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5G-Advanced as a Solid Foundation of Digital Transformation

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Digital transformation and artificial intelligence raise new demands for networks

A global consensus is growing in favor of accelerating digital transformation to empower sustained economic growth. Many countries have launched digital transformation strategies. Saudi Arabia kicked off the "Saudi Vision 2030" initiative to decrease its dependence on oil resources and increase diversification economically, socially, and culturally. In China, government and industries are pursuing "new quality productive forces" through green and digital innovations. The Indonesian government recently launched "Indonesia Digital Vision (VID) 2045" to improve efficiency, productivity, and innovation using digital technologies.

Digital transformation requires a high-quality and robust connectivity infrastructure. Therefore, Saudi Arabia has issued the policy paper "The 10Gbps Society" to accelerate the development of digital infrastructure. The EU also passed the Gigabit Infrastructure Act (GIA) recently, responding to the ever-growing need for faster, more reliable, data-intensive connectivity in Europe.

Notably, the growing number of artificial intelligence (AI) applications in digital transformation processes will raise new demands for broadband networks. Omdia predicts that AI traffic will grow to 64% of global total data traffic by 2030 through two phases:

- Phase 1 spans 2024–27: Business-to-business applications will drive AI traffic growth. Upstream video and image analysis (and response) will be key AI activities that generate large traffic flows.

- Phase 2 spans 2028–30: Consumer-led AI collaboration and entertainment traffic will migrate to new immersive media formats, generating a large amount of data downstream.

Meanwhile, AI-enriched interactions will also generate requirements for more complex service-level agreements (SLA) and higher network capacity. Diverse AI applications have different requirements for network bandwidth, latency, reliability, and so on. End-to-end and flexible SLA management capabilities will be required to orchestrate network resources across the entire network from network core to network edge, sites, and even devices to meet the network quality demand. Some AI applications require persistent high bandwidth and low latency, which limits network utilization, restricts operators' overprovisioning, and increases costs. Therefore, telecom operators must further increase network capacity to support persistent high-volume AI-enriched traffic.

5G-Advanced is on a fast track

Leading operators are investing in advanced technologies to meet the growing demand. China Mobile recently revealed its 5G-Advanced strategy and roadmap. In 2024, the world's largest mobile operator will activate three-component carrier aggregation (3CC) in more than 90,000 cells across China. In 2025 and 2026, China Mobile will further expand its 5G-Advanced network coverage and introduce more advanced features such as nonterrestrial networks and new frequency bands to achieve deployment with the complete set of 5G-Advanced features.

China Mobile expects that 3CC can meet the growing traffic demands in central business districts, universities, shopping centers, and so on to support innovative applications including cloud gaming and glass-free 3D video. Meanwhile, other advanced features, such as integrated sensing and communication (ISAC) and passive Internet of Things (IoT), can be used to explore new business opportunities. For example, ISAC can enable a 5G-Advanced network to become part of the infrastructure of low-altitude aviation traffic management. Passive IoT can support logistics and supply chain management. The deterministic network solutions of 5G-Advanced can help telecom operators extend their business in industrial automation sectors.

China Telecom and China Unicom have also kicked off their 5G-Advanced deployments. During MWC Shanghai 2024, the two operators announced that they have jointly deployed 13,000 5G-Advanced base stations in Shanghai, a number that will increase to more than 20,000 by the end of this year. Chinese operators' clear roadmap for the massive 5G-Advanced rollout will significantly boost 5G-Advanced development in the global market. Almost simultaneous with the gigantic deployments in China, 5G-Advanced has also made considerable progress in the Middle East.

During the annual SAMENA Leaders' Summit, the UAE launched "5G-A Country" and announced plans for the UAE to set sail for 5G-Advanced nationwide. Saif Bin Ghelaita, the representative of the UAE's Telecommunications and Digital Government Regulatory Authority (TDRA), stated at the event: "The TDRA intends to develop a national plan for the 5G-Advanced network and is committed to promoting the planning and allocation of abundant spectrum to further advance mobile network development."

The Saudi Arabian government issued the policy paper "The 10Gbps Society" early this year as part of its Vision 2030 initiative. To facilitate the digital transformation toward 2030, the Saudi Arabian government will accelerate the development of digital infrastructure, including ultra-high-speed mobile and fixed broadband networks. Regarding the mobile broadband network, Saudi Arabia will "allocate sufficient spectrum for mobile broadband" and "accelerate the commercialization and coverage of 5G-Advanced technology."

This progress in advanced markets will boost global 5G-Advanced development and accelerate the ecosystem's maturity, and 5G-Advanced will become a key enabler for the digital transformation to an intelligent world.

Mobile operators will benefit from 5G-Advanced rollout

Because early 6G rollouts will not happen until 2030, 5G enhancement technologies are a must-have connectivity platform to support digital transformation and growing AI applications in the second half of the 2020s, so 5G-Advanced is the right technology emerging at the right time.

The 3CC technology can enable operators to aggregate carriers in multiple frequency bands to deliver optimal user experience and improve network capacity. Recently, e& UAE achieved a recorded data speed of 30.5Gbps by aggregating multiple carriers across high- and midband spectrums. The extensive network capacity combined with network-slicing capabilities can effectively meet the demand of AI traffic on complex SLA management and can also enable communications service providers (CSPs) to provide experience-based service plans that are a new attempt to monetize mobile broadband networks.

China Mobile Shanghai branch has launched dedicated service plans for 5G-Advanced users to monetize the premium user experience brought by 5G-Advanced. According to news reports, China Mobile's 5G-Advanced service can provide an average 2.5Gbps download speed and effectively support glass-free 3D video-streaming service.

In enterprise and vertical-industry markets, 5G-Advanced features have also demonstrated great market potential. China Telecom recently launched the Low-altitude Economy Industry Alliance to leverage 5G-Advanced networks to serve low-altitude aviation applications. Using the ISAC capability of 5G-Advanced, China Telecom will develop service and regulatory monitoring platforms for low-altitude aviation traffic. The operator believes the low-altitude-aviation-related service will become one of the most valuable vertical sectors for telecom operators.

With increasing deployments worldwide, 5G-Advanced is becoming an essential part of digital infrastructure in the second half of the 2020s. The features of 5G-Advanced will benefit operators in advanced markets by improving monetization capabilities and opening new market opportunities. In the second wave of 5G markets, such as Latin America and South-Eastern Asia, operators could deploy 5G-Advanced features to gain such capabilities from day one when they launch 5G services.

In summary, 5G-Advanced networks will become a solid foundation for digital transformation through 2030 and beyond. By rolling out the technology, mobile operators can create more monetization opportunities, access more market segments, and take a more central role in the economic and social digital transformation journey.

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