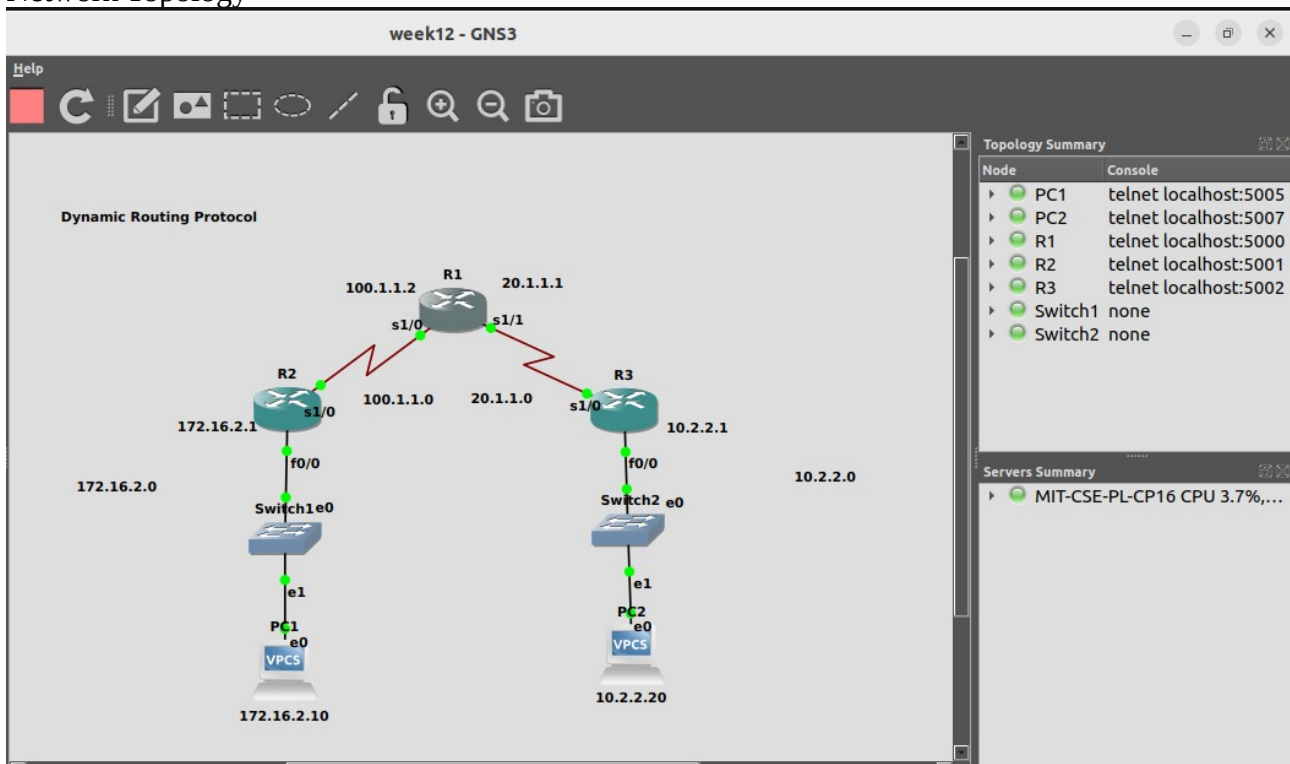


EG.1) Network Topology



PC1

```
PC1> ip 172.16.2.10 255.255.0.0 172.16.2.1
Checking for duplicate address...
PC1 : 172.16.2.10 255.255.0.0 gateway 172.16.2.1

PC1> ping 10.2.2.20

10.2.2.20 icmp_seq=1 timeout
84 bytes from 10.2.2.20 icmp_seq=2 ttl=61 time=58.451 ms
84 bytes from 10.2.2.20 icmp_seq=3 ttl=61 time=59.828 ms
84 bytes from 10.2.2.20 icmp_seq=4 ttl=61 time=60.410 ms
84 bytes from 10.2.2.20 icmp_seq=5 ttl=61 time=60.528 ms

PC1> 
```

