The MPLS Network: A Future-Proof Engine for Voice-Data Convergence

Addressing network traffic trends with new opportunities for business communications

Table of Contents

I. MPLS: The Foundation for the Way Today's Business Works 3
The origins, and future, of MPLS 3
MegaPath: A leader in converged network solutions 5

II. Cost Savings and More: Unlimited Application Potential 5
New applications demonstrate the potential of MPLS networks 6

III. About the MegaPath MPLS Network 8
A catalyst for convergence 9
MegaPath Duet Hosted Voice: Enterprise-grade VoIP quality and service for less 9
MegaPath Managed Security Service: Protection in the cloud 10
The advantages of MegaPath Managed Security Service 10

IV. Success Snapshot: VIZIOSoft Builds Client Relationships, and Its Business, with MegaPath Duet 11
MegaPath Duet Voice and Data is ideal for small and medium businesses 12
Teamwork ensures a seamless transition 12

V. Summary: The Advantages of the MegaPath MPLS Network 12
High performance, from the core to the edge 13
MegaPath offers distinct service advantages 13

The MPLS Network: A Future-Proof Engine for Voice-Data Convergence

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I. MPLS: The Foundation for the Way Today's Business Works

The convergence of voice and data on a single wire is perhaps the most exciting network development since the invention of the private branch exchange (PBX). Over the past decade, Multi Protocol Label Switching (MPLS) technology, which enables voice and data to be transported together on wide area networks (WANs), has matured to provide a platform for almost unimaginable communications and cloud computing possibilities. This is especially important considering the increasing network traffic trends that affect organizations – large and small, public and private sector – across the globe. MPLS helps solve the service management problems brought by fast-ramping demands of video and other bandwidth-intensive, jitter- and latency-sensitive applications.

The origins, and future, of MPLS

Originally designed to allow Internet protocol (IP) routers to mimic the speed of much faster Asynchronous Transfer Mode (ATM) switches, MPLS assigns labels to data packets; the packets' forwarding action is executed based solely on the contents of the label, rather than by the router examining the details of the entire packet. This feature dramatically speeds the routing of network traffic.

MPLS is the fastest-growing WAN technology on the market today, by virtue of its performance and versatility. For example, MPLS is called *multiprotocol* because it works with the IP, ATM and Frame Relay protocols. Its packet label orientation allows end-to-end circuits to be created across any type of transfer medium, using any supported protocol, thus allowing organizations to combine the performance of high-speed legacy WAN technologies with the flexibility and cost advantages of an Internet-based network.

Specifically, MPLS enables new routing functionality and capabilities that were not available with conventional IP routing, such as:

- Virtual private networks (VPNs), which are in widespread use today
- Traffic engineering
- Layer 2 transport in the OSI network stack

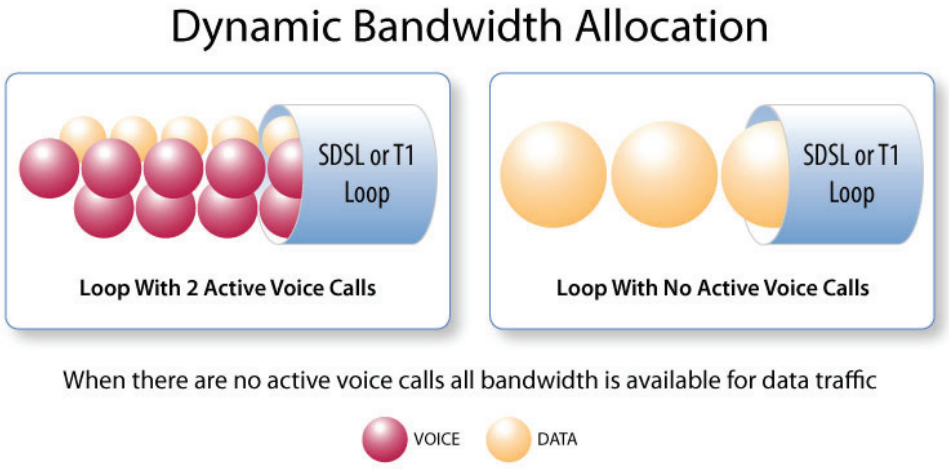
With reference to the standard model for a network (the Open Systems Interconnection, or OSI model), MPLS allows most packets to be forwarded at the layer 2 (switching) level rather than at the layer 3 (routing) level.

