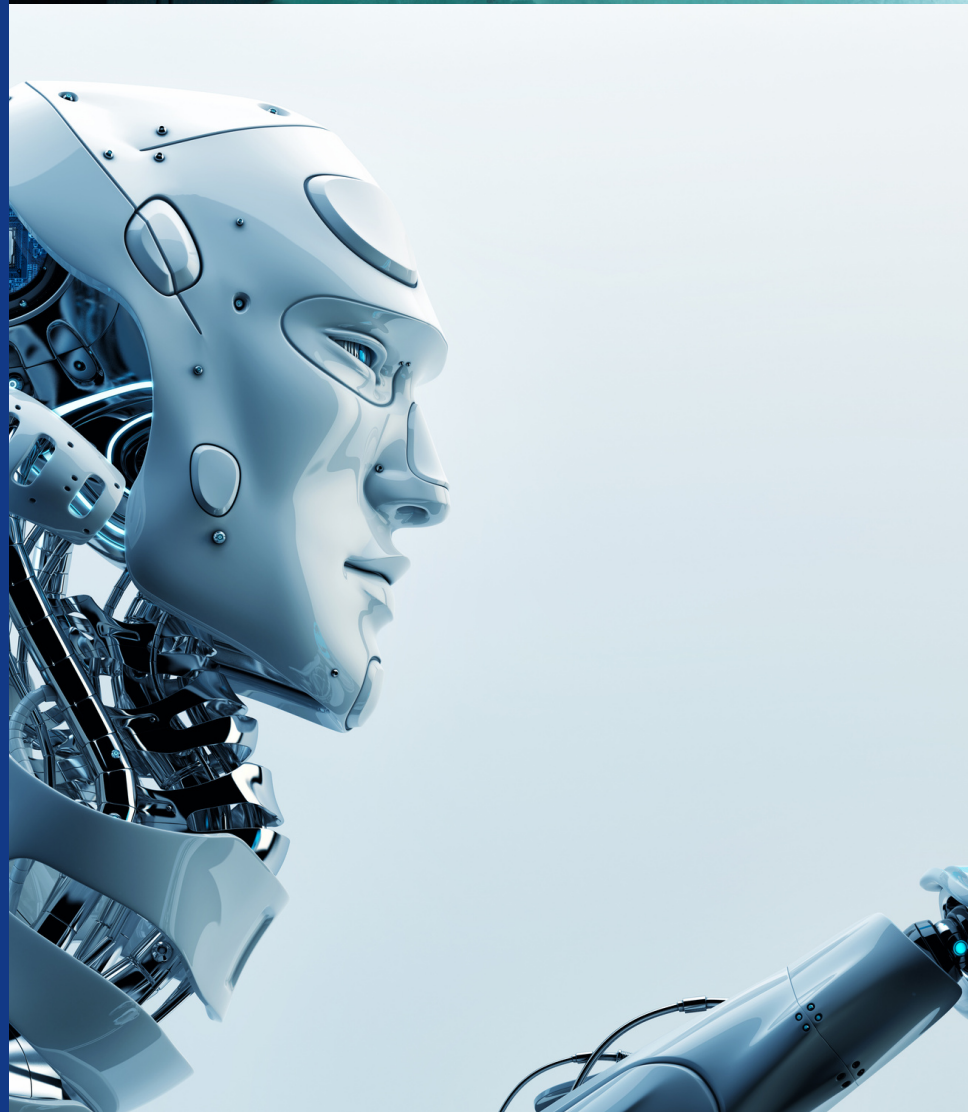


CloudBay

Industry 4.0





Industry 4.0

01 Industry 1.0

1-st industry revolution:
Mechanization

- mechanical control
- steam engines

02 Industry 2.0

2-nd industry revolution:
Electrification

- recording information on punched cards
- First production lines

03 Industry 3.0

3-rd industry revolution:
Digitalisation

- Microcontrollers for controlling machines
- Increase in automation
- IT systems for production planning and control

04 Industry 4.0

4-th industry revolution:
Network/Internet

- Networking of components and machines vertically and horizontally, using network standards
- Identifiable and communicable objects
- Self-improving objects

Possibilities

The concept of Industry 4.0 means the unification of the real world of production machines with the virtual world of the Internet and information technology. It brings new possibilities.

- Production process optimisation
- Particular machine / components, and a whole production line failure prevention
- Predictive Total Productive Maintenance (TPM)
- Bottlenecks identification
- Supply chain monitoring and production line monitoring
- Real time inventory & Real time orders tracking
- Others



How it's possible?

Openness

Distributed intelligence in Industry 4.0 requires open standards in the areas of communication and software. According to many people, Industry 4.0 means the twilight of standards owned by individual producers. Therefore, many companies support open technologies.



