

AIOTI WG03 Workshop

IoT Platforms & Standardization

Industrial IoT Panel

Bruxelles, 8 February 2017

Mauro Isaja – mauro.isaja@eng.it
Engineering Group

Hello!

Mauro Isaja – mauro.isaja@eng.it

Project Manager, Research & Development BU

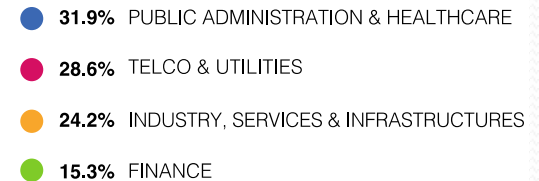
@Engineering Group

The first IT player in Italy:

9% market share

> 1,000 large accounts in all markets

> 8,100 employees



Technical background: developing and delivering commercial solutions to the industry and finance sectors

Current role: project coordinator of **FAR-EDGE**, technical lead of **BEinCPPS**

Perspective on IIoT standardization: **digital platforms for the manufacturing industry**, pilot experimentations focused on **real-world production scenarios**

Setting the Context



FoF-09-2015 – ICT Innovation for Manufacturing SMEs (I4MS)

Project Summary	
Type	IA
Start	01/11/2015
Duration	36
Budget	9.5M
Coordinator	POLIMI



FoF-11-2016-b – Novel Architectures for Factory Automation

Project Summary	
Type	RIA
Start	01/10/2016
Duration	36
Budget	4.5M
Coordinator	ENG

Common Philosophy

BE  **CPPS**



Open Platforms

Open Source Software

Technical results assessed on real production systems

Different Strategies

BE  CPPS

Digitizing Industry

Innovation Action:

adoption/extension of Cyber-Physical Production Systems

major focus on business/migration



Leadership in Digital Platforms

Research & Innovation Action:

advancement over SotA

**major focus on technology/
functionality**

Different Approaches

BE  **CPPS**



Bottom-up: from an existing generic platform to the implementation of specific use cases

(users build their innovation on top of available functionality)

Top-down: from specific user requirements to the design and implementation of a more generic platform

(users start from an abstract “platform concept”)

BEinCPPS Overview



Business Experiments

in

Cyber-Physical Production Systems

<http://beincpps.eu/>

- **Goals**

- Integrate a novel **service platform** based on **SotA technology** – i.e., as a convergence of CPS, IoT and Future Internet platforms
- **Experiment** new **CPS-based business processes** in pilot factories located in five European regions (“**Regional Champions**”)

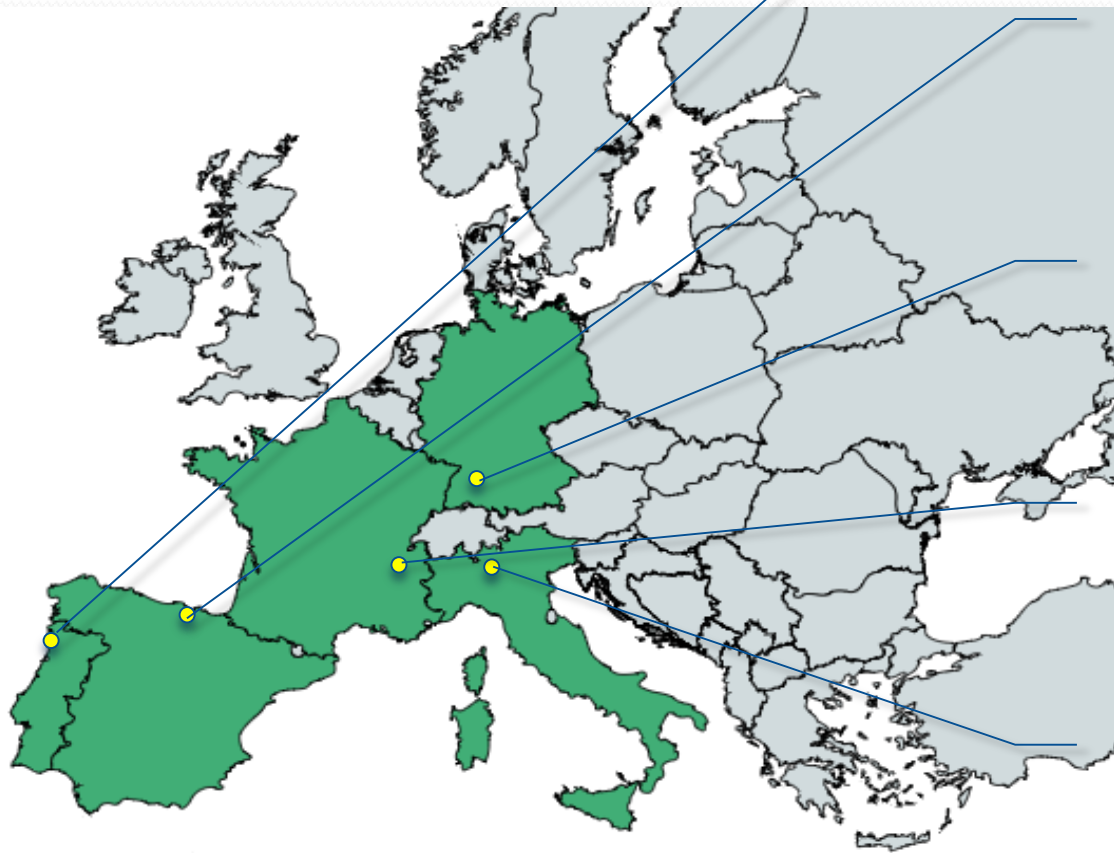
- **Impact**

- **Build an SME-oriented business ecosystem** based on the service platform and on regionally-scoped **Digital Innovation Hubs**
- **Extend the Regional Champion experience** to other regions by means of Open Calls

- **Status**

- Sixteen months into the project
- First-generation service platform deployed on pilot factories, first round of experimentation ongoing, launching of DIHs

The BEinCPPS Pilots



Norte (PT)



Footwear

Euskadi (ES – Basque Country)



Plastic Components for Automotive Ind.

Baden-Württemberg (DE)



Industrial Vehicles for Agriculture

Rhône-Alpes (FR)



Injection Moulds for Thermoplastic Parts

Lombardy (IT)



White Goods

FAR-EDGE Overview

- **Goals**
 - Reference implementation of an IoT-enabled **open platform** for FA based on Edge Computing principles and Blockchain technology for **shortening data paths** and **decentralize control**
 - Enable **more powerful and flexible** FA solutions
- **Impact**
 - Creation of a **multi-sided ecosystem** (OEMs, ICT providers and integrators, standard bodies and communities, end users) around the open platform
- **Status**
 - Five months into the project
 - Investigating scenarios, requirements, standards & technologies
 - Design of the open platform's architecture started



