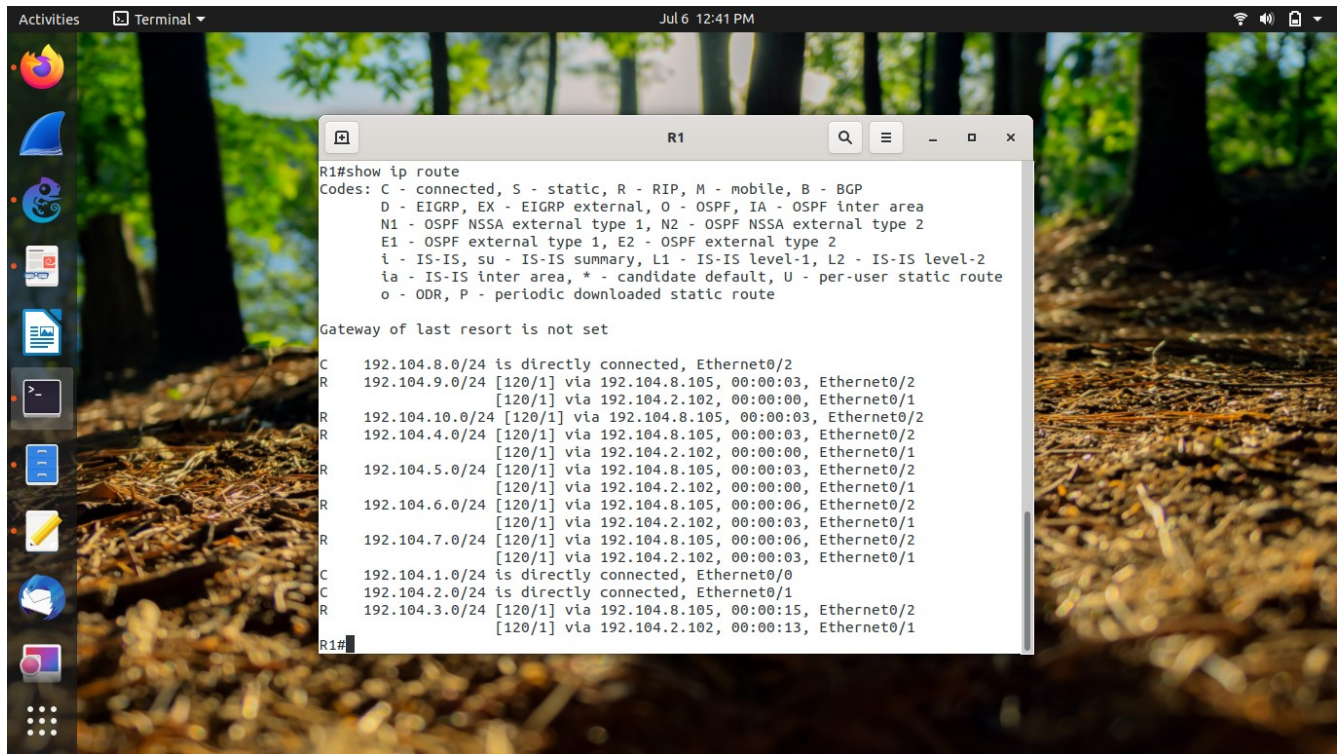


## Show ip route :-

1) R1:



```
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

C    192.104.8.0/24 is directly connected, Ethernet0/2
R    192.104.9.0/24 [120/1] via 192.104.8.105, 00:00:03, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:00, Ethernet0/1
R    192.104.10.0/24 [120/1] via 192.104.8.105, 00:00:03, Ethernet0/2
R    192.104.4.0/24 [120/1] via 192.104.8.105, 00:00:03, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:00, Ethernet0/1
R    192.104.5.0/24 [120/1] via 192.104.8.105, 00:00:03, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:00, Ethernet0/1
R    192.104.6.0/24 [120/1] via 192.104.8.105, 00:00:06, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:03, Ethernet0/1
R    192.104.7.0/24 [120/1] via 192.104.8.105, 00:00:06, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:03, Ethernet0/1
C    192.104.1.0/24 is directly connected, Ethernet0/0
C    192.104.2.0/24 is directly connected, Ethernet0/1
R    192.104.3.0/24 [120/1] via 192.104.8.105, 00:00:15, Ethernet0/2
      [120/1] via 192.104.2.102, 00:00:13, Ethernet0/1
R1#
```

