ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

A Global Survey of Executives and IT Professionals

February
2022

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Introduction

This paper reviews key findings from a global primary research survey with executives as well as networking and operational professionals. The research focused on understanding current network operations, current challenges, expected device growth, and what new technologies are planned for adoption. The research also investigated the adequacy of current monitoring solutions and their ability to support growing scale and complexity as well as new technologies, devices, and network architectures.

This paper reveals a real-world view of where networking operations is today, if they are truly prepared for the massive influx of addition network devices and technology, and what is needed to manage it. The research also investigates practical value of AI/ML and other emerging capabilities for improved network management and security.

Executive Summary

This research finds that most companies have low network visibility today, resulting in 81% having network blind spots. This lack of visibility leads to a number of network-based issues, which increasingly have an impact on customers, partners, and supply chains, and create company challenges through negative press. More than 60% of larger companies state they have 50,000 or more network devices and indicate it is getting harder every year to manage their network, a challenge driven by increasing scale, new architectures, and growing complexity.

However, network innovation is accelerating with 74% of operations professionals expecting more than 10 new device types and technologies will be added to their network over the next 2 years. These technologies, while adding complexity, are also expected to enable greater bandwidth, agility, and new business opportunities. This new technology adoption is occurring most rapidly in the largest networks, which report they plan are expanding exponentially. However, this report finds that insufficient monitoring capabilities are limiting the deployment of new technology or forcing companies to deploy without adequate control and visibility.

Operations professionals state that removing blind spots and increased monitoring coverage is expected to provide improvements in security, reliability, and performance. Those surveyed want monitoring solutions to support new and emerging technology, as well traditional equipment, but also expressed value in new features such as flow analytics, network telemetry, chipset monitoring, and AI/ML. This report finds current monitoring and operations solutions are ill equipped for the tasks at hand, and unable to support a massive influx of new technology over the next 2 years, leading to slower adoption and deployment with increased business risk.

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Key Findings

- **Networks Blind Spots Causing Numerous Issues with External Ramifications**
  - 81% have blind spots in the network
  - Companies experiencing numerous network-based challenges across a wide range of issues
  - Network issues have increasing external ramifications: customer & partner impact, negative press, etc.

- **Networks Beginning Explosive Growth with New Technology Adoption**
  - 49% of companies have 50,000 or more networked devices
  - 73% indicate it is growing increasingly difficult to manage their network
  - 74% indicate 10+ new technologies and devices entering their network over the next 2 years
  - Companies with more network devices plan to increase the number of devices by 50% over 2 years

- **New Monitoring Solutions Needed to Enable New Technologies and Reduce Risk**
  - 71% state adoption of new network technologies is delayed by inadequate monitoring solutions
  - Increased monitoring coverage expected to yield improved security, reliability, and performance
  - Advanced flow analytics, network telemetry, and chipset visibility would deliver improved network operations

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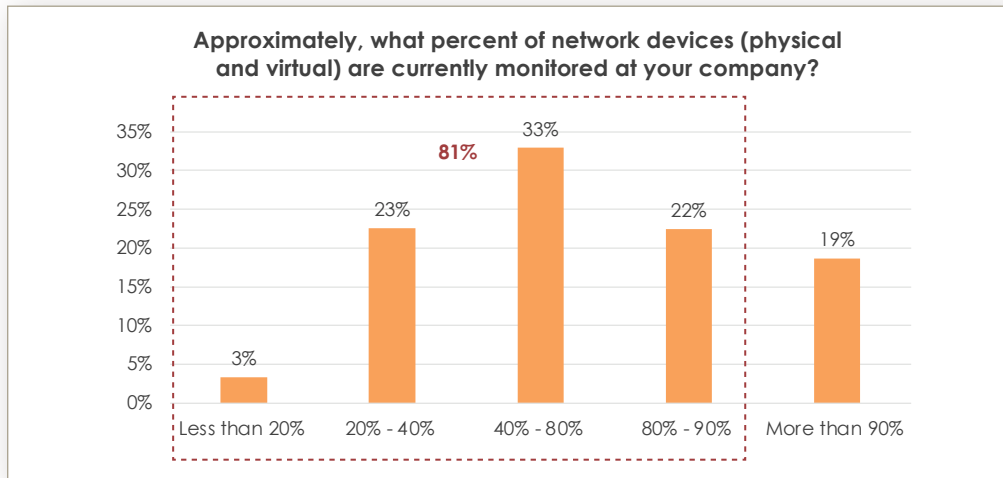A Global Survey of Executives and IT Professionals

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Detailed Findings

Most Companies Have Network Blind Spots

Because today's technology is critical for most business operations, this research focused on the networks which traffic data and services for employees, partners, and customers. But more than 8 out of 10 companies have a lack of visibility into network device operations that obscures knowledge about critical applications and services' performance. Monitoring gaps can also hide security threats making them more difficult to detect. In fact, the data shows that a quarter (26%) of the companies surveyed monitor 40% or less of network devices today.

Approximately, what percent of network devices (physical and virtual) are currently monitored at your company?

Category	Percent
Less than 20%	3%
20% - 40%	23%
40% - 80%	33%
80% - 90%	22%
More than 90%	19%

(81% within dashed boundary covering Less than 20% through 80% - 90%)

