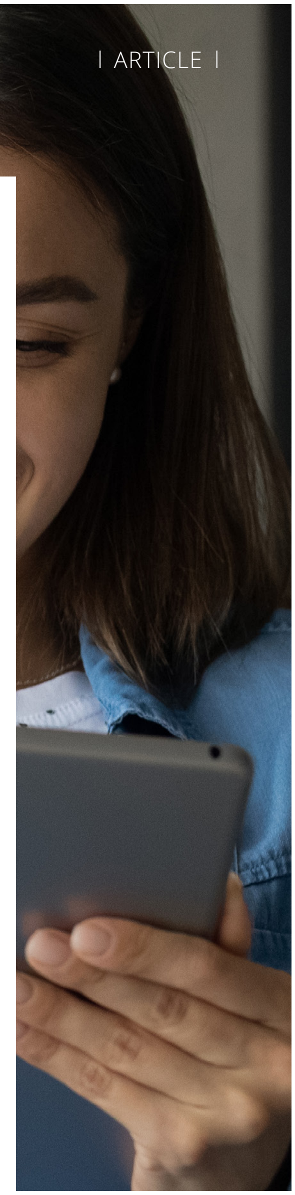


WHY NETWORK OPTIMIZATION AND AUTOMATION ARE KEY TO REALIZING THE PROMISE OF 5G EVOLUTION

By John English, Director of Marketing and Business Development, NETSCOUT.

Despite billions of dollars in investment, no one carrier has fully deployed a 5G standalone network just yet. During the transition phase from 4G to 5G, many communications service providers (CSPs) are leveraging 4G LTE cores to offer select 5G capabilities and gradually expanding their 5G standalone coverage.

This approach helps ensure that the network of today isn't sacrificed for the network of tomorrow. It also explains why, for so many, 5G has felt within arms reach for so long, but also why the evolution to 5G is so challenging. To borrow an analogy, carriers are building the airplane while they fly it.

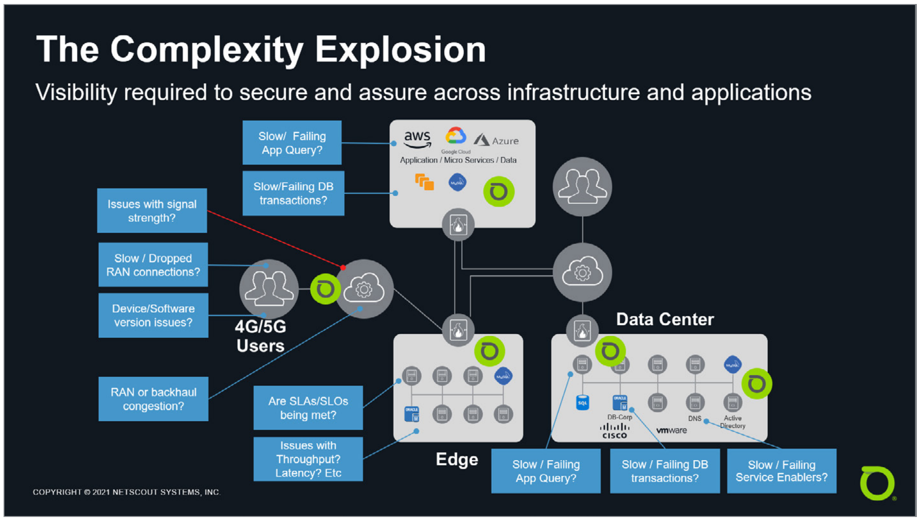
Notably, carriers must troubleshoot issues created during the deployment process – including adding new network capacity and mmWave infrastructure – plus adopt new standards like Open RAN, roll out new services like Mobile Edge Computing (MEC) and network slicing, all while maintaining existing 4G services.

