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Network management solutions and practices must heighten intelligence and insights focused on digital experiences, cloud connections, distributed systems, and increasing workloads while improving IT staff productivity, teamwork, and impact.

Monitoring the Network Edge: Extend Visibility, Exert Control, and Enhance Service

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Introduction

The foundation for any successful digital business model is a resilient and extensible technology infrastructure. Evolving business demands and extensive technology advancements have combined to form a far more complex and distributed digital infrastructure. While core datacenters, switched campus LANs, and routed WAN backbones continue to serve as critical central resources, the infrastructure edge has risen dramatically in both capability and criticality as the digital business model has taken hold across all industries and organizations.

This buildout of the infrastructure edge has altered IT priorities, investment, and risks dramatically. Cloud first, wireless first, remote first, and customer first are major IT strategic management approaches that align with this rising edge influence.

Unfortunately, the many good reasons for this edge buildout are matched by concerning management challenges. Visibility and control must be extended across not only a more distributed environment but also an environment that is more diverse in terms of technologies, systems, services, vendors, and ecosystems. An expanding edge increases security vulnerabilities across a larger perimeter. Integration and operations requirements intensify as more solutions combine to serve data access, workload processing, and digital exchanges at the edge. And just as data, computing, policies, connections, and services are moved more and more from core to edge, so, too, are staff roles and responsibilities. To say that management is a challenge at the edge may be an understatement.

AT A GLANCE

KEY TAKEAWAYS

- The digital infrastructure consists of a myriad of internal on-premises systems and external public services. For any one digital exchange, some combination of these systems and services work together to deliver the best possible digital experience to the end user or smart device.
- The ability to fully view and completely control systems and services — and how they execute in concert — is a prime determinant of success for the digital infrastructure and the IT organization driving its development, deployment, operations, and enhancement.

Situation Overview

The rising complexity and criticality of the infrastructure edge increase the challenges, responsibilities, and risks in deploying and operating an efficient, resilient, and responsive digital infrastructure and delivering a positive digital experience to connected end users and smart devices.

The Enterprise Edge: Challenges and Changes

IT faces three major challenges in meeting digital demand, each of which becomes even more daunting in a highly distributed infrastructure where the edge equals (or even surpasses) the core in terms of digital responsibilities and value.

