Mobile traffic forecasts 2010-2020

A report by the UMTS Forum

Executive Presentation

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Prepared for the UMTS Forum by

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- Main trends & drivers
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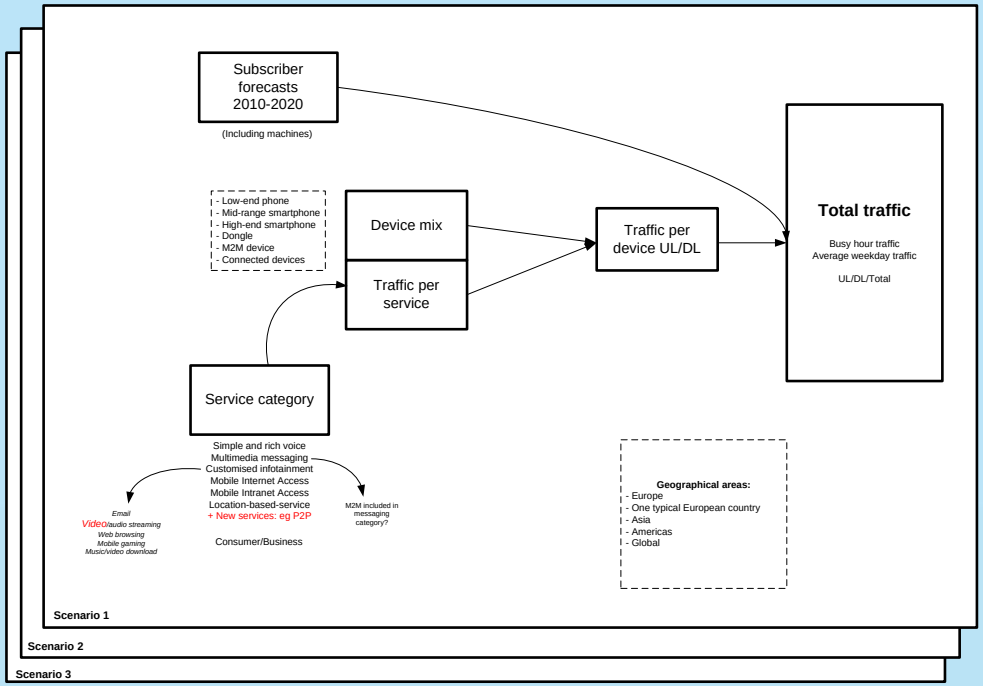
Introduction (1/2)

►This report from the UMTS Forum provides forecasts for the next decade, i.e. from 2010 to 2020 (projections are also given for 2025), on the evolution of penetration rates, voice and data traffic on mobile networks, on the services that are expected to be used and, finally, on the evolution of the use of these services.

►*Mobile Traffic Forecasts 2010-2020* was authored for the UMTS Forum by IDATE who reviewed the forecasts presented in the UMTS Forum report #37 *"Magic Mobile Future 2010-2020"* (published in 2005) and presents new forecasts taking into account the market trends and market drivers as they have evolved since 2005

Methodology



The report is structured as follows:

- Demographics & economic trends
- Analysis of the 2005 key findings
- Main trends for the mobile sector in 2010
- Analysis of the drivers
- Mobile services evolution
- Observed data traffic
- Traffic forecasts
- Scenarios

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Introduction (2/2)

The report subsequently covers:

►The identification of the main trends and drivers that will shape the world of 2010-2020 including mobile data traffic with specific examples of growing number of mobile devices such as tablets, dongles, smartphones, connected devices and M2M.

►The development of a mobile market model for the evolution of mobile traffic and services with potential future services, taking into account segmented categories of devices using mobile networks.

►Detailed global traffic forecasts and traffic forecasts for a Representative Western European country of around 50 million inhabitants in 2010.

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Main trends and drivers

Major drivers and trends that will shape the world of 2010-2020 have been identified:

►Mobile voice was overtaken by mobile data at the end of 2009. Data was the number 1 service category at the beginning of 2010 in terms of traffic generated on mobile networks. Mobile voice traffic growth is expected to remain limited compared to the explosive growth in data traffic from 2010 to 2020.

►Currently mobile data traffic drastically reaches very high figures for mobile broadband [(1)] subscribers. In November 2010, one Scandinavian operator indicated that the average 3G smart phone user consumed 375 MB/month of data. The average 3G broadband user consumed 5 GB/month, largely through HSPA-data cards. But the average LTE consumer (all data cards) used 14 GB – 15 GB/month of data. In the USA, one operator announced an average of 7 GB per month of data for a base of 2 million subscribers in July 2010.

►Growing number of mobile devices such as tablets, dongles, smartphones and connected devices are being used.

[(1)] By "Mobile Broadband", the UMTS Forum refers to subscriptions and devices using technologies that can offer 3G bitrates (or higher, such as HSPA, HSPA+ and LTE). In this context, GSM and GPRS are not considered as Mobile Broadband technologies

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Main trends and drivers

►The LTE ecosystem is developing rapidly as LTE took off in 2010 and LTE-Advanced is planned for 2015 according to time to market expectations.

►In 2010, the machine-to-machine (M2M) market already represents 53 million modules. M2M will continue to grow significantly. However in the future, the main contribution for mobile traffic will come from other devices.

