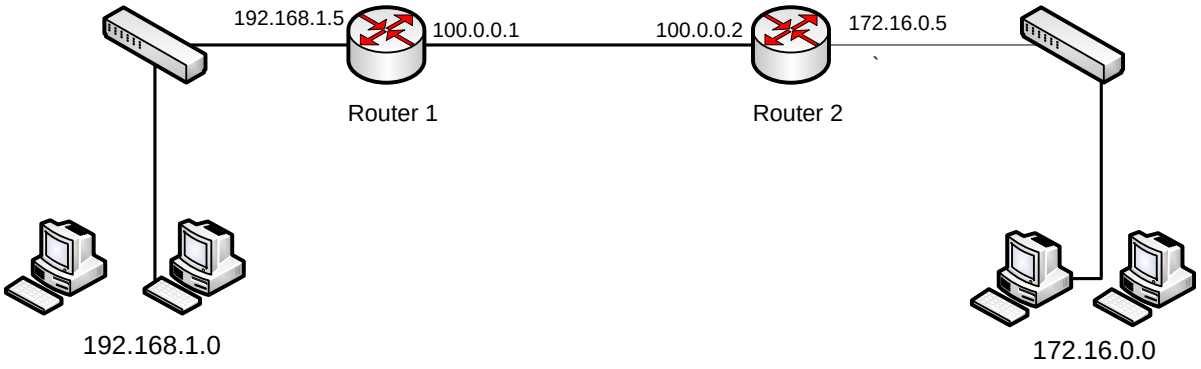
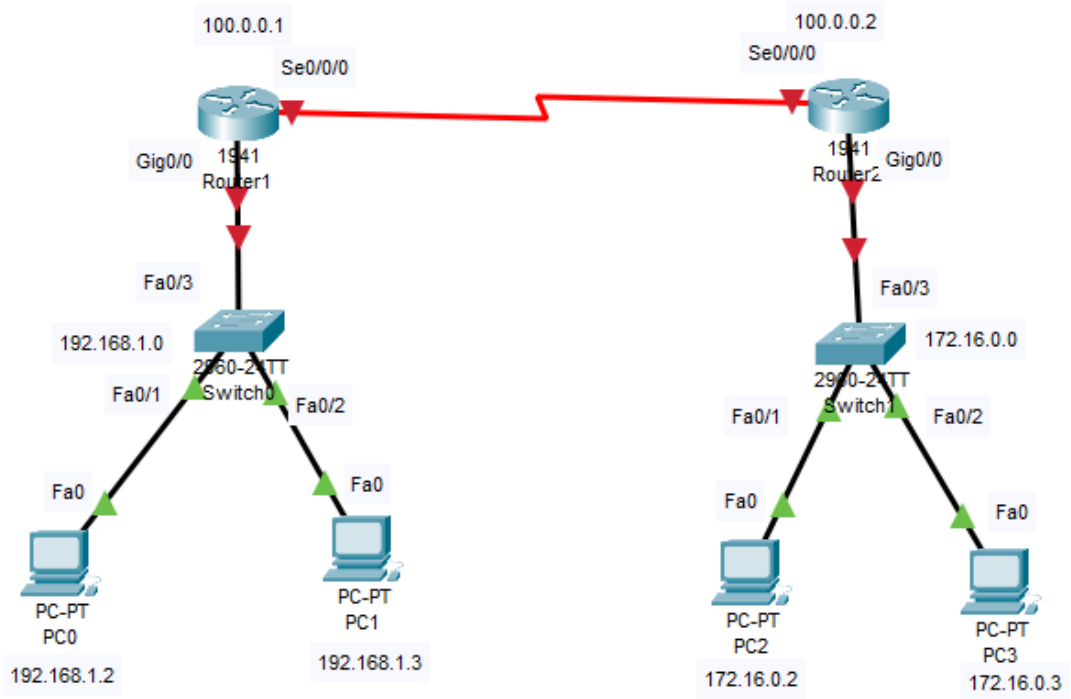
TASK 1:

Configure OSPF on the following network and show all necessary configuration steps for each router.