sd

PC2

```

PC2 : 10.2.2.20 255.255.255.0

PC2> ping 172.16.2.10

host (255.255.255.0) not reachable

PC2> ip 10.2.2.20 255.255.255.0 10.2.2.0
Invalid gateway address

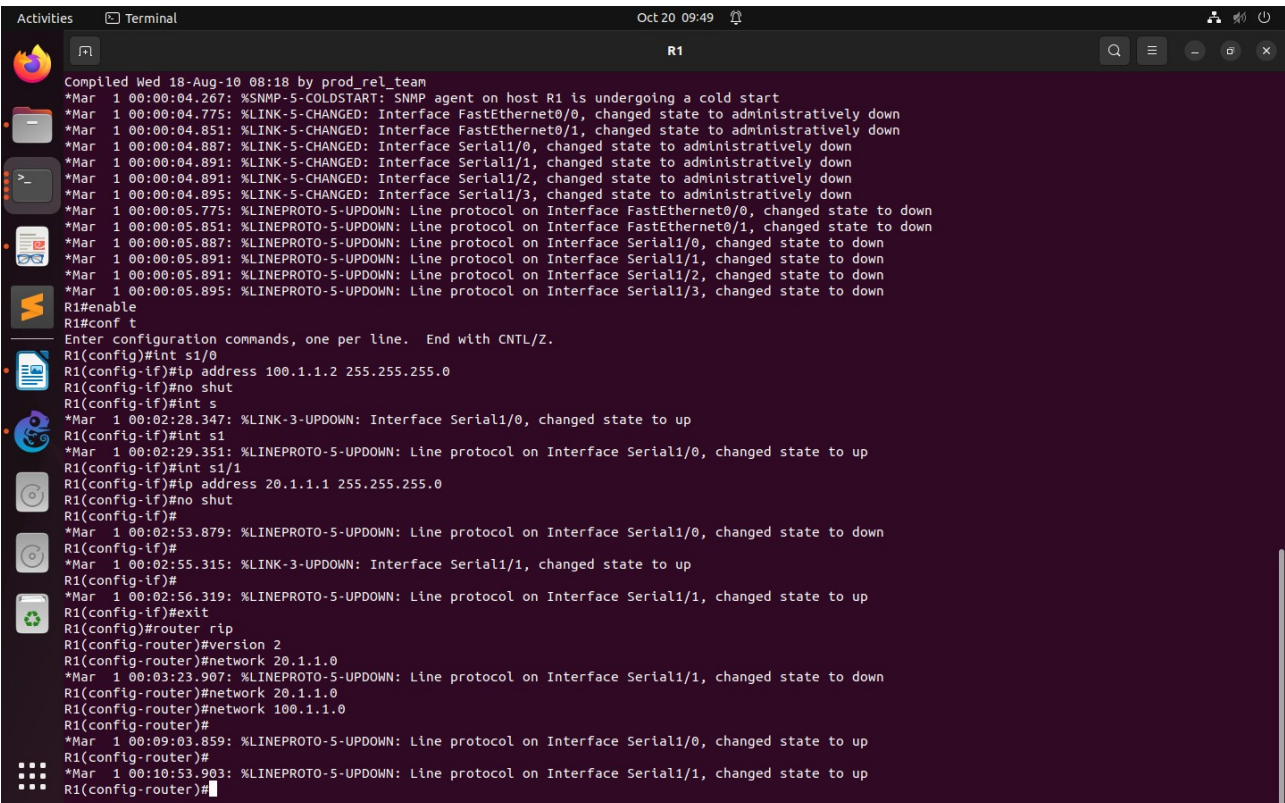
PC2> ip 10.2.2.20 255.255.255.0 10.2.2.1
Checking for duplicate address...
PC2 : 10.2.2.20 255.255.255.0 gateway 10.2.2.1

PC2> ping 172.16.2.10

