Assignment
OSFP

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Class: Se-5B

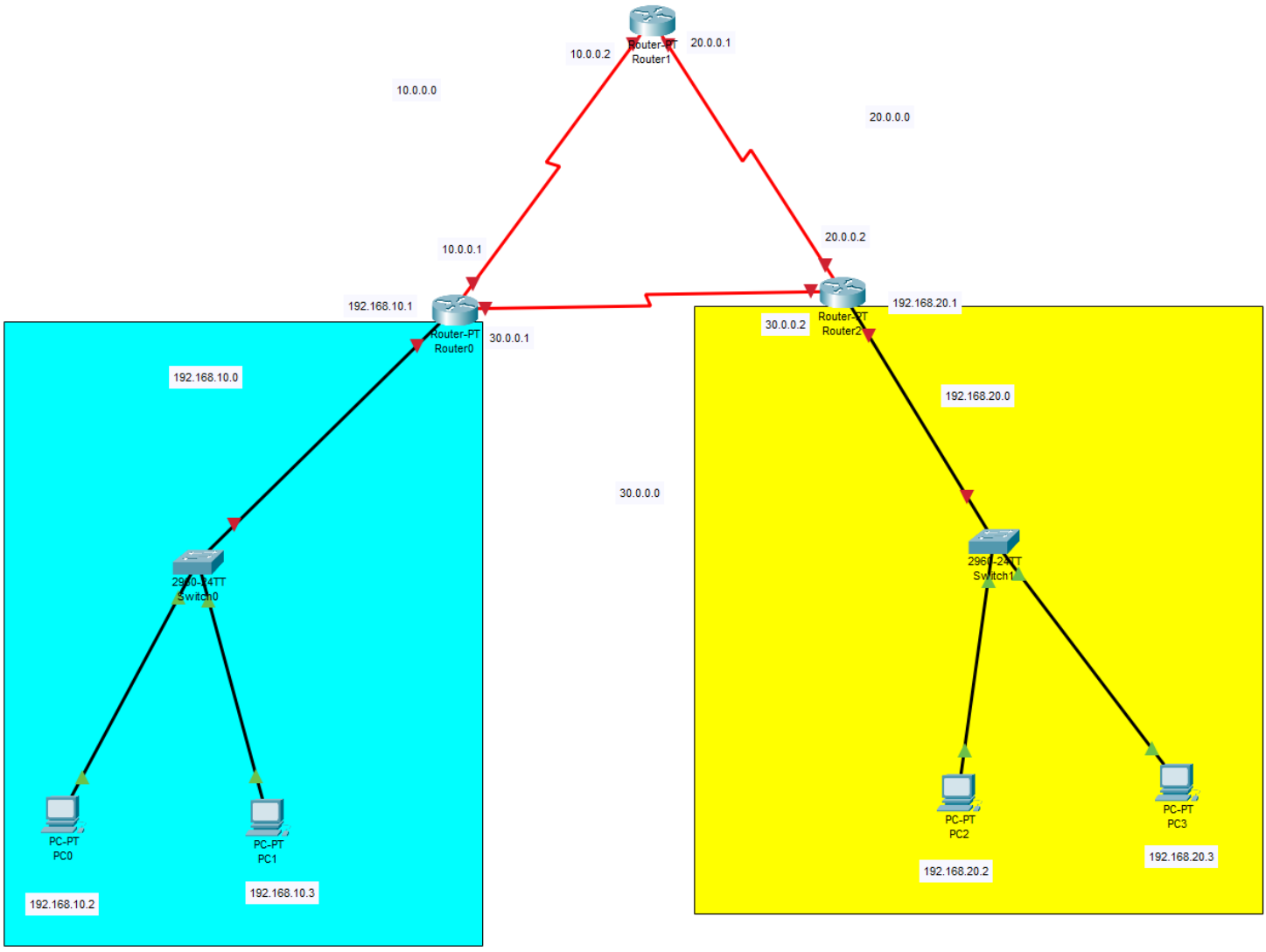
Roll: Se-221027

Course: ***Computer Networks***
By ***Sir Wilayat***

1. Overview of the Topology

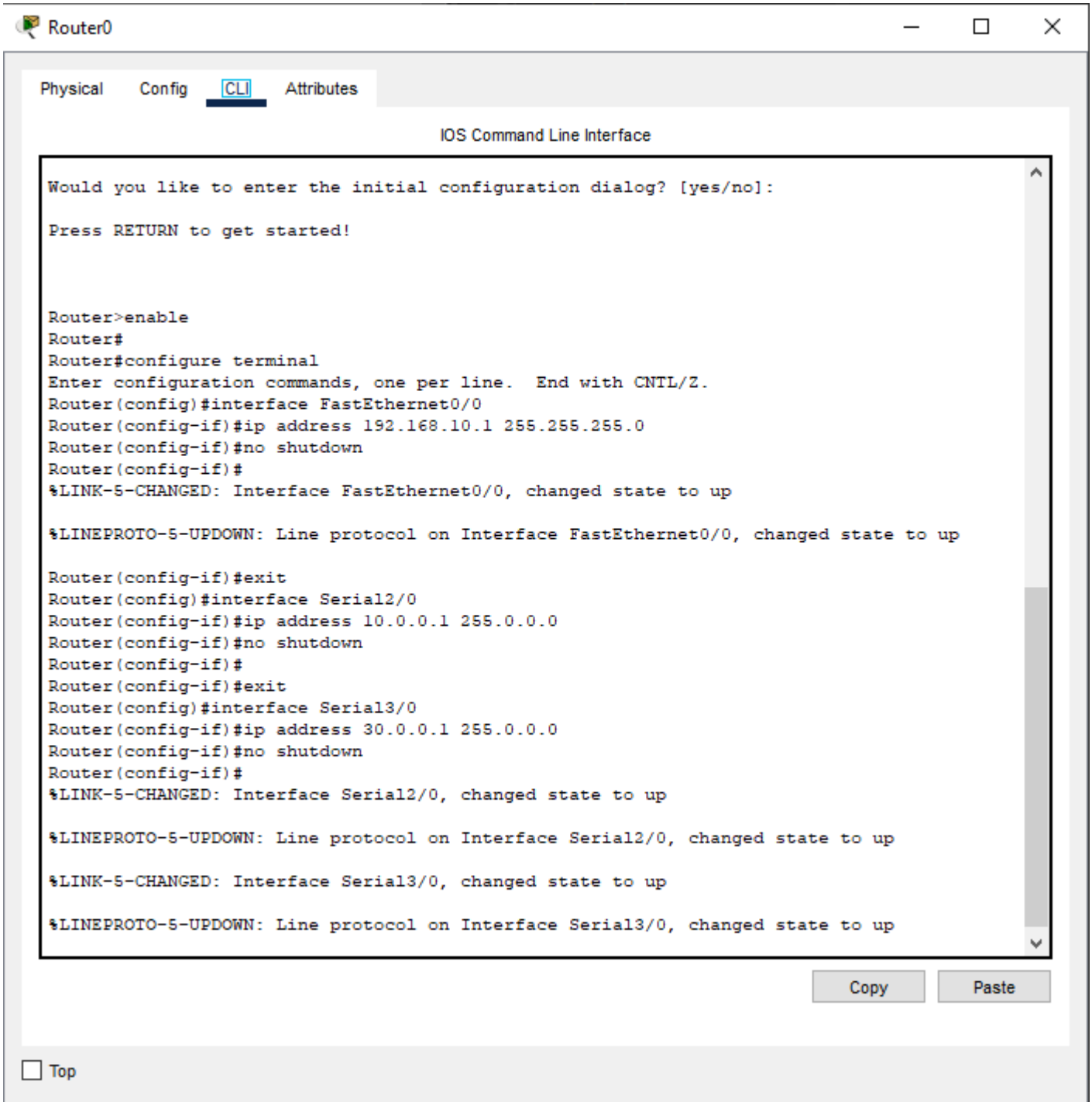
The provided network topology consists of:

- **Three Routers (Router0, Router1, Router2)**
- **Two Switches (Switch0, Switch1)**
- **Four PCs (PC0, PC1, PC2, PC3)**



OSPF (Open Shortest Path First) is a **dynamic routing protocol** that helps routers share and update network information efficiently. It is a **link-state protocol.**

Router Configuration:



Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
Bridging software.
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)


         --- System Configuration Dialog ---

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

Press RETURN to get started!



Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up
```

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Top

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
Bridging software.
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
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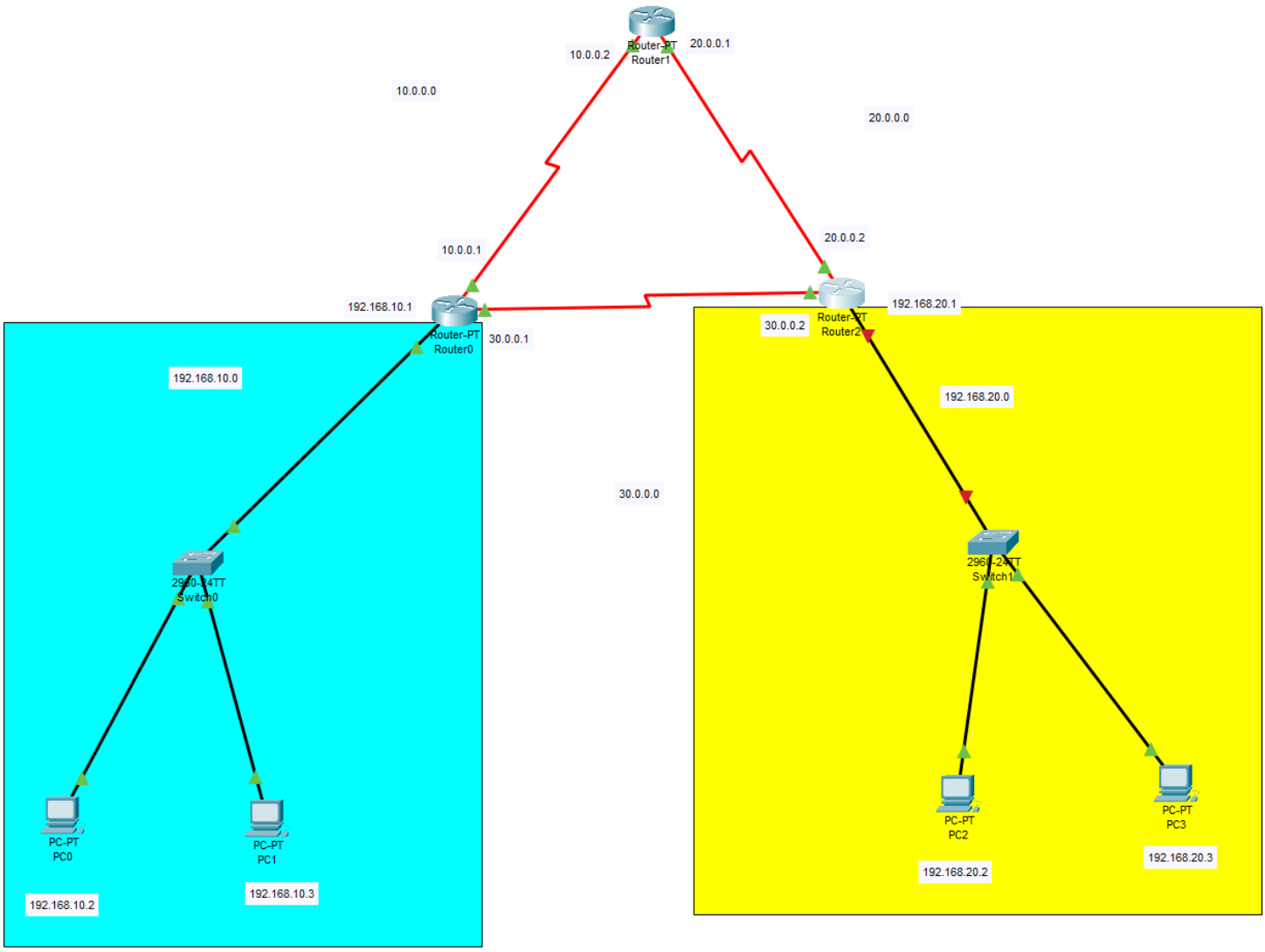
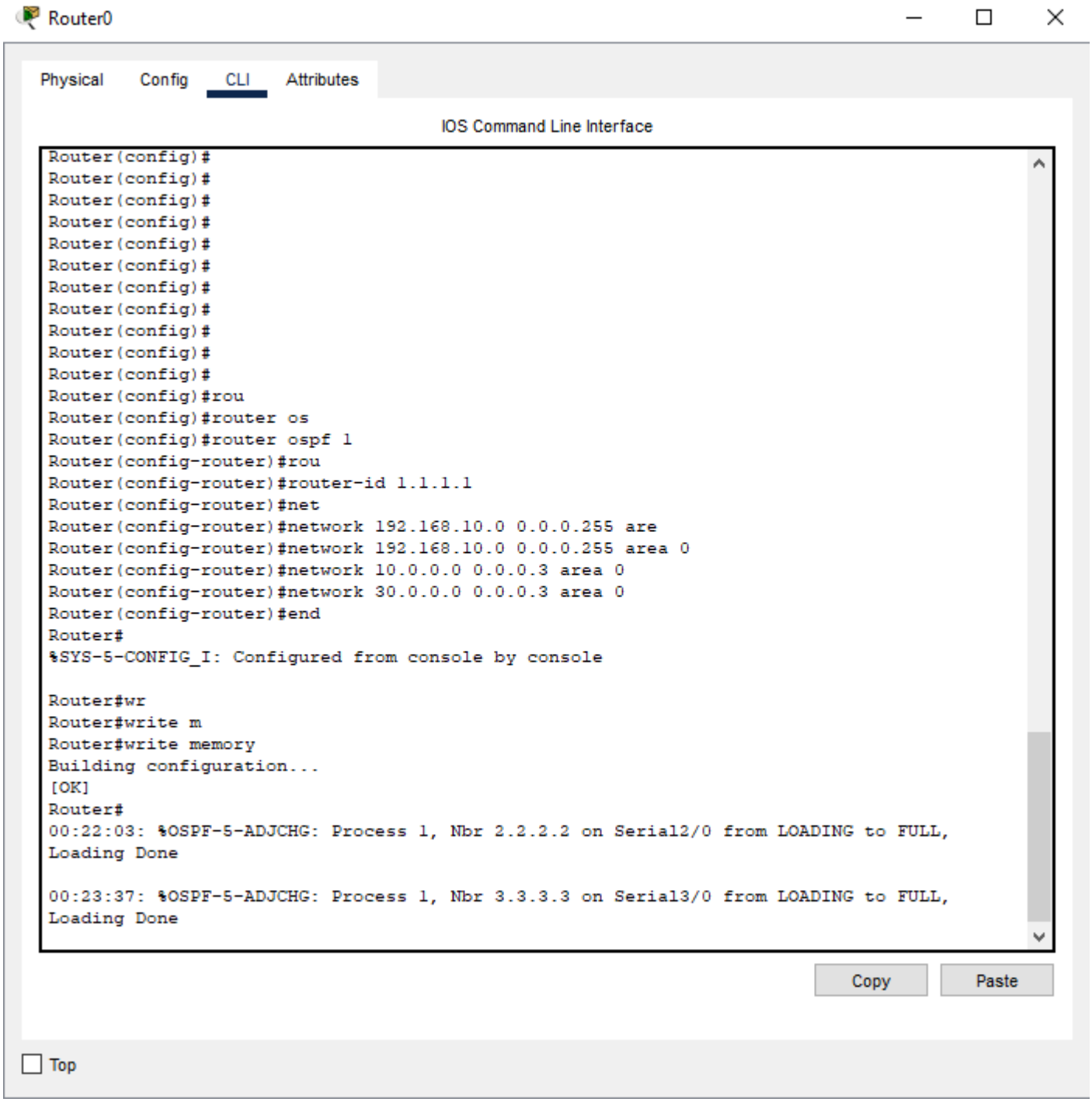
Top


Router-PT
Router1
10.0.0.2
20.0.0.1
10.0.0.0
20.0.0.0
10.0.0.1
20.0.0.2
192.168.10.1
Router-PT
Router0
30.0.0.1
30.0.0.2
Router-PT
Router2
192.168.20.1
192.168.10.0
192.168.20.0
30.0.0.0
2960-24TT
Switch0
2960-24TT
Switch1
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
192.168.10.2
192.168.10.3
192.168.20.2
192.168.20.3

OSFP Configuration:



Router1

Physical Config CLI Attributes

IOS Command Line Interface

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

Router#conf
Router#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#rou
Router(config-router)#router-id 2.2.2.2
Router(config-router)#net
Router(config-router)#network 10.0.0.0 0.0.0.3 area 0
Router(config-router)#network 20.0.0.0 0.0.0.3 area 0
Router(config-router)#en
% Ambiguous command: "en"
Router(config)#
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
00:22:01: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/0 from LOADING to FULL,
Loading Done

Router#wri
Router#write me
Router#write memory
Building configuration...
[OK]
Router#
00:23:27: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on Serial3/0 from LOADING to FULL,
Loading Done
```

