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BUYER'S GUIDE FOR SD-WAN

Managed SD-WAN Services for Digital Transformation

WHITE PAPER

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ABOUT THE AUTHOR

Zeus Kerravala is the founder and principal analyst with ZK Research. Kerravala provides tactical advice and strategic guidance to help his clients in both the current business climate and the long term. He delivers research and insight to the following constituents: end-user IT and network managers; vendors of IT hardware, software and services; and members of the financial community looking to invest in the companies that he covers.

INTRODUCTION: DIGITAL TRANSFORMATION REQUIRES NETWORK TRANSFORMATION

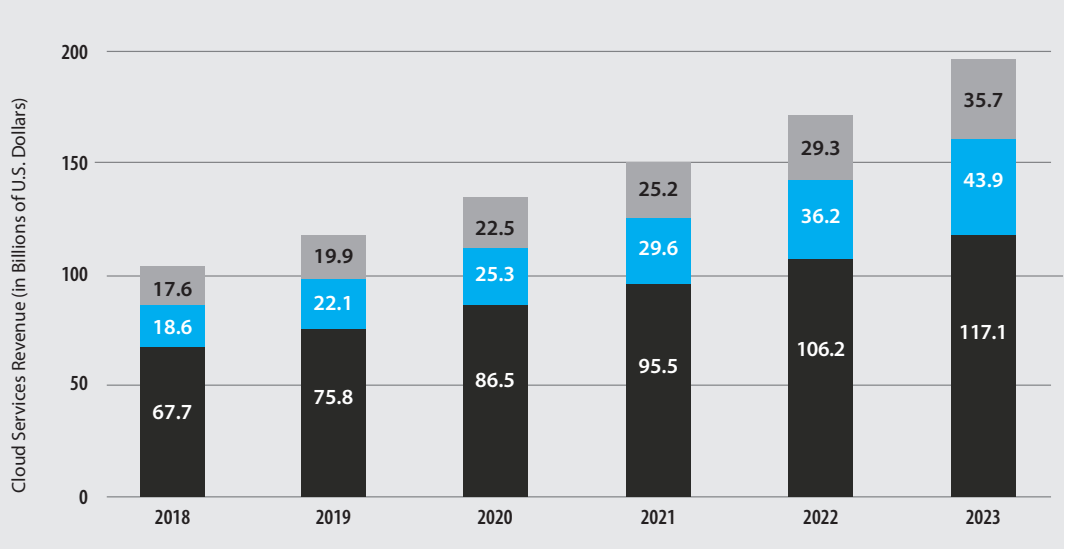
Digital transformation is reshaping the business landscape faster now than at any other time in history. While it once took decades to disrupt a market, natively digital companies have disrupted their industries in just half a decade. Digitization is creating new winners and losers at an unprecedented rate. Organizations that adopt a digital strategy will leapfrog the competition, while those that do not will risk becoming irrelevant within five years.

One important step in becoming a digital enterprise is gaining agility—that is, having the ability to take advantage of market opportunities faster than the competition. Although achieving business agility has become a top goal for IT and business leaders, it cannot be realized if companies lack an agile IT infrastructure to enable it. This is why businesses spent an estimated $14 billion on technology in 2018 to make IT more agile, according to ZK Research.

However, one part of IT that has yet to evolve and lacks flexibility is the enterprise wide-area network (WAN). Evolving the WAN must be a top priority for every IT and business leader because organizations are only as agile as their least agile IT component—which, today, is the WAN. In addition to digitization, several other factors are driving the evolution of the WAN, including the following:

Cloud computing continues to skyrocket. More applications and workloads are heading to the cloud. Today, the cloud is the fastest growing segment of enterprise software, and ZK Research predicts that cloud services will grow from $103.9 billion globally in 2018 to more than $196.7 billion in 2023 (Exhibit 1). The surge in cloud traffic is driving significantly different traffic patterns over enterprise WANs.

Exhibit 1: Cloud Computing Skyrockets



ZK Research 2019 Global Cloud Computing Forecast

If businesses are to achieve the levels of agility required to compete in the digital era, the WAN must now evolve to a software-defined model.