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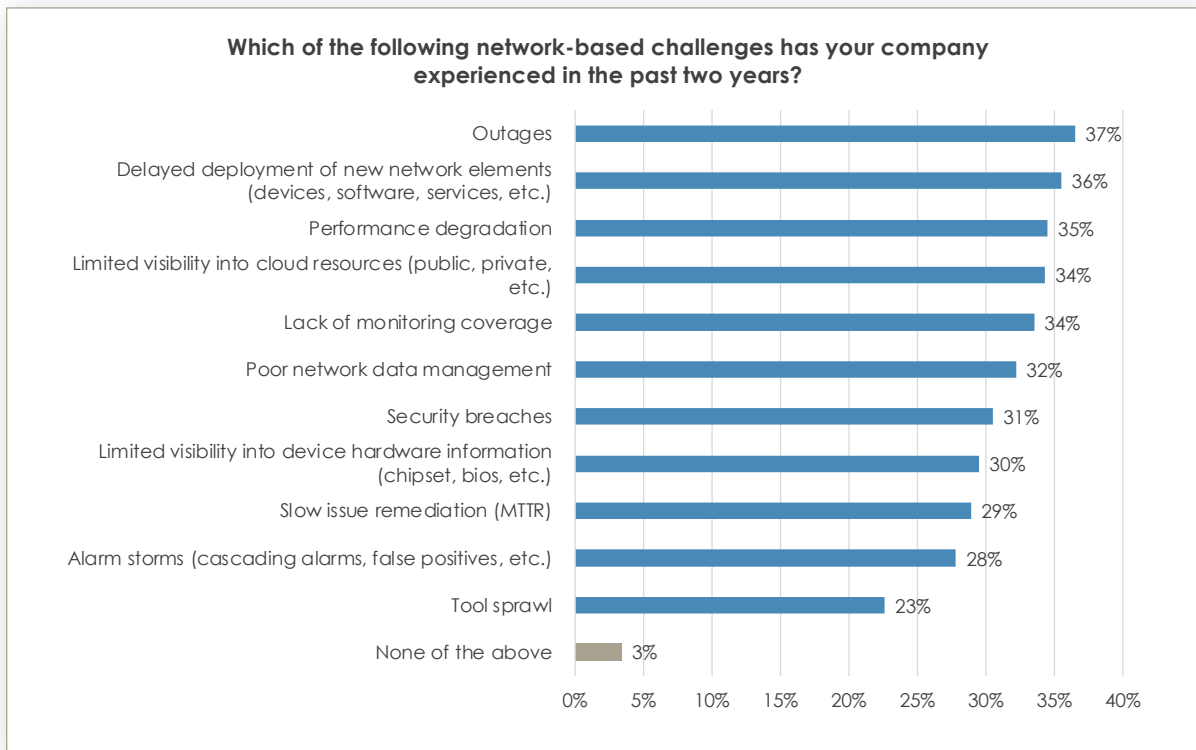# ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

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Companies Experiencing Numerous Network-Based Challenges

This lack of visibility is contributing to the finding that 97% of network and operations professionals reported network challenges. The range of issues is surprising with more than 10 types of problems being reported. The worst problem reported was complete outages (37%) likely with associated business ramifications. But network issues have also delayed new devices (36%) and are potentially delaying business opportunities. While cloud adoption has been on a rapid rise in response to Covid and the transition to remote workers for many companies, this report shows network-based problems with cloud resources (34%). The problems continue with data control (32%), security (31%), and device hardware information (30%). Many of these issues and lack of visibility ulti-mately lead to slower issues resolution (29%).

Which of the following network-based challenges has your company experienced in the past two years?

Challenge	%
Outages	37%
Delayed deployment of new network elements (devices, software, services, etc.)	36%
Performance degradation	35%
Limited visibility into cloud resources (public, private, etc.)	34%
Lack of monitoring coverage	34%
Poor network data management	32%
Security breaches	31%
Limited visibility into device hardware information (chipset, bios, etc.)	30%
Slow issue remediation (MTTR)	29%
Alarm storms (cascading alarms, false positives, etc.)	28%
Tool sprawl	23%
None of the above	3%

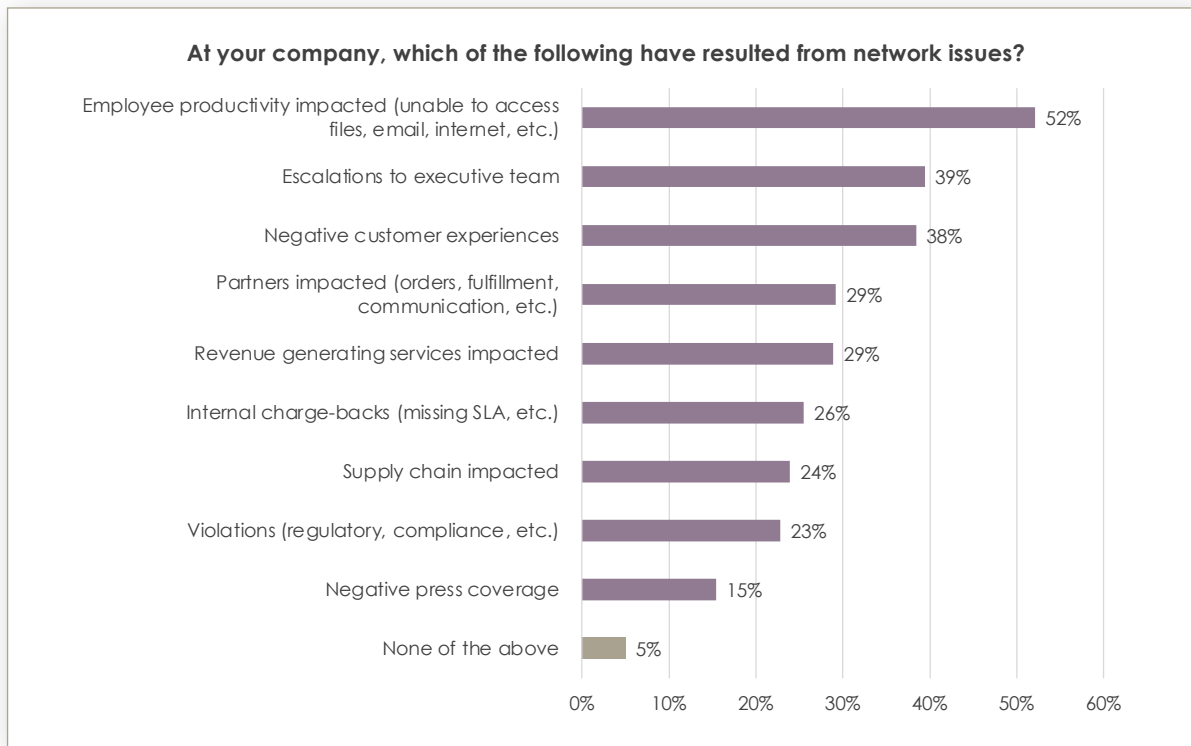# ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

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Network Issues Have Increasing Business and External Ramifications

To gain business insights, the research explored the range of business consequences from network issues. Topping the list at 52% is directly impact on employee productivity. The second most common effect from network issues is executive team notification (39%). Executives are brought into the loop because network issues are now directly impacting the business; customers (38%), as well as partners and revenue generating services, were each reported by 29% of businesses surveyed. Network problems also affect a company's supply chain (24%) and lead to compliance violations (23%). At the bottom, but certainly not insignificant, company brands are impacted by negative press coverage (15%). Thus, today network issues are rarely confined or hidden internally but generate external ramifications directly affecting the business and its image.

