

Eigrp best path selection

RD : Reported Distance is the value from next hop router to the destination
AD: Advertised Distance
CD : Computed Distance (Source to Dest)
FD : Feasible Distance lowest CD value in the history of that route
FS : Feasible Successor is bkup route installed in topology table in ready state
FC : Feasible condition is FS RD < FD of current successor

```

                RD                      CD
RA--8--RB-----8-----DEST          16  ----> Feasible Successor installed in
topology (BKup route)
RA--4--RC-----23-----DEST          27  ----> Possibility          sh ip eigrp top
all-links
RA--2--RD-----9-----DEST          11 (FD) --> Successor route  installed in
RIB/Topology
```

RB 8<11
RC 23 >11 (FC fails)

```

                RD                      CD
RA--5---RB-----11-----DEST          16  ----> Possibility
RA--10--RC-----10-----DEST          20  ----> Feasible Successor installed in
topology (BKup route)
RA--2---RD-----9-----DEST          11 (FD) --> Successor route  installed in
RIB/Topology
RA--3---RD-----1-----DEST          11 (FD) --> Successor route  installed in
RIB/Topology
```

```

                RD                      CD
RA--8--RB-----8-----DEST          16  ----> Feasible Successor installed in
topology (BKup route)
RA--4--RC-----23-----DEST          27  ----> Possibility          sh ip eigrp top
all-links
RA--2--RD-----10-----DEST          12 ( 11-FD) --> Successor route  installed
in RIB/Topology
```

```

                RD                      CD
RA--8--RB-----8-----DEST          16  ----> Feasible Successor installed in
topology (BKup route)
RA--4--RC-----23-----DEST          27  ----> Possibility          sh ip eigrp top
all-links
RA--2--RD-----8-----DEST          10 ( FD) --> Successor route  installed in
RIB/Topology
```

=====
R1:
conf t
int lo 0
Desc LAN
ip add 1.1.1.1 255.255.255.0
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 sh
int s2/2
Desc conn to R4
ip add 10.14.1.1 255.255.255.0
no shut
exit
```

```
router eigrp 100
net 10.12.1.1 0.0.0.0
net 10.13.1.1 0.0.0.0
net 10.14.1.1 0.0.0.0
net 1.1.1.1 0.0.0.0
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 sh
exit
```

```
Router eigrp 100
net 10.12.1.0 255.255.255.0
net 10.25.1.0 255.255.255.0
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 sh
exit
```

```
router eigrp 100
network 10.13.1.0 0.0.0.255
network 10.35.1.0 0.0.0.255
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 sh
exit
```

```
router eigrp 100
net 10.0.0.0
exit
```

```
R5:
conf t
int lo 0
Desc LAN
ip add 200.1.1.1 255.255.255.0
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 sh
int s2/2
Desc conn to R4
ip add 10.45.1.5 255.255.255.0
no shut
exit
```

```
router eigrp 100
net 0.0.0.0
exit
```

```
R1:
sh ip eigrp top
```

```
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 200.1.1.0 255.255.255.0 longer-prefixes | B Gate
Gateway of last resort is not set
```

```
D    200.1.1.0/24 [90/2809856] via 10.14.1.4, 00:02:36, Serial2/2
                               [90/2809856] via 10.13.1.3, 00:02:36, Serial2/1
                               [90/2809856] via 10.12.1.2, 00:02:36, Serial2/0
```

ECMP

```
R1(config)#do trace 200.1.1.1 so lo0
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 11 msec
    10.13.1.3 10 msec
    10.14.1.4 10 msec
  2 10.25.1.5 20 msec
    10.35.1.5 19 msec
```

10.45.1.5 21 msec

```
R1(config)#do sh ip route 200.1.1.0
Routing entry for 200.1.1.0/24
  Known via "eigrp 100", distance 90, metric 2809856, type internal
  Redistributing via eigrp 100
  Last update from 10.12.1.2 on Serial2/0, 00:03:07 ago
  Routing Descriptor Blocks:
  * 10.14.1.4, from 10.14.1.4, 00:03:07 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, 00:03:07 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, 00:03:07 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
```

```
sh ip eigrp top all-links
P 200.1.1.0/24, 1 successors, FD is 2809856, serno 13
  via 10.12.1.2 (2809856/2297856), Serial2/0 ---> Successor
installed in RIB/topology
  via 10.14.1.4 (3479040/2967040), Serial2/2 --.> Possibility RD>FD
2967040>2809856 topology all-likes
  via 10.13.1.3 (3285248/2773248), Serial2/1 --> Feasible Successor RD<FD
2773248< 2809856 installed in topology
```

