5G's promised land finally arrives: 5G standalone networks can transform enterprise connectivity

The coming migration to 5G standalone core networks is expected to allow for increased device density, reliability, and latency, opening the door to advanced enterprise applications.

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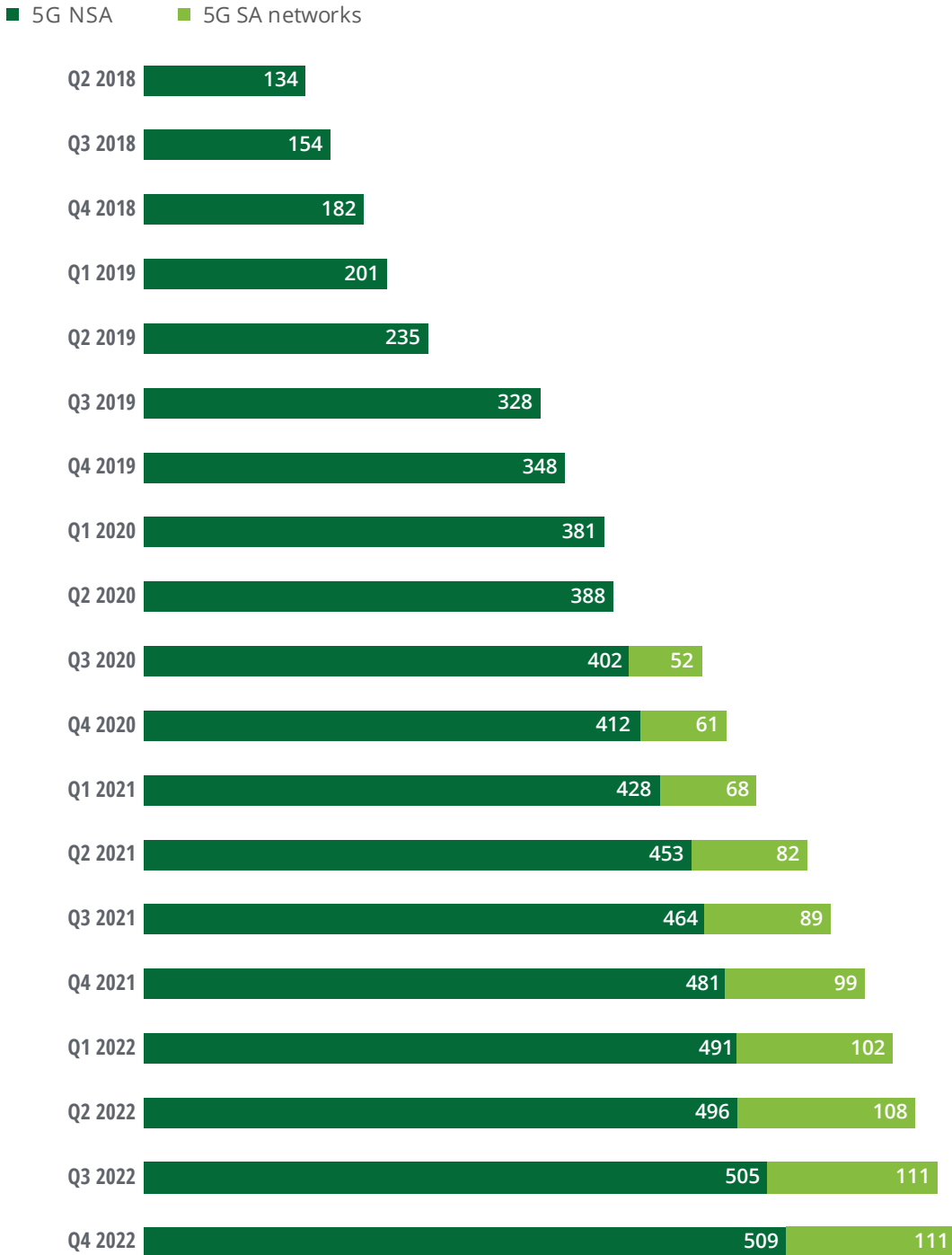
BY INTRODUCING VIRTUALIZED, cloud-centric capabilities, 5G standalone (SA) networks are poised to drive disruptive change that could make previous advances in wireless technology (2G/3G/4G) appear incremental. While the numbers are fluid, Deloitte Global expects the number of MNOs investing in 5G SA networks—with trials, planned deployments, or actual rollouts—to double from more than 100 operators in 2022 to at least 200 by the end of 2023. These MNOs are on the leading edge of helping to unlock 5G's long-heralded benefits, opening the door to disruptive use cases that can boost productivity, enhance operational efficiency, increase cost optimization, and create revenue opportunities for both MNOs and their enterprise customers.[1]

