

Student Instructions: "Rob Router" Learns How to Communicate...Again!

PART 1

Perform the following tasks:

Configure the router assigned to you. (Use the Router Configuration Setup handout.) When finished with the configuration setup, Telnet to the other four routers to make sure that you can communicate. (Use the Telnet Procedure handout.) Teacher must check that your router can communicate with all other routers before continuing on with assignment.

PART 2

Read scenario:

You are working for a very prominent high tech company. You have just gotten back from your lunch hour only to find out that Mr. Smith has quit. Mr. Smith, another employee, has been working with you maintaining the routers for this company for the last year. He has recently become very dissatisfied with his job because he did not receive a raise that he felt he deserved and he decided to quit. However, before he left he decided to sabotage "Rob Router" so that the router would no longer communicate with the other routers. This has left the network down and is increasing the company's down time. "Rob Router" has been a "problem" router ever since it was setup. Mr. Smith named this router "Rob Router" because of this. "Rob Router" was always robbing him of his free time. Mr. Smith had to come into work several late nights and weekends to fix "Rob Router." It is hard for you to believe that Mr. Smith would do this kind of thing. Now there is only one person who can fix "Rob Router," you!

PART 3

Perform the following tasks:

A. Troubleshoot "Rob Router," fix the problems that you encounter so the router will communicate with the other routers again. (Use Telnet to communicate with the other routers. Teacher must see outcome of troubleshooting.)

B. Document detailed information in your Engineer Journal. Information must include the following: Problem scenario, step-by-step analysis of situation and procedures used, troubleshooting techniques used, solutions, and what was learned.

C. Be prepared to discuss the lab during a group discussion at the end of class today.



Create Rubrics for your Project-Based-Learning Activities

Rubric for "Rob Router" Learns How to Communicate...Again!

Teacher name: _____

Student name: _____

CATEGORY	4	3	2	1
Procedures 15%	Procedures are listed in clear steps. Each step is numbered and is a complete sentence.	Procedures are listed in a logical order, but steps are not numbered and/or are not in complete sentences.	Procedures are listed but are not in a logical order or are difficult to follow.	Procedures do not accurately list the steps of the experiment.
Analysis 15%	The relationship between the variables is discussed and trends/patterns logically analyzed. Predictions are made about what might happen if part of the lab were changed or how the experimental design could be changed.	The relationship between the variables is discussed and trends/patterns logically analyzed.	The relationship between the variables is discussed but no patterns, trends or predictions are made based on the data.	The relationship between the variables is not discussed.
Error Analysis 30%	Experimental errors, their possible effects, and ways to reduce errors are discussed.	Experimental errors and their possible effects are discussed.	Experimental errors are mentioned.	There is no discussion of errors.

Summary 25%	Summary describes the skills learned, the information learned and some future applications to real-life situations.	Summary describes the information learned and a possible application to a real-life situation.	Summary describes the information learned.	No summary is written.
Data 15%	Professional looking and accurate representation of the data in tables and/or graphs. Graphs and tables are labeled and titled.	Accurate representation of the data in tables and/or graphs. Graphs and tables are labeled and titled.	Accurate representation of the data in written form, but no graphs or tables are presented.	Data are not shown OR are inaccurate.

Date Created: 2002-07-09

Router Hardware Setup

- Set up 5 PC workstations close together.
- Mount distribution rack near PC workstations.
- Mount catalyst switch in top of rack first.
- Mount the 5 routers in rack under switch.
*Note: You should have 1 router with an AUI and an AUX port and 4 routers with only an AUX port. Mount the routers with only the AUX ports first. The router with both the AUI and the AUX port should be mounted last on the bottom.
- Use sticky labels to label routers, starting at the top, from A to E.
- Use the 5 serial console cables to connect the workstations to router console port on the back of the router.
- Use the 3 V.35 WAN serial cables to connect the DCE/DTE cables one router to another. Start at the top with router A. Each cable will have DCE written on one side of it. Connect the DCE side of the first cable to serial 0 on the back of router A and the DTE side of the cable to the serial 1 port on router B. Connect the DCE side of the second cable to the S0 port of router B and the DTE side to the S1 port of router C. Connect the DCE side of the third cable to router C and the DTE side of the cable to router D. There should be no cable connecting router D to router E because it will use an Ethernet connection.
- Connect the 5 Ethernet transceivers to the back of the routers. Connect 1 transceiver to the AUI port on the back of each router. This will convert router AUI interfaces to 10BASE-T RJ-45.
- Use the 5 cat5 cables wired straight through to connect the Ethernet transceivers to the switch. One cable for each switch. Start connecting the cables to the ports located at the far left of the switch.
- Make sure all connections are correct and secure.
- HyperTerminal should be installed on your 5 workstations. (Ask your tech coordinator.)
- Turn on PCs. When PCs are up and running, go to the Start button located in the bottom corner of the screen on one of your PCs and click on Start. A menu should appear. Click on Programs, Accessories, Communications, and then HyperTerminal to start the program.
- HyperTerminal will then use a popup box that will ask you for a session name. You can use any name, but I usually have the students use the router name that they are working on. Example is: Lab_A. Type in a name for the session and click enter. Another popup box will appear. The

