DataRiver
open source data management

Big Data Integration & Analytics: create value from company data

Mirko Orsini
President & CEO DataRiver Srl

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CLUST-ER INNOVATE
INNOVAZIONE NEI SERVIZI

RETE ALTA TECNOLOGIA
EMILIA-ROMAGNA
HIGH TECHNOLOGY NETWORK

BDV BIG DATA VALUE ASSOCIATION

DataRiver Team

Mirko Orsini, Presidente and CEO

- PhD in ICT
- 15 years international research in Data Integration, Semantic Web

Sonia Bergamaschi, Vice-President and Head of Research

- Full professor in Databases at the Engineering Faculty, Unimore
- leads the Database Research Group (DBGROUP)
- 30+ years Research in Databases, Semantic Web, Data Integration

Domenico Beneventano, member of the Board and Head of Quality

- Associate Professor of Computer Engineering, Unimore
- Member of the database research group (DBGROUP)
- 20+ years research in Data Integration, Semantic Web, Ontologies

Luca Magnotta, Responsabile U.O. Data Integration

- 9 years di R&D in Data Integration Software Development
- PhD in Industrial applications of ICT

Co-Fondatori (DBGroup)

Laura Po

Serena Sorrentino

Alberto Corni

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Accreditation & Partnerships

- **Accreditation as Research Innovation Institution** of the Emilia Romagna Region.
  The Regional Council has approved the definitive Accreditation of DataRiver Srl for industrial research and tecnology transfer

- DataRiver Srl has been officially registered at the special section dedicated to innovative SMEs of the **Italian Business Register**

- Founding Partner and Technology provider of **Competence Center Industry 4.0 BI-REX** (**B**ig Data **I**nnovation & **R**esearch **EX**cellence) of the Emilia Romagna Region

Mission

Problem

• **Integration** of the company's production and business data with external information from suppliers or the distribution network

• Discovery of **new information**, updated **in real-time**

• **Understand** your data through a unified and integrated view of the sources

→ **Improve** decision-making, production and forecasting **processes,** optimizing costs and times.

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Solution:

Software for

Data Integration + Semantics

MoMIS

Mediator envirOnment for Multiple Information Sources

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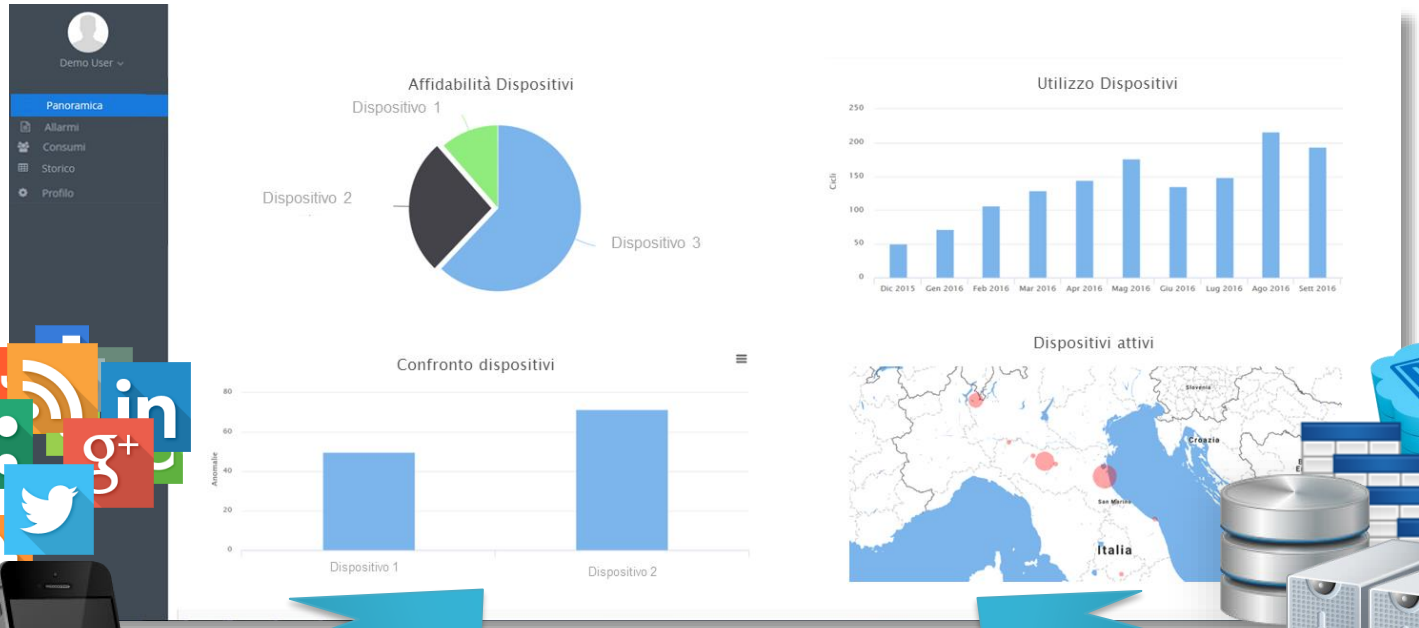
Big Data Integration & Analytics



