5G Public Private Partnership Objectives and opportunities

CELTIC Plus event 2014

23-24 April, Monaco

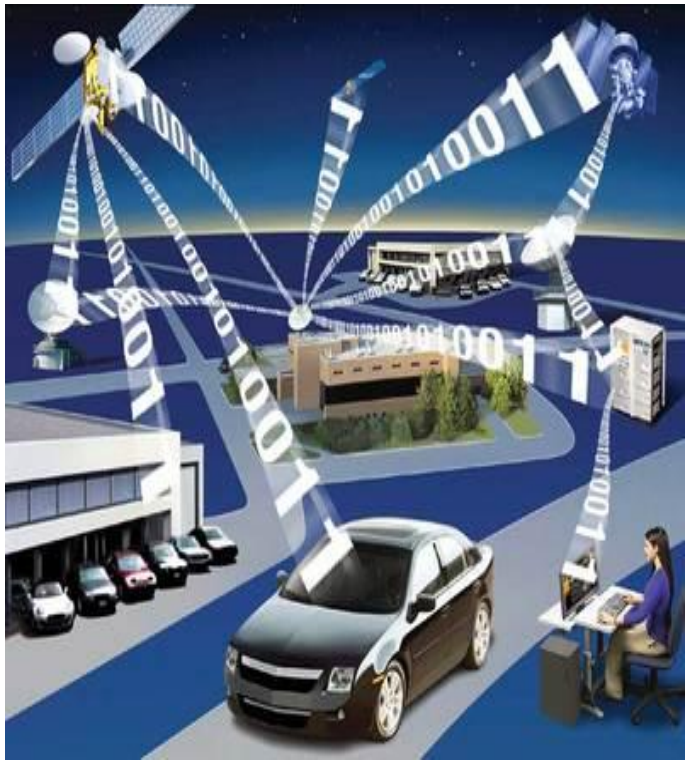
Bernard Barani
European Commission - DG CONNECT
Deputy Head of Unit Network Technologies

Motivations

Communication networks are essential

- Connecting EU citizens
- Enabling the Internet
- Powering digital applications
- Growth and competitiveness
- Global market of €400 billion
- EU-headquartered companies have 40% global market share

>1,3 million jobs
In Europe



➔5G PPP: European Strategic – Holistic – Initiative, + a response to 5G initiatives launched globally