only change you should have to make is to the baud rate, the parity should already be set to 8. Baud rate should be 9600. Click on enter until you have no more popup boxes showing.

- Turn on the routers. After a few seconds you should start to see the router loading up on your PC screen. There should be no setup configured for your routers yet so after the router starts up it should ask you if you want to enter setup configuration. When students are setting up router configuration, like in the beginning of this lesson, they will answer “no” to this question. It will then ask you if you want to terminate auto install. Answer “yes” to this question. You should then see a router> prompt on your screen.

- The router is now ready for the students to enter the commands for the Router Configuration Setup (see next page).

- Note that everytime a router is configured the startup file must be erased before another student can configure the router again. You do this by entering the command erase startup-config at the router# prompt. Type “enable” at router> prompt to get to the router# prompt. Click enter to accept the default answer to the erase confirm question.

Router Configuration Setup

```
Router>enable (moves you from User mode to Privileged mode)
Router#config t (moves you to Global mode)
Router(config)#hostname(Lab_?) (creates Hostname)
```

Initialize Serial and Ethernet connections:

(Only initialize the connections you have for your lab. Example: Some labs may have an E0, but no S0 connection.)

*Note: Only the S0 connection has a clock rate defined.

```
Router(config)#int s1
Router(config-if)#ip address (address and subnet mask)
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#int s0
Router(config-if)#ip address (address and subnet mask)
Router(config-if)#clock rate 56000
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#int e1
Router(config-if)#ip address (address and subnet mask)
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#int e0
Router(config-if)#ip address (address and subnet mask)
Router(config-if)#no shutdown
Router(config-if)#exit
```

Set up router to use Rip protocol and set up directly connected networks:

```
Router(config)#router rip
Router(config-router)#network (IP address of directly connected network)
(Repeat line above for each directly connected network)
Router(config-router)#exit
```

Set up passwords for Telnet sessions, aux, and console:

```
Router(config)#line vty 0 4
Router(config-line)#login
Router(config-line)#password cisco
Router(config-line)#exit
Router(config)#line aux 0
Router(config-line)#login
Router(config-line)#password cisco
Router(config-line)#exit
Router(config)#line con 0
```

```
Router(config-line)#login
Router(config-line)#password cisco
Router(config-line)#exit
```

Set up Host table:

```
Router(config)#Ip host Lab_A (all ip address only for Lab_A -
Repeat for Lab_B, Lab_C, Lab_D, and Lab_E - type on one line and use
a space to separate each Lab and IP address)
```

Set up no ip domain lookup:

```
Router(config)#No IP domain lookup
Router(config)#exit
Router#exit
```

Show your newly created, active, running-config file:

```
Router>show running-config
```

The show running-config command will display the configuration file you just created on the screen. Check and make sure everything is typed in correctly, if not type “enable” and press enter at the prompt (Router>). Then type “config t” and press enter at the next prompt, (Router#), Enter correct or missing commands and then type “exit” to get back to the Router> prompt. After viewing the running-config file again to make sure it is correct you must save it. If you don't save it you will lose it!

Save your running configuration file to your startup-configuration file in NVRAM:

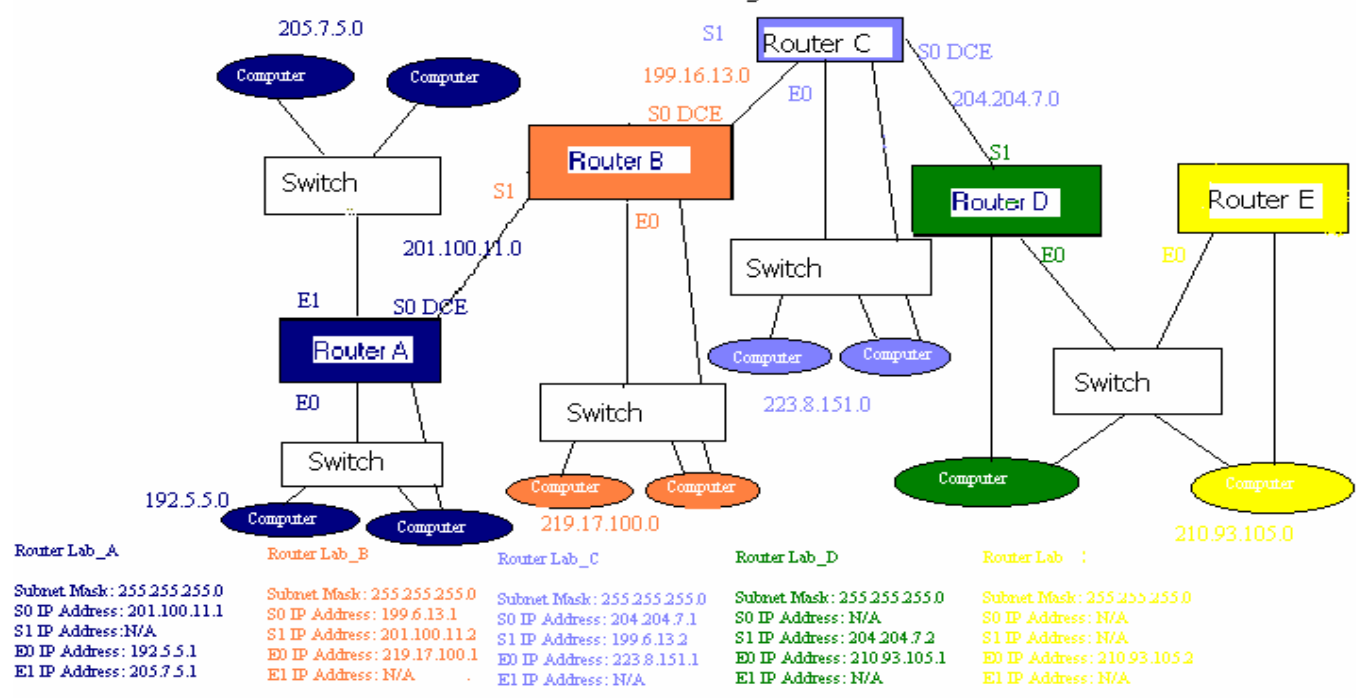
```
Router>copy running-config startup-config
```

Type the following command to make sure your configuration file has been saved:

```
Router>show startup-config
```

Your Startup-config file should now look the same as your running-config file.

Network Diagram



Telnet Procedure

Type: Telnet (Lab_?) at the Router# prompt for each router, Lab_A, Lab_B, Lab_C, Lab_D, and Lab_E. If any of the Telnet sessions time out or have a 0 percent success rate, you must troubleshoot the router setup for the router that you receive this message on and the routers directly connected to this router.

Continue to use Telnet until your router can communicate with all other routers. If you are on router Lab_A and can successfully communicate with router Lab_B, but your peer on router Lab_D cannot communicate with router Lab_E this means that you will also not be able to communicate with router Lab_E. Help your peers to troubleshoot so that all routers can communicate successfully.

Troubleshooting Techniques

1. Always start your troubleshooting at the Physical Layer 1 of the OSI model and work your way up through the other layers. Make sure that all cables are properly connected and that no cables, or any hardware setup items are missing.
2. Make sure that all routers are turned on and finished starting up.
3. Check your configuration file for missing commands, or mistyped IP addresses by typing “show startup-config” at the Router> prompt.
4. Make sure that all router configuration files have been checked for errors.
5. If everything else has been checked and is ok, but you still cannot communicate, you might have a bad cable. Use the cable tester to test your cables.

Student Activity Sheet

Use this activity sheet to make notes on while completing your lab, so you can refer back to it when it's time to write in your Engineer Journal.

Router Setup

Yes or No? Explain

Successful? _____

Problems? _____

Solutions? _____

Telnet Sessions

Yes or No? Explain

Lab_A

Successful? _____

Problems? _____

Solutions? _____

Lab_B

Successful? _____

Problems? _____

Solutions? _____

Lab_C

Successful? _____

Problems? _____

Solutions? _____

Lab_D

Successful? _____

Problems? _____

Solutions? _____

Lab_E

Successful? _____

Problems? _____

Solutions? _____

Troubleshooting Scenario

Briefly define:

Explain troubleshooting techniques used:

List solutions tried:

1.

Successful? _____

Yes or No

2.

Successful? _____

Yes or No

3.

Successful? _____

Yes or No

4.

Successful? _____

Yes or No