



Partnering to share risks and anticipate the future: The 5G-PPP

IEEE-ICC'13

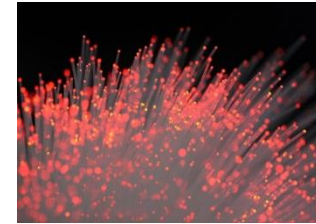
Budapest, 10th June 2013

***Panel: Future Network Technologies - impact on carrier
networks and services***

Luis Rodríguez-Roselló
European Commission - DG CONNECT
Head of Unit Network Technologies

Trends driving Future Networks I

- **Data explosion, content**
 - High capacity networks
 - Architectures
- **Service platforms**
 - Open programmable and virtualised networks
 - End-to-End, cloud interoperability/integration
 - User involvement: personalised, social
- **Ubiquitous access/Mobility**
 - High capacity wireless, spectrum efficient and flexible technologies
 - Low radiation
 - From Convergence to fully integrated global networks



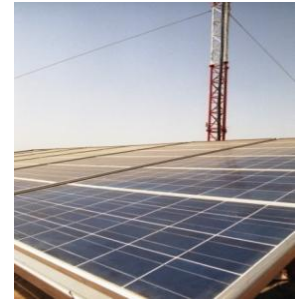
2G population coverage



3G population coverage

Trends driving Future Networks-II

- **Sustainability**
 - Green networks, drastic energy reduction/user
 - All optical beyond IP routing
- **Flexibility, low CAPEX, low OPEX**
 - Flexible self-management across multiple domains.
 - Big data usage, Quality of Experience
 - Leveraging network data in higher level applications
- **Objects connectivity**
 - Internet of Things,
 - Integration environment
- **Security, Privacy...**

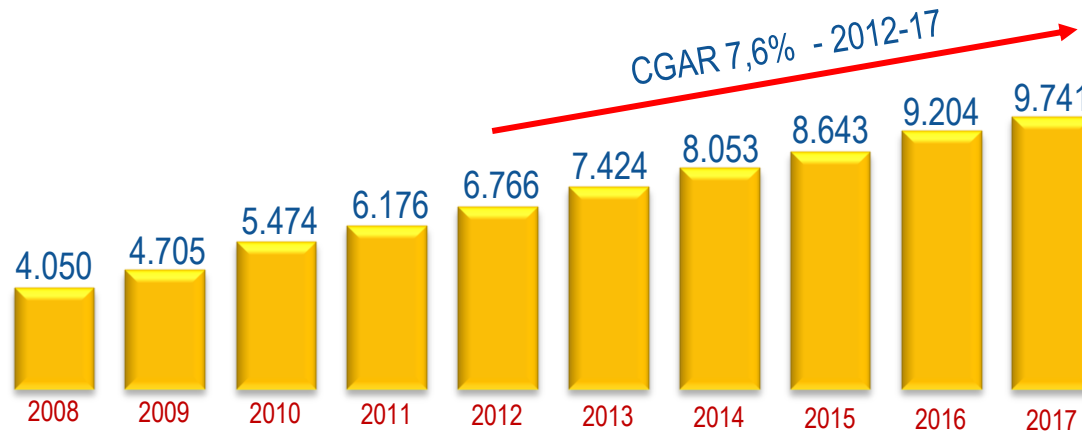


Mobile broadband: a challenging growth

- Mobile broadband penetration ⇒ positive impact on GDP
- Need to address significant challenges:
 - *novel application and trillions of devices, bandwidth, capacity crunch, Spectrum and technological approaches, traffic patterns, cloud paradigm and energy*
- ...exploit trends...
 - *Network Function Virtualization and SDN and management issues*
- ... and action
 - *A bold initiative on advanced 5G network infrastructure*