Mobile devices

Instruments and devices with ***sensors***

Information systems

MES, WMS and ***ERP*** software applications

SAP ORACLE ERP infor EPICOR Microsoft Dynamics INTELLIMAG the warehouse management system

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Big Data Integration Industry 4.0

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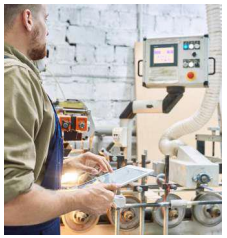

The **MOMIS** Data Integration System uses the most advanced **semantic integration** techniques to:

- **Homogenize data** coming from different systems and machines transmitted through different formats and protocols
- Visualize the data collected at **different levels of abstraction**: plant, process, production line, single machine or workstation
- View the data collected at different **levels of granularity/temporal resolution** (e.g. future analysis of anomalies)
- **Optimize Storage** and availability of more or less important data through the use of hybrid technologies (NoSQL/relational)

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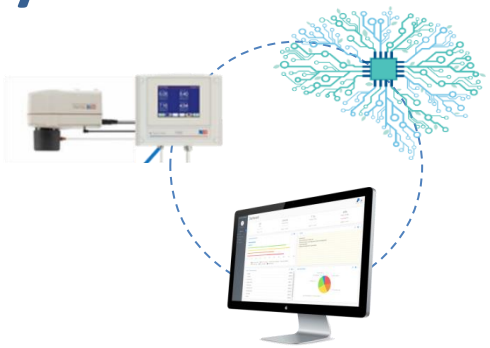
Big Data Analytics Industry 4.0

MOMIS dashboard



MOMIS Dashboard Platform exploits the most advanced technologies in the fields of Artificial Intelligence (AI) and Machine Learning to enable:

- **Continuous Monitoring** of the performance of production lines, warehouse and product quality
- **Real-time analysis** of machinery operating parameters for the timely generation of alarms and notifications to supervisors
- **Analysis of Historical Data Analysis** using Machine Learning algorithms to learn from experience and implement **predictive maintenance policies, optimize production processes** and **reduce energy consumption**