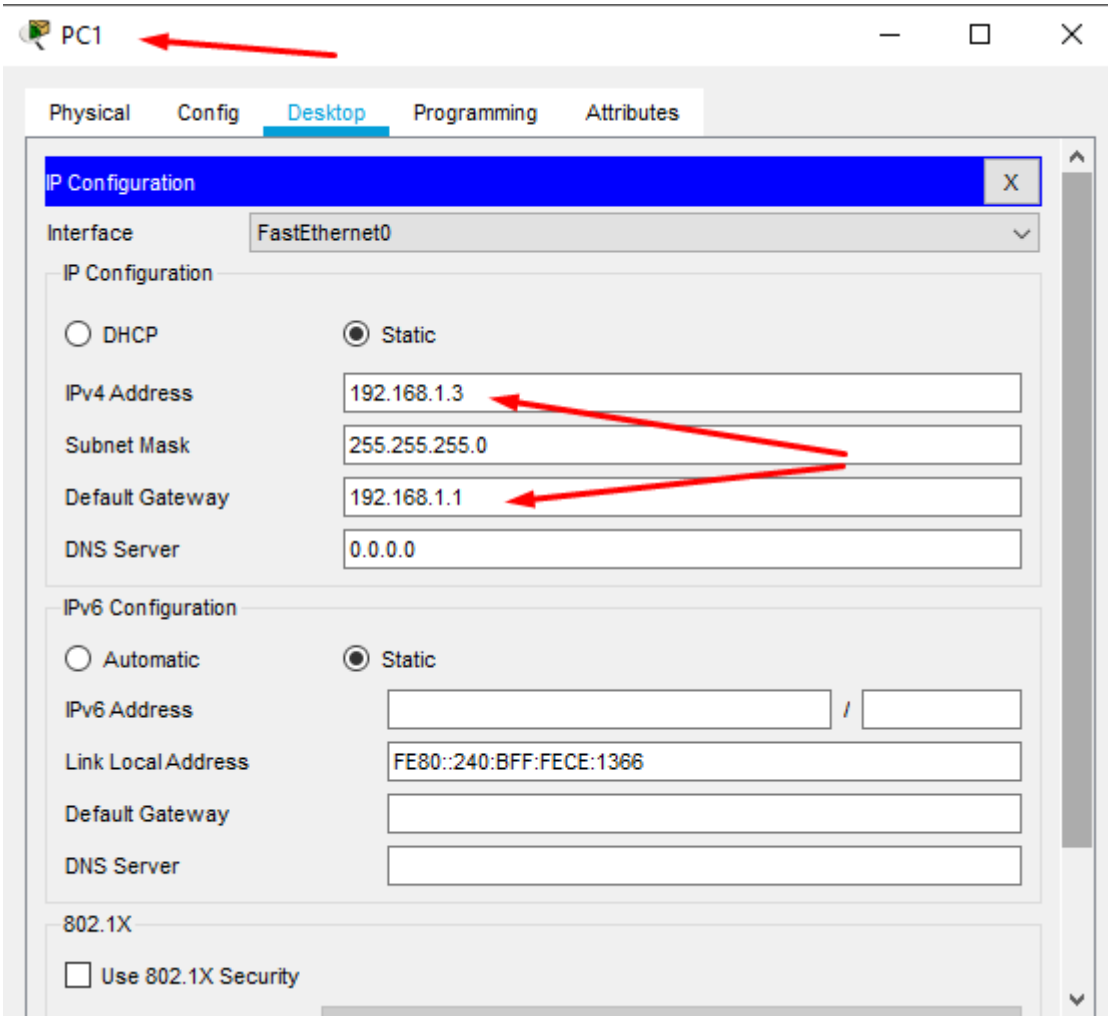


Solution:

Topology:



Setting Ips and default gateway:



Configuring OSPF routing on router 1:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Hostname R1
R1(config)#INT gig0/0
R1(config-if)#ip add 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown

R1(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

R1(config-if)#exit
R1(config)#int se0/0/0
R1(config-if)#ip add 100.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown

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

R1(config)#router ospf 1
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0
R1(config-router)#network 100.0.0.0 0.255.255.255 area 0
R1(config-router)#exit

Configuring OSPF routing on router 2:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int gig0/0
R2(config-if)#ip add 172.16.0.1 255.255.0.0
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)#int se0/0/0
R2(config-if)#ip add 100.0.0.2 255.0.0.0
R2(config-if)#clock rate 64000
This command applies only to DCE interfaces
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R2(config-if)#

