

Course: Cloud and Network Security  
Name: Neville Ngothe Iregi  
Student No.: CS-CNS10-25054  
Date: Tuesday, 23 September 2025

## Week 2: Build a Switch and Router Network Using Packet Tracer

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## Introduction

A **switch** is a hardware device that connects multiple devices within a Local Area network(LAN) and allows them to communicate by receiving and forwarding data packets to their intended destinations through packet switching. It uses a **MAC address** to send data to the correct port at the data link layer (Layer 2) of the OSI model, rather than broadcast the data to all devices. A switch is also used to segment networks into different subnetworks called subnets or LAN segments. Initially, hubs were used in place of switches; they broadcasted data to all connected devices, operating at the physical layer (Layer 1) which presented significant security risks. Switches are more secure because they prevent other devices from seeing traffic not intended for them.

A **router** is a network device that connects two or more packet-switched networks. Routers forward packets to their intended IP addresses and allow multiple devices to use the same Internet connection. A LAN usually requires a single router.

In this lab, I had to cable the equipment as shown in the topology diagram below in Packet Tracer. I then had to configure the devices to match the addressing table. After the configurations had been saved, I had to verify my configurations by testing for network connectivity. I used IOS commands to retrieve information from the devices to answer questions about my network equipment.



**Addressing Table**

Device	Interface	IP Address / Prefix	Default Gateway
R1	G0/0/0	192.168.0.1 /24	N/A
		2001:db8:acad::1/64	

		fe80::1	
G0/0/1		192.168.1.1 /24	N/A
		2001:db8:acad:1::1/64	
		fe80::1	
S1	VLAN 1	192.168.1.2 /24	192.168.1.1
PC-A	NIC	192.168.1.3 /24	192.168.1.1
		2001:db8:acad:1::3/64	fe80::1
PC-B	NIC	192.168.0.3 /24	192.168.0.1
		2001:db8:acad::3/64	fe80::1

## Requirements

- 1 Router (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 1 Switch (Cisco 2960 with Cisco IOS Release 15.2(2) lanbasek9 image or comparable)
- 2 PCs (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

**Note:** The Gigabit Ethernet interfaces on Cisco 4221 routers are autosensing and an Ethernet straight through cable may be used between the router and PC-B. If using another model Cisco router, it may be necessary to use an Ethernet crossover cable.

## Objectives

1. Set Up the Topology and Initialize Devices

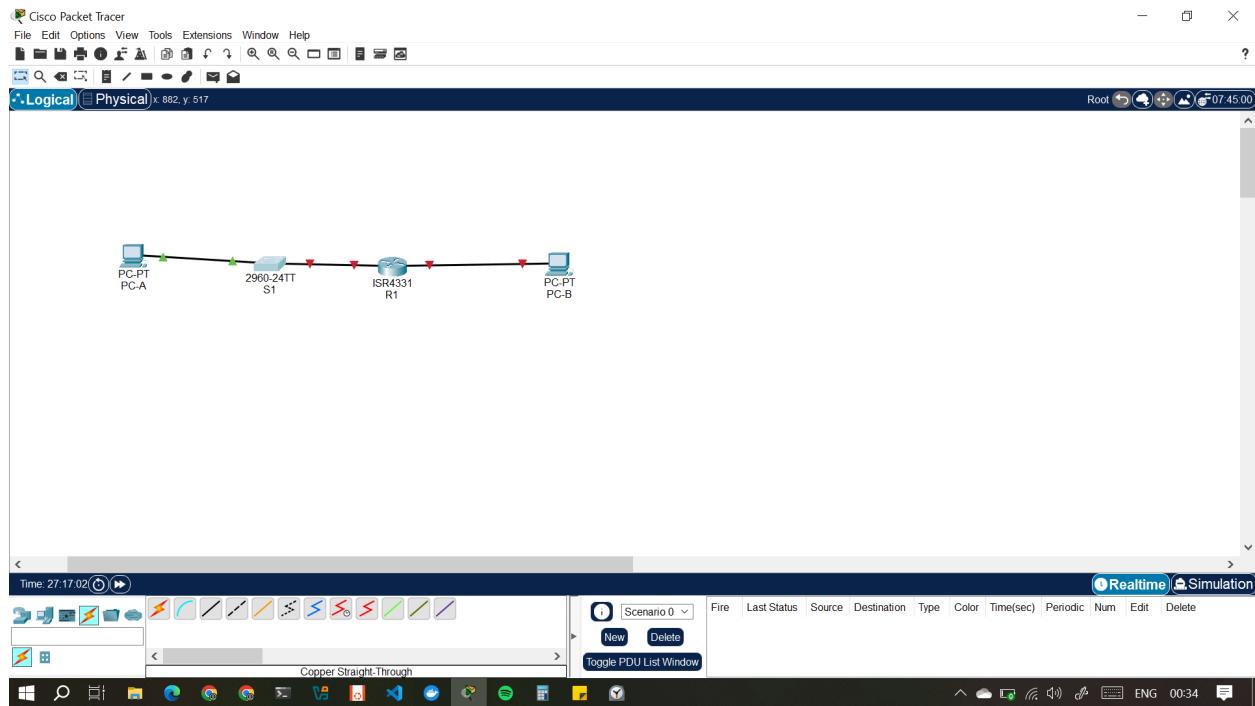
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## 2. Configure Devices and Verify Connectivity

### **Part 1: Set Up Topology and Initialize Devices**

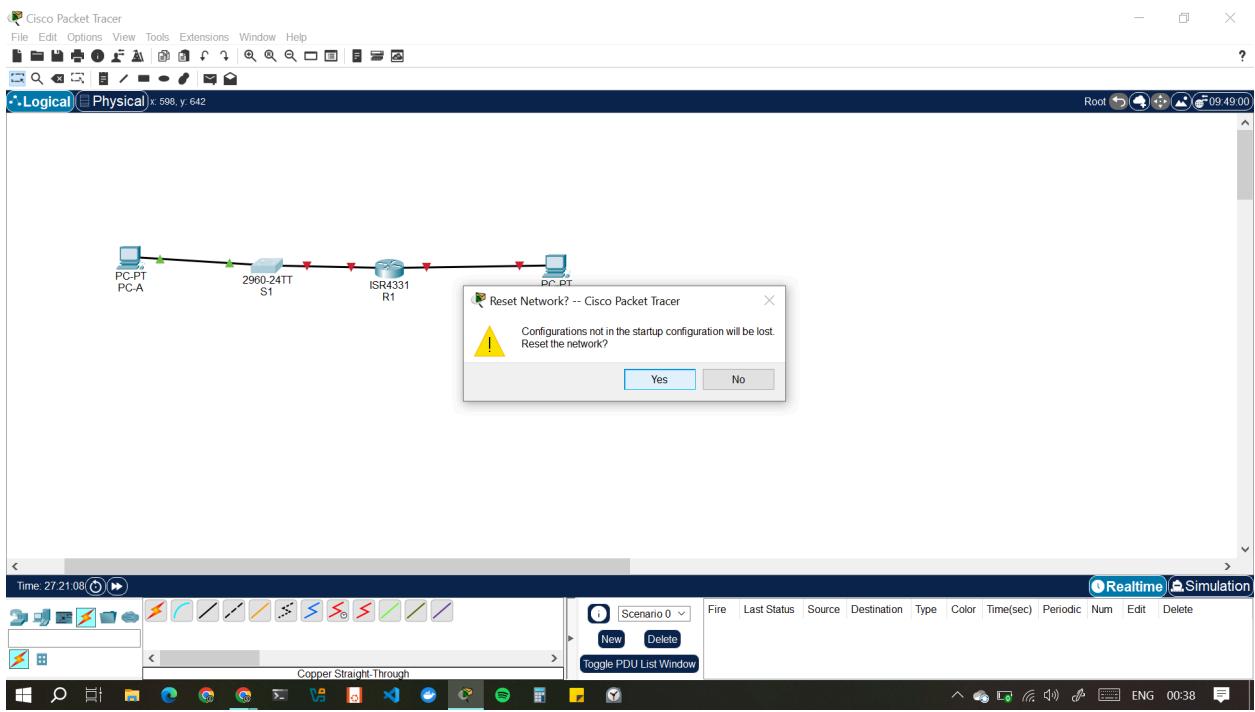
#### **Step 1: Cable the network as shown in the topology.**

- a. Attach the devices shown in the topology diagram, and cable, as necessary.
- b. Power on all the devices in the topology.



#### **Step 2: Initialize and reload the router and switch.**

If configuration files were previously saved on the router and switch, initialize and reload these devices back to their default configurations.

