CISCO IOS Router and 5500 Switch Configuration

Objectives:

This lab will address the following:

1. The functions of Router's console port and connection through it
2. The functions of the Catalyst 5500's console port and connection through it
3. Using HyperTerminal to connect from Windows workstations and tip from Sun workstations
4. Basics of IOS configuration commands
5. Interrogating the configuration of a Router and of the Cat5500
6. Practice with UNIX commands

Equipment:

1. PC with monitor, keyboard, mouse, and power cords
2. Windows or SUN Solaris operating system on workstation.
3. NIC card and console cable connected to the console port and Cat5 patch cable to LAN
4. HyperTerminal or VI/PICO/NEDIT for touch console directly

Background:

During this lab you will configure both a Router and the Cat5500 using CISCO IOS commands. You will first configure these devices using their console ports. Later you will see that that their configurations can be modified through their Ethernet connections to the network. You also will review some TCP/IP commands, most of which were introduced in previous labs.

Preparation:

Before you begin, the teacher or lab assistant will make a SUN Solaris or Windows workstation available to you. Windows workstations are equipped with HyperTerminal and Sun Workstations with a simple editor available at the desktop (or you may use vi). Furthermore, each workstation has a console cable in order to connect to console port. Before the lab you should review CISCO Internetwork Operating System commands. Information is available in your textbook and at the links below.

- Information on the Cisco 2600 Series Routers is available from: http://www.cisco.com/pcgi-bin/Support/PSP/psp_view.pl?Product_Name=2600
- Troubleshooting information is available at: http://www.cisco.com/pcgi-bin/Support/PSP/psp_view.pl?p=Hardware:2600&s=Troubleshooting
- IOS command documentation is available at: http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/index.htm

Overview of commands used in Lab3:

1. General Commands

   $ telnet <host ip address>
   $ vi <filename> for detail see following page
   $ ping [args] [opt] <ip address> for detail see following page
   $ traceroute [args] [opt] 10.0.10.10 for detail see following page
   $ ftp <ip address> for detail see following page
   $ tip hardwire

2. IOS Commands

   $ enable
   $ show config
   $ config t
   $ interface Fastethernet<port number>
   $ ip route
   $ ip address
   $ write
   $ exit

ping command:

ping [args] [opt] 10.0.10.10

-t	Ping the specified host until stopped. To stop - type Control-C.
-a	Resolve addresses to hostnames.
-n count	Number of echo requests to send.
-l size	Send buffer size.
-f	Set Don't Fragment flag in packet.
-i TTL	Time To Live.
-v TOS	Type Of Service.
-r count	Record route for count hops.
-s count	Timestamp for count hops.
-j host-list	Loose source route along host-list.
-k host-list	Strict source route along host-list.
-w timeout	Timeout in milliseconds to wait for each reply.

Using the vi editor:

To enter data:

i	Insert at current position
I	Insert at beginning of line
a	append at cursor position
A	Append to end of line
o	open a new line below the cursor position
O	Open a new line at the cursor position

--- To exit to command mode: escape ---

Command Mode:

Cursor positioning:

k	up line
j	down line
h	left character
l	right character
^f	forward page
^b	back page
^d	forward half page
^u	back half page
^e	scroll forward one line
^y	scroll backward one line
#G	goto line #, ex. 1G goes to first line
w	beginning of next word

e end of next word
b previous word

Deleting text:

dd delete line
D delete to end of line
dw delete word
x delete character right
X delete character left

u undo last operation

Block operations:

Y Yank
p put at the cursor
P Put below the cursor

Search operations:

/ search forward
? search backward
n goto next occurance
N goto previous occurance

Global search and replace

:g/find_string/s//replace_with/g

To exit vi:

Go to command mode (escape)

:w write the file
:q quit the file
:wq write and quit
ZZ write and quit
:q! quit with no changes
:e! edit the original file

ftp command:

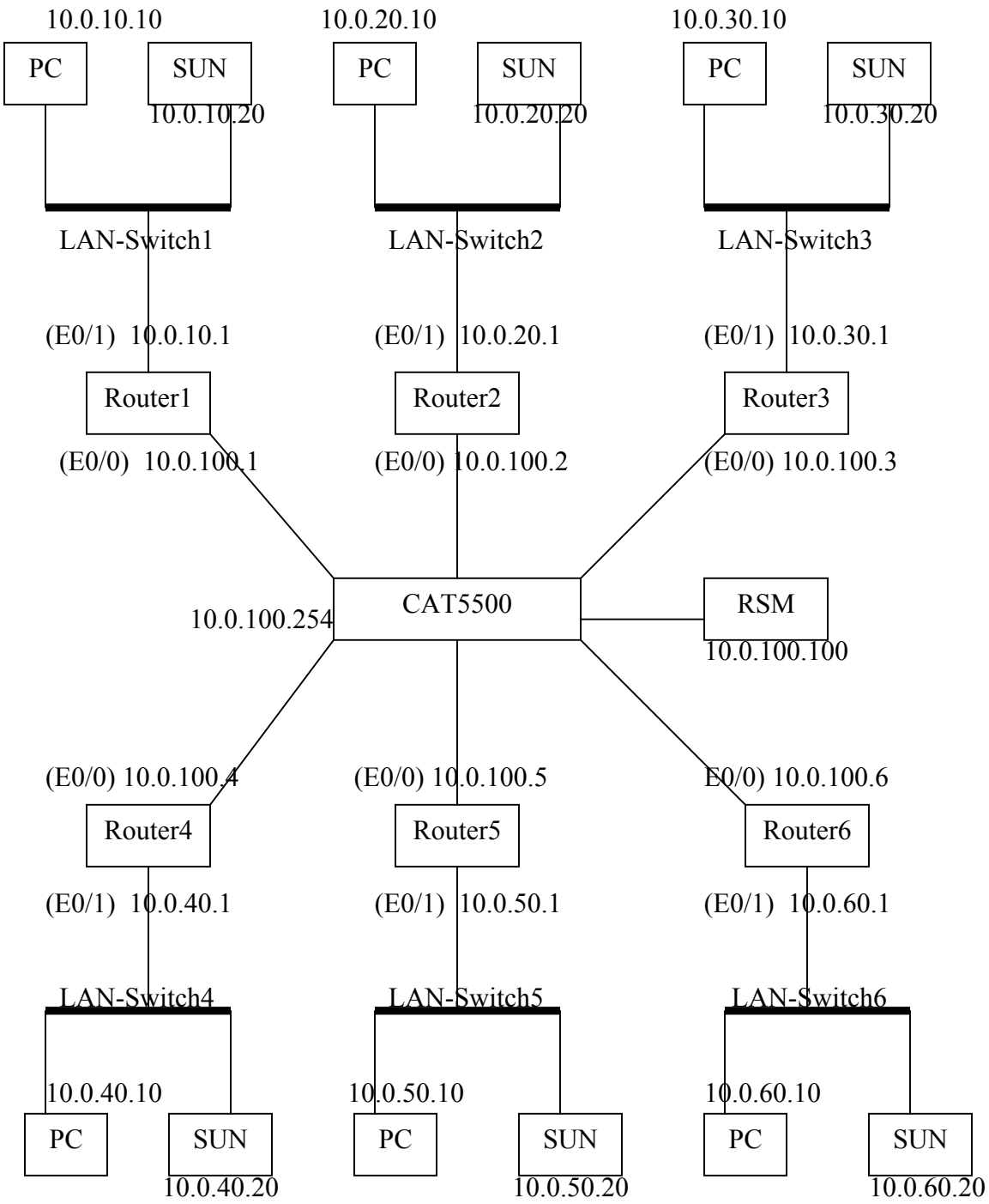
!	delete	literal	prompt	send
?	debug	ls	put	status
append	dir	mdelete	pwd	trace
ascii	disconnect	mdir	quit	type
bell	get	mget	quote	user
binary	glob	mkdir	recv	verbose
bye	hash	mls	remotehelp	
cd	help	mput	rename	
close	lcd	open	rmdir	

Traceroute command:

traceroute [args] [opt] 10.0.10.10

-d	Do not resolve addresses to hostnames.
-h maximum_hops	Maximum number of hops to search for target.
-j host-list	Loose source route along host-list.
-w timeout	Wait timeout milliseconds for each reply.

