



A vision for the Digital Future - Global Forum

Gabrielle Gauthey – EVP Global Government and Public Affairs
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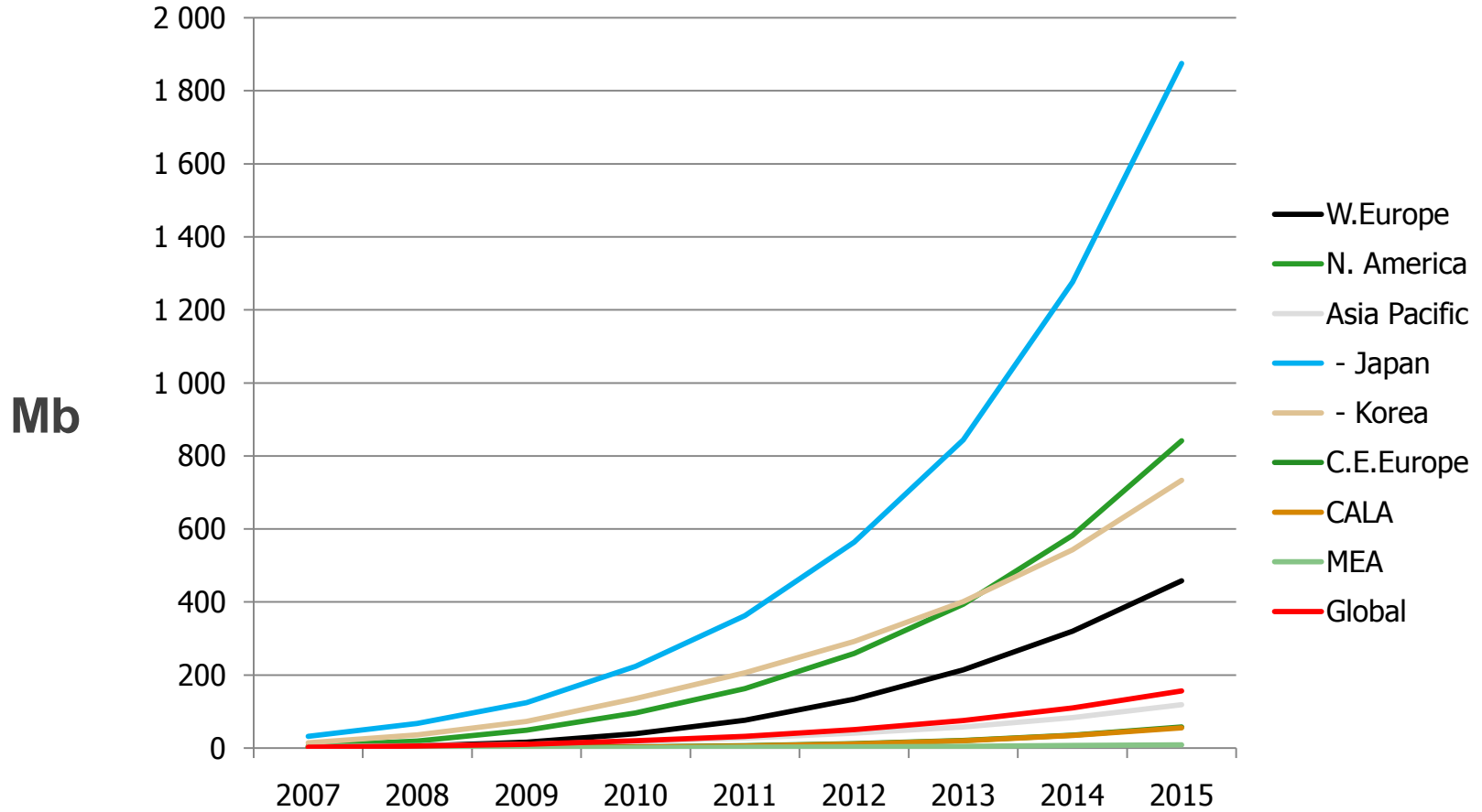
Disruptive changes in progress

➤ 1-1 The explosion of mobile data traffic

- Unanticipated phenomenon by industry, but at the eve of mobile internet
- Rapid adoption of mobile: 1 terminal for 6 people in the world in 1999 - 7 for 10 in 2010
- 10% of mobile "Internet" in 2010 and 70% in 2015
- The 400 most dense cities in the world: 400 per km² smart phones in 2010 - 13 000 in 2015
- 90% of video traffic will be in 2015
- In 2015: 1 out of 5 smart phone simultaneously connected to a speed of 800 kbs = increased connectivity 2Gbs / km² against 16 Mbs / km² today
- An increase in traffic by a factor of 30 in the next 5 years!