At your company, which of the following have resulted from network issues?

Category	Percentage
Employee productivity impacted (unable to access files, email, internet, etc.)	52%
Escalations to executive team	39%
Negative customer experiences	38%
Partners impacted (orders, fulfillment, communication, etc.)	29%
Revenue generating services impacted	29%
Internal charge-backs (missing SLA, etc.)	26%
Supply chain impacted	24%
Violations (regulatory, compliance, etc.)	23%
Negative press coverage	15%
None of the above	5%

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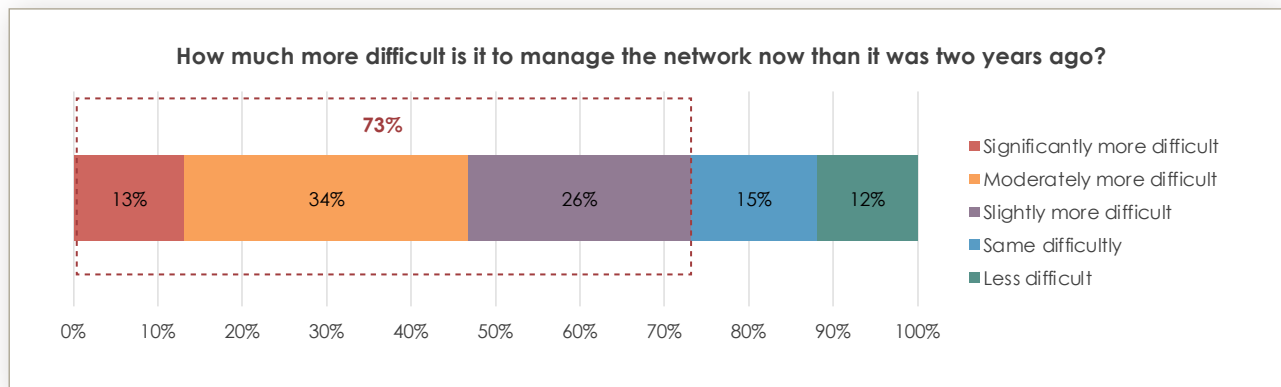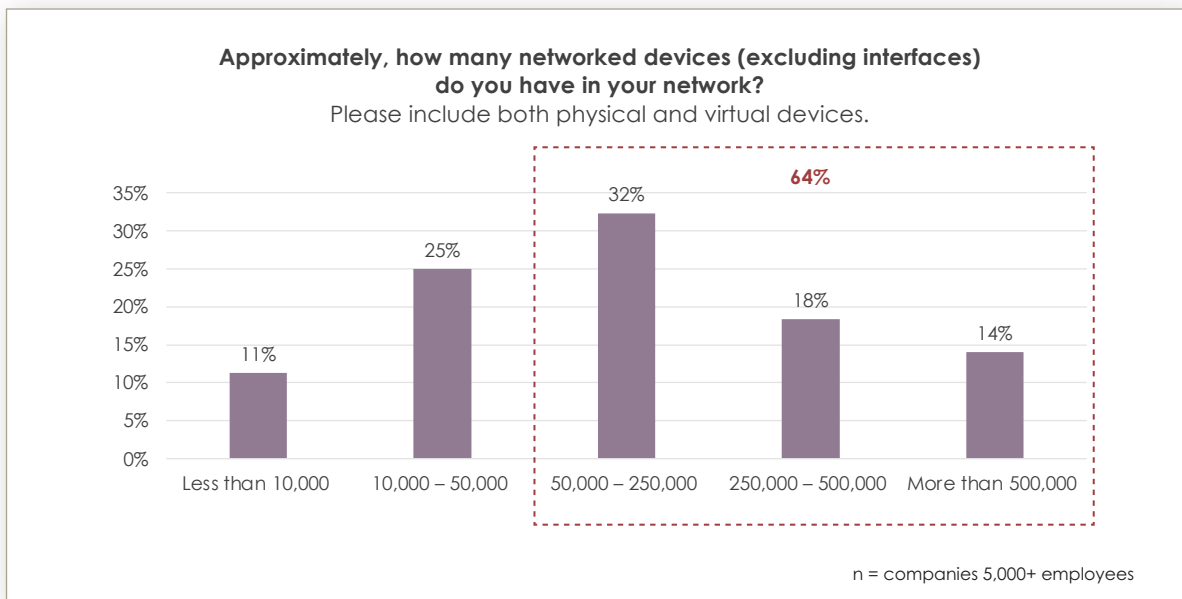# ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

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Network Device Counts Skyrocketing

Networks today are highly complex with 10s of thousands of devices that need to operate properly and securely. In fact, 64% of large enterprises indicated they that had more than 50,000 networked devices. Perhaps even more staggering is 21% reported having a quarter of million devices or more in their network. This is likely directly contributing to 73% of operational professionals stating it is more difficult to manage their network now than it was just two years ago.

Approximately, how many networked devices (excluding interfaces) do you have in your network?
Please include both physical and virtual devices.

Category	Percentage
Less than 10,000	11%
10,000 – 50,000	25%
50,000 – 250,000	32%
250,000 – 500,000	18%
More than 500,000	14%

64% (50,000 – 250,000 through More than 500,000)

n = companies 5,000+ employees

How much more difficult is it to manage the network now than it was two years ago?

Response	Percentage
Significantly more difficult	13%
Moderately more difficult	34%
Slightly more difficult	26%
Same difficultly	15%
Less difficult	12%

73% (Significantly + Moderately + Slightly more difficult)

