

CD=Computed Distance  
RD=Reported Distance  
FD=Feasible Distance  
FC=Feasible Condition  
FC ==> RD<FD of current successor

CD

RA---8--RB-----8-----Dest =16 ----> Feasible Successor Route installed in Topology  
RA---4--RC-----23-----Dest =27 -----> possibility in topology all-links  
RA---2--RD-----9-----Dest =11 -FD --> Successor route installed in RIB

CD

RA---8--RB-----8-----Dest =16 ----> Feasible Successor Route installed in Topology  
RA---4--RC-----23-----Dest =27 -----> possibility in topology all-links  
RA---2--RD-----10-----Dest =12 -FD (11) --> Successor route installed in RIB

CD

RA---8--RB-----8-----Dest =16 ----> Feasible Successor installed in Topology  
RA---4--RC-----23-----Dest =27 -----> possibility in topology all-links  
RA---2--RD-----8-----Dest =10 -FD (10) --> Successor route installed in RIB

CD

RA---8--RB-----12-----Dest =16 ----> possibility Route installed in Topology all-links  
RA---17--RC-----10-----Dest =27 -----> FS in topology all-links  
RA---2--RD-----9-----Dest =11 -FD --> Successor route installed in RIB

R1

```
conf t
int s2/0
Desc conn to R2
ip add 10.12.1.1 255.255.255.0
no shut
int s2/1
Desc conn to R3
ip add 10.13.1.1 255.255.255.0
no shut
int s2/2
Desc conn to R4
ip add 10.14.1.1 255.255.255.0
no shut
int lo0
ip add 192.168.0.1 255.255.255.0
exit
```

Router eigrp 1

```
net 10.0.0.0
net 192.168.0.0
exit
```

R2:

```
conf t
int s2/0
```

```
Desc conn to R1
ip add 10.12.1.2 255.255.255.0
no shut
int s2/1
Desc conn to R5
ip add 10.25.1.2 255.255.255.0
no shut
exit
```

```
Router eigrp 1
net 10.0.0.0
exit
```

```
R3:
conf t
int s2/0
Desc conn to R1
ip add 10.13.1.3 255.255.255.0
no shut
int s2/1
Desc conn to R5
ip add 10.35.1.3 255.255.255.0
no shut
exit
```

```
Router eigrp 1
net 10.0.0.0
exit
```

```
R4:
conf t
int s2/0
Desc conn to R1
ip add 10.14.1.4 255.255.255.0
no shut
int s2/1
Desc conn to R5
ip add 10.45.1.4 255.255.255.0
no shut
exit
```

```
Router eigrp 1
net 10.0.0.0
exit
```

```
R1
conf t
int s2/0
Desc conn to R2
ip add 10.25.1.5 255.255.255.0
no shut
int s2/1
```

```
Desc conn to R3
ip add 10.35.1.5 255.255.255.0
no shut
int s2/2
Desc conn to R4
ip add 10.45.1.5 255.255.255.0
no shut
int lo0
ip add 200.1.1.1 255.255.255.0
exit
```

```
Router eigrp 1
net 10.0.0.0
net 200.1.1.0
exit
```

R1:

```
D 200.1.1.0/24 [90/2809856] via 10.14.1.4, 00:00:22, Serial2/2
    [90/2809856] via 10.13.1.3, 00:00:22, Serial2/1
    [90/2809856] via 10.12.1.2, 00:00:22, Serial2/0
```

```
P 200.1.1.0/24, 3 successors, FD is 2809856
    via 10.12.1.2 (2809856/2297856), Serial2/0
    via 10.13.1.3 (2809856/2297856), Serial2/1
    via 10.14.1.4 (2809856/2297856), Serial2/2
```

```
R1(config)# do sh ip route 200.1.1.0
```

```
Routing entry for 200.1.1.0/24
```

```
Known via "eigrp 1", distance 90, metric 2809856, type internal
```

```
Redistributing via eigrp 1
```

```
Last update from 10.14.1.4 on Serial2/2, 00:03:35 ago
```

```
Routing Descriptor Blocks:
```

```
10.14.1.4, from 10.14.1.4, 00:03:35 ago, via Serial2/2
```

```
Route metric is 2809856, traffic share count is 1
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1544 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
* 10.13.1.3, from 10.13.1.3, 00:03:35 ago, via Serial2/1
```

```
Route metric is 2809856, traffic share count is 1
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1544 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
10.12.1.2, from 10.12.1.2, 00:03:35 ago, via Serial2/0
```

```
Route metric is 2809856, traffic share count is 1
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1544 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
R1(config)#do trace 200.1.1.1 num
```

```
Type escape sequence to abort.
```

