LAB 2 : NETWORK TROUBLESHOOTING

ISSUE 1: R1 (in OSPF Area 1) needed to reach R7 (in EIGRP via R4), but OSPF-to-EIGRP redistribution on R4 wasn't working.

This was because R4 couldn't learn 1.1.1.1 (R1's loopback) via OSPF due to broken adjacency with R3.

IN R4: Area mismatch and stub area configuration, caused the issue

```
router ospf 1
 log-adjacency-changes
 area 3 nssa
 redistribute eigrp 1 subnets
 network 4.4.4.4 0.0.0.0 area 0
 network 10.1.1.0 0.0.0.255 area 0
 network 10.1.3.0 0.0.0.255 area 2
 network 10.1.5.0 0.0.0.255 area 3
!
ip forward-protocol nd

R4#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#router ospf 1
R4(config-router)#no network 10.1.1.0 0.0.0.255 area 0
R4(config-router)#network 10.1.1.0 0.0.0.255 area 1
R4(config-router)#end
```

In R5, stub area configuration is replaced with nssa configuration

```
router ospf 1
 log-adjacency-changes
 area 3 nssa
 network 5.5.5.5 0.0.0.0 area 3
 network 10.1.4.0 0.0.0.255 area 3
 network 10.1.5.0 0.0.0.255 area 3
!
```

In R3, no network 10.1.1.0 configured in OSPF

```
router ospf 1
 router-id 3.3.3.3
 log-adjacency-changes
 area 1 virtual-link 1.1.1.1
 network 3.3.3.3 0.0.0.0 area 0
 network 10.1.2.0 0.0.0.255 area 1
 network 10.1.11.0 0.0.0.255 area 0
 network 10.1.14.0 0.0.0.255 area 3
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!

R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 10.1.1.0 0.0.0.255 area 1
```

Result:

```
R1#ping 7.7.7.7

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 7.7.7.7, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 332/586/1308 ms
```

ISSUE 2: R4 and R2 stuck in INIT/DROTHER state, due to this R8 cannot reach R2's loopback (2.2.2.2)

In R2, OSPF uses IP protocol 89, which is not TCP/UDP/ICMP, so it's blocked by default

```
R2(config)#ip access-list extended 101
R2(config-ext-nacl)#permit ospf any any
R2(config-ext-nacl)#ex
```

Result:

```
R8#ping 2.2.2.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/172/308 ms
```

ISSUE 3: There are some issues due to which R6, R7,R8 cannot reach address 10.1.5.1

- R5 had correct OSPF config (network 10.1.5.0 in area 3, NSSA)
- R4 had route to 10.1.5.1 as connected (Fa2/0), confirmed with show ip route
- R4 is redistributing OSPF into EIGRP with the proper metrics
- R6 learns the route via EIGRP (show ip route confirms this)

BUT — the metric was very high:
metric 2560002816, bandwidth = 1 Kbit, reliability 1/255, MTU 1 byte
This issue was due to default interface bandwidth mismatch.
The interfaces used in EIGRP (like Fa3/0) had default low bandwidth (1 Mbps).
So when OSPF route was redistributed into EIGRP, the K-value calculation produced a huge metric, which might cause other routers to prefer alternate paths or fail to forward.

```
R4(config)#int fa 3/0
R4(config-if)#bandwidth 10000
R4(config-if)#ex
R4(config)#int fa 4/0
R4(config-if)#bandwidth 10000
R4(config-if)#ex
R4(config)#ex
R4#cle
*Mar 23 23:13:45.535: %SYS-5-CONFIG_I: Configured from console by consolear ip eigrp neighbors
R4#
*Mar 23 23:13:53.419: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.6.2 (FastEthernet3/0) is down: manually cleared
*Mar 23 23:13:53.427: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.9.2 (FastEthernet4/0) is down: manually cleared
*Mar 23 23:13:54.347: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.6.2 (FastEthernet3/0) is up: new adjacency
*Mar 23 23:13:56.731: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 10.1.9.2 (FastEthernet4/0) is up: new adjacency
```

However, this was not strictly necessary because R6 already learned the route.
So the problem is likely not with reachability, but perhaps ping or return path issues.

```
R8#ping 10.1.5.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.1, timeout is 2 seconds:
!!!!!
```

```
R7#ping 10.1.5.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 68/396/1084 ms
```

```
R6#ping 10.1.5.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/391/920 ms
```

ISSUE 4: R3 unable to reach ip address 11.11.11.11

```
R3(config-router)#network 11.11.11.11 0.0.0.0 area 0
```

```
R1(config-router)#network 11.11.11.11 0.0.0.0 area 0
```

RESULT :

```
R3#ping 11.11.11.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.11.11.11, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/75/124 ms
```

ISSUE 5: Ensure That All Networks Are Reachable From R1

```
R1#ping 2.2.2.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 156/579/1992 ms
R1#ping 3.3.3.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 3.3.3.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/80/144 ms
R1#ping 4.4.4.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 4.4.4.4, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 52/235/532 ms
R1#ping 5.5.5.5

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.5.5.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 76/284/552 ms
R1#ping 6.6.6.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 6.6.6.6, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/243/344 ms
R1#ping 7.7.7.7

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 7.7.7.7, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 76/332/536 ms
R1#ping 8.8.8.8

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 140/360/668 ms
R1#
```

```
R1#ping 10.1.3.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/376/792 ms
R1#ping 10.1.2.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/191/376 ms
R1#ping 10.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/96/256 ms
R1#ping 10.1.4.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.4.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/56/144 ms
R1#ping 10.1.3.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/314/736 ms
R1#ping 10.1.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/79/176 ms
R1#ping 10.1.5.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/138/248 ms
```

```
R1#ping 10.1.6.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.6.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/164/340 ms
R1#ping 10.1.9.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.9.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/217/464 ms
R1#ping 10.1.5.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/153/260 ms
R1#ping 10.1.4.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.4.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/516/1204 ms
R1#ping 10.1.7.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.7.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 104/444/1492 ms
R1#ping 10.1.6.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.6.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 76/380/1052 ms
```

```
R1#ping 10.1.7.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.7.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 152/319/500 ms
R1#ping 10.1.8.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.8.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 88/336/740 ms
R1#ping 10.1.8.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.8.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 144/264/404 ms
R1#ping 10.1.9.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.9.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/159/276 ms
R1#
```