ERICSSON MOBILITY REPORT

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Welcome to this edition of the Ericsson Mobility Report, where we, among other things, forecast 1 billion 5G subscriptions for enhanced mobile broadband by 2023. The evolution to 5G will enable a range of new use cases. One example we describe is the use of augmented reality-assisted maintenance and repair in the manufacturing industry.

Between Q3 2016 and Q3 2017, the total data traffic in mobile networks increased by 65 percent. The number of LTE subscriptions is growing rapidly, and LTE is anticipated to become the dominant mobile access technology by the end of this year. Operators are increasingly deploying networks that are capable of Gigabit speeds.

In addition to the forecast figures, we have included three feature articles in this report. One article looks into the subject of mobile data plans, exploring operators' need for a variety of offerings. The other two articles cover different aspects of 5G, the first focusing on enhancing the event experience through digitalized services and the second on consumer expectations.

I hope you find this report valuable and engaging. You can find all our content, including regional versions of the report, at **www.ericsson.com/mobility-report**

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WORLDWIDE MOBILE SUBSCRIPTIONS

2017 **7.8B**
2023 **9.1B**

CAGR 3%

WORLDWIDE TOTAL MONTHLY MOBILE DATA TRAFFIC

2017 **14EB**
2023 **110EB**

CAGR 42%

WORLDWIDE MONTHLY DATA TRAFFIC PER ACTIVE SMARTPHONE

2017 **2.9GB**
2023 **17GB**

CAGR 34%

WESTERN EUROPE KEY FIGURES

	2017	2023	CAGR 2017–2023
Mobile subscriptions (million)	520	560	1%
Smartphone subscriptions (million)	400	480	3%
Mobile broadband subscriptions (million)	470	560	3%
LTE subscriptions (million)	250	450	10%
Data traffic per active smartphone (GB/month)	4.1	28	38%
Total mobile data traffic (EB/month)	1.8	12	37%

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WORLDWIDE SMARTPHONE SUBSCRIPTIONS

2017 **4.4B**

2023 **7.3B**

CAGR 9%

WORLDWIDE MOBILE BROADBAND SUBSCRIPTIONS

2017 **5.2B**

2023 **8.5B**

CAGR 9%

WORLDWIDE LTE SUBSCRIPTIONS

2017 **2.6B**

2023 **5.5B**

CAGR 13%

MOBILE SUBSCRIPTIONS Q3 2017

In Q3, 95 million new mobile subscriptions were added, resulting in a total of 7.8 billion

The number of mobile subscriptions is growing at almost 6 percent year-on-year, reaching 7.8 billion in Q3. China had the most net additions during the quarter (+30 million), followed by Indonesia (+7 million), the US (+4 million), Angola (+4 million) and Pakistan (+3 million).

The number of mobile broadband subscriptions[1] is growing at around 20 percent year-on-year, increasing by 210 million in Q3 2017 alone. The total number is now 5 billion.
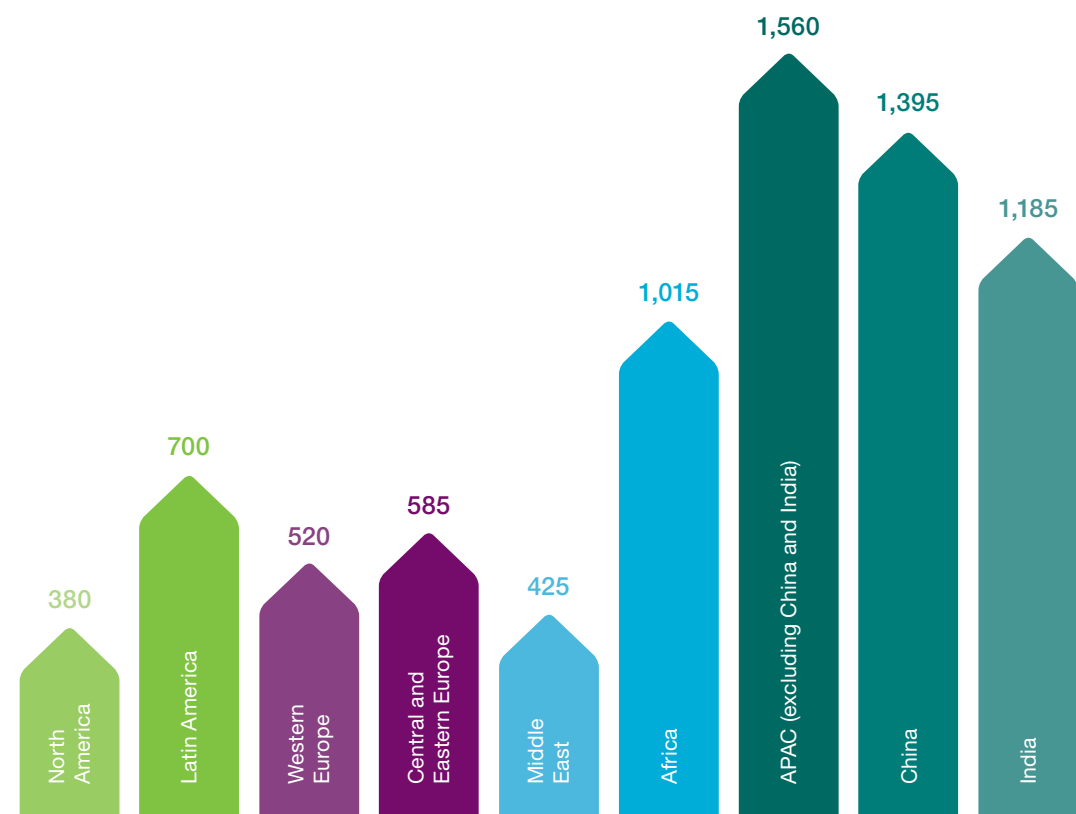
During Q3 2017, 170 million LTE subscriptions were added to reach a total of 2.5 billion. The net additions for WCDMA/HSPA were around 60 million subscriptions during the quarter. The majority of 3G/4G subscriptions can use GSM/EDGE as a fallback.

There are now 5 billion mobile broadband subscriptions

Over the same period, GSM/EDGE-only subscriptions declined by 130 million. Other technologies declined by around 5 million.

Subscriptions associated with smartphones now account for 57 percent of all mobile phone subscriptions. Around 400 million smartphones were sold in Q3, which equates to 83 percent of all mobile phones sold in the quarter.

Mobile subscriptions Q3 2017 (million)

North America: 380
Latin America: 700
Western Europe: 520
Central and Eastern Europe: 585
Middle East: 425
Africa: 1,015
APAC (excluding China and India): 1,560
China: 1,395
India: 1,185

[1] Mobile broadband includes radio access technologies HSPA (3G), LTE (4G), 5G, CDMA2000 EV-DO, TD-SCDMA and Mobile WiMAX
Note: WCDMA without HSPA and GPRS/EDGE (2G) are not included

New mobile subscriptions Q3 2017

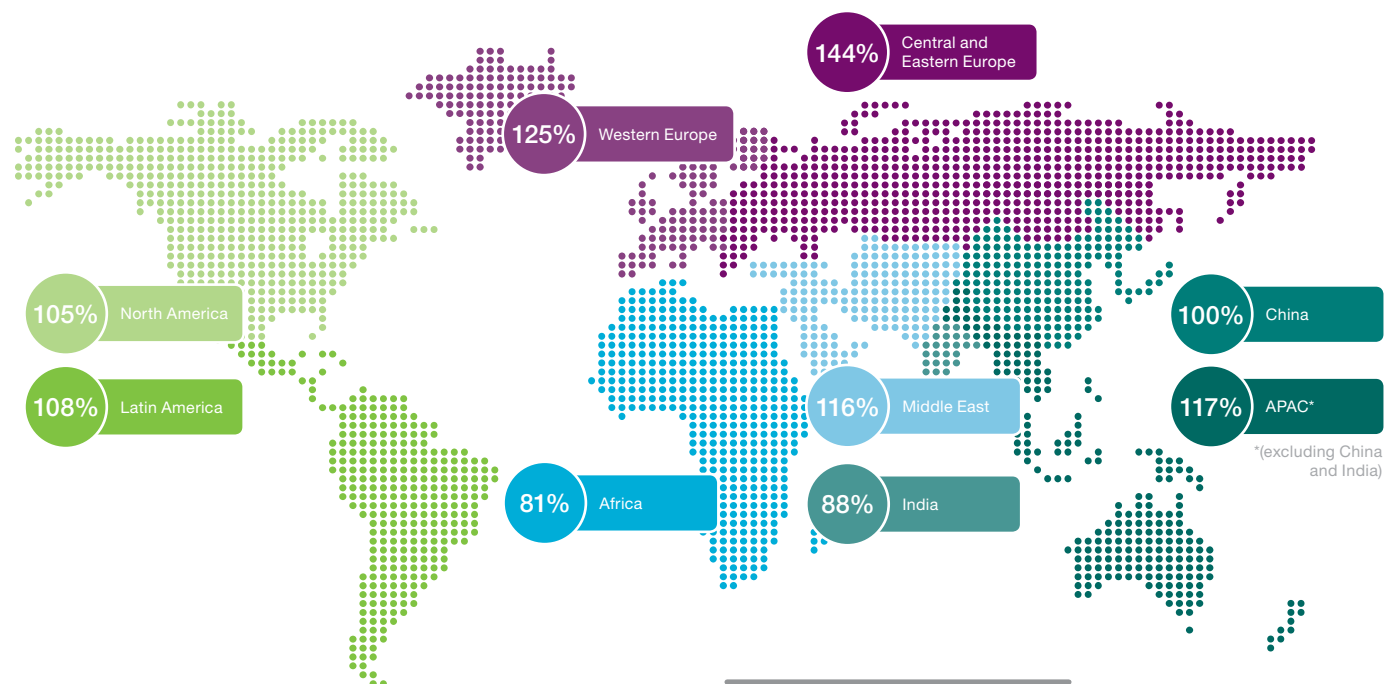### 95 million new mobile subscriptions globally in Q3 2017

Bar chart: New mobile subscriptions Q3 2017

- North America: 4 million
- Latin America: 10 million
- Western Europe: 5 million
- Central and Eastern Europe: 6 million
- Middle East: 7 million
- Africa: 14 million
- APAC (excluding China and India): 22 million
- China: 30 million
- India: -3 million
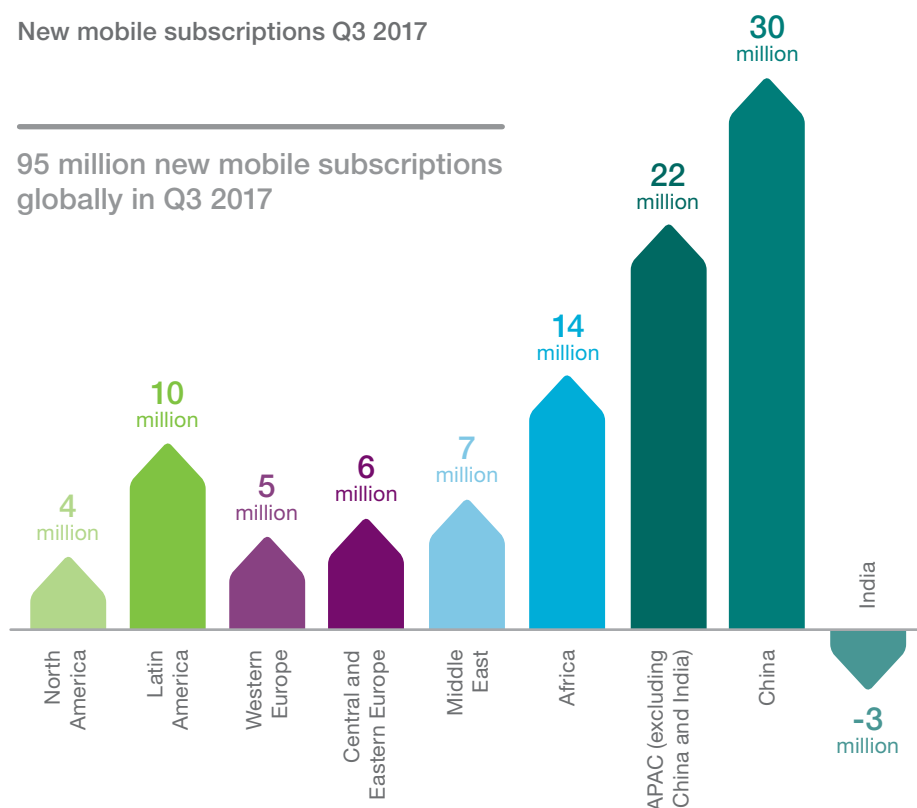
Top 5 countries by net additions Q3 2017

1. China — +30 million
2. Indonesia — +7 million
3. US — +4 million
4. Angola — +4 million
5. Pakistan — +3 million

The number of mobile subscriptions exceeds the population in many countries, which is largely due to inactive subscriptions, multiple device ownership or optimization of subscriptions for different types of calls.