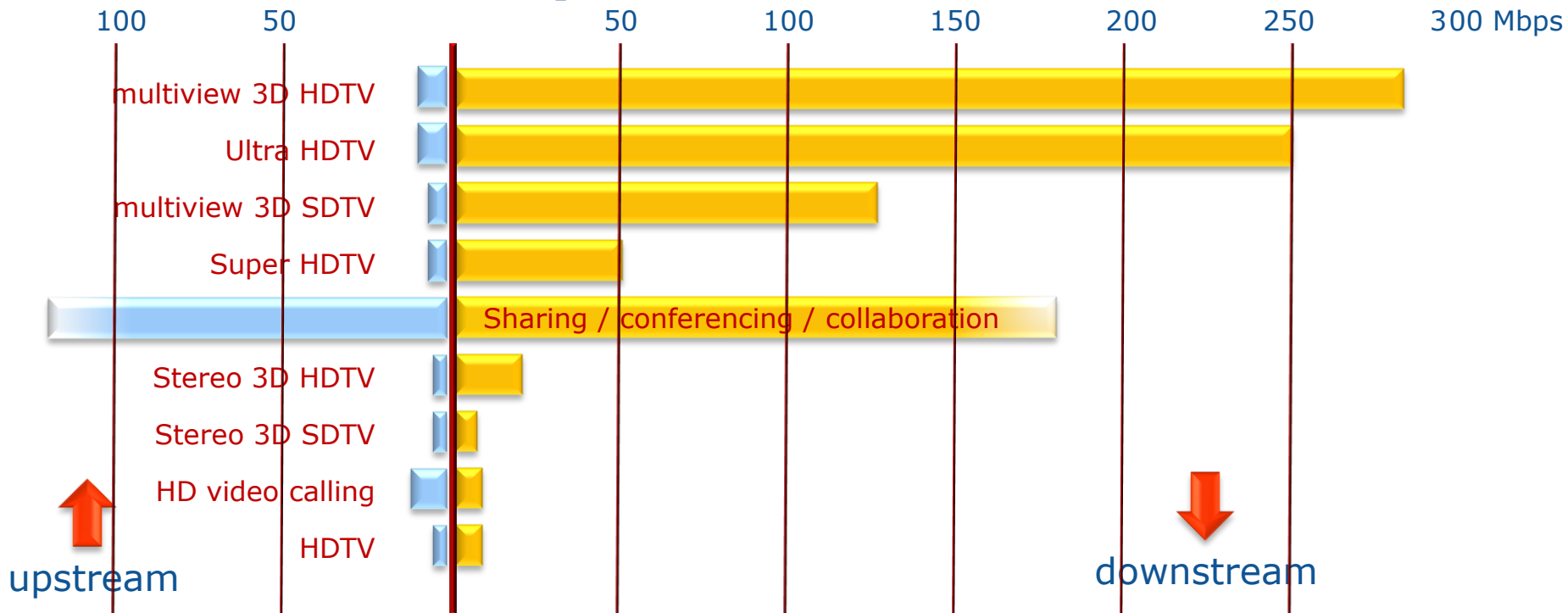
Things and novel applications

IoT predictions: 50 billion connected devices (2020)



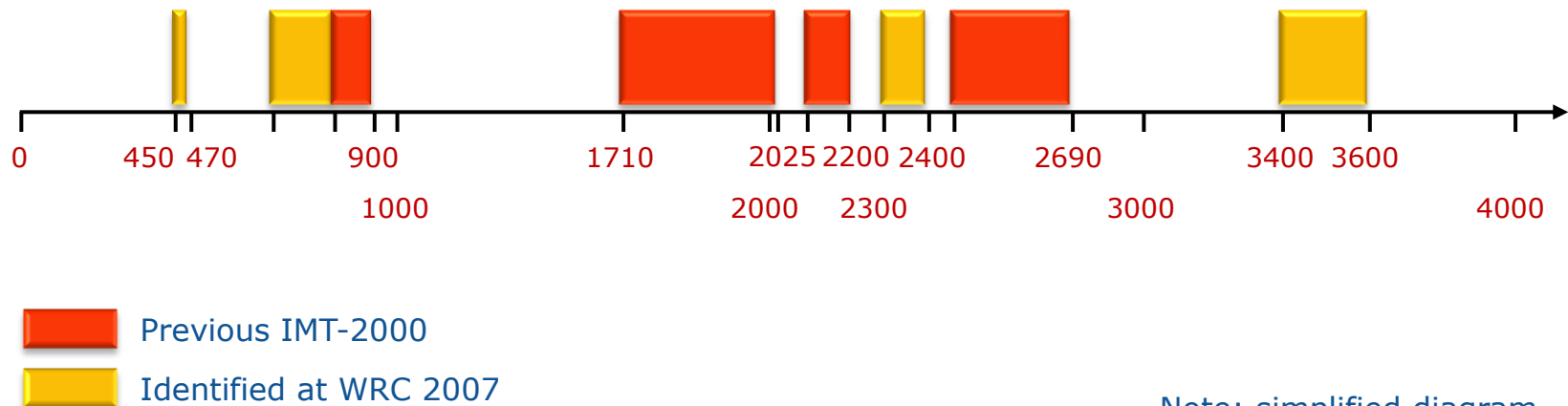
Global connection in Billions, including M2M

