Industry 4.0

Qs Group Road to IoT

Who we are ... What we do ...

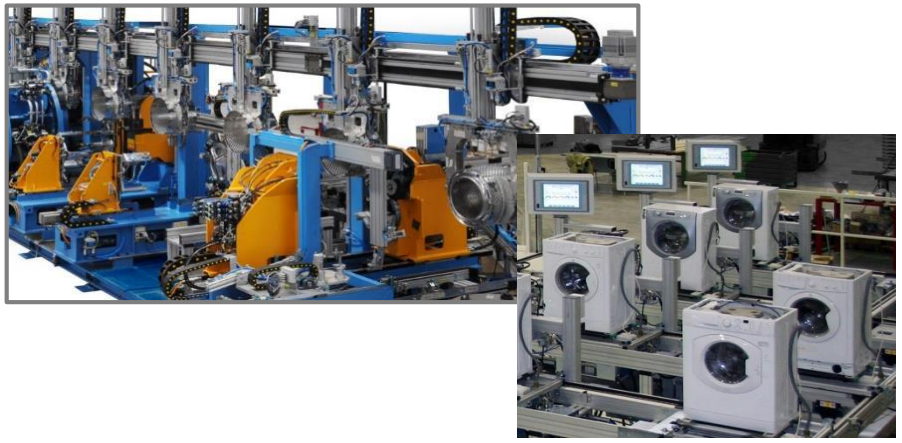
A group of companies that for **over 40 years** operates internationally in **various industrial sectors** such as: household appliances, automotive, food & beverage, pharmaceutical, chemical, health and mechanical in general.

The Group's **areas of specialization** range from the design and construction of machinery, industrial automation systems and dies, the **development of industrial software** and artificial vision systems, to co-design and product engineering services and after-sales assistance services.

Organization	
Founder	Giovanni Porcarelli
Employees	280 between white and blue collars
Turnover	60 Mln Euro
Manufacturing Centres in Italy	Cerreto d'Esi (AN) - 15.000 sqm Fabriano (AN) - 8.000 sqm Abbiategrasso (MI) - 5.000 sqm

Engineering Team
45 Mechanical Designers
10 Electrical Designers
5 Hydraulic Designers
25 Software Designers

- Sheet Metal Division
- Thermoforming Division
- Polyurethane Division
- Handling and Storage Division
- Assembly and Control Division



- MES

(Manufacturing Execution System)

- WMS

(Warehouse Management System)

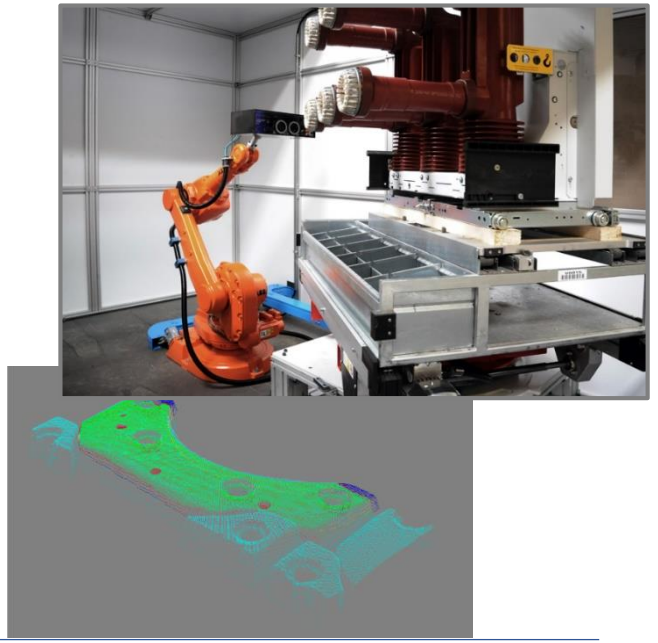
- SCADA

(Supervisory Control And Data Acquisition)

