Session 2

CISCO's Operating System and Basic Configuration

2.1 Objective

The student learns to employ CISCO's operating system and how to perform basic system configuration for a network device (switch or router).

2.2 Before the lab session

CISCO network devices, like switches or routers, employ propietary hardware and operating system. For this session, the student needs to research the different types of memory that CISCO network devices have. This information is described in Chapter 7 of reference [3].

2.2.1 Required for the lab session

The student must provide a written answer to the following question:

1. What is the difference between RAM and NVRAM memory?
2. In a CISCO device, which memory stores the operating system?
3. Where does a CISCO device expects to find the configuration file?
4. What is a roll-over cable used for?
5. What type of cable is needed to connect a PC to a switch?, and to a router?
6. In a CISCO device, what is the *user* mode and how do you distinguish this mode from the others?
7. What is the *privileged* mode and how do you distinguish it?
8. What is the *global configuration* mode and how do you distinguish it?
9. What is the *interface configuration* mode and how do you distinguish it?

2.3 Theoretical framework

Most of the information needed for this session is provided in Chapters 2 and 3 of the CCNA Routing and Switching 200-120 Official Cert Guide book [3].

This session will employ CISCO's Packet Tracer software, which allows to build and simulate networks, devices and configurations. The following subsection is a brief introduction to this software.

2.3.1 Introduction to Packet Tracer

Packet Tracer is a network simulator software produced by Cisco Systems, Inc. It generates two different types of files to save network models and simulations:

.pkt files These files have no restrictions and can be freely modified.

.pka files These files allow the person that originally created the network model to disable some features and restrict edition. This is the type of file that instructors will provide to students in this Lab.

To configure a network in Packet Tracer, first it is necessary to build a network topology:

1. Using a mouse, drag and drop the different *network elements* that need to be included in the network model. Packet Tracer's network elements are represented by the icons shown at the bottom of the window.

2. At the bottom of Packet Tracer's window, select the *Connections* button and link each network element using the regular network connection which is the black cable icon. See Figure 2.1.

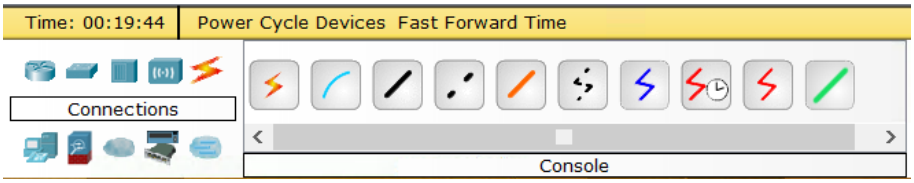

Figure 2.1: Network connections at Packet Tracer

After the network topology has been built, it is necessary to configure each network element. There are three different choices to perform these configurations:

Serial communication This type of configuration requires to define a serial cable communication between the network device and a computer (PC). Use the following instructions to implement this configuration:

1. Using a mouse select the blue Console cable which should also be available at the bottom of the Packet Tracer window. See Figure 2.1.

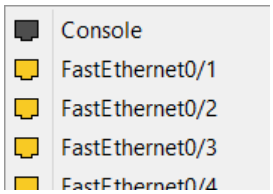

Figure 2.2: Setting up a Console cable at Packet Tracer, part 1

2. Click over the network element that needs to be configured. This will bring up a menu that shows different options to which connect the cable. An example is shown in Figure 2.2. Select *Console*.
3. Click over the PC that will be used to enter the configuration commands. This will also bring a menu, as shown in Figure 2.3. Select *RS-232*.

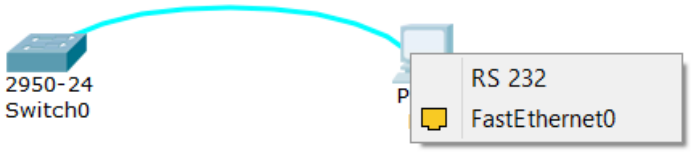

Figure 2.3: Setting up a Console cable at Packet Tracer, part 2

4. Click on the PC, this will bring up a configuration window. Select the *Desktop* tab. Click on the *Terminal* icon and accept the default configuration. See Figure 2.4.

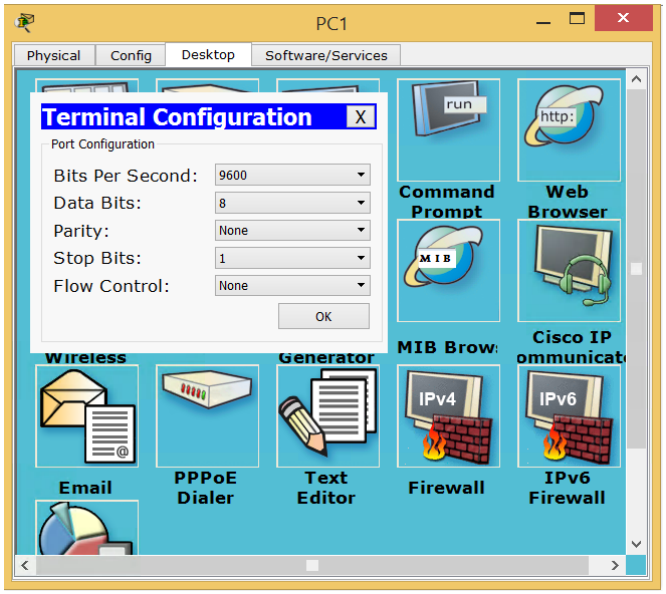

Figure 2.4: Terminal configuration at Packet Tracer

5. The command line interface window should display.

Using the simulator To employ this type of configuration, the user only needs to point the mouse over the network device, double-click on it and a configuration window will display. Then, select the CLI tab which should bring up a command line interface window (Figure 2.5).

