

Today's MPLS It Could be a Better Route to Go

The Evolution of MPLS Higher Speeds, Lower Cost

Choosing the right approach to building a wide area network (WAN) for a company can be confusing and difficult, even for IT staff with an understanding of the associated technology. For business executives and owners without such knowledge, it can be overwhelming. The concepts are complex, the technology is constantly changing and there is no right answer for every business. Wide area networks are a good example. Dramatic increases in connection speeds using fiber-optic cable and decreasing costs are making MPLS an excellent option for many companies that in the past have opted for virtual private networks (VPN) for economy or private line networks (point-to-point) for quality of service. If you haven't looked at MPLS lately, now is the time.

WAN Choices

Businesses that need to connect multiple facilities in different locations have three basic choices for a wide area network: Private Line Networks including Metro Ethernet, Virtual Private Networks and MPLS. Each utilizes a different approach to WAN technology that businesses need to understand when deciding which option is best for their needs.

Private Line Network – this point-to-point network connects facilities in any location through dedicated

lines that are not available to the public. It uses a hub and spoke design that connects all locations through the central headquarters facility.

Virtual Private Network (VPN) – virtual private networks utilize the public Internet to connect different facilities within a WAN. VPN typically connects remote facilities to the HQ location by utilizing "tunneling software" to create a secure connection over the public Internet.

MPLS (Private IP) – Multi-Protocol Label Switching (MPLS) is a traffic management tool that manages the data flow within a WAN, connecting facilities through **private** IP connections. It is a fully meshed design, independent of a central headquarters, which allows any-point-to-any-point connections.

The Changing WAN Landscape

Over the past several years, private line networks and MPLS have been the go-to technology for guaranteed Quality of Service (QoS), Class of Service (CoS) and security. VPNs have offered excellent speed and considerably lower costs when quality and priority have not been critical issues. The evolution of MPLS has created another option that provides significantly higher quality, data prioritization and security than VPN, but was less costly than private line networks. The down side was that MPLS typically could not deliver VPN bandwidth in most areas, and it was still considerably more expensive. This is rapidly



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changing as very high speed fiber-optic cable is being built out in many areas. Today, MPLS speeds in those areas are competitive with VPN, and prices have become much more affordable for businesses of all sizes. Today's MPLS is far more attractive to many businesses than it was just a couple of years ago.

WAN Comparison

Private Line Network

Advantages:

- Highest Quality of Service (QoS) and Class of Service (CoS)– no outside competition for bandwidth or priority.
- Higher Speeds – depending on selected service options.
- Low Latency – for voice, video and mission-critical communications.
- Excellent Security – never connects with public networks.
- High Reliability – very high up time outside the local loop.

Disadvantages:

- Highest Cost – for more than 2 facilities.
- Scalability – cost goes up quickly with more locations.
- Geography – the farther apart the facilities, the more costly the connections.

- Vulnerable – if the headquarters goes down, all the facilities lose service.
- Inefficiency – hub and spoke design requires all connection through a central point

Virtual Private Network (VPN)

Advantages

- Lowest Cost – Internet based service significantly reduces connection costs.
- Scalability – adding locations is simple and low-cost through Internet connections.
- Flexibility – network can be accessed by authorized, enabled users anywhere there is an Internet connection.
- High Speed – depending on bandwidth availability and selected plans.

Disadvantages

- Unreliable QoS – Quality of Service can vary significantly from one moment to the next depending on Internet conditions. No guarantees for essential data. No SLAs for QoS.
- Unreliable CoS – Class of Service also is at the mercy of the Internet. Guaranteed prioritization is unavailable for mission-critical data.
- Latency – inconsistent delays can occur. Lag-times can significantly reduce the quality of voice, multimedia and other streaming communications.



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- Security – connecting through the public Internet can expose the network to threats. Secure VPN networks require special encryption, firewalls and other precautions.
- Connection Reliability – congestion on the Internet can cause connections to be dropped.