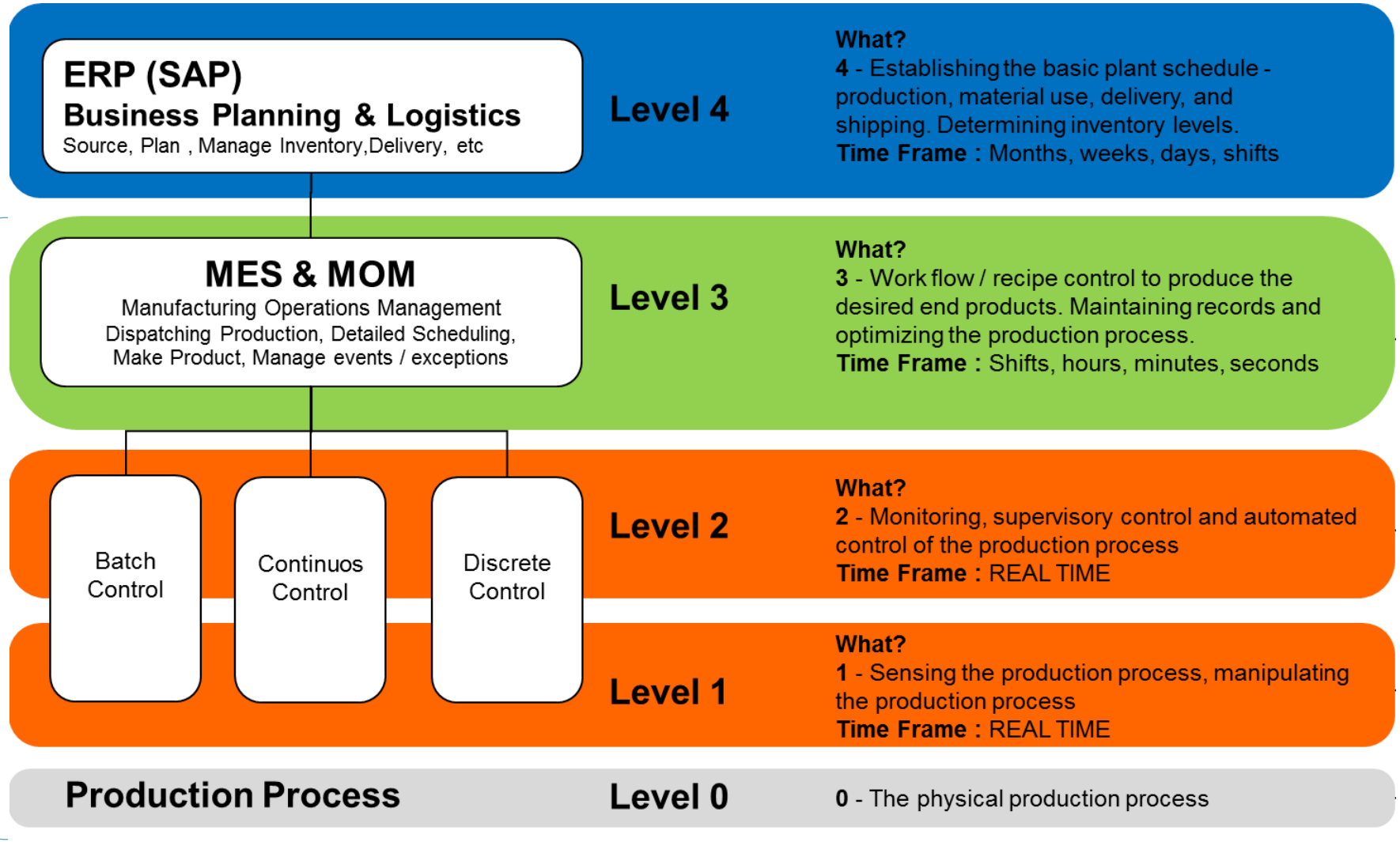
- AIDC

(Automatic Identification and Data Capture)

- Cyber-physical system
- 2D/3D Localization
- Inspection System
- Dimensional control
- String Recognition



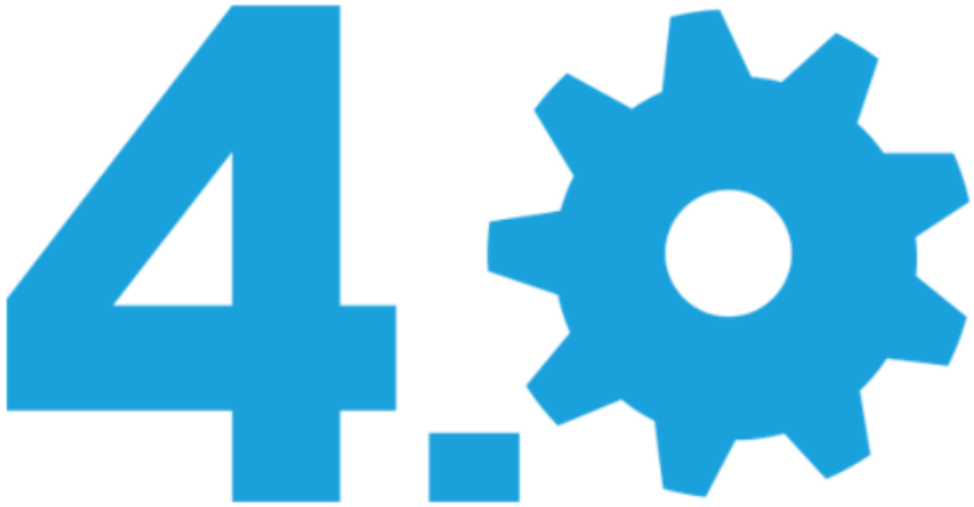
A Team able to communicate at all levels of ISA 95 (Business, Operations, Control)



Some References

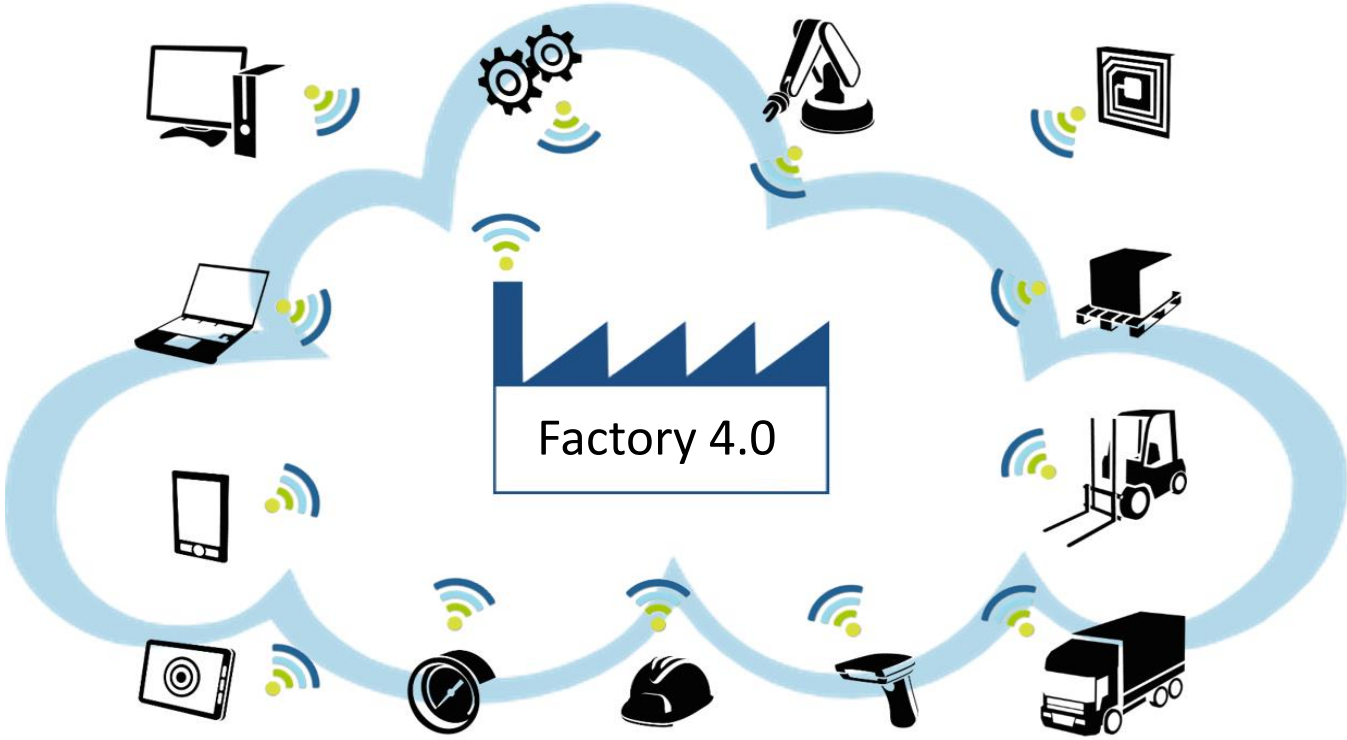
Why Industry 4.0 ?

