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Achieve Better Digital Experiences

Enabling Comprehensive Visibility and Simplifying Management in Campus and Branch Networks

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Office IT Environments Are Being Reimagined

To improve engagement, organizations are shifting employees from full-time remote work to hybrid work environments by enticing (or forcing) them to come to the office more regularly. These return-to-office initiatives have often been met with employee resistance for several reasons.

Beyond the commute, many employees complain that IT experiences in the office are worse than those at home delivered by their high bandwidth connections. This is forcing organizations to reevaluate their existing IT environments and reimagine the workspace—especially the network—to enable consistently positive experiences while in the office.

> **"Many employees complain that IT experiences in the office are worse than those at home"**

Nominally, organizations need to provide employees with the ability to connect to all business applications, regardless of where they are located—in the private data center, in a public cloud, or even at an edge location—and ensure a positive experience. Even with return-to-office initiatives, many employees only work in the office a few days a week, and schedules vary among co-workers. As a result, office environments must also support bandwidth-intensive video and voice collaboration applications—not just from designated conference rooms but from anywhere in the office.

If organizations have not refreshed their network technology since the pandemic began, they will have a significant technology deficit that will negatively impact application experiences and, thus, return-to-office initiatives. Organizations must reimagine campus and branch office IT networks to deliver employees equal or better experiences at the office compared to those they have when working remotely. Assessing the current network environment can help determine the best path forward, but such transformation requires an innovative and modern wired network as a foundation.
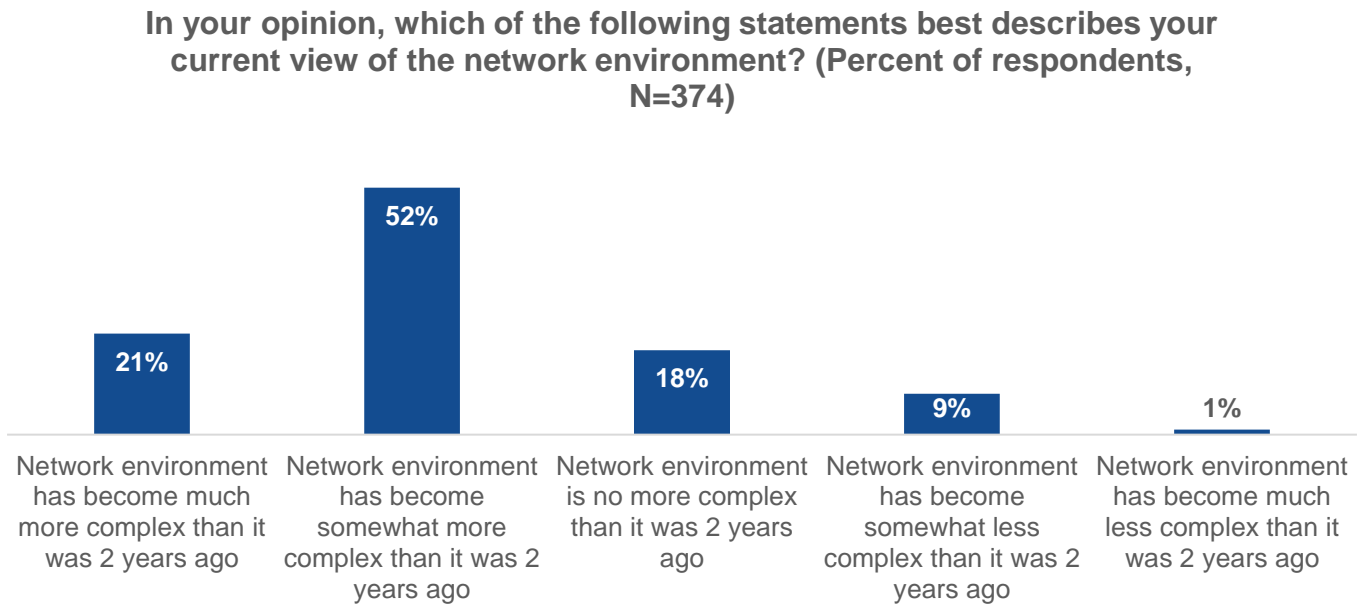
Challenges Negatively Impacting Experiences