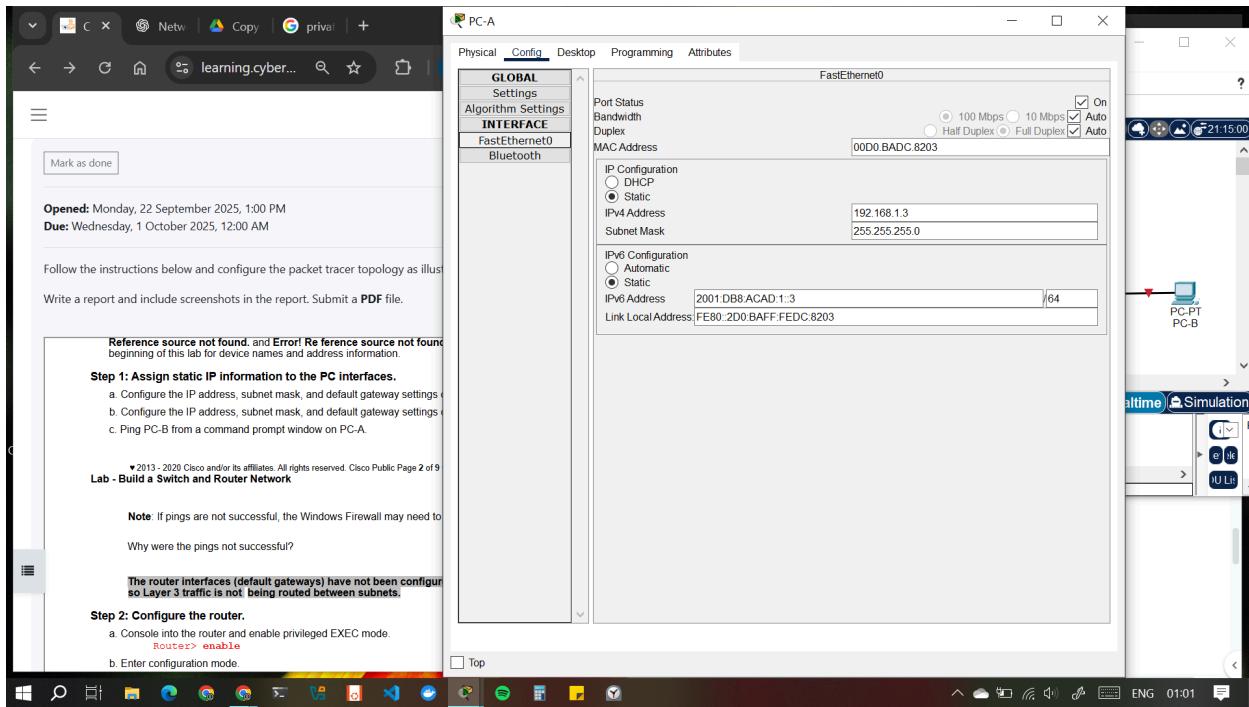
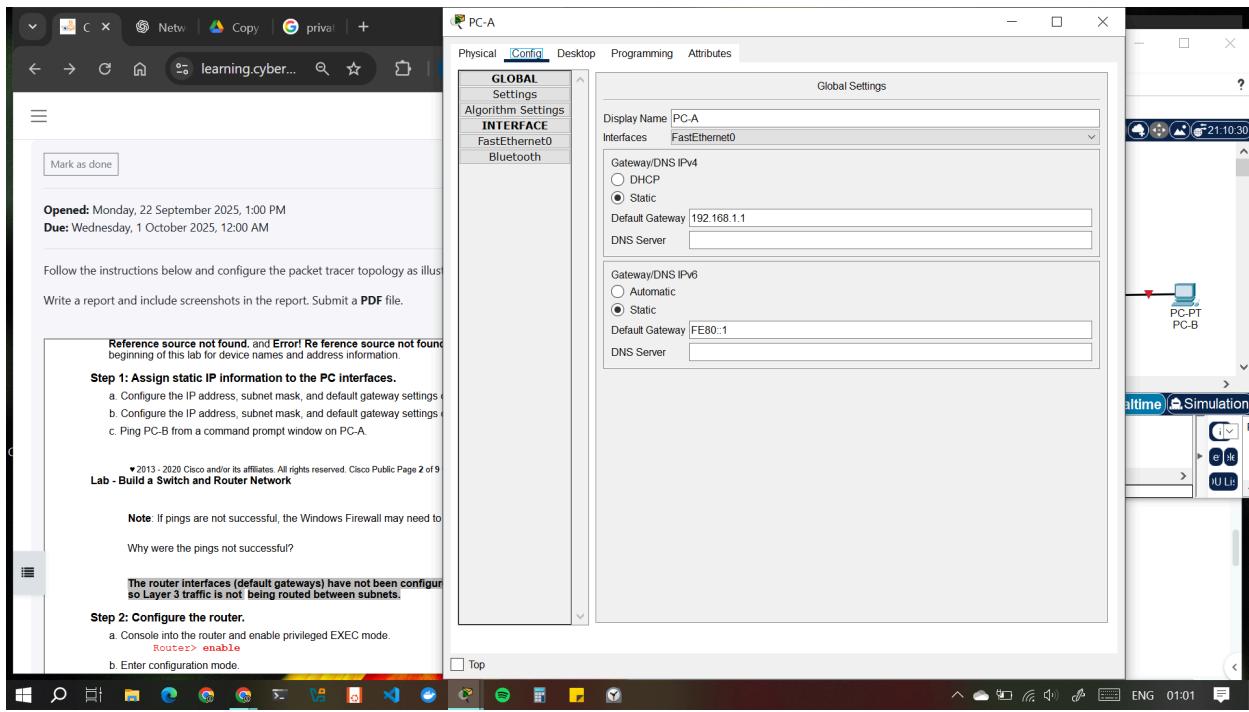


## Part 2: Configure Devices and Verify Connectivity

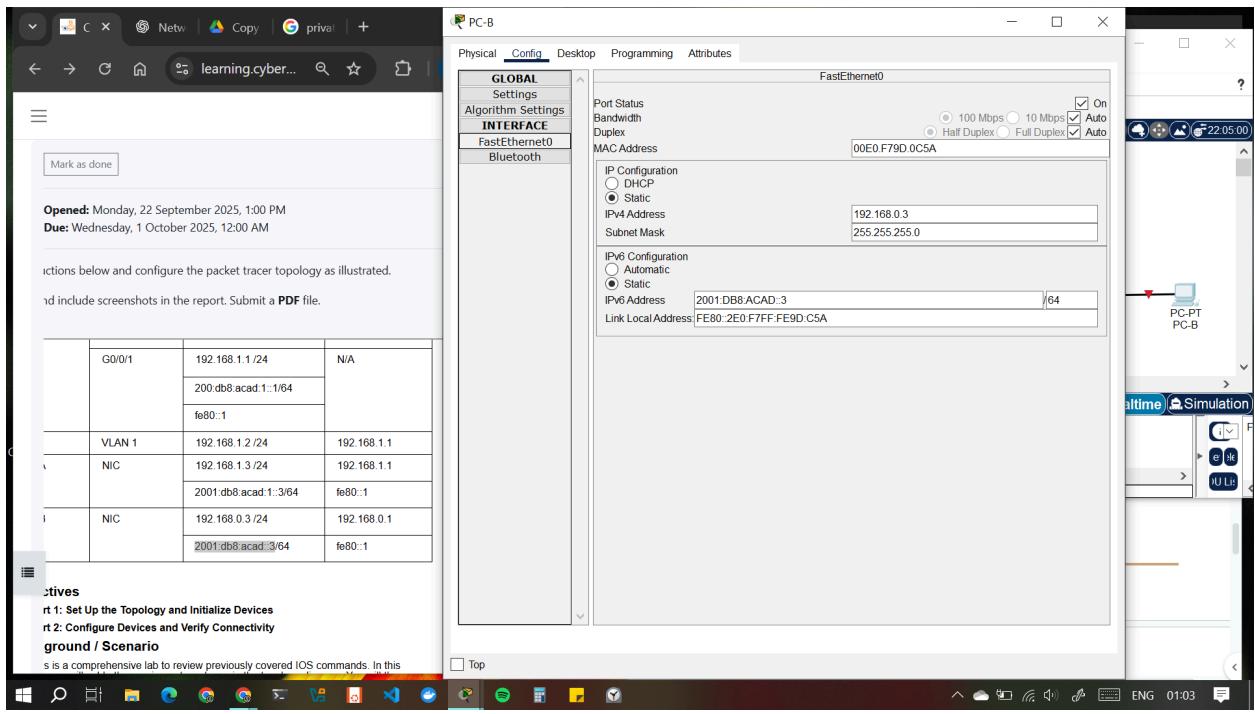
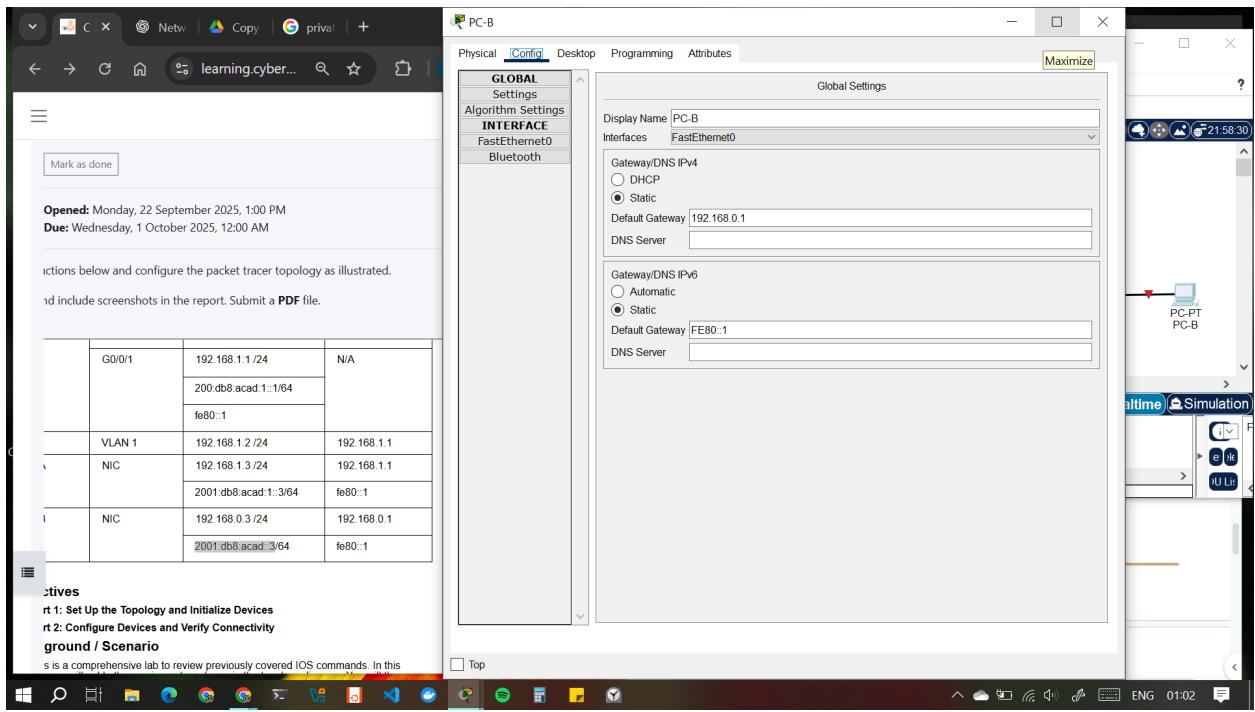
In Part 2, I set up the network topology and configure basic settings, such as the interface IP addresses, device access, and passwords. Refer to the **Error! Reference source not found.** and **Error! Reference source not found.** at the beginning of this lab for device names and address information.