```

sd

R1



```

Activities Terminal Oct 20 09:49 R1

Compiled Wed 18-Aug-10 08:18 by prod_rel_team
*Mar 1 00:00:04.267: %SNMP-5-COLDSTART: SNMP agent on host R1 is undergoing a cold start
*Mar 1 00:00:04.775: %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to administratively down
*Mar 1 00:00:04.851: %LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
*Mar 1 00:00:04.887: %LINK-5-CHANGED: Interface Serial1/0, changed state to administratively down
*Mar 1 00:00:04.891: %LINK-5-CHANGED: Interface Serial1/1, changed state to administratively down
*Mar 1 00:00:04.891: %LINK-5-CHANGED: Interface Serial1/2, changed state to administratively down
*Mar 1 00:00:04.895: %LINK-5-CHANGED: Interface Serial1/3, changed state to administratively down
*Mar 1 00:00:05.775: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down
*Mar 1 00:00:05.851: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
*Mar 1 00:00:05.887: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to down
*Mar 1 00:00:05.891: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to down
*Mar 1 00:00:05.891: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/2, changed state to down
*Mar 1 00:00:05.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/3, changed state to down

R1#enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int s1/0
R1(config-if)#ip address 100.1.1.2 255.255.255.0
R1(config-if)#no shut
R1(config-if)#int s1
*Mar 1 00:02:28.347: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R1(config-if)#int s1
*Mar 1 00:02:29.351: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R1(config-if)#int s1/1
R1(config-if)#ip address 20.1.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Mar 1 00:02:53.879: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to down
R1(config-if)#
*Mar 1 00:02:55.315: %LINK-3-UPDOWN: Interface Serial1/1, changed state to up
R1(config-if)#
*Mar 1 00:02:56.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to up
R1(config-if)#exit
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 20.1.1.0
*Mar 1 00:03:23.907: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to down
R1(config-router)#network 20.1.1.0
R1(config-router)#network 100.1.1.0
R1(config-router)#
*Mar 1 00:09:03.859: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R1(config-router)#
*Mar 1 00:10:53.903: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to up
R1(config-router)#

```

sd

R2

```

R2#enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int f1/0
      ^
% Invalid input detected at '^' marker.

R2(config)#int f0/0
R2(config-if)#ip address 172.16.2.1 255.255.0.0
R2(config-if)#no shut
R2(config-if)#int
*Mar  1 00:04:29.239: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:04:30.239: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#int s1/0
R2(config-if)#ip address 100.1.1.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
*Mar  1 00:06:11.583: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R2(config-if)#exit
*Mar  1 00:06:12.587: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R2(config-if)#exit
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 172.16.0.0
R2(config-router)#network 100.1.1.0
R2(config-router)#

```

sd

R3

```

R3#enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int s1/0
R3(config-if)#ip address 20.1.1.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
*Mar  1 00:05:24.655: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R3(config-if)#i
*Mar  1 00:05:25.659: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R3(config-if)#int f1/0
      ^
% Invalid input detected at '^' marker.

R3(config)#int f0/0
R3(config-if)#ip address 10.2.2.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
*Mar  1 00:06:16.463: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:06:17.463: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#exit
R3(config)#router rip
R3(config-router)#ver 2
R3(config-router)#network 10.2.2.0
R3(config-router)#network 20.1.1.0
R3(config-router)#

```

sd

NOTE-

show ip route command should display all RIP networks and end to end ping should be successful.

show ip protocol command should display if necessary, ports are active.

