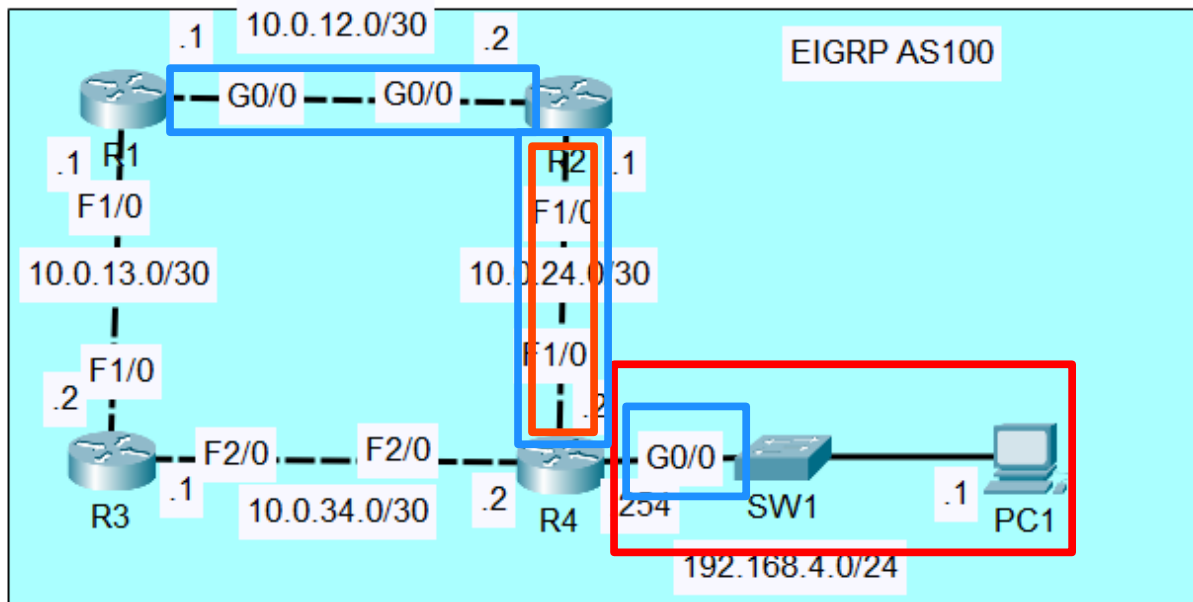


# EIGRP Metric

- 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**

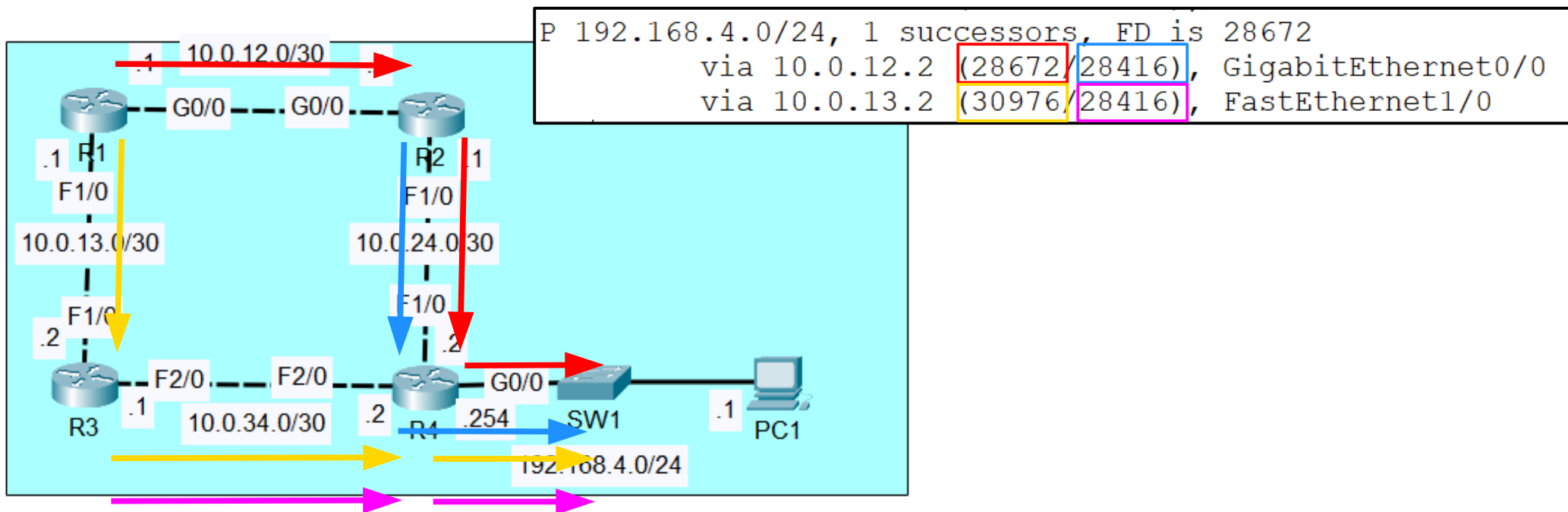


Bandwidth of the **slowest** link  
+ the delay of **all** links



