

Institute of Computer Technology

B. Tech Computer Science and Engineering

Sub: Computer Network

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Batch: 53

Class: B

Practical-8

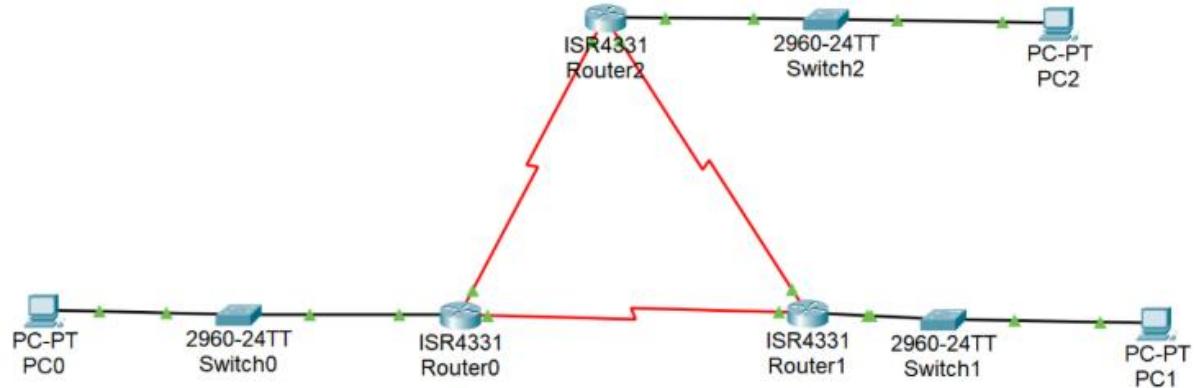
Aim: To design a network using Open Shortest Path First (OSPF) Protocol.

Scenario:

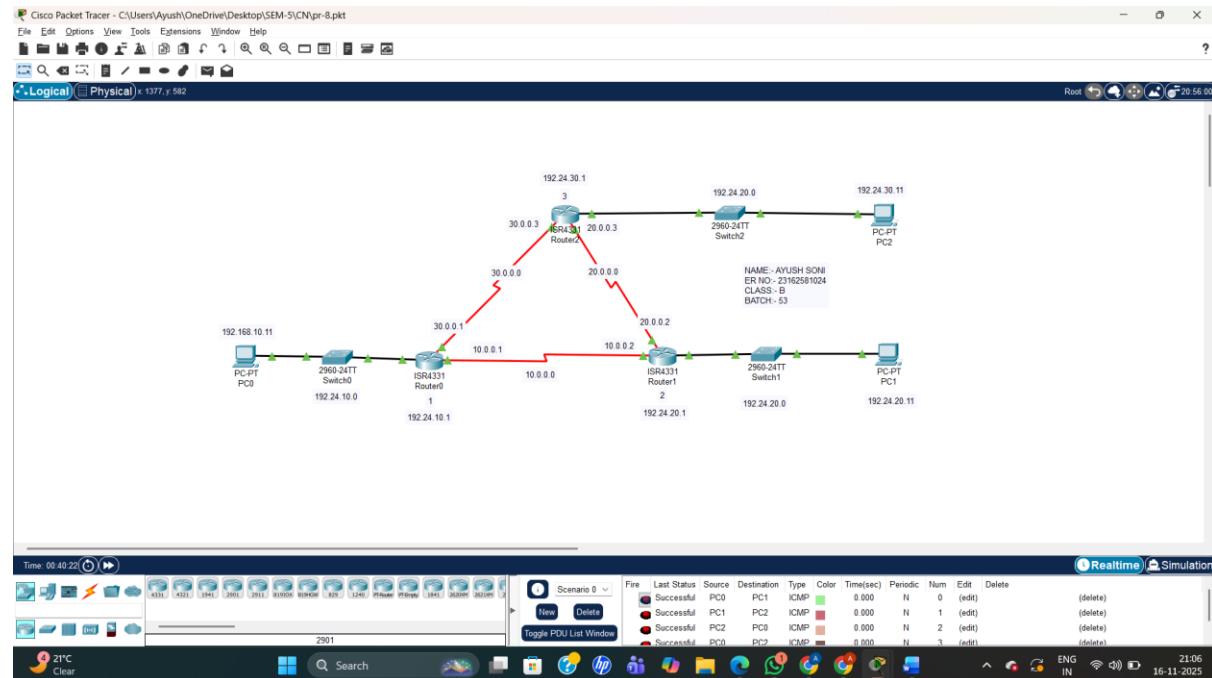
Consider that the organization has three departments and a routing protocol Open Shortest Path First (OSPF) protocol is implemented. Configure network as shown in figure below and implement Open Shortest Path First (OSPF) routing protocol.

Procedure:

- 1) Create network as given below

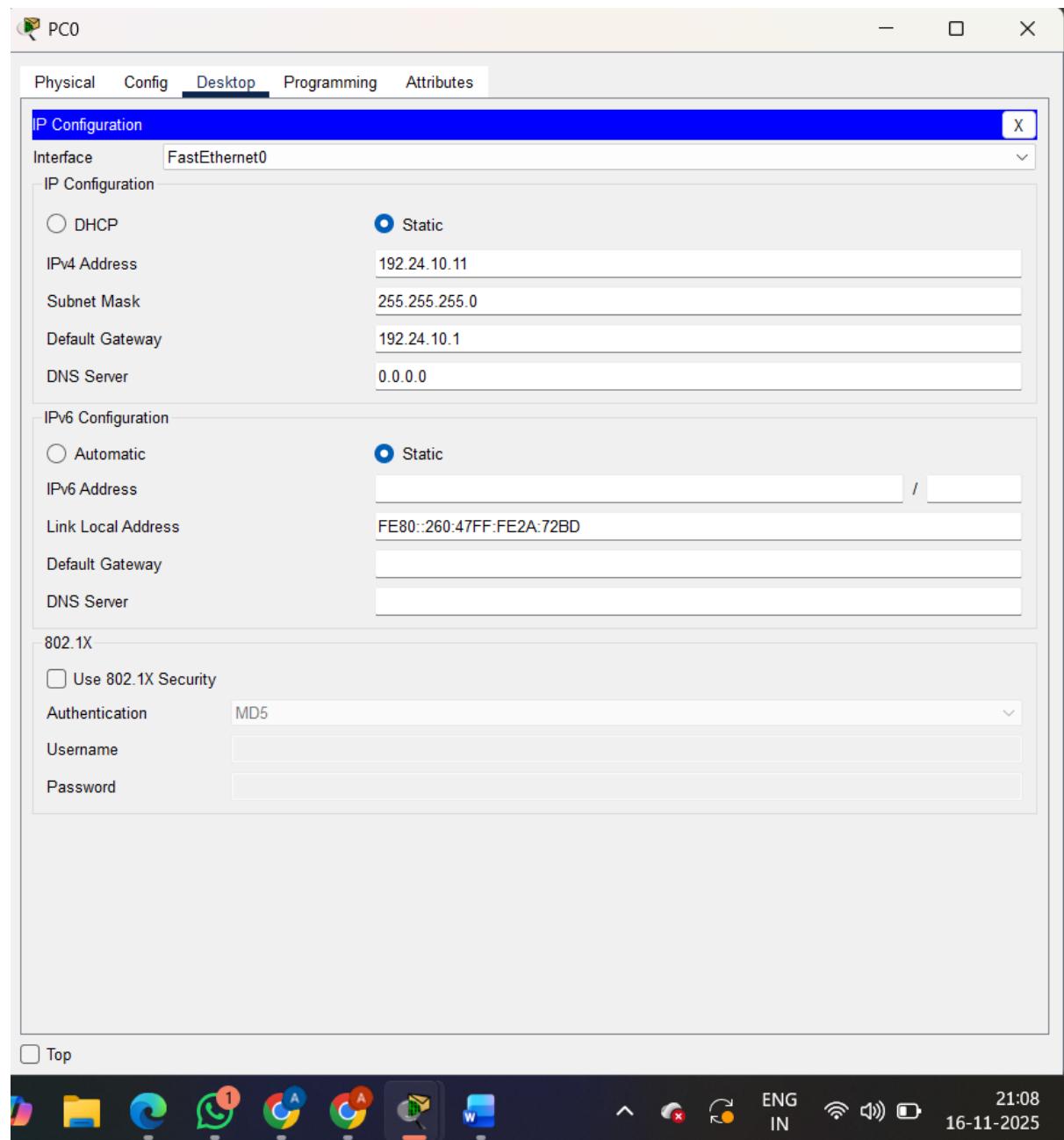


NETWORK DESIGN:

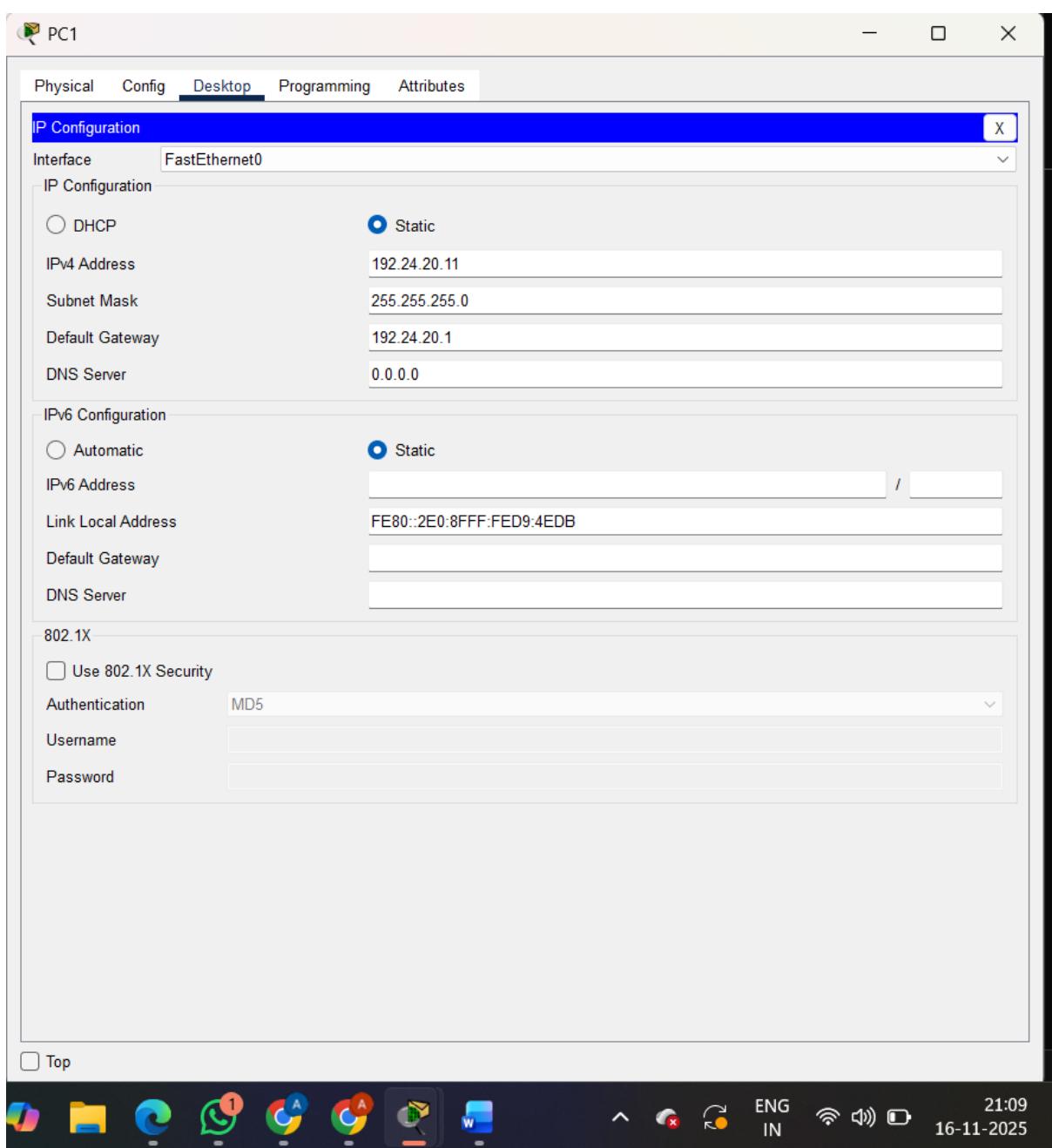


2) Configure IP address (All Devices, Routers)