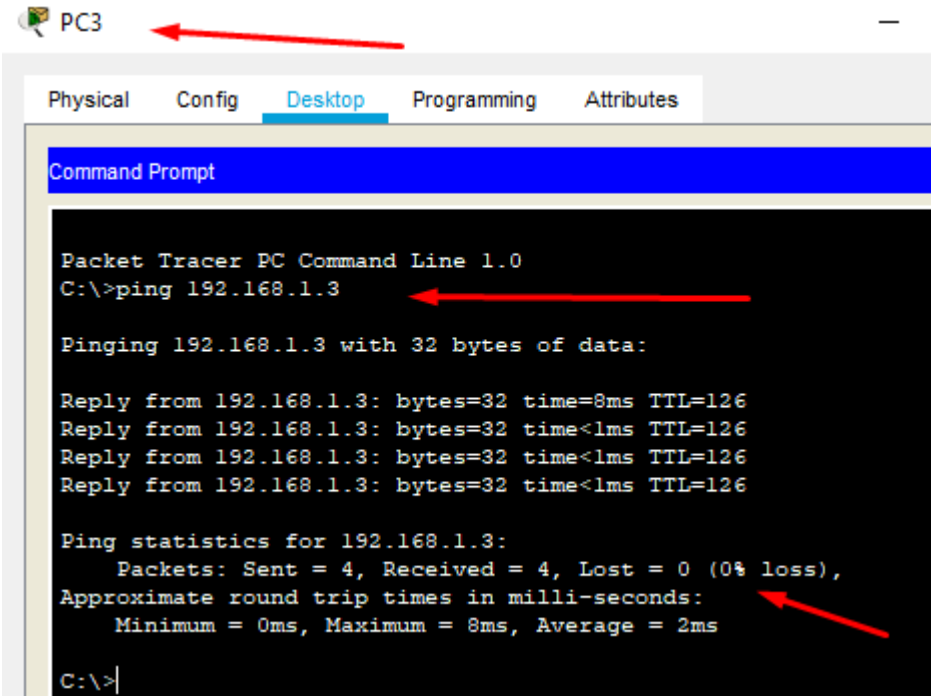
R2(config)#router ospf 1
R2(config-router)#network 100.0.0.0 0.255.255.255 area 0
R2(config-router)#network 172.16.0.0 0.0.255.255 area 0
R2(config-router)#exit
R2(config)#

Digital Ping test:

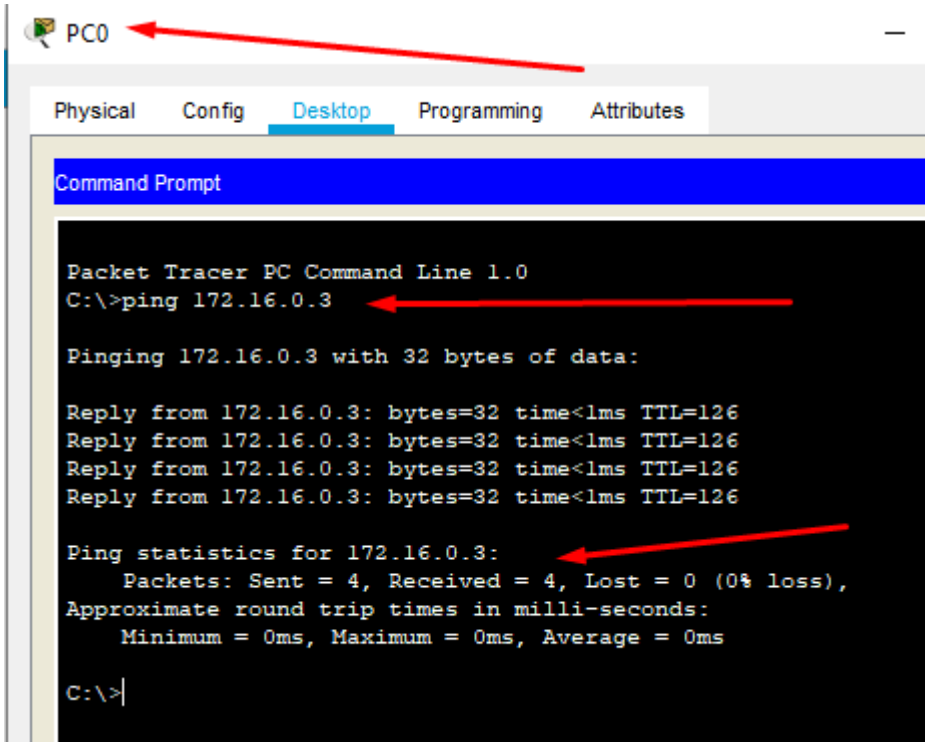
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Ed
	Successful	PC0	PC2	ICMP		0.000	N	0	(e
	Successful	PC0	PC3	ICMP		0.000	N	1	(e
	Successful	PC0	Router2	ICMP		0.000	N	2	(e

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC2	PC1	ICMP		0.000	N	3
	Successful	PC2	PC0	ICMP		0.000	N	4
	Successful	PC2	Router1	ICMP		0.000	N	5