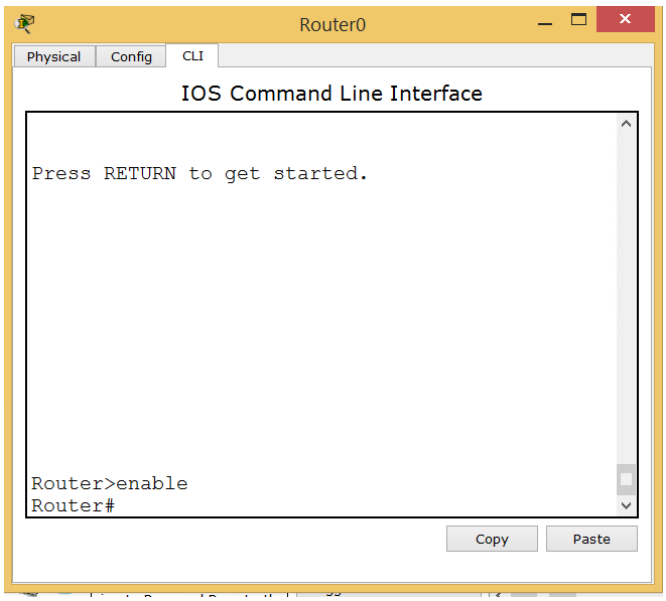

Figure 2.5: Command line interface at Packet Tracer

Remote communication using telnet or ssh This type of configuration requires that the user configures either a telnet or an ssh service in the network device and an IP address. After these have been defined, the user may login to the network device using any command line interface program and the IP address previously defined.

2.4 Procedure

The following instructions will help you to review the commands needed to perform a basic system configuration in a CISCO network device.

2.4.1 Basic system configuration

1. Use Packet Tracer to assemble the network shown in Figure 2.6.
2. Employ the following command to access the privileged mode at the LRT switch:

```
1  Switch> enable
2  Switch#
```

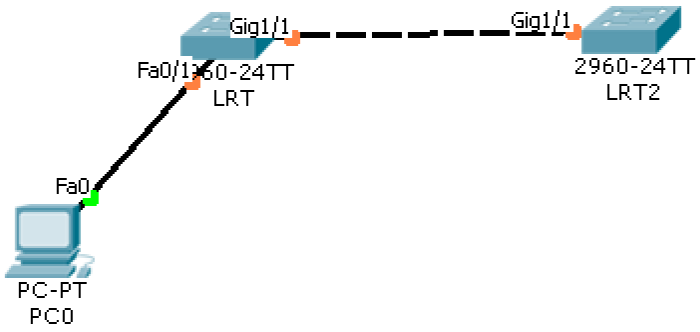

Figure 2.6: Network topology

3. CISCO's operating system provides some help when using the following commands:

```
Switch> show ?
Switch> enable
Switch# show ?
```

4. The default (startup) configuration of a CISCO system is saved at the *startup-config* file. While configuration changes made by the system administrator are saved in the *running-config* file. The following commands display these files:

```
Switch# show running-config
Switch# show startup-config
```

5. Commands for naming a network device:

```
Switch# configure terminal
Switch(config)# hostname LRT
LRT(config)# exit
LRT#
```

6. Setting up a password for the console login:

```
LRT# configure terminal
LRT(config)# line console 0
LRT(config-line)# password redesa
LRT(config-line)# login
LRT(config-line)# exit
LRT(config)# exit
```

7. Close the console session and log back in to verify that the password is now requested:

```
LRT# exit
```

8. Setting up a password for the privileged access mode:

```
LRT> enable
LRT# configure terminal
LRT(config)# enable secret labredes
LRT(config)# exit
```

9. Close the session again and log back in. The device will ask for the console password first. Then, access the privileged mode and the device will ask for the password defined in the previous step:

10. Use the following command to verify the device configuration:

```
LRT# show running-config
```

11. Notice that the console password can be read, while the privileged access password is encrypted. Run the following command to encrypt all passwords:

```
LRT# config t
LRT(config)# service password-encryption
LRT(config)# exit
```

12. Verify again the device configuration file:

```
LRT# show running-config
```

13. Notice how all passwords are now encrypted.

14. The following commands allow the administrator to configure an access banner that will display every time a user starts a session. This example employs the "#" character to limit the banner message, but other symbols may be used as well:

```
LRT# config t
LRT(config)# banner motd #Unauthorized Access to this
   device will be prosecuted#
LRT(config)# exit
```

15. Close the session and log back in to verify that the banner displays properly:

16. At this point, changes made to the system will be lost when the device gets powered down. Therefore, it is necessary to copy the contents of the *running-config* file into the *startup-config* file. This procedure will save the current configuration:

```
LRT# copy running-config startup-config
Destination filename [startup-config]? [Enter]
```

2.4.2 Additional configuration

1. When a configuration command is misspelled, the device will try to process the erroneous command and the system will hang for a few seconds. To avoid this problem, it is necessary to disable the DNS lookup by using the following commands:

```
LRT # configure terminal
LRT (config) # no ip domain-lookup
```

2. Use the following command to verify the device's time:

```
LRT# show clock
```

3. Use the following command to set the correct time in the device.

```
LRT# clock set ?
```

4. Use the clock command again to verify that the time has been set correctly.

2.4.3 Configuring the LRT2 switch

Repeat the same instructions in subsections 2.4.1 and 2.4.2 but for the LRT2 switch.

Once you have completed the configuration for the LRT2 switch, save your network model file using your name and the *.pkt* format.

2.5 Report

The report for this Session is the .pkt file generated after all the procedures have been completed.