- Being competitive
- Continuous Improvement
- Performance Optimization
- Downtime Reduction
- New services to reduce TCO
- After sales services and monitoring
- …market's request

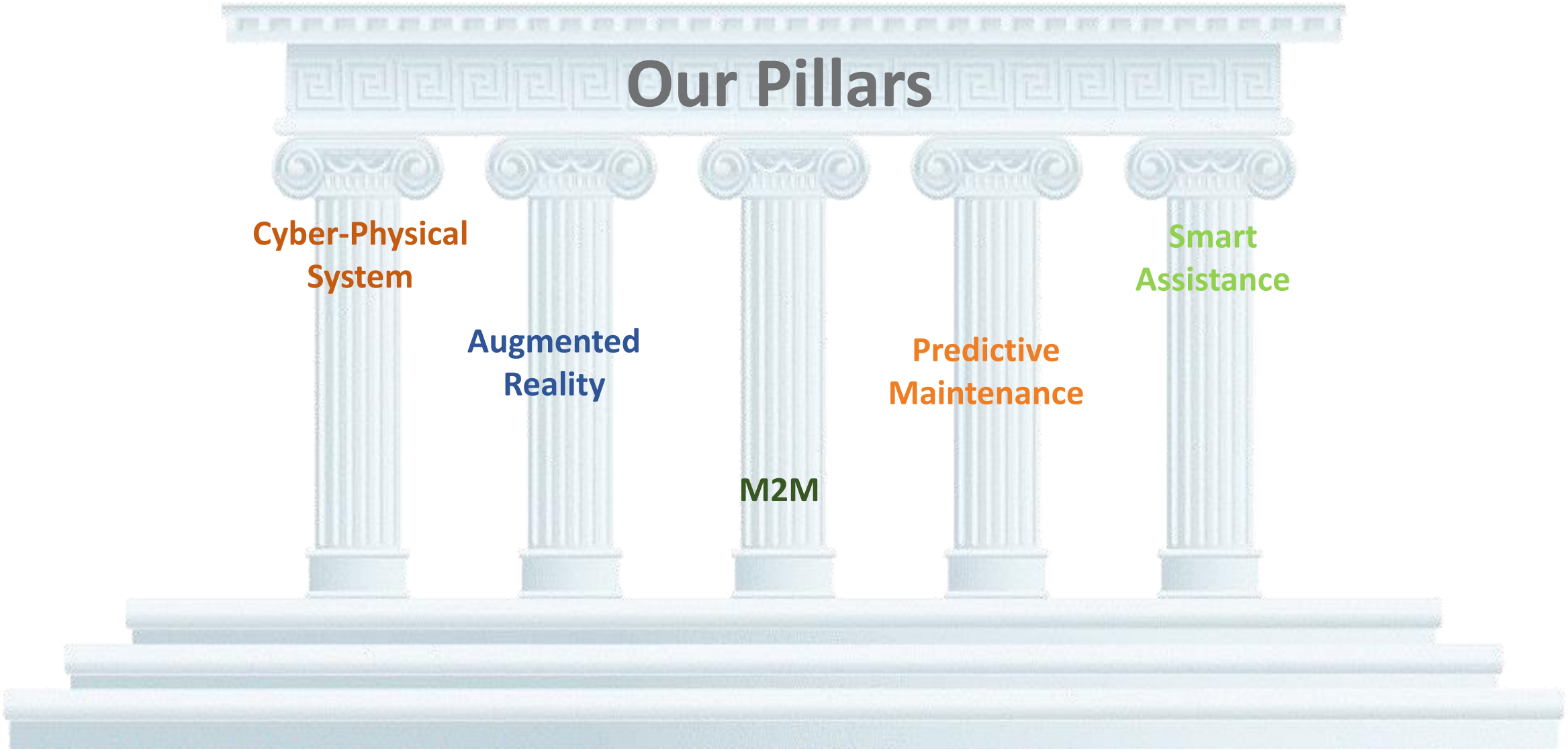


What Market requires

- Zero Errors /Quality improvement
- Manual operation reduction
- IIoT / Big Data Analysis
- Integrated Solutions
- Integrated Supply Chain
- Modelling and Simulation
- Mass Customization
- Zero Heating & Light

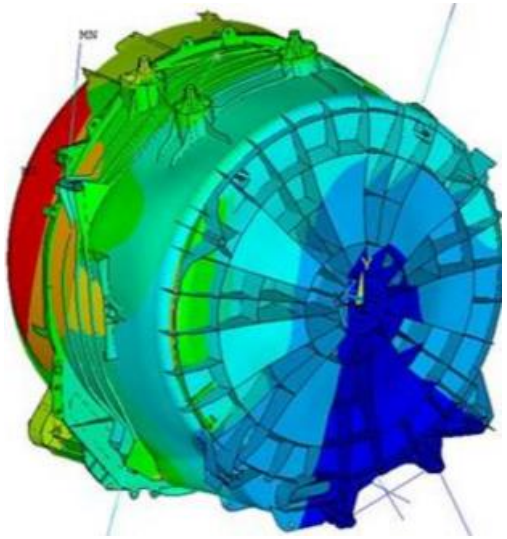


Our Pillars


Cyber-Physical System
Augmented Reality
M2M
Predictive Maintenance
Smart Assistance

Case History: Cyber-Physical System

- **Request:**
  To automate a manual assembly process for feeding 7 production lines.
  The components to be assembled are very similar, so there is a high probability of error.