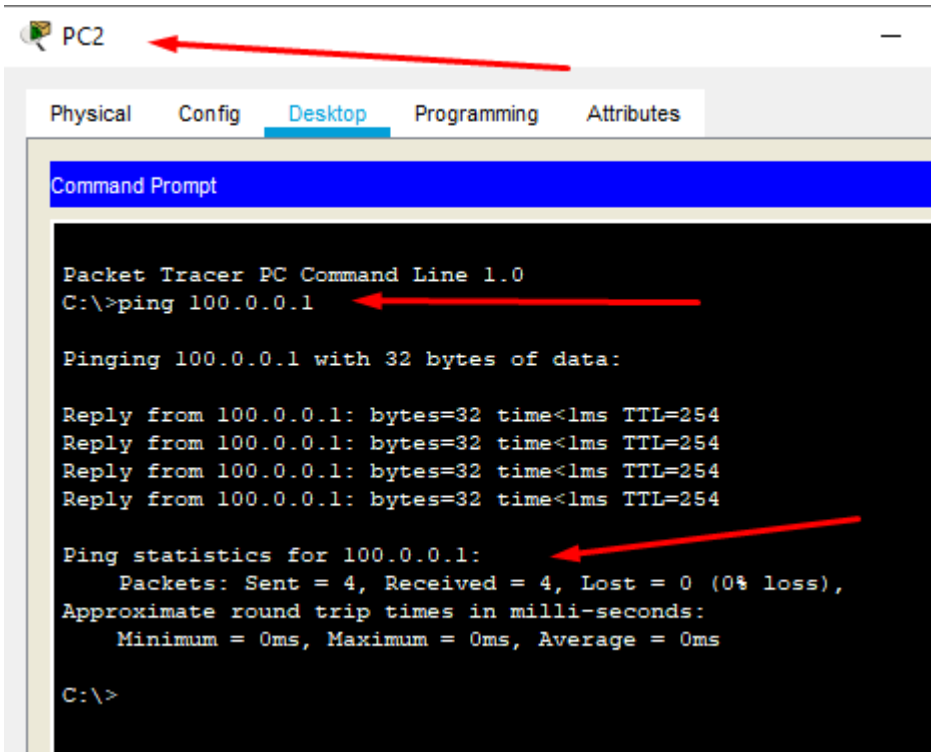
Verify the route by pinging from PC 3 to PC 1:



Verify the route by pinging from PC0 to PC2

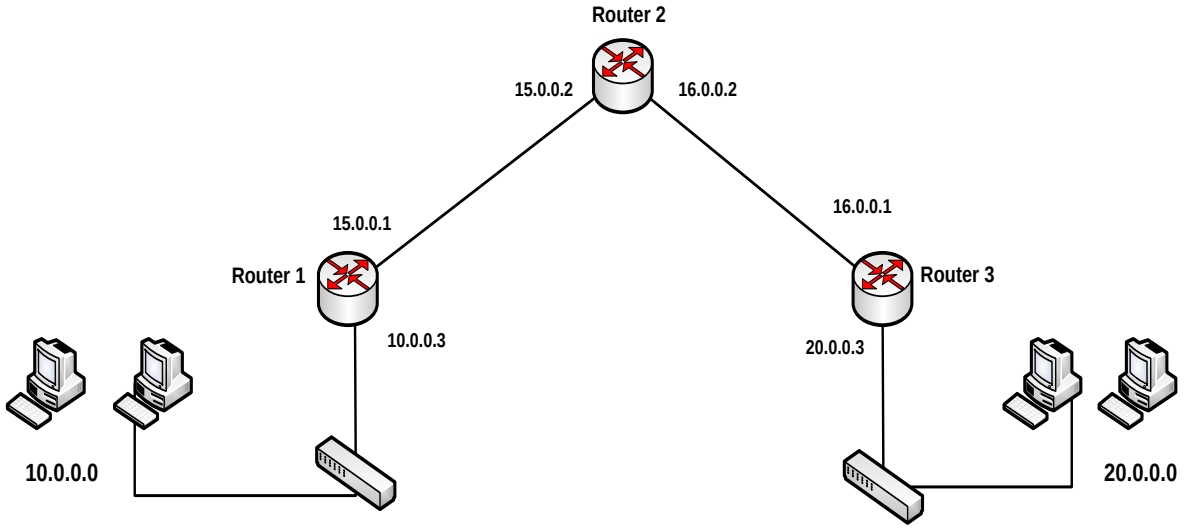


Verify the route by pinging from PC2 to Router1:



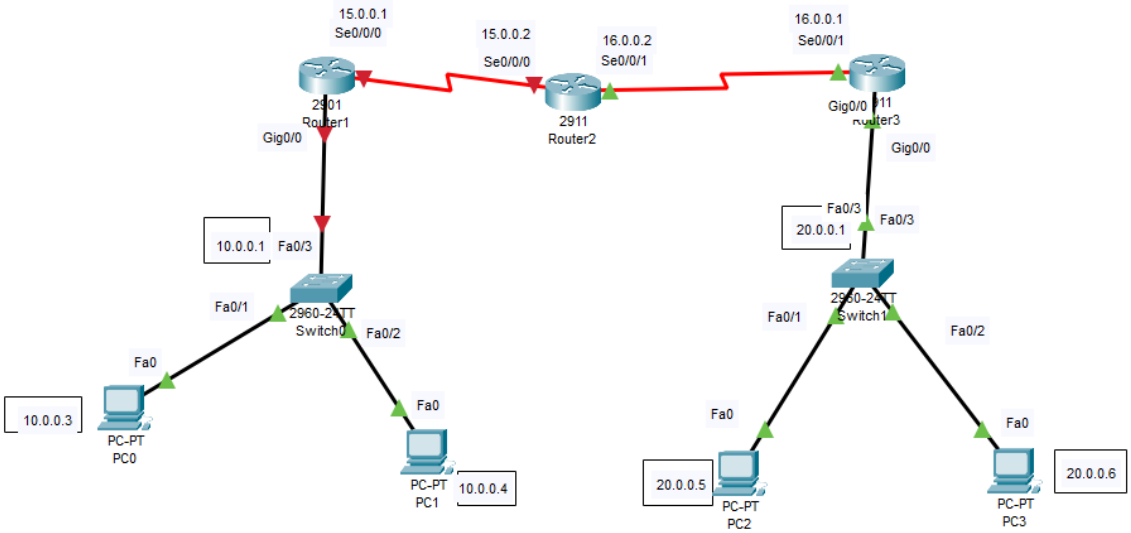
TASK 2

Configure OSPF on the following network and show all necessary configuration steps for each router.

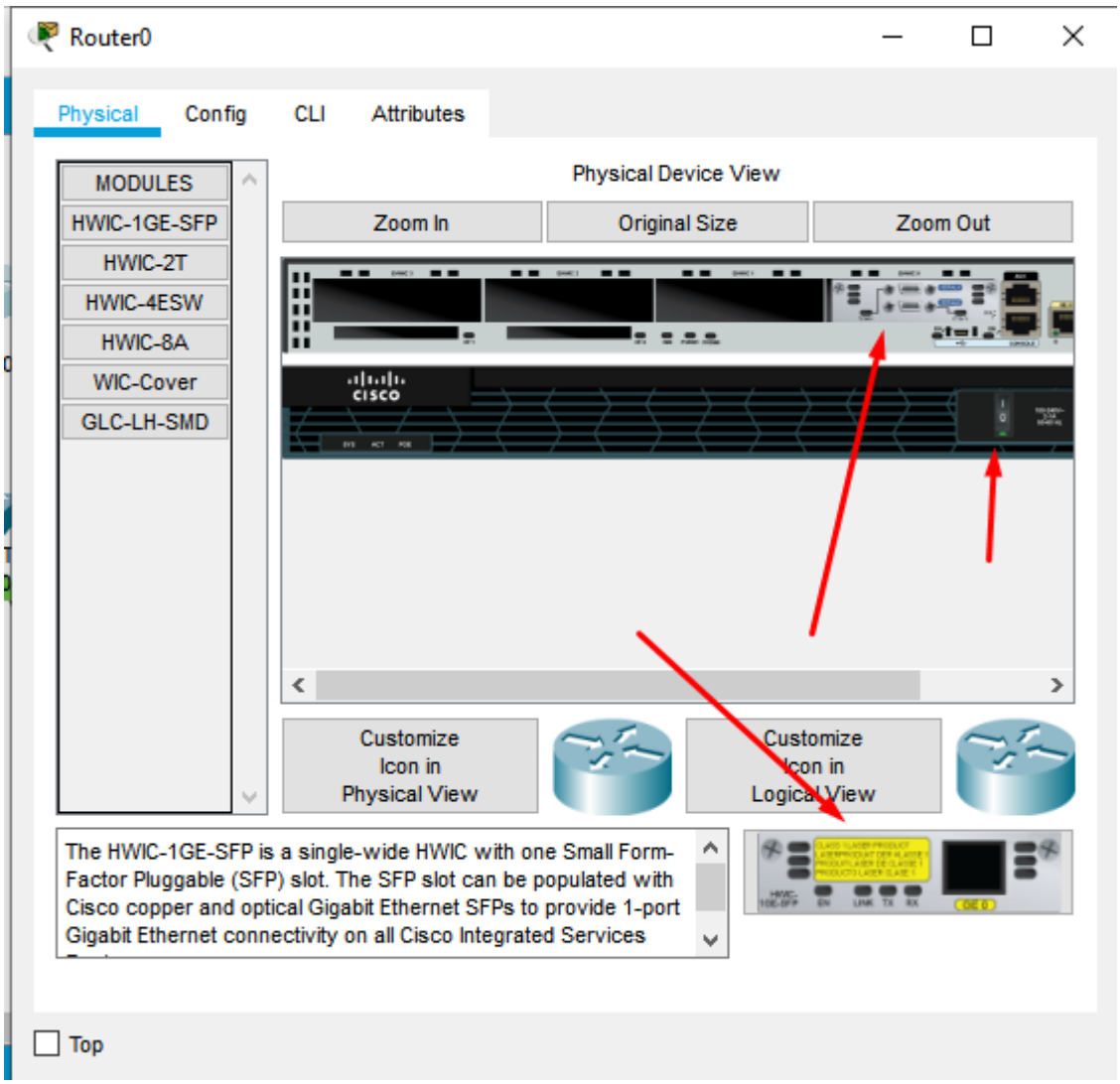


Solution:

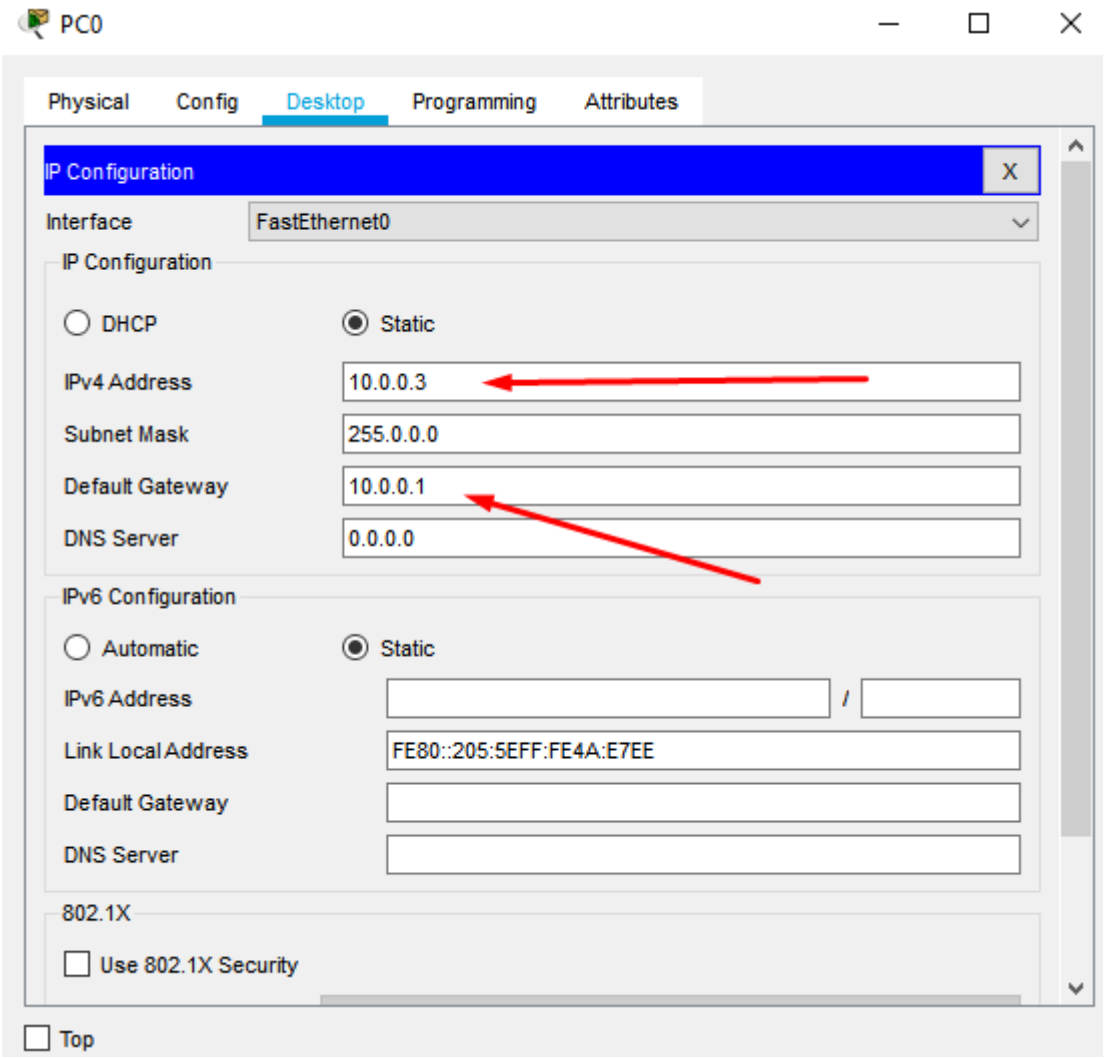
Topology:



Availing extra ports on all routers:



Adding default gateway and ip add. to every pc:



Router 1:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#host R1
R1(config)#Int gig0/0
R1(config-if)#ip add 10.0.0.1 255.0.0.0
R1(config-if)#no shut

