

Managed Service Providers Can Solve  
the Top Five Challenges with

# NETWORK TRANSFORMATION

**WHITE PAPER**

Prepared by  
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**ABOUT THE AUTHOR**

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**INTRODUCTION: IT’S TIME FOR THE NETWORK TO TRANSFORM**

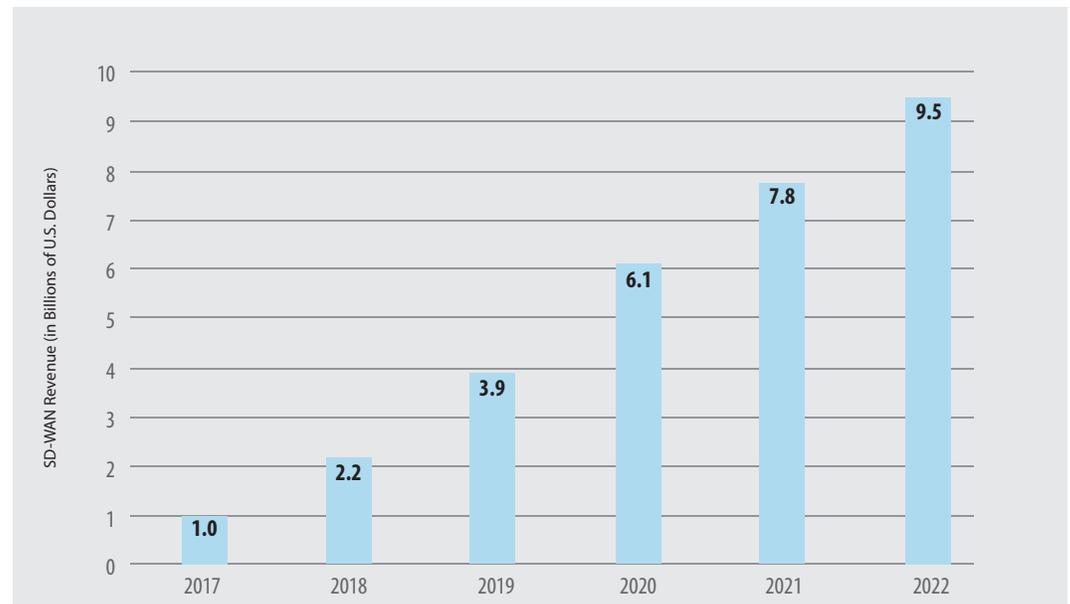
ZK Research defines digital transformation as the application of technology to create new business services and processes by leveraging the convergence of people, processes and networked things. Digital innovation involves companies transforming business operations to generate more revenue, lower costs and achieve unprecedented levels of efficiency in order to gain a sustainable competitive advantage in their markets.

These rapid changes across all industries are yielding a harsh reality for today’s business and IT leaders. Digitization has altered and will continue to change the landscape in every market. Organizations must be willing to become highly agile and disrupt themselves before they are disrupted.

However, being an agile business has its challenges, as it requires an agile IT foundation. But organizations are becoming more dynamic and distributed, making the network significantly more important. Businesses that want to move faster and leverage the full potential of digital transformation must evolve not only their network, but also how they manage it.

The architecture used to build wide-area networks (WANs) was designed decades ago to support client/server applications and best effort internet traffic. The evolving application environment is putting new demands on the WAN that cannot be met by using a traditional network. To adapt, businesses have been looking to software-defined WANs (SD-WANs), which is why the SD-WAN market is one of the fastest growing segments of technology spending. The ZK Research 2018 SD-WAN Forecast projects that SD-WAN revenue will grow from \$1.0 billion in 2017 to \$9.5 billion in 2022 ([Exhibit 1](#)).

**Exhibit 1: SD-WANs to Explode over the Next Five Years**



ZK Research 2018 SD-WAN Forecast

*As powerful as SD-WANs are, they can be more complex than traditional WANs.*

SD-WANs are fundamentally different from legacy networks in that the control plane has been decoupled from the data-forwarding plane. This means network changes can be made centrally and then propagated across the entire network at once. Legacy networks are typically managed on a node-by-node basis, so changes can often take months to implement. Juxtapose this with an SD-WAN where changes can be made network wide in hours or often minutes, and it's easy to see why the demand for SD-WANs is so high. Also, SD-WANs take advantage of low-cost broadband for network transport, dramatically cutting the cost of transport. It's important to note that broadband—particularly very low-cost solutions—can't deliver the same consistent quality as Multiprotocol Label Switching (MPLS), but it is viable for certain use cases.