FIGURE 1

Investment in 5G SA is rising, comprising a higher proportion of overall 5G investment

Number of MNOs investing in 5G deployments globally

■ 5G NSA   ■ 5G SA networks

Quarter	5G NSA	5G SA networks
Q2 2018	134	
Q3 2018	154	
Q4 2018	182	
Q1 2019	201	
Q2 2019	235	
Q3 2019	328	
Q4 2019	348	
Q1 2020	381	
Q2 2020	388	
Q3 2020	402	52
Q4 2020	412	61
Q1 2021	428	68
Q2 2021	453	82
Q3 2021	464	89
Q4 2021	481	99
Q1 2022	491	102
Q2 2022	496	108
Q3 2022	505	111
Q4 2022	509	111

Source: Global Mobile Suppliers Association (GSA), *5G stand-alone June 2022 summary,* accessed August 31, 2022.

With SA architectures, 5G for enterprise can finally come into its own

When MNOs first began implementing 5G wireless networks in 2019, most opted to deploy 5G radios on top of their existing 4G/LTE core network infrastructure in so-called nonstandalone (NSA) deployments. These early NSA network deployments primarily targeted consumers, who could immediately enjoy faster speeds and higher data rates through enhanced mobile broadband (eMBB) when, for example, streaming high-resolution video on their smartphones. But to support 5G's more compelling features, a complete migration to SA networks with 5G radios running on top of a 5G core network infrastructure is necessary. This is because 5G SA enables two additional archetypal 5G use cases beyond eMBB[2] that could be key to unlocking value in an enterprise setting:

- **Massive Internet of Things (mIoT)**, which enables a very high density of connected devices (up to 1 million devices per square km) while ensuring quick and seamless communication among them

- **Ultra-reliable, low-latency communication (URLLC)**, which supports high network reliability and ultra-low latencies of 1 millisecond or less

Ultimately, 5G SA networks could help achieve a unified end-to-end virtualized network architecture with cloud-native orchestration, network functions, and management systems that work consistently from core to edge with carrier-grade quality. This unified platform would offer MNOs many operational benefits, including greater network performance, efficiency, and faster service delivery and innovation cycles.

5G SA's big attraction for MNOs are the new service and revenue opportunities it creates. Along with near-zero latency and massive device density, 5G SA enables MNOs to provide customers—specifically enterprise customers—access at scale to fiber-like speeds, mission-critical reliability, precise location services, and tailored network slices with guaranteed service levels. Armed with these new capabilities, enterprises can begin exploring a broader range of leading-edge applications and business use cases, possibly including self-driving vehicles; precision robotics; drone inspection and delivery services; and AI-driven security, quality control, and predictive maintenance systems.

Why hasn't 5G SA become the industry standard already? Because deploying SA networks involves multiple simultaneous initiatives that require close coordination and integration across technology, operational, and organizational domains. 5G SA involves MNOs migrating core networks, essentially the network's "brains," from monolithic hardware-centric infrastructure to new, lightweight, modular, virtualized, and cloud-based architectures. To do this, existing networks—including highly complex orchestration, operational, and business support systems as well as network functions—would need to be decomposed, recast, and rewritten into software that can operate in various cloud environments with carrier-grade performance. Moreover, these new core systems would have to fully integrate with other elements of the end-to-end network, including edge radio access networks, which are undergoing their own transformation.

These upgrades involve many critical strategic decisions that can significantly impact future operating and capital costs; business, operating, and organizational models; and potential revenue growth and profitability. For instance, one hotly debated topic is whether MNOs should deploy core networks on public clouds or build and operate their own cloud infrastructure. While private on-premise deployments give MNOs more control, they typically require significant upfront

investment and are less scalable. Public clouds offer a ready-built scalable cloud platform but can create challenges in meeting reliability and data privacy requirements. Hybrid approaches may be an option but managing multicloud environments tends to be highly complex.

Another significant hurdle for MNOs may involve transitioning their workforce and methods toward more entrepreneurial, agile, and software-oriented processes needed to operate 5G SA networks effectively. The potentially profound impact of this transition on employee roles and responsibilities, culture and mindsets, and overall ways of working should not be underestimated.

Despite these difficulties, migration to SA seems inevitable. Implementing 5G SA is part of the 3GPP's[3] 5G road map, but more importantly, MNOs could be hard-pressed to compete if they don't. The distinct advantages that MNOs can gain from 5G SA over NSA architectures include:

Reduced complexity and cost. Since SA can support traffic from multiple access technologies, they can effectively converge fixed and wireless, voice and data, consumer and enterprise, or 4G and 5G traffic on a single network, simplifying and reducing the cost of operating multiple networks.