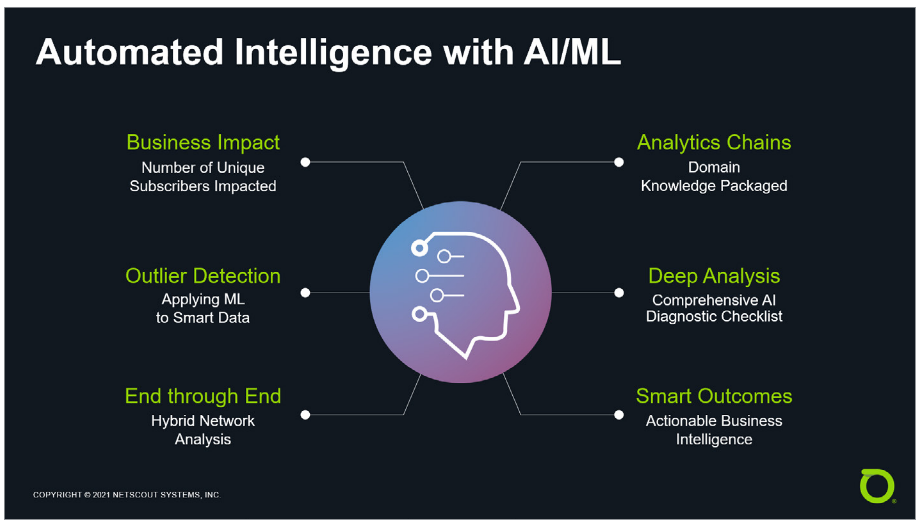
Complexities Abound When Implementing 5G Standalone and Cloudified Networks

As carriers are realizing, the migration to a cloudified 5G core will likely not be as fast as initially assumed for a myriad of reasons.

For starters, a true cloud-native approach requires the disaggregation of traditional network elements into virtual functions using container technology. These types of environments are more difficult to monitor and verify that certain virtualized functions are performing as required. Additionally, as Transport Layer Security (TLS) encryption technology is deployed throughout the new 5G standalone (SA) architecture, engineers no longer have sufficient visibility to the control plane and user plane packets which are also separated to allow for elasticity.

A further challenge relates to multi-access edge computing (MEC). As carriers work to embed part of their 5G cores with hyperscalers like Amazon AWS and Microsoft, engineers must make sure that





any latency introduced through these connections is minimized. Likewise, carriers are turning to multiple hardware and software vendors to support new 5G functions, and though this approach may have the benefit of lowering costs and enabling new, innovative network functions, it also creates a much more complex architecture and vendor relationships to manage and assure.

As a result, deep visibility is needed from the 5G radio access network (RAN) to the edge to the access layer and into the core network infrastructure. The visibility into the "East-West" packet level data will no longer be as simple as placing a physical tap or packet broker in place and sending the control plane and user plane traffic to a service assurance solution. Instead, CSPs require a deeper level of visibility into the RAN with virtualized instrumentation that includes packets collected, processed, and filtered at the source to produce contextual metadata in real-time. This type of smart data is key to gaining insight into the issues above, as well as fielding actionable intelligence for the policy engines that drive network automation and orchestration.

Triaging Network Issues with Smart Data and Automation

On a battlefield or in a hospital, skilled doctors and nurses need a coordinated system to focus their efforts where they are needed the most. Likewise, in CSP war rooms, experienced network operations teams understand that knowing where and how to focus their attention is key, and automation of routine network monitoring and flagging of more serious issues helps deal with the increased complexity that 5G demands.

Intelligent automation sequences blend AI/ML techniques, combining ML libraries for classification and outlier detection, and knowledge base and inference engines to conduct deep correlation and case-based reasoning. There are any number of benefits from adopting this type of approach, which improves over time as machine learning helps the system better recognize the difference between challenges that can cause real business impact and minor transitory issues. But first and foremost, by automating the gathering of information and running analytics to glean the most pertinent information, organizations can clearly see where a service issue is and what its effects are, ensuring the correct team is dispatched to resolve it, with less finger-pointing and organizational ping-pong.

In summary, as CSPs look to cloudify networks in order to deliver on the promise of true 5G SA, they will need to overcome a host of challenges, particularly as it relates to end-through-end visibility. Thankfully, the advent of smart data monitoring and automation of routine network optimization tasks can help carriers manage these extremely complex networks, determine the root cause of issues for more detailed investigation, and effectively triage response teams. In a world where CSPs must balance the rollout of complicated new 5G deployments and services while maintaining their legacy network, it's this kind of automated monitoring and optimization that is key to fully realizing the future of 5G.

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