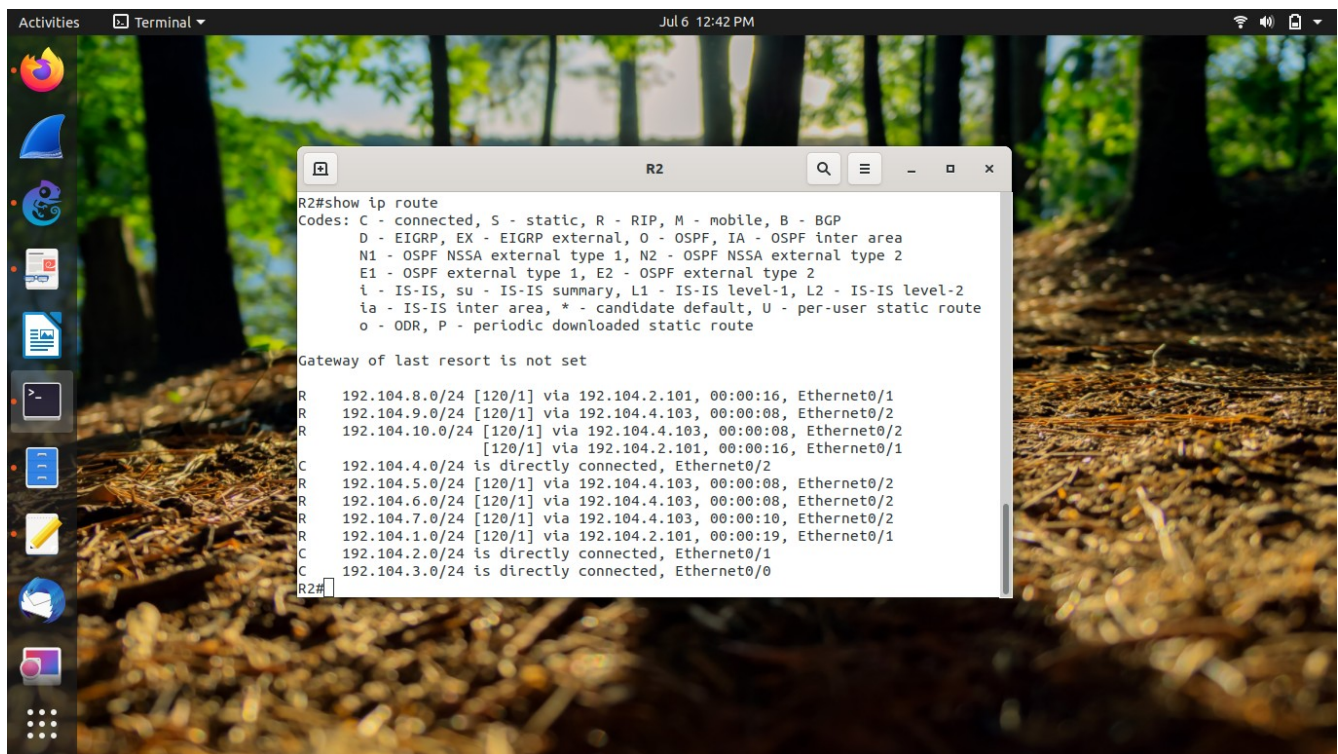
R1 is directly connected to PC1, R2, R5 via via 192.104.1.101, 192.104.2.101, 192.104.8.101 respectively.

