Service Provider Core Networks Are Critical to

DIGITAL TRANSFORMATION

WHITE PAPER

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ABOUT THE AUTHOR

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INTRODUCTION: THE NETWORK RISES IN VALUE

The digital era has arrived and is changing the business landscape faster than ever. This is why digital transformation has become a top mandate for almost every IT and business leader. The ZK Research 2019 IT Priorities Survey found that 94% of businesses currently have digital transformation initiatives underway, up sharply from 84% in 2017. In the digital business era, sustaining market leadership is no longer about having the best products, the lowest prices or the best people. Rather, the industry leaders will be determined by an organization's ability to understand market transitions and capitalize on them faster than the competition.
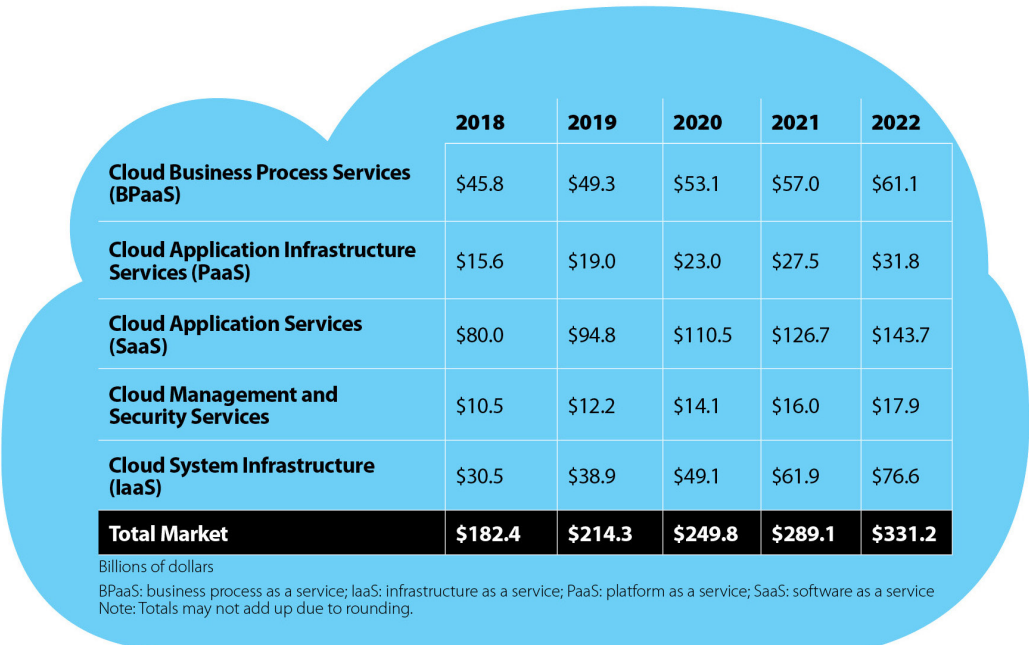
A critical step in the journey to becoming a digital organization is transforming into an agile business. Doing so requires the business's IT infrastructure to be dynamic and able to adapt when required. However, an organization can only be as agile as its least agile IT component, which today is the network. This is a new role for the network, as it's never been as important as it is today. Also, many of the enabling technologies of digital transformation are network centric, further raising the value of the network. The following are the key trends that increase the value of the network:

Video has become the norm for work-from-home workers. The COVID-19 pandemic has forced companies to adopt strict work-from-home guidelines, creating a huge spike in video traffic. The use of products such as Cisco Webex has grown by orders of magnitude, flooding networks with traffic like never before. COVID-19 has made working from home the norm and made video part of our daily lives, meaning the surge in data traffic will continue.

Cloud computing continues to explode. Over the past few years, the cloud has shifted from something companies are experimenting with to the de facto standard in computing. Gartner forecasts that the use of the public cloud will grow from $182.4 billion in 2018 to just under $331.2 billion in 2022, for a whopping 18% CAGR (Exhibit 1). The network has a profound impact on the cloud, as a poorly performing network can significantly impact the performance of cloud apps and services.

The Internet of Things (IoT) is now mainstream. IoT has moved out of the operational technology (OT) shadows and has become a core component of most businesses' digital transformation strategies. As IoT adoption increases, so will the number of connected endpoints. The ZK Research 2020 IoT Device Forecast predicts that by 2025, there will be 80 billion connected IoT endpoints. Almost all of these devices connect at the network edge—therefore, problems at the edge could significantly impair IoT applications.

