

Making 5G a real booster for vertical markets

How to build 5G as a flexible platform towards the digitalization of vertical markets?

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Abstract—This paper describes briefly the objectives of a workshop which will be organized by the European Commission and supported by the 5G Infrastructure Association in order to initiate a long term relationship between 5G players and several vertical sectors.

Keywords—5G requirements; vertical sectors

I. INTRODUCTION

Whilst earlier network generations have been designed as general purpose connectivity platforms with limited differentiation capabilities across use cases, the situation is changing for the definition of 5G networks. 5G infrastructure will cover the specific network needs and contribute to the digitalization of vertical markets such as automotive, banking, education, city management, energy, utilities, finance, food and agriculture, media, government, healthcare, insurance, manufacturing, real estate, transportation and retail. It is now commonly admitted that future networks will have to consider "verticals" requirements from the onset.

5G will bring new unique network and service capabilities such as:

- User experience continuity in high mobility (e.g. in trains) or in very dense (e.g. stadium) or sparsely populated (e.g. villages in Africa) areas
- Internet of Things; 5G being an efficient platform to connect a massive number of sensors, rendering devices and actuators with stringent energy and transmission constraints
- Mission critical services requiring very high reliability, global coverage and/or very low latency much more than a high throughput.

All these new service capabilities could change dramatically the way vertical sectors innovate and be a driver for a sustainable growth in our economies.

The wide range of innovative use cases which we can imagine for vertical sectors with these new capabilities need to be explored further and associated with business perspectives in order to find the right tradeoff between desired performances and sustainable costs. This special session is a first step towards this common work between the ICT industry and vertical sectors players.

II. 5G TECHNICAL INNOVATIONS FOR VERTICAL SECTORS

The vision on 5G objectives and scope is shaping in the world and we have seen recently several whitepapers from all regions in the world giving an insight on the major requirements and technical innovations 5G will bring. The European industry, which has started to work on 5G already a few years ago, has communicated its own vision at Mobile World Congress [1]. In this vision, vertical sectors are well positioned and we will describe in this section some key technical innovations which should address some of their needs.

On the wireless access side, concepts such as Device to Device or Moving Networks will emerge and pave the way towards connecting the objects that are currently at the center of some vertical sectors e.g. the car for automotive or body parameters measurement tools for health. Seamless handover between heterogeneous wireless access technologies will be a native feature of 5G and this will help to bridge the gap between existing non 3GPP technologies used by vertical sectors and long distance 3GPP networks which are today the focal point of the ICT sector.

5G will be driven by software. It will heavily rely on emerging technologies such as Software Defined Networking (SDN), Network Functions Virtualization (NFV), Mobile Edge Computing (MEC) and Fog Computing (FC) to achieve the required performance, scalability and agility. These technologies will also simplify the design of network functions dedicated to vertical sectors and their integration within the whole system without duplicating investments in infrastructure (see e.g. public safety dedicated communication networks like TETRA).

With 5G, Application Programming Interfaces (APIs) should be developed at different levels (resources, connectivity and service enablers) to support a variety of network and service application developers. It means that it will be easier to develop services in partnership between ICT players on one side and vertical players on the other side. The infrastructure will be accessible through lower level interfaces. It will unleash innovation as we have already seen it in all areas where the "as a service" paradigm is developed.

In addition, we will see some specific network platforms for each vertical sector with dedicated features and performance requirements (e.g. high reliability for health or

automobile verticals or high density of terminals for smart cities). The use of COTS (Commercial of the Shelf) instead of current proprietary technologies, will change the market with these industries having a much greater influence on the development of network services and their SMEs will be able to innovate and launch new applications leveraging the new capabilities of 5G.

III. WORKSHOP OBJECTIVES

In this context, the European Commission is organizing a workshop between 5G Infrastructure Association members and some key European vertical sectors players the 18th of June. This workshop aims at fostering the interactions between the more traditional ICT sector and the potential users, to further trigger the wide-scale adoption of 5G systems in vertical industries. The goal is to initiate a process whereby closer structured links can be established between the various communities towards a common understanding of the set of requirements of the various sectors and how these translate into design, architecture, technology and performance requirements.

This workshop will cover various aspects such as:

- Evolving and future business models, exploring the frontiers of infrastructure "ownership" or infrastructure sharing models
- Specific future Service Level Agreements and technical requirements for future wireless systems per vertical sector

- Regulatory and spectrum requirements for vertical usage models
- Standardization strategy and harmonization in ETSI, 3GPP, etc..

This workshop will be focused on four very promising vertical sectors:

- Automotive with concepts such as connected car or more autonomous and secure vehicles
- Health with the development of mobile medicine and body worn sensors
- Factories of the future where sensors, actuators and information will be key
- Energy with the challenge of the transition towards a greener production and distribution

Our presentation at EuCNC conference will summarize the facts, figures and conclusions of this workshop and open a discussion on the next steps for an efficient involvement of vertical sectors players in 5G innovation.

REFERENCES

- [1] 5G Infrastructure Association, "5G Vision," <http://5g-ipp.eu/wp-content/uploads/2015/02/5G-Vision-Brochure-v1.pdf>, March 2015.