- Most importantly, guaranteed bandwidth services.

As it has steadily supplanted legacy wide area networks, MPLS has emerged the ideal technology for use in future-proof networks because it:

- ***Enables data and voice to travel on the same network.*** Called "network convergence," this capability supports myriad exciting new applications – such as voice over IP (VoIP) Internet telephony, Unified Communications , corporate video, cloud computing and many others – as well as the ability to scale existing applications. Corporate video and cloud computing are topics of particular excitement in business circles, and are discussed further in Section II.
- ***Provides for four classes of service (CoS).*** This capability allows service providers' network engineers to segregate voice, data and video traffic to be into different CoS, ensuring that performance-sensitive applications such as VoIP have a clear, uncontested path across the network. For example, most MPLS networks today segregate traffic on the core network by the following CoS priorities:

  - **Real-time,** for voice and video
  - **Critical,** for mission-critical activities such as processing credit card transactions, polling, etc.
  - **Business,** for business-critical for enterprise applications and database access, and surveillance monitoring
  - **Data,** for lower-priority traffic such as Internet browsing and FTP file transfer.
- ***Allows for prioritization of traffic.*** For example, in MPLS networks carrying both voice and data traffic, the most advanced service providers use both IP address and traffic classification to ensure voice traffic delivery. This is done using a two-layer strict priority queue on a private T1 circuit. Most contention occurs on this link, and the queuing strategy ensures that voice traffic will always take priority.



- ***Allows for dynamic bandwidth allocation and QoS.*** CoS, combined with dynamic bandwidth allocation, allows MPLS service providers to ensure Quality of Service (QoS), including setting a special priority to voice traffic. QoS is essential because it:

  - Enables the prioritization of business-critical applications

Unified Communications is the integrated delivery of voice, data and video communications – that can help SMBs accomplish four critical goals: Improve employee productivity by allowing people communicate more freely and efficiently; integrate communications into business processes; simplify operations by connecting people and information more effectively, and reduce capital and operating expenditures.

- Gives companies control over how their bandwidth is used
- Ensures consistent, interruption-free network performance
- Prevents critical applications from failing due to network congestion.

Specifically, throughout the MPLS network, bandwidth is shared to support simultaneous voice and data traffic. When a voice call is received or made, the necessary bandwidth is immediately provided. Through QoS, voice traffic will always take priority over data traffic.

MegaPath: A leader in converged network solutions

MegaPath is the leading provider of managed IP communications services in North America. It has the largest broadband reach of any network in North America, and owns and operates a fiber-optic core network that has run MPLS since 1999. As such, MegaPath has the nation's broadest QoS-enabled voice network, offering a broad portfolio of services that leverage data and voice convergence. These services include:

- The **Duet℠ Voice and Data** service family, which combines business-class phone service and high-speed Internet access. The Duet family comprises:
- **Duet** uses existing analog equipment and phones.
- **Duet PRI** uses existing digital PBX equipment and phones.
- **Duet SIP Trunking** uses existing IP-PBX equipment and phones.
- **Duet+MPLS**, an integrated access solution, provides MPLS VPN, voice, Internet and Managed Security Services.
- **Duet Hosted Voice**, an ideal solution for businesses one or multiple locations, is a hosted, enterprise-grade, cloud-based IP phone service that connects all employees into one unified phone system with the same business features in every location.

The capabilities of MegaPath's MPLS network, and its Managed Security Service, are further discussed in Section III.

