



E-series

IP SERVICES - MULTIPROTOCOL LABEL SWITCHING (MPLS)

The adoption of the Internet as a strategic business tool is driving the rapid growth of IP as the foundation for multi-service networks and IP-based Virtual Private Networks (VPNs). In order to support these enhanced IP services, IP networks must be capable of providing specific quality of service (QoS) and traffic segregation capabilities. The need to provide different levels of service along with VPNs via a connectionless IP network has given rise to an IP switching technology called Multiprotocol Label Switching (MPLS).

Multiprotocol Label Switching (MPLS) is an IP label switching technology which enables pre-determined paths to specific destinations, called Label Switched Paths (LSPs), to be established through an inherently connectionless IP network. The E-series offers significant flexibility in the determination of how LSPs are established through the network, including the ability to specify service levels, explicit routes through the network, and failover path options. By utilizing MPLS traffic engineered LSPs, the E-series enables service providers to offer differentiated services via a common IP-based network as well as attain better network utilization, avoiding hot spots that are typically associated with the use of traditional IP routing technologies. Since LSPs are engineered to provide specific levels of service, service providers can use MPLS to deterministically allocate network resources based upon the specific requirements of the traffic.

The E-series provides a fully functional suite of MPLS capabilities which enable service providers to support revenue-enhancing applications such as differentiated services and VPNs. The MPLS implementation enables the E-series to initiate and terminate a variety of LSPs, "convert" incoming traffic into MPLS and vice versa, and forward MPLS traffic via a label swapping paradigm.

Benefits

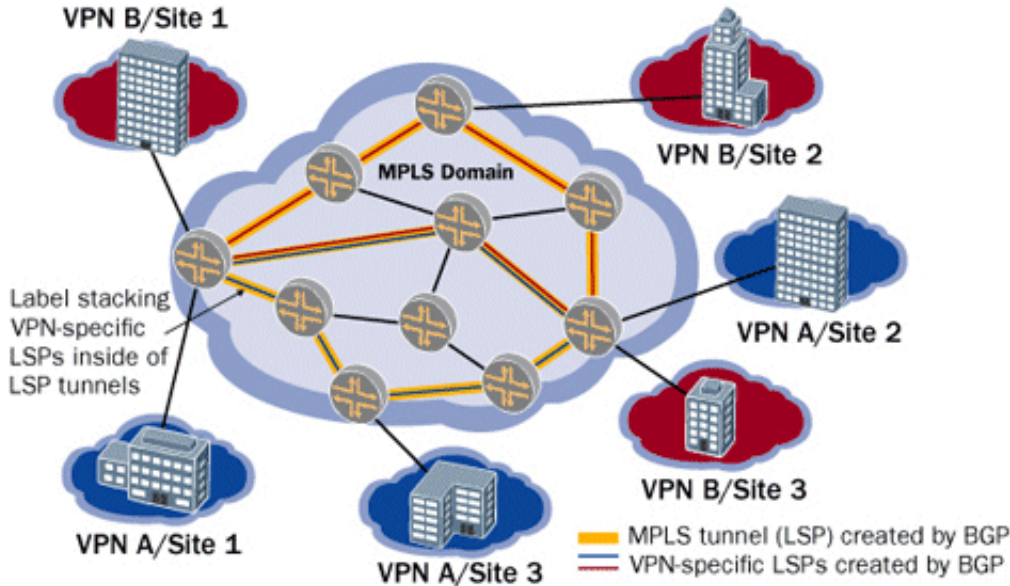
With the flexible MPLS capabilities of the ERX, service providers may create highly customized IP services for their subscribers. For example:

- Automatic establishment of VPN-specific LSPs facilitates the addition of new VPN customers as well as new sites to existing VPNs
- Support for all 3 signaling protocols (LDP, CR-LDP, and RSVP) allows service providers flexibility and interoperability
- Traffic engineering support enables service providers to maintain a high degree of control over network resource utilization
- MPLS-based VPNs and traffic engineering capabilities can be combined to create multi-service VPNs supporting various service levels
- Traffic can be classified at wire-speed according to source, destination, Diffserv category, and a variety of other distinguishing values

The E-series is also designed to enable service providers to offer other highly customized IP-based services, such as:

- VPNs for basic data connectivity
- Multi-service VPNs for comprehensive connectivity of multiple traffic types
- Differentiated services via traffic engineered LSPs with corresponding SLAs
- Selective service for Internet connectivity enabling service levels to be associated with

Network Diagram



Features

The key to MPLS operations is the proper establishment of LSPs. Utilizing standards-based extensions to BGP, the E-series can automatically establish LSPs for VPN connectivity between BGP peers. The E-series also implements standards-based extensions to Interior Gateway Protocols (IGPs: IS-IS and OSPF) to distribute resource information, which is needed for the path selection process. By providing a comprehensive MPLS implementation, the E-series enables the flexible initiation of LSPs with both automatic and manual LSP establishment procedures, along with an extensive methodology for specifying constraints to which the LSPs adhere. The E-series utilizes its policy routing capability as an input mechanism for specifying how and when to initiate LSPs and couples it with highly specialized path selection algorithms to determine how to route capability-based LSPs through the network.

In addition, the following carrier-class features of the E-series round out the service offering:

- The ASIC-based power of the E-series enables all MPLS-based services to be delivered at wire-speed
- The density of the E-series can support thousands of LSPs in a single chassis, optimizing POP space and power, and allowing service providers to hit new cost-competitive pricing targets
- 100% redundancy features such as subscriber-facing interface redundancy deliver a competitive SLA advantage
- MPLS-based services are augmented by other value-added services such as : IP QoS, Security, Multicast, and Routing. Please refer to other datasheets for more information on these services

Technical Specifications

- BGP / MPLS VPNs (RFC 2547)
- Requirements for Traffic Engineering over MPLS (RFC 2702)
- LDP Specification (draft-ietf-mpls-ldp)
- Constraint-Based LSP Setup using LDP (draft-ietf-mpls-cr-ldp)
- RSVP-TE: Extensions to RSVP for LSP Tunnels (draft-ietf-rsvp-lsp-tunnel)
- Carrying Label Information in BGP-4 (draft-ietf-mpls-bgp4-mpls)
- Routing protocol extensions (draft-katz-yeung-ospf-traffic, draft-ietf-isis-traffic)