Business Internet + SD-WAN:
The Network of the Future

A Guide to Leveraging Business Internet +
Software-Defined Wide Area Networks
to Deliver Economical Redundancy + Network Innovation

TPX

EXECUTIVE SUMMARY

Business networks have evolved to segment, compress, transmit and reassemble data in ever-larger amounts and at ever-greater speeds, fueling our Internet-enabled economy.

As a result, network connectivity is as essential for your business operations as electricity, impacting:

- Production and operations
- Finance and HR
- Sales and marketing
- Customer experience, satisfaction and retention

This eBook looks at network evolution and the emergence of the "network of the future" that's already transforming how businesses manage connectivity and security in a cloud-based world.

Key Takeaways

IP networks continue to displace TDM-based networks to meet the demand of today's data-driven applications.	**Business Internet + SD-WAN solutions are the future of networking.**	**Business Internet solutions generally come in synchronous and asynchronous varieties.**

SD-WAN delivers centralized control over data and app prioritization and routing over the top of disparate hardware and networks.	**Pairing Business Internet with SD-WAN allows firms to economically achieve enterprise-class network quality and redundancy.**	**In SD-WAN + Business Internet network deployment, a critical decision for businesses is internal management vs. outsourcing to an MSP.**	**"Best fit" MSPs can free up essential internal IT resources or provide the missing expertise needed for SD-WAN + Business Internet deployments.**

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Transitioning from TDM to IP Networks

The networked world is transitioning from the TDM connections that have long powered telephone networks to more modern data-centric approaches using IP.

Legacy TDM Networks

Time Division Multiplexing (TDM) is used in the Public Switched Telephone Network (PSTN) and underpins many legacy business network services, including:

- T1 lines transmitting voice or data
- Primary Rate Interface (PRI) lines to business phone systems
- Digital Signal (DS) lines for data services

Pros: TDM supports end-to-end quality of the service ideal for voice services.

Cons: It's far more difficult and expensive to scale than newer technologies and ill-suited to latency-sensitive applications. Plus, carriers are retiring Plain Old Telephone Service (POTS) and TDM-based copper networks because of aging infrastructure and lack of qualified operations staff to maintain them.
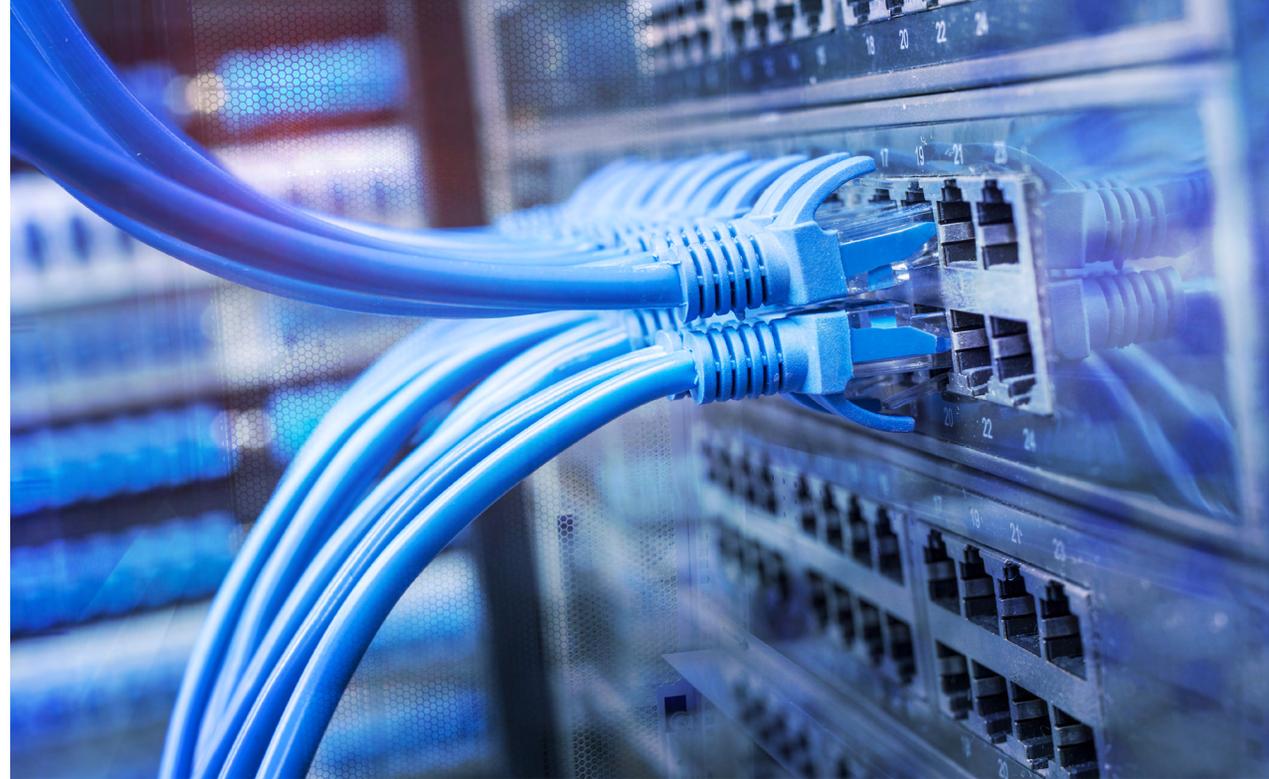
Modern IP Networks