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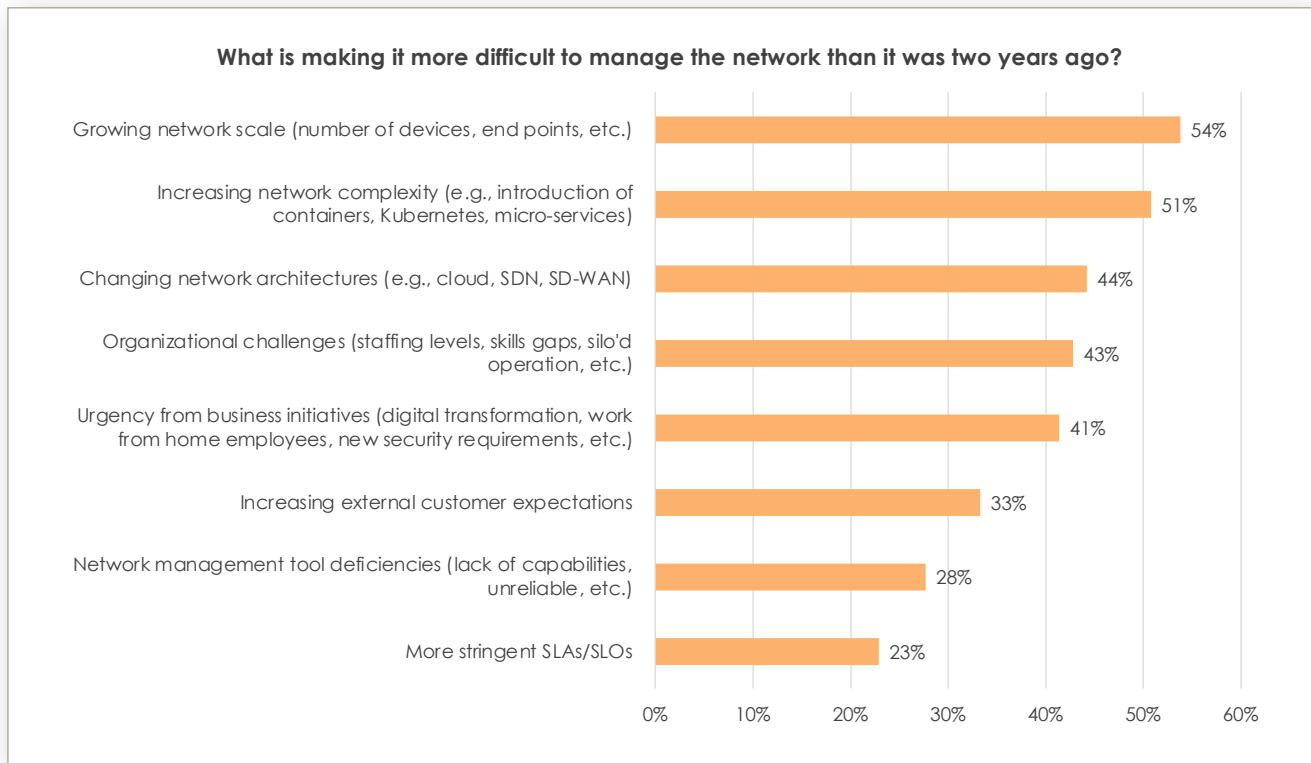# ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

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Numerous Issues Driving Network challenges

Network professionals confirmed that scale (54%) of the network is the top reason managing the network is becoming more difficulty. But professionals also shared complexity (51%) is also contributing significantly to the challenges. In the third spot evolving network architectures are also adding to the difficulties. Staffing levels and missing skills (43%) provide yet another set of issues for organizations. While the network is growing in size and complexity, the business (41%) and customers (33%) have increasing expectations which is making network management more difficult. Network professionals indicate a need for new or enhanced tools pointing to network management tool deficiencies as a challenge (28%).

What is making it more difficult to manage the network than it was two years ago?

Category	Percentage
Growing network scale (number of devices, end points, etc.)	54%
Increasing network complexity (e.g., introduction of containers, Kubernetes, micro-services)	51%
Changing network architectures (e.g., cloud, SDN, SD-WAN)	44%
Organizational challenges (staffing levels, skills gaps, silo'd operation, etc.)	43%
Urgency from business initiatives (digital transformation, work from home employees, new security requirements, etc.)	41%
Increasing external customer expectations	33%
Network management tool deficiencies (lack of capabilities, unreliable, etc.)	28%
More stringent SLAs/SLOs	23%

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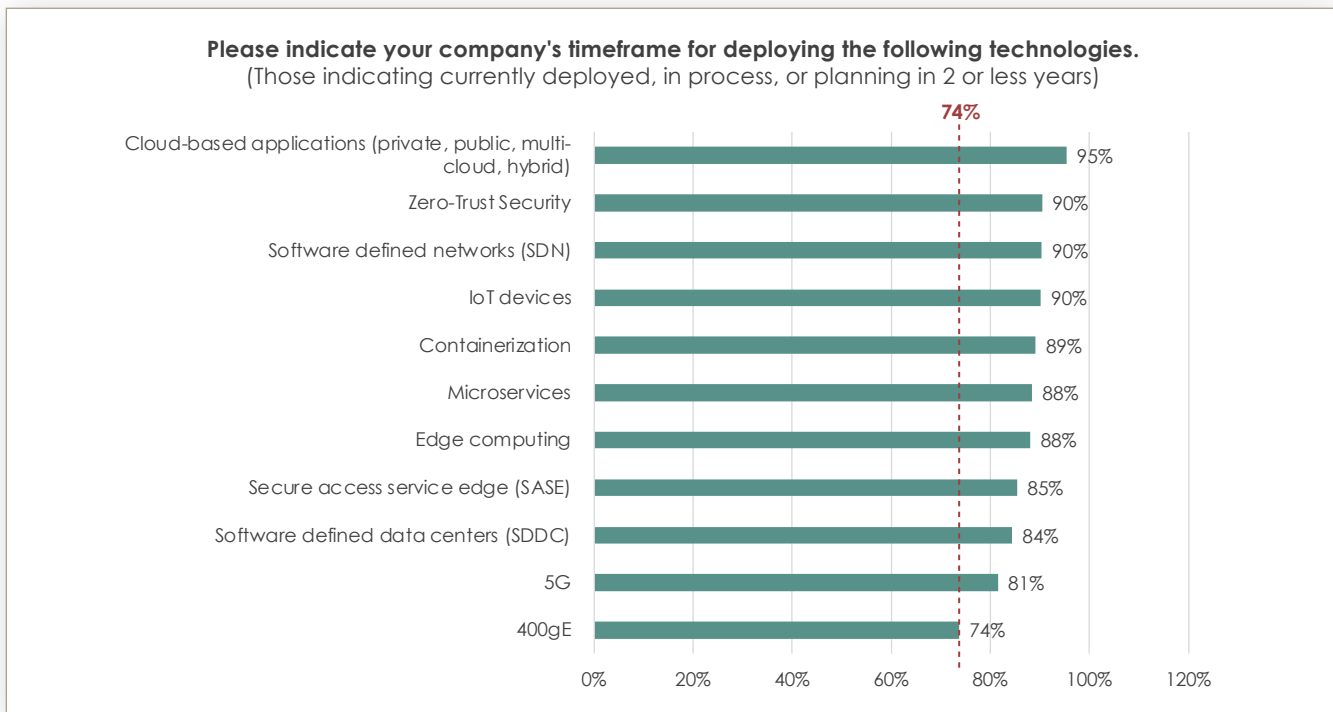
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New Technologies and Devices Rapidly Entering the Network

