

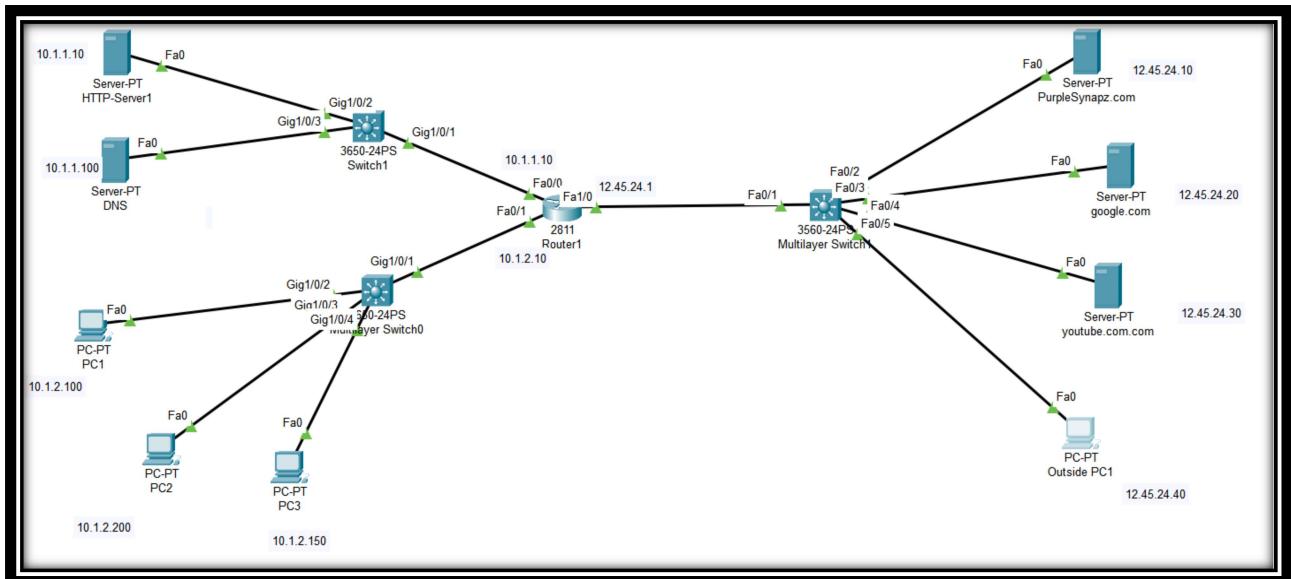
COURSE	Network Fundamentals	ASSIGNMENT NO	
MODULE	Final Assessment LAB 1	ASSIGNMENT DATE	7/09/2024
STUDENT NAME	Konganti Chaithanya Kumar	SUBMISSION DATE	7/09/2024

LAB1: ACL

- Restrict traffic internally using Router as follows:
- use access list number 100
- Hosts on subnet 10.1.2.0/24 can ping any network
- PC1 can only access the HTTP server 1 using HTTP on subnet 10.1.1.0/24
- PC2 can only access the web using HTTPS on 12.45.24.0/24
- No other PCs on subnet 10.1.2.0/24 can access subnet 12.45.24.0/24

Solution:

1. Draw the Network and show the topology in Packet Tracer



Use access list number 100

- Go to Router >>CLI Press ENTER

Create or modify access list number 100

```
Router(config)# ip access-list extended 100
```

1. Hosts on subnet 10.1.2.0/24 can ping any network

- Allow ICMP traffic in access list:

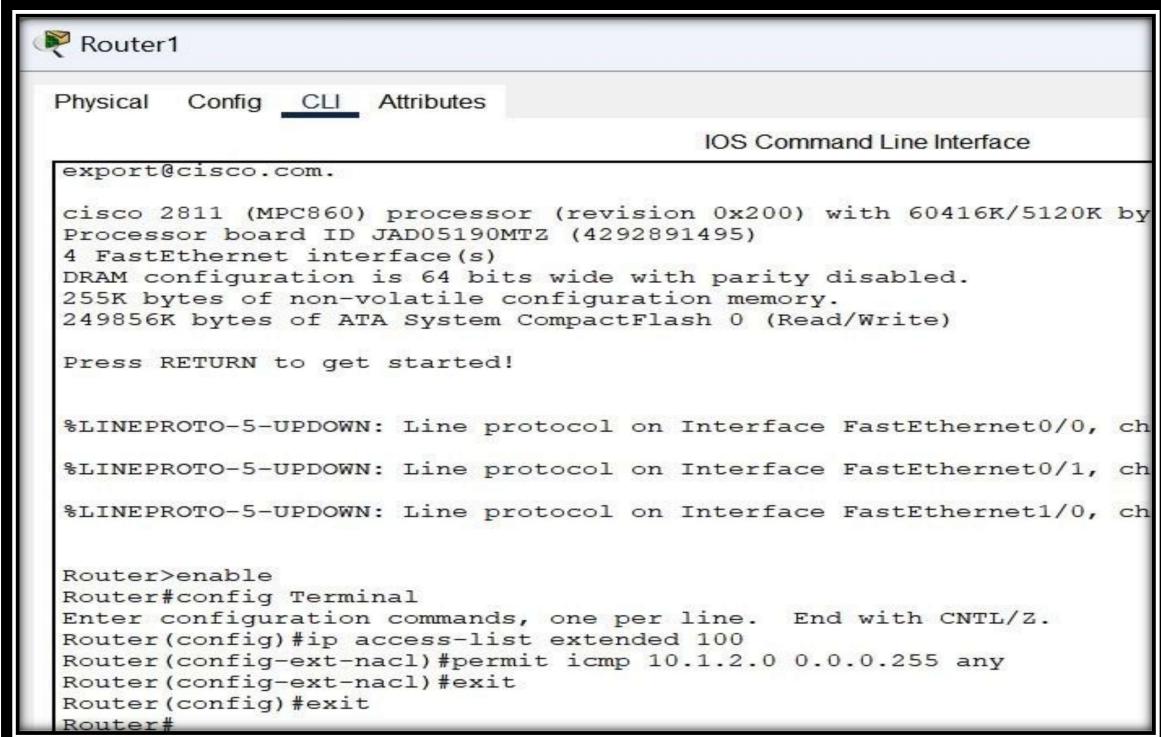
```
Router(config-ext-nacl)# permit icmp 10.1.2.0 0.0.0.255 any
```

Allows ICMP traffic from subnet 10.1.2.0/24 to any destination.

