

How OSPF works

Author	Date	Revision
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Related product (if any):	Routers
Description:	Describes what OSPF is and how it works.
Symptoms:	N/A
Cause:	N/A
Files Needed:	N/A

Steps to Correct:

What is OSPF?

Open Shortest Path First (OSPF) is an **Interior Gateway Protocol** used to distribute routing information within an **Autonomous System (AS)**. Or, in layman terms, it is a dynamic routing protocol used to distribute routes within internal networks.

So... what the hell are those other things? Well, for starters, an **Autonomous System** refers to a collection of independent networks that are controlled by a single entity, such as an ISP. **Interior Gateway Protocols (IGPs)** are used to route traffic within each network of an AS, such as a company's LAN.

There are three types of IGPs, including

- Distance-vector routing protocols
- Link-state routing protocols
- Hybrid routing protocols

A **distance-vector (DVR)** routing protocol calculates the best route based on distance. Distance is usually measured in hops, though the metric could be measured in delay, packets lost, or something similar. If the distance metric is a hop, then each time a packet passes through a router, a hop is considered to have traversed. The route with the least number of hops to a given network is concluded to be the best route to that network. Some examples of distance-vector routing protocols include:

- Routing Information Protocol (RIP)
- Interior Gateway Routing Protocol (IGRP)

A **link-state routing protocol, also called shortest-path-first protocols**, have a complete picture of the network topology. Hence, they have a greater idea about the whole network than any distance vector protocol. Three separate tables are created on each link state routing enabled routing. One table is used to hold details about directly connected neighbors, another is used to hold the topology of the entire internetwork, and the last one is used to hold the actual routing table. Link state protocols send information about directly connected links to all the routers in the network. Some include:

- OSPF
- IS-IS (Intermediate System to Intermediate System)

There also exists **hybrid** routing protocols in the sense that they used aspects of both distance vector and link state protocols.

- EIGRP (Enhanced Interior Gateway Routing Protocol) is one example of a hybrid routing protocol.

So... what exactly *is* OSPF, then? And what's with all this preamble? Well, it's important to understand the distinction between IGPs and EGP (exterior gateway protocols--routes things over the Internet, basically), the concept of autonomous systems, and the difference between distance-vector and link-state protocols, because OSPF was made due to the need for a high functionality non-proprietary IGP for the TCP/IP protocol family. Now that you know these things, I can move forward.

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