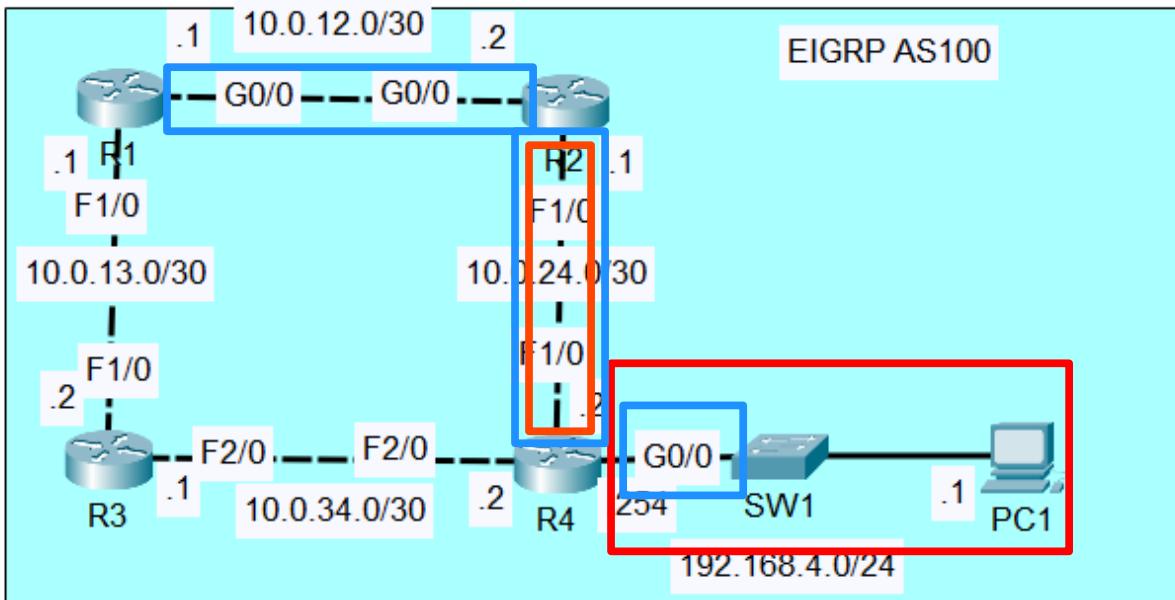


EIGRP Metric

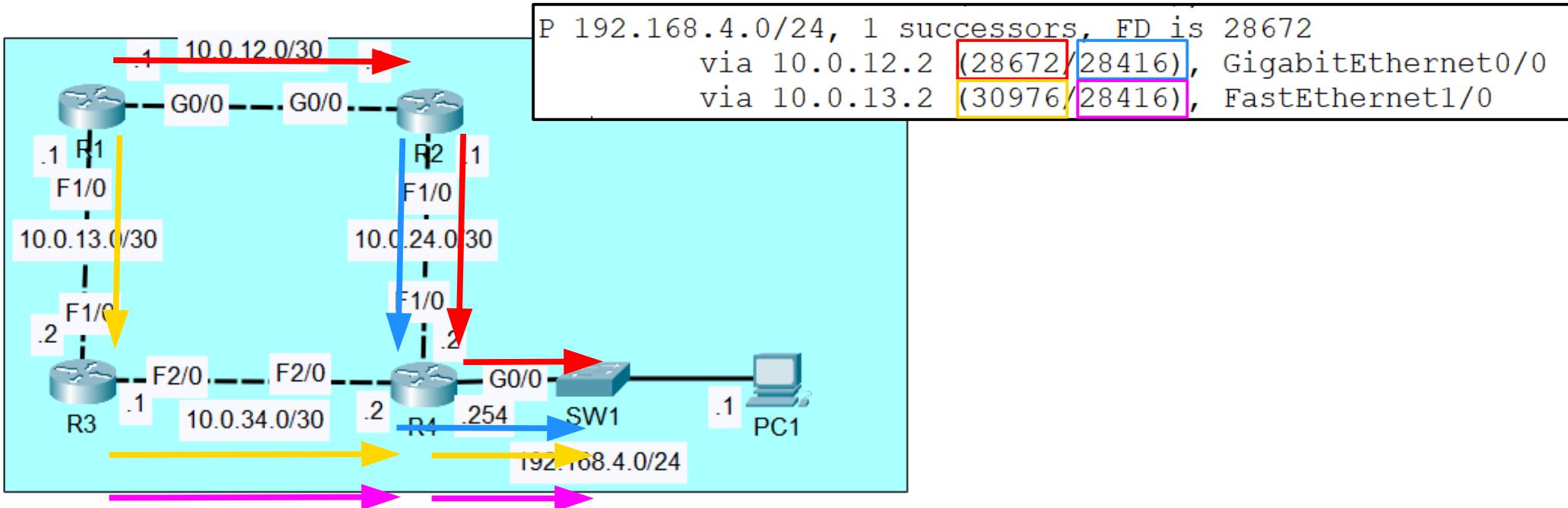
- By default, EIGRP uses **bandwidth** and **delay** to calculate metric.
- $([K1 * \text{bandwidth} + (K2 * \text{bandwidth}) / (256 - \text{load}) + K3 * \text{delay}] * [K5 / (\text{reliability} + K4)]) * 256$
- The default 'K' values are $K1 = 1$, $K2 = 0$, $K3 = 1$, $K4 = 0$, $K5 = 0$
- You can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



