

EIGRP / OSPF

VERIFICA CONFIGURAZIONE PER REDISTRIBUZIONE PREFIX – DISTANZA AMMINISTRATIVA – METRIC TYPE E LINK:

Il diagramma rete di riferimento è:

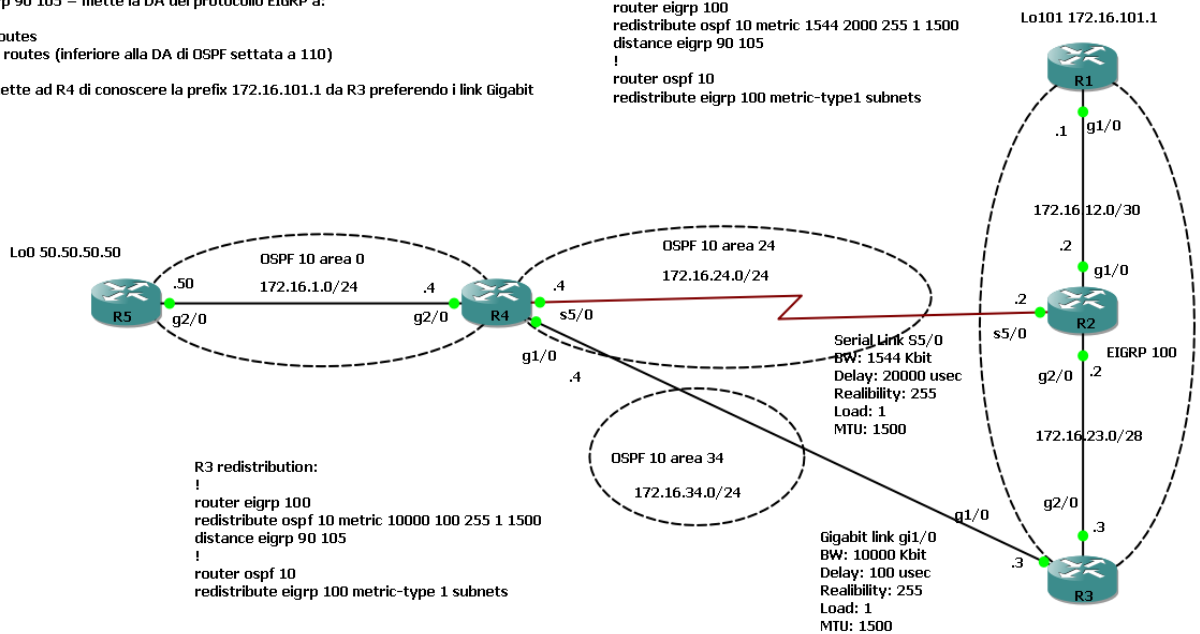
metric-type = OSPF exterior metric 1 or 2

distance eigrp 90 105 = mette la DA del protocollo EIGRP a:

90 internal routes
105 external routes (inferiore alla DA di OSPF settata a 110)

Questo permette ad R4 di conoscere la prefix 172.16.101.1 da R3 preferendo i link Gigabit

R2 redistribution:
!
router eigrp 100
redistribute ospf 10 metric 1544 2000 255 1 1500
distance eigrp 90 105
!
router ospf 10
redistribute eigrp 100 metric-type1 subnets



R3 redistribution:
!
router eigrp 100
redistribute ospf 10 metric 10000 100 255 1 1500
distance eigrp 90 105
!
router ospf 10
redistribute eigrp 100 metric-type 1 subnets

Gigabit link g1/0
BW: 10000 Kbit
Delay: 100 usec
Reliability: 255
Load: 1
MTU: 1500

Tre aree ospf di cui:

- N° 1 area di backbone area 0
- N° 2 aree standard con aree differenti (R4 OSPF ABR router)

Un processo EIGRP AS 100

Link gigabit ethernet e seriali con differenti valori di bandwidth e delay

Le due interfacce di loopback hanno rispettivamente il ruolo di sorgente IP Prefix (in R5) e destinazione IP prefix (in R1) e/o viceversa.