As a result, the number of subscribers is lower than the number of subscriptions. Today, there are around 5.3 billion subscribers globally compared to 7.8 billion subscriptions.

5.3 BILLION subscribers

World map: Subscription penetration Q3 2017 (percent of population)

- North America: 105%
- Latin America: 108%
- Western Europe: 125%
- Central and Eastern Europe: 144%
- Africa: 81%
- Middle East: 116%
- India: 88%
- China: 100%
- APAC*: 117%

*(excluding China and India)

103% global subscription penetration in Q3 2017

Subscription penetration Q3 2017 (percent of population)

MOBILE SUBSCRIPTIONS OUTLOOK

Preparations for 5G are gaining momentum and operators are gearing up for commercial launches. The number of 5G subscriptions is forecast to reach 1 billion by the end of 2023

The standardization work plan for 5G has been accelerated. The standard as specified in 3GPP Release 15 is planned to be finalized by the end of 2017 for Non-Standalone 5G New Radio (NR)[1], and by mid-2018 for Standalone 5G NR. Early 5G deployments are anticipated in several markets, including the US, South Korea, Japan and China. The first commercial networks based on Standalone 5G NR are expected to go live in 2019, with major network deployments from 2020. By the end of 2023, over 1 billion 5G subscriptions are forecast for enhanced mobile broadband.

LTE is anticipated to become the dominant mobile access technology by the end of 2017, and is estimated to reach 5.5 billion subscriptions by the end of 2023. At that point, LTE subscriptions will account for more than 60 percent of all mobile subscriptions. In developing markets, GSM/EDGE-only will still account for a significant share of subscriptions.

Smartphone penetration will continue to rise, driven by the increasing affordability of devices. At the end of 2023, 7.3 billion subscriptions associated with smartphones are anticipated.

A 5G subscription is here counted as such when associated with a device that supports NR as specified in 3GPP Release 15, connected to a 5G-enabled network.
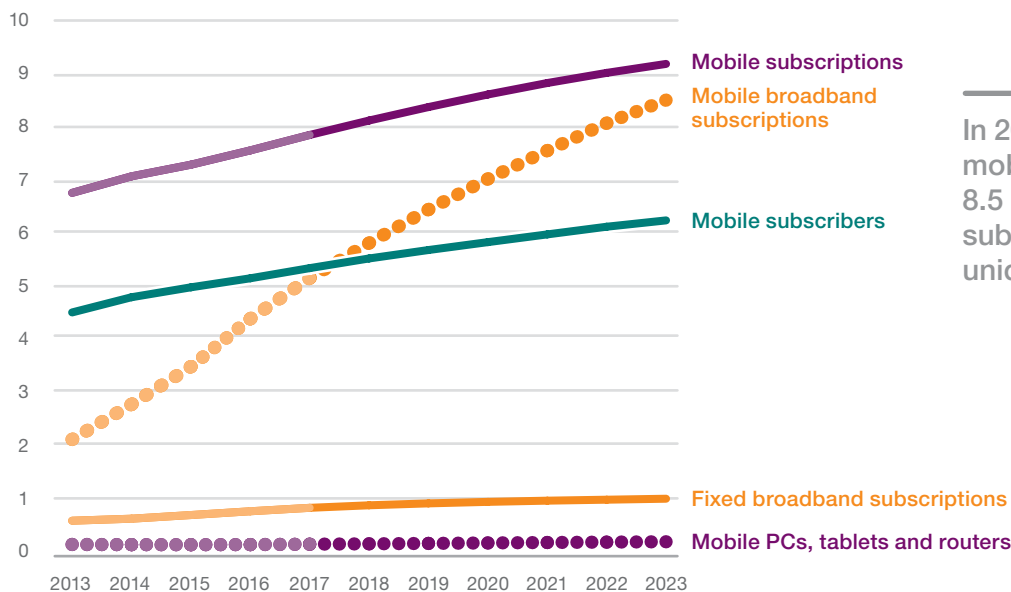
Mobile subscriptions by technology (billion)
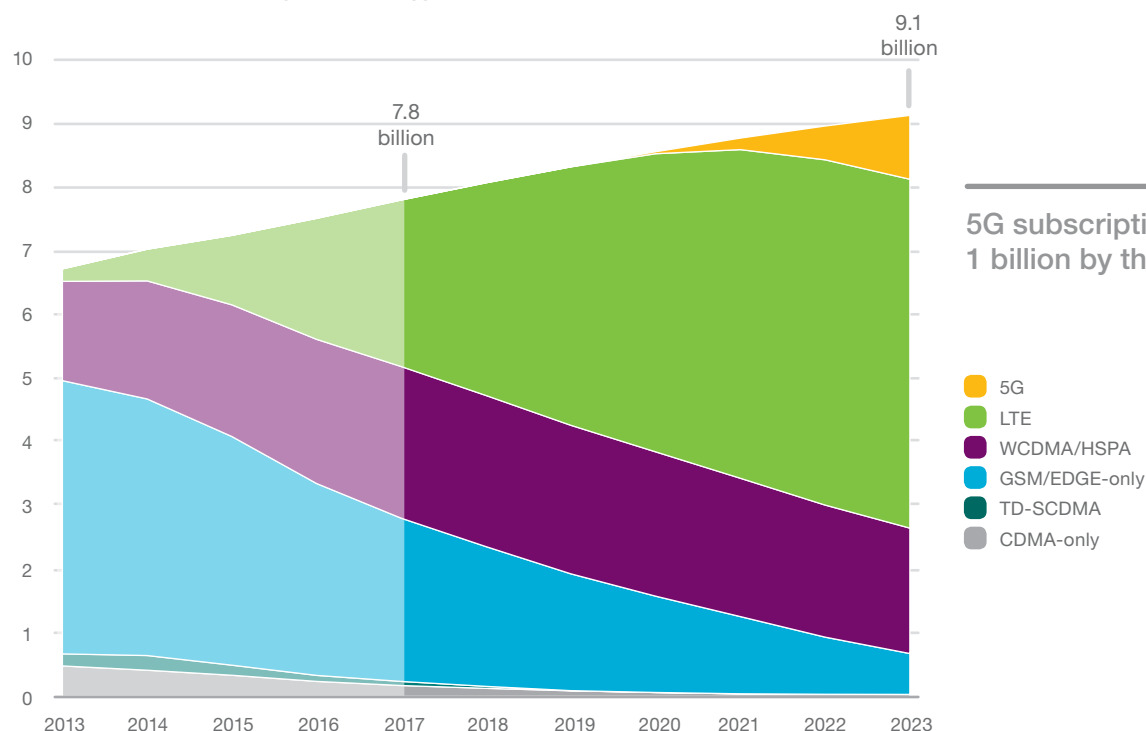
5G subscriptions will reach 1 billion by the end of 2023

- 5G
- LTE
- WCDMA/HSPA
- GSM/EDGE-only
- TD-SCDMA
- CDMA-only

[1] Non-Standalone 5G NR will utilize the existing LTE radio and Evolved Packet Core network as an anchor for mobility management and coverage, while adding a new 5G radio access carrier to enable certain 5G use cases
Figure note: IoT connections and Fixed Wireless Access (FWA) subscriptions are not included in the above graph

Subscriptions/lines, subscribers (billion)

In 2023, there will be 9.1 billion mobile subscriptions, 8.5 billion mobile broadband subscriptions and 6.2 billion unique mobile subscribers

Subscriptions for mobile broadband are expected to approach 95 percent of all subscriptions by the end of 2023

It is forecast that there will be 9.1 billion mobile subscriptions by the end of 2023. Mobile broadband subscriptions will reach 8.5 billion, accounting for close to 95 percent of all mobile subscriptions. The number of unique mobile subscribers is estimated to reach 6.2 billion by the end of the forecast period.

Mobile broadband will complement fixed broadband in some segments, and will be the dominant mode of access in others.[2] Subscriptions for PCs and tablets with mobile capabilities are expected to show moderate growth, reaching 330 million in 2023.

5G will be introduced in higher spectrum bands to meet new traffic demands

Mobile broadband traffic is expected to increase by eight times over the coming six years, while commercial 5G systems will be introduced from 2019. However, below 3GHz, most of the mobile cellular spectrum bands currently used by service providers are becoming congested during busy hours in highly loaded cells.

In response to increasing demands, the mobile industry is focusing on optimizing the spectral efficiency of LTE in existing frequency bands using new advanced functionalities,

such as Multiple Input Multiple Output (MIMO) and carrier aggregation. To solve capacity needs long term, most countries are expected to make additional spectrum available under new national 5G regulatory regimes. This will be achieved by extending the use of spectrum to higher bands, where a large amount of bandwidth could help accommodate the expected mobile data consumption from around 1 billion new 5G subscriptions in 2023.

Several suitable bands are currently being considered to support 5G subscription growth, and to deliver the data rates needed to meet the future demand for broadband services and applications. Currently bandwidth in the 28GHz band (26.5–29.5GHz)

is being allocated in some countries, but bandwidth in the 26GHz band (24.25–27.5GHz) is also being considered. The latter band is part of the International Telecommunication Union's (ITU) World Radiocommunication Conference 2019 (WRC-19) agenda, while the former band is being assigned under an already existing mobile allocation in the ITU Radio Regulations.

The mobile industry considers these two bands to be the most important for terrestrial mobile applications on higher frequencies (above 6GHz). The 38GHz and 42GHz bands are also being considered as complementary resources to support 5G requirements.

