



# Edge and cloud optimization in automation

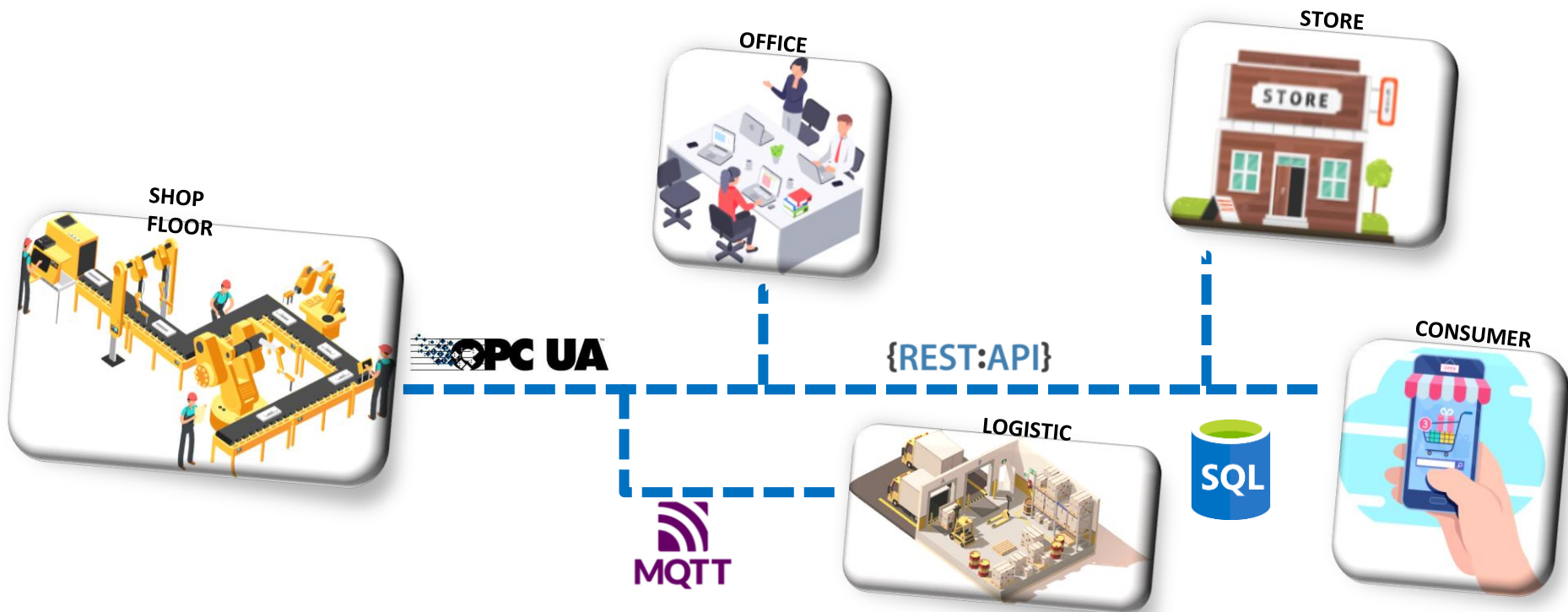
Giacomo Pallucca



# Interconnected framework

Modern production system is nowadays strictly interconnected with many IT system, like Logistic, Store, Office and so often directly with the customer.

Flexibility and optimization are important and not so easy.



