Ericsson Mobility Report

November 2025

ERICSSON

Letter from the publisher

Next wave of mobile

This year, the industry has taken big steps in deploying the 5G standalone (SA) architecture needed to support differentiated connectivity services. The number of communications service providers deploying 5G SA has increased globally, and we've seen many go from proofs-of-concept to commercial offers based on 5G network slicing.

In this edition of the Ericsson Mobility Report, we dig deeper into how the industry is evolving, not just in terms of technology, but in the way it creates value for service providers, users and the ecosystem.

By the end of this year, 5G subscriptions are expected to reach 2.9 billion – about one-third of all mobile subscriptions globally. During 2025, an additional 400 million people worldwide will have 5G coverage. The share of traffic carried over 5G continues to rise, and in 2031, over 1.2 billion people globally will be served by 5G Fixed Wireless Access-based broadband. 5G services are affecting people's lives around the world.

We also examine some interesting markets and recent events showcasing new offerings and go-to-market approaches.

Together with Singtel, we discuss how experience can become a new currency, as the service provider aims to change the conversation from data quantity to data differentiation. Connectivity is enabling tailored experiences that deliver business outcomes when and where they matter most.

With SoftBank, we explore new ways for enterprises to build secure and flexible connectivity for remote and hybrid workforces. 5G connectivity can simplify enterprise IT architecture while supporting zero-trust and AI-enabled workflows that enhance both security and productivity.

5G-powered solutions are also addressing completely new segments in new environments. SailGP, a global racing competition held across various locations worldwide, is using a hybrid 5G public and private network to provide high-quality connectivity, improving both fan experiences and race operations on land and at sea.

As we enter this next wave of mobile, I'm convinced that collaboration across the ecosystem will be the key to unlocking its full potential. The interdependence across the technology stack, especially as AI, cloud and mobile become ever more intertwined, means that fostering a collaborative and open ecosystem, particularly among leading industry players, is more important than ever.

I hope you find this report both engaging and useful. Let's continue to shape the future together.

Erik Ekudden
Senior Vice President and
Chief Technology Officer

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Executive Editor: Peter Jonsson
Project Sponsor: Patrik Cerwall
Project Manager: Anette Lundvall
Forecasts: David von Koch
Writer Editor: Steven Davis

Co-writers:
Hai Thoo Cheong, Terence Lai (Singtel)
Koji Araki, Keisuke Asakura,
Takashi Nakamura (SoftBank)
Kes McHugh (SailGP)

Contributors:
Boris Babić, Greger Blennerud, Marko Čejvan,
Lisa Englund, Michiyo Kato,
Doroteja Kobescak, Zsolt Kormanyos,
Per Lindberg, Nina Lövehagen,
Jens Malmodin, Valerio Manca,
Daniel Paska, Ove Persson,
Kosuke Takizawa, Katsuyoshi Ueno,
John Yazlle, Martin Zander

Forecasts

The proportion of mobile subscriptions that are 5G increased from one-quarter at the end of 2024 to one-third in 2025. 5G mid-band is ideal for providing both capacity and coverage, and therefore enhancing user experience, with population coverage expected to reach 45 percent globally outside mainland China during 2025. Mobile network data traffic grew 20 percent between Q3 2024 and Q3 2025, slightly more than expected. Looking to the next generation, the 6G standardization process has already begun. We expect the first commercial launches to be driven by leading service providers in front-runner markets. AI-native 6G networks, together with new capabilities such as integrated sensing and communication (ISAC), will enable entirely new use cases and classes of devices. These advances will unlock new business opportunities for service providers.

6G

By 2031, most networks in leading countries will have been upgraded to 6G.

1.4 bn

In 2031, around 1.4 billion people globally will be served by Fixed Wireless Access broadband.

20%

Mobile network data traffic grew 20 percent between Q3 2024 and Q3 2025, slightly above expectations.

400m

During 2025, an additional 400 million people worldwide will have 5G coverage.

5G to account for one-third of mobile subscriptions in 2025

During the third quarter of 2025, 162 million 5G subscriptions were added, bringing the total to almost 2.8 billion.

5G subscription uptake continues apace and the total is expected to reach 2.9 billion at the end of 2025, accounting for one-third of all mobile subscriptions. The highest 5G subscription penetration is expected to be in North America with 79 percent, followed by North East Asia at 61 percent and Western Europe and the Gulf Cooperation Council (GCC) countries, both at 55 percent. Globally, 5G is anticipated to overtake 4G as the dominant mobile access technology by subscription by the end of 2027, nine years after launch.

Around 360 service providers have now launched commercial 5G services, and more than 90 of those have launched or soft-launched 5G standalone (SA).[1]

As subscribers migrate to 5G, the number of 4G subscriptions continues to decline. During the third quarter, 4G subscriptions declined by 65 million, bringing the total below 4.8 billion. 3G subscriptions declined by 22 million during the same period, while 2G subscriptions dropped by 29 million.

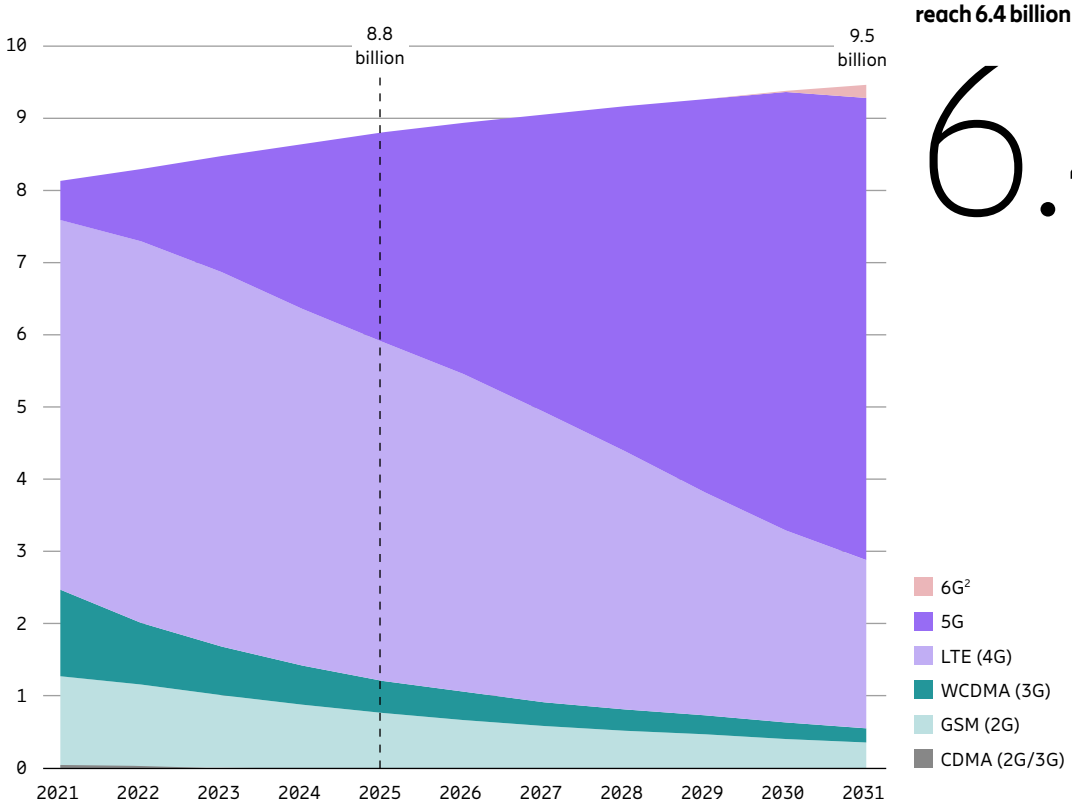
2G and 3G network sunsetting continues around the world. The phasing out of 3G networks is anticipated to happen more quickly than that of 2G in the coming years, but the timeline for this transition varies based on country and service provider.

Two-thirds of all mobile subscriptions expected to be 5G at the end of 2031

Global 5G subscriptions are forecast to reach 6.4 billion in 2031 and will make up two-thirds of all mobile subscriptions. Deployment of 5G SA by leading service providers will continue, and 5G SA subscriptions are projected to account for more than 4.1 billion in 2031, making up around 65 percent of all 5G subscriptions at that time.

In 2031, it is projected that Western Europe, North America and the GCC countries will have 5G subscription penetration of above 90 percent.

Figure 1: Mobile subscriptions by technology (billion)



5G subscriptions are forecast to reach 6.4 billion by the end of 2031.

6.4bn

[1] GSA and Ericsson (November 2025).
[2] This does not include early uptake of AI-enabled IoT devices such as autonomous vehicles, smart glasses and drones.

6G, AI and cloud will redefine service possibilities

Standardization discussions for 6G (3GPP Release 21, based on ITU IMT-2030) have begun. 6G is expected to have only a standalone architecture with a core network built on the architectural principles of 5G SA, extended with new capabilities such as AI and integrated sensing and communication (ISAC). A new Radio Access Network (RAN) architecture will be defined, including a new radio interface. For traditional use cases like enhanced mobile broadband (eMBB), Fixed Wireless Access (FWA) and the Internet of Things (IoT), 6G will advance the performance, service differentiation and guarantees. As these network technologies open up new service possibilities, use cases like massive digital twinning, autonomous mobility and wide-area mixed reality are likely to gain broader commercial adoption.

Global 6G subscriptions[3] are forecast to reach 180 million by the end of 2031, not including early uptake of AI-enabled IoT devices such as autonomous vehicles, smart glasses and drones. If 6G subscription uptake happens earlier, the current forecast could be surpassed significantly. The timing of commercial launch will vary between regions and countries:

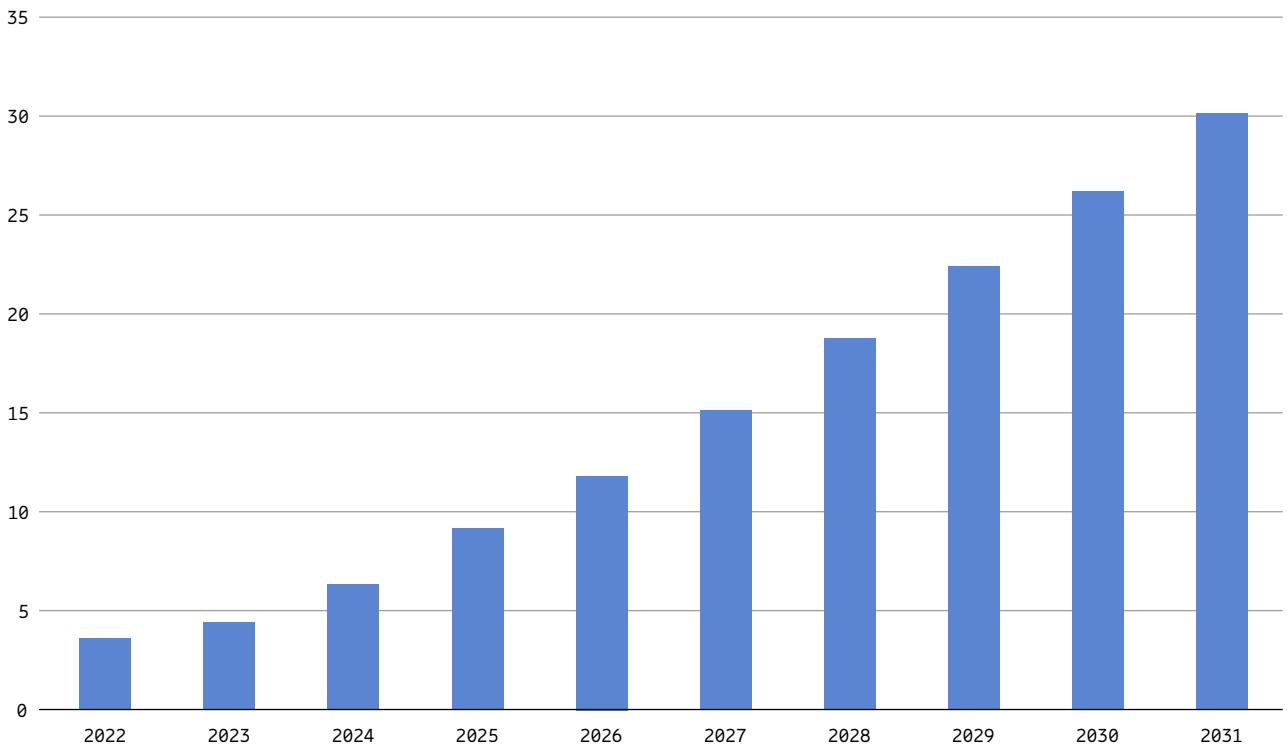
- In the US, China, Japan, the GCC countries and South Korea, the launch of commercial 5G services took place relatively early compared to many other countries, and it is expected that these countries will be among the first to roll out 6G commercial services.
- India has been vocal in its ambition to lead in 6G technology, and it is expected that the timing of the commercial 6G launch compared to other countries will happen earlier than it did for 5G.
- In Europe, the launch of commercial 6G services is anticipated to be about one year later, relative to other countries, than was the case for 5G, due to the later roll out of 5G SA.

Satellite broadband subscriptions

In recent years, there has been a growth in satellite networks, in particular large constellations of low-Earth orbit (LEO) satellites. These networks can provide multiple services such as direct-to-device connectivity and fixed broadband internet (that is, fixed satellite services). To meet the fixed broadband connectivity needs as we approach 2031, the mix of fiber, 5G FWA and satellite technologies will all be crucial to support an increasingly digital world. Globally, satellite broadband subscriptions are forecast to increase from around 9 million by the end of 2025 to around 30 million by the end of 2031. For comparison, there will be a projected 350 million FWA subscriptions on mobile networks by 2031. The total number of fixed broadband connections will be around 2 billion by 2031.

Satellite broadband subscriptions: Number of subscriptions using a satellite broadband service operating in the fixed-satellite service (FSS) spectrum.

Figure 2: Satellite broadband subscriptions (million)



[3] Currently, 6G subscriptions are not published on a regional level.

Adoption of speed-based FWA offerings continues

Service providers are capitalizing on consumer preferences for fast, reliable services; the proportion of Fixed Wireless Access (FWA) service providers offering speed-based tariff plans has increased from 43 percent to 54 percent in one year.

FWA is continuing to grow solidly in terms of the:

- **Adoption:** Proportion of service providers offering it over 5G
- **Monetization:** Share of service providers with speed-based tariff plans
- **Scale:** Number of connections and the traffic volume per connection

Continued global FWA momentum

An updated Ericsson study[1] of retail packages offered by service providers reveals that 81 percent have an FWA offering. There are 159 service providers offering FWA services over 5G, representing 65 percent of all FWA service providers.

Figure 3: Global FWA service provider adoption 2022–2025

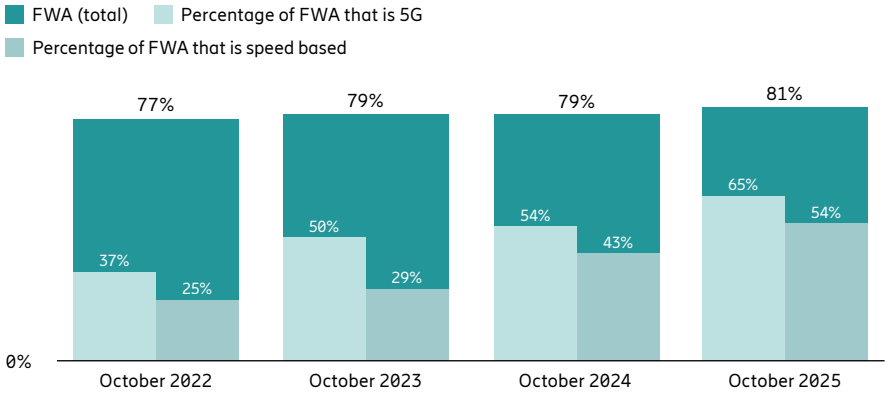
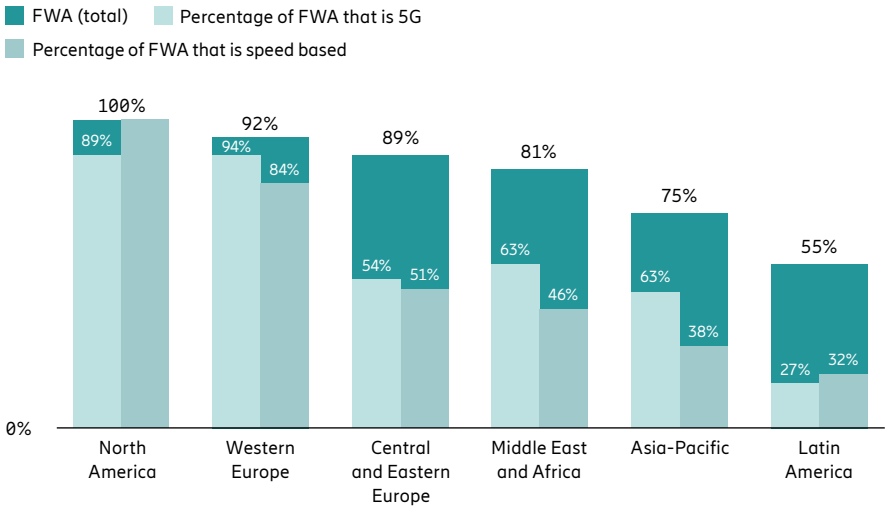


Figure 4: Regional FWA service provider adoption 2025



[1] 304 service providers, representing around 90 percent of global mobile revenues.

Over half of FWA service providers now offer speed-based tariff plans

Speed-based tariff plans are commonly offered for fixed broadband services, such as those delivered over fiber or cable. Consumers understand this type of plan well, enabling service providers to monetize FWA as a broadband alternative. Speed-based tariff plans are now offered by 54 percent of FWA service providers, up from 43 percent a year ago. The remaining 46 percent offer only volume-based tariff plans (buckets of GB per month).

Taking into account only the service providers that offer 5G FWA services, 70 percent offer speed-based tariff plans.