Restless pressure on bandwidth



- Video Mobile data Internet traffic doubles every year. up to 1000 fold traffic increase may be expected by 2020
- Capacity/Spectrum only doubles every 8-10 years
- Video services predominant, even for mobile usages

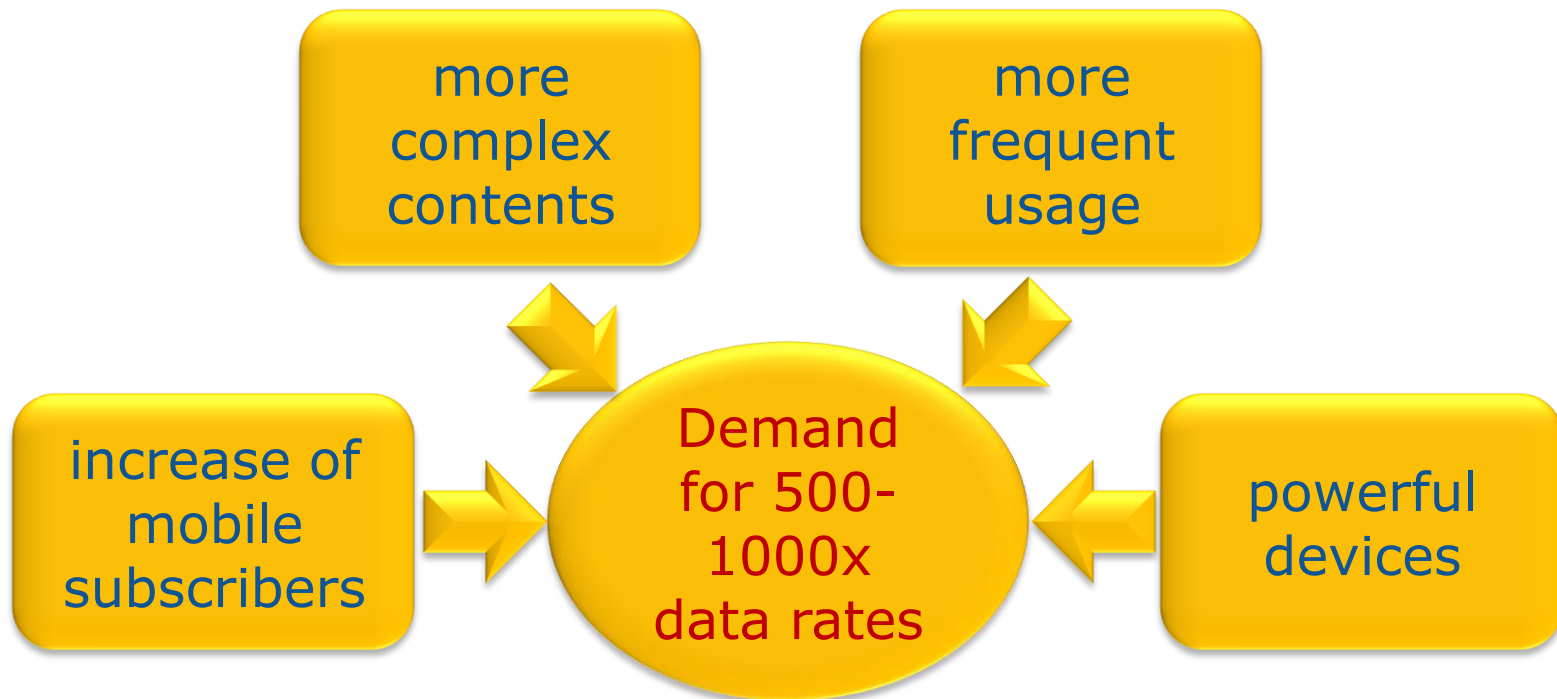
Spectrum matters



