

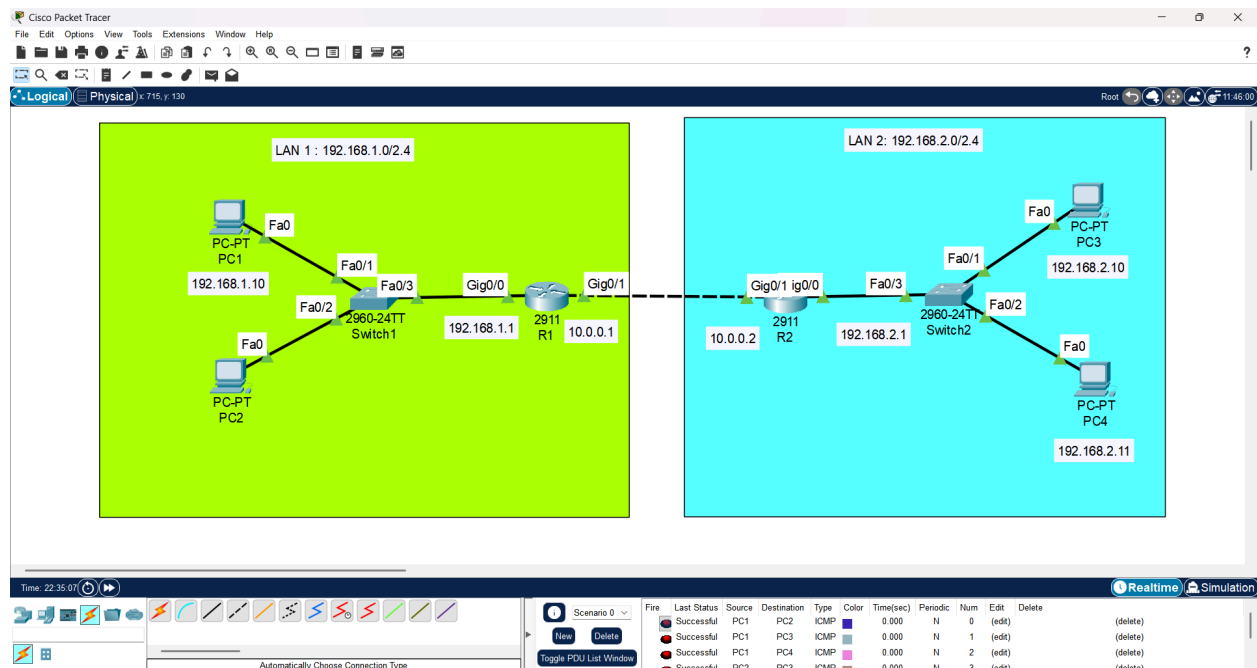
Lab 04 – Static Routing

Objective:

To connect two separate LANs using two routers to form static connection via a WAN link and verify inter-network communication.

Topology:

Two LANs connected via a two routers over a crossover cable



IP Addressing:

LAN 1:

PC1: 192.168.1.10 /24

PC2: 192.168.1.11 /24

Gateway: 192.168.1.1

LAN 2:

PC3: 192.168.2.10 /24

PC4: 192.168.2.11 /24

Gateway: 192.168.2.1

Router 1 Configuration:

- G0/0: 192.168.1.1
- G0/1: 10.0.0.1

Router 1 IP Route

-ip route 192.168.2.0 255.255.255.0 10.0.0.2

```
Cisco CISC02911/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
3 Gigabit Ethernet interfaces
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)

--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface gig
R1(config)#interface gigabitEthernet 0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown

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

R1(config-if)#exit
R1(config)#interface gig
R1(config)#interface gigabitEthernet 0/1
R1(config-if)#ip address 10.0.0.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/1, changed state to up
R1(config-if)#exit |
```

Router 2 Configuration:

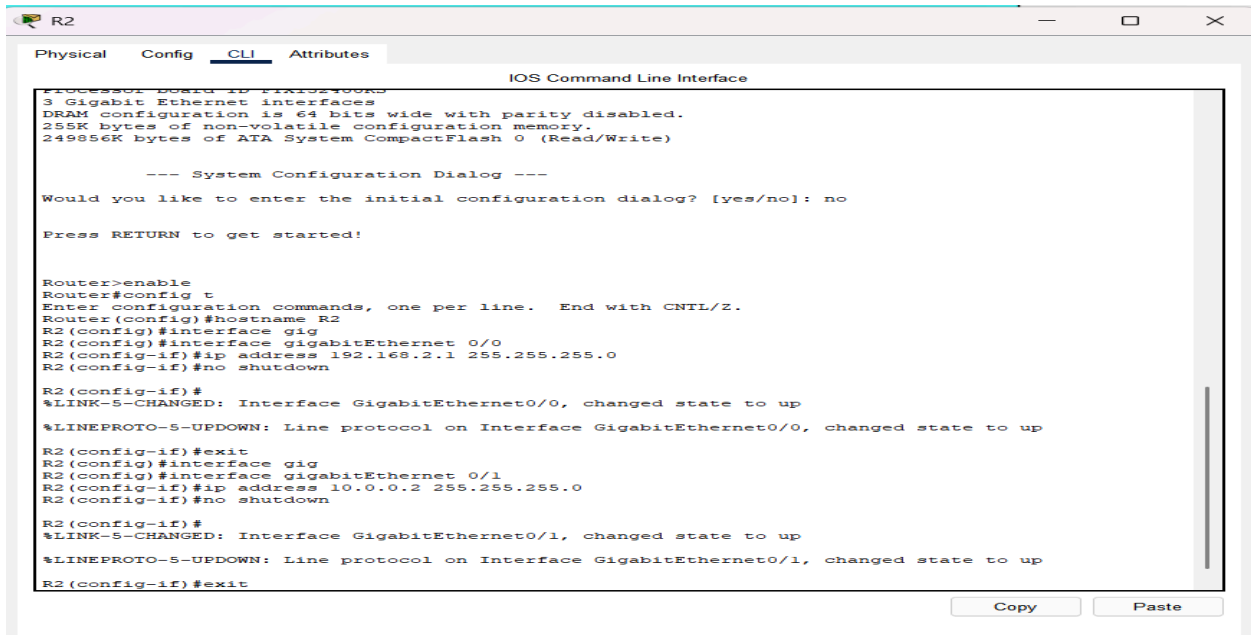
- G0/0: 192.168.2.1
- G0/1: 10.0.0.2

Router 2 IP Route

-ip route 192.168.1.0 255.255.255.0 10.0.0.1

Purpose of IP Routing

- To specify the path data will travel in a static routing

A screenshot of a network simulator window titled 'R2'. The window has tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' selected. The main area displays the 'IOS Command Line Interface'. The text shows the router's boot sequence, including hardware details and a system configuration dialog. The user enters 'enable' to enter privileged mode, then 'configure terminal' to enter configuration mode. They configure the hostname as 'R2', then configure interface 'GigabitEthernet0/0' with IP address '192.168.2.1' and subnet mask '255.255.255.0'. Next, they configure interface 'GigabitEthernet0/1' with IP address '10.0.0.2' and subnet mask '255.255.255.0'. Finally, they exit configuration mode. The interface status messages indicate that both interfaces are now 'up'.

```
Processor board ID Fx10000000
3 Gigabit Ethernet interfaces
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)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

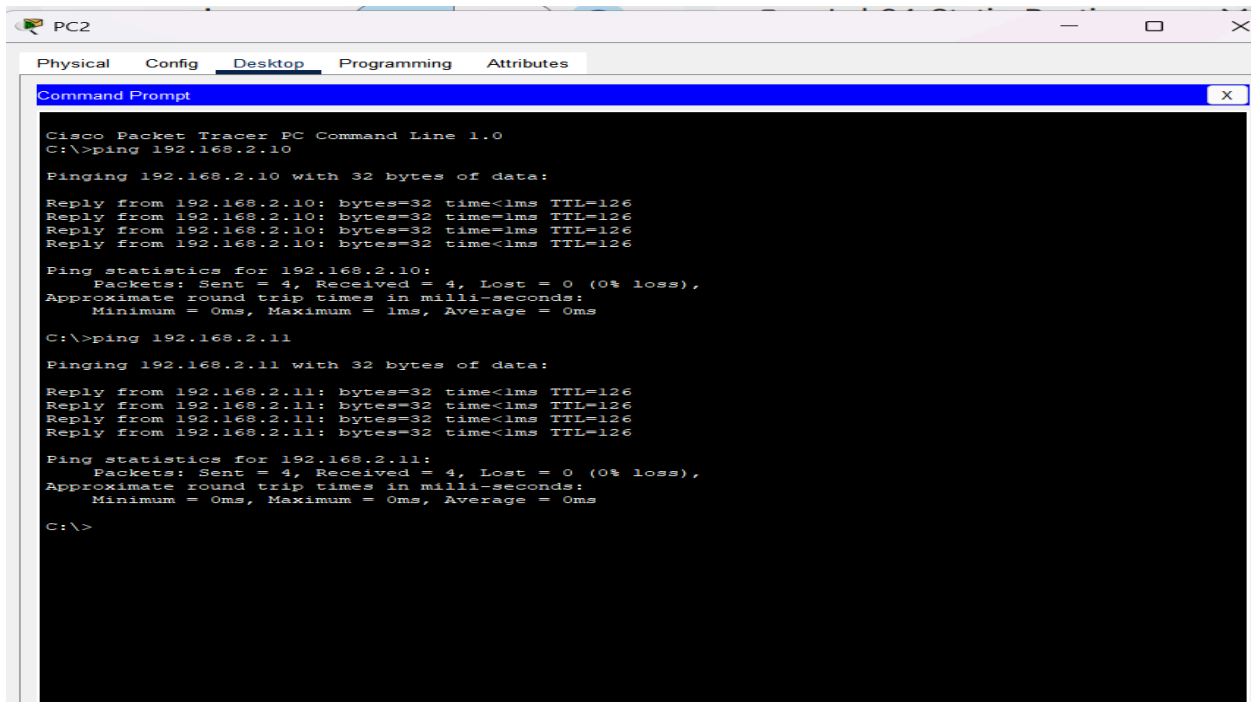
Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface gig
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
R2(config-if)#exit
R2(config)#interface gig
R2(config)#interface gigabitEthernet 0/1
R2(config-if)#ip address 10.0.0.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
R2(config-if)#exit
```

Verification:

- Successful ping between LAN 1 and LAN 2

PC2 to PCs in LAN 2



The screenshot shows the Command Prompt window of PC2 in Cisco Packet Tracer. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt displays the output of two ping commands. The first command is 'ping 192.168.2.10', which shows four successful replies with 32 bytes of data, a time of less than 1ms, and a TTL of 126. The statistics for 192.168.2.10 show 4 packets sent, 4 received, 0 lost (0% loss), and approximate round trip times of 0ms minimum, 1ms maximum, and 0ms average. The second command is 'ping 192.168.2.11', which also shows four successful replies with 32 bytes of data, a time of less than 1ms, and a TTL of 126. The statistics for 192.168.2.11 show 4 packets sent, 4 received, 0 lost (0% loss), and approximate round trip times of 0ms minimum, 0ms maximum, and 0ms average.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time=1ms TTL=126
Reply from 192.168.2.10: bytes=32 time=1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.2.11