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Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#conf
Router#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ru
Router(config)#rou
Router(config)#router os
Router(config)#router ospf 1
Router(config-router)#ro
Router(config-router)#router-id 3.3.3.3
Router(config-router)#netwo
Router(config-router)#network 20.0.0.0 0.0.0.0 area 0
Router(config-router)#network 20.0.0.0 0.0.0.3 area 0
Router(config-router)#network 30.0.0.0 0.0.0.3 area 0
Router(config-router)#network 30.0.0.0 0.0.0.3 area 0
00:23:25: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial3/0 from LOADING to FULL,
Loading Done

00:23:33: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial2/0 from LOADING to FULL,
Loading Done

Router(config-router)#network 192.168.20.0 0.0.0.255 area 0
Router(config-router)#
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Router#write m
Router#write memory
Building configuration...
[OK]
Router#
```

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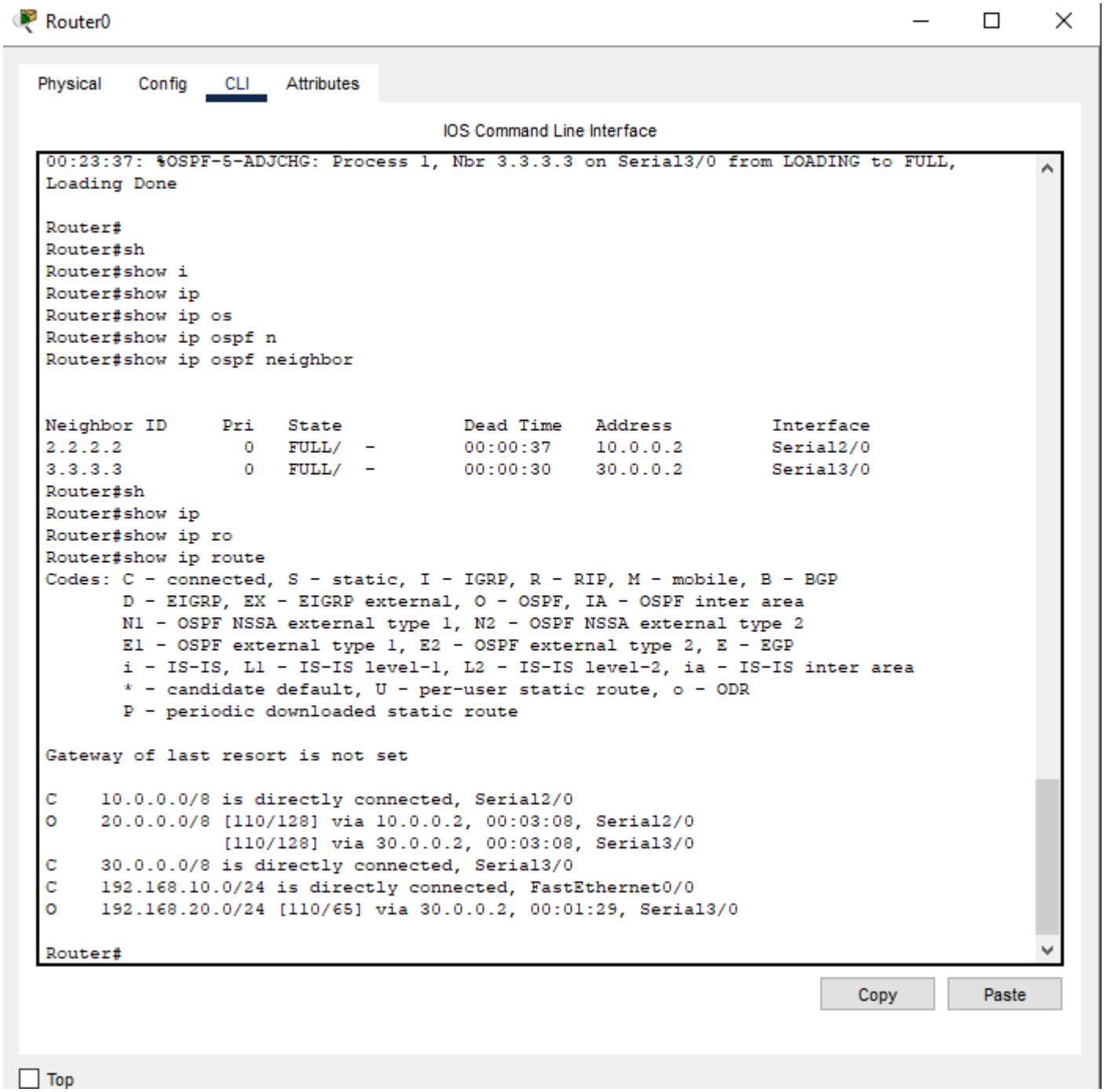
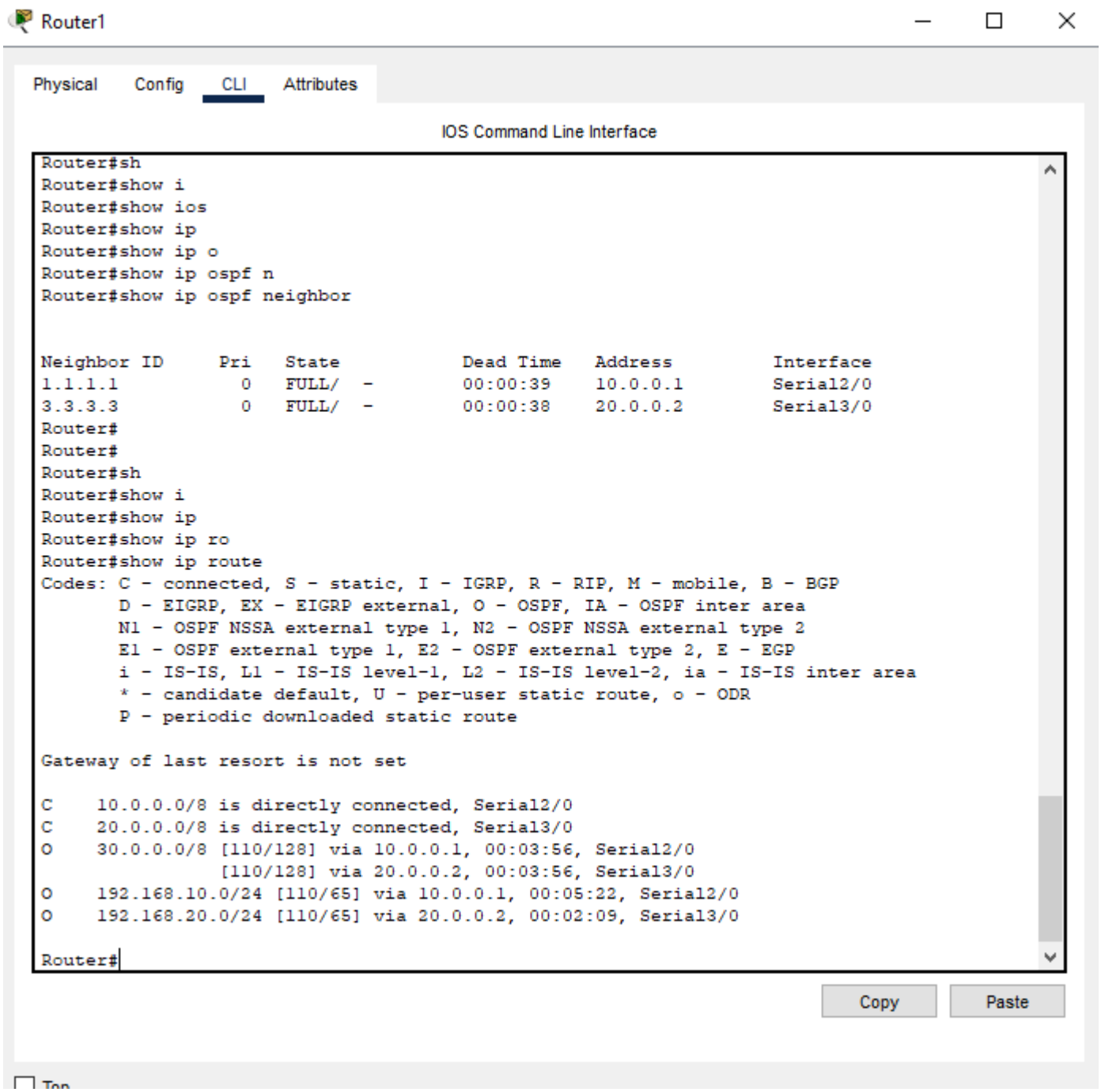
Verify OSPF Configuration:




Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router#sh
Router#show i
Router#show ios
Router#show ip
Router#show ip o
Router#show ip ospf n
Router#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
1.1.1.1 0 FULL/ - 00:00:39 10.0.0.1 Serial2/0
3.3.3.3 0 FULL/ - 00:00:38 20.0.0.2 Serial3/0
Router#
Router#
Router#sh
Router#show i
Router#show ip
Router#show ip ro
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
C 10.0.0.0/8 is directly connected, Serial2/0