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

EIGRP Terminology

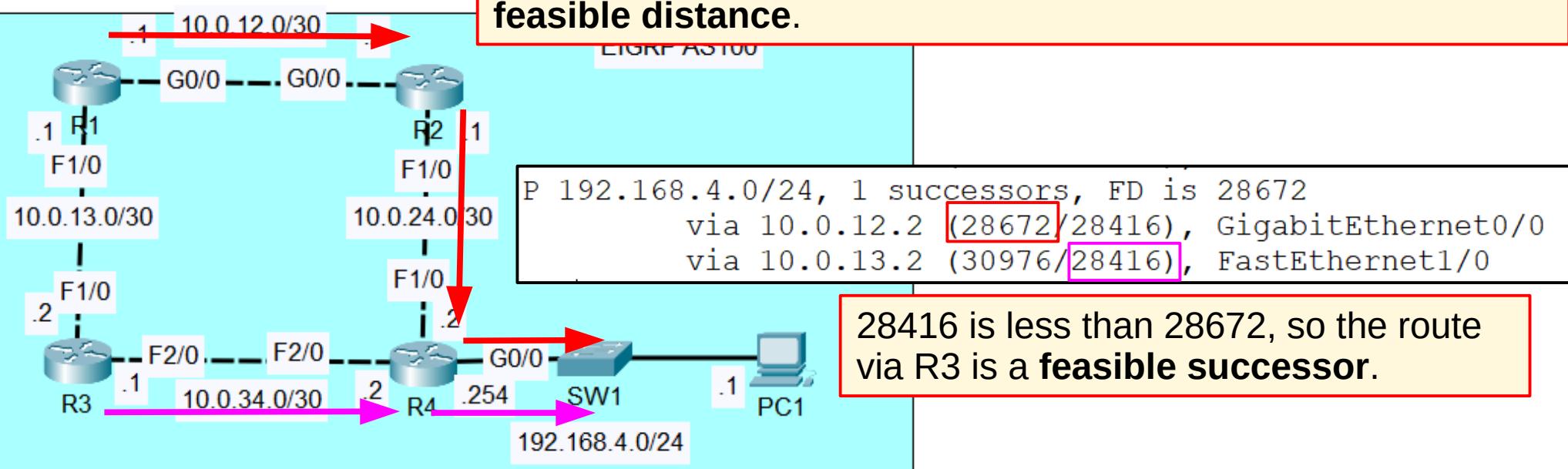
- **Feasible Distance** = This router's metric value to the route's destination.
- **Reported Distance** (aka Advertised Distance) = The neighbor's metric value to the route's destination.



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) which meets the feasibility condition

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



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**.

