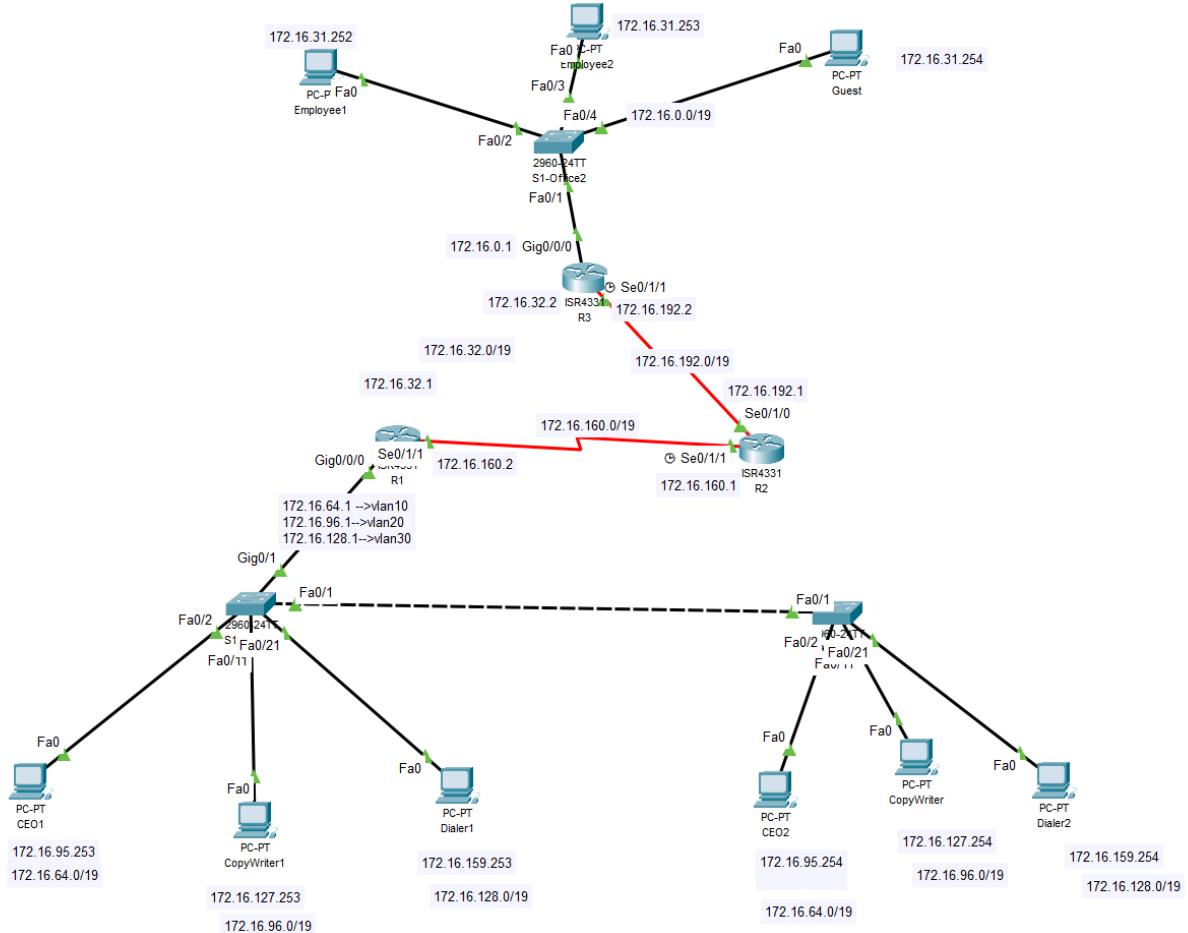


Deliverables:

Topology:



Topology Overview: This section likely outlines the network design, although the specific topology details weren't captured in the text provided. It would typically include diagrams or schematics of how network devices are interconnected.