I'll call network 192.104.x.10y as x.

R1 has 2 paths to all the other networks, one via 2, and one via 8.

Thus, this is different from previous assignment, where only 1 path existed to reach R2, R3, R4 and PCs.

2) R2:



```
Activities Terminal Jul 6 12:42 PM
R2
R2#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

R    192.104.8.0/24 [120/1] via 192.104.2.101, 00:00:16, Ethernet0/1
R    192.104.9.0/24 [120/1] via 192.104.4.103, 00:00:08, Ethernet0/2
R    192.104.10.0/24 [120/1] via 192.104.4.103, 00:00:08, Ethernet0/2
      [120/1] via 192.104.2.101, 00:00:16, Ethernet0/1
C    192.104.4.0/24 is directly connected, Ethernet0/2
R    192.104.5.0/24 [120/1] via 192.104.4.103, 00:00:08, Ethernet0/2
R    192.104.6.0/24 [120/1] via 192.104.4.103, 00:00:08, Ethernet0/2
R    192.104.7.0/24 [120/1] via 192.104.4.103, 00:00:10, Ethernet0/2
R    192.104.1.0/24 [120/1] via 192.104.2.101, 00:00:19, Ethernet0/1
C    192.104.2.0/24 is directly connected, Ethernet0/1
C    192.104.3.0/24 is directly connected, Ethernet0/0
R2#
```

R2 is directly connected to PC2, R1, R3 via via 192.104.3.102, 192.104.2.102, 192.104.4.102 respectively.

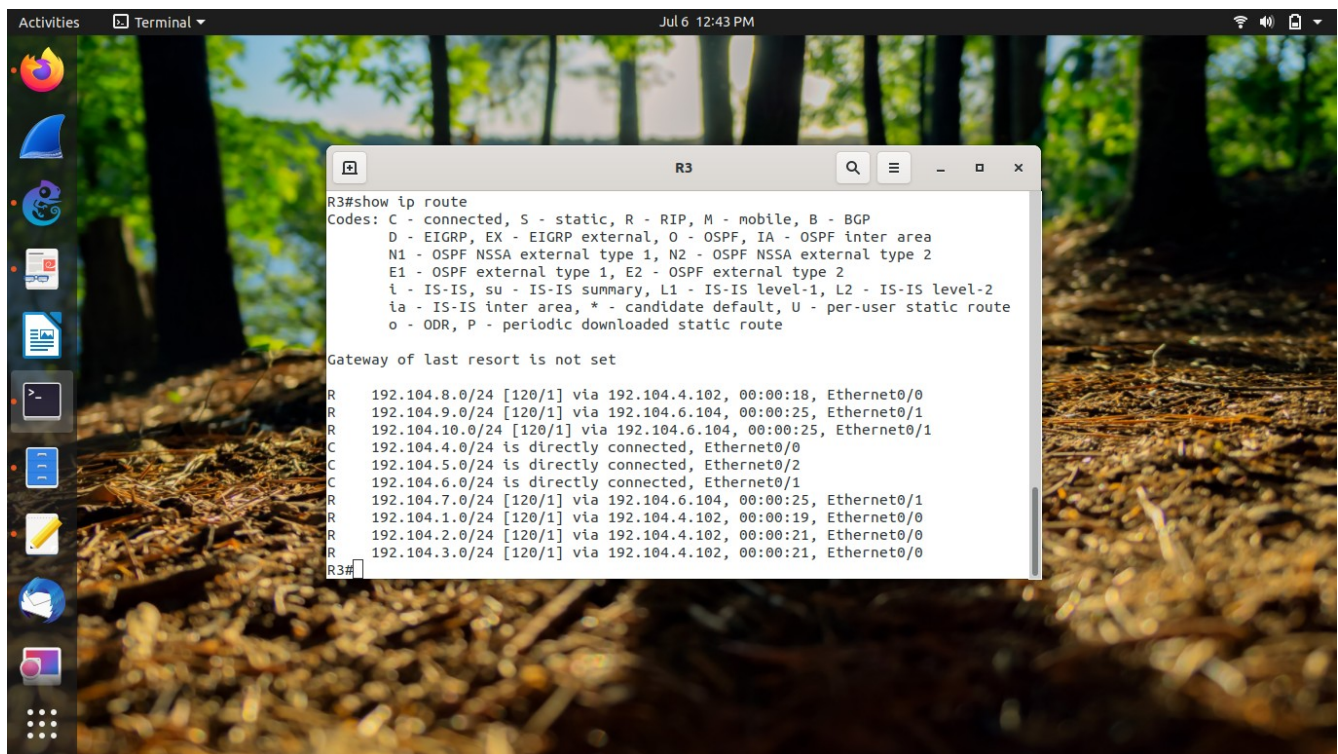
I'll call network 192.104.x.10y as x.

