

```

R1
conf t
int g0/0
Desc conn to LAN
ip add 10.1.1.1 255.255.255.0
no shut
int lo 0
ip add 11.1.1.1 255.255.255.0
int po 1
no shut
exit
int range g1/0,g2/0
no shut
channel-group 1
exit
int po 1
ip add 192.168.12.1 255.255.255.0
exit

router eigrp R1
!
address-family ipv4 unicast autonomous-system 100
!
topology base
exit-af-topology
network 10.1.1.1 0.0.0.0
network 11.1.1.1 0.0.0.0
network 192.168.12.0
exit-address-family

```

```

R2:
int po 1
no shut
exit
int range g1/0,g2/0
no shut
channel-group 1
exit
int po 1
ip add 192.168.12.2 255.255.255.0
exit

```

```

router eigrp R1
!
address-family ipv4 unicast autonomous-system 100
!
topology base
exit-af-topology
network 192.168.12.0
exit-address-family

```

=====

```

EIGRP_BANDWIDTH          10,000,000
EIGRP_DELAY_PICO         1,000,000
EIGRP_INACCESSIBLE      0xFFFFFFFFFFFFFFFFLL
EIGRP_MAX_HOPS           100
EIGRP_CLASSIC_SCALE      256
EIGRP_WIDE_SCALE         65536

```

```

      8M                               2M
lo0-----R1-----Po 1-----R2
11.1.1.0/24

```

```

(EIGRP_BANDWIDTH *
EIGRP_WIDE_SCALE)
Max-Throughput = K1 *
-----
Interface Bandwidth (kbps)
(min BW in the path)

```

$$\begin{aligned}
 &= 1 * (10000000 * 65536) / 2000000 \\
 &= 6,55,36,00,00,000 / 2000000 \\
 &= 3,27,680
 \end{aligned}$$

```

Delay in pico sec * EIGRP_WIDE_SCALE
-----
Latency = K3 *
EIGRP_DELAY_PICO

```

$$\begin{aligned}
 \text{Delay} &= 10^{13} / \text{Interface BW} \\
 &= 10000000000000 / 8000000 + 10000000000000 / 2000000 \\
 &= 12,50,000 + 50,00,000 \\
 &= 62,50,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Latency} &= 1 * (62,50,000 * 65536) / 1,000,000 \\
 &= 4,09,60,00,00,000 / 1000000 \\
 &= 4,09,600
 \end{aligned}$$

$$\begin{aligned}
 \text{metric} &= (K1 * \min(\text{Throughput})) + (K3 * \text{sum}(\text{Latency})) \\
 &= 3,27,680 + 4,09,600 \\
 &= 7,37,280 \text{ --> 64 bit value} \\
 &= 737280 / 128 \\
 &= 5,760 \text{ =Installed in RIB}
 \end{aligned}$$

```

      1M                               2M
go-----R1-----Po 1-----R2
10.1.1.0/24

```

```

(EIGRP_BANDWIDTH *
EIGRP_WIDE_SCALE)
Max-Throughput = K1 *
-----
Interface Bandwidth (kbps)
(min BW in the path)

```

$$\begin{aligned}
 &= 1 * (10000000 * 65536) / 1000000 \\
 &= 6,55,36,00,00,000 / 1000000 \\
 &= 6,55,36,0
 \end{aligned}$$

Latency = K3 * Delay in pico sec * EIGRP_WIDE_SCALE

EIGRP_DELAY_PICO

Delay = $10^{13}/\text{Interface BW}$
= $10000000000000/1000000 + 10000000000000/2000000$
= $1,00,00,000 + 50,00,000$
= $1,50,00,000$

Latency = $1 * (1,50,00,000 * 65536) / 1,000,000$
= $9,83,04,00,00,000 / 1000000$
= $9,83,040$

metric = $(K1 * \min(\text{Throughput})) + (K3 * \text{sum}(\text{Latency}))$ }
= $6,55,36,0 + 9,83,040$
= $16,38,400$ --> 64 bit value
= $16,38,400 / 128$
= $12,800$ = Installed in RIB