# EIGRP Terminology

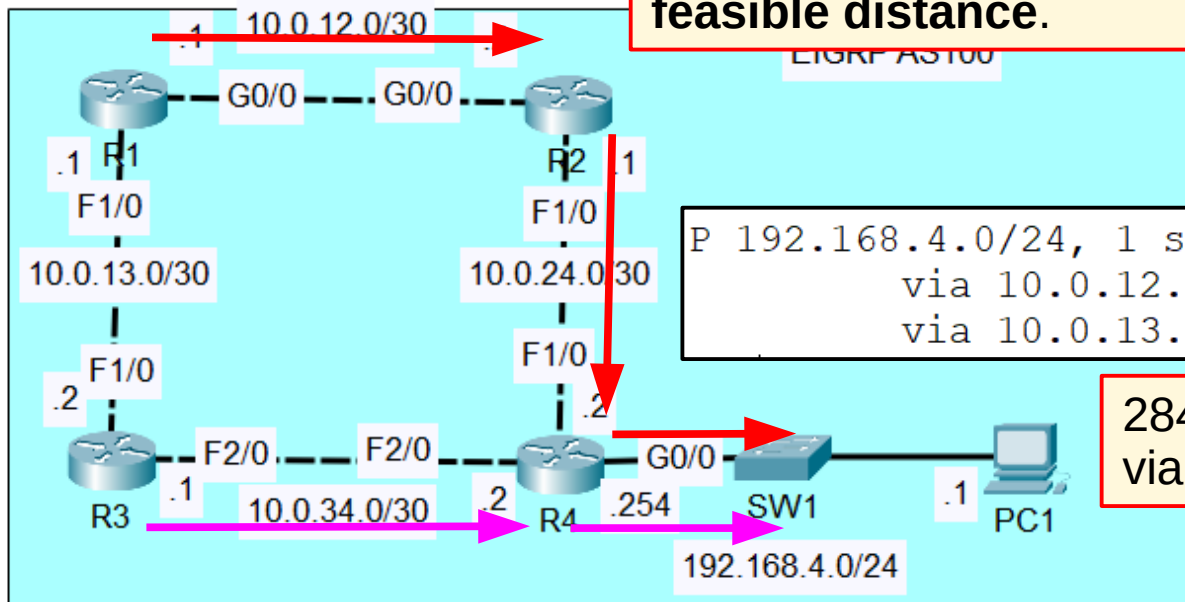
- **Feasible Distance** = This router's metric value to the route's destination.
- **Reported Distance** (aka Advertised Distance) = The neighbor's metric value to the route's destination.