5G PPP in a Nutshell

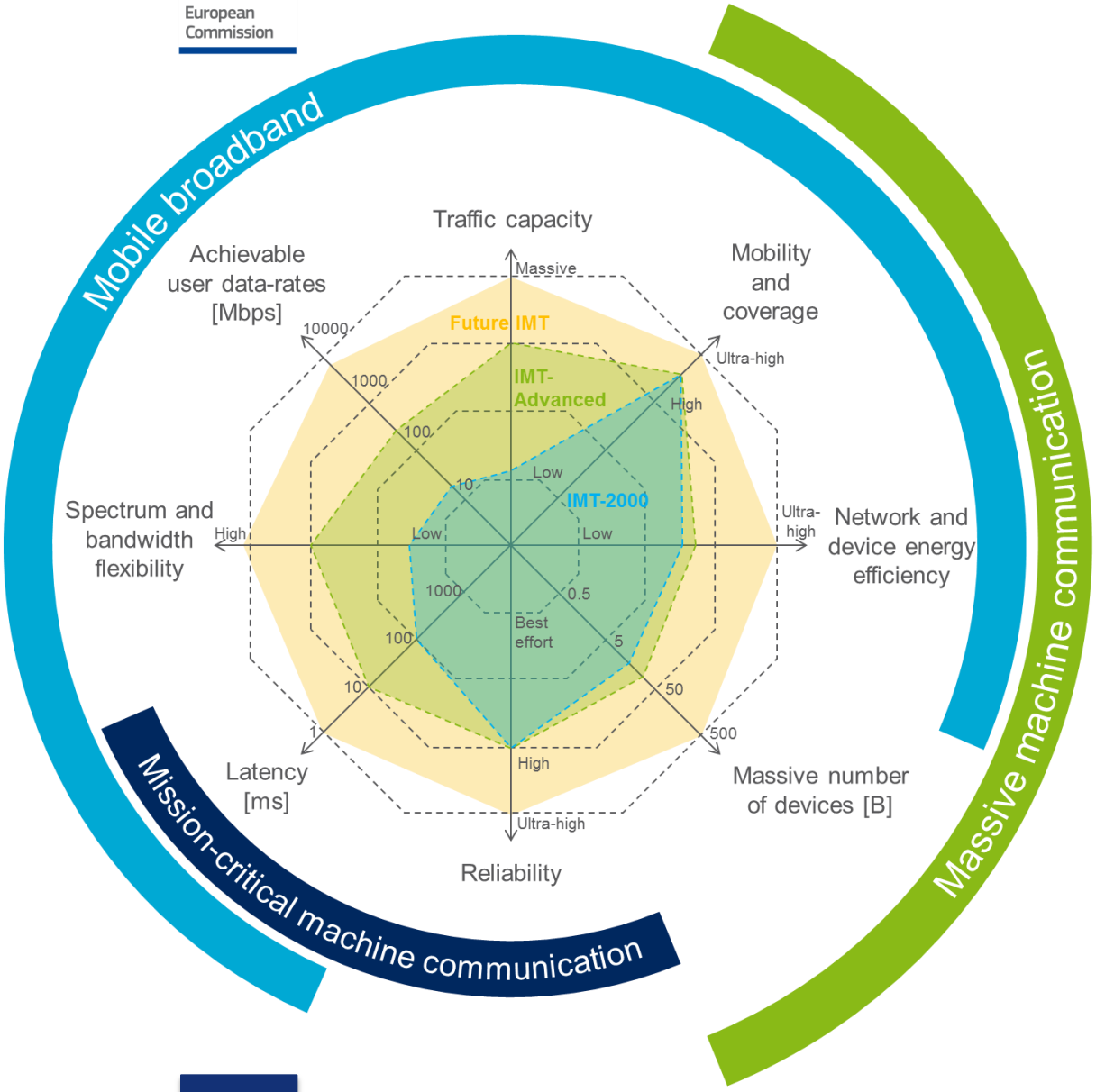
- Focus on **Communications infrastructure,** with a beyond 2020 time line
- Contractual Agreement signed with an **Association** representing the private side: *http://5g-ppp.eu/*
- **Strategic Research & Innovation Agenda** defined through **European Technology Platform:** http://www.networks-etp.eu/
- **EU commits budget up to €700 milions** for R&D&I funding for 5G between 2014 and 2020 (through Horizon 2020 programme)
- **Private Side** commits to **leveraging investments (X5)** and aiming at **agreed KPIs**
- **EU provides policy support** for 5G development (e.g. standardisation, spectrum planning, international consensus)

5 G Drivers

- From IoT to U-HDTV, ubiquity;
- "Verticals" requirements
- Tactile Internet

- True ubiquitous "ABC" access
- Traffic growth (spectrum) and complexity
- Cost /energy
- ……

ITU PDNR
"IMT VISION"



Strand Radio network architecture & technologies

1000 mobile traffic increase, versatile requirements

- Network architecture, new use cases, new frequency bands, latency;
- Increased frequency re-use (10), versatile low-cost radio access infrastructure (IoT to > 1Gbps) + low energy
- Flexible backhaul solutions, efficient signalling
- Architecture for 5G "transceivers" and micro-servers, key HW building blocks to support various spectrum usage scenarios
- Preparing for large scale demonstrators and test-beds (possibly leveraging existing experimental facilities)

ICT 14

Strand Convergence beyond last mile

Integration, unified control

- Ubiquitous access continuum
- Cooperative, cognitive fixed and heterogeneous resources, with fixed optical access reaching at least 10 Gb/s
- Reuse and sharing of functionalities
- Solving management heterogeneity of technologies
- Taking into account regulations

Strand Network management

Minimize Opex, capex, complexity; Optimise QoS, QoE

- Network level management (SON)
- Service level management (metrics, for user perceived quality of service)
- Converging SDN and Autonomic;
- Security across domains, risk analysis and definition of threat models