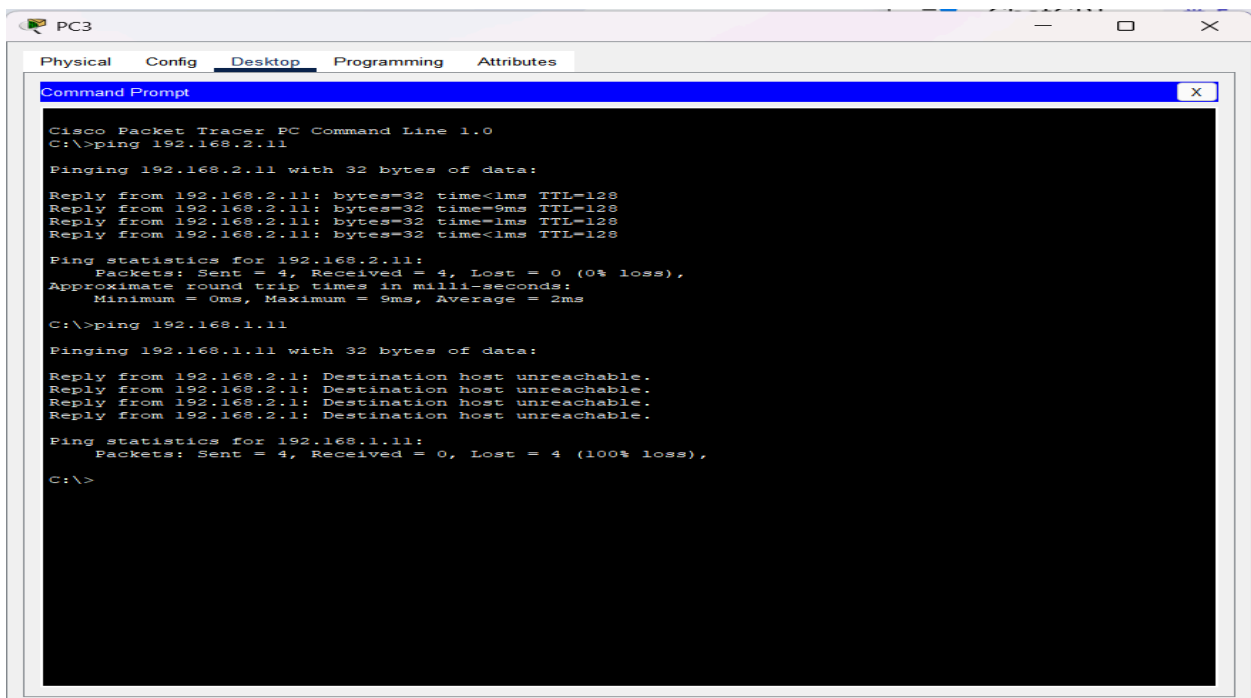
Pinging 192.168.2.11 with 32 bytes of data:

Reply from 192.168.2.11: bytes=32 time<1ms TTL=126
Reply from 192.168.2.11: bytes=32 time<1ms TTL=126
Reply from 192.168.2.11: bytes=32 time<1ms TTL=126
Reply from 192.168.2.11: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

PC3 to PCs in LAN1



The screenshot shows the Command Prompt window of PC3 in Cisco Packet Tracer. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt displays the output of two ping commands. The first command is 'ping 192.168.2.11', which shows four successful replies with 32 bytes of data, a time of less than 1ms, and a TTL of 128. The statistics for 192.168.2.11 show 4 packets sent, 4 received, 0 lost (0% loss), and approximate round trip times of 0ms minimum, 9ms maximum, and 2ms average. The second command is 'ping 192.168.1.11', which shows four failed replies with the message 'Destination host unreachable'. The statistics for 192.168.1.11 show 4 packets sent, 0 received, 4 lost (100% loss).

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.11

Pinging 192.168.2.11 with 32 bytes of data:

Reply from 192.168.2.11: bytes=32 time<1ms TTL=128
Reply from 192.168.2.11: bytes=32 time=9ms TTL=128
Reply from 192.168.2.11: bytes=32 time=1ms TTL=128
Reply from 192.168.2.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.2.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 9ms, Average = 2ms

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Lessons Learned:

- Two routers form a static connection to connect two different networks
- Default gateways allow devices to leave their LAN
- Each interface belongs to a different network
- The two routers are connected to each other via a WAN link using a crossover cable