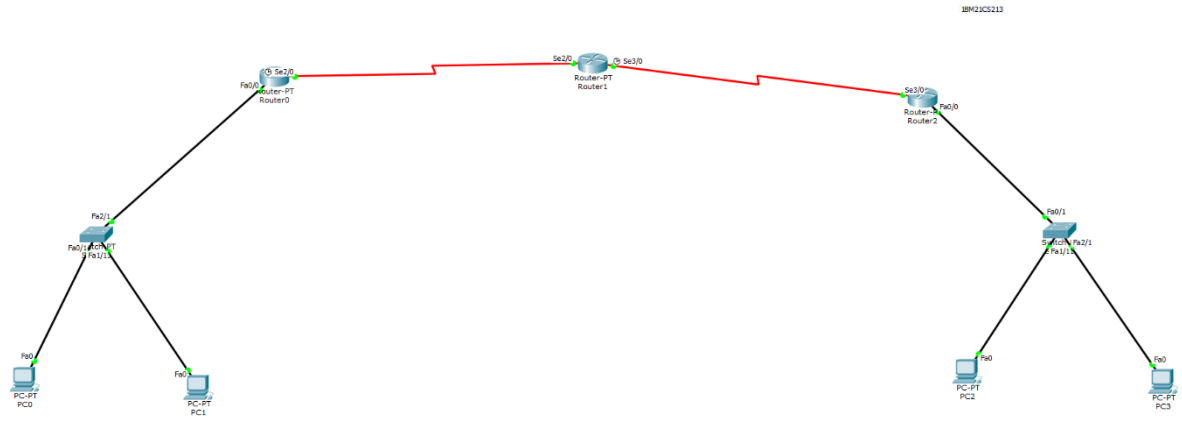
WEEK 4 (1BM21CS213)

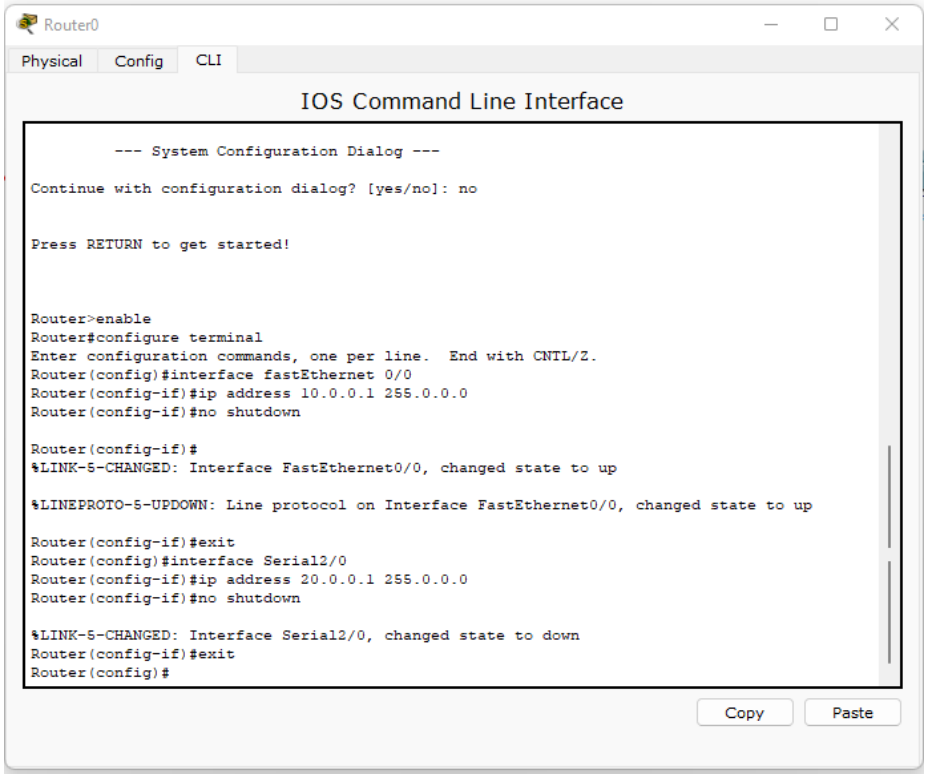
Configuration of default route for routers:-

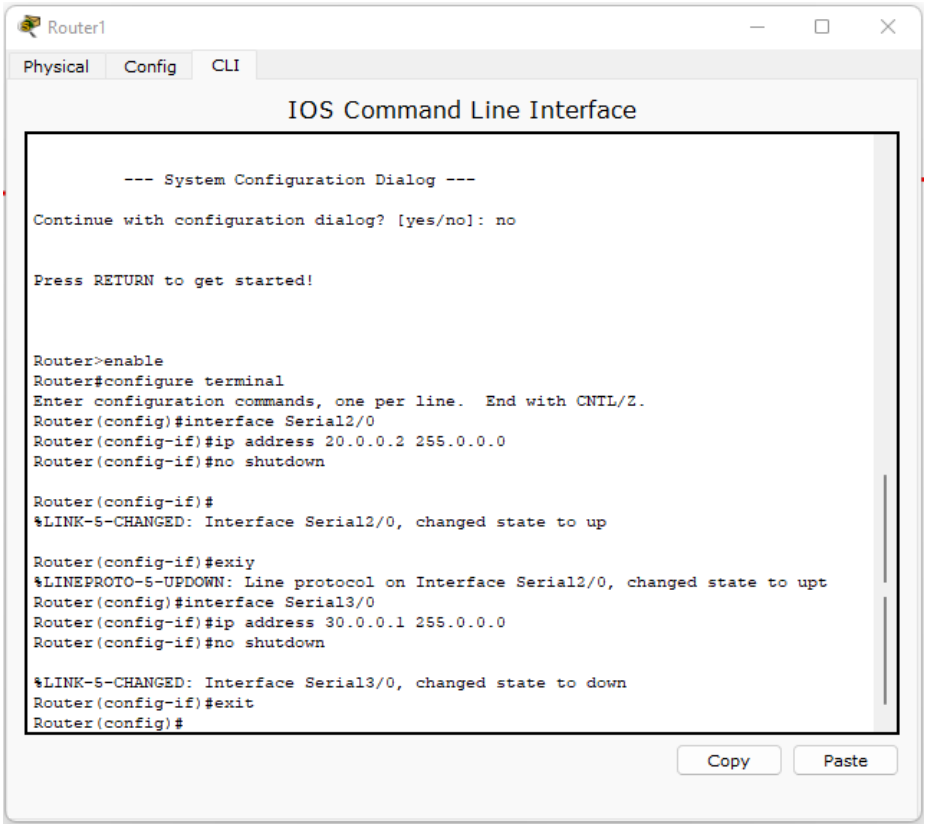
Outcomes:

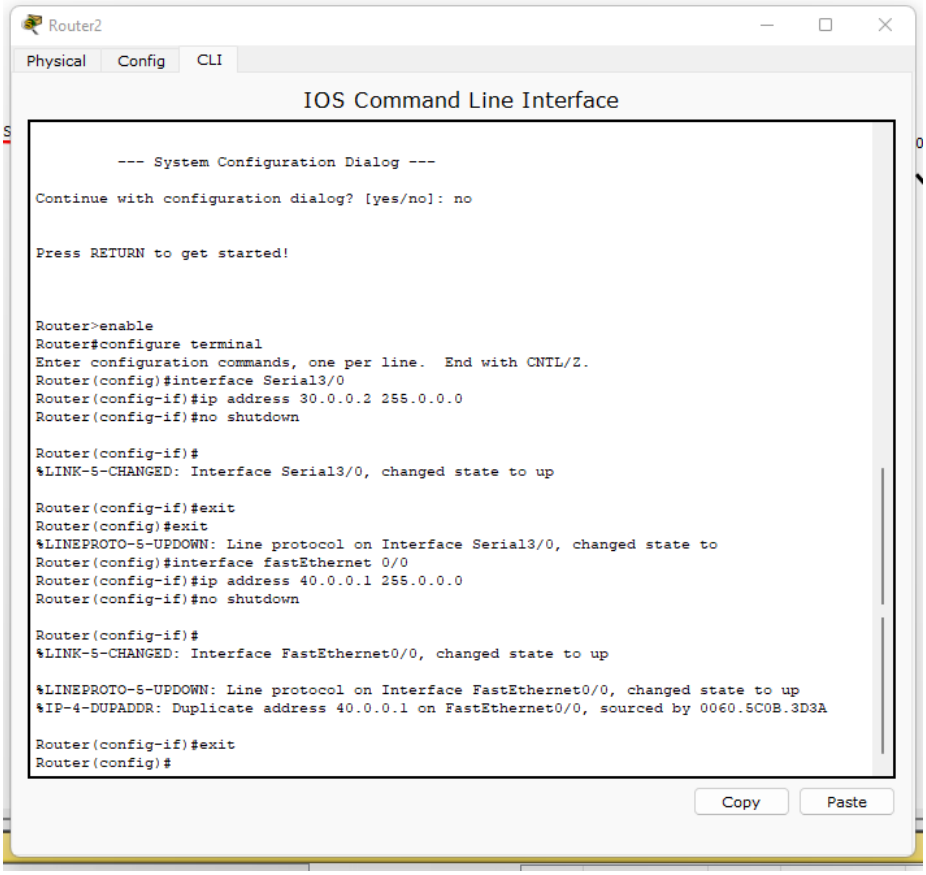


Apply basic configuration IP address to all interfaces and PC's.

