

SAFE[®] INTELLIGENCE

The background of the image features a series of overlapping, wavy horizontal bands in various shades of blue and white, creating a sense of motion and depth. The top portion of the image is white, where the text is located.

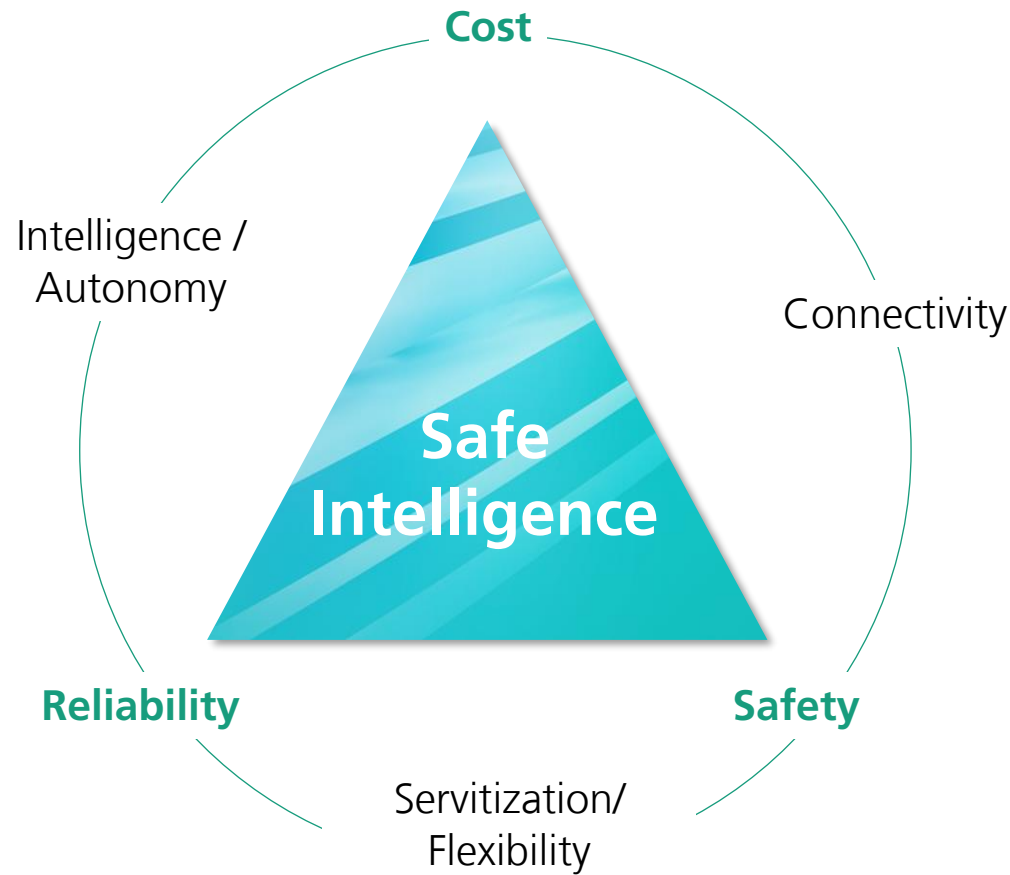
**GXFS-Roundtable: Die Zukunft der Industrie:
Mehr Vernetzung = mehr Automatisierung – eine neue, symbiotische Verbindung?**
19.10.2023

Automatisierung auf dem Weg in die Cloud und EDGE?

