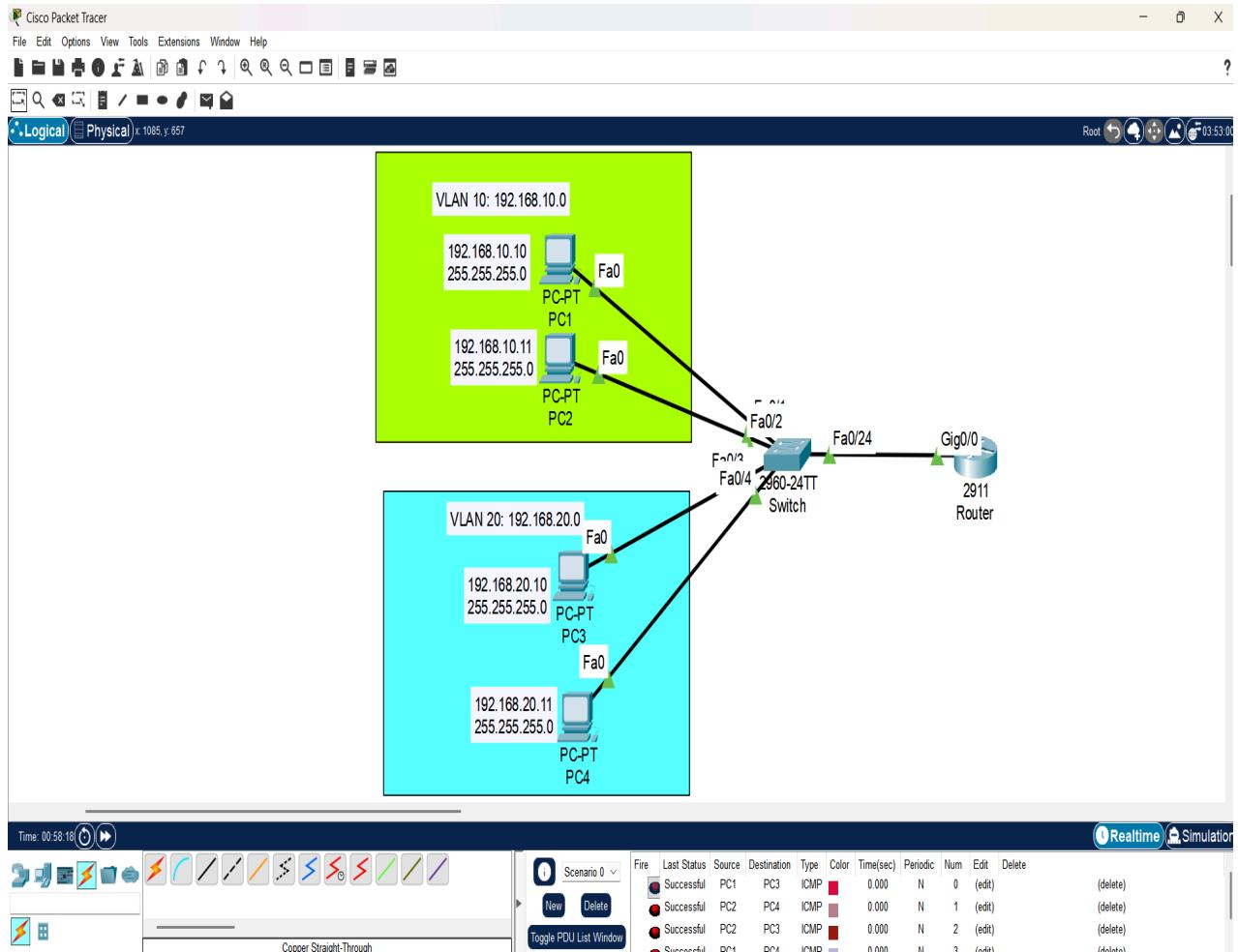


Objective:

Enable communication between VLANs using router-on-a-stick.

Topology:

One router connected to a switch using a trunk port. Two VLANs on the switch.



VLAN Design:

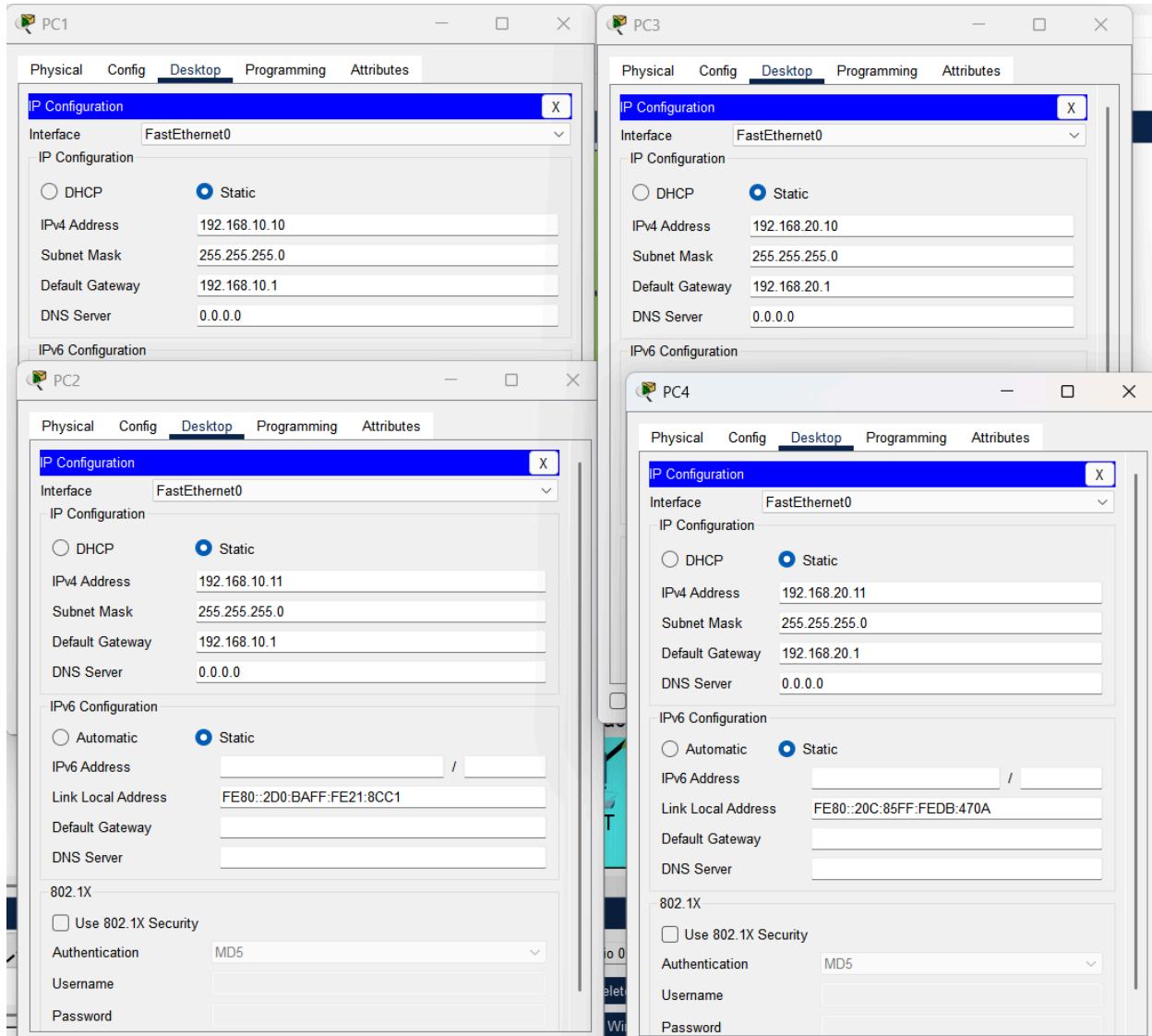
VLAN 10 (SALES)

VLAN 20 (IT)

IP Addressing:

VLAN 10 Gateway: 192.168.10.1

VLAN 20 Gateway: 192.168.20.1



PC Addresses:

VLAN 10: 192.168.10.10, 192.168.10.11

VLAN 20: 192.168.20.10, 192.168.20.11

Switch Config:

- VLAN 10 and VLAN 20 created
- Access ports assigned
- Trunk port configured to router