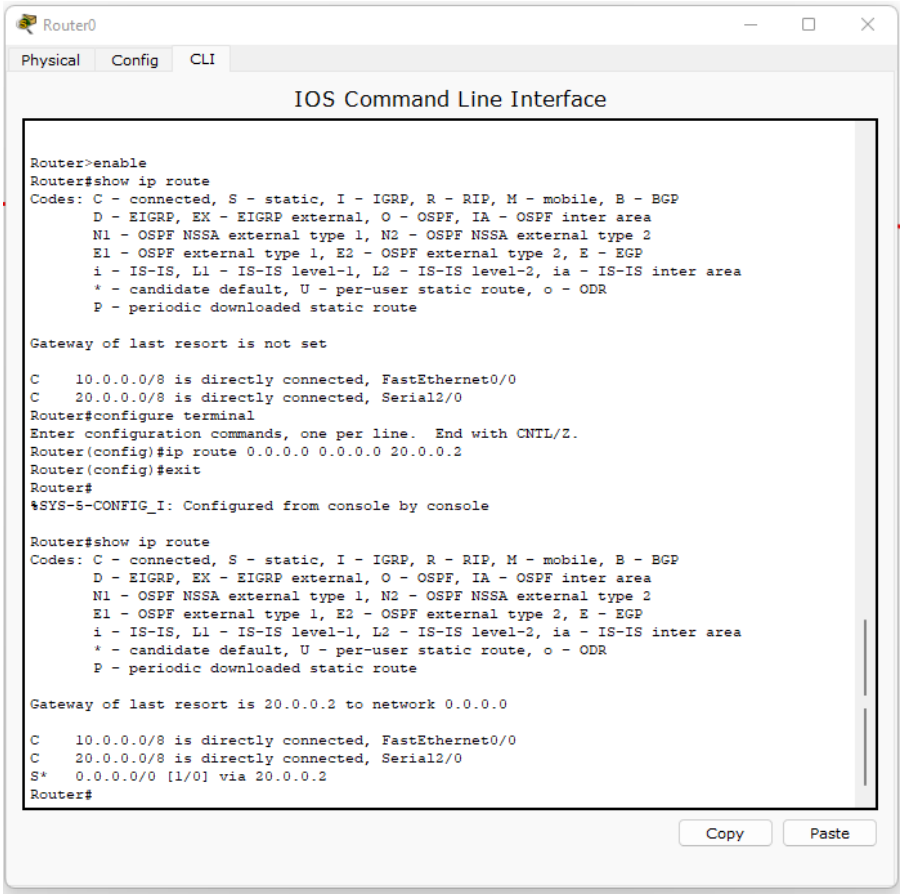
Configuration of routers:

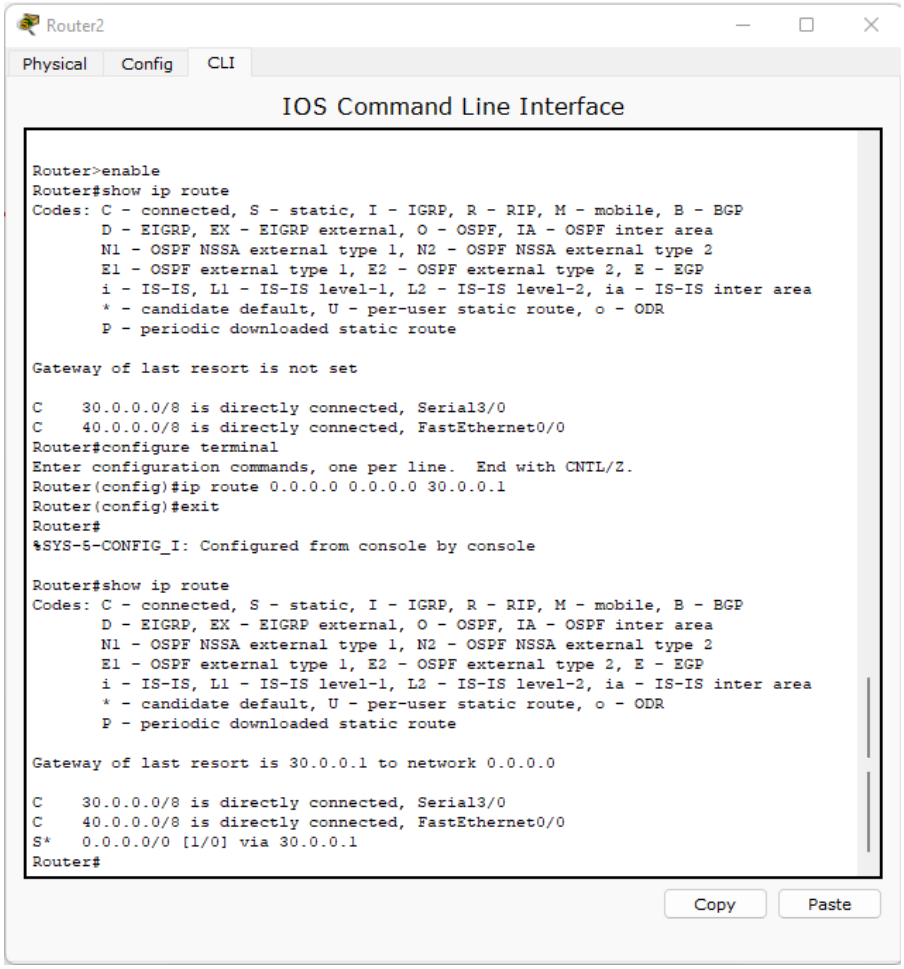



Router1
Physical
Config
CLI
IOS Command Line Interface
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no
Press RETURN to get started!
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
Router(config-if)#exiy
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to upt
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#exit
Router(config)#
Copy
Paste


Router2
Physical
Config
CLI
IOS Command Line Interface
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: no
Press RETURN to get started!
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
Router(config-if)#exit
Router(config)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%IP-4-DUPADDR: Duplicate address 40.0.0.1 on FastEthernet0/0, sourced by 0060.5C0B.3D3A
Router(config-if)#exit
Router(config)#
Copy
Paste

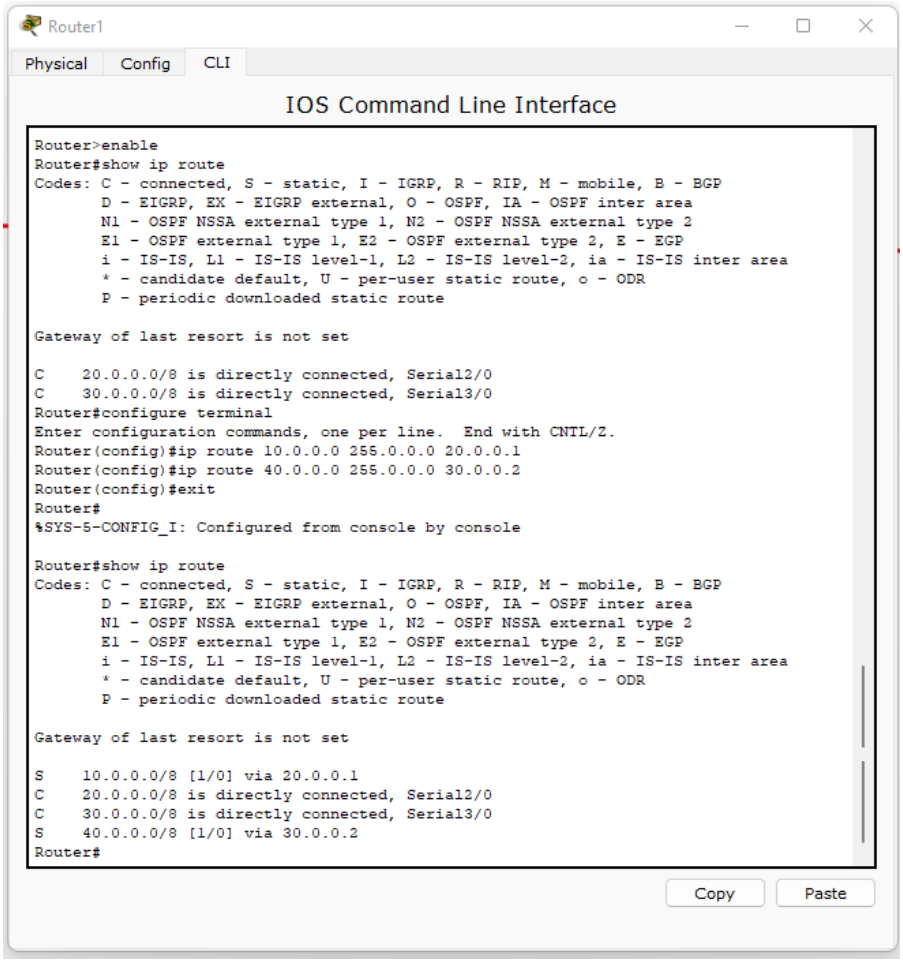
Configure default route on Router0 and Router1. So the routers forward packets to assigned IP address next hop address or exit interface.



