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5G Ready Now!

The Fourth Industrial Revolution – 5G/IoT

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Executive Summary

Innovation is not a new concept. In fact, mankind has been innovating for as long as we have walked the face of the planet. And that innovative spirit has brought us to what many consider to be the fourth industrial revolution!

An important aspect of this revolution is the advent of Fifth Generation (5G) wireless technology, which will be the enabling force behind digital transformation (DX). The blistering fast speed of 5G will make high-volume, real-time applications possible, opening a world of opportunities around artificial intelligence (AI), machine learning (ML), and a world filled with connected devices. Everything that can be connected, will be connected.

As 5G technology becomes widely adopted, virtual networking architectures such as software-defined networking (SDN), network functions virtualization (NFV) and 5G network slicing will be seen as ways to meet Service Level Agreement (SLA) specific requirements for connectivity, speed, and capacity. With the push toward edge computing, carrier service providers (CSPs) and enterprises will embrace applications leveraging container-based microservices given the power and space limitations that will exist at the network edge.

In order to create the best digital experience for customers, CSPs and Enterprises will need to transform their networks to achieve the security, performance and availability required to quickly spin-up services in the most cost-effective way possible. This will require multi-purpose, high-fidelity, real-time visibility across all layers of the network – from physical, to virtual, virtualized services, and automation.

The method by which network services are implemented is constantly changing, innovation is happening all the time; companies are merging and acquiring, bringing disparate architectures together. Therefore, it is important to avoid being locked-in to a specific vendor when selecting security and service assurance solutions, as heterogenous environments are a fact of fast paced technology innovation. This is best illustrated by looking at the way the Radio Access Network (RAN) has been traditionally built, with all the components coming from a single network equipment vendor. This has proven to be excessively expensive and has slowed innovation necessary for 5G. For this reason, the Mobile industry has been pushing OpenRAN, which will be necessary in the long run for 5G to reach its maximum potential.

When it comes to choosing a security and service assurance solution, CSPs would be well-served by selecting an independent and agile vendor that offers end-to-end visibility into multi-generational networks, physical and virtual, using an affordable software-based approach. As the saying goes, it is never a good strategy to have "the fox watching the hen house."

NETSCOUT's industry-proven service assurance, security and big data solutions, fueled by Smart Data, can be leveraged by CSPs for all critical phases of the 5G life cycle; which include pre-launch, launch and operations. Throughout the past 30 years of innovation, NETSCOUT® has been working with the largest CSP's and Enterprises. As the market leader, NETSCOUT has been working together with our customers in solving the next generation of challenges. We have evolved and transformed into a next-generation software solution provider, to meet these new challenges. The latest iteration of the company, NETSCOUT 4.0, is multi-cloud certified, delivering on the promise of unparalleled quality when designing and implementing 5G/IoT cloud-native networks. NETSCOUT, which has made Smart Data affordable, is 5G ready now!

The 5G and cloud journey that CSPs are on promises to be long, but worthwhile. Smart Data, and the resulting visibility it delivers, is the secret to making informed decisions and taking decisive actions that deliver both cost savings and intelligence across the organization.

Why Independence and Agility Matters!

NETSCOUT believes that CSPs should not be locked into any vendor, cloud or technology. We are different in that our Smart Data approach allows for independence and agility. NETSCOUT's Smart Data insights are based on packets, which are 3GPP standards-based and support multi-generational networks in an independent and open manner. Packets are universally available in both physical and virtual environments, thus providing visibility North/South/East/West into all borders.

NETSCOUT delivers an open architecture for visibility and insights across all borders leading to a better digital experience for end-users.

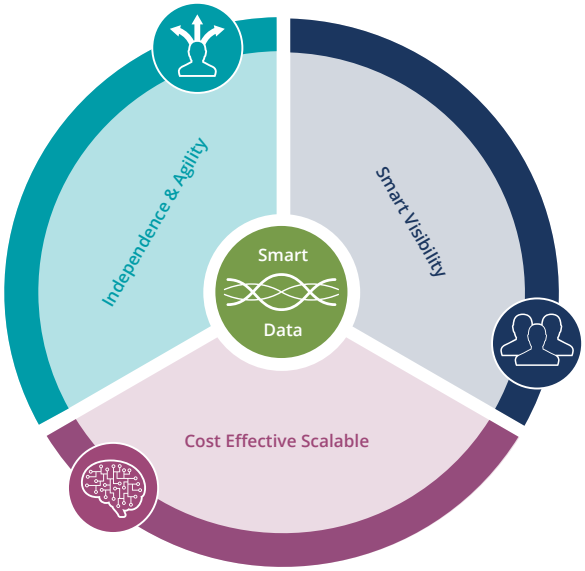


Figure 1: Why Smart Data.

