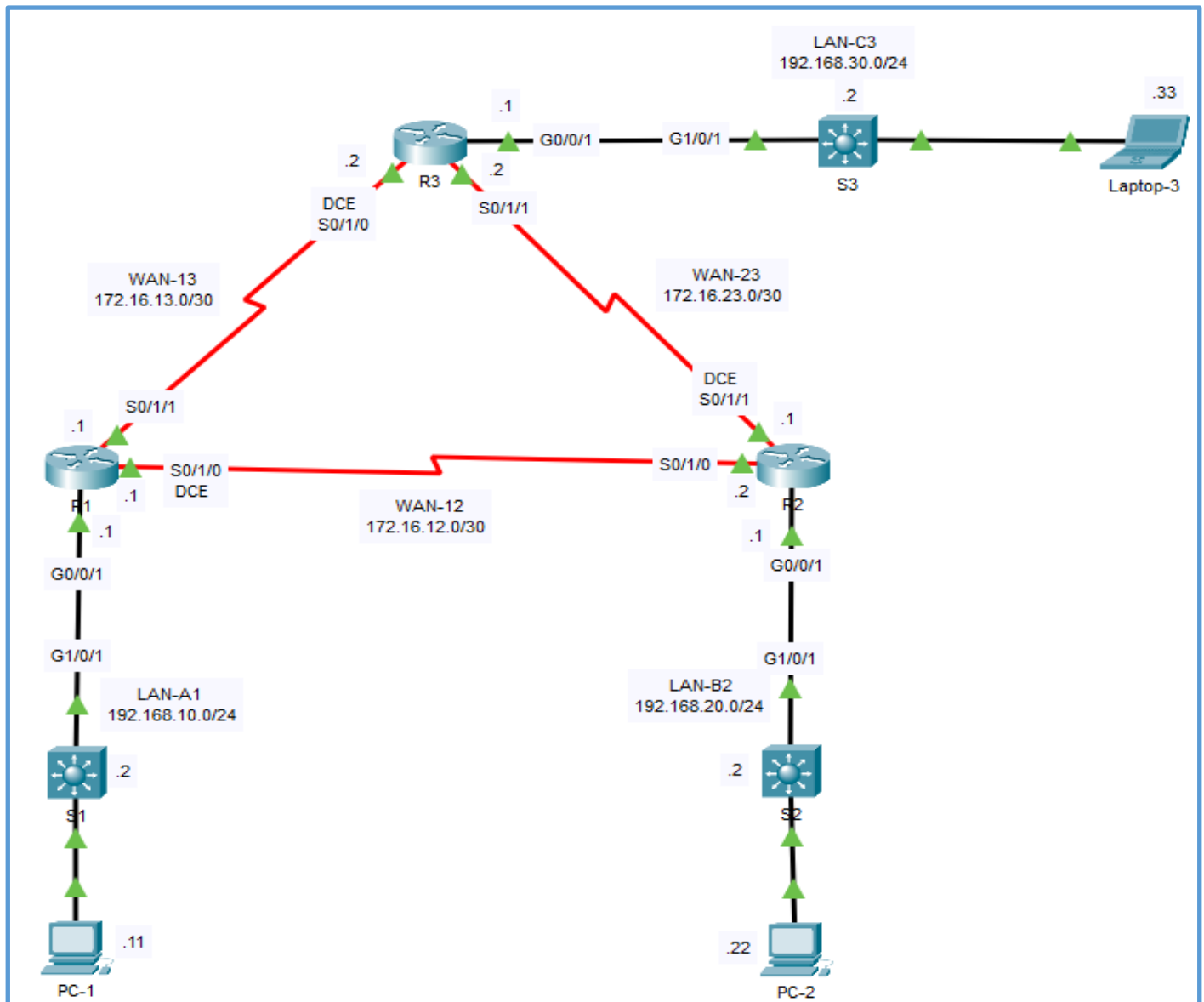


Lab Activity – IP Routing (Static/Manual):

- There are three LANs and three WANs in the topology below. Please build the following topology on the physical pod/rack in the lab room.



Required Resources:

- Three Layer-3/Multilayer Switch (Cisco Catalyst 1000 Series with Cisco IOS Release 15.1+ image)
- Three Routers (Cisco 4221 with Cisco IOS Release 17.6+ image)
- One Laptop (Windows with Terminal Emulation Program)
- Two Desktops (Windows with Terminal Emulation Program)
- Cables:

- Console cables to configure the Cisco IOS devices through the console port.
- Ethernet cables as shown in the topology.

Addressing Table:

Device	Interface	IP Address	Subnet Mask / CIDR	Default Gateway
S1	VLAN1	192.168.10.2	255.255.255.0	192.168.10.1
S2	VLAN1	192.168.20.2	255.255.255.0	192.168.20.1
S3	VLAN1	192.168.30.2	255.255.255.0	192.168.30.1
R1	G0/0/1	192.168.10.1	255.255.255.0 or /24	N/A
	S0/1/0	172.16.12.1	/30	N/A
	S0/1/1	172.16.13.1	/30	N/A
R2	G0/0/1	192.168.20.1	/24	N/A
	S0/1/0	172.16.12.2	/30	N/A
	S0/1/1	172.16.23.1	/30	N/A
R3	G0/0/1	192.168.30.1	/24	
	S0/1/0	172.16.13.2	/30	N/A
	S0/1/1	172.16.23.2	/30	N/A
PC-1	NIC	DHCP Client (Local DHCP Server)		
PC-2	NIC	DHCP Client (Remote DHCP Server)		
Laptop-3	NIC	DHCP Client (Local DHCP Server)		

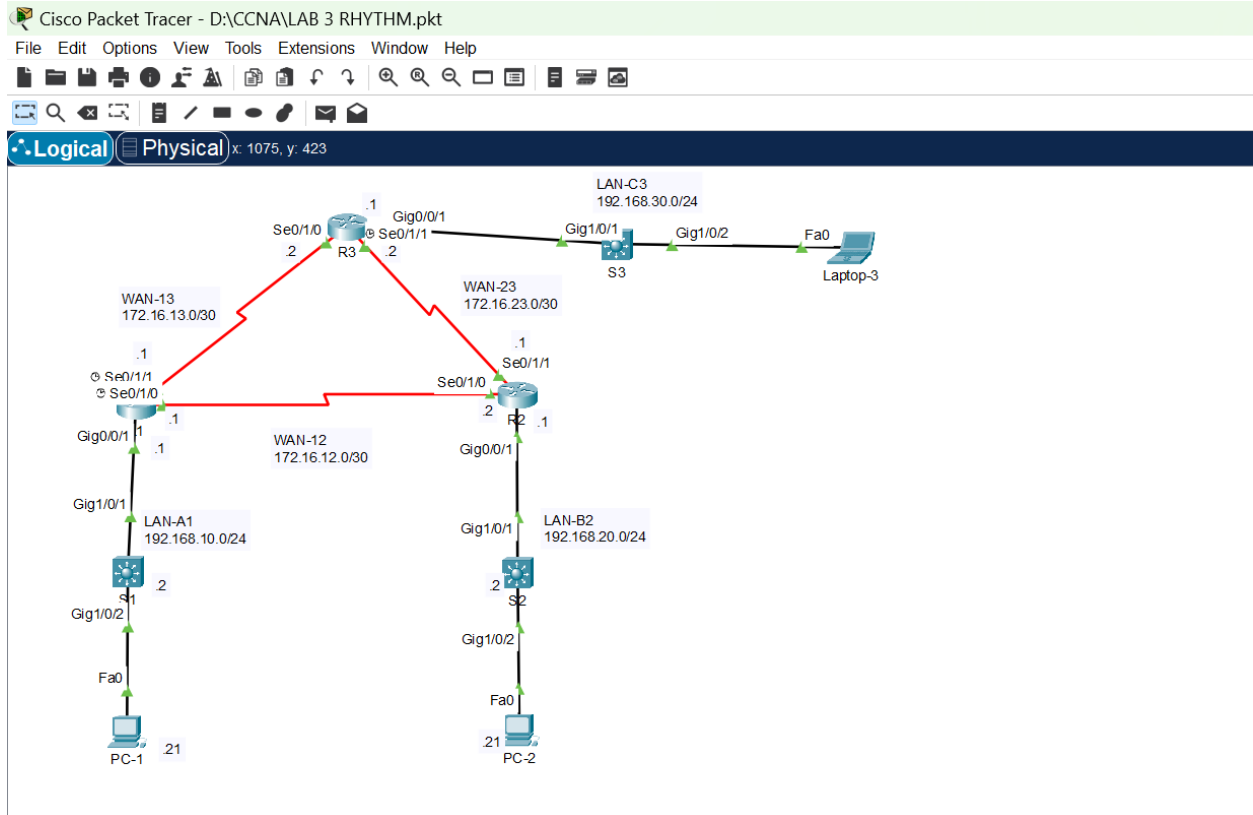
Lab Description:

- In this lab, please build a LAN and WAN based simple network.
 - LAN-A1 with one switch and one host.
 - LAN-B2 with one switch and one host.
 - LAN-C3 with one switch and one host.
 - Three WANs with three routers.
- You are also required to do basic configuration on the following devices:
 - Switch:
 - Hostnames, SVI, default gateway, DNS lookup (disable), and so on.
 - Routers:
 - Hostnames, IP addressing, DNS lookup (disable), and so on.

Solution:

Step 1: Set up the network topology.

- Simulate the topology by using all the devices mentioned above and then cable them all together:
 - Turn on the devices.
 - Connect the switch with the default gateway.
 - Connect the PCs and server with their respective switch.
 - Make sure all the lights between switches, PCs, and laptops are green.



Step 2: Configure and verify basic switch settings on all switches. S1

The image displays the Cisco Packet Tracer interface with a network topology and the CLI configuration for switch S1.

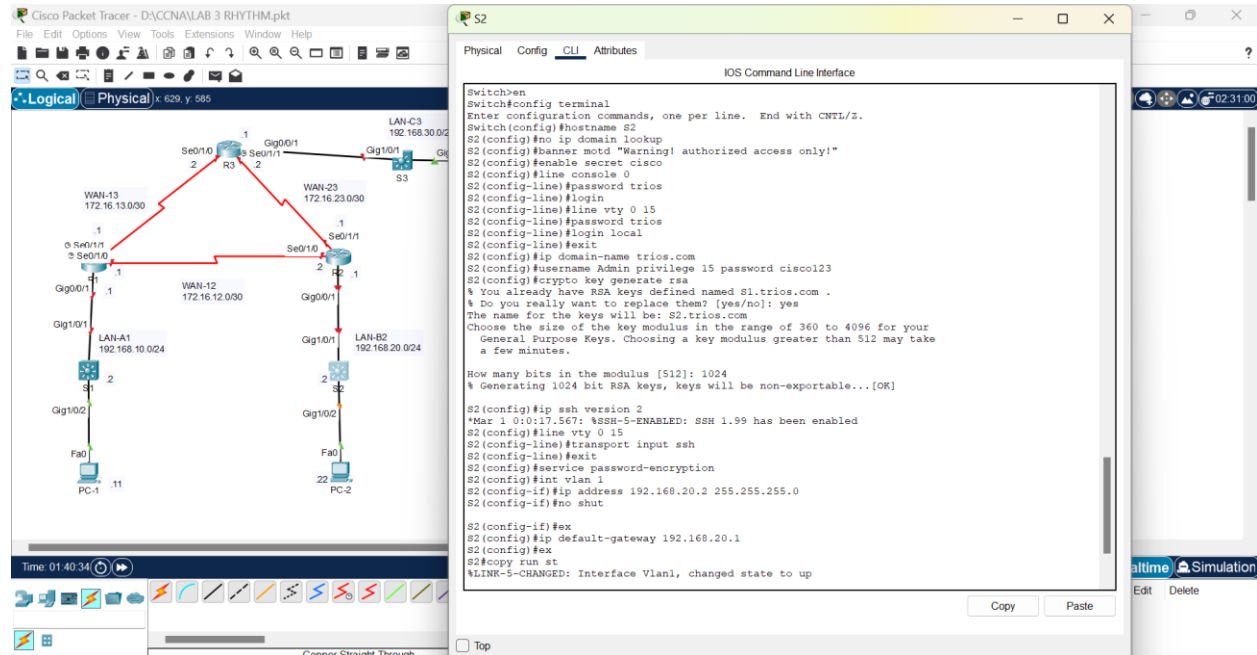
Network Topology:

- Router R3:** Connected to LAN-C3 (192.168.30.0/24) via Gig1/0/1. It has two serial interfaces: Ser0/0/0 connected to WAN-13 (172.16.13.0/30) and Ser0/0/1 connected to WAN-23 (172.16.23.0/30).
- Router R1:** Connected to LAN-A1 (192.168.10.0/24) via Gig1/0/1. It has two serial interfaces: Ser0/0/0 connected to WAN-12 (172.16.12.0/30) and Ser0/0/1 connected to WAN-23 (172.16.23.0/30).
- Router R2:** Connected to LAN-B2 (192.168.20.0/24) via Gig1/0/1. It has two serial interfaces: Ser0/0/0 connected to WAN-12 (172.16.12.0/30) and Ser0/0/1 connected to WAN-23 (172.16.23.0/30).
- Switches:** S1 is connected to R1 via Gig1/0/1. S2 is connected to R2 via Gig1/0/1. S3 is connected to R3 via Gig1/0/1.
- PCs:** PC-1 is connected to LAN-A1 via Fa0/11. PC-2 is connected to LAN-B2 via Fa0/22.

CLI Configuration for S1:

```
Switch>en
Switch#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#hostname S1
S1(config)#no ip domain lookup
S1(config)#banner motd "Warning! authorized access only!"
S1(config)#enable secret cisco
S1(config)#line console 0
S1(config-line)#password trios
S1(config-line)#login
S1(config-line)#line vty 0 15
S1(config-line)#password trios
S1(config-line)#login local
S1(config-line)#exit
S1(config)#ip domain-name trios.com
S1(config)#username Admin privilege 15 password cisco123
S1(config)#crypto key generate rsa
The name for the keys will be: S1.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.
How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]
S1(config)#ip ssh version 2
*Mar 1 0:3:46.802: %SSH-5-ENABLED: SSH 1.99 has been enabled
S1(config)#line vty 0 15
S1(config-line)#transport input ssh
S1(config-line)#ex
% Ambiguous command: "ex"
S1(config-line)#exit
S1(config)#service password-encryption
S1(config)#int vlan 1
S1(config-if)#ip address 192.168.10.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
ex
S1(config)#ip default-gateway 192.168.10.1
S1(config)#ex
S1#
%SYS-5-CONFIG_I: Configured from console by console
copy run st
Destination filename [startup-config]?
Building configuration...
[OK]
```

S2



The network diagram shows a central router R3 connected to two switches, S1 and S2. S1 is connected to PC-1 and S2 to PC-2. Both switches have their Fa0/24 ports connected to R3's S20/24 ports. The configuration window for S2 shows the following commands:

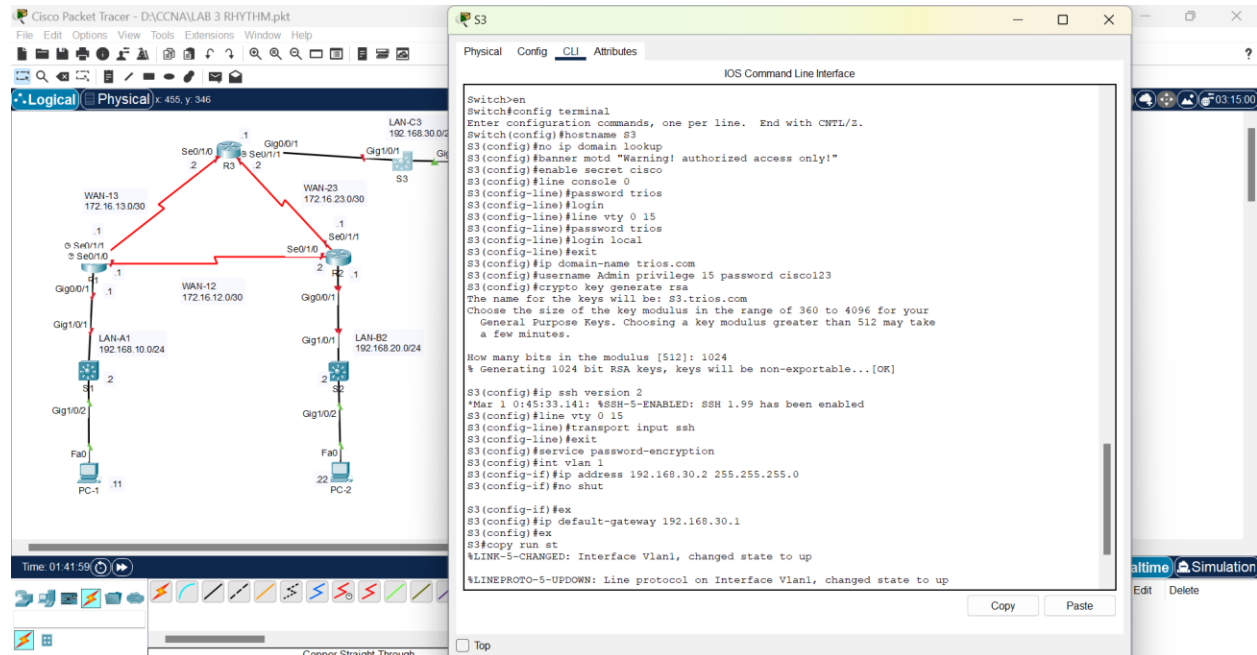
```
Switch>en
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#no ip domain lookup
S2(config)#banner motd "Warning! authorized access only!"
S2(config)#enable secret cisco
S2(config)#line console 0
S2(config-line)#password trios
S2(config-line)#login
S2(config-line)#line vty 0 15
S2(config-line)#password trios
S2(config-line)#login local
S2(config-line)#exit
S2(config)#ip domain-name trios.com
S2(config)#username Admin privilege 15 password cisco123
S2(config)#crypto key generate rsa
% You already have RSA keys defined named S1.trios.com .
% Do you really want to replace them? [yes/no]: yes
The name for the keys will be: S2.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

S2(config)#ip ssh version 2
*Mar 1 01:01:56: %SSH-5-ENABLED: SSH 1.99 has been enabled
S2(config)#line vty 0 15
S2(config-line)#transport input ssh
S2(config-line)#exit
S2(config)#service password-encryption
S2(config)#int vlan 1
S2(config-if)#ip address 192.168.20.2 255.255.255.0
S2(config-if)#no shut

S2(config-if)#ex
S2(config)#ip default-gateway 192.168.20.1
S2(config)#ex
S2#copy run st
%LINK-5-CHANGED: Interface Vlan1, changed state to up
```

S3



The network diagram is identical to the one for S2. The configuration window for S3 shows the following commands:

```
Switch>en
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#no ip domain lookup
S3(config)#banner motd "Warning! authorized access only!"
S3(config)#enable secret cisco
S3(config)#line console 0
S3(config-line)#password trios
S3(config-line)#login
S3(config-line)#line vty 0 15
S3(config-line)#password trios
S3(config-line)#login local
S3(config-line)#exit
S3(config)#ip domain-name trios.com
S3(config)#username Admin privilege 15 password cisco123
S3(config)#crypto key generate rsa
The name for the keys will be: S3.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

S3(config)#ip ssh version 2
*Mar 1 01:45:33: %SSH-5-ENABLED: SSH 1.99 has been enabled
S3(config)#line vty 0 15
S3(config-line)#transport input ssh
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#int vlan 1
S3(config-if)#ip address 192.168.30.2 255.255.255.0
S3(config-if)#no shut

S3(config-if)#ex
S3(config)#ip default-gateway 192.168.30.1
S3(config)#ex
S3#copy run st
%LINK-5-CHANGED: Interface Vlan1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
```

Step 3: Configure and verify basic router settings on all routers

R1

The image shows the Cisco Packet Tracer interface with two windows. The top window displays the network topology, and the bottom window shows the CLI configuration for Router R1.

Network Topology:

- Router R1 is connected to Router R2 via Serial0/0/0 and Serial0/0/1.
- Router R2 is connected to Router R3 via Serial0/0/0 and Serial0/0/1.
- Router R1 has interfaces: GigabitEthernet0/0/0 (connected to LAN-C3), GigabitEthernet0/0/1 (connected to WAN-23), GigabitEthernet0/0/2 (connected to LAN-B2), and GigabitEthernet0/0/3 (connected to LAN-A1).
- Router R2 has interfaces: GigabitEthernet0/0/0 (connected to WAN-13), GigabitEthernet0/0/1 (connected to WAN-12), GigabitEthernet0/0/2 (connected to LAN-B2), and GigabitEthernet0/0/3 (connected to LAN-A1).
- Router R3 has interfaces: GigabitEthernet0/0/0 (connected to LAN-C3), GigabitEthernet0/0/1 (connected to WAN-23), GigabitEthernet0/0/2 (connected to LAN-B2), and GigabitEthernet0/0/3 (connected to LAN-A1).
- PC-1 is connected to LAN-A1, and PC-2 is connected to LAN-B2.

CLI Configuration for R1:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain-lookup
R1(config)#banner motd "Warning! authorized access only!"
R1(config)#enable secret cisco
R1(config)#line console 0
R1(config-line)#password trios
R1(config-line)#login
R1(config-line)#exit
R1(config)#line vty 0 15
R1(config-line)#password trios
R1(config-line)#login local
R1(config-line)#exit
R1(config)#ip domain-name trios.com
R1(config)#username Admin privilege 15 password cisco123
R1(config)#crypto key generate rsa
The name for the keys will be: R1.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

R1(config)#ip ssh version 2
*Mar 1 0:55:51.246: %SSH-5-ENABLED: SSH 1.99 has been enabled
R1(config)#line vty 0 15
R1(config-line)#transport input ssh
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#int g0/0/1
R1(config-if)#ip address 192.168.10.1 255.255.255.0
R1(config-if)#no shut

R1(config-if)#exit
R1(config)#int s0/1/1
R1(config-if)#ip address 172.16.13.1 255.255.255.252
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
R1(config-if)#exit

R1(config)#int s0/1/0
R1(config-if)#ip address 172.16.12.1 255.255.255.252
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R1(config-if)#exit
R1(config)#int g0/0/1
R1(config-if)#description Link to LAN-A1
R1(config-if)#int s0/1/1
R1(config-if)#description Link to WAN-13
R1(config-if)#int s0/1/0
R1(config-if)#description Link to WAN-12
R1(config-if)#
R1(config-if)#
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)#ex
R1(config)#ex
R1#
%SYS-5-CONFIG_I: Configured from console by console
copy run st
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

R2

The network diagram shows a topology with three routers: R1, R2, and R3. R1 is connected to R2 and R3. R2 is connected to R3. R1 is connected to LAN-A1 (192.168.10.0/24) and LAN-B2 (192.168.20.0/24). R2 is connected to LAN-A1 and LAN-B2. R3 is connected to LAN-C3 (192.168.30.0/24). The routers are connected via their Serial0/0/0 and Serial0/0/1 interfaces. The CLI for R2 shows the following configuration:

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#no ip domain-lookup
R2(config)#banner motd "Warning! authorized access only!"
R2(config)#enable secret cisco
R2(config)#line console 0
R2(config-line)#password trios
R2(config-line)#login
R2(config-line)#exit
R2(config)#line vty 0 15
R2(config-line)#password trios
R2(config-line)#login local
R2(config-line)#exit
R2(config)#ip domain-name trios.com
R2(config)#username Admin privilege 15 password cisco123
R2(config)#crypto key generate rsa
% Do you really want to replace them? [yes/no]: yes
The name for the keys will be: R2.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