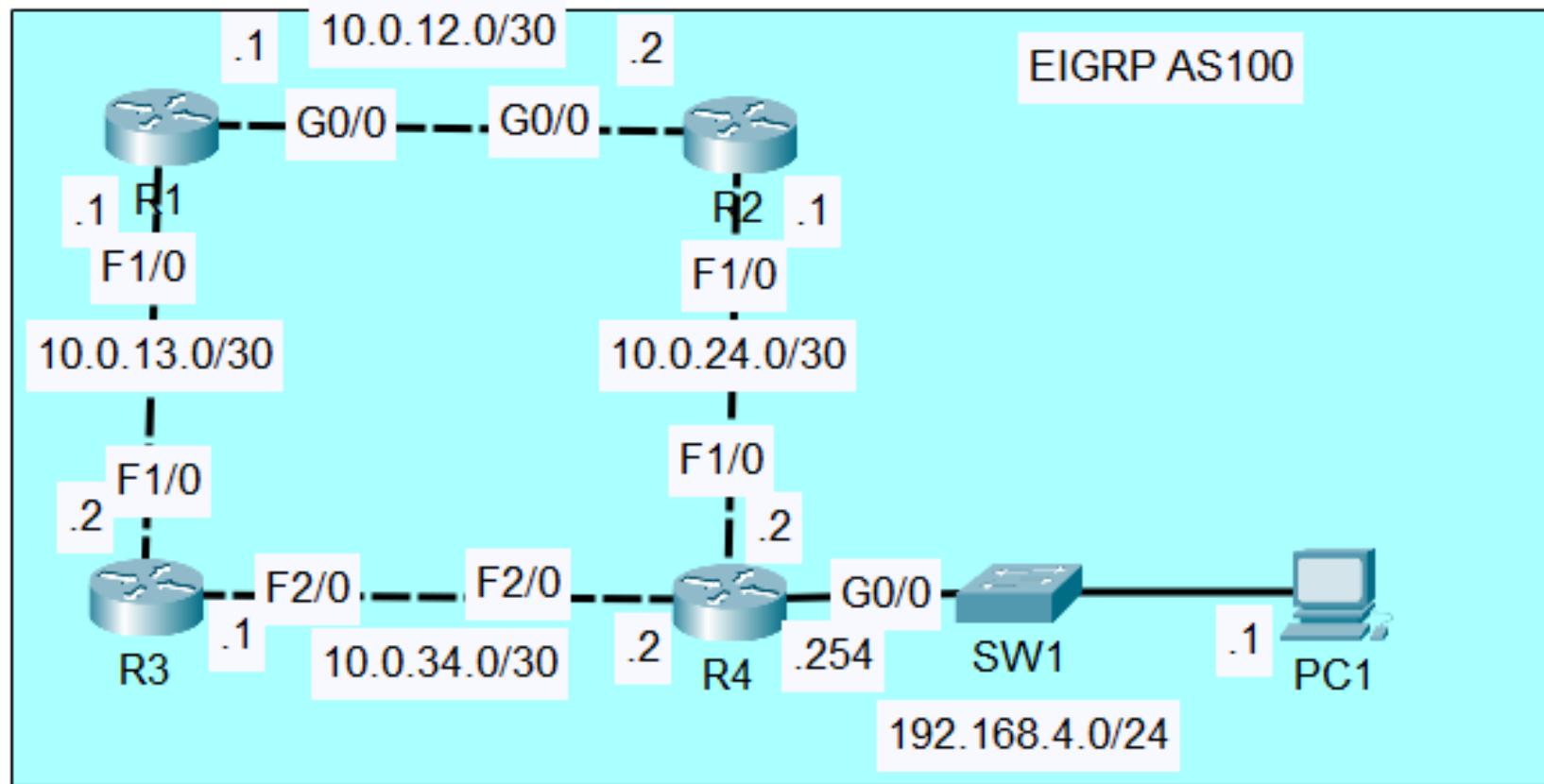
```
P 192.168.4.0/24, 1 successors, FD is 28672
    via 10.0.12.2 [28672]/28416), GigabitEthernet0/0
    via 10.0.13.2 [30976]/28416), FastEthernet1/0
```

$$28672 * 2 = 57344$$

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 its **reported distance** is lower than the **successor** route's **feasible distance**.