How IS-IS works

Author	Date	Revision
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Related product (if any):	
Description:	Describes how the Intermediate-Systems to Intermediate-Systems (IS-IS) routing protocol works and what it is.
Symptoms:	N/A
Cause:	N/A
Files Needed:	N/A

Steps to Correct:	**What is IS-IS?** The IS-IS (Intermediate-Systems to Intermediate-Systems) protocol is an *interior gateway protocol (IGP)* that uses link-state information to make routing decisions. Just like OSPF, another IGP, it uses the shortest-path-first (SPF) algorithm to determine routes. IS-IS evaluates the topology changes and determines whether to perform full SPF recalculation or a partial route calculation (PRC). This protocol was orginally developed for routing **International Organization for Standardization (ISO) Connectionless Network Protocol (CLNP)** packets. Just like OSPF routing, IS-IS uses hello packets that allow network convergence to occur quickly when changes are detected. IS-IS uses SPF to determine routes. Using SPF, IS-IS evaluated network topology changes and determines if a full or partial route calculation is required. **The main difference between OSPF and IS-IS is that where OSPF requires IP configuration, IS-IS uses CLNP packets, which are connectionless, to send information.** **How does IS-IS work?** An IS-IS network is a single autonomous system (AS), also called a **routing domain**, that consists of *end systems* and *intermediate systems*. **End systems** are network entities that send and receive packets. **Intermediate systems** send and receive packets and relay (forward) packets. (Intermediate system is the Open System Interconnection [OSI] term for a router.) ISO packets are called network PDUs. Why are we discussing this terminology? Well, IS-IS doesn't use IP addresses like OSPF does, as mentioned above. The ISO developed CLNP packets and an entire suite of other functionality separate to that of IP to make a "connectionless" IGP. In IS-IS, a single AS can be divided into smaller groups called *areas*. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring *Level 1* and *Level 2* intermediate systems. Level 1 systems route within an area; when the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs. No IS-IS area functions strictly as a backbone. Level 1 routers share intra-area routing information, and Level 2 routers share interarea information about IP addresses available within each area. Uniquely, IS-IS routers can act as both Level 1 and Level 2 routers, sharing intra-area routes with other Level 1 routers and interarea routes with other Level 2 routers. The propagation of link-state updates is determined by the level boundaries. All routers within a level maintain a complete link-state database of all other routers in the

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