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II. Cost Savings and More: Unlimited Application Potential

Because telecom expenses represent 1-2% of an organization's operating costs, it is not surprising that most companies are initially attracted to converged services by the cost savings made possible by VoIP communications. Indeed, Sage Research finds that 83 percent of companies turn to IP voice communications for savings. As long-distance toll calls disappear, phone bills can be reduced by 20-30 percent, and more; most companies can typically fund their entire converged network via their voice savings.

In addition to hard cost reductions, a converged network solution provides an entry point to other important savings:

- ***Only one network to manage,*** instead of separate networks for voice and data. This translates into less maintenance, increased manageability, and more flexibility.
- ***Provides a cost-effective WAN solution*** for linking headquarters and branch offices via a secure, scalable and highly redundant network infrastructure. Additionally, MPLS networks are the foundation of network solutions that are easily customizable and tailored to best fit each site's specific bandwidth, communication and redundancy requirements.
- ***Enables easy deployment of expansive intranets and extranets*** for sharing confidential data and accessing business critical applications.
- ***Ease-of-use*** and simplicity for end users.
- ***Enhanced personal productivity*** for mobile and teleworkers, as traffic traverses the network with minimal delay and packet loss.

New applications demonstrate the potential of MPLS networks

A wide range of new applications is available, and is being rapidly adopted, that promises to fundamentally improve the way companies function, and people work. These applications illustrate the unlimited potential of converged voice and data, and today generally fall into two major categories:

- **Corporate video:** Although the media tends to generate the most buzz about consumer-facing content, corporate video – as deployed in small- and mid-size businesses, and large enterprises – presents exciting new opportunities for cost savings and efficiency for companies of all sizes. Video is being used in a very wide range of marketing, communication and business capacities, including:
- **Training**: Video is quickly replacing classroom training as the most effective, and lowest-cost, way to train workers. Students can proceed through material at their own pace, and their progress is automatically tracked.
- **Meetings:** The high cost of business travel is driving many organizations to adopt videoconferencing as a way to save time and money. One-on-one and group meetings can easily be conducted via video, delivering the immediacy and personal touch of face-to-face communication.
- **Human resources:** Targeted in particular at younger workers of the "YouTube generation," video-based tutorials on new policies and procedures, and informational videos about company benefits, can be delivered highly effectively via corporate video. Again, online tracking can be used to verify viewing, an essential element for compliance issues.
- **IT troubleshooting:** IT personnel are nearly always stretched thin, particularly when addressing a queue of break-fix issues. Especially useful in working with hardware or software that can't be remotely accessed, corporate video allows an IT expert in one location to walk another employee through a step-by-step repair or maintenance procedure, at a distance.

- **On-premise security:** In retail environments, Internet-based video surveillance presents a cost-effective way to monitor premises, and protect customers and employees.

Clearly, for geographically dispersed companies, corporate video presents an ever-growing roster of usage opportunities – all of which rely on a high-performance network for application delivery.

- **Cloud computing:** A new consumption and delivery model for IT services based on the Internet, cloud computing typically involves the provision of dynamically scalable, virtualized resources as a service, delivered through the Internet "cloud." Cloud computing providers offer a wide range of common business applications online, accessed via a Web browser, while the software and data are stored on servers maintained by the provider.

Cloud computing presents a dramatic shift in the economics of business computing, as customers do not own the physical infrastructure associated with the services they consume. Instead, they avoid capital expenditure (CapEx) by typically renting usage from a third-party provider and paying only for the resources they consume, such as with software as a service (SaaS).