IoT / IoRT

- Connecting equipment, machines and robots to the Internet
- Real-time transferring & processing data
- Real time communication
- Security IEC 62443

Centralised Cloud services

- Cloud based solutions
- Connection between machine and human
- Registering and managing all components in one place
- Automatic scalability
- High availability 24/7

Centralised data lake

- Gathering all data from the machines / components
- Big data processing
- Basis for Artificial Intelligence
- High performance streamings

Sophisticated tools

- Real-time monitoring
- Real-time processing
- Artificial Intelligence
- Self-improvement
- Predicting

Use cases

✓ Production line performance and optimisation

The production line manager wants to know what the efficiency of the production line is on a given shift. What are the main causes of machine downtime and how does this affect the entire production line?

✓ Predictive Total Productive Maintenance (TPM)

The production line manager wants to know the degree of wear of machines and their parts in order to plan their service in advance and avoid unexpected breakdowns.

✓ Real-time inventory

The manager wants to know in real time what the stock level is, in terms of the material necessary to maintain the continuity of production and manufactured products.

✓ Supply chain monitoring

Logistics providing materials for production want to know at what stage their deliveries are, in what quantity and when they were accepted into the warehouse.

✓ Order tracking

The shipping team, as well as the recipients of the manufactured products, want to know where their orders are, in what quantity and how they were transported.





Technology



Sensors

Sensors measure and send machine parameters like vibrations temperature, rotation, etc. with MQTT protocol

RFID readers

RFID readers read all data registered in eTAG, like product ID, temperature, etc. using appropriate frequency

RFID eTAGs

Well designed eTAGs gather all required data concerning product, like timestamps, IDs, it's temperature, etc.

IoT infrastructure

All machines, sensors, robots, and other hardware components are creates Internet of Things. High performance streamings allow to register all data they pass

Cloud services

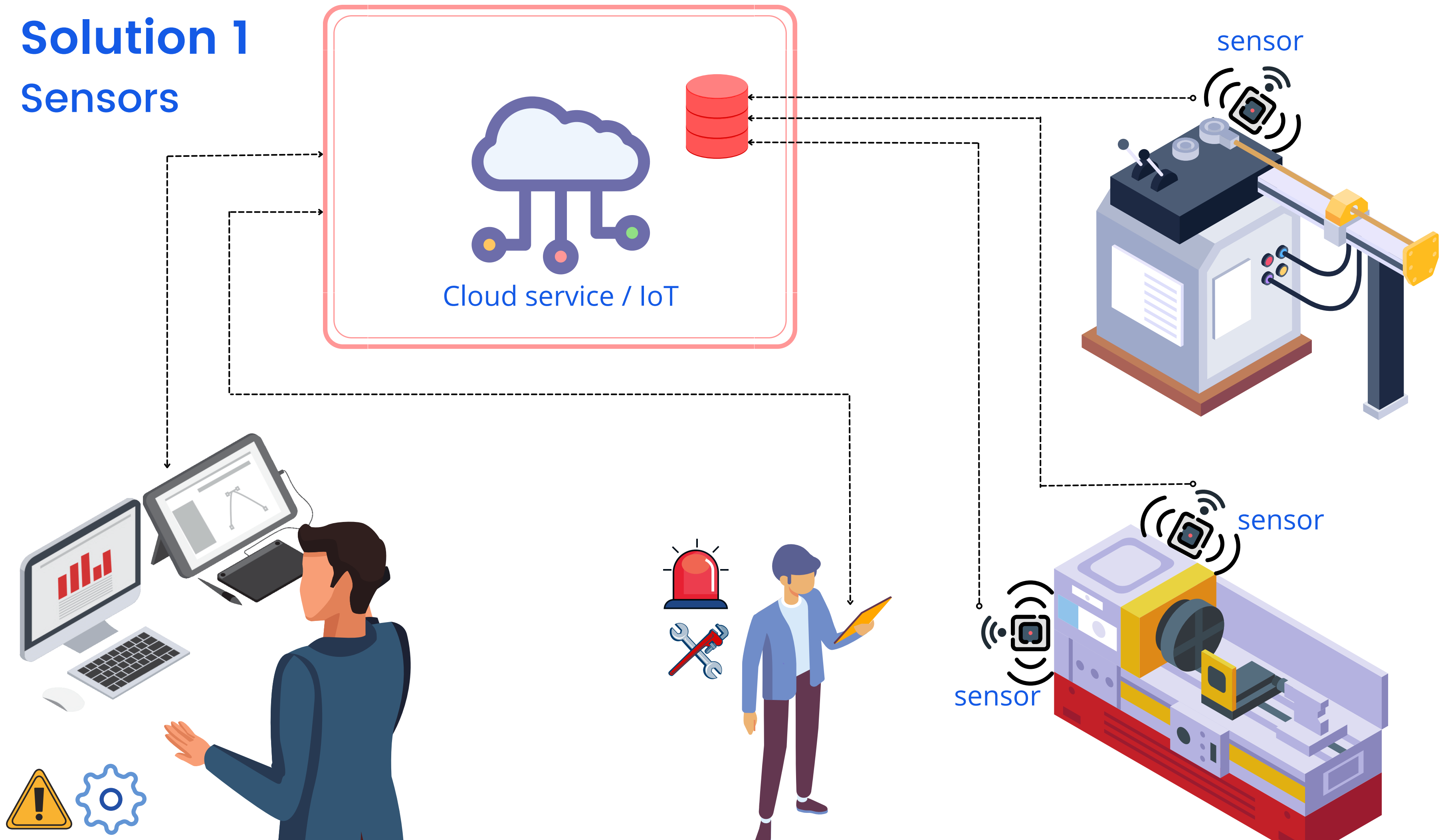
Cloud services allow to process the data, and provide the best scalability and availability (24/7