The network environment will be one of the most important factors in delivering optimized experiences for employees returning to the office. Unfortunately for IT teams, the network is becoming more complex. TechTarget's Enterprise Strategy Group research shows that almost three-quarters (73%) of organizations reported that their network environment is more complex than it was just two years ago (see Figure 1).[1]

> **"It was difficult to keep up with the multitude of issues ranging from authentication to capacity, coverage, signal strength, configuration, firmware and software updates, optimization, documentation, and monitoring and troubleshooting in a multi-vendor environment."**
>
> -Jorge Miranda, Network Administrator, Dalton Public Schools

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[1] Enterprise Strategy Group Complete Survey Results, *A Network Perspective on SASE and SD-WAN*, September 2023.

Figure 1. Reported Increase in Network Complexity[2]

In your opinion, which of the following statements best describes your current view of the network environment? (Percent of respondents, N=374)

Network environment has become much more complex than it was 2 years ago	Network environment has become somewhat more complex than it was 2 years ago	Network environment is no more complex than it was 2 years ago	Network environment has become somewhat less complex than it was 2 years ago	Network environment has become much less complex than it was 2 years ago
21%	52%	18%	9%	1%

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

When we asked organizations what they believed the top reasons were for their IT environment's increased complexity, respondents stated an increase in remote/hybrid work concerns.[3] This highlights the challenge organizations have in delivering positive experiences, for example, to employees using video and voice collaboration applications from anywhere, in and out of the office. Other challenges of remote and hybrid work include:

- **Increased data volume.** Network operations teams are seeing an increased volume of data across wired and wireless networks, largely because of bandwidth-intensive video applications using HD cameras. Also, operations teams are dealing with securely delivering traffic flows that have new and more diverse traffic patterns, connecting to private data centers, multiple public clouds, edge locations, and home offices.

- **Insufficient bandwidth.** For many, legacy Wi-Fi solutions struggle with increased traffic volume and delivering the requisite bandwidth to every user. To keep pace, organizations may have to upgrade to Wi-Fi 6E. However, that may also require a refresh of the wired network to accommodate increased power demands, such as Power over Ethernet (PoE)+ or greater, and network throughput of greater than 1 Gbps.

- **Unpredictable network demands.** The dynamic nature of reimagined environments leads to unpredictability. Return-to-office initiatives require employees to work in the office a certain number of days. This could result in surges of network traffic based on daily attendance fluctuations, which could be compounded by monthly or quarterly corporate meetings for which all employees must return to the office.

- **Overtaxed network operations teams.** The faster demands on networks change, the more likely operations teams will be in constant firefighting mode, reacting to problems instead of being proactive. Staff skills limitations and size (without budget to hire) can exacerbate time spent in this reactive mode.

- **Lack of visibility.** The delivery of services is highly dependent on wired and wireless domains being in tight alignment and performing optimally. Plus, in many cases, traffic must traverse the WAN, requiring

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[2] Note: Totals in figures throughout this white paper may not add up to 100% due to rounding.
[3] Source: Enterprise Strategy Group Research Report, *2023 Technology Spending Intentions Survey*, April 2023.

comprehensive visibility and management of software-defined WAN (SD-WAN) solutions along with campus wired and wireless domains.

- **Disparate management tools.** Operations teams must spend more time learning and becoming proficient in the separate tools used for each network domain, such as wireless, wired access switches, etc. This places additional pressure on staff to be cross-trained on different domain tools to ensure coverage.

- **Longer Mean Time To Innocence (MTTI).** Troubleshooting and problem resolution also take longer when operations teams must utilize swivel-chair management (i.e., switching between different screens) and perform manual correlation of the events being reported in each tool in order to solve problems. This extends the MTTI for the network team whenever there is an issue (e.g., service degradation, outage, etc.) which results in more trouble tickets being issued and escalated and creates even more work.