Scale, complexity, and new architectures are driving network issues today, and looking to the future, it's not going to get any easier. 74% of those surveyed indicated they will be deploying 10 or more new technology types over the next two years. Continuing cloud-based resource utilization led all other technologies for 95% of companies. Adoption of security with Zero-Trust, along with SDN and deploying more IoT devices, are tied at 90% for the next 3 spots. Just reviewing the list below, it is clear every facet of the network is being altered over the next two years. It starts from what is being deployed (microservice, IoT, edge computing) on new network architectures (SDN, 5G, 400gE), to where it is being deployed (SDDC, cloud), including how it is deployed (containers) and secured (Zero-Trust, SASE). This amount of change and transformation is a tremendous undertaking for operations teams.

Please indicate your company's timeframe for deploying the following technologies.
(Those indicating currently deployed, in process, or planning in 2 or less years)

Technology	Percentage
Cloud-based applications (private, public, multi-cloud, hybrid)	95%
Zero-Trust Security	90%
Software defined networks (SDN)	90%
IoT devices	90%
Containerization	89%
Microservices	88%
Edge computing	88%
Secure access service edge (SASE)	85%
Software defined data centers (SDDC)	84%
5G	81%
400gE	74%

74% reference line shown on chart

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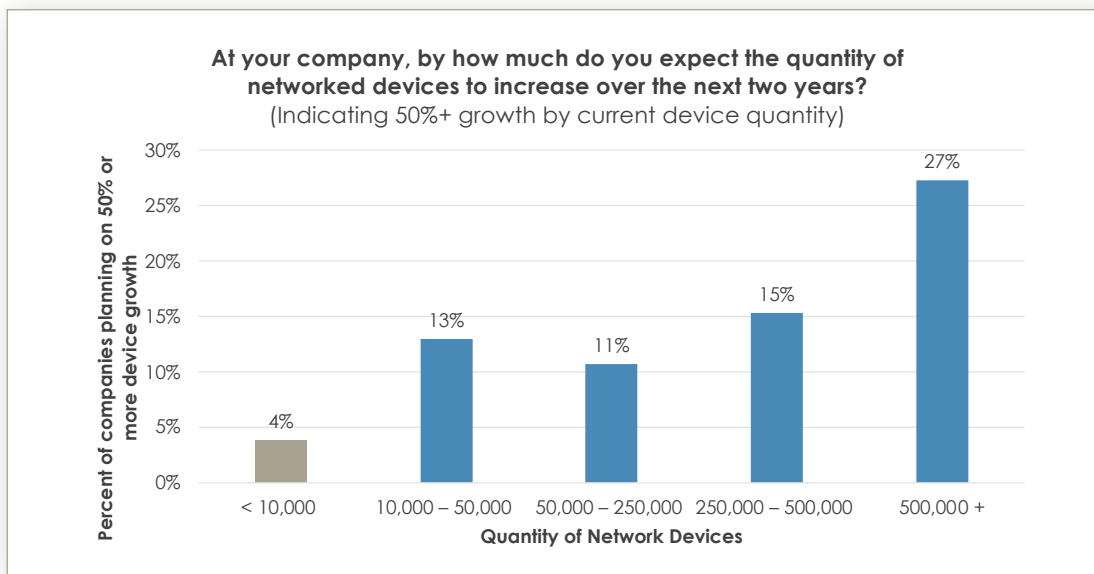
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Companies with More Network Devices are Growing Faster

The research sought to understand if the rate of growth and adoption of the new technology discussed previously was by smaller and more agile companies, or technology laggards attempting to catch up? However, the results showed quite the opposite. Those companies already with tens of thousands of devices indicating larger and sophisticated companies, are in fact accelerating the most. The chart illustrates companies which plan to grow the number of network devices by 50% or more over the next two years correlated to the number of network devices already deployed. Thus, those with more network devices already deployed are growing and accelerating the fastest.

At your company, by how much do you expect the quantity of networked devices to increase over the next two years?
(Indicating 50%+ growth by current device quantity)

Percent of companies planning on 50% or more device growth

Quantity of Network Devices	Percent
< 10,000	4%
10,000 – 50,000	13%
50,000 – 250,000	11%
250,000 – 500,000	15%
500,000 +	27%

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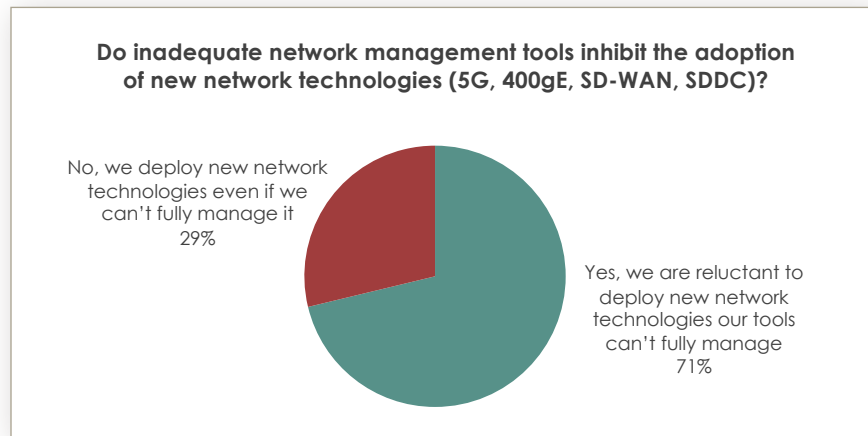
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New Network Technologies Delayed by Inadequate Monitoring Solutions

As discussed, companies are planning to rapidly adopt new network technology and at staggering rates. The research sought to understand if professionals believe they have tools today to deploy and manage new technologies. 71% indicated that current network tools lack key capabilities and thus slows the adoption of new network technologies Perhaps more unsettling is that 29% will deploy new technologies even if their current tools can't properly manage them. It is this type of approach that creates the lack of network visibility and resulting management issues and outages cited earlier in this report.