Tracing the route to 200.1.1.1

VRF info: (vrf in name/id, vrf out name/id)

1 10.12.1.2 10 msec  
10.13.1.3 10 msec  
10.14.1.4 12 msec  
2 10.25.1.5 18 msec  
10.35.1.5 25 msec  
10.45.1.5 31 msec

=====

UnEqual Cost LB:

-----

R3  
int s2/1  
bandwidth 1500  
exit

R4  
int s2/1  
bandwidth 1100  
exit

R1:

P 200.1.1.0/24, 1 successors, FD is 2809856, serno 24  
via 10.12.1.2 (2809856/2297856), Serial2/0 ----> Successor route installed in RIB  
via 10.13.1.3 (2858496/2346496), Serial2/1 ----> Feasible Successor installed in topology as BKU  
P  
via 10.14.1.4 (3479040/2967040), Serial2/2 ---> Fails FC ( Possibility) topology all-links

sh ip route  
D 200.1.1.0/24 [90/2809856] via 10.12.1.2, 00:02:56, Serial2/0

When primary goes Down then Feasible Successor will be installed in RIB

int s2/0  
shut  
exit

D 200.1.1.0/24 [90/2858496] via 10.13.1.3, 00:00:12, Serial2/1

When primary comes back it will replace the Feasible successor in RIB

int s2/0  
no shut  
exit

D 200.1.1.0/24 [90/2809856] via 10.12.1.2, 00:00:09, Serial2/0

R2  
int s2/1  
bandwidth 1540  
exit

```
P 200.1.1.0/24, 1 successors, FD is 2809856, serno 43
  via 10.12.1.2 (2814208/2302208), Serial2/0 --Successor
  via 10.13.1.3 (2858496/2346496), Serial2/1 --FS
  via 10.14.1.4 (3479040/2967040), Serial2/2
```

FD is the best computed distance in the history of that route.

Default variance

```
sh ip protocol | in Maximum metric
  Maximum metric variance 1 < Range 1-128>
```

```
Variance = CD of FS/CD of Current Successor
          =2858496/2814208
          =1.001
          =2
```

Round 1.4 =1 ,1.5=2

Floor 1.9 =1

Ceil = 1.001 =2

```
sh ip route 200.1.1.0 longer-prefixes
```

```
D 200.1.1.0/24 [90/2858496] via 10.13.1.3, 00:00:15, Serial2/1
  [90/2814208] via 10.12.1.2, 00:00:15, Serial2/0
```

```
sh ip eigrp top
```

```
P 200.1.1.0/24, 2 successors, FD is 2809856
  via 10.12.1.2 (2814208/2302208), Serial2/0
  via 10.13.1.3 (2858496/2346496), Serial2/1
```

```
R1#sh ip route 200.1.1.0
```

```
Routing entry for 200.1.1.0/24
```

```
Known via "eigrp 1", distance 90, metric 2814208, type internal
```

```
Redistributing via eigrp 1
```

```
Last update from 10.13.1.3 on Serial2/1, 00:01:52 ago
```

```
Routing Descriptor Blocks:
```

```
10.13.1.3, from 10.13.1.3, 00:01:52 ago, via Serial2/1
```

```
Route metric is 2858496, traffic share count is 59
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1500 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
* 10.12.1.2, from 10.12.1.2, 00:01:52 ago, via Serial2/0
```

```
Route metric is 2814208, traffic share count is 60
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1540 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

To add possibility in RIB

R1

```
Access-list 1 permit 200.1.1.0 0.0.0.255
```

```
router eigrp 1
offset-list 1 in 152850 s2/0
offset-list 1 in 152850 s2/1
exit
```

```
P 200.1.1.0/24, 3 successors, FD is 2809856, serno 51
  via 10.12.1.2 (2967058/2455058), Serial2/0
  via 10.13.1.3 (3011346/2499346), Serial2/1
  via 10.14.1.4 (3479040/2967040), Serial2/2
```