MPLS (Private IP)

Advantages

- Any to Any Connections – the fully meshed design creates fast, efficient, highly reliable connections between any points on the network, without going through a central headquarters.
- QoS – true QoS can be guaranteed, and levels of service can be managed for different data types. SLAs available.
- CoS – Class of Service can also be managed to ensure that mission-critical data gets priority and other traffic is prioritized on data type.
- High Speed – excellent speeds with rapidly spreading fiber-optic cable availability.
- Low Latency – necessary for high-quality voice, video and other streaming.
- Highly Scalable – locations/users can be easily and economically added, removed or changed on a MPLS network.
- Security – not vulnerable to the threats of the public Internet.

- High Reliability – fully meshed design, not dependent on a central headquarters.
- Cost-Effectiveness – significantly lower cost than Private Line Networks in most cases, with near-comparable quality. Marginally more expensive than VPN, but with many advantages.

Disadvantages

- Cost – while MPLS has become less expensive and more cost-effective with the expansion of fiber-optic cable, it is still usually more than VPN, but significantly less than Private Line networks.
- Bandwidth – connection speeds are dependent on service that is available in each location on the network. Some facilities may be slower than desirable in places where high-speed connections like fiber are not yet offered.
- Equipment – special routers are needed to utilize MPLS.
- Expertise – optimally setting up MPLS requires special training and capabilities.

More About MPLS (Private IP)

Multi-Protocol Label Switching is a network management protocol that greatly improves data flow by placing labels on IP (data) packets and optimally routing their progress from origin to



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destination. MPLS is an overlay protocol that adds a set of rules to IP so that traffic is classified, marked and directed. MPLS networks utilize devices called label edge routers (LER) – or just edge routers – positioned at the network’s edges. They inspect IP packets as they enter the network and add MPLS headers, where instructions reside. They also remove headers from packets leaving the MPLS network. Inside the MPLS network, label switch routers (LSR) scan MPLS labels on each packet and follow the pre-defined instructions, which results in the desired routing.

Additional MPLS Benefits

In addition to the advantages listed above, MPLS offers many valuable benefits:

- High Quality – MPLS is excellent for real-time applications that cannot tolerate latency, like voice, video and mission-critical data.
- Versatility – voice and data applications can all be seamlessly run on the same MPLS network.
- Data Classifications – different types of data can be pre-programmed to be given different priorities and classes of service. For example, email and Web browsing may have lower priorities and quality designations, making them subordinate to voice transmissions, multimedia, real-time transactions and other vital data.
- Bandwidth Optimization – a business can allocate different percentages of its bandwidth to various data types.
- Usage Control – traffic shaping and class of service enforcement enables companies to better control employee behavior (like Web surfing) and more effectively implement usage policies.
- DR & Business Continuity – MPLS’s fully meshed technology is excellent for disaster recovery and business continuity because if interruption occurs in a facility, operations and functions can be seamlessly and automatically transferred to any other enabled location within the network.
- Scalability – with new fiber-optic cable, MPLS networks are highly scalable. Businesses only provision and pay for the bandwidth they need until requirements change. Then the technology makes adding or reducing bandwidth much faster, easier and lower cost than private line networks.
- Secure Internet Gateway (Cloud-Based Internet) – each location connects to the Internet through the MPLS network. This provides redundant security and more reliable connectivity. There is no local loop (last mile) connection to be compromised, since the Internet connection resides in a data center on the MPLS backbone. Third-party secure data centers can be added, as well.



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Summary

As markets disperse and business becomes more mobile, building the right wide area network will continue to become more important. Private line networks and VPN technology have their place, but more and more businesses are recognizing that MPLS can provide an excellent foundation to support their business objectives. If you have not

looked at MPLS in a couple of years, or have a MPLS network that is over a year old, it's time to take another look. Today's MPLS is fast, secure, versatile and very cost-effective. If you do not have access to WAN expertise in-house, get outside help. This is not a do-it-yourself proposition, but it's a route that is well worth exploring.

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