

# CCNA Routing and Switching Study Guide

## Chapters 3 & 17: Enhanced IGRP

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# Chapter 19 objectives

The ICND2 topics covered in this chapter include:

- **IP Routing Technologies**

- **Differentiate methods of routing and routing protocols**
- **Administrative distance**
- **split horizon**
- **metric**
- **next hop**
- **Configure and verify EIGRP (single AS)**
- **Feasible Distance / Feasible Successors / Administrative distance**
- **Feasibility condition**
- **Metric composition**

# Chapter 19 objectives (con't)

The ICND2 topics covered in this chapter include:

- **IP Routing Technologies**
  - **Router ID**
  - **Auto summary**
  - **Path selection**
  - **Load balancing**
  - **Equal**
  - **Unequal**
  - **Passive interface**
  - **Troubleshooting**
  - **Troubleshoot and resolve routing issues**
  - **Routing is enabled**
  - **Routing table is correct**
  - **Correct path selection**
  - **Troubleshoot and resolve EIGRP problems**
  - **Neighbor adjacencies**
  - **AS number**
  - **Load balancing**
  - **Split horizon**

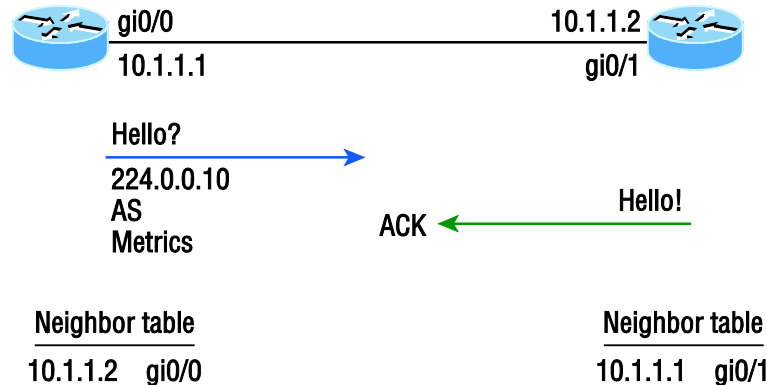
# EIGRP

*Enhanced Interior Gateway Routing Protocol (EIGRP)* is a Cisco protocol that runs on Cisco routers and on some Cisco switches.

EIGRP has a number of features that make it especially useful within large, complex networks. A real standout among these is its support of VLSM, which is crucial to its ultra-efficient scalability. EIGRP even includes benefits gained through other common protocols like OSPF and RIPv2, such as the ability to create route summaries at any location we choose.

# EIGRP neighbor discovery

Before EIGRP routers can exchange routes with each other, they must become neighbors, and there are three conditions that must be met before this can happen.



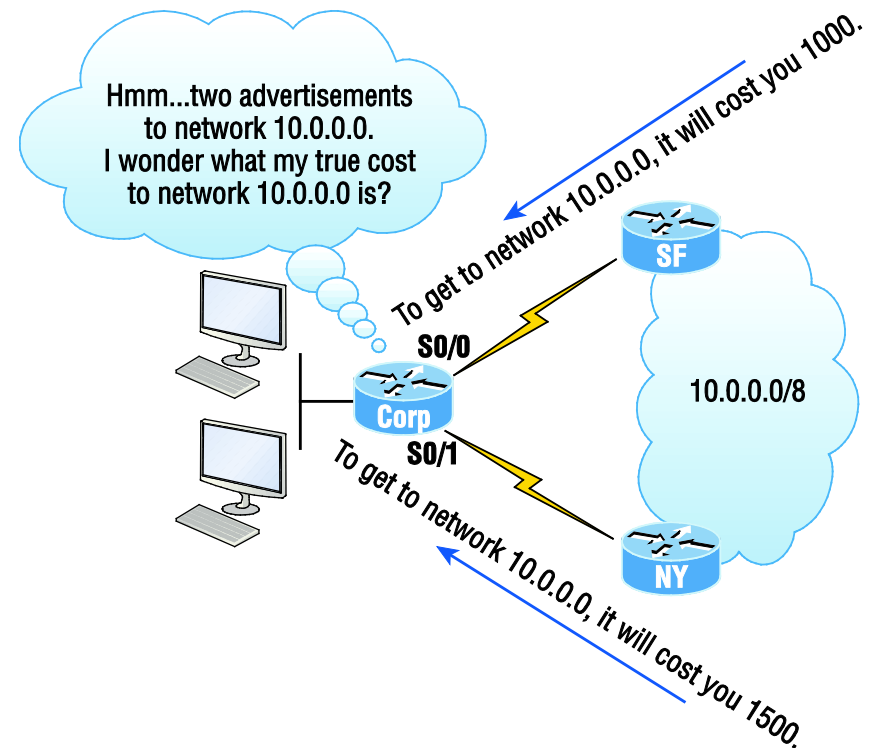
And these three things will be exchanged with directly connected neighbors:

- Hello or ACK received
- AS numbers match
- Identical metrics (K values)

# Advertised distance

## Reported/advertised distance (AD)

This is the metric of a remote network, as reported by a neighbor. It's also the routing table metric of the neighbor and is the same as the second number in parentheses as displayed in the topology table. The first number is the administrative distance. In the figure, routers SF and NY are both advertising the path to network 10.0.0.0 to the Corp router, but the cost through SF to network 10.0.0.0 is less than NY.

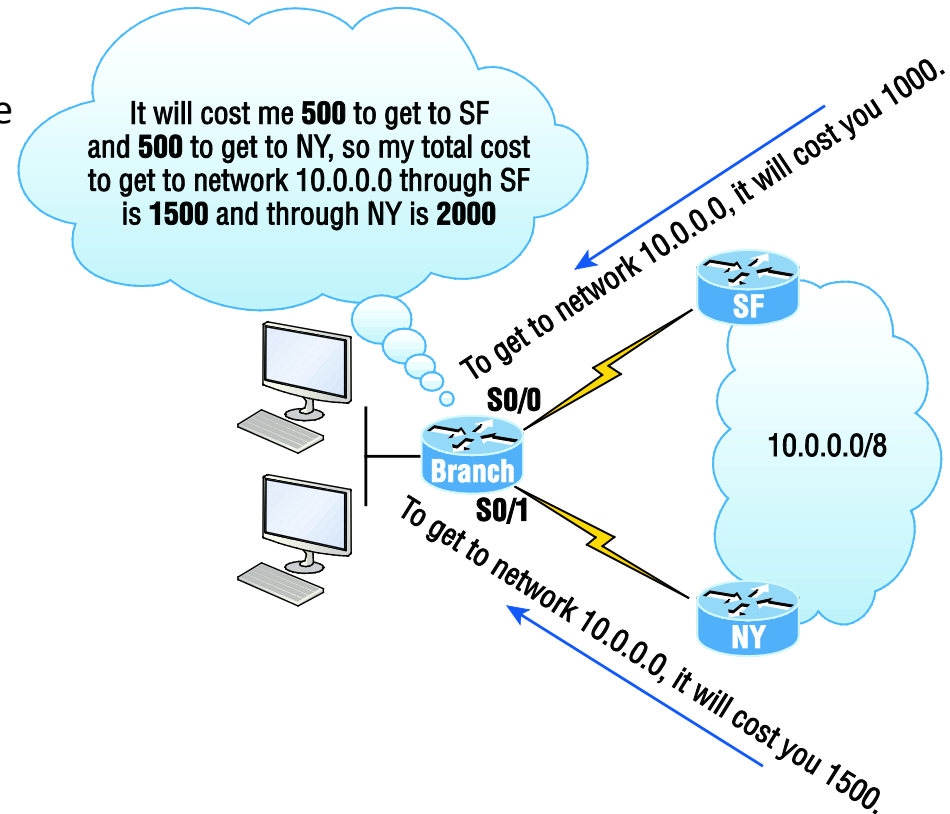


# Feasible distance

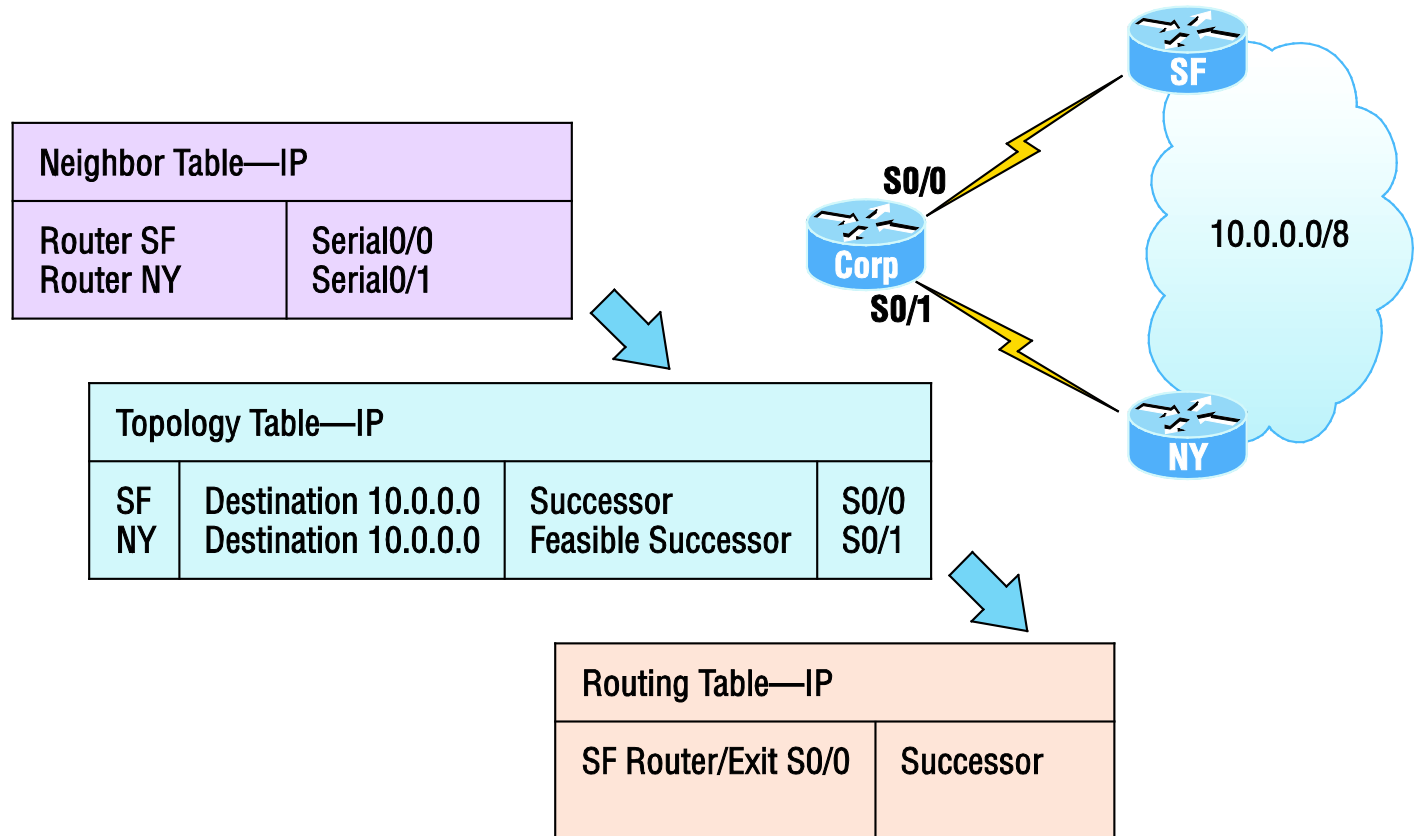
## Feasible distance (FD)

This is the best metric among all paths to a remote network, including the metric to the neighbor that's advertising the remote network. The route with the lowest FD is the route that you'll find in the routing table because it's considered the best path. The metric of a feasible distance is calculated using the metric reported by the neighbor that's referred to as the reported or advertised distance plus the metric to the neighbor reporting the route.

