

I D C E X E C U T I V E B R I E F

MPLS: Future Proofing Enterprise Networks for Long-Term Success

January 2010

Adapted from *U.S. Managed MPLS IP VPN Services 2009–2013 Forecast* by Courtney Munroe and Meera Singh, IDC #217754

Sponsored by Qwest

Introduction: Understanding MPLS

Multiprotocol label switching (MPLS) is a converged data network technique that facilitates the most efficient platform for transporting a diverse array of different types of traffic. MPLS provides a simplified network infrastructure for the simultaneous transport of multiple applications such as voice, video, and data.

One of the misconceptions about MPLS is that it's often labeled as a service. MPLS is a technology that facilitates various services. Multiple protocols supported by MPLS include IP packets, native ATM, SONET, and Ethernet frames. MPLS is highly scalable and provides a mechanism to create virtual links on a national basis and a global basis. MPLS provides high availability and high levels of security.

The best way to understand MPLS is to compare it with native TCP/IP. Standard routed IP routers independently decide where to send the packet each time the packet arrives at the router. This decision is based entirely on the packet's network-layer header, which is large — over 100 bits. In other words, it's large and cumbersome. In addition, TCP/IP does not provide users with quality of service (QoS), real-time capabilities, or the ability to prioritize and manage traffic.

MPLS was designed to address these deficiencies in TCP/IP networking. The strength of MPLS lies in its packet-tagging capabilities. MPLS provides a more efficient mechanism for tagging and transporting data packets, which are labeled and routed based on these tags. All traffic with the same label is treated the same way.

When a packet arrives in the network, it's provided with a forwarding equivalence class (FEC) that attaches a short bit sequence, or label, to the packet. The routing tables in each router on the network then identify how packets of a specific FEC type are to be handled. These tables allow the MPLS network to consistently sort packets based on their individual characteristics (i.e., packets coming from certain ports or packets carrying data for certain applications).

This is perhaps the most important — and complex — aspect of MPLS. In contrast to TCP/IP, MPLS packets can be assigned with information in addition to the labels in the original router. For example, packets carrying priority or real-time traffic, such as voice and video, can be given priority over other applications by assigning them to low-latency routes within the network. In addition, the identifying MPLS heading labels are smaller and offer a smaller payload; approximately 30 bits compared with over 100 bits for TCP/IP headers.

Why MPLS Matters to Business

Today's enterprises face a complex networking environment. The average WAN manager typically oversees multiple different network protocols, ranging from traditional circuit-switched, legacy point-to-point private lines to frame relay and IP networks. These networks are difficult to manage efficiently in a hybrid environment.

Maintaining several different network protocols requires multiple operating procedures, as well as multiple skilled personnel proficient in managing the various networks. It also presents an enormous challenge for seamless interoperation.

MPLS-based services facilitate cost-effective and converged wide area networking that offers a high level of security, management, and flexibility over various types of network traffic through class-of-service (CoS) capabilities. Other major advantages are flexibility and scale over legacy networking schemes.

MPLS is efficient because it facilitates the transport of a diverse range of multimedia applications (such as voice and video) and disparate business data applications (such as enterprise resource planning [ERP] and database applications) over the same access platform. Enterprises can save on network costs as well as internal IT costs by reducing the number of networks managed and maintained in-house.

In addition to reduced personnel costs, as enterprise requirements evolve, organizations can easily and consistently implement new applications as well as higher-bandwidth speeds. Thus, in the long term, enterprises save on internal IT resources as well as on maintaining multiple network protocols.

Perhaps the most important aspect of MPLS is CoS. Class-of-service functionality allows enterprises to prioritize the importance of various forms of traffic over their network at any given time of day.

For example, at peak hours when voice may be the most important type of traffic, it can be prioritized at a higher level than, say, email. Similarly, video can be prioritized at a peak time for a specific video-streaming or videoconferencing application, ensuring optimal network performance.

