MPLS

Multi-Protocol Label Switching

INSTRUCTION MANUAL

profitability.

With the latest technology, SDN Communications can help you turn more profit than ever.

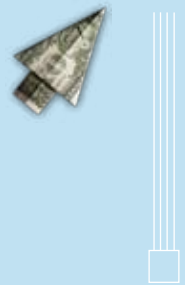
SDN COMMUNICATIONS

the businessimplification experts

DATA INTERNET VIDEO VOICE

MPLS

With MPLS you are only limited by your imagination on what you can interconnect across this common platform.



BENEFITS

MPLS Networks are not appropriate for every situation. However, they are appropriate for enterprise networks looking for the following benefits:

- Control over network infrastructure
- Better performance, reliability, and efficiency
- Multiple classes of services to user base
- Extends a virtual piece of the backbone network to organizational entities
- Ensures performance of demanding applications
- Supports the convergence of multiple technologies and/or multiple traffic types onto a single network
- Supports legacy protocols while migrating to an all IP network

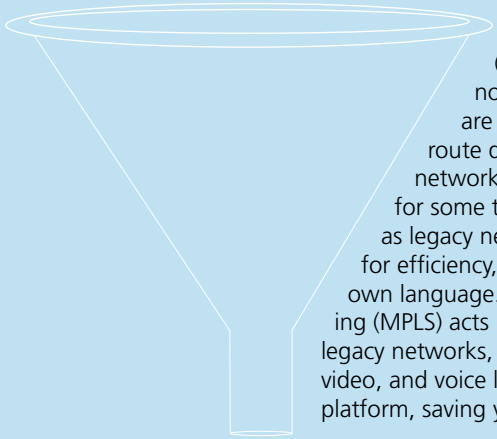
THE DETAILS

TRANSLATOR- Multiprotocol Label Switching (MPLS), is a service that offers a common framework that encapsulates and seamlessly transports any traffic type over an MPLS network core. SDN Communications can use a single IP/MPLS network infrastructure and network management environment to bring customers connectivity for ATM, Frame Relay, Ethernet, PPP, and High-Level Data Link Control (HDLC) traffic, as well as carry customers' IP traffic in Layer 3 VPNs. It is important that MPLS advanced capabilities allow SDN to assure appropriate levels of service for different types of traffic in QoS.

While point-to-point virtual circuits are built with MPLS features, the Layer 2 connections remain characteristic of VPNs. Routing within the network is controlled by the customer and the routing information resides on their routing equipment. Point-to-point connections are supplied by SDN's packet network or an emulated pseudo-wire required by the customer.

TRANSLATOR

MPLS speaks all languages.



Private Line, Frame Relay (FR), Ethernet, and Asynchronous Transfer Mode (ATM) are different protocols used to route data over a fiber optic network. They've been in existence for some time and are referred to as legacy networks. Each has its place for efficiency, but they each speak their own language. MultiProtocol Label Switching (MPLS) acts like a translator among all the legacy networks, allowing convergence of data, video, and voice like a funnel onto a single platform, saving you time and resources.

THE DETAILS

LABELING- MPLS is an architecture for fast packet switching and routing. It provides the designation, routing, forwarding and switching of traffic flows through a network. More specifically, MPLS has the ability to manage traffic flows of various granularities. It is independent of the layer-2 and layer-3 protocols such as ATM and IP. With MPLS you can map IP addresses to simple, fixed-length labels used by different packet-forwarding and packet-switching technologies. MPLS interfaces to existing routing and switching protocols, such as IP, ATM , Frame Relay, Resource ReSerVation Protocol (RSVP) and Open Shortest Path First (OSPF), etc.

In MPLS, the transmission of data takes place on Label-Switched Paths (LSPs). LSPs are a sequence of labels located at each and every node along the path from the source to the destination. Various label distribution protocols are used today, such as Label Distribution Protocol (LDP) or RSVP or piggybacked on routing protocols like border gateway protocol (BGP) and OSPF. The fixed-length labels are inserted at the very beginning of the packet or cell and can be used by hardware to switch packets quickly between links. This makes the high-speed switching of data possible.