Regional variations

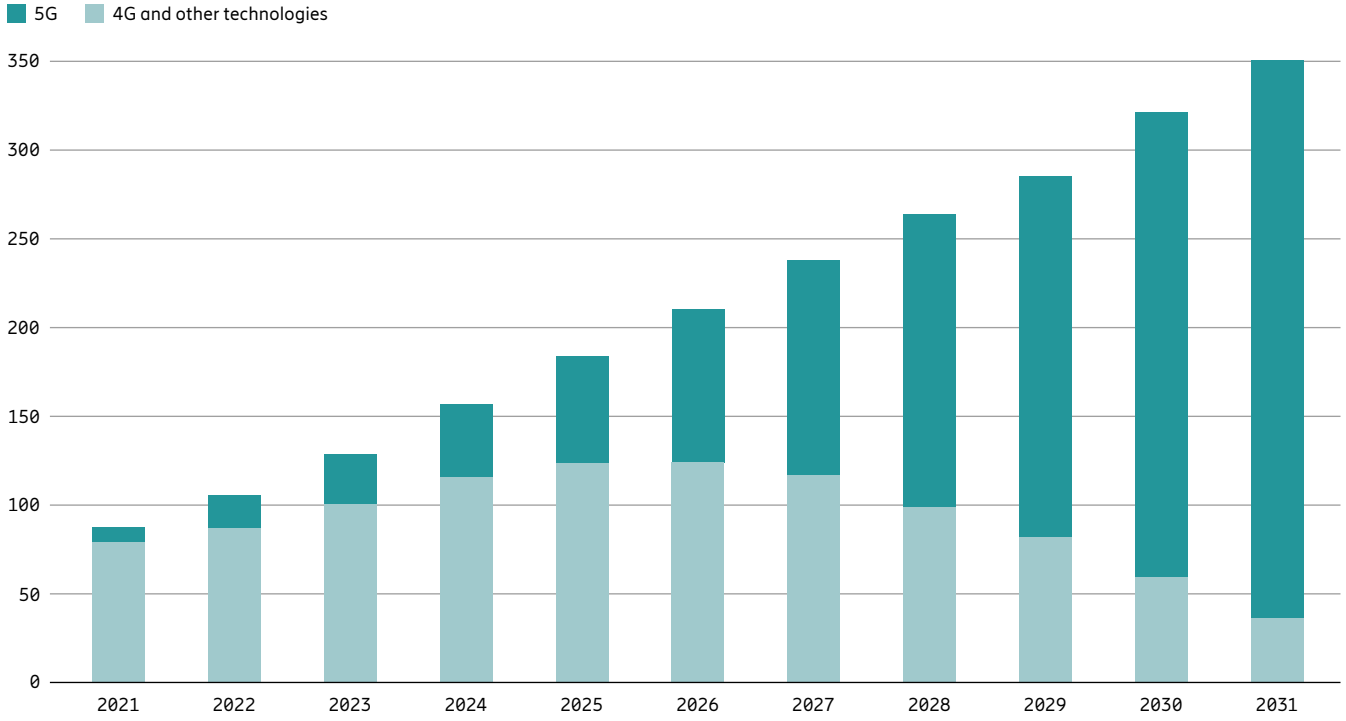
There are large regional variations in the proportion of service providers adopting FWA:

- FWA adoption is widespread globally. In five out of six regions, 75 percent or more service providers are offering FWA.
- In the past year, there has been continuous growth in the number of service providers offering speed-based plans, driven primarily by Western Europe.
- Latin America has the most potential to increase the number of service providers that offer FWA over 5G and speed-based tariff plans.

FWA connection advancements

- During Q2 2025, Jio grew to become the largest global FWA provider in terms of the number of connections, with 9.5 million connections as of Q3 2025.
- There is robust demand for FWA in India, with the combined number of connections from Jio and Airtel reaching 12 million as of September 2025.
- In the US, the three largest service providers achieved all-time-high quarterly FWA net adds of 1.04 million connections in Q3 2025. As a result, their combined FWA user base stands at 14.6 million connections.

Figure 5: FWA connections (millions)



- High-growth markets are leveraging FWA to drive revenue expansion. For example, Smart Philippines reported a 12 percent year-on-year increase in 5G FWA connections, with FWA revenues emerging as the fastest-growing segment of mobile revenues with an increase of 22 percent year-on-year.
- A recent FWA customer premises equipment (CPE) survey, which encompasses insights from 17 leading vendors, projects shipments of 35 million CPE units in 2025, representing a 26 percent year-on-year growth.[2] Notably, 57 percent of these shipments are expected to be 5G-capable.

FWA monetization advancements

- Cosmote, Greece, has introduced differentiated 5G FWA connectivity, reaching 19,000 connections at the end of Q2 2025. This enabled the total fixed broadband segment to achieve growth and reverse the negative trajectory seen from previous quarters.
- In the US, FWA is a major factor in 5G standalone (SA) traffic growth, primarily driven by leading service providers.
- Telstra has launched "Dynamic 5G," an advanced FWA solution tailored for enterprise customers. This offering is based on differentiated connectivity with guaranteed performance levels.

350 million FWA connections by 2031

While 5G FWA adoption is strong in many markets, uptake in certain regions – particularly Latin America, Africa and parts of South East Asia – remains comparatively limited. Nonetheless, many of these regions have substantial underlying demand and long-term growth potential as consumers want high-speed, reliable broadband services. Markets with strong 5G FWA growth excel in two areas:

- **5G deployment maturity:** Characterized by broad 5G population coverage, in particular 5G mid-band coverage (see the network coverage forecast on page 15), as well as adoption of 5G SA and 5G Advanced.
- **FWA monetization maturity:** Refers to a variety of 5G FWA offerings, in particular speed-based FWA such as tiered speed plans. More advanced service providers are offering a premium experience FWA based on differentiated connectivity.

Markets that have experienced strong FWA growth, including the US and India, excel in both of these areas. Conversely, regions with slower growth in FWA connections typically have limited 5G deployment and monetization maturity. Consequently, the aggregated FWA connection forecast has been adjusted one year forward, and is expected to grow from 185 million at the end of 2025 to 350 million by the end of 2031, with 90 percent of the connections being on 5G.

Considering a global average household size of about four people, this equates to approximately 1.4 billion individuals being served by FWA broadband by the end of 2031.

Half of global FWA connections to be in Asia-Pacific by 2031

Higher volumes of 5G FWA in populous, high-growth countries can drive economies of scale for the overall 5G FWA ecosystem, resulting in even more affordable CPE. Asia-Pacific's share of global FWA connections is expected to increase from just over 40 percent in 2025 to 50 percent by 2031.

FWA impact on global mobile network data traffic

At the end of 2025, FWA data traffic is set to represent 27 percent of global mobile data traffic and is projected to grow by a factor of over 3 to reach around 174 EB per month by the end of 2031. This will represent 36 percent of total mobile network data traffic.

In 2031, around 1.4 billion people globally will be served by FWA broadband, with 90 percent on 5G.

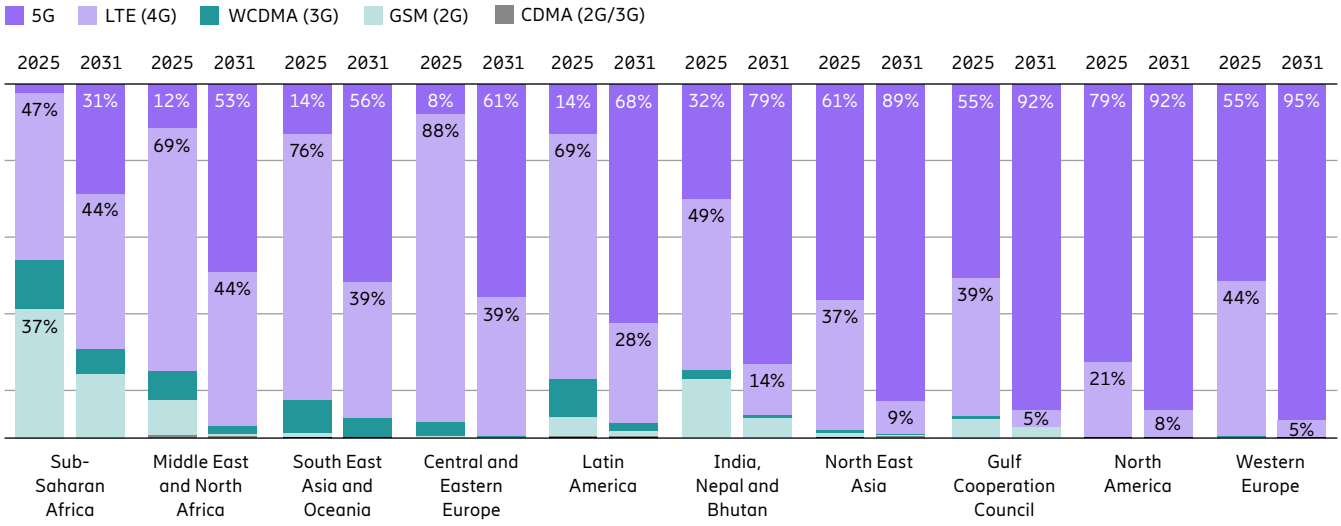
1.4bn

[2] GSA survey (September 2025).

Global growth in 5G subscriptions

In Central and Eastern Europe and Latin America, 5G subscription penetration is expected to grow by over 50 percentage points up to 2031.

Figure 6: Mobile subscriptions by region and technology (percent)



Note: All Middle East and North Africa figures include GCC countries. Currently, 6G subscriptions are not published on a regional level, but included in 5G figures in regions where 6G is expected to launch early.

Sub-Saharan Africa

The telecoms sector continues to drive growth in the region, fueled by a young population, wider access to affordable smartphones, and a rising demand for mobile data and digital services.

The ongoing rollout of 4G and the early stages of 5G deployment are expected to gradually phase out legacy technologies. Sunsetting of 3G networks is anticipated to happen sooner than for 2G networks, with 3G subscriptions expected to decline by 8 percent annually over the forecast period, to a total of 89 million in 2031. 2G subscriptions are projected to fall by 7 percent annually to a total of 243 million. In 2031, 4G is set to account for 44 percent of all mobile subscriptions, while 5G is expected to grow significantly to around 400 million subscriptions.

Smartphone subscriptions are projected to rise to 960 million in 2031. Notably, around 42 percent of these are expected to be 5G subscriptions, reflecting the growing consumer demand and evolving mobile ecosystem.

Service providers are increasingly diversifying their offerings, with a strong focus on fintech – particularly mobile money services – and Fixed Wireless Access (FWA), aimed at boosting connectivity for both consumers and enterprises. The sector's resilience and long-term momentum will hinge on ongoing infrastructure developments and supportive regulatory environments.

Middle East and North Africa

The telecom sector across the region continues to show resilience in the face of ongoing global economic uncertainty and geopolitical complexities.

Regional efforts to diversify economies and drive digital transformation are helping to stabilize the sector and sustain investment momentum. Mobile subscriptions are projected to grow at an annual rate of 1 percent up to 2031, reaching a total of 780 million. Notably, 5G subscriptions are forecast to rise with a CAGR of around 30 percent over the same period, signaling a shift in how users engage with digital services.

In 2031, 4G is anticipated to make up 44 percent of mobile subscriptions, while 5G is set to dominate with 53 percent of the total subscriptions. 5G FWA is also gaining traction as a key enabler of next-generation connectivity, complementing traditional broadband offerings. Service providers are continuously working to enhance network capacity while minimizing energy consumption and their carbon footprint – modernization is key to achieving business goals and reducing energy costs to meet net-zero ambitions.

South East Asia and Oceania
5G subscriptions in the region are forecast to reach around 680 million in 2031. 5G is evolving beyond coverage to prioritize performance, differentiated connectivity and high-value use cases. Service providers across the region have launched experience-led differentiated connectivity offerings, such as boost packs and network slices, for consumers and enterprises.

Singapore offers tiered 5G experiences for consumers and enterprises, delivering differentiated connectivity based on user needs for speed, priority and security. Meanwhile, Australia is rolling out service level agreement-backed 5G for mission-critical enterprise workloads. In Malaysia, network slicing capabilities are now available for 5G consumers. 5G has become a significant driver of data consumption and increased ARPU in Thailand, with service providers reporting 10–15 percent ARPU uplift among 5G users. Vietnam's government is driving accelerated 5G deployment of 90 percent population coverage in 2025, through a mix of targeted subsidies for service providers and spectrum reforms.

Central and Eastern Europe
Technology adoption and subscription uptake has historically been slower here than in Western Europe. 5G deployment varies by country, partly due to slower spectrum allocation processes. However, the region has seen several accelerated 5G deployments, driven by growing demand. For example, Croatia leverages 5G for tourism and smart cities, while 5G in Hungary is going beyond smartphones to the automotive sector and other use cases. Regionally, 5G subscriptions are expected to reach 45 million during 2025.

4G is currently the dominant technology and is expected to account for 88 percent of all subscriptions at the end of 2025. It is estimated that this share will decline after a peak in 2025, as subscribers migrate to 5G.

Latin America
5G is gaining momentum in Latin America after a slow start. Although the region currently has a small base with 106 million 5G subscriptions, the large overall subscriber base is projected to enable Latin American 5G subscriptions to reach 553 million by the end of 2031. Throughout this period of growth in number of 5G subscriptions, the mobile infrastructure is anticipated to mature significantly with the adoption of 5G standalone (SA) architecture, 5G Advanced technologies, network slicing and open programmable architectures. This will fuel digital transformation in the region.

India, Nepal and Bhutan
5G adoption in India is growing rapidly. The expansion of 5G networks, availability of affordable 5G FWA customer premises equipment (CPE) and high data consumption from FWA users is fueling the data traffic growth in India. 5G FWA allows for rapid deployment of broadband services to homes and businesses, especially in rural and semi-urban areas where fiber optic cable installation is slow and expensive, and is helping to bridge the digital divide.

Regionally, 5G subscriptions are expected to reach 394 million at the end of 2025, accounting for 32 percent of total mobile subscriptions. More than 1 billion 5G subscriptions are expected by the end of 2031, reaching 79 percent subscription penetration. 4G is currently the dominant subscription type, making up 49 percent of total mobile subscriptions. 4G subscriptions are forecast to decline from around 600 million in 2025 to around 190 million in 2031, as subscribers migrate to 5G.

North East Asia
The region has the second-highest 5G subscription penetration globally, and is expected to reach 61 percent at the end of 2025. Adoption of differentiated connectivity is expanding across the region, enhancing user experience and creating opportunities for service providers to monetize personalized services.

In mainland China, 5G subscriptions are expected to reach 1.2 billion at the end of 2025, and over 90 percent of smartphone shipments are anticipated to be 5G-capable.[1] 5G Advanced is becoming more widely available, including functionalities such as support for reduced capability (RedCap) and high-order carrier aggregation.

In Japan, progress in 5G SA is improving consumer experiences, and service offerings that leverage differentiated connectivity are emerging. Service providers are also increasing investments in areas such as AI, to support future monetization strategies.

South Korea continues to offer high average 5G throughput while expanding coverage, including in rural areas, through network sharing. Service providers remain focused on improving user experience and preparing networks for increased importance in the AI era, alongside efforts to monetize 5G services.

In Hong Kong, service providers report a substantially increased ARPU from 5G compared to 4G, contributing positively to financial performance.

In Taiwan, service providers have begun testing differentiated connectivity offerings in specific segments, such as live entertainment, with commercial 5G SA services expected to launch within the next one to two years.

Gulf Cooperation Council (GCC)
The region, while small in terms of subscribers, is notable for its high penetration, high levels of urbanization and robust consumer spending power.

Service providers are transitioning from traditional telcos to digital service providers. This is enabled by extensive 5G deployment and the adoption of technologies such as AI, cloud computing and edge solutions. Network slicing, supported by programmable networks and open APIs, is expected to be a cornerstone in delivering customized and performance-sensitive services.

In 2031, mobile subscriptions are expected to reach 97 million. Subscriptions for legacy network generations will decline sharply as users migrate to next-generation connectivity. By the end of 2031, 5G subscriptions are expected to comprise 92 percent of all mobile subscriptions, totaling 89 million.

FWA adoption is driven by demand for high-speed alternatives to fixed broadband and national initiatives aimed at reaching underserved areas and supporting smart-city ambitions.

North America
5G subscriptions are expected to reach 359 million at the end of 2025, accounting for 79 percent of all mobile subscriptions at that time, and to further reach around 450 million in 2031. Leading service providers anticipate continued growth for FWA and are introducing differentiated connectivity to offer tailored experiences. Extensive mid-band 5G network coverage is the foundation for new consumers, enterprises and government innovations across the broader tech ecosystem. The innovations are created at the intersection of AI, cloud and mobile.

Western Europe
5G subscription growth is strong in the region, and is expected to rise from 227 million at the end of 2024 to 307 million in 2025, equaling a penetration of 55 percent. 5G subscription penetration varies between countries, where markets that launched 5G early, such as the UK and Finland, have already achieved high penetration relative to other markets. Going forward, 4G is expected to decline in favor of 5G. 5G subscriptions are anticipated to reach around 540 million at the end of 2031, representing 95 percent penetration at that time, which is in line with other leading 5G markets. 5G mid-band and SA are gaining traction in the region, with leading service providers launching new offerings based on differentiated connectivity in areas such as payment terminals, live broadcasting and photojournalism.

[1] China Academy of Information and Communications Technology (CAICT).

5G standalone: From smartphones to smartwatches and beyond

5G standalone (SA) is playing a central role in improving wearable devices. Smartwatches are leading this development with integrated connectivity, with smart glasses expected to follow in the future.

RedCap wearables supported by 5G SA
The first widely used smartwatch supporting 5G SA reduced capability (RedCap) is now supported by over 20 service providers, underscoring a growing focus on 5G SA-enabled devices. Although wearables cannot compare in sales volume to smartphones, they may have an important role in the future device ecosystem. Device manufacturers selecting 5G SA with RedCap for devices requiring long battery life confirms that the 5G SA era is here, with the rest of the ecosystem expected to follow.

Smart glasses in the 5G era
Lightweight smart glasses typically connect to the cellular network through a companion device, such as a smartphone, but integrated connectivity is expected in the next two to three years. RedCap can play an important role here, providing the size and power efficiency required for this form factor. Companion devices will continue to be important for offloading compute from the glasses, but edge computing is expected to be the way forward. Early adopters of AI/AR glasses report benefits such as the simplicity of hands-free phone calls and use of the simple screen for incoming messages.

The question of whether smart glasses will ultimately replace smartphones remains: Currently, sales volumes are less than 1 percent of smartphones.

Growth of 5G SA-only devices
In China, there is a growing trend toward 5G SA-only devices to reduce cost and increase simplicity. This trend is expected to drive demand for SA roaming, as most service providers today rely on non-standalone (NSA) when subscribers roam. Without SA roaming, these devices will need to fall back to LTE when abroad.