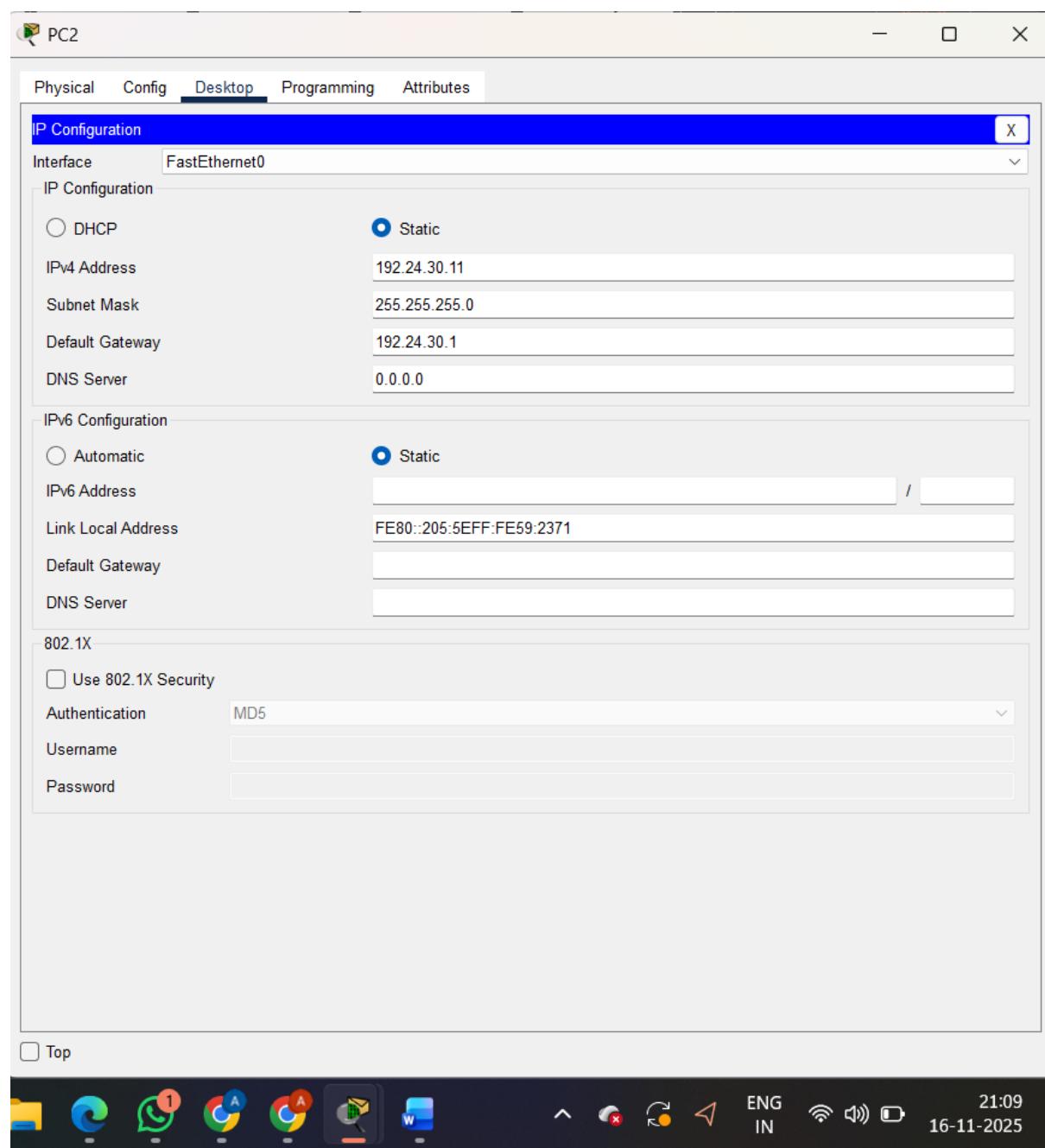
PC 0:



PC 1:



PC 2:



ROUTER 0:

The screenshot shows the configuration interface for Router 0. The main window has tabs: Physical, Config (selected), CLI, and Attributes. On the left, a sidebar lists GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, and INTERFACE. Under INTERFACE, GigabitEthernet0/0/0 is selected. The right panel displays configuration for GigabitEthernet0/0/0. It includes fields for Port Status (On), Bandwidth (100 Mbps selected), Duplex (Full Duplex selected), MAC Address (0001.63BA.7401), IP Configuration (IPv4 Address 192.24.10.1, Subnet Mask 255.255.255.0), and Tx Ring Limit (10). Below this is a section titled "Equivalent IOS Commands" containing the following text:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
```

The bottom of the screen shows a taskbar with various icons and system status indicators.

Router0

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0**
- Serial0/1/1**

Serial0/1/0

Port Status

Duplex Full Duplex On

Clock Rate 2000000

IP Configuration

IPv4 Address 10.0.0.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

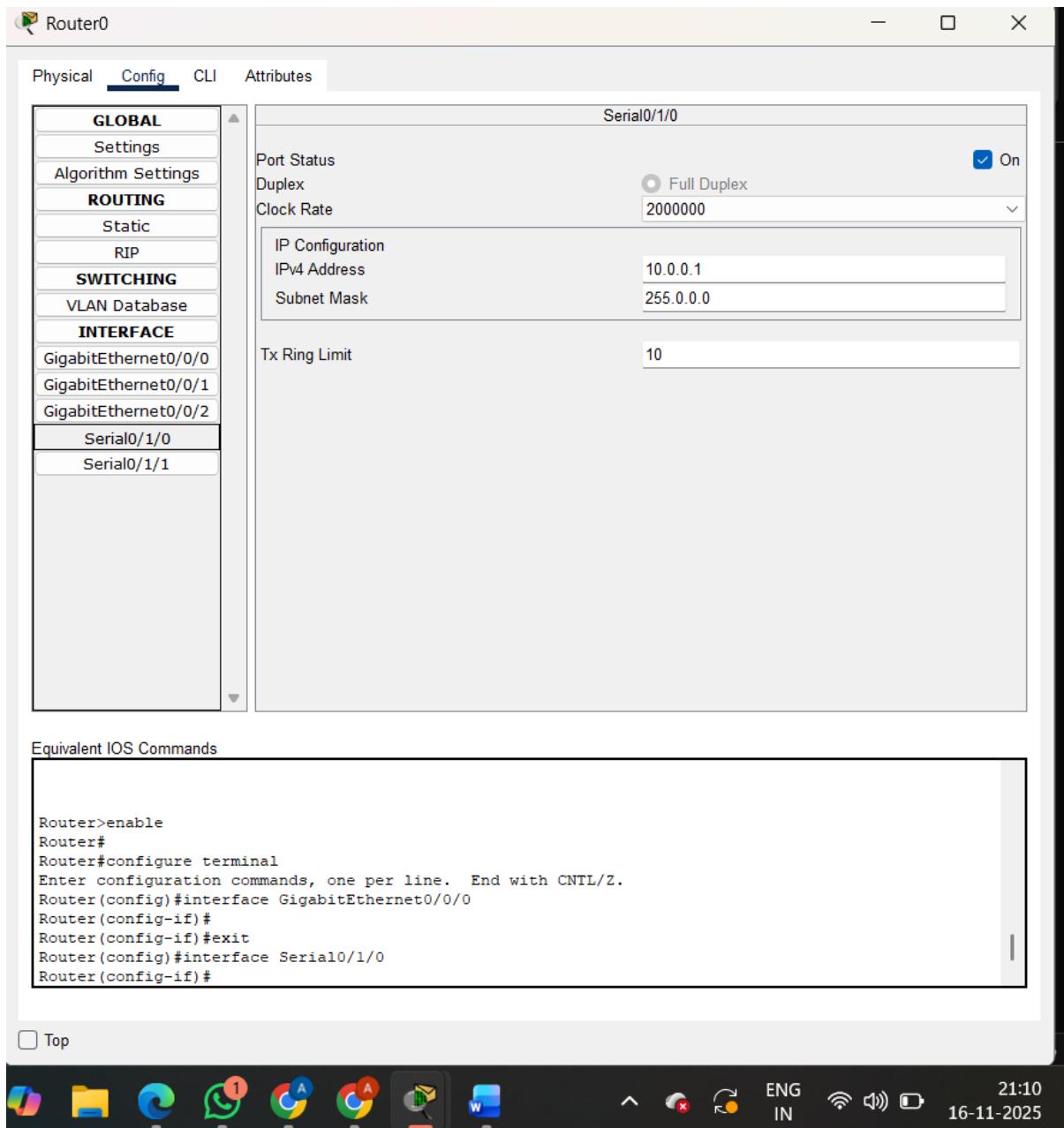
Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#