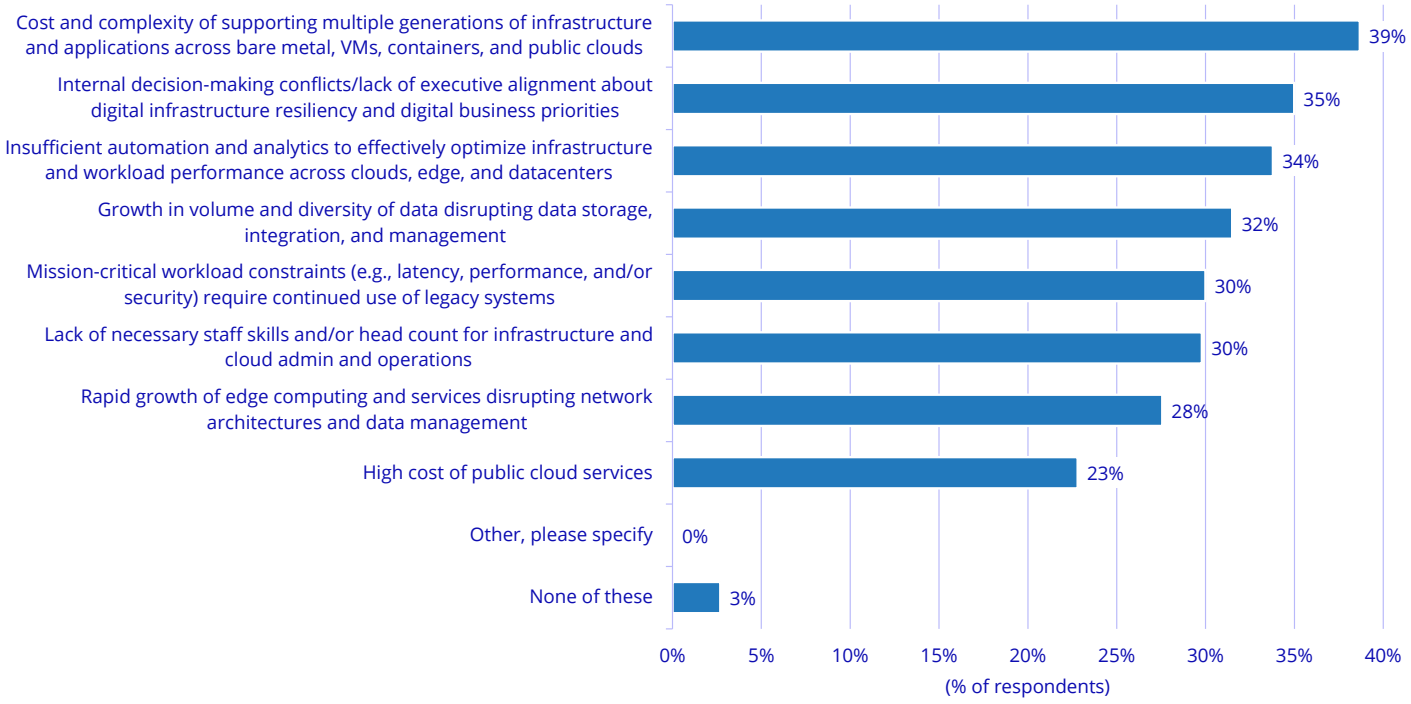
1. First and foremost, IT must best serve digital endpoints (e.g., end users, IoT devices) — no matter location, affiliation, function, or interaction.
2. IT must make best use of available technologies, solutions, and services, driving both full utilization of the existing and rapid adoption of the developing.
3. IT must be best positioned to serve the fast-moving and far-reaching requirements of the digital business model.

Nowhere are these challenges more apparent than in and across the network, the centerpiece of any organization's end-to-end digital infrastructure and an absolutely vital component at the infrastructure edge. Addressing all three challenges is difficult given the many barriers to success in building a resilient digital infrastructure (see Figure 1).

FIGURE 1: ***Top Barriers to Building a Resilient Digital Infrastructure***

Digital unification, analytics, and automation stand out as key success factors.

Q *What are the three greatest barriers to achieving your organization's digital infrastructure resiliency goals over the next two years?*



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Source: IDC's Future of Enterprise Resiliency and Spending, Wave 2, March 2022

While "insufficient analytics and automation" is cited as a top barrier in Figure 1, many of the top barriers can be completely or partially overcome by proper and full use of network analytics solutions. The comprehensive network intelligence and insights offered by these solutions serve to streamline and synchronize management of the

digital infrastructure, readily accommodate growth and innovation, improve workload performance and security, and bolster cloud/multicloud oversight. The more barriers overcome, the more the IT organization moves forward in addressing challenges relating to experience delivery, resource utilization, and digital innovation — from core to edge.

Edge Responsibilities and Risks in the Digital Infrastructure

With digital-driven challenges and barriers come new responsibilities and risks relating to the digital infrastructure. Failure to deliver the best possible digital experience results in user dissatisfaction. Failure to fully utilize digital infrastructure systems and services results in resource waste. Failure to adapt to new requirements results in digital stagnation. Key responsibilities include:

- **Ensuring the best possible digital experience for users.** Users are the ultimate judge of end-to-end service quality (and source of credibility) for IT organizations. IDC's 2022 global survey research indicates that digital experience is a top 3 key performance indicator for IT organizations, alongside client engagement/loyalty and staff satisfaction/retention. Providing users with the best possible digital experience — for all exchanges, at all times, across all pathways — should be a priority for IT organizations. Bear in mind that "users" in this digital era are not only internal workers (local, remote, and hybrid) but also external partners, end customers and, increasingly, smart devices. Ensuring the best possible experience for these many types of "users" is paramount to success — for IT and the business. Productivity and profitability are at stake when the digital experience degrades or, worst of all, is interrupted.
- **Solidifying cloud and multicloud environments.** In today's IT environment, business exchanges and transactions that do not leverage cloud services (e.g., IaaS, SaaS) are increasingly rare. IDC research indicates that cloud adoption will further increase into the future, driving up investment in related cloud services focused on security, management, automation, and networking. A 2022 IDC global survey found that spending on cloud connectivity is slated to increase for more than 58% of respondents and that over half of those respondents (30%) will see cloud connectivity budgets expand by more than 10%. Given that user experiences and IT service levels are more and more determined by the quality of cloud services, it is necessary for network analytics solutions to heighten visibility into and control over cloud services, resources, and connections. Intelligence presented from inside the cloud (via management instances), across the cloud (via synthetic transactions), and at the edge of the cloud (via detailed private network intelligence and insights) enables a more complete view into cloud services and service levels. For cloud customers, this clearer view into their cloud and multicloud environments provides more accurate cloud service oversight and validation, more timely cloud-related problem identification and resolution, and more confidence in future cloud service expansion and expenditures.
- **Accelerating digital business initiatives.** The digital business environment requires much more from the network and, as a result, much more from network management solutions — and staff. Networks must be more resilient and dynamic. Network management must be more proactive and precise. Without complete visibility into and control over the network infrastructure, networked resources, and connected end users and devices, organizations are flying blind as they accelerate their digital initiatives. Reporting on the state of an existing workload or evaluating the network's ability to support a new workload is hindered by limited network intelligence and insights that constrain digital movements and heighten risks of failures, slowdowns, or threats. This constraint puts network operations and engineering teams on the defensive and certainly prevents any desired movement toward a more proactive network management approach, where such capabilities as predictive analytics, "what if" modeling, and preemptive optimization facilitate digital acceleration.

Key Focal Points for Edge Monitoring and Management

While many areas of impact are associated with more efficient and effective management of the infrastructure edge, the following stand out as key areas of focus for IT organizations in this hybrid-first, cloud-first, and talent-first environment:

- **Serving remote and hybrid work models.** In a 2022 IDC global survey of IT executives, 78% of respondents indicated they have adopted a hybrid-first work model for employees and are redefining processes, technologies, policies, and available talent pools. Further IDC research indicates the hybrid work model challenges IT in providing effective remote support, securing distributed resources, and enabling experience parity (e.g., access, performance, simplicity) for all workers — no matter location. Tracking the digital experience for remote/hybrid workers across the many critical applications in use in a virtual work environment (e.g., video collaboration, contact center) and having access to ongoing detailed intelligence and insights relating to the shifting conditions and many components that influence the hybrid worker experience and productivity are two critical management success functions. Both serve to identify and solve problems faster — or, best of all, avoid problems altogether. Avoidance is particularly beneficial for remote/hybrid workers because these workers often make numerous attempts to fix their problems before reporting them to the help desk. Those repair efforts translate directly to employee downtime and lost productivity.

- **Enabling a cloud-first environment.** Visibility into and control over cloud-first infrastructure are paramount for success for IT organizations looking to deliver a consistent and predictable digital experience; make the most efficient use of networking and networked resources; and support the most fail-safe and secure systems, services, and exchanges. Cloud services form a core and still growing portion of the IT infrastructure. The elasticity, velocity, and cost effectiveness of cloud services are a great match for the fast-moving and fluid digital era. As such, most organizations will see further acceleration in their usage of cloud services into the future. This has dramatic implications for the network — and network management. Network exchanges no longer follow a set path — from end client to network core to central compute. Network experiences no longer are solely determined by private network infrastructure. Without detailed visibility into cloud services and infrastructure, a blind spot develops within the end-to-end network and IT infrastructure. And the more cloud services in use, the bigger that blind spot can become.