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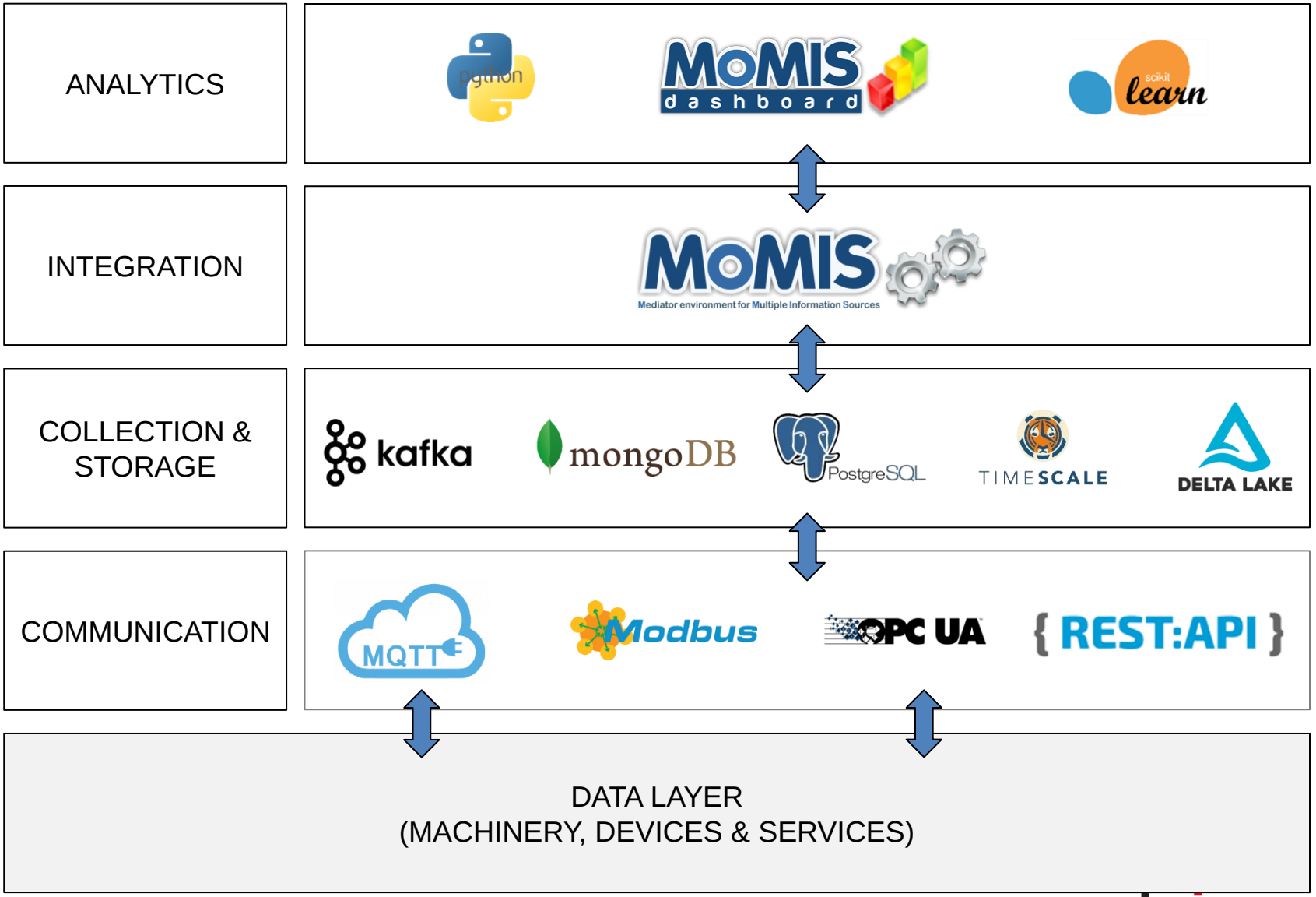
Stack MOMIS Industry 4.0



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Industry 4.0 Architecture

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Cloud Level

Prediction
Alerting
Prescription
Analysis services
Export services
Querying services
Model Update Service
Data Ingestion services
Integration services
Hybrid Storage
Blockchain service

Monitoring & Alarms

BLOCKCHAIN
network platform

Plant & Devices

Sensors
Devices
Information Systems

Edge Level

Data Ingestion services
Integration services
Hybrid Storage
Data Cleaning
Prediction
Alerting
Prescription

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Big Data & AI for Energy & Sustainability

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EIP-IA – Energy Intelligence Platform

- **EIP-IA Platform** for advanced monitoring and management of solar photovoltaic plants
- **Integration of Big Data** coming from photovoltaic plants with external data sources (eg. GSE, ARPA)
- **Forecast of production and performance data** of a single photovoltaic system based on the historical trend of the detected production and solar irradiation
- **Prediction of the possible causes** of plant inefficiency and the elaboration of the risk classes for each new plant
- **Forecast** of the **energy production profiles**, input and sharing for each photovoltaic system
- **Proposal of innovative services for the revamping** and predictive maintenance of plants supplied to customers and prospects

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EIP-IA – Energy Intelligence Platform

Energy Intelligence Platform – IA (EIP-IA) enabled:

- Creation of **predictive tools** to support maintenance technicians for **ordinary and extraordinary maintenance** activities
- Possibility of implementing the **technological updating (revamping)** of the systems already installed according to innovative planning, based on artificial intelligence algorithms
- Creation of **new innovative services** for the revamping and predictive maintenance of plants proposed to future customers
- **Innovative proposals** on the market to acquire new customers and retain customers currently managed

