



Predictive maintenance and quality control on autonomous and flexible production lines



With the implementation of an IoT infrastructure on the shopfloor level, through Boost 4.0 it will be developed a system able to collect data from multiple sources (e.g. company production tools, mobile robots, welding cells) with the main objectives to reduce the manufacturing costs (optimizing the production planning and maintenance costs) and increase the product quality



Mobile robot on assembly line

Factory 4.0 Big Data Pilot Motivation

- Since the traditional automotive linear production process presents different criticalities (e.g. Saturation of processing stations and logistic equipments, space shortage at the lineside), the evolution is moving towards autonomous and flexible production lines
- High manufacturing equipment maintenance cost due to lack of monitoring and analysis infrastructure
- Learn to get value out of data through intelligent systems design, using real-time analytics to tailor products to customers and continually improve the processes.






Big Data for autonomous manufacturing

- Enable the optimal planning of the production missions and the management of the incoming events.
- Develop an analysis section which, based on the continuous data flow coming from the shopfloor, can determine the planning of the maintenance activities.
- Given the huge amount of data, a standardized and procedural scheme to follow will help the company to better understand data, by extrapolating only the useful information necessary at the time.

Competitive Advantages

- Production line operations time saving: +16%
- Zero defect manufacturing (10 ppm)
- Real-time, product-service value added networks
- Reduction of maintenance activities: +30%
- Overall cost reduction: +50%
- Enhanced work environments

Big Data Pilot Lifecycle Scope

| | | | | | | |
|--|---------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|  | Digital Engineering | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | Production Planning | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | Smart Operations | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
|  | Smart Production | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | Smart Services | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> |

Big Data Pilot Site

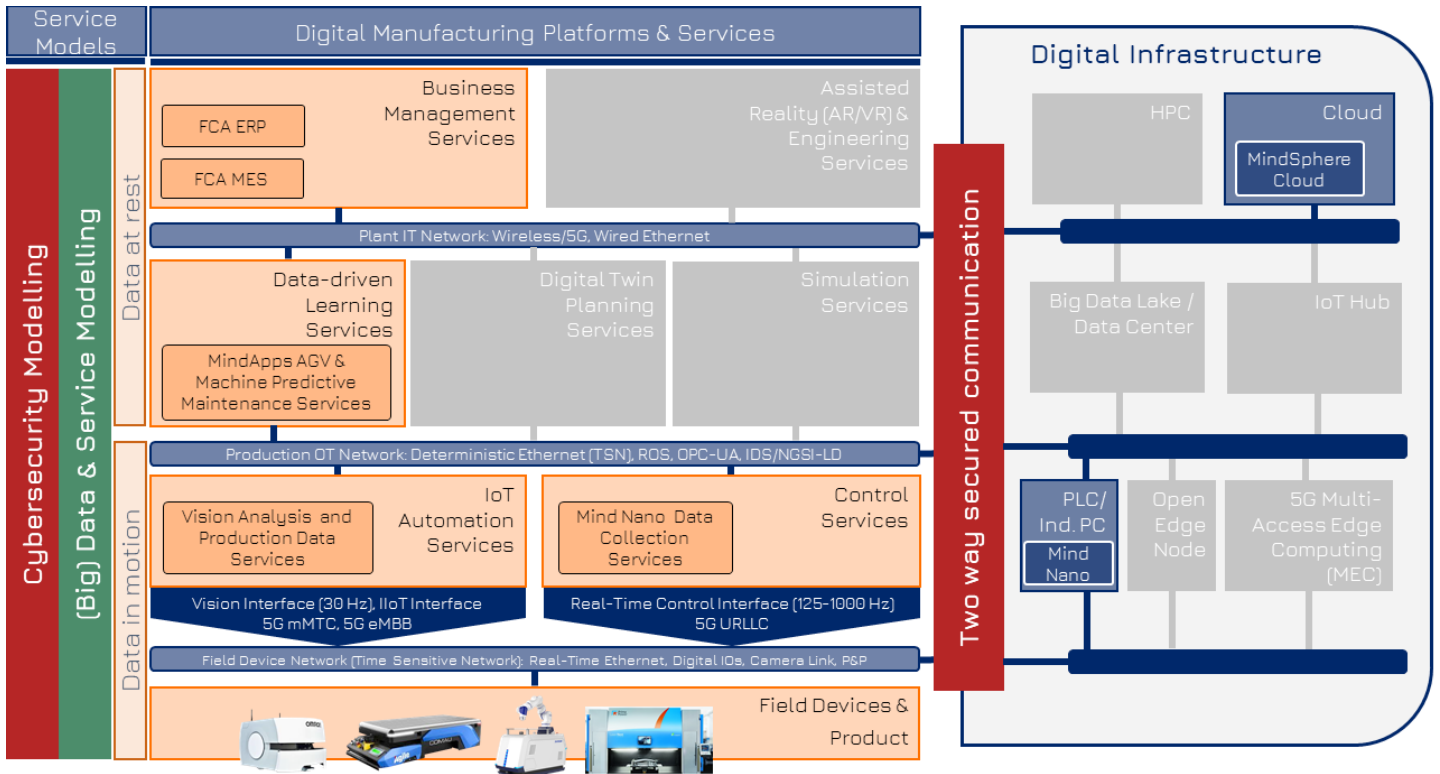


FCA CRF Campus Melfi, Digital Innovation Hub (DIH)
Melfi | Basilicata, Italy

Pilot Partners



14.0 Big Data Pilot Solution Framework



Boost 4.0 big data solution framework leverages on Big Data Europe (BDE) big data pipeline technologies, International Data Spaces Association (IDSA) specifications for data sovereignty, FIWARE NGSI-LD API for open IDS implementation and Hyperledger technologies for transaction traceability. Boost 4.0 big data platforms and technologies align to RAMI 4.0 and are integrated under the Digital Shopfloor Alliance (DSA) autonomous service framework to ensure reduced cost, time and effort in solution deployment and extensibility (<https://digitalshopflooralliance.eu/>).



14.0 Big Data Pilot Features

Sector / Product: Automotive

Manufacturing Process: Cutting/Welding

Big Data Analytic Techniques: Predictive maintenance optimal scheduling algorithms

Big Data Platforms:

- Siemens MindSphere (siemens.mindsphere.io)

Open 14.0 Big Data Pilot Pillars

INTERNATIONAL DATA SPACES ASSOCIATION

IDSA defines a reference architecture and an ecosystem, which supports sovereign exchange and sharing of data between industrial partners.

FI-WARE

FIWARE is a curated framework of open source platform components to accelerate the development of smart solutions for Industry 4.0.

HYPERLEDGER

HYPERLEDGER is an open source collaborative effort created to advance cross-industry blockchain technologies.

BIG DATA EUROPE
Empowering Communities with Data Technologies

The BDE offers an open source platform, allowing to build several Big Data components into a pipeline through a simple graphical UI.