Current Enterprise Requirements: Facilitating Convergence, Flexibility, and Optimized Application Performance

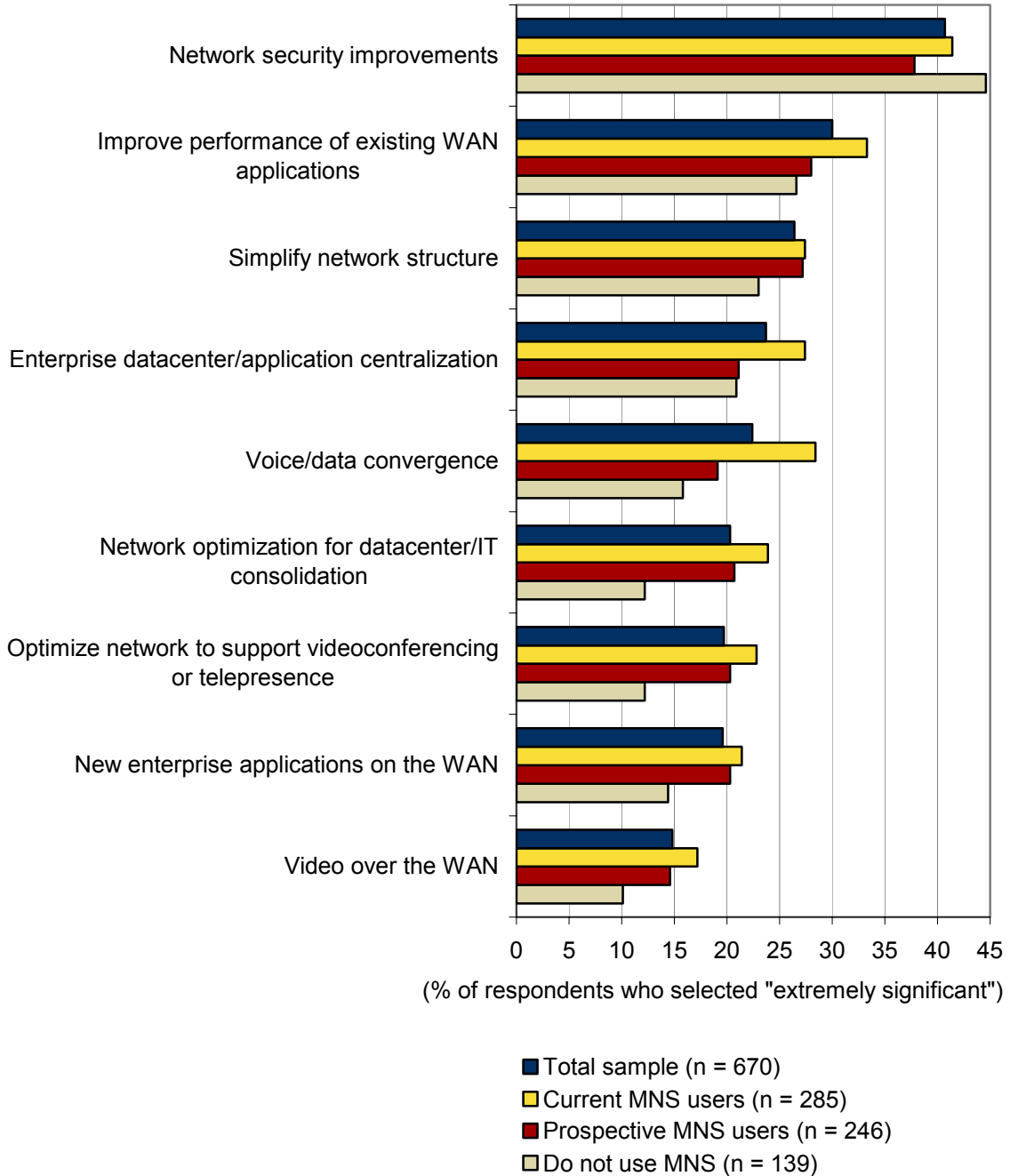
MPLS enables "telecommunications convergence," but this term can mean different things. In this context, we're looking at the enterprise segment and the strategy of converging traditional telephony point-to-point and hub-and-spoke private networks into fully meshed IP-based infrastructures.

MPLS provides a smooth path to convergence by facilitating a cost-effective strategy for managing various types of traffic in a reliable and secure environment. As Figure 1 shows, convergence, simplifying the IT environment, and improving the performance of applications are top issues for enterprises today. Companies are consolidating many data applications such as voice, ERP, CRM, and others into a centralized datacenter.

FIGURE 1

Key Drivers of Enterprise Network Evolution

Q. How significant are each of the following issues as drivers of your organization's network evolution?



Note: Significance is rated on a scale of 1 to 5, where 1 is "not at all significant" and 5 is "extremely significant."

Source: IDC's WAN Manager Survey, 2009

MPLS-based networks meet many of these major requirements for companies today, including the ability to facilitate cost-effective, secure access on a global basis for geographically dispersed internal sites and provide access to roaming and telecommuting staff as well as to external partners.