Dr. Gereon Weiß
Fraunhofer IKS

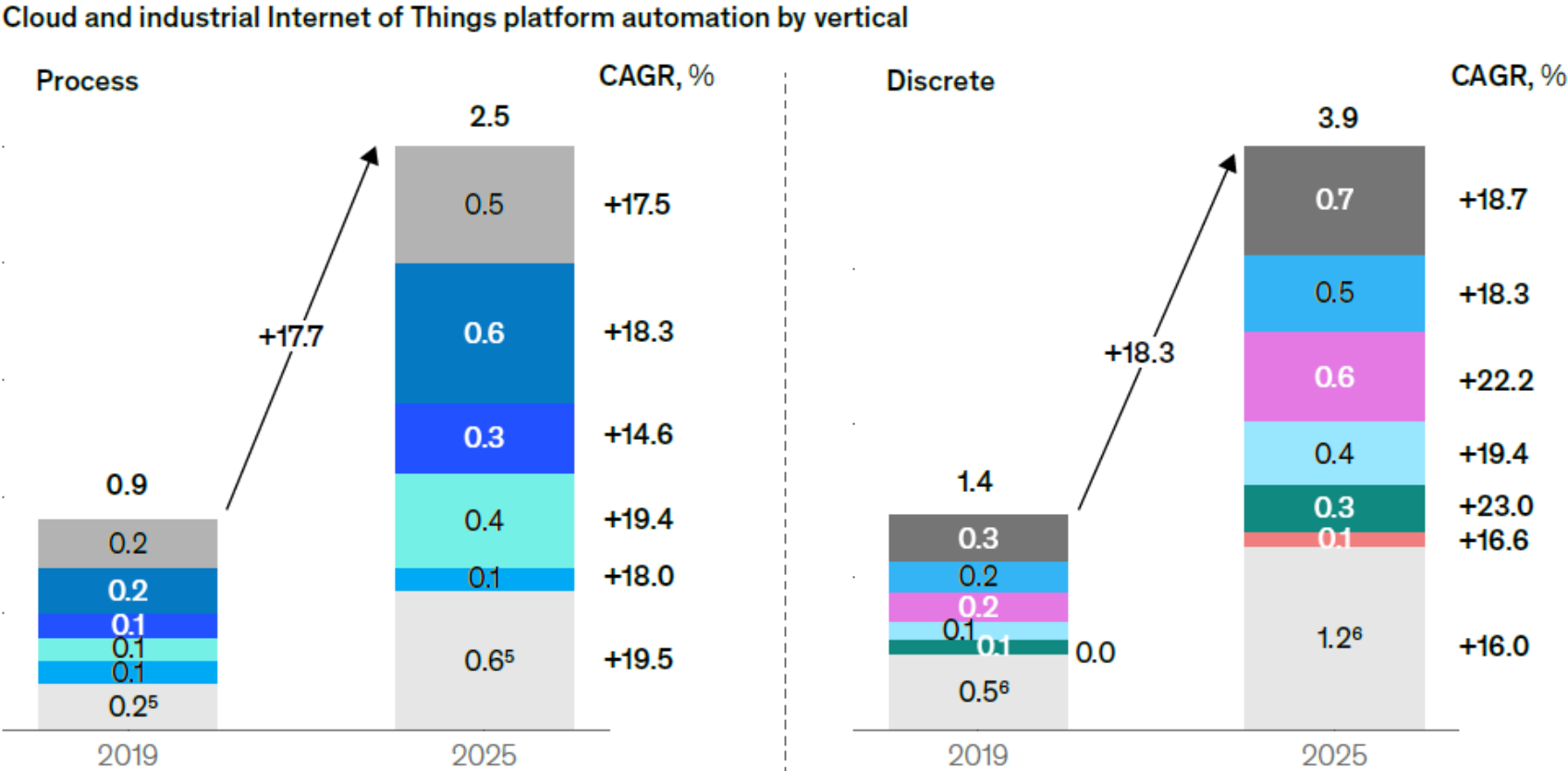
FRAUNHOFER IKS – COMPETENCY IN SAFE INTELLIGENCE

Fraunhofer Institute for Cognitive Systems IKS



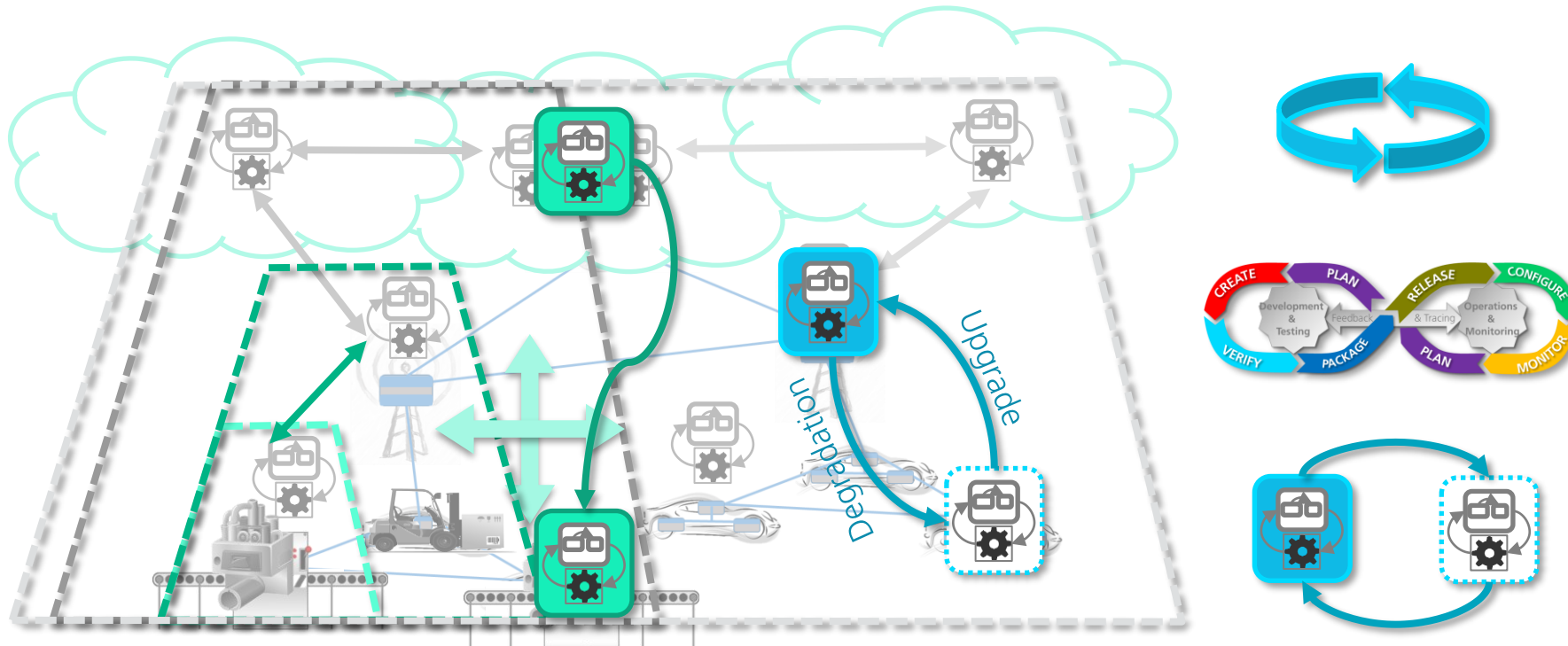
Opportunities of Cloud- & Edge-based Automation

