7.2.4 Routing Protocol Facts

In this lesson, you will learn about several routing protocols:

- RIP and RIPv2
- EIGRP
- OSPF
- IS-IS
- BGP

The following table lists the characteristics of each routing protocol.

Protocol	Type	Category	Description
Routing Information Protocol (RIP)	IGP	Distance Vector	RIP is a distance vector routing protocol used for routing within an autonomous system (such as an IGP). - RIP uses hop count as the metric. - RIP network size is limited to a maximum of 15 hops between any two networks. A network with a hop count of 16 indicates an unreachable network. - RIP v1 is a classful protocol; RIP v2 is a classless protocol. RIP is best suited for small private networks.
Enhanced Interior Gateway Routing Protocol (EIGRP)	IGP	Hybrid	EIGRP is a hybrid routing protocol developed by Cisco for routing within an AS. - EIGRP uses a composite number for the metric, which indicates bandwidth and delay for a link. The higher the bandwidth, the lower the metric. - EIGRP is a classless protocol. EIGRP is best suited for medium to large private networks.

Open Shortest Path First (OSPF)	IGP	Link State	OSPF is a link state routing protocol used for routing within an AS.
			
			- OSPF uses relative link cost for the metric.
			- OSPF is a classless protocol.
			- OSPF divides a large network into areas.
			  - Each autonomous system requires an area 0 that identifies the network backbone.
			  - All areas are connected to area 0, either directly or indirectly through another area.
			  - Routes between areas must pass through area 0.
			- Internal routers share routes within an area; area border routers share routes between areas; autonomous system boundary routers share routes outside of the AS.
			- A router is the boundary between one area and another area.
			
			OSPF is best suited for large private networks.

Intermediate System to Intermediate System (IS-IS)	IGP	Link State	IS-IS is a link-state routing protocol used for routing within an AS. - IS-IS uses relative link cost for the metric. - IS-IS is a classless protocol. - The original IS-IS protocol was not used for routing IP packets; use integrated IS-IS to include IP routing support. - IS-IS divides a large network into areas. There is no area 0 requirement, and IS-IS provides greater flexibility for creating and connecting areas than OSPF . - L1 routers share routes within an area. L2 routers share routes between areas. An L1/L2 router can share routes with both L1 and L2 routers. - A network link is the boundary between one area and another area. IS-IS is best suited for large private networks; it supports larger networks than OSPF. IS-IS is typically used within an ISP and easily supports IPv6 routing.

| Border Gateway Protocol (BGP) | EGP | Hybrid | BGP is an advanced distance vector protocol (also called a path vector protocol). BGP is an exterior gateway protocol (EGP) used for routing between autonomous systems.

- BGP uses paths, rules, and policies instead of a metric for making routing decisions.
- BGP is a classless protocol.
- Internal BGP (iBGP) is used within an autonomous system; External BGP (eBGP) is used between autonomous systems.

BGP is the protocol used on the internet; ISPs use BGP to identify routes between autonomous systems. Very large networks can use BGP internally, but typically share routes on the internet only if the AS has two (or more) connections to the internet through different ISPs. |