DATA TRAFFIC

Average Megabytes per Data User



Source: Strategy Analytics.

1- Disruptive changes in progress

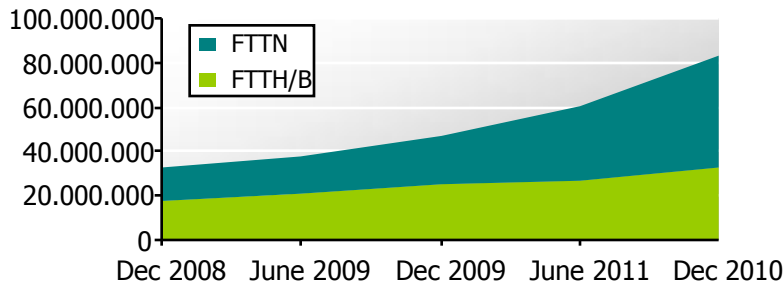
➤ 1-2 Massive investment needed

- Fixed and mobile / Core - backhaul - Access
- Future of mobile = fixed / No economic balance of fixed wireless mobile network!
- Investments start in all regions of the World: USA, Asia, Russia, etc. ..
- But Europe is lagging behind
- Europe: the need for incremental investment over 10 years of 380 billion € in Europe, including 100 M € in the radio access (source: EC)

