

Computer Practical – Week 4

Objectives

The aim of this week's computer practical includes:

- Learn how to configure router basic settings
- Understand the purpose and procedure of ARP

Tasks

Accordingly you will need to complete the following tasks in this week's computer practical class:

- a. Packet Tracer - Configure Initial Router Settings
- b. Packet Tracer - Connect a Router to a LAN
- c. Packet Tracer - Examine the ARP Table

Instructions of the activities are given on the next pages.

Assessment

This week's Computer Practical is assessed in class, and it is worth 2% of the total score of the course.

Notes:

- To be awarded marks for this computer practical, a student must attend this week's Computer Practical class and submit the following files using the "Computer Practical-Week 4-Submission" link in Week 4 section of Learnonline course site:
 - The completed .pka file for Packet Tracer activity - Configure Initial Router Settings
 - The completed .pka file for Packet Tracer activity – Connect a Router to a LAN
 - The Word document with your answers for Packet Tracer activity – Examine the ARP Table (see page 10 for details of the Word document)
- Students are expected to make the submission in your Computer Practical class in Week 4, but if you cannot finish all the activities in class, you can complete them and submit the files as required by Sunday 11:59 pm of Week 4.

Packet Tracer - Configure Initial Router Settings

Before start:

Review some of the contents related to this activity by answering the following questions:

- List the 4 major types of memories of a Cisco router.
- Which of the 4 types of memories is volatile storage, which of them are non-volatile storage?
- Where is the startup configuration file stored? Where is the running configuration file stored?

Note:

1. Make sure Packet Tracer has been installed on the computer you are using. If not, download the installation file from Learnonline course site and install it.
2. Download from Learnonline course website (**Computer Practical-Week 4** folder) the Packet Tracer activity file: **wk4-computer-prac-PKA-a-Config-Initial-Router-Settings.pka**
3. Open the Packet Tracer activity file downloaded
4. Follow the instruction **given below** to complete this Packet Tracer activity

Topology



Objectives

Part 1: Verify the Default Router Configuration

Part 2: Configure and Verify the Initial Router Configuration

Part 3: Save the Running Configuration File

Background

In this activity, you will perform basic router configurations. You will secure access to the CLI and console port using encrypted and plain text passwords. You will also configure messages for users logging into the router. These banners also warn unauthorized users that access is prohibited. Finally, you will verify and save your running configuration.

Part 1: Verify the Default Router Configuration

Step 1: Establish a console connection to R1.

- a. Choose a **Console** cable from the available connections.
- b. Click **PCA** and select **RS 232**.
- c. Click **R1** and select **Console**.
- d. Click **PCA > Desktop** tab > **Terminal**.
- e. Click **OK** and press **ENTER**. You are now able to configure **R1**.

Step 2: Enter privileged mode and examine the current configuration.

You can access all the router commands from privileged EXEC mode. However, because many of the privileged commands configure operating parameters, privileged access should be password-protected to prevent unauthorized use.

- a. Enter privileged EXEC mode by entering the **enable** command.

```
Router> enable
Router#
```

Notice that the prompt changed in the configuration to reflect privileged EXEC mode.

- b. Enter the **show running-config** command:

```
Router# show running-config
```

- c. Answer the following questions:

What is the router's hostname? _____

How many Fast Ethernet interfaces does the Router have? _____

How many Gigabit Ethernet interfaces does the Router have? _____

How many Serial interfaces does the router have? _____

What is the range of values shown for the vty lines? _____

- d. Display the current contents of NVRAM.

```
Router# show startup-config
startup-config is not present
```

Why does the router respond with the startup-config is not present message?

Part 2: Configure and Verify the Initial Router Configuration

To configure parameters on a router, you may be required to move between various configuration modes. Notice how the prompt changes as you navigate through the router.

Step 1: Configure the initial settings on R1.

Note: If you have difficulty remembering the commands, refer to the content for this topic. The commands are the same as you configured on a switch.

- a. **R1** as the hostname.
- b. Use the following passwords:
- 1) Console: **letmein**
 - 2) Privileged EXEC, unencrypted: **cisco**
 - 3) Privileged EXEC, encrypted: **itsasecret**
- c. Encrypt all plain text passwords.
- d. Message of the day text: `Unauthorized access is strictly prohibited.`

Step 2: Verify the initial settings on R1.

- a. Verify the initial settings by viewing the configuration for R1. What command do you use?

- b. Exit the current console session until you see the following message:

R1 con0 is now available

Press RETURN to get started.

- c. Press **ENTER**; you should see the following message:

Unauthorized access is strictly prohibited.

User Access Verification

Password:

Why should every router have a message-of-the-day (MOTD) banner?

If you are not prompted for a password, what console line command did you forget to configure?

- d. Enter the passwords necessary to return to privileged EXEC mode.

Why would the **enable secret** password allow access to the privileged EXEC mode and the **enable password** no longer be valid?