R2(config)#ip ssh version 2
*Mar 1 01:02:63: %SSH-5-ENABLED: SSH 1.99 has been enabled
R2(config)#line vty 0 15
R2(config-line)#transport input ssh
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#int g0/0/1
R2(config-if)#ip address 192.168.20.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#int s0/1/1
R2(config-if)#ip address 172.16.23.1 255.255.255.252
R2(config-if)#no shut
  
```

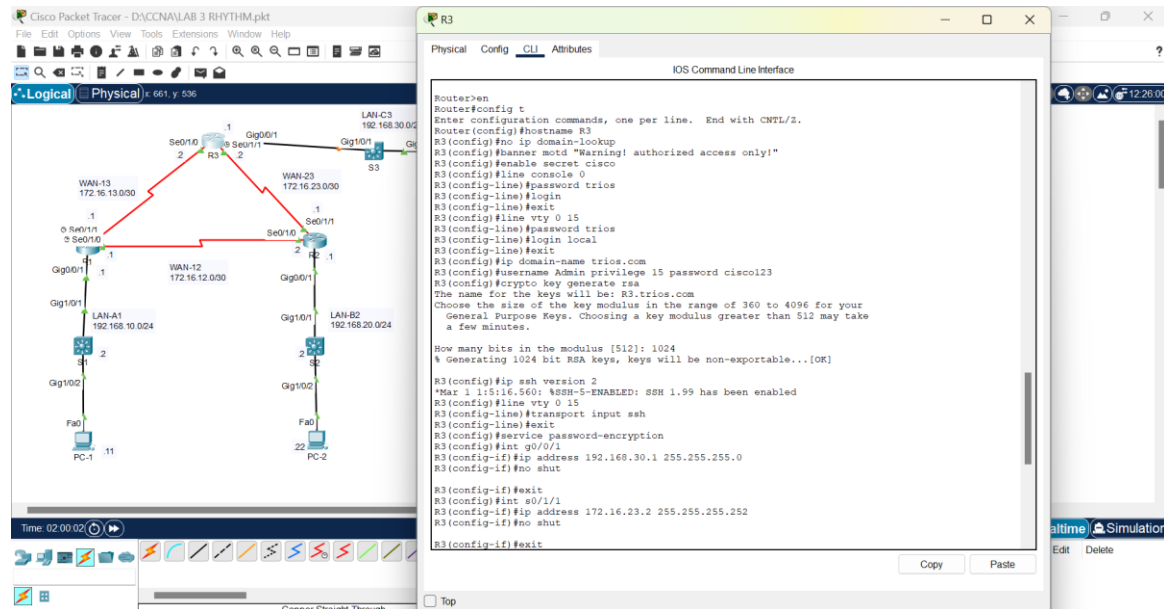
Interface s0/1/0

The CLI for R2 shows the configuration of interface s0/1/0:

```

R2(config-if)#ip address 172.16.12.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#int g0/0/1
R2(config-if)#description Link to LAN-B2
R2(config-if)#int s0/1/1
R2(config-if)#description Link to WAN-23
R2(config-if)#int s0/1/0
R2(config-if)#description Link to WAN-12
R2(config-if)#exit
R2(config)#exit
R2#copy run st
Destination filename [startup-config]?
%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
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%SYS-5-CONFIG_I: Configured from console by console
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Building configuration...
[OK]
R2#
  
```

R3



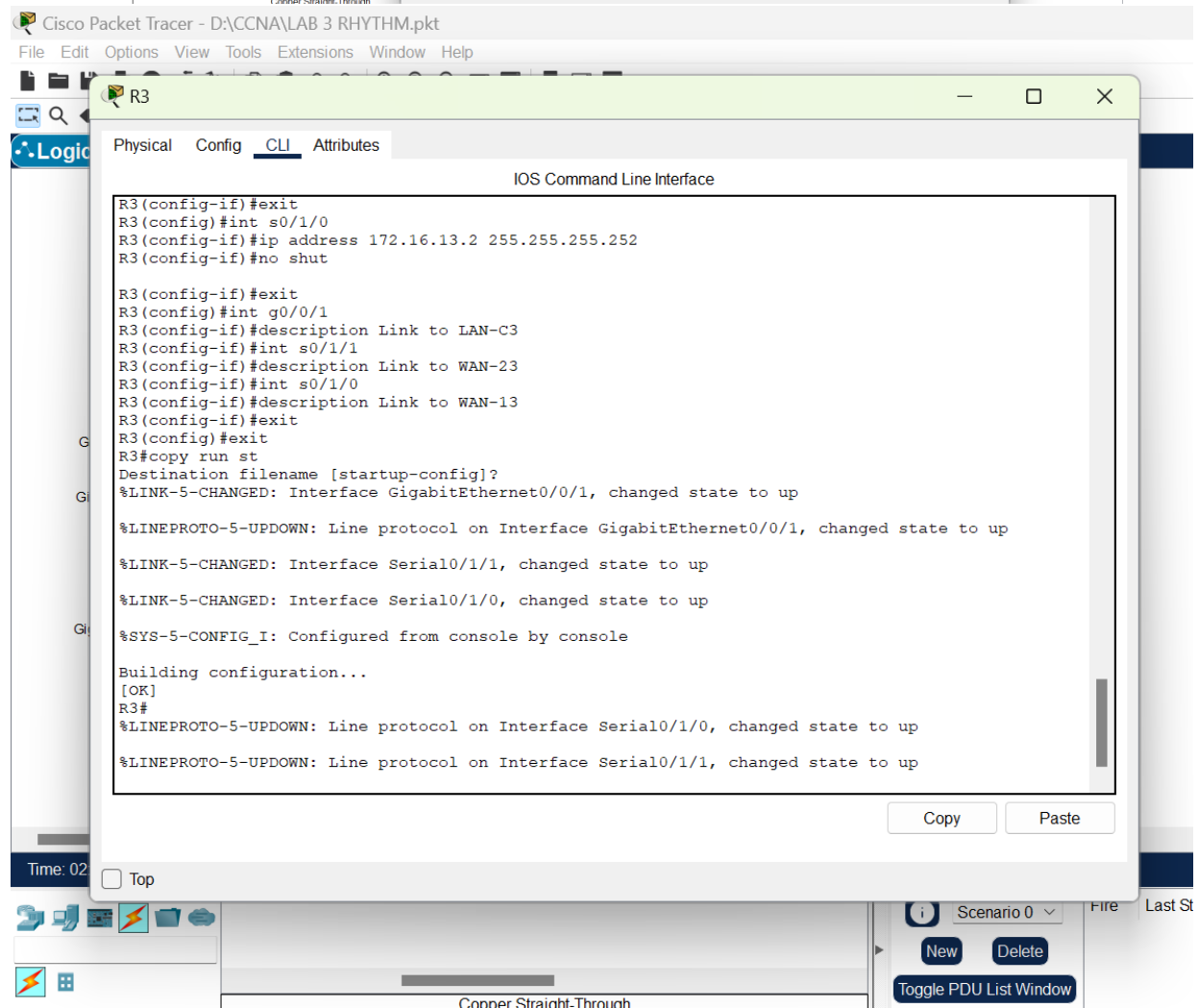
The image shows a Cisco Packet Tracer window titled "Cisco Packet Tracer - D:\CCNA\LAB 3 RHYTHM.pkt". The main window displays a network diagram with several routers and PCs. A red line highlights a specific path through the network. The "CLI" tab is selected, showing the configuration for router R3. The configuration includes setting the hostname to R3, enabling domain lookup, setting a MOTD banner, enabling secret access, setting console and vty passwords, and configuring IP addresses on various interfaces.