However, as powerful as SD-WANs are, they can be more complex than traditional WANs, and this can limit their ability to transform the network. Network engineers that take a “do it yourself” (DIY) approach to SD-WANs need to consider factors such as the following:

- How to optimize broadband links
- Which type of broadband to use (cable, DSL, Ethernet, wireless, etc.)
- Where to implement local internet breakout
- How to secure branch offices and where to apply security
- How to manage multiple broadband service providers in a scalable way
- Whether to use active–active or active–passive architectures
- How to design a network with a hub-and-spoke, partial or full meshing topology

If businesses are to succeed with digital transformation, they must overcome these challenges. A manufacturing organization that ZK Research interviewed in 2018 tried to migrate to an SD-WAN using its own internal staff and had less than desirable results. In the discussion, the company's CIO told us, “The number of decisions that have to be made when SD-WANs are deployed can be overwhelming.”

## SECTION II: THE TOP FIVE CHALLENGES WITH SD-WAN

The value proposition of shifting to an SD-WAN is multifaceted, as the technology promises to increase business agility and lower costs. However, those benefits only happen if the technology is implemented correctly. The following are the top five challenges that organizations must overcome if they are to maximize their investment in an SD-WAN:

- 1. Architectural choices:** Traditional networks were typically designed with a rigid hub-and-spoke topology. The cloud, the Internet of Things (IoT), mobility and other trends change traffic patterns, and it's important to change the network architecture along with them. For example, if the business has a “cloud first” strategy, local internet breakout should be used to provide faster access to the cloud. If this is done without the right type of security, the business will be at risk of being breached. Another example is businesses that try to run

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real-time apps on asynchronous broadband, in which case the unpredictability and uneven bandwidth can cause voice and video to perform poorly.

- 2. Inclusion of broadband:** One of the biggest areas of cost savings for an SD-WAN is to use broadband internet for transport. Conceptually, this may seem fine, particularly if WAN optimization is applied. However, several factors must be considered. Unlike MPLS, there are no global or even nationwide service providers for broadband. ZK Research has estimated there are approximately 850 broadband providers in the United States alone. This creates a management headache for large organizations, as they may need to establish relationships with dozens—possibly hundreds—of providers.

Also, broadband performance can be inconsistent based on location, time of day or other factors. For example, ZK Research recently interviewed a large retail firm that was paying for 50 MB of cable internet. The network manager told us that speeds would often reach 100 MB during the day but would be as low as 8 MB at night. This is because cable is a shared medium, so one subscriber's performance can be degraded by the activity of other subscribers.

- 3. Security concerns:** In traditional architectures, security tools were deployed in the hub of the network. All internet traffic coming in or leaving the organization would pass through this point, making it easy to inspect and filter out any malicious traffic. Many businesses that deploy an SD-WAN break away from the centralized hub and let users access the internet directly from the branch office. Although this offers better cloud performance, it changes the security paradigm.

Businesses need to shift security from the core of the network to the edge. Deploying big, expensive security tools in each branch office isn't practical, as it's prohibitively expensive to procure and complicated to manage. Several options are available to security professionals, including all-in-one security appliances, virtualized services and cloud-based security. Understanding what to deploy and where is not an easy task; if not done correctly, it could lead to overspending on security. This can affect the ROI on an SD-WAN or can leave the organization exposed, which could have a catastrophic effect in the event of a breach. ZK Research recently interviewed the CSO of a retail firm who told us that the shift to an SDN increased the number of entry points by an order of magnitude, causing the company to rethink cybersecurity by moving to a more layered approach.

