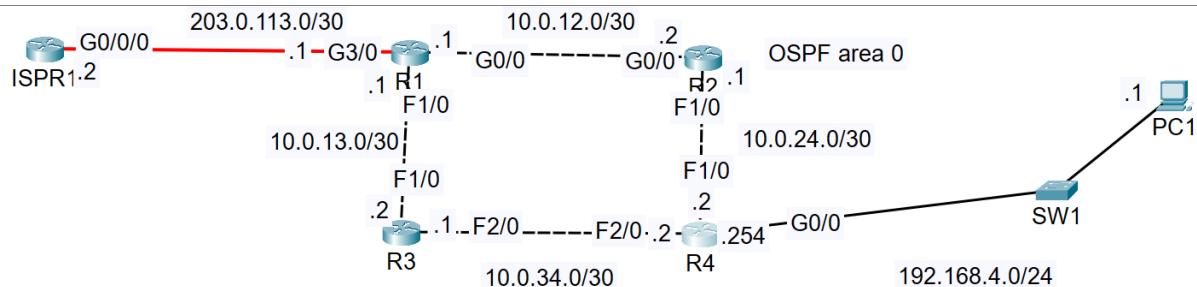


Network Topology:



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

R1 CLI:

```
R1#  
R1>enable  
R1#  
R1>terminal length 0  
R1>  
  
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)#
C
```

2. Configured a loopback interface on each router

R2 CLI:



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 lo

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)#

```

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



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

R1

Physical | Config | CLI | Attributes |

IOS Command Line Interface

```

R1(config)#ip route 0.0.0.0 0.0.0.0 203.0.113.2
R1(config)#default-information originate
      ^
% Invalid input detected at '^' marker.

R1(config)#router ospf 1
R1(config-router)#default-information originate
R1(config-router)#exit
R1(config)#do sh ip int br
Interface          IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0    10.0.12.1       YES manual up
FastEthernet1/0       10.0.13.1       YES manual up
FastEthernet2/0        unassigned     YES unset administratively down
down
GigabitEthernet3/0    203.0.113.1     YES manual up
Loopback0             1.1.1.1        YES manual up
R1(config)#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 1.1.1.1
  It is an autonomous system boundary router
  Redistributing External Routes from,
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4

```

Copy **Paste**

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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

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:\>

```