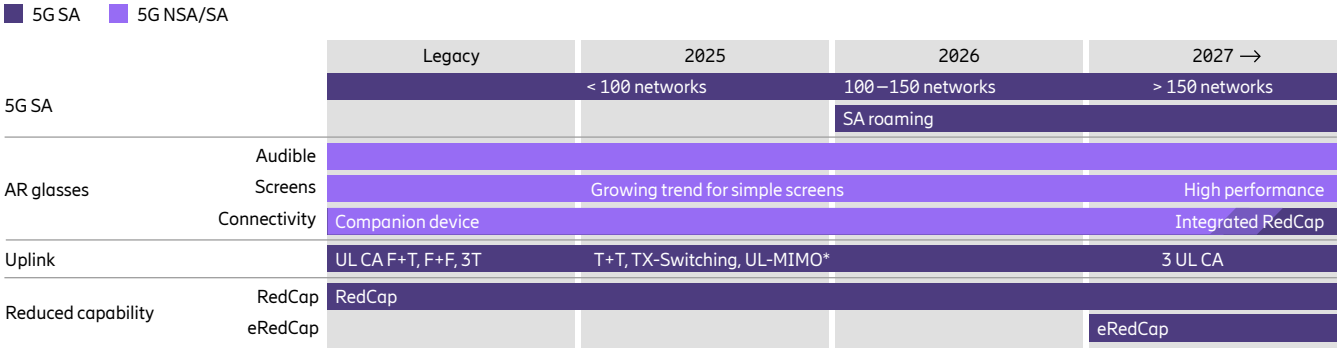
Boosting uplink performance
The smartphone industry is increasingly focusing on uplink performance. Some commercial smartphones now include support for uplink carrier aggregation (CA), combining frequency division duplex (FDD) and time division duplex (TDD) frequency bands to boost capacity and performance. Certain models also support uplink Multiple-Input Multiple-Output (MIMO), enabling the simultaneous transmission of data over several antennas, increasing uplink speed and reliability. A few devices implement Release 16 uplink transmit (TX) switching, a feature that lets the smartphone intelligently switch between uplink antennas depending on signal conditions, providing improved connection stability and energy efficiency.

However, adding more uplink capabilities to the smartphone can introduce size, complexity, cost and battery performance challenges. For Fixed Wireless Access (FWA), there is a concurrent trend to increase output power to strengthen the uplink signal. Overall, the intensified focus on uplink aligns with today's demanding user behavior, where people upload content more than ever before.

EVs and drones driving 5G innovation
Smartphone vendors and established chipset vendors are now investing in the electric vehicle (EV) sector. As cars offload more computational tasks, their data consumption increases. Self-driving taxis, for example, rely on reliable connectivity that can be further enhanced using network slicing.

The low-altitude digital airspace ecosystem, particularly the drone segment, is becoming an important market for 5G connectivity, with 5G SA enabling digital services that enhance cost-efficiency and support weight requirements of drones.

Figure 7: 5G technology area readiness on device



Note: Readiness means more than one infrastructure and device vendor is ready. Key terms: carrier aggregation (CA), F+T (FDD and TDD), F+F (FDD and FDD), T+T (TDD and TDD), TX-switching (antenna switching), UL-MIMO (2TX antennas in uplink), 3 UL CA (3 uplink carrier aggregation).
*Limited market use ahead of timeline.

Decrease in ICT's carbon footprint slows down

While electricity consumption continues to grow – largely due to AI – the adoption of renewables has slowed, leading to only a slight decrease in greenhouse gas (GHG) emissions compared to last year.

Electricity consumption increasing
Global ICT sector electricity consumption in the use stage was estimated to be nearly 1,100 TWh in 2024, up from about 940 TWh in 2020. About 40 percent of the total usage relates to user devices and IoT. The main growth is in the data center segment, where electricity consumption has grown about 9 percent yearly since 2020. This corresponds to about 90 TWh, compared to the rise of 25 TWh 2010–2020. The increase is largely related to AI. For the network segment, the increased electricity usage is about 2 percent per year since 2020, corresponding to about 23 TWh, and mainly relates to an increase reported by the three major Chinese service providers. Between 2010 and 2020 the network electricity usage increased by 88 TWh.

The ICT sector's electricity consumption remains about 4 percent of the global total, increasing in line with global consumption.

The total estimated GHG emissions for the entire lifecycle in 2024 were still about 750 million metric tons (Mt) of carbon dioxide equivalents (CO_2e), reduced by about 1 percent since 2023. In 2020, it was about 780 Mt. The decrease in reported emissions in 2024 compared to 2020 relates to increased investments in renewables by ICT companies and less fossil fuels generally in electricity production. During 2024 however, investments in renewables grew more slowly compared to previous years.

Looking forward to 2030
Up to 2030, it is forecast that electricity consumption will continue to rise gradually in all areas of ICT. The increase in electricity consumption has been greater in the last two years than in previous years, mainly due to the development and adoption of AI. In our current forecast, this increased growth rate is expected to continue during 2025, but thereafter fall back to the previous growth rate. However, this will depend on the future development of AI.

The carbon footprint of the sector is forecast to continue to decrease by 2030, due to an increased share of renewable energy used by networks and data centers, as well as generally in the global electricity grid. This will also reduce GHG emissions from device usage and production.

With the current AI impact, geopolitical situation and slower shift to renewable energy, both electricity usage and GHG emissions are expected to be higher compared to 2024's forecast.[1]

Figure 8: ICT sector development up to 2024 and forecast to 2030

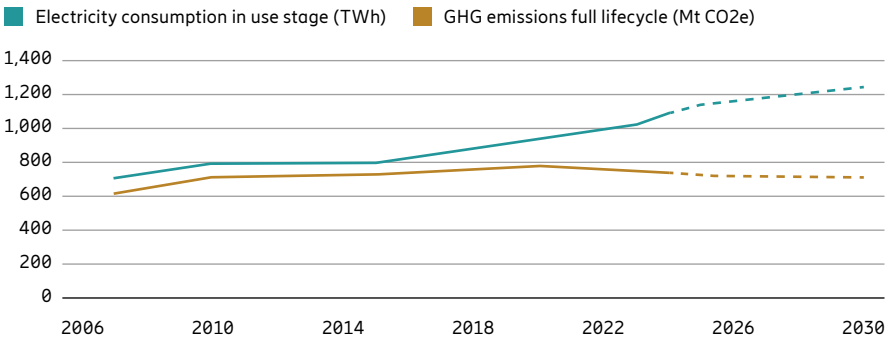
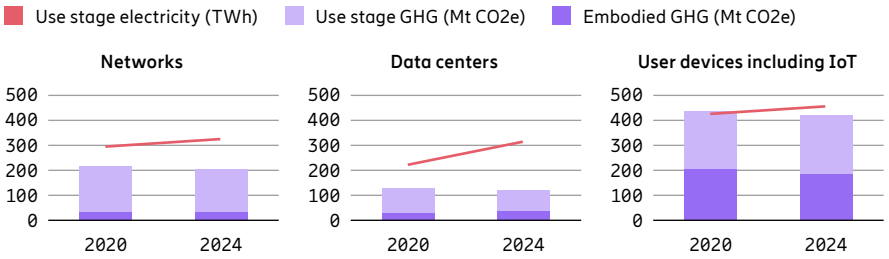


Figure 9: ICT sector 2024 versus 2020



ICT sector
The ICT sector is defined as: **data centers**, meaning all deployments of servers, from small racks to large hyperscale data centers including all infrastructure; **networks**, comprising mobile and fixed networks, including enterprise networks and communication satellites; **user devices** such as PCs, monitors, phones, tablets or customer premises equipment (CPE) such as routers and modems; and **Internet of Things (IoT)**, including payment terminals, surveillance cameras, smart meters, smart home devices and other IoT and machine-to machine (M2M) communication modules.

All segments consume electricity in the use stage, which leads to GHG emissions. The full carbon footprint includes the use stage and the embodied GHG emissions, which covers materials, production, transport and end-of-life treatment.

[1] Ericsson Mobility Report, "ICT's carbon footprint continuing to decrease" (November 2024).

During 2025, mobile network data traffic growth has been stable

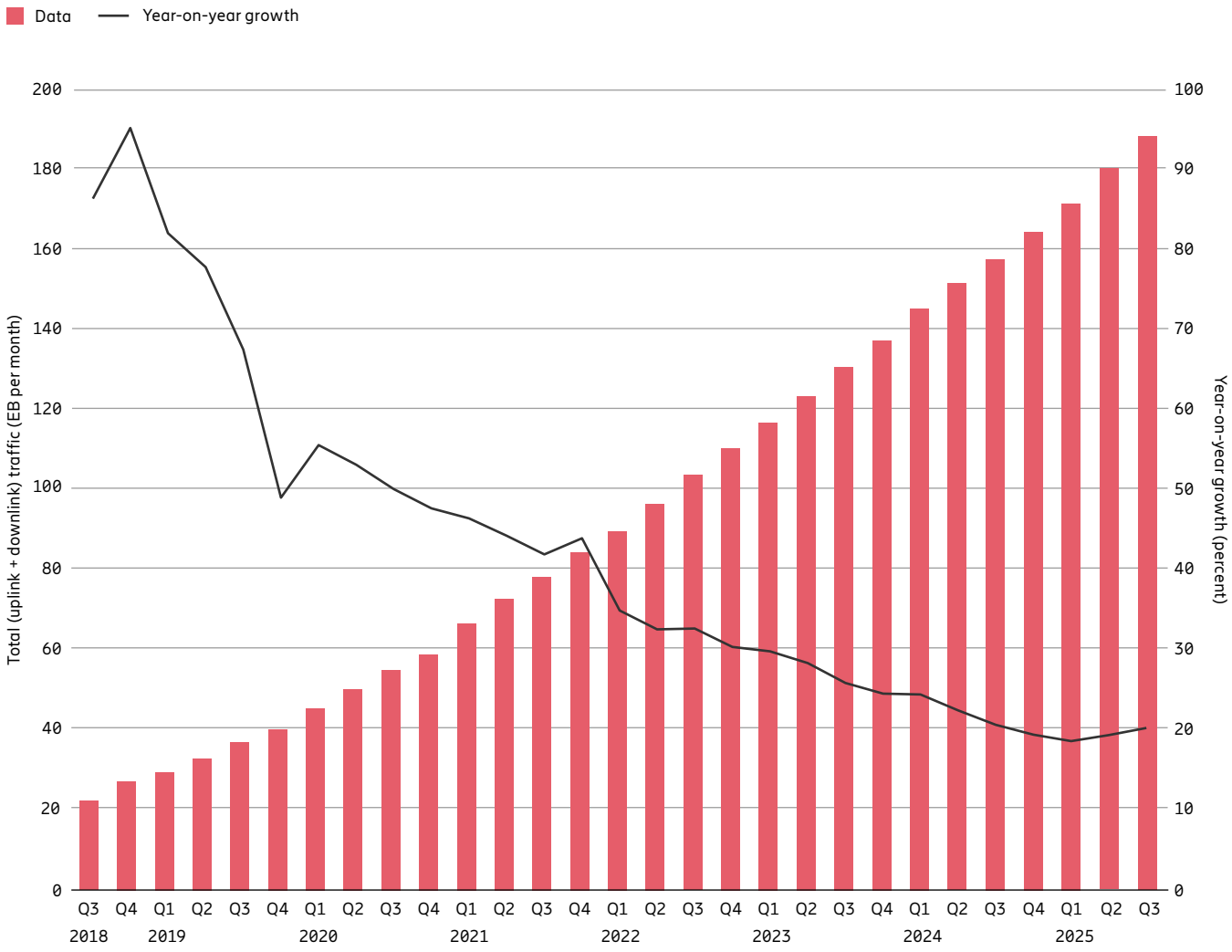
Mobile network data traffic grew slightly above expectations at 20 percent between Q3 2024 and Q3 2025.

The quarter-on-quarter mobile network data traffic growth between Q2 2025 and Q3 2025 was around 5 percent. Total monthly global mobile network data traffic reached 188 EB. The slightly stronger than expected yearly growth in Q3 2025 was mainly driven by India and mainland China.

Mobile data traffic growth is being driven by both rising smartphone subscriptions and increasing average data volume per subscription, fueled primarily by increased viewing of video content. At the end of 2025, video traffic is expected to account for 76 percent of all mobile data traffic.

Figure 10 shows the total global monthly network data traffic from Q3 2018 to Q3 2025, along with year-on-year percentage growth for mobile network data traffic.

Figure 10: Global mobile network data traffic and year-on-year growth



Note: Mobile network data traffic also includes traffic generated by Fixed Wireless Access services.

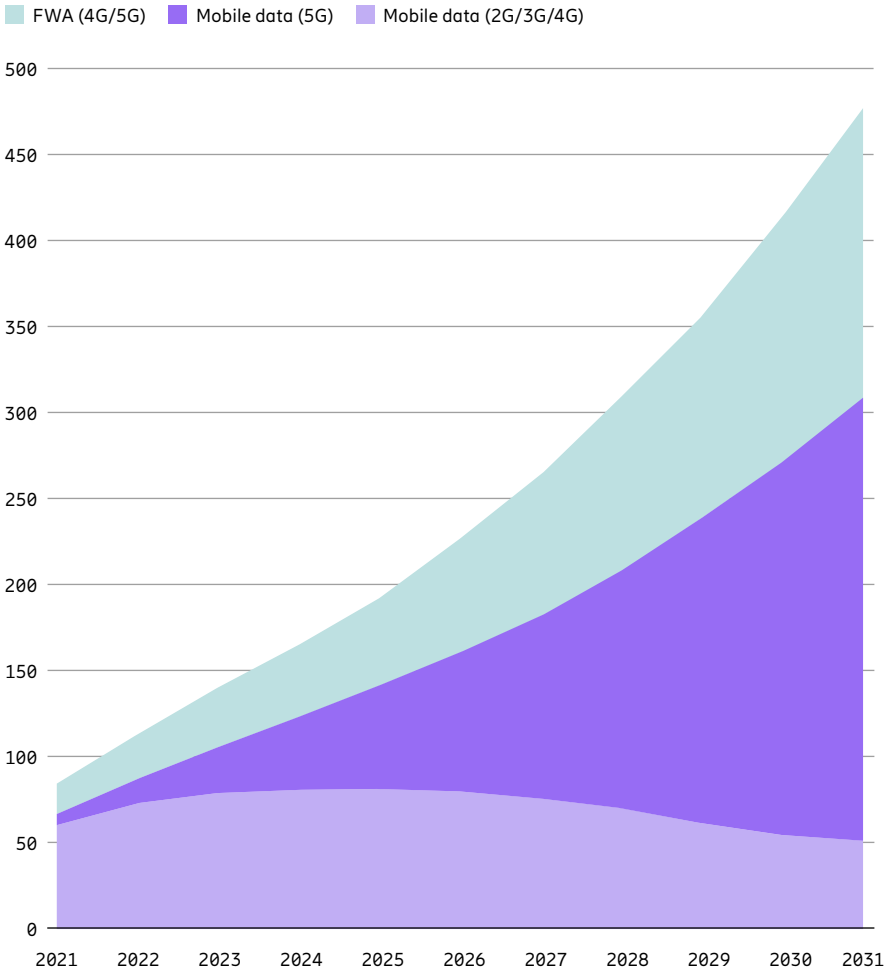
Traffic growth in mobile networks driven by 5G

Mobile network data traffic continues to grow, with the highest yearly net addition so far projected for 2025.

Global mobile data traffic, excluding Fixed Wireless Access (FWA), is projected to increase by a factor of around 2.2 to reach 310 EB per month in 2031. Including FWA, total mobile network data traffic is expected to grow by a factor of around 2.4, reaching 482 EB per month by the end of the forecast period. Despite some regional differences, the overall projections are consistent with the estimate from six months ago.

The share of mobile data carried over 5G is forecast to rise from 34 percent at the end of 2024 to 43 percent by the end of 2025, reaching 83 percent in 2031. In 2031, a 14 percent year-on-year growth rate is expected, with a CAGR of 16 percent over the full forecast period. Total global mobile data traffic generated by 6G subscriptions is expected to be limited in 2031, due to the relatively low number of such subscriptions compared to 5G at that time.

Figure 11: Global mobile network data traffic (EB per month)



Factors that can impact traffic growth

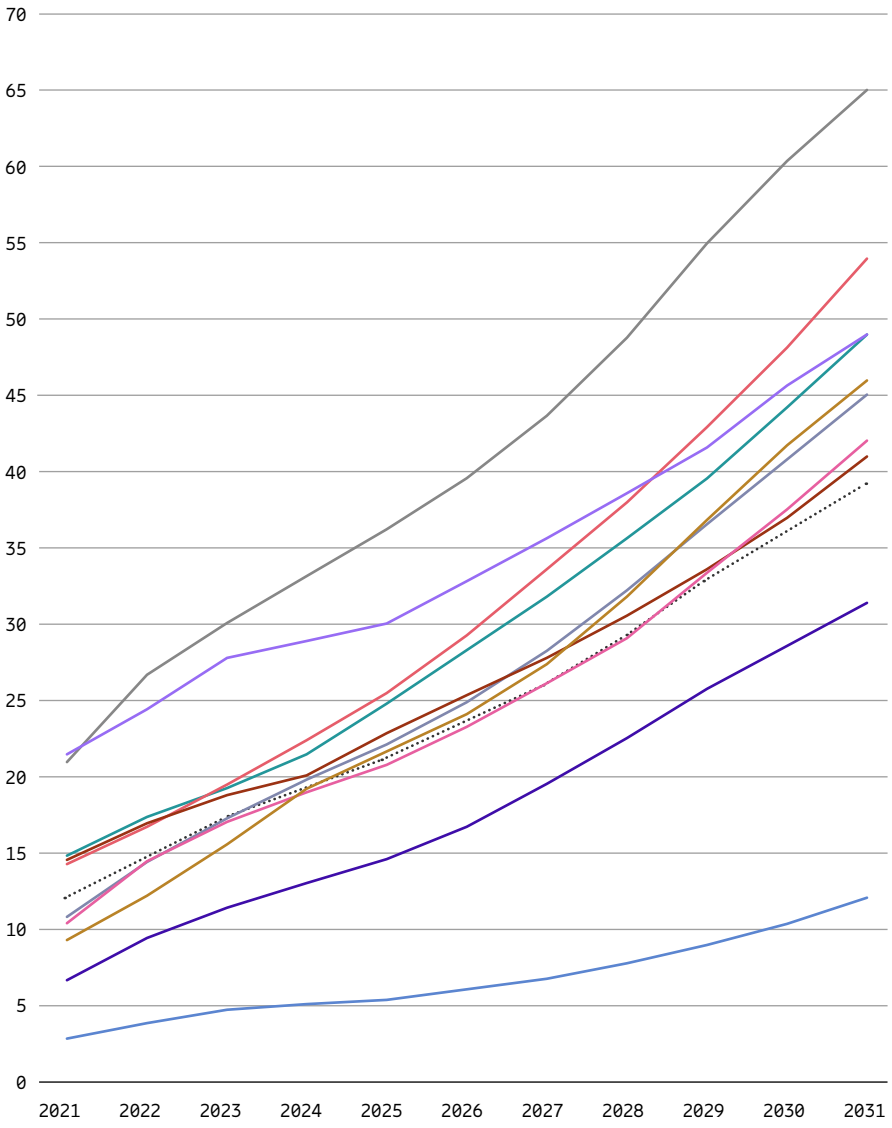
Mobile data traffic growth can be highly volatile and vary significantly between years, regions, markets and service providers, depending on local market dynamics. Factors that could impact traffic growth include:

- The uptake rate of new devices, such as those built for AR, and scalable, multimodal generative AI (GenAI) applications. The current predicted traffic growth up to 2031 includes an assumption that an initial uptake of extended reality (XR) services, including AR, VR and mixed reality (MR), will happen in the latter part of the forecast period. However, if adoption is accelerated, data traffic could significantly surpass our current traffic outlook at the end of the forecast period.
- Tariff plans and available services.
- Continued improvements in the performance of deployed networks.
- The pace of subscriber migration to later mobile technology generations in populous markets like India, Latin America, South East Asia and Africa.
- Changes to the split between FWA and mobile data traffic when FWA connections grow. With continued strong FWA uptake in parts of the world where fixed broadband connections have been limited, it is likely that household-based traffic will move from smartphones to FWA – especially for streaming services.
- Smartphone shipment volumes in different regions.