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[2] The number of fixed broadband users is at least three times the number of fixed broadband connections, due to shared subscriptions in households, enterprises and public access spots. This is the opposite of the situation for mobile phones, where subscription numbers exceed user numbers

REGIONAL SUBSCRIPTIONS OUTLOOK

Mobile subscriptions by region and technology (percent)

Legend:
- 5G
- LTE
- WCDMA/HSPA
- GSM/EDGE-only
- TD-SCDMA
- CDMA-only
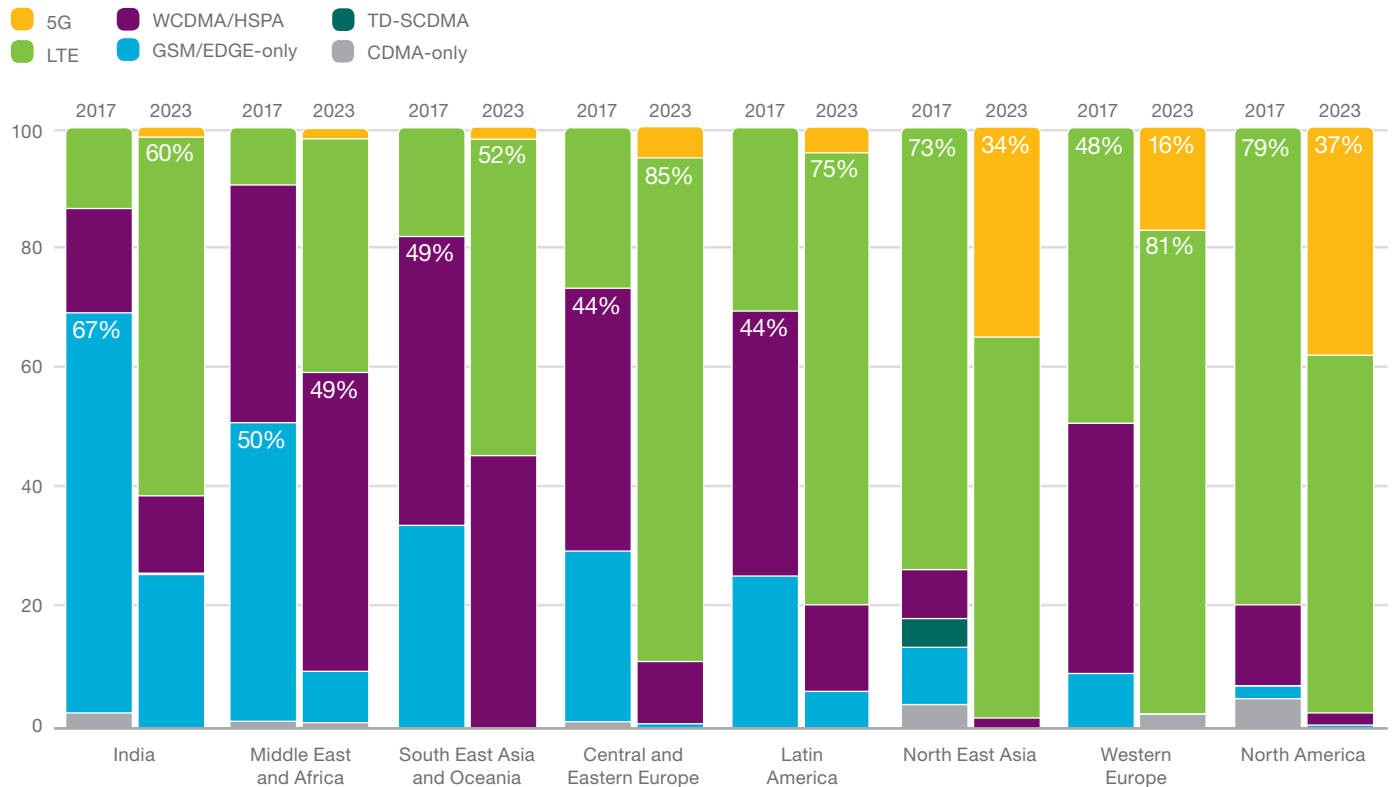
Mobile broadband drives subscription growth across all regions

The number of mobile subscriptions continues to grow across the regions, fueled by a strong uptake in mobile broadband.[1] There are still large variations between regions. However, with the exception of India, subscriptions for mobile broadband now make up 50 percent or more of total subscriptions in all regions. Globally, the most common way to access the internet is over a mobile network.

By the end of 2023, the Middle East and Africa region will transform from a situation where half of all mobile subscriptions are GSM/EDGE-only, to one where 90 percent of subscriptions are for mobile broadband. Driving factors for this growth include a young and growing population with increasing digital skills, as well as more affordable smartphones.

37% of subscriptions in North America are expected to be for 5G in 2023

In North East Asia, 5G is expected to be deployed early in South Korea, Japan and China. For the region as a whole, 5G subscription penetration is expected to reach 34 percent by the end of the forecast period.

North America currently has the highest penetration of LTE subscriptions at close to 80 percent. The region will also lead 5G uptake, with major operators stating their intentions to deploy 5G early. 5G subscriptions are expected to account for 37 percent of all mobile subscriptions in the region by the end of 2023.

Western Europe is expected to evolve more slowly, with 5G making up 16 percent of mobile subscriptions at the end of the period.

[1] Mobile broadband includes radio access technologies HSPA (3G), LTE (4G), 5G, CDMA2000 EV-DO, TD-SCDMA and Mobile WiMAX
Note: WCDMA without HSPA and GPRS/EDGE (2G) are not included

VOICE OVER LTE OUTLOOK

VoLTE subscriptions[1] are expected to exceed 650 million by the end of 2017, creating a foundation for interoperable consumer and enterprise communication services on different devices

VoLTE has now been launched in more than 125 networks in over 60 countries across all regions. The number of VoLTE subscriptions is projected to reach 5.5 billion by the end of 2023, accounting for more than 80 percent of the combined LTE and 5G subscriptions.

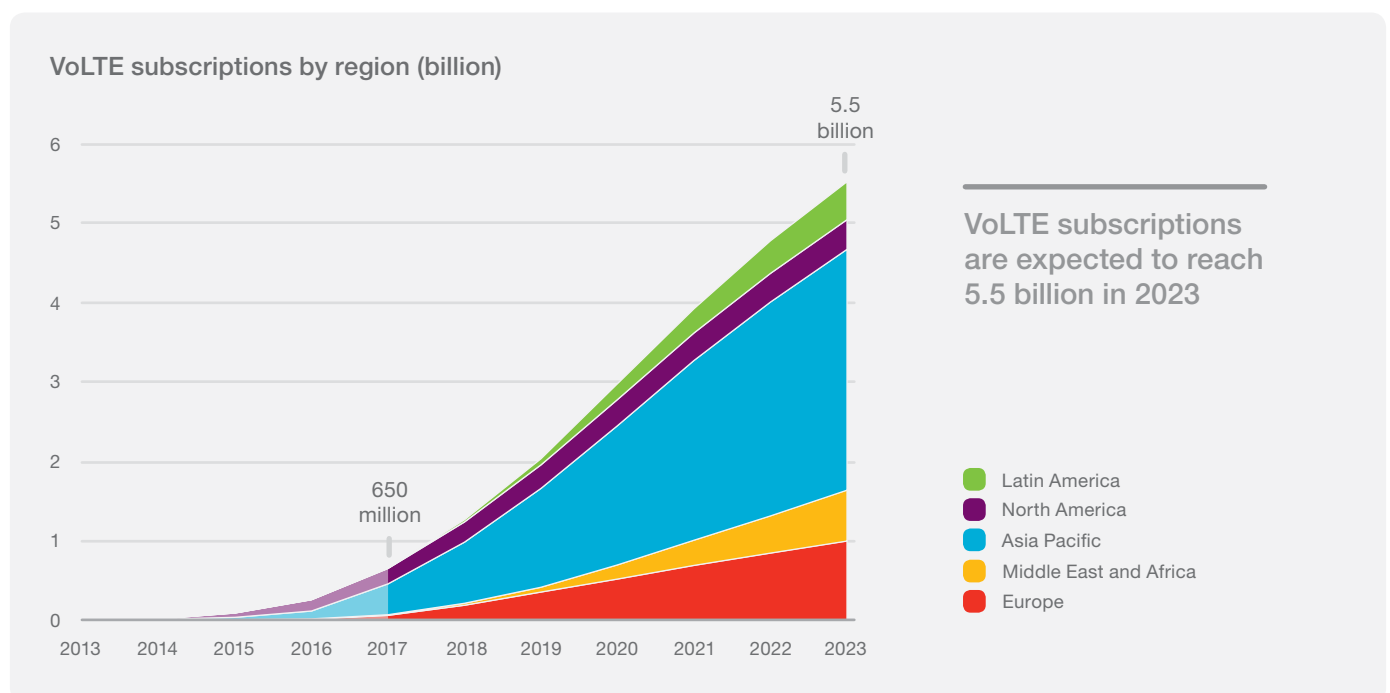### Enabling new consumer and enterprise use cases with VoLTE

VoLTE is delivered via the IP Multimedia Subsystem (IMS) and enables operators to offer high-quality, simultaneous communication and data services on smartphones and other devices. Functionality includes HD voice, HD voice+ and music within calls with the new Enhanced Voice Services (EVS) codec, content sharing within calls, video communication, IP messaging and evolution to chat bots, and allowing several devices to share the same phone number.

Wi-Fi calling is built on the same core network systems as VoLTE, and enables operators to extend their voice service to places with limited cellular coverage. To date, Wi-Fi calling has been implemented on over 55 networks in more than 30 countries.[2]

There are more than 1,300 VoLTE-enabled device models.[3] Cellular smartwatches are one of the latest devices to utilize VoLTE. Users are able to make voice calls directly on their smartwatch, without having a smartphone nearby. Calls can also be transferred between a user's smartphone and watch.

VoLTE support in Cat-M1-capable Internet of Things (IoT) devices and network infrastructure is now being enabled, and new use cases are being explored. Many IoT use cases could benefit by incorporating basic voice calling functionality. One example is in assistance situations, such as using an alarm panel in an elevator, or calling the owner of a lost dog via its IoT-connected collar. The technology could also be used to improve business performance, for example, enabling faster repair of vending machines by providing a button to call a service center easily.

VoLTE technology will be the foundation for enabling voice calls over 5G access. New communication service use cases in a 5G context are being explored, such as combining them with augmented reality and virtual reality.

VoLTE subscriptions by region (billion)

5.5 billion

650 million

VoLTE subscriptions are expected to reach 5.5 billion in 2023

- Latin America
- North America
- Asia Pacific
- Middle East and Africa
- Europe

[1] A subscriber is counted as having a VoLTE subscription if making at least one VoLTE call per month
[2] GSMA (November 2017)
[3] GSA (July 2017), supporting different regions and frequencies
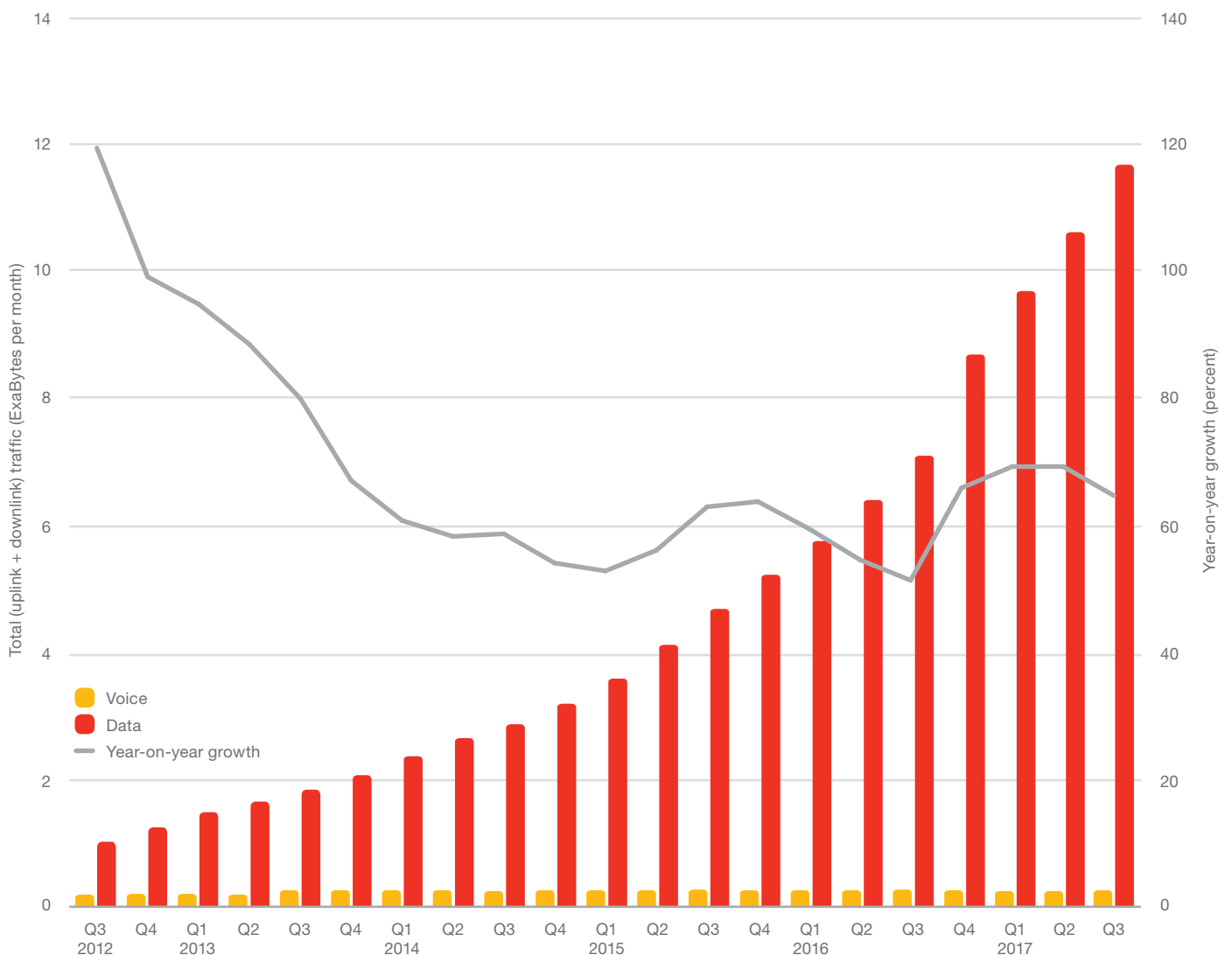
MOBILE TRAFFIC
Q3 2017

Mobile data traffic[1] continues to grow. This is driven by increasing smartphone subscriptions and increasing average data volume per subscription, fueled primarily by more viewing of video content.

