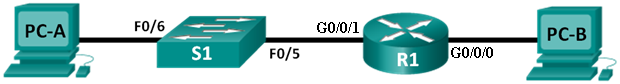
EE3009 Lab 1-1

Lab 1.1.4.6 – Configuring Basic Router Settings with IOS CLI – PT (Sem B 2020/21)



1. Addressing Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| R1 | G0/0/0 | 192.168.1.1 | 255.255.255.0 | N/A |
|  | G0/0/1 | 192.168.2.1 | 255.255.255.0 | N/A |
| PC-A | NIC | 192.168.2.3 | 255.255.255.0 | 192.168.2.1 |
| PC-B | NIC | 192.168.1.3 | 255.255.255.0 | 192.168.1.1 |

1. Objectives

Part 1: Set Up the Topology and Initialize Devices

* Cable equipment to match the network topology.

Part 2: Configure Devices and Verify Connectivity

* Assign static IPv4 information to the PC interfaces.
* Configure basic router settings.
* Verify network connectivity.
* Configure the router for SSH.

Part 3: Display Router Information

* Retrieve hardware and software information from the router.
* Interpret the output from the startup configuration.
* Interpret the output from the routing table.
* Verify the status of the interfaces.

Part 4: Configure IPv6 and Verify Connectivity

1. Background / Scenario

This is a comprehensive lab to review previously covered IOS router commands. In Parts 1 and 2, you will cable the equipment and complete basic configurations and IPv4 interface settings on the router.

In Part 3, you will use SSH to connect to the router remotely and utilize IOS commands to retrieve information from the device to answer questions about the router. In Part 4, you will configure IPv6 on the router so that PC-B can acquire an IP address and then verify connectivity.

For review purposes, this lab provides the commands necessary for specific router configurations.

**Note**: The routers used with CCNA hands-on labs are Cisco 4321 Integrated Services Routers (ISRs) with Cisco IOS Release 15.2(4)M3 (universalk9 image). The switches used are Cisco Catalyst 2960 with Cisco IOS Release 15.0(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and output produced might vary from what is shown in the labs.

1. Set Up the Topology and Initialize Devices

***Open the template : lab1\_1146\_template.pkt with the program Packet Tracer.***

* 1. Cable the network as shown in the topology.

1. Configure Devices and Verify Connectivity
   1. Configure the PC interfaces.
      1. Configure the IP address, subnet mask, and default gateway settings on PC-A.
      2. Configure the IP address, subnet mask, and default gateway settings on PC-B.
   2. Configure the router.
      1. Console into the router and enable privileged EXEC mode.

Router> **enable**

Router#

* + 1. Enter into global configuration mode.

Router# **config terminal**

Router(config)#

* + 1. Assign a device name to the router.

Router(config)# **hostname R1**

* + 1. Assign **user** as the console password, establish a timeout, enable login, and add the **logging synchronous** command. The **logging synchronous** command synchronizes debug and Cisco IOS software output and prevents these messages from interrupting your keyboard input.

R1(config)# **line con 0**

R1(config-line)# **password user**

R1(config-line)# **exec-timeout 5 0**

R1(config-line)# **login**

R1(config-line)# **logging synchronous**

R1(config-line)# **exit**

R1(config)#

For the **exec-timeout** command, what do the **5** and **0** represent?

The session will shut down in 5 minutes and 0 seconds.

Assign **vtypass** as the vty password, establish a timeout, enable login, and add the **logging synchronous** command.

R1(config)# **line vty 0 4**

R1(config-line)# **password vtypass**

R1(config-line)# **exec-timeout 5 0**

R1(config-line)# **transport input telnet**

R1(config-line)# **login**

R1(config-line)# **logging synchronous**

R1(config-line)# **exit**

R1(config)#

**Configure the password enpass for enable mode.**

R1(config)#enable secret enpass

R1(config)#exit

R1(config)#

* + 1. Encrypt the clear text passwords.

R1(config)# **service password-encryption**

* + 1. Configure an IP address and interface description. Activate both interfaces on the router.

R1(config)# **int g0/0/0**

R1(config-if)# **description Connection to PC-B**

R1(config-if)# **ip address 192.168.1.1 255.255.255.0**

R1(config-if)# **no shutdown**

R1(config-if)# **int g0/0/1**

R1(config-if)# **description Connection to S1**

R1(config-if)# **ip address 192.168.2.1 255.255.255.0**

R1(config-if)# **no shutdown**

R1(config-if)# **exit**

R1(config)# **exit**

R1#

* + 1. Set the clock on the router; for example:

R1# **clock set 17:00:00 18 Feb 2013**

* + 1. Save the running configuration to the startup configuration file.

R1# **copy running-config startup-config**

Destination filename [startup-config]?

Building configuration...

[OK]

R1#

What would be the result of reloading the router prior to completing the **copy running-config startup-config** command?

The running configuration will be deleted and the router would have no startup configuration. After the restart the user would be asked if they want to enter the initial configuration dialog.

* 1. Verify network connectivity.
     1. Ping PC-B from a command prompt on PC-A.

Were the pings successful? Yes

After completing this series of commands, what type of remote access could be used to access R1?

Telnet

* + 1. Remotely access R1 from PC-A using the Telnet client.

