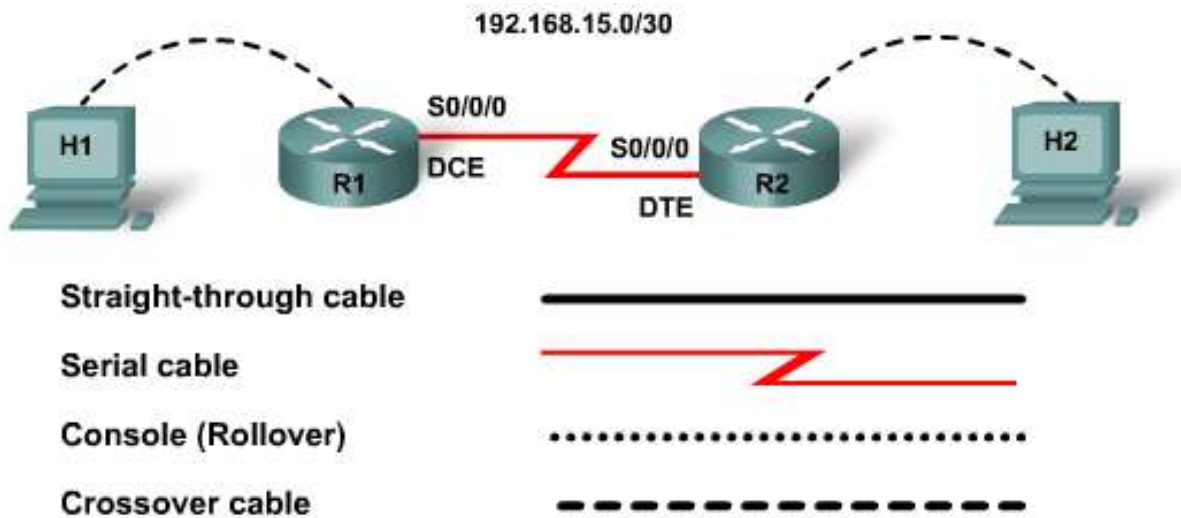


Lab 9.4.2 Troubleshooting WAN and PPP Connectivity



Device	Host Name	Serial 0/0/0 IP Address	Subnet Mask	Serial 0/0/0 Interface Type	Enable Secret Password	Enable, vty, and Console Password
Router 1	R1	192.168.15.1	255.255.255.252	DCE	class	cisco
Router 2	R2	192.168.15.2	255.255.255.252	DTE	class	cisco

Objectives

- Load the routers with preconfigurations.
- Discover where communication is failing.
- Gather information about the misconfigured portion of the network or any other errors.
- Analyze WAN and PPP related information to determine why communication is failing.
- Propose solutions to network errors.
- Implement solutions to network errors.

Background / Preparation

A small company is having problems in their network. You have been called to troubleshoot their problem. The company is using PPP with CHAP authentication. Follow the topology diagram and addressing table to determine the physical setup and find where communication is failing. Use the **show** and **debug** commands to help locate the problems. When problems are found, implement solutions to repair any network errors.

Cable a network similar to the one shown in the topology diagram. Any router that has a single serial interface may be used for this lab. For example, router series 800, 1600, 1700, 1800, 2500, 2600, 2800, or any combination are acceptable.

The information in this lab applies to the 1841 router. Other routers may be used; however, the command syntax may vary. Depending on the router model, the interfaces may be identified differently. For example, on some routers, Serial 0 may be Serial 0/0 or Serial 0/0/0 and Ethernet 0 may be FastEthernet 0/0. The information in this lab applies to routers that use the Serial 0/0/0 notation. If the router in use differs, use the correct notation for the serial interface.

The following resources are required:

- Two Routers, each with one Serial interface
- Two Windows-based PCs, both with a terminal emulation program
- At least one RJ-45-to-DB-9 connector console cable to configure the routers
- One 2-part (DTE/DCE) serial cable

NOTE: Make sure that the routers have been erased and have no startup configurations. For instructions on erasing and reloading a switch and a router please refer to the Lab Manual. The Lab Manual can be found and downloaded on the Academy Connection in the Tools section.