- 4. Application optimization and resiliency:** As mentioned earlier, the use of broadband creates inconsistent application performance. However, several application optimization

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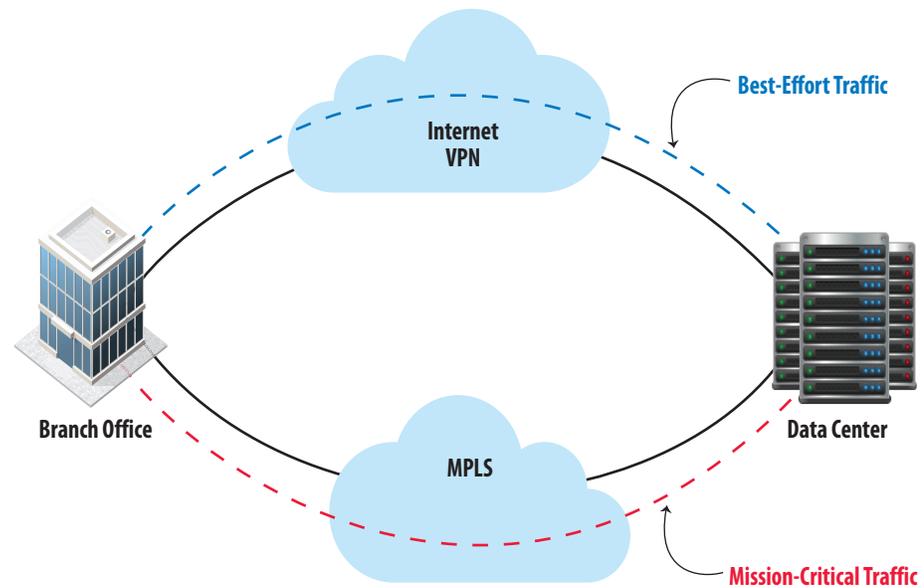
technologies are available including quality of service (QoS) and acceleration. It's important to note that these technologies only work if there is bandwidth available. The quality of many low-cost broadband connections is so poor that no amount of optimization will help. Another option is to use multipath technology, in which case mission-critical traffic can be sent down the MPLS connection and best effort traffic can be sent over an internet link. There are also many optimization techniques such as forward error correction (FEC) and packet striping that are lightly adopted but can make a big difference with SD-WANs. The key is to understand how all of these optimization techniques can work together to optimize the performance of all applications.

- 5. The role of on-premises hardware:** Branch hardware, such as routers, has been integral to WAN architectures for decades. However, some SD-WAN architectures only use a minimal amount of branch network equipment. Network professionals need to determine how they want to deploy SD-WAN services, as this will dictate the evolutionary path of the network infrastructure. Options include using cloud-based services, virtual appliances, physical appliances, multi-function devices or some combination of these. Businesses need to understand the pros and cons of each option to make the best decision. For example, physical appliances should be used when guaranteed performance is the most important criterion, but virtual ones are superior when agility is most important. Similarly, if simplified management is crucial, then the best choice might be a multi-function appliance.

### **SECTION III: MANAGED SERVICE PROVIDERS CAN SOLVE COMPLEXITY ISSUES ASSOCIATED WITH SD-WANS**

The use of managed service providers (MSPs) has grown over the past decade as more and more businesses look to use their internal IT staff to drive innovation and leave the day-to-day operations to the MSP. With SD-WANs, the MSP can play a dual role by helping businesses that are new to the technology both evolve their network and maintain operations. Digital organizations need to focus on understanding market trends and then adapting faster than the competition. By offloading the operations of the SD-WAN to the MSP, more resources can be allocated to strategic initiatives.

There are multiple types of managed service providers ranging from local value-added resellers (VARs), to systems integrators, to service providers, to consultancy firms. MSPs that own their own network have an inherent advantage, as they can take a hybrid approach ([Exhibit 2](#)) in which the MPLS network can be used for mission-critical and real-time traffic, and then the internet can be leveraged for best effort traffic and software-as-a-service (SaaS) applications. This combination of public and private networking provides the business with a “best of both worlds” scenario in which the company can optimize the network for both performance and cost.