Task 1

Hosts per Subnet: $2^{(32-19)} - 2 = 2^{13} - 2 = 8192 - 2 = 8190$ usable addresses per subnet

Addressing Table

Subnet #	Network Address	Usable Host Address Range	Broadcast Address	Subnet mask
Subnet 1	172.16.0.0	172.16.0.1 - 172.16.31.254	172.16.31.255	255.255.224.0
Subnet 2	172.16.32.0	172.16.32.1 - 172.16.63.254	172.16.63.255	255.255.224.0
Subnet 3	172.16.64.0	172.16.64.1 - 172.16.95.254	172.16.95.255	255.255.224.0
Subnet 4	172.16.96.0	172.16.96.1 - 172.16.127.254	172.16.127.255	255.255.224.0
Subnet 5	172.16.128.0	172.16.128.1 - 172.16.159.254	172.16.159.255	255.255.224.0
Subnet 6	172.16.160.0	172.16.160.1 - 172.16.191.254	172.16.191.255	255.255.224.0
Subnet 7	172.16.192.0	172.16.192.1 - 172.16.223.254	172.16.223.255	255.255.224.0

Task 1 - Hosts per Subnet Calculation: The document provides calculations for the number of usable host addresses per subnet, using the formula $(2^{(32-n)} - 2)$, where n is the subnet mask length. It results in 8190 usable addresses per subnet.

TASK 2:

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#Name Management
Switch(config-vlan)#int range fa0/1-10
Switch(config-if-range)#swit
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#swit
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#ex
Switch(config)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on
FastEthernet0/1 (10), with Switch FastEthernet0/1 (1).
vlan 20
Switch(config-vlan)#name Marketing
Switch(config-vlan)#int range fa0/11-20
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#ex

Switch(config)#vlan 30
Switch(config-vlan)#name Accounting
Switch(config-vlan)#int range fa0/21-2
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on
FastEthernet0/1 (10), with Switch Fas^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 30
Switch(config-vlan)#int range fa0/21-24
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
Switch(config-if-range)#no shutdown
Switch(config-if-range)#vlan 30
```

```

Switch(config-vlan)#switc
Switch(config-vlan)#swi
Switch(config-vlan)#int fa0/1
Switch(config-if)#switch
Switch(config-if)#switchport mo
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to down

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

Switch(config-if)#swi
Switch(config-if)#switchport trun
Switch(config-if)#switchport trunk na
Switch(config-if)#switchport trunk native vlan 100
Switch(config-if)#switch
Switch(config-if)#switchport trun
Switch(config-if)#switchport trunk allowed vlan 10,20,30,100
Switch(config-if)#



| VLAN | Name               | Status | Ports                                                                              |
|------|--------------------|--------|------------------------------------------------------------------------------------|
| 1    | default            | active | Gig0/1, Gig0/2                                                                     |
| 10   | Management         | active | Fa0/2, Fa0/3, Fa0/4, Fa0/5<br>Fa0/6, Fa0/7, Fa0/8, Fa0/9<br>Fa0/10                 |
| 20   | Marketing          | active | Fa0/11, Fa0/12, Fa0/13, Fa0/14<br>Fa0/15, Fa0/16, Fa0/17, Fa0/18<br>Fa0/19, Fa0/20 |
| 30   | Accounting         | active | Fa0/21, Fa0/22, Fa0/23, Fa0/24                                                     |
| 100  | Native             | active |                                                                                    |
| 1002 | fdci-default       | active |                                                                                    |
| 1003 | token-ring-default | active |                                                                                    |
| 1004 | fddinet-default    | active |                                                                                    |
| 1005 | trnet-default      | active |                                                                                    |



Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#Name Management
Switch(config-vlan)#int range fa0/1-10
Switch(config-if-range)#swit
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#swit
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#ex

```

```
Switch(config-vlan)#int range fa0/1-10
Switch(config-if-range)#s
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mode
Switch(config-if-range)#switchport mode acc
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#swi
Switch(config-if-range)#switchport acce
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#no shut
Switch(config-if-range)#no shutdown
Switch(config-if-range)#ex

vlan 20
Switch(config-vlan)#Name Marketing
Switch(config-vlan)#int range fa0/11-20
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#no shutdown
Switch(config-if-range)#ex

Switch(config)#vlan 30
Switch(config-vlan)#Name Accounting
Switch(config-vlan)#int range fa0/21-24
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
Switch(config-if-range)#no shutdown
Switch(config-if-range)#ex
```