C 20.0.0.0/8 is directly connected, Serial3/0
O 30.0.0.0/8 [110/128] via 10.0.0.1, 00:03:56, Serial2/0
[110/128] via 20.0.0.2, 00:03:56, Serial3/0
O 192.168.10.0/24 [110/65] via 10.0.0.1, 00:05:22, Serial2/0
O 192.168.20.0/24 [110/65] via 20.0.0.2, 00:02:09, Serial3/0
Router#
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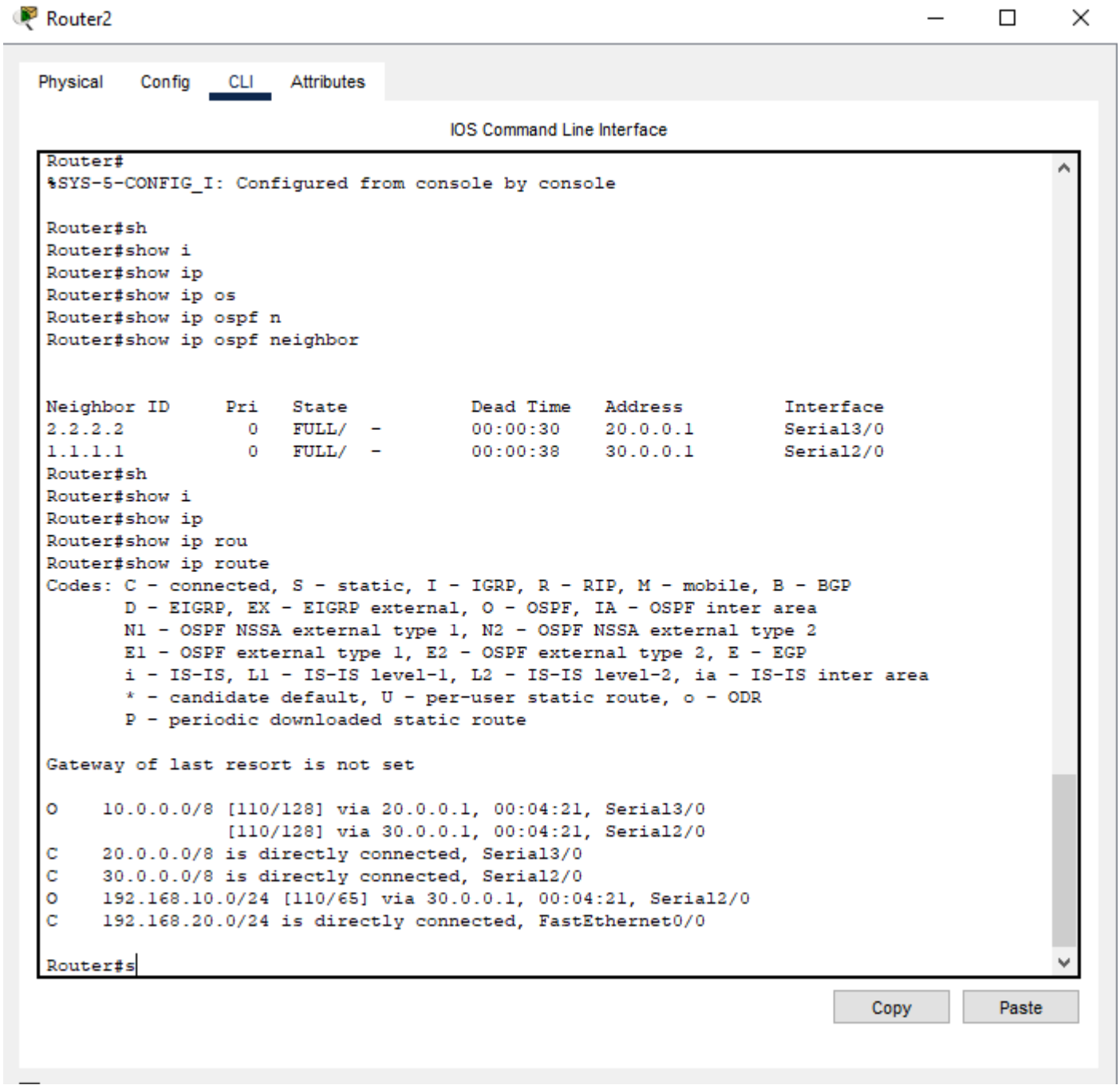
Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#sh
Router#show i
Router#show ip
Router#show ip os
Router#show ip ospf n
Router#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
2.2.2.2 0 FULL/ - 00:00:30 20.0.0.1 Serial3/0
1.1.1.1 0 FULL/ - 00:00:38 30.0.0.1 Serial2/0
Router#sh
Router#show i
Router#show ip
Router#show ip rou
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
O 10.0.0.0/8 [110/128] via 20.0.0.1, 00:04:21, Serial3/0