Dashboard console

Tool for managers, production line workers, logistics, and other employees which allow to monitor all production line and manage it.

Solution 1

Sensors



Pareto OEE



OEE Index

The OEE (Overall Equipment Effectiveness) indicator, i.e. the efficiency of using the equipment, allows on the percentage of the degree of utilization of the machine park

Real time monitoring



Processing data from sensors

Processing data from sensors allows to identify in real time any anomalies in the operation of the machine, such as downtime, wear, efficiency, etc.

Predictive TPM



Failure prevention

The analysis of vibrations and temperature of individual parts of machines allows to detect their critical wear, thanks to which it is possible to prevent their failures, as well as their maximum use.

Data analysis

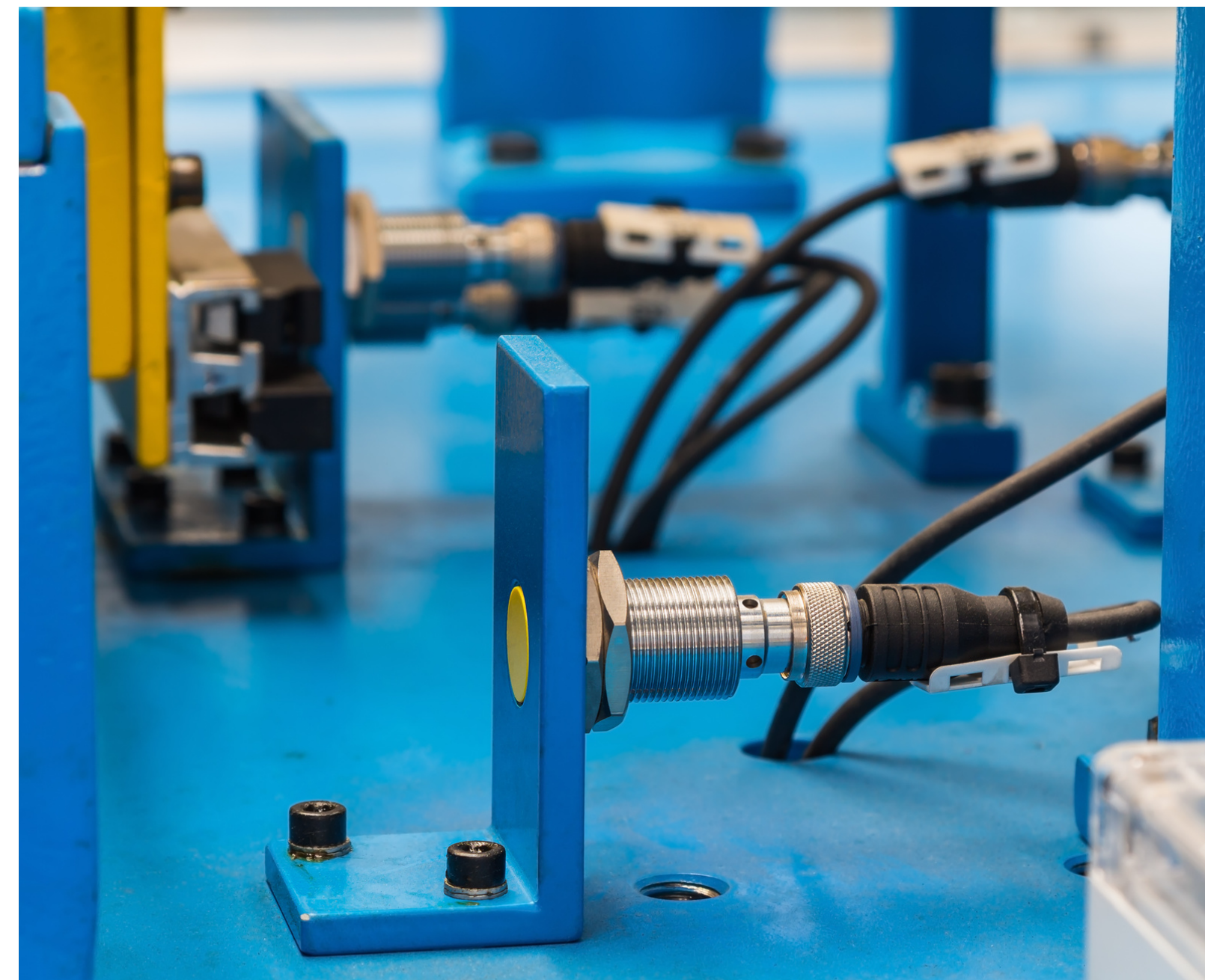


Real-time monitoring

The system allows you to monitor the machine while it is working, as well as its idle. Comparing the results over the long term gives a picture of it.


Sensors

Features

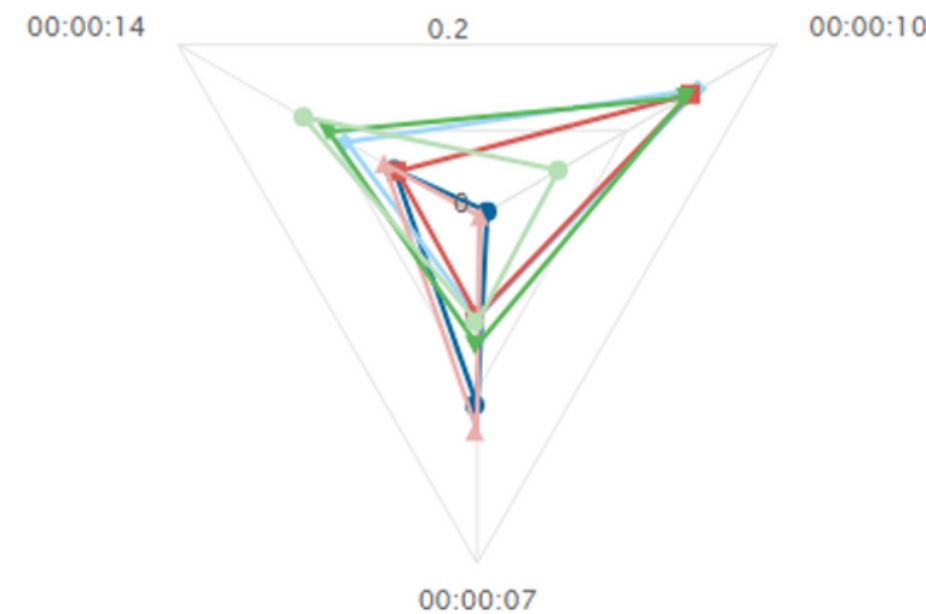


Key features

 **Pareto OEE**
Daily trend of machine efficiency.

 **Monitoring**
Temperature, vibrations, rotations
real-time monitoring

 **Data analysis**
Real-time data analysis, IDLE, etc.



Other features

- ✓ Automatic sensor registration and configuration
- ✓ Machine management, configuration
- ✓ Sensor data analysis, 3D vibrations, temperature, charts
- ✓ Machine breakdown automatic identification
- ✓ Breakdown analysis (Pareto), charts
- ✓ Vibration and temperature alert thresholds configuration