- Apply ACL to interface:

```
Router(config)# interface FastEthernet 0/1
```

```
Router(config-if)#ip access-group 100 in
```



The screenshot shows the Cisco IOS Command Line Interface (CLI) running on a router named 'Router1'. The interface is in 'CLI' mode. The screen displays the following information:

- System boot message:

```
export@cisco.com.  
  
cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K by  
Processor board ID JAD05190MTZ (4292891495)  
4 FastEthernet interface(s)  
DRAM configuration is 64 bits wide with parity disabled.  
255K bytes of non-volatile configuration memory.  
249856K bytes of ATA System CompactFlash 0 (Read/Write)
```
- User prompt: Press RETURN to get started!
- Line protocol status messages:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, ch  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, ch  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, ch
```
- Configuration history:

```
Router>enable  
Router#config Terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#ip access-list extended 100  
Router(config-ext-nacl)#permit icmp 10.1.2.0 0.0.0.255 any  
Router(config-ext-nacl)#exit  
Router(config)#exit  
Router#
```

The screenshot demonstrates that hosts on subnet 10.1.2.0/24 can successfully ping any network. This indicates that the access control list (ACL) configured on the router allows ICMP traffic from this subnet to other networks.

PC1

Physical Config Desktop **Programming** Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.1.1.20

Pinging 10.1.1.20 with 32 bytes of data:

Request timed out.
Reply from 10.1.1.20: bytes=32 time=10ms TTL=127
Reply from 10.1.1.20: bytes=32 time=1ms TTL=127
Reply from 10.1.1.20: bytes=32 time<1ms TTL=127

Ping statistics for 10.1.1.20:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 3ms

C:\>ping 10.1.2.100

Pinging 10.1.2.100 with 32 bytes of data:

Reply from 10.1.2.100: bytes=32 time=10ms TTL=128
Reply from 10.1.2.100: bytes=32 time=15ms TTL=128
Reply from 10.1.2.100: bytes=32 time<1ms TTL=128
Reply from 10.1.2.100: bytes=32 time=3ms TTL=128

Ping statistics for 10.1.2.100:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 15ms, Average = 7ms
```

PC2

Physical Config Desktop **Programming** Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.1.1.20

Pinging 10.1.1.20 with 32 bytes of data:

Reply from 10.1.1.20: bytes=32 time<1ms TTL=127
Reply from 10.1.1.20: bytes=32 time<1ms TTL=127
Reply from 10.1.1.20: bytes=32 time<1ms TTL=127
Reply from 10.1.1.20: bytes=32 time=1ms TTL=127

Ping statistics for 10.1.1.20:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.1.2.200

Pinging 10.1.2.200 with 32 bytes of data:

Reply from 10.1.2.200: bytes=32 time=5ms TTL=128
Reply from 10.1.2.200: bytes=32 time=17ms TTL=128
Reply from 10.1.2.200: bytes=32 time=11ms TTL=128
Reply from 10.1.2.200: bytes=32 time=12ms TTL=128

Ping statistics for 10.1.2.200:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 17ms, Average = 11ms
```

Observation:

Hosts on subnet 10.1.2.0/24 can ping any network, confirming the ACL allows ICMP traffic.

2. PC1 can only access the HTTP server 1 using HTTP on subnet 10.1.1.0/24

- Allow PC1 to access HTTP server1 using HTTP(on subnet 10.1.1.0/24) in access list:

```
Router(config-ext-nacl)# permit tcp host 10.1.2.100 host 10.1.1.20 eq www
```

- Apply ACL to interface:

```
Router(config)# interface FastEthernet 0/1
```

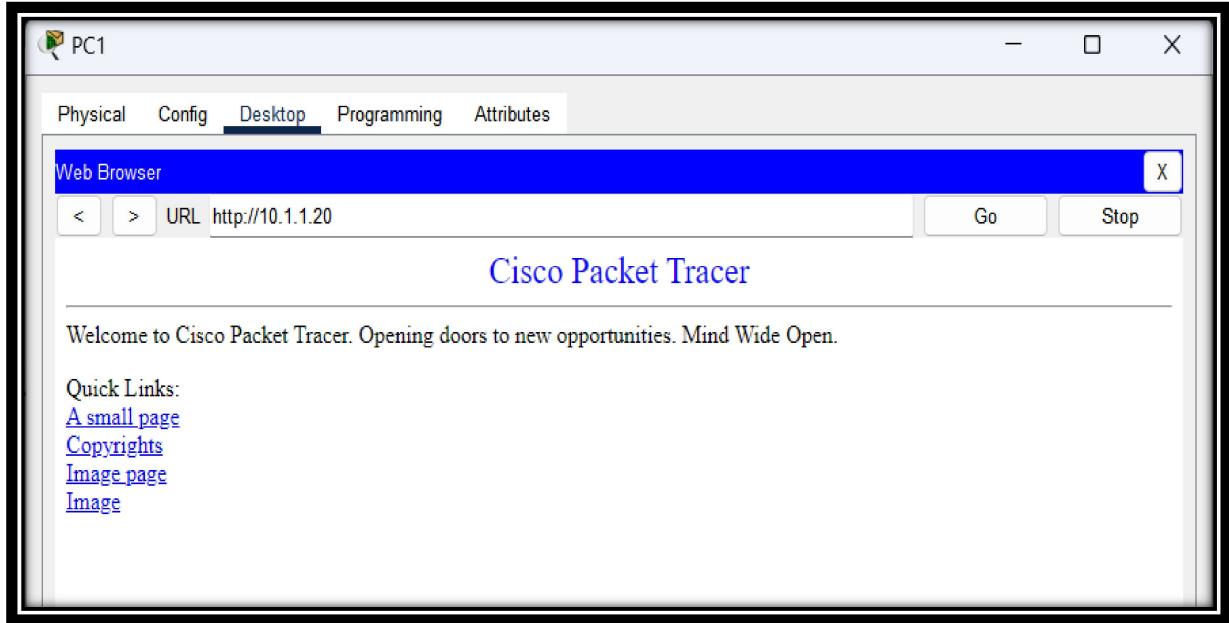
```
Router(config-if)#ip access-group 100 in
```

The screenshot shows the Cisco IOS Command Line Interface (CLI) running on Router1. The interface has tabs for Physical, Config, CLI, and Attributes, with CLI selected. The title bar says "IOS Command Line Interface".