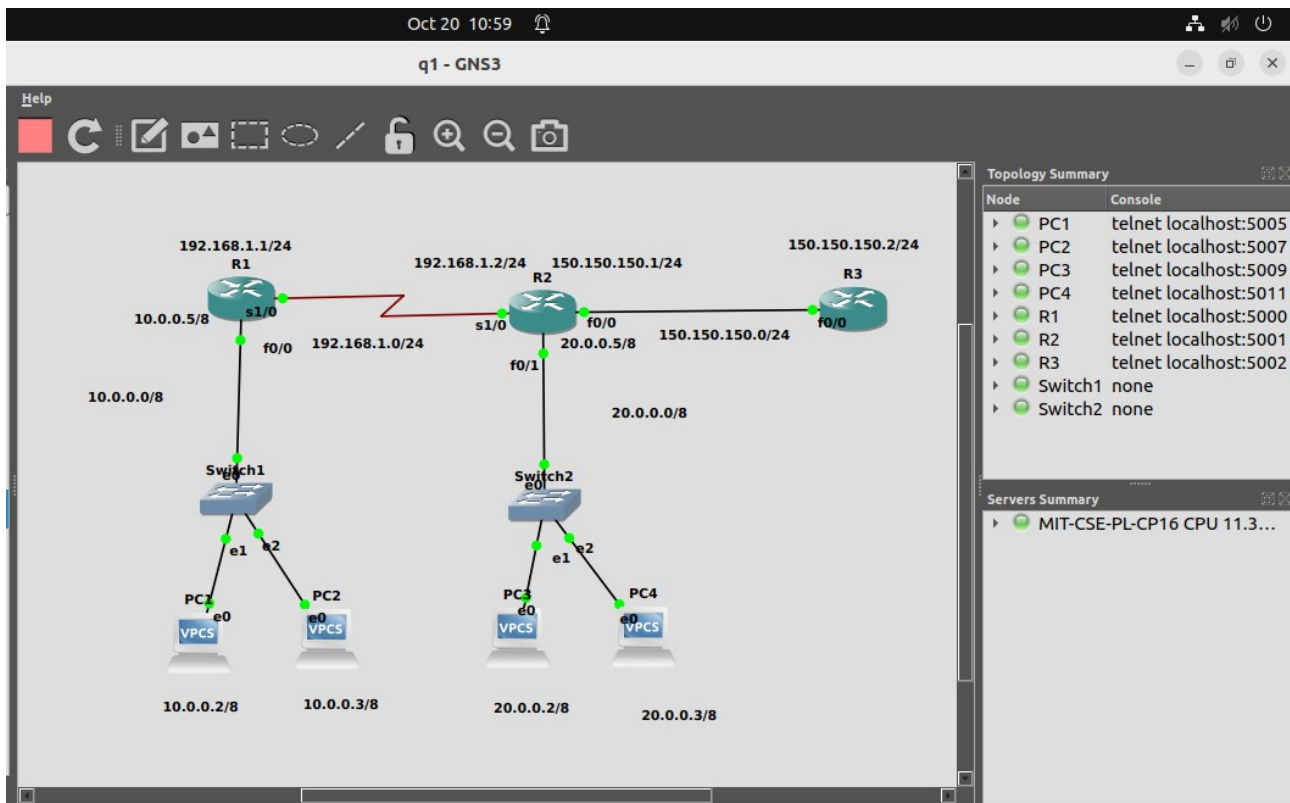
show ip rip database command should displays the contents of RIP database inside the router.

debug ip rip command shows RIP updates occurring in the system undebug all Once you turn on debug ip rip router will keep showing RIP updates. The command undebug all will stop such RIP updates.

show running-config command is used to get the current configuration from the Router.

Q1)

Network Topology



sd

R1

```
R1#enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int s1/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Mar 1 00:02:08.555: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
*Mar 1 00:02:09.567: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R1(config-if)#
*Mar 1 00:02:33.927: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to down
R1(config-if)#int f0/0
R1(config-if)#ip address 10.0.0.5 255.0.0.0
R1(config-if)#no shut
R1(config-if)#
*Mar 1 00:09:10.327: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:09:11.327: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#router ospf 200
R1(config-router)#network 10.0.0.0 255.255.255 area 0
^
% Invalid input detected at '^' marker.
R1(config-router)#network 10.0.0.0 0.255.255.255 area 0
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0.0.0.0
^
% Invalid input detected at '^' marker.
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0.0.0.0
R1(config-router)#exit
R1(config)#
*Mar 1 00:13:03.907: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R1(config)#
*Mar 1 00:15:26.291: %OSPF-5-ADJCHG: Process 200, Nbr 192.168.1.2 on Serial1/0 from LOADING to FULL, Loading Done
R1(config)#
R1#
*Mar 1 00:29:58.963: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

sd

NOTE - In OSPF we use wild mask.

R2