►Small cells and Femtocells are becoming the solutions of choice for increasing network capacity.

►Social networking has become very important for mobile users and now represents new consumption patterns and generates significant traffic.

►Video has become increasingly important and is the No.1 source of data traffic. TV content provision by Internet also generates data traffic on mobile networks

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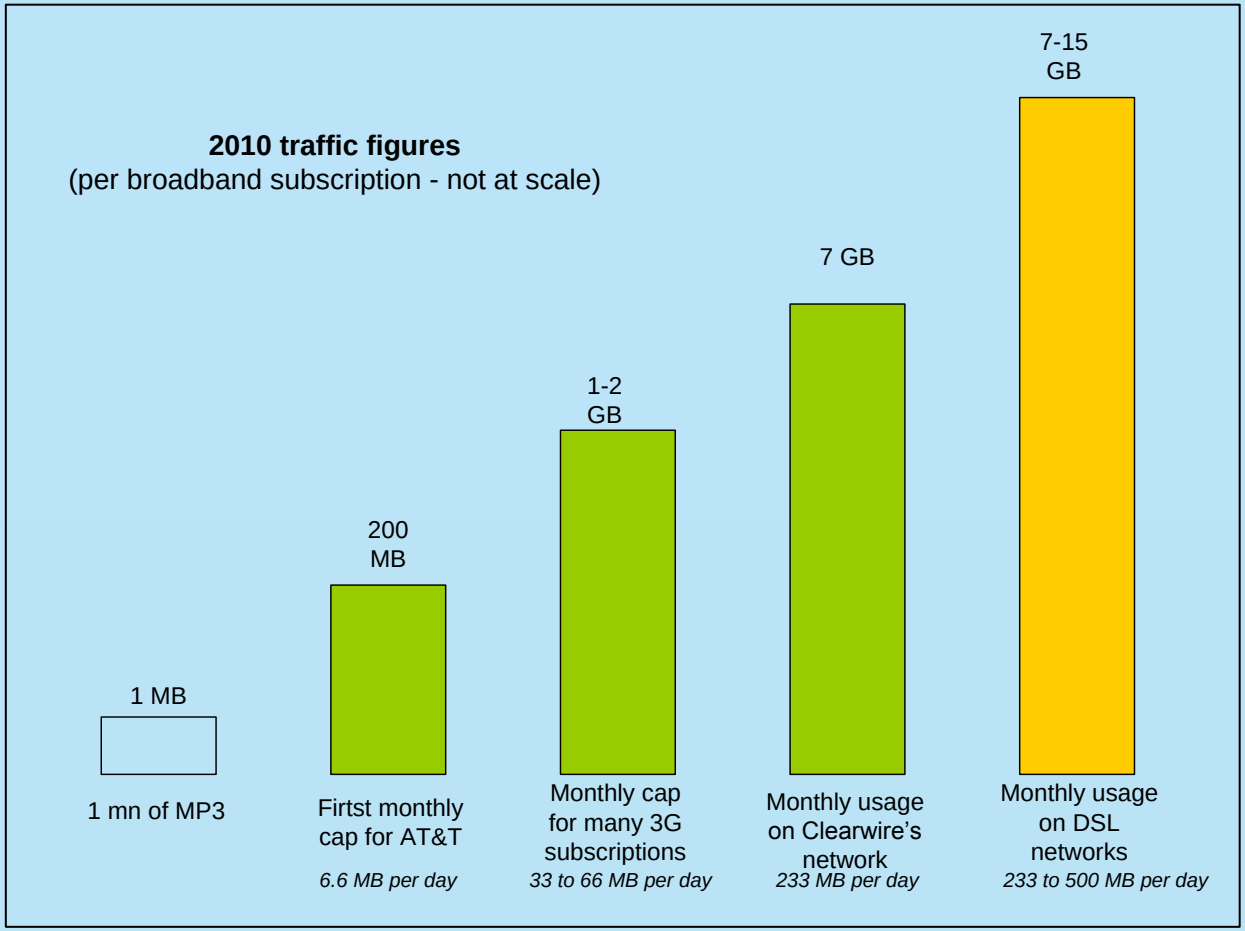
Main trends and drivers

2010 traffic on mobile and fixed networks



Network capacity units:

Kilobyte	**kB**	10^3
Megabyte	**MB**	10^6
Gigabyte	**GB**	10^9
Terabyte	**TB**	10^{12}
Petabyte	**PB**	10^{15}
Exabyte	**EB**	10^{18}

1 Gigabyte = 1,000 Megabytes
1 Terabyte = 1,000 Gigabytes
1 Petabyte = 1,000 Terabytes = 1,000,000 Gigabytes
1 Exabyte = 1,000 Petabytes = 1,000,000 Terabyte

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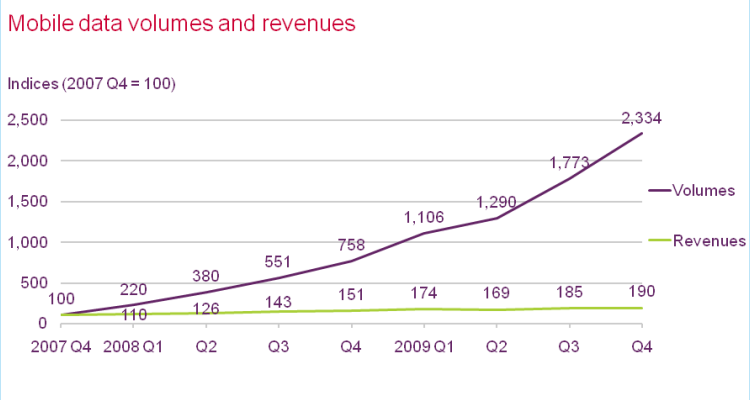
Main trends and drivers

