

OVERCOMING THE CHALLENGE OF MANAGING MULTIGENERATIONAL NETWORKS

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5G is here or coming to your network soon, and along with the incredible new capabilities it brings to end users and machines, it also presents a game-changing challenge to communications service providers (CSPs):

How to manage yet another generation of wireless technology atop the 2G, 3G, and 4G many CSPs still support. While it's true that many providers began to shift their focus away from GSM, UMTS, and CDMA technologies years ago as they looked to recoup valuable spectrum by embracing LTE-based 4G networks, 5G is unlike any previous mobile generation. Adding it into the mix represents a sea change in how wireless networks are built and managed.

Looking at the previous generations of wireless networks, there has been a clear evolution of technologies:

- 2G utilized GSM and TDMA, with CDMA acting as a bridge between 2G and 3G. Most 2G networks worldwide have already been phased out or will be over the next year.
- 3G utilized WCDMA and EV-DO standards. Many 3G networks around the world are in queue to be phased out over the next few years.
- 4G utilizes LTE. 4G networks have now reached mainstream use around the world and are expected to remain in use for the foreseeable future.

With each generation, we saw improvements in speed and capacity, but a continuity of the same network model. 5G, however, rips up the playbook and introduces a completely different network that requires a completely different network infrastructure. Instead of replacing 4G, 5G is expected to co-exist alongside 4G—a different layer, if you will—with each playing different roles. And perhaps most importantly, 5G is driving the virtualization and automation of the network.

Key differences between 4G and 5G include:

- **Different spectrum:** 4G networks operate at around 800 MHz and 2.6 GHz, while 5G has been assigned to the frequency bands around 600 MHz and 24+ GHz and will soon add 2.5 GHz, 3.5 GHz, and 3.7-4.2 GHz mid-band spectrums into the mix.
- **Different bandwidth:** 5G has dramatically higher transfer rates and lower latency requirements than 4G.
- **Different use cases:** 4G will continue to improve and be invested in by CSPs to deliver the services many consumers and businesses already use—voice, data, lightweight video streaming, and so on. 5G will tackle the heavy-hitting applications: virtual reality, enterprise IoT, ultra-high-definition video, autonomous vehicles, and other use cases that demand the increased speed, capacity, and real-time capabilities 4G can't deliver.
- **Different infrastructure:** 5G utilizes small cells, which are smaller than the macrocells used by previous mobile generations. And because high-frequency wavelengths are less able to travel long distances without interference, they need to be placed closer together. 5G is also driving a shift toward virtualized infrastructure, both at the core and the edge, with network slices and containers playing a key role in helping CSPs differentiate their service offerings and orchestration to automate. This requires a sea change not only in the network infrastructure but throughout the 5G life cycle, from planning and designing to operations and optimization.

CSPs will implement their 5G networks in one of two ways: Non-standalone and standalone. Non-standalone leverages the existing 4G network (primarily for the control plane) and the new 5G network for the user plane traffic. Standalone utilizes a new 5G core network that handles both the control plane and user plane traffic. Some CSPs are going directly to standalone 5G and bypassing the interim phase. Those that are not taking this route must stitch together 4G and 5G communications flows to monitor and troubleshoot mobile sessions. Therefore, their performance monitoring solutions must support not only all the new 5G protocols, but those in 4G/LTE and, in many cases, 3G as well. Solutions must see through the layers to deliver end-to-end visibility of the network, whatever combination of generations that network may be.

At NETSCOUT®, our solution for the 5G network evolution is Visibility Without Borders. CSPs can implement NETSCOUT solutions across multiple generations of network technologies—mobile, cloud, and hybrid—to gain actionable insights into performance, reliability, and latency for 5G networks and services. From RAN planning and design with geospatial propagation modeling calibration, to proactive service assurance, network automation and optimization, and everything in between, NETSCOUT helps CSPs overcome the challenges of multigenerational networks as they march toward a 5G future.

[Click here to learn more about NETSCOUT's carrier-grade monitoring solution for 5G.](#)



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