Given these challenges, it should not come as a surprise that improving operational efficiency has been the top digital transformation goal for the last five years.[4] Organizations need unified visibility and management solutions to enable their teams to work more effectively and efficiently.

Unified Visibility and Management Is Critical for Campus and Branch Offices

To ensure a seamless return to the office and consistently positive experiences for employees, network operations teams need to have unified network visibility and management for campus and branch office environments. Nominally, this would include wired and wireless environments; however, as more organizations deploy cloud- or edge-based applications, they need unified visibility and management over SD-WAN, as well.

To facilitate comprehensive visibility and management for wired and wireless domains, network vendors are activity incorporating key capabilities into their solutions, including:

- **Cloud-based management.** Collecting data from all network domains and locations makes providing a comprehensive view via a single cloud-based portal possible. A portal also enables remote IT workers to easily access solutions regardless of where they are. Enterprise Strategy Group research highlights that almost three-quarters (73%) of organizations prefer cloud-based visibility and management tools (see Figure 2).[5] The collected anonymized network data can also provide the foundation instrumental for AI/ML capabilities. However, due to compliance issues, just over one-quarter of organizations prefer to deploy on premises or in specialized or certified clouds (e.g., to meet FedRAMP requirements), and they should understand what options are available.

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[4] Ibid.
[5] Source: Enterprise Strategy Group Research Report, *End-to-end Network Visibility and Management*, April 2023.

Figure 2. Critical Capabilities Include Cloud-based Management

What is your organization's preference for where unified end-to-end network visibility or management solutions are located? (Percent of respondents, N=339)


Don't know/no preference, 1%

On-premises, 26%

Cloud, 73%
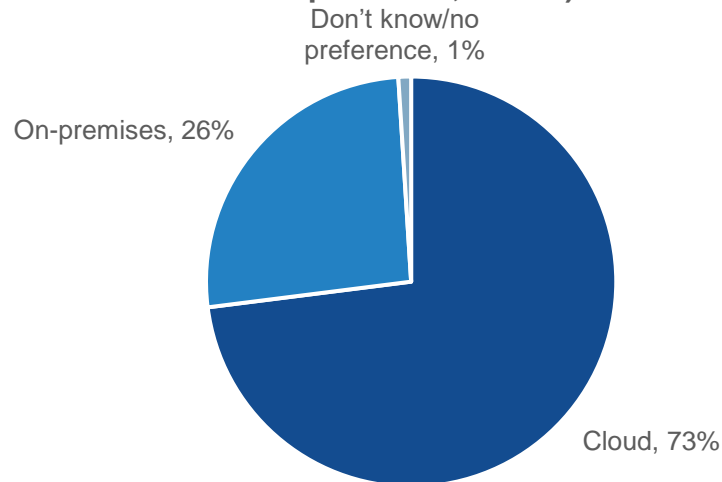
Source: Enterprise Strategy Group, a division of TechTarget, Inc.

- **End-to-end visibility.** It is hard to manage something if you can't see it. Because of this, Enterprise Strategy Group research highlights that 81% of organizations cite that end-to-end visibility of their network environment is critical or very important (see Figure 3).[6] In addition to enabling effective management, understanding all the devices connected to their environments enables organizations to quickly identify any vulnerabilities and mitigate risks.

Figure 3. Critical Capabilities Include End-to-end Visibility

How important is having unified end-to-end visibility of your organization's network environment? (Percent of respondents, N=339)