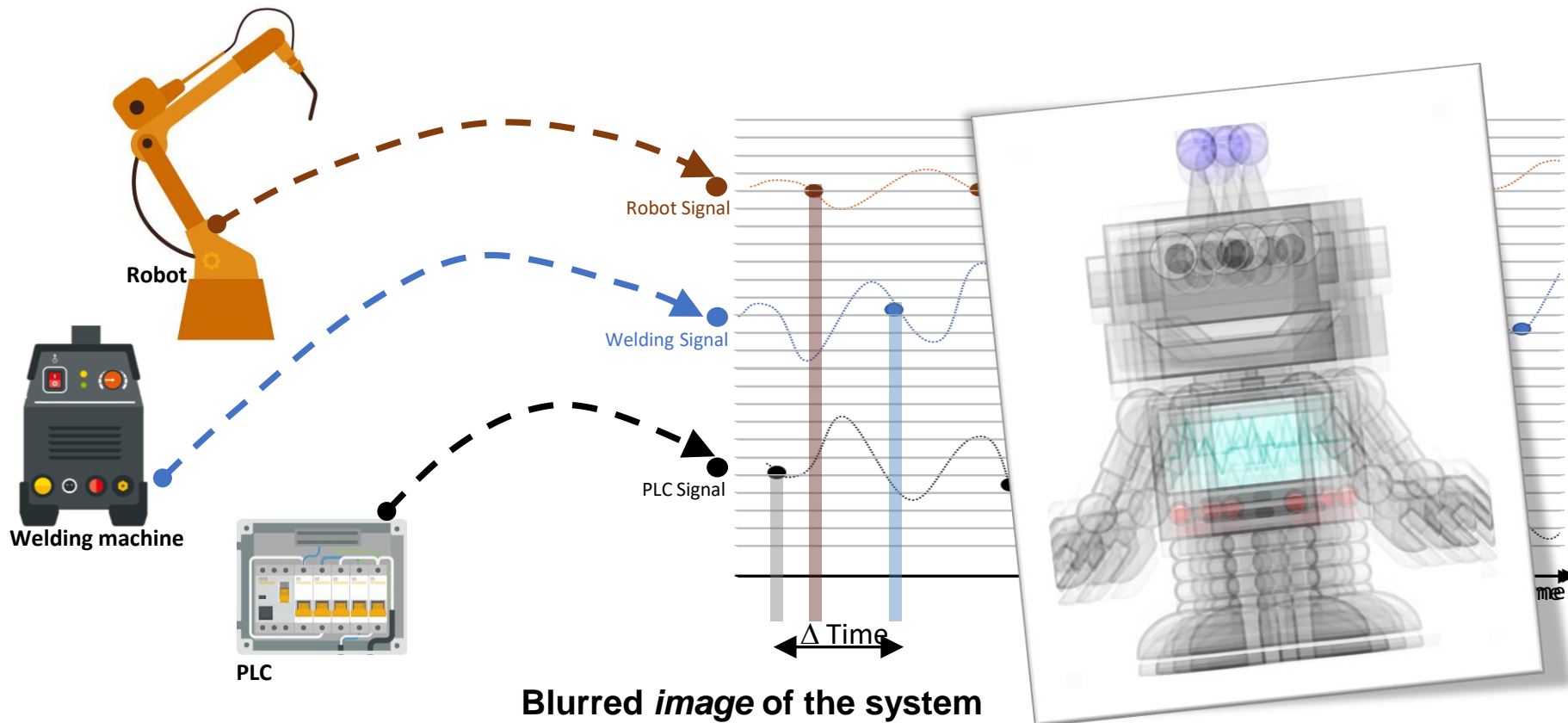
A production system is not following the superposition principle.