```

Router>en
Router(config)#hostname R3
R3(config)#no ip domain-lookup
R3(config)#banner motd "Warning! authorized access only!"
R3(config)#enable secret cisco
R3(config)#line console 0
R3(config-line)#password trios
R3(config-line)#login
R3(config-line)#exit
R3(config)#line vty 0 15
R3(config-line)#password trios
R3(config-line)#login local
R3(config-line)#exit
R3(config)#ip domain-name trios.com
R3(config)#username Admin privilege 15 password cisco123
R3(config)#crypto key generate rsa
The name for the keys will be: R3.trios.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

R3(config)#ip ssh version 2
*Mar 1 1:51:16.560: %SSH-5-ENABLED: SSH 1.99 has been enabled
R3(config)#line vty 0 15
R3(config-line)#transport input ssh
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#int g0/0/1
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#int s0/1/1
R3(config-if)#ip address 172.16.23.2 255.255.255.252
R3(config-if)#no shut
R3(config-if)#exit
  
```



The image shows a second Cisco Packet Tracer window titled "Cisco Packet Tracer - D:\CCNA\LAB 3 RHYTHM.pkt". The "CLI" tab is selected, showing the configuration for router R3. The configuration includes setting the hostname to R3, enabling domain lookup, setting a MOTD banner, enabling secret access, setting console and vty passwords, and configuring IP addresses on various interfaces. The configuration is being applied to the router, and the output shows the status of the interfaces and the configuration process.

```

R3(config-if)#exit
R3(config)#int s0/1/0
R3(config-if)#ip address 172.16.13.2 255.255.255.252
R3(config-if)#no shut

R3(config-if)#exit
R3(config)#int g0/0/1
R3(config-if)#description Link to LAN-C3
R3(config-if)#int s0/1/1
R3(config-if)#description Link to WAN-23
R3(config-if)#int s0/1/0
R3(config-if)#description Link to WAN-13
R3(config-if)#exit
R3(config)#exit
R3#copy run st
Destination filename [startup-config]?
%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

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%SYS-5-CONFIG_I: Configured from console by console

Building configuration...
[OK]
R3#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