Open Desktop of PC-A, click Telnet/SSH client. Select Telnet option and enter the G0/0/1 interface IP address of R1 (192.168.2.1).

The access password is : vtypass

The enable password is : enpass

The remote access should be successful.

Why is the Telnet protocol considered to be a security risk?

Because in the connecting session, it can be read in plain test and it is not encrypted, the password can be seen using a packet sniffer.

* 1. Configure the router for SSH access.
     1. Enable SSH connections and create a user in the local database of the router.

R1# **configure terminal**

R1(config)# **ip domain-name CCNA-lab.com**

R1(config)# **username admin privilege 15 secret adminpass**

R1(config)# **line vty 0 4**

R1(config-line)# **transport input ssh**

R1(config-line)# **login local**

R1(config-line)# **exit**

R1(config)# **crypto key generate rsa general-keys modulus 1024**

R1(config)# **exit**

* + 1. Remotely access R1 from PC-A using the SSH client.

Open Desktop of PC-A, click Telnet/SSH client. Select SSH option and enter the G0/0/1 interface IP address of R1(192.168.2.1). The user is: admin and the password is adminpass.

The remote access should be successful.

1. Display Router Information

In Part 3, you will use **show** commands from an SSH session to retrieve information from the router.

* 1. Establish an SSH session to R1.

Open Desktop of PC-B, click Telnet/SSH client. Select SSH option and enter the 192.168.1.1 . Log in as **admin** with the password **adminpass**.

* 1. Retrieve important hardware and software information.
     1. Use the **show version** command to answer questions about the router.

What is the name of the IOS image that the router is running?

System image file is "bootflash:/isr4300-universalk9.03.16.05.S.155-3.S5-ext.SPA.bin"

How much non-volatile random-access memory (NVRAM) does the router have?

32768K bytes of non-volatile configuration memory.

How much Flash memory does the router have?

3223551K bytes of flash memory at bootflash:.

* + 1. The **show** commands often provide multiple screens of outputs. Filtering the output allows a user to display certain sections of the output. To enable the filtering command, enter a pipe (**|**) character after a **show** command, followed by a filtering parameter and a filtering expression. You can match the output to the filtering statement by using the **include** keyword to display all lines from the output that contain the filtering expression. Filter the **show version** command, using **show version | include register** to answer the following question.

What is the boot process for the router on the next reload?

In most cases the record (0x2102) will proceed with a normal boot. Loads the operating system from flash memory and loads the startup configuration from NVRAM. If the record is (0x2142), the router will pass the startup configuration and enter the user prompt. If the initial boot fails, the router enters ROMMON mode.

* 1. Display the startup configuration.

Use the **show startup-config** command on the router to answer the following questions.

How are passwords presented in the output?

The key for the vty line is cisco and it is encrypted as 0837585719181604. The key for the line with is cisco and it is encrypted as $1$mERr$yNrBPV8M7v1CvfgBAIZmH0.

* 1. Display the routing table on the router.

Use the **show ip route** command on the router to answer the following questions.

What code is used in the routing table to indicate a directly connected network?

C

How many route entries are coded with a C code in the routing table? 2

* 1. Display a summary list of the interfaces on the router.

Use the **show ip interface brief** command on the router to answer the following question.

What command changed the status of the Gigabit Ethernet ports from administratively down to up?

No shutdown

**Configure IPv6 and Verify Connectivity**

* 1. Assign IPv6 addresses to R1 G0/0/0 and enable IPv6 routing.

**Note**: Assigning an IPv6 address in addition to an IPv4 address on an interface is known as dual stacking, because both the IPv4 and IPv6 protocol stacks are active. By enabling IPv6 unicast routing on R1, PC-B receives the R1 G0/0/0 IPv6 network prefix and can auto-configure its IPv6 address and its default gateway.

* + 1. Assign an IPv6 global unicast address to interface G0/0/0, assign the link-local address in addition to the unicast address on the interface, and enable IPv6 routing.

R1# **configure terminal**

R1(config)# **interface g0/0/0**

R1(config-if)# **ipv6 address 2001:db8:acad:c::1/64**

R1(config-if)# **ipv6 address fe80::1 link-local**

R1(config-if)# **no shutdown**

R1(config-if)# **exit**

R1(config)# **ipv6 unicast-routing**

R1(config)# **exit**

* + 1. Use the **show ipv6 int brief** command to verify IPv6 settings on R1.

If no IPv6 address is assigned to G0/0/1, why is it listed as [up/up]?

The up / up state reflects Layer 1 and Layer 2 status on the interface and does not reflect the status for Layer 3.

On PC-B config, the ipv6 address should select: auto config.

* + 1. Issue the **ipconfig** command on PC-B to examine the IPv6 configuration.

What is the IPv6 address assigned to PC-B?

2001:DB8:ACAD:C:201:C9FF:FE73:C47E

Issue a ping from PC-B to the R1 default gateway link local address.

It should will be successful. If not, troubleshoot.

Issue a ping from PC-B to the R1 IPv6 unicast address 2001:db8:acad:c::1.

It should will be successful. If not, troubleshoot.

**☞** Save your Packet Tracer file (.pkt) and upload to Canvas.