Si riportano le configurazioni dei link e dei processi di routing per ciascun router:

R1#

```
interface Loopback101
ip address 172.16.101.1 255.255.255.255
!
interface GigabitEthernet1/0
description EIGRP
ip address 172.16.12.1 255.255.255.252
negotiation auto
!
router eigrp 100
redistribute connected
network 172.16.12.0 0.0.0.3
auto-summary
```

R2#

```
interface GigabitEthernet1/0
description EIGRP
ip address 172.16.12.2 255.255.255.252
negotiation auto
!
interface GigabitEthernet2/0
description EIGRP
ip address 172.16.23.2 255.255.255.240
negotiation auto
!
interface Serial5/0
description OSPF24
ip address 172.16.24.2 255.255.255.0
serial restart-delay 0
no dce-terminal-timing-enable
!
router eigrp 100
network 172.16.12.0 0.0.0.3
network 172.16.23.0 0.0.0.15
auto-summary
!
router ospf 10
log-adjacency-changes
network 172.16.24.0 0.0.0.255 area 24
```

R3#

```
interface GigabitEthernet1/0
description OSPF34
ip address 172.16.34.3 255.255.255.0
negotiation auto
!
interface GigabitEthernet2/0
description EIGRP
ip address 172.16.23.3 255.255.255.240
negotiation auto
!
router eigrp 100
redistribute connected
network 172.16.23.0 0.0.0.15
distance eigrp 90 105
auto-summary
!
router ospf 10
log-adjacency-changes
network 172.16.34.0 0.0.0.255 area 34
```

R4#

```
interface GigabitEthernet1/0
description OSPF34
ip address 172.16.34.4 255.255.255.0
negotiation auto
!
interface GigabitEthernet2/0
description OSPF0
ip address 172.16.1.4 255.255.255.0
negotiation auto
!
interface Serial5/0
description OSPF24
ip address 172.16.24.4 255.255.255.0
serial restart-delay 0
no dce-terminal-timing-enable
!
router ospf 10
log-adjacency-changes
network 172.16.1.0 0.0.0.255 area 0
network 172.16.24.0 0.0.0.255 area 24
network 172.16.34.0 0.0.0.255 area 34
```

R5#

```
interface Loopback0
 ip address 50.50.50.50 255.255.255.255
!
interface GigabitEthernet2/0
 description OSPF0
 ip address 172.16.1.50 255.255.255.0
 negotiation auto
!
router ospf 10
 log-adjacency-changes
 network 50.50.50.50 0.0.0.0 area 0
 network 172.16.1.0 0.0.0.255 area 0
```

Si riporta l'output per la configurazione delle singole interfacce fisiche gigabit ethernet e seriali per il solo router R2 (le altre interfacce riportano i stessi valori) per MTU, BW, Delay, Reliability, Load

R2#

R2#sh int gi1/0

```
GigabitEthernet1/0 is up, line protocol is up
 Hardware is 82543, address is ca04.1be8.001c (bia ca04.1be8.001c)
 Description: EIGRP
 Internet address is 172.16.12.2/30
 MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, loopback not set
 Keepalive set (10 sec)
 Full-duplex, 1000Mb/s, link type is autonegotiation, media type is SX
 output flow-control is unsupported, input flow-control is unsupported
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input 00:00:01, output 00:00:00, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue: 0/40 (size/max)
!
```

R2#sh int gi2/0

```
GigabitEthernet2/0 is up, line protocol is up
 Hardware is 82543, address is ca04.1be8.0038 (bia ca04.1be8.0038)
 Description: EIGRP
 Internet address is 172.16.23.2/28
 MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, loopback not set
```

```
Keepalive set (10 sec)
Full-duplex, 1000Mb/s, link type is autonegotiation, media type is SX
output flow-control is unsupported, input flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:01, output 00:00:04, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
!
```

R2#sh interfaces serial 5/0

```
Serial5/0 is up, line protocol is up
Hardware is M4T
Description: OSPF24
Internet address is 172.16.24.2/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, crc 16, loopback not set
Keepalive set (10 sec)
Restart-Delay is 0 secs
Last input 00:00:05, output 00:00:02, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
```

A configurazione base (senza mutua redistribuzione dei processi di routing) abbiamo la seguente situazione:
partendo dal lato sinistro del diagramma con i router in OSPF:

R5#

R5#sh ip ospf database

OSPF Router with ID (50.50.50.50) (Process ID 10)

Router Link States (Area 0) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
50.50.50.50	50.50.50.50	892	0x80000002	0x00070E	2 → ip address loopback R1
172.16.34.4	172.16.34.4	892	0x80000002	0x000ADD	1 → link R4 R3

Net Link States (Area 0) → LSA TYPE 2

Link ID	ADV Router	Age	Seq#	Checksum
172.16.1.4	172.16.34.4	893	0x80000001	0x00AF3A → link R5 R4

Summary Net Link States (Area 0) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
172.16.24.0	172.16.34.4	932	0x80000001	0x00E361 → link R4 R2
172.16.34.0	172.16.34.4	888	0x80000003	0x00F87F → link R4 R3

R5#sh 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

50.0.0.0/32 is subnetted, 1 subnets

C 50.50.50.50 is directly connected, Loopback0

172.16.0.0/24 is subnetted, 3 subnets

O IA 172.16.34.0 [110/2] via 172.16.1.4, 00:15:00, GigabitEthernet2/0

O IA 172.16.24.0 [110/65] via 172.16.1.4, 00:15:00, GigabitEthernet2/0

C 172.16.1.0 is directly connected, GigabitEthernet2/0

R5#

R4# ABR per le aree 0, 24 e 34:

R4#sh ip ospf database

OSPF Router with ID (172.16.34.4) (Process ID 10) → considera l'IP address più alto in tabella

Router Link States (Area 0) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
50.50.50.50	50.50.50.50	1261	0x80000002	0x00070E	2 → ind loopback di R5
172.16.34.4	172.16.34.4	1260	0x80000002	0x000ADD	1 → link R4 R3

Net Link States (**Area 0**) → LSA TYPE 2

Link ID	ADV Router	Age	Seq#	Checksum
172.16.1.4	172.16.34.4	1260	0x80000001	0x00AF3A → link R5 R4

Summary Net Link States (**Area 0**) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
172.16.24.0	172.16.34.4	1301	0x80000001	0x00E361 → link R4 R2
172.16.34.0	172.16.34.4	1256	0x80000003	0x00F87F → link R4 R3

Router Link States (**Area 24**) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.16.24.2	172.16.24.2	547	0x80000003	0x007AEB	2
172.16.34.4	172.16.34.4	1296	0x80000002	0x0058FF	2

Summary Net Link States (**Area 24**) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
50.50.50.50	172.16.34.4	1252	0x80000001	0x00FE90
172.16.1.0	172.16.34.4	1247	0x80000003	0x006534
172.16.34.0	172.16.34.4	1257	0x80000003	0x00F87F

Router Link States (**Area 34**) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.16.34.3	172.16.34.3	475	0x80000003	0x00DFC8	1
172.16.34.4	172.16.34.4	1266	0x80000002	0x00E2C2	1

Net Link States (**Area 34**) → LSA TYPE 2

Link ID	ADV Router	Age	Seq#	Checksum
172.16.34.4	172.16.34.4	1266	0x80000001	0x008728

Summary Net Link States (**Area 34**) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
50.50.50.50	172.16.34.4	1252	0x80000001	0x00FE90
172.16.1.0	172.16.34.4	1249	0x80000003	0x006534
172.16.24.0	172.16.34.4	1304	0x80000001	0x00E361

R4#

R4#sh 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

50.0.0.0/32 is subnetted, 1 subnets

O 50.50.50.50 [110/2] via 172.16.1.50, 00:34:50, GigabitEthernet2/0

172.16.0.0/24 is subnetted, 3 subnets

C 172.16.34.0 is directly connected, GigabitEthernet1/0

C 172.16.24.0 is directly connected, Serial5/0

C 172.16.1.0 is directly connected, GigabitEthernet2/0

R3#

R3#sh ip ospf database

OSPF Router with ID (172.16.34.3) (Process ID 10)

Router Link States (**Area 34**) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.16.34.3	172.16.34.3	1376	0x80000003	0x00DFC8	1
172.16.34.4	172.16.34.4	190	0x80000003	0x00E0C3	1