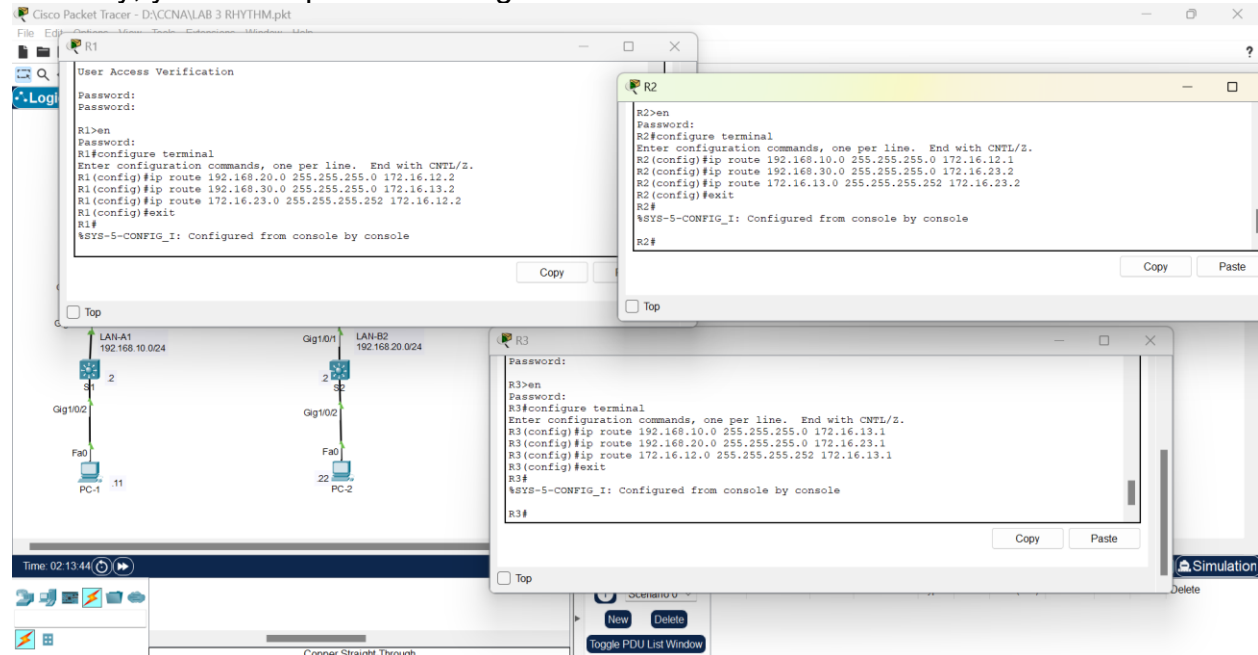
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
  
```


Step 4: Configure static routing between all routers so all hosts can communicate with every host in all LANs and WANs.

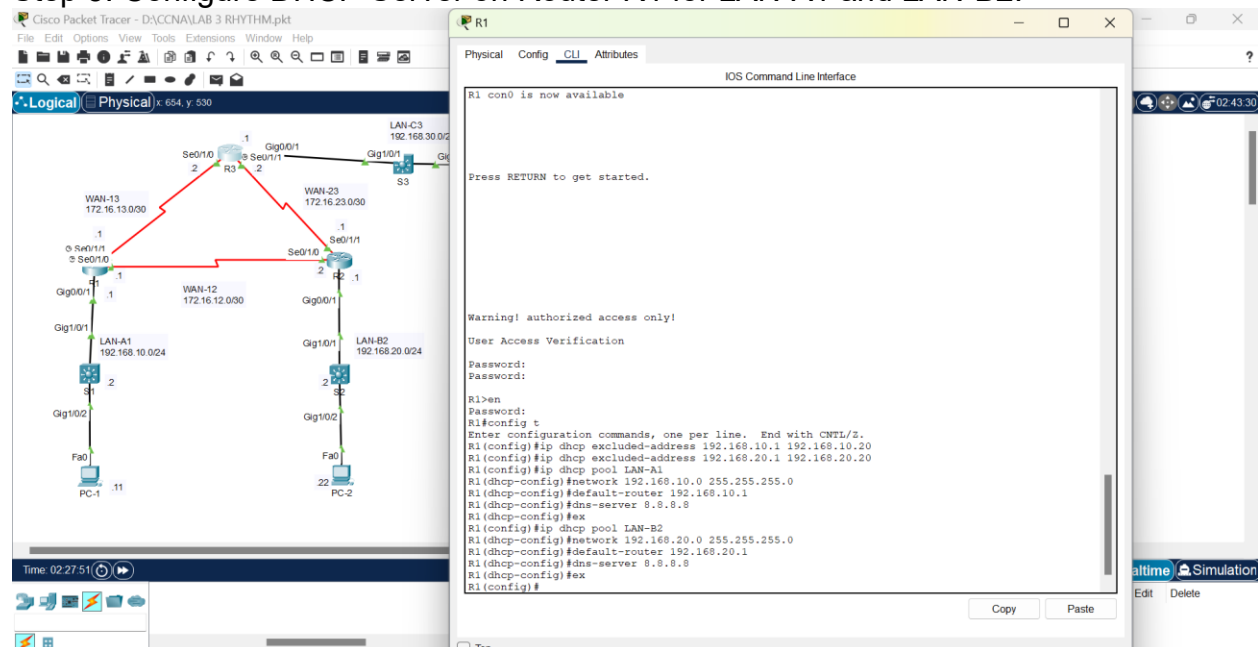
a. You are required to configure sufficient static routes on router R1.

(Hint: Three static routes for LAN-B2, LAN-C3 and WAN-23)

Similarly, you are required to configure static routes on routers R2 and R3.



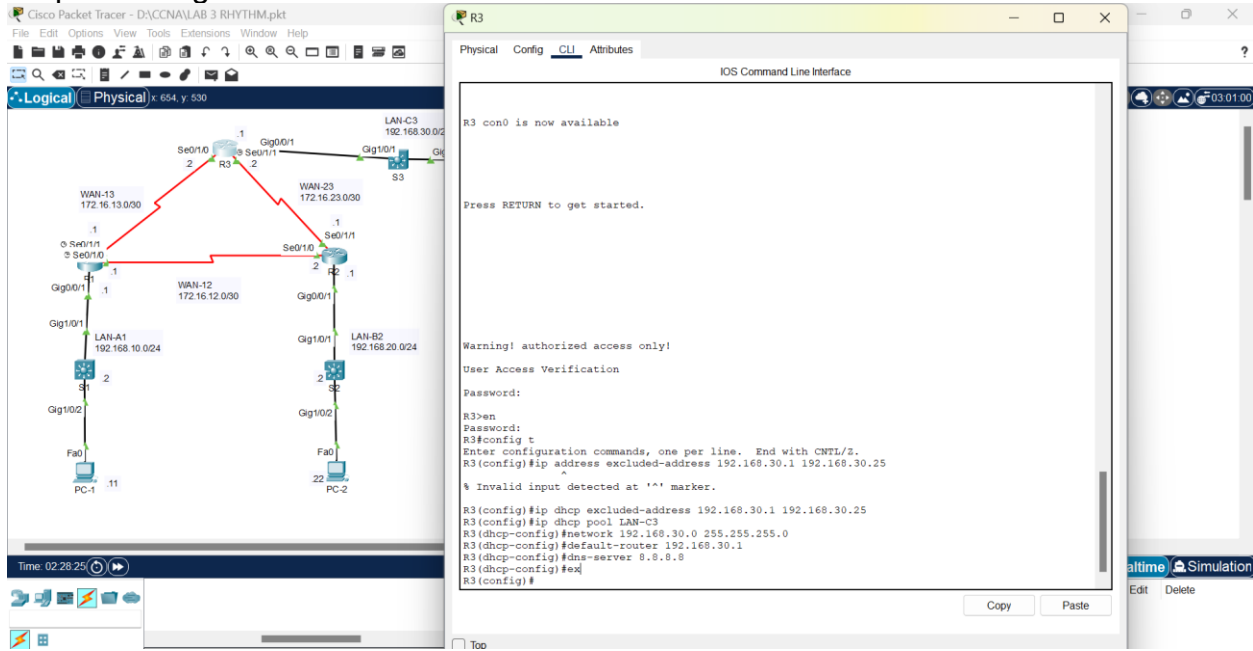
Step 5: Configure DHCP Server on Router R1 for LAN-A1 and LAN-B2.



- Exclude the first 20 addresses from the pools, so these excluded addresses may be assigned as static IP addresses to the intermediary devices, servers, printers and so on within LANs.

- Create DHCP Pool for LAN-A1 and LAN-B2:
 - Configure the LAN Network.
 - Configure the default router.
 - Configure the DNS server (8.8.8.8).

Step 6: Configure DHCP Server on router R3 for LAN-C3.



- Exclude the first 25 addresses from the pool, so that these excluded addresses may be assigned as static IP addresses to the intermediary devices, servers, printers and so on within LANs.
- Create DHCP Pool for LAN-C3:
 - Configure the LAN Network.
 - Configure the default router.
 - Configure the DNS server (8.8.8.8).

(Note: R1 is a remote router and DHCP Server for LAN-B2. It is important to make sure to configure the appropriate IP Helper address on the appropriate interface for R2.)

Cisco Packet Tracer - D:\CCNA\LAB 3 RHYTHM.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x 445, y 377

Time: 02:52:37

Cisco Packet Tracer - D:\CCNA\LAB 3 RHYTHM.pkt

Physical Config CLI Attributes

IOS Command Line Interface

R2 con0 is now available

Press RETURN to get started.

Warning! authorized access only!

User Access Verification

Password:

R2>en

Password:

R2#en

R2#config t

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)#int g0/0/1

R2(config-if)#ip helper-address 172.16.12.1

R2(config-if)#ex

R2(config)#ex

R2#

%SYS-5-CONFIG_I: Configured from console by console

copy run st

Destination filename [startup-config]?

Building configuration...

[OK]

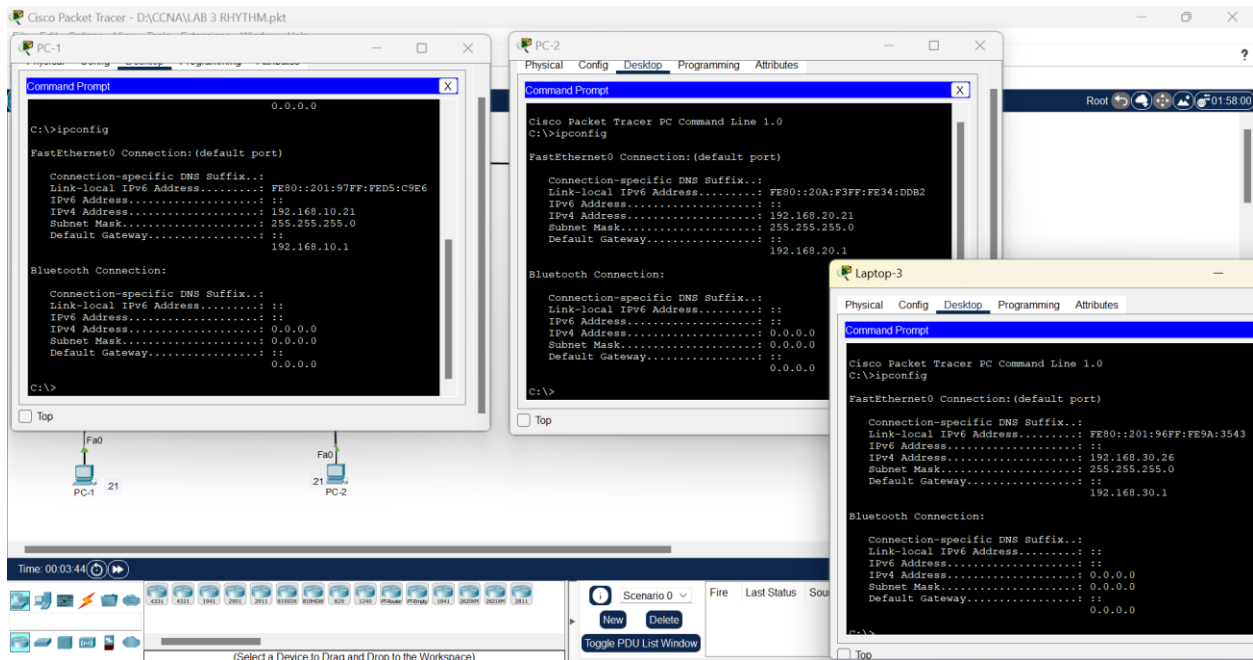
R2#

Copy Paste

alttime Simulation

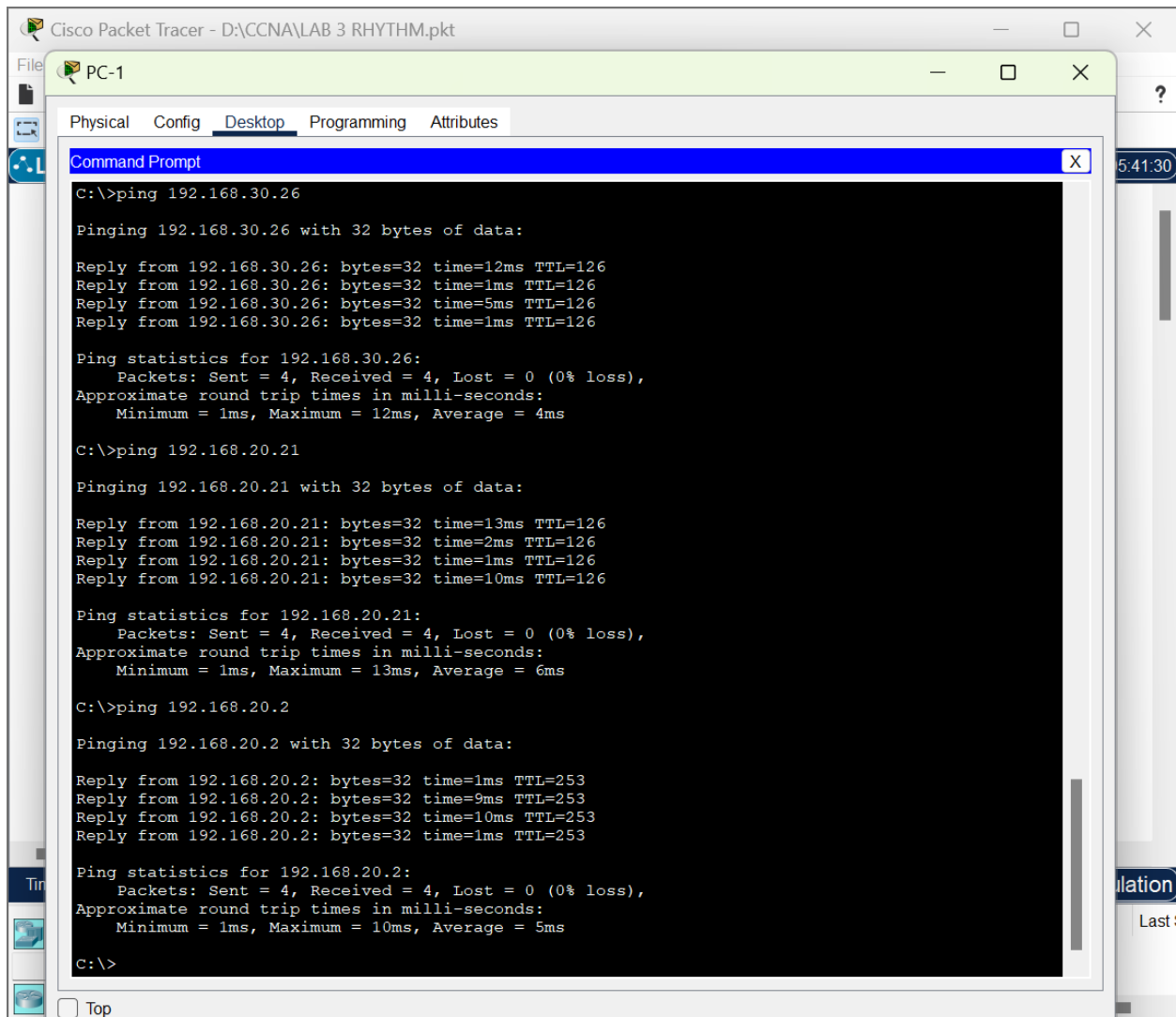
Edit Delete

Step 7: Check and verify the IP address, subnet mask, and default gateway at PC-1, PC-2, and Laptop-3 by typing the command “ipconfig” at command prompt.



Step 8: Verify the connectivity.

- Using the command line at PC-1, ping the IP address of:
 - Laptop-3
 - PC-2
 - SVI of switch S2



The screenshot shows the Cisco Packet Tracer interface with a window titled "PC-1" open. The "Desktop" tab is selected, and a "Command Prompt" window is active. The command prompt shows the following output:

```
C:\>ping 192.168.30.26

Pinging 192.168.30.26 with 32 bytes of data:

Reply from 192.168.30.26: bytes=32 time=12ms TTL=126
Reply from 192.168.30.26: bytes=32 time=1ms TTL=126
Reply from 192.168.30.26: bytes=32 time=5ms TTL=126
Reply from 192.168.30.26: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.30.26:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 12ms, Average = 4ms

C:\>ping 192.168.20.21

Pinging 192.168.20.21 with 32 bytes of data:

Reply from 192.168.20.21: bytes=32 time=13ms TTL=126
Reply from 192.168.20.21: bytes=32 time=2ms TTL=126
Reply from 192.168.20.21: bytes=32 time=1ms TTL=126
Reply from 192.168.20.21: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.20.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 13ms, Average = 6ms

C:\>ping 192.168.20.2

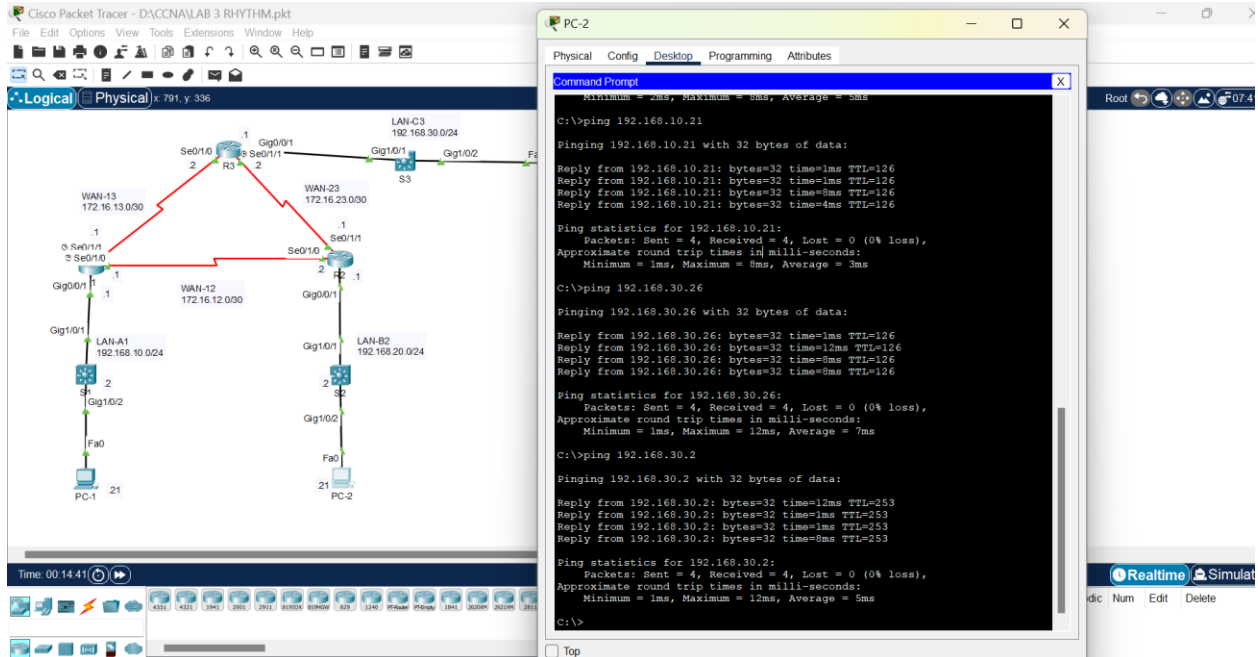
Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time=1ms TTL=253
Reply from 192.168.20.2: bytes=32 time=9ms TTL=253
Reply from 192.168.20.2: bytes=32 time=10ms TTL=253
Reply from 192.168.20.2: bytes=32 time=1ms TTL=253

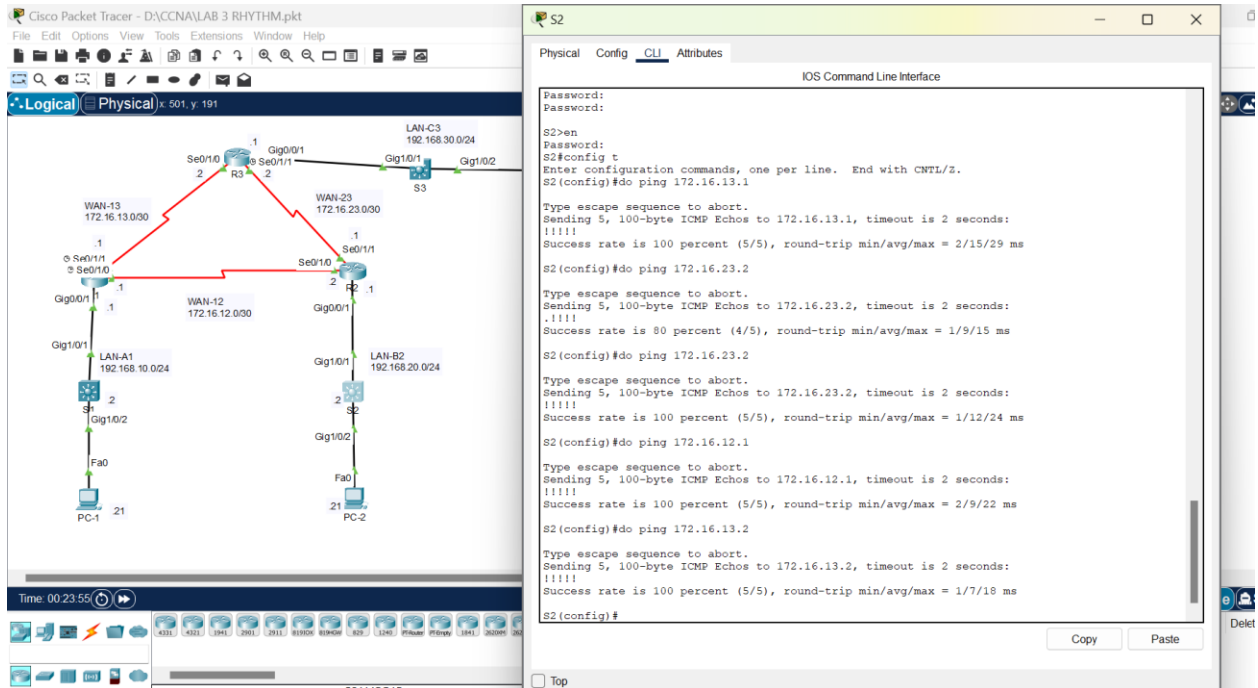
Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 10ms, Average = 5ms