Besides the new R5, the old paths havent changed though.

1 is reached via 2. 5,6,7 are reached via 4.

There are 2 paths to reach network 10.

3) R3 :



```
Activities Terminal Jul 6 12:43 PM
R3
R3#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

R    192.104.8.0/24 [120/1] via 192.104.4.102, 00:00:18, Ethernet0/0
R    192.104.9.0/24 [120/1] via 192.104.6.104, 00:00:25, Ethernet0/1
R    192.104.10.0/24 [120/1] via 192.104.6.104, 00:00:25, Ethernet0/1
C    192.104.4.0/24 is directly connected, Ethernet0/0
C    192.104.5.0/24 is directly connected, Ethernet0/2
C    192.104.6.0/24 is directly connected, Ethernet0/1
R    192.104.7.0/24 [120/1] via 192.104.6.104, 00:00:25, Ethernet0/1
R    192.104.1.0/24 [120/1] via 192.104.4.102, 00:00:19, Ethernet0/0
R    192.104.2.0/24 [120/1] via 192.104.4.102, 00:00:21, Ethernet0/0
R    192.104.3.0/24 [120/1] via 192.104.4.102, 00:00:21, Ethernet0/0
R3#
```

R3 is directly connected to PC3, R2, R4 via 192.104.5.103, 192.104.4.103, 192.104.6.103 respectively.

I'll call network 192.104.x.10y as x.