By using industry-standard APIs and data formats, such as KAFKA, Pulsar, REST, JSON and AVRO in our software solution, NETSCOUT delivers an open architecture for visibility and insights across all borders leading to a better digital experience for end-users. We help providers collect Smart Data to achieve service assurance, improve security, and support Big Data analytics projects – all within the same software framework and at a lower cost.

Packets are universally available in both physical and virtual environments, thus providing visibility North/South/East/West into all borders.

NETSCOUT is constantly innovating to keep up with the rapidly changing face of the marketplace. As the compute world moves to the edge, we will be there supporting this dynamic landscape with flexible, scalable, cloud-friendly and automation-friendly solutions. The 5G edge with slicing is just another border! This is our strategy and our strength.

5G Strategy Should Begin in the C-Suite

With the stakes and costs related to implementing 5G so high, the C-Suite should set the strategy going forward. According to the McKinsey report, A 5G Manifesto for the CEO, "A CEO's top priority must be to decide the company's strategic stance. Some operators will choose to be network leaders, committing to fast, national or regional rollout to secure first-mover advantage. Others may opt to focus more narrowly, perhaps on certain regions or cities, use cases, sectors, segments, or clients. Operators who serve stadiums, shopping malls, or private hotspots could focus on these areas first, for example, while those with a manufacturing client base could lock in these clients by helping facilitate smart, autonomous systems. The choice will depend on each operator's existing customer base, appetite to invest, and ambitions."

The Push Toward the Edge

To meet the emerging and future needs of the marketplace, CSPs are increasingly moving to the cloud and the Software Defined Data Center (SDDC). In this type of data center, the infrastructure is completely virtualized and delivered as a service. Intelligent software systems automate control of the data center and configuration of hardware to ensure SLAs are met. As CSPs refine their strategies for a 5G roll out, they are compelled to look at where the quickest return on investment (ROI) will be. One thing is apparent - compute is moving to the edge.

Mobile edge computing (MEC) is dependent on disaggregated, virtualized data centers. One of the big promises of 5G is its ability to deliver the high bandwidth and low latency required by new MEC services, such as virtual gaming, the smart energy grid, autonomous vehicles, remote healthcare services, robotic manufacturing, smart homes and IoT devices, etc.

To meet the varied customer use cases that are emerging, CSPs will likely be reliant on virtual networking architectures, such as SDN, NFV and 5G network slicing. 5G network slicing allows CSPs to provide portions of their networks for each specific customer requirement, optimizing resources and network topology to meet SLA-specific requirements, such as connectivity, speed, and capacity for each given application as needed.

As the push toward edge computing continues, CSPs will likely embrace container technologies such as Kubernetes because they offer many features of a virtual machine, but without all of the baggage. Designing fast, secure containers is ideal given the power and space limitations that will exist at the edge.

The Growing Importance of Visibility Without Borders

In order to create the best digital experience for customers, CSPs need to transform their networks to achieve the agility and flexible footprint required to quickly spin-up services in the most cost-effective way possible. To reap the rewards of new digital opportunities, providers must be able to manage risk across security, performance and availability exposure areas in order to transform with confidence and velocity.

Ultimately, this requires end-to-end visibility, so that organizations can gain invaluable insights into the latency, performance and security of digital services, making it possible for CSPs to get ahead of any problems and ensure a positive outcome. In short, CSPs need "Visibility Without Borders," which means achieving multi-purpose, consistent, high-fidelity, real-time visibility across all layers of the network – from physical, to virtual, virtualized services, and automation.