Not at all important, 1%

Somewhat important, 19%

Critical, 13%

Very important, 68%
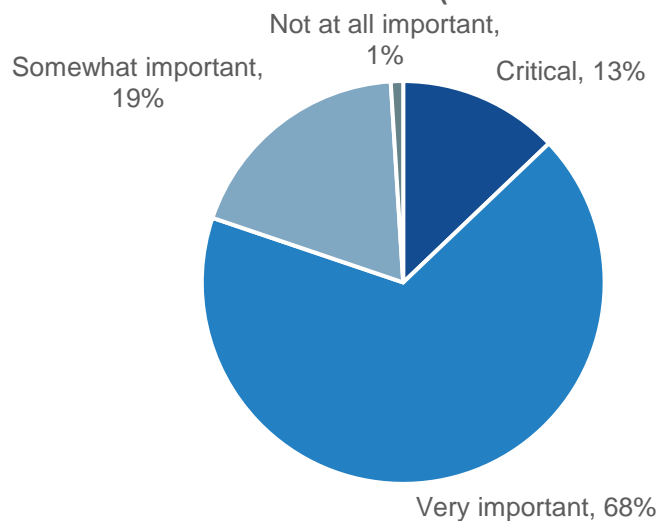
Source: Enterprise Strategy Group, a division of TechTarget, Inc.

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[6] Ibid.

- **Unified management.** The natural extension to having unified end-to-end visibility is the ability to have unified management over that environment as well. Again, Enterprise Strategy Group research shows that the need to have a unified wired, wireless, and SD-WAN solution is very important or critical to 93% of organizations (see Figure 4).[7]

Figure 4. Critical Capabilities Include Unified Management

How important is it for your organization to have a unified wired, wireless, and WAN solution (i.e., common management platform for SD-WAN, wired, and wireless networks)? (Percent of respondents, N=374)

Somewhat important, 7%

Critical, 19%

Very important, 74%
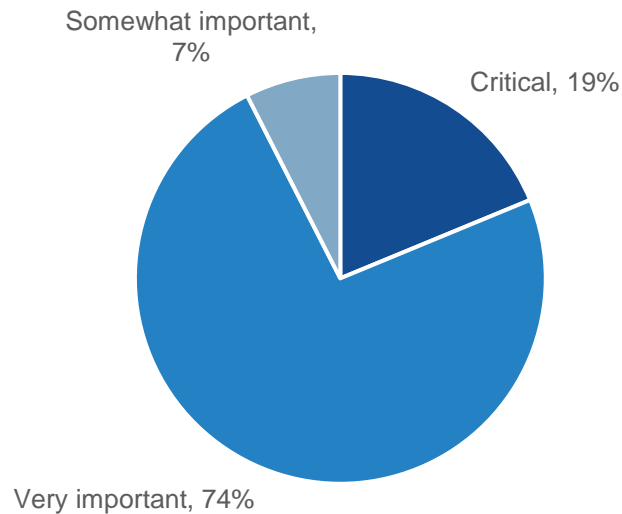
Source: Enterprise Strategy Group, a division of TechTarget, Inc.

- **AI/ML capabilities.** Modern IT environments are defined by their distributed nature. To keep up with the increasing volume of data that needs to be collected and correlated to provide actionable insights to operations teams, AI/ML capabilities are rapidly becoming a must-have technology. They can have a significant impact on improving customer and employee experiences in highly dynamic wired and wireless environments. The ability to find issues and recommend actions to remediate them, even before users notice them, across the wired and wireless environment can dramatically reduce the number of trouble tickets. By leveraging this technology, operations teams can focus more on strategic initiatives. Figure 5 illustrates Enterprise Strategy Group research on how organizations want to consume AI/ML and automation technologies.[8]

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[7] Source: Enterprise Strategy Group Complete Survey Results, *A Network Perspective on SASE and SD-WAN*, September 2023.
[8] Source: Enterprise Strategy Group Research Report, *End-to-end Network Visibility and Management*, April 2023.

Figure 5. Use of AI and Automation

Which of the following statements aligns with your organization's preference or expectations in terms of leveraging network intelligence/automation capabilities? (Percent of respondents, N=339)

34%	48%	18%
We get alerts, but prefer retaining full control so that our staff analyzes and defines what should be done	We expect the management software to provide alerts and serve as a recommendation engine based on learned behavior from automated real-time and/or historical data analysis, but staff should be responsible for implementation and execution of the recommendat	We want the management software to automatically detect, analyze, recommend, and apply changes as needed, with the ability of the staff to review outcomes and make changes if required

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Juniper Delivers Unified Management to Help Make 'Experience First' Real

Juniper has recognized the need to deliver innovative network solutions to its enterprise customers, and over the last few years it has made several moves to provide a comprehensive solution that incorporates all the above capabilities. Using the mantra of "Experience First" to guide them, Juniper acquired companies like Mist Systems and 128 Technology to integrate with its own solutions and deliver the key technologies to fulfill its vision.

Along with innovative Wi-Fi technology, Mist brought its AI-driven, cloud-based management with a truly cloud-native architecture, and Juniper made it the foundation for its unified visibility and management solution. Juniper has extended Mist AI now to deliver unified management across its wired, wireless, and SD-WAN solutions. Recently, Juniper added a Mist-based 802.1x network access control (NAC) solution for wireless and wired devices.

This unified management enables Juniper to collect data (anonymously) to further develop the algorithms used to understand the interactions across all three network domains. As Juniper deployments continue to grow, the solution's ability to solve more complex issues will only increase.

Building further upon "Experience First," Juniper has continued to invest heavily in the Mist AI engine and Marvis, its virtual network assistant that provides a conversational AI interface. Marvis enables network operations teams and executives to make plain text queries (e.g., "show me bad cables and unhappy users") regarding network status and performance. Also, Marvis Actions can find the "needle in a haystack" root cause of many user-impacting issues (e.g., a bad cable or missing VLAN) and can save operations teams significant time and effort in successfully troubleshooting them.

Today, with generative AI gaining so much attention, Juniper has incorporated this technology into Marvis to accelerate and simplify access to publicly available data from Juniper documentation and manuals using natural

language queries. For example, users can ask "How do I configure a switching stack?" and get step-by-step instructions.

Mist Wired Assurance delivers improved experiences for both the IT operators and the end customers by optimizing wired network operations for better MTTR. With tools like automated configuration templates, dynamic port profiling, and a campus fabric workflow, Juniper greatly simplifies and scales Day 0 operations. Even customers deploying an EVPN/VXLAN fabric can do so in a matter of minutes with the Juniper Mist cloud. And it provides zero-touch provisioning, onboarding, and provisioning for switches, eliminating error-prone, manual installations and configurations.

For Juniper customers, the ability to have unified visibility, management, and AI across multiple network domains—wired, wireless, and SD-WAN—only increases the value they can derive from the solution. Importantly Juniper's "Experience First" vision applies not only to end users but operations teams as well. Its cloud-based platform can drive significant operational efficiencies that enable IT teams to focus more time on strategic initiatives and less on dealing with repetitive tasks or troubleshooting issues.

Juniper Delivers Enhanced Experience for Dalton Public Schools

When a Georgia K-12 school system supporting ten schools with almost eight thousand students (7,892) and over six hundred faculty members (645) needed to upgrade its network to improve connectivity for students, devices, and staff, it turned to Juniper.

According to Jorge Miranda, Network Administrator for Dalton Schools, the journey to modernize their network started back in 2015 when the school system took advantage of a "Connections 2 Classrooms" grant. This enabled the school system to upgrade their existing wired network to a robust solution that would provide reliability for their students and staff and that would also be sustainable for future refresh cycles. After a thorough investigation of four vendors, Juniper was chosen. Then in 2019, when the wireless network was due for a refresh, Dalton again conducted a thorough evaluation of four wireless vendors with cloud-based management solutions. According to Jorge, Juniper (Mist) was chosen because of its ability to "have a 'real-time' configuration push from the cloud console down to the AP level." Mist also provided Marvis AI with advanced analytics capabilities, and the Mist console was able to monitor and manage the compatible Juniper switches in a single pane of glass. In addition, Juniper (wired) reliability and support from Juniper's Technical Assistance Center (JTAC) and regional support teams influenced the decision-making process.