Do inadequate network management tools inhibit the adoption of new network technologies (5G, 400gE, SD-WAN, SDDC)?

No, we deploy new network technologies even if we can't fully manage it
29%

Yes, we are reluctant to deploy new network technologies our tools can't fully manage
71%

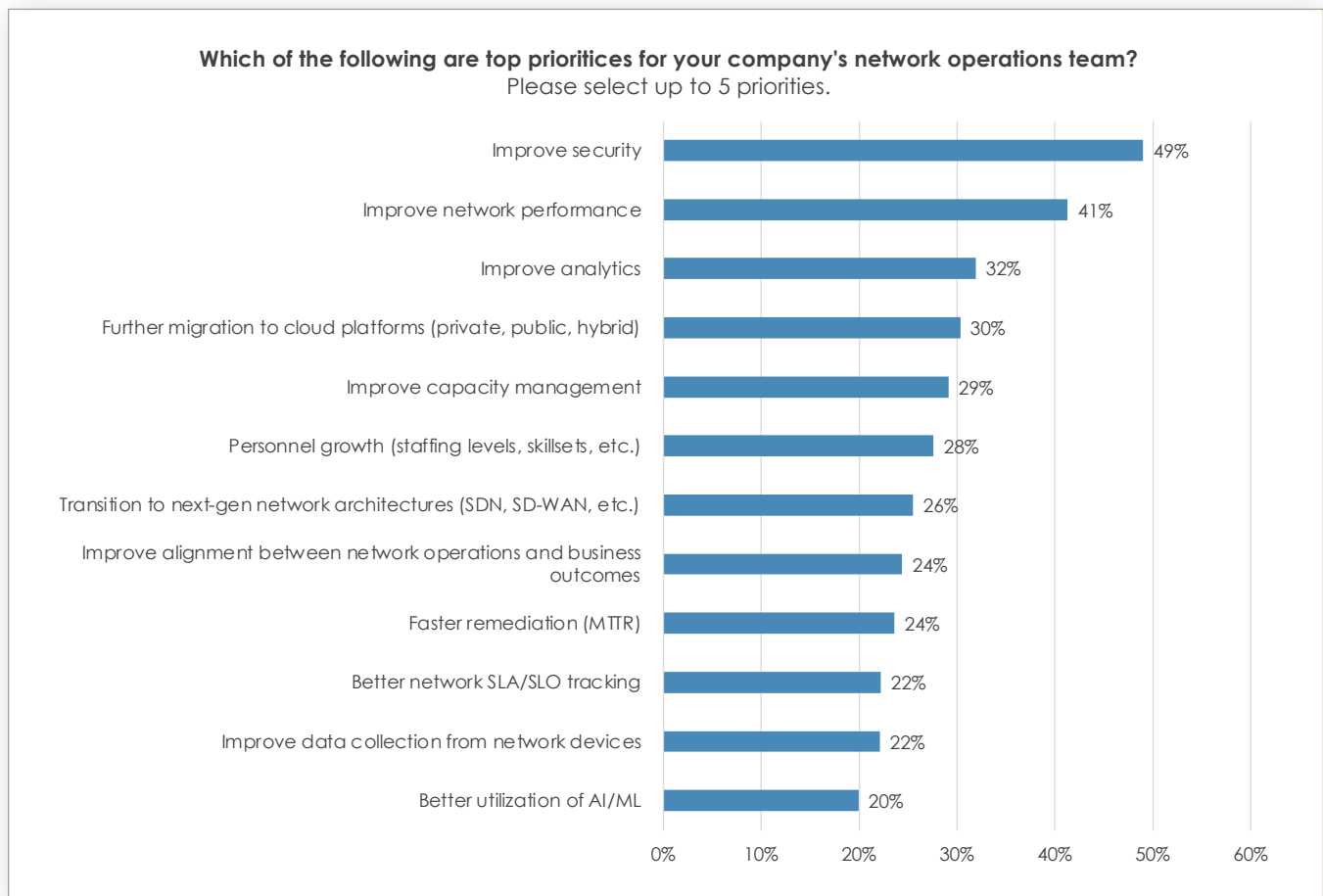# ARE NETWORKS READY FOR MASSIVE SCALE INCREASES AND NEW TECHNOLOGY?

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Top Networking Priorities are Security, Performance, and Analytics

Given current network issues, along with impending network growth and evolution, the research asked operations professionals to provide visibility into their organization's key objectives. Perhaps not surprising is improved security at the top spot at 49%. But we see better performance (41%) in the second spot followed by improved analytics (32%). Migration to the cloud (30%) remains a strong focus. Improved capacity management (29%) rounds out the top 5. Many of these priorities reinforce the business need for a faster, more reliable, and secure network. However, also prevalent in the findings is the need for tools that provide needed visibility and information to properly manage and secure the network.

Which of the following are top prioritices for your company's network operations team?
Please select up to 5 priorities.

Priority	%
Improve security	49%
Improve network performance	41%
Improve analytics	32%
Further migration to cloud platforms (private, public, hybrid)	30%
Improve capacity management	29%
Personnel growth (staffing levels, skillsets, etc.)	28%
Transition to next-gen network architectures (SDN, SD-WAN, etc.)	26%
Improve alignment between network operations and business outcomes	24%
Faster remediation (MTTR)	24%
Better network SLA/SLO tracking	22%
Improve data collection from network devices	22%
Better utilization of AI/ML	20%

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Holistic Network Solutions are Critical