Companies of all sizes are using a wide range of computing resources delivered through the cloud. These include:

- ***Hosted VoIP services:*** Hosted VoIP is the ideal solution for businesses with multiple locations. Available as MegaPath Duet Hosted Voice, this enterprise-grade, cloud-based IP phone service connects all of a company's employees into one unified phone system with the same business features in every location. MegaPath Duet Hosted is available nationwide includes either T1 or SDSL, and leverages MegaPath's dedicated MPLS VPN network for high quality service delivery. MegaPath Managed Security Service is further described in Section III.
- ***Bundled services,*** such as the MegaPath Managed Security Service that provides distributed security services throughout the core of the MegaPath MPLS network. Managed security offerings alleviate the need for customer IT organizations to deploy, manage and maintain their own network security infrastructure. MegaPath Managed Security Service is also further described in Section III.
- ***Pay-for SaaS applications*** like Salesforce customer relationship management (CRM), and many other business applications. The SaaS delivery model gives companies of all sizes ready access to enterprise-class applications, and requires appropriate network support.
- ***Free applications*** that deliver similarly enterprise-class capabilities such as email and collaboration. Google Gmail is the email platform of choice for many businesses, and the GoogleWave collaboration environment will also likely gain widespread adoption. These types of mission-critical applications demand high-performance network resources.

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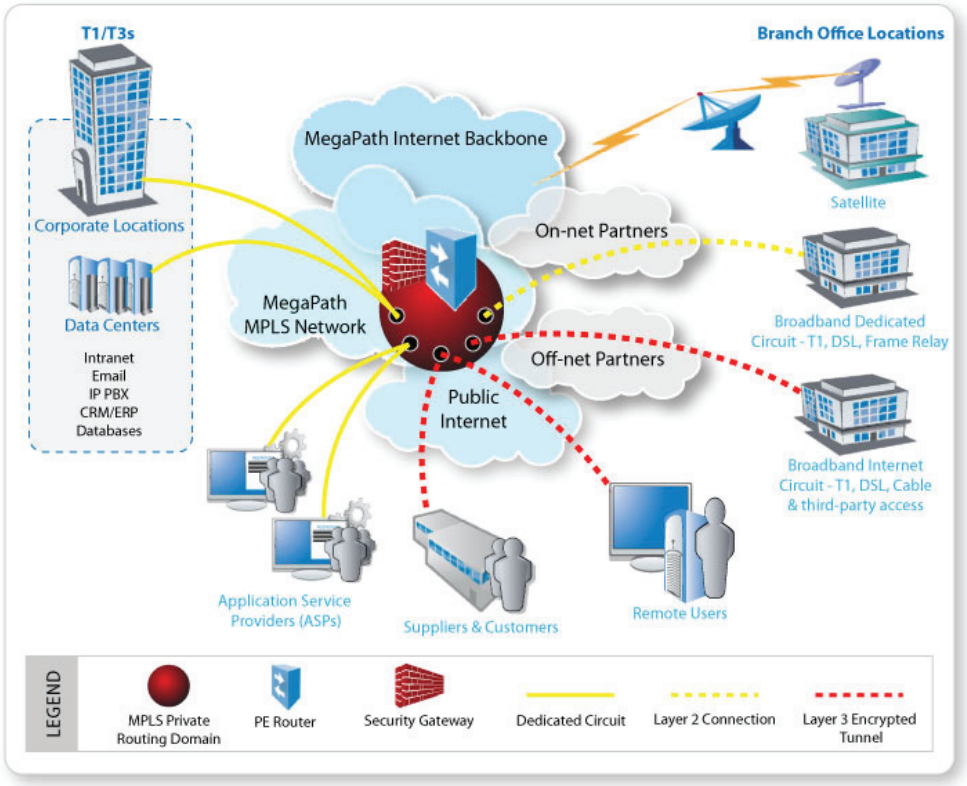
III. About the MegaPath MPLS Network

As the leading provider of managed IP services in North America, MegaPath serves over 23,000 customers and 84,000 endpoints with an MPLS-based Tier 1, all-optical IP network. MegaPath operates approximately 30 points-of-presence (POPs), all of which are located in fault-tolerant, carrier-grade facilities. The POPs are interconnected to the network via multiple optical circuits (OCx) for complete redundancy.



Site-to-Site MPLS VPN

MegaPath's all-optical network switching technology allows coast-to-coast "single hop" networking for on-net traffic, significantly reducing the amount of latency that traffic experiences as it traverses the network. And, since there is redundant path for every connection, traffic is instantaneously re-routed in the event of a network failure, helping to ensure uninterrupted service.