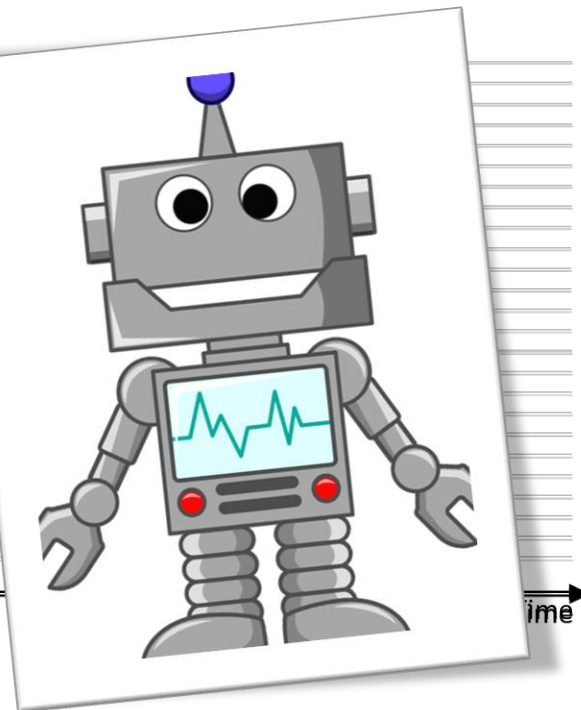
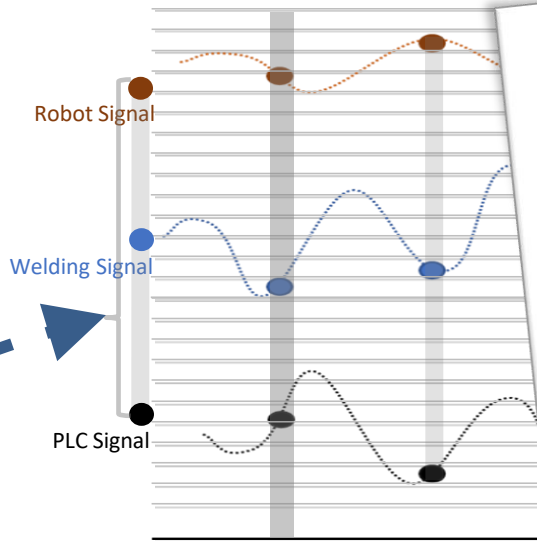
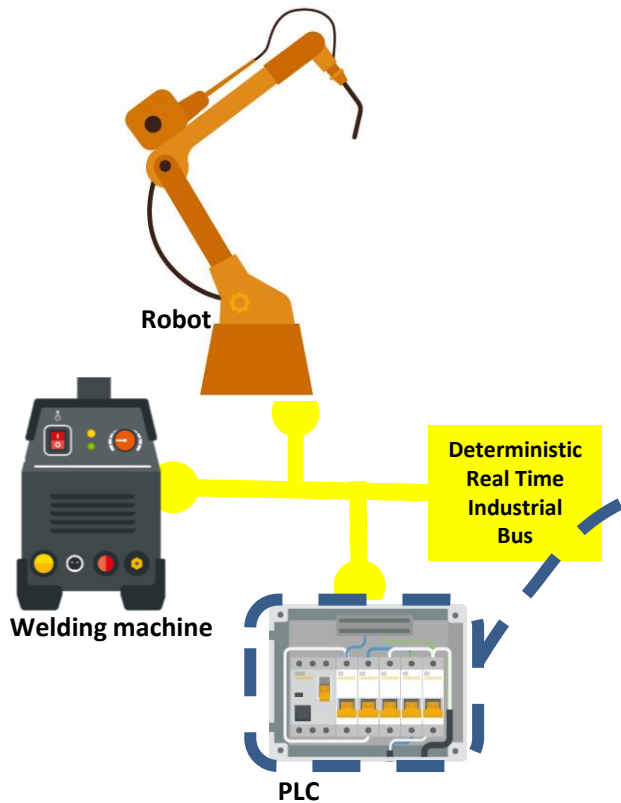


A system is a **function (not linear)** that puts together different technology to realize physical transformation to raw material.

Just collecting data is not enough.