```

R2#enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s1/0
R2(config-if)#ip address 192.168.1.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#
*Mar 1 00:06:03.035: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R2(config-if)#
*Mar 1 00:06:04.039: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R2(config-if)#int f0/0
R2(config-if)#ip address 150.150.150.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#int
*Mar 1 00:06:38.227: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:06:39.227: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#int f0/1
R2(config-if)#ip address 20.0.0.5 255.0.0.0
R2(config-if)#no shut
R2(config-if)#
*Mar 1 00:07:26.907: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 00:07:27.907: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R2(config-if)#exit
R2(config)#router ospf 200
R2(config-router)#network 20.0.0.0 0.255.255.255 area 0
R2(config-router)#network 192.168.1.0 0.0.0.255 area 0
R2(config-router)#
*Mar 1 00:08:36.151: %OSPF-5-ADJCHG: Process 200, Nbr 192.168.1.1 on Serial1/0 from LOADING to FULL, Loading Done
R2(config-router)#network 150.150.150.0 0.0.0.255 area 1
R2(config-router)#exit
R2(config)#
*Mar 1 00:12:15.931: %OSPF-5-ADJCHG: Process 200, Nbr 150.150.150.2 on FastEthernet0/0 from LOADING to FULL, Loading Done
R2(config)#

```

sd

R3

```

R3#enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int f0/0
R3(config-if)#ip address 150.150.150.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
*Mar 1 00:08:28.619: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:08:29.619: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#exit
R3(config)#router ospf 200
R3(config-router)#network 150.150.150.0 0.0.0.255 area 1
R3(config-router)#exit
R3(config)#
*Mar 1 00:09:55.847: %OSPF-5-ADJCHG: Process 200, Nbr 192.168.1.2 on FastEthernet0/0 from LOADING to FULL, Loading Done
R3(config)#

```

sd

PC1

```

PC1> ip 10.0.0.2 255.0.0.0 10.0.0.5
Checking for duplicate address...
PC1 : 10.0.0.2 255.0.0.0 gateway 10.0.0.5

PC1> ping 20.0.0.3

20.0.0.3 icmp_seq=1 timeout
84 bytes from 20.0.0.3 icmp_seq=2 ttl=62 time=29.024 ms
84 bytes from 20.0.0.3 icmp_seq=3 ttl=62 time=29.940 ms
84 bytes from 20.0.0.3 icmp_seq=4 ttl=62 time=30.000 ms
84 bytes from 20.0.0.3 icmp_seq=5 ttl=62 time=29.252 ms

PC1>

```

sd

PC2

```
vPCS is free software, distributed under the terms of the BSD licence.  
Source code and license can be found at vpcs.sf.net.  
For more information, please visit wiki.freecode.com.cn.
```

```
Press '?' to get help.
```

```
Executing the startup file
```

```
PC2> ip 10.0.0.3 255.0.0.0 10.0.0.5  
Checking for duplicate address...  
PC2 : 10.0.0.3 255.0.0.0 gateway 10.0.0.5  
  
PC2>
```

sd

PC4

```
vPCS is free software, distributed under the terms of the BSD licence.  
Source code and license can be found at vpcs.sf.net.  
For more information, please visit wiki.freecode.com.cn.
```

```
Press '?' to get help.
```

```
Executing the startup file
```

```
PC4> ip 20.0.0.3 255.0.0.0 20.0.0.5  
Checking for duplicate address...  
PC4 : 20.0.0.3 255.0.0.0 gateway 20.0.0.5  
  
PC4> █
```

sd

```

R1#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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    20.0.0.0/8 [110/74] via 192.168.1.2, 00:24:44, Serial1/0
C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    192.168.1.0/24 is directly connected, Serial1/0
     150.150.0.0/24 is subnetted, 1 subnets
O IA  150.150.150.0 [110/74] via 192.168.1.2, 00:24:44, Serial1/0
R1#show ip ospf neighbor

Neighbor ID    Pri   State           Dead Time   Address        Interface
192.168.1.2    0     FULL/ -         00:00:34    192.168.1.2    Serial1/0
R1#show ip ospf database

                OSPF Router with ID (192.168.1.1) (Process ID 200)

                Router Link States (Area 0.0.0.0)

Link ID        ADV Router    Age      Seq#          Checksum Link count
192.168.1.1    192.168.1.1   1662     0x80000003    0x00560F    3
192.168.1.2    192.168.1.2   1643     0x80000003    0x0084D3    3

                Summary Net Link States (Area 0.0.0.0)

Link ID        ADV Router    Age      Seq#          Checksum
150.150.150.0  192.168.1.2   1639     0x80000001    0x00A161
R1#

```

sd

NOTE- OSPF Verification:

show ip route

show ip ospf neighbor

show ip ospf database