Today's multi-domain, multi-technology networks have many borders. These are the points of connection - where 3G connects to 4G; how 4G will connect to 5G; where radio access connects to the core network and where the core network connects to the cloud. There is enormous fragmentation in these infrastructures with proprietary software and tools being put forward by different vendor systems. Even the open source orchestration landscape has competing options for CSPs to select from, adding to the complexity. Without complete visibility into all of these borders, service providers are essentially operating blind.

Packets Never Lie: The Key to Delivering Visibility Without Borders

As these new architectures emerge and expand, the one true source of reliable insight into customer experience, performance and security in this complex environment is packets. Whether in the cloud or on-premise, the simple fact of the matter is that packets never lie.

By using virtual appliances that offer pervasive visibility with software-based instrumentation into packet traffic and application workloads, it becomes possible to monitor and capture all traffic flows traversing a CSP's network environment. Packets are the gold standard for measuring actual subscriber transactions and the meta-data that NETSCOUT produced from this high-fidelity source is what we call Smart Data.

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One of the many advantages of Smart Data is that it delivers a high-fidelity, centralized view into the performance characteristics of all infrastructure and application components including their dependencies. The intelligence generated can be harnessed to achieve service assurance, cybersecurity and Big Data analytics in datacenters and hybrid cloud environments.

As disaggregated architectures become more prevalent, Smart Data will be key to achieving Visibility Without Borders, enabling CSPs to monitor the health between all of its components. Pervasive visibility is absolutely vital for making intelligent digital transformation decisions around the adoption of new technologies – from 5G to cloud, VMware, OpenStack or Kubernetes. Developing a comprehensive traffic/packet acquisition strategy for N/S/E/W visibility is crucial for any CSP.

NETSCOUT 4.0

As a company, NETSCOUT is constantly innovating. Over the past four years we have been preparing for the fourth industrial revolution – 5G/IoT, transforming into a next-generation software solution provider. As a Smart Data company, we are able to deliver Visibility Without Borders to our customers which in turn gives them independence of any vendor, technology, service, and network, physical or virtual.



Figure 2: Visibility Without Borders.

We are filling the void created by the need for independence and agility as cloud 5G/IoT services and network investments are made. In this dynamic new environment, business are constantly changing and technologies are constantly evolving. CSPs need the option to change an infrastructure vendor for price, technology, or for a competitive advantage. For example, a few years ago, cloud workloads were being built using virtual machines, which in today's standards are heavy and inefficient. As we fast forward to 5G Edge, there is a need to be more efficient as solutions use less power and space, thus giving rise to Kubernetes and containers. The Visibility Without Borders approach makes this all possible as these are all just simply borders. The service assurance, security and Big Data workflows would remain unchanged, thus allowing CSPs to do what's right for them in a cost-effective and competitive fashion!

Our smart visibility is accomplished through our intelligently designed Smart Data platform. This entails InfiniStreamNG®/vSTREAM™ software, which is automation and multi-cloud ready. The Smart Data platform relies on patented Adaptive Service Intelligence™ (ASI) technology to convert high-value network packets to Smart Data in real time, delivering accurate and actionable insights for service assurance, cybersecurity, big data and closed-loop automation applications. It offers pervasive visibility across technology services, infrastructures and the platforms that comprise today's connected world, including private and public cloud, SDDCs and virtualized environments.

As a Smart Data company, we are able to deliver Visibility Without Borders to our customers which in turn gives them independence of any vendor, technology, service, and network, physical or virtual.

NETSCOUT's Smart Data Platform enables CSPs to illuminate mission-critical services into the connected world, such as voice, video, OTT, entertainment, connected cars, and IoT devices. Going forward, microservices deployed in containers for network slices and mobile edge computing will need this level of visibility. Our intelligent tools are "always on" and can be relied on to deliver actionable insights.

The 5G Life Cycle

NETSCOUT's industry-proven service assurance, security and big data solutions, fueled by Smart Data, can be leveraged by CSPs for all critical phases of the 5G life cycle, which include pre-launch, launch and operations.

The 5G life cycle starts with modeling and planning phases, moves to design and engineering, then on to field-friendly trials in specific locations, such as key markets. Once key criteria are met, the market is launched into production. Operations then monitors and troubleshoots all service issues. The final phase is optimization from both a performance and cost point of view. The 5G life cycle is repeated for each location and is performed by various teams representing the RAN, Core, Application and Cloud.