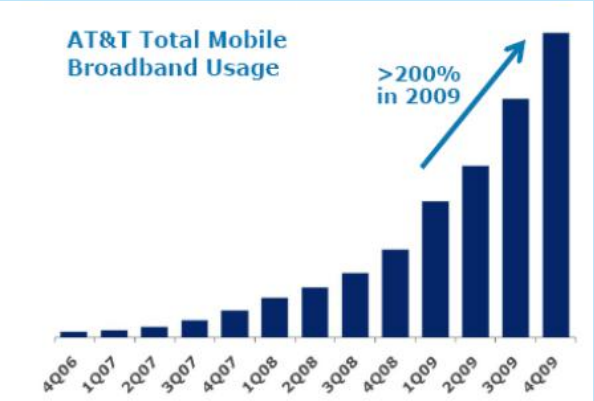
The dramatic growth of data traffic

UK mobile data traffic growth



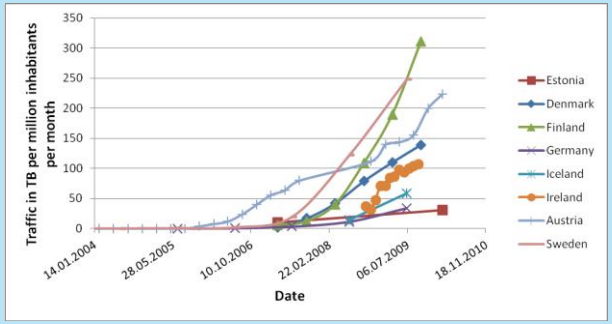
Source: Ofcom

AT&T traffic evolution



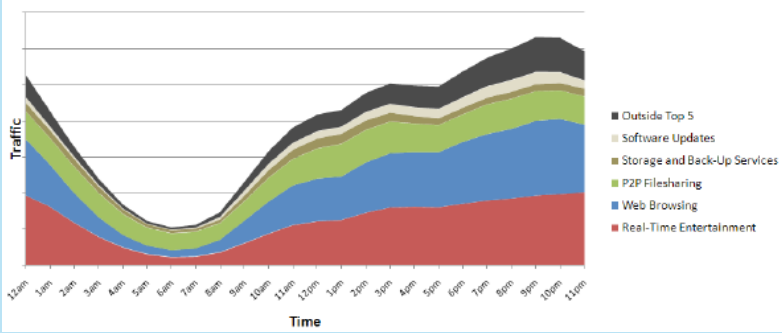
Source: AT&T

Mobile data traffic evolution (TB per million inhabitants per month) in some European countries



Source: ECC PT1

Daily traffic consumption in Europe



Source: Sandvine

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Main trends and drivers

The dramatic growth of data traffic

Daily mobile broadband data per subscription in European countries

Country	Time	Mobile Broadband Traffic per Day
Sweden	2009	61 MB/subscriber (average of private and corporate)
Finland	2H/2009	61 MB/subscription
Denmark	2H/2009	43 MB/subscription
Austria	Q4/2009	42 MB/subscription
Ireland	Q1/2010	42 MB/customer (average btw business and residential)
Iceland	2H/2009	31 MB
Slovak	n/a	15 MB/subscriber
Germany	2009	4.8MB/UMTS user (*as a response to Q2)
Netherlands	2H/2009	2.5MB/connection
Malta	1Q/2010	0.5MB/subscriber

Source: : ECC PT1

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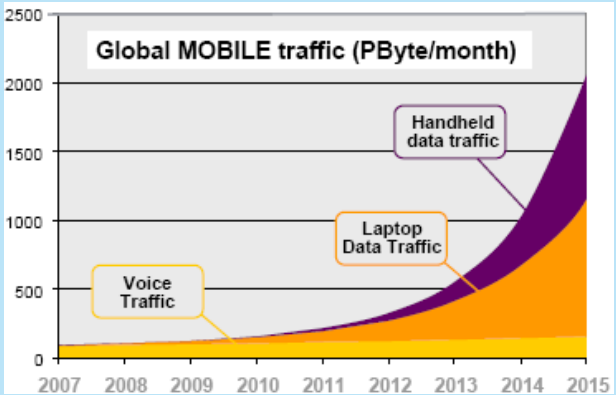
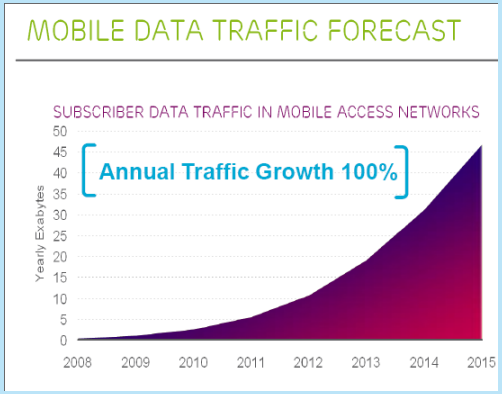
Main trends and drivers