In the figure, the Corp router will have the path through router SF to network 10.0.0.0 in the routing table since it's the lowest feasible distance. It's the lowest true cost from end to end.

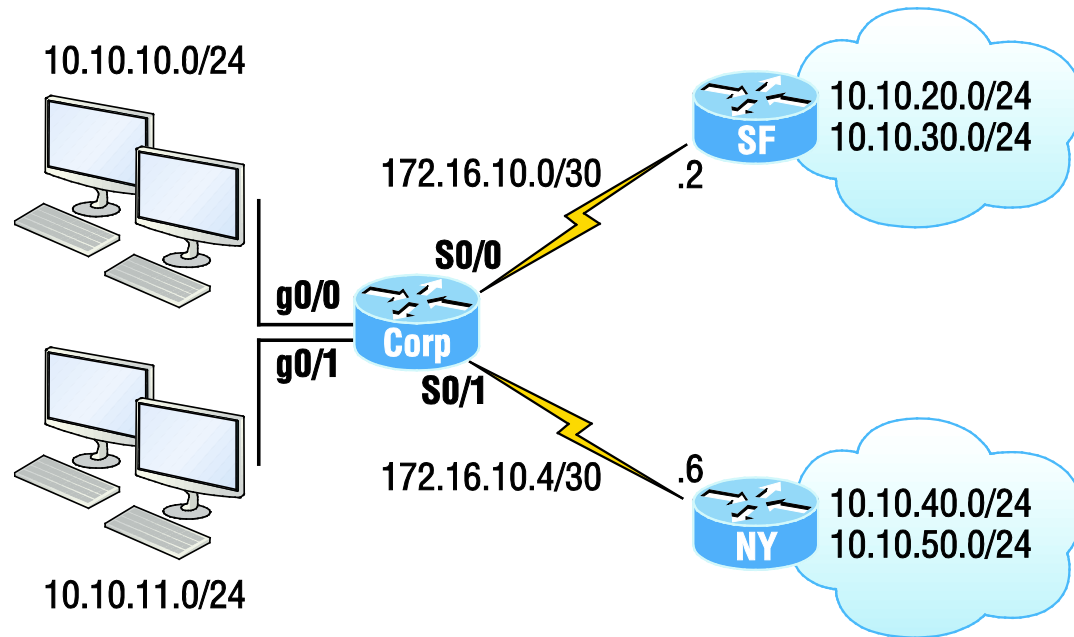