### **Step 1: Assign static IP information to the PC interfaces.**

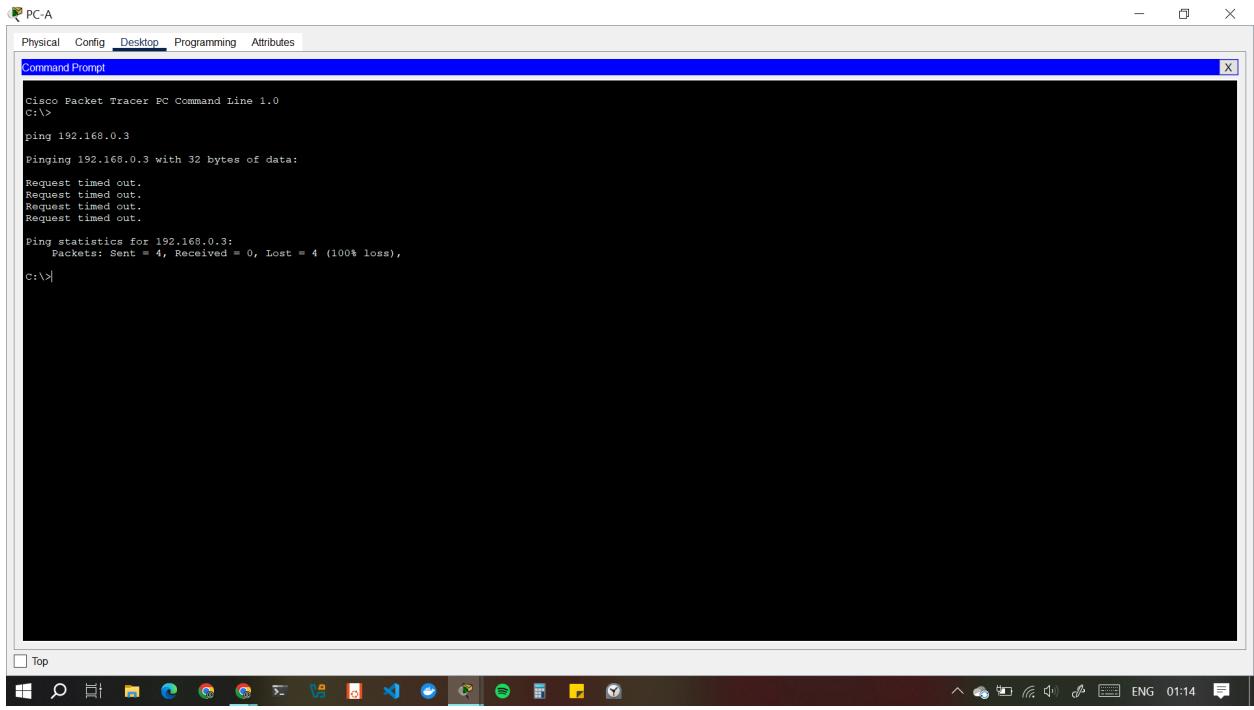
- Configure the IP address, subnet mask, and default gateway settings on PC-A.



- b. Configure the IP address, subnet mask, and default gateway settings on PC-B.



c. Ping PC-B from a command prompt window on PC-A.



The screenshot shows a Windows desktop environment with a Cisco Packet Tracer application window open. The window title is "Command Prompt". The application menu bar includes "Physical", "Config", "Desktop" (which is underlined), "Programming", and "Attributes". The main window displays the following command-line output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>
ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.3:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

The taskbar at the bottom shows various icons for common Windows applications like File Explorer, Internet Explorer, and File Explorer. The system tray on the right shows network status, battery level (ENG), and the time (01:14).

The pings were not successful because the router interfaces(default gateways) were not yet configured, so Layer 3 traffic(using IP addresses) was not routed between subnets.

## Step 2: Configure the router.

- Console into the router and enable privileged EXEC mode i.e.

**Router> enable**

R1

Physical Config **CLI** Attributes

Compiled Thu 19-Jan-17 11:24 by mcpre

IOS Command Line Interface

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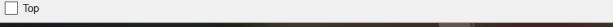
cisco ISR4331/K9 (IRU), processor with 1795999K/6147K bytes of memory.  
Processor board ID FLM232010G0  
3 Gigabit Ethernet interfaces  
32768K bytes of non-volatile configuration memory.  
4194304K bytes of physical memory.  
3223551K bytes of flash memory at bootflash:.

Press RETURN to get started!

Router>enable  
Router#

Top

Copy Paste



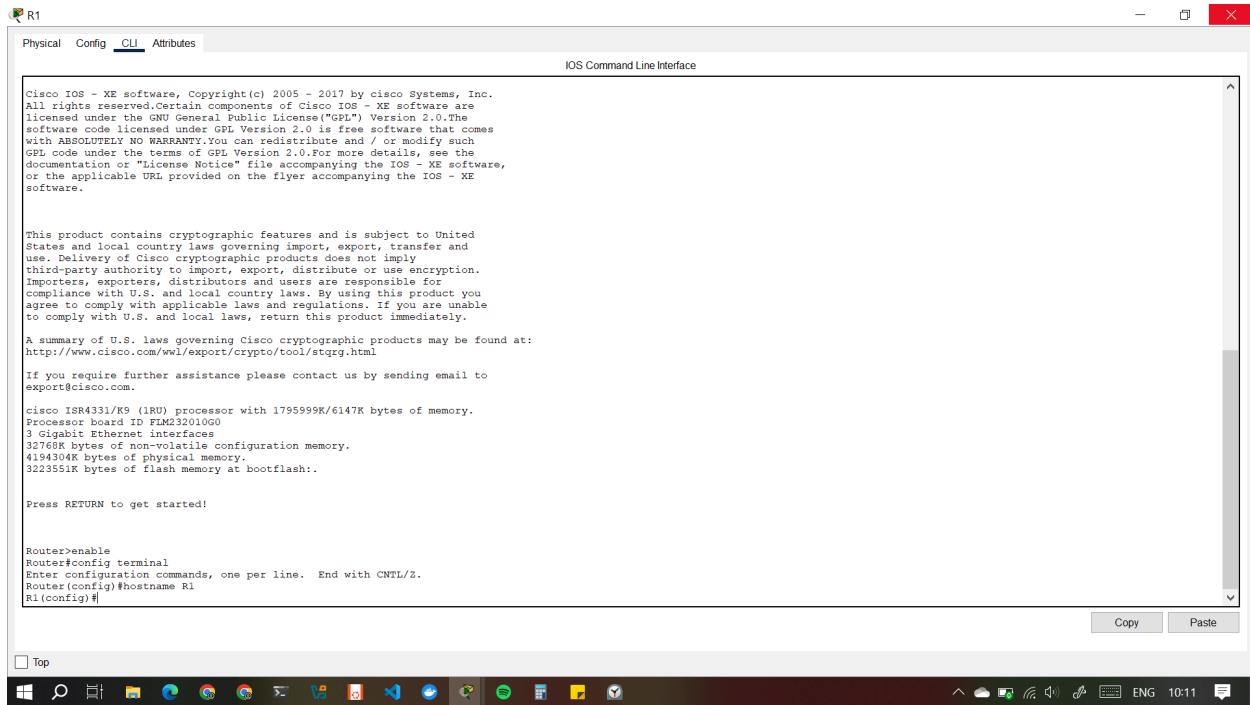
ENG 10:10

b. Enter configuration mode, i.e.