```
Switch(config-if)#switchport tru
Switch(config-if)#switchport trunk na
Switch(config-if)#switchport trunk native vlan 100
Switch(config-if)#switch
Switch(config-if)#switchport tr
Switch(config-if)#switchport trunk allo
Switch(config-if)#switchport trunk allowed vlan 10,20,30,100
Switch(config-if)#no sh
Switch(config-if)#no shutdown
Switch(config-if)#ex

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range fa0/2-24
Switch(config-if-range)#swi
Switch(config-if-range)#switchport nonig
Switch(config-if-range)#switchport noni
Switch(config-if-range)#switchport no
Switch(config-if-range)#switchport nonegotiate
Switch(config-if-range)#ex
```

TASK3 :

```
Router(config)#hostname R1
R1(config)#int se0/1/0
R1(config-if)#ip add 172.16.32.1 255.255.224.0
R1(config-if)#nos sh
R1(config-if)#nos sh
^
% Invalid input detected at '^' marker.

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

R1(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state
to up

R1(config-if)#ex
R1(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/1/0, changed state to up

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#int se0/1/0
R1(config-if)#ip add 172.16.32.1 255.255.224.0
R1(config-if)#nos sh
R1(config-if)#nos sh
^
% Invalid input detected at '^' marker.

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

R1(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

R1(config-if)#ex
R1(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
```

```
R1(config-if)#ex
R1(config)#int gig0/0/0.10
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.10, changed
state to up

R1(config-subif)#enc
R1(config-subif)#encapsulation dot1
R1(config-subif)#encapsulation dot1Q 10
R1(config-subif)#ip add 172.16.64.1 255.255.224.0
R1(config-subif)#no shutdown

R1(config-subif)#encapsulation dot1Q 20
R1(config-subif)#ip add 172.16.96.1 255.255.224.0
R1(config-subif)#no shutdown
R1(config-subif)#ex
```

```
R1(config)#int gig0/0/0.30
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.30, changed
state to up

R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip add 172.16.128.1 255.255.224.0
```

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int gig0/0/0
R3(config-if)#ip add 172.16.0.1 255.255.224.0
R3(config-if)#no shutdown

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int gig0/0/0
R3(config-if)#ip add 172.16.0.1 255.255.224.0
R3(config-if)#no shutdown

R3(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

R3(config-if)#ex
R3(config)#int se0/1/0
R3(config-if)#ip add 172.16.32.2 255.255.224.0
R3(config-if)#no shutdown
```