Note: simplified diagram

- At least additional 500MHz new spectrum by 2020
- More innovative spectrum usage technologies / systems

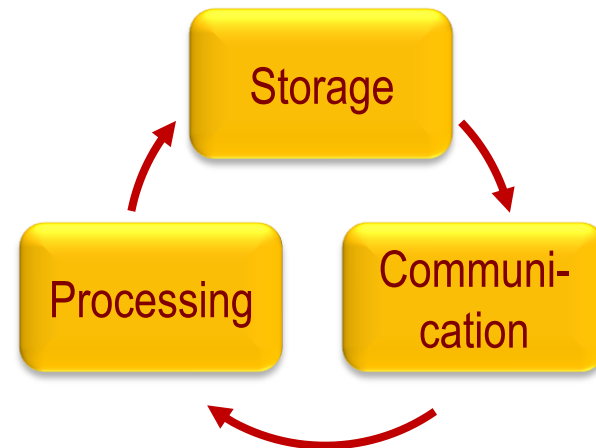
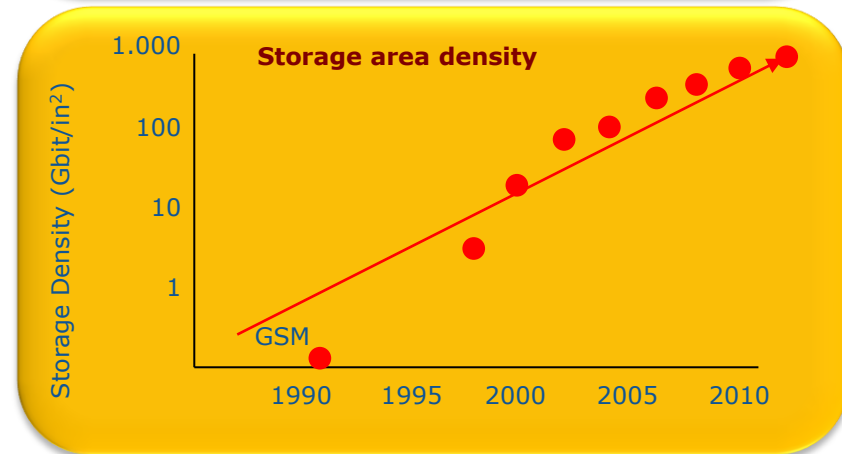
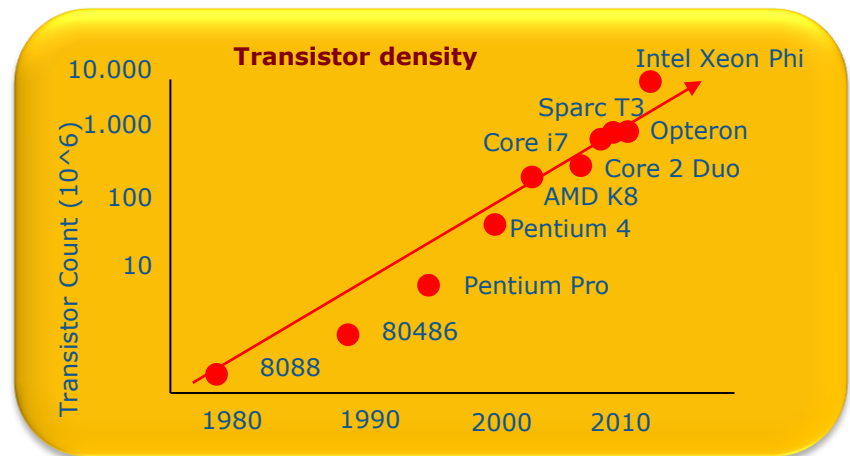
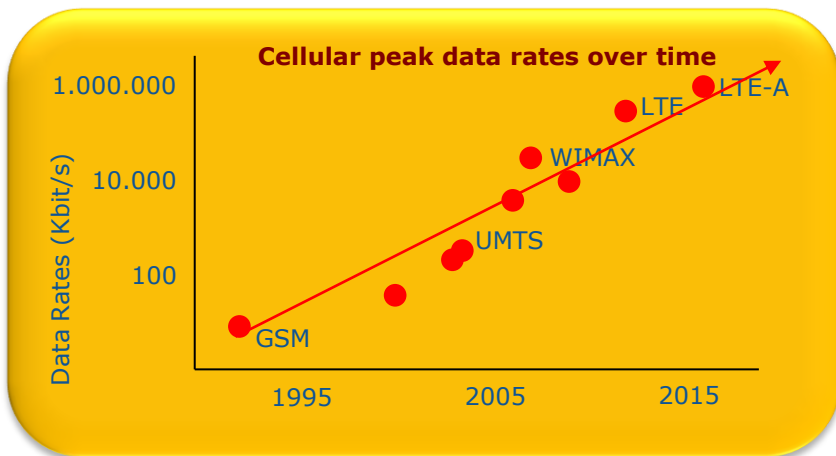
Complex traffic patterns