Designed to address network problems such as scalability, traffic engineering, quality-of-service (QoS), and networks-speed, MPLS has also become a solution to meet the service requirements and bandwidth-management for our future IP-based backbone networks.

LABELING

MPLS lets you prioritize how your data travels.

Imagine a business with multiple locations. Each location has a central mailing room where everything is sent at the same rate, but some of your campuses have time-sensitive materials. You set up a mailing system that offers first class, priority, and express delivery simply by labeling each packet with a code the mail room understands. That's what MPLS does for your electronic communications. MPLS prioritizes your packets and places only your highest priority traffic on the most efficient routes, while allowing your routine traffic to take standard routes.

THE DETAILS

PRIORITY DELIVERY- MPLS accelerates data movement by removing Layer 3 routing decisions for individual packets at intermediate nodes in a network. The first router in the path looks at the Layer 3 header of the first packet in a transmission (such as a voice conversation or video stream) destined for an end location. The end location information is used to put a new header called a label on that packet and all subsequent packets in the same transmission. Each following router then processes a label from its previous router, removes, and adds another, which points the packet in the same direction as the first. This fixed, end-to-end route for all packets is defined by the set of labels.

While it may seem that MPLS degrades QoS by inserting more overhead, it is quite the opposite. Because all packets follow the same path, it is more likely those end-to-end transfer times will be consistent. As the packet moves through the network, labels rather than Layer 3 headers are processed. By traveling on a predetermined route rather than by repeated router table lookups, packets will take less time to process at each switch than they would for a non-MPLS network.

The way the label is attached to the packet explains why "multi" is part of the technology's name. The label creates a PDU at an intermediate layer between Layers 2 and 3, different from any Layer 2 or 3 protocol. Consequently, MPLS may be used across protocols. The result is that with QoS guarantees enabled by MPLS, even subnetworks within a system running under different protocols can all send packets to each other's end-points.

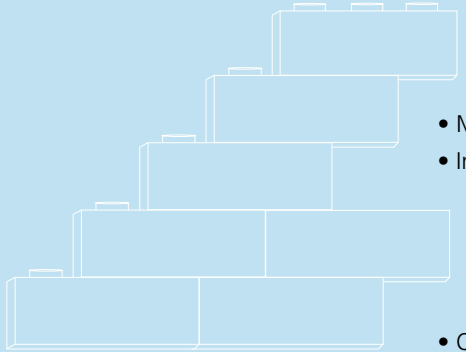
PRIORITY DELIVERY

MPLS prioritizes packets with labels.

MPLS allows routers to quickly read labels and move them along. Voice messages for example have to be delivered as a first priority and in the correct order so your voice does not sound garbled on the receiving end. Much like road construction, the commitment must be to keep traffic moving even if there's a problem somewhere along the path. In highway construction, planned detours are established before closing the highway. MPLS does the same thing in the Internet Protocol (IP) world, and it also makes sure that the detours have the same quality as the links to be taken down for repair. MPLS pre-provisions the detour so data traffic isn't slowed by network failures.

