New pathways to the future via 5G-Advanced
Welcome to an era of transformational growth opportunities
Open up new pathways to possible across your connected world with 5G-Advanced
Experience will become truly immersive
Expansion beyond communications
A fast and cost-effective extension of network reach
Enabling new levels of operational excellence
Service Providers’ top priorities

Read more about 5G-Advanced at Nokia.com
Welcome to an era of transformational growth opportunities

By Peter Merz, Head of Nokia Standards

4G and 5G networks are about raising mobile broadband data rates and capacity to make any information instantly accessible. Now 5G-Advanced is set to further evolve what 5G can do, telling us not just ‘what’ we need to know, but also ‘where’ something is with great accuracy and ‘when’ something happens within a few hundred nanoseconds. The impact of this will be far-reaching, allowing us, for instance, to build integrated networks optimized for the bespoke needs of specific verticals.

Nokia has been deeply engaged in developing new 5G-Advanced technology enhancements through the central role we play in the standards community, 3GPP. But listing enhancements fails to capture the enormity of the network shift that 5G-Advanced will bring. It will make network performance radically more energy and cost efficient and open up new areas of opportunity, from extending 5G networks to several industries that have dedicated spectrum allocations to bringing digital opportunities to more communities by supporting low-cost devices with modest data-rate requirements.

5G-Advanced will also be a bridge technology towards the 6G era, advancing the industrial, enterprise and consumer metaverses by unleashing the possibilities of AI and extended reality (XR) applications. It will also free up Communications Service Providers (CSPs) and their enterprise and industrial customers to trial new revenue-generating services and occupy a prime position to profit from 6G.

But 5G-Advanced is more than just a steppingstone to 6G. It will start to redefine our world in its own right in the next couple of years by enhancing network capabilities in four dimensions that we call the four Es:

Experience,
Expansion,
Extension,
Excellence.

As we stand at the threshold of this new era, let’s consider each dimension in turn and explore how 5G-Advanced creates a platform for transformational growth.

Read more about 5G-Advanced at Nokia.com
Open up new pathways to possible across your connected world with 5G-Advanced

The new features and capabilities to be released through 3GPP are set to turn our networks into future-ready, universal communication, precision and timing platforms for transformational growth.

CSPs will be empowered to evolve their networks in profound and clearly defined new ways beyond everyday communication, creating new revenue-generating services and refining their existing services in preparation for the 6G era.

Industries will be accelerated into the digital age and societies uplifted with the possibilities of sustainable growth. 5G connectivity will be extended to remote critical industrial sites, optimizing how we power and feed the world.

Transform how you think, design and profit with 5G-Advanced. Talk to the innovation experts at Nokia about taking the first steps.

Read more about 5G-Advanced at Nokia.com
XR evolves VR and AR to create a new killer app, unlocking a blended existence in which physical and virtual worlds co-exist. Be digitally present in a conference in the United States while working from your kitchen in Prague. Attend training sessions and board-meetings as the digital you. Create new sales and customer service propositions, letting customers remotely sit on a new sofa, explore a kitchen, relax in a hotel room while experiencing the breath-taking views of a holiday destination. XR is potentially as big a game-changer as the mobile phone itself and 5G-Advanced will give it lift off, enabling powerful new AI-driven industrial metaverse applications. For example, city planners will be freed from the design room to roam the streets with XR glasses, spotting problem zones in the real world and redesigning them in the virtual one.

What are the new technologies enabling it all?

5G-Advanced will support features like radio resource-allocation optimization and mobility and beam management add-ons, as well as device power savings and quality-of-experience enhancements through edge cloud capabilities and application awareness.

“5G-Advanced will greatly enhance today’s extended reality (XR) experience by expanding the reach of VR and immersive AR applications beyond bulky head-mounted devices.”

Sari Nielsen, Head of Standardization for RAN2, RAN3 and RAN5 at Nokia

Read more about 5G-Advanced at Nokia.com
Expansion beyond communications

High-precision location, presence and timing technologies are key innovations planned in 5G-Advanced. These will all expand the role of the network beyond communications. Devices connected to a 5G-Advanced network will benefit from high levels of positioning accuracy – whether they are indoors or outdoors – making navigation and logistics systems more efficient and autonomous. This will be a great advantage for dedicated logistics networks at facilities such as ports and airports.