```

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Router0

Physical Config CLI Attributes

GLOBAL

Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1

Serial0/1/1

Port Status
Duplex
Clock Rate

Full Duplex
On

2000000

IP Configuration
IPv4 Address
Subnet Mask

30.0.0.1
255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#

```

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Router0

Physical Config CLI Attributes

ROUTING

RIP Routing

Network Address

20.0.0.0
30.0.0.0
192.24.20.0

Add Remove

Equivalent IOS Commands

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#

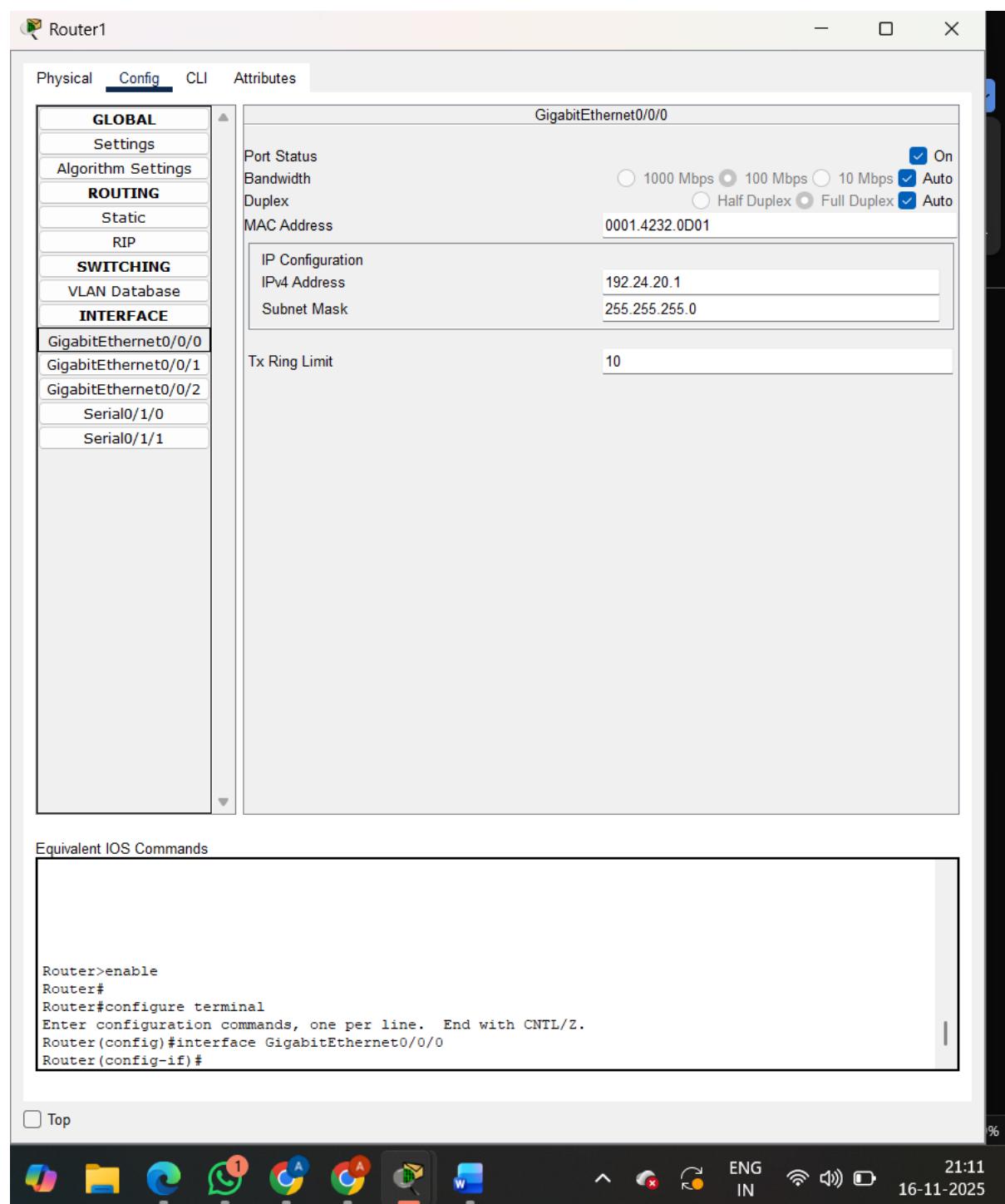
```

Top

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This screenshot shows a network configuration interface for a device named 'Router0'. The main window has tabs for Physical, Config, CLI, and Attributes, with 'Config' selected. On the left, a navigation tree includes GLOBAL, Settings, Algorithm Settings, ROUTING (selected), Static, RIP, SWITCHING, VLAN Database, and INTERFACE (with options for GigabitEthernet0/0/0, 0/0/1, 0/0/2, and Serial0/1/0, 0/1/1). The central panel is titled 'RIP Routing' and shows a table for 'Network' with entries for 20.0.0.0, 30.0.0.0, and 192.24.20.0. Buttons for 'Add' and 'Remove' are present. Below this is a section for 'Equivalent IOS Commands' containing configuration commands for setting up RIP. At the bottom, there's a taskbar with various icons and system status information like battery level, signal strength, and date/time.

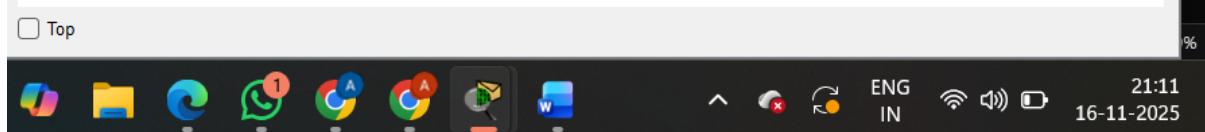
ROUTER 1



The screenshot shows the configuration interface for Router1. The top navigation bar includes tabs for Physical, Config, CLI, and Attributes, with Config being the active tab. The left sidebar is organized into sections: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (GigabitEthernet0/0/0, GigabitEthernet0/0/1, GigabitEthernet0/0/2, Serial0/1/0, Serial0/1/1). The main pane displays the configuration for Serial0/1/0, including Port Status (On, Full Duplex), Clock Rate (2000000), IP Configuration (IPv4 Address 10.0.0.2, Subnet Mask 255.0.0.0), and Tx Ring Limit (10).