The net result is a powerful, business-class MPLS core network that provides secure connections to empower the distributed enterprise with converged IP data, voice and video applications.

A catalyst for convergence

MegaPath's national footprint ensures that companies will always have a single source for all their network access requirements. With MPLS routing technologies and Tier-1 peering infrastructure, MegaPath customers can be assured they are getting the best performance possible.

MegaPath's innovative network architecture allows companies to extend VoIP, corporate video, cloud computing and other emerging broadband access applications to remote sites and teleworkers. These applications, which require broadband access technologies, can be delivered across the extended enterprise with a combination of more traditional analog dial, frame relay and private line networks for a complete connectivity solution. With network connectivity from MegaPath available in a variety of access speeds – from DSL to DS3 – companies can select the right speed for each individual user or remote location.

That said, MegaPath offers the widest array of broadband access services with the widest coverage available from a single provider. By partnering with all known providers nationwide, MegaPath enhances the chance that broadband services will be available in needed areas, and that remote locations will always get the best service at the best price.

MegaPath Duet Hosted Voice: Enterprise-grade VoIP quality and service for less

MegaPath Duet Hosted Voice is the ideal solution for businesses with one or multiple locations. It is an enterprise-grade, cloud-based IP phone service that connects all employees into one unified phone system with the same business features in every location. Duet Hosted is available nationwide and includes either T1 or SDSL access.

MegaPath's hosted voice services leverages a dedicated MPLS VPN network to provide crystal clear voice quality and call stability; as a hosted solution it can cost up to 50 percent less than a traditional PBX or key system per employee and offers more essential business features. MegaPath Duet Hosted comprises:

- A fully managed total IP phone system
- Low upfront capital expenditure and predictable monthly expense
- Network-based Quality of Service (QoS) for crystal clear voice service and built-in security
- Advanced IP business features on every phone, in every location
- Easy-to-use online portal to simplify system and individual phone management
- Flexible plans and system configurations
- Selection of popular IP phones and enterprise-grade equipment
- Professional installation (optional) and support.

"By leveraging one vendor to deliver secure, high-quality connectivity and communications services, we are assured a single point of accountability as well as a cohesive, integrated solution that supports all of our requirements. Because a lot of our traffic travels between offices, MegaPath's MPLS core is critical to helping ensure the security and performance of our communications and data transmissions."

– Nowfal Akash, Chief Technology Officer, One Source Talent

MegaPath Duet Hosted can help companies achieve significant cost savings. With no expensive PBX equipment to lease, purchase or maintain, MegaPath's hosted VoIP solution costs up to 50% less per employee than a traditional PBX or key system, while offering far more essential business features. MegaPath gives companies a choice of affordable phones, features, and calling plans and provide all the advanced IP features, eliminating the need to worry about technology obsolescence. MegaPath can also work with an existing telephone systems, allowing companies to migrate to IP at their own pace.

MegaPath Managed Security Service: Protection in the cloud

MegaPath complements its robust national network, which is comparable to those maintained by large traditional telecommunications providers, with products and services that are designed for specifically for the business communication needs of SMBs, all the way up to the enterprise level. One of the most innovative is MegaPath's Managed Security Service, which delivers comprehensive Unified Threat Management through the network cloud.

MegaPath Managed Security Service is a hosted solution that requires no customer premise equipment (CPE) – relieving customer IT organizations of the burden of buying, deploying and managing/maintaining firewalls, anti-spam and a host of associated security functions. The MegaPath service allows for proactive monitoring of customers' networks, through MegaPath's multiple redundant Network and Security Operations Centers.

MegaPath Managed Security Service complies with selected industry-specific standards such as the PCI for credit card processing, and offers exceptional depth and breadth of security features including:

- Managed Firewall
- Anti-Virus
- Intrusion Prevention
- Spam Tracker
- Content Filtering
- White List/Black List

Furthermore, the MegaPath network is protected at a global level from large-scale threats, including zero-day attacks, by Fortinet, a world leader in unified threat management.