Lab 3 Configuration



The switch supervisor module is the "brain" of the 5500 switch. It acts as a virtual host for the switch on the backbone network. Its IP address is 10.0.100.254.

Note: In the instructions below the values of X and Y must be assigned by the student depending on their assigned LAN segment and router. This can be done with reference to the above figure.

Procedure:

Connect the PC with the console port for preparing configures the Router and Switcch5500.

Explanation: Ensure that the console port for each router is connected, via the patch panel, to the serial port on the machine from which you will be working. Each router has four consecutive ports on the second row of ports on the patch panel. The first quartet corresponds to router 1, the second quartet corresponds to router 2, etc. The last port in each quartet is the console port. Similarly, each subnet has four consecutive ports on the patch panel row, directly above the quartet of ports assigned to that subnet's router. The serial line to each subnet is the last port in each quartet of subnet ports. Connect the last port in each router's quartet to the last port in the corresponding subnet's quartet. Then, connect port 4 on the wall at your station, to the serial port on your machine.

*Before configuring, try following commands **from a window on your local workstation** and record your finding: (Tracert is the windows version of Solaris' traceroute.)*
Note: X means your segment number, Y means another segment number.

*ping 10.0.**X0.**1*	
*ping 10.0.100.**X***	
*ping 10.0.**Y**0.20*	
*tracert 10.0.**Y**0.20 or traceroute 10.0.Y0.20*	
ping 10.0.100.254	

- **Direct connection to router via console port for initial configuration**

Direction: in order to reach the router before it is configured, you have to reach it through the router's console port with special tools. In this section, you will do this from both a Windows and Sun Solaris workstation.

1. Turn on computer.

2. Connect to the router via the console port.

Instructions for connecting from Windows2000:

1. Click ***Start→Programs→Accessories→Communication→HyperTerminal***
   see: a HyperTerminal window and its setup dialog

2. Set a name for this connection: ***routerX,*** where X is the number of the router associated with your subnet

3. Set connection port: ***COM1***

4. Set connection speed: ***9600***

5. Click ***OK,*** and hit ***Enter***
   see: the router console connected and prompting for a password

Instructions for connecting from SUN Solaris:

1. From the command prompt type:
   $ ***tip hardwire*** (first use the ***man tip*** command to understand tip)
   see: "Connected" on the screen

2. Hit **Enter**
   see: "routerX> " on the screen

Worksheet 1 - direct connection to router via console port for initial configuration.

- **IOS commands to interrogate and change router configuration parameters**

Direction: To put your segment's router on the network you must set its configuration parameters. Once you have connected to the router through the console port input the following commands. (Recall that the X in "routerX" or "10.0.100.X" refers to your router number.)

1. Go to router window on your workstation using hyperterminal or tip You may want to review these procedures from Lab2.
   $ routerX>**enable**
   see: "Enter password: _" on the screen

2. Input password and type Enter again
   $password: ******
   see: "routerX#_" on the screen

3. (To interrogate) $ routerX# **show config**
   See: the whole configuration on the screen

4. (To modify) $ routerX# **config t**
See: "routerX (config)#" on the screen

5. $ router1 (config)# **ip routing**

6. $ router1 (config)# **interface fastEthernet0/0**
See: "routerX (config-if)#" on the screen

7. $ routerX (config-if)# **ip address 10.0.100.X 255.255.255.0**

8. $ routerX (config-if)# **exit**
See: "routerX (config)#" on the screen

9. $ router1 (config)# **interface fastEthernet0/1**
See: "routerX (config-if)#" on the screen

10. $ routerX (config-if)# **ip address 10.0.X0.1 255.255.255.0**

11. $ routerX (config-if)# **exit**
See: "routerX (config)#" on the screen

12. $routerX (config)# **exit**
See: "router1#" on the screen

13. $router1# **write**
See: "Building configuration…"
"[OK]" on the screen
14. $router1# **exit**

14. For Windows 2000, close the HyperTerminal window; for Solaris, type "~." to exit tip.

* Hint: Type "?" on every environment to get more information (i.e. config ?)