Case History: Cyber-Physical System

- **Solution:**

  Integrating an automated assembly station in line (*Cyber-Physical System*)

- **Main characteristics**:

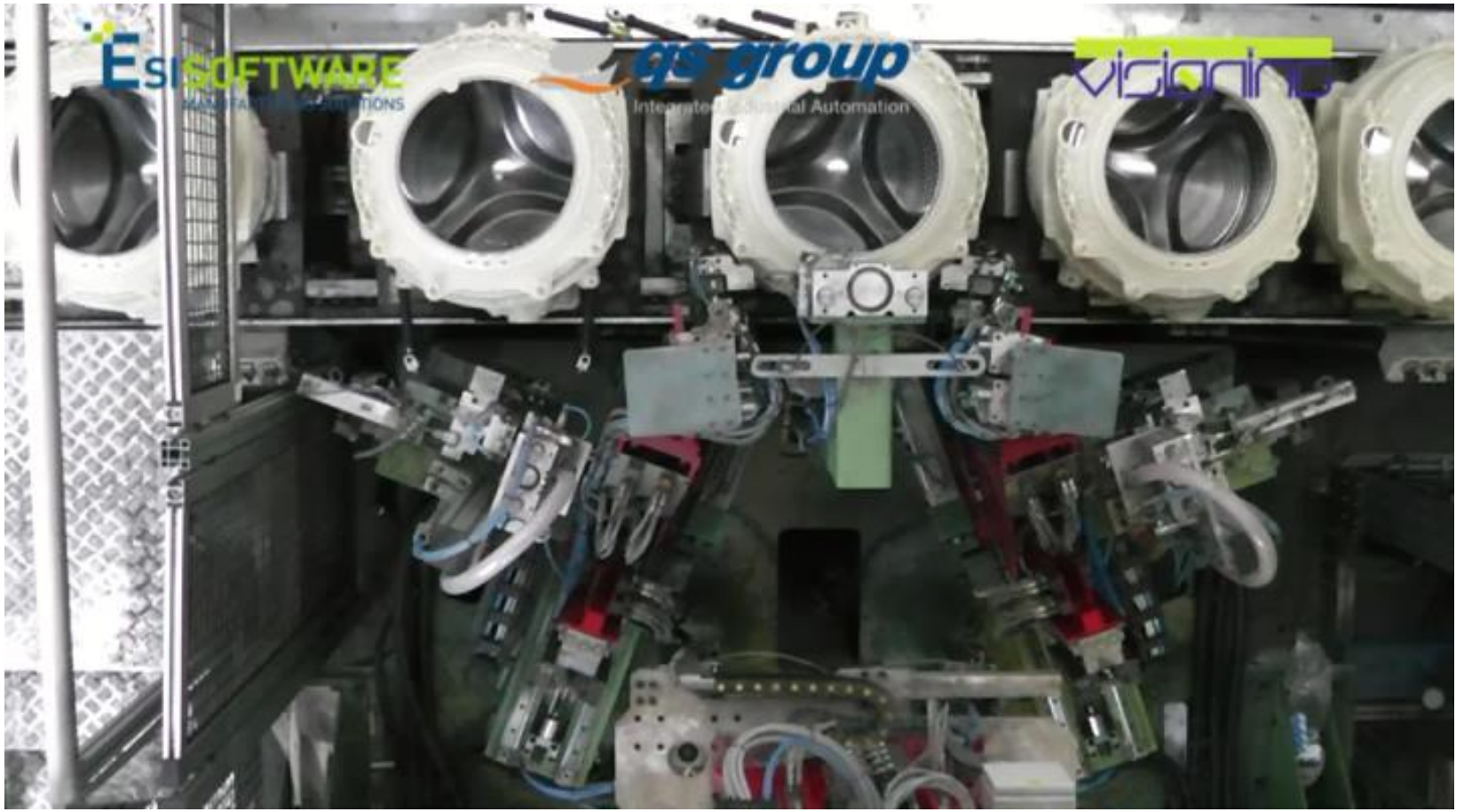
  - Integrating Supermarket in line
  - Integrating vision systems (*Machine Vision*)
  - Integrating RFID in order to implement communication between the assembly station and sub-assembly product (Dynamic Group) (*M2M*)