If you configure any more passwords on the router, are they displayed in the configuration file as plain text or in encrypted form? Explain.

Part 3: Save the Running Configuration File

Step 1: Save the configuration file to NVRAM.

- a. You have configured the initial settings for **R1**. Now back up the running configuration file to NVRAM to ensure that the changes made are not lost if the system is rebooted or loses power.

What command did you enter to save the configuration to NVRAM?

What is the shortest, unambiguous version of this command? _____

Which command displays the contents of the NVRAM? _____

- b. Verify that all of the parameters configured are recorded. If not, analyze the output and determine which commands were not done or were entered incorrectly. You can also click **Check Results** in the instruction window.

Step 2: Save the startup configuration file to flash.

As an added backup procedure, you can save your startup configuration file to flash. By default, the router still loads the startup configuration from NVRAM, but if NVRAM becomes corrupt, you can restore the startup configuration by copying it over from flash.

Complete the following steps to save the startup configuration to flash.

- a. Examine the contents of flash using the **show flash** command:

```
R1# show flash
```

How many files are currently stored in flash? _____

Which of these files would you guess is the IOS image? _____

Why do you think this file is the IOS image?

- b. Save the startup configuration file to flash using the following commands:

```
R1# copy startup-config flash
```

```
Destination filename [startup-config]
```

The router prompts to store the file in flash using the name in brackets. If the answer is yes, then press **ENTER**; if not, type an appropriate name and press **ENTER**.

- c. Use the **show flash** command to verify the startup configuration file is now stored in flash.

Packet Tracer - Connect a Router to a LAN

Before start:

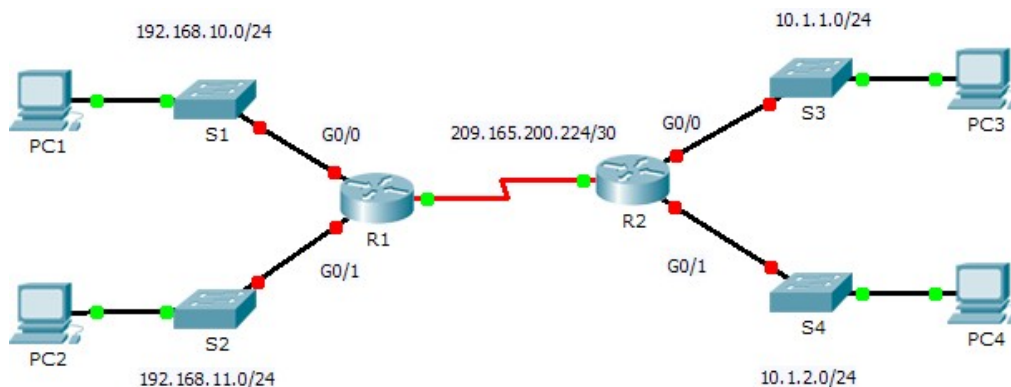
Review the contents related to this activity by answering the following questions:

- Referring to the topology diagram and the IP addressing table below, would PC1 and PC2 be able to communicate with each other without the router, R1? Justify your answer.
- Which interfaces of R1 are PC1 and PC2's default gateways, respectively?
- Which CLI command is used to show the routing table on a Cisco router?
- For the entries/rows in a Cisco routing table, what do the first letters "C" and "D" refer to respectively?

Note:

1. Download from Learnonline course website (Computer **Practical-Week 4** folder) the Packet Tracer activity file: **wk4-computer-prac-PA-b-Connect-Router-to-LAN.pka**, and open the activity file downloaded.
2. Follow the instruction **given below** to complete this Packet Tracer activity

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.10.1	255.255.255.0	N/A
	G0/1	192.168.11.1	255.255.255.0	N/A
	S0/0/0 (DCE)	209.165.200.225	255.255.255.252	N/A
R2	G0/0	10.1.1.1	255.255.255.0	N/A
	G0/1	10.1.2.1	255.255.255.0	N/A
	S0/0/0	209.165.200.226	255.255.255.252	N/A
PC1	NIC	192.168.10.10	255.255.255.0	192.168.10.1
PC2	NIC	192.168.11.10	255.255.255.0	192.168.11.1
PC3	NIC	10.1.1.10	255.255.255.0	10.1.1.1
PC4	NIC	10.1.2.10	255.255.255.0	10.1.2.1

Objectives

Part 1: Display Router Information

Part 2: Configure Router Interfaces

Part 3: Verify the Configuration

Background

In this activity, you will use various **show** commands to display the current state of the router. You will then use the Addressing Table to configure router Ethernet interfaces. Finally, you will use commands to verify and test your configurations.

Note: The routers in this activity are partially configured. Some of the configurations are not covered in this course, but are provided to assist you in using verification commands.

Part 1: Display Router Information

Step 1: Display interface information on R1.