Internet Protocol (IP) governs traffic over copper, fiber and wireless networks. IP networks can be small, such as a local area network (LAN) in a small office, or they also can be enormous like the Internet itself.

Pros: IP facilitates every type of communications — from file sharing and email to voice, video and multimedia. IP's flexibility, scalability and interoperability has made it today's standard networking protocol.

Cons: Many IP-based services traverse the public Internet, which is less secure and subject to jitter, latency, packet loss and outages.

Future Networks

The future of networking has emerged through a combination of high-speed Business Internet and software-defined wide-area networks (SD-WAN). In 2018, SD-WAN was globally installed in only 18% of business networks; by 2020, the figure more than doubled to 43%. The addition of SD-WAN levels the "end-to-end quality of service" playing field between standalone Business Internet vs TDM by delivering:

- Dynamic routing
- Traffic optimization
- Security
- Centralized network management

Together, Business Internet and SD-WAN empower businesses to access Internet-based applications and managed services, so they can enjoy:

- Reliable communications
- Superior customer experience
- Competitive advantage

What is Business Internet?

Business Internet or High-speed Internet Access (HSIA) is defined by the U.S. Federal Communications Commission as delivering a minimum download speed of 25Mbps. However, Business Internet can support speeds much faster than this minimum.

What are the types of Business Internet?

Business Internet comes in two forms:

- **Symmetrical connections,** usually acquired via dedicated internet access (DIA), deliver equal upload and download speeds and are typically associated with business connectivity which must support real time applications like voice and video communications that require synchronous up and down speeds.

- **Asymmetrical connections,** also known as broadband, have higher download than upload speeds. In the past broadband was associated with home use, but it's now widely used by businesses, too, since it now delivers multimegabit and even gigabit speeds that support the requirements of real-time business applications.

What are the features and benefits of Business Internet?

	DIA			Broadband		
Features + Benefits	**Ethernet**	**Fiber**	**Fixed Wireless**	**Cable**	**DSL**	**4G/5G**
	Fast Reliable Widely available SLA-backed	Fast Ideal campuses + large offices Reliable SLA-backed	Fast Rural friendly Widely available Often a failover option	Wide availability, especially in metro areas Generally faster and more reliable than DSL	More broadly available than cable Can be symmetrical, which is good for businesses	4G usually used as a failover option 5G is much faster but not widely available

What is SD-WAN?

A Software-Defined Wide Area Network (SD-WAN) creates a software-based management layer over top of your network infrastructure, including low-cost broadband connections, to deliver unprecedented control over routing and traffic prioritization.

SD-WAN deployments are increasing, with SD-WAN revenue to exceed $6 billion by 2026, according to a recent report from market intelligence research firm 650 Group.

What are the types of SD-WAN?

Internet-based (DIY)

Do-it-yourself, or DIY, SD-WAN is when your IT team procures, deploys and manages SD-WAN devices, software and connectivity.

Third-Party Managed

Managed SD-WAN takes the burden of SD-WAN management from your IT team—from planning and sourcing to deployment and maintenance.

SD-WAN-as-a Service

SD-WAN-as-a-service delivers SD-WAN over a provider's private network. In this model, you may own, share or offload management through a cloud-based portal.

What are the primary benefits of SD-WAN?

Reliability & Efficiency

SD-WAN uses real-time routing and optimization to improve connectivity and employee productivity.