Serial0/1/0	
Port Status	<input checked="" type="checkbox"/> On
Duplex	Full Duplex
Clock Rate	2000000
IP Configuration	
IPv4 Address	10.0.0.2
Subnet Mask	255.0.0.0
Tx Ring Limit	10

Equivalent IOS Commands



Router1

Physical Config CLI Attributes

GLOBAL

Settings
Algorithm Settings

ROUTING

Static
RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1

Serial0/1/1

Port Status
Duplex
Clock Rate

IP Configuration
IPv4 Address: 20.0.0.2
Subnet Mask: 255.0.0.0

Tx Ring Limit: 10

On

Equivalent IOS Commands

```
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#interface GigabitEthernet0/0/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface GigabitEthernet0/0/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface Serial0/1/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface Serial0/1/1  
Router(config-if)#[
```

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Router1

Physical Config CLI Attributes

ROUTING

RIP Routing

Network

Add

Network Address

10.0.0.0

20.0.0.0

192.24.10.0

Remove

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#

```

Top %

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This screenshot shows a network configuration interface for a device named 'Router1'. The 'Config' tab is selected. On the left, a navigation tree includes 'GLOBAL', 'ROUTING' (selected), 'Static', 'RIP', 'SWITCHING', 'VLAN Database', and 'INTERFACE' (with options for GigabitEthernet and Serial interfaces). In the main pane, under 'ROUTING', the 'RIP Routing' section is displayed. It shows a table with a single row for 'Network Address' containing '10.0.0.0', with an 'Add' button above it. Below this is a large empty area. At the bottom right of the main pane is a 'Remove' button. A scroll bar is visible on the left side of the main pane. Below the main pane is a section titled 'Equivalent IOS Commands' containing a block of configuration text. At the very bottom is a dark taskbar with various icons and system status indicators.

ROUTER 2:

Router2

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- GigabitEthernet0/0/0
- GigabitEthernet0/0/1
- GigabitEthernet0/0/2
- Serial0/1/0
- Serial0/1/1

GigabitEthernet0/0/0

Port Status: On (checked)

Bandwidth: 1000 Mbps (radio button)

Duplex: Half Duplex (radio button)

MAC Address: 0001.C91B.4601

IP Configuration

IPv4 Address: 192.24.30.1

Subnet Mask: 255.255.255.0

Tx Ring Limit: 10

Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#

