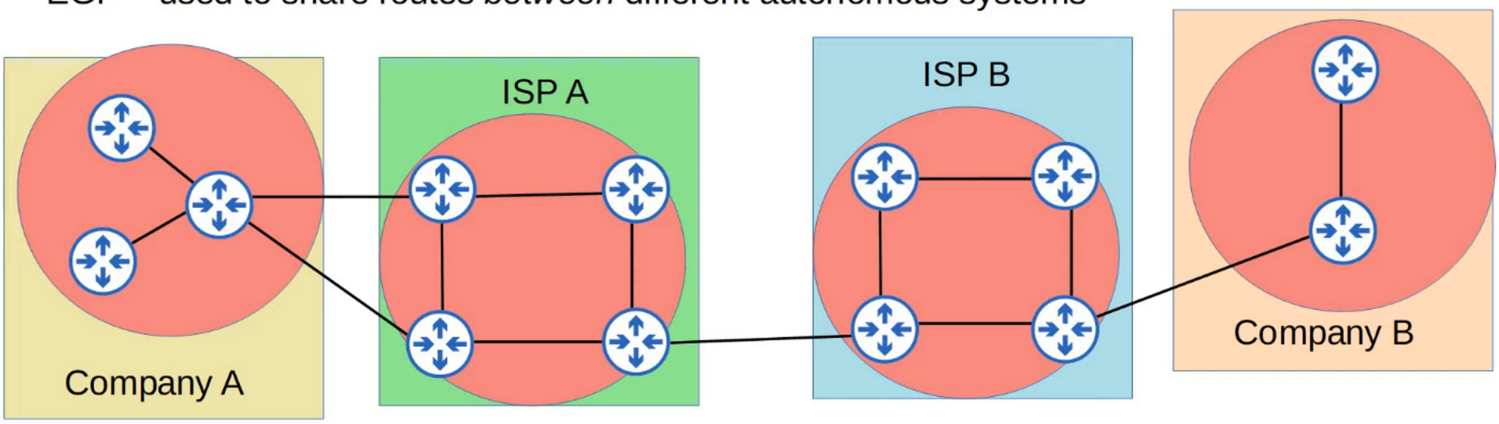
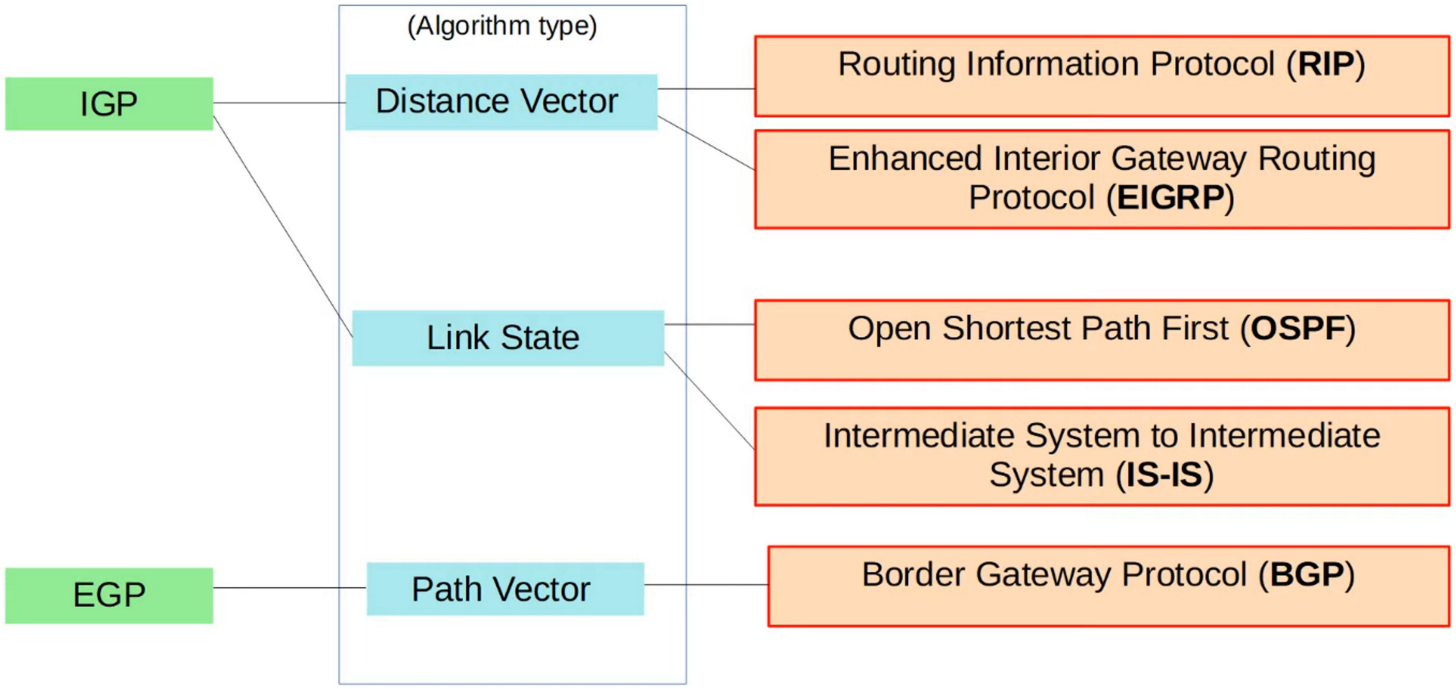
Metric and AD