These new capabilities will enable the operation of driverless cars, autonomous robots and industrial automation systems in the near future. In fact, they’ll make it possible to manage any complex interaction of machines, robots and people using a single infrastructure. Specialist network services that require high resiliency such as timestamping will become possible on the main network too, removing the need for an expensive dedicated network. That creates new efficiencies in many sectors such as finance, energy and pharmaceutical manufacturing that demand a high degree of transactional precision. In this way, 5G-Advanced will open the way for CSPs to offer timing, synchronization and resiliency as value-added integrated network services.

Accuracy and safety will also be assured in expanded geographical locations far from the reach of satellite signals, for instance within the depths of mines. All our critical infrastructure will become more resilient, less susceptible to the interruptions caused by space debris, solar flares or network attacks.

“Whether the application requires data transmission, super-accurate positioning, or sub-microsecond timing accuracy, one network will do it all.”

Matthew Baker, Head of Standardization for RAN4 at Nokia
A fast and cost-effective extension of network reach

Today, broadband underpins the global economy, opening up access to a wealth of commercial opportunities and all the educational, health and wellbeing benefits that mobile connectivity provides. But despite broadband’s apparent ubiquity there is still a huge digital divide in our world. Many underserved, often rural and remote, communities continue to live in network no-go zones that terrestrial networks simply can’t reach.

5G-Advanced will help to bridge those digital divides, further extending broadband connectivity into underserved geographies and opening up new economic opportunities by delivering better mobile coverage and enhanced location accuracy. It’s also set to provide 5G connectivity to critical industrial networks in remote locations such as smart power grids, making the vital rapid growth of renewable energy production from windfarms to solar not just technically possible, but profitable.

Thanks to new beamforming techniques, 5G-Advanced will power up the skies, connecting fleets of video enabled drones that can, for example, help farmers intelligently and cost-effectively monitor irrigation systems to optimize crop yields. Sidelink technologies will enable the networking of interlinked devices too, extending the power of cloud-based apps and data analytics beyond anything we’ve seen before.

“5G-Advanced will enable 5G to embrace whole new categories of devices we never imagined would have a cellular connection. Drones are a prime example.”

Antti Toskala, Bell Labs Fellow and 3GPP collaborator

Read more about 5G-Advanced at Nokia.com
Enabling new levels of operational excellence

5G-Advanced brings with it evolved 5G mobile features such as network slicing and wireline-wireless convergence alongside new AI and Machine Learning capabilities that will revolutionize energy efficiency across the RAN and core. This makes 5G-Advanced the perfect technology for an era in which measurable carbon reduction becomes an operational priority across industrial sectors, on the urgent journey to achieving net zero operations.

Complex traffic management tasks will be simplified and 5G-Advanced networks will run with new levels of energy efficiency, paving the way to the more connected and sustainable future that the planet needs.

It’s also the dawn of a new era of robust, high-performing and consumable networks resulting in far less downtime, fewer dropped users and less performance patchiness. Instead, service providers will be able to manage network resources in new ways, identifying when users are collaborating in real-time and delivering precisely the right mix of resources to ensure an optimal experience.

“A more energy-efficient radio access network will make 5G-Advanced networks more operationally efficient, as will the new slicing and analytics capabilities.”

Devaki Chandramouli, Bell Labs Fellow and Head of North American Standardization at Nokia

Read more about 5G-Advanced at Nokia.com
Operators’ expectation

In the webinar together with TechInsights we provided an overview of the broad trends that are driving network evolution through 2030, based on the results of service provider interviews, and an online survey to identify service provider priorities for both business and technology capabilities of 5G-Advanced.

We also provide inputs from interviews with leading-edge enterprise executives on their top requirements for 5G-Advanced.

The below highlighted white paper and webinar provides an overview of the key technology enhancements to be expected in 5G-Advanced as for Release 18.

In June 2023 3GPP has provided a first insight into Release 19 content which you can read below.
About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

Nokia is a registered trademark of Nokia Corporation. Other product and company names mentioned herein may be trademarks or trade names of their respective owners.

© 2023 Nokia