



Let's configure these routers based on the above diagram.

### On SW1:

```
SW1 (config) #int range f0/7-8
SW1 (config-if-range) #swi mode acc
SW1 (config-if-range) #swi acc v 100
SW1 (config-if-range) #No shut
```

### On R7:

```
R7 (config) #int g0/0
R7 (config-if) #ip addr 78.1.1.7 255.255.255.0
R7 (config-if) #No shut
```

### On R8:

```
R7 (config) #int g0/0
R7 (config-if) #ip addr 78.1.1.8 255.255.255.0
R7 (config-if) #No shut
```

```
R7 (config) #int lo0
R7 (config-if) #ip addr 8.8.8.8 255.255.255.0
```

### To test the configuration:

### On R7:

```
R7 #Ping 78.1.1.8
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 78.1.1.8, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms

We can see that the routers have NLRI to each other's directly connected interface. Let's configure EIGRP Named mode on the G0/0 interfaces of R7 and R8 and the loopback0 interface of R8:

## On R7:

```
R7(config)#router eigrp tst
R7(config-router)#address-family ipv4 unicast autonomous-system 100
R7(config-router-af)#Network 78.1.1.7 0.0.0.0
```

## On R8:

```
R8(config)#router eigrp tst
R8(config-router)#address-family ipv4 unicast autonomous-system 100
R8(config-router-af)#Network 8.8.8.8 0.0.0.0
R8(config-router-af)#Network 78.1.1.8 0.0.0.0
```

We should see the following console message stating that the two routers have established an EIGRP adjacency:

```
%DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 78.1.1.7
(GigabitEthernet0/0) is up: new adjacency
```

## Let's verify the routing table of R7:

### On R7:

```
R7#Show ip route eigrp | B Gate
Gateway of last resort is not set

      8.0.0.0/24 is subnetted, 1 subnets
D       8.8.8.0 [90/103040] via 78.1.1.8, 00:00:25, GigabitEthernet0/0
```

We can see that the local router's cost to get to prefix 8.8.8.0/24 is "103,040", let's check the topology table for this prefix:

### On R7:

```
R7#Show ip eigrp topology 8.8.8.0/24
```

EIGRP-IPv4 VR(tst) Topology Entry for AS(100)/ID(8.8.8.8) for 8.8.8.0/24

State is Passive, Query origin flag is 1, 1 Successor(s), **FD is 13189120**, **RIB is 103040**

Descriptor Blocks:

78.1.1.8 (GigabitEthernet0/0), from 78.1.1.8, Send flag is 0x0

Composite metric is (13189120/163840), route is Internal

Vector metric:

**Minimum bandwidth is 100,000 Kbit**

**Total delay is 101250000 picoseconds**

Reliability is 255/255

Load is 1/255

Minimum MTU is 1500

Hop count is 1

Originating router is 78.1.1.8

**NOTE: The feasible Distance is 13,189,120 but the RIB is 103,040, what is going on?**

In the EIGRP named mode configuration we can see a “Metric rib-scale” command and by default it is set to 128, therefore, if the Feasible Distance is divided by the RIB-Scale value we should see what is entered in the routing table, let’s verify:

**13,189,120 / 128 = 103,040**

**But why did Cisco do that?**

The variable in the routing table that allows the composite metric to be placed is a 32 bit value and therefore, larger numbers can’t be installed, therefore, the RIB-Scale command can reduce this number so it can fit in.

**So how does the local router calculate the feasible distance?**

EIGRP uses a number of defined constants for the calculation of the metric value and they are based on the following:

<b>EIGRP_BANDWIDTH</b>	<b>10,000,000</b>
<b>EIGRP_DELAY_PICO</b>	<b>1,000,000</b>

**Now that we know the constants let’s go through the calculation.**

**The formula for calculating the metric is:**

**Throughput + Latency**

**But let’s see how these are calculated:**

**Throughput = EIGRP\_BANDWIDTH \* 65536 / Min Bandwidth**

**This means the following:**

$$10,000,000 * 65536 / 100,000 = 6,553,600$$

**The “EIGRP\_BANDWIDTH” is the constant value described above and the “Min Bandwidth” is taken from the output of the “Show ip EIGRP topology 8.8.8.0/24” command.**

**Let’s see how the latency is calculated:**

**Latency = Total delay (In picoseconds) \* 65536 / EIGRP\_DELAY\_PICO**

**This means the following:**

$$101,250,000 * 65536 / 1,000,000 = 6,635,520$$

**The “Total delay” is also taken from the output of the “Show ip EIGRP topology 8.8.8.0/24” command, and the “EIGRP\_DELAY\_PICO” is the constant value described above.**

**NOW that we have calculated the latency, let’s add the latency to the throughput:**

$$6,553,600 + 6,635,520 = 13,189,120 \rightarrow \text{The Feasible Distance}$$

**I hope this was beneficial to you all. See you in the class.**