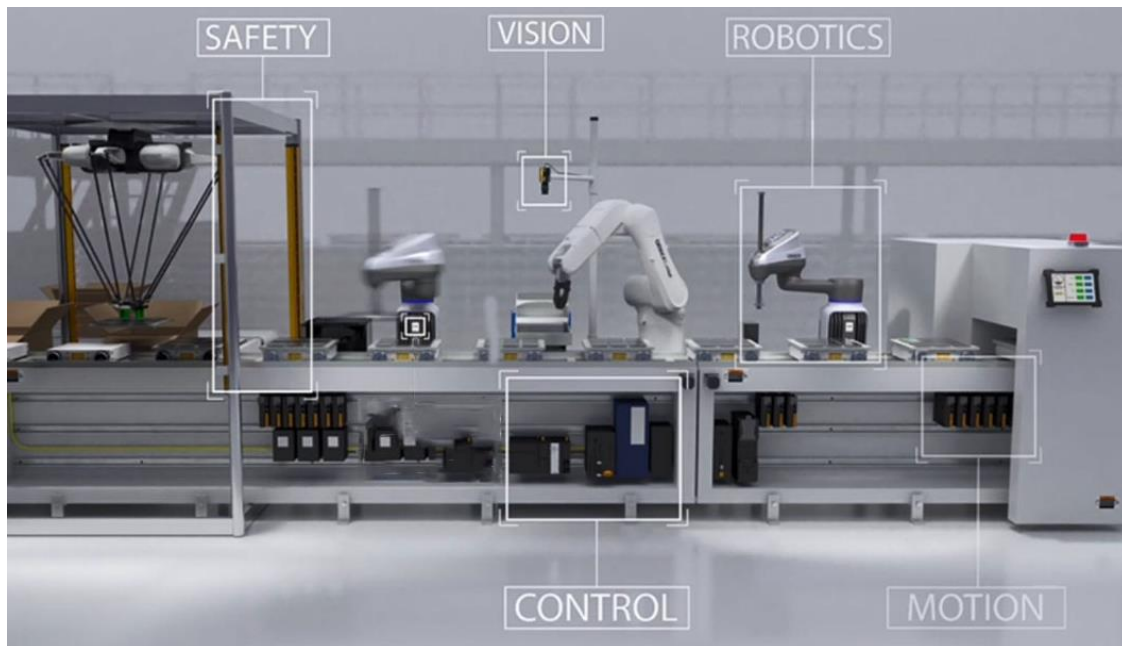




Clear *image* of the system

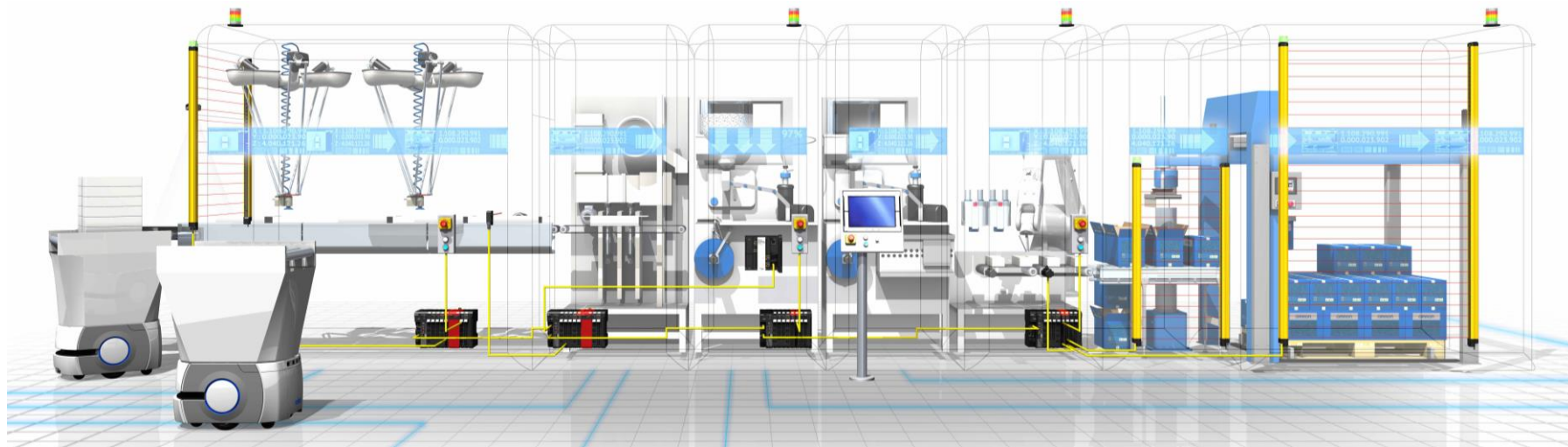
## Sincronization and real time data matters

All the data inside a machine must be collected in a consistent way. This means that value and acquisition time are very important to allow us better performance analysis. In this way, using a unified platform and real-time bus, is a key factor.