5G is set to account for 43 percent of mobile data traffic at the end of 2025.

43%

Figure 12: Mobile data traffic per active smartphone[1] (GB per month)



Regions	2025	2031	CAGR 2025–2031
India, Nepal and Bhutan	36	65	10%
Western Europe	25	54	13%
North America	25	49	12%
Gulf Cooperation Council	30	49	8%
Middle East and North Africa[2]	21	46	14%
Central and Eastern Europe	22	45	13%
South East Asia and Oceania	21	42	12%
North East Asia	23	41	10%
Global average	21	39	11%
Latin America	14	31	14%
Sub-Saharan Africa	5	12	15%

The growth in mobile data traffic per smartphone can be attributed to several drivers: improved device capabilities, affordable service plans, increased time spent consuming services, an increase in data-intensive content, and growth in data consumption due to continued improvements in deployed network performance.

During 2025, these factors affected mobile data traffic differently across several countries:

- In Brazil, mobile data prices rose by around 20 percent, driving data traffic growth rate down.
- In China, intensified competition among service providers supported growth in mobile data traffic.
- In South Korea, mobile data traffic reached double-digit year-on-year growth after a prolonged period of single-digit expansion, driven by a larger share of data-intensive content.
- In India, traffic growth increased year-on-year, supported by improved device capabilities.

There are significant variations in monthly data consumption within all regions, with some individual countries and service providers having considerably higher or lower consumption than the regional averages.

As traffic demand varies across regions and over time, it is important to keep in mind that average monthly data traffic growth in a region cannot be used to estimate daily peak traffic growth in a local area, or to support network evolution strategies there. Traffic growth is not universal across locations within a service provider's network. For example, in dense urban locations, traffic demands can be up to 1,000 times larger relative to rural areas.[3]

Average mobile data traffic per active smartphone is 21 GB globally in 2025.

21 GB

[1] Traffic per active smartphone refers to all traffic generated by that device, regardless of number of subscriptions attached.
[2] All Middle East and North Africa figures include the Gulf Cooperation Council countries.
[3] Ericsson Mobility Report, "Exploring how traffic patterns drive network evolution" (June 2023).

5G covers half of the world's population outside mainland China

Total 5G coverage outside mainland China is expected to increase from 45 percent to 50 percent during 2025, while mid-band coverage is projected to grow from 40 percent to 45 percent over the same period.

There are currently 841 4G networks deployed worldwide, with 347 upgraded to LTE-Advanced and 448 LTE devices supporting Cat-16.[1] By the end of 2025, 4G population coverage outside mainland China is set to reach 90 percent globally and is projected to exceed 95 percent in 2031.

The build-out of 5G continues, with around 360 networks launched worldwide. Global 5G population coverage is expected to reach 60 percent by the end of 2025, providing 5G coverage to an additional 400 million people during the year. Outside mainland China, it is projected to increase from 50 percent in 2025 to about 85 percent in 2031.

5G mid-band, either delivered through time division duplex (TDD) or frequency division duplex (FDD), combines high capacity with good coverage. It is available in most markets, making it an ideal choice for delivering the full 5G experience. Combined with a low-band FDD 5G carrier, mid-band can provide full coverage and mobility. Good mid-band coverage is also essential for enabling differentiated connectivity and unlocking new revenue opportunities across consumer and enterprise use cases.

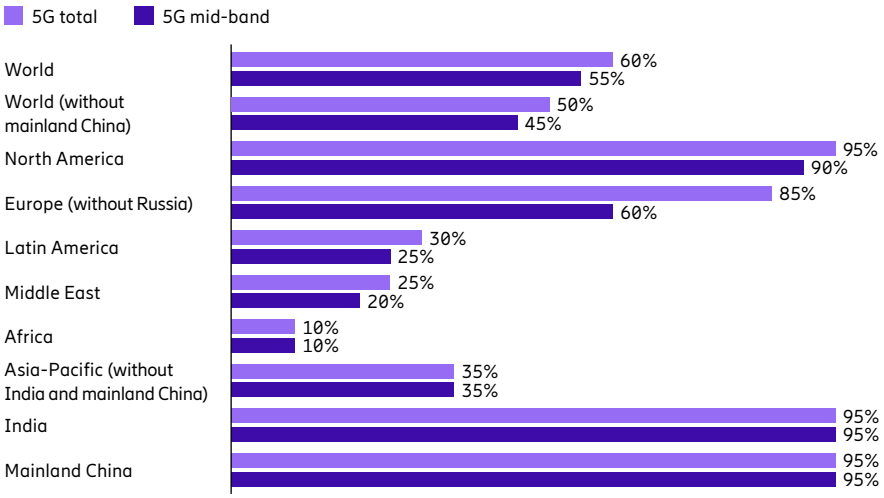
Large regional variations in 5G coverage

By the end of 2025, 5G mid-band population coverage outside mainland China is projected to reach about 45 percent, but coverage levels vary significantly by region. Africa is expected to have the lowest total and mid-band 5G coverage, reaching about 10 percent by the end of 2025. The Middle East shows somewhat higher levels, with a total coverage of around 25 percent and mid-band coverage of about 20 percent expected.

Latin America, with 30 percent total and 25 percent mid-band 5G coverage, and Asia-Pacific (outside India and mainland China), with around 35 percent total and mid-band coverage, both remain below the global average for 5G population coverage. Extensive total and mid-band 5G coverage has been established across North America, mainland China and India, now covering 90–95 percent of the population in these regions.

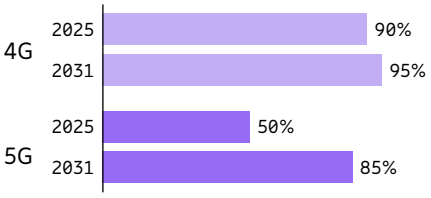
Despite these coverage advancements, only around 35 percent of sites globally outside of mainland China have been upgraded to 5G mid-band.

Figure 13: World population and mid-band coverage[2] split by region (end of 2025)



Note: The figures in these graphs are rounded and refer to the coverage of each technology. The ability to utilize the technology is subject to factors such as access to devices and subscriptions.

Figure 14: World population coverage outside mainland China, by technology



Global 5G population coverage, outside of mainland China, will reach 50 percent by the end of 2025.

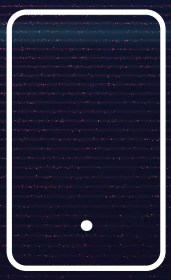
50%

[1] Ericsson and GSA (Oct 2025).

[2] Population coverage is estimated using a database of regional population and territory distribution, based on population density. This is then combined with proprietary data on the installed base of radio base stations (RBS), together with estimated coverage per RBS for each of six population density categories (from metro to wilderness).

Articles

5G has the power to provide tailored experiences for consumers, create business opportunities for service providers and enhance operations for enterprises. Our articles include: a study into how prevalent differentiated connectivity and network slicing are becoming around the world; an exploration of how 5G standalone (SA) is helping Singtel unlock opportunities by providing tailored experiences; a discussion in collaboration with SoftBank Corp. about how 5G can modernize enterprise IT; a case study of how 5G is enhancing operations and viewer experiences at global SailGP events; analysis of different types of video traffic affect traffic patterns; and discussion of how the adoption of some technologies is expected to drive significant uplink growth.

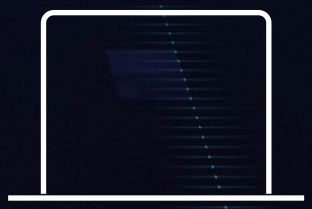


An updated study found that globally there are now 65 commercial offerings from service providers based on 5G SA network slicing.

Page 17

Singtel's strategic focus on 5G SA and differentiated connectivity is delivering commercial offerings to foster loyalty and create new business opportunities.

Page 19



With SoftBank Corp., we explore how technologies such as 5G SA are helping to modernize enterprise IT, offering improved agility and security.

Page 22

A hybrid public/private 5G network is the perfect solution for deployment at the SailGP races, improving fan experiences and handling the data-heavy race operations.

Page 25

Analysis of four sample networks reveals differences in uplink and downlink usage per application category, as well as insights into how users consume video on smartphones.

Page 28

The convergence of AI, cloud and mobile is expected to shift traffic patterns in the near future, which could lead to a sharp increase in uplink demands on networks.

Page 30

Global momentum in commercial differentiated connectivity services

New offerings that leverage 5G standalone (SA) capabilities, such as network slicing, have progressed from limited pilots and niche experiments to fully launched commercial services.

Key insights

- Commercial differentiated connectivity services are accelerating worldwide, with strong growth in both scale and diversity of offerings.
- Europe stands out with the highest number of commercial cases, reflecting increased market maturity and adoption.
- Marketing innovations – such as in-the-moment offers – can significantly outperform traditional channels.

The ability for service providers to differentiate connectivity services – for example, by providing latency guarantees, priority services, security enhancements, immersive experiences, or connectivity targeting specific situations and locations or app categories – is changing with the introduction of 5G SA.

A broad review of the global service provider landscape reveals a striking shift in the pace and scale of commercial service offering launches that are based on differentiated connectivity. In the latest study, covering over 300 service providers across 134 markets, a significantly higher number of launches was found compared to previous studies.

The findings point to a market transitioning from proof-of-concept trials to commercial services that serve real customers in diverse contexts. This shift has been driven by advances in network capabilities and greater confidence among service providers, with an increasing willingness to explore new monetization models beyond traditional data and speed tiers. The extent of engagement is notable, with many service providers now active in several categories simultaneously. This demonstrates scalability, market validation and confidence in the commercial viability of service offerings based on differentiated connectivity. Out of 118 such offerings, 55 percent are commercially available.

Traditional data plans continue to evolve

In the context of traditional data plan offerings, about 99 percent of surveyed service providers offer some form of data bucket plan. Meanwhile, around 58 percent provide one or more unlimited data packages to their users. Regional differences are notable, with unlimited offerings most prevalent in Western Europe, where about 86 percent of service providers include unlimited options in their plans.

There has been a constant growth in the number of service providers in recent years offering device-based plans, mainly driven by smartwatches.

More service providers are deploying 5G networks that can support reduced capability (RedCap), and new categories of RedCap devices are expected to enter the market (beyond today's available broadband devices such as dongles and routers, surveillance cameras and smartwatches). Meanwhile, a range of new consumer and enterprise service offerings are expected to emerge. Commercial broadband services using RedCap devices have been launched by one service provider in the US and by two service providers in the Asia-Pacific region.

Commercialization of differentiated connectivity

Out of 79 service providers with commercially deployed 5G SA, there are 118 documented cases, from 56 service providers, of network slicing being used for some type of differentiated connectivity offering. Of these, 65 are commercially available either as a subscription service, an add-on package, or in the B2B and B2B2C space as a packaged, deployment-ready service. In the B2C sphere, application or situation-focused services such as video conferencing, gaming, event-specific packages and premium fixed wireless broadband subscriptions make up around 55 percent of all offerings. In the B2B area, vertical markets like public safety, transport and logistics, defense and general enterprise use cases dominate.

In the parts of Europe where service providers have deployed 5G SA, they are increasingly active. The region accounts for 45 percent of all network slicing-related activities globally, including trials, proofs-of-concept and commercial offerings. Proportionally, there are more tests and trials in Europe than in other regions such as Asia-Pacific and North America. Out of all commercial offerings globally, 37 and 36 percent are in Europe and Asia-Pacific, respectively. North America constitutes 18 percent of the offerings, with just one service provider accounting for three-quarters of all deployments in the region.

Learning to communicate benefits

One recurring challenge identified by service providers, particularly in the consumer market, is how to explain new offers in terms that resonate with their customers. Selling "more gigabytes" or "faster speeds" is familiar territory – but telling the story of latency guarantees for gamers, uninterrupted HD streaming at live events, or priority service for emergency communications requires a more benefits-led approach. Customers respond more strongly when the offer is tied clearly to their personal experience, a specific app or situational need.

Speed, bandwidth, general performance or stability improvements are still being highlighted as user benefits in 86 of the cases based on network slicing. There are some new areas being highlighted, however, like latency (48 percent) or improved experiences when using a specific service or app (38 percent). In many cases, multiple benefits are communicated and combined to enhance the value proposition.

The word "guarantee" has seldom been used in marketing by service providers, but 22 cases express some form of performance guarantee. These could be guarantees for a maximum latency for gamers, minimum bandwidth on Fixed Wireless Access (FWA) or when using video conferencing, or for businesses buying a "productivity slice" with the mobile private network (MPN/VPN) solution. As described in a previous article, delivering a proposition at just the right moment can be very important.[1] A striking example involves a service provider that utilized a direct in-app promotional strategy (displaying a pop-up within a partner app) that generated 95 percent of its sales for a specific package, making it 20 times more efficient than any other channel.

Many offers blended benefits, combining speed, priority and security messages to enhance perceived value.

Scaling success stories

The number of service providers deploying 5G SA and starting to use network slicing to create differentiated connectivity offerings is increasing at pace. Meanwhile, service providers that were first to introduce differentiated connectivity, some as early as 2022, have now scaled up their deployments and started to broaden their reach. Across the 65 commercial offerings based on network slicing, half of them are offered by only six service providers. Two of the service providers have 17 of the commercial offers combined, including both B2C and B2B segments. This scale-up indicates that the initial launch phase has been successful enough to justify expansion. The variety of current business models – from guaranteed service tiers for broadcasters to secure connectivity for defense applications – shows both the adaptability of the approach with differentiated connectivity offerings and the market's appetite for specialized solutions.

Momentum is real and global

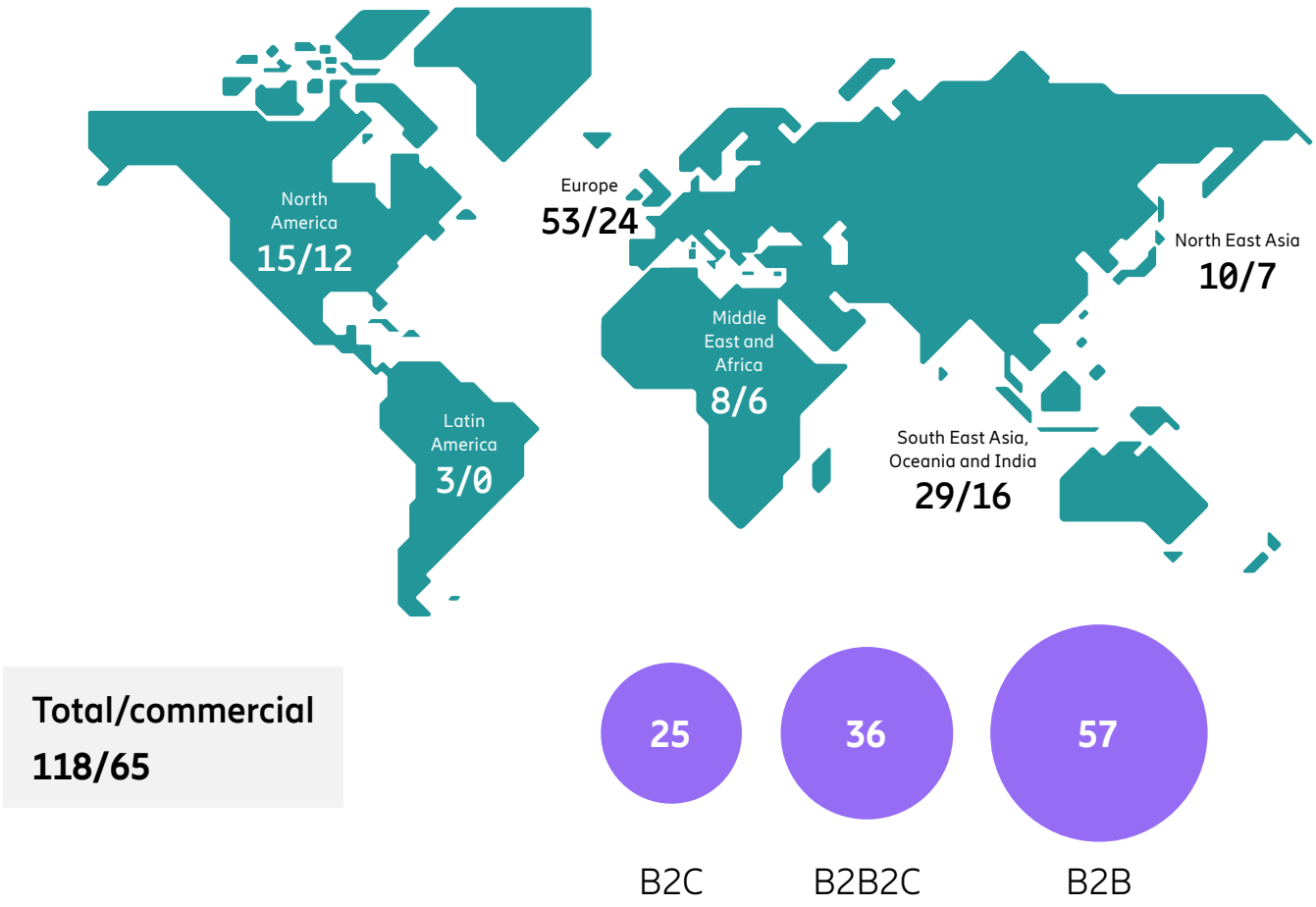
The data from the study paints a positive picture: Differentiated connectivity is no longer a speculative field, it is a growing commercial reality across regions and sectors. The fact that Europe is catching up fast, the scale of multi-segment engagement among service providers, and the proven impact of innovative marketing all point toward a market entering a new phase.