```
Router(config-if)#
Router(config-ext-nacl)#permit tcp host 10.1.2.100 host 10.1.1.20 eq www
Router(config-ext-nacl)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show access-list
Extended IP access list 100
    10 permit udp any any
    20 permit tcp host 10.1.2.200 host 12.45.24.10 eq 443
    30 permit tcp host 10.1.2.200 host 12.45.24.20 eq 443
    40 permit tcp host 10.1.2.200 host 12.45.24.30 eq 443
```

Screenshot Demonstrating ACL configuration allowing PC1 (10.1.2.100) to access HTTP Server 1 (10.1.1.20) using HTTP.



Observation:

The ACL configuration permits PC1 (10.1.2.100) to access HTTP Server 1 (10.1.1.20) via HTTP only

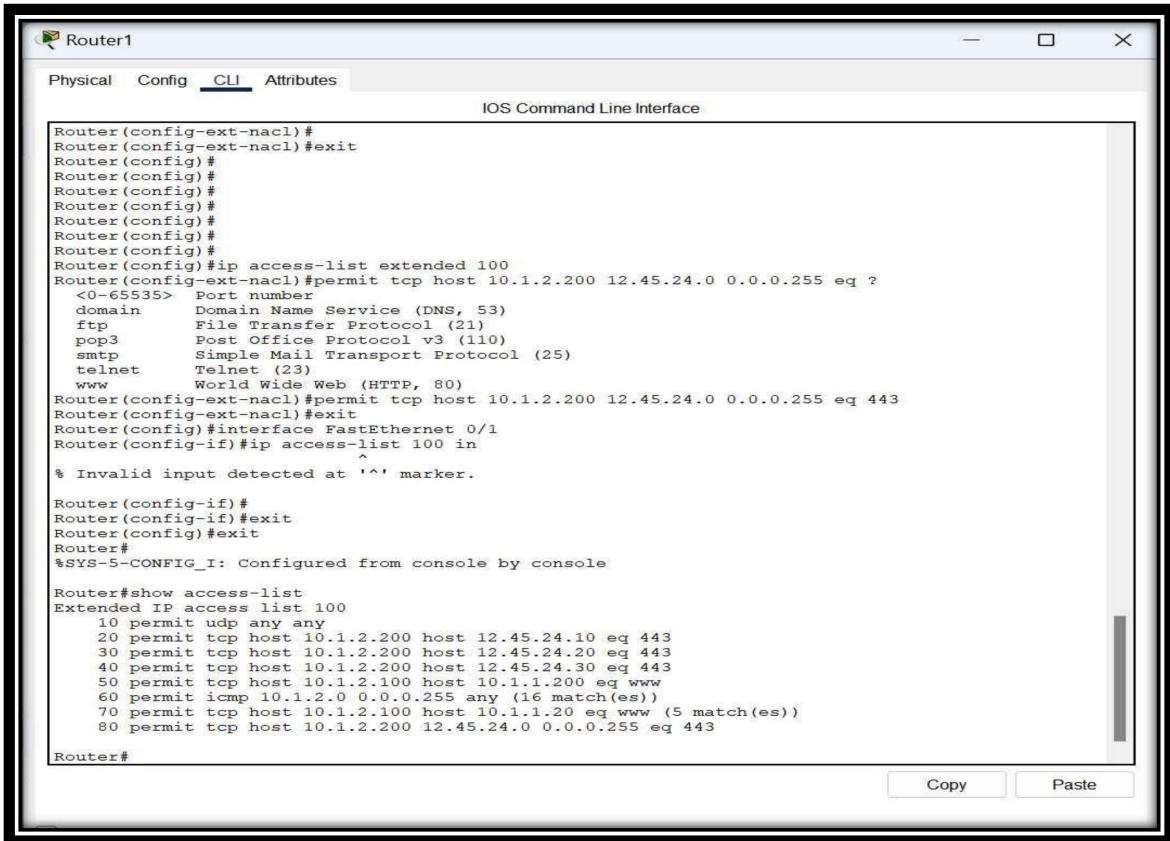
3. PC2 can only access the web using HTTPS on 12.45.24.0/24

- Allow PC2 to access the web using HTTPS on subnet 12.45.24.0/24 in access list:

```
Router(config-ext-nacl)# permit tcp host 10.1.2.200 12.45.24.0 0.0.0.255 eq  
443
```

- Apply ACL to interface:

```
Router(config)# interface FastEthernet 0/1  
Router(config-if)#ip access-group 100 in
```



Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

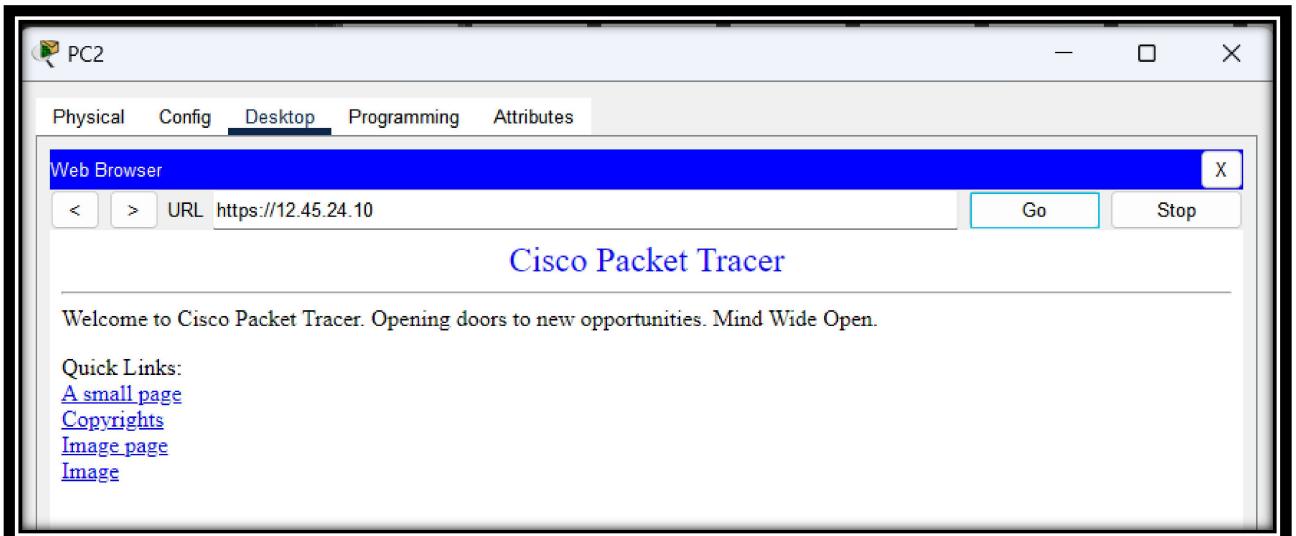
```
Router(config-ext-nacl)#
Router(config-ext-nacl)#exit
Router(config)#
Router(config) ip access-list extended 100
Router(config-ext-nacl)#permit tcp host 10.1.2.200 12.45.24.0 0.0.0.255 eq ?
<0-65535> Port number
domain Domain Name Service (DNS, 53)
ftp File Transfer Protocol (21)
pop3 Post Office Protocol v3 (110)
smtp Simple Mail Transport Protocol (25)
telnet Telnet (23)
www World Wide Web (HTTP, 80)
Router(config-ext-nacl)#permit tcp host 10.1.2.200 12.45.24.0 0.0.0.255 eq 443
Router(config-ext-nacl)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip access-list 100 in
^
% Invalid input detected at '^' marker.

