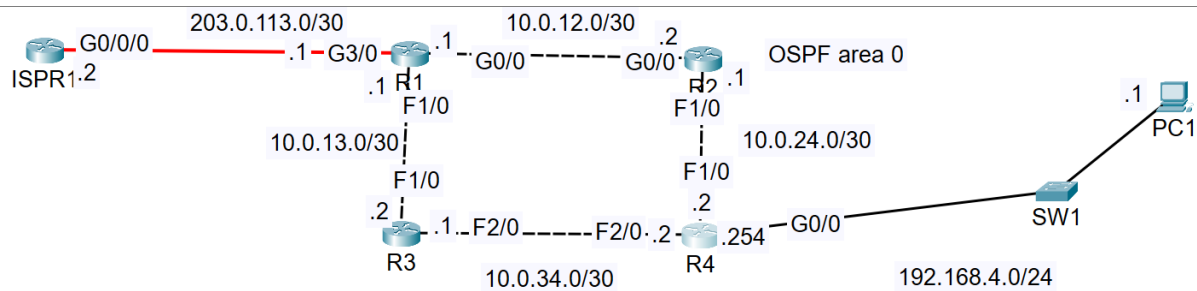


Network Topology:



1. First, I gave the correct IP addresses to the router's interfaces and enabled them.

R1 CLI:

```
R1
Physical | Config | CLI | Attributes |
IOS Command Line Interface

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)#int f1/0
R1(config-if)#ip address 10.0.13.1 255.255.255.252
R1(config-if)#no shutdown
R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

R1(config-if)#do sh ip int br
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  10.0.12.1      YES manual up          up
FastEthernet1/0    10.0.13.1      YES manual up          down
FastEthernet2/0    unassigned     YES unset administratively down down
GigabitEthernet3/0  unassigned     YES unset administratively down down
R1(config-if)#int g3/0
R1(config-if)#ip address 203.0.113.1 255.255.255.252
R1(config-if)#no shutdown
R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet3/0, changed state to up

R1(config-if)#do sh ip int br
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  10.0.12.1      YES manual up          up
FastEthernet1/0    10.0.13.1      YES manual up          down
FastEthernet2/0    unassigned     YES unset administratively down down
GigabitEthernet3/0  203.0.113.1    YES manual up          up
R1(config-if)#
```

2. Configured a loopback interface on each router

R2 CLI:

R2

Physical | Config | CLI | Attributes |

IOS Command Line Interface

```

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

R2(config-if)#int g0/0
R2(config-if)#ip address 10.0.12.2 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

R2(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status              Protocol
GigabitEthernet0/0       10.0.12.2       YES manual up                  down
FastEthernet1/0          10.0.24.1       YES manual up                  up
FastEthernet2/0          unassigned      YES unset  administratively down down
R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R2(config-if)#exit
R2(config)#int 10

R2(config-if)#
%LINK-3-UPDOWN: Interface Loopback0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R2(config-if)#ip address 2.2.2.2 255.255.255.255
R2(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status              Protocol
GigabitEthernet0/0       10.0.12.2       YES manual up                  up
FastEthernet1/0          10.0.24.1       YES manual up                  up
FastEthernet2/0          unassigned      YES unset  administratively down down
Loopback0                 2.2.2.2         YES manual up                  up
R2(config-if)#
    
```

☐ Top

- Advertising the neighbouring routers to enable OSPF, also advertising the loopback interface

R4

Physical | Config | CLI | Attributes |

IOS Command Line Interface

```


Loopback0                 4.4.4.4         YES manual up                  up
R4(config-if)#exit
R4(config)#router ospf?
ospf
R4(config)#router ospf ?
<1-65535> Process ID
R4(config)#router ospf 1
R4(config-router)#network 10.0.24.0 0.0.0.3 area 0
R4(config-router)#network 10.0.34.0 0.0.0.3 area 0
R4(config-router)#network 4.4.4.4 0.0.0.0 area 0
R4(config-router)#do sh ip protocols

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 4.4.4.4
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.0.24.0 0.0.0.3 area 0
    10.0.34.0 0.0.0.3 area 0
    4.4.4.4 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    4.4.4.4          110          00:00:17
  Distance: (default is 110)

R4(config-router)#passive-interface 10
R4(config-router)#do sh ip protocols

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 4.4.4.4
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
    
```