Flexibility and scalability. SA's cloud-based nature offers MNOs more flexibility to locate and manage core network functions wherever needed to help deliver a great customer experience, whether in the cloud, in multiple clouds, at the network edge, in a private data center, or in some combination. SA networks are also easier to scale, which is important to support the future development of hundreds or even thousands of edge locations arising from the growing trend toward distributed (edge) computing.[4]

Responsiveness to demand. Many of 5G SA's new features are possible because it uses a

consistent, programmable platform (known as service-based architecture) that enables MNOs to seamlessly manage distributed locations as a single unified network. This allows SA networks to not only scale but also become more elastic to meet changes in demand without necessarily adding more people, hardware, or cost. In other words, SA essentially migrates MNOs from a lumpy capex to a more granular opex spending model.[5]

New feature development. 5G SA can speed up service delivery and innovation cycles due to its software-based service model as well as its agile continuous innovation and continuous deployment cycles. MNOs can also more easily engage third-party developers to introduce new network functions and features. One promising opportunity is to create more advanced automation tools that utilize big data technologies to reduce network cost and complexity. For example, new AI-driven applications allow SA networks to self-optimize and customize resources in response to changing demand or environmental conditions.[6] Further innovations may also lead to fully automated systems, ultimately enabling closed-loop, zero-touch service fulfillment, provisioning, and assurance.

New revenue opportunities. For instance, many view network slicing as a key opportunity for MNOs to expand their addressable market. With network slicing, MNOs can create and manage multiple distinct virtual networks on the same infrastructure and configure each slice to support different service level requirements for specific customer applications.[7] This could pave the way for operators to move away from selling simple connectivity solutions to offering more advanced value-added services such as private networks, managed network operations, and tailored privacy and security solutions. MNOs may also choose to open their SA platform to third-party developers (similar to what cloud providers do), thereby fostering the development of potential new applications.

THE BOTTOM LINE

MNOs can take several steps to speed their transition to 5G SA:

- **Determine an appropriate migration plan, deployment model, and cloud strategy.**[8] How an operator decides to move forward can differ widely based on the status of legacy networks. 5G is inherently a cloud technology; thus, MNOs should develop overarching cloud and data management strategies to manage 5G SA. At some point, MNOs may need to take decisive action to invest in fully digitizing and migrating network operations to the cloud.

- **Automate network management systems and organizational structures.** In a data-centric, hyperconnected world, automation is important to reduce cost and complexity. Eventually, MNOs may be able to manage and orchestrate interoperable services across networks on the fly without human intervention.

- **Get the right talent and prepare for culture shock.** Because 5G SA essentially converges networking with IT computing, MNOs may need to hire or upskill engineering talent to augment existing network operating models (NetOps) with IT software-oriented operating models (DevOps). MNOs might also consider augmenting their workforce with outsourced talent to fill experience gaps in specific areas.

- **Carefully choose vendors.** No single vendor offers the broad set of required products and capabilities for a successful 5G SA migration. This is pushing MNOs toward adopting open systems using new best-of-breed vendors instead of relying on a few incumbent suppliers. However, using multiple vendors creates challenges in ensuring that all components integrate and work well together, requiring careful vendor selection and robust integration, testing, and validation methods.

Given all that 5G SA offers, the real question is not whether MNOs will migrate to 5G SA but when and how. The challenges are significant, but the benefits are undeniable: a fully mature 5G capability that unlocks 5G's full potential for enterprise and underpins MNOs' pursuit of greater efficiency, innovation, and value.

Endnotes

1. YouTube, "Open for debate: Is the industry moving fast enough on standalone 5G?," video, 57:14, July 25, 2022; Dan Jones, "What's happening with standalone 5G?," TechTarget, January 2022.

2. 5G SA further improves data rates to 10Gb/s versus only 1.5Gb/s using 5G NSA.

3. 3GPP (3rd Generation Partnership Project) is the industry's standards-setting body for mobile communications.

4. Naima Hoque Essing et al., *Battle for the Enterprise Edge: Providers prepare to pounce on the emerging enterprise edge computing market*, Deloitte Insights, November 30, 2022.

5. Guy Daniels, "Removing the barriers to cloud native operations within telcos," *Telecom TV*, September 14, 2021.

6. Qualcomm, "What's the role of artificial intelligence in the future of 5G and beyond?," September 21, 2021.

7. Naima Hoque Essing and Dan Littmann, *The 5G network slicing opportunity*, Deloitte Insights, August 19, 2020.

8. Samsung Newsroom, "Samsung introduces 5G migration strategy in new whitepaper: "5G Standalone Architecture," January 7, 2021; GSMA, "Guidance out now on 5G's Standalone Option 2 configuration, " June 30, 2020.

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