Fastest growing segment



Source graphic: H.Bauer et al.: „Is Industrial automation headed for a tipping point?“, McKinsey & Company, 06-2023.

Device to Cloud – Cyber-Physical System-of-Systems (CPSoS)

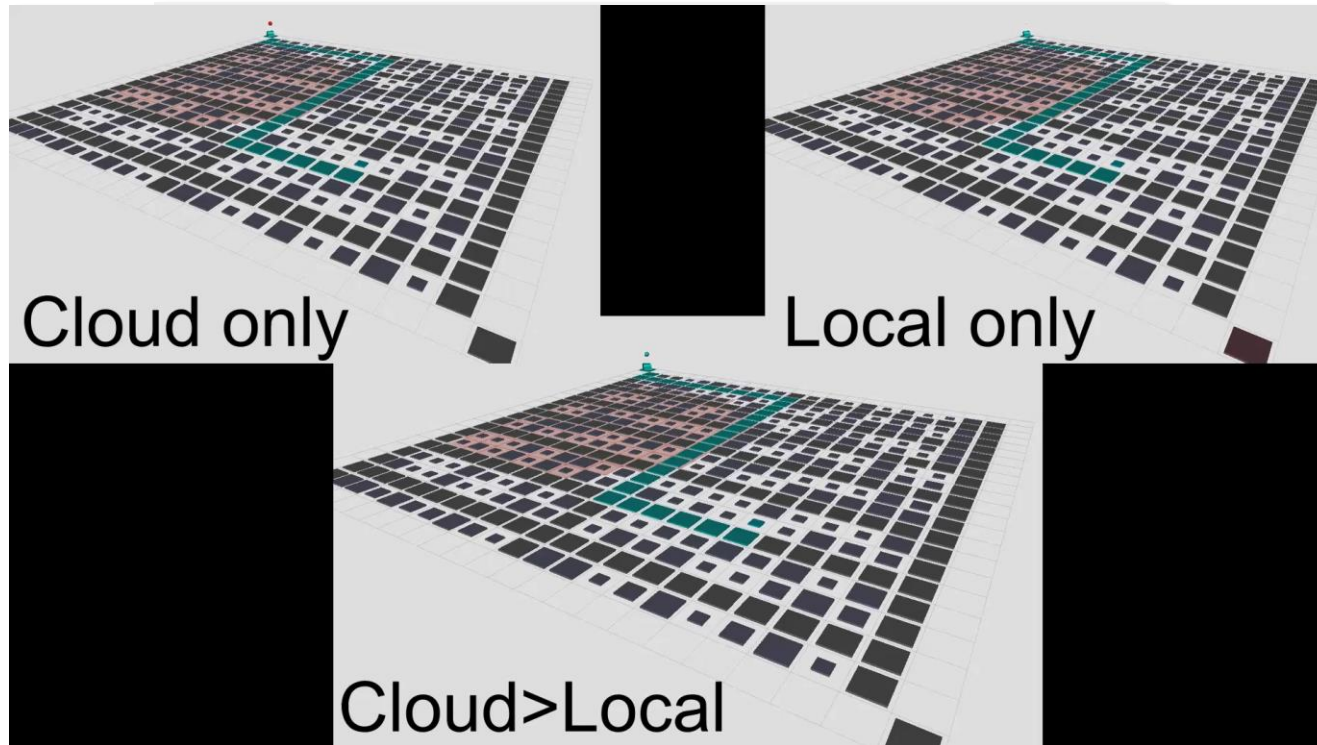


EXAMPLE APPLICATIONS

01 – Cloud-Supported Automated Valet Parking

Resilient Cloud-based Functions (Upgrade / Downgrade)