R1(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

R1(config-if)#exit
R1(config)#int se0/0/0
R1(config-if)#ip add 15.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000

```
R1(config-if)#no shut

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

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

R1(config)#
```

Router2:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#INT se0/0/0
R2(config-if)#ip add 15.0.0.2 255.0.0.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#int se0/0/1
R2(config-if)#clock rate 64000
R2(config-if)#ip add 16.0.0.2 255.0.0.0
R2(config-if)#no shut
R2(config-if)#
R2(config-if)#exit
R2(config)#
```

Router3:

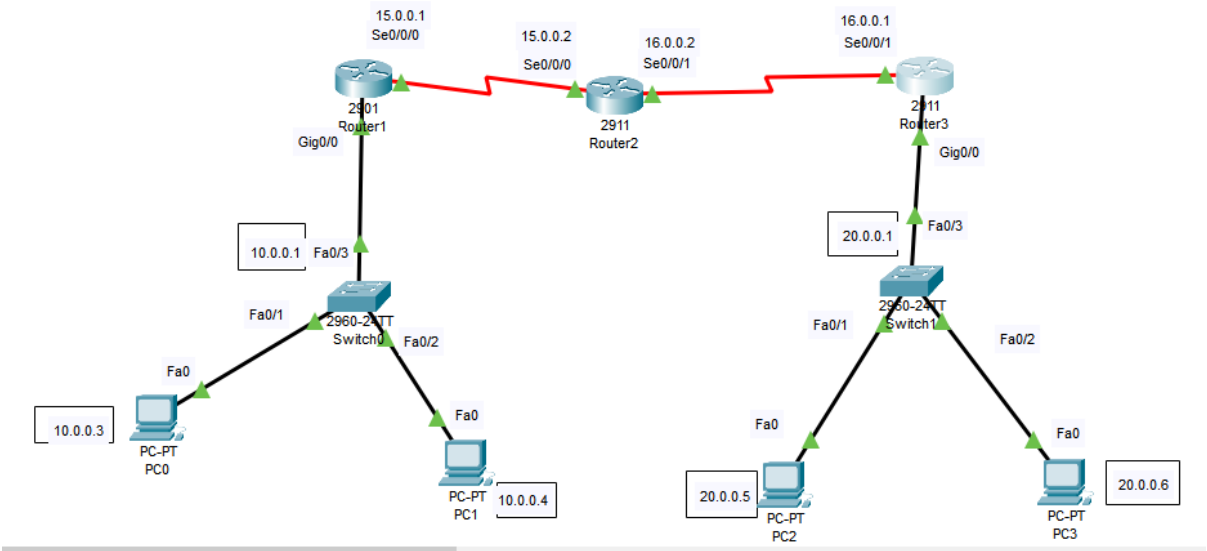
```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int gig0/0
R3(config-if)#ip address 20.0.0.1 255.0.0.0
R3(config-if)#no shut