The graph below shows total global monthly data and voice traffic from Q3 2012 to Q3 2017, along with the year-on-year percentage change for mobile data traffic.

This curve illustrates a typical moderating growth rate as the market has evolved over time, which has been disrupted on a couple of occasions. In 2015, the growth rate was influenced by zero-rated video offers in North America. In 2016, introductory free data traffic offers in India pushed up the global traffic noticeably.

In Q3 2017, data traffic grew around 10 percent quarter-on-quarter and around 65 percent year-on-year. However, there are large differences in traffic levels between markets, regions and operators.

Data traffic grew 65% between
Q3 2016 and Q3 2017

Legend:
- Voice
- Data
- Year-on-year growth

Source: Ericsson traffic measurements (Q3 2017)

[1] Traffic does not include DVB-H, Wi-Fi, or Mobile WiMAX. VoIP is included in data traffic

MOBILE TRAFFIC BY APPLICATION CATEGORY

Increased viewing of video on mobile devices, embedded video and emerging video formats will drive data consumption
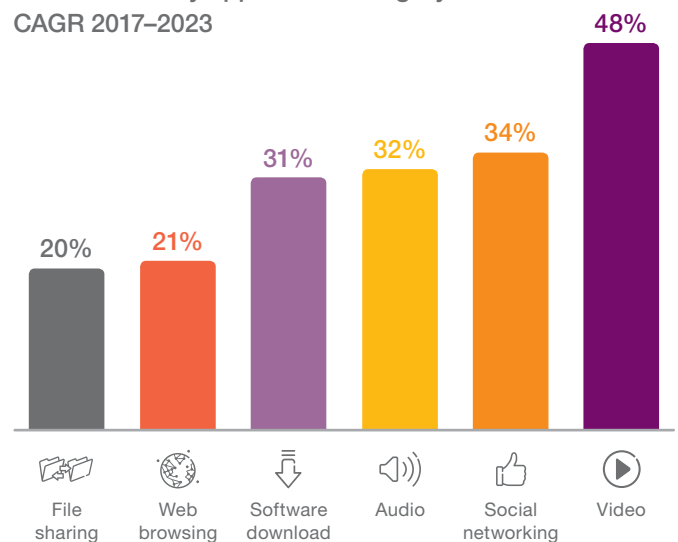
Mobile video traffic is forecast to grow by around 50 percent annually through 2023 to account for 75 percent of all mobile data traffic. Social networking is also expected to grow – increasing by 34 percent annually over the next 6 years. However, its relative share of traffic will decline from 12 percent in 2017 to around 8 percent in 2023, as a result of the stronger growth of video.

Other application categories have annual growth rates ranging from 20 to 32 percent, and so are shrinking as a proportion of overall traffic. The use of embedded video in social media and webpages (here counted as video traffic) is also growing, fueled by larger device screens, higher resolution and new platforms supporting live streaming.
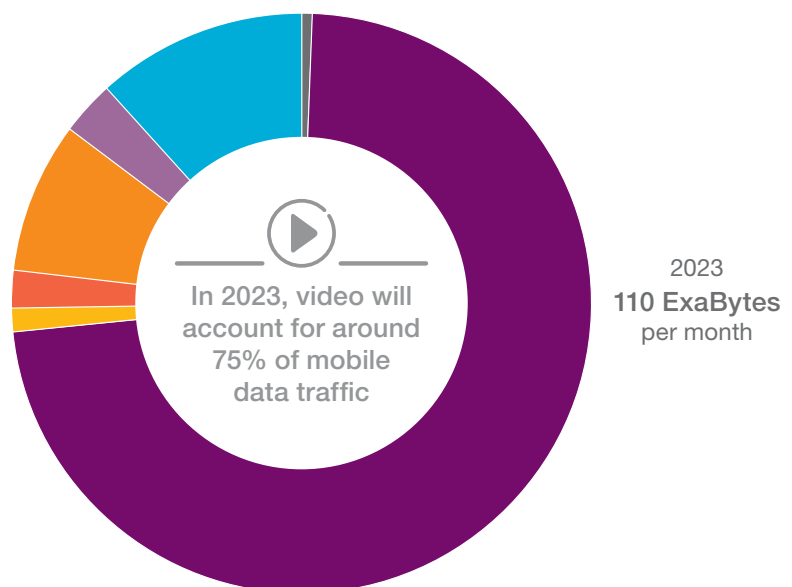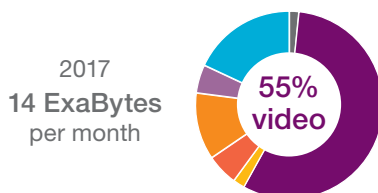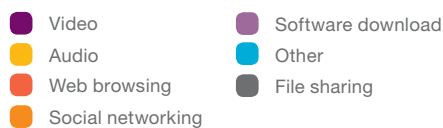
The emergence of new applications and changes in consumer behavior can shift the forecast relative traffic volumes. Streaming videos in different resolutions can impact data traffic consumption to a high degree. Watching HD video (1080p) rather than video at a standard resolution (480p) typically increases the data traffic volume by around 4 times. An emerging trend with increased streaming of immersive video formats, such as 360-degree video, would also impact data traffic consumption. For example, a YouTube 360-degree video consumes 4 to 5 times as much bandwidth as a normal YouTube video at the same resolution.

Another driver is an increasing preference among consumers for on-demand and catch-up TV over scheduled linear TV viewing. Consumer research indicates that as early as 2020, half of all TV and video viewing will be done on a mobile screen.[1]

Mobile traffic by application category CAGR 2017–2023

File sharing	Web browsing	Software download	Audio	Social networking	Video
20%	21%	31%	32%	34%	48%

Mobile data traffic by application category per month (ExaBytes)

- Video
- Audio
- Web browsing
- Social networking
- Software download
- Other
- File sharing

2017
14 ExaBytes
per month

55% video

In 2023, video will account for around 75% of mobile data traffic

2023
110 ExaBytes
per month

MOBILE DATA TRAFFIC OUTLOOK

In 2023, monthly global mobile data traffic will surpass 100 ExaBytes (EB)

Monthly mobile data traffic per smartphone continues to increase in all regions. North America has the highest usage, and traffic is expected to reach 7.1 GigaBytes (GB) per month per smartphone by the end of the year and increase to 48GB by the end of 2023. Western Europe has the second highest usage, with traffic set to reach 4.1GB by the end of 2017 and 28GB by the end of 2023. Western Europe will be the region with the highest growth rate in monthly mobile data traffic per smartphone during the forecast period.
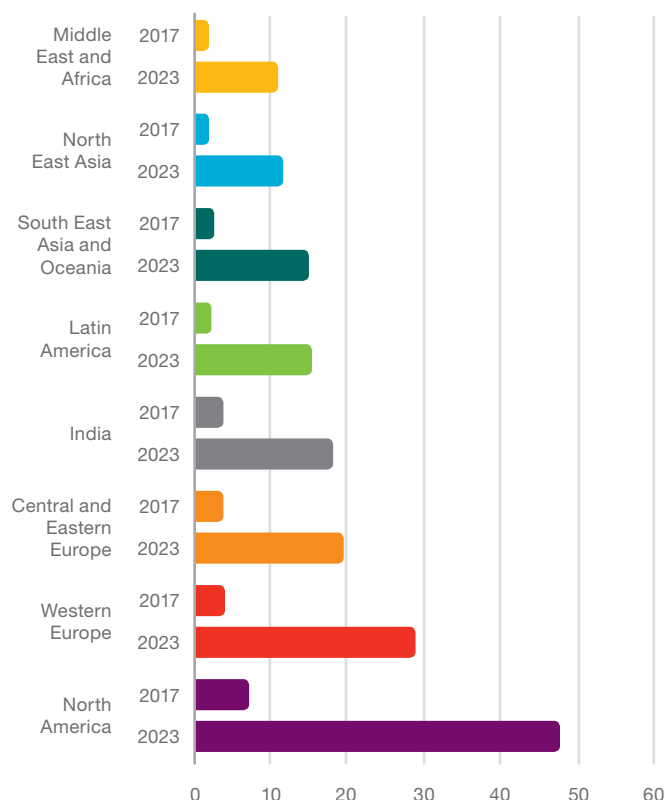
The high average usage in India – estimated to reach 3.9GB per month per smartphone at the end of 2017 – is mainly due to an introductory LTE offer by an operator during the latter half of 2016, which included free voice and data traffic. Data traffic is expected to continue to grow, reaching 18GB per month per smartphone in 2023.

Factors that will drive higher usage in general include an increase in the number of LTE subscriptions, improved device capabilities and more affordable data plans, as well as an increase in data-intensive content. As virtual reality and augmented reality technologies are more widely adopted, content will become even more data intensive.
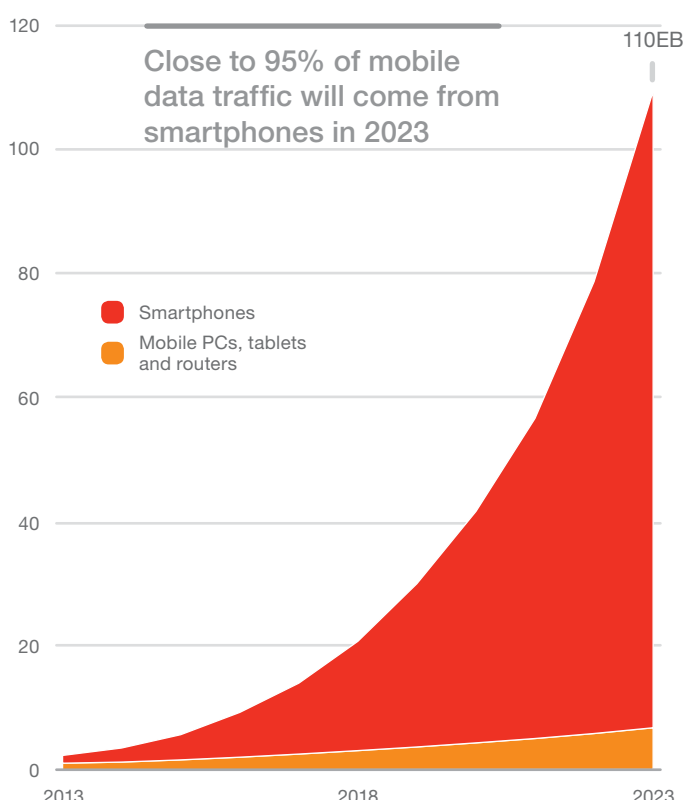
Total mobile data traffic is expected to rise at a compound annual growth rate (CAGR) of 42 percent