Example Application – Cloud-Supported Automated Valet Parking



- Cloud-based car parking management
 - Safety analysis and derived mitigation strategies
 - Reliable Upgrade / Downgrade with Monitoring & Recovery
 - Simulation and evaluation of scenarios
- Optimized performance while maintaining safety guarantees

EXAMPLE APPLICATIONS

02 – Autonomous Mobile Robots and Humans in Warehouses

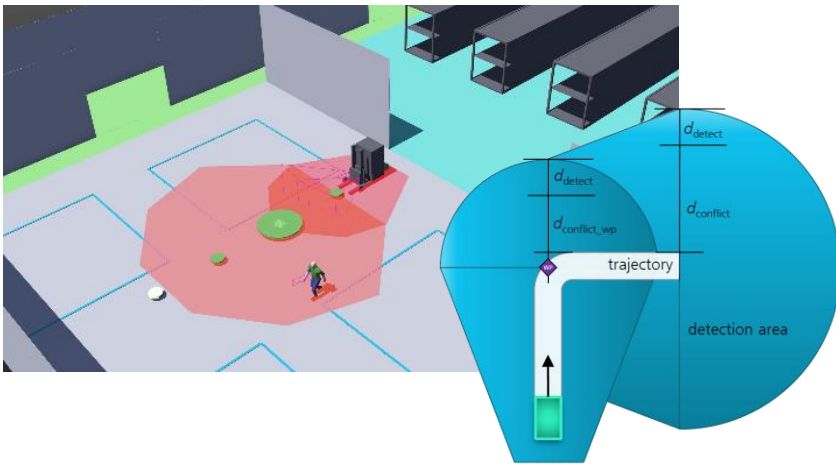
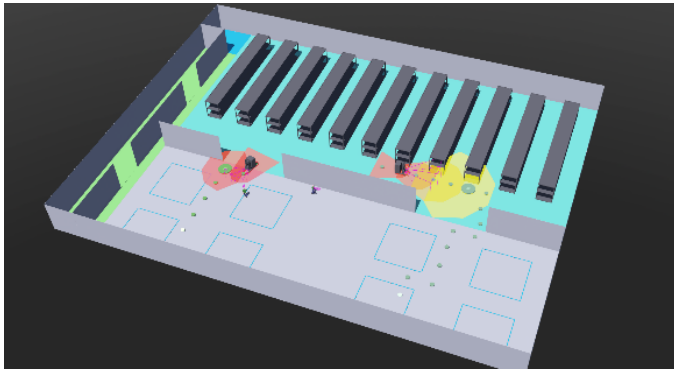
Cloud-based Safety Support