**Exhibit 2: A Hybrid SD-WAN with Multipath Capabilities**

ZK Research, 2019

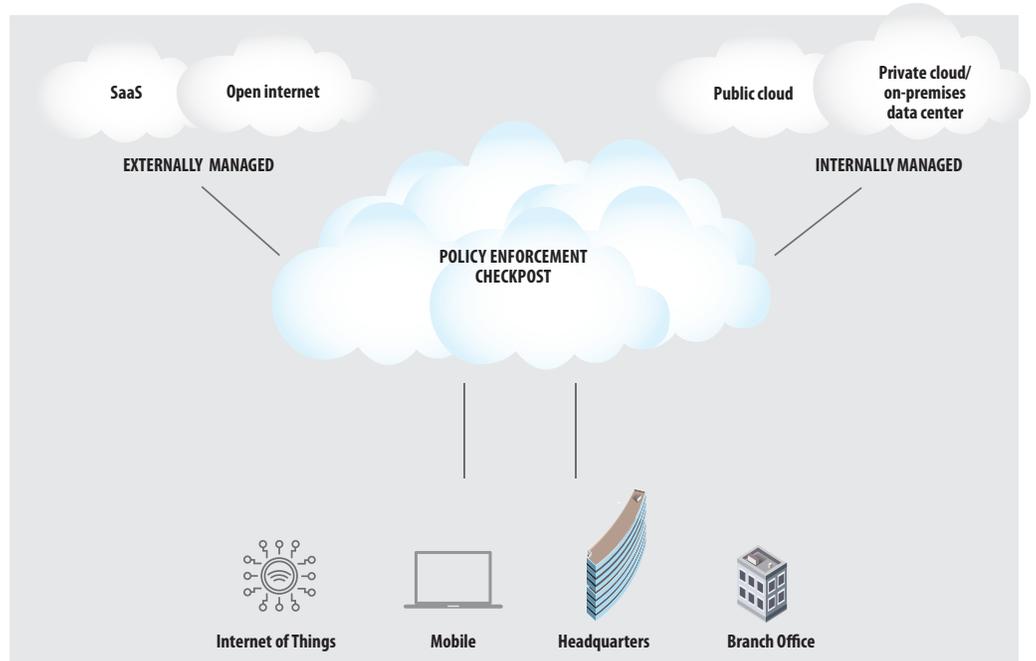
Also, MSPs can offload the heavy lifting often required to make broadband part of the corporate network. In most cases, the MSP will act as an agent on behalf of the enterprise and manage all the broadband relationships for its customer. This means the business can enjoy the benefits of using broadband but have a single contract in place for network services, dramatically simplifying the process of leveraging broadband. Also, MSPs often have relationships with in-country internet service providers (ISPs) and can recommend the best ISP to ensure end-to-end performance.

Another benefit of using an MSP (including service providers) that owns the private network is that intelligence can be built into the network. This is beneficial for both security and ongoing manageability. Network traffic patterns can change very quickly, and it's important that the network continually adapt. By always monitoring the network, an MSP can predict issues that could cause application performance problems and remediate them before workers notice a degradation in service.

By moving security services into the network, businesses can quickly implement a direct-to-cloud model in which mobile workers, branch employees and even IoT devices can be secured by checking policies before granting access to cloud services ([Exhibit 3](#)). This obviates the requirement to deploy security technology in every branch location. However, for larger branches, where it might make sense to have local security tools, an MSP can facilitate branch security and ensure it's configured correctly to protect the business.

MSPs also have the ability to layer other services on an SD-WAN. For example, unified communications (UC) requires a high-quality network to deliver optimal performance. MSPs can deliver a bundled offering in which UC is stacked on the SD-WAN solution, improving performance and simplifying deployment.

**Exhibit 3: Cloud Security Can Simplify Deployments**



ZK Research, 2019

Another benefit of MSPs is that they can leverage an organization’s existing investment in routers. MSPs typically have solutions that run on any type of customer premises equipment (CPE) in branches, including x86 servers, white boxes and existing routers. This lets the business have ultimate flexibility in how it wants to provision branch services.

Using an MSP should result in better application performance (including cloud performance) than when a business tries to run its own SD-WAN. Many of the leading MSPs that own their own network have direct connections to the major cloud providers so that traffic never traverses the internet other than for last-mile connectivity. For long-distance connections, such as between continents, this can result in two to four times better cloud performance.