## Edge approach to optimization

Thanks to powerful Machine controller, that centralize all the data of the machine on the edge of it, we can monitor all the process also for complex machine, or different interconnected one.





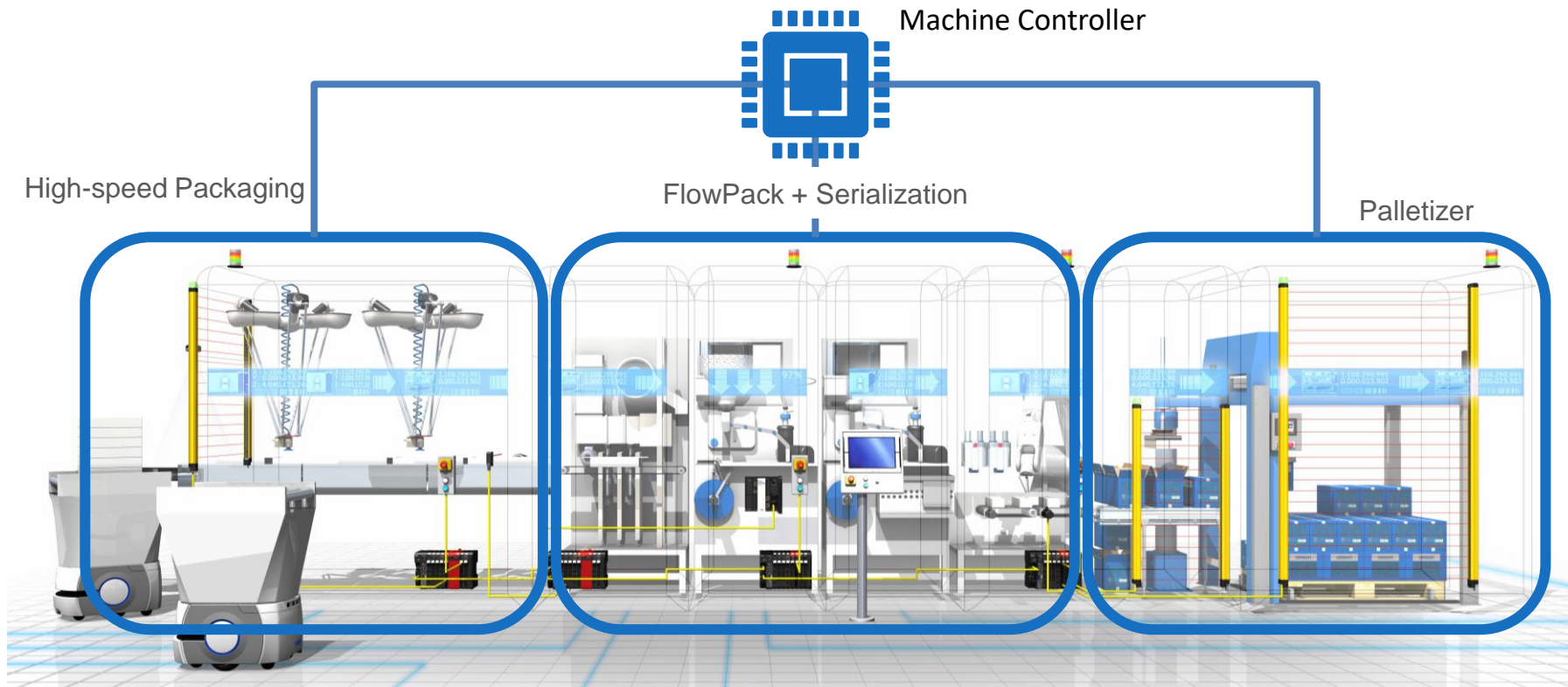


Technologies for our future

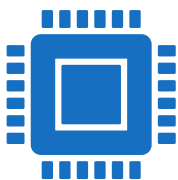