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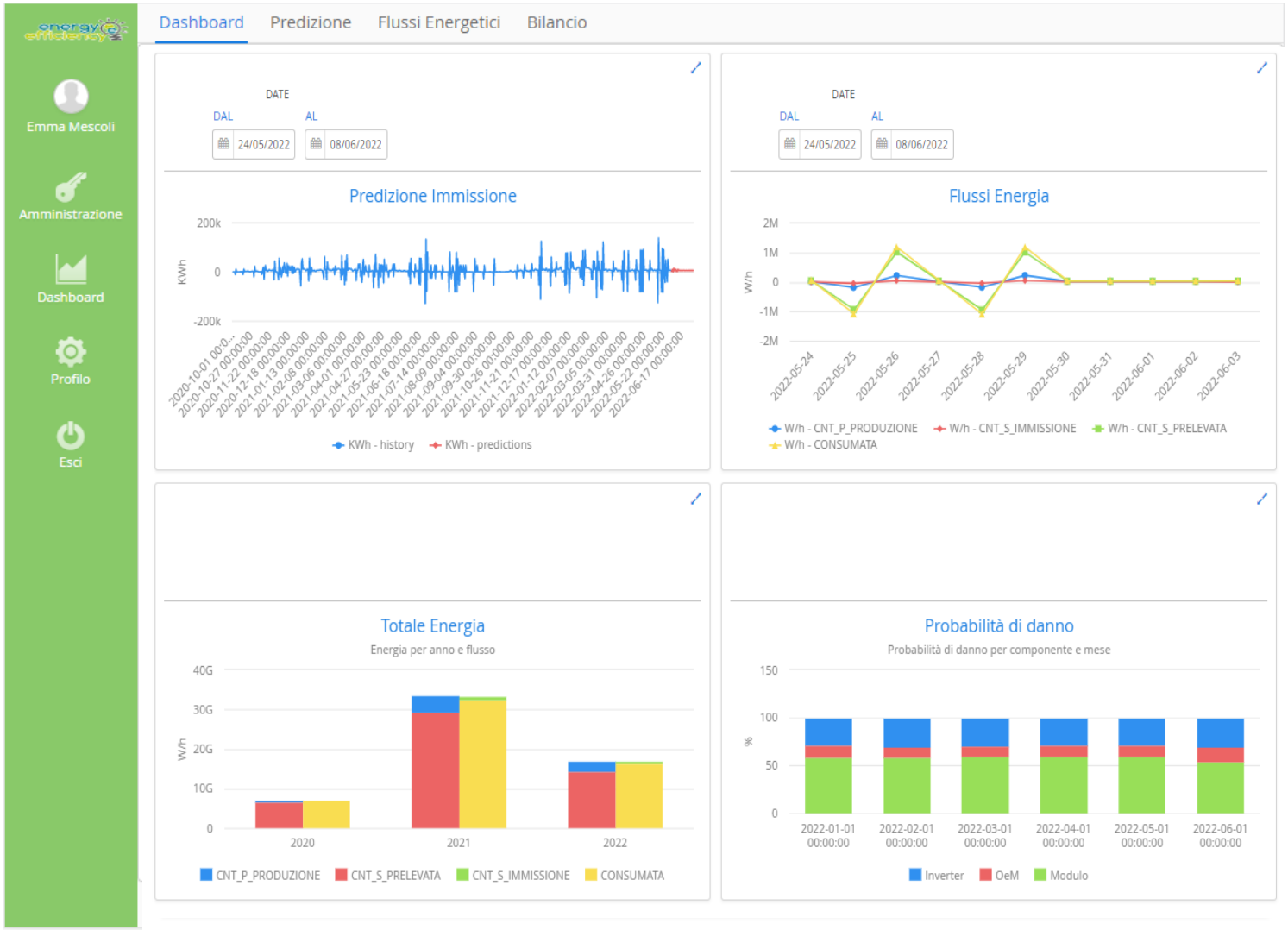
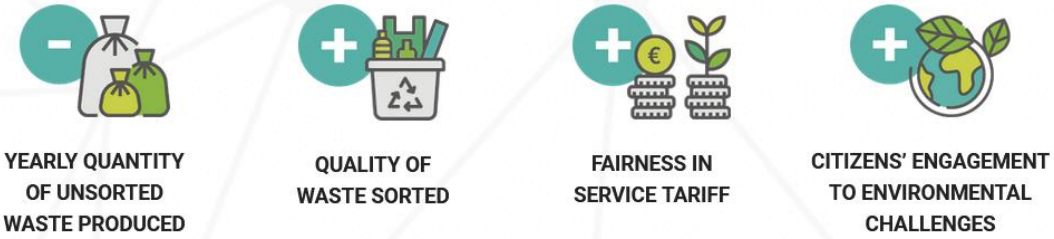
EIP-IA – Energy Intelligence Platform