# The tables used by EIGRP



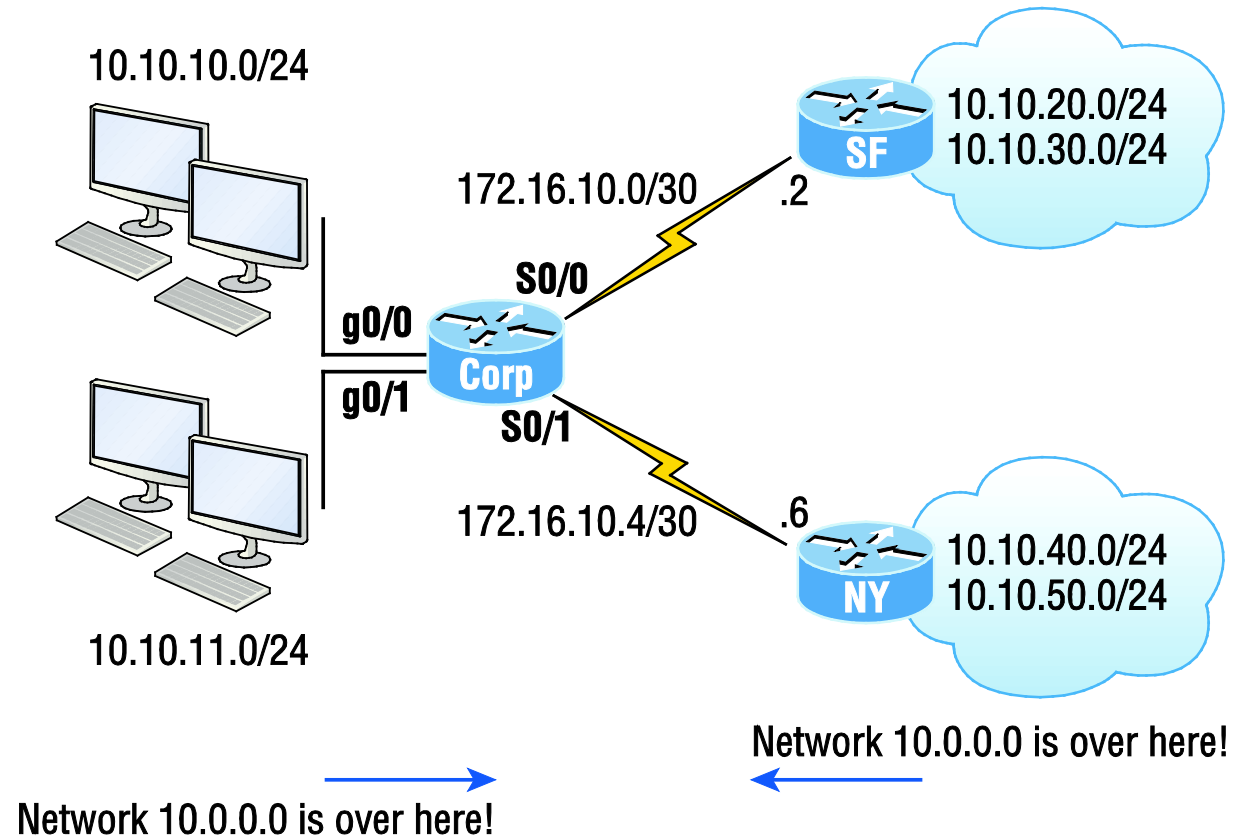


# Configuring our little internetwork with EIGRP

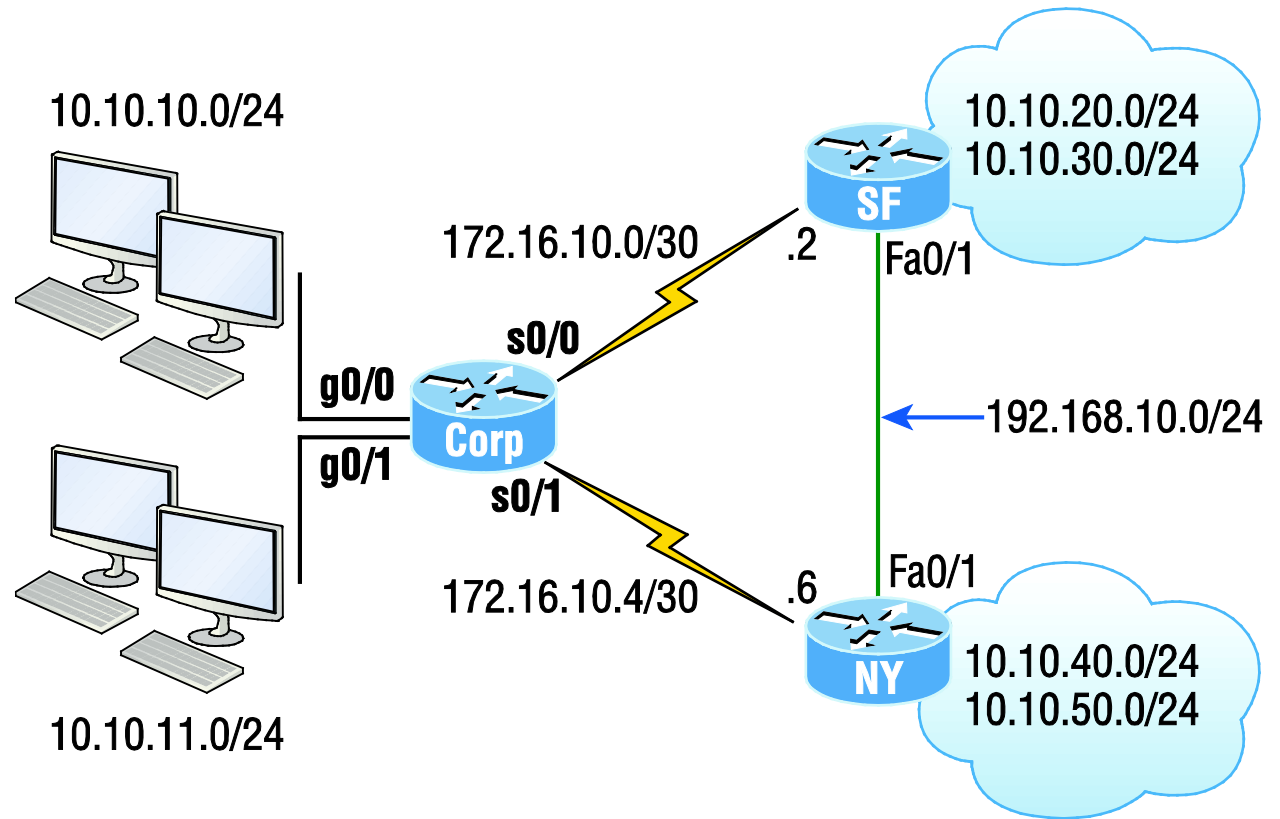


```
Corp#config t  
Corp(config)#router eigrp 20  
Corp(config-router)#network 172.16.0.0  
Corp(config-router)#network 10.0.0.0
```