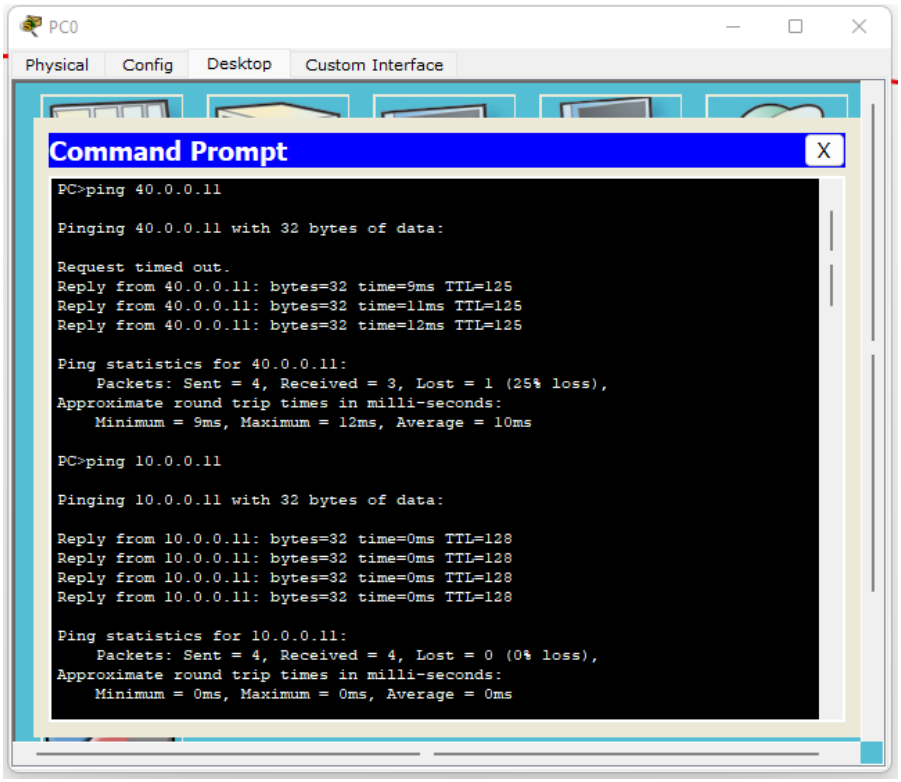


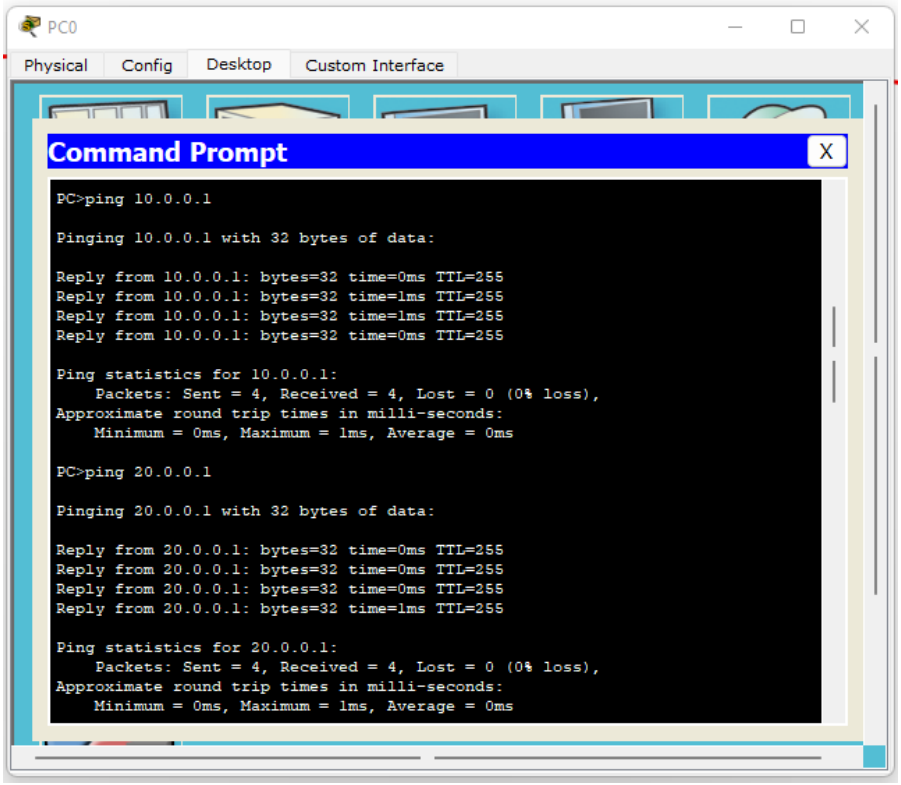
Here, 0.0.0.0 0.0.0.0 represents any network, any subnet mask, i.e., any packet that came to Router0 will be forwarded to next hop address 20.0.0.2 and any packet that came to Router1 will be forwarded to next hop address 30.0.0.1

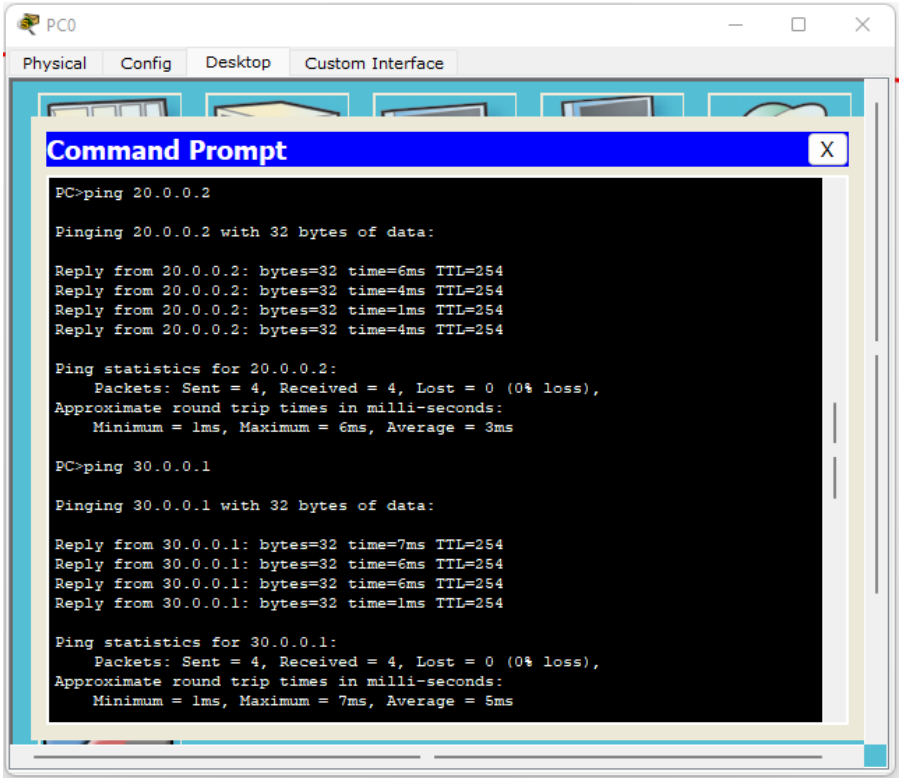
Configure static route on Router1 to route packets for 10.0.0.0 and 40.0.0.0 as shown:

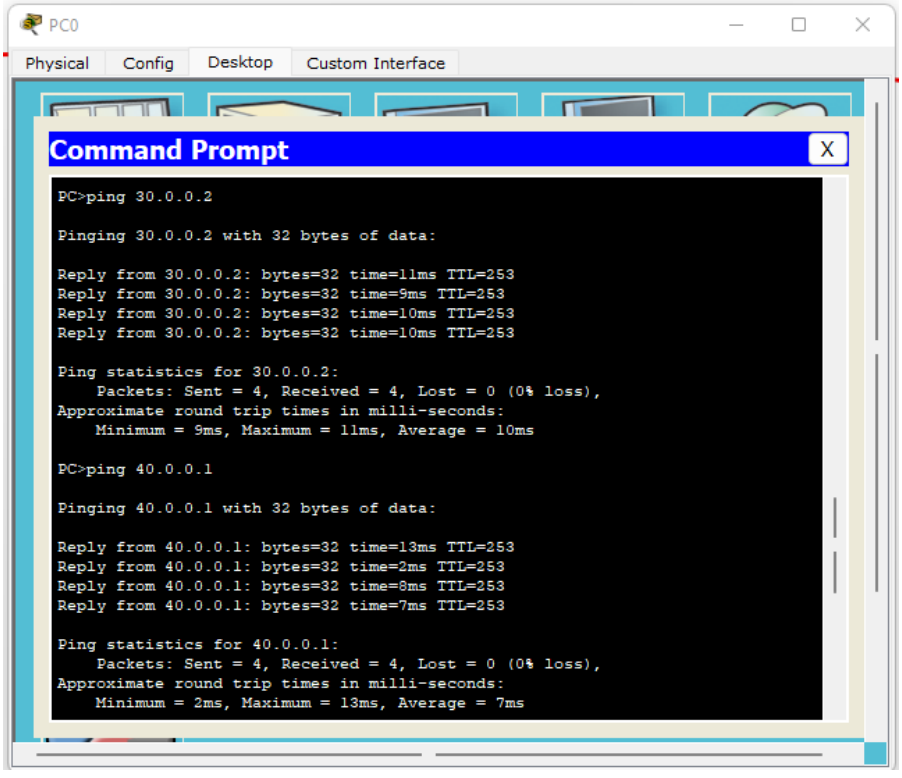


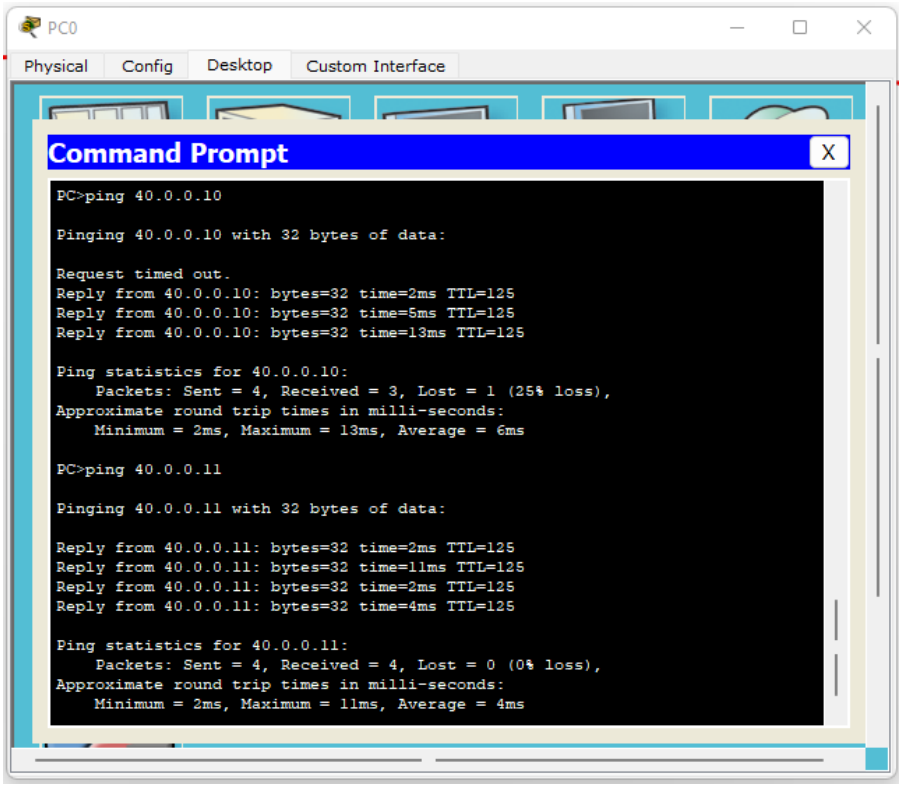
After establishing the IP route, we get reply from all the pings.



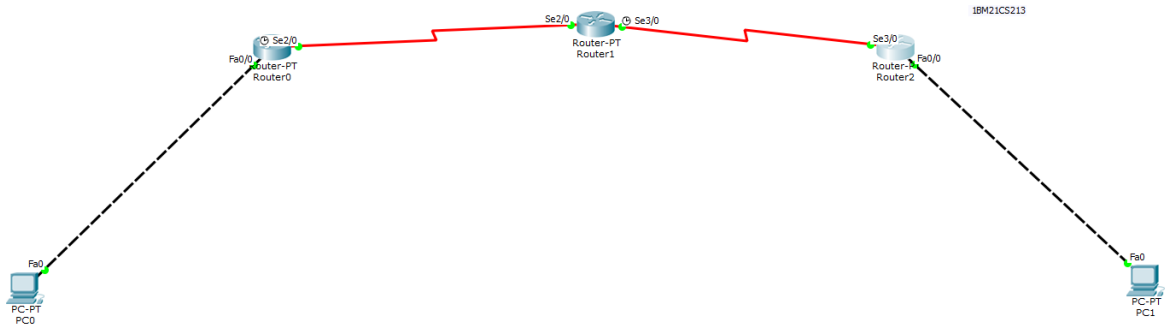



PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Reply from 20.0.0.2: bytes=32 time=6ms TTL=254
Reply from 20.0.0.2: bytes=32 time=4ms TTL=254
Reply from 20.0.0.2: bytes=32 time=1ms TTL=254
Reply from 20.0.0.2: bytes=32 time=4ms TTL=254
Ping statistics for 20.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 6ms, Average = 3ms
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=7ms TTL=254
Reply from 30.0.0.1: bytes=32 time=6ms TTL=254
Reply from 30.0.0.1: bytes=32 time=6ms TTL=254
Reply from 30.0.0.1: bytes=32 time=1ms TTL=254
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 5ms


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 30.0.0.2
Pinging 30.0.0.2 with 32 bytes of data:
Reply from 30.0.0.2: bytes=32 time=11ms TTL=253
Reply from 30.0.0.2: bytes=32 time=9ms TTL=253
Reply from 30.0.0.2: bytes=32 time=10ms TTL=253
Reply from 30.0.0.2: bytes=32 time=10ms TTL=253
Ping statistics for 30.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 9ms, Maximum = 11ms, Average = 10ms
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes=32 time=13ms TTL=253
Reply from 40.0.0.1: bytes=32 time=2ms TTL=253
Reply from 40.0.0.1: bytes=32 time=8ms TTL=253
Reply from 40.0.0.1: bytes=32 time=7ms TTL=253
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 13ms, Average = 7ms

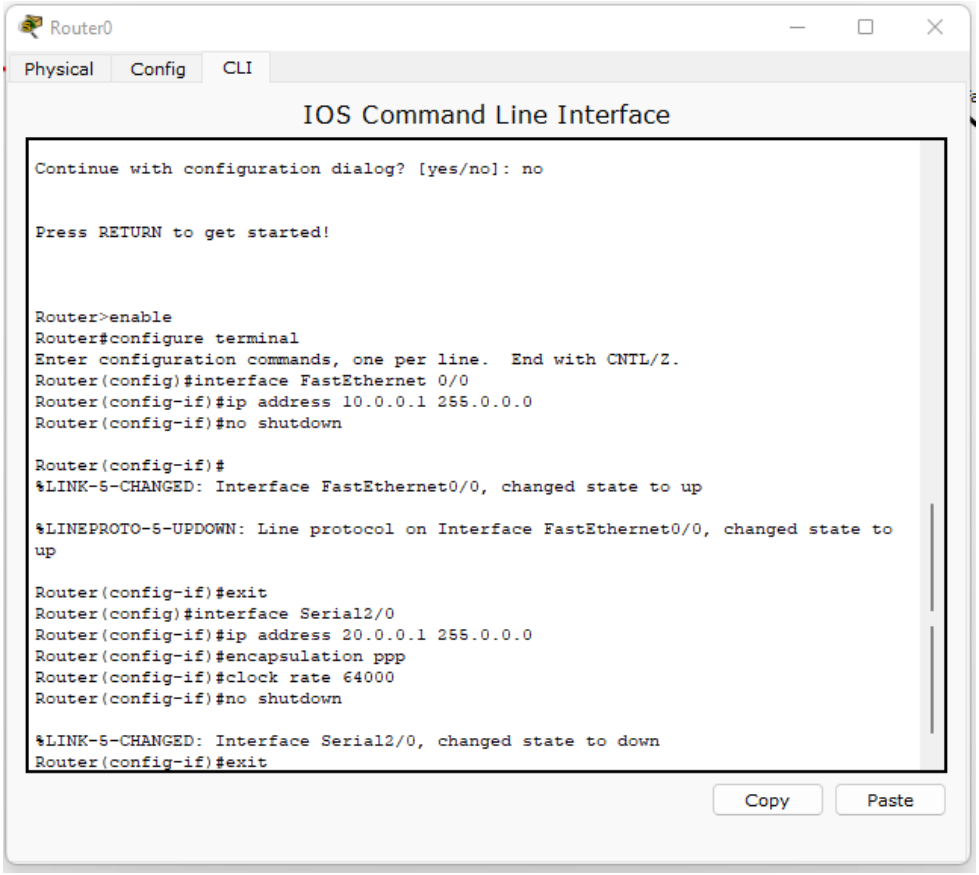

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.10: bytes=32 time=2ms TTL=125
Reply from 40.0.0.10: bytes=32 time=5ms TTL=125
Reply from 40.0.0.10: bytes=32 time=13ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 13ms, Average = 6ms
PC>ping 40.0.0.11
Pinging 40.0.0.11 with 32 bytes of data:
Reply from 40.0.0.11: bytes=32 time=2ms TTL=125
Reply from 40.0.0.11: bytes=32 time=11ms TTL=125
Reply from 40.0.0.11: bytes=32 time=2ms TTL=125
Reply from 40.0.0.11: bytes=32 time=4ms TTL=125
Ping statistics for 40.0.0.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 11ms, Average = 4ms

2. Configuration of RIP Protocol for routers:-



Configuration of routers:

Configure IP address for all interfaces and assign IP address, default gateway to hosts.



Router1

Physical | Config | CLI

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#e
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
xit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#exit
Router(config)#
```

Copy | Paste

Router2

Physical | Config | CLI

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

Router(config-if)#exit
Router(config)#
```