TASK4:

```
S1(config)#int gig0/1
S1(config-if)#sw
S1(config-if)#switchport mode tr
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to up

S1(config-if)#ex
S1(config)#ex
S1#
%SYS-5-CONFIG_I: Configured from console by console
write mem
S1#write memory
Building configuration...
[OK]

R1#show ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0/0 unassigned      YES unset  up           up
GigabitEthernet0/0/0.10172.16.64.1 YES manual up           up
GigabitEthernet0/0/0.20172.16.96.1 YES manual up           up
GigabitEthernet0/0/0.30172.16.128.1 YES manual up           up
GigabitEthernet0/0/1 unassigned      YES unset  administratively down down
GigabitEthernet0/0/2 unassigned      YES unset  administratively down down
Serial0/1/0          172.16.32.1    YES manual up           up
Serial0/1/1          unassigned      YES unset  administratively down down
Vlan1               unassigned      YES unset  administratively down down

R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int se0/1/1
R1(config-if)#ip add 172.16.160.2 255.255.224.0
R1(config-if)#no shutdown
I

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

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

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se0/1/1
Router(config-if)#ip add 172.16.32.3
% Incomplete command.
Router(config-if)#ip add 172.16.32.3 255.255.224.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#int se0/1/1
Router(config-if)#ip add 172.16.160.1 255.255.224.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to
up
Router(config)#int se0/1/0
Router(config-if)#ip add 172.16.192.1 255.255.224.0
Router(config-if)#no shutdown

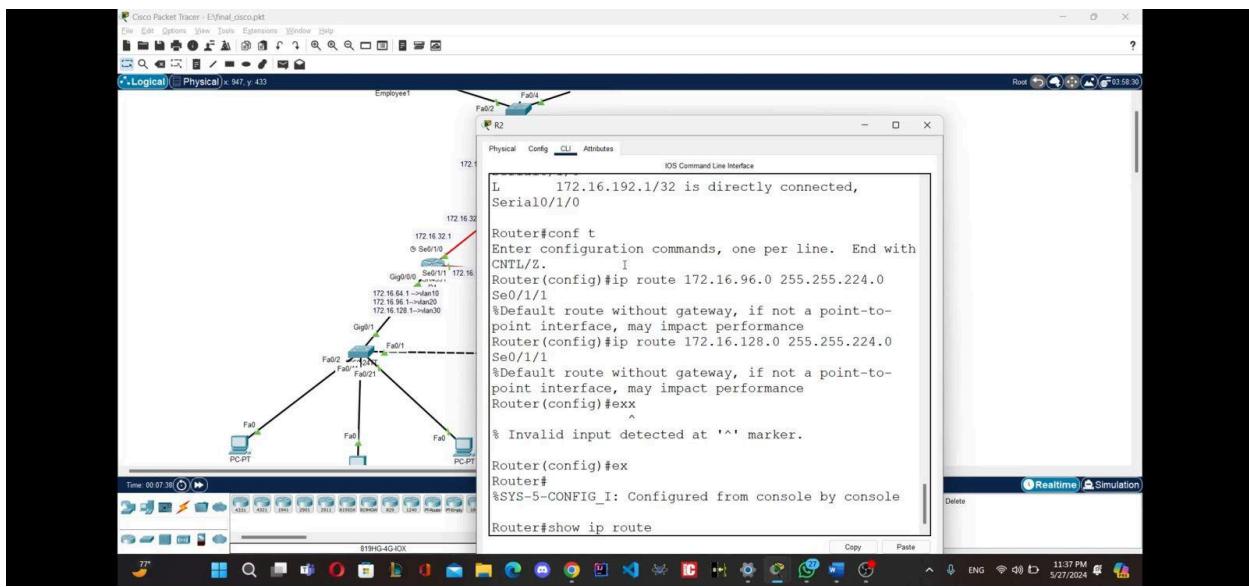
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
|
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.I.
R3(config)#int se0/1/1
R3(config-if)#ip add 172.16.192.2 255.255.224.0
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

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

TASK5:



A terminal window titled "R1" shows the output of the "show ip route" command:

```
GigabitEthernet0/0/0.10
L      172.16.64.1/32 is directly connected,
GigabitEthernet0/0/0.10
C      172.16.96.0/19 is directly connected,
GigabitEthernet0/0/0.20
L      172.16.96.1/32 is directly connected,
GigabitEthernet0/0/0.20
C      172.16.128.0/19 is directly connected,
GigabitEthernet0/0/0.30
L      172.16.128.1/32 is directly connected,
GigabitEthernet0/0/0.30
C      172.16.160.0/19 is directly connected,
Serial0/1/1
L      172.16.160.2/32 is directly connected,
Serial0/1/1
S      172.16.192.0/19 [1/0] via 172.16.160.1

R1#wr
R1#write me
R1#write memory
Building configuration...
[OK]
R1#
```

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 0.0.0.0 0.0.0.0 172.16.160.1
R1(config)#ex
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

The screenshot shows the Cisco IOS CLI interface for router R1. The title bar indicates the device is 'R1'. Below the title bar, there are tabs for 'Physical', 'Config' (which is selected), and 'Attributes'. The main window is titled 'IOS Command Line Interface'. It displays the following information:

- A legend for route types:
 - 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, U - per-user static route, o - ODR
 - P - periodic downloaded static route
- A message: 'Gateway of last resort is 172.16.160.1 to network 0.0.0.0'
- The routing table entries:

S	172.16.0.0/16 is variably subnetted, 12 subnets, 2 masks
	172.16.0.0/19 is directly connected, Serial0/1/0
C	172.16.32.0/19 is directly connected, Serial0/1/0
L	172.16.32.1/32 is directly connected, Serial0/1/0
C	172.16.64.0/19 is directly connected, GigabitEthernet0/0/0.10
L	172.16.64.1/32 is directly connected, GigabitEthernet0/0/0.10
C	172.16.96.0/19 is directly connected, GigabitEthernet0/0/0.20
L	172.16.96.1/32 is directly connected, GigabitEthernet0/0/0.20
C	172.16.128.0/19 is directly connected, GigabitEthernet0/0/0.30
L	172.16.128.1/32 is directly connected, GigabitEthernet0/0/0.30
C	172.16.160.0/19 is directly connected, Serial0/1/1
L	172.16.160.2/32 is directly connected, Serial0/1/1
S	172.16.192.0/19 [1/0] via 172.16.160.1
S*	0.0.0.0/0 [1/0] via 172.16.160.1

Task6:

The screenshot shows a Cisco IOS Command Line Interface window titled "S1-Office1". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs, it says "IOS Command Line Interface". The main area contains the following configuration commands and their output:

```
S1>en
S1#conf t
Enter configuration commands, one per line. End with
CNTL/Z.
S1(config)#username
S1(config)#username Admin secret ACDC1973
S1(config)#line console
S1(config)#line console 0
S1(config-line)#login local
S1(config-line)#enable se
S1(config-line)#enable sec
S1(config-line)#enable secret beatles1960
S1(config)#service pass
S1(config)#service password-encryption
S1(config)#banner "#Unauthorized acess is prohibited"
          ^
% Invalid input detected at '^' marker.

S1(config)#banner #Unauthorized acess is prohibited
          ^
% Invalid input detected at '^' marker.

S1(config)#banner #Unauthorized acess is prohibited
```

At the bottom right of the command window are "Copy" and "Paste" buttons. At the bottom left is a "Top" button.

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1>
R1>EN
R1#conf t
Enter configuration commands, one per line. End with
CNTL/Z.
R1(config)#username Admin secret ACDC1973
R1(config)#line console 0
R1(config-line)#login local
R1(config-line)#ena
R1(config-line)#enable secret beatles1960
R1(config)#service pass
R1(config)#service password-encryption
R1(config)#banner motd "#Unauthorized access is
prohibited"
R1(config)#ex
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#write
Building configuration...
[OK]
R1#
```

Top

Copy **Paste**

S1-Office1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
#Unauthorized access is prohibited

User Access Verification

Username: Admin
Password:

S1>en
Password:
S1#conf t
Enter configuration commands, one per line. End with
CNTL/Z.           I
S1(config)#ex
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#write mem
S1#write memory
Building configuration...
[OK]
S1#
S1#
```

Top

Copy Paste

The above is a detailed description about the tasks by screenshots.

Task 7:

The screenshot shows a Windows Command Prompt window titled "CEO1". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. Below the tabs is a title bar for a child window titled "Command Prompt". The main content area displays the output of several ping commands.

```
Reply from 172.16.0.252: bytes=32 time=1ms TTL=126
Reply from 172.16.0.252: bytes=32 time=1ms TTL=126

Ping statistics for 172.16.0.252:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 4ms

C:\>ping 172.16.160.1

Pinging 172.16.160.1 with 32 bytes of data:

Reply from 172.16.160.1: bytes=32 time=20ms TTL=254
Reply from 172.16.160.1: bytes=32 time=20ms TTL=254
Reply from 172.16.160.1: bytes=32 time=12ms TTL=254
Reply from 172.16.160.1: bytes=32 time=10ms TTL=254

Ping statistics for 172.16.160.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 20ms, Average = 15ms

C:\>ping |
```

Top

The screenshot shows a software interface titled "Guest" with a navigation bar at the top. The "Desktop" tab is selected. Below it is a "Command Prompt" window with the following text:

```
Ping statistics for 172.16.159.253:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 12ms, Maximum = 19ms, Average = 15ms  
  
C:\>  
C:\>ping 172.16.159.254  
  
Pinging 172.16.159.254 with 32 bytes of data:  
  
Request timed out.  
Reply from 172.16.159.254: bytes=32 time=1ms TTL=126  
Reply from 172.16.159.254: bytes=32 time=2ms TTL=126  
  
Ping statistics for 172.16.159.254:  
    Packets: Sent = 3, Received = 2, Lost = 1 (34% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 1ms, Maximum = 2ms, Average = 1ms  
  
Control-C  
^C  
C:\>
```

Thank you