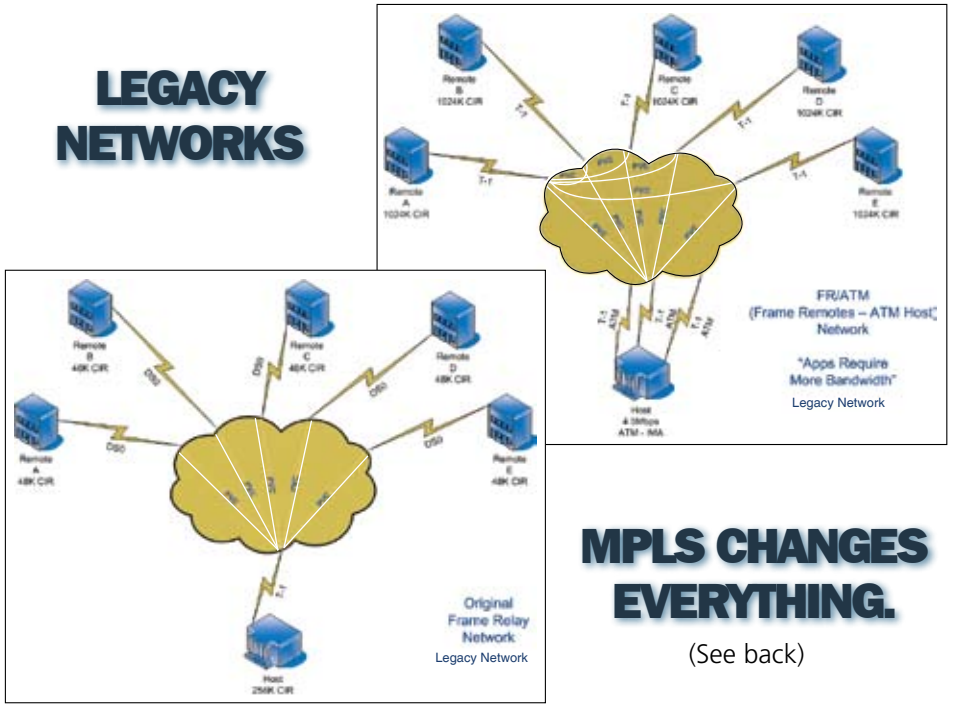
SERVICES

Taking the steps to build MPLS deployment.



- Layer 3 IP VPNs
- Layer 2 VPNs
  - Point-to-Point Ethernet
  - Transparent Local Area Network Services
  - 802.1q Ethernet trunked circuits
- Multi-Link Frame-Relay (FRF.16)
- Internetworking Services
  - Frame-Relay to ATM
  - Frame-Relay to Ethernet
  - ATM to Ethernet
  - Basically any transport to any transport (AToM)
- Quality of Service (QoS) available for all of these transport methods

LEGACY NETWORKS



MPLS CHANGES EVERYTHING.

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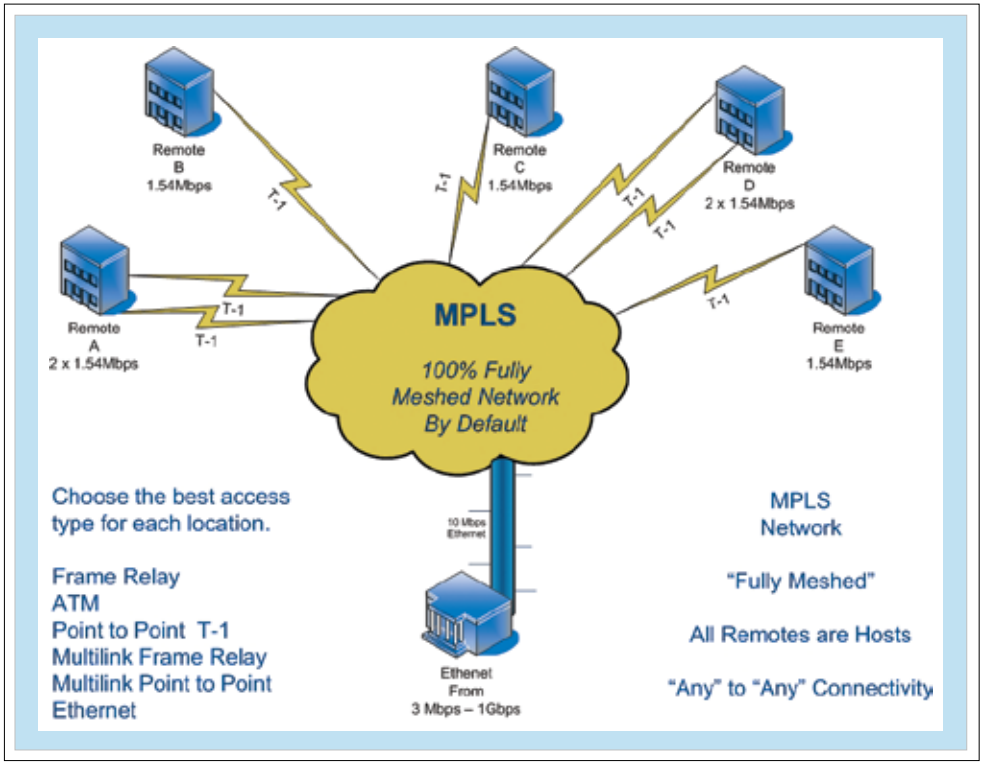

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