OSPF Routes Types:

OSPF routes come in a variety of shapes and size. Distinguish between different types of routes in routing tables.

OSPF Route:

Typical route marked with **O** in routing table; indicates OSPF as the origin of the route.

Default Route:

A route used to propagate traffic to an External Area; marked with **O*IA.**

Intra-Area Routes:

Routes originated and learned in the same area, i.e. Internal to the Area; marked with **O**. Routes, originated within an area, are known by the routers in the same area as Intra-Area routes. These routes are flagged as O in the show ip route command output.

Inter-Area Routes:

Routes originated in other OSPF areas; marked with **O IA**. When a route crosses an OSPF Area Border Router (ABR), the route is known as an OSPF Inter-Area route. These routes are flagged as O IA in the show ip route command output.

External Routes:

Routes from other Autonomous System (AS), external to the particular OSPF area; appear as **O E1** or **O E2** in a Standard Area and as **O N1** or **O N2** in a NSSA or Totally NSSA Area.
E1 are type 1 routes – used when there are multiple ASBRs advertising a route to the AS; external cost is added to the internal cost of each link [have cumulative cost]
E2 are type 2 routes – used if only one router is advertising a route to the AS; external cost does not change [have static cost]. The same applies to O N1 and O N2 routes.
Routes which were redistributed into OSPF, such as Connected, Static, or other Routing Protocol, are known as External Type-2 or External Type-1. These routes are flagged as O E2 or O E1 in the show ip route command output. External Type-2 is the default.

```
      4.0.0.0/32 is subnetted, 1 subnets
O E2     4.4.4.1 [110/20] via 10.1.12.1, 00:00:02, GigabitEthernet0/0
      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O        10.1.13.0/30 [110/2] via 10.1.23.2, 04:39:17, GigabitEthernet0/2
                      [110/2] via 10.1.12.1, 00:07:39, GigabitEthernet0/0
O IA     10.1.35.0/30 [110/2] via 10.1.23.2, 04:39:17, GigabitEthernet0/2
      172.16.0.0/32 is subnetted, 9 subnets
```

```
R2#show ip route ospf
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
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

      4.0.0.0/32 is subnetted, 1 subnets
O E2     4.4.4.1 [110/20] via 10.1.12.1, 00:00:02, GigabitEthernet0/0
      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O        10.1.13.0/30 [110/2] via 10.1.23.2, 04:39:17, GigabitEthernet0/2
                      [110/2] via 10.1.12.1, 00:07:39, GigabitEthernet0/0
O IA     10.1.35.0/30 [110/2] via 10.1.23.2, 04:39:17, GigabitEthernet0/2
      172.16.0.0/32 is subnetted, 9 subnets
O        172.16.0.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.1.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.2.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.3.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.4.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.5.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.6.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.7.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O        172.16.8.1 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
      172.30.0.0/32 is subnetted, 9 subnets
O IA     172.30.0.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.1.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.2.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.3.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.4.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.5.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.6.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.7.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O IA     172.30.8.1 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
O     192.168.1.0/24 [110/2] via 10.1.24.2, 04:39:07, GigabitEthernet0/1
O IA  192.168.2.0/24 [110/3] via 10.1.23.2, 04:38:58, GigabitEthernet0/2
R2#
```

```
R2#show ip route ospf
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
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
```