

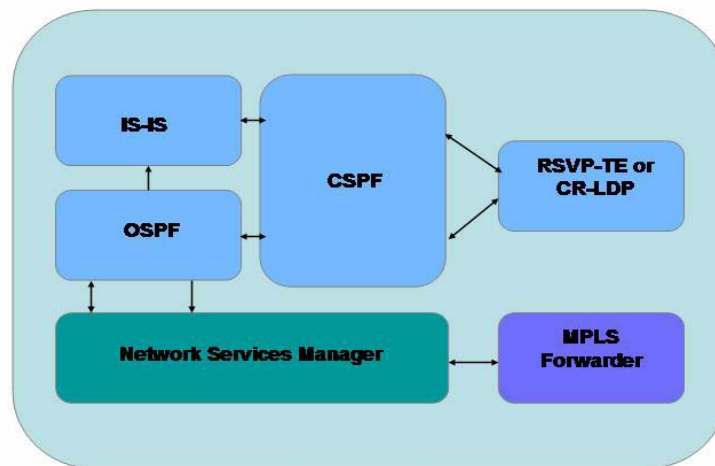
ZebOS®
Network Platform

OSPF-CSPF Protocol Module

Overview

Built on IP Infusion's ZebOS® Network Services Module (NSM), the ZebOS Network Platform Constraint-based Shortest Path First (CSPF) protocol module utilizes the Traffic Engineering Database (TED) of IGP protocols like OSPF or IS-IS to calculate the shortest path through a network. The IGP TED provides CSPF with up-to-date topology information, including link attributes, such as reservable bandwidth, protection type, switching capability, and link colors. The NSM configures the link attributes and updates the OSPF module with the information. In turn, the CSPF computation engine uses this information to calculate an optimum explicit route (ER), based on the topology of the network and the link attributes. Signaling protocols, such as RSVP-TE or CR-LDP, then use the computed ERO to establish Label Switched Paths (LSP).

The ZebOS OSPF-CSPF module encompasses the requirements of Generalized Multi-Protocol Label Switching (GMPLS). Enhancements to the CSPF computation engine help support LSP calculations with GMPLS-specific constraints, including switching type, encoding type, protection type, bandwidth requirements, administrative groups (link color requirements), numbered or unnumbered links, and the computation of bidirectional LSP.



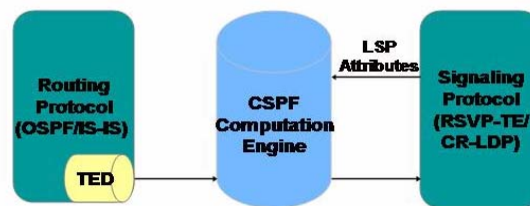
CSPF Topology in ZebOS

CSPF Computation of Label Switched Paths

When computing an LSP, CSPF considers the topology of the network, plus attributes of the LSP and network links, and attempts to utilize networks efficiently by balancing loads. Updates to the ZebOS CSPF computation engine allow consideration of constraints specified by signaling protocols, such as RSVP or CR/LDP, when a client requests an LSP. Targeted LSP attributes that are considered during best-path

computation include bandwidth requirements, hop limitations, administrative groups (that is, link color requirements), priority, explicit route (strict or loose paths), and switching and encoding capabilities.

Interior Gateway Protocols (IGP), such as OSPF and IS-IS, supply CSPF with the traffic engineering database necessary for path computation. The IGP TED updates CSPF with the latest topology information, including link attributes. CSPF traverses the topology supplied by the TED, selects nodes that satisfy the constraints, forms an ERO, and sends it to the RSVP signaling protocol.



CSPF Computation Using Routing Protocol TED

Requirements

- ZebOS Network Services Module
- ZebOS OSPF Module

Standard Deliverables

- Source Code (written in ANSI-compliant C)
- Installation Guide
- Configuration Guide
- Command Reference Guide
- Developer Guide