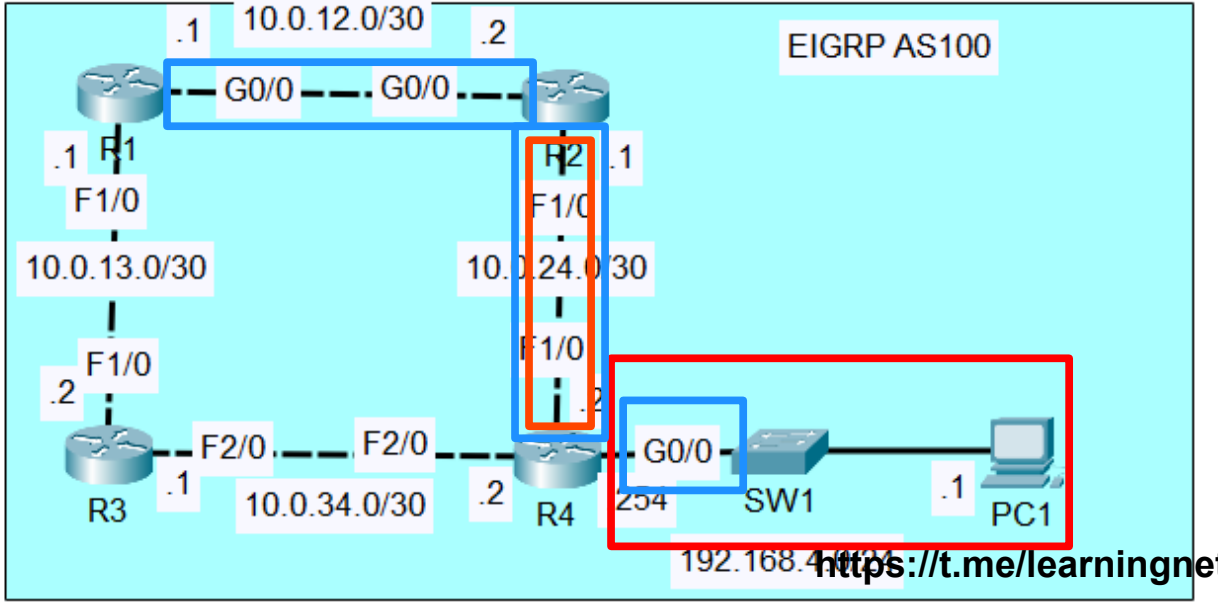
EIGRP Metric

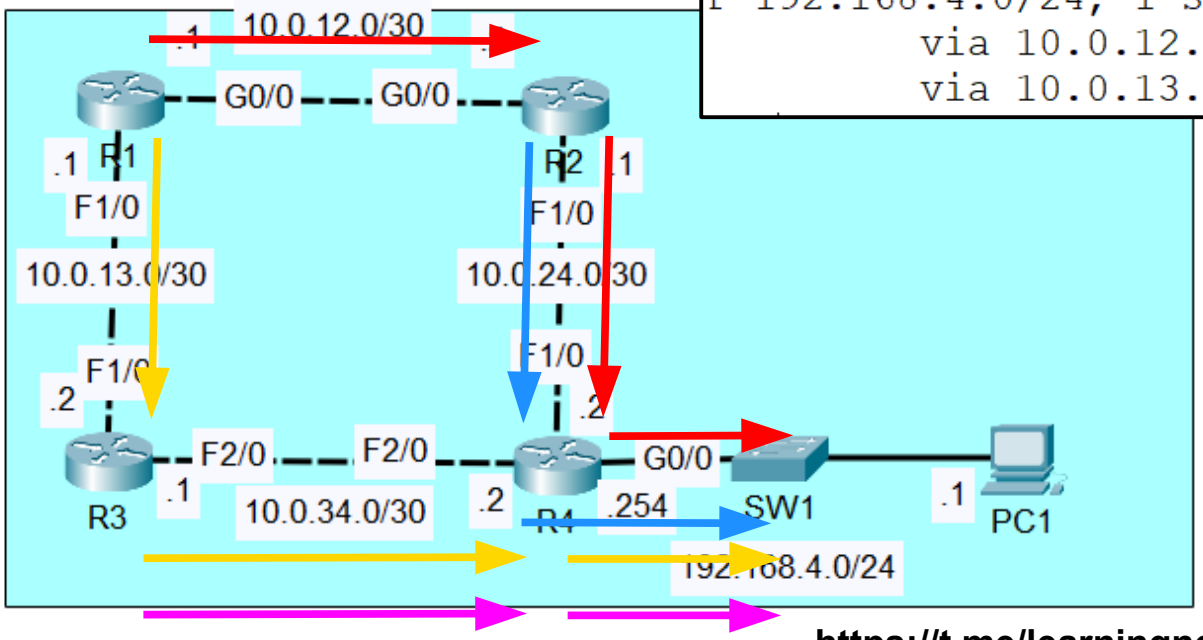
- By default, EIGRP uses **bandwidth** and **delay** to calculate metric.
- ([K1 * bandwidth + (K2 * bandwidth) / (256 - load) + K3 * delay] * [K5 / (reliability + K4)]) * 256
- The default ‘K’ values are K1 = 1, K2 = 0, K3 = 1, K4 = 0, K5 = 0
- You can simplify the formula like this: metric = bandwidth + delay



Bandwidth of the **slowest link**
+ the delay of **all links**

EIGRP Terminology

- **Feasible Distance** = This router's metric value to the route's destination.
- **Reported Distance** (aka Advertised Distance) = The neighbor's metric value to the route's destination.