Total mobile data traffic for all devices is anticipated to increase by 8 times during the forecast period, reaching around 110EB per month by the end of 2023. At close to 85 percent, data traffic generated by smartphones is already accounting for the largest proportion of mobile data traffic. Going forward, smartphone data traffic will become even more dominant, and is expected to increase by 9 times during the forecast period to account for close to 95 percent of total mobile data traffic by the end of 2023.
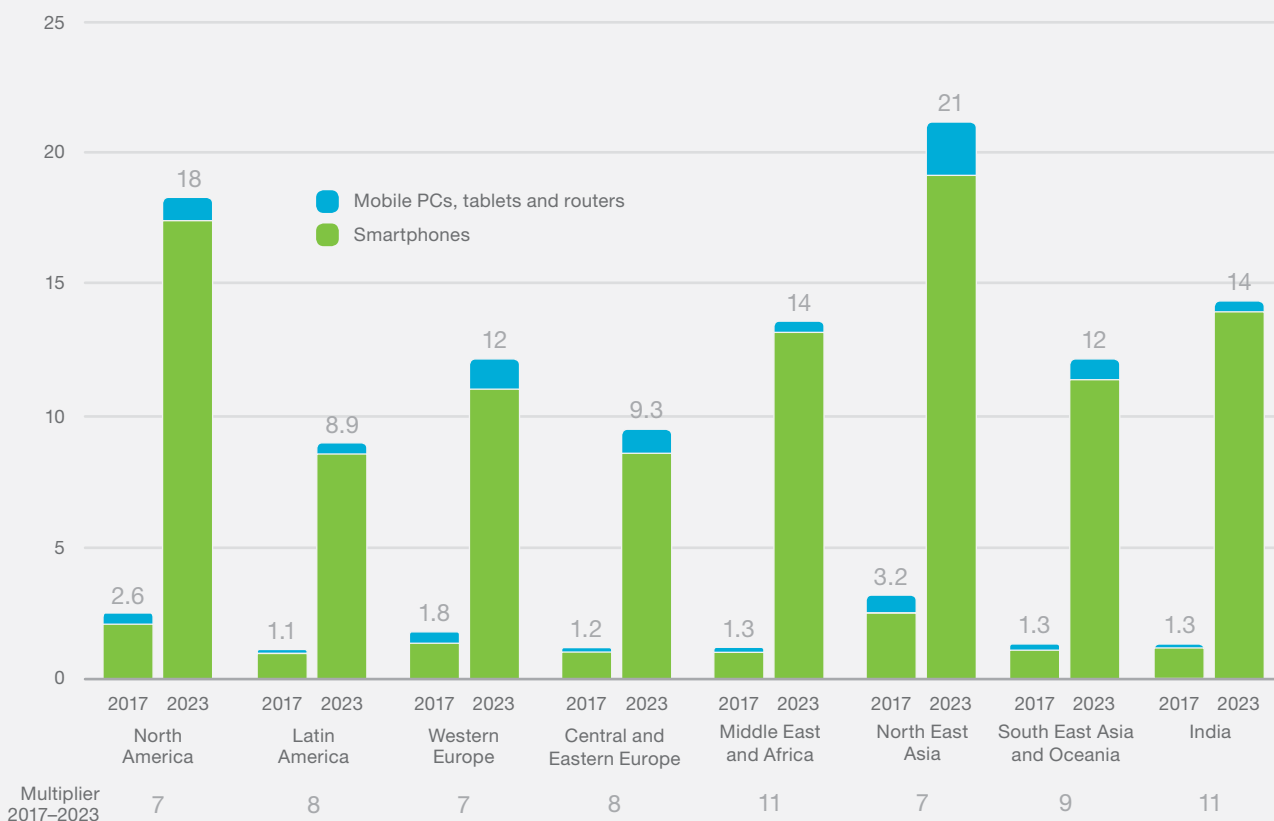
Data traffic per active smartphone
(GigaBytes per month)

Global mobile data traffic
(ExaBytes per month)

Close to 95% of mobile data traffic will come from smartphones in 2023

- Smartphones
- Mobile PCs, tablets and routers

Global mobile data traffic (ExaBytes per month)

	North America		Latin America		Western Europe		Central and Eastern Europe		Middle East and Africa		North East Asia		South East Asia and Oceania		India	
	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023
	2.6	18	1.1	8.9	1.8	12	1.2	9.3	1.3	14	3.2	21	1.3	12	1.3	14
Multiplier 2017–2023	7		8		7		8		11		7		9		11	

Legend: Mobile PCs, tablets and routers; Smartphones

North East Asia is set to keep the largest share of global mobile data traffic

North East Asia is the most populous region and as such has the largest share of global mobile data traffic – 23 percent by the end of 2017. This will continue into 2023, when total mobile data traffic in the region is forecast to reach 21EB per month. South Korea and Japan engaged in early deployment of LTE with fast uptake, and markets like Singapore and Hong Kong are also highly advanced. The rapid growth in mobile broadband subscriptions is expected to continue. China is set to add 420 million mobile broadband subscriptions by the end of 2023, driving data traffic to 15EB per month.

In India, total mobile data traffic per month is expected to increase by 11 times during the forecast period to exceed 14EB in 2023. The strong growth in LTE subscriptions and increasing smartphone penetration, as well as the demand for data-intensive applications like video, will drive usage. In South East Asia and Oceania, total mobile data traffic will also show strong growth, increasing by 9 times to reach 12EB per month in 2023.

The regions of the Middle East and Africa and Central and Eastern Europe will experience an 11 times

There will be 11 times more mobile data traffic in India in 2023

and 8 times increase in mobile data traffic, respectively, up to the end of the forecast period. In 2023, total monthly mobile data traffic will reach 14EB in the Middle East and Africa and 9.3EB in Central and Eastern Europe.

North America and Western Europe have a larger share of the total traffic volume than subscription numbers imply. This is due to well built-out WCDMA and LTE networks and high penetration of high-end user devices, complemented with affordable packages offering large volumes of data. This combination leads to high data usage per subscription. Total mobile data traffic is expected to exceed 18EB per month in North America in 2023 and reach 12EB per month in Western Europe.

In Latin America, the rising number of smartphone subscriptions, as well as the increasing use of mobile broadband to access a range of online services, has led to strong growth in mobile data traffic. This growth is expected to continue over the forecast period to reach close to 9EB per month by the end of 2023.

IOT CONNECTIONS OUTLOOK

The number of connected IoT devices is expected to increase at a CAGR of 19 percent up to 2023. More than 20 massive IoT cellular networks have been commercially deployed across several regions

20 billion connected IoT devices by 2023

By 2023, over 30 billion connected devices[1] are forecast, of which around 20 billion will be related to the IoT. Connected IoT devices include connected cars, machines, meters, sensors, point-of-sale terminals, consumer electronics[2] and wearables. Between 2017 and 2023, connected IoT devices are expected to increase at a CAGR of 19 percent, driven by new use cases and affordability.

Short-range and wide-area segments

In the figure below, IoT is divided into short-range and wide-area segments. The short-range segment 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. This category also includes devices connected over fixed-line local area networks and powerline technologies.

The wide-area segment consists of devices using cellular connections, as well as unlicensed low-power technologies, such as Sigfox and LoRa.

1.8 billion IoT devices with cellular connections by 2023

At the end of 2017, there will be around 0.5 billion IoT devices with cellular connections. This number is projected to reach 1.8 billion in 2023, or around 75 percent of the wide-area category.

Presently, the dominant technology in the wide-area segment is GSM/GPRS. However, by 2023, IoT cellular connectivity will mainly be provided by LTE and 5G. The majority of these connections will be over LTE networks, while 5G technology will continue to support an increase in IoT applications, especially those requiring critical communications. 5G will also provide mechanisms for rapid and cost-effective introduction and provisioning of new IoT services.

Based on technologies like Cat-M1 and NB-IoT,[3] a growing number of cellular IoT networks are being deployed, with more than 20 networks now commercially launched across several regions.[4]

Connected devices (billion)
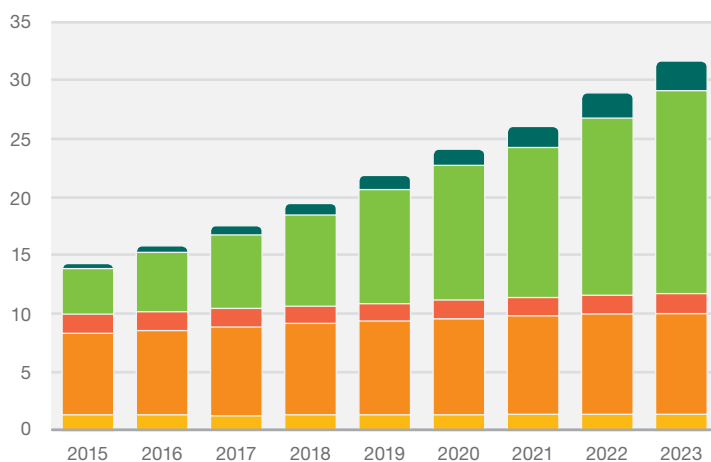
	2017	2023	CAGR
Wide-area IoT	0.6	2.4	26%
Short-range IoT	6.4	17.4	18%
PC/laptop/tablet	1.6	1.7	0%
Mobile phones	7.5	8.8	3%
Fixed phones	1.4	1.3	0%
	17.5 billion	31.6 billion	

[1] In our forecast, a connected device is a physical object that has a processor, enabling communication over a network interface
Note: Traditional landline phones are included for legacy reasons
[2] Including: Smart TVs, digital media boxes, Blu-Ray players, gaming consoles, audio/video (AV) receivers, etc.

[3] Cat-M1 supports a wide range of IoT applications, including content-rich ones, and NB-IoT is streamlined for ultra-low throughput applications. Both of these technologies are deployed on LTE networks
[4] GSA (October 2017)

NETWORK COVERAGE

In 2023, more than 20 percent of the world's population will be covered by 5G

Demand for population and geographical coverage

Historically, mobile services have been centered on providing sufficient radio signal for the world's inhabitants where they live, which is defined as population coverage. Today, mobile networks cover around 95 percent of the world's population and this figure continues to grow.

Mobile service usage has evolved from predominantly voice to messaging and internet access, as well as to a variety of apps on a range of smart devices, placing greater demands on network performance.

For mobile broadband (WCDMA/HSPA or a later technology), population coverage is currently at around 80 percent and forecast to grow to over 95 percent in 2023.

With the expected growth of IoT services, there is a higher demand on geographical coverage – be it wide-area or dedicated coverage – as networks of sensors are installed in places with low population density such as agricultural areas or forestland.

LTE deployment continues to gain momentum

In terms of build-out and subscription uptake, LTE is the fastest-deployed mobile communication technology to date. It took just 5 years for LTE to cover 2.5 billion people, compared to 8 years for WCDMA/HSPA.

LTE is driven by demand for improved user experience and faster networks. Several drivers are further increasing the speed of LTE deployment. In India, a rise in low-cost offerings and low cost per MegaByte is making the technology attractive. Similar drivers are also prevalent in other high-growth markets.

LTE population coverage is currently around 55 percent and is forecast to grow to more than 85 percent in 2023.
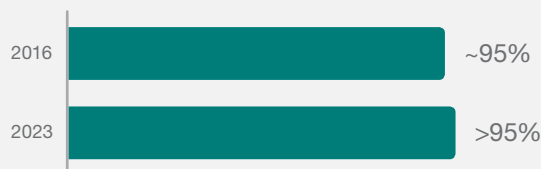
Providing coverage for 5G use cases

In the past, mobile networks have first been deployed in urban areas, and then gradually expanded to areas such as suburban and major interconnecting highways.

In a similar fashion, 5G is expected to be deployed first in dense urban areas to support enhanced mobile broadband services, and by 2023, more than 20 percent of the world's population is expected to be covered by the technology.