```
=====
R1(config)# do sh ip route 200.1.1.0 255.255.255.0 longer-prefixes | B Gate
Gateway of last resort is not set
```

```
D 200.1.1.0/24 [90/2809856] via 10.12.1.2, 00:03:06, Serial2/0
```

```
R1:
int s2/0
Desc Successor route
Shut
exit
```

When the successor goes down or its CD changes to a higher value more than FS then FS will be installed in RIB automatically

```
R1(config)# do sh ip route 200.1.1.0 255.255.255.0 longer-prefixes | B Gate
Gateway of last resort is not set
```

```
D 200.1.1.0/24 [90/3285248] via 10.13.1.3, 00:00:06, Serial2/1
```

```
R1:
int s2/0
Desc Successor route
no Shut
exit
```

When the successor comes back it will replace the FS in RIB.

```
R1(config)#do sh ip route 200.1.1.0 255.255.255.0 longer-prefixes | B Gate
Gateway of last resort is not set
```

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

```
FD:
R2
int s2/1
band 1500
```

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

```
=====
UnEqual Load balancing:
```

```
P 200.1.1.0/24, 1 successors, FD is 2809856
   via 10.12.1.2 (2858496/2346496), Serial2/0  --Successor
   via 10.13.1.3 (3285248/2773248), Serial2/1  --Feasible Successor
```

To add Feasible successor to the routing table ,Eigrp has a feature called variance

```
sh ip protocol
Maximum metric variance 1 (Default) Range <1-128>
```

```
Variance =CD of FS/FD of Successor
          =3285248/2858496
          =1.14
          =2
```

```
Ceil =1.0001 =2
Floor = 1.999 =1
Round =1.5 =2
      =1.4 =1
```

```
Router Eigrp 100
Variance 2
exit
```

```
Maximum metric variance 2
```

```
R1(config)#do sh ip route 200.1.1.0 255.255.255.0 longer-prefixes | B Gat
Gateway of last resort is not set
```

```
D    200.1.1.0/24 [90/3285248] via 10.13.1.3, 00:00:30, Serial2/1
                          [90/2858496] via 10.12.1.2, 00:00:30, Serial2/0
```

```
R1(config)#do sh ip route 200.1.1.0
Routing entry for 200.1.1.0/24
  Known via "eigrp 100", distance 90, metric 2858496, type internal
  Redistributing via eigrp 100
  Last update from 10.13.1.3 on Serial2/1, 00:01:08 ago
  Routing Descriptor Blocks:
    10.13.1.3, from 10.13.1.3, 00:01:08 ago, via Serial2/1
      Route metric is 3285248, traffic share count is 209
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1200 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 2
* 10.12.1.2, from 10.12.1.2, 00:01:08 ago, via Serial2/0
Route metric is 2858496, traffic share count is 240
Total delay is 45000 microseconds, minimum bandwidth is 1500 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 2
```

```
=====
To add possibility to the routing table
We will use Eigrp manipulating tool OFFSET list
```

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

```
router eigrp 100
offset-list 1 in 108550 s2/0
exit
```

```
D 200.1.1.0/24 [90/3479040] via 10.14.1.4, 00:00:22, Serial2/2
[90/3285248] via 10.13.1.3, 00:00:22, Serial2/1
[90/2967046] via 10.12.1.2, 00:00:22, Serial2/0
```

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

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

```
Known via "eigrp 100", distance 90, metric 2967046, type internal
```

```
Redistributing via eigrp 100
```

```
Last update from 10.14.1.4 on Serial2/2, 00:00:49 ago
```

```
Routing Descriptor Blocks:
```

```
10.14.1.4, from 10.14.1.4, 00:00:49 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, 00:00:49 ago, via Serial2/1
```

```
Route metric is 3285248, traffic share count is 217
```

```
Total delay is 45000 microseconds, minimum bandwidth is 1200 Kbit
```

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

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

```
* 10.12.1.2, from 10.12.1.2, 00:00:49 ago, via Serial2/0
```

```
Route metric is 2967046, traffic share count is 240
```

```
Total delay is 49241 microseconds, minimum bandwidth is 1500 Kbit
```

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

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

```
=====
MAX hop count
Default is 100
Range 1-255
```

```
Route eigrp 100
metric maximum-hops 255
exit
```