- **Boosting IT staff productivity and impact.** Networks are growing increasingly critical and complex. And yet, networking staff has stabilized or even declined for most organizations over the past few years. As a result, organizations must get more from their existing networking staff — mainly by getting more from their network management systems and practices. Detailed data on network conditions and components combined with intelligent analysis of all that data provides needed relief from time-consuming operational tasks (e.g., problem resolution, configuration management) and enables more focus on strategic efforts (e.g., digital rollouts, technology innovation). Instead of spending most of their time finding and fixing problems, networking staff can focus on tasks that deliver greater strategic value to IT and the business. This refocus positively impacts the staff member (e.g., job satisfaction, career development), the IT organization (e.g., service integrity, operational excellence), and the business (e.g., digital initiatives, client satisfaction).

Essential Guidance

Network analytics solutions certainly offer much promise with regard to overcoming the challenges associated with an ever-expanding and always complicated digital infrastructure. As outlined previously, the network intelligence and insights offered by these solutions address many pressing network management requirements and can deliver many significant benefits. IDC industry research into network management practices and solutions has turned up some keys to success and expected returns when applying network analytics solutions.

Best Practices in Operating and Optimizing the Enterprise Edge

IT organizations must ask themselves: How do we drive more efficiency and effectiveness in network management? Key steps to success are as follows:

- **Organize for success.** Develop IT organizational structures, cultures, practices, and skill sets that are responsive, forward looking, and team oriented.
- **Streamline the management toolset.** Leverage solutions that solve multiple functional requirements and support multiple technology domains.
- **Prioritize usability and interoperability.** Emphasize ease of use for multiple IT roles and ease of integration with complementary tools and data sets.
- **Ensure data integrity and completeness.** Use multiple sources and methods to ensure complete and timely collection, distribution, and processing of network intelligence.
- **Leverage analytics for action.** Maximize the system/service contribution to analytics and automation while minimizing staff demands for data analysis and determining actions.

Expected ROI: Judging and Justifying Monitoring and Management

IT departments should focus on the following activities and their specific impacts on the business or the IT organization:

- **Speed problem resolution.** Detailed network intelligence and insights reduce MTTR by 50–90%. Additionally, predictive analytics and prescriptive actions work to avoid problems altogether. (Impact on the business: Improved productivity and service levels)
- **Maximize infrastructure utilization and resiliency.** Higher thresholds and precise trend analysis enable well-timed, cost-effective upgrades. Performance and protection measures drive integrity. (Impact on the business: Cost savings and risk reduction)
- **Boost staff productivity and impact.** Armed with network data and analysis, all levels of staff across all IT domains upshift their skills, responsibilities, cross-IT contributions, and value. (Impact on IT: Improved staff talent, satisfaction, and retention)
- **Bolster IT credibility.** Consistent service levels, ready infrastructure adaptation, strengthened security posture, and improved worker productivity solidify IT as a digital partner. (Impact on IT: Better engagement with the business and confidence in technology)
- **Heighten digital innovation.** Digital business success hinges on speed and precision. Knowledge of network conditions and capacities promotes resiliency and responsiveness. (Impact on the business: Increased digital acceleration and IT innovation)