The challenge may no longer be whether these services can be launched, but how best to communicate their unique benefits to users, transforming technical capabilities into experiences and outcomes that customers truly value and are willing to purchase.

Of the network slicing use cases found, 65 are commercial offerings.

65

Figure 15: Global instances of network slicing



[1] Ericsson Mobility Report, "A new era for connected creativity and entertainment" (June 2025).

Growing loyalty and creating business opportunities with tailored customer experiences

For Singtel, unlocking opportunities to offer tailored experiences and add more value to consumers while improving business outcomes is a key priority.

Key insights

- Singtel aims to move the conversation from data quantity toward high-quality performance, shifting the focus to user experience in a digital world.
- Commercialization of differentiated connectivity has been achieved through a cross-organizational focus on developing offerings built upon 5G standalone (SA).
- Increasing application centricity is important for the future evolution of tailored experiences and business outcomes.

Singapore is an island country, similar in size to New York City, with a population of around 6 million people. In 2022, with Singtel's network buildout, it became the first country in the world to be fully covered (95 percent) by 5G SA. In 2025, the network was further enhanced with 5G low-band (700 MHz) added to the existing coverage. This delivers reliable nationwide coverage, especially improving deep indoor penetration. Singtel's early-mover advantage has enabled it to explore and develop products and services to capitalize on the opportunities presented by 5G SA.

A business and technology journey

Singtel's early move into 5G SA clearly signals its strategic priorities. Service providers predominantly compete to offer data packages at the lowest price, meaning increasing the size of data buckets is no longer a differentiator in the hyper-competitive landscape. Therefore, the top priority was to shift the conversation from data quantity to data differentiation, and to make enhanced experiences the new currency, where experience become the main measure of value. This was both a technical and marketing challenge, requiring a company-wide approach. Singtel's strong belief that 5G SA is a strategic asset to achieve this goal has been a driving force behind its successful business transformation, embedding new ways of working to both maximize and commercialize the capabilities of 5G.

From a technology perspective, a robust and flexible network is required to support varying performance levels across consumer, enterprise and industry verticals. Key enablers such as network slicing, advanced traffic management and end-to-end quality assurance mechanisms mean Singtel can deliver consistent, predictable performance. Through the various capabilities unlocked in the network, they have been able to integrate with device and application ecosystems to ensure a seamless user experience.

From a business perspective, differentiated connectivity is most impactful when closely aligned with user needs and use cases. Enterprises, for example, value guarantees on latency, reliability and security for business-critical operations, whereas consumers are increasingly aware of enhanced experiences in gaming, streaming and immersive applications, and seek high-performance connectivity capabilities to support these needs. Differentiated connectivity is not just a network feature – it is a customer value proposition that requires strong collaboration from technology, business and ecosystem partners to unlock its full potential.

Singtel

This article was written in collaboration with Singtel, a leading communications technology group in Asia, providing a portfolio of services from next-generation communication, 5G and technology services, to infotainment for both consumers and businesses.

Co-creation with partners, clear consumer monetization models and business outcome-driven offerings for enterprises are essential for success.

Singtel was able to bring the technical and business aspects together through building a common language across the organization as a foundation, removing barriers between the technological and commercial sides of the organization. From here, a unifying goal of launching offerings that provided tailored experiences was built, based on the combined technical capabilities and value proposition of differentiated connectivity.

In 2022, Singtel had already achieved 95 percent nationwide 5G SA coverage.

95%

Figure 16: Singtel 5G+ commercial offerings structure

	5G+	5G+ Enhanced	5G+ Priority
Connectivity	**Network PLUS** – 700 MHz **Coverage PLUS** – deep inside	**Network PLUS** – 700 MHz **Coverage PLUS** – deep inside **Enhanced network** – 2x faster speed **Enhanced roaming** – trusted partners	**Network PLUS** – 700 MHz **Coverage PLUS** – deep inside **Priority lane** – 4x faster speed **Priority roaming** – first choice partners
Services		**Enhanced security** – security protection software **Enhanced care** – 24/7 hotline	**Priority security** – Mobile Protect **Priority care** – dedicated in-store service and 24/7 hotline
Extras		**Enhanced deals** – latest phones	**Priority deals** – 15 percent off accessories

From data quantity to performance differentiation at scale

The industry is exploring differentiated connectivity services, with growth in both scale and diversity of offerings. In 2025, Singtel's first nationwide commercial offering, 5G+, was introduced. It is a three-tier structure that allows consumers to select experience levels aligned to their needs. These tiers are enabled by network slicing capabilities and are elevated by product value propositions, enhanced cyber security, and exclusive user experience and perks. 5G+, the entry-level package that all existing 5G consumers have been migrated to, provides reliable nationwide coverage with the ability for consumers to further enhance their plans according to their desired connectivity performance and consumer experience needs.

5G+ Enhanced is where slicing is used to provide enhanced connectivity in congested situations with up to two-times faster speeds. Additionally, it features improved roaming and stronger security. This package also includes the flexibility to upgrade during moments of greater connectivity need via a priority boost pass. To build the full value proposition, enhanced security, roaming and customer care are bundled into the offering alongside promotional subscriptions to premium streaming applications.

5G+ Priority is the top-tier offering that is also based on slicing but includes up to four-times faster speeds and network priority in congested situations, exclusive benefits and dedicated customer care. To kick-start adoption of this plan, existing top-tier plan consumers were upgraded for free. With greater bandwidth, ultra-low latency and faster speeds, users enjoy better digital experiences such as smoother streaming, ultra-responsive gaming and uninterrupted video calls. Users benefit from seamless connectivity even in high-traffic areas and during peak hours. This plan also includes priority security in the form of Mobile Protect, a security-as-a-slice service, which provides advanced real-time monitoring for protection both locally and while roaming.

Experience, the new currency

Network developments in preparation for this launch were focused on experience differentiation for all users. For example, when Singtel achieved nationwide 5G low-band (700 MHz) coverage, it resulted in up to a 40 percent increase in signal strength in high-rise indoor and underground spaces, as well as in remote areas. This has been used to redefine the base-level experience for all Singtel 5G customers. This addresses a critical factor for network satisfaction: A recent study found indoor coverage was the second most important factor impacting overall network satisfaction in Singapore amongst 5G users aged 15–69.[1] All of Singtel's 5G+ subscribers can access enhanced connectivity with a priority boost offering, be it for concerts, gaming marathons, or video streaming binge sessions. To achieve this, Singtel has built alignment across networks, business support systems and IT systems, to ensure the time to commission such services is reduced, allowing users to buy in the moment.

Consumer research from 2025 shows that one in three users in Singapore were willing to pay for assured network performance.[2] The recent study found that 8 percent are interested in hourly connectivity boosts that could be activated at critical moments, while 25 percent are interested in monthly subscriptions that offer enhanced connectivity performance.

The new performance-based plans are in their early days. However, initial findings show high levels of satisfaction from consumers who had subscribed to the 5G+ Priority plan, who were delighted to be upgraded and received the promised four-times faster speed based on congested situations. For example, at a recent Lady Gaga concert, 5G+ Priority users noticed faster speeds and reported being able to send messages and upload videos to social media without any problem. A notable 32 percent of frequent concert attendees reported a superior network experience compared to past concerts. This positive sentiment is a vital step in defining experience as the new currency, moving the conversation from data quantity to data differentiation and tailored experiences.

Nationwide 5G low-band coverage resulted in a 40 percent increase in signal strength in indoor locations.

40%

[1, 2] Ericsson ConsumerLab research (2025).

Developing the market

The 5G+ Enhanced and Priority plans are seeing encouraging uplifts in subscribers after just a few months following the launch, as consumers with more demanding connectivity needs opt for these packages. A key to success here has been market education that simplifies complex technical concepts, such as network slicing, for consumers in a way that is simple and relatable. This means highlighting how users get consistently better performance in real-life situations – from crowded concerts to high-traffic areas. The message is moving the conversation away from "how much data you have" to "how reliable your network is when it matters most."

Moving beyond a one-size-fits-all approach and focusing on tailored experiences, Singtel aims to both strengthen consumer loyalty and unlock new revenue streams. To realize this, it is important to deliver differentiated services tailored to the diverse needs of consumer segments. This means developing offerings that address specific use cases. For example, offering real-time monitoring and security solutions for consumers, whether at home or abroad, or guaranteeing access to subscribers in congested areas, or providing reliable, secure and customizable services for enterprises.

Increasing application centricity

To deliver tailored experiences that meet the diverse needs of users, becoming more application-centric will be important for optimizing the user experience. For example, Singtel has already tested the slicing capability with User equipment Route Selection Policy (URSP), working with content partners to monetize this capability with content, video or gaming apps. Figure 17 shows how 5G Advanced Latency Priority Scheduling is being used to identify and prioritize time-critical game data, such as player commands and in-game animations, reducing delays in real-time gameplay.

This will become even more important with AI and extended reality (XR), two of the most transformative forces expected to shape the future of digital experiences. On one hand, AI is becoming the engine of personalization, automation and intelligence, enabling networks to self-optimize, services to be tailored in real time and enterprises to run more efficiently. On the other hand, XR devices and applications are pushing the boundaries of how people interact with the digital world, whether through immersive entertainment, training, remote collaboration, or industrial use cases.

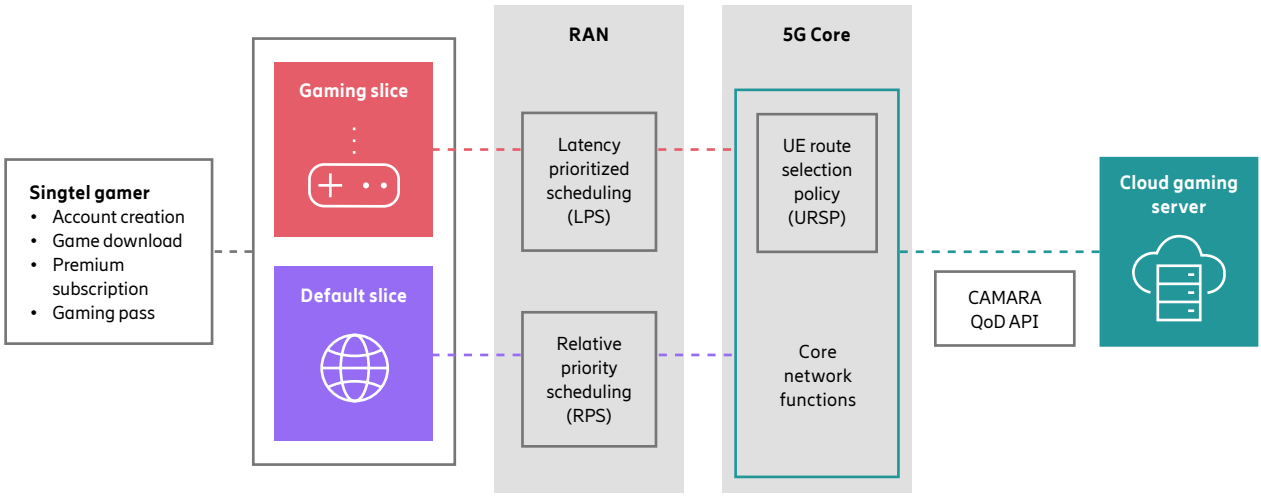
For Singtel, the excitement is around the convergence of the two: AI will be critical to make XR experiences seamless, adaptive and accessible, while 5G connectivity provides the low-latency, high-bandwidth foundation to deliver them reliably anytime, anywhere. In the near future, Singtel expects to see AI-driven XR services move from pilots into mainstream adoption, creating opportunities for both consumers and enterprises, and reinforcing the value of differentiated connectivity. Success here will be driven by volume offerings for the mass market experiences that are application-centric for efficient individual experiences. Alongside the new devices and user interfaces that smart glasses will provide, this will unlock new revenue streams.

Network APIs for QoD

The future for enhancing application-centric offerings is the ability to use differentiated connectivity via a quality-on-demand (QoD) API. This would provide an interface for enterprises and applications to dynamically request specific network parameters, such as latency or throughput, to improve network performance during high traffic load conditions, tailoring connectivity to the needs of specific services. Singtel is actively piloting its API Gateway, extending to the QoD API and network exposure, to become a key enabler of next-generation digital services, providing real-time boosts for gaming, streaming and immersive XR experiences. While Singtel believes the QoD API could potentially provide monetization opportunities, there are several factors that need to be addressed as an industry to make it scalable and profitable. These factors include network complexity, a fragmented ecosystem and a standardization gap for interworking and operational implementation. But as with 5G SA and differentiated connectivity, having the foresight to start early is important for Singtel so they can build the knowledge base required to move fast and scale with confidence, when the time is right.

Figure 17: Singtel gaming slice

"5G Advanced Latency Priority Scheduling – this technology identifies and prioritizes time-critical game data, such as player commands and in-game animations, reducing delays in real-time gameplay."



Source: Singtel press release, "Singtel and Tencent Games to launch Honor of Kings" (4 September, 2025).

Modernizing enterprise IT with 5G

As digital transformation accelerates in the enterprise sector, service providers are well positioned to modernize enterprise IT, shifting from traditional site-bound perimeter models to secure, zero-trust endpoint-centric models that improve user experience while enabling agile, resilient operations.

Key insights

- SoftBank Corp. aims to enhance its 5G network and develop enterprise solutions that leverage 5G standalone (SA) capabilities.
- An endpoint-centric model, built on zero-trust, 5G and cloud technologies, is set to redefine enterprise IT architecture.
- More agile, flexible business practices will be enabled by making 5G programmable networks available to enterprise IT.

SoftBank is advancing its Beyond Carrier strategy – an initiative that guides its efforts to combine mobile network expertise with cloud, security and AI capabilities to support enterprise digital transformation. Within this approach, SoftBank continues to enhance its 5G network and develop enterprise solutions that leverage 5G SA capabilities such as ultra-low latency and massive device connectivity, which are essential for modern enterprise IT environments.

Facing new challenges in enterprise IT management

For decades, enterprise IT has largely revolved around centralized, site-based infrastructure. Data centers, on-premises servers and wired networks formed the backbone of corporate computing and communications. However, the rise of remote work, high-performing mobile networks and 5G laptops, and cloud services is disrupting this model. Enterprises now require greater agility, scalability and mobility to support distributed operations and real-time data processing.

The enterprise IT market encompasses a wide range of technologies and solutions designed to support complex business processes, enhance productivity, ensure security and enable digital transformation at scale. These technologies are typically implemented, managed and maintained by the enterprise's IT department. The trends of cloudification, hybrid working and AI are raising significant challenges for enterprises to cost-effectively and securely manage, maintain and develop existing IT infrastructure to meet future demands:

- **Cloudification:** The current software trends strongly lean toward cloud services driven by their flexibility, scalability, cost-effectiveness and ease of maintenance. As enterprise applications migrate to the cloud, IT infrastructure becomes lighter but also more distributed – requiring consistent management and security across locations and devices.
- **Hybrid working:** Catalyzed by the COVID-19 pandemic, hybrid working has become the new normal for many organizations. Enterprises are now managing users and devices across office, home and mobile environments, requiring seamless and secure connectivity. This shift increases reliance on mobile networks and makes location-based security models less effective.
- **AI:** Enterprises are increasingly integrating AI tools into a wide range of business functions, and even moving beyond pilot initiatives to embed AI in their core operations, such as automating tasks and enabling real-time decision making. These applications depend on continuous, secure connectivity to access data and computing resources distributed between the cloud and edge. In this context, 5G's low-latency and always-on characteristics provide the foundation for secure and responsive AI-driven workflows, while also reinforcing the need for zero-trust security principles.

SoftBank

This article was written in collaboration with SoftBank Corp. (SoftBank), a leading communications and technology company operating one of Japan's most advanced 5G networks. SoftBank aims to drive enterprise digital transformation by combining mobile connectivity with cloud, AI and security innovations.

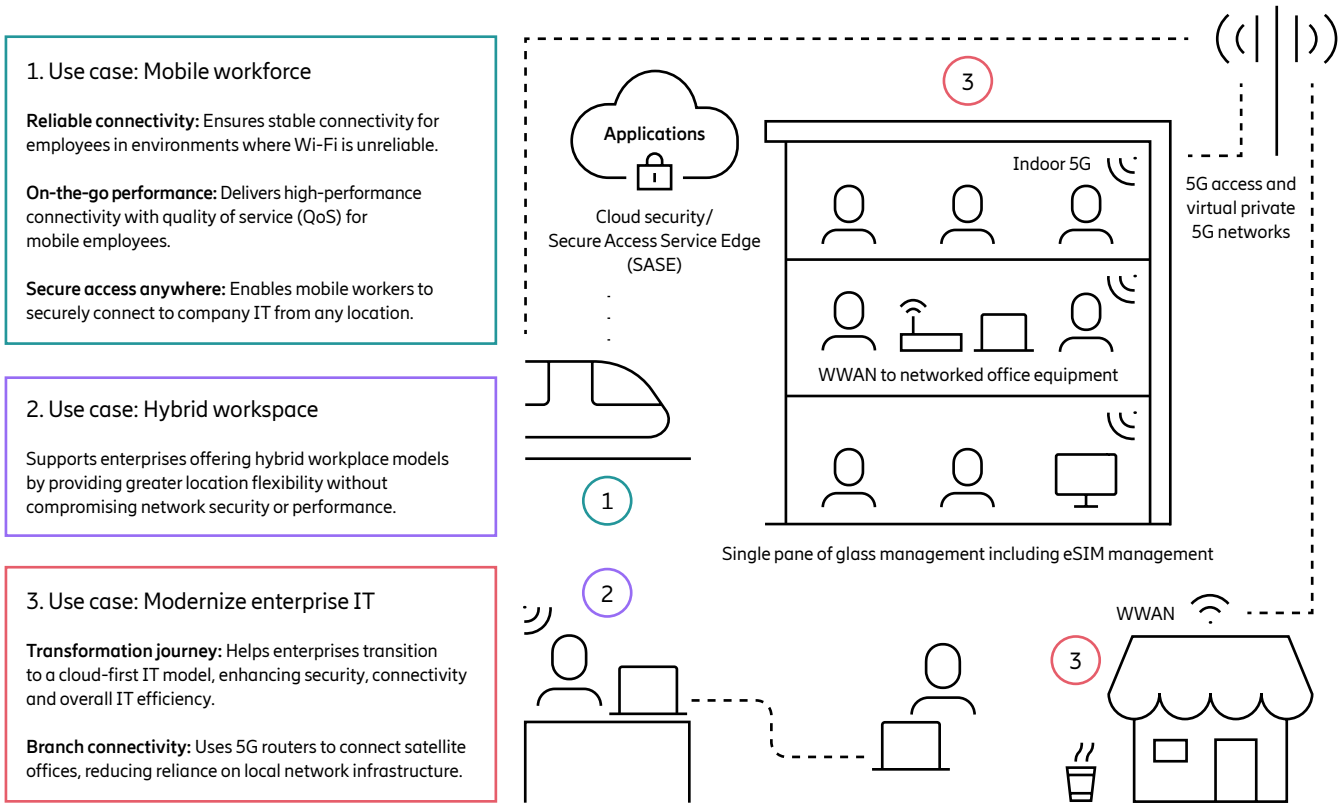
Enterprises face significant IT management challenges in: device selection, procurement and lifecycle management; network design and operations for both on-site and remote locations; and IT asset governance. The shift to hybrid work broadens the scope of these tasks. In environments that mix on-premises and cloud systems, secure operations based on zero-trust principles are increasingly essential. From a management perspective, the ongoing costs of maintaining legacy systems are a persistent concern.