Traffic forecasts (equipment vendors)

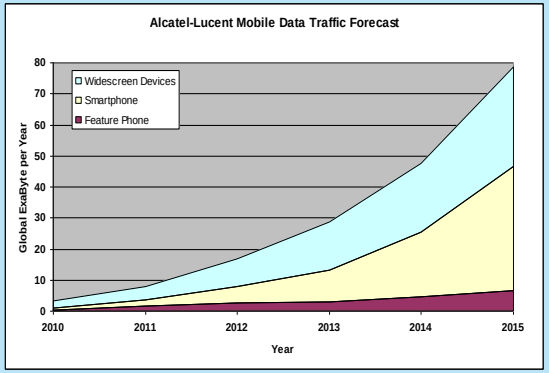
Mobile traffic evolution from equipment vendors' perspectives



Source: Nokia Siemens Networks, 2009



Source: Ericsson, 2010



30x Growth in Global Aggregate Mobile Traffic
31% CAGR MBB Subscribers
41% Smartphones in 2012

Source ALU: November 2010

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Mobile traffic forecasts 2010-2020 based on this study

Main hypothesis

In this report, mobile traffic forecasts represent:

- Traffic forecasts presented in this section represent the uplink and downlink traffic for voice and data
- The traffic taken into account is the traffic transported on mobile networks using licensed spectrum
- Wi-Fi offloading is not taken into account*
- Traffic forecasts include the traffic managed by Femtocells
- The forecasts presented in this report do not take into account RFID traffic or any other traffic on unlicensed frequency bands

* Wi-Fi or any type of traffic offloading on unlicensed spectrum relates, by essence, to stationary wireless broadband access. It implies some usage restrictions/limitations on the quality, mobility and security of the service. As such, Wi-Fi is a 'second choice' solution to a primary mobile broadband access. The two access methods (mobile broadband and stationary wireless broadband) are complementary, not competing. There will always be applications that work reasonably well in best effort, while many others will need QoS. This Report clearly focuses on mobile broadband - that is, not stationary wireless broadband - and therefore Wi-Fi traffic was excluded from this Report.

Global mobile subscriptions forecasts (including M2M):

Global Base (million)	2010	2015	2020
Europe	1 033	1 222	1 427
Americas	915	1 166	1 437
Asia	2 579	3 825	4 957
Rest of the world	801	1 276	1 863
World	5 328	7 490	9 684

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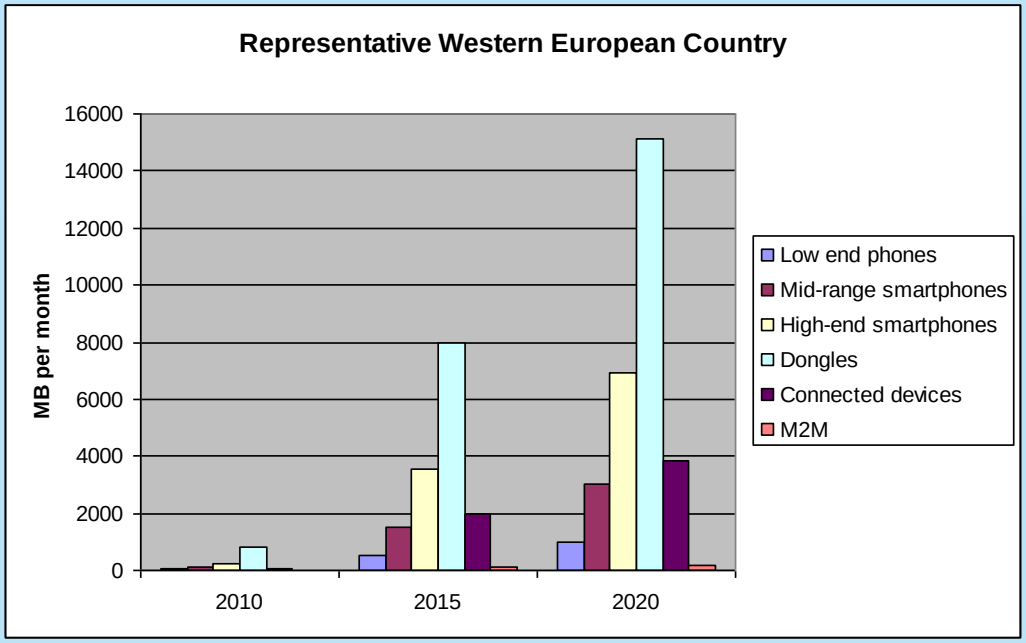
Mobile traffic forecasts 2010-2020 based on this study

Main hypothesis - Traffic mix

A Representative Western European country is considered as a country with

- ►50 million population in 2010 and 50.2 million in 2020
- ►62.6 million subscriptions in 2010 and 85.4 million subscriptions in 2020, respectively.