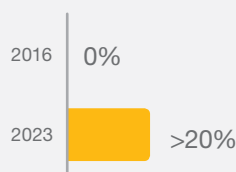To a large extent, 5G is driven by use cases with a wide range of requirements. One of the first commercial uses for 5G is expected to be for Fixed Wireless Access (FWA), implying a coverage build-out in urban areas. Other use cases will come from industries such as automotive, manufacturing, energy and utilities, and healthcare, and will drive demand for dedicated coverage.

World population coverage by technology[1]

Total population coverage of 3GPP cellular technologies

2016	~95%
2023	>95%

LTE is driven by demand for improved user experience and faster networks

2016	~55%
2023	>85%
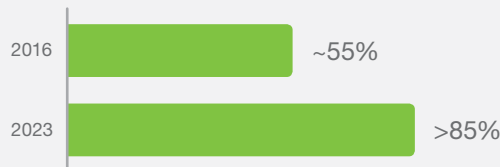
5G coverage will commence in metropolitan and urban areas

2016	0%
2023	>20%

[1] The figures refer to population coverage of each technology. The ability to utilize the technology is subject to factors such as access to devices and subscriptions

NETWORK EVOLUTION

Mobile networks with Gigabit speed capabilities are currently being launched and trialed in several regions worldwide. Beyond enhanced mobile broadband use cases, a range of new industrial and enterprise use cases are enabled by evolving networks. In the manufacturing industry, augmented reality-assisted maintenance and repair could improve productivity and efficiency throughout the manufacturing process

Mobile networks are evolving to deliver enhanced mobile broadband and communication services with high data throughput, quality of service and low latency requirements, as well as new IoT services with strong requirements on scalability, reliability, availability and latency. Significant radio performance enhancements, together with a more flexible and agile core network, will enable operators to serve a much broader range of use cases in the future.

Gigabit LTE network deployments gaining momentum

Operators have deployed multi-standard access networks with GSM, HSPA and LTE, and are evolving their existing LTE networks to LTE-Advanced (LTE-A), enabling Gigabit network speeds. Device ecosystems are well aligned, as most new smartphones support the latest 3GPP Category[1] (Cat 16).

By using higher order carrier aggregation, operators can combine more spectrum assets. As carrier aggregation is coupled with 4x4 MIMO and 256 QAM, operators can achieve network speeds with peak rates of Gigabit per second. This will lead to increased network capacity, a wider coverage area, and faster average end-user data speeds.

There are currently 14 Gigabit LTE networks that have been commercially launched, and the deployment rate is expected to increase during 2018. Even so, in ongoing trials (based on commercially available network infrastructure and chipsets) speeds above Gigabit per second have been achieved. Commercial launches of such networks are also expected during 2018.
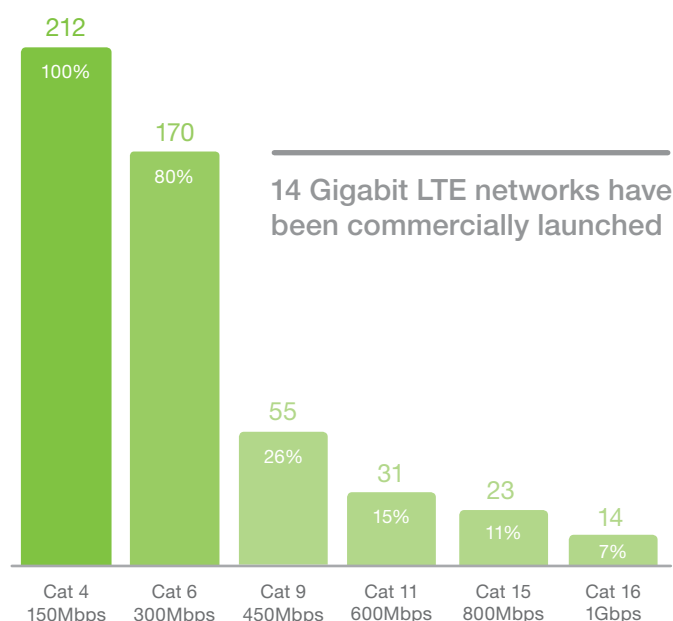
There are currently 644 commercial LTE networks deployed in 200 countries. Of these, 212 have been upgraded to LTE-A networks.

Further technology advances on the road to 5G

In the quest to offer increased capacity and faster data speeds, one of the limiting factors is the availability of a sufficient amount of licensed spectrum. Licensed Assisted Access (LAA) is a new technology that allows operators to use unlicensed spectrum in combination with their licensed spectrum to improve network capacity and speed. Commercial deployments are expected in 2018.

Another technology that improves end-user experience, as well as increasing network capacity and coverage while reducing interference, is Massive MIMO. Massive MIMO will play an important role in current generations of mobile communication and will become even more important with 5G technology. Several trials are ongoing and commercial deployments are expected during 2018.

Percentage and number of LTE-Advanced networks supporting Cat 4, Cat 6, Cat 9, Cat 11, Cat 15 and Cat 16 devices

14 Gigabit LTE networks have been commercially launched

212	100%
170	80%
55	26%
31	15%
23	11%
14	7%

| Cat 4 150Mbps | Cat 6 300Mbps | Cat 9 450Mbps | Cat 11 600Mbps | Cat 15 800Mbps | Cat 16 1Gbps |

Source: Ericsson and GSA (November 2017)

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[1] Category (Cat) labels the theoretical maximum downlink speed a mobile device supports. The higher the Cat number, the faster the speeds

Examples of use case evolution and supporting network technologies

		Current	On the road to 5G	5G experiences
	Enhanced mobile broadband	Browsing, social media, music, video	Fixed Wireless Access, interactive live concerts and sports events	4K/8K videos, mobile AR/VR gaming, immersive media
	Automotive	Wi-Fi hotspots, on-demand GPS map data, over-the-air software updates	Predictive vehicle maintenance; capturing of sensor data for real-time traffic, weather, parking and mapping services	Autonomous vehicle control, cooperative collision avoidance, vulnerable road user discovery
	Manufacturing	Connected goods, intra/inter enterprise communication	Collaborative robots, distributed control system, remote quality inspection	Remote control of robots; AR in training, maintenance, construction and repair
	Energy and utilities	Smart metering, dynamic and bidirectional grids	Distributed energy resource management, distribution automation	Control of edge-of-grid generation, virtual power plants, real-time load balancing
	Healthcare	Remote patient monitoring, connected ambulances, electronic health records	Tele surgery, AR aiding medical treatment	Precision medicine, remote robotic surgery, ambulance drones
	Technologies	> Multi-standard network > Cat-M1/NB-IoT > Cloud-optimized network functions > VNF orchestration	> Gigabit LTE (TDD, FDD, LAA) > Massive MIMO > Network slicing > Dynamic service orchestration > Predictive analytics	> 5G New Radio > Virtualized RAN > Federated network slicing > Distributed cloud > Real-time machine learning/AI

Evolution of use cases

Beyond enhanced mobile broadband, networks are evolving to handle use cases with different demands on mobility, data rates, latency, scalability, security, integrity, reliability, availability and device density. As indicated in the table above, networks will serve an increasing number of use cases over time. These will come from a range of industries, such as automotive, manufacturing, energy and utilities, and healthcare.

As an example, digitalization in the manufacturing industry will enable a range of new use cases with the potential to improve productivity and efficiency throughout the whole manufacturing process.

Use case: Augmented reality-assisted maintenance and repair

The manufacturing industry has short business cycles and caters to increasingly varied customer demands. Now, digitalization and globalization are making the industry more competitive, requiring supply chains to be managed more efficiently as they become interconnected worldwide.

Unplanned interruptions in the manufacturing process drive increased costs, leading to lower utilization of machinery and product throughput, and extended lead times. Current operational processes create several related challenges. For example, maintenance planning is typically based on inadequate data and much time is spent on information collection and documentation, or on training repair crews to use complex and diverse machinery.

Augmented reality (AR)[2] will help to address these challenges. One example is the use of AR alongside applications supporting data analysis and diagnostics, which will enable preventive and remote maintenance. These measures optimize the cost of operations, while also increasing uptime in the manufacturing process. Depending on the specifics of the use case, AR support will be provided through a range of devices, such as smartphones, tablets, smart helmets, smart gloves and smart glasses.

Repair crews could also be supported by augmented information. For example, operational guidance and automated processes could enable them to more easily carry out preventive and corrective maintenance, with less time spent on fault identification and a reduction in human error.

The role of 5G

Many use cases can be addressed by evolved 4G (LTE) networks. As networks evolve further there will be even more opportunities to enhance existing use cases, as well as to meet the demands of new ones when 5G is implemented.

5G will be highly beneficial for industrial use cases where AR-based applications will require high data rates and low latency. Bandwidth requirements are expected to be significant to ensure consistent and secure streaming of high-resolution images, as well as large volumes of data, in a sensor-rich environment with high-connection density.

[2] Live direct or indirect view of a physical, real-world environment with elements augmented by computer-generated sensory input such as sound, video and graphics
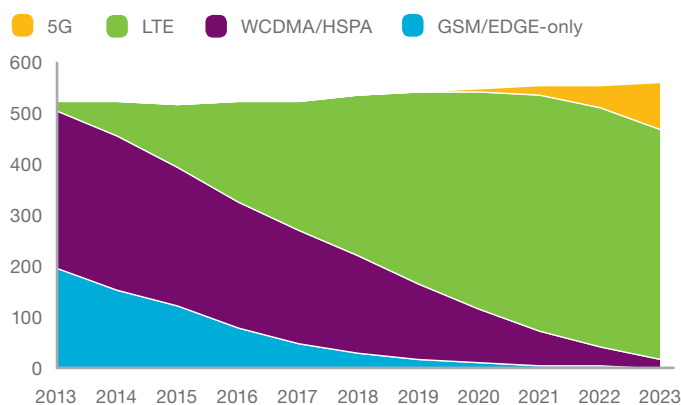
WESTERN EUROPE IN FOCUS

Economic growth in Western Europe[1] is steady and the region's governments are supporting future digital developments, paving the way for 5G adoption. By the end of 2017, LTE will be the dominant mobile technology and, with a compound annual growth rate (CAGR) of 10 percent, it is continuing to expand

| Key figures: Western Europe	2017	2023	CAGR 2017–2023
Mobile subscriptions (million)	520	560	1%
Smartphone subscriptions (million)	400	480	3%
Mobile broadband subscriptions (million)	470	560	3%
LTE subscriptions (million)	250	450	10%
Cellular IoT subscriptions (million)	120	410	22%
Data traffic per active smartphone (GB/month)	4.1	28	38%
Total mobile data traffic (EB/month)	1.8	12	37%

Countries in Western Europe are showing a continued and steady recovery.[2] Economic growth is being supported by recent expansionary fiscal policies, combined with strengthened monetary policies. As part of these policies, many governments in Western Europe are supporting developments in their information and communication infrastructure to boost long-term economic growth. For example, the UK government has committed GBP 1.1 billion to its future digital infrastructure, including fiber and 5G.[3]

Countries within Western Europe have developed economies, with high gross domestic product (GDP) per capita. This enables an increased rate of information and communication technology adoption, reflected in the high levels of smartphone ownership. The left-hand graph below shows that, by the end of 2017, LTE will be the dominant mobile technology, with around 50 percent of all subscriptions, representing an 11 percentage point increase compared to 2016. The first commercial 5G networks and devices based on 3GPP standards are expected to go live in 2019, with major network deployments from 2020. By 2023, 5G will make up 16 percent of all mobile subscriptions in the region.