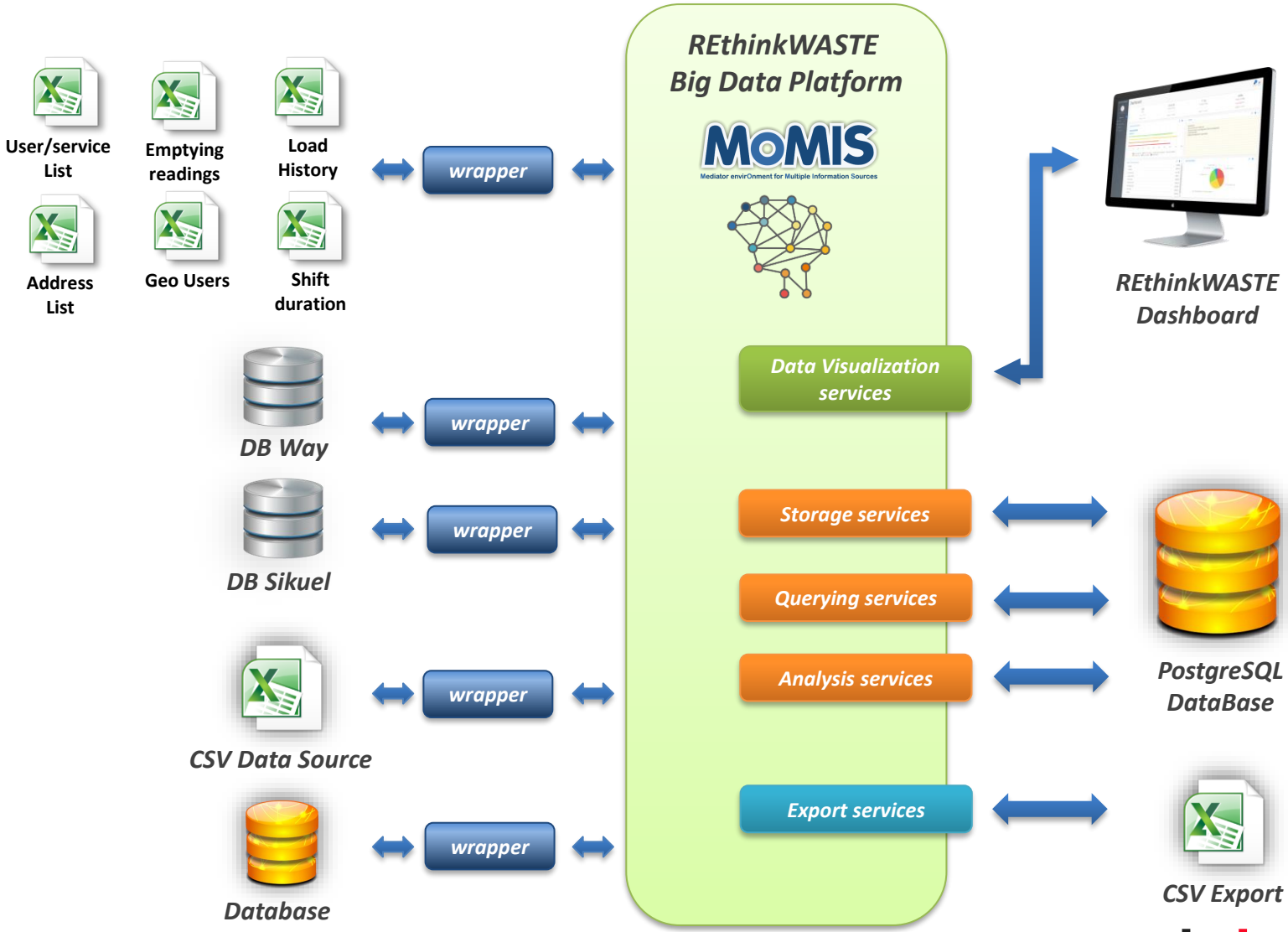
REthinkWASTE Big Data Platform



Challenge

- Design and implementation of a **forecasting** platform for **maximizing the efficiency** of waste collection services
- **Integration** of data from 22 municipalities with about 100,000 users for a total of 700 annual collections with geolocated data of the vehicles used in the collection activity
- **Big Data Analytics** and **machine learning** features to analyze data and evaluate and improve the overall efficiency of the collection service