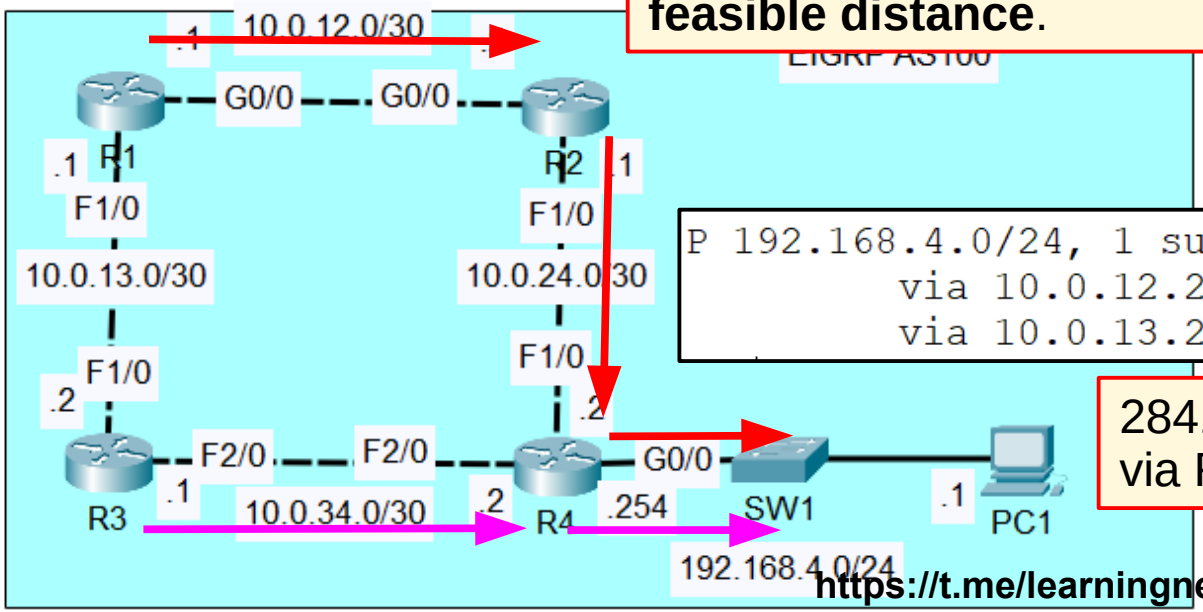



```
P 192.168.4.0/24, 1 successors, FD is 28672
        via 10.0.12.2 (28672/28416), GigabitEthernet0/0
        via 10.0.13.2 (30976/28416), FastEthernet1/0
```

EIGRP Terminology

- **Successor** = the route with the lowest metric to the destination (the best route)
- **Feasible Successor** = an alternate route to the destination (not the best route) <u>which meets the *feasibility condition*</u>

Feasibility condition: A route is considered a **feasible successor** if it's **reported distance** is lower than the **successor** route's **feasible distance**.




```
P 192.168.4.0/24, 1 successors, FD is 28672
        via 10.0.12.2 (28672/28416), GigabitEthernet0/0
        via 10.0.13.2 (30976/28416), FastEthernet1/0
```

28416 is less than 28672, so the route via R3 is a **feasible successor**.

EIGRP Unequal-Cost Load-Balancing

```
R1#show ip protocols

Routing Protocol is "eigrp  100 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
```

Variance 1 = only ECMP load-balancing will be performed

```
P 192.168.4.0/24, 1 successors, FD is 28672
        via 10.0.12.2 (28672/28416), GigabitEthernet0/0
        via 10.0.13.2 (30976/28416), FastEthernet1/0
```

EIGRP Unequal-Cost Load-Balancing

```
R1(config-router)#variance ?
  <1-128>  Metric variance Multiplier
R1(config-router)#variance 2
```

Variance 2 = **feasible successor** routes with an FD up to 2x the **successor** route's FD can be used to load-balance.