Collaboration becomes business critical. For the digital enterprise, competitive advantage is based on the organization's ability to make the right decision as quickly as possible while involving the best people, regardless of where they are located. The rise in mobile workers and virtual employees has made collaboration technologies such as unified communications (UC) and video conferencing mission critical. Bandwidth-hungry multimedia applications, including voice and video initiated from real-time collaboration solutions such as Slack and Microsoft Teams, are putting a strain on today's WANs.

Computing shifts to a network-centric model. Mobile computing, the cloud, the Internet of Things (IoT) and big data are at the top of almost every organization's priority list. These new compute models are all network centric, meaning the network plays a significant role in the success or failure of these initiatives. This is particularly true in the WAN where, historically, bandwidth has been at a premium.

If businesses are to achieve the levels of agility required to compete in the digital era, the WAN must now evolve to a software-defined model. However, the path to a software-defined WAN (SD-WAN) involves many components, and organizations that want to quickly implement an SD-WAN and minimize risk should consider purchasing a managed service.

This white paper discusses the challenges with today's WAN, introduces the SD-WAN and highlights how to select the best managed service provider.

SECTION II: CHALLENGES WITH LEGACY WANS

Like most technologies that carry the label "legacy," legacy networks are traditional, rigid IT environments governed by hardware limitations and manual processes. Legacy networks were engineered for the needs of a different time when network changes were rare. When changes did happen, turnaround times of weeks or months were expected.

With competitive pressure mounting today, businesses need to move faster than ever—but they're hamstrung by the long lead times for implementing changes. ZK Research found that it still takes an average of four months to make a change network wide, but modern businesses don't have that kind of time.

Moreover, it's not just about the speed of the network or how long it takes to make simple changes. The entire architecture was created for an era that is long gone—the hub-and-spoke design was optimized for client/server computing. Cloud-first organizations need an entirely new type of network.

Collaboration Hampered by Legacy Networks

Communications and collaboration tools deployed by organizations not only consume bandwidth, but also require pristine network conditions to perform as needed. For example, video

In addition to having reliability issues, legacy networks are not efficient with bandwidth.

conferencing and real-time collaboration platforms are essential tools for today's distributed workforces, and they require near-perfect network performance to serve their purpose. We all know what it's like to be in an important meeting when the video stutters or messages aren't delivered to all parties at the same time—that's because old networks don't meet today's demands.

Inefficient Bandwidth Is the Norm

In addition to having reliability issues, legacy networks are not efficient with bandwidth. It's a fixed thing in the legacy world—and this active/passive model is inefficient at best. With this architecture, companies pay for a network connection that can only be used when the primary circuit fails. Another issue with the hub-and-spoke model is that traffic coming in from the internet goes through a single point, traverses that WAN to the branch and then is returned down the same path. This "trombone" or "hairpin curve" effect exacerbates network inefficiencies and can create application performance problems.

Security and Performance Are Complex Overlay Technologies

Historically, network, security and visibility have been deployed as overlay technologies. The challenge with this is one domain has no knowledge of the other, leading to "blind spots." For example, a spike in network traffic could indicate a distributed denial of service (DDoS) attack. But when the systems are deployed independently, there is no way for information to be shared. This setup has never been ideal but historically was not business crippling, as all security and management were limited to a single ingress/egress point.