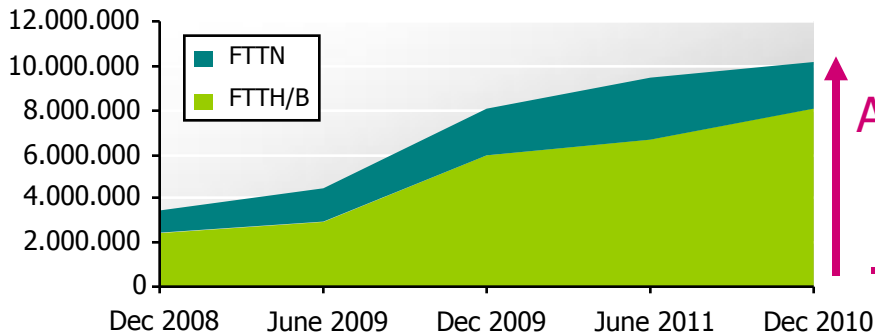
NEXT-GENERATION ACCESS DEPLOYMENT

EUROPE BY NUMBERS AND COMPARISON WITH OTHER REGIONS

Homes Passed



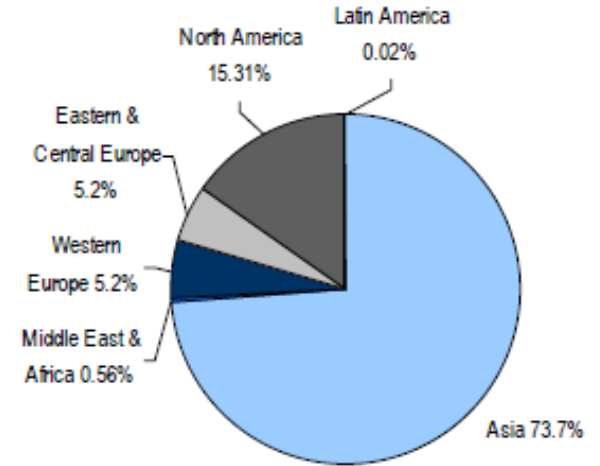
Subscribers



Russia is included in the figures

!!!!!!
Adoption
is only
15%

70M FTTx subscribers around the globe, December 2010



Mixed penetration rates, December 2010

- Japan 39%
- USA 34%
- France 8%

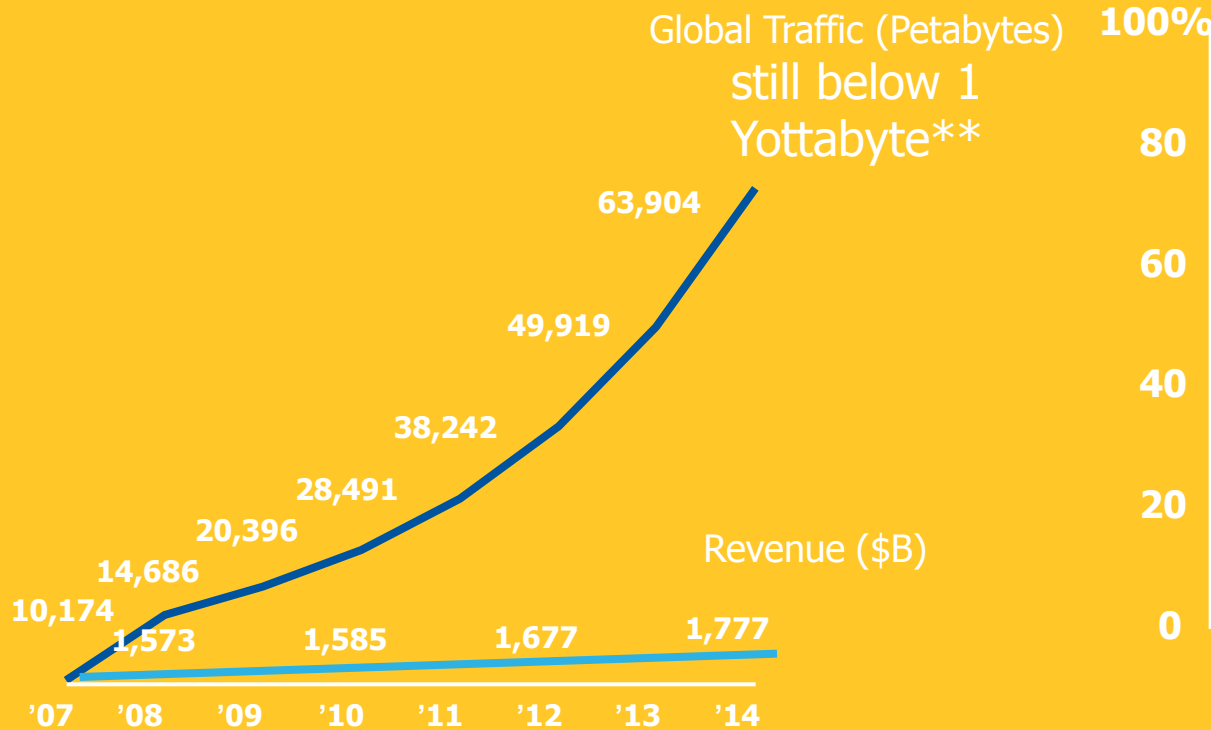
Europe (EU27) ranks 3rd after Asia and North America in FTTx subscribers and has the lowest NGA take-up rate

1- Disruptive changes in progress

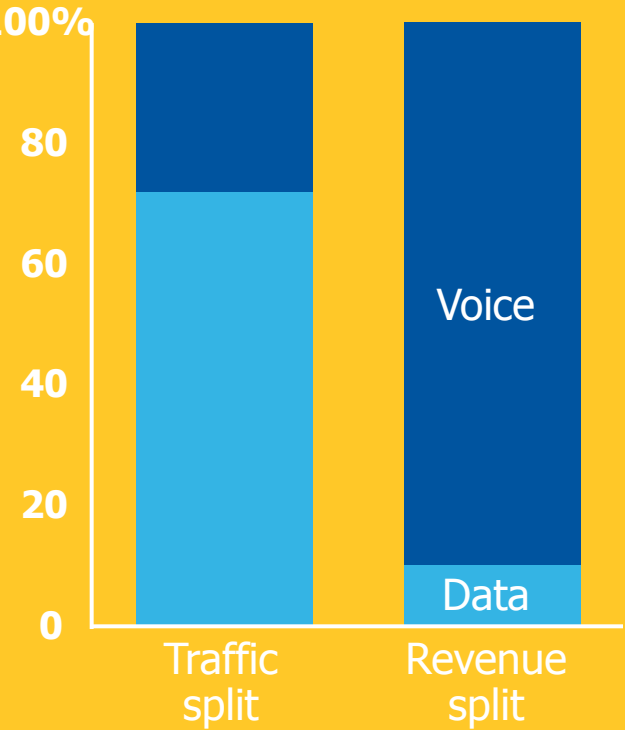
1-3 The changes in the value chain

- End of voice models - distance
- Inability to monetize the explosion of data traffic for operators via traditional business models
- Decoupling traffic / revenue - erosion of margins