Mobile subscriptions by technology in Western Europe

Smartphone penetration of handsets (percent)
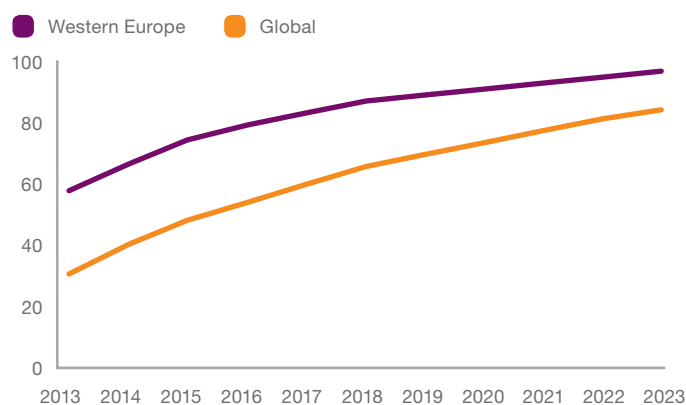
[1] In this report, Western Europe includes: Åland Islands, Andorra, Austria, Belgium, Cyprus, Denmark, Faroe Islands, Finland, France, Germany, Gibraltar, Greece, Greenland, Guernsey, Iceland, Ireland, Isle of Man, Italy, Jersey, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, Réunion, San Marino, Spain, Svalbard and Jan Mayen, Sweden, Switzerland, United Kingdom
[2] OECD Economic Outlook, Volume 2017, Issue 1 (June 2017). This issue showed that in the Eurozone, GDP growth is projected to remain around 1.75 percent in 2017 and 2018
[3] UK Government Department for Culture, Media and Sport, Next Generation Mobile Technologies: A 5G Strategy for the UK (March 2017)

MOBILE TRAFFIC

By 2023, data usage is expected to be 6.5 times that of the end of 2017. This is a result of the increased consumption of broadband-intensive services, such as video, and new applications like virtual reality (VR) and augmented reality (AR)

Smartphones dominate mobile subscriptions and drive data traffic

In 2023, total mobile data usage in Western Europe is expected to reach around 12 ExaBytes (EB) per month – equivalent to 6 billion hours of movie watching.[1] This growth is fueled by the continued transition to LTE, as well as increased usage by individual smartphone users. Today, smartphones dominate the mobile subscription market with a 76 percent share of subscriptions. Average data traffic per smartphone will increase from 4.1GB per month per user at the end of 2017 to 28GB by 2023 – a CAGR of 38 percent.

Western Europe has the world's second highest consumption of traffic per month per active smartphone, exceeded only by North America. Across both Western Europe and North America, a combination of high-end user devices, well-built-out WCDMA and LTE networks, and affordable packages that offer large volumes of data resulted in high data usage per subscription.

Demand for video shows no sign of slowing

Video is a significant contributor to data traffic, and consumer demand for video services shows no sign of slowing down. The chart below[2] shows the consumption of two popular video services on Android phones (YouTube and Netflix) over a year and across four countries: the UK,

Germany, France and Spain. The graph shows that there is a common trend among all four countries – that the amount of both time and data consumed per user per month have significantly increased over the period September 2016 to August 2017.

Analysis of data across the UK, Germany, France and Spain for Android smartphone users shows that the number using video services has increased, impacting the overall level of data consumption. For example, YouTube penetration rose by around 20 percent from September 2016 to August 2017 across the 4 markets, while for Netflix the number of active Android users has doubled in the same period.[3]

Western Europe traffic forecast (EB/month)
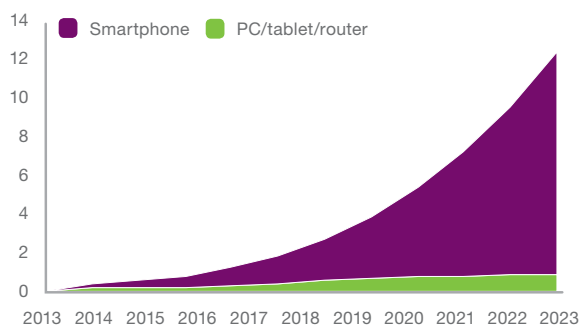
Average increase in Gigabytes consumed per user per month from September 2016 to August 2017 (percent)
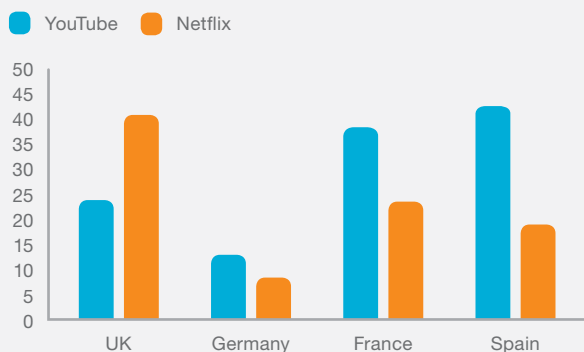
Average increase in time per user per month from September 2016 to August 2017 (percent)
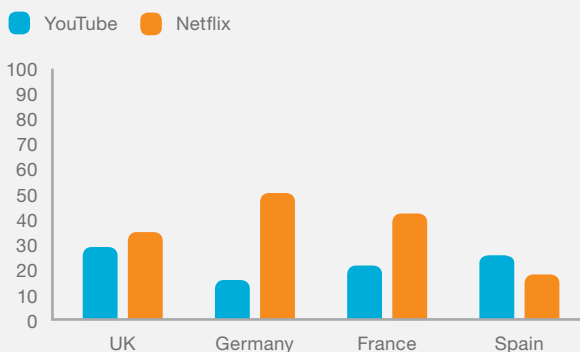
Source: Ericsson analysis of App Annie data for Android OS smartphone apps.
Base: Active Android OS smartphone users (September 2016–August 2017)

[1] Calculated with an average streaming video media rate of 5Mbps
[2] The statistics on mobile consumption were sourced from App Annie. App Annie Intelligence data for Android phones was derived from mobile usage data collected from a large sample of real-world users
[3] Ericsson analysis of App Annie data for Android OS smartphone apps
Base: Active Android OS smartphone users (September 2016–August 2017)

MERGED REALITY TO DRIVE 5G EXPECTATIONS

Today, early adopters of VR and AR are already starting to recognize the potential for 5G to improve the current experience. In Western Europe 40 percent of consumers are aware of 5G today

Moving towards a merged reality

VR and AR could shift our use of technology by enabling consumers to transition between virtual and physical worlds. The idea of merging the real with the digital has been coined the Fourth Industrial Revolution.[1]

There are many recent examples of physical reality being merged with virtual experiences – challenging traditional notions of "real experience".

For example, the location-based AR game Pokémon Go allows players to catch virtual monsters on real streets, in parks and in subway stations (or wherever they happen to be). Global hotelier Marriott teleports its guests to exotic locations virtually, helping them to decide on a vacation spot, and the Guinness World Records book allows readers to have their picture taken with the world's shortest man through an AR-enriched app, before sending it to friends and family.
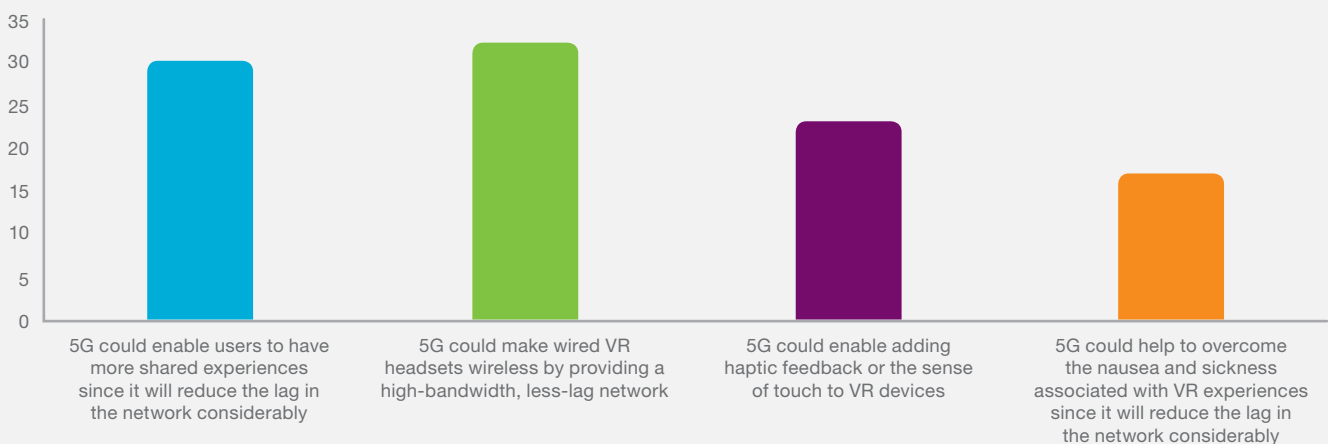
Improving the VR experience

With many of these experiences, VR technologies in their current form collide rather than merge with our physical reality. Bulky headsets cut the user off from their surroundings and hinder mobility, and a highly interactive VR experience can induce nausea for some people.

A report highlighted that, during qualitative VR tests, for the majority of users the amount of lag determined whether or not they felt nauseous. However, at opposite ends of the spectrum there were some users who were almost immune to nausea and some who would always feel nauseous.[2] A next-generation network, like 5G, that minimizes lag time could address this issue, but today only around 20 percent of early VR adopters surveyed expect 5G technology to do so.

A third of early adopters believe that next-generation networks could enable more shared experiences and wireless headsets with less lag. However, despite the qualitative research showing the connection between lag and nausea, a limited number of consumers understand the impact that lag has on nausea today. With lower latency, new features like haptics can be added to the VR experience, but still only around a quarter of users expect 5G to deliver on that promise.

These figures show that some early adopters of VR, though small in number today, are starting to recognize the potential of 5G. This is despite only 40 percent of consumers being aware of 5G, and 1 in 10 saying they felt comfortable explaining it to others, according to another recent survey in Germany, France, Ireland and the UK.[3]

Share of early adopters of VR that expect 5G will play a central role (percent)

5G could enable users to have more shared experiences since it will reduce the lag in the network considerably	5G could make wired VR headsets wireless by providing a high-bandwidth, less-lag network	5G could enable adding haptic feedback or the sense of touch to VR devices	5G could help to overcome the nausea and sickness associated with VR experiences since it will reduce the lag in the network considerably

Source: Ericsson ConsumerLab, Merged Realities (2017)
Base: Smartphone users aged 15–69 across France, Germany, Italy, Spain and the UK, who currently use tethered VR headsets at least several times a week

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[1] Foreign Affairs, Klaus Schwab, The Fourth Industrial Revolution (December 2015)
[2] Ericsson ConsumerLab, Merged Realities (2017)
[3] Ericsson ConsumerLab, Analytical Platform (2017)

INDUSTRY OPPORTUNITIES FOR 5G

5G will be a major driver of digitalization. It will enable and enhance use cases including immersive gaming, autonomous driving, remote robotic surgery, production-line robotics, VR and AR

5G-fueled business potential

Cellular Internet of Things (IoT) in Western Europe is growing at a CAGR of 22 percent – rising from 120 million to 410 million by 2023 – and representing almost 30 percent of total cellular IoT connections globally.

IoT communications, high-performance mobile connectivity and cloud services are expected to become key driving forces behind business innovation. A recent report identifies opportunities for telecom operators who address industry digitalization.[1] The report highlights a 5G digitalization revenue potential of USD 619 billion globally in 2026, with an equivalent of USD 150 billion in Western Europe.

Globally, the sectors that have the greatest revenue potential for operators when enhanced by 5G are manufacturing, energy and utilities – and the same is true for Western Europe.

The graphs below illustrate that the manufacturing, energy and utilities industries are worth a potential USD 27.5 billion and USD 22.5 billion respectively to operators in the region. Germany, followed by the UK,

France, Italy and Spain, are the five markets in Western Europe with the highest 5G-enabled business potential for manufacturing.

