

## How Variance Works

- EIGRP multiplies the **best (lowest) Feasible Distance (FD)** by the **variance value**.
- Any **feasible successor** with a metric **less than or equal to this value** becomes **eligible for load balancing**.

### Formula:

Eligible if: Route Metric  $\leq$  (FD of best path  $\times$  Variance)

## Default Variance Value

variance = 1

This means: only **equal-cost** paths are used (normal behavior).

### Example: Understanding Variance with Routes

Imagine 3 paths to a destination with these metrics:

#### Path Metric (FD) RD < FD (Feasible)?

|            |  |
|------------|--|
| Path A 100 |  Yes (best route) |
| Path B 120 |  Yes              |
| Path C 200 |  Yes              |

Now apply different variance values:

#### With Variance = 1:

- Only metric  $\leq 100$  are used  $\rightarrow$  Only Path A

#### With Variance = 2:

- $FD \times 2 = 100 \times 2 = 200$
- Metrics  $\leq 200 \rightarrow$  Path A, B, C are used

 Now, EIGRP can load balance across **unequal paths**, improving bandwidth usage.

### How to Configure Variance in EIGRP

```
R1(config)# router eigrp 100  
R1(config-router)# variance 2
```

This tells EIGRP:

"Allow paths with up to 2x the cost of the best path — if they're feasible successors."

## Load Balancing with Variance

- If variance is applied and multiple paths qualify, EIGRP will:
  - Distribute traffic across those paths
  - Based on **metric ratios**, not equal splits (unless you use traffic-share balanced)