4. Configuring passive interfaces

 R4

Physical | Config | CLI | Attributes

IOS Command Line Interface

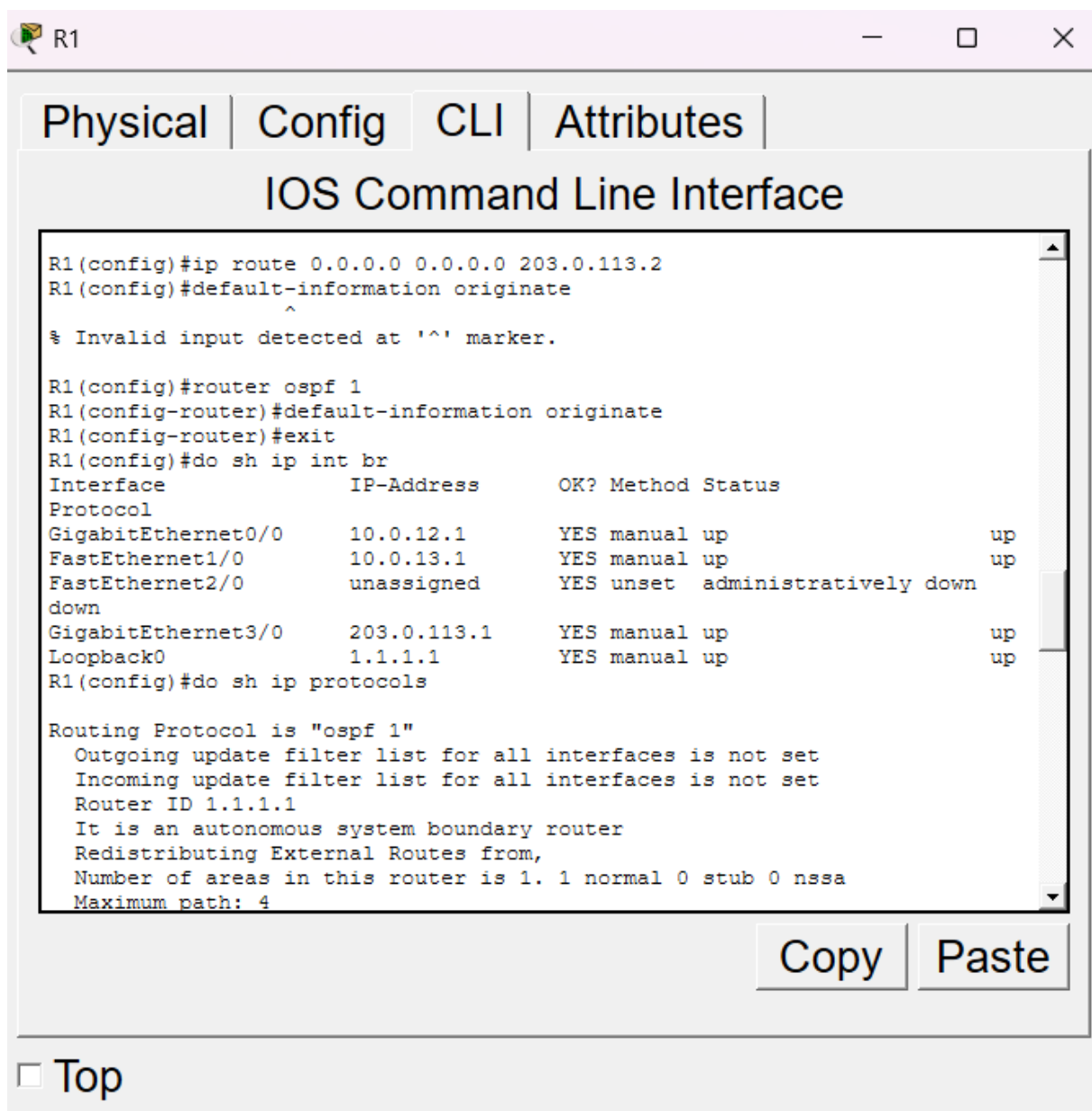
```
R4(config-router)#passive-interface 10
R4(config-router)#do sh ip protocols

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 4.4.4.4
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.0.24.0 0.0.0.3 area 0
    10.0.34.0 0.0.0.3 area 0
    4.4.4.4 0.0.0.0 area 0
  Passive Interface(s):
    Loopback0
  Routing Information Sources:
    Gateway         Distance      Last Update
    4.4.4.4          110          00:00:54
  Distance: (default is 110)

R4(config-router)#passive-int g0/0
R4(config-router)#do sh ip protocols

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 4.4.4.4
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.0.24.0 0.0.0.3 area 0
    10.0.34.0 0.0.0.3 area 0
    4.4.4.4 0.0.0.0 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    Loopback0
```

5. Advertised the default root to the network by R1



6. This default route is also saved on neighbouring routers.

Eg, R2 CLI shows:

```
Gateway of last resort is 10.0.12.1 to network 0.0.0.0
```

7. Ping from PC1 (ICMP actually sent to the default gateway of PC1, i.e., R4)

```
C:\>ping 0.0.0.0

Pinging 0.0.0.0 with 32 bytes of data:

Reply from 192.168.4.254: bytes=32 time=4ms TTL=255
Reply from 192.168.4.254: bytes=32 time=4ms TTL=255
Reply from 192.168.4.254: bytes=32 time=4ms TTL=255
Reply from 192.168.4.254: bytes=32 time=4ms TTL=255

Ping statistics for 0.0.0.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>
```