ACTIVITY AND REVENUE DICHOTOMY



The revenue challenge Wireless



e.g. Large Service Provider
85% of traffic = data
85% of revenue = voice

Note: Traffic estimates based on Pan-European mobile operator; Source: Pyramid Research; Deutsche Bank; ING; Barclays Capital; Cisco; Bain analysis
 Petabyte (PB) 10¹⁵ Yottabyte (YB) 10²⁴

1- Disruptive changes in progress

➤ 1-4 Emergence of OTT (Over The Top)

- Google, Facebook, Apple store, DailyMotion etc.
- Generate traffic growth and innovation
- Bandwidth-intensive applications
- No incentive for an efficient use of bandwidth
- Unbalanced data interconnection agreements with operators
- OTT's are global / operators are local
- Business Model: Market Cap and Price / Earning ... is different

2- The need for a shared vision

➤ 2-1 The future of players connected in the ecosystem

- Interdependent ecosystems: end of “silo” model
- IP networks carry the same identical data (Voice, Data, Video) in a best effort way....
- But unlike voice world: no standard interconnection
- No standards for data QoS; unable to guarantee end to end QOS delivery
- Quality based on bilateral agreement (Google / Verizon), patches softwares or Content Delivery Network (Akamai)

2- The need for a shared vision

- **2-2 Increased user expectations for QoE (quality of experience)**
 - Flow, ubiquity, latency, stability, reliability, security, privacy ...
 - Matters not addressed by the OTT
 - While OTT applications require more performance and quality from start to finish
 - Important gaps to fill!
 - Even more critical in mobile environment

- **Urgency to call for a shared vision, especially in Europe, and to continue to support the development of the digital world**

3- What are the solutions?

➤ **3-1 New business models between operators and OTTs:**

- Agreements of "wholesale" grading services on QoS: throughput, latency, stability, security
- Multilateral agreements based on open protocols and standard
- Allow operators to manage their networks to offer differentiated services - Debate on Net Neutrality ...
- 3 Conditions:
 - Investments needed
 - Non harmful discrimination
 - Increased transparency: throughput, capacity, traffic management system, user information on services offered

3- What are the solutions?

➤ **3-2 Increased revenues from end users**

- Monetizing new services
- Segmentation based on experience levels expected
- Responding to various requests from users
- Available in "overlay" and offer standard "best effort " with appropriated pricing

3- What are the solutions for fixed?

➤ **3-3 Devise new models of investment for fixed networks**

- Layer 1: passive infrastructure (civil engineering, dark fiber) = 80% of the cost of the network with ROI of 15 years
- Layer 2: active infrastructure (network intelligence) = Return On Investment of 5 years
- Layer 3: service = OTT model

➤ **Need to share, co-finance and open Layer 1**

- Global phenomenon: Asia - Latin America

3- Why do Governments step-in?

➤ 3-4 Ensuring coverage, perequation and openness

- To accelerate **ubiquitous coverage** of **very high speed connectivity** and tackle future challenges of society (social inclusion, ageing population, climate change)
- To ensure cost-effective connectivity through **network sharing** and competition through **network openness** while encouraging new investments needed to handle data explosion
- To **complement private initiatives** in policy driven areas and maximize network's social benefits, minimize public funding thanks to perequation

➤ Different types of public intervention

- **Government driven PPP projects** (Australia, New Zealand, Singapore, India,...) to foster **coverage** and **competition**
- **Regional and local PPP projects** (Italy, France, Spain, Germany, Netherlands...) based on **infrastructure sharing**
- **Rural projects** based on new competition models (LTE sharing in rural areas,...)

GOVERNMENT DRIVEN PROJECTS TYPOLOGY

WIRELESS ACCESS



- LTE based Open Access
- Digital Dividend – 700 MHz
- Nation or rural coverage

➤ Mexico, Kenya

- + Fast time-to-market
- + Ubiquitous coverage
- + Data centric
- + Limited civil works investment
- Spectrum availability?