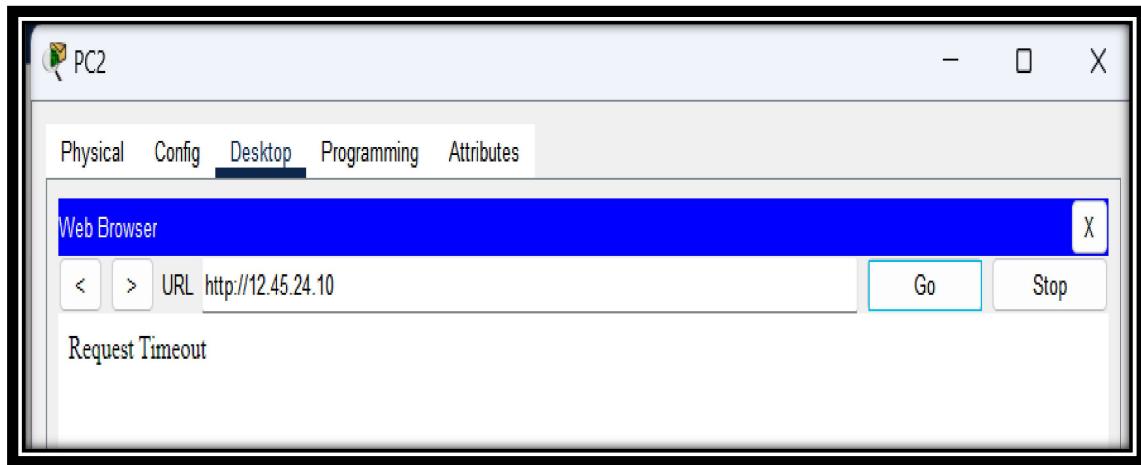
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router# %SYS-5-CONFIG_I: Configured from console by console