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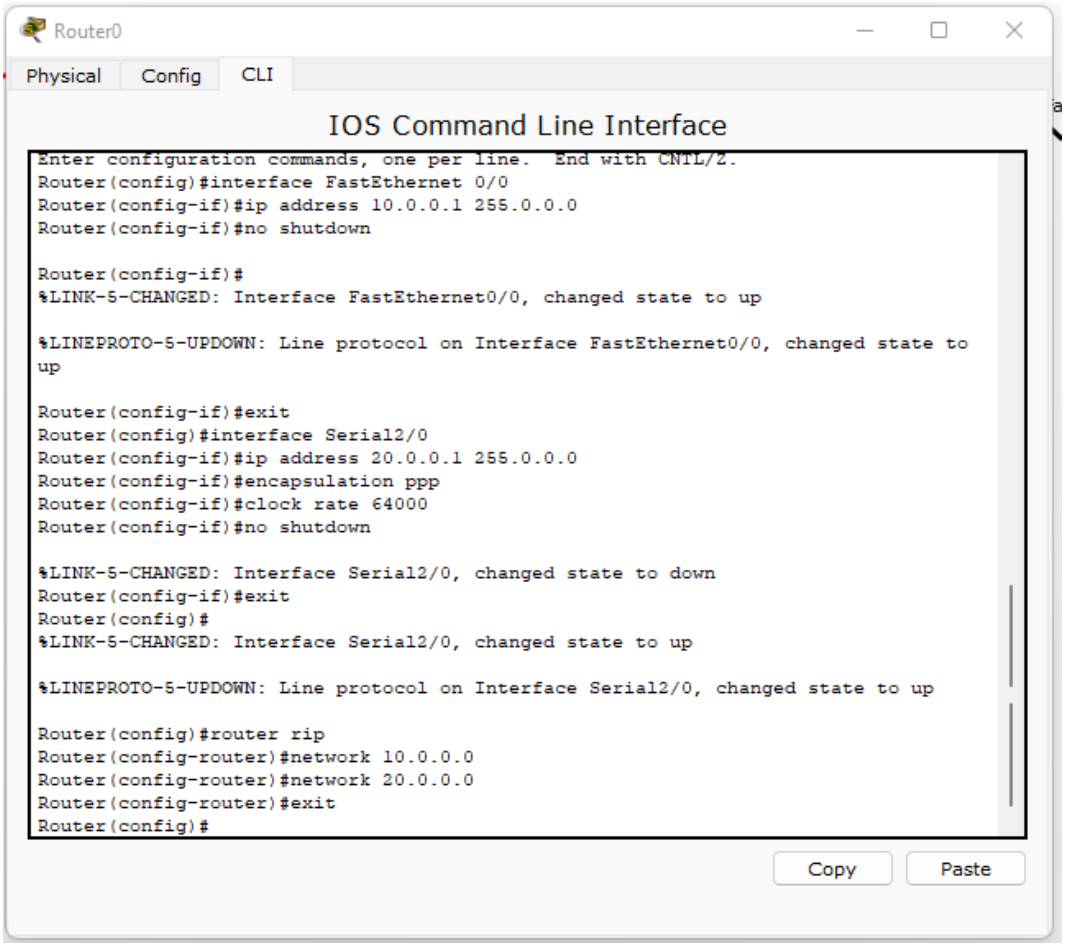
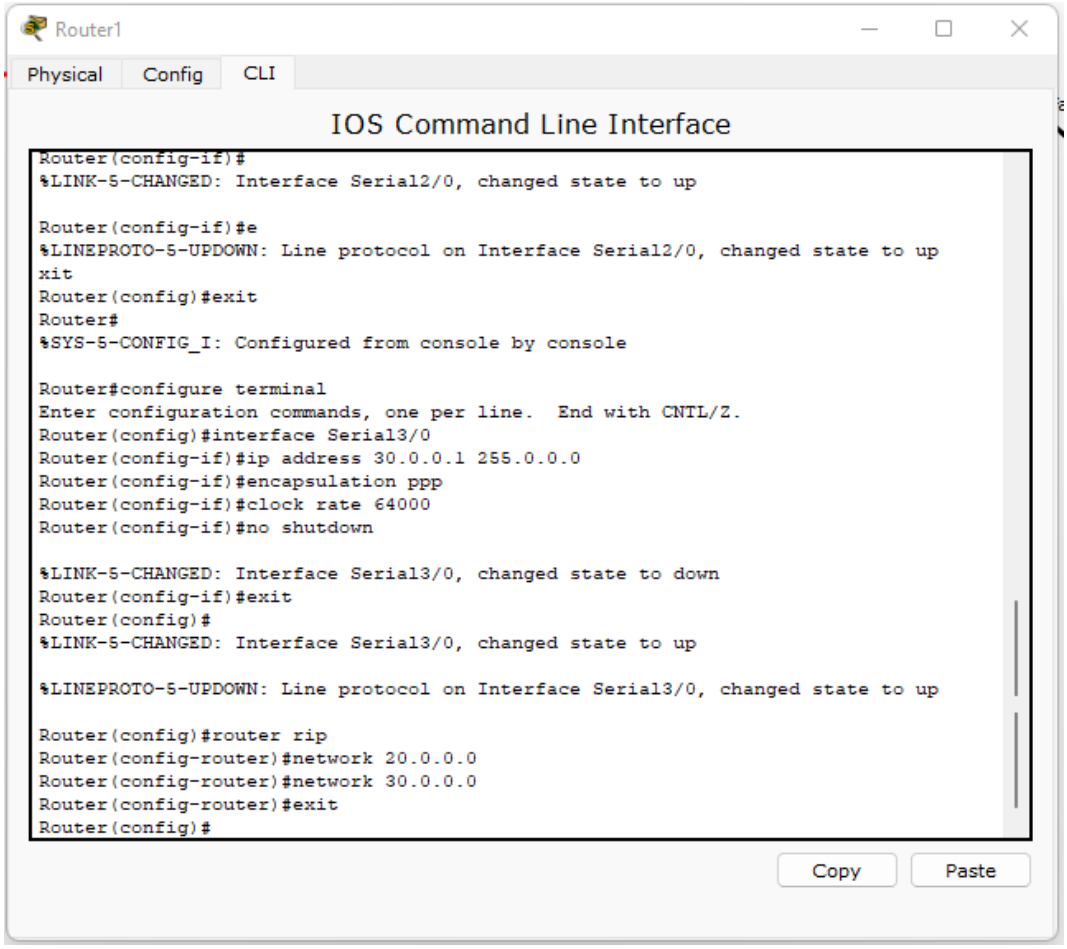
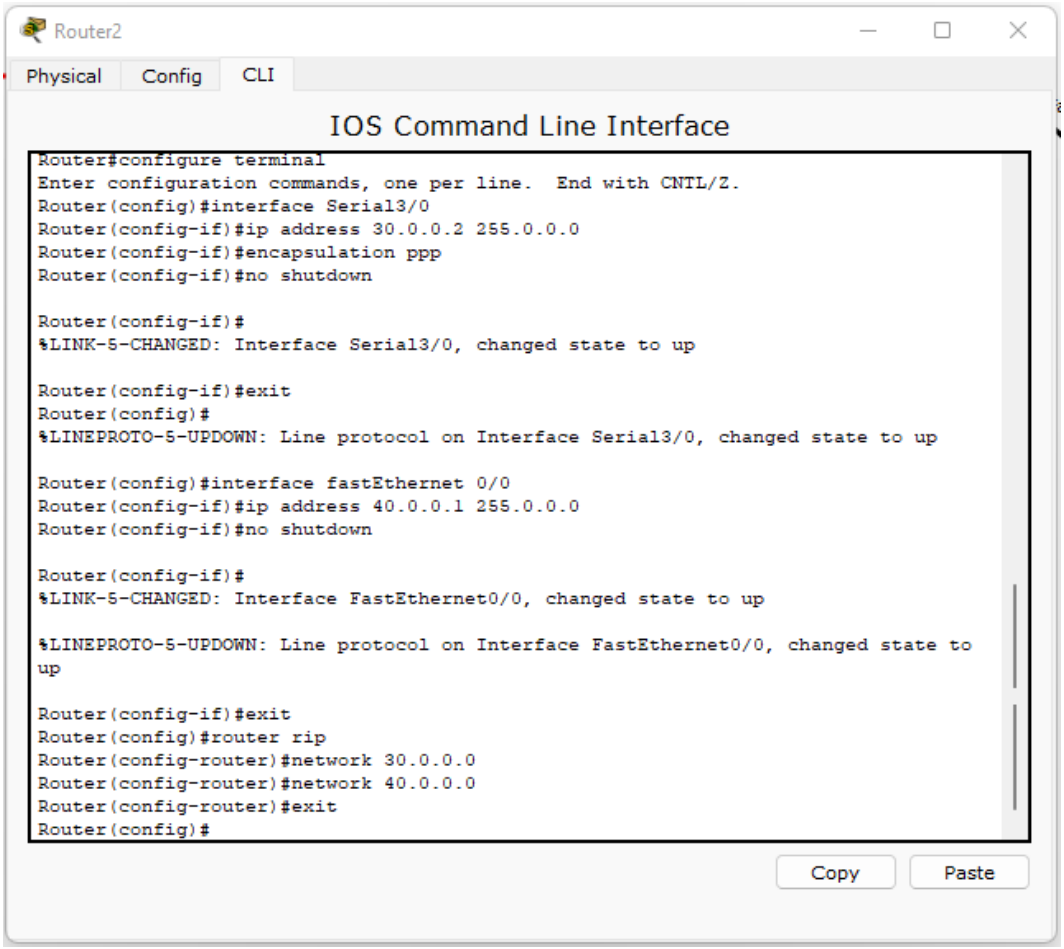
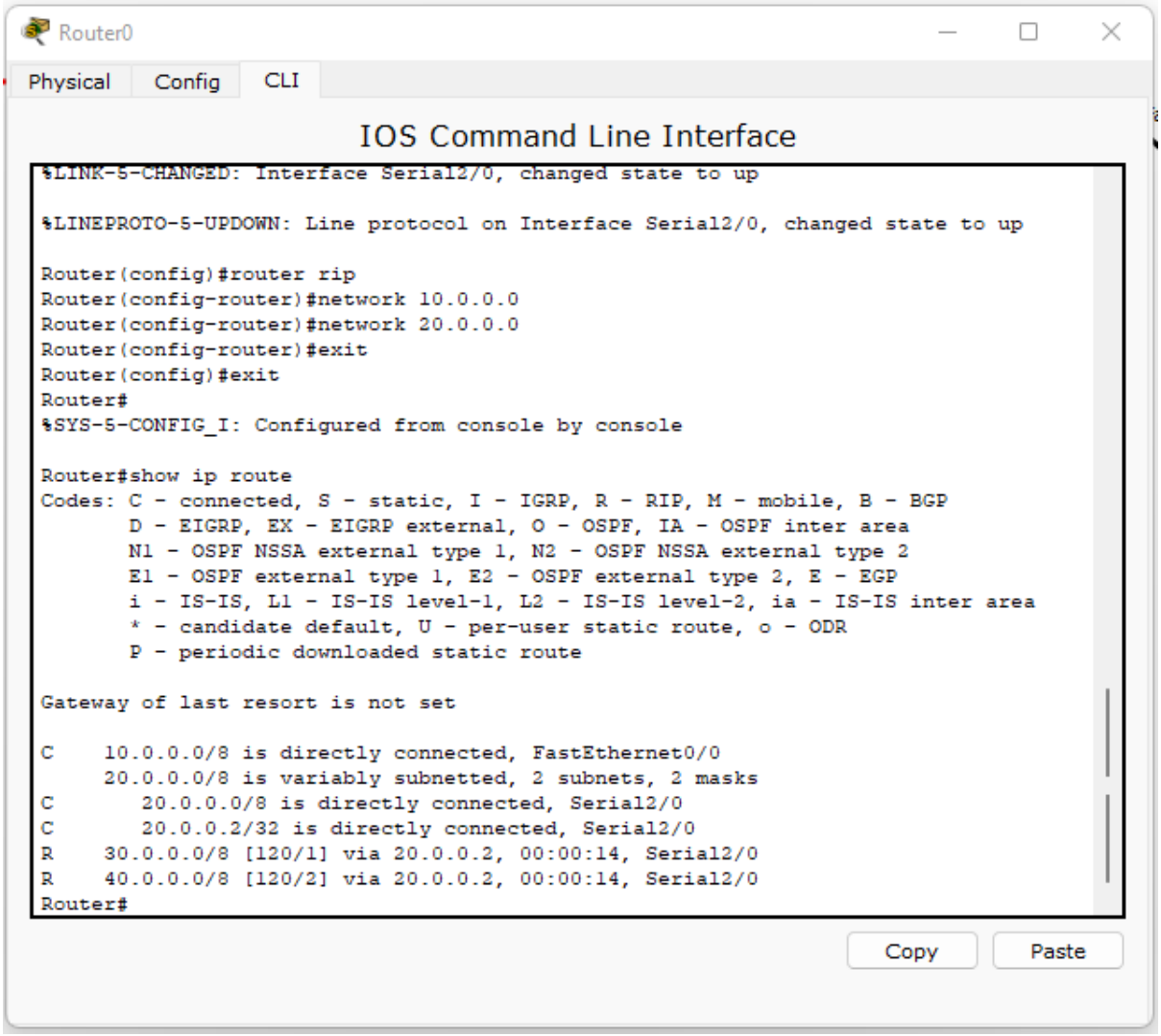
Configure RIP to all the routers:

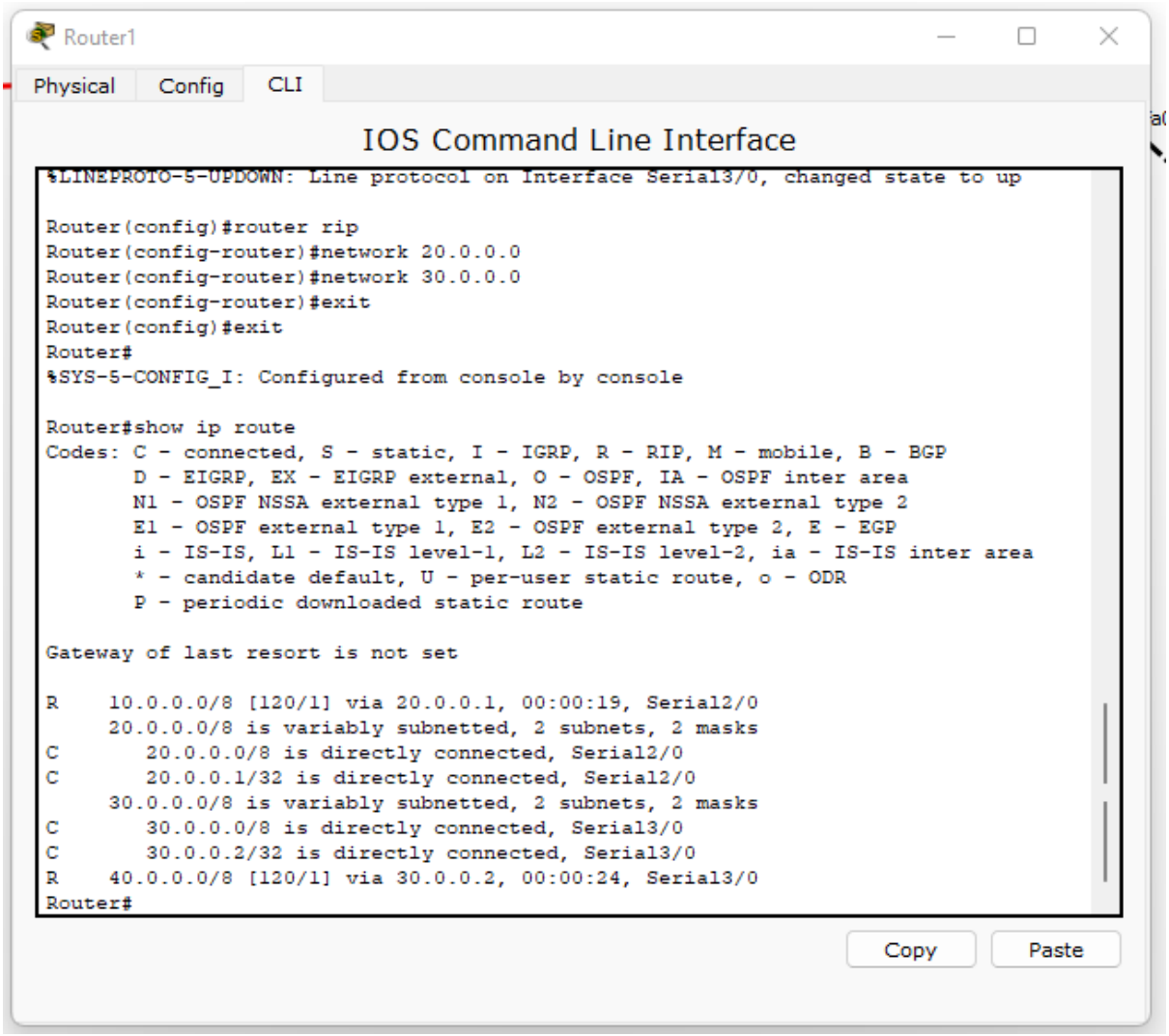


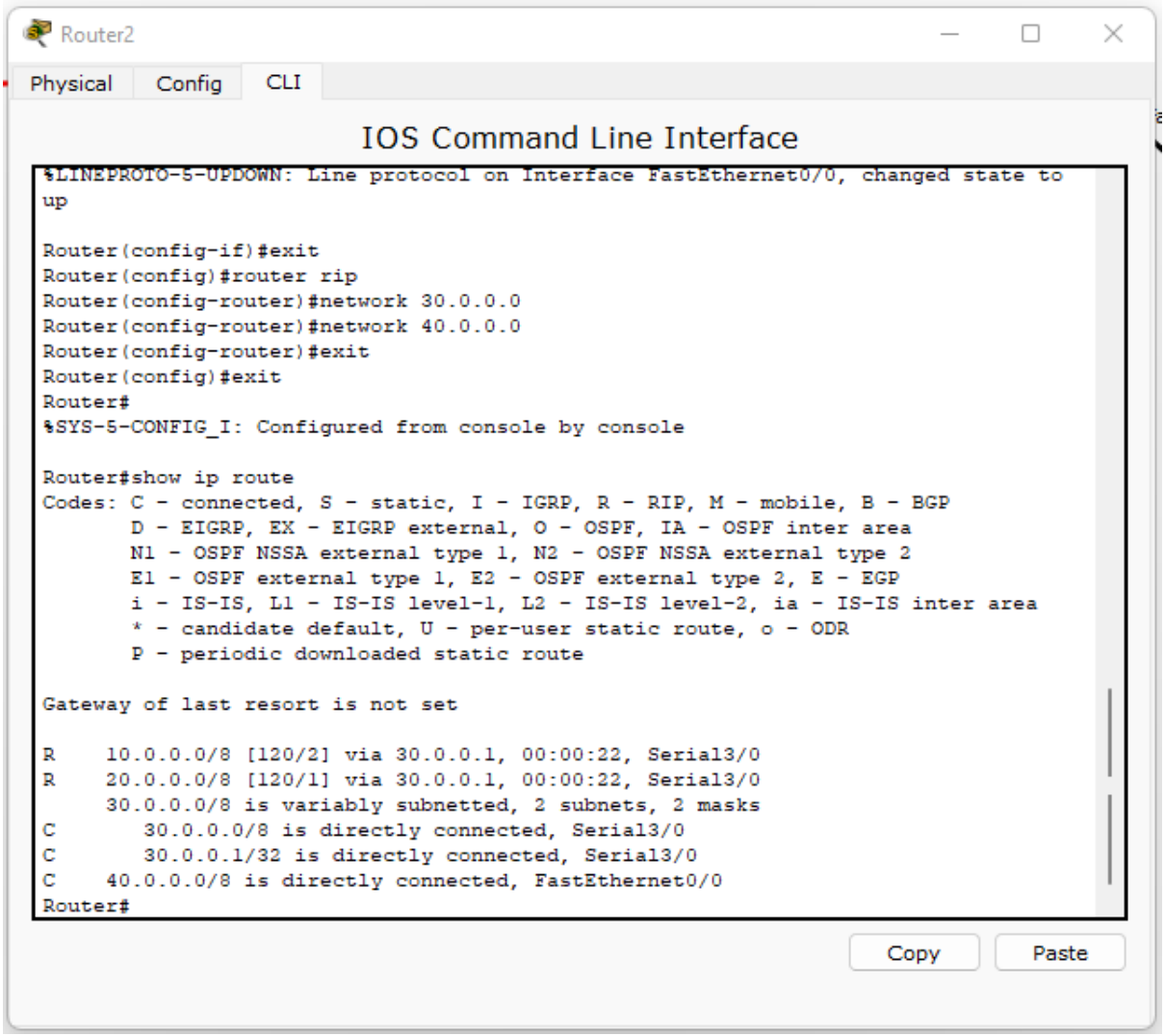

Router1
Physical
Config
CLI
IOS Command Line Interface
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
Router(config-if)#e
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
xit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#clock rate 64000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
Router(config)#router rip
Router(config-router)#network 20.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#exit
Router(config)#
Copy
Paste


