Topology Summary:

PC1 telenet localhost:5004

Ethernet0 -> FastEthernet0/0

PC2 telenet localhost:5006

Ethernet0 -> FastEthernet2/0 (This section was readjusted after issues with OSPF)

R1 telenet localhost:5000

FastEthernet0/0

FastEthernet2/0

R2 telenet localhost:5001

FastEthernet0/0

FastEthernet2/0

R3 telenet localhost:5002

FastEthernet0/0

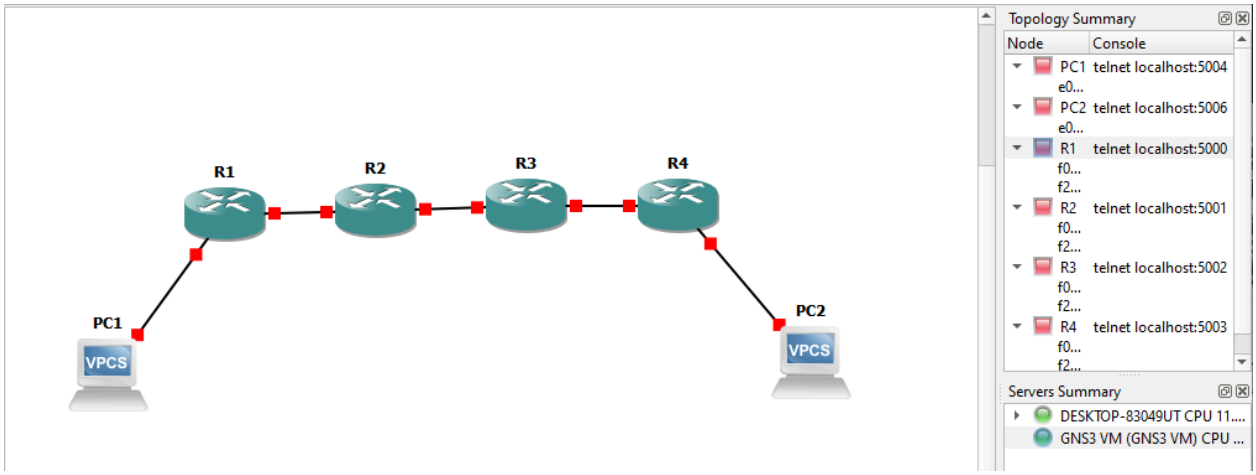
FastEthernet2/0

R4 telenet localhost:5003

FastEthernet0/0

FastEthernet2/0

GNS3 GUI Summary:



PC1 Setup

```
PC1> ip 10.10.10.10/24 10.10.10.1
Checking for duplicate address...
PC1 : 10.10.10.10 255.255.255.0 gateway 10.10.10.1

PC1> save
Saving startup configuration to startup.vpc
.  done

PC1>
```

PC2 Setup

```
PC2> ip 50.50.50.50/24 50.50.50.1
Checking for duplicate address...
PC1 : 50.50.50.50 255.255.255.0 gateway 50.50.50.1

PC2> save
Saving startup configuration to startup.vpc
.  done

PC2>
```

Router1 Setup and OSPF

```
R1#configure
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface f0/0
R1(config-if)#ip address 10.10.10.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#end
R1#
*Sep 18 20:35:19.759: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Sep 18 20:35:21.095: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 18 20:35:22.095: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1#interface f2/0
   ^
% Invalid input detected at '^' marker.

R1#configure
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface f2/0
R1(config-if)#ip address 20.20.20.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Sep 18 20:36:17.979: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R1(config)#
*Sep 18 20:36:18.979: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R1(config)#
```

```
R1(config)#router ospf 1
R1(config-router)#network 10.10.10.0 0.0.0.255 area 0
R1(config-router)#network 20.20.20.0 0.0.0.255 area 0
R1(config-router)#exit
R1(config)#
```

Router2 Setup and OSPF (OSPF Loads here but not in Router1, Router3, and Router4)
Note: I fixed this by changing the topology as you'll see this later in the doc.

```
R2#configure
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface f0/0
R2(config-if)#ip address 20.20.20.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
*Sep 18 20:39:57.359: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 18 20:39:58.359: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config)#interface f2/0
R2(config-if)#ip address 30.30.30.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#router
*Sep 18 20:40:19.751: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 18 20:40:20.751: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
```

```
R2(config)#router ospf 1
R2(config-router)#network 20.20.20.0 0.0.0.255 area 0
R2(config-router)#n
*Sep 18 20:40:47.687: %OSPF-5-ADJCHG: Process 1, Nbr 20.20.20.1 on FastEthernet0/0 from LOADING to FULL, Loading Done
R2(config-router)#network 30.30.30..0 0.0.0.255 area 0
                                   ^
% Invalid input detected at '^' marker.

R2(config-router)#network 30.30.30.0 0.0.0.255 area 0
R2(config-router)#exit
R2(config)#end
R2#
*Sep 18 20:41:19.483: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

Router3 Setup and OSPF

