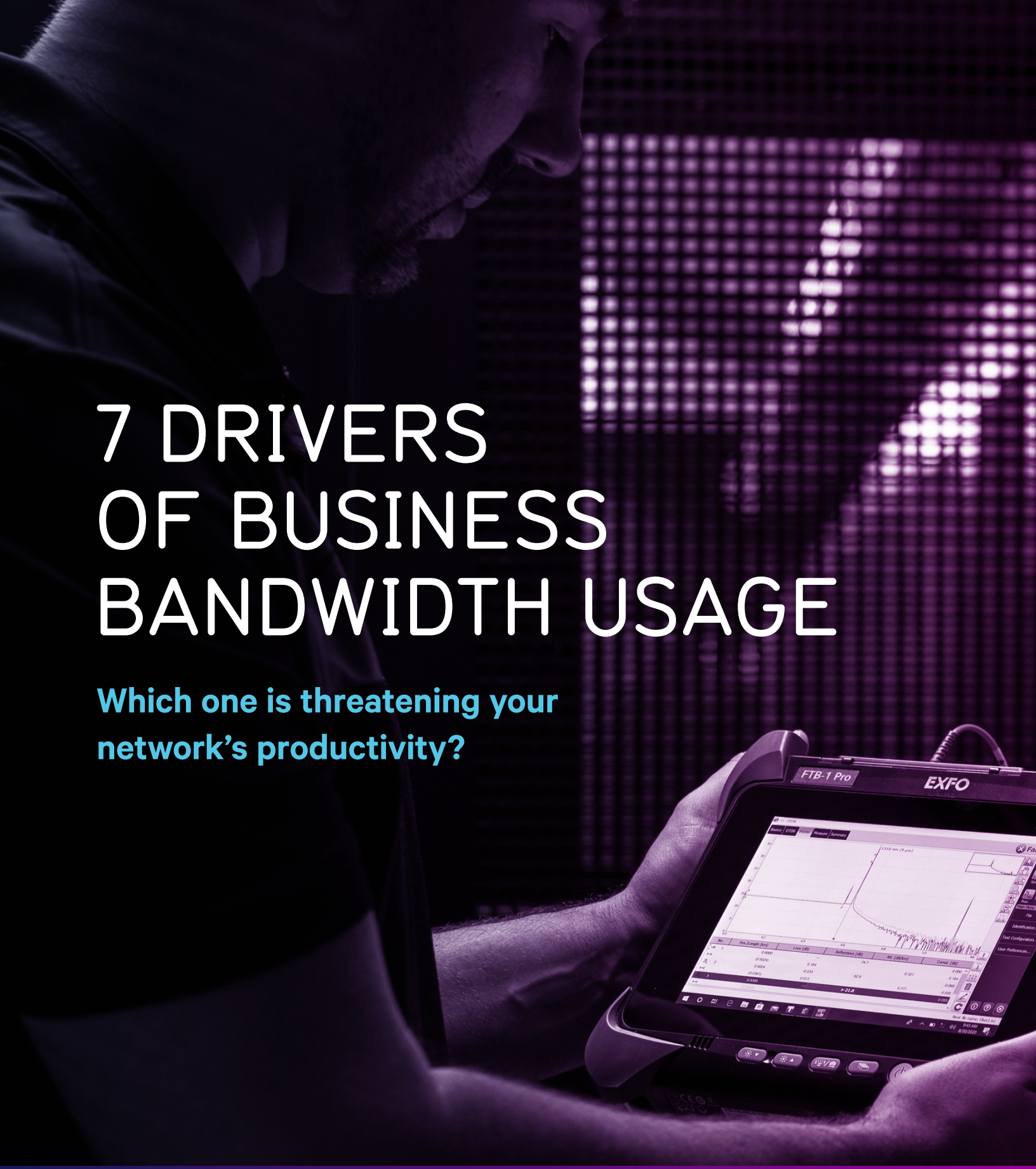

7 DRIVERS OF BUSINESS BANDWIDTH USAGE

Which one is threatening your network's productivity?

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2020 White Paper

EXECUTIVE SUMMARY

Enterprise and midsize businesses alike want and demand access to information when they need it, and wherever they are located. No delays. No excuses. When bandwidth constraints slow down your ability to do business, the implications can be far-reaching for employees, customers and your company's bottom line.

Today's technology and digital transformation initiatives continue to increase the number of applications businesses use to manage data, drive profitability or enhance customer experience — and these applications require bandwidth.

You might be thinking, "Of course, they do. I know that." But do you really? Are you confident that your business network has enough high-capacity, low-latency bandwidth to meet the needs of every employee, customer, vendor or guest?

Because most organizations don't have the luxury of having one person responsible for tracking network-dependent applications company-wide, it is easy to underestimate the amount of bandwidth your company is using and truly needs. If you haven't audited your network lately, there is no better time than right now. Take a closer look at what may be impacting your bandwidth usage — from current business drivers to projections based on tomorrow's technology — and see if the backbone of your business needs a bandwidth boost.

INTRODUCTION

As our reliance on technology increases with each passing day, so do the expectations for our business networks. Today's enterprise networks manage core organizational workloads, including routine internet usage, business-critical applications, multiple office locations and more — and effectively managing these workloads requires bandwidth.

The lifeblood of your organization hinges on decisions about bandwidth usage and infrastructure. IT departments aren't the only ones feeling the weight of these decisions, either. Business owners, sales leaders, technical engineers, product designers and visitors are each clamoring for their share of bandwidth and are impacted by these decisions — but, often, no one really knows how much bandwidth is required or is being used network-wide.

At a corporate level, it's easy to check off email, Office 365 and Salesforce as resources in use today. But, departmental decision-making within a company also impacts network requirements. For example, marketing may opt to purchase a new automation tool, which takes up additional bandwidth.

This is known as Shadow IT, defined as the use of IT-related hardware or software by a department or individual without the knowledge of the organization's IT department. Notably, cloud-based services are the main area of concern as users have become comfortable downloading and using apps and services from the cloud to assist them in their work.

Your network also has a direct impact on the success or failure of digital initiatives. Research shows that a staggering 70% of digital transformations fail[1], with inadequate management support and a lack of accountability cited among the common pitfalls. But if your company is investing in a digital transformation without first ensuring that the network is structurally sound enough to handle it, the results could be devastating.

Finally, there are the technologies you may have yet to consider, but are right around the corner. Organizations are increasingly investing in artificial intelligence capabilities to expedite and personalize customer service, reduce human bias and increase productivity. The value of artificial intelligence, big data and machine learning tools are dependent upon the data they are fed, all of which impacts bandwidth requirements.

There is hope, though. Regardless of business size, industry or number of applications, organizations want the same thing from their networks: Fast, immediate accessibility — and that's where having adequate bandwidth capacity factors in.

A network that is truly ready to serve your needs is one that can dynamically align with the ever-changing demands of the enterprise — a high-bandwidth, low latency network that allows for more agility and greater operational efficiency.

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BUSINESS BANDWIDTH DRIVERS

Regardless of industry and even company size, many businesses today share similarities in what it takes to thrive as a company. Business bandwidth is a frequent point of conversation — and consternation — as cloud-based applications, data management and replication, and even voice over IP calls impact the bandwidth requirements for enterprise and SMB businesses alike.

Having an appropriate amount of bandwidth for your business is as essential as having an appropriate distribution of utilities. You wouldn't think of running a manufacturing facility from a single outlet or centralize a lone hand-washing station for a hospital.

Similarly, the bandwidth expectations for your business network have likely changed since yesterday, let alone last year. Consider these five factors to determine if you need to add another "outlet" (or five) to your connection.

1. Network-Dependent Applications

To innovate and automate, organizations are increasingly utilizing network-dependent applications, which require bandwidth to implement and operate.

Today's businesses use an average of 900 applications each[2]. Content Management Systems (CMS), Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) platforms are used routinely across industries while Practice Management Software, Warehouse Management Software (WMS) and similar tools are commonplace by business segment.

Some companies may have to meet specific, government-mandated requirements in storage, order processing and shipping capabilities. Failure to meet these requirements can result in severe fines, penalties and restitution in addition to permanent harm to public image. So much time is spent on compliance, businesses have to use technology[3] to keep up.

A robust, low-latency bandwidth connection is necessary to successfully utilize these applications and deliver for your business — and a critical component of that connection is its symmetry. The push and pull of data — as information travels rapidly in both directions — requires a symmetrical connection that is ready to scale up or down as data is created, saved and later accessed.

"Symmetry," when used in relation to connectivity, refers to data speeds that are the same in both directions. Traditional networks such as cable and DSL are typically asymmetrical and deliver uneven upload and download speeds — with upload speeds being a mere fraction of the download speeds.

However, upload speeds are becoming increasingly critical to business operations as more companies implement these network-dependent cloud-based services and applications. For example, sending emails and accessing Salesforce utilizes download speeds while updating Dropbox and uploading a document requires an appropriate upload speed.

2. Data Creation, Management, Transfer and Replication

The volume of data that is being created every day is staggering. There are 2.5 quintillion bytes of data created daily and 90% of the data on the internet[4] has been created since 2016, according to an IBM Marketing Cloud study. Businesses, individuals and devices have all become data factories that are pumping out incredible amounts of information to the web each day.

Recent statistics show there are more than 1 billion non-cash movements daily across the globe. These electronic payments total in excess of $500 billion annually.

Worldwide, 58% of Chief Financial Officers[4] in all industries expect the amount of data they process to increase by up to 50% by 2020 — which has the potential to nearly double business bandwidth expectations.

With the amount of data being created, the management, transfer, backup and replication of that data becomes a critical component for businesses in all industries and sectors.

Here are a few industry-related statistics:

Medical images make up much of the healthcare data currently available, and the volume of data is projected to grow to 2,314 exabytes in 2020 — up from 153 exabytes produced in 2013, according to the Stanford Medicine 2017 Health Trends Report.[5] There are 1 billion gigabytes in 1 exabyte.

Today's law practitioners create an estimated 2.5 exabytes of data every day.[6] From electronic documents and emails to text messages and social-media postings, law firms and independent practitioners alike contribute to the industry's continued growth of information.

As an industry, retailers generate more than 7 zettabytes — the equivalent of 7 trillion gigabytes — of data annually.

Here's a fun fact to put that last bullet into perspective.

If each gigabyte in a zettabyte were a brick, **258** Great Walls of China,[7] which is made of **3,873,000,000** bricks, could be built.

Notably, businesses in one new industry are contributing greatly to the volume of data being created. Marijuana facilities are under intense scrutiny as the cannabis industry and state regulation bodies work to develop guidelines for this new, highly regulated industry. The need for high-speed bandwidth — and lots of it — quickly becomes apparent to ensure businesses are compliant.

From individually tracked seedlings and plant leaves to mandatory 24-hour video surveillance across an operation, marijuana facilities must adopt robust, high-bandwidth infrastructures that meet current industry guidelines and can scale over time as well.

In 2020, some expect the cannabis industry's video surveillance requirements will generate more than 859 Petabytes (PB)[8] — the equivalent of 859 million gigabytes — of new data daily. To help frame this figure, it would take 1.5 million CD-ROM discs[9] to store a single Petabyte.

Whether a business is creating its share of data, accessing that data, transferring large digital documents or safeguarding files through replication, having a high-bandwidth, scalable connection is critical to ensure companies remain competitive in a changing landscape.

It is critical that today's businesses have adequate network support so that users at a company's headquarters have the same experiences as those at satellite offices.

3. Number of Employees and Locations

Growth in both headcount and locations also factor into bandwidth demands. Whether a business operates a single site or multiple locations, the number of employees accessing your network and how best to serve each person and site play a role in determining bandwidth requirements.

Whether ensuring access at branch locations or making cloud assets securely available, it is critical that today's businesses have adequate network support and a low-latency connection so that users at a company's headquarters have the same experiences as those at satellite offices.

4. User Experience

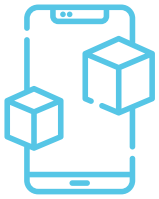
Businesses serve various internal and external audiences and digital interactions shape the perceptions of all users. Customers no longer base their loyalty on price or product. Instead, customers stay loyal to companies due to the experience they receive. If you cannot keep up with their increasing demands, your customers will leave.

To stay ahead of this trend, 70% of CEOs[10] cite user or customer experience as a key competitive differentiator. Similarly, customer experience is a top goal for 71%[2] of IT decision makers as they develop their digital transformation initiatives.

Hotel properties, for instance, rely heavily on their networks. Today's hotel guests bring an average of three devices (a laptop, smartphone and tablet, for example) with them for personal and business use. Guests expect to simultaneously conduct video calls, stream and share online content, and browse the web with no delays in service, whether in-room or poolside — and that's just for the guest experience.

In addition to increasing bandwidth needs to maintain and exceed guest expectations, hotels need to account for their business operations as well.

Increasingly, hotel properties need to:



- Offer the ability to manage rooms via smart devices; 68% of guests[11] want to use their smartphones for check in/check out, for example.
- Provide virtual tours of the property through augmented and virtual reality.

A lack of adequate bandwidth can mean a loss in future revenue if customers take their business elsewhere. Today's users want fast, fluid, digital solutions that will enhance their communication, productivity and, ultimately, their satisfaction.

5. Communication Tools: Video Conferencing and VoIP

Video conferencing and voice over IP (VoIP) calls are often used in business and both are dependent on high-bandwidth, low-latency connections.

By its simplest definition, latency is a delay that occurs while processing data over an online connection. Just 150 milliseconds of latency — a delay of less than 2 tenths of second — can result in poor network performance. In addition, jitter is any variation in latency regarding the distribution of data on a network, including packet loss and congestion.

According to the State of Video Conferencing 2019[12] study, 96% of respondents agree or strongly agree that video conferencing is effective for improving the connectedness of remote team members. But these same respondents noted that starting meetings is the most frequently reported problem with video conferencing meetings today.

Video conferencing relies on packets of data being sent and received consistently and in real time to ensure that the call remains clear, with every inflection, gesture and word correctly transmitted. When optimizing your network for video conferencing, it's important to plan for an appropriate amount of bandwidth headroom.

Likewise, no one wants to think about their voice calls. We simply expect a clear, crisp connection. However, when using a VoIP[13] phone service, the quality of your calls and how many lines you can support will largely depend on bandwidth because VoIP depends on your broadband connection. If the connection goes down, your phone line goes down as well.

VoIP calls compete with other data and communication needs across the same connection — downloads, server connectivity, chat, email and more. As a result, VoIP calls only receive a share of the connection and peak times can leave inadequate bandwidth for it, causing call quality to deteriorate. With no way to determine the number of employees using VoIP at any given time, it is difficult to segment an adequate amount of bandwidth all the time.

And there is only so much that optimizing can do. To avoid a poor user experience and even a hit to your company's reputation, an enterprise may need to increase[14] its bandwidth to ensure a quality connection.

From health care and hospitality to manufacturing and education, an organization's appetite for data creation and bandwidth consumption is integral in determining its bandwidth requirements. Today's businesses and employees are doing and creating things that, even just a few years ago, weren't feasible. This means more speed, more power, more data and, yes, more bandwidth are necessary to maintain the status quo and especially so for businesses that want to grow.

FUTURE BANDWIDTH PROJECTIONS

What you are doing today is just the beginning. The future of your organization hinges on infrastructure decisions, from increases in internet usage and the rise of data centers to the implementation of voice applications and data back-up.

It's time to consider your company's future organic and inorganic growth — such as the new applications scheduled for implementation later this year or the 25 new hires that may join the team if you win that new business — and how that growth impacts your future bandwidth needs.

6. Continued Data Increases

The bandwidth drivers of today will only continue to increase the load placed on your network tomorrow. A single new hire has the potential to impact each of the bandwidth drivers mentioned previously — plus others you have yet to consider. Therefore, it's no surprise that increases in data creation must lead to increases in bandwidth to accommodate the new traffic.

According to a State of Infrastructure survey,[15] the single greatest factor driving change in IT infrastructure is the rapid growth of data and data storage technology. Nearly half of survey respondents (48%) say their data is growing between 10% and 24% per year. Similarly, 39% of respondents cited high-speed Ethernet and bandwidth as top priorities for network investments.

In the health care industry alone, digital connectivity, imaging sizes and telemedicine continue to increase the bandwidth needs for health care systems and independent hospitals. For instance, a typical MRI generates 200 images[16] and requires about 40 megabytes uncompressed. These files can be transmitted from the radiology department to anywhere in the world.

For those who still need convincing, the November 2019 edition of the Ericsson Mobility Report[17] predicts that 5G will drive data usage through the roof. In North America, it calls for average smartphone data traffic to increase by a factor of more than five — from 8.5 GB per user a month in 2019 to 45 GB a month in 2025. In Ericsson's analysis, streaming video will drive these soaring data-usage levels. By 2025, the report expects that video will grow by 30% a year to soak up 76% of all mobile traffic.

Regardless of industry, the healthy business network of the future is one with a foundation that is built to scale to accommodate an unprecedented level of data increases and prioritize them effectively.

Notably, this research also answered how much companies spend on data analytics:

62.5% of participants said their organization appointed a Chief Data Officer, which indicates a five-fold increase since 2012 (12%).

60.3% of organizations have made a financial investment in big data and AI.

7. Tomorrow's Trends Today

The future trends that have been discussed for a decade or more are here — whether or not your business currently is using them — and must be considered as part of the larger conversation around bandwidth. Big data — which was first coined in 2005, artificial intelligence (AI), the internet of things (IoT), virtual and augmented reality, and other analytics are causing data quantities to multiply rapidly.

For starters, 97.2% of organizations[18] are investing in big data and artificial intelligence initiatives. A 2018 New Vantage study of executives from approximately 60 Fortune 1000 companies indicated a strong presence of big data in leading companies.

Organizations are increasingly investing in AI capabilities to expedite and personalize customer service, reduce human bias and increase productivity. Research anticipates a 95%[2] growth projection in the adoption of AI over the next 2 years. And there are use cases across every industry — from surgical robots, warehouse pick-and-place robots and drones to fraud detection, investing services and automated loan approval processes.

For example, calls to the human concierge desk at several leading hotel brands have reduced by an average 35%[19] as a result of AI-enabled concierge services answering guest queries by text and/or voice instead.

According to the State of UX in the Enterprise 2019,[10] 80% of respondents believe artificial intelligence is the most important trend affecting user experience in the next 5 years. Ericsson's research also suggests we will watch more immersive video formats, including augmented reality and virtual reality, in 2025.

A seemingly far-off example is multiple users experiencing a sporting event or movie together in a virtual environment as if they were in the same physical location. Perhaps this will be a future alternative to team members from around the globe traveling to an off-site company meeting. This would amount to a bottom-line cost savings provided the company's network and infrastructure can handle the associated bandwidth demands.

However, it is important to note that legacy infrastructure and systems is cited as the most frequently reported challenge to digital transformation. Notably, 59% of IT leaders[20] say their legacy infrastructure makes it hard to introduce new technologies like artificial intelligence, big data, and the internet of things — further complicating implementation.

Widespread adoption of big data, AI, IoT and other technologies will play a significant role in leading businesses, which means others will need to follow suit in order to remain relevant. Maybe it's time to dust off that five-year plan.

Data growth is occurring at an increasingly rapid rate across all industries, causing more and more businesses to take notice. This growth coupled with legacy network infrastructure plus impending big data and AI initiatives reinforce why organizations must take an active role in preparing their networks for the future. Taking the time to implement a well-constructed plan through an organized, phased rollout could be the differentiator for your business to manage future data and bandwidth needs.

CLOSING SUMMARY

Simply put, you must understand who and what impact your available bandwidth as well as how much bandwidth is needed for your company to run efficiently and effectively. And that target is constantly moving.

Network-dependent applications, data replication and the inevitable roll out of 5G rely on bandwidth. Without it, your business will feel the impact. Maybe not immediately or significantly at first, but eventually — and maybe even too late.

It sounds daunting, but it is imperative that you evaluate your business holistically, incorporate all current and future bandwidth demands into a comprehensive plan, and develop strategies related to bandwidth growth and network needs accordingly.

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