NOTE: SDM Enabled Routers – If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. The steps provided in this lab use IOS commands and do not require the use of SDM. If you wish to use SDM for basic router configuration, refer to the instructions provided in the Lab Manual, which can be found and downloaded on the Academy Connection in the Tools section or contact your instructor if necessary.

Step 1: Connect the equipment

Connect the equipment as shown in the topology diagram.

Step 2: Load the preconfiguration on R1

- a. See your instructor for obtaining the preconfigurations for this lab.
- b. Connect PC1 to the console port of Router 1 to perform loading the preconfigurations using a terminal emulation program.
- c. Transfer the configuration from PC1 to Router 1:
 - 1) In the terminal emulation program on PC1, choose **Transfer > Send Text File**.
 - 2) Locate the preconfiguration file and choose **Open** to start the transfer of the preconfiguration to Router 1.

NOTE: The preconfiguration can also be copied and pasted into the router using the HyperTerminal program. Choose **Edit** and then **Paste to Host**. Before using the **Paste** function, be sure that you are in configuration mode.

- 3) When the transfer is complete, save the configuration.

Step 3: Load the preconfiguration on R2

Copy the preconfiguration on R2 using the process detailed in Step 2.

Step 4: Troubleshoot R1

- a. Enter the command `show interfaces serial 0/0/0` to view the details of the interface.

What is the status of Serial 0/0/0? _____

Line Protocol is _____

The Internet address is _____

The subnet mask is _____

Encapsulation is _____

Is PPP LCP open? _____

Are there any problems? _____

If yes, what are they?

Issue the `show controllers serial 0/0/0` command. What did you find as a result of the command just entered?

- b. If any errors were found, make the necessary configuration changes to R1.

Step 5: Show the details of Serial interface 0/0/0 on R2

- a. Enter the command `show interfaces serial 0/0/0` to view the details of the interface.

What is the status of Serial 0/0/0? _____

Line Protocol is _____

The Internet address is _____

The subnet mask is _____

Encapsulation is _____

Is PPP open? _____

Are there any problems? _____

If yes, what are they?

- b. If any errors were found, make the necessary configuration changes to R2.

Step 6: Turn on PPP debugging

- a. Turn on the PPP debug function on both routers by entering `debug ppp authentication` at the privileged EXEC mode prompt.

```
R1#debug ppp authentication
R2#debug ppp authentication
```

NOTE: Debugging output is assigned high priority in the CPU process and can render a system unusable. When working on a live network, use only during periods of low network traffic.

What did the debug function report when the PPP encapsulation was applied to the router?

Is PPP authenticating properly? _____

- b. Turn off the debug function by entering `undebug all` at the privileged EXEC mode prompt of both routers.

```
R1#undebug all
R2#undebug all
```

Step 7: Show the details of the configuration on R2

- a. Enter the command `show running-config` to view the details of the interface.

What errors were found with PPP?

- b. If any errors were found, make the necessary configuration changes to R2.

Step 8: Verify that the serial connection is functioning

- a. Ping from R1 to R2 to verify that there is connectivity between the two routers.

```
R1#ping 192.168.15.2
R2#ping 192.168.15.1
```

Can the serial interface on the R2 router be pinged from R1? _____

Can the serial interface on the R1 router be pinged from R2? _____

- b. If the answer for either question is no, troubleshoot the router configurations to find the error. Then do the pings again until the answer to both questions is yes.

Step 9: Reflection

- a. The IP address and subnet mask for R1 s0/0/0 is 196.168.15.1 and 255.255.255.252. R2s s0/0/0 interface was misconfigured to 192.168.15.2 and an incorrect subnet mask of 255.255.255.254. If all PPP authentication and all other parameters were configured correctly would R1 have been able to ping R2? Why or why not? _____
- b. What command allows you to view the details of a specific interface? _____

- c. When should you use the debug function in a router?

- d. What is the default serial encapsulation on a Cisco router? _____

- e. There were a number of configuration errors in the preconfigurations that were provided for this lab. Use this space below to write a brief description of the errors that you found.