The ability to have unified visibility and management was an important criterion for Jorge as the sole network administrator because "it was difficult to keep up with the multitude of issues ranging from authentication to capacity, coverage, signal strength, configuration, firmware and software updates, optimization, documentation, and monitoring and troubleshooting in a multi-vendor environment." In fact, prior to the Juniper solution being deployed, the school system would react to 389 tickets per year, on average, with an average time to troubleshoot a problem of 30 to 60 minutes. With the current Juniper deployment, Jorge stated that he could be more proactive, and now there is an average of just 42 tickets per year (89% reduction) and he troubleshoots them in less than half the time (10-15 minutes). Jorge believes that when the environment is entirely Juniper, he will be able to be both proactive and predictive, although he will always need to react to unavoidable issues.

The transformation from reactive to proactive was aided by Juniper's Mist AI, with Jorge saying that it didn't take long for him to begin using Juniper alerts and leveraging its recommendations. According to Jorge, other benefits of the Juniper solution include:

- Proactive AI-driven radio management for their individual sites to help address signal strength and improve end-user performance.

- Granular insights into clients, access points, switches, wired clients, and sites provide valuable information that allows him to make proactive decisions to ensure the school system's network ecosystem runs smoothly.

- Locating lost or misplaced devices. Every student has laptop in this district, and they often leave their laptops in a classroom and forget where they left them.

- Mist Service Level Experience (SLE) data has helped uncover potential issues with DHCP, DNS, and RADIUS authentication.

- Addressing interface issues from the UI and directly opening a CLI shell for any specific switch, which saves time when working on time-sensitive issues.

- Improved overall experience for students and staff, enables them to do the most important things in the K-12 environment—teach, learn, and grow.

In addition, the network administrator benefits. As Jorge states, "While the network admin role will never be without some stress, our current Juniper solutions have allowed me to tilt the scales toward a better work-life balance."

Better Experiences

The Juniper solution is helping Jorge deliver better experiences for both faculty and students. He sums it up, saying, "From a single console, I can proactively use analytics to improve user experience, increase security in an ever-changing and demanding digital landscape, and have a positive impact on the students that will be the future of our community."

He provides staff with a year-round stable, reliable, and efficient network. "Students can not only rely on the connectivity for their school," he stated, regarding access to the learning management system and online testing, "but also for eSports competitions, sports analytics, educational virtual tours with VR headsets, creative art projects, and audio and video content." Jorge added, "From the moment we began implementing Juniper solutions, we have improved our infrastructure and experiences for our end users at a very impressive rate." Whenever a problem has been reported, the Juniper console helps him uncover the underlying issue to address, whether related to the network or a device.

Jorge believes that Juniper's Mist AI, along with its wired and wireless infrastructure, helps him support the desired outcomes and mission of the Dalton Public Schools: "To develop trusting relationships and provide quality work that engages students in profound learning," enabling both student and staff in its pursuit.

Conclusion

As organizations push for more in-office days, they must modernize their campus and branch office environments in order to ensure positive experiences. IT and network operations teams must deliver an equal or better in-office experience compared to the one employees experienced at home to ensure successful return-to-office initiatives.

Given the increased complexity and limited resources many organizations are grappling with, network teams must have solutions that drive greater operational efficiencies. For the best outcomes, they should use a cloud-based platform with built-in AI assistance that unifies visibility and management across wired and wireless

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> -Jorge Miranda, Network Administrator, Dalton Public Schools

environments. Managing each network domain separately is not a viable plan moving forward—it only contributes to complexity. Furthermore, given the increasing consumption of applications and services from the cloud, it is

becoming increasingly important to include all network domains, wired, wireless, and SD-WAN, as a part of the solution.

Juniper understands the demands on the network and the network operations teams supporting campus and branch office environments. It has worked hard to tightly integrate innovative technology to deliver a comprehensive, cloud-based management platform that is driven by AI and that covers the wired, wireless, and SD-WAN domains. Their solution can help organizations provide employees returning to the office with the best possible experiences.

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