The screenshot shows a software application window titled "Switch". The tab bar at the top has four tabs: "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is selected, and the main area is titled "IOS Command Line Interface". Inside the CLI window, there is a message "Press RETURN to get started!" followed by several log entries indicating link state changes for FastEthernet interfaces 0/1 through 0/4. Below these, the configuration command history is displayed, starting with "Switch>enable" and "Switch#config t", followed by the creation of VLANs 10 and 20, and the assignment of access and trunk modes to various interfaces.

```
Press RETURN to get started!

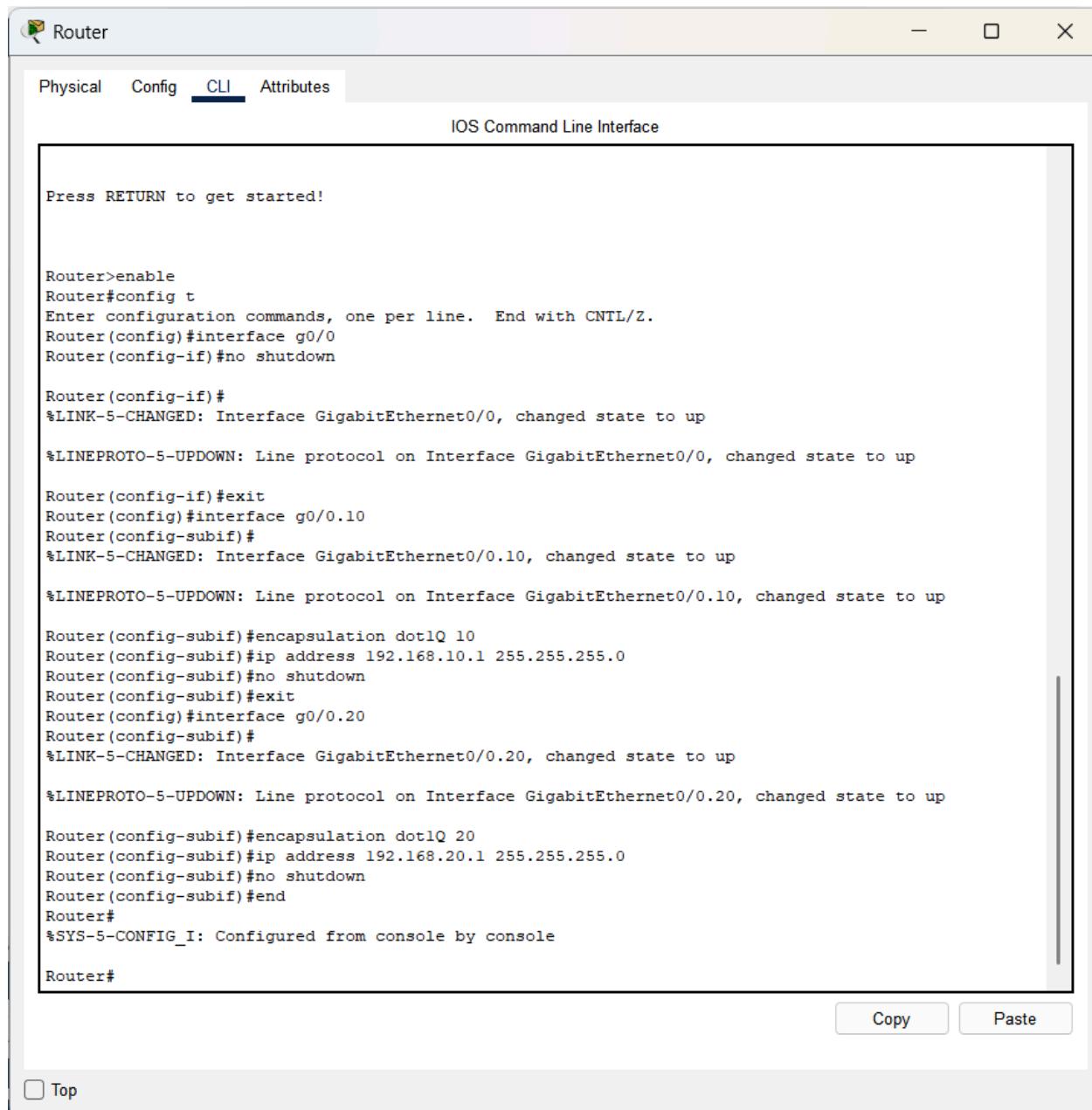
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up

Switch>enable
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name SALES
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name IT
Switch(config-vlan)#exit
Switch(config)#interface range fa0/1-2
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#exit
Switch(config)#interface range fa0/3-4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#interface fa0/24
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config) #
```

Top

Router Config:

- Subinterfaces g0/0.10 and g0/0.20 created
- Dot1Q encapsulation enabled
- IP addresses assigned