5G laptops: Anywhere is a secure office

Cellular-enabled laptop adoption is expected to grow faster than the overall laptop market. By 2030, the global installed base of 5G laptops is, by some external analysts, projected to approach 100 million, corresponding to a CAGR of approximately 45 percent between 2024 and 2030.[1] The growth of 5G laptops, combined with the migration of enterprise applications to cloud platforms, serves as a catalyst for enterprise IT transformation.

[1] External analyst forecast (H2 2025).

Figure 18: IT infrastructure-light enterprise



This shift indicates that traditional perimeter-based, location-dependent enterprise IT network architectures will become increasingly obsolete, making way for more flexible, cloud-centric and zero-trust networking approaches enabled by seamless 5G connectivity both inside and outside the office.

Traditional, perimeter-based architectures rely on securing fixed physical sites and treating remote access as an exception – typically employing device certificates and virtual private networks (VPNs) to mimic a trusted internal environment. This approach is becoming less cost effective as modern workforces demand secure, seamless connectivity from anywhere, and as new operational models emerge that leverage 5G networks to meet evolving user demands and offer enhanced experiences.

Transitioning to a mobility-first, zero-trust network

A mobility-first, zero-trust network protects enterprise information assets by continuously validating both the user and the device, rather than basing security on physical location. Access rights are determined by identity and the device's security posture. By leveraging persistent device authentication based on non-removable eSIM and SIM credentials managed through the mobile network, and integrating these with enterprise-managed identity systems and device management platforms, organizations achieve a unified, high-assurance security framework that works seamlessly across office, home and mobile environments. With the traditional notion of a "secure location" disappearing, there is no longer a need to centralize assets at specific sites. This new model allows enterprises to provision, manage and secure devices anywhere – creating the foundation for more flexible operational practices. Service providers play a key role in enabling this transformation, as mobile networks provide the trusted, always-on connectivity required to verify users and devices continuously.

In a zero-trust environment built on persistent device identity, even traditionally IT-controlled tasks such as device provisioning can now be performed securely by end users. User-driven onboarding – supported by cloud-based Unified Endpoint Management (UEM) tools and integrated mobile authentication – enables employees to set up corporate devices directly, wherever they are, without compromising security. This approach reduces operational overhead and enhances flexibility in enterprise IT operations.

Enhancing security and policy enforcement across working environments

Cellular laptops maintain continuous connectivity via the mobile network. This ensures remote management functions and security actions can be immediately executed at any time and at any location, such as remote wiping or the removal of connection profiles if a device is lost or stolen. Always-on, network-native connectivity also gives IT administrators increased confidence in managing and responding to incidents by enabling consistent policy enforcement across all working environments within a zero-trust framework. While this consistent policy enforcement is a core benefit, another important advantage of cellular-first connectivity is the reduced dependence on extensive Wi-Fi infrastructure, enhancing both security and operational simplicity.

Transforming enterprise IT with 5G and partners

In collaboration with partners, SoftBank has been exploring new ways for enterprises to build secure and flexible connectivity for remote and hybrid workforces. High-performing 5G networks enable employees to securely access cloud-based services using 5G-connected laptops – whether in the office, at home or on the move. These initiatives illustrate how 5G connectivity can simplify enterprise IT architecture while supporting zero-trust and AI-enabled workflows that enhance both security and productivity.

Improved efficiencies with mobile-first connected laptops

In Japan, enterprises are increasingly looking for ways to improve both security and productivity through mobile-first IT environments. SoftBank conducted an internal study involving employees from the enterprise sales division to evaluate the benefits of equipping employees with cellular-enabled PCs, focusing on the direct impact on users. For example, participating sales employees often need to access company resources while visiting customers. Previously, they had to spend several minutes preparing their devices and completing authentication procedures before each presentation. With cellular PCs providing continuous, secure connectivity within a zero-trust framework, this step was eliminated. Based on internal trials, this improvement translated into measurable productivity gains across the sales organization – the cumulative reduction is estimated to be up to one full working day per month, per employee. This demonstrates how cellular-enabled PCs can enhance both security and employee experience by enabling truly seamless, always-on access to enterprise resources.

Quantifying potential IT cost efficiencies

As enterprises transition their office environments to support hybrid work and accelerate cloud migration, traditional LAN and WAN infrastructures often become underutilized yet still costly to maintain. According to Ericsson internal analysis, replacing parts of these conventional network environments with 5G-based architectures leveraging network virtualization could reduce overall IT infrastructure costs by up to 50 percent, depending on deployment conditions and enterprise size.

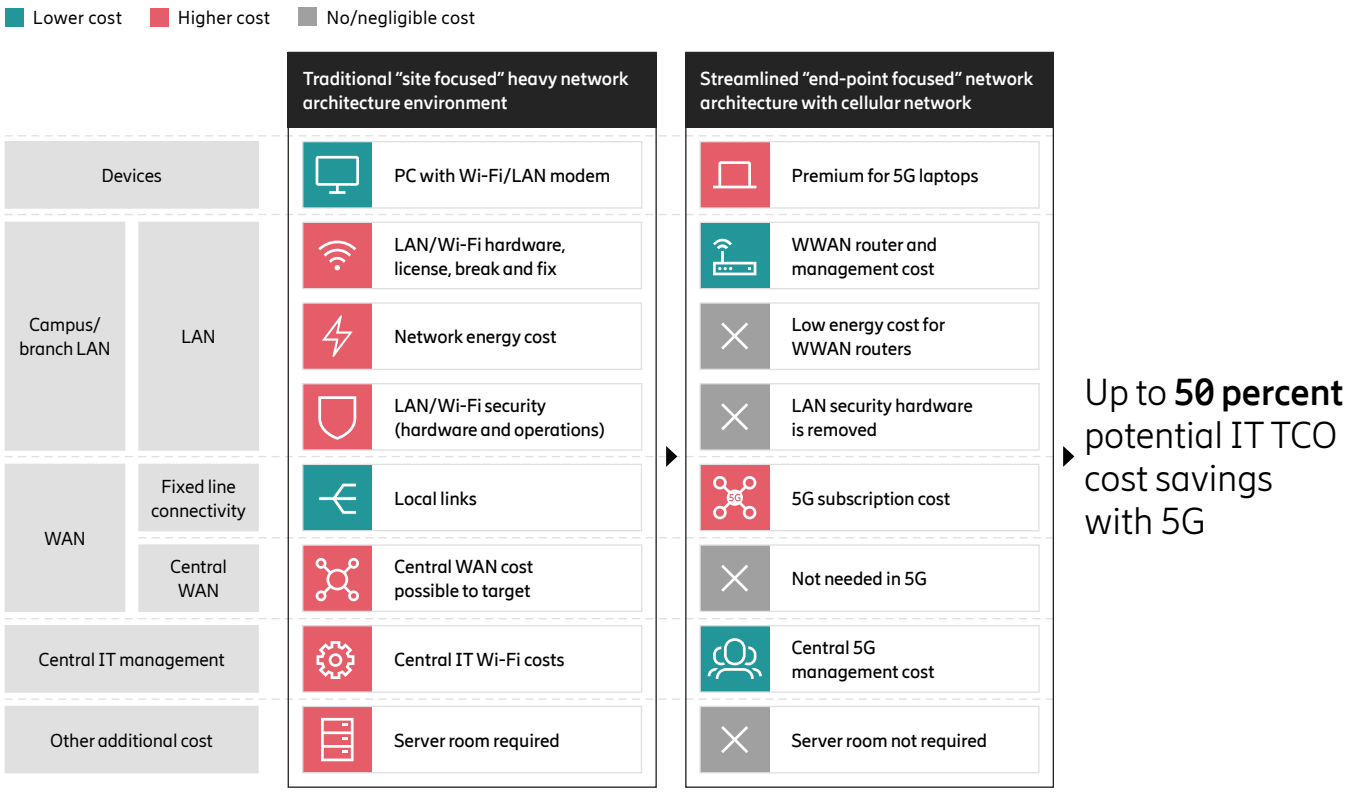
Ericsson Japan has also been implementing this approach within its own offices, gradually replacing local Wi-Fi environments with private 5G networks. Early internal results show reduced operational complexity and improved network reliability, providing a practical demonstration of how 5G can streamline enterprise IT and connectivity management. While the actual savings will vary, such 5G-enabled architectures offer opportunities to simplify network operations, improve agility and future-proof enterprise connectivity.

Evolving to an infrastructure-light enterprise

As enterprises accelerate cloud adoption and hybrid work, a fundamental shift from perimeter-based security to zero-trust models is becoming essential. A mobility-first, zero-trust architecture – powered by cellular-connected secure endpoints – enables service providers to deliver this transformation with capabilities unique to 5G mobile networks. This evolution not only strengthens enterprise security across all workspaces during hybrid working, but also streamlines operations and paves the way for more agile, flexible business practices by making 5G programmable networks available for enterprise IT.

Service providers are uniquely positioned to lead this transformation, integrating secure connectivity, identity management and managed lifecycle services into a cohesive solution offering for enterprise customers. In doing so, they enable enterprises to boost operational efficiency, strengthen security and reduce total cost of ownership (TCO) – while enhancing user experience and laying the groundwork for AI-driven innovation. The endpoint-centric model, powered by zero-trust, 5G and cloud technologies, is positioned to redefine enterprise IT architecture. Service providers who embrace this shift stand to gain not only new revenue streams but also deeper strategic partnerships with enterprises undergoing digital transformations.

Figure 19: TCO comparison: Traditional enterprise IT infrastructure versus 5G



Note: Central IT management includes connectivity procurement, central management of network equipment patches and software updates, and network operation centers for troubleshooting.

5G is supercharging sports technology, events and entertainment

A hybrid 5G public and private network provides high-quality 5G connectivity, improving fan experience and race operations, all with distinct requirements.

Key insights

- Real-time data is critical for the SailGP competition, with teams reliant on instant data to make tactical decisions. Fans also benefit from enhanced insights into sailing strategies.
- Deploying 5G networks in harsh marine environments, with limited setup time and varying licensed spectrum across global locations, requires advanced planning and compact, manageable hardware.
- The optimum event solution is to expand 5G deployment across all use cases, combining private networks and public network slicing to fully leverage 5G's capabilities.

Each year, 12 international teams race in SailGP, a global racing competition that spans multiple grands prix held across various locations worldwide. The event creates an even playing field for competitors, with each team racing on an identical high-performance F50 catamaran and having access to the same race data. This means it's the skill and split-second responses made by the athletes that make the difference between victory and defeat. To support those decisions, each team requires access to real-time data and statistical feedback instantaneously, despite their F50s reaching speeds of up to 100 km per hour over open waters. Beyond the racing itself, operations must also run seamlessly on the land: security, retail outlets and the fan engagement and experience from live broadcast to Wi-Fi must all be managed.

Data drives the SailGP experience

Secure and resilient network connectivity with predictable performance is required to enhance both the racing and the fan experience. When racing, each team is looking to gain a competitive advantage, so optimizing their vessel in real time is critical. This is supported by real-time transport of extensive data between off- and on-shore teammates about boat speed, wind conditions, race position, course layout and other factors. To ensure fairness and transparency, the data is sent immediately, directly and securely into the cloud, and shared with all teams. This allows for real-time analysis to maximize speed and efficiency, for example by adjusting sail settings and boat trim, and to enhance tactical decision-making, such as choosing optimal sailing angles, deciding when to turn left or right, and strategizing for rounding marks. To improve spectator engagement, harnessing connectivity is key, allowing viewers to benefit from shared data which provides insights into the intricacies of sailing tactics and strategy, making races more engaging and understandable.

Connectivity in challenging environments

There are several main challenges facing the SailGP championship network operations team building the 5G private network and operating the hybrid 5G private public network. These include the harsh marine environment and the very limited timeframe for build and delivery, with just one day to test the systems on the water prior to racing. Another notable challenge is gaining licensed spectrum – as SailGP takes place in many global locations, different channels are required in different regions. This means the setup cannot simply be replicated between locations.

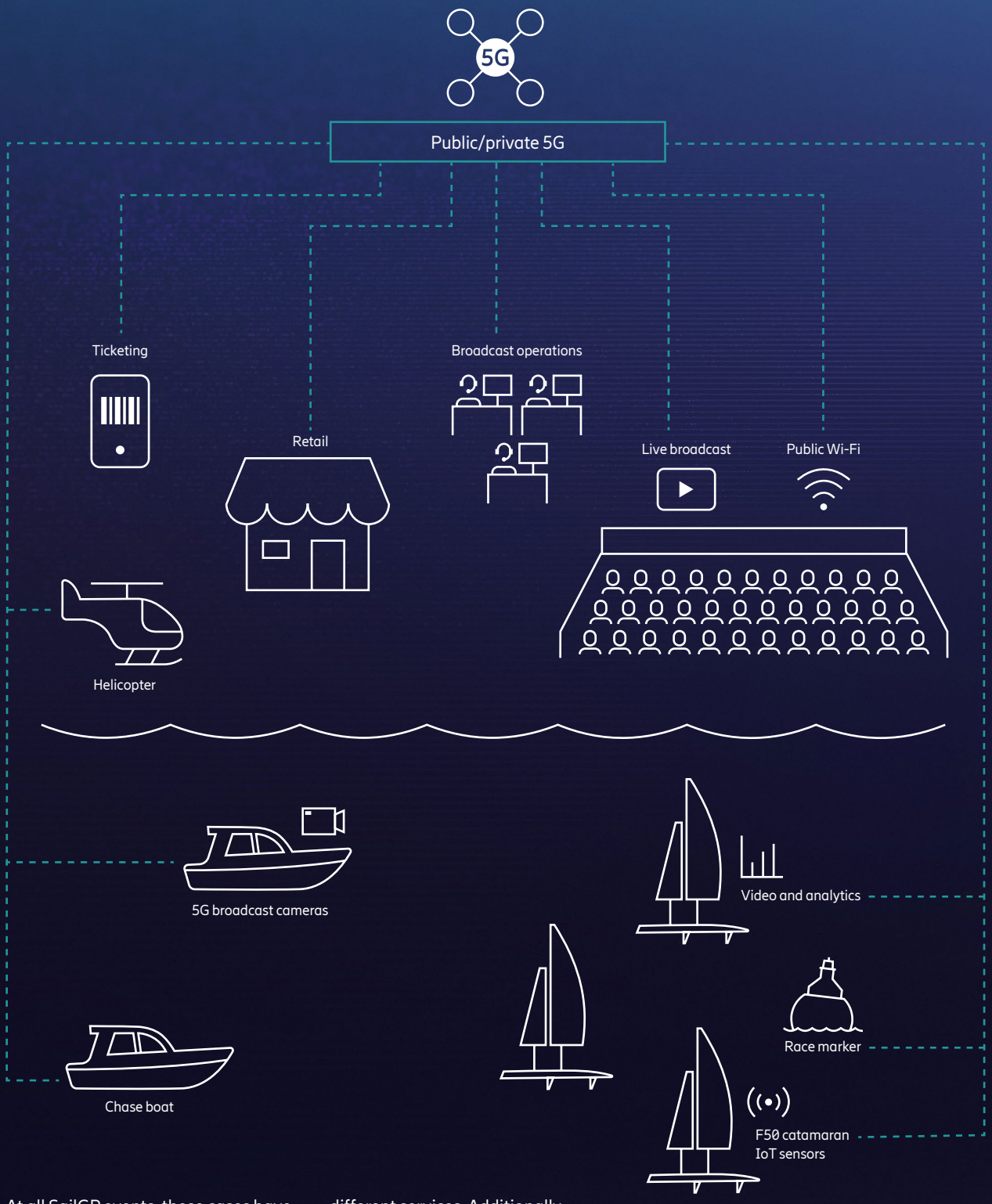
SAILGP

This article was written in collaboration with SailGP, a global racing championship.

5G is the ideal solution, offering coverage and allowing IP-based technology to be easily deployed. Once the private 5G is deployed and functioning, the 5G system cleanly resolves a lot of on-site challenges, such as: enlargement of the internal networks without extensive cabling; on-water usage for both the internal services like telemetry, communications and video but also internet access for teams using their own services; and services for the guests, including VIPs on chaser boats or other guests on viewing platforms.

To ensure a smooth build within the limited time on-site pre-event, it is critical to have radio frequency designs in place three months before the event, based on the in-country licensed spectrum availability for that specific event. Once on-site, it is essential all equipment is available on-site for day one of setup, to ensure the network can be built in a timely manner. This is supported by having hardware that is both compact and easy to handle, with a managed design. The design is supported by two or three template configuration formats that can be applied with minimum deployment time, as well as system functionality checks carried out on site to measure and analyze performance.

Figure 20: Public/private 5G at SailGP events



At all SailGP events, these cases have been tested. The critical points of a ship-to-shore system are robustness, consistency and maintaining high quality of service at a minimum bounded latency. This is achieved by usage of multiple modems, working in a bonded environment. The ability to switch between private and public when needed is critical, alongside the ability to fine tune between different services. Additionally, voice communications must be clearly audible with no buffering or clipping, telemetry must have low latency and minimum packet loss and video must be smooth with no buffering. On the shore, ticketing, retail and other services require low-latency quality of service (QoS) and robustness, but the service level is not required to be as high as the on-water connectivity.

SailGP: 53 billion data requests on event day

Flexibility between private and public 5G networks

Local service providers have had varying roles in the deployment across the different venues. In some markets, they have helped with spectrum applications and advice on which bands to use. In other markets, leading service providers have played a bigger role in the event connectivity through network slicing and prioritizing their network SIMs as part of commercial agreements.