With the expected explosion of network devices and technologies that will be deployed over the next two years with growing performance expectations, the research investigated what professionals needed to meet that challenge. Pragmatically, at the top is network management tools (66%) that are equally adept at managing the traditional technologies currently in use and capable of supporting new technologies. This also indicates operations teams don't want yet another set of tools that are technology-centric and creating even more tool sprawl. The trend continues in that professionals want network tools to integrate with security tools (62%), minimize tool sprawl while adding capabilities to visibility. Operations teams would like this all in a holistic 'single pane of glass' view. Given the growing scale, complexity, and new technologies, 36% indicated that AI/ML should be better leveraged. The use of AI/ML is likely to help monitor, analyze and intelligently manage these infrastructures containing tens or hundreds of thousands of devices.
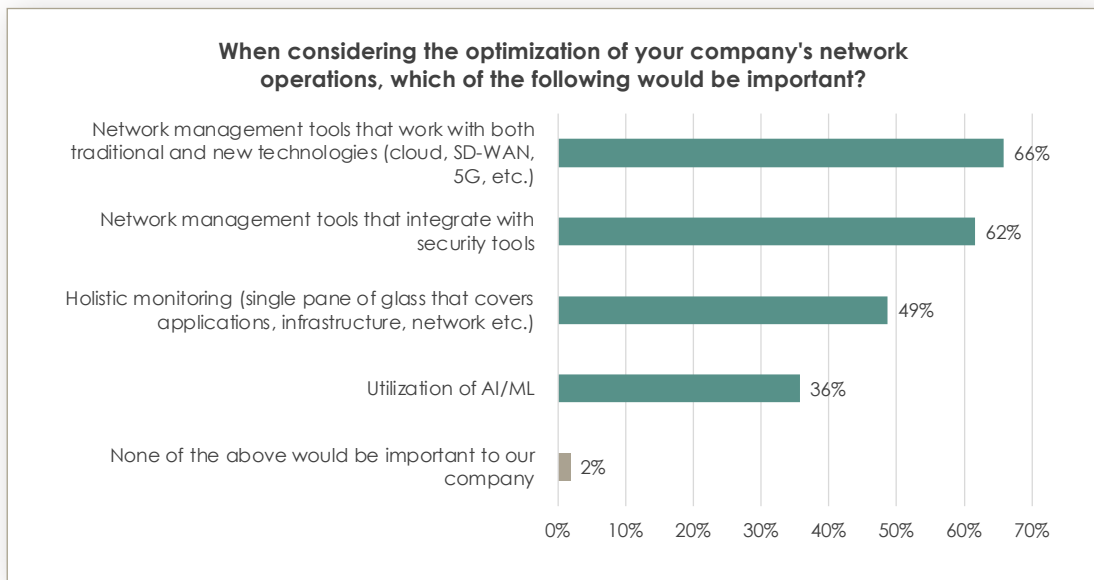
When considering the optimization of your company's network operations, which of the following would be important?

Category	Percentage
Network management tools that work with both traditional and new technologies (cloud, SD-WAN, 5G, etc.)	66%
Network management tools that integrate with security tools	62%
Holistic monitoring (single pane of glass that covers applications, infrastructure, network etc.)	49%
Utilization of AI/ML	36%
None of the above would be important to our company	2%

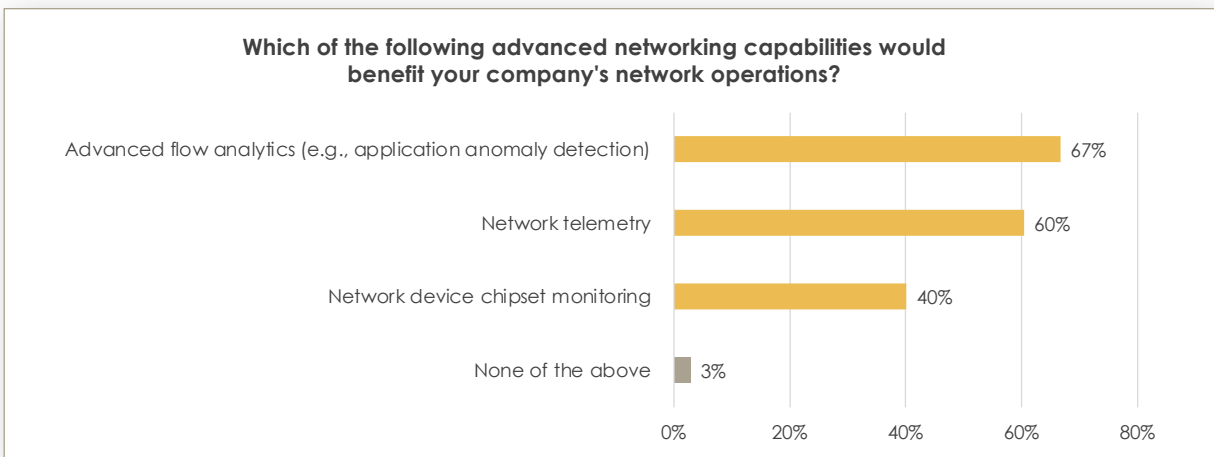Dimensional Research | February 2022

Increased Monitoring Yields Improved Security, Reliability, and Performance

Findings in this report have revealed that most companies don't have full visibility today into their network operations and devices. The research wanted a professional's perspective on the real-world benefits of better-ing monitoring and visibility. Those surveyed indicated that better monitoring coverage would improve security (57%), reliability (50%), and performance (50%). These three benefits for most companies are a perfect trifecta, yet 42% also reported better monitoring could reduce costs. Protecting critical services (42%), faster triage (36%), and repair ((35%) rounded out the benefits reported from increased visibility.

Which of the following benefits of increased monitoring coverage of networking devices would be valuable to your company?

Benefit	Percentage
Improved security	57%
Improved reliability (uptime)	50%
Increased performance	50%
Cost savings	42%
Protected operation of critical services	42%
Reduced issue triage times	36%
Faster MTTR	35%
None of the above would be valuable to my company	1%
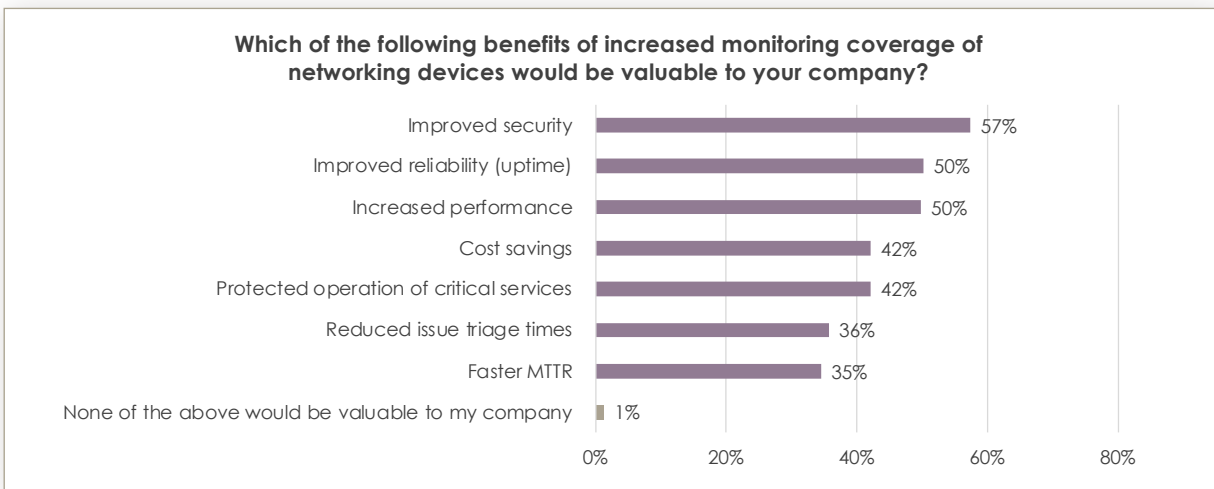
Flow Analytics, Network Telemetry, and Chipset Visibility Wanted