```

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Router2

Physical Config CLI Attributes

GLOBAL

Settings
Algorithm Settings

ROUTING

Static
RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2

Serial0/1/0

Serial0/1/1

Serial0/1/0

Port Status

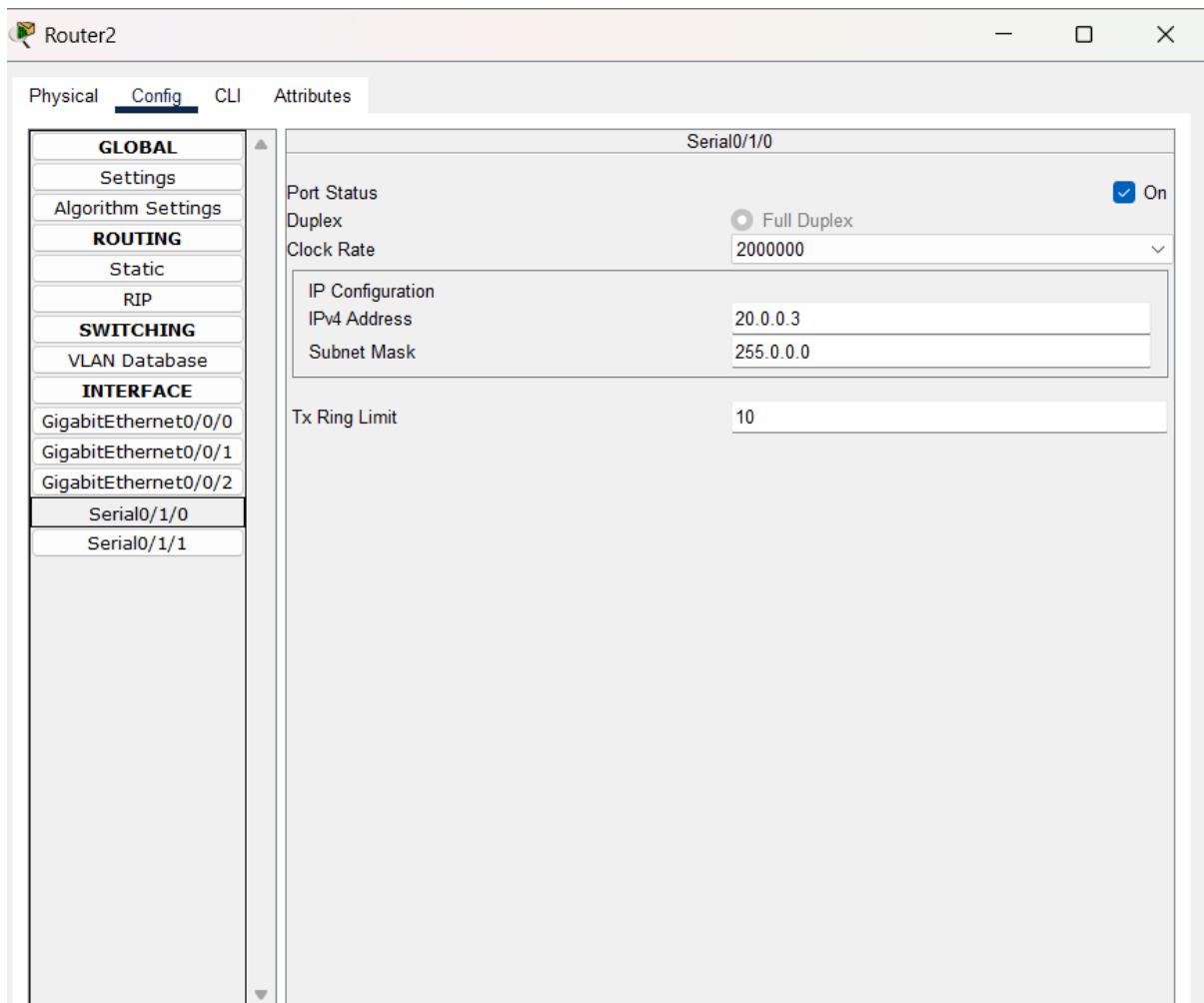
Duplex Full Duplex On

Clock Rate 2000000

IP Configuration

IPv4 Address 20.0.0.3
Subnet Mask 255.0.0.0

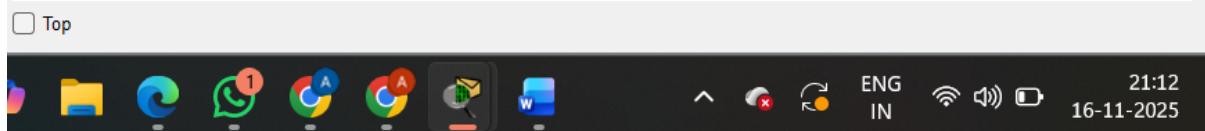
Tx Ring Limit 10



Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#

```



Router2

Physical Config CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0

GigabitEthernet0/0/1

GigabitEthernet0/0/2

Serial0/1/0

Serial0/1/1

Serial0/1/1

Port Status

Duplex Full Duplex On

Clock Rate 2000000

IP Configuration

IPv4 Address 30.0.0.3

Subnet Mask 255.0.0.0

Tx Ring Limit 10

This screenshot shows a network configuration interface for a device named 'Router2'. The left sidebar contains navigation links for 'GLOBAL', 'ROUTING', 'SWITCHING', and 'INTERFACE' sections, with 'INTERFACE' currently selected. Under 'INTERFACE', options like 'GigabitEthernet0/0/0', 'GigabitEthernet0/0/1', 'GigabitEthernet0/0/2', 'Serial0/1/0', and 'Serial0/1/1' are listed. The main panel displays configuration for 'Serial0/1/1', including 'Port Status' (Duplex set to 'Full Duplex' with 'On' checked), 'Clock Rate' (set to 2000000), 'IP Configuration' (IPv4 Address set to 30.0.0.3 and Subnet Mask to 255.0.0.0), and 'Tx Ring Limit' (set to 10). Below the interface panel is a section titled 'Equivalent IOS Commands' containing configuration commands:

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#

```

Equivalent IOS Commands

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#

```

Top



Router2

Physical Config CLI Attributes

ROUTING

Global Settings Algorithm Settings Static RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0 GigabitEthernet0/0/1 GigabitEthernet0/0/2 Serial0/1/0 Serial0/1/1

RIP Routing

Network Add

Network Address

10.0.0.0
20.0.0.0
192.24.30.0

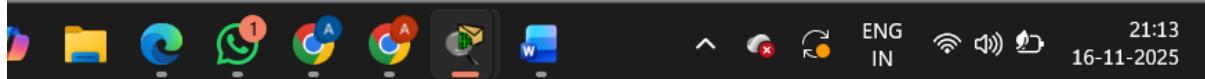
Remove

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#

```

Top



3) Configure open short path first routing table (OSPF in routers)

Router 0:

Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 20.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#network 192.24.20.0
Router(config-router)#exit
Router(config)#do show ip int brief
Interface          IP-Address      OK? Method Status       Protocol
GigabitEthernet0/0/0 192.24.10.1    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         10.0.0.1       YES manual up        up
Serial0/1/1         30.0.0.1       YES manual up        up
Vlan1              unassigned      YES unset administratively down down
Router(config)#do show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 21 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
```

Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Default version control: send version 1, receive any version
  Interface      Send  Recv  Triggered RIP  Key-chain
    Serial0/1/1        12  1

Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
  20.0.0.0
  30.0.0.0
  192.24.20.0
Passive Interface(s):
Routing Information Sources:
  Gateway      Distance      Last Update
Distance: (default is 120)

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set

Router(config)#do show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 2 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 1, receive any version
    Interface      Send  Recv  Triggered RIP  Key-chain
      Serial0/1/1        12  1

Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
  20.0.0.0
  30.0.0.0
  192.24.20.0
Passive Interface(s):
Routing Information Sources:
  Gateway      Distance      Last Update
Distance: (default is 120)

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
```

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Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router# Router# Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Router# Maximum path: 4
Router# Routing for Networks:
Router#     192.24.10.0 0.0.0.255 area 0
Router#     10.0.0.0 0.0.0.3 area 0
Router#     30.0.0.0 0.0.0.3 area 0
Router# Routing Information Sources:
Router#       Gateway         Distance      Last Update
Router#       1.1.1.1          110          00:13:28
Router#       2.2.2.2          110          00:13:28
Router#       3.3.3.3          110          00:13:28
Router# Distance: (default is 110)

Router(config)# Router(config)#
Router(config)#router ospf ?
<1-65535> Process ID
Router(config)#router ospf 1
Router(config-router)#network 192.24.10.0 0.0.255 area 0
^
% Invalid input detected at '^' marker.

Router(config-router)#network 192.24.10.0 0.0.255 area 0
^
% Invalid input detected at '^' marker.

Router(config-router)#network 192.24.10.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#do sh ip ospf neighbor

Neighbor ID      Pri      State            Dead Time      Address           Interface
2.2.2.2          0        FULL/ -          00:00:38      10.0.0.2        Serial0/1/0
3.3.3.3          0        FULL/ -          00:00:38      30.0.0.3        Serial0/1/1
Router(config-router)#do sh ip route
Codes: L - local, C - connected, S - static, 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
```

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Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router(config)#router ospf 1
Router(config-router)#network 192.24.10.0 0.0.255 area 0
^
% Invalid input detected at '^' marker.

Router(config-router)#network 192.24.10.0 0.0.255 area 0
^
% Invalid input detected at '^' marker.

Router(config-router)#network 192.24.10.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#do sh ip ospf neighbor

Neighbor ID      Pri      State        Dead Time     Address          Interface
2.2.2.2           0      FULL/ -       00:00:38    10.0.0.2      Serial0/1/0
3.3.3.3           0      FULL/ -       00:00:38    30.0.0.3      Serial0/1/1
Router(config-router)#do sh ip route
Codes: L - local, C - connected, S - static, 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

      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        10.0.0.0/8 is directly connected, Serial0/1/0
L        10.0.0.1/32 is directly connected, Serial0/1/0
O        20.0.0.0/8 [110/128] via 10.0.0.2, 00:19:43, Serial0/1/0
                  [110/128] via 30.0.0.3, 00:19:43, Serial0/1/1
            30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        30.0.0.0/8 is directly connected, Serial0/1/1
L        30.0.0.1/32 is directly connected, Serial0/1/1
      192.24.10.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.24.10.0/24 is directly connected, GigabitEthernet0/0/0
L        192.24.10.1/32 is directly connected, GigabitEthernet0/0/0
O        192.24.30.0/24 [110/65] via 30.0.0.3, 00:19:43, Serial0/1/1
--More-- |
```

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ROUTER 1:

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#do show ip int brief
show ipint brief
^
% Invalid input detected at '^' marker.

