



ENERGY MEETS 5G MOBILE NETWORKS EXPERT MEETING, 2017-03-14

Energy aspects of the 5G PPP white paper "5G Empowering Vertical Industries"

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Introduction

Industry Perspective

2015 5GPPP White Paper on 5G and Energy

2016 5GPPP White Paper summarizing multiple vertical industries:
"5G Empowering Vertical Industries"

Time to reflect ...



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5G - A Driver for Industrial and Societal Changes

5G Empowering Vertical Industries

...The energy industry has developed over a prolonged period (in excess of 100 years) and the demand side has been largely separated from the supply side...

...We are now faced with unpredictable small generation stations (solar, wind, etc. in their thousands) combining with changing end-user energy use patterns such as mobile large demand/storage units such as Electric Vehicles...

...The physical infrastructure will need to support a two-way energy flow originating from the distributed energy resources, which in turn implies new needs for communication technologies, intelligence, business models and market structure.

...

Industry perspective

This scenario continues to evolve:

- Renewable generation
- Micro grids
- Electric vehicles
- Battery storage

The grid will be more digitalised and automated, using distributed sensors and control.

5G has the potential to provide the necessary infrastructure.

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For Europe, 5G is Business Driven

5G Empowering Vertical Industries

...These changes require new value propositions, new partnerships and business models and improved cost structures...

...5G will be instrumental for the digitalization of the traditional industry in its race for better productivity and competitiveness, especially if it can create synergies across verticals, lowering individual costs thanks to cost-sharing on infrastructure deployment and service operations...

...5G can create new grounds for cost sharing with innovative partnership models built on synergies between network operators and vertical industries...

...Investment cycles of vertical industries are different compared to the telecom investment cycles... 25 years...

Industry perspective

We need new business models, and operators with an industrial mindset:

- Fulfill vertical requirements
- Vertical specific solutions

Examples of operator offerings/solutions:

- Accurate time information
- Efficient power up of the grid & telecom after a blackout
- Life cycle support

Still – 5G must be cost efficient!

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Technical Requirements

5G Empowering Vertical Industries

5G KEY CAPABILITIES AND KPIs

- ...
- *1/5 X in end-to-end latency reaching delays ≤ 5 ms.*
- *Service reliability $\geq 99.999\%$ for specific mission critical services*
- ...

Industry perspective

The use-cases, requirements and KPIs has been valuable input!
It is a large mind change, to go from MBB, towards mission critical applications – example: *IIC figure on Trustworthiness*

From requirements, into operation for Energy use-cases:

- Provide the latency, reliability and security in a resilient system!
- A robust self healing system

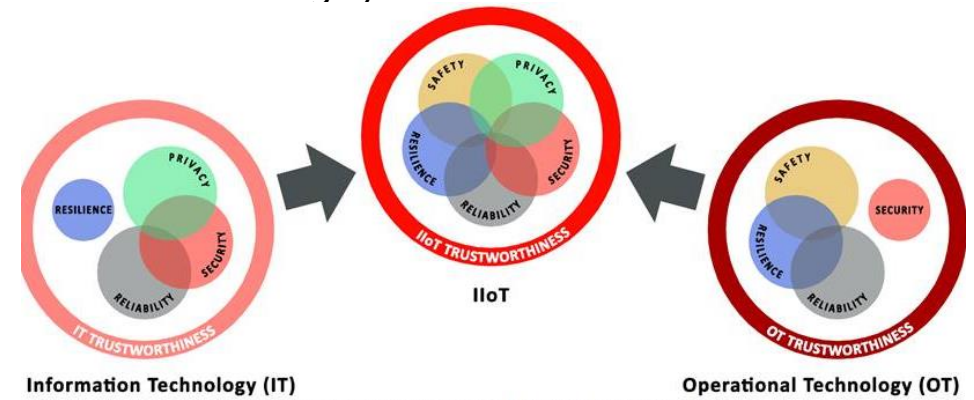


Figure 2-1: Convergence of IT and OT Trustworthiness

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5G ARCHITECTURE FOR DISTRIBUTED AND FLEXIBLE ALLOCATION OF VERTICAL-SPECIFIC NETWORK FUNCTIONS

5G Empowering Vertical Industries

... in order to fulfil vertical-specific requirements as well as mobile broadband services in parallel....

...The 5G infrastructure may belong to different infrastructure providers (mobile, cloud, transport, etc.) that interrelate in complex business relationships...

Industry perspective

The flexibility within 5G is a key to succeed to support the variety of use-cases defined.

Into operation:

- Risk of using different infrastructure providers

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NEXT STEPS IN STANDARDISATION AND SPECTRUM CONSIDERATIONS

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...Standardised solutions provide end-users with services that are safe, reliable and of good quality. For businesses, standards create the interoperability that is necessary to save costs and provide access to global markets...

...and the liability will then include more than just the device. This leads to a set of security, privacy, identity and liability issues that have to be addressed natively in the standardisation and regulation processes...

...The 5G standardization time plan currently adopted by 3GPP, which is gradually realizing the full 5G capabilities in three consecutive releases...

Industry perspective

Standardization is key for high volumes and lower cost

Stepwise access to 5G features

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Summary

Industry Perspective

As a summary, the White Papers play an important role to share the energy domain knowledge.

As a next step the operators needs to be more involved in the vertical discussions, making 5G more concrete:

- Business models
- Services

From Technical Definition to Operation





ABB