Considering NETSCOUT nGenius Performance Management

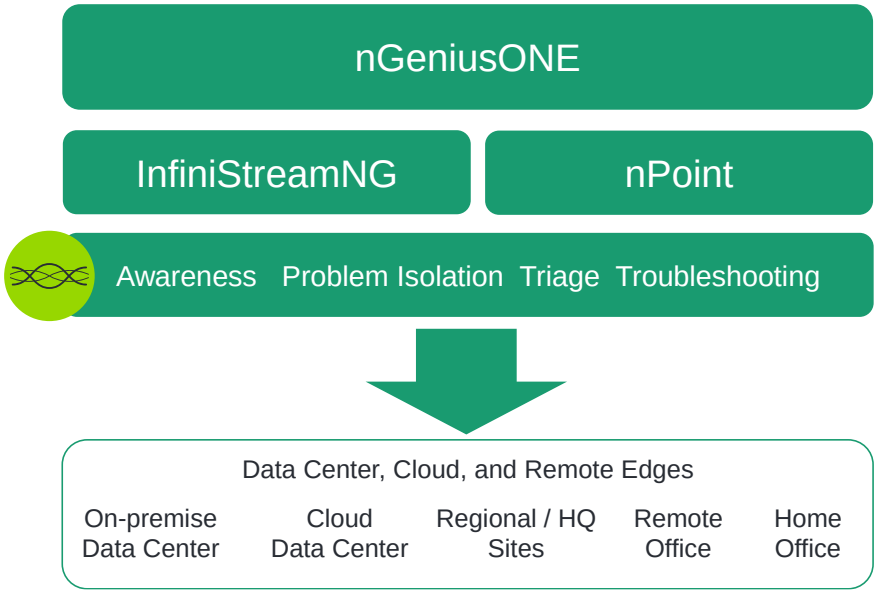
NETSCOUT is a longtime supplier of management solutions that offer insights, control, and protection of both enterprise and service provider networks. The company's solutions and services are well-established across the globe, serving over 2,000 customers and, specifically, 90% of tier 1 service providers and 90% of U.S. Fortune 100 companies. With this significant presence within many of the world's most complex and critical digital infrastructures, NETSCOUT functions as a key management solution partner for organizations looking to deliver the most resilient and responsive network infrastructure and the best possible digital experience to all their users — no matter locations, conditions, or applications.

NETSCOUT nGenius Performance Management: Key Capabilities and Components

NETSCOUT's nGenius Performance Management (nGenius) solution leverages key monitoring and management capabilities that enhance visibility into and control over service quality, user experiences, network conditions, and application performance (see Figure 2).

FIGURE 2: ***nGenius Performance Management: Combining Network Data Acquisition and Analysis***

Cut resolution times. Solidify user experiences. Validate service levels. Drive business outcomes.



Source: NETSCOUT, August 2022

NETSCOUT's nGenius solution provides deep packet inspection insights and high-fidelity application analytics from strategic vantage points anywhere in the enterprise network (e.g., datacenters, colocation facilities, cloud infrastructures, and even home offices). NETSCOUT's ability to capture packets from any location and for any application or service at scale enables customers to proactively manage and monitor the increasingly complex and critical edge of the digital infrastructure. The nGenius solution combines both real user traffic analysis and integrated synthetic testing to simplify the measurement, monitoring, and management of today's multifaceted, hybrid environments.

The nGenius solution consolidates and streamlines alerting, monitoring, and workflows. Network operations teams can examine reports and performance of all network and application traffic and quickly key on metrics such as packet loss, jitter, latency, application errors, and volumes. nGenius can also help diagnose and resolve often challenging UCaaS or SaaS issues — a vital capability given the rising influence of public cloud services in today's digital infrastructure. In addition, synthetic traffic can be compared with actual user traffic to create baselines and can also be used to emulate actual user exchanges when doing service assurance checks outside of user hours or in preparation for and after a new service/application rollout. As organizations move from a reactive management model to a more proactive management model, this look-ahead capability becomes vital in the digital era where resiliency and responsiveness combine to drive success.

Key nGenius Performance Management components include:

- **nGeniusONE: Core Management Platform.** Available as either physical or virtual server platform, nGeniusONE delivers service assurance leveraging NETSCOUT's ASI-driven Smart Data. Formed as a singular simplified network, security, and applications analytics solution, nGeniusONE not only serves as the central collection and management point for network data but also provides for the intelligent analysis of all relevant data and timely and tailored presentation of this analysis to the relevant operator, engineer, or support person.
- **Edge Instrumentation: InfiniStreamNG and nPoint Agents.** Available as a hardware appliance or a software instance, InfiniStreamNG performs deep packet inspection to generate ASI Smart Data in the form of key performance metrics for the network, applications, and cloud services. Supporting synthetic exchanges, nPoint agents are placed at key locations in private or public networks and serve as simulation endpoints for nGeniusONE.

Each of these components serves important roles in monitoring and managing private network infrastructures, public cloud services, and connected user activities and experiences.