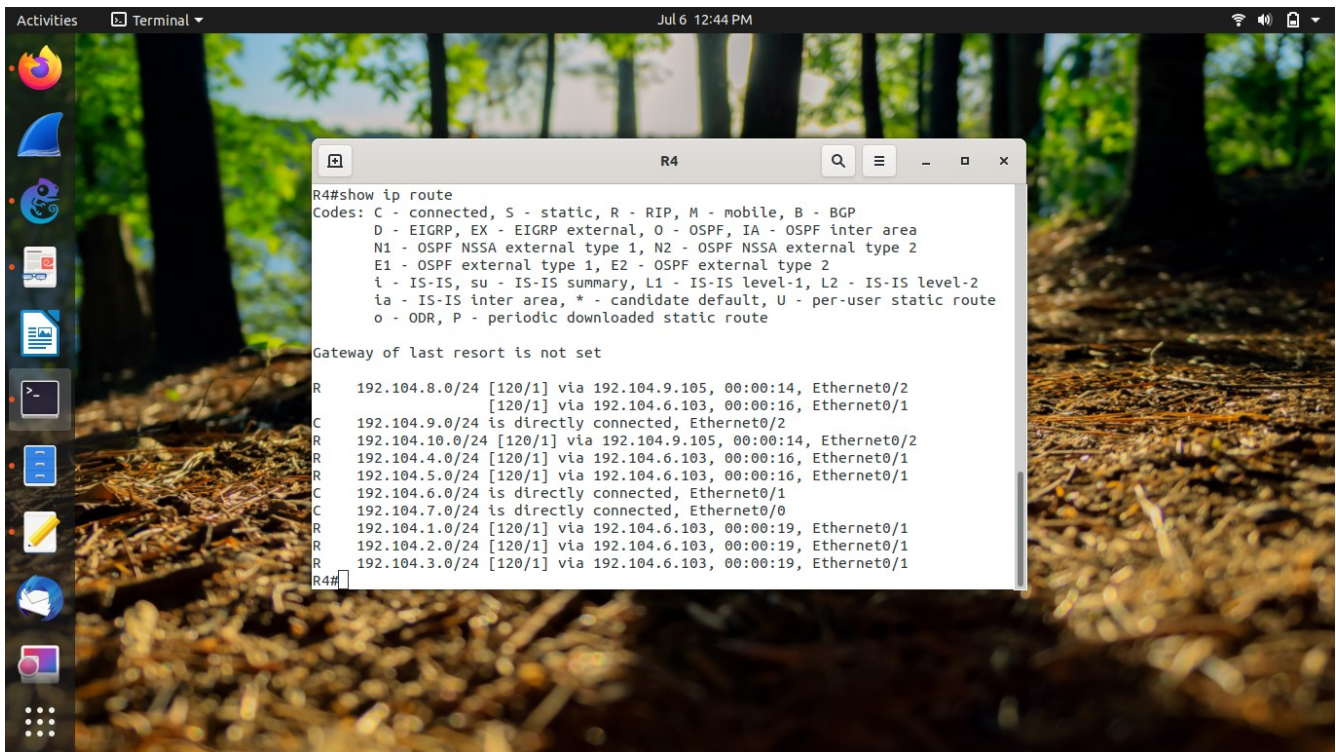
Besides the new R5, the old paths haven't changed though.

1 is reached via 2. 5,6,7 are reached via 4.

10 can be reached by 6, and 8 via 4 and 9 via 6.

4) R4 :





```
R4#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

R    192.104.8.0/24 [120/1] via 192.104.9.105, 00:00:14, Ethernet0/2
     [120/1] via 192.104.6.103, 00:00:16, Ethernet0/1
C    192.104.9.0/24 is directly connected, Ethernet0/2
R    192.104.10.0/24 [120/1] via 192.104.9.105, 00:00:14, Ethernet0/2
R    192.104.4.0/24 [120/1] via 192.104.6.103, 00:00:16, Ethernet0/1
R    192.104.5.0/24 [120/1] via 192.104.6.103, 00:00:16, Ethernet0/1
C    192.104.6.0/24 is directly connected, Ethernet0/1
C    192.104.7.0/24 is directly connected, Ethernet0/0
R    192.104.1.0/24 [120/1] via 192.104.6.103, 00:00:19, Ethernet0/1
R    192.104.2.0/24 [120/1] via 192.104.6.103, 00:00:19, Ethernet0/1
R    192.104.3.0/24 [120/1] via 192.104.6.103, 00:00:19, Ethernet0/1
R4#
```