Technology trends

- Network Function Virtualisation
- Software Defined Networks
- Automated deployment and operation, self-organising networks
- Use of Big Data to optimise content and service delivery, security.
- Integration Fixed-Wireless access with unified management serving heterogeneous technologies

Cloud computing paradigm





Towards an Integrated ubiquitous ICT infrastructure

"5G" initiative for Europe - context

- Horizon 2020 Proposal
 - *Supporting PPPs (public-private partnerships), including Future Internet.*
- Speech of EC VP. Neelie Kroes
 - *Barcelona, World Mobile Congress, Feb. 2013, call for action to industry to submit partnership proposals for an advanced 5G future network infrastructure*
- Part of an integrated approach to Future Internet
 - *Cloud strategy (research, legal and procurement), PPP Internet as an innovation accelerator (generic enablers, platforms, new actors, entrepreneurship, innovation), FIRE (experimentation)*

So, what do we mean by 5G?

not a linear extrapolation of 1G, 2G, 3G, 4G...
instead, focus on...

- capacity and application crunch;
- convergence environment between networks and cloud computing
- true seamless convergence between fixed and mobile
- true ABC (Always Best Connected)
- optimised operation and deployment costs
- support to innovative applications

A 5G initiative for Europe

- Multiple actors called upon to contribute: telecom, IT, microelectronic, users, SME's...
- Validation through experiments and testbeds
- Clear KPI's as design goals:
 - *Providing 1000 times higher capacity and more varied rich services compared to 2010.*
 - *Saving 90% energy as today per service provided.*
 - *From 90 hours to 90 min service creation.*
 - *Secure, Reliable, dependable: perceived zero downtime for services*

A 5G initiative for Europe - rationale

- Strong foundation:
 - *Close cooperation with and within community*
 - *Strong and visible community (800 entities in NET!works) – but not restricted to.*
 - *Industry oriented strategy*
- What the PPP brings:
 - *Long term commitment from both public /private side*
 - *Greater impact on innovation and leverage effect on complementary sources of financing*

more partnership, more commitment, more leverage!



Key factors of success

- **Bundle competence** in EU to develop next generation networks and information systems for 2020
- Address **full innovation cycle** and leverage "eIndustry"
- **Smart networks and novel architectures** to serve highly demanding requirements;
- **Bring together IT, Cloud Computing, Network virtualisation, IoT/M2M, big data** analytics to reap innovation potential of novel usages and services
- Valorization of network data(nami) in high end applications;
- **Network as (open) infrastructure for innovation**