**Router# config terminal**

- c. Assign a device name to the router.

**Router(config)# hostname R1**



```
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Cisco ISR4331/K9 (IRU) processor with 1795999K/6147K bytes of memory.
Processor board ID FIM232010G0
3 Gigabit Ethernet interfaces
32M bytes of nonvolatile configuration memory.
4194304K bytes of physical memory.
3223551K bytes of flash memory at bootflash:.

Press RETURN to get started!

Router>enable
Router>config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#
```

- d. Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names.

**R1(config)# no ip domain lookup**

R1

Physical Config **CLI** Attributes

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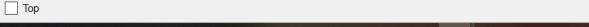
cisco ISR4331/K9 (IRUN processor with 1795999K/6147K bytes of memory.  
Processor board ID: PWR2000  
3 Gigabit Ethernet interfaces  
32768K bytes of non-volatile configuration memory.  
4194304K bytes of physical memory.  
3223551K bytes of flash memory at bootflash:..

Press RETURN to get started!

Router>enable  
Router#config terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname R1  
R1(config)#no ip domain lookup  
R1(config)#

Top

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ENG 10:12

e. Assign class as the privileged EXEC encrypted password.

**R1(config)# enable secret class**

```
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Cisco ISR4331/K9 (IRU) processor with 1795999K/6147K bytes of memory.
Processor board ID FLM232010G0
3 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
3223551K bytes of flash memory at bootflash:.

Press RETURN to get started!

Router#enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain lookup
R1(config)#enable secret class
R1(config)#
```

f. Assign cisco as the console password and enable login.

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

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

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

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1 con0 is now available

Press RETURN to get started.

R1>enable
Password:
Password:
Password:
% Bad secrets

R1>reset
Translating "reset"
% Unknown command or computer name, or unable to find computer address

R1>enable
Password:
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#

```

Top

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g. Assign cisco as the VTY password and enable login.

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

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

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

h. Encrypt the plaintext passwords.

R1(config)# service password-encryption

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1 con0 is now available

Press RETURN to get started.

R1>enable
Password:
Password:
Password:
% Bad secrets

R1>reset
Translating "reset"
% Unknown command or computer name, or unable to find computer address

R1>enable
Password:
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#
```

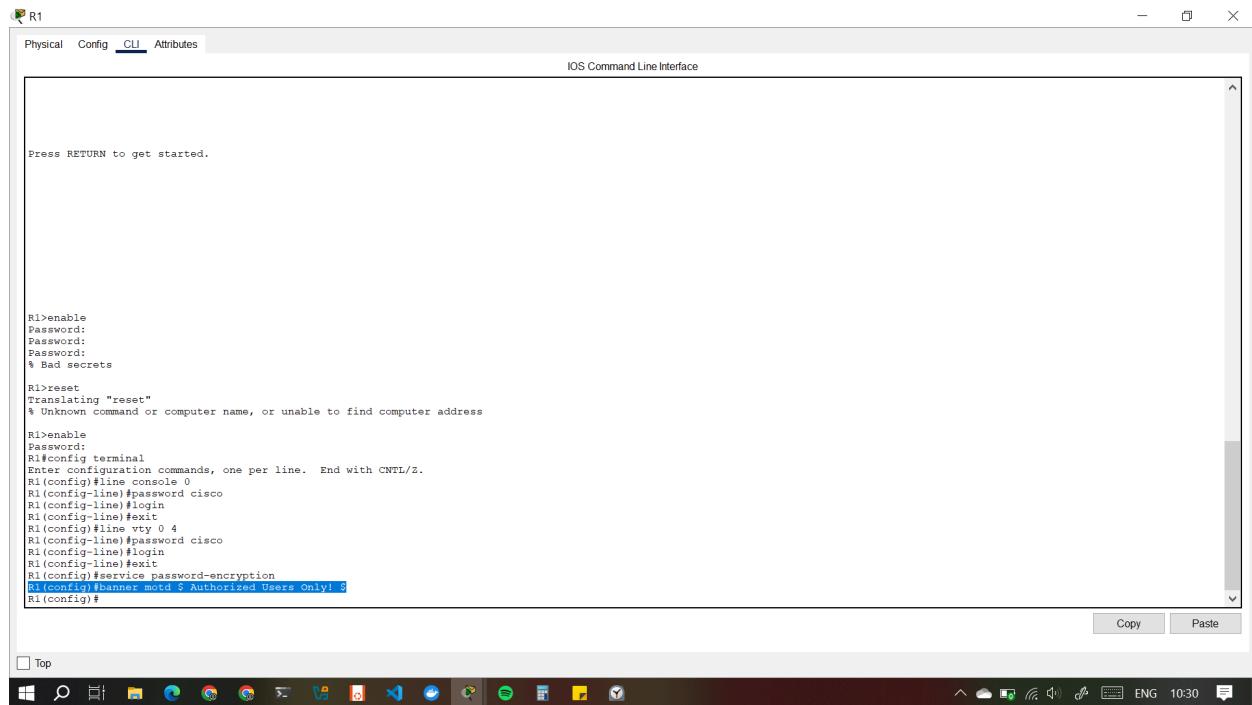
Top

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Windows Taskbar icons: Start, Search, File Explorer, Edge, Chrome, File Manager, Task View, Taskbar settings, Volume, Network, Battery, Signal strength, Notifications, Language, ENG, 10:29

- 
- i. Create a banner that warns anyone accessing the device that unauthorized access is prohibited.

**R1(config)# banner motd \$ Authorized Users Only! \$**



```
R1>enable
Password:
Password:
Password:
% Bad secrets
R1>reset
Translating "reset"
% Unknown command or computer name, or unable to find computer address
R1>enable
Password:
Password:
config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $ Authorized Users Only! $
R1(config)#
```

- j. Configure and activate both interfaces on the router.

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

**R1(config-if)# ip address 192.168.0.1 255.255.255.0**

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

**R1(config-if)# ipv6 address FE80::1 link-local**

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

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

**R1(config)# interface g0/0/1**

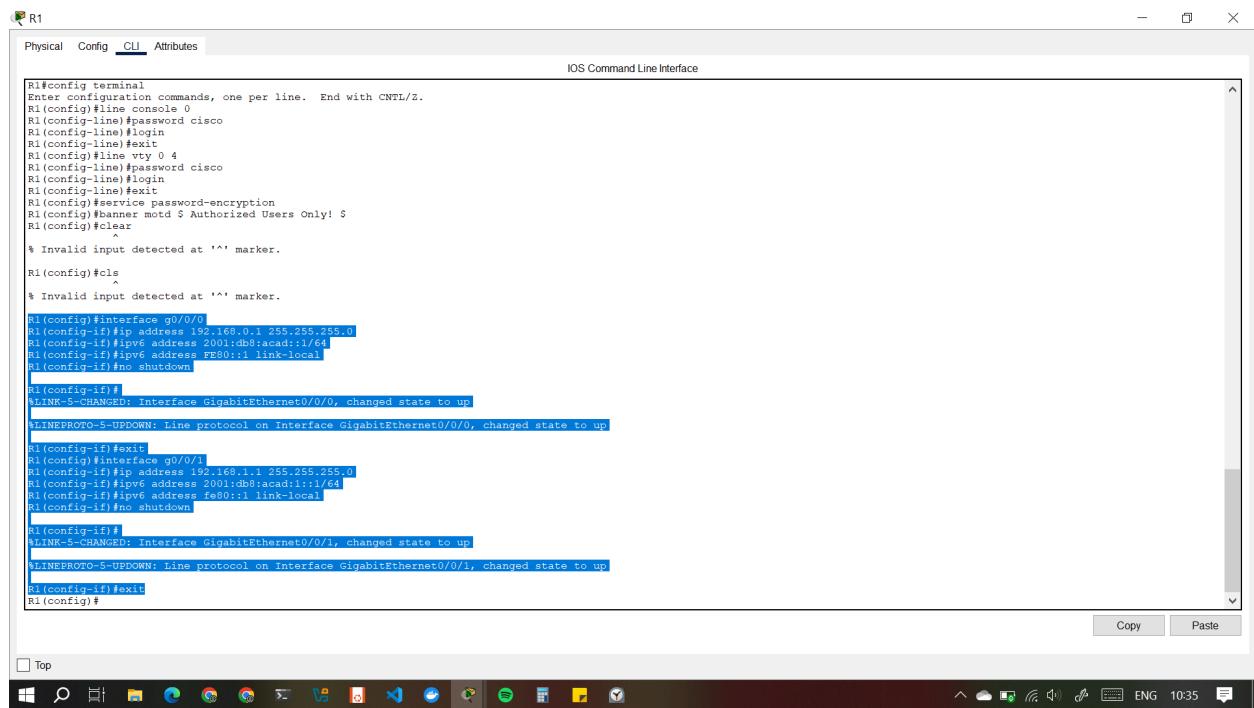
**R1(config-if)# ip address 192.168.1.1 255.255.255.0**

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

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

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

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



```
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#log
R1(config-line)#exit
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $ Authorized Users Only!
R1(config)#clear
% Invalid input detected at '^' marker.
R1(config)#+cls
% Invalid input detected at '^' marker.
R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown
R1(config-if)#
LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown
R1(config-if)#
LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
R1(config-if)#exit
R1(config)#

```

- k. Configure an interface description for each interface indicating which device is connected to it.