**SECTION IV: TATA COMMUNICATIONS ENABLES SECURE NETWORK TRANSFORMATION**

Tata Communications is a global telecommunications solutions and services company that is part of the larger Tata Group headquartered in India. The company started as a wholesale service provider focused only on India, but it now sells communication services to global businesses. Today, Tata Communications has more than 5,000 customers globally, including many of the world’s largest companies. The company’s massive network spans the globe and includes more than 500,000 km of subsea fiber and over 200,000 km of terrestrial fiber.

Tata Communications also has a broad portfolio of advanced technology services including SD-WAN, security, cloud, IoT and UC. The company couples this network with comprehensive managed services to deliver a range of network services to any customer, anywhere in the world. One such offering is its managed SD-WAN services.

Unlike most service providers that take a “one size fits all” approach to SD-WANs, Tata Communications’ IZO™ WAN connectivity portfolio includes the following components:

### **IZO™ SDWAN**

There are two variants of this offering. **IZO™ SDWAN Prime** is meant for customers that want to move to an SD-WAN but maintain their investment in Cisco routers. **IZO™ SDWAN Select** is for more aggressive organizations and uses off-the-shelf hardware to build a robust and secure overlay network to complement its global underlay network.

The IZO SDWAN solutions have cloud gateways built globally that function as interconnection points to the internet or to IZO cloud partners, which include Alibaba, Amazon Web Services (AWS), Google, IBM, SoftLayer, Microsoft Azure, Salesforce, Oracle and Office 365.

IZO SDWAN Prime has an in-house–developed feature to handle network congestion. When the public internet is used for an SD-WAN, QoS can’t be applied, making it difficult to control the end-to-end application experience. The integrated congestion management capabilities automatically select the best path, ensuring that quality remains high.

### **IZO™ Internet WAN**

Many businesses want the option to move part or all of their network to the internet. The downside of this is that the internet can be inherently unpredictable. Tata Communications’ IZO Internet WAN routes traffic over its global tier-1 IP network, giving businesses an MPLS-like experience but with the cost profile of the internet. Also, the company has relationships with many of the local and regional ISPs across the globe. It can combine their knowledge with information on its own network to ensure predictable end-to-end internet connectivity as opposed to just the middle mile. This is how Tata Communications can guarantee end-to-end performance, including the last mile of local ISPs. According to what we observe, this is a unique offering in the market in which end-to-end predictability can be achieved even with connections to the local ISPs. Although it is easy to get an end-to-end guarantee at their own points of presence, having it extended to local and regional ISPs globally is a first-of-its-kind development.

### **IZO™ Hybrid WAN**

This service targets companies that want to keep the private MPLS network for corporate applications and use the internet for remote sites or passive backups. IZO Hybrid WAN is composed of Tata Communications’ global VPN and the IZO Internet WAN and security services.

*When the internet is used to connect workers to apps, security and performance concerns arise.*

### **IZO™ Private Connect**

Many businesses have migrated or are in the process of moving mission-critical apps to the cloud. When the internet is used to connect workers to apps, security and performance concerns arise. IZO Private Connect is a set of pre-built, high-speed connections that directly connect to clouds.

In addition to the above services, Tata Communications offers a rich customer portal that acts as a “single pane of glass” so customers can see how their applications are performing. The company’s robust portfolio lets customers build a custom SD-WAN solution using any combination of internet and MPLS.

Tata Communications also complements its IZO SDWAN with the following security and IoT services:

### **Security Services**

Tata Communications offers a range of managed security services including distributed denial-of-service (DDoS) attack mitigation, unified threat management and next-generation firewalls. It enables around-the-clock immunity against DDoS attacks, offering uninterrupted service availability. The services, which are based on a managed security framework, include the following:

**Multi-layered security** protects people, processes and technology from all threat actors across the entire attack surface via security services for application, infrastructure, cloud and threat management.

**Integrated security model** provides fast vendor updates, security policies, open source collaboration and threat intelligence across all IT environments along with ease of access to Tata Communications’ multi-layered stack through a single portal.

**Best-in-class security operations** leverage a strong alliance with several of the world’s leading security technology providers. Tata Communications employs more than 300 highly skilled and certified security professionals in its global security and operations centers (SOCs), also called Cyber Security Response Centres (CSRCs), providing visibility of global network traffic flows and embedded attack patterns to issue threat intelligence advice.