Case History: Cyber-Physical System

Integrated Supermarket in line and Vision system

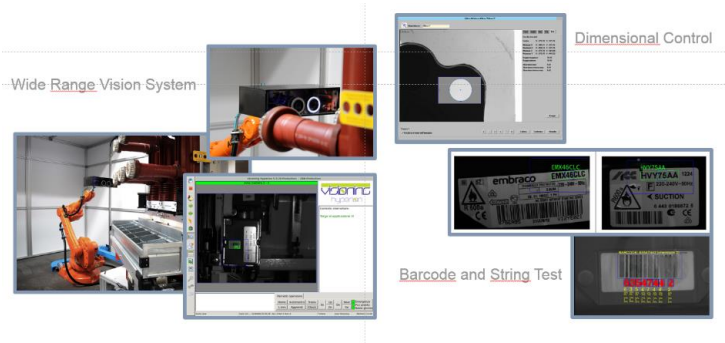
Case History: Cyber-Physical System

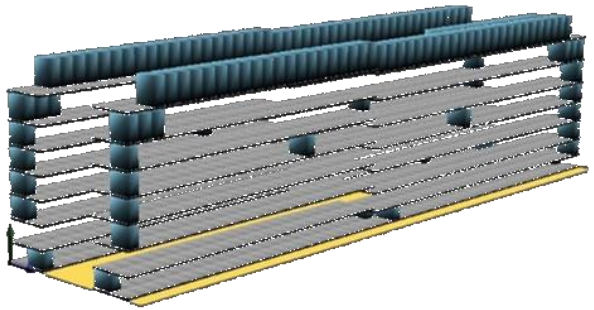
M2M – RFID and Automatic Assembling



Case History: Cyber-Physical System

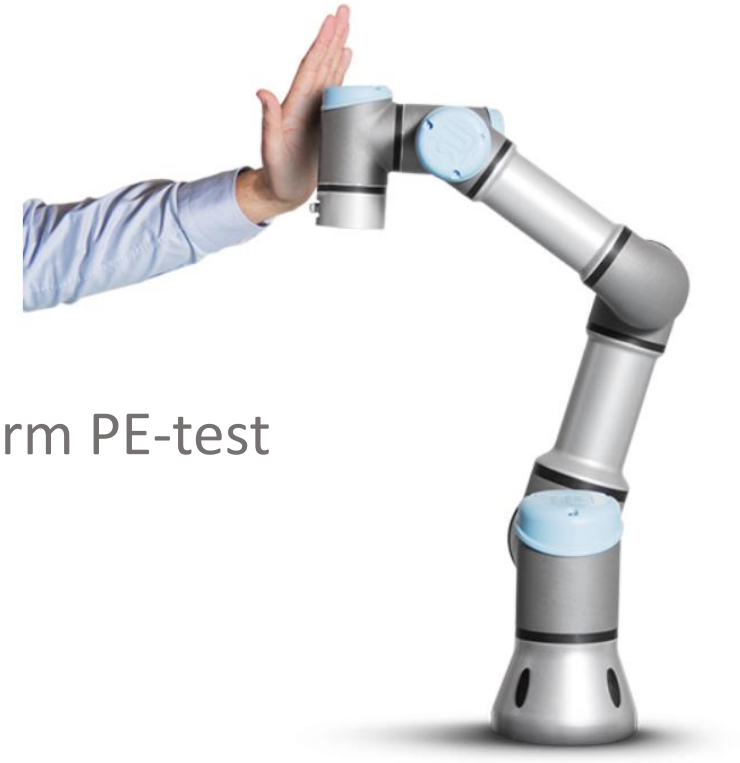
- Extension : automatic refilling of counter-weight
- Extension: integration with Automatic Warehouse system
- Extension: integration with MMS (Material Management System)





Case History – One Piece Flow / Mass Customization

- **Focus: manual activites reduction and introducing Mass customization system**
  - ERP / MES Integration
  - Integrating Vision System (*Machine Vision*)
  - Integrating Anthropomorphic Robots for manipulation
  - Automatic Components Fitting and Traceability
  - Collaborative anthropomorphic Robot (COBOT) to perform PE-test



Case History – One Piece Flow / Mass Customization

Automatic Assembly Line

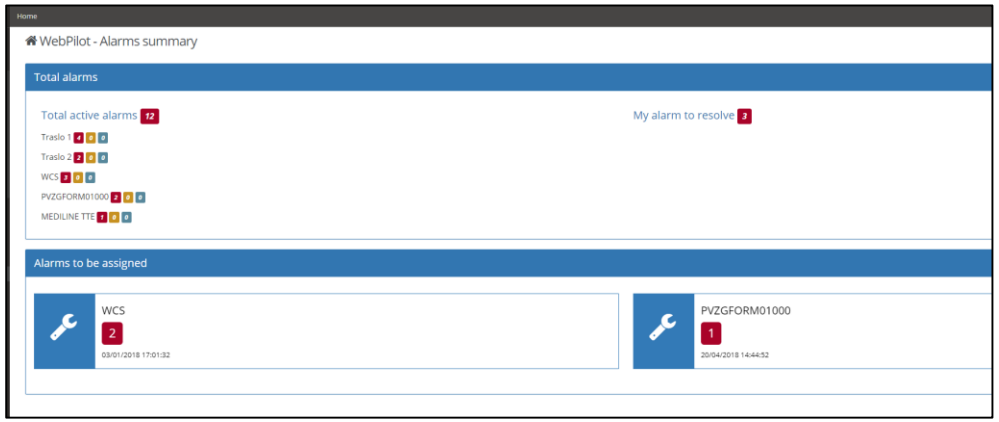
Case History: Smart Assistance

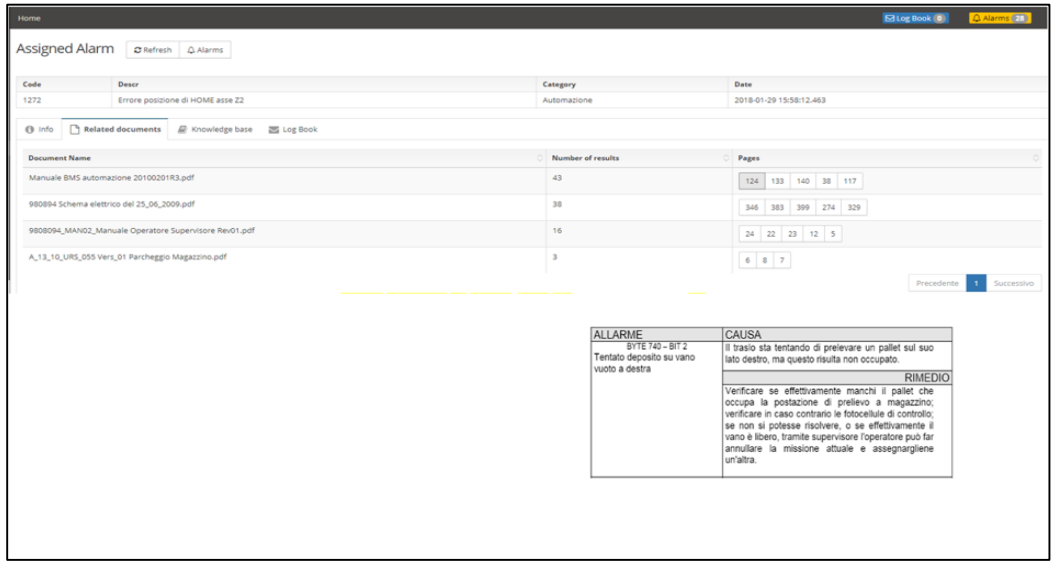
- **Focus: downtime reduction**
  - Know-how digitalization
  - Documents and procedures digitalization
  - Maintenance activities tracking
  - Solutions rating
  - KPI