**R1(config)# interface g0/0/1**

**R1(config-if)# description Connected to F0/5 on S1**

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

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

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

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

```
R1(config)#line vty 0 4
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $ Authorized Users Only!
R1(config)#clear
% Invalid input detected at '^' marker.

R1(config)#cls
^
% Invalid input detected at '^' marker.

R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1:1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#
R1(config)#interface g0/0/1
R1(config-if)#description Connected to F0/5 on S1
R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to Host PC-B
R1(config-if)#exit
R1(config)#

Copy Paste
```

1. To enable IPv6 routing, enter the command `ipv6 unicast-routing`.

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

```
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $ Authorized Users Only! $
R1(config)#clear
^
% Invalid input detected at '^' marker.

R1(config)#cls
^
% Invalid input detected at '^' marker.

R1(config-if)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acadi:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#shutdown

R1(config-if)#
$LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acadi:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#shutdown

R1(config-if)#
$LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#description Connected to F0/5 on S1
R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to Host PC-B
R1(config-if)#exit
R1(config)#ipv6 unicast-routing
R1(config)#

```

m. Save the running configuration to the startup configuration file.

**R1(config)# exit**

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

```
R1(config)#cls
% Invalid input detected at '^' marker.

R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to F0/5 on S1
R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to Host PC-B
R1(config-if)#exit
R1(config)#ipv6 unicast-routing
R1(config)#exit
R1#
%WGS-5-CONFIG_I: Configured from console by console

R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

n. Set the clock on the router.

**R1# clock set 15:30:00 27 Aug 2019**

Note: Use the question mark (?) to help with the correct sequence of parameters needed to execute this command.

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1(config)#cls
% Invalid input detected at '^' marker.

R1(config)#interface g0/0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acadi:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/1
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acadi:1::1/64
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up

R1(config-if)#exit
R1(config)#interface g0/0/2
R1(config-if)#description Connected to F0/5 on S1
R1(config-if)#exit
R1(config)#interface g0/0/0
R1(config-if)#description Connected to Host PC-B
R1(config-if)#exit
R1(config)#ipv6 unicast-routing
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#clock set 15:30:00 27 Aug 2016
R1#
```

Top

ENG 1040

o. Ping PC-B from a command prompt window on PC-A.

PC-A

Physical Config Desktop Programming Attributes

Command Prompt

Cisco Packet Tracer PC Command Line 1.0

```
C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Reply from 192.168.0.3: bytes=32 time=1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 3ms

C:\>clear
Invalid Command.

C:\>cls
invalid Command.

C:\>clear screen
Invalid Command.

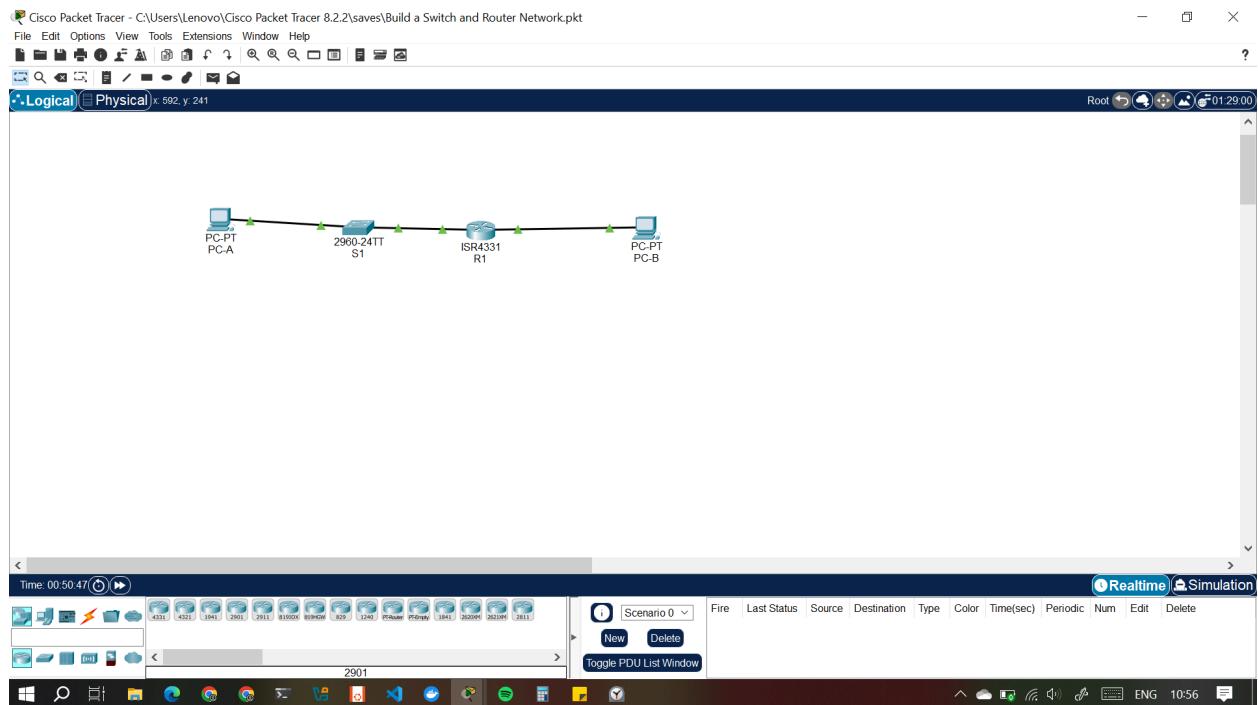
C:\>
```

Top

ENG 1042

Question: Were the pings successful? Explain.

**Answer:** Yes. The router is routing the ping traffic across the two subnets. The default settings for the 2960 switch will automatically turn up the interfaces that are connected to devices.



### Step 3: Configure the switch.

In this step, I configured the hostname, the VLAN 1 interface and its default gateway.

- **A VLAN (Virtual Local Area Network)** is a way to logically divide a single physical LAN into multiple smaller, isolated virtual networks based on software, rather than physical cables. This allows network administrators to group devices for functional or security reasons, create separate broadcast domains, improve network efficiency, and manage traffic more effectively on the same network hardware

- a. Console into the switch and enable privileged EXEC mode.

## Switch> enable

The screenshot shows a Windows desktop with two open windows. The left window is a web browser displaying a 'Router Network' configuration page with instructions and a form. The right window is a 'Cisco IOS Command Line Interface' window titled 'S1' showing system statistics and configuration commands.

**Browser Window Content:**

- Router Network**
- Mark as done**
- Opened:** Monday, 22 September 2025, 1:00 PM  
**Due:** Wednesday, 1 October 2025, 12:00 AM
- Follow the instructions below and configure the packet tracer topology as illustrated.
- Write a report and include screenshots in the report. Submit a **PDF** file.
- Were the pings successful? Explain.**
- Yes. The router is routing the ping traffic across the two subnets. settings for the 2960 switch will automatically turn up the interfaces connected to devices.**
- Step 3: Configure the switch.**
  - In this step, you will configure the hostname, the VLAN 1 interface and its gateway.
  - a. Console into the switch and enable privileged EXEC mode.  
Switch> enable
  - b. Enter configuration mode.  
Switch# config terminal
  - c. Assign a device name to the switch.  
Switch(config)# hostname S1
  - d. Disable DNS lookup to prevent the router from attempting to translate entered commands as though they were host names.  
S1(config)# no ip domain-lookup

**Cisco IOS Command Line Interface (CLI) Window Content:**

```
System Information
2 Gigabit Ethernet interfaces
The password-recovery mechanism is enabled.
64K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address : 00:50:0F:75:63:CA
Motherboard assembly number : 73-10390-03
Power supply part number : 341-0097-02
Motherboard serial number : FOC10093R12
Power supply serial number : AD81007032H
Model revision number : B0
Motherboard revision number : B0
Model number : WS-C2960-24TT-L
System serial number : FOC1010X104
Top Assembly Part Number : 800-27221-02
Top Assembly Revision Number : A0
Version ID : V02
CIEI Code Number : COM3L00BRA
Hardware Board Revision Number : 0x01

Switch Ports Model SW Version SW Image
----- -----
1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE
(fcl)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#
```

- b. Enter configuration mode.