Wednesday, October 29, 2025 2:01 PM

- IGP = used to share routes within a single *autonomous system* (AS), which is a single organization (ie. a company)
- EGP = used to share routes *between* different autonomous systems





DISTANCE VECTOR ROUTING PROTOCOLS

Called DISTANCE VECTOR because the ROUTERS only learn the 'distance' (METRIC) and 'vector' (DIRECTION, NEXT-HOP ROUTER) of each ROUTE

DISTANCE VECTOR PROTOCOLS were invented before LINK STATE PROTOCOLS

Early examples are RIPv1 and Cisco's IGRP (which was updated to EIGRP)

DISTANCES VECTOR PROTOCOLS operate by sending the following to their directly connection neighbors:

Their KNOWN DESTINATION networks
Their METRIC to reach their KNOWN DESTINATION networks
This METHOD of sharing ROUTE information is often called 'routing by rumor'

'routing by rumor' = because the ROUTER doesn't know about the NETWORK beyond it's NEIGHBOURS. It only knows the information that the NEIGHBOURS tell it.

Dynamic Routing Protocol Metrics

IGP	Metric	Explanation
RIP	Hop count	Each router in the path counts as one 'hop'. The total metric is the total number of hops to the destination. **Links of all speeds are equal.**
EIGRP	Metric based on bandwidth & delay (by default)	Complex formula that can take into account many values. By default, the bandwidth of the **slowest link in the route** and the total delay of all links in the route are used.
OSPF	Cost	The cost of each link is calculated based on bandwidth. The total metric is the total cost of each link in the route.
IS-IS	Cost	The total metric is the total cost of each link in the route. The cost of each link is **not** automatically calculated by default. All links have a cost of 10 by default.

Route protocol/type	AD
Directly connected	0
Static	1
External BGP (eBGP)	20
EIGRP	90
IGRP	100
OSPF	110

Route protocol/type	AD
IS-IS	115
RIP	120
EIGRP (external)	170
Internal BGP (iBGP)	200
Unusable route	255

ADMINISTRATIVE DISTANCE

In MOST cases, a company will only use a single IGP - usually OSPF or EIGRP

However, in some RARE cases, they might use TWO.

Ex: If TWO companies connect their networks to share information, TWO different ROUTING PROTOCOLS might be in use.
METRIC is used to compare ROUTES learned via the same ROUTING PROTOCOL

Different ROUTING PROTOCOLS use totally different METRICS, so they cannot be compared

An OSPF ROUTE to 192.168.4.0/24 might have a METRIC of 30, while an EIGRP ROUTE to the same DESTINATION has a METRIC of 33280.
Which ROUTE is better? Which route should the ROUTER put in the ROUTE TABLE ?
The ADMINISTRATIVE DISTANCE (AD), is used to determine which ROUTING PROTOCOL is preferred.

A LOWER AD is preferred, and indicates that the ROUTING PROTOCOL is considered more ‘trustworthy’ (more likely to select good ROUTES)