Lower Costs

SD-WAN reduces costs of hardware, connectivity (via low-cost broadband) and time to deployment.

Business Continuity

SD-WAN enables dynamic routing or failover to a secondary link, ensuring always-on Internet.

Improved Security

SD-WAN solutions leverage encryption and Virtual Private Networks (VPNs) for secure connections.

What is Business Internet + SD-WAN?

Business Internet is mandatory for today's connected business. While you can source and deploy primary and backup circuits to improve uptime for Internet-based networks, adding SD-WAN to Business Internet is even better. It creates resilient networks that rival more expensive approaches with greater flexibility and dramatically lower costs.

Why do you need both Business Internet + SD-WAN?

SD-WAN empowers you to:

- Aggregate lower-cost Business Internet circuits to boost bandwidth
- Manage Business Internet for optimal network performance and cost efficiency
- Introduce network diversity and redundancy with multicarrier Business Internet

What are the components of Business Internet + SD-WAN?

Embracing Business Internet + SD-WAN as a modern strategy generally includes the following components (shown at right):

Business Internet + SD-WAN Components

Professional Services
Consulting, Deployment & Management

Business Internet
One or more circuits at each site

SD-WAN Software
Licenses for edge and core node

SD-WAN Hardware
Edge devices at each site
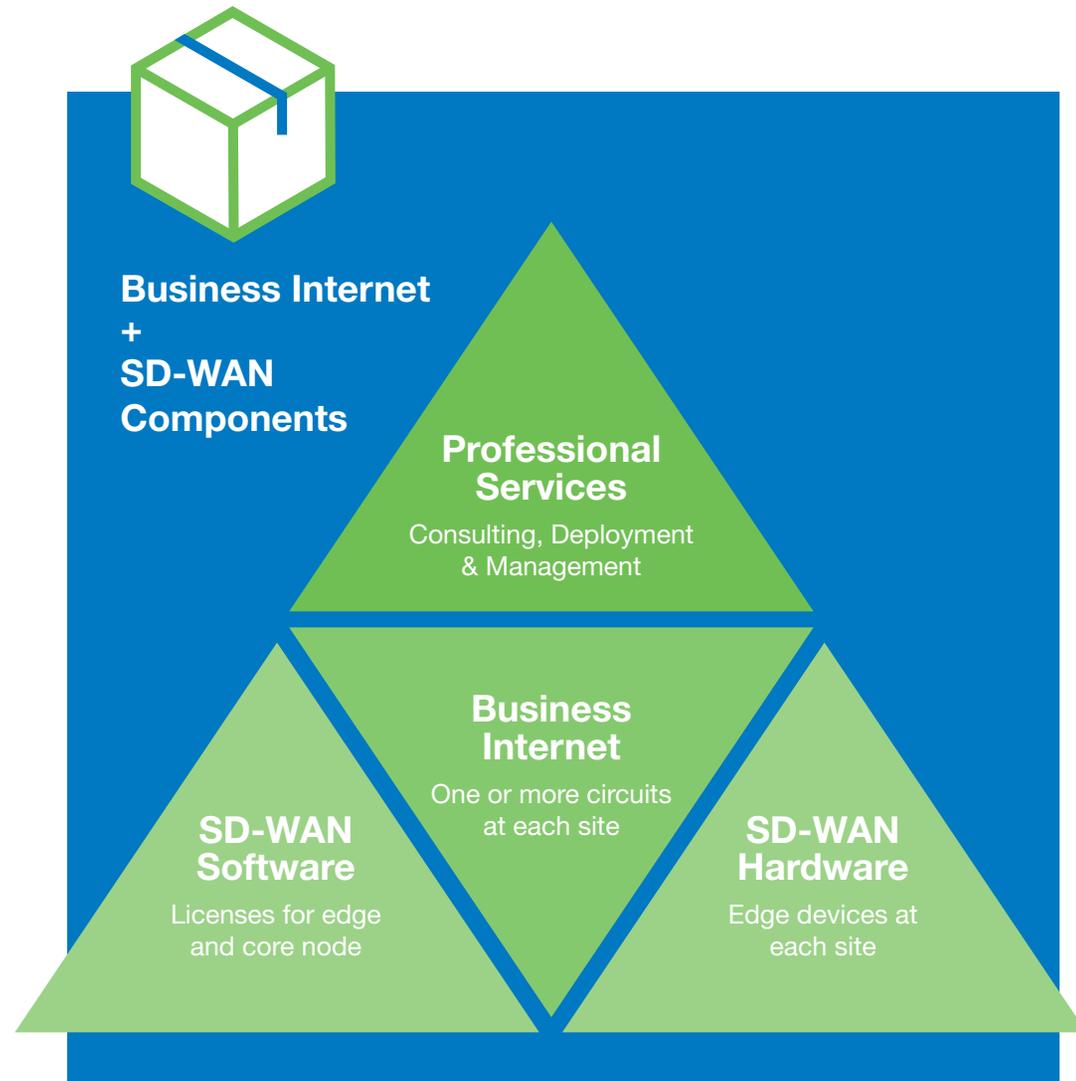
What are the costs of Business Internet + SD-WAN?