### Switch# config terminal

S1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
The password-recovery mechanism is enabled.
64K bytes of flash-simulated nonvolatile configuration memory.
Base ethernet MAC Address : 00:50:0F:75:63:CA
Motherboard assembly number : 73-10390-03
Power supply part number : 341-0097-02
Motherboard serial number : FOC10093R12
Power supply serial number : A281007032H
Model revision number : 10
Motherboard revision number : B0
Model number : WS-C2960-24TT-L
System serial number : FOC1010X104
Top Assembly Part Number : 800-27221-02
Top Assembly Revision Number : A0
Version ID : V02
CLET Code Number : COM3L00BRA
Hardware Board Revision Number : 0x01

Switch Ports Model SW Version SW Image
----- -----
* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M

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Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#

Copy Paste
```

Top

ENG 11:59

c. Assign a device name to the switch.

**Switch(config)# hostname S1**

S1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
The password-recovery mechanism is enabled.
64K bytes of flash-simulated nonvolatile configuration memory.
Base ethernet MAC Address : 00:50:0F:75:63:CA
Motherboard assembly number : 73-10390-03
Power supply part number : 341-0097-02
Motherboard serial number : FOC10093R12
Power supply serial number : A281007032H
Model revision number : 10
Motherboard revision number : B0
Model number : WS-C2960-24TT-L
System serial number : FOC1010X104
Top Assembly Part Number : 800-27221-02
Version ID : V02
CLET Code Number : COM3L00BRA
Hardware Board Revision Number : 0x01

Switch Ports Model SW Version SW Image
----- -----
* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M

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Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#

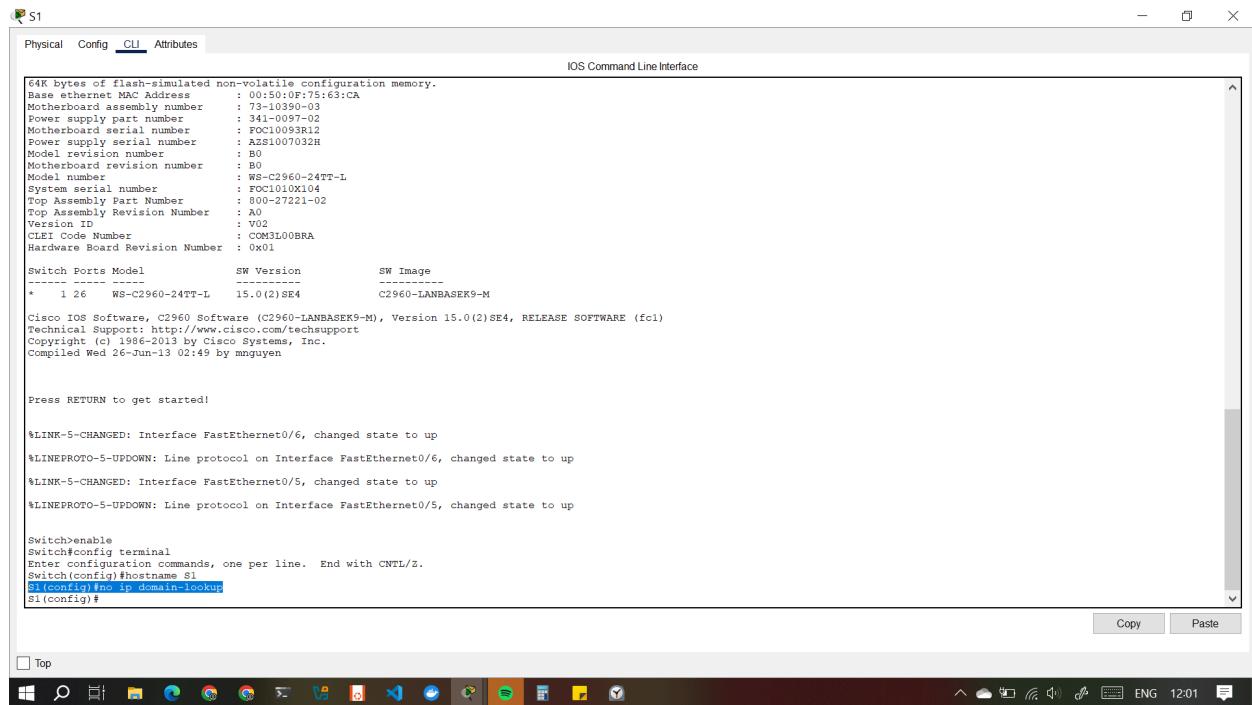
Copy Paste
```

Top

ENG 11:59

- d. Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names.

**S1(config)# no ip domain-lookup**



```

S1
Physical Config CLI Attributes
IOS Command Line Interface

64K bytes of flash-simulated non-volatile configuration memory.
Base Ethernet MAC Address : 00:50:0f:75:63:CA
Motherboard assembly number : 73-1030-03
Power supply part number : 341-0087-02
Motherboard serial number : FOC10093R12
Power supply serial number : A2S1007032H
Model revision number : B0
Motherboard revision number : B0
Model number : WS-C2960-24TT-L
System serial number : FOC1010X104
Top Assembly Part Number : 800-27221-02
Top Assembly Revision Number : A0
Version ID : V02
CMEF Code Number : COM3100BRA
Hardware Board Revision Number : 0x01

Switch Ports Model          SW Version      SW Image
-----  -----
*   1 26    WS-C2960-24TT-L  15.0(2)SE4  C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#

```

- e. Configure and activate the VLAN interface on the switch S1.

**S1(config)# interface vlan 1**

**S1(config-if)# ip address 192.168.1.2 255.255.255.0**

**S1(config-if)# no shutdown**

**S1(config-if)# exit**

```
* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#ip domain-lockup
S1(config)#interface vlan 1
S1(config-if)#ip address 192.168.1.2 255.255.255.0
S1(config-if)#shutdown
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
S1(config)#
S1(config)#
*SYS-5-CONFIG_I: Configured from console by console
S1#
S1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#

Copy Paste
```

f. Configure the default gateway for the switch S1.

**S1(config)# ip default-gateway 192.168.1.1**

**S1(config-if)# exit**

g. Save the running configuration to the startup configuration file.

```
Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up

Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#interface vlan 1
S1(config-if)#ip address 192.168.1.2 255.255.255.0
S1(config-if)#shutdown
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
S1(config-if)#exit
S1(config)#
S1#
%SYS-5-CONFIG_I: Configured from console by console
S1#
S1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#ip default-gateway 192.168.1.1
S1(config)#exit
S1#
%WDS-5-CONFIG_I: Configured from console by console
S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S1#
```

#### Step 4: Verify connectivity end-to-end connectivity.

- From PC-A, ping PC-B.
- From S1, ping PC-B.

All the pings should be successful.

```

PC-A
Physical Config Desktop Programming Attributes
Command Prompt
Request from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 3ms

C:\>clear
Invalid Command.

C:\>cls
Invalid Command.

C:\>clear screen
Invalid Command.

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Reply from 192.168.0.3: bytes=32 time=<1ms TTL=127

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>

```

Top

Close configuration window

## Part 3: Display Device Information

In Part 3, you will use show commands to retrieve interface and routing information from the router and switch.

### Step 1: Display the routing table on the router.

- Use the show ip route command on the router R1 to answer the following questions.

Open configuration window

**R1# show ip route**

**Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP,**

**EX - EIGRP external, O - OSPF, IA - OSPF inter area**

**N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2**

---

**E1 - OSPF external type 1, E2 - OSPF external type 2**

**i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, \* - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, H - NHRP, 1 - LISP + - replicated route, % - next hop override**

**Gateway of last resort is not set**

**192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks**

**C 192.168.0.0/24 is directly connected, GigabitEthernet0/0/0**

**L 192.168.0.1/32 is directly connected, GigabitEthernet0/0/0**

**192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks**

**C 192.168.1.0/24 is directly connected, GigabitEthernet0/0/1**

**L 192.168.1.1/32 is directly connected, GigabitEthernet0/0/1**

```

R1 Physical Config CLI Attributes
IOS Command Line Interface

Press RETURN to get started.

Authorized Users Only!
User Access Verification
Password:
R1>enable
Password:
Password:
Password:
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, s - per-user static route, o - ODR
      P - periodic downloaded static route
Gateway of last resort is not set
      192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.0.0/24 is directly connected, GigabitEthernet0/0/0
L        192.168.0.1/32 is directly connected, GigabitEthernet0/0/0
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.1.0/24 is directly connected, GigabitEthernet0/0/1
L        192.168.1.1/32 is directly connected, GigabitEthernet0/0/1
R1#

```

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

**Answer:** The C designates a directly connected subnet. An L designates a local interface. Both answers are correct.

**Question:** How many route entries are coded with a C code in the routing table?

**Answer:** 2

**Question:** What interface types are associated with the C coded routes?

**Answer:** GigabitEthernet0/0/0 and GigabitEthernet0/0/1.

- b. Use the show ipv6 route command on router R1 to display the IPv6 routes.

