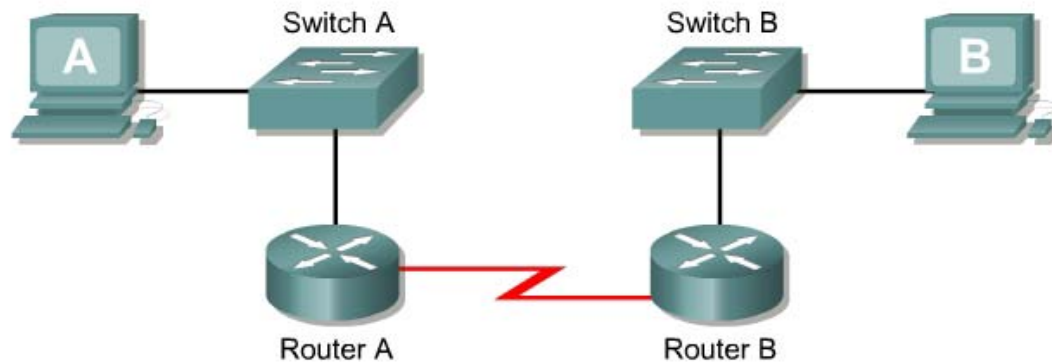



Lab 5.2.3c Troubleshooting Interconnected Devices – Instructor Version



Straight-through cable	—————
Serial cable	———  ———
Rollover (console)
Crossover cable	- - - - -

Objective

- Create a simple routed wide-area network (WAN) with two PCs, two switches or hubs, and two routers
- Configure workstation IP address information
- Identify and correct networking problems related to cabling issues
- Identify and correct networking problems workstation IP addressing issues

Background / Preparation

This lab focuses on configuring a basic router-to-router WAN and then troubleshooting Layer 1 cabling problems and workstation Layer 3 IP addressing problems.

Note: The two routers need to be preconfigured by the instructor or lab assistant to have the correct IP addresses on their LAN and WAN interfaces. Router A will provide the clocking signal as DCE.

Use the prior lab “Basic Routed WAN” to set up this lab prior to starting the troubleshooting. As the configuration shown is being set up, problems with cabling and workstation IP addressing should be introduced into the setup of the network. By working in teams of two, one person can set up the

configuration and introduce some errors, and the other person can troubleshoot the setup to determine the problems.

The equipment needed in this lab is the following:

- Two Ethernet 10BASE-T or Fast Ethernet switches or two hubs
- Two routers with an RJ-45 Ethernet or Fast Ethernet interface (or an AUI interface) and at least one serial interface.
- 10BASE-T AUI transceiver (DB-15 to RJ-45) for a router with an AUI Ethernet interface, which is a 2500 Series
- Several straight-through, crossover, and improperly wired or bad cables for connecting the workstations and routers to the hub or switch
- One female (DCE) and one male (DTE) V.35 cable for interconnecting the routers

Step 1 Set up the lab configuration for Team member A by doing the following:

- a. Set up the lab according to prior lab “Building a Basic Routed WAN”.
- b. As the components are being connected, use a variety of Category 5 cables including at least one crossover cable and a cable that is improperly wired.
- c. When configuring the workstations, introduce at least one misconfiguration of IP address information per PC.
- d. Record the problems introduced in the table below. (Examples are listed.) Space is provided for up to three cabling problems and three IP problems. If it is a cabling problem, indicate the location of the problem, such as PC-A to Switch-A. If it is an IP related problem, indicate which PC the problem is with. In the third column, describe the problem introduced, such as crossover cable used, wrong IP address or wrong default gateway.

Type of problem	Location of problem	Problem introduced
Cabling related	<u>Router A Ethernet 0</u>	<u>Cable loose</u>
Cabling related	<u>Router A Ethernet 0 to Switch A</u>	<u>Crossover cable used</u>
Cabling related	<u>Switch B</u>	<u>Bad termination</u>
IP related	<u>Router A Serial 0</u>	<u>Bad IP address</u>
IP related	<u>Router B Serial 1</u>	<u>Incorrect subnet mask</u>
IP related	<u>Ethernet & Serial Links</u>	<u>All addresses on same subnet</u>

Step 2 Troubleshoot the lab configuration for Team member B

- a. Check workstation to workstation connectivity.
Ping from the command prompt on workstation A to the IP address of workstation B. If problems have been introduced, the ping attempt should fail.
- b. Check physical layer integrity.
Start with Layer 1 issues and check the cabling between the PCs and the switch. Check for the proper type of cable as well as good connections. Check the cabling between the routers and the switches for connections. Replace cables and insure good connections as necessary.
- c. Check network layer integrity.

Check for Layer 3 configuration problems with the workstations. Note that the router should be preconfigured and should not have the problems that are introduced. Use the command prompt and the command **winipcfg** (Windows 95/98/ME) or **ipconfig** (Windows NT/2000) to check the IP configuration of each workstation. Control panel network application may also be used to check IP settings. Verify the IP address subnet mask and default gateway for each workstation.

Step 3 Record problems found in the table below. This should be done by Team member B.

Type of problem	Location of problem	Corrective Action Taken
Cabling related	<u>Router A Ethernet 0</u>	<u>Plug in cable securely.</u>
Cabling related	<u>Router A Ethernet 0 to Switch A</u>	<u>Replace with straight cable or re-terminate one end.</u>
Cabling related	<u>Switch B</u>	<u>Re-terminate</u>
IP related	<u>Router A Serial 0</u>	<u>Reconfigure with proper IP Address</u>
IP related	<u>Router B Serial 1</u>	<u>Reconfigure with proper subnet mask</u>
IP related	<u>Ethernet & Serial Links</u>	<u>Readdress system</u>

Step 4 Team members A and B switch roles and repeat the lab

Step 5 Restore the PCs to their original IP settings, disconnect the equipment, and store the cables