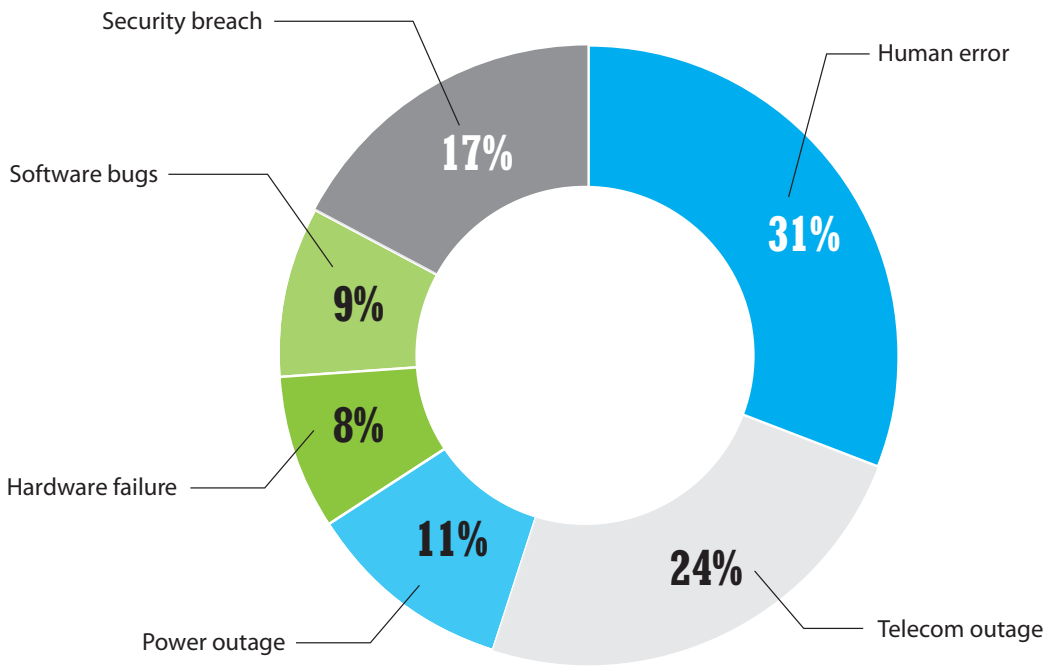
With SD-WANs, businesses are now provisioning local internet breakout, which mandates security and management tools being placed locally in each branch. This means in a software-defined environment, network security and visibility are inextricably linked and must be integrated into the solution.

Manual Work at the Root of All Downtime

Adding to the litany of issues with legacy networks is all the manual work required to set up, manage and maintain them. That's because there is little in the way of automation for these antiquated systems. If a change is needed, high-level engineers must implement it manually, node by node. Because of the repetitive nature of these tasks, errors happen frequently and often. Not surprisingly, the ZK Research 2019 Network Purchase Intention Study found that human errors are still the largest cause of unplanned downtime (Exhibit 2).

All of this can get expensive because the first instinct is to throw bandwidth at the problem, but a legacy network is pricey, and it doesn't really make sense to have a fixed amount of bandwidth for peak times that later goes unused after things quiet down. Instead, organizations need to "right-size" their network, matching business needs and cloud applications to the appropriate type of connectivity—all with the goal of balancing the triangle of price, performance and reliability.