Router#show access-list
Extended IP access list 100
10 permit udp any any
20 permit tcp host 10.1.2.200 host 12.45.24.10 eq 443
30 permit tcp host 10.1.2.200 host 12.45.24.20 eq 443
40 permit tcp host 10.1.2.200 host 12.45.24.30 eq 443
50 permit tcp host 10.1.2.100 host 10.1.1.200 eq www
60 permit icmp 10.1.2.0 0.0.0.255 any (16 match(es))
70 permit tcp host 10.1.2.100 host 10.1.1.20 eq www (5 match(es))
80 permit tcp host 10.1.2.200 12.45.24.0 0.0.0.255 eq 443
Router#
```

Copy Paste

PC2- 12.45.24.10:

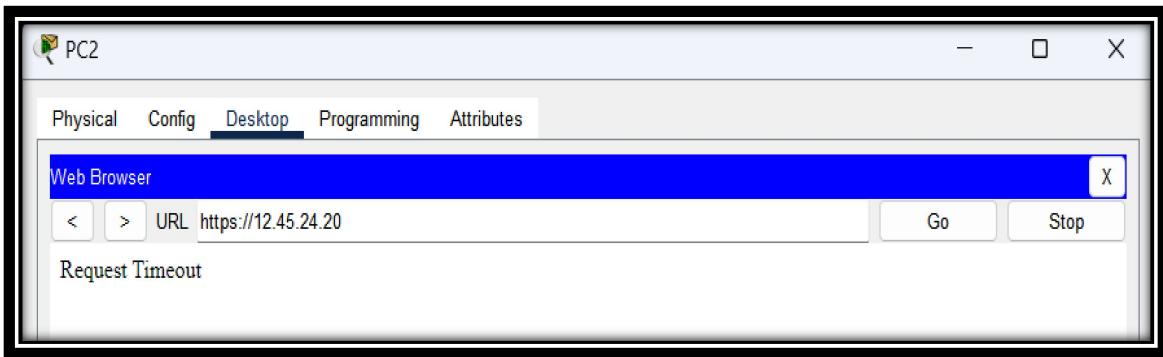




PC2- 12.45.24.20:

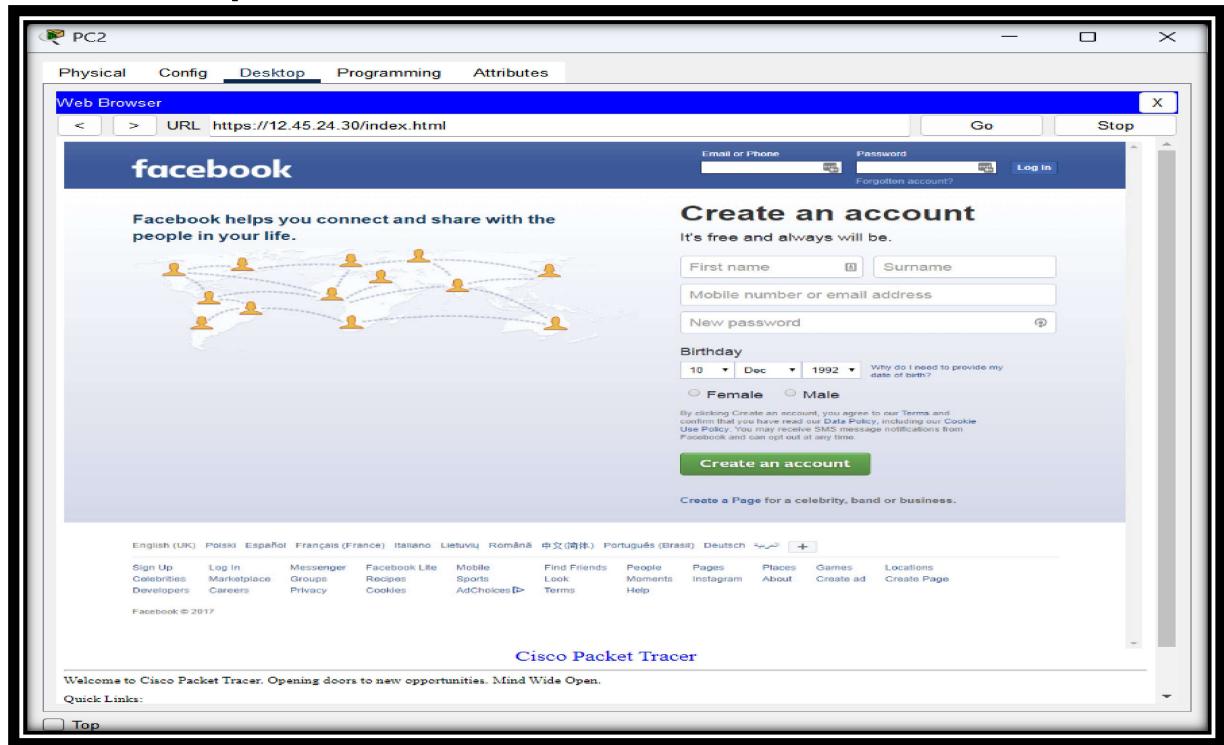
- **Test HTTP Request:** Access <http://12.45.24.20>

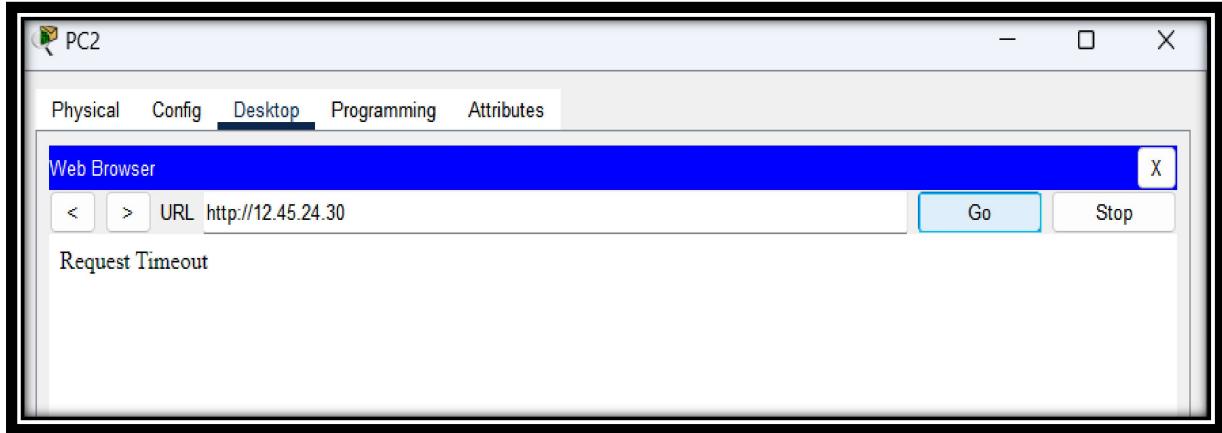
A screenshot of a web browser window showing the Cisco CCNA Routing and Switching landing page. The browser's title bar says "PC2" and the URL bar shows "https://12.45.24.20". The main content area displays the Cisco logo and navigation links for Products & Services, Support, How to Buy, Training & Events, and Partners. Below this, there is a breadcrumb trail: Training & Events / Training & Certifications / Certifications / Associate Certifications / CCNA Routing and Switching. A large hero image shows a person working in a server room. To the right of the image, there is a headline "Ten Reasons to Get CCNA Routing & Switching Certification" and a subtext "A successful career in networking starts with CCNA Routing & Switching." Below the headline is a green "Learn More" button. At the bottom of the page, there is a navigation menu with tabs: Overview (which is selected and highlighted in blue), Study & Learn, Training, Take Exam, Recertify, and Resources.



PC2- 12.45.24.30

➤ Access <http://12.45.24.30>





1. No other PCs on subnet 10.1.2.0/24 can access subnet 12.45.24.0/24

- Deny other PCs (only 10.1.2.150 is remaining) from accessing subnet 12.45.24.0/24 in accesslist:

```
Router(config-ext-nacl)# deny icmp 10.1.2.150 0.0.0.255 12.45.24.0  
0.0.0.255 host-unreachable
```

- Exit access list configuration:

```
Router(config-ext-nacl)#exit
```

- Verify access list

```
Router # show access-list
```

- Apply ACL to interface:

```
Router(config)# interface FastEthernet 0/1  
Router(config-if)#ip access-group 100 in
```

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Press RETURN to get started.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip access-list extended 100
Router(config-ext-nacl)#deny icmp 10.1.2.150 0.0.0.255 12.45.24.0 0
Router(config-ext-nacl)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip access-group 100 in
Router(config-if)#exit
Router(config)# exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Router1

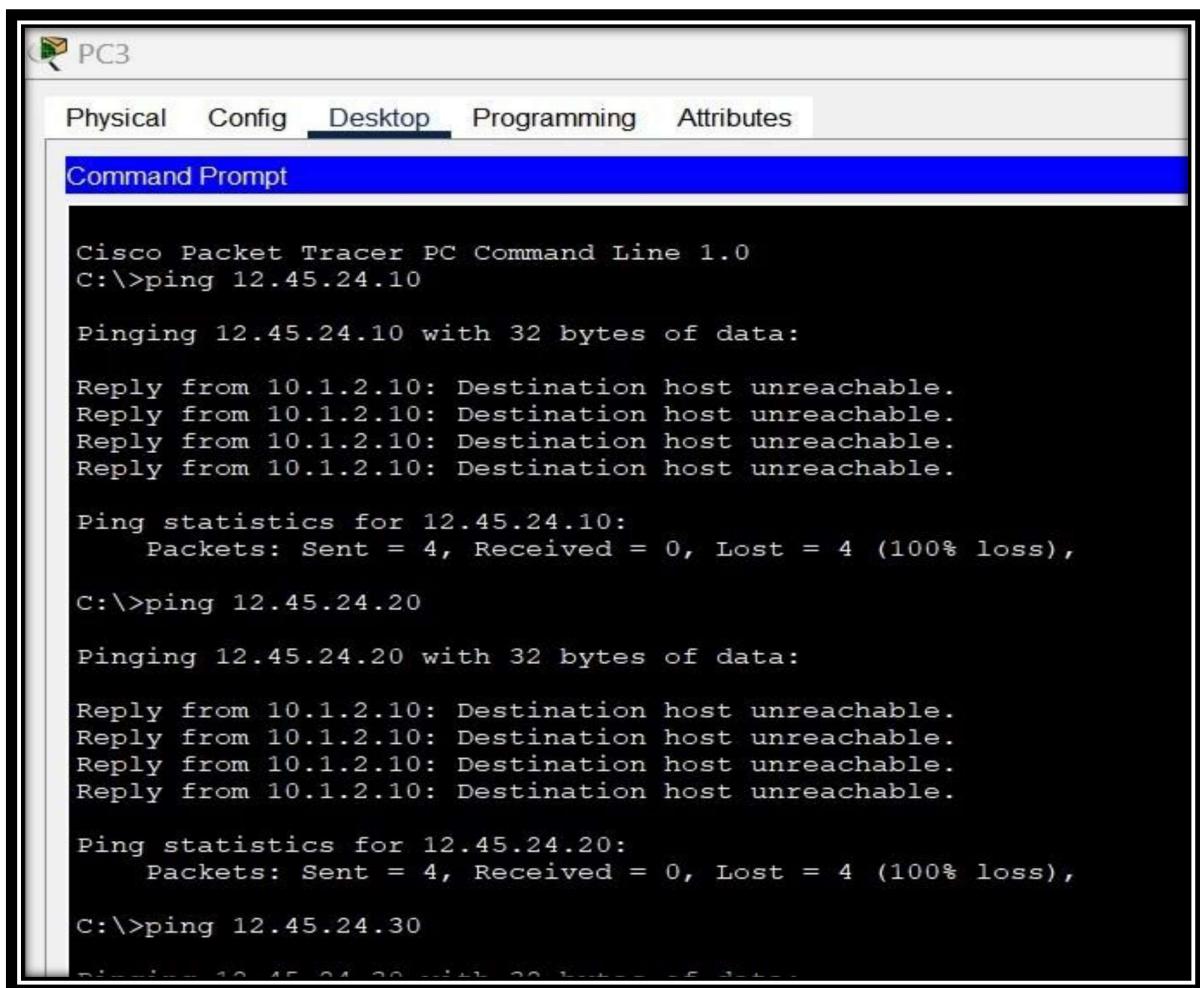
Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router(config)#
Router(config)#
Router(config)#ip access-list extended 100
Router(config-ext-nacl)#no 60
Router(config-ext-nacl)#exit
Router(config)#ip access-list extended 100
Router(config-ext-nacl)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show access-lists
Extended IP access list 100
    10 permit udp any any
    20 permit tcp host 10.1.2.200 host 12.45.24.10 eq 443 (5 match)
```

Screen shot demonstrates ACL rule to deny access from subnet 10.1.2.0/24 to subnet 12.45.24.0/24.



The screenshot shows a Cisco Packet Tracer window titled "PC3". The menu bar includes "Physical", "Config", "Desktop", **Desktop**, "Programming", and "Attributes". The main area is a "Command Prompt" window with the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 12.45.24.10

Pinging 12.45.24.10 with 32 bytes of data:

Reply from 10.1.2.10: Destination host unreachable.

Ping statistics for 12.45.24.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 12.45.24.20

Pinging 12.45.24.20 with 32 bytes of data:

Reply from 10.1.2.10: Destination host unreachable.

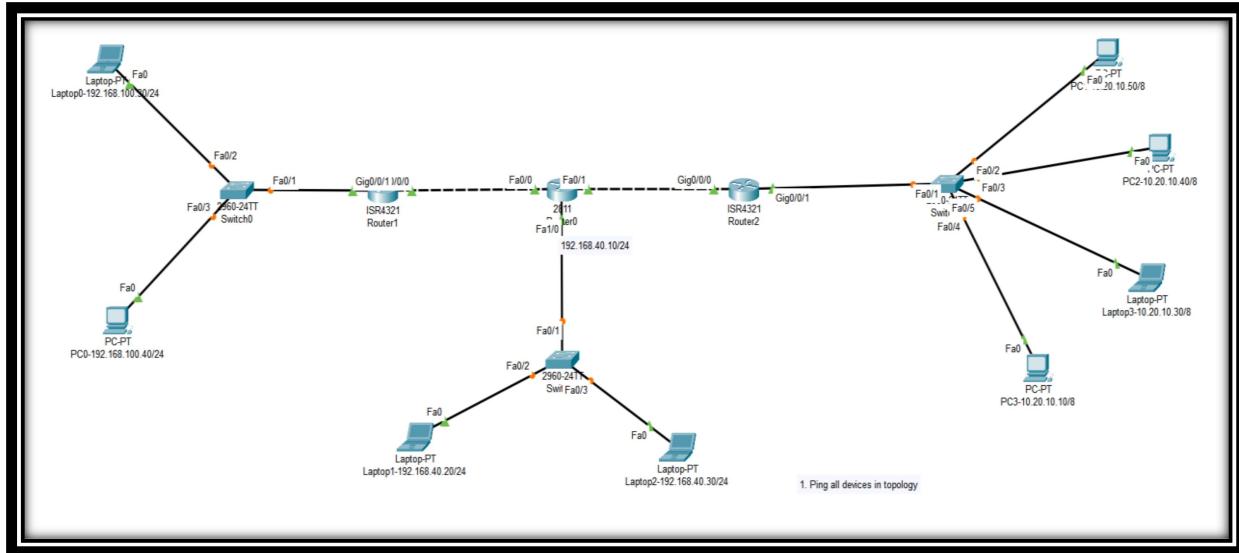
Ping statistics for 12.45.24.20:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 12.45.24.30
```

Observation: The screenshot shows the removal of the old ACL rule and the addition of a new rule denying access from subnet 10.1.2.0/24 to subnet 12.45.24.10/24.

LAB 1: STATIC ROUTER

- Ping all devices in topology



Steps to Resolve Issues After Interchanging IP Addresses with Correct Static Routes

1. Verify and Correct IP Addresses on Router 0

- Access Router 1:
- Open Router's Configuration:
- Check and Correct Interface IP Addresses:
 - Select each interface (e.g., `GigabitEthernet0/0` and `GigabitEthernet0/1`) and ensure the IP addresses match your network design.
 - Make sure both interfaces are enabled (On or Enabled).

2. Ensure IP Assignments on End Devices

- Access Each End Device:
- Verify IP Configuration:
 - Go to the `Desktop` tab and select `IP Configuration`.
 - Ensure each end device's IP settings match the corrected router interfaces.

2. Verify Static Routes

- **View Routing Table:**
 - On Router, go to the **Config tab**, select the Routing section, and check the **Static Routes** to confirm they match your network design.
- **Check Routing Status:**
 - Ensure that the static routes appear correctly in the routing table and point to the intended next-hop addresses or interfaces.

3. Test Connectivity Across Devices

- **Ping Devices from End Devices:**
 - Use the **Command Prompt** under the **Desktop** tab of each end device to perform ping tests to devices in other subnets.
- **Ping Devices from all Routers:**
 - Open the **Simulation** mode or **Command Prompt** on Router 0.
 - Ping devices across different networks to test connectivity.
- **Check connectivity between routers.**

Successfully pinged Router 2 and Router 3 from Router 1 with a 100% success rate, confirming that all routers are able to communicate with each other.

The screenshot shows the Cisco Network Simulator interface. The title bar says "Router1". Below it is a navigation bar with tabs: Physical, Config, **CLI**, and Attributes. The main area is titled "IOS Command Line Interface". The CLI session shows the following commands and output:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#exit
Router(config)#ping 172.16.5.30
^
% Invalid input detected at '^' marker.

Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#ping 172.16.5.30

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.5.30, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Router#ping 10.20.10.5

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.20.10.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Successfully pinged Router 1 and Router 3 from Router 2 with a 100% success rate, confirming that all routers are able to communicate with each other.

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
3223551K bytes of flash memory at bootflash:.

Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/

Router>enable
Router#ping 192.168.100.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.100.10, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Router#ping 172.16.5.20

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.5.20, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Router#ping 172.32.15.20
```