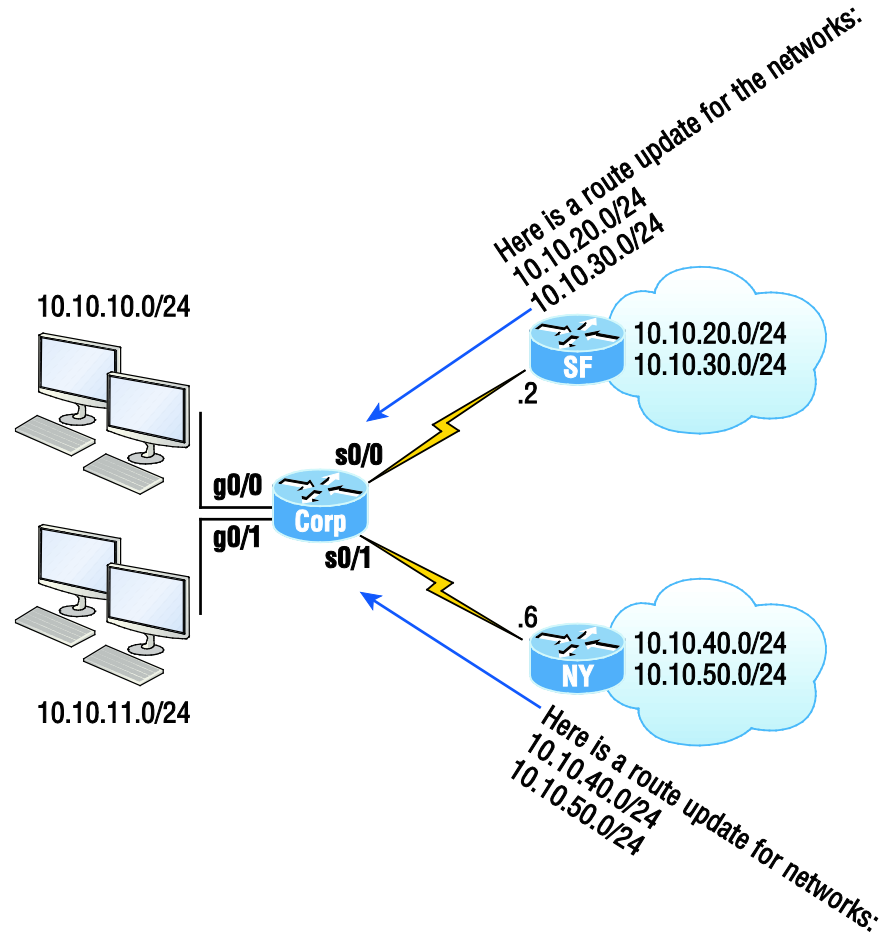
# Discontiguous networks



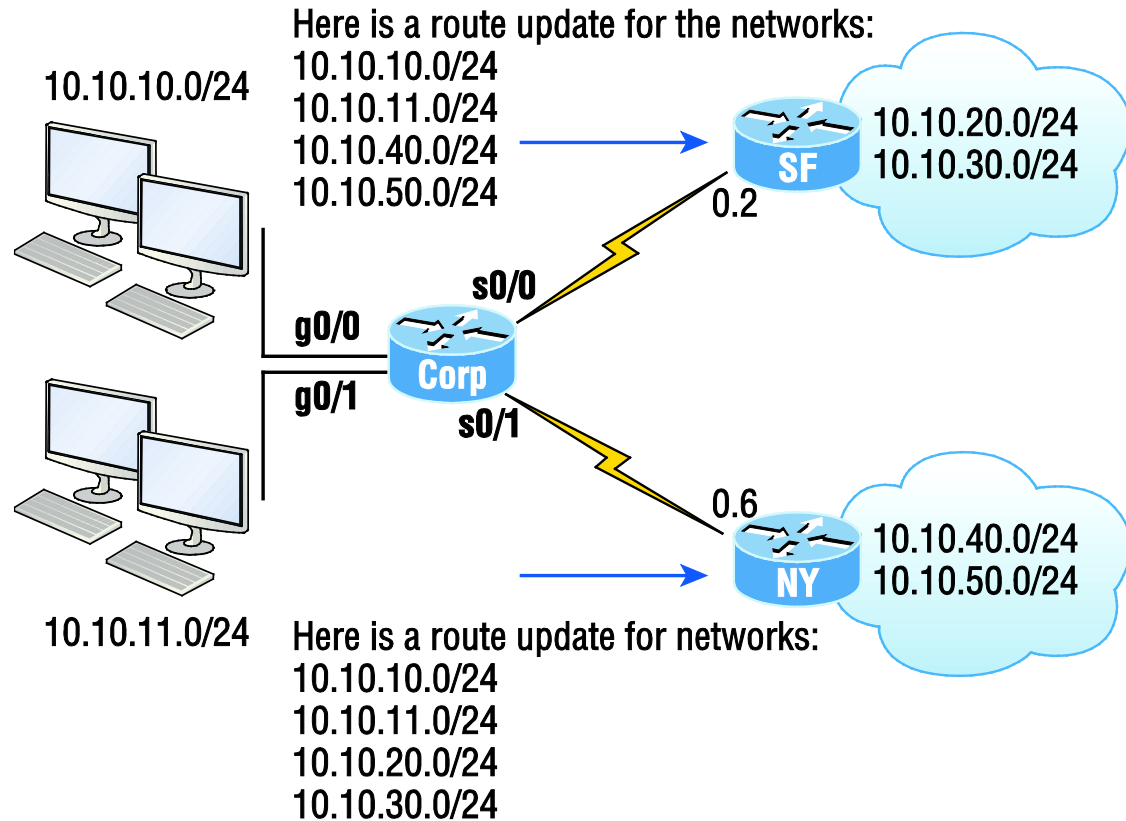
# EIGRP route selection process



# Split horizon in action, part 1



# Split horizon in action, part 2



# EIGRP troubleshooting commands

Command	Description/Function
show ip eigrp neighbors	Shows all EIGRP neighbors
show ip eigrp interfaces	Lists the interfaces on which the router has actually enabled EIGRP
show ip route eigrp	Shows EIGRP entries in the routing table
show ip eigrp topology	Shows entries in the EIGRP topology table
show ip eigrp traffic	Shows the packet count for EIGRP packets sent and received
show ip protocols	Shows information about the active protocol sessions