Case History – Smart Assistance

Main Features

- Alarm notification in real time
- Multi asset configuration
- Multi zone configuration
- Alarm severity management
- Ldap integration for user management
- Notification escalation
- Contextualized document search
- Preview of each page



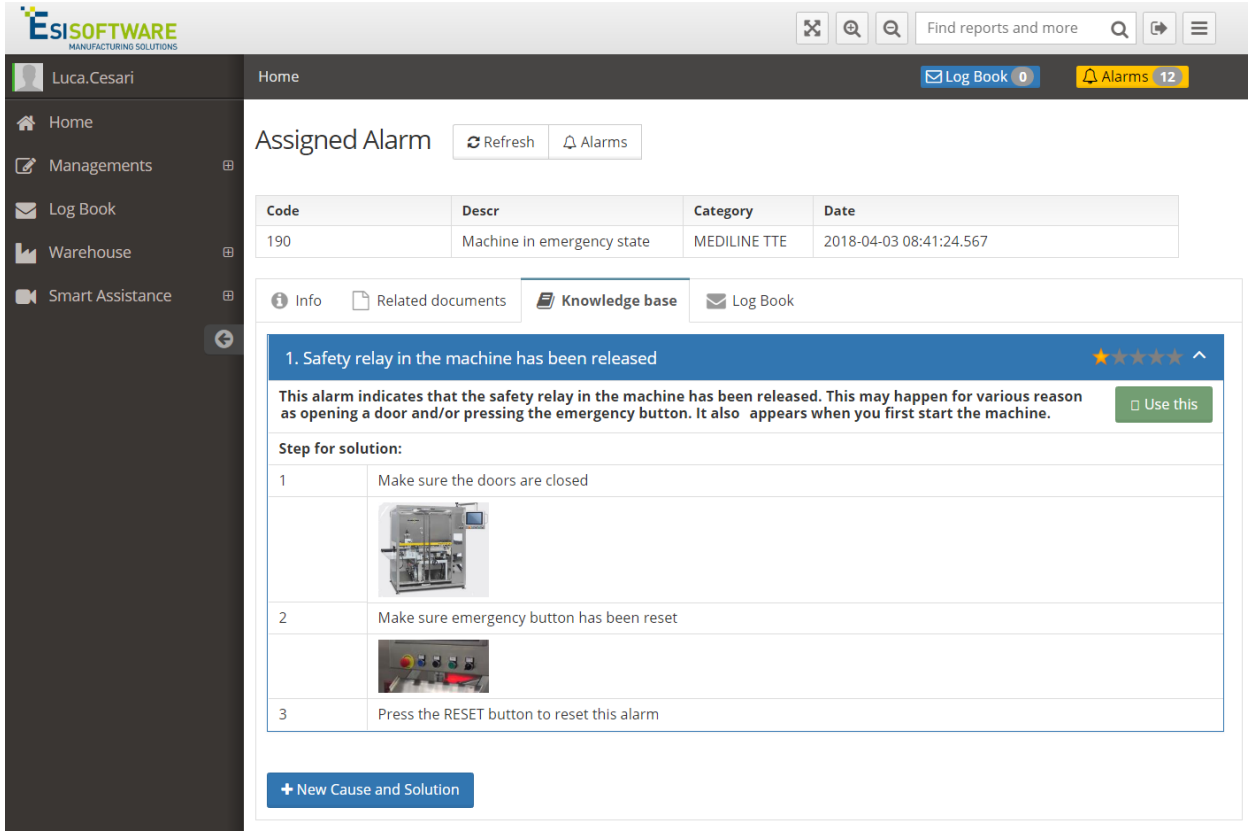


Case History – Smart Assistance

Digitalization

Scope is to provide to operator all the information:

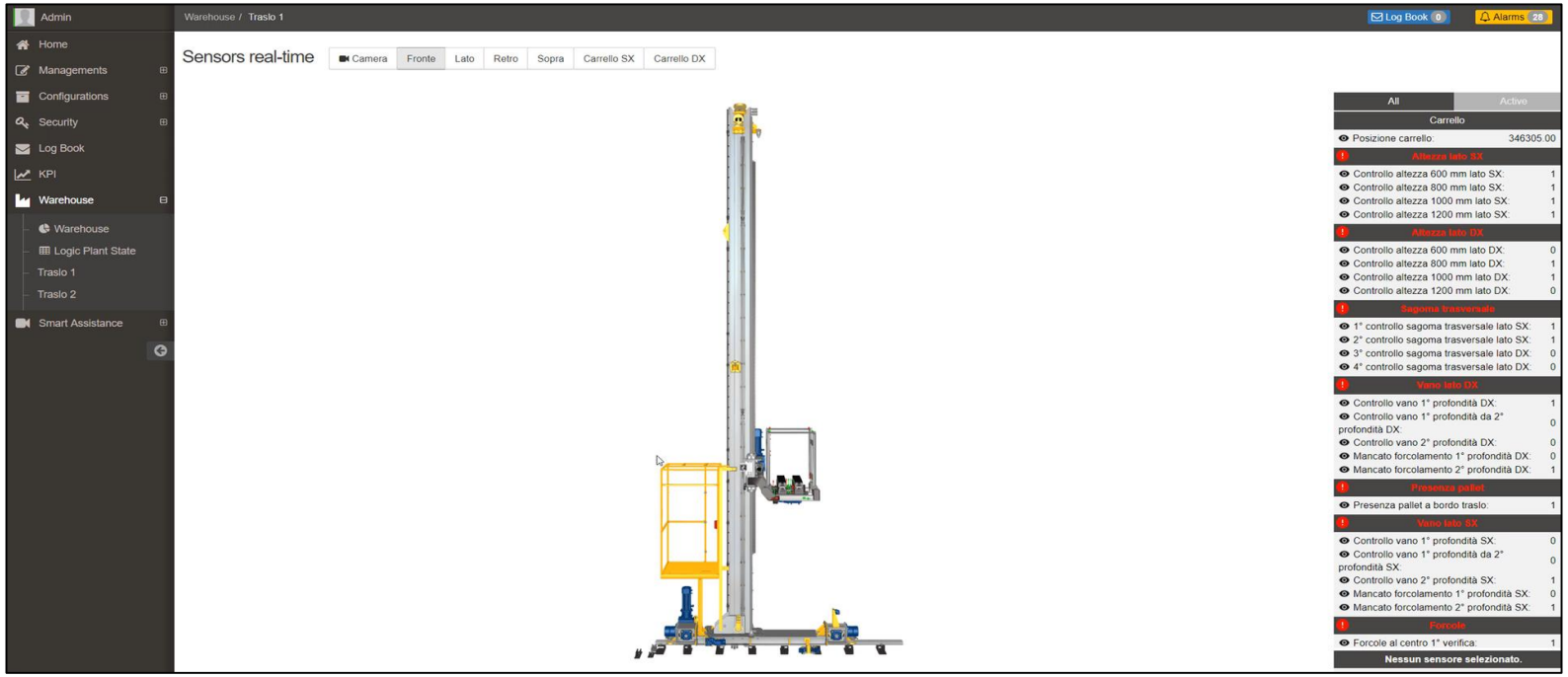
- Electrical Drawings
- Layout
- 3D Drawings
- User Manual
- Maintenance user
- Image /Video Tutorial
- Check List / Procedure



Case History – Smart Assistance

Real time 3D

- 3D web virtualization
- Remoted sensor data (on the right)
- Different predefined views



Case History: Integrated Supply Chain

Objectives:

- Create an integrated supply chain system to manage the order and receiving of packaging materials.
- Pallet shipment optimization
- Warehouse areas optimization
- Reduction of acceptance activities
- NO MIX-UP

Case History: Integrated Supply Chain

- **Solution:**

  Introduction of RFID technology

- **Main characteristics**:
  - Identification of boxes and pallets with *RFID* LABEL
  - Integration between packaging line with pallettizing system *(M2M)*
  - Installation and integration of RFID GATE

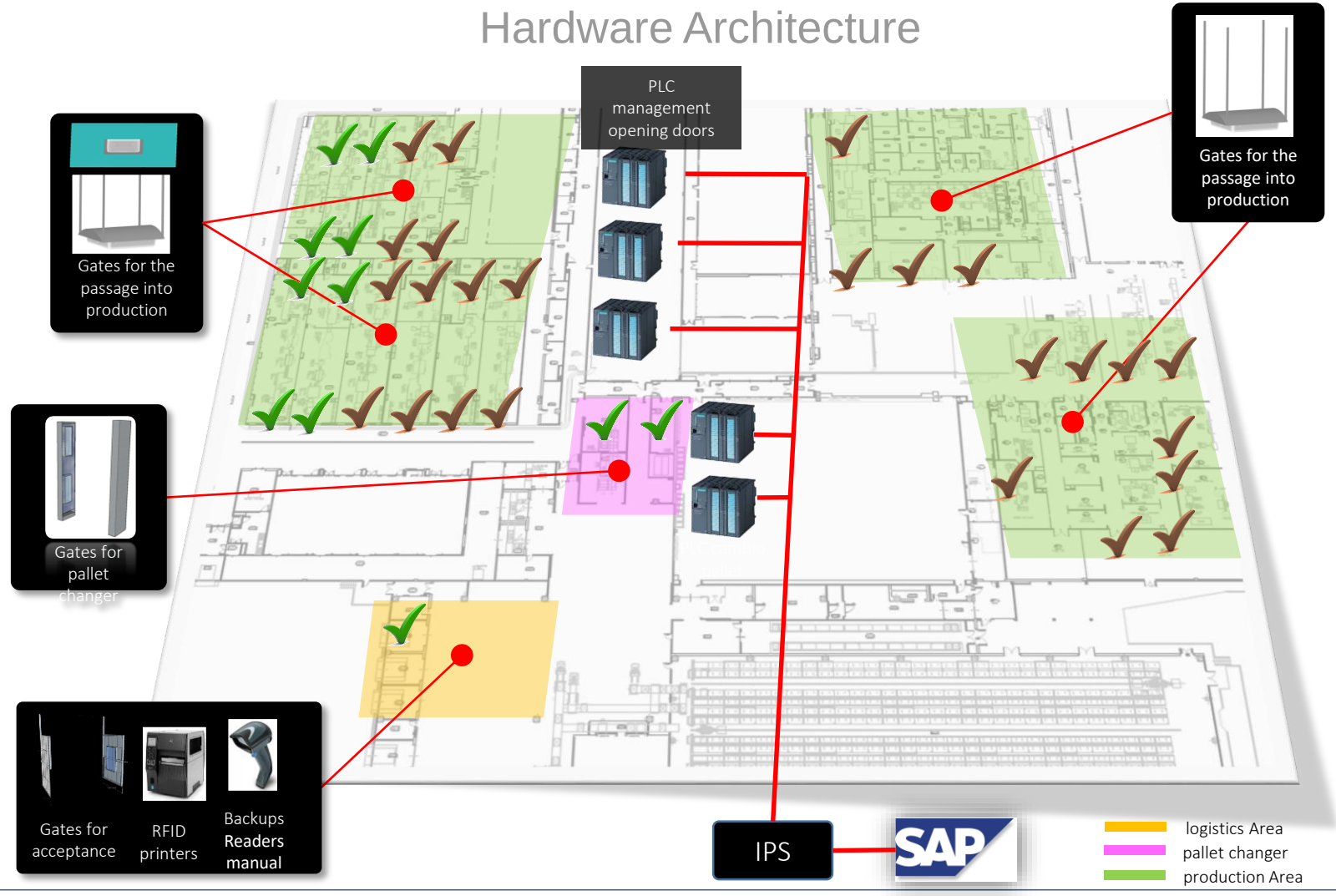
Case History: Integrated Supply Chain

Main Activitites

- Material flow analysis / data
- RFID tag selection
- Selection of antennas
- Reader selection and RFID device
- Execution of field tests for reading tests
- Engineering gates
- Electromechanical installation
- Qualification

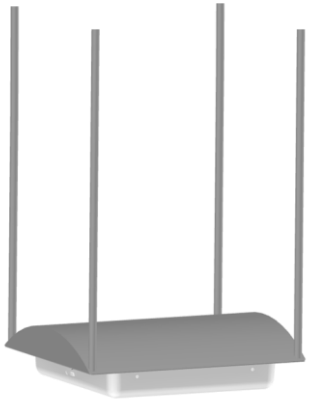
Case History: Integrated Supply Chain

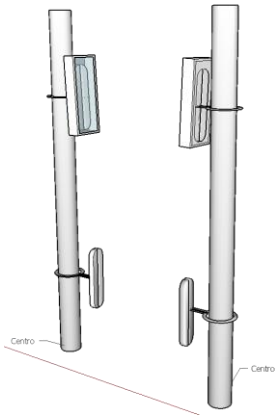
Hardware Architecture

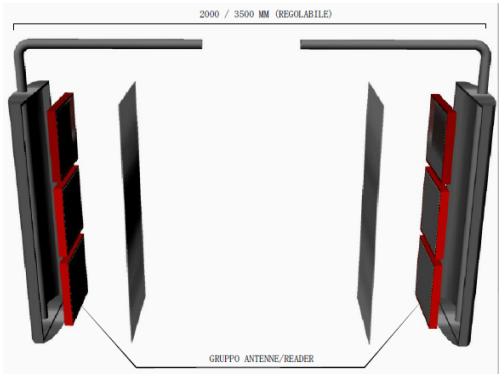


Case History: Integrated Supply Chain

Concepts and Realizations







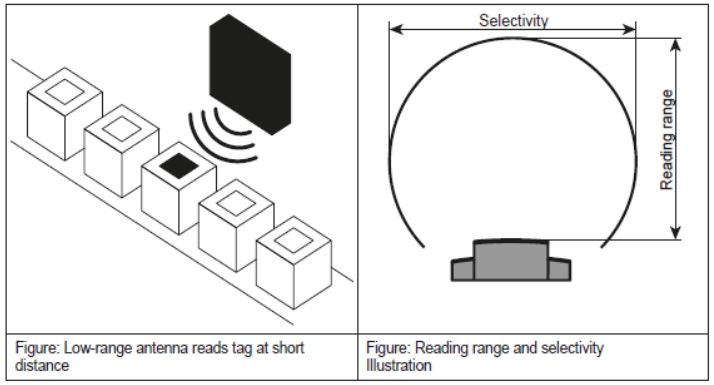
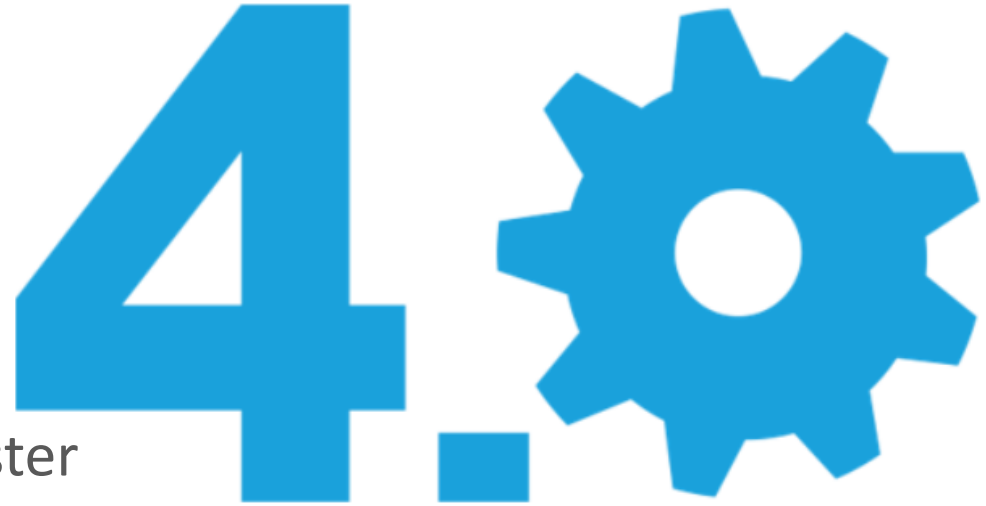


Figure: Low-range antenna reads tag at short distance

Figure: Reading range and selectivity Illustration

Conclusions

- Industry 4.0 as an opportunity:
  - Internal : new skills and challenges
  - External: products innovation
  - IT/OT convergence as mission
- New technologies to know better and to act faster
- Servitization….opportunities or new challenges?



Next Steps

- Predictive Maintenance
- Digital Twin

Thank you!