Router2
Physical
Config
CLI
IOS Command Line Interface
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial3/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#encapsulation ppp
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up
Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#exit
Router(config)#
Copy
Paste

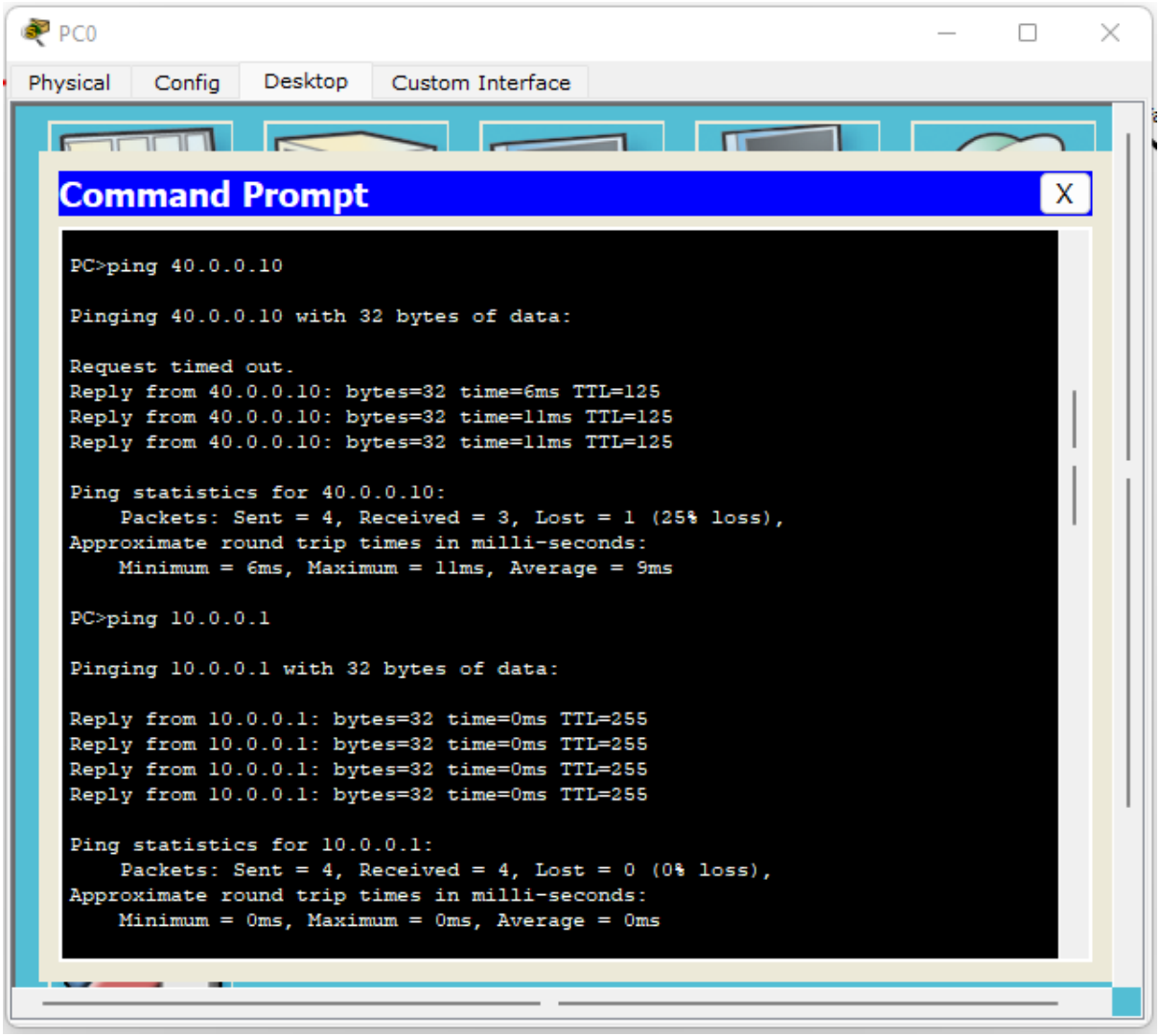
Check routing table of all the routers. Router will have all the network information in its routing table, router learned this route by using RIP.