Resilient connectivity is essential for these events, therefore the solution is built so that the private and public networks are both used consistently. All critical assets have a minimum of two, but often three, modems onboard. If there are three modems, then one will always be connected to the public network and configured with failover for increased resilience.

The ability to offer SailGP a network slice is becoming more frequent, as the local service providers look to develop this service as a commercial offering. Having slicing alongside private 5G is the optimum and desired setup for SailGP events, as this enables the use of private 5G for landing data locally, and then a dedicated slice for cloud-based traffic and shared data-exchange functionality.

Scaling and trialing multiple cases

Each SailGP event, like any other major event, has many areas that are dependent on reliable and stable connectivity for retail, ticketing and live broadcasts. Beyond a typical event setup there are specific requirements for the in-water aspects of these events. There are IoT sensors, video and analytics from the F50 catamarans that generate billions of data points. The racecourse itself is laid out with connected markers that can be adjusted based on wind direction. There are additional vessels on the water for broadcast cameras, support boats and guest VIP chase boats. Finally, there are helicopters in the skies above the race capturing footage and monitoring events.

Meeting distinct requirements

Across most deployments, the focus has been on ensuring both network reliability and high uplink capacity, with average data throughput around 150 Mbps. Given the short time available for setup and testing, results have naturally varied across locations and use cases. Shore-to-ship connectivity has delivered consistently strong performance, while ship-to-shore links have proven more challenging due to the fast-moving platforms, diverse installation methods and highly reflective over-water environment. Achieving stable sub-40 ms latency requires further fine-tuning and optimization – something limited by the brief on-water testing window. The experience gained this season, however, will guide more refined, site-specific deployment strategies for future events.

While specific private 5G outcomes for each case are still being meticulously tracked, it is crucial to understand the sheer scale of data involved: a single SailGP event day generates 53 billion data requests. This immense volume underscores the absolute necessity of leveraging advanced technology to effectively harness this data, thereby empowering the teams, the league and the fans, with unparalleled insights and experiences.

Connecting helicopters has brought unique challenges, as the setup needs to take place outside of the private 5G network coverage area. During the Emirates Great Britain Sail Grand Prix in Portsmouth, UK, SailGP were able to work with BT to provide a 30 km transit route with connectivity on the public network, allowing the helicopter to switch seamlessly between the public and private network. This same route also provided connectivity between remote control centers and the event location.

The role of collaboration across the ecosystem was also demonstrated during the Portsmouth event where SailGP worked with BT and Sony to use a 5G network slice on the public network as the connectivity layer to support broadcast-quality video, delivering the low latency and high bandwidth required for delay-sensitive video encoders.

> 5G has been deployed at SailGP events in Dubai and Abu Dhabi, UAE; Auckland, New Zealand; Sydney, Australia; Los Angeles, San Francisco and New York, US; Portsmouth, UK; Sassnitz, Germany; Saint-Tropez, France; Geneva, Switzerland; and Cádiz, Spain.

The season ahead

SailGP's first year being supported by 5G at events has been an evolutionary period of testing and learning, offering invaluable insights into 5G's potential to revolutionize the races' operations. This journey has not only illuminated how this technology can empower the league, but has also highlighted key developments within the ecosystem that are enabling boundaries to be pushed and the full potential of 5G to be realized in this harsh environment. Following the trials and looking ahead, the aim is to gradually implement 5G across all identified use cases in future seasons, and combine the benefits of private 5G and network slicing on the public network.

Short-form dominates video traffic

Social platform video accounts for the vast majority of smartphone video viewing, while video-on-demand services deliver higher bitrates and superior quality of experience (QoE) scores.

Key insights

- Social media-generated videos constitute 70–80 percent of all mobile video traffic viewed on smartphones, while streaming of video-on-demand services represents less than 10 percent, underscoring users' preference for short, engaging clips from social platforms.
- For short-form social-media videos, 5G provides faster startup and smoother playback compared to 4G, minimizing interruptions as users rapidly scroll.
- Professionally produced and optimized streaming services deliver higher bitrates and superior QoE scores on smartphones compared with social media video platforms.

Comparing downlink and uplink traffic across four European mobile networks shows that video still dominates downlink usage, while cloud storage and communication services generate relatively more uplink traffic.

Video dominates downlink, but not uplink traffic

Video represents the largest portion of mobile data traffic across all four networks, accounting for around 50 percent of mobile traffic. Downlink traffic consistently shows a high share for video, reaching up to 60 percent. The share of video in uplink traffic, however, varies between networks. This variation reflects differences in user behavior, such as content creation and live streaming activity.

Communication services (including messaging, VoIP and video calls) are more bi-directional than video streaming, and therefore they generate a higher proportion of uplink traffic compared to downlink across the four sampled networks – 73 percent downlink and 27 percent uplink. The share of uplink traffic for communication services across the sampled networks ranges from 13 percent to 23 percent, while the share of downlink traffic remains around 5 percent or lower. This disparity underscores the interactive and user-driven nature of these services, where frequent user-originated activities such as voice and video calls, conferencing and content uploads significantly contribute to uplink traffic.

Across the sampled networks, social networking downlink traffic varies considerably, ranging from about 2 percent to 13 percent. For uplink, social networking usually ranks as the third-largest traffic category share – after video and either communications services or cloud storage – contributing roughly 7 percent to 14 percent of uplink traffic.

Cloud storage services represent a substantially larger share of uplink traffic compared to downlink, highlighting active usage of cloud-based functions such as backups and file synchronization. Conversely, gaming, audio and software downloads consistently contribute less than 2 percent of both downlink and uplink traffic across all networks.

Smartphone users prefer short, dynamic videos

Across the four sampled European networks, a more detailed analysis of video traffic was performed, where video consumption of content from the most popular global service providers was grouped into two main categories:

- social media–generated video (YouTube, TikTok, Instagram, Facebook)
- global[1] video on-demand streaming (Netflix, Disney+, Amazon Prime, Apple TV)

Methodology

The application mix and share of traffic in the sampled networks might not represent the absolute shares of the total traffic, as some traffic could not be classified. For example, the absolute share of video traffic is presumably higher across all networks as part of it is included in the categories "Other" and "Social networking" (such as Instagram feeds, Reels and Stories). The analysis is based on one week of data collection.

The analysis shows that across the four European service providers, video traffic on smartphones is dominated by social media, far exceeding that of streaming video-on-demand services. For three of the service providers, social media video accounts for approximately 80 percent of all video traffic, while the fourth records nearly 70 percent. These results highlight smartphone users' clear preference for short, dynamic videos on social platforms.

YouTube – the dominant platform in terms of reach

Across the four European mobile service providers, YouTube consistently emerges as a leading video service by user share, with the share of mobile video users ranging from about 73 percent to nearly 99 percent. Almost every mobile video user consumes YouTube content, making it the dominant platform in terms of reach. In terms of traffic volume, it takes the clear lead in two networks with a 34 and 21 percent share, while in one network it shares the top position with Instagram, and in the fourth network it remains a major contributor despite a slightly lower user share.

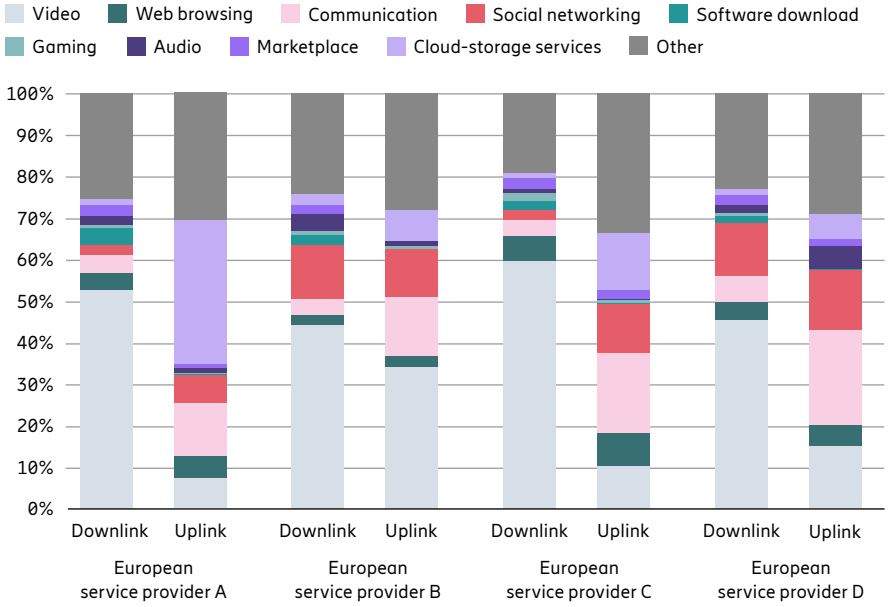
[1] To maintain analytical consistency, local TV streaming platforms and smaller content providers have been grouped under the "Other video" category due to regional and service provider-specific variations.

TikTok is the third most popular service by reach, with user share ranging from 52–59 percent and generating about 20–40 percent of the video traffic across the four service providers.

Instagram's user base varies across the four networks: It engages around 50 percent of users in two networks, while its adoption remains limited in the other two. In terms of traffic share, Instagram is most dominant in one network, accounting for about 20 percent of the total traffic.

Facebook is especially popular in two networks, engaging more than 75 percent of video users and accounting for over 20 percent of total video traffic in both networks. Across the other networks, Facebook still attracts a large share of users, but it generates a smaller proportion of traffic there. This pattern suggests that consumption is driven by autoplay content and short-form formats like Reels, which increase user counts but have shorter viewing times.

Figure 21: Share of traffic volume in downlink and uplink per application category



Note: "Other" includes unclassified traffic and traffic from services that have too small a share to be significant compared to the categorized segments, for example location services, email, speed tests, weather and web security. A large share of "Other" is presumably video traffic.

Mobile video-on-demand's role limited on smartphones

Streaming of global video-on-demand services accounts for less than 10 percent of total mobile video traffic consumed on smartphones across all sampled networks. Netflix consistently dominates this category, contributing between 3 and 6 percent of total video traffic on these networks. Other services like Disney+, Amazon Prime and Apple TV+ have a relatively small share, typically less than 1 percent. This limited usage on smartphones likely reflects users' preference to stream high-resolution content over Wi-Fi or fixed broadband connections and on larger devices such as tablets and PCs.

While traffic volumes and user behavior reveal a clear preference for short-form video content on social media platforms, the quality of the viewing experience is shaped by a range of technical factors. These include the capabilities of the smartphone itself, the encoding strategies of content providers and the performance of the underlying mobile network.

Smartphone video experience differs across models

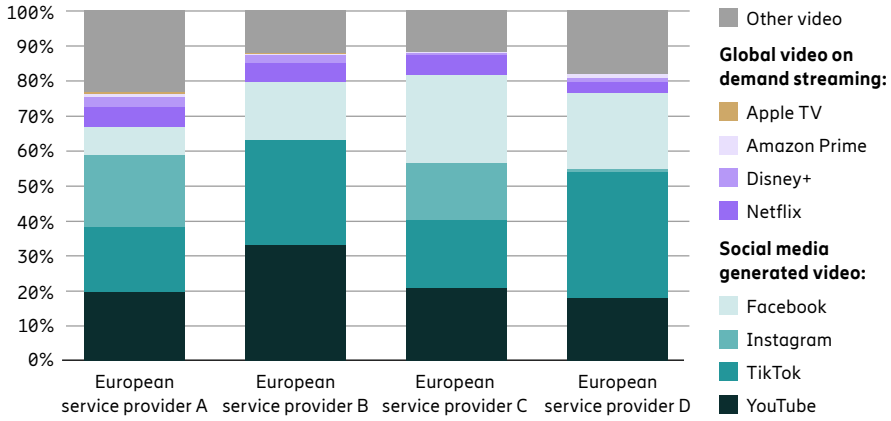
Mobile video experience on smartphones depends on several measurable factors, including intrinsic encoding quality (influenced by resolution, frame rate and codec) and dynamic quality effects such as time-to-content, rebuffering events and resolution adaptations to available channel capacity. It also depends on a specific smartphone model's capability. Calculated performance metrics across the sampled networks show that high-end flagship smartphones delivered the best streaming experience, with higher bitrates and QoE scores[2] of above 4.2, while entry-level models showed lower bitrates and QoE scores of 3.6–4.0. Overall, flagship smartphones deliver a superior video streaming experience due to better bitrate performance and optimization.

As expected, professionally produced and optimized streaming services like Netflix and Amazon Prime deliver higher bitrates and superior QoE scores compared with social media video platforms. Notably, Instagram achieves unusually high QoE scores despite lower bitrates, suggesting particularly effective adaptation and encoding strategies that preserve perceived quality under constrained network conditions.

5G enhances the streaming and scrolling experience

Across all four networks, 5G consistently delivers an improved video streaming experience compared with 4G.
The enhancement is noticeable for long-form, high-quality content on video-on-demand platforms, where higher bitrates, shorter stall times and better QoE make streaming smoother.
For short-form, social-media videos, 5G provides faster startup and smoother playback, minimizing interruptions as users rapidly scroll. In both cases, the upgrade to 5G results in a more responsive and reliable viewing experience.

Figure 22: Share of video traffic per video service provider



Note: To maintain analytical consistency, local TV streaming platforms and smaller content providers have been grouped under the "Other video" category due to regional and service provider-specific variations.

[2] Reported QoE values are estimates, calculated from video models using bitrate, resolution, stalls and video length, and may be less precise for encrypted traffic.

AI, cloud and mobile set to drive significant growth in uplink traffic

The accelerated development and convergence of AI, cloud and mobile will fundamentally shift future traffic patterns, driving significant growth in uplink demands on mobile networks in the coming decade.

Key insights

- As AI, cloud and mobile converge, devices constantly send data to the cloud for real-time learning and personalization; this continuous feedback loop sharply increases uplink traffic.
- AR/AI glasses use large AI models in the cloud, while autonomous vehicles (AVs)/droids transmit large datasets for training and remote functions, making them major uplink traffic drivers.
- To begin preparing for the increase in uplink, relevant 5G standalone (SA) networking features are becoming available.

As intelligent devices increasingly rely on cloud-based processing, data is flowing in the uplink more than ever before. Yet, this shift is more complex than a simple surge in uplink demand. While AI-driven systems like AVs and AR glasses continuously send data to the cloud, advances in on-device intelligence, compression and smart data transport are reshaping how and when that data moves. The result is a more dynamic balance, where networks must support both the growing appetite for real-time cloud and the efficiencies that keep bandwidth use sustainable. Understanding this interplay is key to preparing for the next wave of connected intelligence.

Convergence of AI, cloud and mobile

The convergence of AI, cloud computing and mobile technologies represents one of the most transformative shifts in the digital era. Together, they create a powerful ecosystem where intelligence, scalability and accessibility reinforce each other: cloud platforms provide the computational infrastructure and storage capacity needed to deploy and train advanced AI models; mobile devices serve as both a data feed and the end-user interface to deliver these AI-powered cloud services, enabling personalized and context-aware experiences in real time; and networks provide ubiquitous and dependable connectivity between cloud and devices.

AI models hosted on the cloud can process massive datasets and deliver insights instantly to mobile users, whether they are powering smart assistants, enabling real-time language translation, or optimizing logistics and healthcare operations. Mobile devices therefore act not only as endpoints, but as data generators, feeding continuous streams of contextual information (such as location, behavior and sensor data) back to the cloud which, in turn, improves AI models through feedback loops.

The future drivers of uplink traffic

As the convergence mentioned earlier happens, data rates increase further as a result. This will be particularly notable in the uplink.

In the enterprise and industry sectors, for instance, 5G-native laptops, AI-enabled Internet of Things (IoT) devices, AVs, humanoid droids and drones will require significant uplink capacity. AVs and droids will transmit a lot of data to the cloud, as they collect a lot of training data, require data to be stored for legal reasons and sometimes require remote interventions.

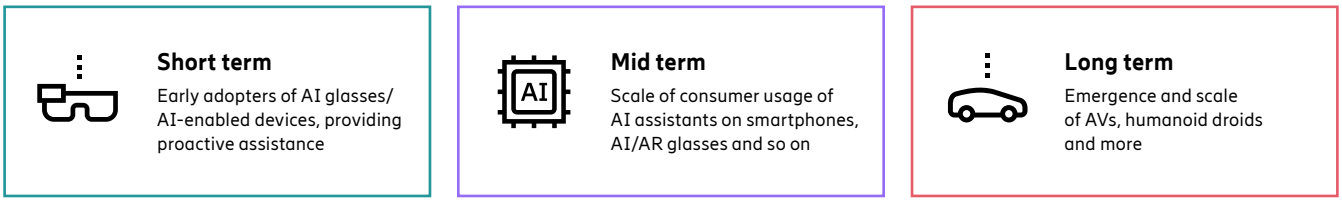
In the consumer space, personalized agents will be used on smartphones and emerging devices like AI and AR glasses, or similar companion devices. Some will be activated on demand, while other agents will be on all the time.

As a result, the uplink traffic will increase significantly over the coming years and, indeed, is becoming telecom's new "currency." Short term, this will be driven by the early adoption of AI glasses; mid term, by the adoption of AI assistants over AI/AR glasses at scale; and long term, by the large-scale deployment of AVs and possibly humanoid droids.

To effectively handle such an increase in uplink traffic, advancements such as carrier aggregation (CA) and Massive Multiple-Input Multiple-Output (M-MIMO) – available in 5G SA – enable more flexible and efficient use of spectrum across both frequency division duplex (FDD) and time division duplex (TDD) bands.

For example, uplink traffic can be anchored on a low-band FDD carrier to maximize coverage and enhanced with FDD M-MIMO to boost capacity. Meanwhile, downlink capacity can be boosted through aggregation between FDD and a mid-band TDD carrier, leveraging TDD M-MIMO for higher throughput and improved overall performance.

Figure 23: Future drivers of uplink traffic



Uplink requirements of current AI glasses

To date, approximately 2 million smart glasses from leading manufacturers have been sold in the US – amounting to approximately 1 percent market penetration – with ambitions to sell millions per year going forward. The success driving these sales is in connecting the user to an AI agent that delivers sentient engagements based on video and audio input from the glasses.