Successfully pinged Router 1 and Router 2 from Router 3 with a 100% success rate, confirming that all routers are able to communicate with each other.

Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

Router>enable
Router#ping 192.168.100.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.100.10, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Router#ping 172.16.5.20

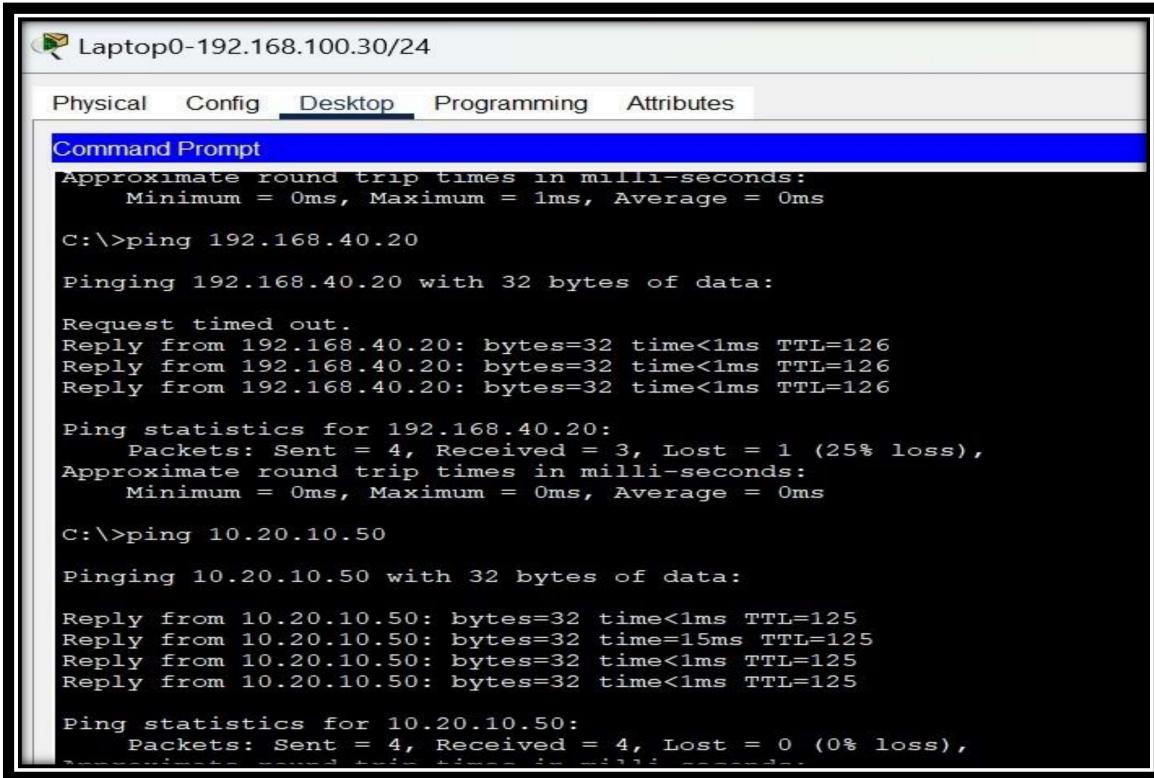
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.5.20, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Router#ping 172.32.15.20

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.32.15.20, timeout is 2 seconds
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

Successfully pinged devices on other networks from Laptop0 with a 100% success rate, confirming that end devices can communicate across different network segments.

Pinging Laptop0—>Laptop1, PC1, PC0



```
Laptop0-192.168.100.30/24
Physical Config Desktop Programming Attributes
Command Prompt
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.40.20

Pinging 192.168.40.20 with 32 bytes of data:

Request timed out.
Reply from 192.168.40.20: bytes=32 time<1ms TTL=126
Reply from 192.168.40.20: bytes=32 time<1ms TTL=126
Reply from 192.168.40.20: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.40.20:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

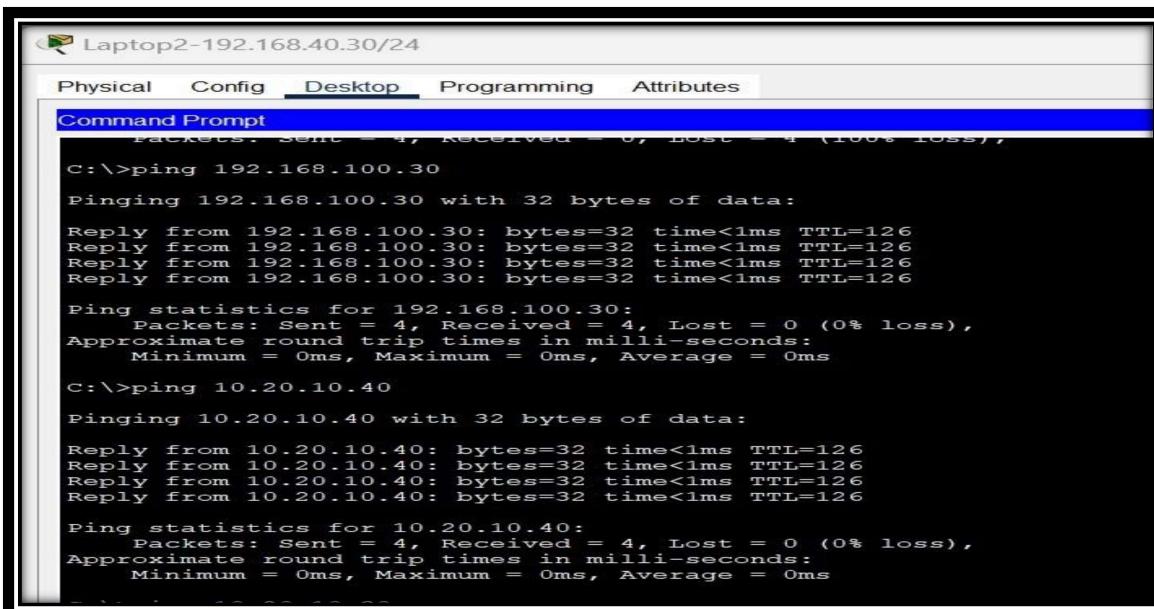
C:\>ping 10.20.10.50

Pinging 10.20.10.50 with 32 bytes of data:

Reply from 10.20.10.50: bytes=32 time<1ms TTL=125
Reply from 10.20.10.50: bytes=32 time=15ms TTL=125
Reply from 10.20.10.50: bytes=32 time<1ms TTL=125
Reply from 10.20.10.50: bytes=32 time<1ms TTL=125

Ping statistics for 10.20.10.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

Pinging Laptop2—>Laptop1, PC2, Laptop 3