Net Link States (**Area 34**) → LSA TYPE 2

Link ID	ADV Router	Age	Seq#	Checksum
172.16.34.4	172.16.34.4	190	0x80000002	0x008529

Summary Net Link States (**Area 34**) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
50.50.50.50	172.16.34.4	190	0x80000002	0x00FC91
172.16.1.0	172.16.34.4	190	0x80000004	0x006335
172.16.24.0	172.16.34.4	190	0x80000002	0x00E162

R3#sh ip eigrp topology

IP-EIGRP Topology Table for AS(100)/ID(172.16.34.3)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 172.16.34.0/24, 1 successors, FD is 2816
via Rconnected (2816/0)
P 172.16.23.0/28, 1 successors, FD is 2816
via Connected, GigabitEthernet2/0
P 172.16.12.0/30, 1 successors, FD is 3072
via 172.16.23.2 (3072/2816), GigabitEthernet2/0
P 172.16.101.1/32, 1 successors, FD is 131072
via 172.16.23.2 (131072/130816), GigabitEthernet2/0

R3#sh ip protocols

Routing Protocol is "eigrp 100"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

EIGRP maximum hopcount 100

EIGRP maximum metric variance 1

Redistributing: connected, eigrp 100

EIGRP NSF-aware route hold timer is 240s

Automatic network summarization is in effect

Maximum path: 4

Routing for Networks:

172.16.23.0/28

Routing Information Sources:

Gateway	Distance	Last Update
172.16.23.2	90	00:26:41

Distance: internal 90 external 170

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 172.16.34.3

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

172.16.34.0 0.0.0.255 area 34

Routing Information Sources:

Gateway	Distance	Last Update
172.16.34.4	110	00:26:41
172.16.24.2	110	00:28:31

Distance: (default is 110)

R3#sh 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

50.0.0.0/32 is subnetted, 1 subnets

O IA 50.50.50.50 [110/3] via 172.16.34.4, 00:28:53, GigabitEthernet1/0

172.16.0.0/16 is variably subnetted, 6 subnets, 4 masks

C 172.16.34.0/24 is directly connected, GigabitEthernet1/0

O IA 172.16.24.0/24 [110/65] via 172.16.34.4, 00:28:53, GigabitEthernet1/0

C 172.16.23.0/28 is directly connected, GigabitEthernet2/0

D 172.16.12.0/30 [90/3072] via 172.16.23.2, 00:29:03, GigabitEthernet2/0

O IA 172.16.1.0/24 [110/2] via 172.16.34.4, 00:28:53, GigabitEthernet1/0

D EX 172.16.101.1/32

[170/131072] via 172.16.23.2, 00:28:58, GigabitEthernet2/0

R2#

R2#sh ip ospf database

OSPF Router with ID (172.16.24.2) (Process ID 10)

Router Link States (**Area 24**) → LSA TYPE 1

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.16.24.2	172.16.24.2	101	0x80000004	0x0078EC	2
172.16.34.4	172.16.34.4	852	0x80000003	0x005601	2

Summary Net Link States (**Area 24**) → LSA TYPE 3

Link ID	ADV Router	Age	Seq#	Checksum
50.50.50.50	172.16.34.4	852	0x80000002	0x00FC91
172.16.1.0	172.16.34.4	852	0x80000004	0x006335
172.16.34.0	172.16.34.4	852	0x80000004	0x00F680

R2#sh ip eigrp topology

IP-EIGRP Topology Table for AS(100)/ID(172.16.24.2)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 172.16.34.0/24, 0 successors, FD is Inaccessible
via 172.16.23.3 (3072/2816), GigabitEthernet2/0
P 172.16.23.0/28, 1 successors, FD is 2816
via Connected, GigabitEthernet2/0
P 172.16.12.0/30, 1 successors, FD is 2816
via Connected, GigabitEthernet1/0
P 172.16.101.1/32, 1 successors, FD is 130816
via 172.16.12.1 (130816/128256), GigabitEthernet1/0