Router(config)#do show ip int brief
Interface          IP-Address      OK? Method Status        Protocol
GigabitEthernet0/0/0 192.24.20.1    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         10.0.0.2       YES manual up           up
Serial0/1/1         20.0.0.2       YES manual up           up
Vlan1              unassigned      YES unset administratively down down
Router(config)#do show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 1 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 1, receive any version
    Interface          Send   Recv Triggered RIP Key-chain
    Serial0/1/0        12     1
    Serial0/1/1        12     1
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for Networks:
    10.0.0.0
    20.0.0.0
    192.24.10.0
  Passive Interface(s):
  Routing Information Sources:
    Gateway          Distance      Last Update
    20.0.0.3          120          00:00:19
  Distance: (default is 120)

--More--
```

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Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Distance: (default is 120)

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.0.0.0 0.0.0.3 area 0
    20.0.0.0 0.0.0.3 area 0
  Routing Information Sources:
    Gateway          Distance      Last Update
    1.1.1.1           110          00:23:04
    2.2.2.2           110          00:23:04
    3.3.3.3           110          00:23:04
  Distance: (default is 110)

Router(config)#
Router(config)#
Router(config)#
Router(config)#router ospf 1
Router(config-router)#network 192.24.20.0 0.0.0.255 area 0
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 20.0.0.0 0.255.255.255 area 0
Router(config-router)#do sh ip route
Codes: L - local, C - connected, S - static, 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

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.0.0.0/8 is directly connected, Serial0/1/0
L    10.0.0.2/32 is directly connected, Serial0/1/0
  20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.0.0.0/8 is directly connected, Serial0/1/1
L    20.0.0.2/32 is directly connected, Serial0/1/1
O    30.0.0.0/8 [110/128] via 20.0.0.3, 00:25:19, Serial0/1/1
      [110/128] via 10.0.0.1, 00:25:19, Serial0/1/0
O    192.24.10.0/24 [110/65] via 10.0.0.1, 00:25:29, Serial0/1/0
  192.24.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.24.20.0/24 is directly connected, GigabitEthernet0/0/0
L    192.24.20.1/32 is directly connected, GigabitEthernet0/0/0
O    192.24.30.0/24 [110/65] via 20.0.0.3, 00:25:19, Serial0/1/1

Router(config-router)#

```

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20:52
IN ENG 16-11-2025

ROUTER 2:

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/1/0 from LOADING to FULL, Loading Done

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.24.30.0
Router(config-router)#

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```

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#do show ip int brief
Interface          IP-Address      OK? Method Status           Protocol
GigabitEthernet0/0/0 192.24.30.1   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         20.0.0.3       YES manual up            up
Serial0/1/1         30.0.0.3       YES manual up            up
Vlan1              unassigned     YES unset administratively down down
Router(config)#router ospf 1
Router(config-router)#network 192.24.30.0 0.0.0.255 area 0
Router(config-router)#network 20.0.0.0 0.255.255.255 area 0
Router(config-router)#network
% Incomplete command.
Router(config-router)#network 30.0.0.0 0.255.255.255 area 0
Router(config-router)#do sh ip ospf neighbor

Neighbor ID      Pri  State        Dead Time    Address          Interface
2.2.2.2          0    FULL/ -      00:00:32    20.0.0.2        Serial0/1/0
1.1.1.1          0    FULL/ -      00:00:39    30.0.0.1        Serial0/1/1
Router(config-router)#do sh ip route
Codes: L - local, C - connected, S - static, 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 30.0.0.1, 00:30:51, Serial0/1/1
   [110/128] via 20.0.0.2, 00:30:51, Serial0/1/0
   20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C  20.0.0.0/8 is directly connected, Serial0/1/0
L  20.0.0.3/32 is directly connected, Serial0/1/0
   30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C  30.0.0.0/8 is directly connected, Serial0/1/1
L  30.0.0.3/32 is directly connected, Serial0/1/1
O  192.24.10.0/24 [110/65] via 30.0.0.1, 00:31:01, Serial0/1/1
O  192.24.20.0/24 [110/65] via 20.0.0.2, 00:06:29, Serial0/1/0
   192.24.30.0/24 is variably subnetted, 2 subnets, 2 masks
C  192.24.30.0/24 is directly connected, GigabitEthernet0/0/0
L  192.24.30.1/32 is directly connected, GigabitEthernet0/0/0