Example Application – Autonomous Mobile Robots and Humans in Warehouses



Cloud-based Safety Support

Example Application – Autonomous Mobile Robots and Humans in Warehouses



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Autonomous forklift

Manned forklift

Human worker

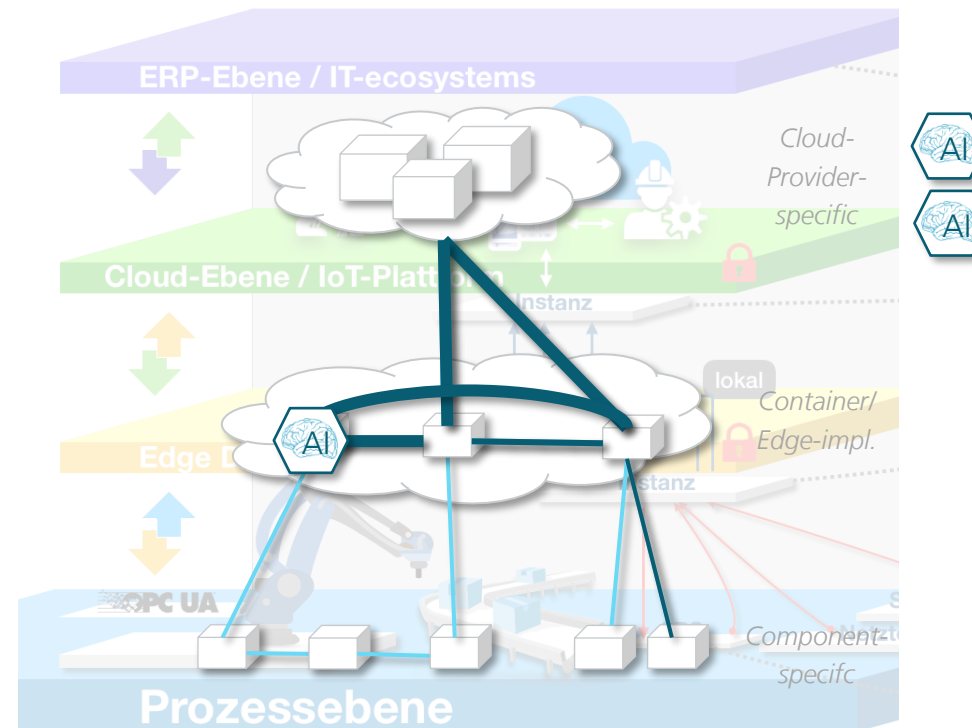
Safety Concept 0
maximal performance (speed 5m/s), no cloud

EXAMPLE APPLICATIONS

03 – AI-based Quality Control

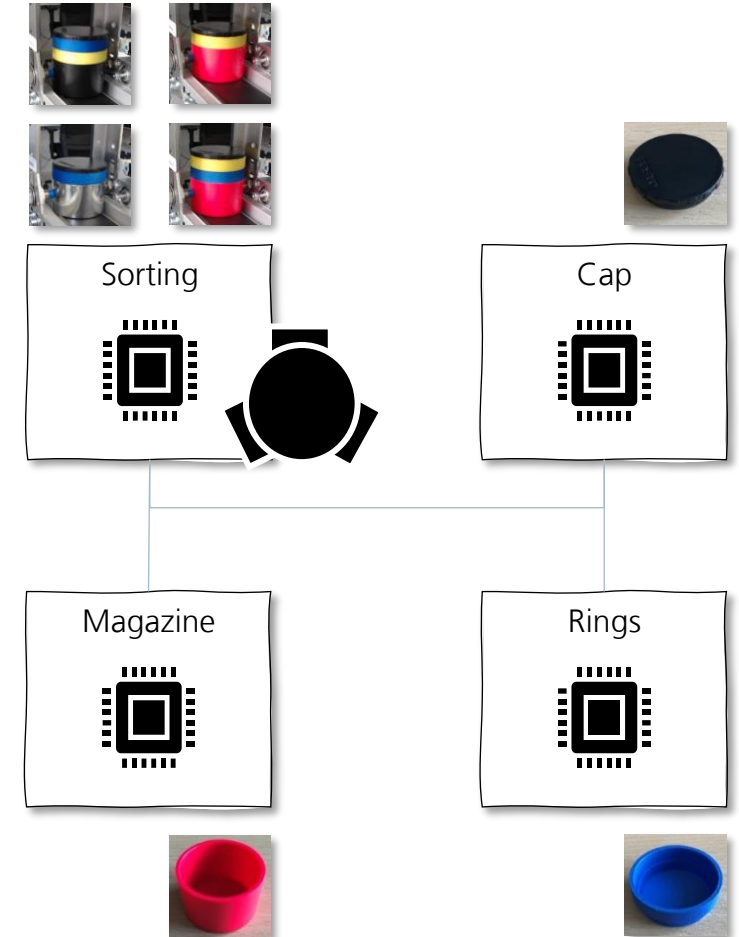
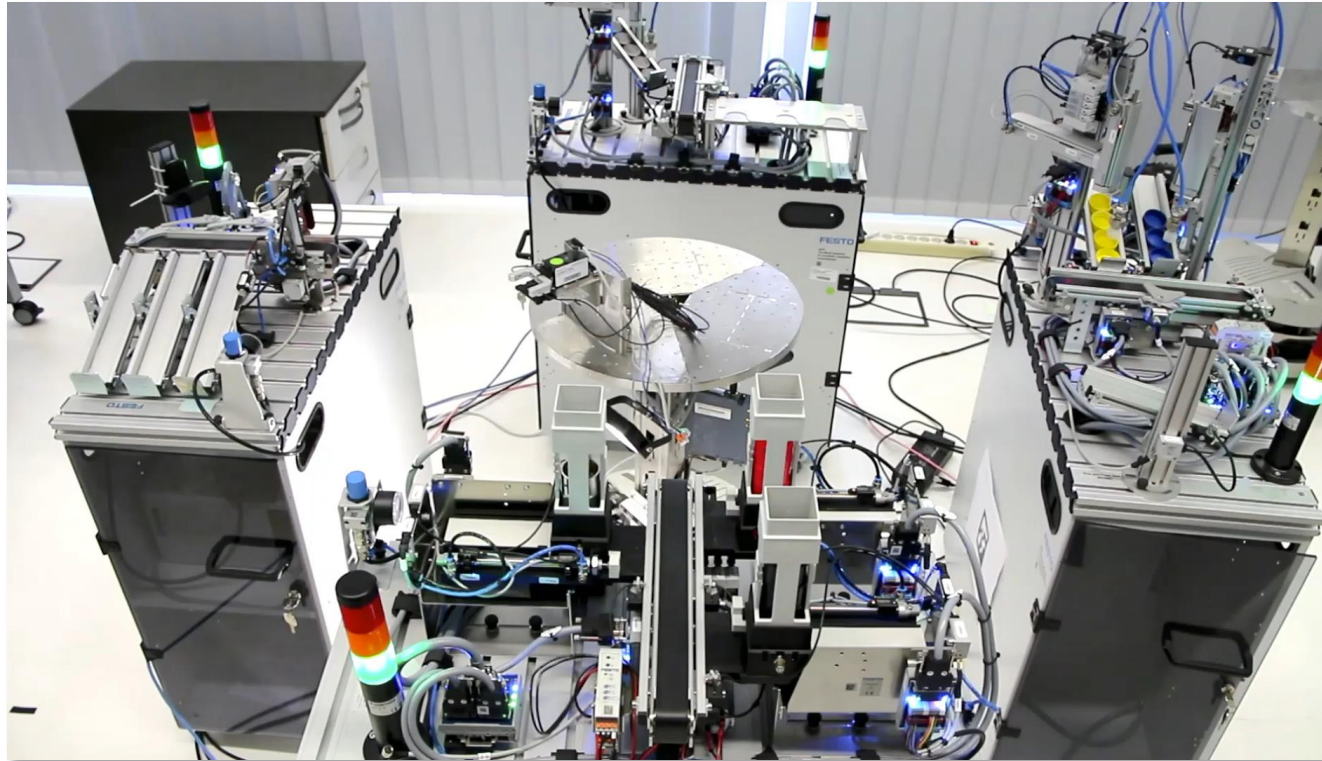
Adaptive Architecture for Machine Learning / AI

Example Application – AI-based Quality Control



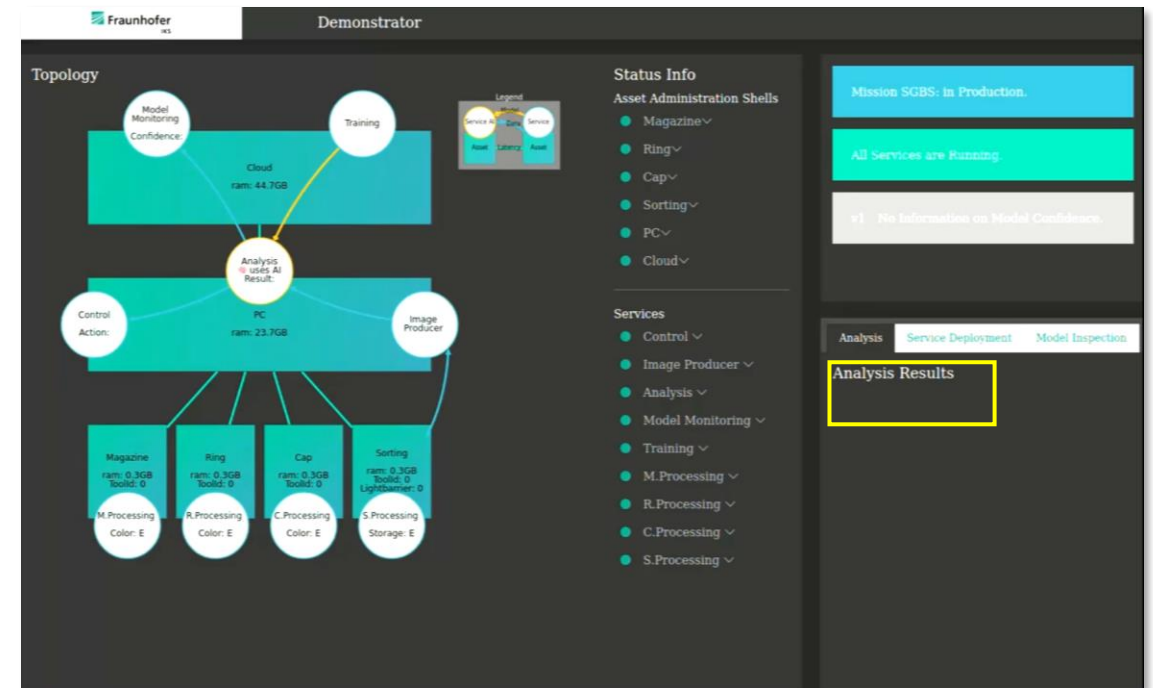
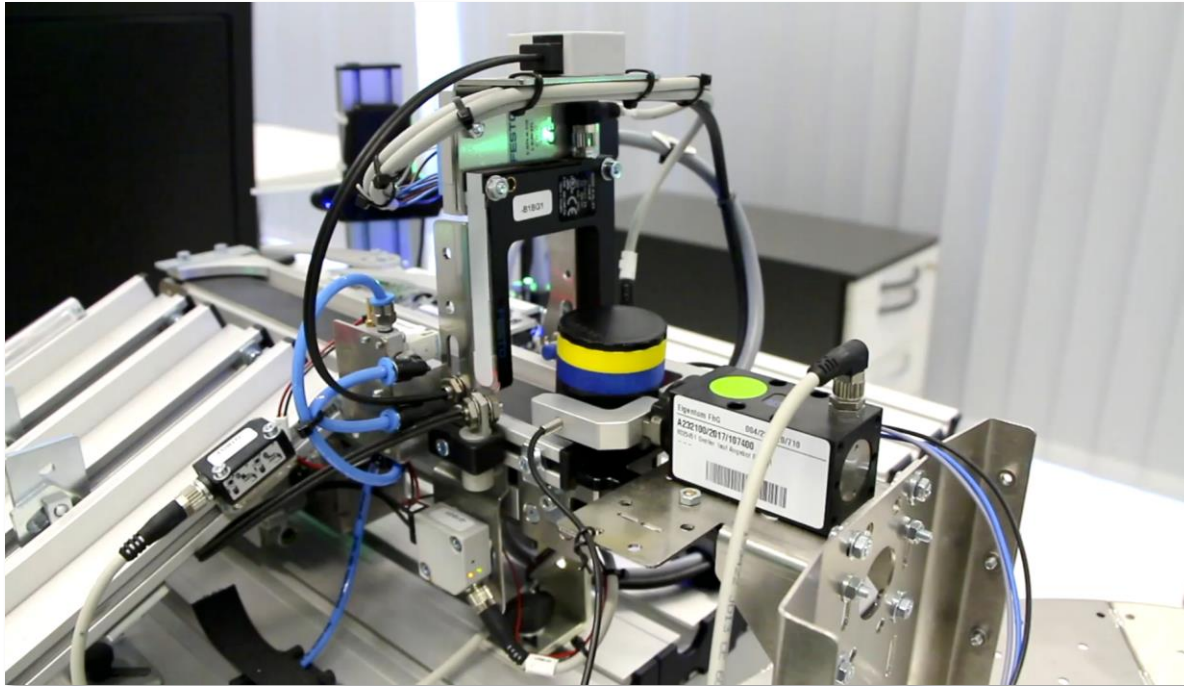
Cap Factory