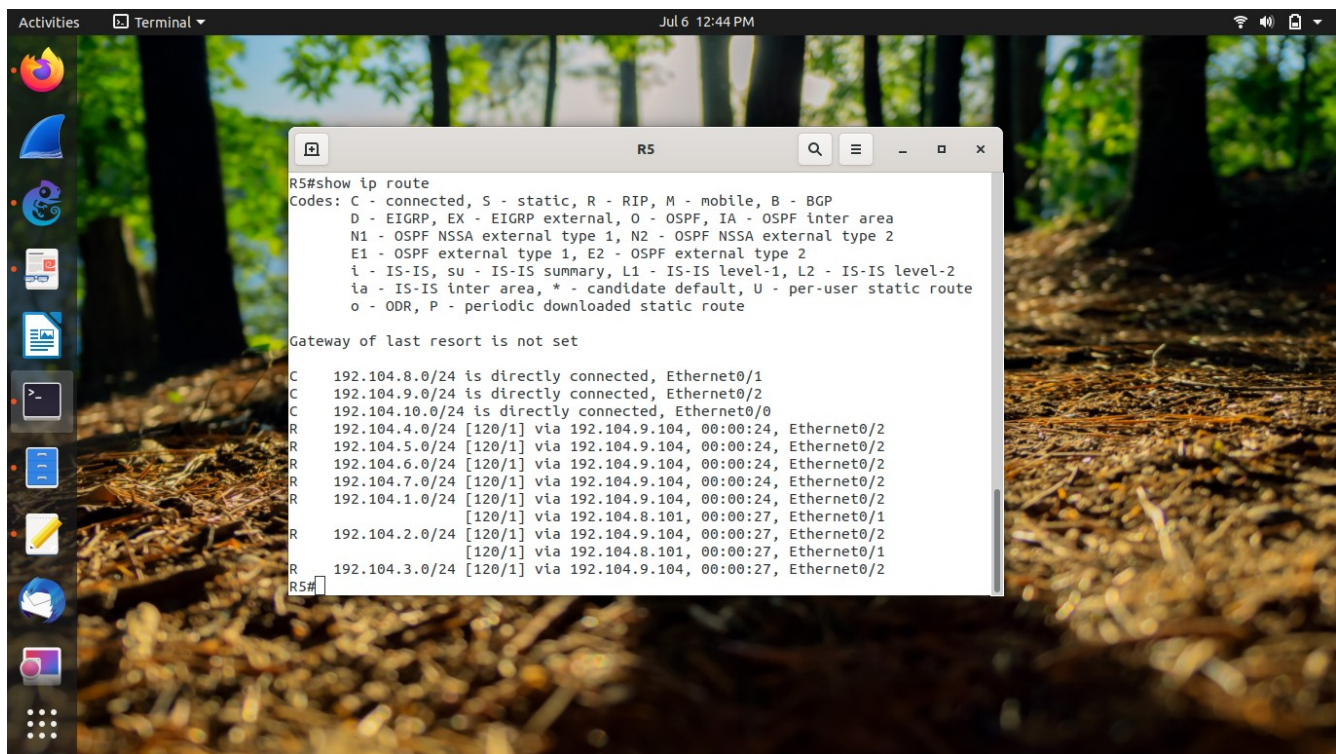
R4 is directly connected to PC4, R3, R5 via 192.104.7.104, 192.104.6.104, 192.104.9.104 respectively. I'll call network 192.104.x.10y as x.

Besides the new R5, the old paths haven't changed though.

1,2,3,4,5 can be reached via 4.

10 can be reached by 9; and 8 via 9, 6.

5) R5:



```
R5#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

C    192.104.8.0/24 is directly connected, Ethernet0/1
C    192.104.9.0/24 is directly connected, Ethernet0/2
C    192.104.10.0/24 is directly connected, Ethernet0/0
R    192.104.4.0/24 [120/1] via 192.104.9.104, 00:00:24, Ethernet0/2
R    192.104.5.0/24 [120/1] via 192.104.9.104, 00:00:24, Ethernet0/2
R    192.104.6.0/24 [120/1] via 192.104.9.104, 00:00:24, Ethernet0/2
R    192.104.7.0/24 [120/1] via 192.104.9.104, 00:00:24, Ethernet0/2
R    192.104.1.0/24 [120/1] via 192.104.9.104, 00:00:24, Ethernet0/2
R    192.104.2.0/24 [120/1] via 192.104.8.101, 00:00:27, Ethernet0/1
R    192.104.3.0/24 [120/1] via 192.104.8.101, 00:00:27, Ethernet0/1
R    192.104.3.0/24 [120/1] via 192.104.9.104, 00:00:27, Ethernet0/2
R5#
```

R5 is directly connected to PC5, R1, R4 via 192.104.10.105, 192.104.8.105, 192.104.9.105 respectively.