```
Laptop2-192.168.40.30/24
Physical Config Desktop Programming Attributes
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.168.100.30

Pinging 192.168.100.30 with 32 bytes of data:

Reply from 192.168.100.30: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.100.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

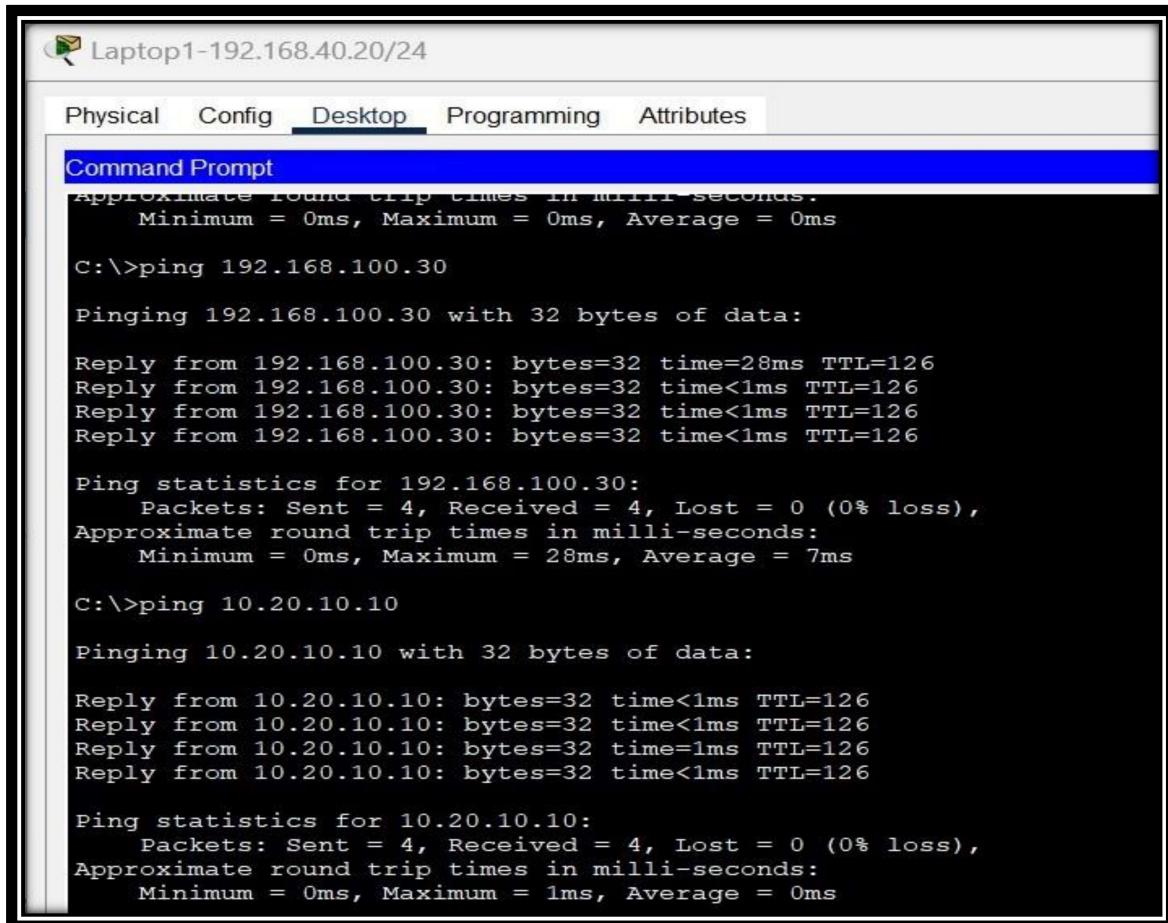
C:\>ping 10.20.10.40

Pinging 10.20.10.40 with 32 bytes of data:

Reply from 10.20.10.40: bytes=32 time<1ms TTL=126

Ping statistics for 10.20.10.40:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Pinging Laptop2→Laptop1, PC3, PC0



Laptop1-192.168.40.20/24

Physical Config Desktop Programming Attributes

Command Prompt

```
Approximate round trip times in milli-seconds.
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.100.30

Pinging 192.168.100.30 with 32 bytes of data:

Reply from 192.168.100.30: bytes=32 time=28ms TTL=126
Reply from 192.168.100.30: bytes=32 time<1ms TTL=126
Reply from 192.168.100.30: bytes=32 time<1ms TTL=126
Reply from 192.168.100.30: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.100.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 28ms, Average = 7ms

C:\>ping 10.20.10.10

Pinging 10.20.10.10 with 32 bytes of data:

Reply from 10.20.10.10: bytes=32 time<1ms TTL=126
Reply from 10.20.10.10: bytes=32 time<1ms TTL=126
Reply from 10.20.10.10: bytes=32 time=1ms TTL=126
Reply from 10.20.10.10: bytes=32 time<1ms TTL=126

Ping statistics for 10.20.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Observation:

- Successfully pinged all devices connected to Router 1, Router 2, and Router 3 with a 100% success rate, confirming full network connectivity across all routers.