Example Application – AI-based Quality Control



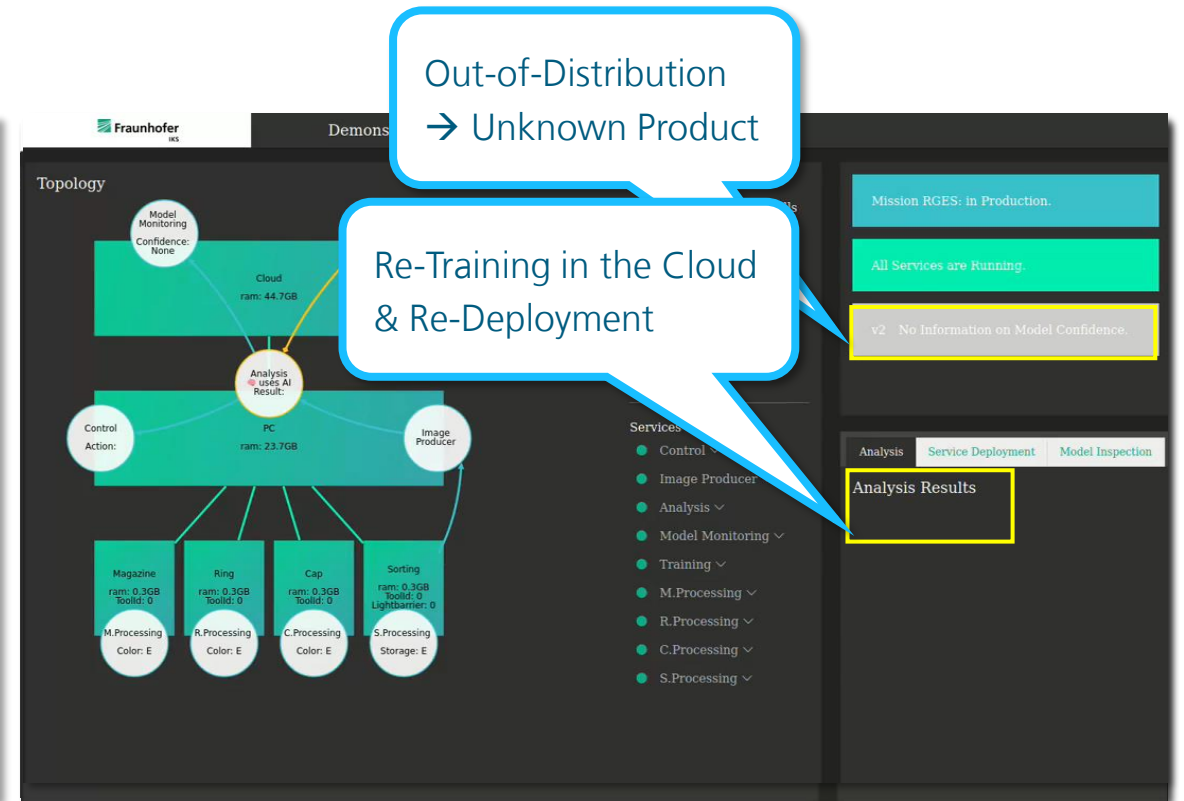
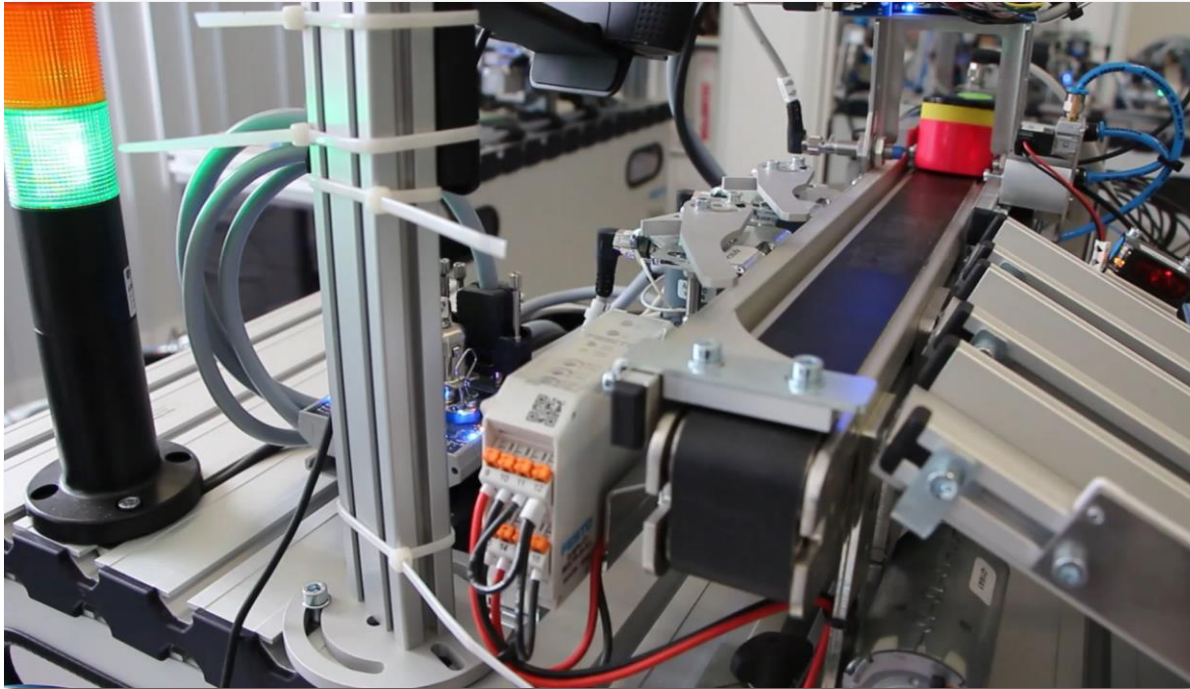
Cap Factory – Camera-based Inspection

Example Application – AI-based Quality Control



Cap Factory – Cloud-based Re-Training & Re-Deployment

Example Application – AI-based Quality Control



SUMMARY & OUTLOOK

- Cloud- & Edge-based solutions hold great potential
- Enable new applications & business opportunities
- Novel cognitive systems require »Safe Intelligence«

Thank you for your attention!



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