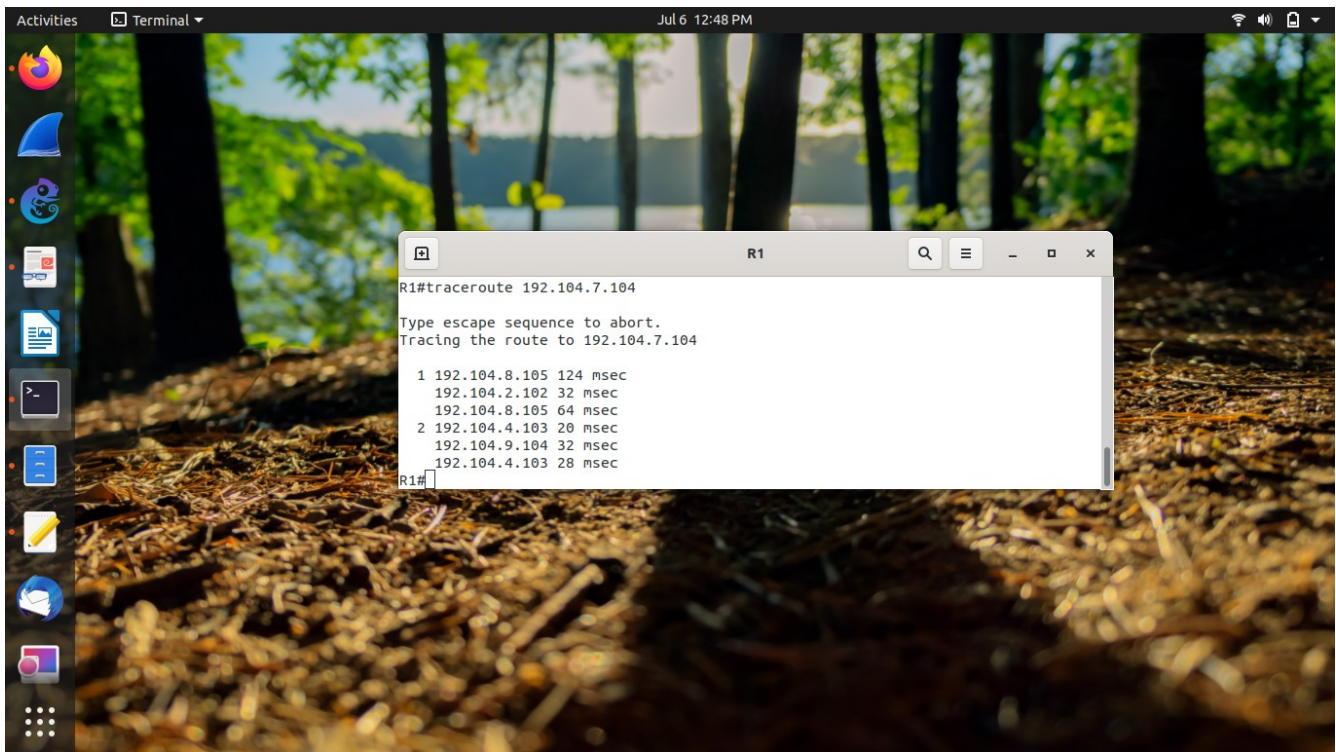
I'll call network 192.104.x.10y as x.

1,2 both can be reached by both 8 and 9.

3,4,5,6,7 are reached via 9.

## Traceroute :-

1) From R1 to 192.104.7.104 :-



192.104.7.104 is connected to R4, and the path that reaches R4 first from R1 is the shortest. There are 2 paths to start from R1, one is via 192.104.2.102(R2) and the other is via 192.104.8.105(R5).

The path 192.104.8.105(R5), 192.104.9.104(R4) reaches R4 in 2 hops.