R2#sh 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

50.0.0.0/32 is subnetted, 1 subnets
O IA 50.50.50.50 [110/66] via 172.16.24.4, 00:03:37, Serial5/0
172.16.0.0/16 is variably subnetted, 6 subnets, 4 masks
O IA 172.16.34.0/24 [110/65] via 172.16.24.4, 00:03:37, Serial5/0
C 172.16.24.0/24 is directly connected, Serial5/0
C 172.16.23.0/28 is directly connected, GigabitEthernet2/0
C 172.16.12.0/30 is directly connected, GigabitEthernet1/0
O IA 172.16.1.0/24 [110/65] via 172.16.24.4, 00:03:37, Serial5/0
D EX 172.16.101.1/32
[170/130816] via 172.16.12.1, 00:03:37, GigabitEthernet1/0

R1#

R1#sh ip eigrp topology

IP-EIGRP Topology Table for AS(100)/ID(172.16.101.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - reply Status, s - sia Status

P 172.16.23.0/28, 1 successors, FD is 3072
via 172.16.12.2 (3072/2816), GigabitEthernet1/0

```
P 172.16.12.0/30, 1 successors, FD is 2816
  via Connected, GigabitEthernet1/0
P 172.16.101.1/32, 1 successors, FD is 128256
  via Rconnected (128256/0)
```

R1#sh 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

```
172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
D   172.16.23.0/28 [90/3072] via 172.16.12.2, 00:42:58, GigabitEthernet1/0
C   172.16.12.0/30 is directly connected, GigabitEthernet1/0
C   172.16.101.1/32 is directly connected, Loopback101
```

REDISTRIBUZIONE PREFIX IP TRA EIGRP ed OSPF:

La redistribuzione delle prefix IP è da configurare solo nei router di bordo R2, R3 i quali sono i soli aventi interfacce immerse sia in ospf che eigrp.

I comandi utilizzati sono rispettivamente:

R2#

router eigrp 100

```
redistribute ospf 10 metric 10000 1 255 1 1500 → permette la redistribuzione delle prefix ospf in eigrp
network 172.16.12.0 0.0.0.3
network 172.16.23.0 0.0.0.15
auto-summary
!
```

R3#

router eigrp 100

```
redistribute connected
redistribute ospf 10 metric 10000 1 255 1 1500
network 172.16.23.0 0.0.0.15
auto-summary
```

dopo questa redistribuzione la loopback annunciata in ospf da R5 è vista da R1 come External EIGRP (AD = 170) più tutte le altre prefix OSPF redistribute in EIGRP

R1#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

D EX 50.50.50.50 [170/256512] via 172.16.12.2, 00:01:12, GigabitEthernet1/0

172.16.0.0/16 is variably subnetted, 6 subnets, 4 masks

D EX 172.16.34.0/24

[170/256512] via 172.16.12.2, 00:01:12, GigabitEthernet1/0

D EX 172.16.24.0/24

[170/256512] via 172.16.12.2, 00:01:12, GigabitEthernet1/0

D 172.16.23.0/28 [90/3072] via 172.16.12.2, 01:04:29, GigabitEthernet1/0

C 172.16.12.0/30 is directly connected, GigabitEthernet1/0

D EX 172.16.1.0/24

[170/256512] via 172.16.12.2, 00:01:12, GigabitEthernet1/0

C 172.16.101.1/32 is directly connected, Loopback101

Stessa cosa deve essere fatta per redistribuire le prefix EIGRP in OSPF

R2#

router ospf 10

log-adjacency-changes

redistribute eigrp 100 subnets → permette la redistribuzione delle prefix eigrp in ospf

network 172.16.24.0 0.0.0.255 area 24

R3#

router ospf 10

log-adjacency-changes

redistribute eigrp 100 subnets

network 172.16.34.0 0.0.0.255 area 34

Dal router R5 si può vedere come dopo questi comandi di redistribuzione, la tabella di routing è popolata anche delle prefix EIGRP in OSPF viste come External Type 1

R5#sh 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

```

50.0.0.0/32 is subnetted, 1 subnets
C   50.50.50.50 is directly connected, Loopback0
   172.16.0.0/16 is variably subnetted, 6 subnets, 4 masks
O IA 172.16.34.0/24 [110/2] via 172.16.1.4, 00:02:00, GigabitEthernet2/0
O IA 172.16.24.0/24 [110/65] via 172.16.1.4, 00:02:00, GigabitEthernet2/0
O E1 172.16.23.0/28 [110/22] via 172.16.1.4, 00:02:00, GigabitEthernet2/0
O E1 172.16.12.0/30 [110/22] via 172.16.1.4, 00:02:00, GigabitEthernet2/0
C   172.16.1.0/24 is directly connected, GigabitEthernet2/0
O E1 172.16.101.1/32 [110/22] via 172.16.1.4, 00:02:00, GigabitEthernet2/0