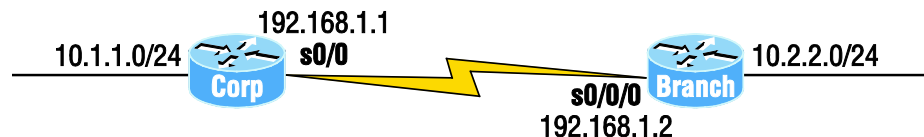
# Troubleshooting scenario

Here are some key things to look for if neighbors haven't formed an adjacency:

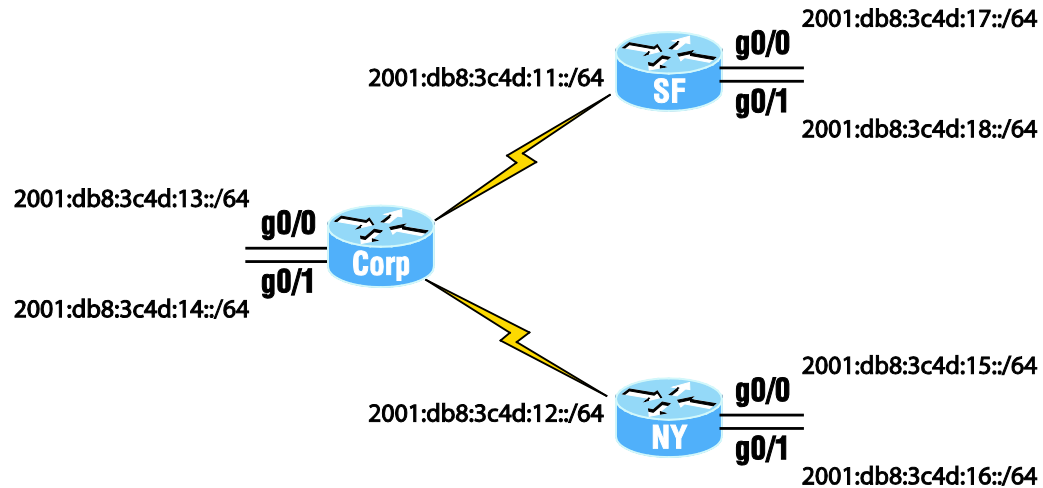
- Interfaces between the devices are down.
- The two routers have mismatching EIGRP autonomous system numbers.
- Proper interfaces are not enabled for the EIGRP process.
- An interface is configured as passive.
- The K values are mismatched.
- EIGRP authentication is misconfigured.

Also, if the adjacency is up, but you're not receiving remote network updates, there may be a routing problem, likely caused by these issues:

- The proper networks aren't being advertised under the EIGRP process.
- An access list is blocking the advertisements from remote networks.
- Automatic summary is causing confusion in your discontinuous network.



# Configuring EIGRPv6 on our Internetnetwork



```
Corp#config t
Corp(config)#ipv6 router eigrp 10
Corp(config-rtr)#no shut
Corp(config-rtr)#router-id 1.1.1.1
Corp(config-rtr)#int s0/0/0
Corp(config-if)#ipv6 eigrp 10
Corp(config-if)#int s0/0/1
Corp(config-if)#ipv6 eigrp 10
Corp(config-if)#int g0/0
Corp(config-if)#ipv6 eigrp 10
Corp(config-if)#int g0/1
Corp(config-if)#ipv6 eigrp 10
```



# Written Labs and Review Questions

- Read through the Exam Essentials section together in class.
- Open your books and go through all the written labs and the review questions.
- Review the answers in class.