Exhibit 2: Human Error Is the Leading Cause of Network Downtime



ZK Research 2019 Network Purchase Intention Study

SECTION III: INTRODUCING SD-WANS

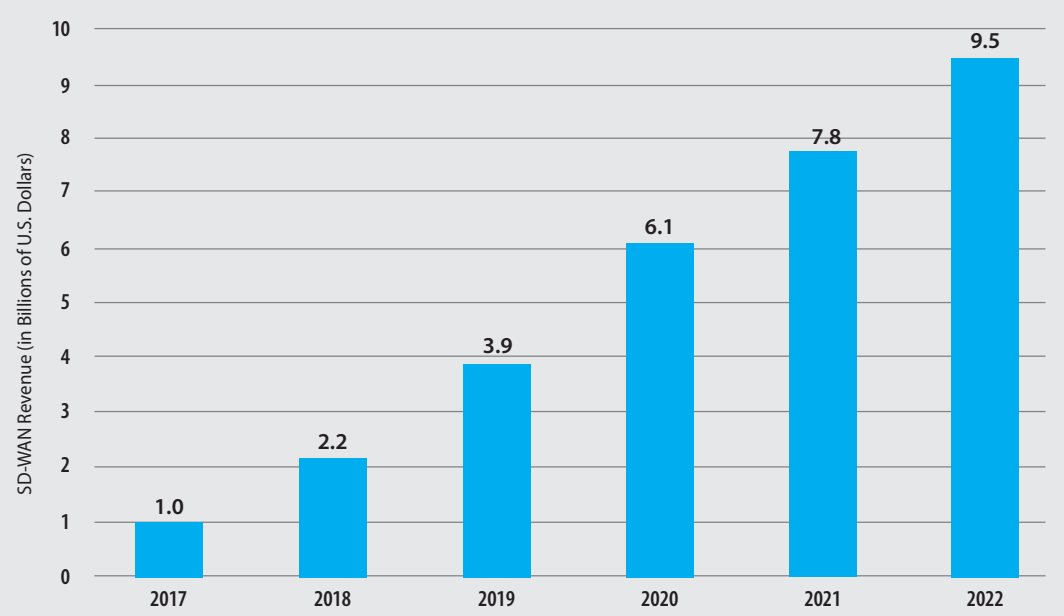
The right route to escape from a legacy network, which is slowing not just the bits and bytes coursing over the infrastructure but the business itself, is software-defined wide-area networking. By now, everyone has heard the axiom that software is eating the world. Well, software is now ready to devour networking as we know it. Software-defined wide-area networking is an application of software-defined networking. And as familiar as these terms might be, it's helpful to understand exactly what this technology is.

SD-WANs decouple the underlying hardware from the control plane. Control shifts from hardware devices that are attached to the network and transfers over to software, which enables an entirely new network paradigm. With software controlling everything, management and configuration are centralized. That means no more truck rolls or walks around campus to figure out what's wrong, find the node and fix it; it's all managed and maintained centrally. The increased agility and speed have made SD-WANs a top initiative for companies, which is why ZK Research forecasts the market will grow from $1.0 billion in 2017 to $9.5 billion in 2022 (Exhibit 3).

Moving at the Speed of Innovation: Branch Offices, Flexibility and Cost Savings

SD-WANs can move as fast as the company wants to move. Changes can be propagated across the network almost instantly, ensuring the business keeps pace with the constantly chang-

Exhibit 3: SD-WANs Are Set to Explode



ZK Research 2019 SD-WAN Forecast

ing market dynamics. Plus, the technology is engineered and optimized for the cloud age. Workers in branch offices can connect directly to the cloud—rather than backhauling traffic to headquarters first—which uses bandwidth more efficiently. With multi-cloud environments becoming commonplace, SD-WANs are evolving into a necessity for any company.

Flexibility is another hallmark of the SD-WAN. Customers can choose the architecture and connectivity strategy that make the most sense for their business challenges and application priorities. Maybe an all-broadband WAN is the best option, or maybe a hybrid WAN that mixes public and private connectivity is preferred. With SD-WANs, customers can select options based on what makes sense at installation and then change the network architecture depending on the needs of the day, evolving at their own pace.

Earlier, we mentioned human errors, which are a significant issue with legacy networks and can add considerable time to any new rollout. With SD-WANs, the automation capabilities reduce the number of errors so that a business can move and grow as fast as it needs to.

Finally, SD-WANs save money. Shifting from private to public broadband connectivity offers the most obvious cost savings, but connectivity cost reductions should not be a business's only motive. Organizations that deploy an SD-WAN will also see a reduction in hardware costs as well as lower operating expenditures thanks to automation and faster troubleshooting times.

ZK Research has interviewed numerous organizations that have made the jump to SD-WANs and found the cost savings can be significant. In fact, ZK Research estimates that businesses that deploy SD-WANs will save between 20% and 40% depending on several factors including telecom spend and level of automation.

SD-WANs: Powerful but Not Perfect

SD-WANs are powerful, but they're not perfect. In fact, there are a few challenges to address and critical decisions to make when deploying SD-WANs, such as the following:

Architectural choices: Traditional networks typically were designed with a rigid hub-and-spoke topology. The cloud, 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 a breach. Another example is businesses that try to run real-time apps on asynchronous broadband, in which case the unpredictability and uneven bandwidth can cause voice and video to perform poorly.

Use of broadband: One of the biggest areas of cost savings related to SD-WANs is the use of broadband internet for transport. Conceptually, using broadband might seem fine, particularly if WAN optimization is applied. However, several factors must be considered. Unlike Multiprotocol Label Switching (MPLS), there are no global service providers for broadband. ZK Research estimates there are approximately 850 broadband providers in the United States alone, and this creates a management headache for large organizations, as they might need to establish relationships with dozens of providers to procure broadband services across their global footprint. The fact that broadband is unpredictable and can negatively impact application performance only adds to the management challenge, as troubleshooting across many providers becomes an issue.

What Are the Best SD-WAN Use Cases?

Adopting a cloud-first approach: Businesses focused on adopting cloud solutions such as Office 365 and Google G Suite need a more efficient path to the public cloud. SD-WANs provide three key ingredients required to be cloud ready: secure local internet breakouts, direct connections to cloud services, and on-demand controls and services.

Reducing the cost of legacy carrier network services: Organizations facing IT budget cuts should evaluate SD-WANs. The cost savings and IT productivity gains, coupled with a superior customer service experience, can help take the pressure off.

Creating a hybrid WAN to diversify connectivity: SD-WANs are ideal for a hybrid WAN environment. They're a simple way to route connectivity, mixing private and public links as needed.

Making WAN management simpler: Companies looking to decrease network complexity and increase agility should turn to an SD-WAN. It makes rigid infrastructures modular, enabling automation and easing the burdens of administrative management.

Growing the business or expanding locations: If the organization has an aggressive M&A strategy or is expanding organically, an SD-WAN can make growth sustainable and safer without expanding IT staff.

Businesses must shift security from the core of the network to the edge.

Security concerns: In traditional architectures, security tools were deployed in the hub of the network. All internet traffic coming into 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. And although this approach offers better cloud performance, it changes the security paradigm.

Businesses must 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, or worse—a catastrophic effect in the event of a breach.

Application optimization and resiliency: As mentioned earlier, the use of broadband creates inconsistent application performance. However, several application optimization technologies are available including quality of service (QoS) and acceleration. 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 performance difference with SD-WANs. The key is to understand how all of these optimization techniques can work together to improve the performance of all applications.

How and where to use on-premises hardware: Branch appliances, such as routers, have 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. Organizations must understand how to best leverage each option. 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.

Understanding software-defined wide-area networking's challenges, key considerations and best practices is essential to design a strategy that won't sabotage the benefits the technology is designed to deliver. As such, the importance of expertise cannot be understated. Managed services partners must bring strong experience and have an intimate, shared understanding of the existing

network traffic flows, as solution design is one of the most influential prerequisites for success. But first, IT leaders must decide which partner to select.

SECTION IV: HOW TO CHOOSE THE RIGHT MANAGED SD-WAN PROVIDER

Features such as real-time analytics, billing and bandwidth controls are essential to the smooth operation of an SD-WAN.

This section presents a guide to help buyers select the right managed services provider and evaluate the SD-WAN vendor landscape.

The crowded SD-WAN market includes edge equipment manufacturers and vendors that offer only SD-WAN devices for buyers to implement themselves and manage on their own. The wide range of these device-only vendors includes security vendors, network vendors, integrators and local value-added resellers (VARs). In the other camp are managed SD-WAN services, in which a service provider pairs the SD-WAN hardware with a package of services. The managed SD-WAN service arena is largely dominated by giant tier-one providers that aren't necessarily known for their responsiveness and service quality, as well as start-ups that might lack migration expertise.

So, in this confusing marketplace, with different types of solutions and providers to sort through, what should businesses look for in an SD-WAN service provider? ZK Research has assembled the following checklist to help buyers navigate the evaluation process:

Comprehensive managed services: The list of services included in managed SD-WAN solutions will differ among vendors. So, look for those that cover more ground and are capable of quickly scaling as your business needs change. This will relieve the implementation and ongoing monitoring and management burdens from your IT team, enabling your business to stay focused on transformative strategies rather than WAN troubleshooting and optimization.

Integrated security: The SD-WAN carries your company's most important data, so it should be secured from end to end. Look for a vendor that integrates security capabilities so you know your data will be protected every step of the way.

Feature-rich portal: If you move to an SD-WAN but you can't see what's going on in the network, you might as well revert to your previous carrier. You need a vendor that provides a management portal with eyes into every corner of your IT environment. Features such as real-time analytics, billing and bandwidth controls are essential to the smooth operation of an SD-WAN. In addition, an artificial intelligence (AI)-based network advisor will help you anticipate and correct network errors, pushing toward the autonomous, self-driving or intent-based networks of the future.

Transport neutral: Your SD-WAN vendor should be able to accommodate your business's transport needs, including private and dedicated internet access, broadband connections and wireless options. Highlight each option that's a "must" for you, and then ensure the vendor you

The SD-WAN carries your company's most important data, so it should be secured from end to end.

choose can fulfill those needs. Also, make sure the vendor will help you to procure broadband services globally and will allow you to switch connectivity types without imposing significant change fees and long timelines.

Best-in-class customer service: Look for a vendor with a sterling customer service reputation. This will be a new journey for you and your team. Therefore, knowing that a group of dedicated, caring customer service team members are available to guide you when you need help is invaluable.

SECTION V: MASERGY MANAGED SD-WAN

Masergy has been a pioneer in software-defined networking since 2000 and continues to innovate with managed SD-WAN services that deliver positive outcomes for global enterprises. Masergy's Managed SD-WAN is unique because it's built on the vendor's global network that delivers industry-leading performance and provides a single portal for real-time analytics and control with end-to-end visibility of application performance. Security is built in with Fortinet edge devices along with security monitoring and management, and customers can mix and match any transport method or connectivity type. Plus, Masergy is known for delivering an unparalleled customer experience.

The Masergy Managed SD-WAN Difference

- The only pure-play software-defined network
- Industry-leading performance
- Pioneered software-defined networking two decades ago
- 99%+ global availability
- 1,600+ customers in 102 countries

One Portal for Real-Time Analytics and Controls

- End-to-end visibility of application performance
- Real-time bandwidth controls for every location and link
- Both self-service and full-service controls

Built-in Security

- Next-generation firewalls with unified threat management
- Security threat dashboards
- Security monitoring and management services

Transport Agnostic

- Mix and match public and private connectivity
- Broadband procurement services or "bring your own"
- Network service-level agreements (SLAs) that are guaranteed globally

Direct Cloud Connections

- Scalable and secure connectivity to cloud providers (Amazon Web Services, Azure, etc.)
- Connect to an ecosystem of software-as-a-service (SaaS) applications
- Application performance guaranteed by cloud SLAs

Unparalleled Customer Experience

- 70+ Net Promoter Score (NPS) for more than four years
- 99% customer retention
- 24/7 support

SECTION VI: CONCLUSION AND RECOMMENDATIONS

The SD-WAN marketplace can be confusing, but ZK Research has made a few key observations while surveying the landscape.

Manual work is what's standing in the way of a more efficient, error-free network, but legacy networks don't enable the kind of automation that can eliminate those errors. SD-WANs can get businesses on the road to a more efficient and effective network because they shift the focus from hardware to software.

To help buyers make the right choices, ZK Research offers the following recommendations:

Go with speed. Your SD-WAN should move as fast as you need to. Features and services should accelerate deployment and speed your provisioning of new connectivity.

Introduce agility. Be sure you can make changes easily and have them hit the entire network at the same time. You should be able to start, stop, change and optimize rapidly to help drive your digital transformation forward.

Look for flexibility. If you're moving to an SD-WAN, ensure you get the flexibility you're after. Don't get locked into an all-broadband WAN if you need a hybrid WAN; if you do, it'll be like you never left your previous provider.

Know what you need. Compile a list of everything you need, ranking each component and critical business application in order of priority. The checklist provided in this paper is a good starting point, but look at your entire IT environment. True technology-driven innovation stems from a wide variety of systems and tools working in harmony without overburdening your IT resources, so ensure you cover as many bases as possible.

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