Costs associated with components required for SD-WAN (noted on the previous page) vary depending on whether you insource or outsource and which technology vendors or service providers you choose. That said, don't underestimate the costs of professional services to ensure your Business Internet + SD-WAN deployment is engineered and implemented correctly and maintained in a stable state. Sourcing SD-WAN from third-party experts typically reduces these expenses dramatically.

Business Internet + SD-WAN Professional Services Costs

Consulting
Needs assessment and solutions engineering

Deployment
Installation and implementation

Management
Ongoing maintenance
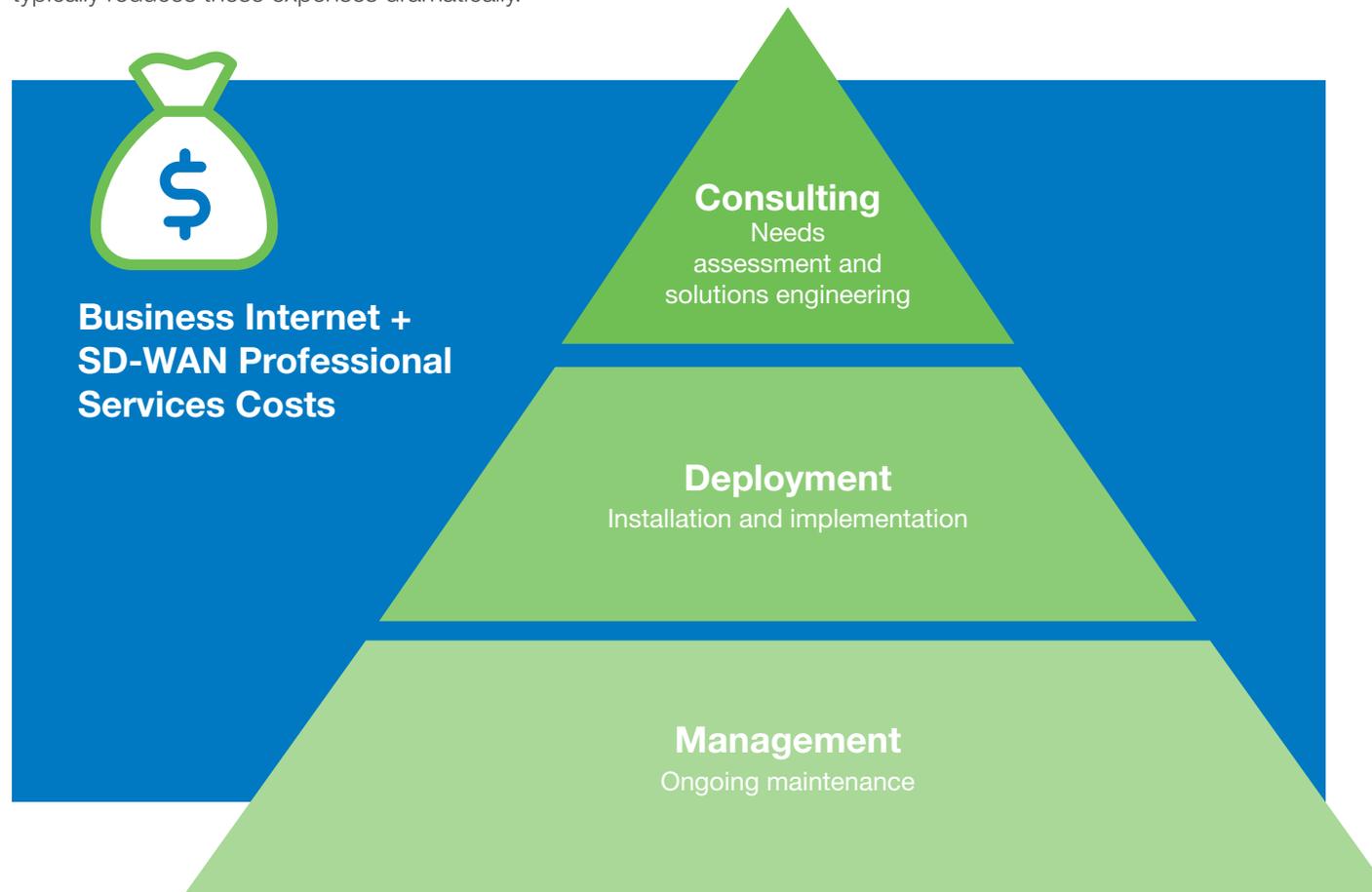
Is Business Internet + SD-WAN the right fit for your business?