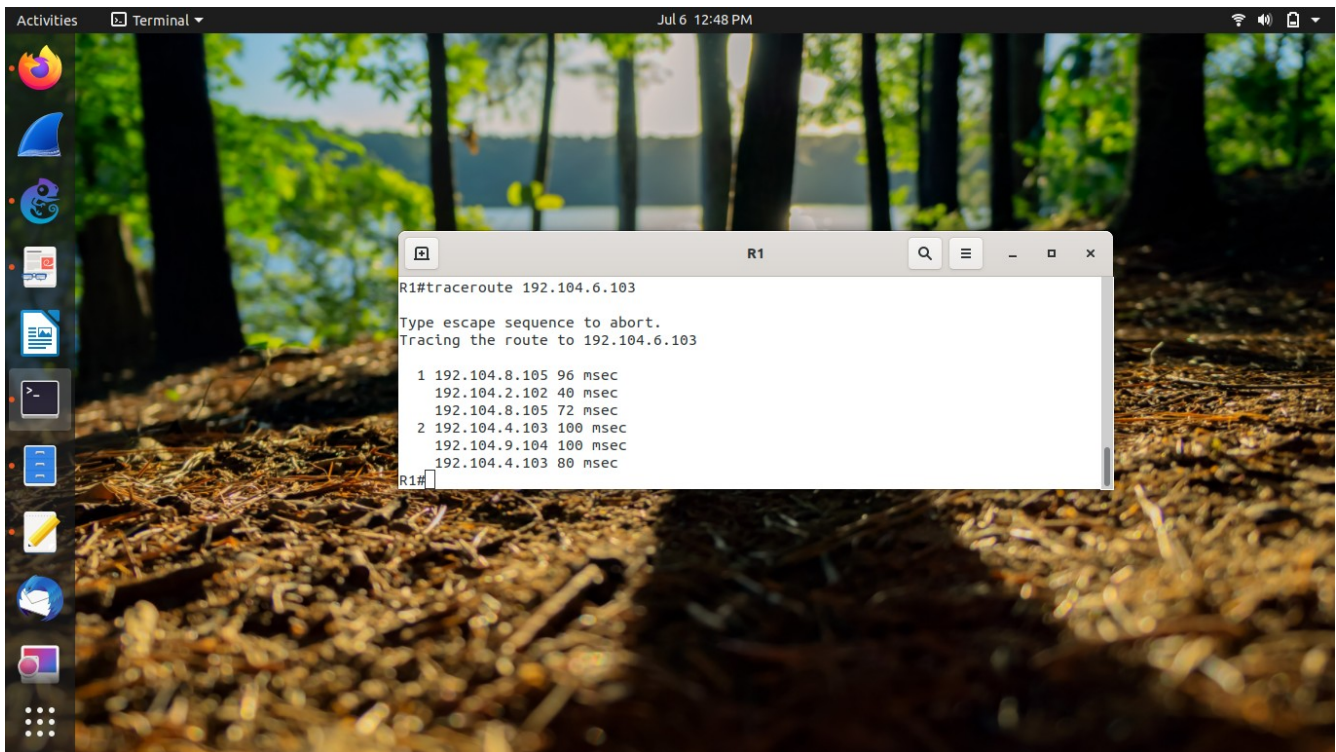
The path 192.104.2.102(R2), 192.104.4.103(R3), 192.104.6.104 reaches R4 in 3 hops.

Thus, traceroute, which sends packets along all possible paths from a node, reaches R4 first via the 1<sup>st</sup> path.

Note that in previous assignment, the 2<sup>nd</sup> path of 3 hops was used, as R was not there.

2) From R1 to 192.104.6.103 :





Traceroute distributes packets in all possible nodes. In 1<sup>st</sup> hop, 2 packets reach 192.104.8.105(R5) from R1, and 1 reaches 192.104.2.102(R2).

In 2<sup>nd</sup> hop, the R5 packets reach 192.104.9.104(R4), while, the R2 packets reach 192.104.4.103(R3).

As R3 is reached, and 192.104.6.103 is connected to R3, so, we have found a 2 hop path.

Note that this was the same path to reach 192.104.6.103 in previous assignment.