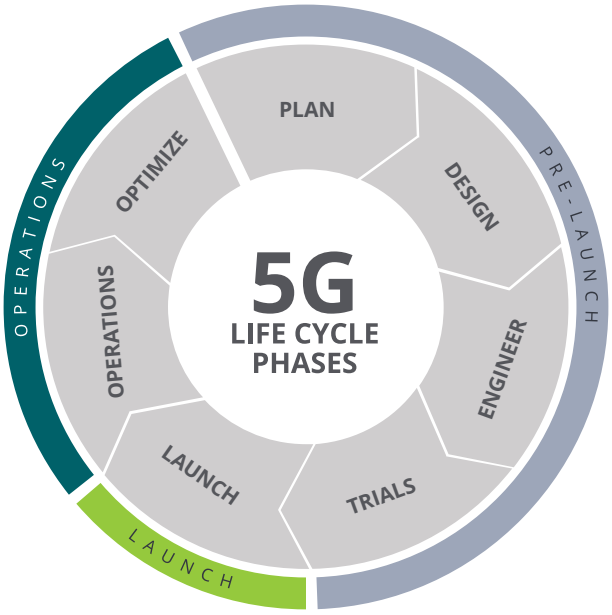
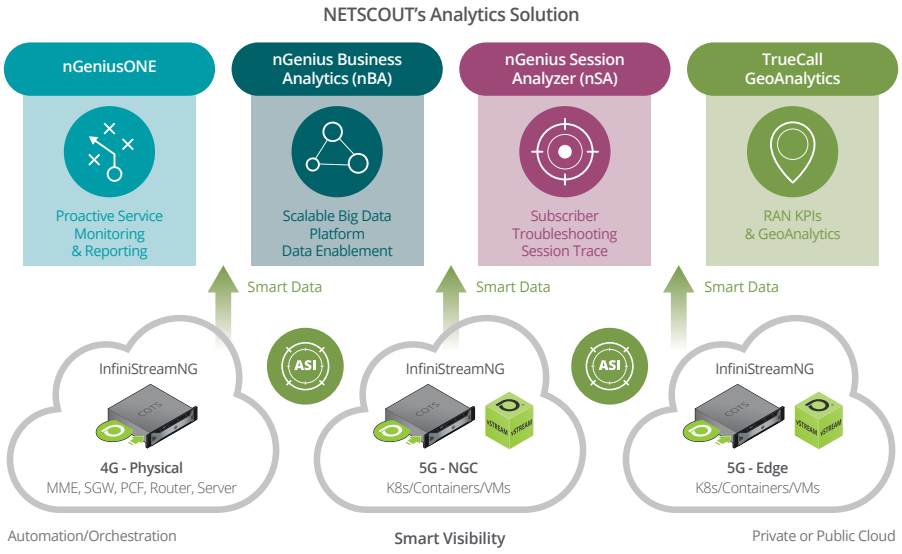


Figure 3: 5G Life Cycle.

NETSCOUT is also multi-cloud certified, giving us unparalleled software quality when designing and implementing a 5G/IoT cloud-native network. This allows ITOps/DevOPs to deploy with confidence.

As we fast forward to 5G Edge, there is a need to be more efficient as solutions use less power and space, thus giving rise to Kubernetes and containers.

Our intelligent tools are "always on" and can be relied on to deliver actionable insights.



5G Ready Now!

The 5G and cloud journey that CSPs are on promises to be long, but worthwhile. Smart Data, and the resulting visibility it delivers, is the secret to making informed decisions and taking decisive actions that deliver both cost savings and intelligence across the organization.

NETSCOUT's visibility solutions give CSPs the confidence to innovate! We have always and will continue to support CSPs that are early adopters of technologies. Helping our customers succeed at any technology turn is why we are industry leaders in service assurance. The advent of 5G is no different. Supporting both 3GPP 5G non-standalone and 5G standalone environments, we are "5G READY NOW!"

The complexity of this transformation may seem daunting. However, relying on wire data to gain Visibility Without Borders is the best way to achieve consistent views of the entire infrastructure, applications, and services - including all dependencies – in an open architecture with an end-to-end view of all components in both physical and virtual multi-generational networks.

LEARN MORE

For more information about NETSCOUT's 5G solutions visit:

www.netscout.com/5G

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