Worksheet 2 - IOS commands to interrogate and change router configuration Parameters

Task: Examine and change router/switch configuration parameters using simple IOS commands.

Now that your Router has been configured enter the following commands and record the results **from a window on your local workstation** (illustrated from windows workstation):

*ping 10.0.**X**0.1*	

*ping 10.0.100.**X***	
*ping 10.0.**Y**0.20*	
*tracert 10.0.**Y**0.20 or traceroute 10.0.Y0.20*	
ping 10.0.100.254	

- **Telnet to router and switches when available**

  Direction: Now that the router is configured, it is active on the network. Thus, we can reach it using the telnet command.

  To Telnet to your router:

1. At the command prompt type:
   $**telnet 10.0.X0.1 (or 10.0.100.X)**
   where X is the router number for the router on your subnet.
   see: "Enter password: _ " on the screen

2. Input password and type Enter
   $password: ******
   see: "routerX>_" on the screen

3. At this point you have accessed router

4. $ routerX>**enable**
   see: "Enter password: _" on the screen

5. Input password and type Enter again
   $password: ******
   see: "routerX#_" on the screen

6. At this point you have entered routerX

Workeet 3 - Telnet to router when available

Task: connect to router using telnet through the Ethernet port and examine router and switch configurations.

Explanation: Now that your router and the workstations on its segment have been configured, you can reach the Router through telnet, but you cannot yet reach the other Routers or the Cat5500 switch.

Record your findings in following table:
(**try from your local workstation**)

*telnet 10.0.**X**0.1*	
*telnet 10.0.100.**X***	
telnet 10.0.100.254	

- **Manual build of routing tables**

  Direction: routing table is the key part of the router's configuration. It must be built before workstations can communicate from one sub-network to another through the router. Begin this exercise by telneting to your segment router.

  Example for router1:
  1. $router1#**config terminal**
  2. $router1 (config)# **ip route 10.0.60.0 255.255.255.0 10.0.100.6**
  3. $router1 (config)# **ip route 10.0.50.0 255.255.255.0 10.0.100.5**
  4. $router1 (config)# **ip route 10.0.40.0 255.255.255.0 10.0.100.4**
  5. $router1 (config)# **ip route 10.0.30.0 255.255.255.0 10.0.100.3**
  6. $router1 (config)# **ip route 10.0.20.0 255.255.255.0 10.0.100.2**

10.0.X0.0	Destination prefix
255.255.255.0	Destination prefix mask
10.0.100.X	Forwarding router's address

  6. $router1 (config)# **exit**

  7. $router1# **write**
     See: "Building configuration…" on the screen

  For 5500 switch: (See instructor about which team will do this.)

To telnet to the Switch5500:

1. Open a new prompt window or a new terminal. At the prompt type:
   $**telnet 10.0.100.254**
   see: "Enter password: _" on the screen

2. Input password and click enter
   $password: ******
   see: "Console>_" on the screen

3. At this point you have accessed switch5500

4. $Console>**enable**
   see: "Enter password: _" on the screen

5. Input password and click enter again
   $password: ******
   See: "Console>(enable)_" on the screen

6. At this point you've entered the switch5500 supervisor module

1. $Console>(enable) **set ip route 10.0.10.0 10.0.100.1**
2. $Console>(enable) **set ip route 10.0.20.0 10.0.100.2**
3. $Console>(enable) **set ip route 10.0.30.0 10.0.100.3**
4. $Console>(enable) **set ip route 10.0.40.0 10.0.100.4**
5. $Console>(enable) **set ip route 10.0.50.0 10.0.100.5**
6. $Console>(enable) **set ip route 10.0.60.0 10.0.100.6**
7. $Console>(enable) **exit**

Worksheet 5 - Manual build of routing tables

Task: Building segment routers routing table

Explanation: Now that routing table is complete retest connectivity to other network nodes and workstations.

Execute the following commands and record the results (**from a local workstation window**).

*ping 10.0.**X**0.1*	
*ping 10.0.100.**X***	
*ping 10.0.**Y**0.20*	
*tracert 10.0.**Y**0.20 or traceroute 10.0.**Y**0.20*	
ping 10.0.100.254	