**R1# show ipv6 route**

---

## IPv6 Routing Table - default - 5 entries

**Codes: C - Connected, L - Local, S - Static, U - Per-user Static route B - BGP, R - RIP, H - NHRP, I1 - ISIS L1**

**I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination NDr - Redirect, RL - RPL, O - OSPF Intra, OI - OSPF Inter**

**OE1 - OSPF ext 1, OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1**

**ON2 - OSPF NSSA ext 2, la - LISP alt, lr - LISP site-registrations ld - LISP dyn-eid, IA - LISP away, le - LISP extranet-policy a - Application**

**C 2001:DB8:ACAD::/64 [0/0]**

**via GigabitEthernet0/0/0, directly connected**

**L 2001:DB8:ACAD::1/128 [0/0]**

**via GigabitEthernet0/0/0, receive**

**C 2001:DB8:ACAD:1::/64 [0/0]**

**via GigabitEthernet0/0/1, directly connected**

**L 2001:DB8:ACAD:1::1/128 [0/0]**

**via GigabitEthernet0/0/1, receive**

**L FF00::/8 [0/0]**

**via Null0, receive**

```

R1 Physical Config CLI Attributes
IOS Command Line Interface

Password:
R1>enable
Password:
Password:
Password:
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2, E - EGP
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route
Gateway of last resort is not set

      192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C         192.168.0.0/24 is directly connected, GigabitEthernet0/0/0
L         192.168.0.1/32 is directly connected, GigabitEthernet0/0/0
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C         192.168.1.0/24 is directly connected, GigabitEthernet0/0/1
L         192.168.1.1/32 is directly connected, GigabitEthernet0/0/1

R1#show ipv6 route
IPv6 Routing Table - 5 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
      U - Per-user Static route, M - MIPv6
      I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
      ND - ND Default, NDp - ND Prefix, DCE - Destination, NDR - Redirect
      O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
      ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
      D - EIGRP, EX - EIGRP external
C 2001:DB8::AC:AD::/64 [0/0]
  via GigabitEthernet0/0/0, directly connected
L 2001:DB8::AC:AD::1/128 [0/0]
  via GigabitEthernet0/0/0, receive
C 2001:DB8::AC:AD::/64 [0/0]
  via GigabitEthernet0/0/1, directly connected
L 2001:DB8::AC:AD:1::1/128 [0/0]
  via GigabitEthernet0/0/1, receive
L FF00::/8 [0/0]
  via Null0, receive
R1#

```

## Step 2: Display interface information on the router R1.

- Use the **show ip interface g0/0/1** to answer the following questions.

**R1# show ip interfaces g0/0/1**

**GigabitEthernet0/0/1 is up, line protocol is up**

**Hardware is ISR4321-2x1GE, address is a0e0.af0d.e141 (bia a0e0.af0d.e141)**

**Description: Connected to F0/5 on S1**

**Internet address is 192.168.1.1/24**

**MTU 1500 bytes, BW 100000 Kbit/sec, DLY 100 usec,**

**reliability 255/255, txload 1/255, rxload 1/255**

**Encapsulation ARPA, loopback not set**

---

**Keepalive not supported**

**Full Duplex, 100Mbps, link type is auto, media type is RJ45**

**output flow-control is off, input flow-control is off**

**ARP type: ARPA, ARP Timeout 04:00:00**

**Last input 00:00:00, output 00:00:19, output hang never**

**Last clearing of "show interface" counters never**

**Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo**

**Output queue: 0/40 (size/max)**

**5 minute input rate 0 bits/sec, 0 packets/sec**

**5 minute output rate 0 bits/sec, 0 packets/sec**

**4579 packets input, 637737 bytes, 0 no buffer**

**Received 1092 broadcasts (0 IP multicasts)**

**0 runts, 0 giants, 0 throttles**

**0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored**

**0 watchdog, 2863 multicast, 0 pause input**

**700 packets output, 115187 bytes, 0 underruns**

**0 output errors, 0 collisions, 1 interface resets**

**0 unknown protocol drops**

**0 babbles, 0 late collision, 0 deferred**

**0 lost carrier, 0 no carrier, 0 pause output**

**0 output buffer failures, 0 output buffers swapped out**

```
R1# show ip interfaces g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up (connected)
  Internet address is 192.168.1.124
  Broadcast address is 255.255.255.255
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Outgoing access list is not set
  Inbound access list is not set
  Priority level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachable messages are always sent
  ICMP mask replies are never sent
  IP fast switching is disabled
  IP fast switching spanning tree interface is disabled
  IP float switching is disabled
  IP Fast switching turbo vector
  IP multicast fast switching is disabled
  IP multicast distributed fast switching is disabled
  IP multicast discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is disabled
  Router discovery transmission is disabled
  BGP Policy Mapping is disabled
  Input features: MCI Check
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
R1#
```

## Questions

What is the operational status of the G0/0/1 interface?

**Answer:** GigabitEthernet0/0/1 is up, line protocol is up (connected)

What is the Media Access Control (MAC) address of the G0/1 interface?

**Answer:** 0001.63dc.e102

How is the Internet address displayed in this command?

---

**Answer:** Internet address is 192.168.1.1/24.

- b. For the IPv6 information, enter the **show ipv6 interface** interface command.

**R1# show ipv6 interface g0/0/1**

**GigabitEthernet0/0/1 is up, line protocol is up**

**IPv6 is enabled, link-local address is FE80::1**

**No Virtual link-local address(es):**

**Description: Connected to F0/5 on S1**

**Global unicast address(es):**

**2001:DB8:ACAD:1::1, subnet is 2001:DB8:ACAD:1::/64**

**Joined group address(es):**

**FF02::1**

**FF02::2**

**FF02::1:FF00:1**

**MTU is 1500 bytes**

**ICMP error messages limited to one every 100 milliseconds**

**ICMP redirects are enabled**

**ICMP unreachables are sent**

**ND DAD is enabled, number of DAD attempts: 1**

**ND reachable time is 30000 milliseconds (using 30000)**

**ND advertised reachable time is 0 (unspecified)**

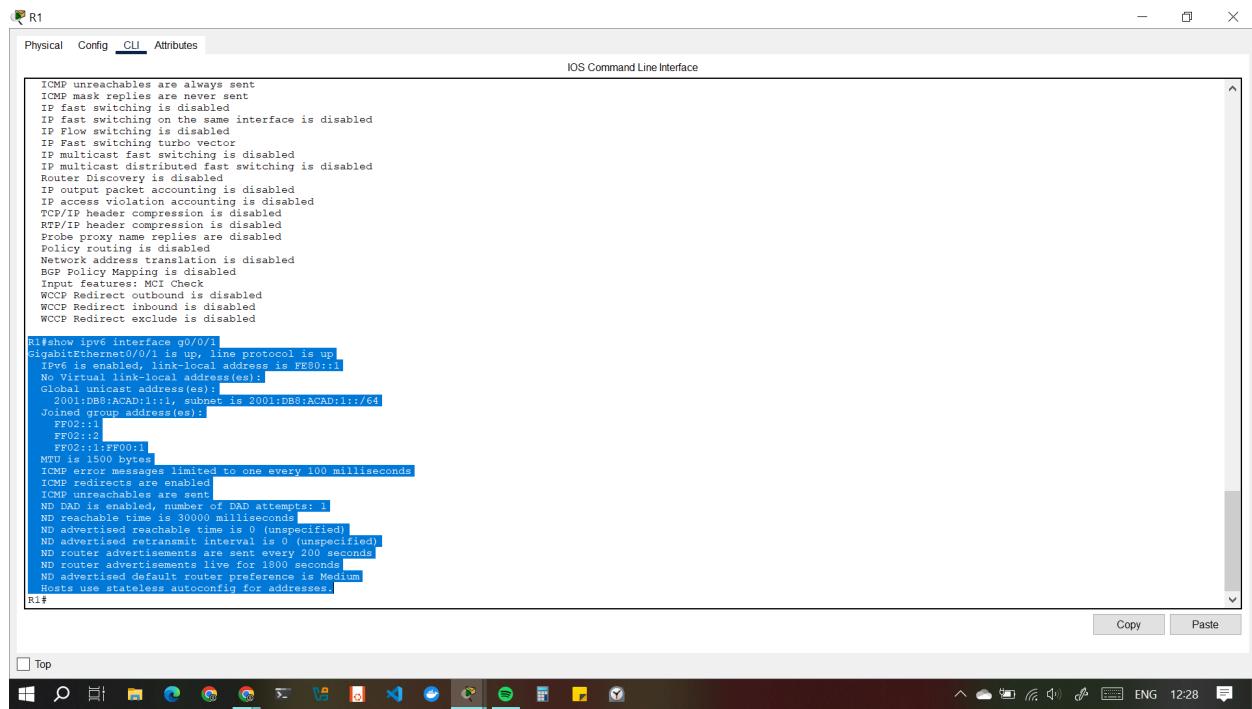
**ND advertised retransmit interval is 0 (unspecified)**