Monthly traffic per device (representative Western European country):



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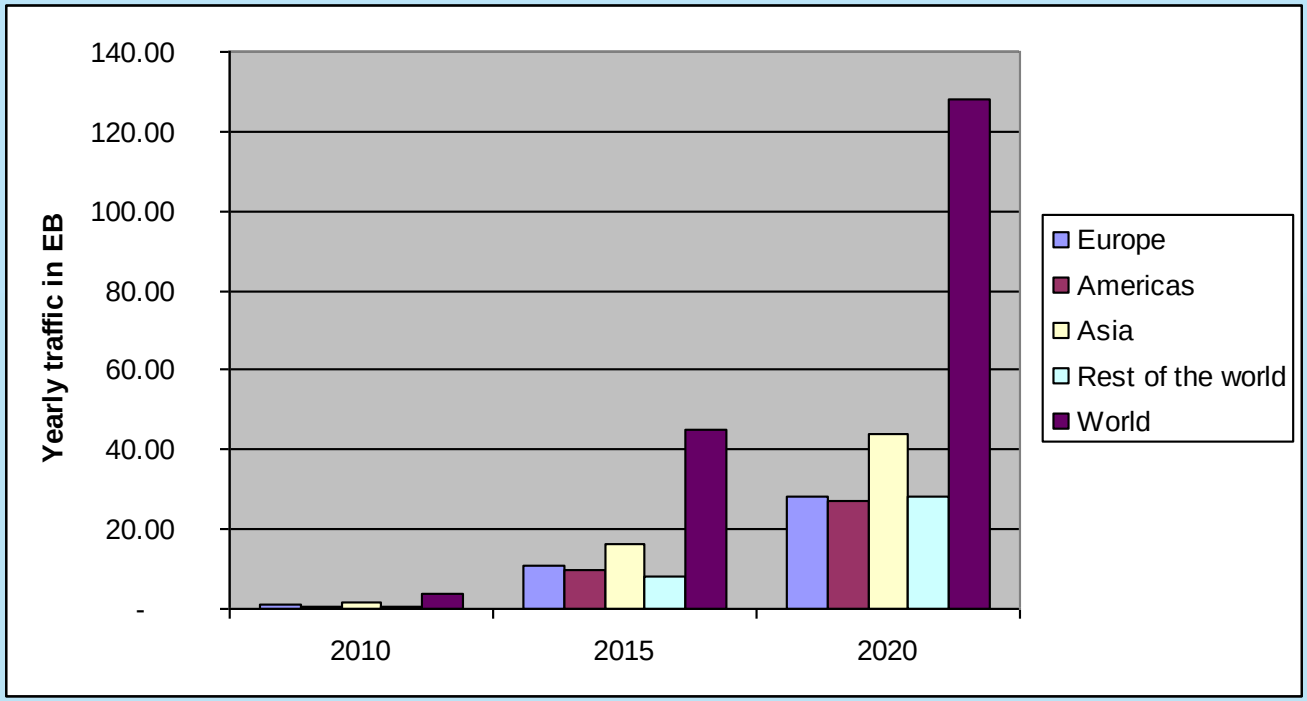
Mobile traffic forecasts 2010-2020 based on this study

Total mobile traffic

As a conclusion, total worldwide mobile traffic will reach more than **127 EB in 2020**, representing a **33 times increase** compared with 2010 figure.

Total mobile traffic (EB per year)



Source: IDATE

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Mobile traffic forecasts 2010-2020 based on this study

Total daily mobile traffic
From 2010 to 2020, total daily mobile traffic in the representative Western European country will grow 67 times from 186 TB to 12540 TB.

Total daily mobile traffic	2010	2015	2020
Representative Western European Country (TB per day)	**186**	**5,098**	**12,540**

►Significantly, at least 80% of the traffic volume remains generated by users, leading to large variations of the total mobile traffic both in terms of time and space variations of traffic.

►Future mobile networks must be designed to cope with such variation of traffic and uneven traffic distribution, while at the same time maintaining a permanent and extensive geographical coverage in order to provide continuity of service to customers.

►These opposite constraints are some of the most significant future challenges for operators.

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Mobile traffic forecasts 2010-2020 based on this study

Total daily mobile traffic per subscription

In 2020, daily traffic per Mobile Broadband subscription [1] in the representative Western European country will stand at 294 MB as an average and at 503 MB for dongles only.

Finally, we anticipate total worldwide mobile traffic of 351 EB in 2025 representing a 174% increase compared to 2020.

Daily mobile traffic per subscription	2010	2015	2020
Mobile Broadband (MB per day)	**10**	**155**	**294**
Dongles (MB per day)	**26.7**	**265**	**503**

[1] According to the model used in this report, users of Mobile Broadband (MBB) subscriptions with high-end smartphones and dongles will represent 31% of the subscriptions in 2020 and 63% of the mobile traffic