```

VERIFICA IMPIEGO DEI PERCORSI OTTIMALI / SUBOTTIMALI E MANIPOLAZIONE DI ESSI PER USO DEI LINK A MAGGIORE BW:

Attraverso il traceroute vediamo che il percorso tra sorgente e destinazione attraverso il link T1 utilizzando quindi un link a banda inferior:

```
R5#traceroute 172.16.101.1
```

```
Type escape sequence to abort.
Tracing the route to 172.16.101.1
```

```
R5#traceroute 172.16.101.1
```

```
Type escape sequence to abort.
Tracing the route to 172.16.101.1
```

```

 1 172.16.1.4 32 msec 20 msec 12 msec    → R4 link 1G
 2 172.16.24.2 28 msec 32 msec 88 msec   → R2 link T1 (seriale 1544 Mbit/s)
 3 172.16.12.1 92 msec 80 msec 44 msec   → R1 link 1G

```

```
R1#traceroute 50.50.50.50
```

```
Type escape sequence to abort.
Tracing the route to 50.50.50.50
```

```

 1 172.16.12.2 80 msec 76 msec 72 msec    → R2 link 1G
 2 172.16.24.4 180 msec 140 msec 108 msec   → R4 link T1 (seriale 1544 Mbit/s)
 3 172.16.1.50 140 msec 144 msec 104 msec   → R5 link 1G

```

L'obiettivo è quello di utilizzare il path a banda 1G:

Manipolare quest'ultimo path preferendo un percorso con maggiore banda, significa preferire il percorso R2 → R3 → R4 → R5 tutto ad 1 Gigabit

Per fare questo dobbiamo agire variando la distanza amministrativa

Verificando le tabelle di routing di R2, R3 ed R4, possiamo vedere che rispettivamente loro conoscono la prefix 50.50.50.50 e 172.16.101.1

R2#sh ip route

R2#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

O IA 50.50.50.50 [**110/66**] via 172.16.24.4, 00:43:25, Serial5/0

D EX 172.16.101.1/32

[**170/130816**] via 172.16.12.1, 00:00:43, GigabitEthernet1/0

50.50.50.50 da OSPF con DA = 110

172.16.101.1 da EIGRP External con DA = 170

R3#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

O IA 50.50.50.50 [**110/3**] via 172.16.34.4, 00:06:22, GigabitEthernet1/0

O E1 172.16.101.1/32 [**110/85**] via 172.16.34.4, 00:06:17, GigabitEthernet1/0

50.50.50.50 da OSPF come IA (Inter-Area) e DA = 110

172.16.101.1 da OSPF come External Type 1 (perché rivecuto da R4 e non R2) e DA = 110