# 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 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**.

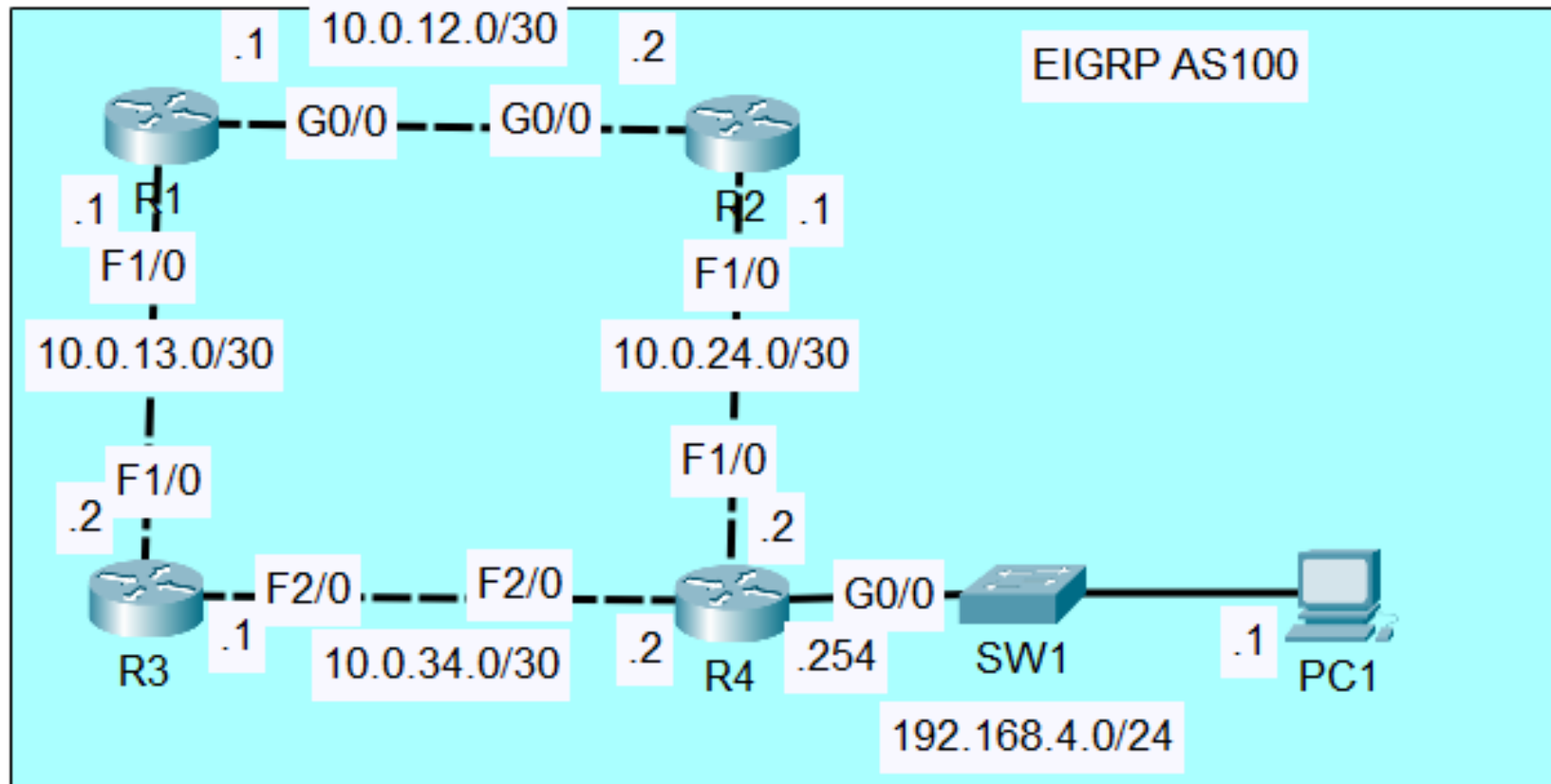
```
P 192.168.4.0/24, 1 successors, FD is 28672  
    via 10.0.12.2 [28672/28416], GigabitEthernet0/0  
    via 10.0.13.2 [30976/28416], FastEthernet1/0
```

$$28672 * 2 = 57344$$

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**.