Sample Industry Use Cases

Edge monitoring and management are vital functions when building and operating a resilient digital infrastructure — across every industry and across all sizes of organizations. Detailed views and precise controls serve to support not only tactical and strategic IT initiatives but also key business priorities. The following examples highlight how NETSCOUT's nGenius Performance Management solution serves select industry verticals:

- **Healthcare.** Healthcare organizations face pressure on two major fronts: improving care and controlling costs. To deliver on both fronts, the healthcare network must focus on meeting (even exceeding) requirements across three critical areas of concern. First, worker productivity and patient satisfaction are driven by a positive user experience — as judged by response times, resource access, system integrity, and information protection. Second, a properly deployed, operating, and secured network drives cost-effective use of healthcare infrastructure, connected medical devices and data sets, and available care providers. Third, digital innovation is driven by ready adoption of new or improved medical systems or procedures — often seen now at the infrastructure edge (e.g., patient monitoring, telemedicine, remote consultations). Across each area, NETSCOUT's nGenius solution provides the detailed network intelligence and insights necessary for the network and networked resources to deliver on the full promise of advanced healthcare practices in this digital era.

- **Financial services.** Within the financial services industry, reimagining the client engagement model is a primary driving force for all strategic and tactical technology initiatives — from client interactions to service workflows to regulatory compliance. As the main conduit for client engagement, the financial network infrastructure serves not only to connect clients and workers and resources but also to protect vital information, transactions and, of course, monetary assets. NETSCOUT's nGenius solution provides the network visibility and control necessary to improve the connected client experience, secure transactions and resources, boost worker interactions and impact, and ensure regulatory compliance.
- **Manufacturing.** Manufacturing organizations face the challenge of advancing along multiple digital business fronts while operating with constrained budgets driven by pandemic restrictions, supply shortages, and inflationary pressures. A network that provides for consistent, high-quality, and resilient services — and protects connected resources, users, devices, assembly lines, and information — is an absolute necessity in today's hyperconnected manufacturing environment where data in motion is central to success. NETSCOUT's nGenius solution, with its service and experience assurance capabilities offering detailed visibility and control, enables the delivery of consistent service levels across the manufacturing plant, supply chain, and distribution channel.

Meeting Challenges in Edge Monitoring and Management

As more and more business data, workflows, and transactions are distributed across internal systems and external services within the digital infrastructure, the need to fully understand loads and flows (and threats) across the network rises in importance. This presents significant challenges in monitoring and management.

First, gathering **detailed and timely network intelligence** from all edge points in the network (private and public, core and client edge) is critical to providing both an end-to-end and an in-depth view into network conditions and components. Second, the sheer volume of network data presented to central operations systems and staff must be **managed properly and processed fully** so that IT staff are presented the most comprehensive view and analysis — from systems to services, from users to smart devices.

Third, the **presentation of data analysis** must be simplified to be fully absorbed and properly acted upon by operations, engineering, and support staff — no matter their experience levels, specific roles, and assigned responsibilities.

Conclusion

Digital infrastructure and application management must be driven by comprehensive analytics and automation. Knowing current conditions, resolving existing or developing problems, mitigating onrushing threats, ensuring full resource utilization, and adapting readily to new demands are management responsibilities that are bolstered by detailed network intelligence, in-depth analysis, and precise directed actions. In this hyperconnected digital era, network knowledge — and the direction it provides — is a prime determinant of success in building and operating a resilient digital infrastructure.

Digital infrastructure and application management must be driven by comprehensive analytics and automation.

About the Analyst

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Mark Leary is Research Director for Network Analytics and Automation responsible for worldwide technology market research and analysis. Mark's core research coverage focuses on the advancement and adoption of network performance management solutions (both on-premises systems and cloud-based services) and the development of network automation capabilities by both technology suppliers and enterprise operators. Sample key areas of interest include end-to-end visibility, predictive analytics, AI/ML-driven insights, digital experience management, open source technologies, cloud service monitoring, and "programmed" automation as they apply to a secure, dynamic, and predictable network environment.

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