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Annex

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Key findings

2005 key findings	2010 analysis
Traffic will increase by a factor of 23: From 2012 to 2020, total daily traffic in the Representative Western European country will grow from 250 Tbytes to approx. 5 750 Tbytes. This large growth is due to the increasing number of available services using photos, videos… which will lead to exchange higher data volumes	**IDATE forecast global mobile traffic of 9 EBytes in 2012.** **For a 50 million people country, traffic would reach 175 PBytes per year in 2012 (or 470 TB per day) and more than 10,000 TB per day in 2020**
Internet access will be the driver: Mobile Internet access (consumer segment) and mobile Intranet/Extranet access (business segment) will benefit from higher frequency of use and larger file sizes. Mobile Internet access subscriber base will grow significantly. In 2020, voice is overtaken in terms of volume (Tbytes) by Mobile Intranet/Extranet access **which generates the highest traffic volumes**	**Voice was overtaken by data at the end of 2009. Voice traffic growth should remain limited compared to traffic growth from 2010 to 2020** **The application stores have changed the mobile value chain and new players are now part of the game**
Voice will stay the predominant service: In 2012, voice (simple and rich) is still the first service category in terms of daily traffic volumes. Simple voice duration will remain flat in both consumer and business segments. However, total call duration will be higher in **2020 than in 2012 thanks to the increase of rich voice and VoIP calls**	**Data is the n°1 service category at the beginning of 2010 in terms of traffic generated on mobile networks**
Relations between people will expand: P2P communications (such as MMS) traffic volumes will grow from 2012 to 2020 thanks to the migration from text based MMS to photo/video based MMS and thanks to the increasing number of M2M file transfers.	**In 2010, M2M already represents 53 million modules. M2M will continue to grow significantly**
More personalised services – from entertainment to life coaching: In 2020, customised infotainment subscriptions base will be slightly higher than in 2012 but traffic volumes will increase steadily thanks to a higher use of services	**Entertainment continues to generate most of the data traffic growth with video representing the bulk of the consumption**
A world under individuals' own control via sensors and location based services: **Location-based services daily traffic will grow thanks to both subscriber growth and frequency of use growth**	**Location-based services are becoming a utility as capabilities are integrated into smartphones. Services are often offered for free**

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Main trends 1/2

Technology trends that will shape future mobile devices and networks	UMTS Forum report #40	2010 situation
Key drivers that will shape the world of 2010-2020	The key drivers will be: •more urban and more aged population •labour-force evolution will lead to new needs for communication •privacy and education are identified as social trends •the ICT environment booming everywhere; dramatic growth in Asia	No significant change compared to 2005 forecasts
Key technology trends	Mobile devices will benefit from major breakthroughs expected to occur in the next decade: technology developments in areas such as semiconductors, nanotechnology, processing power and storage capacity will enable the emergence of smaller, increasingly complex and intelligent devices. However, battery power technology will only improve in terms of power to weight ratios, rather than any generational improvements. Many networking technologies will be available to enable true ubiquitous mobile access: many technologies will become available that provide different wireless solutions (e.g. wireless sensor networks, “enhanced 3G”) and networking protocols will connect users to the best available network.	Mobile devices : tablets, dongles, Smartphones and connected devices proliferate LTE take-off and LTE Advanced planned for 2015 Small cells and Femtocells are becoming the favoured solutions to increase network capacity Network sharing is developing

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Main trends 2/2

Possible trends of some emerging mobile services:	UMTS Forum report #40	2010 situation
Object identification, sensor networks and machine-to-machine (M2M)	Miniaturisation will enable wireless tags, beacons and sensor nodes may enable the number of connected points, products and machines to exceed the number of connected people (billions of units in a year). This will enable a host of new services: homes will be "sensorised" with remote monitoring and control over refrigerator inventory, environmental controls and parental control of content	M2M is taking off
Health monitoring	Mobile devices will enable the transmission of health information to a server maintained by individual or healthcare providers for analysis. From a niche-market in 2010, adoption will expand to routine monitoring and sophisticated analysis by 2020	e-health is gaining momentum
Location discovery	Future technologies such as wireless beacons are likely to provide location information potentially to the nearest few centimetres	Geolocation facilities (GPS, compass) included in many devices
M-payment and micro-commerce	By the next decade, the technologies required for initiating the transaction, the mobile transaction authentication and payment reconciliation will be available	M-Payment is taking-off (already widespread in Japan and in many African countries)
Digital content	Mobile technology will be in place to meet consumers' demand for rich digital content anytime, anywhere and over any channel	Social networking has become very important for mobile users and now represents new usage and generates significant traffic
Mobile entertainment	The user will have access to entertainment media wherever and whenever desired, and will have increasing ability to customise their own entertainment experience	Video has become increasingly important and is the N°1 source of data traffic. TV content provision by Internet also generates data traffic on mobile networks
Corporate services	Mobile technologies like virtual private networks (VPNs) or M2M services will enable the increased blurring of home and work life. Working hours are likely to become more flexible as a result	No significant change
M-government	Government will encourage the adoption of technology by proactively using technology to disseminate information and provide services	M-Government applications are being adopted
M-education	This would be a second step in the digitalisation of education that was decided by many governments	M-education is quite high on the priority list of many governments

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Drivers

2007 Drivers	2010
Device evolution – e.g. usability, functionality, capacity and battery life	**Significant evolution as evidenced by smartphones and tablets**
Level of fixed-mobile substitution	**More complementarities than substitution (attractiveness of dongles)**
Supply side change – e.g. consolidation and entry of new players	**Consolidation in the UK and in the USA. New entrants in the TDD field (India, Japan, Europe, Russia…)**
Availability of spectrum for LTE services	**Digital Dividend and 2.6 GHz band becoming available**
Level of demand for non-voice services requiring higher performance networks	**High demand for video services**
Evolution of LTE ecosystem	**Rapid development**
Impact of alternative wireless standards (e.g. WIMAX and proprietary BB FWA)	**Low impact**
Actual LTE network performance	**As expected**
LTE standard convergence of UMTS and CDMA2000 evolution	**LTE chosen by HSPA and CDMA2000 operators**
Global macroeconomic environment	**Mixed (see section 2.)**
Demographic trends	**No significant change (see section 2.)**
Investor willingness to finance new network rollout	**Limited**
Timing for LTE network and device availability	**On track**