The flexibility of the Business Internet + SD-WAN combination makes it suitable for many businesses. The use cases are wide-ranging and benefit many business types.

Common Use Cases for Business Internet + SD-WAN

Multilocation Branch Connectivity

An enterprise with tens, hundreds or thousands of branch offices or retail locations can use Business Internet + SD-WAN to lower costs and centralize network management.

Quality of Service

Companies with mission-critical data like financial transactions or bandwidth-sensitive multimedia can use Business Internet + SD-WAN to prioritize traffic and avoid pricey network upgrades.

Broadband Aggregation

Organizations large and small can leverage Business Internet + SD-WAN to economically boost bandwidth by aggregating low-cost broadband circuits rather than installing expensive private lines.

Always-On Connections

Businesses that are dependent on cloud communications and applications can rely on Business Internet + SD-WAN to deliver best-path routing or failover to eliminate costly downtime.

What Should You Know Before Moving to Business Internet + SD-WAN?

When evaluating the move to Business Internet + SD-WAN, consider these factors:

TCO/ROI
Skyrocketing Business Internet + SD-WAN adoption is driven by near-universal return on investment (ROI). However, it's important to assess the total costs of ownership (TCO), including projected ongoing maintenance costs, to help you determine whether to go the DIY or managed services route, and your projected ongoing maintenance costs.

Cost vs. Quality
The Business Internet + SD-WAN combination offers unprecedented opportunities to leverage traffic shaping and prioritization to dramatically reduce your bandwidth bill. Rather than purchase a 1Gbps link to avoid video degradation during peak usage, you may be able to prioritize video traffic and achieve high QoS on a less expensive 100Mpbs circuit. That said, be mindful of the minimum bandwidth you need to maintain business operations with acceptable levels of productivity.

Change Management
Be sure to document all changes needed in both your initial deployments and your ongoing network procurement management due to Business Internet + SD-WAN adoption. Train, plan and assign roles with your team ahead of time to facilitate a smooth transition.

LAN Impact on WAN
The best Business Internet + SD-WAN configuration in the world won't matter if your LAN equipment and configurations are subpar or can't keep pace with your WAN upgrades. Bringing your LAN(s) in line with your planned SD-WAN ensures that you gain the most from your newly configured network.

DIY vs. Managed Services

DIY Business Internet + SD-WAN		**VS**	Managed Business Internet + SD-WAN	
Pros	**Cons**		**Pros**	**Cons**
• Ability to control entire process and maintenance schedule • Can be less expensive if internal IT staff is underutilized	• Drain on IT resources • Results are typically less effective than when sourced by professionals • Risk of underestimating time and costs in adoption and maintenance		• No drain on IT teams • Typically yields better results than DIY instances • Peace of mind gained from a fully managed solution	• Typically must adhere to process and maintenance schedules set by vendor • In some instances, can be more expensive than DIY solutions

One Provider vs. Many Providers

One Provider Business Internet + SD-WAN		**VS**	Many Providers Business Internet + SD-WAN	
Pros	**Cons**		**Pros**	**Cons**
• Simplicity – one bill and one number to dial for help	• Lack of diversity increases risk and impact of outages		• Redundancy and business continuity • Ability to lower costs through aggregation	• More complex buying process • Ongoing management of more vendors

What Should You Look for in an MSP?