Another key trend is the rapid growth of collaborative videoconferencing and content transport. In this context, it's not cost-effective to implement mesh networking over traditional point-to-point, packet-based frame relay, and ATM networks. They are difficult to scale and lack the flexibility to handle a wide range of multimedia applications. As a result, many MNCs have migrated to mesh-type IP virtual private networks (VPNs).

A key challenge facing enterprises today is how to provide a cost-effective and flexible framework for migrating applications from legacy platforms to an IP-based infrastructure. MPLS offers one of the best platforms for implementing a centralized IP-based network.

The Deployment and Availability of MPLS Networks

Over the past few years, service providers all over the world have invested billions in implementing MPLS networks. These investments have facilitated the ability to consolidate multiple networks, integrate applications over a single network infrastructure, and scale existing backbones. MPLS platforms are now available in dozens of countries and are also provided by a wide range of service providers, including large national operators; CLECs; and regional, second-tier providers in many countries.

This is largely a result of the widespread acceptance of IP VPN in the enterprise today. In the United States, for example, while more than 50% of all enterprises today have an IP VPN, the fastest growth is in the migration from do-it-yourself VPNs to a carrier-managed solution.

Enterprises are responding to the increasing availability of MPLS on a domestic basis and an international basis, and they are growing increasingly comfortable with the technology and its potential for enabling a more flexible network configuration and a faster and more comprehensive evolution to an IP-based converged solution.

MPLS is also contributing to the emergence of Ethernet virtual private LAN services (EVPLS). For companies that require the attributes of Layer 2, but the flexibility and cost advantages of an MPLS Layer 3 service, VPLS is a great option. As a Layer 2 solution, VPLS allows companies to maintain control of its routing, as well as the ability to keep some aspects of network management in-house.

Another benefit of VPLS is that companies don't need to acquire a deep understanding of a new technology because many are familiar with Ethernet. VPLS also allows companies to prioritize traffic and view detailed reporting, features that are growing increasingly important as the number of applications and the amount of traffic traversing enterprise networks increase.

Selecting the Right MPLS Service Provider

While many network operators are providing MPLS-based services today, it's critical for enterprises to select the most appropriate service provider that will best meet their enterprise requirements. The choice of service provider depends on many factors, including network coverage and services availability, features and functions, and, of course, price structure and postsales support.

However, an often overlooked aspect is the overall policy of the potential service provider in providing assistance to an enterprise to enable it to migrate from a legacy to an MPLS or a converged IP platform. For example, what is the provider's track record and experience in terms of technical and personnel experience? How many networks has the provider implemented? What is the provider's provisioning record for what is often a complex and challenging process?

Perhaps the most important attributes are the operator's network footprint and overall experience dealing with MPLS. What are the provider's track record and vision for upgrading and maintaining its networks?

Another important issue is pricing. Does the provider offer a flexible and simplified pricing structure? A key inhibitor IDC has seen for many enterprises has been pricing that's confusing or that has too many conditions and caveats, which naturally are unappealing to many customers.

Also, the ability of the service provider to help enterprises operate hybrid networks may be very important to some organizations. Depending on the cost, regulatory, and other compliance requirements, companies may need a specific configuration in one region or country and something totally different in another region. It's important to select a service provider with a wide range of experience in managing diverse networks as well as a long history of operating in various regions, whether on its own network or via partners.

Does the service provider have the adequate resources and expertise to provide timely provisioning and support? Does it have the requisite network infrastructure and industry partners to provide consistent support on a global basis? Finally, does the service provider have a long-term vision and capabilities that will allow your enterprise to realize its overall mission?

These issues are as critical as price and features in determining the best MPLS service partner for a long-term strategic relationship.

Conclusion

MPLS-based network services have evolved into a mainstream enterprise phenomenon. The technology is a proven, reliable platform that's changing the way enterprises configure and manage their business-critical networks.

Equally important, however, MPLS is about establishing a strategic partnership with a service provider that will affect a broadband spectrum of convergence issues. The decision to implement MPLS-based technology with the right strategic partner is a crucial step toward future proofing your enterprise network for long-term success.

COPYRIGHT NOTICE

The analyst opinion, analysis, and research results presented in this IDC Executive Brief are drawn directly from the more detailed studies published in IDC Continuous Intelligence Services. Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from IDC. Contact IDC Go-to-Market Services at gms@idc.com or the GMS information line at 508-988-7610 to request permission to quote or source IDC or for more information on IDC Executive Briefs. Visit www.idc.com to learn more about IDC subscription and consulting services or www.idc.com/gms to learn more about IDC Go-to-Market Services.

Copyright 2010 IDC. Reproduction is forbidden unless authorized.