NATIONAL BACKBONES



- Fibre based Open backbones
- Access backhauling, transit
- Rural coverage

➤ Brazil, Mexico, India, Kenya

- + Fast time-to-market
- + Mobile and fixed access capacity increase
- + Limited civil works investment
- Access bottleneck?

NEXT GEN ACCESS



- FTTx based access
- Passive & active wholesale
- Network separation

➤ Australia, New Zealand, Singapore

- + Unlimited bandwidth
- + Future-proof investment
- Capex intensive – civil works
- Longer time-to-market
- Ubiquitous coverage requires wireless complement

3- What are the solutions for mobile networks?

➤ **3-5-Mobile operators increasingly share networks.**

- The increased capacity will come from densification: pico and femto cell with fixed backhaul
- Shortage in the number of sites in urban / environmental consideration = sharing sites themselves and Rans
- « Ran sharing » = sharing of radio access
- Spectrum scarcity particularly in LTE with larger channels, should lead operators to increasingly share spectrum
- Useless duplication of 3 or 4 networks in rural areas

3- What are the solutions in Europe?

➤ **3-6: Devise new models of investment**

- Revisit the dogma of passive infrastructure competition in favor of active infrastructure competition?
- Avoid duplication of infrastructure level 1 and admit it should be considered as an essential infrastructure?
- Define methods of long-term financing for this level 1 (European Investment Bank Fund - national grant - local) if necessary using the flexibility of PPP Models?

CROSS-INDUSTRY INITIATIVE

HOW TO ADDRESS BB INVESTMENT CHALLENGES (3/03/11 – 13/07/11)

Change ahead needed !

Need for 380 B€ investment in a context of
...Declining revenues of Service Providers
...Changing business models with Over-The-Tops

New approach beyond existing initiatives scope

Inclusive: Not a carrier-centric initiative but an industry-wide effort embarking all ecosystem parties
Executive led: 2 CEOs meetings in Brussels hosted by the Commissioner
Forward looking: Embracing and driving change towards a new 2015+ cross-industry standards use rather than preserving status-quo

From 3 working groups to CEOs 11 proposals

Wg1 -« New business models for Internet development »
Wg2 -« Technical Framework for Digital Delivery - Interoperability and Standardization »
Wg3 -« Investment framework and financing sources to foster NGA roll-out »

Objectives were to find the NGA dynamics which will foster investment and help Europe to reach the Digital Agenda broadband targets by 2020

11 INDUSTRY PROPOSITIONS

RIGHT ENVIRONMENT

EUROPE NEEDS HEALTHY COMPANIES WILLING AND CAPABLE TO INVEST

- Scale and specialisation are overall market trends
- There should be one binding European framework

NET NEUTRALITY

SUSTAINABLE BUSINESS MODELS AND EFFICIENT USE OF SCARCE RESOURCES

- Promotion of traffic management differentiation (while securing Best Effort)
- Business models could be two-sided, based on commercial agreements

TECHNOLOGICAL PLATFORM

ENABLING NG SERVICES ACROSS NGA NETWORKS VIA OPEN & INTEROPABLE NETWORKS

- IP-based QoS Interconnection
- Next-Generation bitstream access across multiple technologies

INVESTMENT MODELS

MARKET FOR NGA WILL BE DIFFERENTIATED BASED ON LOCAL CIRCUMSTANCES

- In areas with no infra-competition, co-investment models will be promoted
- Roll-out context improvement with demand stimulation, de-risked investment and reduction of roll-out costs

NGA INVESTMENT MODELS

MAIN OUTCOMES

- Local circumstances will prevail for NGA roll-out – **No One-size fits all**
- In some areas, infrastructure competition already fierce (presence of cable operators) will lead to mixed access technologies (combination of fibre and VDSL2 Vectoring)
- In most cases, when only one network is commercially viable, co-investment models will be promoted
- In policy-driven areas, public intervention (subsidies and PPPs) will be required
- In all areas, Mobile demand is also driving progressive migration towards fibre backhauling

Intervention from European Investment Bank will be a key enabler to improve current NGA roll-out dynamics

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