- ✓ Machine changing state registration, charts
- ✓ Machine OEE calculation, charts
- ✓ Maintenance planning
- ✓ IDLE measurement and comparison



Registering eTAG



Product tracking

Using RFID readers it's more than easy to register new batch of eTags. Different frequencies can be used for different purposes (UHF, etc.)

Gathering data



eTAGs

RFID eTAGs can be designed according to specific and sophisticated needs and gather all required data.

Tracking



Particular products tracking

Every product which is tagged is trackable, starting from production process.

Supply chain & orders delivery support



Deliveries monitoring

After leaving the factory, the manufactured products, thanks to the eTags, record the basic parameters in which they are transported. This allows you to monitor their health and the logistics path

RFID e-TAGs

Features



✓ Predictive production

- Overall Equipment Effectiveness (OEE)
- Predictive TPM
- Production line real-time monitoring

✓ Assurance of originality

- No counterfeit products
- Measuring major parameters and logistic process
- Reliable supplier

✓ Predictive deliveries

- Orders tracking
- Supply Chain monitoring
- Measuring delivery parameters



✓ Revenue maximisation

- Production line optimisation
- Deliveries just-in-time
- No unexpected failures

✓ Cost reduction

- Automated real-time data processing & predicting
- Automated real-time inventory
- Automated entry into storage



Thank You

We're here to help you

Your proven Technology Partner



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