**Trusted relationships** with its customers are built through executive dashboards, technology partnerships and a flexible consumption model. This ensures customers are buying what they need and are not purchasing what they don’t require.

### **MOVE IoT Connect™**

Tata Communications’ MOVE IoT Connect platform provides the network-independent, cross-border cellular connectivity required to deliver international IoT services. This enables businesses to

*The key to being a digital organization is having business agility, which requires an agile IT foundation.*

focus on IoT services, digital transformation and customer service instead of having to take care of issues such as last-mile cellular and radio access.

The use of IZO WAN also enables fixed-connection IoT devices to access the cloud:

Enterprise mobility and IoT require strong connectivity to link network endpoints to applications. This can be accomplished with SD-WAN and network functions virtualization (NFV) providing the connection between the intelligent network edge to gain agility, prioritize IoT traffic and deliver a strong underlying network to ensure predictable application performance.

IoT network endpoints need to connect securely via both public and private access to the cloud (AWS, Microsoft Azure, Google, IBM, Salesforce, Alibaba, Oracle, SAP, etc.).

IZO WAN offers intelligent connectivity, which can be bundled with unified communications and collaboration (UCC) and managed security solutions to deliver complete and secure end-to-end solutions.

## UCC

Tata Communications is a very strong global collaboration and communication provider delivering carrier-grade service-level agreements (SLAs) for real-time traffic (voice/video). The company has massive scale, carrying about 52 billion voice minutes each year and offering SIP trunking in 50 countries. Its multi-modal SIP service is unique, enabling customers to use the same SIP trunk for all UCC/unified communications as a service (UCaaS) applications including video.

Tata Communications has strong cloud-based UCC offerings covering collaboration and contact center solutions based on products from Cisco (Webex services, private and hybrid cloud services) and Microsoft (Skype for Business, Direct Routing for Microsoft Teams). The company has a strong partnership with Cisco and Microsoft to offer UCaaS and hosted contact center solutions, and the addition of Amazon Connect will enable customers to tap into AWS's artificial intelligence (AI) and automation tools.

## SECTION V: CONCLUSION AND RECOMMENDATIONS

The digital era has arrived and is accelerating business transformation. Companies that embrace this change will have a chance to lead their industries, while those that do not risk falling behind and will struggle to survive. The key to being a digital organization is having business agility, which requires an agile IT foundation. Tremendous evolutionary steps have been taken to improve the dynamism of applications and computing technologies, but the network has stood still. If businesses are to make the shift to being digital, it's now time for the wide-area network to transform.

Cloud computing, mobility and other trends have changed traffic patterns, and the legacy network is now holding companies back. IT and business leaders must focus on evolving the WAN into a software-defined network to make it agile, dynamic, secure and application-aware.

However, network transformation isn't a cookie-cutter process, and many factors must be considered and addressed in order to ensure application performance remains high and security risks are minimized. Given the importance of network transformation, ZK Research makes the following recommendations:

**Make network transformation a top priority.** Businesses can't become a digital company without transforming their network. Legacy networks don't have the necessary levels of dynamism and agility to fuel digital transformation efforts. Network transformation starts with an SD-WAN as the foundation, but application performance and security requirements also must be considered. IT leaders need to understand that application performance depends on both the overlay SD-WAN and the physical underlay, so a vendor that offers both is preferred.

**Use a managed service provider to simplify deployment.** SD-WANs have far more moving parts than a traditional network. Cloud connectivity, broadband, equipment transitions, application optimization and other factors must be considered as part of the deployment. Managed service providers offer a scalable path to network transformation while minimizing risk and accelerating deployments. The term "MSP" is very broad and can include everything from small value-added resellers, to consultants, to network owners. In the context of SD-WANs, the right type of MSP will own its own global network and have established relationships with ISPs in every major country.

**Compare vendors based on criteria unique to network transformation.** In the past, technology vendors typically were compared using technical metrics such as the speed of the network. MSPs should be measured based on factors critical to the success of an SD-WAN, including the following:

- o Application performance improvements
- o Security capabilities that are integrated into the network
- o Deployment flexibility
- o Cloud connectivity
- o Predictable internet connectivity as an underlay
- o Quality of dashboard

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