When seeking the right MSP partner, it's essential to find one that you can rely on to help you through all of your company's growth phases. That means top-tier expertise, financial stability, the size and reach to scale with your company as it grows, flexibility, reliability and 24/7/365 support.

Key attributes to look for when selecting an MSP to manage your Business Internet + SD-WAN deployments include:

Experience
Business Internet + SD-WAN involves multiple moving parts, potentially many vendors in different locations, and the ability to diagnose and maintain your network. Choosing an MSP with experience in what works and what doesn't is key.

Complementary Services
Choose an MSP that manages your LAN and your edge devices as well as your Business Internet + SD-WAN deployment. That way, they can diagnose and fix issues no matter where they lay in your network(s). And it makes life easier on you administratively when you have one point of contact and accountability.

Network Agnostic
Some MSPs offer access to their network or suppliers, while others only work with suppliers you bring to the table. MSPs that take your needs seriously have both and can accommodate any combination of infrastructure.

Network Expertise
Look for an established MSP with a significant industry presence. TPx, for example, has roots as a network services provider. We understand networks, their function and troubleshooting better than other MSPs. And, we have long-standing partnerships with Internet Service Providers (ISPs) to deliver Business Internet coast to coast – all managed under one bill and one point of contact.

Inbound and Outbound QoS
If you want to prioritize voice and video, for example, you need a partner that makes sure the signals you receive – not just the ones you send – are QoS-optimized. Many MSPs offer outbound optimization of your SD-WAN but few deliver inbound QoS because they don't also manage your LAN. It's also a weakness in carrier-provided Managed SD-WAN offerings since their reach and responsibility stops at your LAN.

Why Choose TPx for Business Internet + SD-WAN?

As one of the nation's largest MSPs, TPx can handle all your managed networking and security needs. For Business Internet + SD-WAN deployments, we tick every box on your MSP provider requirements list and then some — all backed by industry-leading infrastructure, engineers and support teams.

TPx Business Internet + SD-WAN Features + Benefits

- **Managed LAN** – Better performance and security, and custom optimization for your Business Internet + SD-WAN experience
- **Network Visibility** – Device-level visibility for precision management and analytics
- **Network Coverage + Diversity** – Partnerships with ISPs covering 96% of the continental U.S.
- **Any Network** – Bring your own provider, use one of ours or mix-and-match
- **Cloud VPN** – Dynamic, edge-to-edge communication via IPSec VPN connectivity

- **Secure Connectivity**– Encrypted traffic with VPN access
- **Enterprise-Grade Wireless Network Access** – Connect more users securely without sacrificing flexibility
- **Wi-Fi 6 Certified Routers** – Fast, seamless experiences with maximum coverage
- **RF Optimization** – Optimized wireless performance in dense and demanding environments
- **Universal QoS** – QoS over any network

- **Flexible, Multicircuit Continuity** – Achieve bi-directional continuity with circuits that all back each other up
- **4G LTE and 5G Connectivity and Continuity** – Leverage wireless networks as primary, secondary and redundancy options
- **WAN Optimization** – Forward Error Correction (FEC) for superior circuit performance
- **Inbound Failover** – Failover redundancy for remote users and web servers

- **Application-Ware/ Smart QoS** – Customized traffic shaping and prioritization of key application data
- **Inbound & Outbound QoS** – Prioritize high-value inbound and outbound traffic across your WAN and LAN
- **24/7 Live Support** – Troubleshooting tools and instant access to experts
- **End-to-End Planning and Management** – Expert support and management through the consultative, deployment and maintenance phases

PART 7:

Interactive Glossary

Click on any of these terms to see Wikipedia pages
and definitions.

- Digital Signal (DS) Service

- Edge Device

- Failover

- Internet Protocol (IP)

- Internet Service Provider (ISP)

- Local Area Network (LAN)

- Primary Rate Interface (PRI)

- Quality of Service (QoS)

- Return on Investment (ROI)

- Software-Defined Wide Area Network (SD-WAN)

- T1

- Time Division Multiplexing (TDM)

- Total Cost of Ownership (TCO)

- Virtual Private Network (VPN)

- Wide Area Network (WAN)

ABOUT TPX

TPx is a leading nationwide managed service provider focused on the success of small- and medium-sized businesses (SMBs) with approximately 18,000 customers in more than 49,000 locations across the U.S. For more than two decades, TPx has offered managed services and solutions to help customers across every business sector address the growing complexity of their IT environments.

For more information

tpx.com