[110/128] via 30.0.0.1, 00:04:21, Serial2/0
C 20.0.0.0/8 is directly connected, Serial3/0
C 30.0.0.0/8 is directly connected, Serial2/0
O 192.168.10.0/24 [110/65] via 30.0.0.1, 00:04:21, Serial2/0
C 192.168.20.0/24 is directly connected, FastEthernet0/0
Router#s
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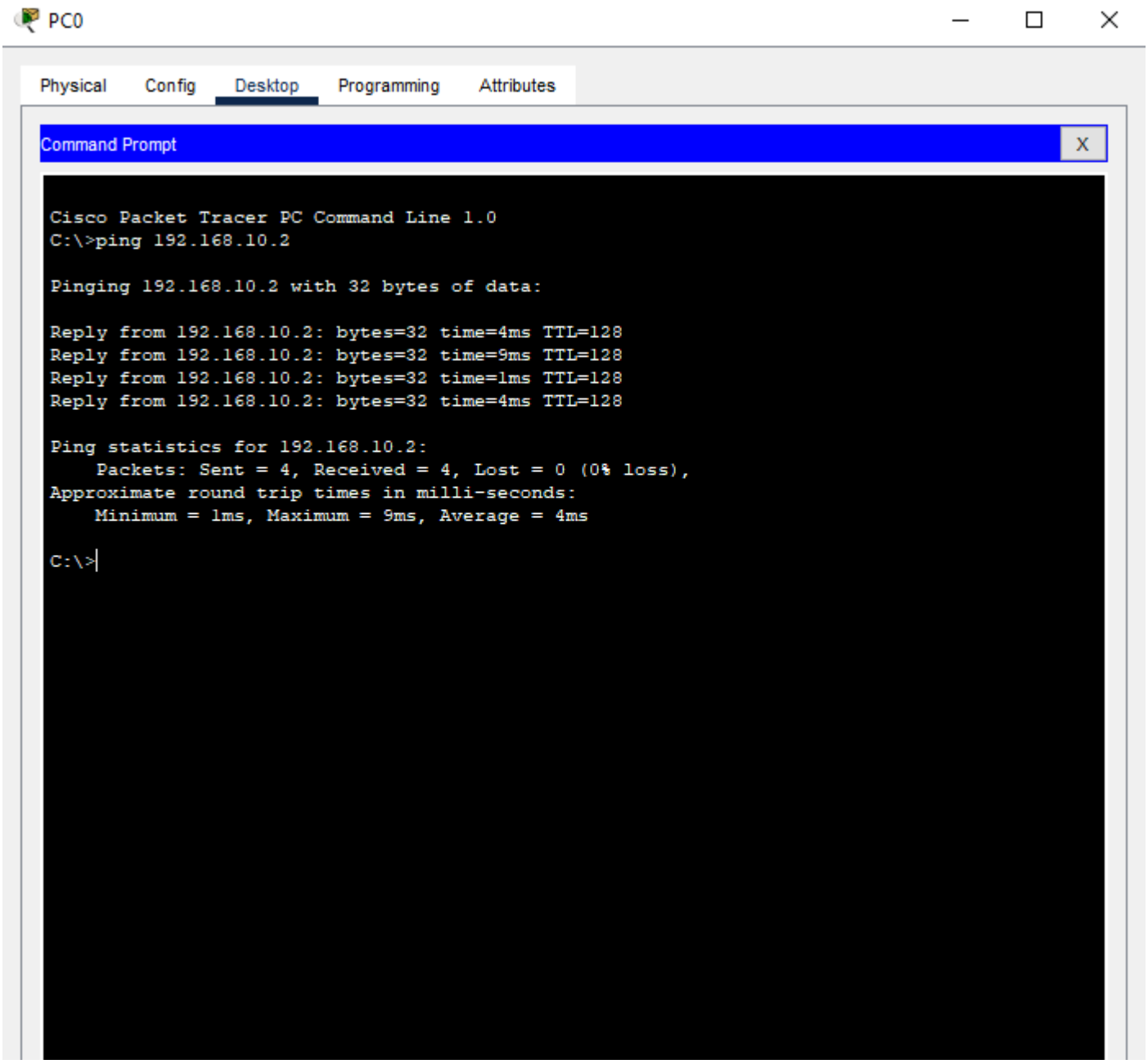
Testing Connectivity

From PC0 (192.168.10.2) to PC2 (192.168.20.2



the **successful pings and routing table validation demonstrate that OSPF was correctly implemented and is functioning as expected**. The routers are dynamically

sharing routing information, allowing seamless communication between all devices in the network. This setup ensures efficient routing, redundancy, and scalability, making OSPF an effective choice for this network topology