# Performance optimization

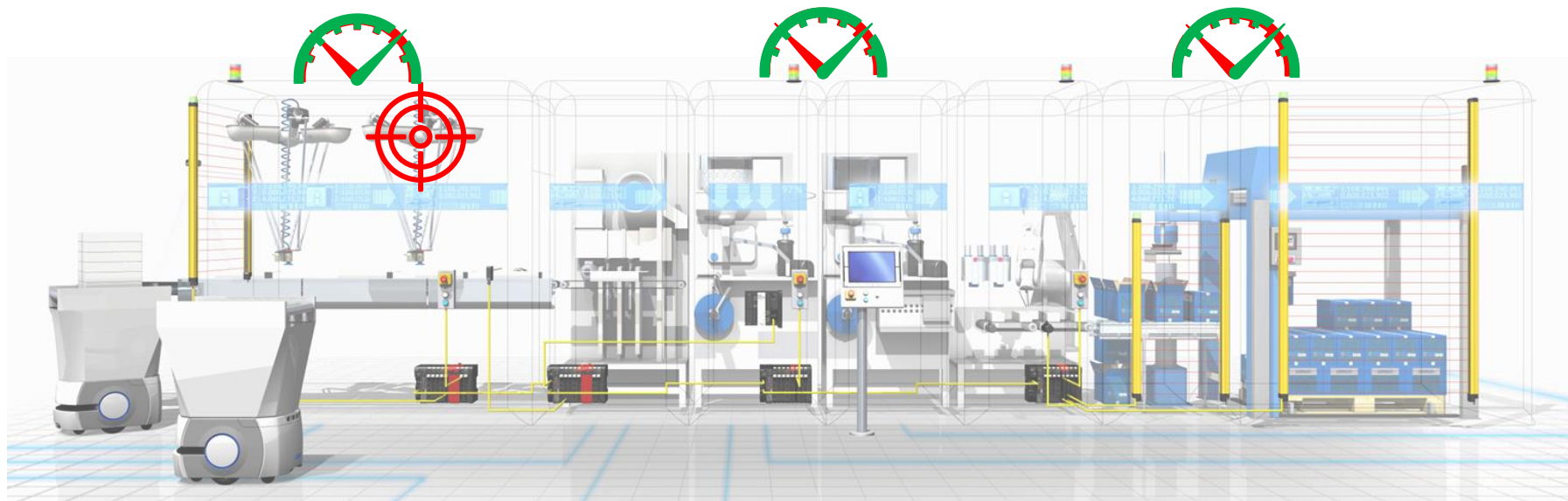
## Real-time optimization of complex machine



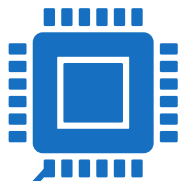
## Real-time optimization of complex machine



**Machine Controller** can monitor and control three machines and optimize them. In this way, react to issue or to production rate variation can be smart, fast and easy