REthinkWASTE Big Data Platform



REthinkWASTE Big Data Platform

- **Optimization** of waste **collection policies** for specific geographic areas thanks to advanced analyzes based on Big Data
- **Punctual monitoring** of collection rounds refuses and elimination of the causes of service inefficiency
- **New tariff plans optimized** on the habits of citizens and collection tour operators

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Big Data & AI for Industry

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Big Data 4 Manufacturing (BD4M)

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Challenge

- Big Data platform design and implementation for Industry 4.0 for **storage** and **analysis of data** from different types of **machines** at different levels of abstraction (single machine, production line, and multi-line or multi-plant)
- **Semantic integration** of heterogeneous data, both structured and unstructured, from **different machines** and **applications** such as PLM, CRM, ERP.
- **Implementation** and validation of **online analysis algorithms** for diagnosis, optimization and reconfiguration of production lines based on Machine Learning and Artificial Intelligence techniques

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Bonfiglioli Forever Forward
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IMA Sustain Ability
ROBOPAC Innovation driven by values
SAMP
SIEMENS Ingegno per la vita
ptc
POGGIPOLINI
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Big Data 4 Manufacturing (BD4M)

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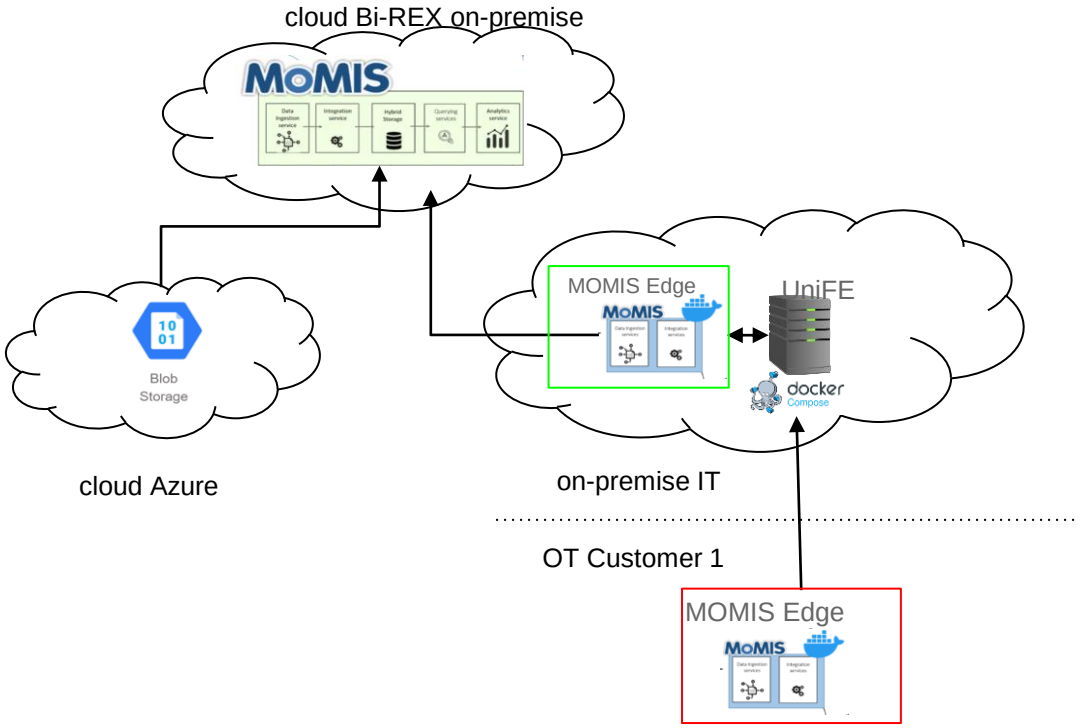

- Implementation of **new methods for quality control** (e.g. Novelty Detection) based and identification of anomalies thanks to the use of **machine learning models**
- **Reduction of failures** due to wear or non-optimal use of the devices
- **Dynamic reconfiguration of devices** to avoid potentially critical processes for the functioning of the devices