**ND router advertisements are sent every 200 seconds**

**ND router advertisements live for 1800 seconds**

**ND advertised default router preference is Medium**

**Hosts use stateless autoconfig for addresses.**



```
R1
Physical Config CLI Attributes
IOS Command Line Interface

ICMP unreachables are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching topo vector
IP multicasting fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
TCP/IP based compression is disabled
Proxy proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
BGP Policy Mapping is disabled
Input features: MCI Check
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled

R1#show ipv6 interface g0/0/1
GigabitEthernet0/0/1 is up, line protocol is up
  Link layer address is FE80::1
  No Virtual link-local address(es):
  Global unicast address(es):
    2001:DB8:ACAD:1::1, subnet is 2001:DB8:ACAD:1::/64
  Joined group address(es):
    FF02::1
    FF02::1:FF00:1
    FF02::1:1FF00:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachable messages enabled
  Number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 (unspecified)
  ND advertised retransmit interval is 0 (unspecified)
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  ND advertised default router preference is Medium
  Hosts use stateless autoconfig for addresses.

R1#
```

### Step 3: Display a summary list of the interfaces on the router and switch.

There are several commands that can be used to verify an interface configuration. One of the most useful of these is the **show ip interface brief** command. The command output displays a summary list of the interfaces on the device and provides immediate feedback to the status of each interface.

- a. Enter the show ip interface brief command on the router R1.

**R1# show ip interface brief**

**Interface IP-Address OK? Method Status Protocol GigabitEthernet0/0/0 192.168.0.1  
YES manual up up GigabitEthernet0/0/1 192.168.1.1 YES manual up up Serial0/1/0  
unassigned YES unset up up Serial0/1/1 unassigned YES unset up up**

```

R1# show ip interface brief
GigabitEthernet0/0/0    192.168.0.1      YES manual up      up
GigabitEthernet0/0/1    192.168.1.1      YES manual up      up
Serial0/1/0             unassigned       YES unset       administratively down down
Serial0/1/1             unassigned       YES unset       administratively down down

```

- b. To see the IPv6 interface information, enter the show ipv6 interface brief command on R1.

**R1# show ipv6 interface brief**

**GigabitEthernet0/0/0 [up/up]**

**FE80::1**

**2001:DB8:ACAD::1**

**GigabitEthernet0/0/1 [up/up]**

**FE80::1**

**2001:DB8:ACAD:1::1**

**Serial0/1/0 [up/up]**

**Unassigned**

**Serial0/1/1 [up/up]**

**Unassigned**

**GigabitEthernet0 [down/down]**

**Unassigned**

**Close configuration window**

```
R1#show ip vrf brief
VRF Name      VRF ID     State
Global          1          Active
R1#show ip interface brief
Interface      IP Address      OK? Method Status      Protocol
GigabitEthernet0/0/0  192.168.0.1  YES manual up
GigabitEthernet0/0/1  192.168.1.1  YES manual up
GigabitEthernet0/0/2  unassigned   YES unset administratively down down
Vlan1           unassigned   YES unset administratively down down
R1#show ip vrf brief
R1#show ip interface brief
GigabitEthernet0/0/0  [up/up]
  2001:DB8:ACAD:1::1
GigabitEthernet0/0/1  [up/up]
  FE80::1
  2001:DB8:ACAD:1::1
GigabitEthernet0/0/2  [administratively down/down]
Vlan1              [administratively down/down]
R1#
```

- 
- c. Enter the show ip interface brief command on the switch S1.

**Open configuration window**  
**S1# show ip interface brief**

**Interface IP-Address OK? Method Status Protocol Vlan1 192.168.1.2 YES NVRAM**  
**up up FastEthernet0/1 unassigned YES unset down down FastEthernet0/2**  
**unassigned YES unset down down FastEthernet0/3 unassigned YES unset down**  
**down**

**FastEthernet0/4 unassigned YES unset down down**

**FastEthernet0/5 unassigned YES unset up up FastEthernet0/6 unassigned YES**  
**unset up up FastEthernet0/7 unassigned YES unset down down FastEthernet0/8**  
**unassigned YES unset down down FastEthernet0/9 unassigned YES unset down**  
**down**

**FastEthernet0/10 unassigned YES unset down down**

**FastEthernet0/11 unassigned YES unset down down**

**FastEthernet0/12 unassigned YES unset down down**

**FastEthernet0/13 unassigned YES unset down down**

**FastEthernet0/14 unassigned YES unset down down**

**FastEthernet0/15 unassigned YES unset down down**

**FastEthernet0/16 unassigned YES unset down down**

**FastEthernet0/17 unassigned YES unset down down**

**FastEthernet0/18 unassigned YES unset down down**

**FastEthernet0/19 unassigned YES unset down down**

**FastEthernet0/20 unassigned YES unset down down**

**FastEthernet0/21 unassigned YES unset down down**

**FastEthernet0/22 unassigned YES unset down down**

**FastEthernet0/23 unassigned YES unset down down**

**FastEthernet0/24 unassigned YES unset down down**

**GigabitEthernet0/1 unassigned YES unset down down**

**GigabitEthernet0/2 unassigned YES unset down down**

**Close configuration window**

```
S1
Physical Config CLI Attributes
Press RETURN to get started.

IOS Command Line Interface

S1>show ip interface brief
Interface          IP-Address      OK? Method Status        Protocol
FastEthernet0/1    unassigned     YES manual down      down
FastEthernet0/2    unassigned     YES manual down      down
FastEthernet0/3    unassigned     YES manual down      down
FastEthernet0/4    unassigned     YES manual down      down
FastEthernet0/5    unassigned     YES manual up       up
FastEthernet0/6    unassigned     YES manual up       up
FastEthernet0/7    unassigned     YES manual down      down
FastEthernet0/8    unassigned     YES manual down      down
FastEthernet0/9    unassigned     YES manual down      down
FastEthernet0/10   unassigned     YES manual down      down
FastEthernet0/11   unassigned     YES manual down      down
FastEthernet0/12   unassigned     YES manual down      down
FastEthernet0/13   unassigned     YES manual down      down
FastEthernet0/14   unassigned     YES manual down      down
FastEthernet0/15   unassigned     YES manual down      down
FastEthernet0/16   unassigned     YES manual down      down
FastEthernet0/17   unassigned     YES manual down      down
FastEthernet0/18   unassigned     YES manual down      down
FastEthernet0/19   unassigned     YES manual down      down
FastEthernet0/20   unassigned     YES manual down      down
FastEthernet0/21   unassigned     YES manual down      down
FastEthernet0/22   unassigned     YES manual down      down
FastEthernet0/23   unassigned     YES manual down      down
FastEthernet0/24   unassigned     YES manual down      down
GigabitEthernet0/1 unassigned     YES manual down      down
GigabitEthernet0/2 unassigned     YES manual down      up
Vlan1            192.168.1.2  YES manual up       up

S1>
```

## Reflection Questions

- 
1. If the G0/0/1 interface showed that it was administratively down, what interface configuration command would you use to turn the interface up?

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

2. What would happen if you had incorrectly configured interface G0/0/1 on the router with an IP address of 192.168.1.2?

**Answers:** PC-A would not be able to ping PC-B. This is because PC-B is on a different network than PC-A which requires the default-gateway router to route these packets. PC-A is configured to use the IP address of 192.168.1.1 for the default-gateway router, but this address is not assigned to any device on the LAN. Any packets that need to be sent to the default-gateway for routing will never reach their destination.

## **Conclusion**

In this lab, I successfully built a small routed network consisting of a Cisco router, a switch, and two end devices. The devices were properly cabled, powered on, and initialized before configuration. I configured static IP addressing for both IPv4 and IPv6 on the PCs and router interfaces, set up the switch management interface with a default gateway, and implemented basic security measures such as console, VTY, and enable passwords with encryption. Descriptions and banners were also added for proper documentation and security awareness.

After saving the configurations, I verified end-to-end connectivity using **ping tests**, confirming that the router was correctly routing between subnets and that all devices could communicate. I also used various **show commands** (**show ip route**, **show ipv6 route**, **show interfaces**, **show ip interface brief**) to examine routing tables, interface status, MAC addresses, and IPv6 settings. These commands validated both the Layer 2 and Layer 3 configurations.

---

Overall, the lab reinforced key networking skills: **device initialization, interface configuration, IPv4/IPv6 addressing, basic security, and connectivity troubleshooting**. It demonstrated how routers interconnect different networks, how switches provide local connectivity, and how IOS commands can be used to monitor and verify the network. This exercise provided valuable practice in setting up and managing a functional LAN that integrates both IPv4 and IPv6.