Legend: significant change compared with 2007 | no significant change

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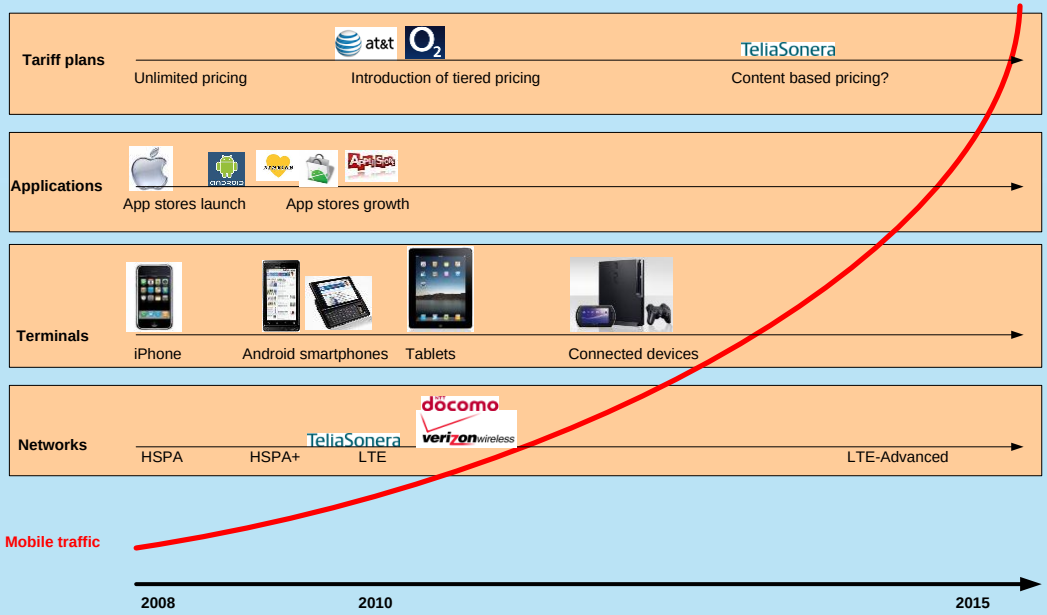
Drivers

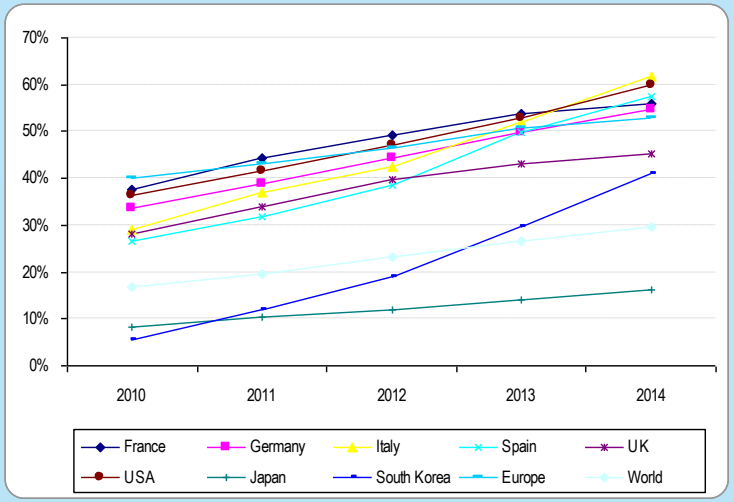
Main changes compared to 2005 findings:

- ►Mobile penetration rates
- ►The smartphones impact
- ►New devices: tablets & other connected devices
- ►Evolutions of the mobile value chain