The screenshot shows a window titled "Router" with a tab bar containing "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is the text "IOS Command Line Interface". The main area displays the following CLI session output:

```
Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface g0/0
Router(config-if)#no shutdown

Router(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

Router(config-if)#exit
Router(config)#interface g0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.0
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface g0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

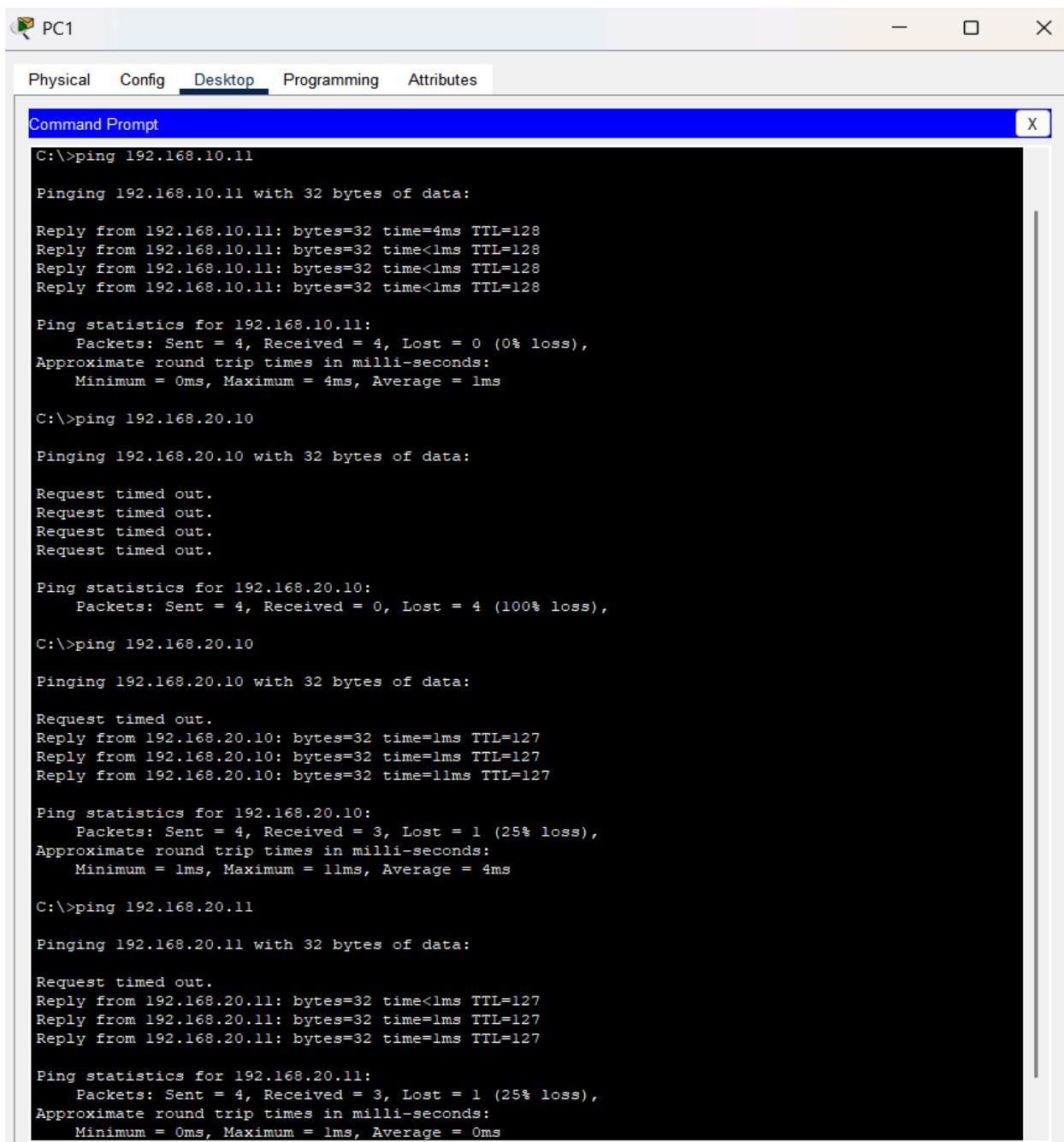
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#no shutdown
Router(config-subif)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

At the bottom of the window, there are "Copy" and "Paste" buttons. A "Top" button is located at the bottom left.

Verification:

- Successful ping between VLAN 10 and VLAN 20 devices



The screenshot shows a software interface titled "PC1" with a toolbar at the top featuring icons for Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is currently selected. Below the toolbar is a "Command Prompt" window with a blue header bar containing the title and a close button (X). The main area of the window displays the output of several ping commands:

```
C:\>ping 192.168.10.11
Pinging 192.168.10.11 with 32 bytes of data:
Reply from 192.168.10.11: bytes=32 time=4ms TTL=128
Reply from 192.168.10.11: bytes=32 time<1ms TTL=128
Reply from 192.168.10.11: bytes=32 time<1ms TTL=128
Reply from 192.168.10.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>ping 192.168.20.10
Pinging 192.168.20.10 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.20.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.168.20.10
Pinging 192.168.20.10 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.10: bytes=32 time=1ms TTL=127
Reply from 192.168.20.10: bytes=32 time=1ms TTL=127
Reply from 192.168.20.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.20.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 4ms

C:\>ping 192.168.20.11
Pinging 192.168.20.11 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.11: bytes=32 time<1ms TTL=127
Reply from 192.168.20.11: bytes=32 time=1ms TTL=127
Reply from 192.168.20.11: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.20.11:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Lessons Learned:

- Routers perform inter-VLAN routing
- Trunk links carry multiple VLANs
- Subinterfaces represent VLAN gateways