New operator opportunities

Industry digitalization presents new opportunities, and operators can take on a range of roles along the value chain, including:

> IoT connectivity provider: Providing reliable and scalable networks to connect the growing numbers of devices and manage the connections securely and cost effectively

> IoT service enabler: Offering flexible and agile platforms to enable swift onboarding of new ecosystem partners and speedy launches of new IoT services to the market

> IoT service creator: Creating innovative, end-to-end services that go directly to end users while transforming own sales, distribution and delivery channels for targeted market segments

Operator-addressable 5G digitalization revenue potential for Western Europe in 2026 (percent)
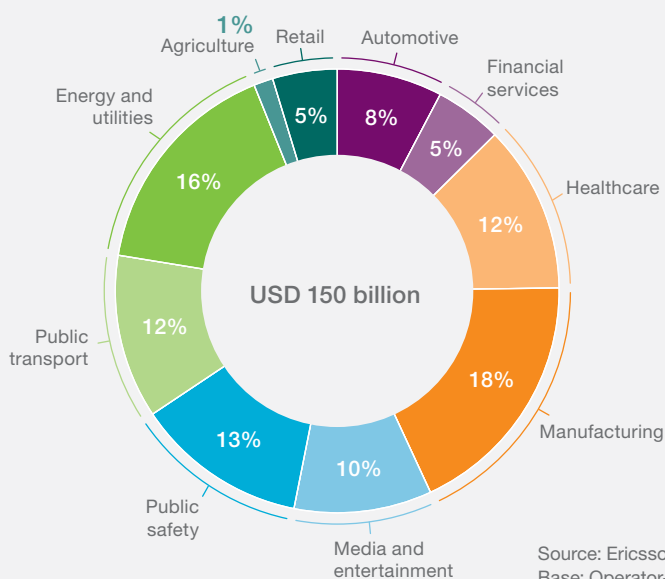
Operator-addressable market for manufacturing in Western Europe (billion)
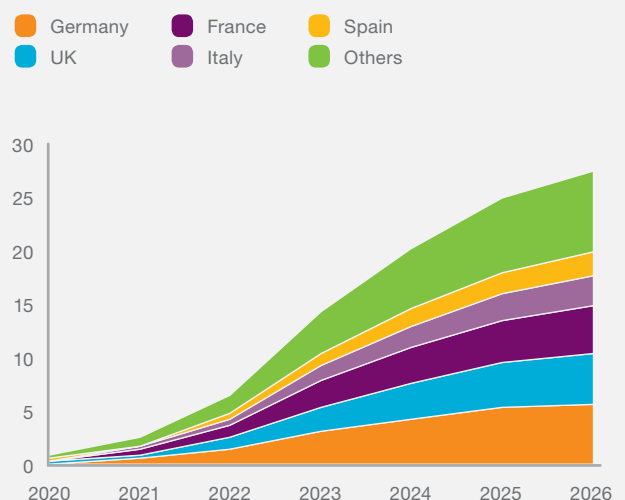
Source: Ericsson, The 5G Business Potential, second edition (October 2017)
Base: Operator-addressable 5G industry digitalization revenues, 2026, Western Europe

[1] Ericsson, The 5G Business Potential, second edition (October 2017)

METHODOLOGY

Forecast methodology

Ericsson makes forecasts on a regular basis to support internal decisions and planning, as well as market communication. The subscription and traffic forecast baseline in this report uses historical data from various sources, validated with Ericsson internal data, including extensive measurements in customer networks. Future development is estimated based on macroeconomic trends, user trends (researched by Ericsson ConsumerLab), market maturity, technology development expectations and documents – such as industry analyst reports – on national and regional levels, together with internal assumptions and analyses.

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

Mobile subscriptions include all mobile technologies. Subscriptions are defined by the most advanced technology that the mobile phone and network are capable of. Figures are rounded and therefore summing up rounded data may result in slight differences from the actual totals. In the key figures tables, subscriptions have been rounded to the nearest 10th million. However, when used in highlights in the articles, subscriptions are usually expressed in full billions or to one decimal. Compound annual growth rate (CAGR) is rounded to the nearest full percentage figure, and traffic volumes are expressed in two digits, for example, 69GB/month or 8.5GB/month.

Traffic refers to aggregated traffic in mobile access networks and does not include DVB-H, Wi-Fi or Mobile WiMAX traffic. VoIP is included in data traffic.

Traffic measurements

New devices and applications affect mobile networks. Having a deep and up-to-date knowledge of the traffic characteristics of different devices and applications is important when designing, testing and managing mobile networks. Ericsson regularly performs traffic measurements in over 100 live networks covering all major regions of the world. Detailed measurements are made in a selected number of commercial WCDMA/HSPA and LTE networks with the purpose of discovering different traffic patterns. All subscriber data is made anonymous before it reaches Ericsson's analysts.

Population coverage methodology

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) combined 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 on a regional and global level, world population coverage per technology can be calculated.

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)

5G: 5th generation mobile networks (not yet standardized)

App: A software application that can be downloaded and run on a smartphone or tablet

CAGR: Compound annual growth rate

Cat-M1: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity. Cat-M1 is a solution that can be deployed on LTE, targeting a wide range of IoT applications from simple to rich content

CDMA: Code Division Multiple Access

dB: In radio transmission, a decibel is a logarithmic unit that can be used to sum up total signal gains or losses from a transmitter to a receiver through the media a signal passes

DL: Downlink

EB: ExaByte, 10^{18} bytes

EDGE: Enhanced Data Rates for Global Evolution

EPC: Evolved Packet Core

GB: GigaByte, 10^9 bytes

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

Gbps: Gigabits per second

GSA: Global mobile Suppliers Association

GSM: Global System for Mobile Communications

GSMA: GSM Association

HSPA: High Speed Packet Access

ICT: Information and Communications Technology

IMS: IP Multimedia Subsystem

ITU: International Telecommunication Union

IoT: Internet of Things

Kbps: Kilobits per second

LTE: Long-Term Evolution

MB: MegaByte, 10^6 bytes

MBB: Mobile Broadband (defined as CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX and TD-SCDMA)

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

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)

NB-IoT: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity. NB-IoT is a narrowband solution that can be deployed on LTE, or as a standalone solution, targeting ultra-low-throughput IoT applications

NFV: Network Functions Virtualization

NR: New Radio as defined by 3GPP Release 15

OS: Operating System

PB: PetaByte, 10^{15} bytes

QAM: Quadrature Amplitude Modulation

SDN: Software-Defined Networking

Smartphone: Mobile phone with OS capable of downloading and running "apps" e.g. iPhones, Android OS phones, Windows phones and also Symbian and Blackberry OS

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. An end-to-end mobile system including IP Multimedia Subsystem (IMS), Evolved Packet Core (EPC), LTE RAN, Subscriber Data Management and OSS/BSS

UL: Uplink

WCDMA: Wideband Code Division Multiple Access

GLOBAL AND REGIONAL KEY FIGURES

In this edition of the Ericsson Mobility Report, we have included the regional key figures in addition to the global figures

To find out more, scan the QR code, or visit
www.ericsson.com/mobility-report

Traffic Exploration Tool:

Create your own graphs, tables and data using the Ericsson Traffic Exploration Tool. The information available here can be filtered by region, subscription, technology, traffic and device type. You may use charts generated from this tool in your own publications as long as Ericsson is stated as the source.

Regional versions:

This time we have provided five versions of the report: a standalone global version as well as four variations of this, each containing a section for a different region of the world.
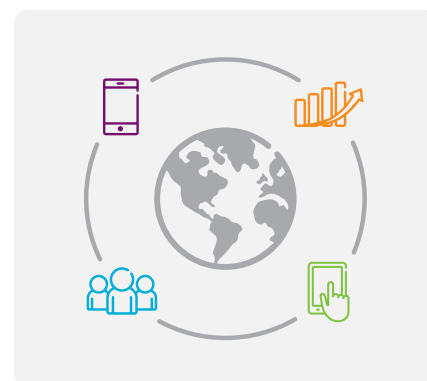
GLOBAL KEY FIGURES

	2016	2017	2023 forecast	CAGR** 2017–2023	Unit
Mobile subscriptions					
Worldwide mobile subscriptions	7,510	7,790	9,120	3%	million
> Smartphone subscriptions	3,840	4,410	7,270	9%	million
> Mobile PC, tablet and mobile router* subscriptions	240	260	330	4%	million
> Mobile broadband subscriptions	4,410	5,160	8,450	9%	million
> Mobile subscriptions, GSM/EDGE-only	3,010	2,560	640	-21%	million
> Mobile subscriptions, WCDMA/HSPA	2,260	2,380	1,970	-3%	million
> Mobile subscriptions, LTE	1,900	2,620	5,470	13%	million
> Mobile subscriptions, 5G			1,000		million
Mobile data traffic*					
> Data traffic per smartphone	2.1	2.9	17	34%	GB/month
> Data traffic per mobile PC	7.7	9.8	27	18%	GB/month
> Data traffic per tablet	3.6	4.6	12	18%	GB/month
Total data traffic*					
Total mobile data traffic	8.8	14	110	42%	EB/month
> Smartphones	7.2	11	100	44%	EB/month
> Mobile PCs and routers	1.3	1.6	4.5	19%	EB/month
> Tablets	0.32	0.47	1.8	25%	EB/month
Total fixed data traffic	70	80	250	20%	EB/month

* Active devices
** 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

[1] These figures are also included in the figures for North East Asia
[2] These figures exclude Pakistan
[3] These figures are also included in the figures for Middle East and Africa

REGIONAL KEY FIGURES

	2016	2017	2023 forecast	CAGR** 2017–2023	Unit
Mobile subscriptions					
North America	380	390	460	3%	million
Latin America	690	700	780	2%	million
Western Europe	520	520	560	1%	million
Central and Eastern Europe	580	610	640	1%	million
North East Asia	1,720	1,780	2,090	3%	million
China[1]	1,320	1,380	1,600	3%	million
South East Asia and Oceania	1,070	1,110	1,290	3%	million
India, Nepal and Bhutan	1,160	1,240	1,500	3%	million
Middle East and Africa[2]	1,390	1,440	1,800	4%	million
Sub-Saharan Africa[3]	660	700	990	6%	million
Smartphone subscriptions					
North America	290	310	390	4%	million
Latin America	410	460	610	5%	million
Western Europe	380	400	480	3%	million
Central and Eastern Europe	240	270	490	10%	million
North East Asia	1,310	1,430	1,940	5%	million
China[1]	1,050	1,150	1,560	5%	million
South East Asia and Oceania	470	560	1,050	11%	million
India, Nepal and Bhutan	270	380	970	17%	million
Middle East and Africa[2]	470	600	1,340	14%	million
Sub-Saharan Africa[3]	260	340	850	17%	million
Data traffic per smartphone*					
North America	5.2	7.1	48	37%	GB/month
Latin America	1.7	2.4	16	36%	GB/month
Western Europe	2.8	4.1	28	38%	GB/month
Central and Eastern Europe	2.7	3.8	19	31%	GB/month
North East Asia	1.2	1.9	12	35%	GB/month
China[1]	0.84	1.5	9.5	36%	GB/month
South East Asia and Oceania	1.8	2.7	15	34%	GB/month
India, Nepal and Bhutan	4.1	3.9	18	30%	GB/month
Middle East and Africa	1.3	2.0	11	34%	GB/month
Sub-Saharan Africa[3]	1.0	1.4	7.0	31%	GB/month
Total mobile data traffic					
North America	1.8	2.6	18	39%	EB/month
Latin America	0.7	1.1	8.9	42%	EB/month
Western Europe	1.2	1.8	12	37%	EB/month
Central and Eastern Europe	0.76	1.2	9.3	41%	EB/month
North East Asia	1.9	3.2	21	37%	EB/month
China[1]	1.0	1.8	15	41%	EB/month
South East Asia and Oceania	0.79	1.3	12	45%	EB/month
India, Nepal and Bhutan	1.0	1.3	14	48%	EB/month
Middle East and Africa	0.71	1.3	14	48%	EB/month
Sub-Saharan Africa[3]	0.25	0.41	4.6	50%	EB/month

Ericsson is a world leader in communications technology and services with headquarters in Stockholm, Sweden. Our organization consists of more than 111,000 experts who provide customers in 180 countries with innovative solutions and services. Together we are building a more connected future where anyone and any industry is empowered to reach their full potential. Net sales in 2016 were SEK 222.6 billion (USD 24.5 billion). The Ericsson stock is listed on Nasdaq Stockholm and on NASDAQ in New York. Read more on www.ericsson.com