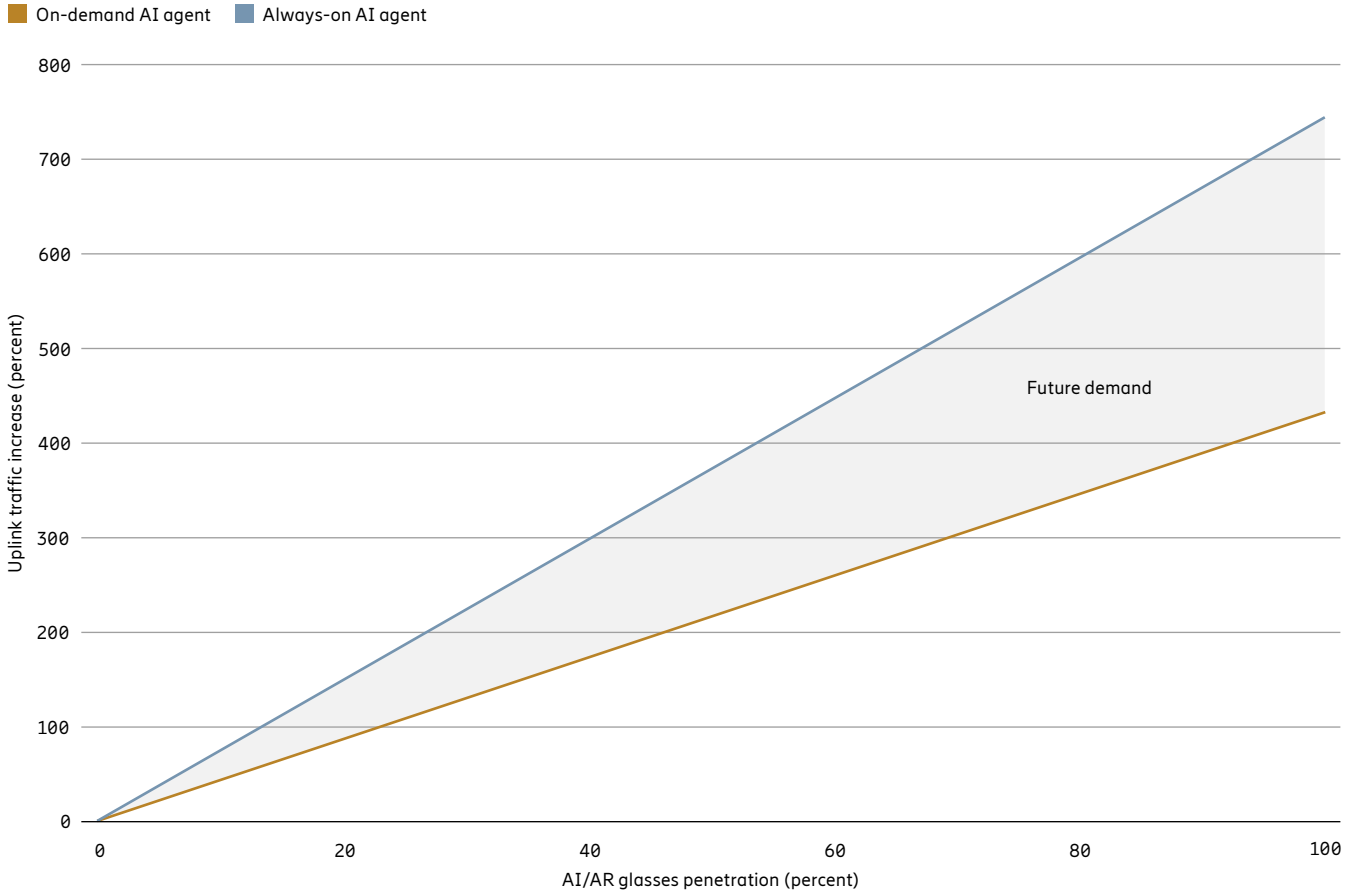
Going forward, some models will use AI capabilities right on the glasses and/or tethered devices; however, advanced AI capabilities will need to run in the cloud and – when inference time of the models is low – the uplink network characteristics become critical.

A recently announced smart glasses model has an advertised video capture resolution of 1,440 x 1,920 pixels. Multimodal AI on-demand engagements typically require framerates in the order of 5–10 frames per second (FPS) while being used. Always-on agents, on the other hand, are likely to use lower and perhaps dynamic framerates, such as 1 frame every 5–10 seconds. The on-demand agent can make use of video codecs with a compression ratio of about 0.1 bits per pixel (bpp). At the given resolution and a frame rate of 5 FPS, this yields about 1.4 Mbps in the uplink. It is further assumed that for users of these AI agents, about 20 percent are "power users" at 100 min/day, with the remaining 80 percent being "ordinary users" at 10 min/day. This yields an average of 28 min/day.

The always-on agent will need to use image compression, at about 0.5 bpp; at the given resolution and a frame rate of about 0.1 FPS, this yields about 0.14 Mbps. It is then assumed that the agent is on for about 8h/day.

The resulting increase in the uplink percentage with regards to today's global average baseline of about 2 GB per month is shown in Figure 24. Per user, the always-on agent consumes a slightly higher uplink than the on-demand agent under these assumptions. For a given device penetration, given the value on the x-axis in Figure 24, some users may adopt an always-on agent whilst others prefer on-demand. The future demand will therefore be between these two curves. This potential growth of uplink traffic underlines the importance of network capacity planning, spectrum allocation and RAN feature developments.

Figure 24: Uplink traffic increase with regards to today's uplink baseline versus AI/AR glasses penetration



Methodology

Forecast methodology
Ericsson makes forecasts on a regular basis to support internal decisions and planning, as well as market communications. The forecast time in the Ericsson Mobility Report is six years and this moves forward one year in the November report each year. All estimates in Ericsson Mobility Report are for the month of December each year. The subscription and traffic forecast baseline is established using historical data from various sources, validated with Ericsson internal data, including measurements in customer networks. Future developments are estimated based on macroeconomic trends, user trends, market maturity and technological advances. Other sources include industry analyst reports, together with internal assumptions and analyses.

Historical data may be revised if the underlying data changes – for example, if service providers report updated subscription figures.

Mobile subscriptions
Mobile subscriptions include all mobile technologies. Subscriptions are defined by the most advanced technology that the mobile phone and network are capable of. Our mobile subscriptions by technology findings divide subscriptions according to the highest-enabled technology they can be used for. LTE (4G) subscriptions, in most cases, also include the possibility for the subscription to access 3G (WCDMA/HSPA) and 2G (GSM or CDMA in some markets) networks. A 5G subscription is counted as such when associated with a device that supports New Radio as specified in 3GPP Release 15, and connected to a 5G-enabled network. Mobile broadband includes radio access technologies HSPA (3G), LTE (4G), 5G, CDMA2000 EV-DO, TD-SCDMA and Mobile WiMAX. WCDMA without HSPA and GPRS/EDGE are not included. FWA is defined as a connection that provides broadband access through mobile network enabled customer premises equipment (CPE). This includes both indoor (desktop and window-mounted) and outdoor (rooftop and wall-mounted) CPE. It does not include portable battery-based Wi-Fi routers or dongles.

Rounding of figures
As figures are rounded, summing up data may result in slight differences from the actual totals. In tables with key figures, subscriptions have been rounded to the nearest 10th of a million. However, when used in highlights in the articles, subscriptions are usually expressed in full billions or to one decimal place. Compound annual growth rate (CAGR) is calculated on the underlying, unrounded numbers and is then rounded to the nearest full percentage figure. Traffic volumes are expressed to two significant figures.

Subscribers
There is a large difference between the numbers of subscriptions and subscribers. This is because many subscribers have several subscriptions. Reasons for this could include users lowering traffic costs by using optimized subscriptions for different types of calls, maximizing coverage and having different subscriptions for mobile PCs/tablets and mobile phones. In addition, it takes time before inactive subscriptions are removed from service provider databases. Consequently, subscription penetration can be above 100 percent, which is the case in many countries today. However, in some developing regions, it is common for several people to share one subscription, for example via a family- or community-shared phone.

Mobile network traffic
Ericsson regularly performs traffic measurements in around 100 live networks covering all major regions of the world. These measurements form a representative base for calculating worldwide total mobile network traffic. Mobile network data traffic also includes traffic generated by FWA services. More detailed measurements are made in a select number of commercial networks with the purpose of understanding how mobile data traffic evolves. No subscriber data is included in these measurements. Please note that the Ericsson Mobility Report data traffic forecast, both global and regional, represents the estimated traffic volume in all networks over the duration of one month in December. Traffic (in terms of throughput) in high-traffic areas will be much higher than the average traffic.

Population coverage
Population coverage is estimated using a database of regional population and territory distribution, based on population density. This is then combined with proprietary data on the installed base of radio base stations (RBS), together with estimated coverage per RBS for each of six population density categories (from metro to wilderness). Based on this, the portion of each area that is covered by a certain technology can be estimated, as well as the percentage of the population it represents. By aggregating these areas, world population coverage per technology can be calculated.

Disclaimer
The content of this document is based on a number of theoretical dependencies and assumptions. Ericsson shall not be bound by or liable for any statement, representation, undertaking or omission made in this document. Furthermore, Ericsson may, at any time, change the contents of this document at its sole discretion and shall not be liable for the consequences of such changes.

Ericsson Mobility Visualizer
Explore actual and forecast data from the Ericsson Mobility Report in our interactive web application. It contains a range of data types, including mobile subscriptions, mobile broadband subscriptions, mobile data traffic, traffic per application type, VoLTE statistics, monthly data usage per device and an IoT connected device forecast. Data can be exported and charts generated for publication subject to the inclusion of an Ericsson source attribution.

Find out more
Scan the QR code, or visit
ericsson.com/mobility-visualizer

Glossary

2G: 2nd generation mobile networks (GSM, CDMA 1x)

3G: 3rd generation mobile networks (WCDMA/HSPA, TD-SCDMA, CDMA EV-DO, Mobile WiMAX)

3GPP: 3rd Generation Partnership Project

4G: 4th generation mobile networks (LTE, LTE-A)

4K: In video, a horizontal display resolution of approximately 4,000 pixels. A resolution of 3840 × 2160 (4K UHD) is used in television and consumer media. In the movie projection industry, 4096 × 2160 (DCI 4K) is dominant

5G: 5th generation mobile networks (IMT-2020)

AI: Artificial intelligence

AR: Augmented reality. An interactive experience of a real-world environment whereby the objects that reside in the real world are "augmented" by computer-generated information

ARPU: Average revenue per user

CAGR: Compound annual growth rate

CAMARA: An open-source project to develop APIs.

Cat-M1: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity

CDMA: Code-division multiple access

EB: Exabyte, 10^{18} bytes

FDD: Frequency division duplex

FWA: Fixed wireless access

Gaussian splatting: A 3D rendering technique that uses millions of tiny, translucent ellipsoids (or "splats") to represent a scene

GB: Gigabyte, 10^{9} bytes

Gbps: Gigabits per second

GHz: Gigahertz, 10^{9} hertz (unit of frequency)

GSA: Global mobile Suppliers Association

GSM: Global System for Mobile Communications

GSMA: GSM Association

HSPA: High speed packet access

IoT: Internet of Things

Kbps: Kilobits per second

LTE: Long-Term Evolution

MB: Megabyte, 10^{6} bytes

Mbps: Megabits per second

MHz: Megahertz, 10^{6} hertz (unit of frequency)

MIMO: Multiple Input Multiple Output is the use of multiple transmitters and receivers (multiple antennas) on wireless devices for improved performance

mmWave: Millimeter waves are radio frequency waves in the extremely high frequency range (30–300GHz) with wavelengths between 10mm and 1mm. In a 5G context, millimeter waves refer to frequencies between 24 and 71GHz (the two frequency ranges 26GHz and 28GHz are included in millimeter range by convention)

Mobile broadband: Mobile data service using radio access technologies including 5G, LTE, HSPA, CDMA2000 EV-DO, Mobile WiMAX and TD-SCDMA

Mobile PC: Defined as laptop or desktop PC devices with built-in cellular modem or external USB dongle

Mobile router: A device with a cellular network connection to the internet and Wi-Fi or Ethernet connection to one or several clients (such as PCs or tablets)

MR: Mixed reality. Immersive technology in which elements from both the real world and a virtual environment are fully interactive with each other

NB-IoT: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity

Net Zero: Defined in ITU standards as a future state where all emissions that can be reduced are reduced, with like-for-like or permanent removals applied by carbon-removal technologies to balance the remaining emissions

Neural radiance fields: A deep learning method for creating 3D representations of scenes from 2D images

NR: New Radio as defined by 3GPP Release 15

NR-DC: NR-NR Dual connectivity

NSA 5G: Non-standalone 5G is a 5G Radio Access Network (RAN) that operates on a legacy 4G/LTE core

PB: Petabyte, 10^{15} bytes

RedCap: Reduced capability

SA: Standalone

Short-range IoT: Segment that largely consists of devices connected by unlicensed radio technologies, with a typical range of up to 100 meters, such as Wi-Fi, Bluetooth and Zigbee

Sunsetting: The process of closing down older mobile technologies

TD-SCDMA: Time division-synchronous code-division multiple access

TDD: Time division duplex

VoIP: Voice over IP (Internet Protocol)

VoLTE: Voice over LTE as defined by GSMA IR.92 specification

VR: Virtual reality

WCDMA: Wideband code-division multiple access

Wide-area IoT: Segment made up of devices using cellular connections or unlicensed low-power technologies like Sigfox and LoRa

XR: Extended reality. An umbrella category for virtual or combined real/virtual environments, which includes AR, VR and MR

Key figures

Global key figures

Mobile subscriptions	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
Worldwide mobile subscriptions	8,660	8,830	9,500	1%	million
• Smartphone subscriptions	7,130	7,410	8,480	2%	million
• Mobile PC, tablet and mobile router subscriptions	290	320	530	8%	million
• Mobile broadband subscriptions	7,710	8,010	9,220	2%	million
• Mobile subscriptions, GSM/EDGE-only	870	760	350	-12%	million
• Mobile subscriptions, WCDMA/HSPA	550	460	200	-13%	million
• Mobile subscriptions, LTE	4,940	4,690	2,320	-11%	million
• Mobile subscriptions, 5G	2,290	2,900	6,410	14%	million
Mobile subscriptions, 5G standalone	1,270	1,690	4,140	16%	million
• Mobile subscriptions, 6G	0	0	180	N/A	million
Fixed broadband connections	**1,620**	**1,690**	**2,030**	**3%**	**million**
Fixed Wireless Access connections	160	185	350	11%	million
Satellite broadband subscriptions	6	9	30	22%	million

Mobile data traffic					
• Data traffic per smartphone	19	21	39	11%	GB/month
• Data traffic per mobile PC	26	28	40	6%	GB/month
• Data traffic per tablet	15	18	29	9%	GB/month

Total data traffic**					
Mobile data traffic	123	143	310	14%	EB/month
• Smartphones	121	140	304	14%	EB/month
• Mobile PCs and routers	1.2	1.5	2.7	11%	EB/month
• Tablets	1	1.2	2.5	13%	EB/month
Fixed Wireless Access	41	54	174	22%	EB/month
Total mobile network traffic	164	197	482	16%	EB/month
Total fixed data traffic	330	380	710	11%	EB/month

Regional key figures

Mobile subscriptions	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
North America	450	460	490	1%	million
Latin America	730	750	820	1%	million
Western Europe	550	550	570	0%	million
Central and Eastern Europe	560	560	560	0%	million
North East Asia	2,260	2,310	2,410	1%	million
China[1]	1,790	1,830	1,880	0%	million
South East Asia and Oceania	1,180	1,170	1,230	1%	million
India, Nepal and Bhutan	1,190	1,230	1,350	2%	million
Middle East and North Africa	740	750	780	1%	million
Gulf Cooperation Council (GCC)[2]	81	84	97	2%	million
Sub-Saharan Africa	1,000	1,050	1,310	4%	million

Regional key figures

LTE subscriptions	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
North America	130	100	40	-14%	million
Latin America	530	520	230	-13%	million
Western Europe	310	240	30	-30%	million
Central and Eastern Europe	480	490	220	-13%	million
North East Asia	1,020	850	220	-20%	million
China[1]	720	570	70	-29%	million
South East Asia and Oceania	930	890	480	-10%	million
India, Nepal and Bhutan	620	600	190	-17%	million
Middle East and North Africa	500	510	340	-7%	million
GCC[2]	39	33	5	-27%	million
Sub-Saharan Africa	411	490	570	3%	million

5G subscriptions[3]	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
North America	316	359	450	3%	million
Latin America	63	106	550	32%	million
Western Europe	227	307	540	10%	million
Central and Eastern Europe	30	45	340	40%	million
North East Asia	1,178	1,411	2,150	6%	million
China[1]	1,014	1,213	1,790	5%	million
South East Asia and Oceania	111	160	680	27%	million
India, Nepal and Bhutan	290	395	1,070	18%	million
Middle East and North Africa	57	91	410	28%	million
GCC[2]	37	46	89	11%	million
Sub-Saharan Africa	11	27	400	57%	million

Data traffic per smartphone	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
North America	21	25	49	12%	GB/month
Latin America	13	15	31	14%	GB/month
Western Europe	22	25	54	13%	GB/month
Central and Eastern Europe	20	22	45	13%	GB/month
North East Asia	20	23	41	10%	GB/month
China[1]	21	23	42	10%	GB/month
South East Asia and Oceania	19	21	42	12%	GB/month
India, Nepal and Bhutan	33	36	65	10%	GB/month
Middle East and North Africa	19	21	46	14%	GB/month
GCC[2]	29	30	49	8%	GB/month
Sub-Saharan Africa	5	5.3	12	15%	GB/month

Total mobile data traffic	2024	2025	Forecast 2031	CAGR* 2025–2031	Unit
North America	8.7	10	21	13%	EB/month
Latin America	6.9	7.9	20	17%	EB/month
Western Europe	10	12	24	13%	EB/month
Central and Eastern Europe	7.3	8.7	18	13%	EB/month
North East Asia	37	43	81	11%	EB/month
China[1]	32	37	70	11%	EB/month
South East Asia and Oceania	17	19	42	14%	EB/month
India, Nepal and Bhutan	24	29	63	14%	EB/month
Middle East and North Africa	9.3	11	30	18%	EB/month
GCC[2]	1.6	1.8	3.4	11%	EB/month
Sub-Saharan Africa	2.3	2.8	10	24%	EB/month

[1] These figures are also included in the figures for North East Asia.
[2] These figures are also included in the figures for Middle East and North Africa.
[3] Currently, 6G subscriptions are not published on a regional level, but included in 5G figures in regions where 6G is expected to launch early.

* CAGR is calculated on unrounded figures.
** Figures are rounded (see methodology) and therefore summing up of rounded data may result in slight differences from the actual total.

About Ericsson

Ericsson's high-performing networks provide connectivity for billions of people every day. For nearly 150 years, we've been pioneers in creating technology for communication. We offer mobile communication and connectivity solutions for service providers and enterprises. Together with our customers and partners, we make the digital world of tomorrow a reality.

www.ericsson.com

Ericsson
SE-164 80 Stockholm, Sweden
Telephone +46 10 719 0000
www.ericsson.com

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