C:\>
```

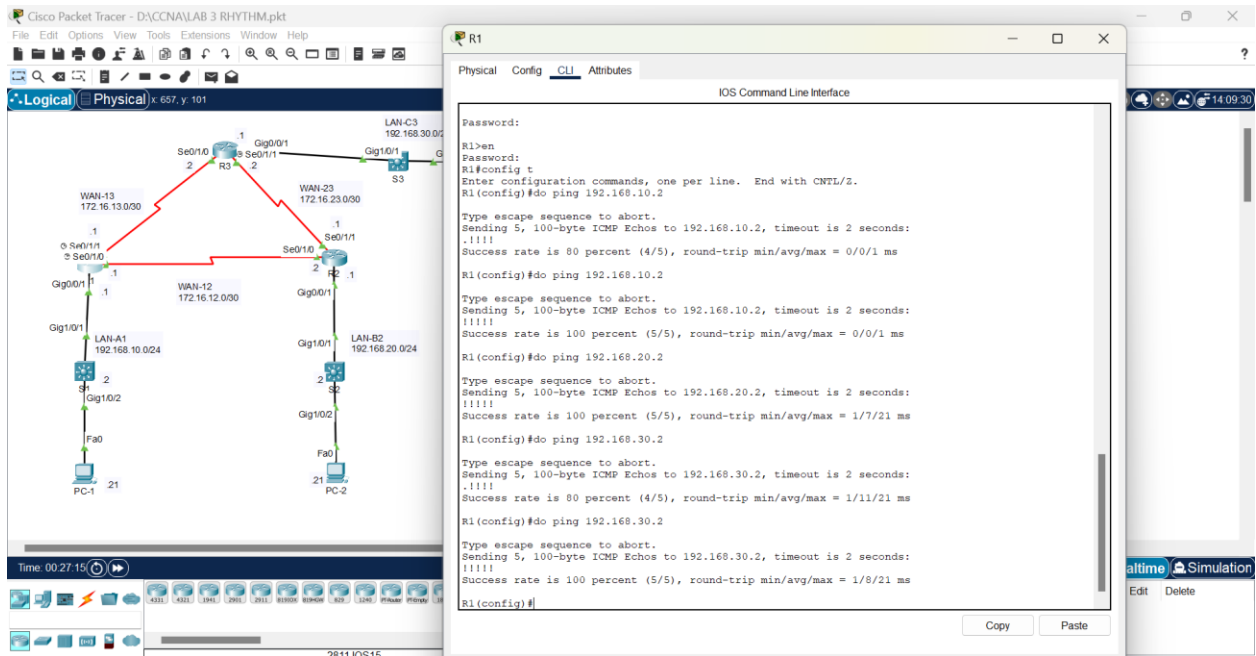
- Using the command line at PC-2, ping the IP address of:
 - PC-1
 - Laptop-3
 - SVI of switch S3



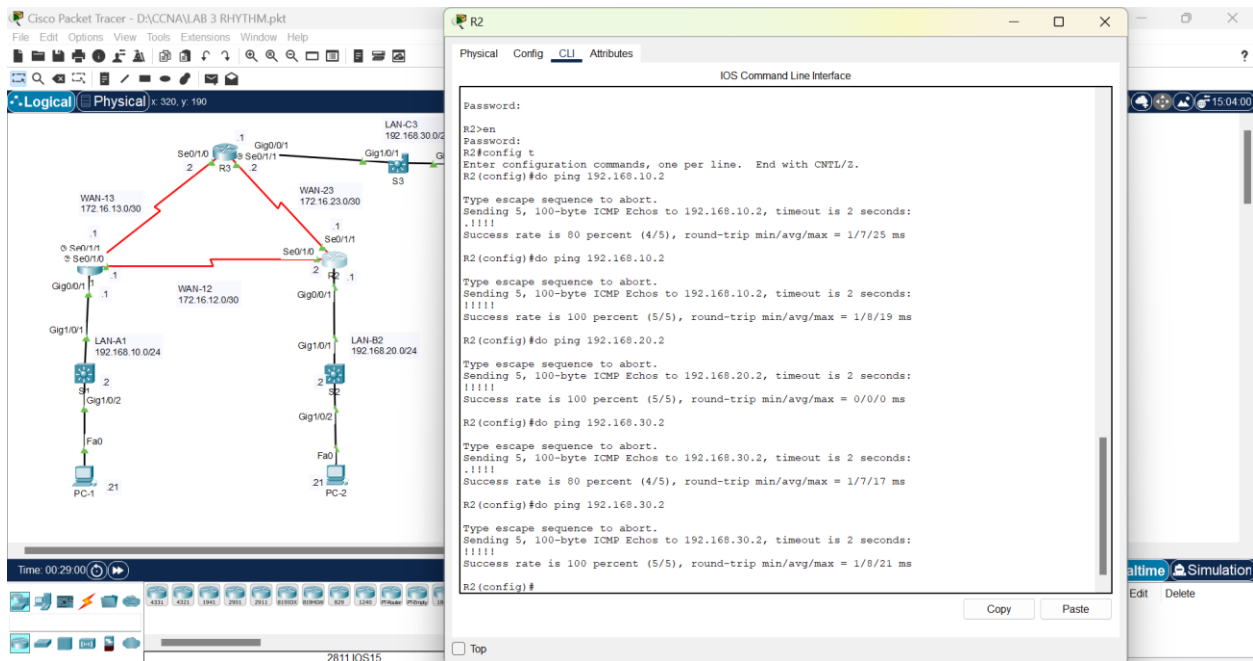
- Using the switch S2, ping the S0/1/1 interface of router R1 and R3.
- Using the switch S2, ping the S0/1/0 interface of router R1 and R3.



- Using the router R1, ping the switch virtual interface of S1, S2, and S3.



- Using the router R2, ping the switch virtual interface of S1, S2, and S3.



- Using the router R3, ping the switch virtual interface of S1, S2, and S3.

The screenshot displays a Cisco Packet Tracer simulation. On the left, a network topology is shown with three routers (R1, R2, R3) and three switches (S1, S2, S3). R3 is connected to S1, S2, and S3. The switches are connected to PCs (PC-1, PC-2) and other network devices. The right window shows the CLI of router R3, where the user has entered the command `R3(config)#do ping 192.168.10.2` and received a success rate of 80 percent (4/5). The user has also entered the command `R3(config)#do ping 192.168.20.2` and received a success rate of 100 percent (5/5). The user has also entered the command `R3(config)#do ping 192.168.30.2` and received a success rate of 100 percent (5/5).

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Warning! authorized access only!

User Access Verification

Password:
R3>en
Password:
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#do ping 192.168.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/4/14 ms

R3(config)#do ping 192.168.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/12/22 ms

R3(config)#do ping 192.168.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.20.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/8/20 ms

R3(config)#do ping 192.168.30.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

R3(config)#
  
```

NOTE: All the above-mentioned pings must work, otherwise troubleshoot the network.