```
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#interface f0/0
R3(config-if)#ip address 30.30.30.2 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#
*Sep 18 20:43:23.043: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 18 20:43:24.043: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config)#interface f2/0
R3(config-if)#ip address 40.40.40.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#
*Sep 18 20:43:45.335: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 18 20:43:46.335: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
```

```
R3(config)#router ospf 1
R3(config-router)#network 30.30.30.0 0.0.0.255 area 0
R3(config-router)#network 40.40.40.0 0.0.0.255 area 0
R3(config-router)#exit
R3(config)#end
R3#
*Sep 18 20:46:11.539: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

Router4 Setup and OSPF

```
R4#configure
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#interface f0/0
R4(config-if)#ip address 40.40.40.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#
*Sep 18 20:49:59.779: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 18 20:50:00.779: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R4(config)#interface f2/0
R4(config-if)#ip address 50.50.50.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#
*Sep 18 20:51:37.687: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 18 20:51:38.687: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
```

```
R4(config)#router ospf 1
R4(config-router)#network 40.40.40.0 0.0.0.255 area 0
R4(config-router)#network 50.50.50.0 0.0.0.255 area 0
R4(config-router)#exit
R4(config)#end
R4#
*Sep 18 20:54:15.515: %SYS-5-CONFIG_I: Configured from console by console
R4#
```

Issues with OSPF were remedied by changing the network topology to flow from f0/0 -> f2/0 from PC1 to PC2. Because some routers were incorrectly linked I could configure the IPs but not the OSPF.

Router1 Ping and OSPF neighbor

```
R1#show 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
       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, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        10.10.10.0/24 is directly connected, FastEthernet0/0
L        10.10.10.1/32 is directly connected, FastEthernet0/0
      20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.20.20.0/24 is directly connected, FastEthernet2/0
L        20.20.20.1/32 is directly connected, FastEthernet2/0
      30.0.0.0/24 is subnetted, 1 subnets
O        30.30.30.0 [110/2] via 20.20.20.2, 00:22:04, FastEthernet2/0
      40.0.0.0/24 is subnetted, 1 subnets
O        40.40.40.0 [110/3] via 20.20.20.2, 00:02:13, FastEthernet2/0
      50.0.0.0/24 is subnetted, 1 subnets
O        50.50.50.0 [110/4] via 20.20.20.2, 00:02:03, FastEthernet2/0
R1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
30.30.30.1        1   FULL/BDR        00:00:30    20.20.20.2      FastEthernet2/0
R1#
```

PC1 and PC2 pinging each other through OSPF

```
PC1> ping 50.50.50.50
84 bytes from 50.50.50.50 icmp_seq=1 ttl=60 time=117.453 ms
84 bytes from 50.50.50.50 icmp_seq=2 ttl=60 time=82.247 ms
84 bytes from 50.50.50.50 icmp_seq=3 ttl=60 time=85.958 ms
84 bytes from 50.50.50.50 icmp_seq=4 ttl=60 time=81.300 ms
84 bytes from 50.50.50.50 icmp_seq=5 ttl=60 time=81.192 ms
```

```
PC2> ping 10.10.10.10
84 bytes from 10.10.10.10 icmp_seq=1 ttl=60 time=81.071 ms
84 bytes from 10.10.10.10 icmp_seq=2 ttl=60 time=84.286 ms
84 bytes from 10.10.10.10 icmp_seq=3 ttl=60 time=81.413 ms
84 bytes from 10.10.10.10 icmp_seq=4 ttl=60 time=83.153 ms
84 bytes from 10.10.10.10 icmp_seq=5 ttl=60 time=86.271 ms
```

I learned how to set up OSPF routing protocols using the given topology. I realized some of the mistakes I made in CLab2 had to do with my topology, and if I had created a write-out of how the topology looked I would have figured out how to route the RIP protocol. This lab went a lot more smoothly overall and I feel more accomplished.
RIP is based on a distance vector where routes are limited to 15 hops whereas OPSF uses the shortest path first making it more ideal for larger networks with more complex topologies.