R4#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

O 50.50.50.50 [**110/2**] via 172.16.1.50, 00:20:38, GigabitEthernet2/0

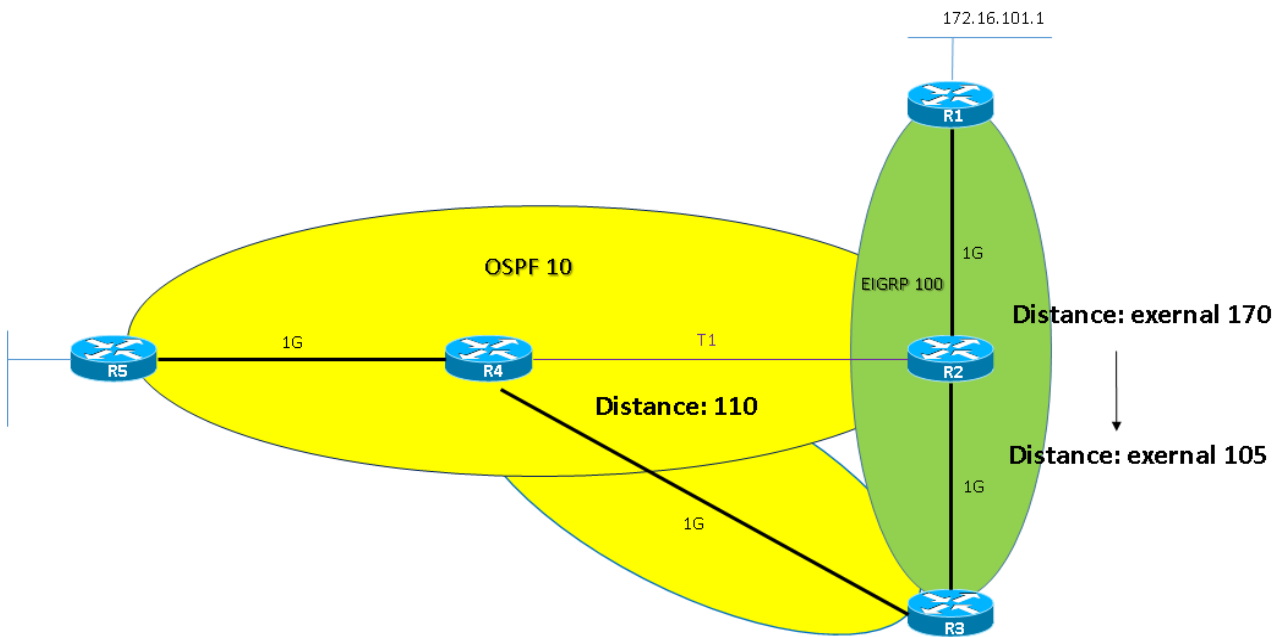
O E1 172.16.101.1/32 [**110/21**] via 172.16.34.3, 00:20:38, GigabitEthernet1/0

50.50.50.50 da OSPF con DA = 110

172.16.101.1 da OSPF E1 con DA = 110

La soluzione è quella di abbassare la Distanza Amministrativa EXTERNAL di EIGRP ad un valore più basso di quella OSPF settata di default a 110.

La configurazione che ne consegue è:



R2#

router eigrp 100

```
redistribute ospf 10 metric 1544 2000 255 1 1500
```

```
network 172.16.12.0 0.0.0.3
```

```
network 172.16.23.0 0.0.0.15
```

```
distance eigrp 90 105
```

```
auto-summary
```

R3#

router eigrp 100

```
redistribute connected
```

```
redistribute ospf 10 metric 10000 100 255 1 1500
```

```
network 172.16.23.0 0.0.0.15
```

```
distance eigrp 90 105
```

```
auto-summary
```

Verifica delle tabelle di routing:

R2#

R2#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

D EX 50.50.50.50 [**105/281856**] via 172.16.23.3, 00:03:00, GigabitEthernet2/0

D EX 172.16.101.1/32

[**105/130816**] via 172.16.12.1, 00:03:00, GigabitEthernet1/0

R3#

R3#sh ip route

50.0.0.0/32 is subnetted, 1 subnets

O IA 50.50.50.50 [**110/3**] via 172.16.34.4, 00:20:58, GigabitEthernet1/0

D EX 172.16.101.1/32

[**105/131072**] via 172.16.23.2, 00:04:47, GigabitEthernet2/0

Dal Traceroute, rispettivamente:

R1#traceroute 50.50.50.50

Type escape sequence to abort.

Tracing the route to 50.50.50.50

1	172.16.12.2	36 msec	20 msec	20 msec	→ R2 link 1G
2	172.16.23.3	72 msec	40 msec	28 msec	→ R3 link 1G
3	172.16.34.4	60 msec	44 msec	76 msec	→ R4 link 1G
4	172.16.1.50	112 msec	128 msec	100 msec	→ R5 link 1G

R5#traceroute 172.16.101.1

Type escape sequence to abort.

Tracing the route to 172.16.101.1

1	172.16.1.4	32 msec	20 msec	40 msec	→ R4 link 1G
2	172.16.34.3	20 msec	36 msec	44 msec	→ R3 link 1G
3	172.16.23.2	56 msec	80 msec	72 msec	→ R2 link 1G
4	172.16.12.1	108 msec	132 msec	104 msec	→ R1 link 1G