In addition to improved monitoring visibility, operations professionals also indicated new advanced capabilities would aid their management of the network. Advanced flow analytics was desired the most at 67%, followed by network telemetry (60%), with the ability to monitor network device chipsets (40%) completing the top three. New technologies are entering the network often in massive scale and professionals are clear that the same old tools with historical features won't work to deliver the network the business needs.

Which of the following advanced networking capabilities would benefit your company's network operations?

Capability	Percentage
Advanced flow analytics (e.g., application anomaly detection)	67%
Network telemetry	60%
Network device chipset monitoring	40%
None of the above	3%

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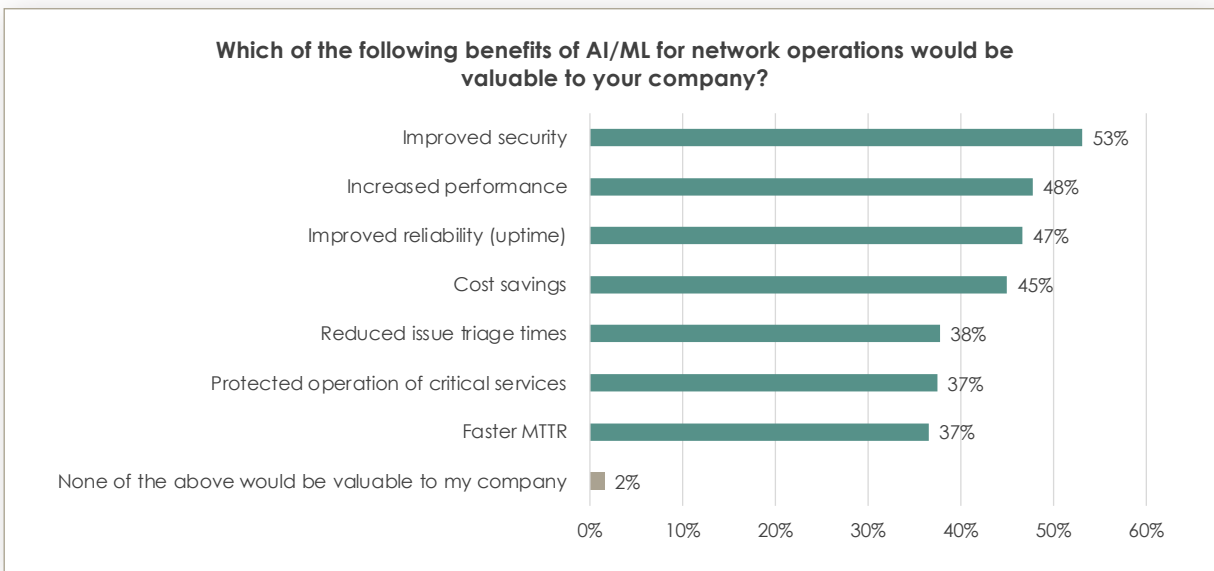
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Flow Analytics, Network Telemetry, and Chipset Visibility Wanted

In the preceding answers, network and operational professionals indicated a need for AI/ML for network. The research directly inquired to what benefits of AI/ML are needed for their company. 98% of professionals indicated desirable AI/ML benefits with improved security again rising to the top (53%), followed by increased performance (48%), reliability (47%), and cost savings (45%). Interestingly these four exactly mirror the benefits expected from increased network visibility. This indicates, perhaps, a synergy between AI/ML and increased network visibility and tools that provide it.

Which of the following benefits of AI/ML for network operations would be valuable to your company?

Benefit	Percentage
Improved security	53%
Increased performance	48%
Improved reliability (uptime)	47%
Cost savings	45%
Reduced issue triage times	38%
Protected operation of critical services	37%
Faster MTTR	37%
None of the above would be valuable to my company	2%

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Conclusion

The network today is already challenging to manage even as it is pulled in new directions with evolving business needs. Network professionals are burdened with poor visibility facilitated by inadequate tools, which is leading to outages and other network issues.

These network issues are directly impacting employees, partners, and customers. In addition to these business risks, networking issues can lead to compliance violations and negative press coverage.

Network device and technology adoption is skyrocketing over the next two years, with most companies deploying 10 or more new technologies. A majority of companies are expected to grow the number of network devices by 50% over the next two years. This tremendous growth is led by large companies already with staggering numbers of devices in their network and potentially compounding problems exponentially. Add to these challenges the move to work-from-home which involves companies of all sizes.

The reality is companies don't have the technology they need today, let alone tomorrow, given the new technologies, architectures, remote workers, and tens of thousands more devices. They simply won't be able to adequately manage and secure the evolving network. Operations professionals clearly and consistently stated they need better tools that provide increased visibility throughout their network and across the internet to devices beyond the corporate boundaries., intelligent analytics and control to manage existing networks as well as future technologies. Sought after capabilities include flow analytics, telemetry, and chipset monitoring along with AI/ML.

Not providing the right network management technology will slow the planned adoption of needed technology or forced deployment as black boxes, leading to more network issues, outages, and slower resolutions.

The network facilitates most businesses today. Professionals that run networks state new properly featured network solutions will increase security, performance and reliability, and help reduce costs.

As companies invest in network innovations to support changing business needs, the commensurate investment in tools is required to ensure companies receive the intended business benefits and reduce network issues and outages.

Survey Methodology

Executives as well as networking and operations professionals at enterprise companies representing all seniority levels were invited to participate in a survey on their company's network operations and future direction.

A total of **705 qualified participants** completed the global survey. All participants had direct IT operations and networking responsibilities. Participants were from 5 continents representing a global viewpoint. The survey was administered electronically, and participants were offered a token compensation for their participation.

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