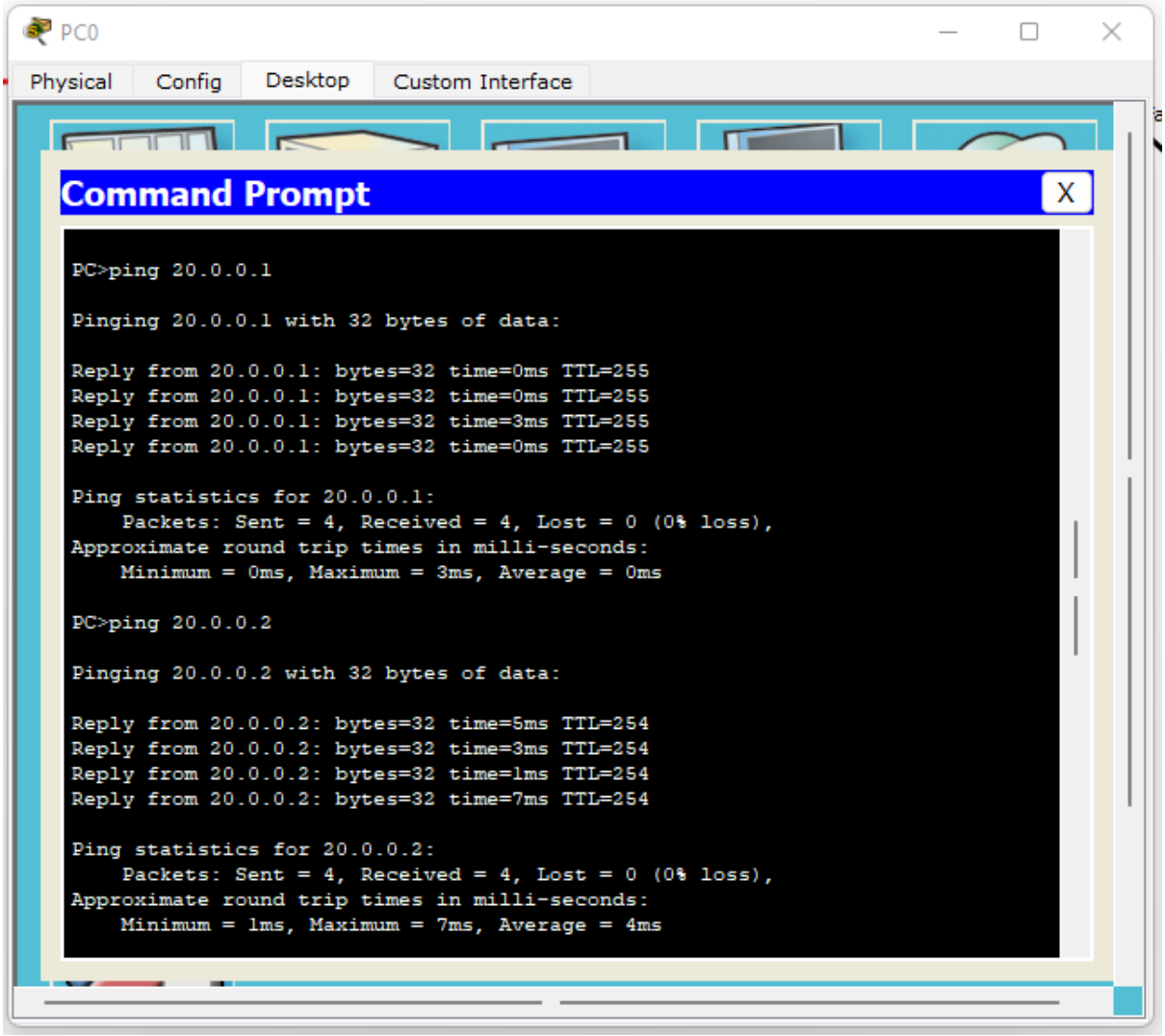


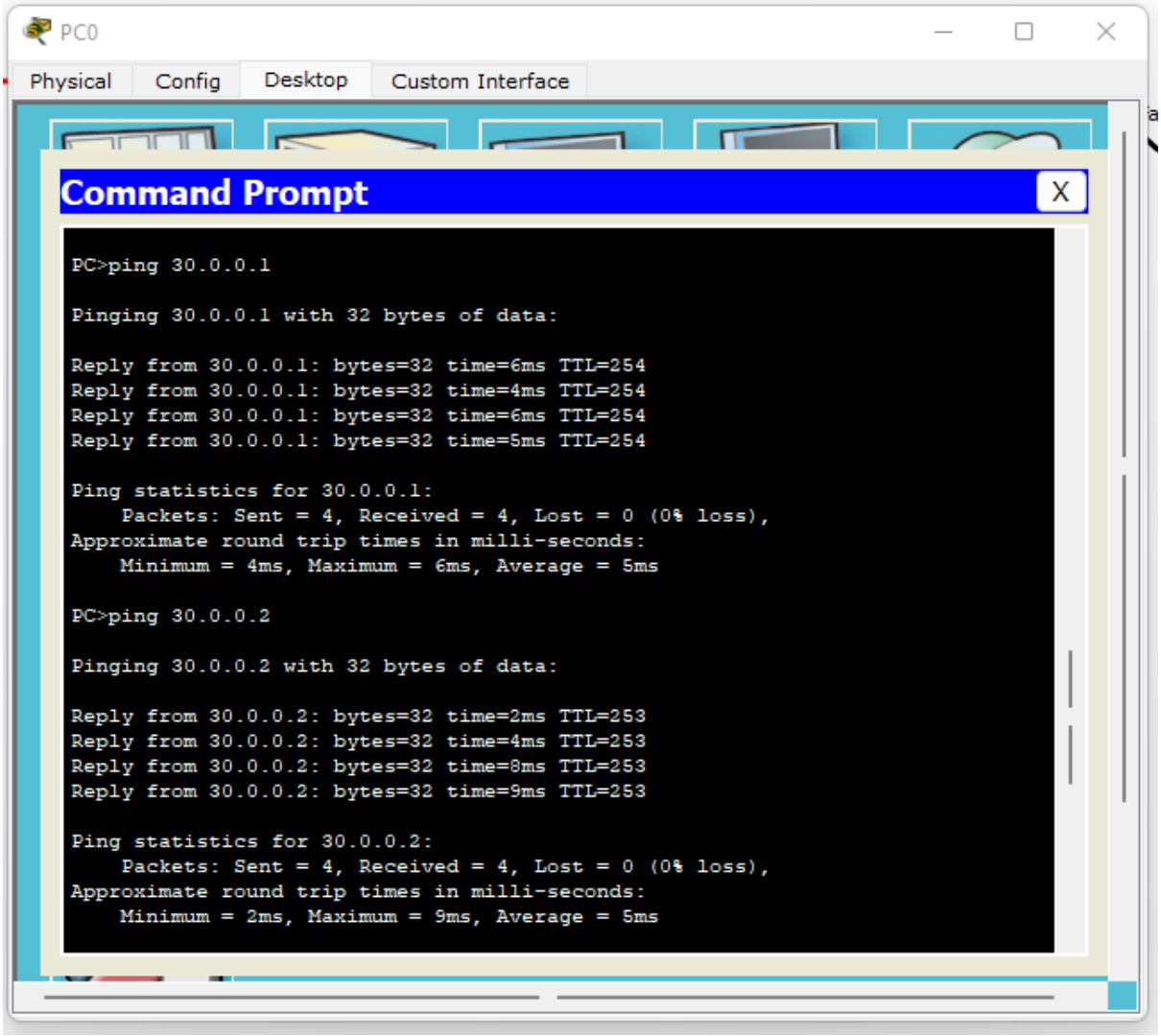

Router1
Physical
Config
CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
Router(config)#router rip
Router(config-router)#network 20.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
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
Gateway of last resort is not set
R 10.0.0.0/8 [120/1] via 20.0.0.1, 00:00:19, Serial2/0
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.1/32 is directly connected, Serial2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.2/32 is directly connected, Serial3/0
R 40.0.0.0/8 [120/1] via 30.0.0.2, 00:00:24, Serial3/0
Router#
Copy
Paste

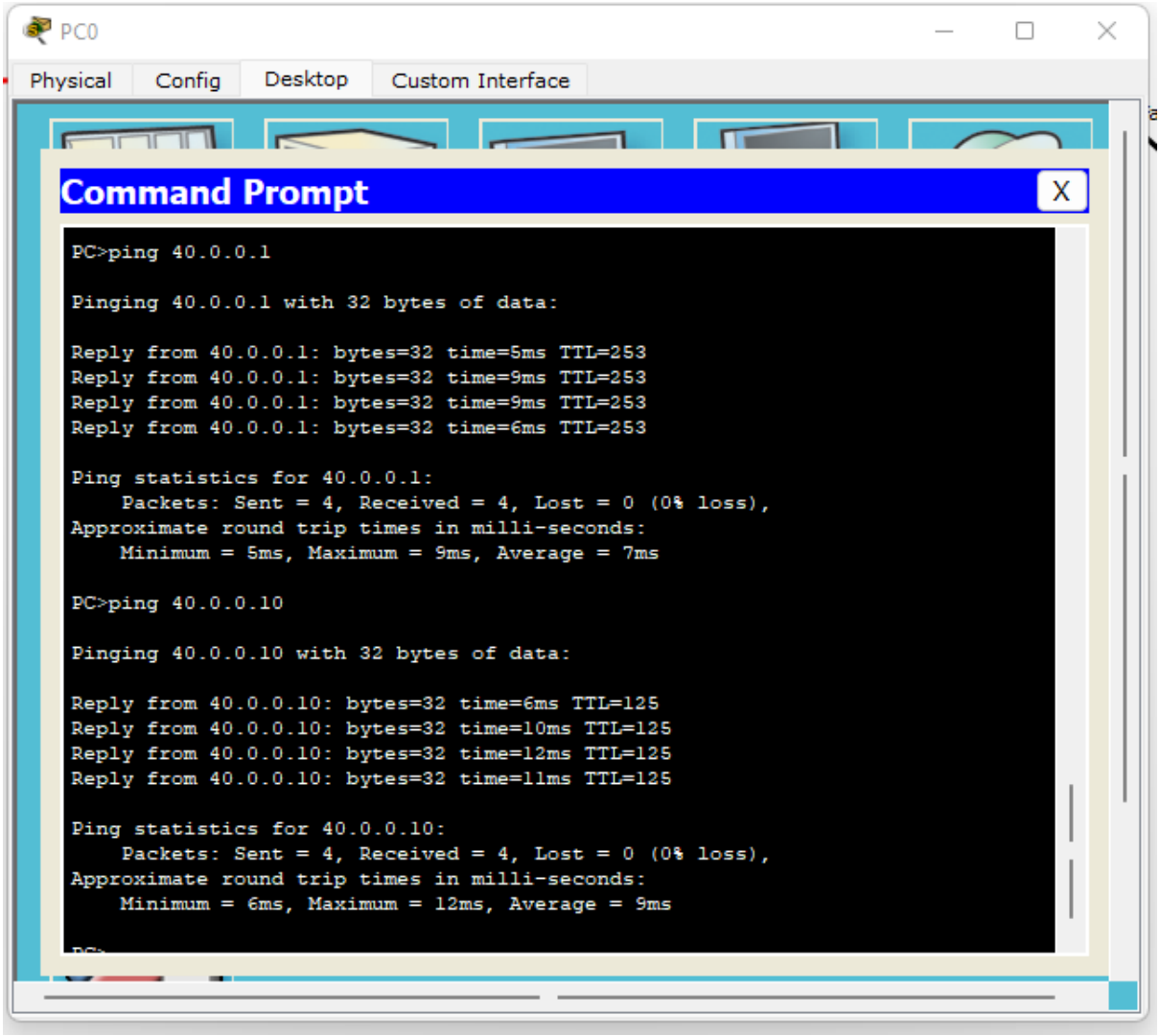

Router2
Physical
Config
CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
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
Gateway of last resort is not set
R 10.0.0.0/8 [120/2] via 30.0.0.1, 00:00:22, Serial3/0
R 20.0.0.0/8 [120/1] via 30.0.0.1, 00:00:22, Serial3/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.1/32 is directly connected, Serial3/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0
Router#
Copy
Paste

After establishing the IP route, we get reply from all the pings.




PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 20.0.0.1
Pinging 20.0.0.1 with 32 bytes of data:
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Reply from 20.0.0.1: bytes=32 time=3ms TTL=255
Reply from 20.0.0.1: bytes=32 time=0ms TTL=255
Ping statistics for 20.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 3ms, Average = 0ms
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Reply from 20.0.0.2: bytes=32 time=5ms TTL=254
Reply from 20.0.0.2: bytes=32 time=3ms TTL=254
Reply from 20.0.0.2: bytes=32 time=1ms TTL=254
Reply from 20.0.0.2: bytes=32 time=7ms TTL=254
Ping statistics for 20.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 4ms


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=6ms TTL=254
Reply from 30.0.0.1: bytes=32 time=4ms TTL=254
Reply from 30.0.0.1: bytes=32 time=6ms TTL=254
Reply from 30.0.0.1: bytes=32 time=5ms TTL=254
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 6ms, Average = 5ms
PC>ping 30.0.0.2
Pinging 30.0.0.2 with 32 bytes of data:
Reply from 30.0.0.2: bytes=32 time=2ms TTL=253
Reply from 30.0.0.2: bytes=32 time=4ms TTL=253
Reply from 30.0.0.2: bytes=32 time=8ms TTL=253
Reply from 30.0.0.2: bytes=32 time=9ms TTL=253
Ping statistics for 30.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 9ms, Average = 5ms



We observe that when we configure the route for the routers using RIP protocol, it finds the best path by simply looking at the number of hop counts, while when we configure routers using static route, it does not have the ability to choose the path on its own.