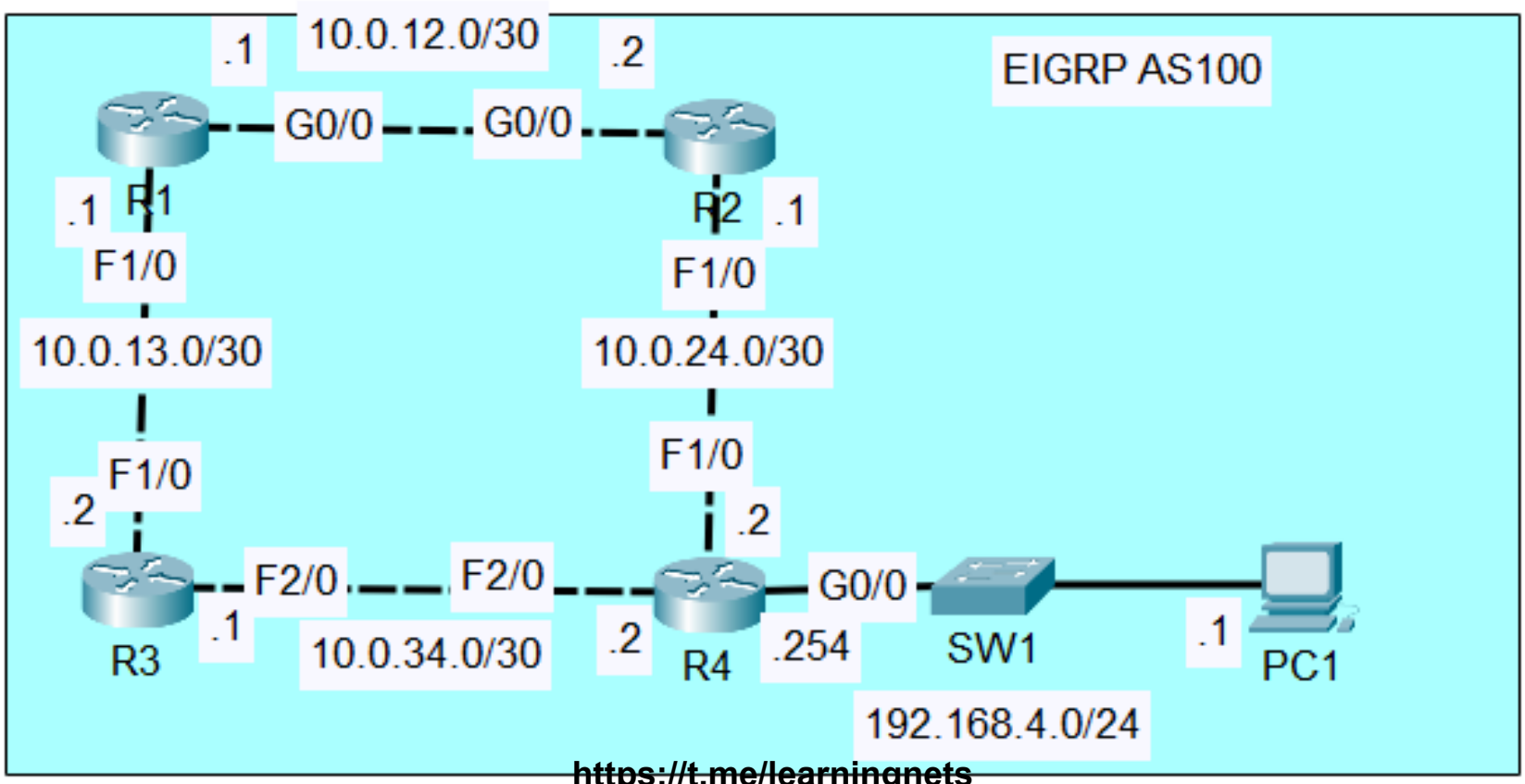
EIGRP will only perform unequal-cost load-balancing over **feasible successor** routes. If a route doesn't meet the feasibility requirement, it will NEVER be selected for load-balancing, regardless of the **variance**.

```
P 192.168.4.0/24, 1 successors, FD is 28672
        via 10.0.12.2 (28672/28416), GigabitEthernet0/0
        via 10.0.13.2 (30976/28416), FastEthernet1/0
```

28672 * 2 = 57344
30976 is less than 57344, so the route via R3 can now be used for load-balancing.

EIGRP Unequal-Cost Load-Balancing

```
D     192.168.4.0/24 [90/28672] via 10.0.12.2, 00:11:21, GigabitEthernet0/0
                     [90/30976] via 10.0.13.2, 00:11:21, FastEthernet1/0
```



EIGRP Terminology

- **Feasible Distance** = This router's metric value to the route's destination.
- **Reported Distance** (aka Advertised Distance) = The neighbor's metric value to the route's destination.
- **Successor** = the route with the lowest metric to the destination (the best route)
- **Feasible Successor** = an alternate route to the destination (not the best route) which meets the *feasibility condition*

Feasibility condition: A route is considered a **feasible successor** if it's **reported distance** is lower than the **successor** route's **feasible distance**.