Data traffic skyrockets. The number of internet users continues to grow at an unprecedented rate, putting pressure on business and service provider networks. Cisco's most recent Visual Networking Index (VNI) forecasts that by 2022, there will be 5.7 billion global mobile users,

Exhibit 1: Cloud Computing Is Now the De Facto Standard

	2018	2019	2020	2021	2022
Cloud Business Process Services (BPaaS)	$45.8	$49.3	$53.1	$57.0	$61.1
Cloud Application Infrastructure Services (PaaS)	$15.6	$19.0	$23.0	$27.5	$31.8
Cloud Application Services (SaaS)	$80.0	$94.8	$110.5	$126.7	$143.7
Cloud Management and Security Services	$10.5	$12.2	$14.1	$16.0	$17.9
Cloud System Infrastructure (IaaS)	$30.5	$38.9	$49.1	$61.9	$76.6
Total Market	**$182.4**	**$214.3**	**$249.8**	**$289.1**	**$331.2**

Billions of dollars
BPaaS: business process as a service; IaaS: infrastructure as a service; PaaS: platform as a service; SaaS: software as a service
Note: Totals may not add up due to rounding.

Gartner, 2019

each consuming an average of 11 MB of data per month. Business video traffic will account for 79% of this traffic, up sharply from 59% today. Therefore, organizations need to be ready to handle the continued escalation of data traffic.

Businesses that want to compete and lead in the digital transformation era must focus on their network transformation.

SECTION II: SERVICE PROVIDER CORE IS CRITICAL TO NETWORK TRANSFORMATION

Digital experiences are reshaping the business landscape, which is driving network transformation and making WAN modernization critical for most businesses. These changes are leading companies to evolve to software-defined WAN (SD-WAN) solutions. This new type of network has driven business customers to incorporate internet as an underlay via broadband services, such as cable, DSL and Ethernet, as part of their network.

With SD-WANs, there's a common misconception that the quality of applications can be controlled solely from the endpoint. And although that's true for short distance connections of a few hundred miles or less, the quality of longer distance connections can be quite varied. With SD-WANs, the service provider core matters because it will be the largest determining factor of application quality—but the requirements for the service provider core are changing.

On the other hand, even though the growing deployment of cloud and mobility calls for the increasing use of internet, enterprises will still need a strong core network to achieve the following:

Performance: Connectivity between two locations with network-intensive operations that require high availability, ring redundancy, secure access, and equal upload and download bandwidth (e.g., data center interconnectivity; connectivity to disaster recovery/data center; connectivity to sites with high numbers of users, agents, applications, access)

Convenience: Applications or business requirements that need to scale; the ability to use bandwidth for multiple needs; custom planning and configuration to meet specific requirements and enhanced control (e.g., media workflow, DevOps)

Compliance: The need for some businesses to meet stringent regulatory compliance or client requirements and their preference to have control rather than optimization due to data privacy issues (e.g., banking, financials and trading compliance; client requirements for system integrators; local data storage regimes such as in the European Union)

Because of this, service providers need to be evaluated on the following criteria:

Dedicated connectivity: A data circuit at layer 1 and layer 2 in terms of international private line (IPL) and Ethernet that securely connects two or more points over a private, global network provides dedicated connectivity. The benefit of a dedicated private network is that it does not traverse the public internet, so the quality remains very consistent and the end-to-end data path is secure. Service providers should be able to offer several diverse paths for resilience, different levels of latency performance to suit various applications, and the capability to scale to high speeds effectively.

Robust underlay IP network: For private IP networks over Multiprotocol Label Switching Virtual Private Network (MPLS VPN), service providers need to support multiple classes of service, flexible billing such as usage-based charging, and billing according to logical segmentation circuits. As far as public internet is concerned, for shorter distance connections, such as a few hundred miles, it can deliver performance equivalent to a private network. For longer connections, the internet adds too much latency and impacts application performance—hence you need a robust internet core that can guarantee predictable end-to-end routing. Exhibit 2 shows a sampling of network response times for global links and demonstrates how a robust, private underlay network can provide consistency of services and experience across the network—from data center to branch to IoT edge.

On-demand services: The network needs of companies are often seasonal in nature, causing them to buy for peak periods. This means they are underutilizing the network for most of the

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Exhibit 2: Private Network versus Internet Response Times

	Internet (seconds)	Private network (seconds)
Dubai to Dallas	1.185	0.375
Dubai to London	4.24	0.19
Frankfurt to Shanghai	1.99	0.2
San Jose to Shanghai	3.97	0.306
San Jose to Chicago	0.194	0.158

ZK Research, 2020

year. On-demand network services let customers buy what they need today but then increase the bandwidth when required on short notice.

Managed service options: Not all companies have the technical skills or the desire to run a high-performance network, and those that don't tend to outsource part or all of their network operations. The network operator should offer a wide range of managed services to help these customers design, deploy and operate a next-generation network.

SECTION III: TATA COMMUNICATIONS' CORE NETWORK IS BUILT FOR THE DIGITAL ERA

Tata Communications is a market-leading network service provider in its home country of India and has a significant presence in all other regions of the world. Although not as well known as the incumbent service providers in North America and Europe, Tata Communications should be considered a strong alternative because its network was one of the first built for the demands of global, digital companies. Key strengths of Tata Communications' core network include the following:

Global reach: Tata Communications offers network services in more than 190 countries and territories across the world. The network is built on over 225 Ethernet/MPLS points of presence (PoPs), over 600 transmission PoPs and over 240 IP PoPs globally. The company augments this with network-to-network interface (NNI) partners to reach anywhere a customer may do business. The global transmission network is the bedrock of Tata Communications' network services, which enables it to layer on other services such as private lines, Ethernet, internet access and MPLS-based VPNs.

As proof of its massive reach, approximately one-third of the world's internet routes are shared by the Tata Communications network.

Layered approach to the network: Tata Communications' network is the largest wholly owned subsea fiber network with more than 240,000 km of subsea fiber and more than 50,000 km of terrestrial fiber. The company is ranked among the top five service providers for internet traffic volume in all five continents—a distinction that no other provider currently holds. As proof of its massive reach, approximately one-third of the world's internet routes are shared by the Tata Communications network. The core backbone network serves as a high-performance foundation for the provider's connectivity services such as private lines, Ethernet, MPLS, internet access and services on its IZO platform.

Dedicated low-latency network: This purpose-built network supports ultra-low-latency connectivity requirements for the financial services vertical. Tata Communications also offers direct connectivity into key global stock exchanges including the Singapore Exchange, the National Stock Exchange (NSE) of India and the Multi Commodity Exchange (MCX) of India.

International Private Line: This offering provides seamless ordering for end-to-end connectivity. Tata Communications acts as a single point of contact for the lifecycle of IPL requirements including contract, maintenance implementation, support and billing. The provider's IPL services offer a high level of redundancy and use alternate cable systems to ensure continuous service in the event of a cable cut on the primary circuit.

Global Dedicated Ethernet: This service extends the reliability, security, flexibility and manageability of Ethernet WANs to enterprises on a global scale. It takes advantage of the massive reach and scale of Tata Communications' worldwide network to empower enterprises with a choice of flexibility in its offerings. The provider offers service-level agreements (SLAs) to ensure performance and availability as well as 24x7x365 monitoring to maintain optimum performance, and it has reliability and diversity built in along with proactive link monitoring.

Global VPN: Tata Communications' Global VPN service is available in more than 190 countries through direct and extended access. This provides its customers with greater control over application performance and full visibility into network performance as well as competitive pricing.

Tata Communications' Ethernet WAN services should be considered the robust underlay that can power overlay services such as SD-WAN services for businesses.

Next-generation internet access services: Tata Communications currently has more than 240 direct-access PoPs across its global IP network, and they are capable of delivering up to 100 Gbps port speeds. These services are protected by security built into the core backbone. Customers can also leverage best-in-class distributed denial-of-service (DDoS) security solutions

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via 21 scrubbing farms across the globe. The services use the latest software-defined technologies to deliver maximum agility and cost effectiveness. Customers will enjoy a best-in-class application experience, as they have direct connections to 14 of the top 20 content providers as well as extensive peering partners. In addition, Tata Communications has launched IZO Internet WAN, for which it partnered with regional ISPs globally to offer end-to-end guaranteed SLAs on internet WAN services.

SD-WAN services: Tata Communications has now added an SD-WAN to its portfolio of services to enhance network performance. Its SD-WAN is composed of the following:
o   Global VPN, which enables access anywhere in the world
o   IZO Internet WAN with software-defined overlay network for dynamic traffic steering, application QoS and data analytics
o   Integration with cloud and on-premises security solutions

The two variants available are powered by Cisco (Viptela) and Versa, with a customer portal for analytics and self service. Managed Azure Virtual WAN is also integrated with IZO SDWAN to provide an optimized branch connectivity solution from the end user to cloud applications.

Tata Communications' core and hybrid network services should be thought of as enablers of digital transformation because the network ties together digital infrastructure and cloud-based applications into a robust network.

SECTION IV: CONCLUSION AND RECOMMENDATIONS

The digital era has arrived, and it's here to stay. Today, competitive advantage is based on an organization's ability to be agile, adapt to changes and make rapid shifts to capture market transitions. Several digital-enabling technologies—such as IoT, cloud and mobility—have been introduced into businesses in the past several years, and they are all network centric. If the business is to harness the full potential of these technologies, the network must evolve. Shifting to an SD-WAN gives companies the necessary agility to adapt to market changes in real time, but the network must be built on a rock-solid core network.

To help businesses get started with the transition to an SD-WAN, ZK Research makes the following recommendations:

Focus on transforming network-intensive operations. For most businesses, the WAN is critically important. It connects branches, cloud services and mobile users—where the action is. Businesses should rethink the WAN, consider their service provider's core network, and determine how to connect to cloud services, data centers, and non-branch and other network-intensive operations. There's more to the WAN than branches, and companies need to think more broadly.

Choose an SD-WAN provider with a best-in-class core network. Not all SD-WAN providers are created equal. A strong core network and an internet WAN with predictable end-to-end routing will complement a business's digital transformation strategy, as it will ensure high-quality application performance. This is critical to deliver a superior customer and employee experience.

Don't be afraid to dump the incumbent. When making a technology decision, it can be easy to choose the incumbent provider. However, when markets transition, the challengers often have the best solution, as the incumbents do not want to disrupt their own business.

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