The advantages of MegaPath Managed Security Service

MegaPath Managed Security Service allows companies to realize a number of important benefits, including:

- ***Protects critical resources:*** The MegaPath solution filters inbound and outbound Internet traffic at the network edge, thereby protecting all devices on the network, not just computers. It provides an extra layer of security, in addition to security programs that may be installed on individual computers, to protect companies from viruses, spyware, attacks

and visits to unauthorized Web sites.

- ***Reduces wasted time and resources:*** MegaPath tags spam and additionally proactively blocks network-based attacks, viruses, worms and non-productive Web surfing, providing detailed reports on all security-related network activity.
- ***Reduces liability*** by preventing access to illegal and harmful Web sites.
- ***Saves money:*** MegaPath eliminates the need for dedicated hardware and specialized security staff, while reducing the need for traditional security skill sets. By reducing bandwidth consumption, MegaPath Managed Security Service can subsequently reduce required bandwidth while increasing uptime and employee productivity.

Finally, the infrastructure for the MegaPath Managed Security Service provides the foundation for site-to-site security services that MegaPath customers can subscribe to remotely. This CPE-based extension of the Managed Security Service allows MegaPath customers to achieve the same high levels of security for site-to-site communications in their private MegaPath networks.

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IV. Success Snapshot: VIZIOSoft Builds Client Relationships, and Its Business, with MegaPath Duet

In an era in which the IT services industry touts "bigger is better," VIZIOSoft is a high-touch solutions boutique that bucks the trend. VIZIOSoft is focused on rapid software application development and IT outsourcing services. The company has a passion for partnership that extends both to customers and to providers like MegaPath, which recently teamed with VIZIOSoft to deliver a cost-effective VoIP customer solution based on MegaPath's Duet Voice and Data service, which is delivered via MegaPath's MPLS network.

The VIZIOSoft customer was Velocity Athletics, a sportswear company with U.S. operations in Jacksonville, Fla., and Las Vegas, and a clothing production facility in the Philippines. Velocity Athletics had looked to VIZIOSoft to replace its traditional analog phone system with VoIP technology.

> *"When we started talking with service providers about how to architect a VoIP solution for Velocity Athletics, MegaPath was much more responsive, and worked with us in an individualized way,"* says Omar Akram, co-founder and president of VIZIOSoft. *"Some other vendors wanted VIZIOSoft to pay up-front to resell their services, but did not take time to have a conversation with us. MegaPath provided us with the domain expertise we needed to put together the right solution for Velocity Athletics."*

MegaPath Duet Voice and Data is ideal for small and medium businesses

In collaboration with MegaPath, VIZIOSoft proposed and subsequently implemented a cost-effective Duet Voice and Data solution. By integrating Velocity Athletics' voice and data applications over a consistent solution, supported by T1 connectivity, VIZIOSoft and MegaPath are enabling the customer to increase productivity without increasing resources or overhead.

Specifically, the solution integrates Velocity Athletics' customer relationship management (CRM) system and includes advanced VoIP features such as the use of four-digit dialing to communicate as a single organization, across the US facilities and the factory in the Philippines. Akram says, "The Duet solution lets our customers leverage their existing analog switches while getting a productivity boost from VoIP applications and features."

Teamwork ensures a seamless transition

As high quality as Akram found the Duet service offering, his relationship with MegaPath was sealed by its commitment to customer service. During the deployment, the MegaPath worked closely with the VIZIOSoft team, providing real-time guidance on system configuration and other issues. "The Velocity Athletics system went live with no service interruption," Akram recalls, "It was an exceptionally smooth cut-over, thanks to MegaPath."

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V. Summary: The Advantages of the MegaPath MPLS Network

As an engine for convergence, an MPLS network provides significant advantages, starting with the immediate business advantages of reduced costs via VoIP communications. For many companies, the savings in traditional telephony charges alone can fund the entire converged WAN solution. In addition, there are no long-distance charges for site-to-site calling.