Note: Click a device and then click the **CLI** tab to access the command line directly. The console password is **cisco**. The privileged EXEC password is **class**.

- a. Which command displays the statistics for all interfaces configured on a router? _____
- b. Which command displays the information about the Serial 0/0/0 interface only? _____
- c. Enter the command to display the statistics for the Serial 0/0/0 interface on R1 and answer the following questions:
 - 1) What is the IP address configured on **R1**? _____
 - 2) What is the bandwidth on the Serial 0/0/0 interface? _____
- d. Enter the command to display the statistics for the GigabitEthernet 0/0 interface and answer the following questions:
 - 1) What is the IP address on **R1**? _____
 - 2) What is the MAC address of the GigabitEthernet 0/0 interface? _____
 - 3) What is the bandwidth on the GigabitEthernet 0/0 interface? _____

Step 2: Display a summary list of the interfaces on R1.

- a. Which command displays a brief summary of the current interfaces, statuses, and IP addresses assigned to them?

- b. Enter the command on each router and answer the following questions:
 - 1) How many serial interfaces are there on **R1** and **R2**? _____
 - 2) How many Ethernet interfaces are there on **R1** and **R2**?

 - 3) Are all the Ethernet interfaces on **R1** the same? If no, explain the difference(s).

Step 3: Display the routing table on R1.

- a. What command displays the content of the routing table? _____
- b. Enter the command on **R1** and answer the following questions:
 - 1) How many connected routes are there (uses the C code)? _____
Which route is listed? _____
 - 2) How does a router handle a packet destined for a network that is not listed in the routing table?

Part 2: Configure Router Interfaces

Step 1: Configure the GigabitEthernet 0/0 interface on R1.

- a. Enter the following commands to address and activate the GigabitEthernet 0/0 interface on **R1**:

```
R1(config)# interface gigabitethernet 0/0
R1(config-if)# ip address 192.168.10.1 255.255.255.0
R1(config-if)# no shutdown
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
```
- b. It is good practice to configure a description for each interface to help document the network information. Configure an interface description indicating to which device it is connected.

```
R1(config-if)# description LAN connection to S1
```
- c. **R1** should now be able to ping PC1.

```
R1(config-if)# end
%SYS-5-CONFIG_I: Configured from console by console
R1# ping 192.168.10.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.10, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/2/8 ms
```

Step 2: Configure the remaining Gigabit Ethernet Interfaces on R1 and R2.

- a. Use the information in the Addressing Table to finish the interface configurations for **R1** and **R2**. For each interface, do the following:
 - 1) Enter the IP address and activate the interface.
 - 2) Configure an appropriate description.
- b. Verify interface configurations.

Step 3: Back up the configurations to NVRAM.

Save the configuration files on both routers to NVRAM. What command did you use?

Part 3: Verify the Configuration

Step 1: Use verification commands to check your interface configurations.

- a. Use the **show ip interface brief** command on both **R1** and **R2** to quickly verify that the interfaces are configured with the correct IP address and active.

How many interfaces on **R1** and **R2** are configured with IP addresses and in the “up” and “up” state?

What part of the interface configuration is NOT displayed in the command output? _____

What commands can you use to verify this part of the configuration?

- b. Use the **show ip route** command on both **R1** and **R2** to view the current routing tables and answer the following questions:

- 1) How many connected routes (uses the **C** code) do you see on each router? _____
- 2) How many EIGRP routes (uses the **D** code) do you see on each router? _____
- 3) If the router knows all the routes in the network, then the number of connected routes and dynamically learned routes (EIGRP) should equal the total number of LANs and WANs. How many LANs and WANs are in the topology? _____
- 4) Does this number match the number of C and D routes shown in the routing table? _____

Note: If your answer is “no”, then you are missing a required configuration. Review the steps in Part 2.

Step 2: Test end-to-end connectivity across the network.

You should now be able to ping from any PC to any other PC on the network. In addition, you should be able to ping the active interfaces on the routers. For example, the following tests should be successful:

- From the command line on PC1, ping PC4.
- From the command line on R2, ping PC2.

Note: For simplicity in this activity, the switches are not configured; you will not be able to ping them.

Packet Tracer - Examine the ARP Table

Before start:

1. Go through Week 4 slides no. 21-25. Slides no. 23-25 contains 3 videos introducing how ARP works.
2. Download from Learnonline course website (**Computer Practical-Week4** folder) the Packet Tracer activity file: **wk4-computer-prac-PKA-c-Examine-ARP-Table.pka**
3. Open the Packet Tracer activity file downloaded
4. Download from Learnonline course website (**Computer Practical-Week4** folder) the Word file: **week4-computer-prac-PKA-c-Instruction-Questions.docx**

Reminder

1. Follow the instruction in the Word document to complete this Packet Tracer activity. Answer ALL questions in the word document by typing your answers in the space provided in the Word document.
2. Save the Word document with your answers and submit the Word document as part of your Week 4 computer practical submission.