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DEEPMON (Dynamic EdgE computing for Plant MONitoring)

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Challenge

- Design and development of software infrastructure for **collection**, **integration** and **aggregation of** production line monitoring data
- **Data Harmonization** and **Enrichment** to a common data model for different IIoT protocols
- Facilitation of coordination of different production systems through **Semantic Integration**, **Artificial Intelligence** and **Machine Learning** technologies

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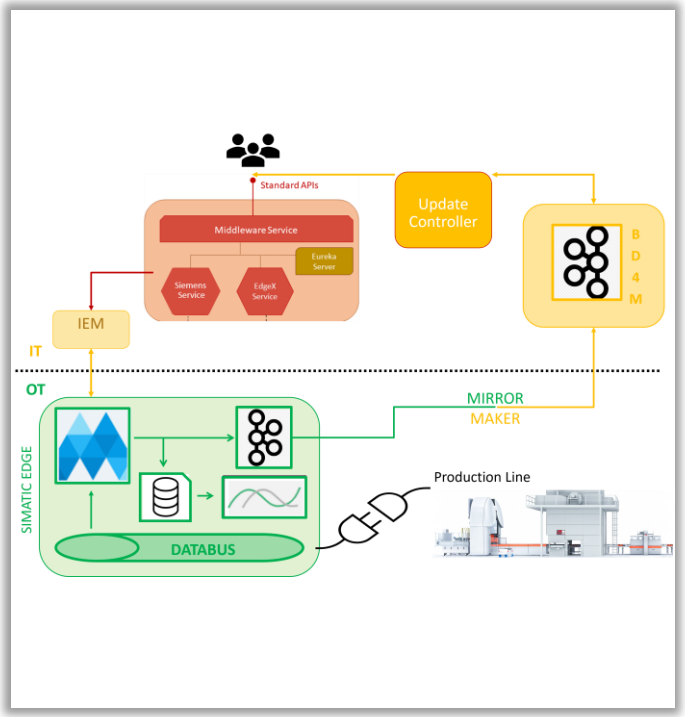
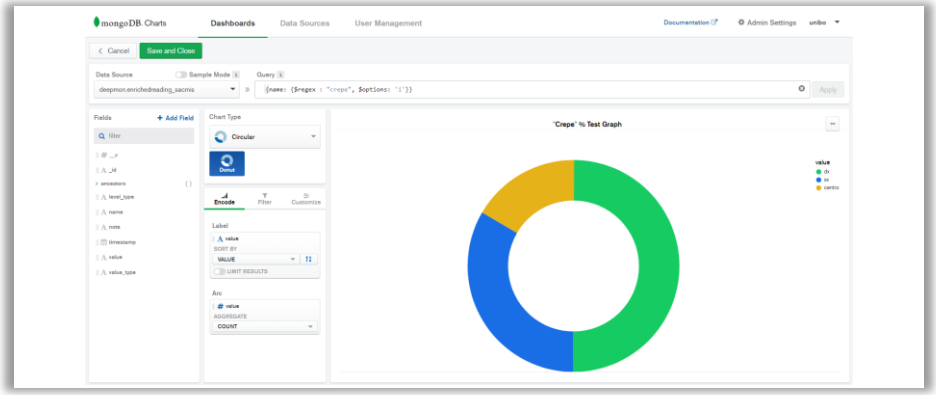
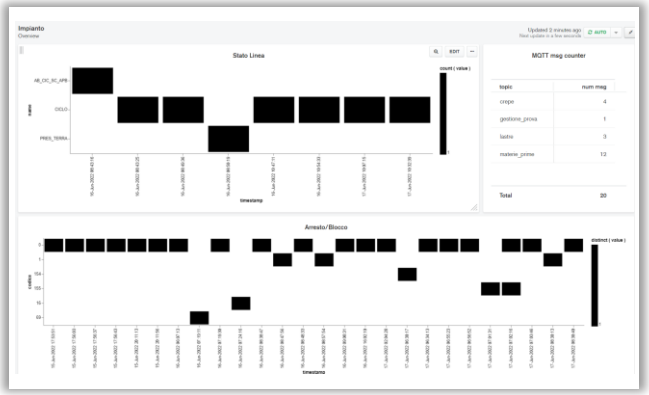


DEEPMON Architecture



Dashboard Creation



Dashboard for production line monitoring

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We help companies make the best decisions by fully exploiting the power of data

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