Router(config-router)#
Router(config-router)#

```

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OUTPUT:

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.24.30.11

Pinging 192.24.30.11 with 32 bytes of data:

Request timed out.
Reply from 192.24.30.11: bytes=32 time=9ms TTL=126
Reply from 192.24.30.11: bytes=32 time=10ms TTL=126
Reply from 192.24.30.11: bytes=32 time=10ms TTL=126

Ping statistics for 192.24.30.11:
 Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
 Minimum = 9ms, Maximum = 10ms, Average = 9ms

C:\>

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21:00 16-11-2025

C:\>ping 192.24.10.11

Pinging 192.24.10.11 with 32 bytes of data:

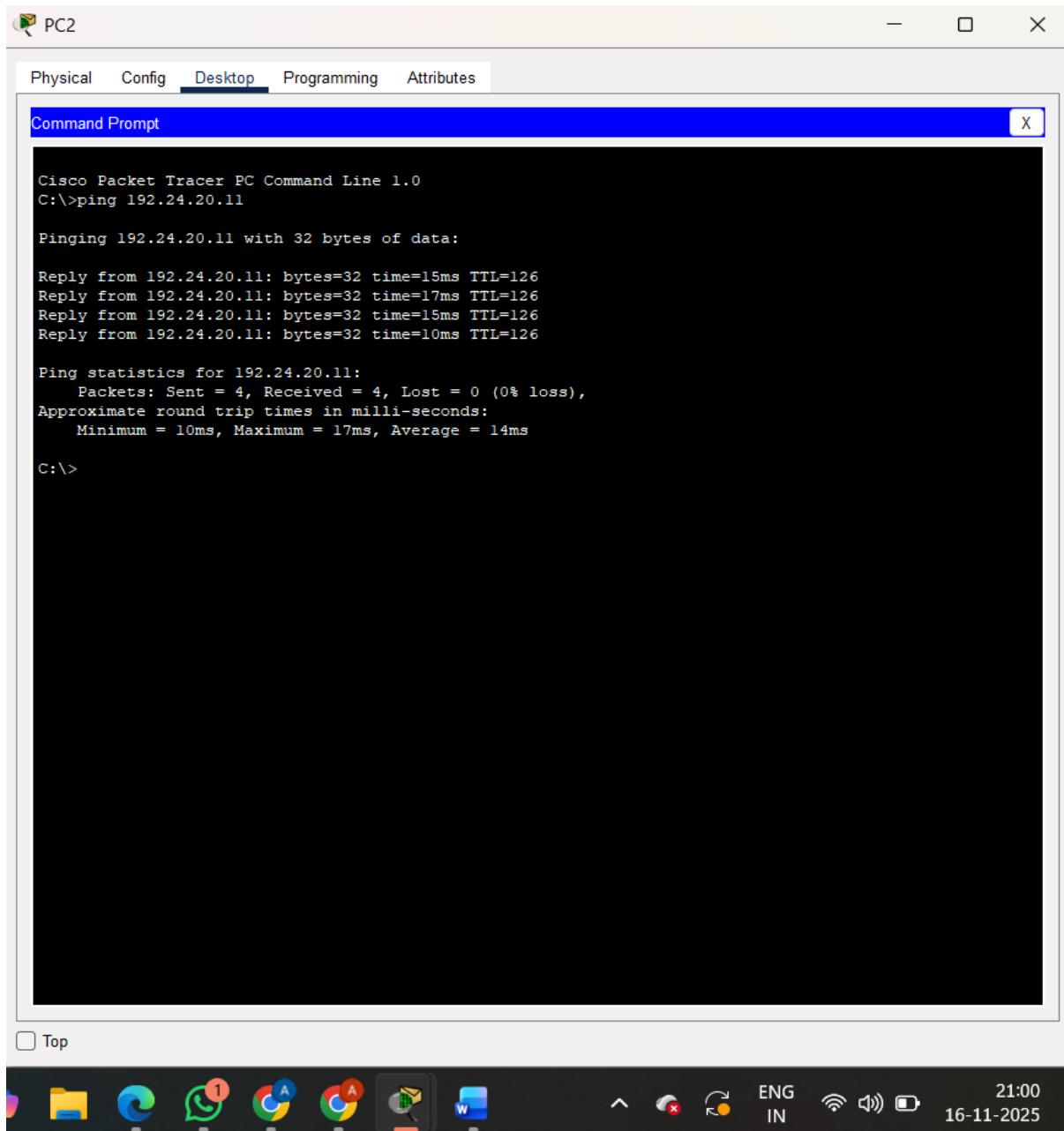
Reply from 192.24.10.11: bytes=32 time=12ms TTL=126
Reply from 192.24.10.11: bytes=32 time=15ms TTL=126
Reply from 192.24.10.11: bytes=32 time=13ms TTL=126
Reply from 192.24.10.11: bytes=32 time=11ms TTL=126

Ping statistics for 192.24.10.11:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
 Minimum = 11ms, Maximum = 15ms, Average = 12ms

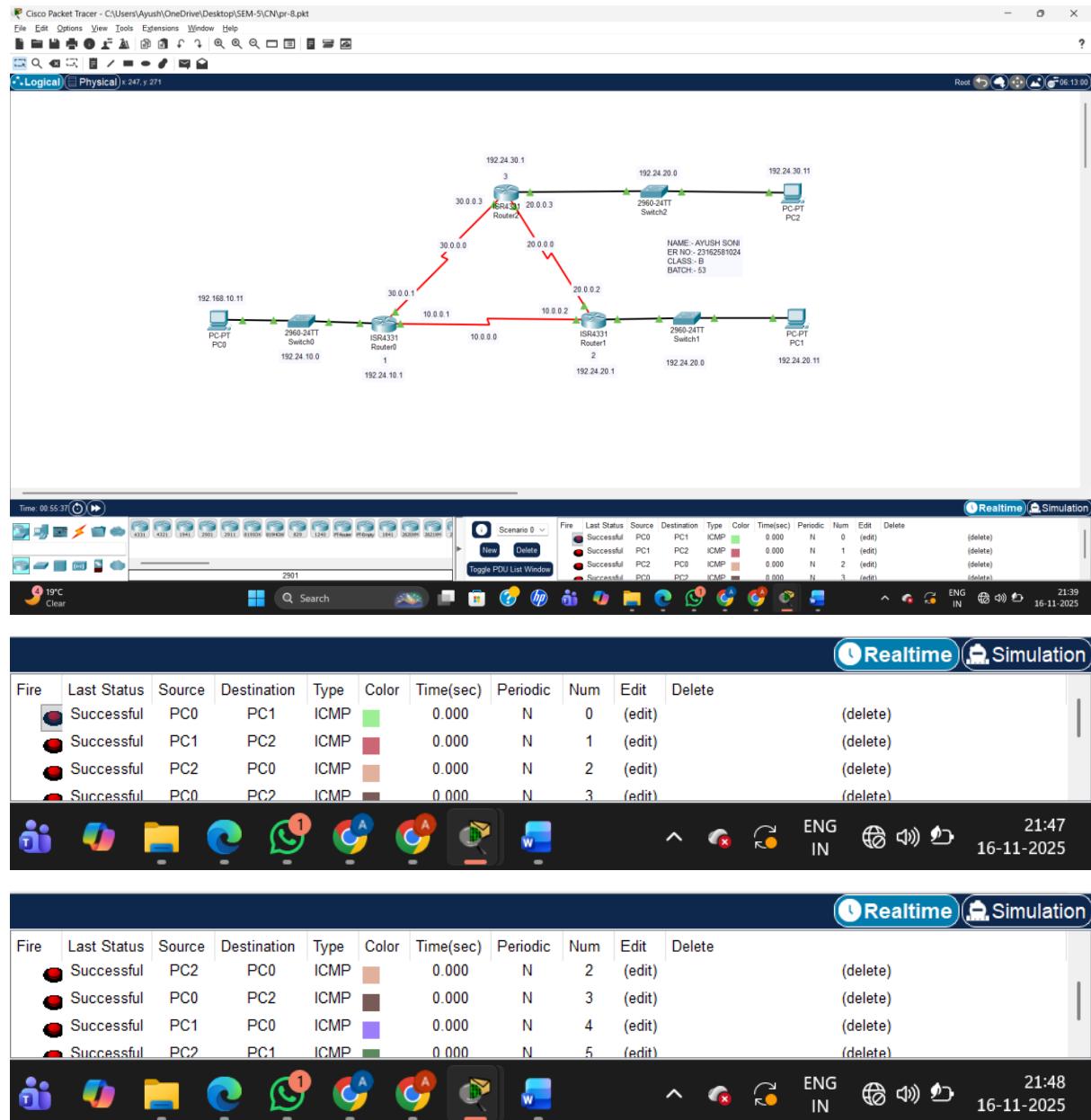
C:\>

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21:02 16-11-2025



FINAL OUTPUT OF PACKET TRANSFER



Conclusion:

The network was effectively designed and configured using the OSPF routing protocol. All routers successfully formed neighbor relationships and exchanged routing information accurately. Each department's network achieved complete connectivity with optimal path selection. OSPF provided rapid convergence, automatic route updates, and stable communication across all network segments, demonstrating a well-implemented OSPF setup for a multi-department organization.

Note: Make sure the last two digits of your enrollment numbers appear in the network IP address that must be visible in the snapshot of the cisco packet tracer. i.e. 192.XX.10.1 (XX indicates last two digits of your enrollment no.)