Expected Impacts

At macro level, strong EU industrial base % of markets

At societal level, a wider spectrum of applications and services at lower cost, with increased resilience and continuity, with higher efficiency of resources usage

At operational level,

- 1000 times higher mobile data volume per geographical area.
- 10 times to 100 times higher number of connected devices.
- 10 times to 100 times higher typical user data rate.
- 10 times lower energy consumption for low power Machine type communication.
- 5 times reduced End-to-End latency (5ms for 4G-LTE).
- Ubiquitous 5G access including in low density areas .
- European industry driving the development of 5G standards, of 5G SEP -
- Availability of a scalable management framework reduction of network management opex by at least 20%. Availability of security/authentication metrics across multi domain virtualised networks.

Strand Virtualisation and SW Networks

Flexibility, beyond firmware implementations

- Virtualisation of net.functions, VM concurrent access to resources, migration
- Orchestration of resources, OS like, cross domain configurability, open source approach;
- Integration application/service layers with network layers, landscape aware decision for reconfigurability
- Openness, OTT integration, E2E SLA, exposure of resources to third party providers/developers

ICT 14

Expected Impacts

At macro level, i) NFV/SDN industrial capability in Europe by 2020; ii) large scale operational deployment of NFV/SDN by 2020.

At operational level,

- network function implementation through generic IT servers (target) rather than on non-programmable specific firmware (today).

- Fast deployment of large scale service platforms on top of network infrastructures, from 90 days (today) to 90 minutes (target).

- Trustworthy interoperability across multiple operational domains, networks and data centres.

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Support Actions

Coherence and impact

- Programme integration, analysis of outcomes
- Societal issues
- International activities
- Support to standards
- Support to spectrum policy
- Web site,
- Roadmaps, including experimental facilities

NB: International co-operation with countries having bold R&I initiatives in the field (Korea, Japan, US, China) may be considered on a win-win basis.

Programme Aspects

- **Objectives**:

  Achieve more than a group of standalone or loosely coordinated projects

  Avoiding gaps

  -> Optimising overall project portfolio but leaving space for flexibility

  -> You are part of a Programme

- **Ex Ante:**
  - **Pre Structuring model**: a working methodology worked out by the Association as a tool to define optimised set of activities and their interfaces.
- **Ex post**:
  - **Contractual clause linking 5G PPP projects,** enabling easier knowledge and output sharing. As per FI-PPP model.

Pre Structuring Model

P8:
5G Holistic Network Architecture

P13:
5G Network Security

P11:
Cognitive Network Management

P9:
Enabling Technologies Unified Control

P16:
Multi-Domain

P14:
Software Networks Platform

P1:
5G Wireless System Design

P6:
Novel Architecture

P2:
5G Air Interface

P3:
5G for Massive MTC

P4:
5G mm-Wave Air Interface

P5:
5G HW/SW Platforms

P7: Backhaul/Fronthaul

P12:
SLM & Metrics for QoS/QoE

P15:
Service Program. and Orchestr.

P10:
5G Services E2E Brokering and Delivery

See also

http://5g-ppp.eu/

Open consultation, closed 17 April 2014

Post Structuring

Projects to contribute to Association led Working groups:

- WG 5G **Vision** ➔ towards 5G definition by end of 2015
- WG **pre standards**/IPR
- WG **spectrum**
- WG **Public Relations**
- WG **International coop**
- WG **societal**

Next steps: WP 2016-17; experiments..

Important Dates

- Constituency building event April, 28, Paris
- Constituency building event June, 26, Bologna, in the context of the EUCnC Conference

See http://5g-ppp.eu/

See http://eucnc.eu/

- Possibility of another event end of May explored!

- ***Submission date 25 November 2014 (€125 million)***
- ***Projects start March-April 2015***

Useful Sites

Main portal (grants, calls, Work progs…)

- **http://ec.europa.eu/research/participants/portal/desktop/en/funding/reference_docs.html#h2020-work-programmes-2014-15-annexes**

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5G in Digital Agenda Web site

http://ec.europa.eu/digital-agenda/en/towards-5g

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Thank You