With MegaPath converged services, additional costs can be saved, as a single connection supports all of a customer's current and future WAN needs. Customers can begin enjoying immediate VoIP cost savings with their existing "plug and play" analog and PRI equipment, which requires no costly CapEx expenditures in their voice infrastructure.

Similarly, MegaPath's Managed Security Service provides the highest levels of network-based managed security, negating the need for related CPE to purchased or managed, and thus reducing in-house IT resource requirements. Should customers wish to enhance their site-to-site security, they can supplement the Managed Security Service with additional MegaPath offerings.

High performance, from the core to the edge

In terms of technology and products, MegaPath's "single hop" for cross-country, on-net traffic ensures the highest possible QoS for voice and all other traffic. By not "handing off" voice traffic to the public Internet, as many traditional Internet service providers (ISPs) do with their VoIP services, MegaPath delivers voice and video that are crystal clear, and of exceptional quality.

In addition, MegaPath provides a range of high-performance add-on offerings that customers can use to tailor their converged environments. These include:

- A PCI module for retail, for secure, logged credit card transactions
- Excellent last-mile offerings, from DSL to DS3, as well as wireless options that blend in seamlessly with the core network
- The largest private DSL footprint in the US
- SSL and Web-based access, to allow easy remote access from anywhere, via a browser – a secure, convenient option for companies that want to allow remote access but do not want to carry the costs of a VPN.

MegaPath offers distinct service advantages

With resources on par with any national telecommunications service provider, MegaPath offers enterprises of all sizes, and small- and mid-size businesses, a unique flexibility to grow the service with customers' needs. For example, a company can immediately gain the benefits of voice-data convergence with MegaPath's Duet Voice and Data service, using existing analog equipment. As needs grow, the customer can migrate to Duet PRI, Duet SIP Trunking or Duet+MPLS, as well as MegaPath Hosted Voice Services that provide smart phones and hosted Unified Communications applications.

MegaPath's customer focus extends to its ability to develop custom MPLS solutions. For example, for retail customers, MegaPath can set up multiple VLANs to segregate sales (PCI) traffic from Internet traffic. Other customers may use a mix of last-mile connectivity, to transmit daily inventory and sales information. For all customer engagements, MegaPath provides a dedicated project management team to oversee the entire rollout of the network environment. This includes working with voice and data teams in IT organizations to help ensure a smooth transition to the new converged network.

For more information on how MegaPath can help your organization gain the benefits of voice and data convergence, please visit www.megapath.com.

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MegaPath receives industry recognition

- *Internet Telephony's 2008 & 2007 Product of the Year (Duet)*
- *Unified Communications 2008 Product of the Year (Site-to-Site MPLS VPN)*
- *Communication Solutions 2008 Product of the Year (Managed Security Services)*
- *Telecom Associations Members Choice Award 2009*
- *CRN's 2009 Channel Chiefs*
- *Inc. Magazine's 2009 Inc. 5000 Fastest-Growing Private Companies and Top 100 Telecommunications Companies*
- *VAR 500 Top Technology Integrator, six consecutive years Deliotte Fast 500 Technology List http://www.megapath.com/pressroom/2009_press_releases/MEGAPATH-NAMED-TO-DELOITTE-TECHNOLOGY-FAST-500-LIST.cfm*

About MegaPath Inc.

MegaPath is the leading provider of managed IP communications services in North America. MegaPath leverages its wide selection of broadband connectivity, Virtual Private Networks (VPN), Voice over IP (VoIP) and security technologies to enable businesses to lower costs, increase security and enhance productivity. Organizations of all sizes can easily and securely communicate between their headquarters, branch offices, retail locations, mobile workers, and business partners.

Next Steps

To learn more about MegaPath MPLS network solutions, go to:

http://www.megapath.com/vpn-security/mpls-site-to-site-vpn/

MegaPath™

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