Factory Automation
Edge Computing
Operating System

The FAR-EDGE Pilots



Process Agility



Cross-Plant Process Synchronization

Approach to Standards

BE  **CPPS**



Basic Goal:
Communicate
with people

Basic Goal #1:
Operate your
system

Basic Goal #2:
Cooperate with
other systems

Architecture Standards
Platform Design

Technical Standards
Platform Implementation and Operation

Standard Adoption

BE CPPS



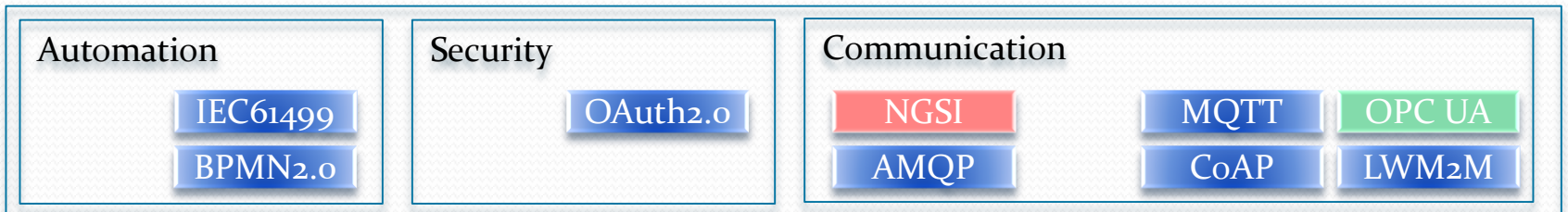
Status: Inherited
from SotA

Technical Standards
in Implementation and Operation

Status:
Considered for
dissemination &
exploitation

Standard Adoption

BE CPPS



Lessons Learned:

The Manufacturing Enterprise Perspective

- Standardization can only be pushed forward by **business concerns** like **reducing cost, avoiding vendor lock-in** and **enabling new/enhanced business processes**
- In planning the adoption of standards, reduction of cost must be **objectively proven**
- Vendor lock-in is normally **not perceived as a concern**, but this is **slowly changing**
- Enhancing existing processes is **perceived as difficult**, because of the **risk of disruption**
- Introducing entirely new processes (or even plants) is **perceived as less difficult**

Lessons Learned:

The Technology Provider Perspective

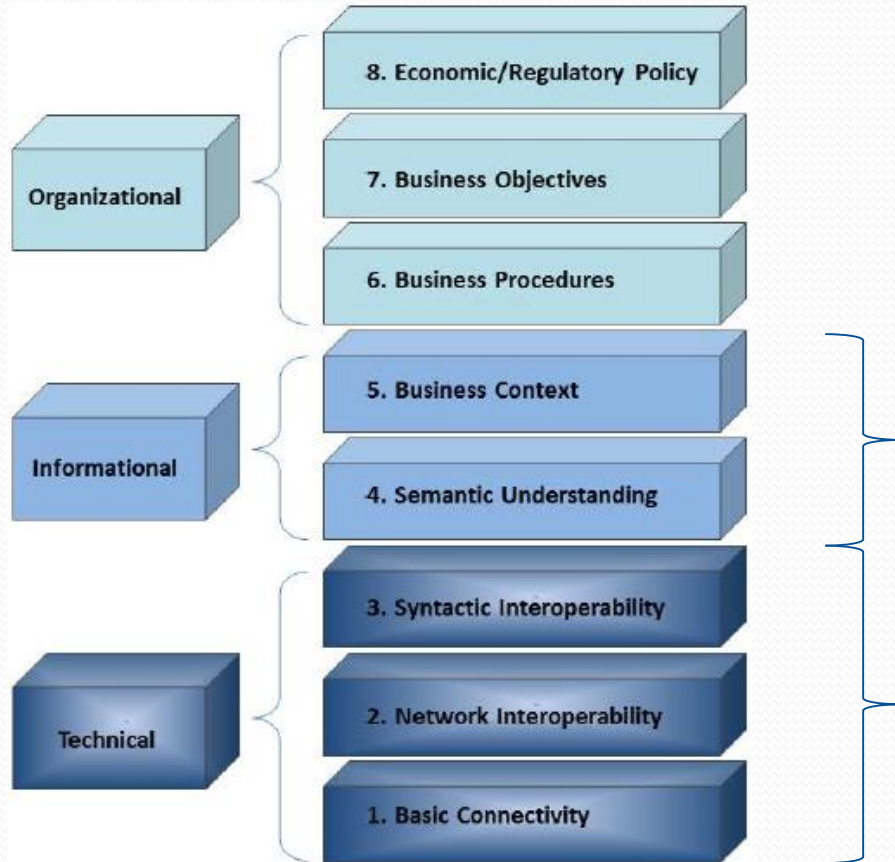
- Pursuing vendor lock-in is gradually becoming a **less profitable and more risky strategy**
- Standards tend to **reduce the cost of development**, but are **not a competitive advantage**

Lessons Learned:

The Research Project Perspective

- The mission is to **promote technology**, using funding and *sandboxed* environments to **overcome the barriers to experimentation**
- Running on-the-field experimentation is like injecting new technology into the factory's DNA: in the end, the expected result is to **lower the barriers to future adoption**
- Promoting standardization is **not different** than promoting new technologies

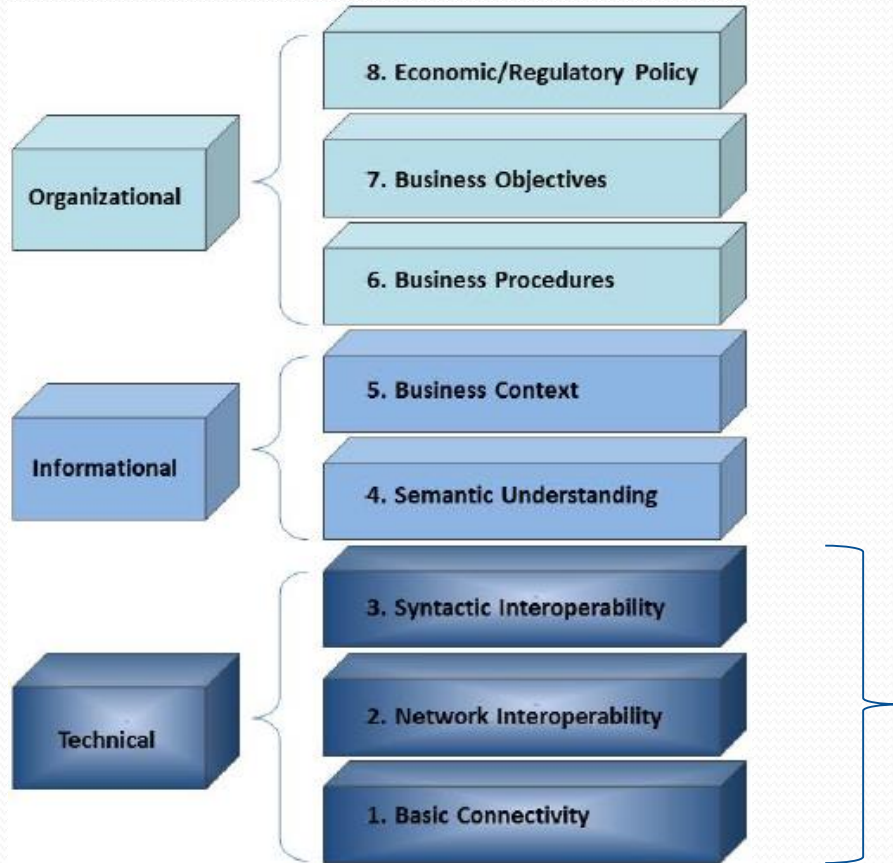
Status Check: IIoT Interop in Factories



- Current target of research actions: **achieve semantic interoperability**
- Adoption by the manufacturing industry mandates mature standards
- Ontologies and ICT tools are in the early stages of their development
- Awareness of users is low, research actions **must demonstrate business benefits**

- Current target of innovation actions: **standardize field communication**
- Mature standards are available
- Mature ICT tools are starting to be available
- Market demand is low but growing – at least for **new equipment**

Focus on Communication




Emerging winner on the Edge level
Commercial and Open Source
implementations of the software stack

Focus on Semantic Interoperability



- Not a requirement today at the **Edge level**: shopfloor systems are mostly homogeneous, RT control software is built ad-hoc
- Might change when plug-and-produce smart objects / machinery will become a reality outside of labs (e.g., SmartFactoryKS)

- Not a requirement at the **Cloud level** as well: plant / factory / enterprise systems are *wired* to the Edge level by ad-hoc integration
- Might change if manufacturing industries will adopt standard-based off-the-shelf solutions for their upper layers of the automation pyramid, or even outsource them to SaaS providers (e.g., Virtual Fort Knox)

Thank you!

by Mauro Isaja – mauro.isaja@eng.it