R3(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

R3(config-if)#ex
R3(config)#

R3>en
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
```

R3(config)#int se0/0/1
R3(config-if)#ip ad 16.0.0.1 255.0.0.0
R3(config-if)#no shut

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Configuration as per now:



Configuring OSPF routing on router 1:

R1(config)#router ospf 1
R1(config-router)#network 10.0.0.0 0.255.255.255 area 1
R1(config-router)#network 15.0.0.0 0.255.255.255 area 1
R1(config-router)#exit
R1(config)#

Configuring OSPF routing on router 2:

R2(config)#
R2(config)#router ospf 2
R2(config-router)#network 15.0.0.0 0.255.255.255 area 1
R2(config-router)#
00:16:57: %OSPF-5-ADJCHG: Process 2, Nbr 15.0.0.1 on Serial0/0/0 from LOADING to FULL, Loading Done

R2(config-router)#network 16.0.0.0 0.255.255.255 area 2
R2(config-router)#

R2(config-router)#exit

Configuring OSPF routing on router 3:

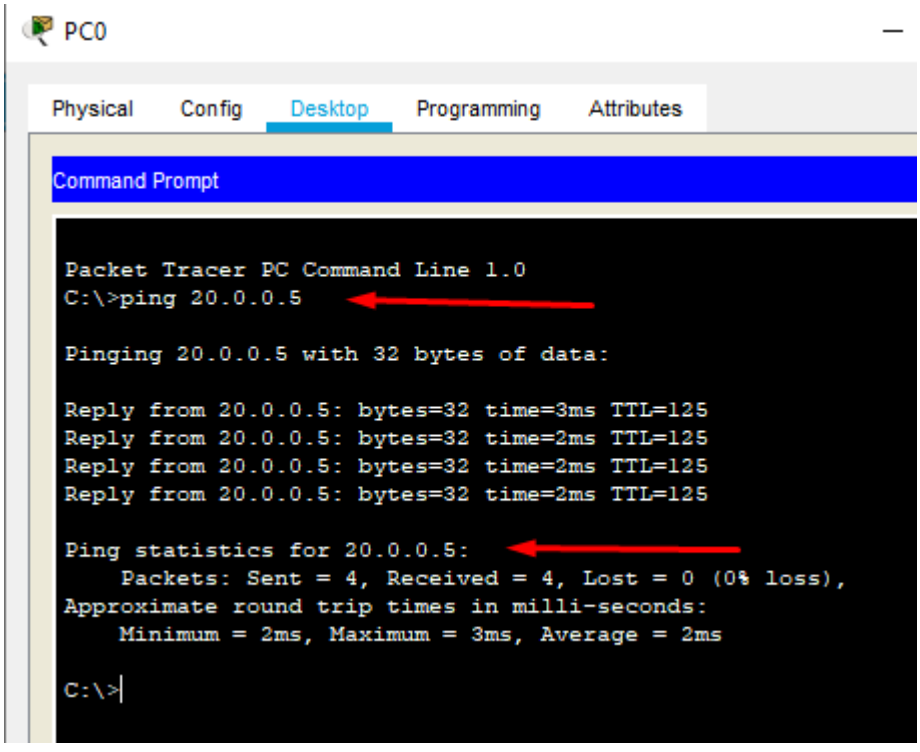
```
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 20.0.0.0 0.255.255.255 area 2
R3(config-router)#network 16.0.0.0 0.255.255.255 area 2
R3(config-router)#exit
R3(config)#
```

Digital Ping test:

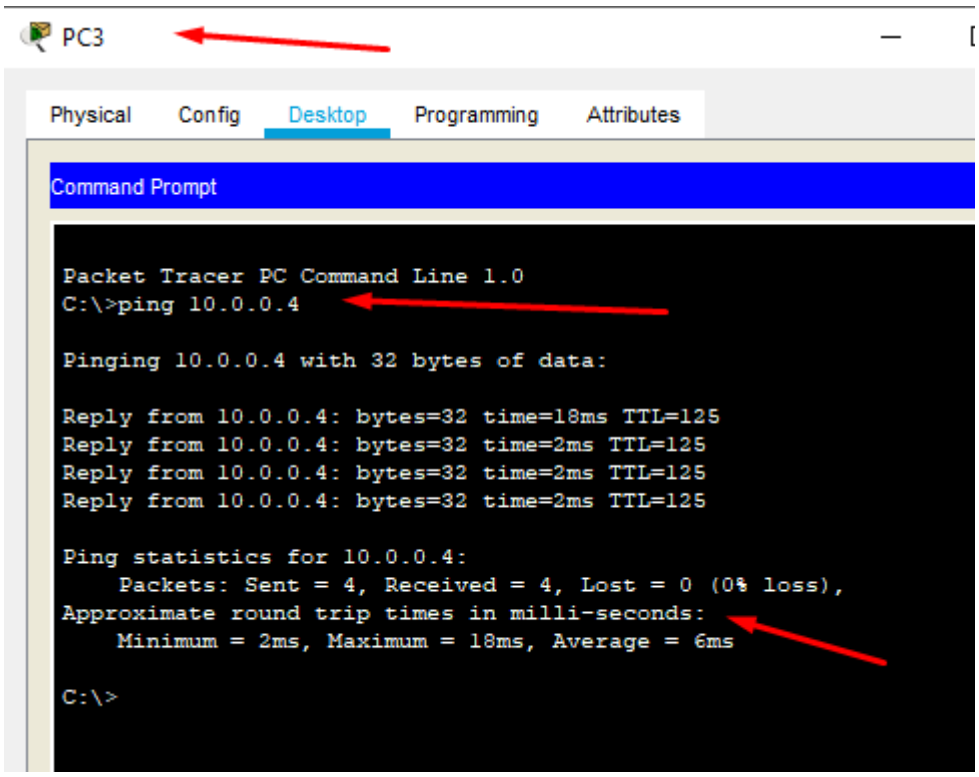
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	E
	Successful	PC1	Router1	ICMP		0.000	N	0	
	Successful	PC1	PC2	ICMP		0.000	N	1	
	Successful	PC1	PC3	ICMP		0.000	N	2	

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	E
	Successful	PC2	Router1	ICMP		0.000	N	0	
	Successful	PC2	PC1	ICMP		0.000	N	1	
	Successful	PC2	PC0	ICMP		0.000	N	2	

Pinging from PC 0 to PC 2:



Pinging Pc 1 from PC 3:



Pinging Router 3 from Pc1: