Preparing Your Network for the Digital Age

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Executive Summary

Digitization gives small and midmarket enterprises an opportunity to compete like never before, but any digital initiative will fail without the right network. One essential requirement for success is a modern network. For this reason, many midmarket enterprises are upgrading their networks with next-generation technologies. This white paper shows why a network upgrade is essential, and it offers a guide on how to proceed on a network transformation journey.
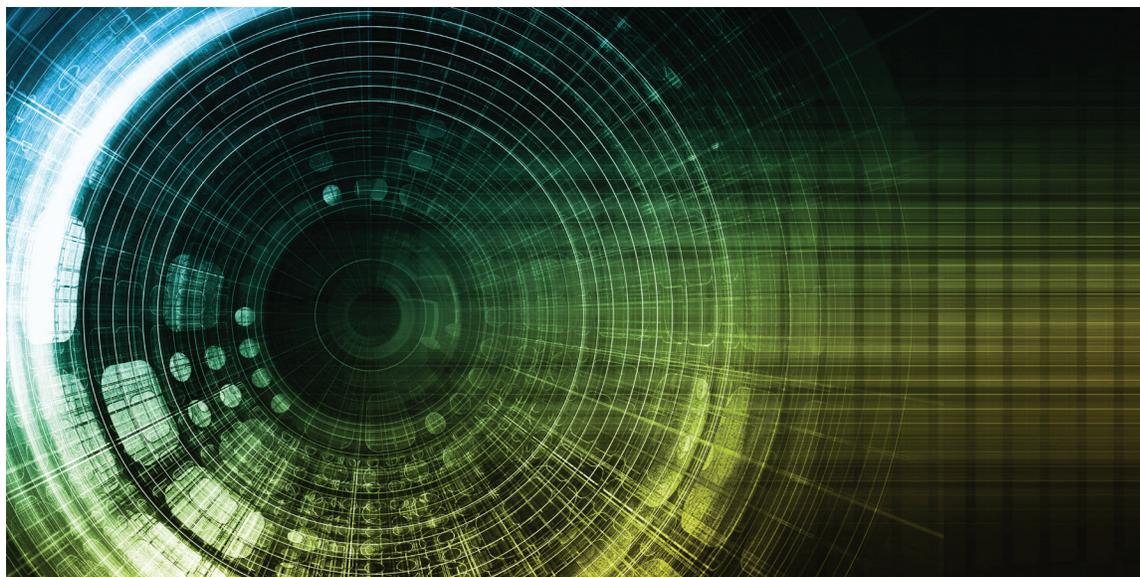
Network Upgrades: Essential to Modern Digital Services

Digital services are essential to any midmarket enterprise. They can drive efficiencies, accelerate business initiatives, and validate success through data analysis. Many of the business initiatives that are important to today's small enterprises will enjoy more success through digitization, including cost optimization, customer satisfaction, and end-user productivity initiatives.

Network managers and engineers know they have a digital mandate. For instance, they no longer use uptime to measure success. Instead, network teams say they are increasingly judged on their ability to reduce security risk, deliver high-quality services, manage end-user experience, improve application performance, and support cloud readiness. All of these new metrics point to one inescapable reality—many midmarket companies will need to modernize and upgrade their networks.

The network is the foundation of digital services. In fact, small enterprises (44 percent) are more likely than larger companies (25 percent) to say that effective network operations translate into improved responsiveness to new business initiatives.[1] As midmarket enterprises tackle new initiatives, network modernization becomes essential. Digitized businesses need more bandwidth and more mobility. They require more powerful access controls and effective security technology. Small and midmarket enterprises will need networks that are easier to build and manage as they digitize. According to Enterprise Management Associates (EMA) research,

> **Network teams are increasingly judged on their ability to reduce security risk, deliver high-quality services, manage end-user experience, improve application performance, and support cloud readiness.**

1 Unless noted otherwise, all data cited in this research was published in the EMA report "Network Management Megatrends 2018: Exploring NetSecOps Convergence, Network Automation, and Cloud Networking," April 2018.

small enterprises are nearly twice as likely as large enterprises to struggle with a shortage of skilled networking personnel. They need management and monitoring tools integrated into their modernized infrastructure to assure network operations are effective and efficient.

EMA research identified several digital initiatives that correlate with network upgrades. For instance, companies engaged in voiceover IP (VoIP), videoconferencing and telepresence, desktop virtualization, Internet of Things (IoT), application performance optimization, and digital experience management are more likely to upgrade their switching and routing infrastructure. Additionally, VoIP, desktop virtualization, IoT, and application performance optimization correlate closely with wireless LAN (WLAN) upgrades.

Network Upgrades are More than a Simple Refresh

Digital initiatives drive network upgrades because they introduce new requirements. VoIP, video, and desktop virtualization need highly-available and high-performing networks with minimal latency, jitter, and packet loss. They need granular quality of service (QoS) controls. Video, especially, will be bandwidth-intensive. IoT will require mobility, particularly Wi-Fi, and Wi-Fi with integrated BLE beacons in some cases for location-based analytics. EMA research found that Wi-Fi is the most strategically important technology for network teams involved in an IoT initiative, but planning for IoT is a struggle. Midmarket firms are twice as likely as large enterprises to struggle with projecting the volume of data that IoT devices will produce on the network. IoT also requires enhanced access and security policies and controls because of the profound increase in device diversity it introduces on the network. Midmarket firms are nearly twice as likely as large enterprises to struggle with modeling security threats to security devices.[2]

Network teams will need to adopt new technologies to meet these requirements. Next-generation Wi-Fi based on 802.11ac Wave 2 is a good start. It delivers mobility with more bandwidth, but more importantly, it offers better performance and reliability. End-to-end network automation and intent-based networking will also be essential so network managers can build and manage these upgraded networks more efficiently. Distributed companies will also need to consider software-defined-WAN (SD-WAN), which will facilitate cloud access, affordable WAN bandwidth, and agile security architectures.

As a network team tackles infrastructure upgrades, they should keep security and operations optimization in mind.

When one looks at the network technology initiatives that drive network team priorities, the need for modernization becomes quite clear. Network managers say network security (43 percent of network teams) is the most prominent network technology driving their decision-making today. Network operations optimization (39 percent) is also a major driver. As a network team tackles infrastructure upgrades, they should keep security and operations optimization in mind.

The Benefits of Network Upgrades

Network upgrades correlate with overall network operations success. EMA research found that 47 percent of network infrastructure teams consider themselves completely successful with network operations. Success rates are higher among organizations that are driven by switching and routing upgrades (63 percent) and WLAN upgrades (60 percent).

This success will translate into several key business benefits. Network managers say user satisfaction is the most prominent business payback they see today, but many also say they've become more responsive to new business initiatives. Network managers listed the top four benefits of effective operations as follows: improved end-user/customer satisfaction, reduced downtime, improved responsiveness to new business initiatives, and a more unified IT organization.

2 EMA, "The Internet of Things and Enterprise Networks: Planning, Engineering, and Operational Strategies," April 2017.
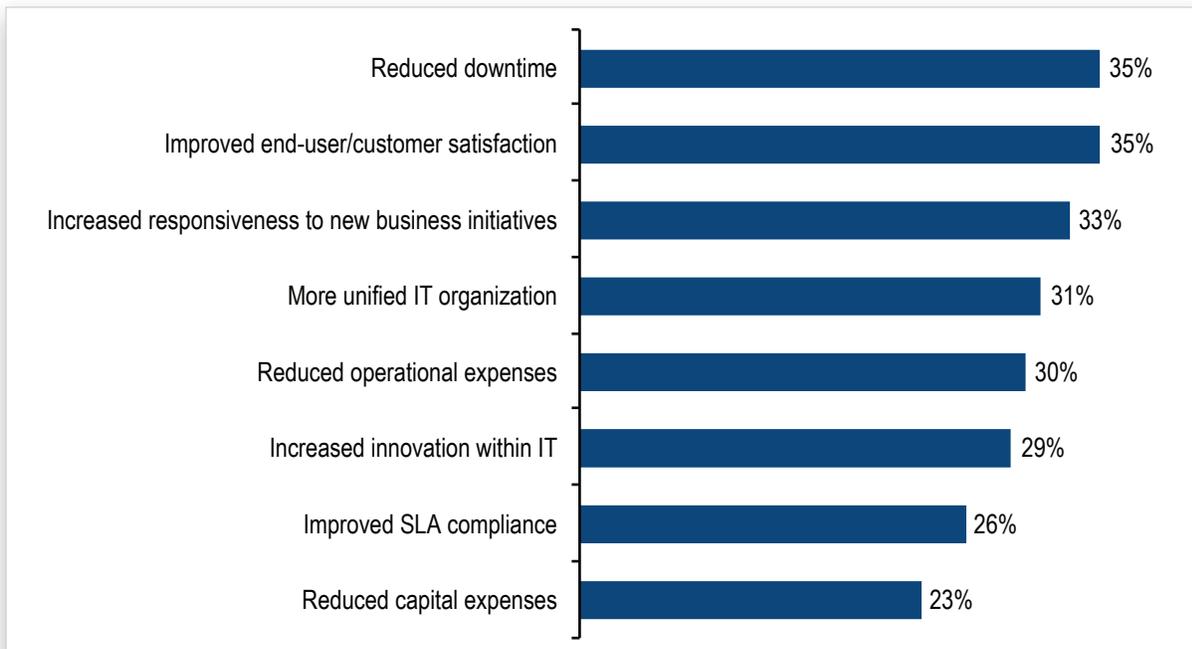
Figure 1. Top benefits realized from network operations success

Midmarket enterprises especially value improved end-user and customer satisfaction, while small enterprises consider improved responsiveness to new business initiatives a priority. Many network managers also report increased innovation in IT, which will prove especially valuable to midmarket companies that support new digital initiatives.

A well-executed network upgrade will also help network teams address some key challenges. Organizations that are involved in switching and routing upgrades were 33 percent less likely to struggle with a shortage of skilled networking personnel. These organizations are also nearly 20 percent less likely to identify network infrastructure as the root cause of a complex IT service problem.

Getting Started with an Upgrade: Assess Everything

With digital services so critical today, the stakes are much higher with any network upgrade. EMA recommends that midmarket enterprises review their processes for such an endeavor from top to bottom.

Identify Your Essential Internal Partners

First off, network teams should identify their key internal partners. Network teams involved in network upgrades tend to partner very closely with the IT executive suite and the IT security group, according to EMA research. The executive suite is an obvious partner since it will serve as a sponsor for any upgrade project.

The security group is a valuable partner for both engineering and operations. Network and security groups are collaborating closely in many enterprises today, and the most critical point of that collaboration is infrastructure design and implementation, according to 38 percent of enterprises. As the network group plans an upgrade, the security group can help write security into the DNA of the new network. Network managers should review policy requirements with the security group and consult with them on overall design. The security group is also a critical partner for operational monitoring (31 percent), so network managers should keep this in mind as they establish tools and processes on the upgraded network.

Finally, network teams should work with IT service management (ITSM) and the IT analytics group, if one exists. More than one-third of all network managers say they have increased their collaboration with these groups in recent years. The analytics group can help assess capacity requirements, user trends, and emerging business requirements. The ITSM group can define the services that will live on the new network and provide best practices and processes for operationalization.

Know How the Business Will Leverage Your Network

Many network managers have muddled along for years without knowing how exactly their networks are used. They set QoS for some critical applications and manage for uptime, fighting fires as they emerge. When planning for a network upgrade in the digital era, network engineers need to know exactly how the network is being used. More importantly, they need to model how the network will be used in the future. This process should begin with identifying the company's business goals over the next five years. The network team should understand how the business will leverage IT services over the life of the upgraded network. This requires an understanding of business strategy and digital strategy. The network team needs to know what kinds of applications and services will live on the network.

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For instance, it will be important to understand how much real-time communications traffic will traverse the network. Nearly half of network managers (48 percent) say video-conferencing applications are a significant source of network traffic on a daily basis. Forty-six percent are tracking significant IoT traffic. Network engineers also need to plan for scheduled jobs that can hit the network hard. For instance, 51 percent of network managers are tracking significant traffic from storage backups and restore jobs.

Most network teams will need to assess the state of mobility in their networks. For many companies, Wi-Fi is becoming the primary network access technology, with users relying on laptops, tablets, smartphones, and other mobile devices to access IT services. In fact, EMA research found that enterprises involved in network upgrades are more likely to be involved in a client mobility initiative. It is likely that most enterprises engaged in a network upgrade already have Wi-Fi in place. An upgrade will likely require more than a one-to-one swap of legacy access points with next-generation wireless, given the increase in bandwidth demand in device density in most networks.

Understand the Impact of the Public Cloud

In the average enterprise, 45 percent of all network traffic is traceable to the public cloud, such as SaaS or IaaS-based services. This has profound effects on a network upgrade. On the LAN side of things, this trend will lead to major growth in north-south traffic patterns, from the access layer of the network out to the Internet egress. Many of these flows will be bandwidth-intensive and require granular QoS features, particularly cloud-based video and collaboration solutions. Network engineers will need a modern network that provides enough bandwidth and traffic engineering capabilities to serve these applications. As cloud applications proliferate, networks will also require programmatic, cloud-aware policy controls.

The cloud has WAN implications as well. Many remote sites will now require direct cloud access via an Internet breakout. Hairpinning traffic to a data center via the MPLS network for a secure Internet connection will simply add too much latency and packet loss to critical applications. SD-WAN solutions will be an important solution here, since they can provide secure Internet breakouts from remote sites with granular QoS and path selection across multiple links.

Focus Your Team Where it Delivers the Most Value

As network teams modernize their networks, they should explore ways to maximize the skills they have in-house. On the one hand, given that they will probably adopt new technologies, they should leverage professional services from their vendor partners or their vendor's sales channel. This approach will assure that these new technologies are implemented correctly for maximum value.

Midmarket enterprises should also consider strategic outsourcing of some aspects of IT and network operations. EMA research found a granular increase in the number of enterprises that outsource aspects of network management. In 2014, only 36 percent of enterprises outsourced network management to a management services provider (MSP). In 2016, 51 percent were outsourcing, and in 2018, 58 percent are outsourcing.

The most common management responsibilities that enterprises outsource today are device management and configuration (35 percent), WLAN networking and support (33 percent), 24x7 network health monitoring (32 percent), and data center networking and support (32 percent). Each network team needs to determine for itself which aspects of network management are strategically important to it. They need to understand what their individual team strengths are. They also need to understand how those strengths deliver value to the business. Once they identify all of this, they can determine where to devote personnel. Then they can outsource tasks that are not strategic. Strategic value and expertise may not align completely in each organization. In those cases, network teams will need to train personnel or hire new experts on next-generation technologies.

Once a network team identifies outsourcing opportunities, they need to proceed systematically. Any outsourcing should align with internal best practices and policies to ensure smooth, end-to-end operations across internal and outsourced resources. For example, organizations that outsource aspects of network management are two times more likely struggle with assembling the right team of stakeholders for a troubleshooting event. This can slow down incident response and resolution. In many cases, the ITSM group, which specializes in mapping services and defining processes and best practices, will be a key partner for the network team.

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Technology Strategies for a Network Upgrade

Adopt an End-to-End Architecture

A good technology strategy begins with the understanding that midmarket enterprises need to think holistically about their networks. They should consider an end-to-end architecture. Today's networks are often islands of technology with limited management integration. The WAN, campus LAN, remote site LAN, and the data center are all treated as places in the network (PINs) that require silos of expertise, siloed tools, and siloed policies. Digital services demand a more integrated network platform. Network teams need to identify opportunities to integrate policy, design, administration, and operations actress all these PINS. This end-to-end approach allows network teams to streamline workflows and processes across multiple administrative domains in the network.

Also, midmarket firms should adopt end-to-end architectures that support openness and programmability. With open APIs, network engineers will be able to integrate third-party technologies, including configuration management databases, IT service management platforms, and security monitoring systems with the overall network, allowing the enterprise to leverage more value from the network and better integrate it with other IT management and business systems. By the same token, a programmable architecture will allow these integrated systems to orchestrate and reconfigure the network in response to events and business requirements.

Next-Generation Wi-Fi and Multispeed Ethernet

Next, the IT organization must understand how the latest generation of network technologies will unlock the value of a network upgrade. It is likely that Wi-Fi advanced tremendously in the years since a midmarket enterprise last upgraded. WLAN infrastructure based on the 802.11ac Wave 1 and 2 standards are widely available. These next-generation wireless solutions deliver gigabit Wi-Fi with robust RF management techniques that can optimize connectivity for rich media and real-time communications.

Network vendors also introduced multispeed Ethernet, such as switches with 2.5 and 5 Gbps interfaces, which will enable a faster wired access layer and maximize the gigabit bandwidth available from advanced Wi-Fi infrastructure.

Network Automation is Essential

Network automation is also a critical technology to consider during an upgrade. Ninety-two percent of network managers are looking for ways to expand their use of network automation today, including 70 percent who call it a high priority. EMA identified three areas where network teams are trying to apply more automation. Network optimization is the top priority (49 percent of network managers). Optimization is even a higher priority to organizations heavily engaged in a switching and routing upgrade (62 percent) or Wi-Fi upgrade (56 percent). Network teams are looking for solutions that offer programmatic policy controls, network analytics capabilities, and intent-based networking workflows that streamline optimization.

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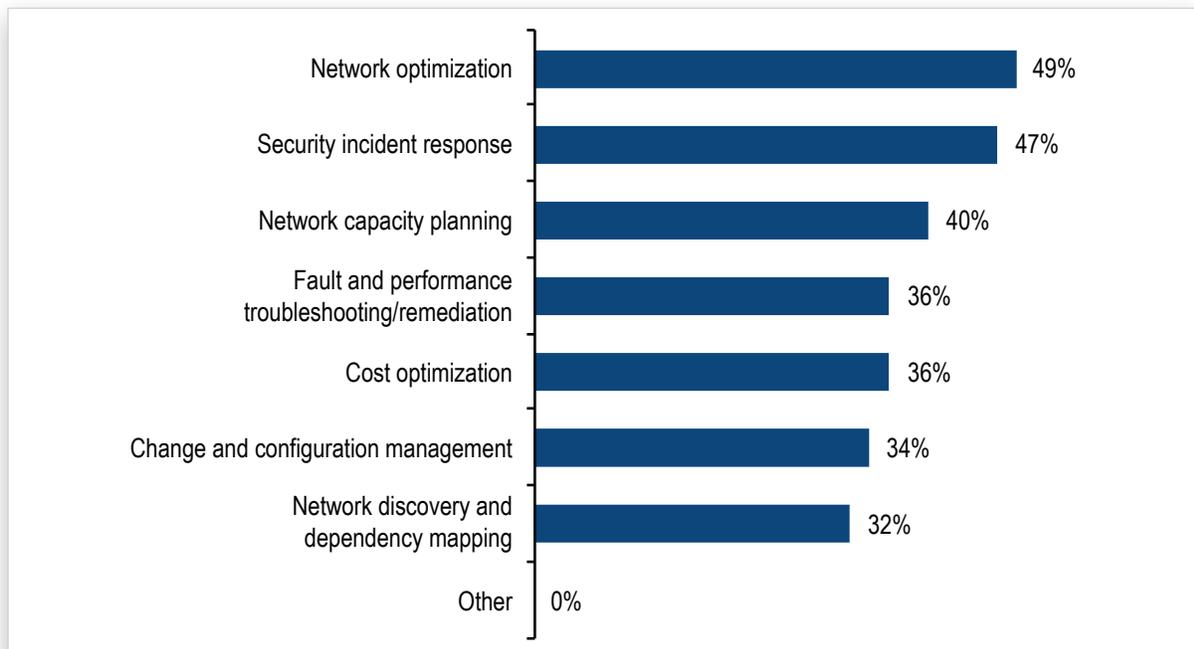

Figure 2. Tasks that network managers are targeting for automation

Security incident response (47 percent) is another major target for network automation. Most network managers are collaborating more closely with information security today. Security-focused automation can facilitate this internal partnership. Many newer network technologies have embedded security capabilities or integrations with third-party security solutions to enable this automation.

Finally, 40 percent of network managers are automating network capacity planning. This is especially important to network teams involved in WLAN upgrades (62 percent) and routing and switching upgrades (56 percent). As midmarket firms move forward with new digital initiatives, capacity planning will be a critical capability for the network. Automation should make the network more responsive to new technologies.

Network teams that are engaged in network upgrades report two significant benefits when they implement network automation. They are more likely to experience improved collaboration across the IT organization, and they are more likely to increase network agility. Both of these benefits are essential to support digital initiatives. Furthermore, EMA research found that small and midmarket enterprises are more likely to achieve staff and workflow efficiencies through the implementation of network automation.

Distributed Enterprises Will Require SD-WAN

Any distributed midmarket company engaged in a network upgrade will ultimately need to consider SD-WAN technology. At first glance, many think of SD-WAN as a solution for reducing costs through MPLS-to-Internet migration, but the technology is truly a solution for network transformation in the digital era. Enterprises leverage SD-WAN to improve application performance, enable public cloud access, and enhance network security.

SD-WAN solutions deliver automation and programmatic control across branch offices, allowing network engineers to architect a distributed, end-to-end network security infrastructure as well as global QoS policies. Local gateways enable hybrid networking, where lower-cost Internet connectivity can supplement or replace bandwidth-constrained MPLS circuits. This hybrid connectivity comes with path control for maximum network performance, but it also enables local Internet breakouts, which facilitates direct and secure remote site access to IaaS and SaaS services.

Avoid Network Upgrade Pitfalls

For years, EMA has polled network managers on the day-to-day challenges they face on the job. At the top of that list is a lack of end-to-end network visibility and a lack of skilled personnel. Small enterprises are 50 percent more likely to struggle with personnel shortage. Organizations that are deeply engaged in a WLAN upgrade are also more likely to cite personnel as a problem. Therefore, EMA recommends that network teams, especially those at small and midmarket companies, review whether they have the internal skills required for an upgrade to next-generation Wi-Fi technology. If not, they may want to consider outsourcing some aspect of WLAN implementation or management. Another possibility is training existing engineers to make sure they understand the latest technology.

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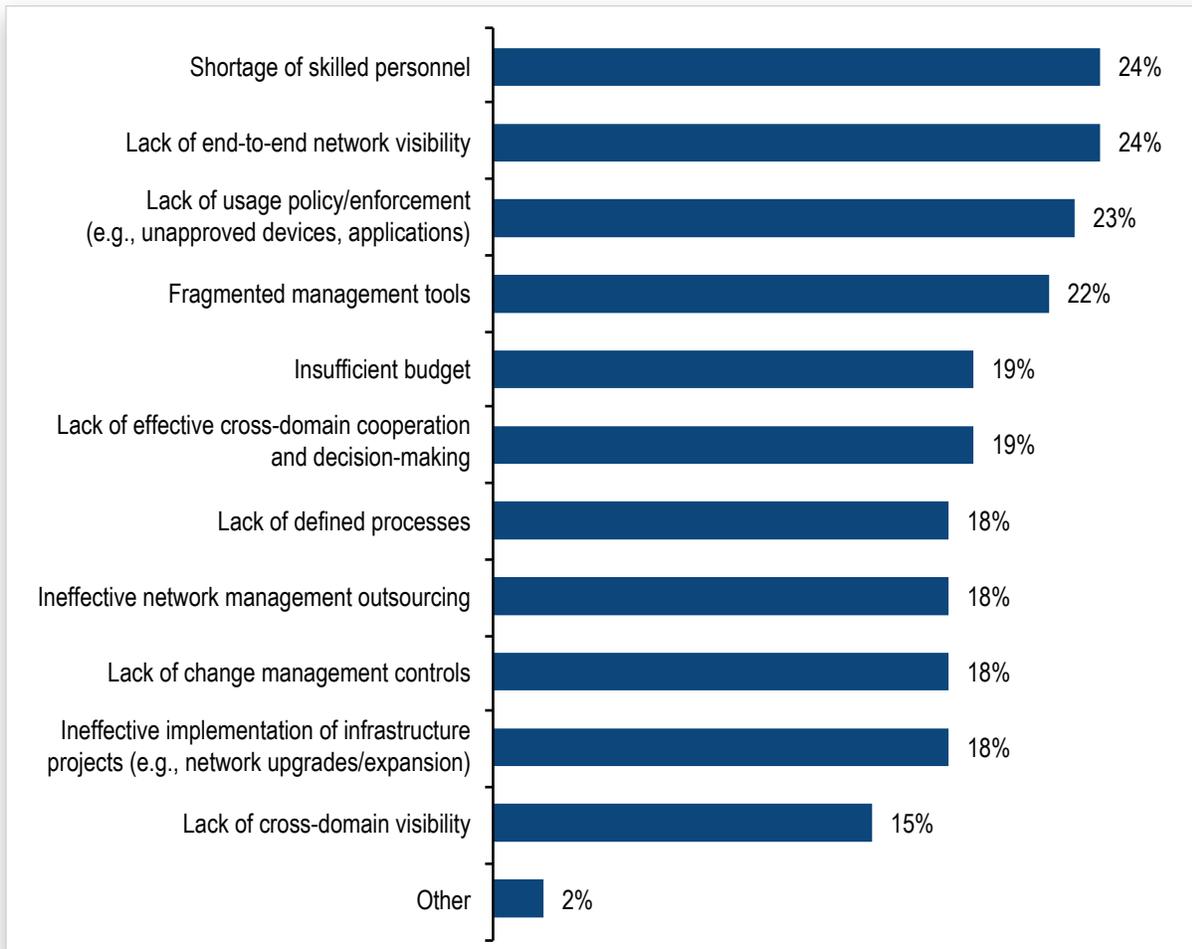
Figure 3. Top obstacles to challenges to successful network operations

Network managers also report that they struggle with network usage policy, fragmented network management toolsets, insufficient budgets, and a lack of cross-domain cooperation with other groups in IT. The network team should keep all of these issues in mind as they upgrade the network. In fact, EMA research found that organizations that are upgrading switching and routing are more likely to struggle with cross-domain operations and decision-making. This finding suggests that IT organizations are struggling to align new network investments with digital services. This is an area where internal sponsors of an upgrade, such as the IT executive suite, could offer to help by providing the necessary leadership to bring different groups together. Network teams should also keep in mind that collaboration with the security group is extremely important during the implementation of a new network, so they should partner closely with that group.

Conclusion

Midmarket enterprises that are engaged in desktop VoIP, video, desktop virtualization, IoT, and other digital initiatives need to upgrade their networks. EMA research confirms that network upgrades correlate strongly with these projects. EMA recommends that as the network team plans and implements upgrades to support digitization, they must also must consider network operations optimization. It will be essential to map best practices, next-generation management, and automation tools to an upgraded network to assure success. EMA research also reveals that network teams must modernize network security as they execute on a network upgrade.

A network upgrade will not necessarily be a one-to-one swap of old infrastructure. As the network team assesses the requirements of digitization, it must simultaneously research and evaluate next-generation network technologies, including Gigabit Wi-Fi, multispeed Ethernet, SD-WAN, and network automation. Network managers must work with their internal partners and their vendor partners to identify how these new technologies can support digital services. If done right, network managers will find that the network is capable of becoming a platform for success. EMA research confirms that network teams engaged in network upgrades tend to be more successful. This success can lead to improved end-user and customer-reduced downtime, improved responsiveness to new business initiatives, and more. In this era of digitization, midmarket IT organizations have an opportunity to shine. With the right network, the IT organization can be a strategic asset, not just a cost center. When upgrading the network, keep this in mind.

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