Enablers of mobile Internet



Share of smartphones in mobile shipments, 2010-2014 forecast



Source: IDATE

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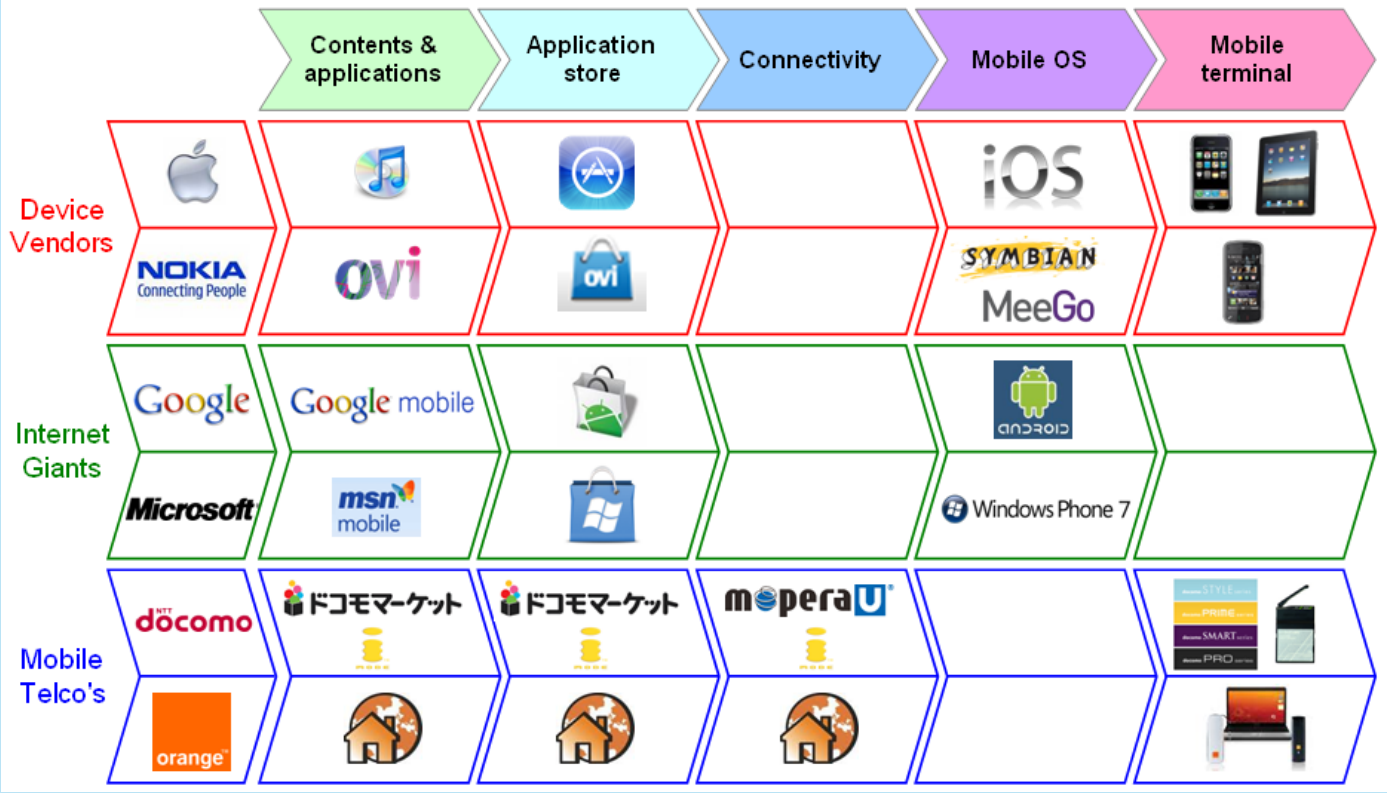
Drivers

Evolution of the mobile value chain



Source: IDATE

The arrival of Internet and PC actors in the mobile sector

- Apple with the iPhone and the AppStore concept
- Google launching the Android Operating System

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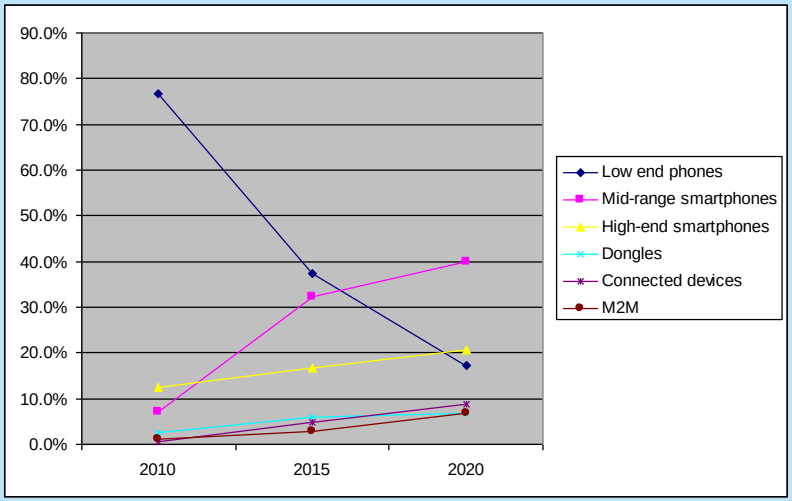
Mobile traffic forecasts 2010-2020 based on this study

Main hypothesis

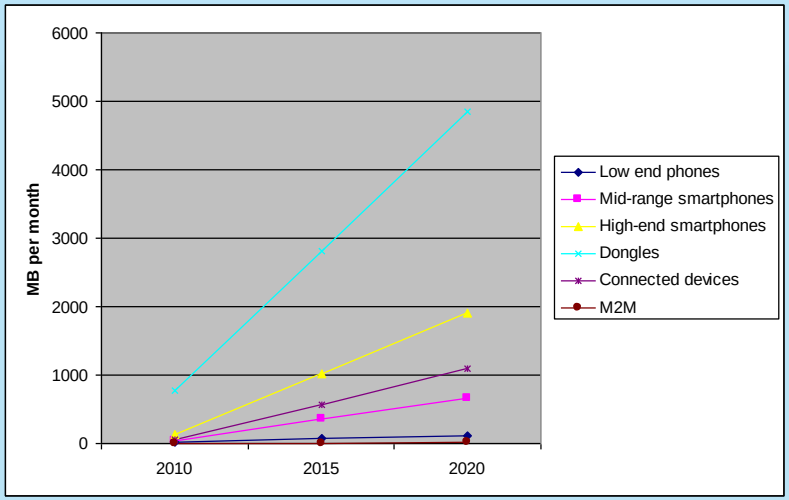
Device mix

- Reflects the growing success of smartphones
- Takes into account connected devices & M2M



Traffic mix

- World average traffic per month
- (higher in representative European country)



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