=====
Summarization:

R1:

```
conf t
int g1/0
Desc LAN
ip add 192.168.0.1 255.255.255.0
no sh
int g0/0
Desc conn to R2
ip add 10.12.1.1 255.255.255.0
no shut
int lo 0
ip add 10.1.100.1 255.255.255.0
int lo 1
ip add 10.1.200.1 255.255.255.0
exit
```

R3

```
conf t
int e0/1
Desc LAN
ip add 192.168.1.1 255.255.255.0
no sh
int e0/0
Desc conn to R2
ip add 10.23.1.3 255.255.255.0
no shut
int lo 0
ip add 10.3.100.1 255.255.255.0
int lo 1
ip add 10.3.200.1 255.255.255.0
exit
exit
```

```
R2
conf t
int e0/1
Desc conn to R1
ip add 10.12.1.2 255.255.255.0
no sh
int e0/2
Desc conn to R3
ip add 10.23.1.2 255.255.255.0
no shut
int e0/0
Desc conn to R4
ip add 2.2.2.2 255.255.255.0
no sh
int s2/0
Desc conn to R4
ip add 1.1.1.2 255.255.255.0
exit
int lo 0
ip add 192.168.2.2 255.255.255.0
exit
```

```
R4
conf t
int s2/0
Desc conn to R2
ip add 1.1.1.4 255.255.255.0
no sh
int e0/0
ip add 2.2.2.4 255.255.255.0
no sh
int lo 0
ip add 4.4.4.4 255.255.255.0
```

```
=====
R1
key chain abc
  key 1
  key-string cisco123
exit
```

```
router eigrp 1
net 10.12.1.1 0.0.0.0
net 192.168.0.1 0.0.0.0
exit
```

```
int g0/0
  ip authentication mode eigrp 100 md5
  ip authentication key-chain eigrp 100 abc
exit
```

```
=====
R2:
 8      8      x H
192.168.0.0
192.168.1.0
192.168.2.0
```

```

3rd octet
      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  1  0
AND    0      0  0  0  0  0  0  0 =0

```

```

192.168.0.0 255.255.252.0
192.168.0.0/22

```

```

=====
R2

```

```

router eigrp R2
!
address-family ipv4 unicast autonomous-system 100
!
af-interface Ethernet0/1
 authentication mode md5
 authentication key-chain abc
exit-af-interface
!
af-interface Ethernet0/2
 authentication mode hmac-sha-256 cisco123
exit-af-interface
!
af-interface Ethernet0/0
 summary-address 192.168.0.0 255.255.252.0
exit-af-interface
!
af-interface Serial2/0
 summary-address 192.168.0.0 255.255.252.0 leak-map RM-LM
exit-af-interface
!
topology base
 distribute-list 10 in
 distribute-list prefix abc out
 summary-metric 192.168.0.0/22 1000000 10 255 1 1500
exit-af-topology
network 1.1.1.2 0.0.0.0
network 2.2.2.2 0.0.0.0
network 10.12.1.2 0.0.0.0
network 10.23.1.2 0.0.0.0
network 192.168.2.2 0.0.0.0
exit-address-family

ip prefix-list abc seq 5 deny 10.3.100.0/24
ip prefix-list abc seq 10 permit 0.0.0.0/0 le 32
!

access-list 10 deny 10.1.100.0 0.0.0.255
access-list 10 permit any
!

Access-list 1 permit 192.168.1.0 0.0.0.255

Route-map RM-LM permit 10

```

```
match ip add 1
exit
```

```
-----
-----
R3# sh run | s eigrp
router eigrp R3
!
address-family ipv4 unicast autonomous-system 100
!
af-interface Ethernet0/0
 authentication mode hmac-sha-256 cisco123
exit-af-interface
!
topology base
exit-af-topology
network 10.0.0.0
network 10.23.1.0 0.0.0.255
network 192.168.1.0
exit-address-family
```

```
R4
router eigrp 100
 network 0.0.0.0
exit
```