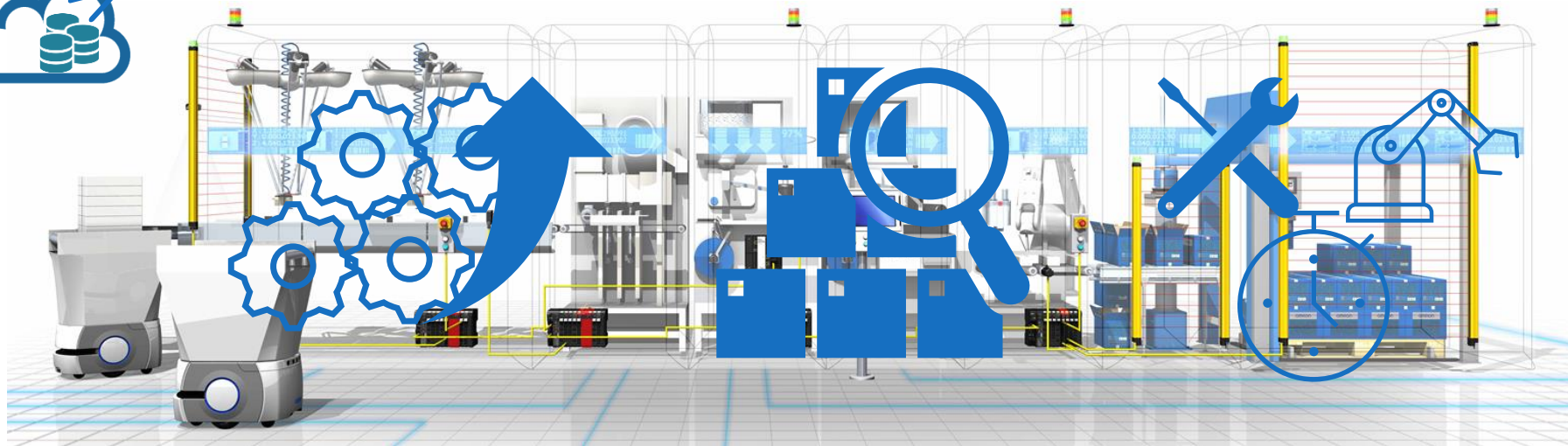


## Real-time optimization of complex machine



Connecting the system to ERP, MES and Database should allow to optimize:

- Performance – Improving and monitor of Overall Equipment Effectiveness (OEE)
- Traceability –BlockChain approach of production system
- Predictive Maintenance – Discover system issue or derate of components



# Two concurrent approach



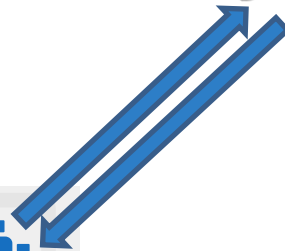
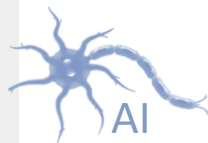
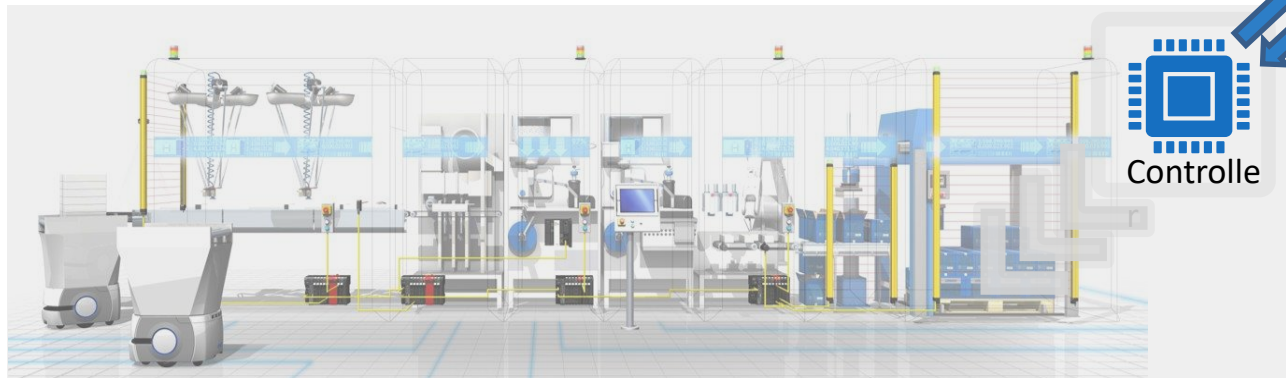
Optimization in the **CLOUD** enables:

- Artificial intelligence - Deep Learning
- Total process optimization



Fast processing on the **EDGE** enables:

- **Spinal reflex AI** - Real-Time correction
- Fast anomaly detection



Two different approach those enable different improvement.

- Fast synchronous analysis
- Overall optimization of interconnected machine

Highlight how much is important using modern technology and accurate approach.

Those can enable improvement in production and new challenge for engineers:

- Needs of **highly skilled engineers** for analysis and mathematical model design
- **Innovation** of production plant
- **Energy and production optimization**
- **High Flexibility**