```
D 200.1.1.0/24 [90/3479040] via 10.14.1.4, 00:00:27, Serial2/2
  [90/3011346] via 10.13.1.3, 00:00:27, Serial2/1
  [90/2967058] via 10.12.1.2, 00:00:27, Serial2/
```

```
R1(config)# do sh ip route 200.1.1.0
```

```
Routing entry for 200.1.1.0/24
```

```
Known via "eigrp 1", distance 90, metric 2967058, type internal
```

```
Redistributing via eigrp 1
```

```
Last update from 10.14.1.4 on Serial2/2, 00:02:56 ago
```

```
Routing Descriptor Blocks:
```

```
10.14.1.4, from 10.14.1.4, 00:02:56 ago, via Serial2/2
```

```
Route metric is 3479040, traffic share count is 205
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1100 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
* 10.13.1.3, from 10.13.1.3, 00:02:56 ago, via Serial2/1
```

```
Route metric is 3011346, traffic share count is 236
```

```
Total delay is 50971 microseconds, minimum bandwidth is 1500 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
10.12.1.2, from 10.12.1.2, 00:02:56 ago, via Serial2/0
```

```
Route metric is 2967058, traffic share count is 240
```

```
Total delay is 50971 microseconds, minimum bandwidth is 1540 Kbit
```

```
Reliability 255/255, minimum MTU 1500 bytes
```

```
Loading 1/255, Hops 2
```

```
=====
Summarization with leak map
```

```
R1
int lo 1
ip add 192.168.1.1 255.255.255.0
int lo 2
ip add 192.168.2.2 255.255.255.0
```

```
Router ei 1
net 192.168.1.0
net 192.168.2.0
exit
```

```
R3
int s2/0
bandwidth 1500
exit
```

R5:Verification

D 192.168.0.0/24 [90/2809856] via 10.25.1.2, 00:00:03, Serial2/0  
D 192.168.1.0/24 [90/2809856] via 10.25.1.2, 00:00:03, Serial2/0  
D 192.168.2.0/24 [90/2809856] via 10.25.1.2, 00:00:03, Serial2/0

R1: Summarization

8 8 X  
N N N H  
192.168.0.0  
192.168.1.0  
192.168.2.0

```

      128 64 32 16 8 4 |2 1
0      0  0  0  0  0 0 0 0
1      0  0  0  0  0 0 0 1
2      0  0  0  0  0 0 0 10
AND    0  0  0  0  0 0 0 0 =0
```

192.168.0.0/22

192.168.0.0 255.255.252.0

R1

int s2/0  
ip summary-address eigrp 1 192.168.0.0 255.255.252.0  
exit

R5:

D 192.168.0.0/22 [90/2809856] via 10.25.1.2, 00:00:21, Serial2/0  
D 192.168.0.0/24 [90/2858496] via 10.35.1.3, 00:00:21, Serial2/1  
D 192.168.1.0/24 [90/2858496] via 10.35.1.3, 00:00:21, Serial2/1  
D 192.168.2.0/24 [90/2858496] via 10.35.1.3, 00:00:21, Serial2/1

R5(config)#do trace 192.168.0.1 so lo0

Type escape sequence to abort.

Tracing the route to 192.168.0.1

VRF info: (vrf in name/id, vrf out name/id)

1 10.35.1.3 12 msec 7 msec 11 msec

2 10.13.1.1 17 msec 21 msec 24 msec

R1

int s2/1  
ip summary-address eigrp 1 192.168.0.0/22

R5;

D 192.168.0.0/22 [90/2809856] via 10.25.1.2, 00:00:07, Serial2/0

R1: Summ with leak map

```
Access-list 2 permit 192.168.2.0 0.0.0.255
```

```
Route-map RM-LEAK-MAP permit 10  
match ip add 1  
exit
```

```
int s2/1  
ip summary-address eigrp 1 192.168.0.0/22 leak-map RM-LEAK-MAP  
exit
```

```
R5  
D 192.168.0.0/22 [90/2809856] via 10.25.1.2, 00:07:18, Serial2/0  
D 192.168.2.0/24 [90/2858496] via 10.35.1.3, 00:00:40, Serial2/1
```

```
=====  
=====
```