

# FME AI FOR INDUSTRY JAAREVENT



**Bouwen van een  
data infrastructuur  
voor toepassing AI**

**11 december 2024**

## AGENDA

1. Joost Willems - Siemens:  
Introductie: uitdagingen bij ontsluiten OT-data
2. Meyad Brojerdyan - Siemens:  
Ontsluiten OT Data dmv Edge Devices
3. Arjen van Wijngaarden - FourCo IT Services:  
Opzetten van een AWS Datahub
4. Vragen & discussie

## Smart Data as key enabler for digital evolution



More **knowledge**

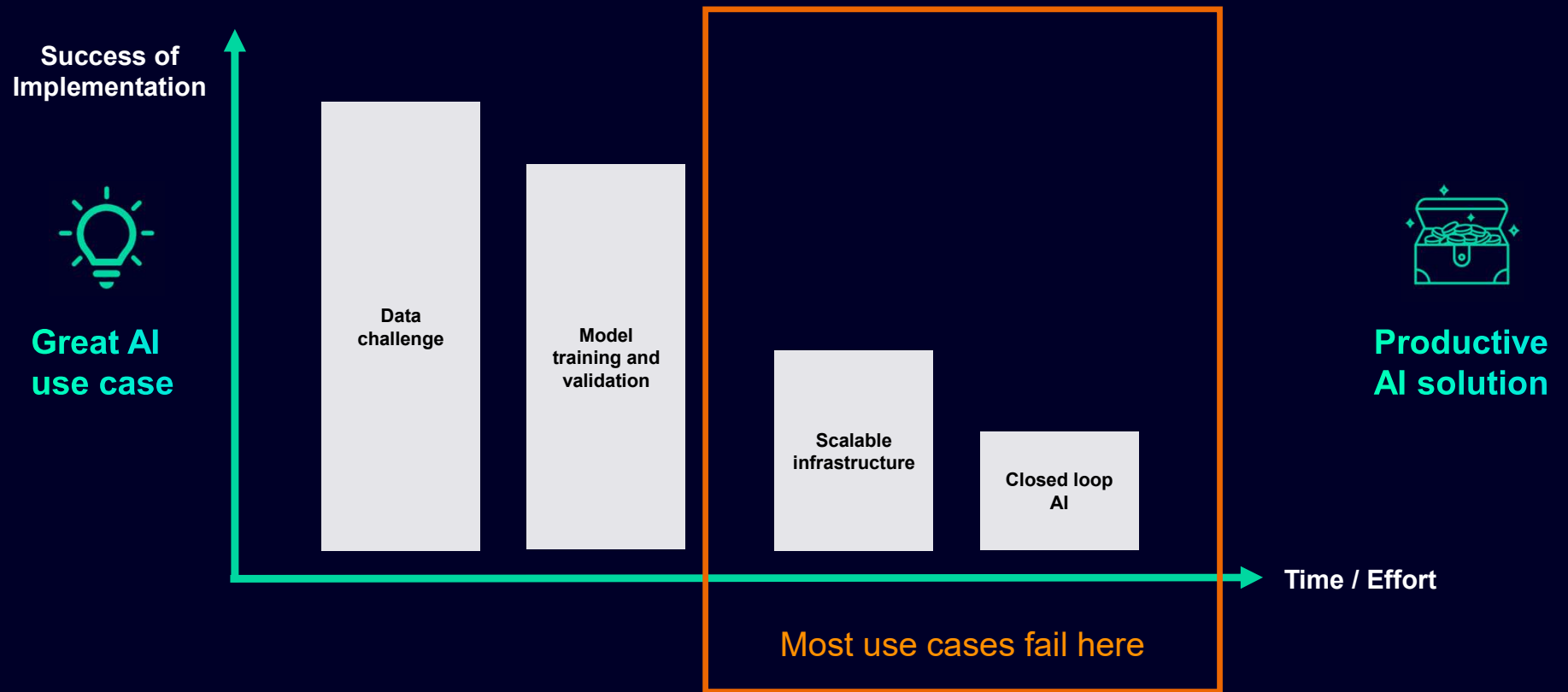


through  
smart **data**



opens up new  
**possibilities**

# What is their challenge? And why are they failing?

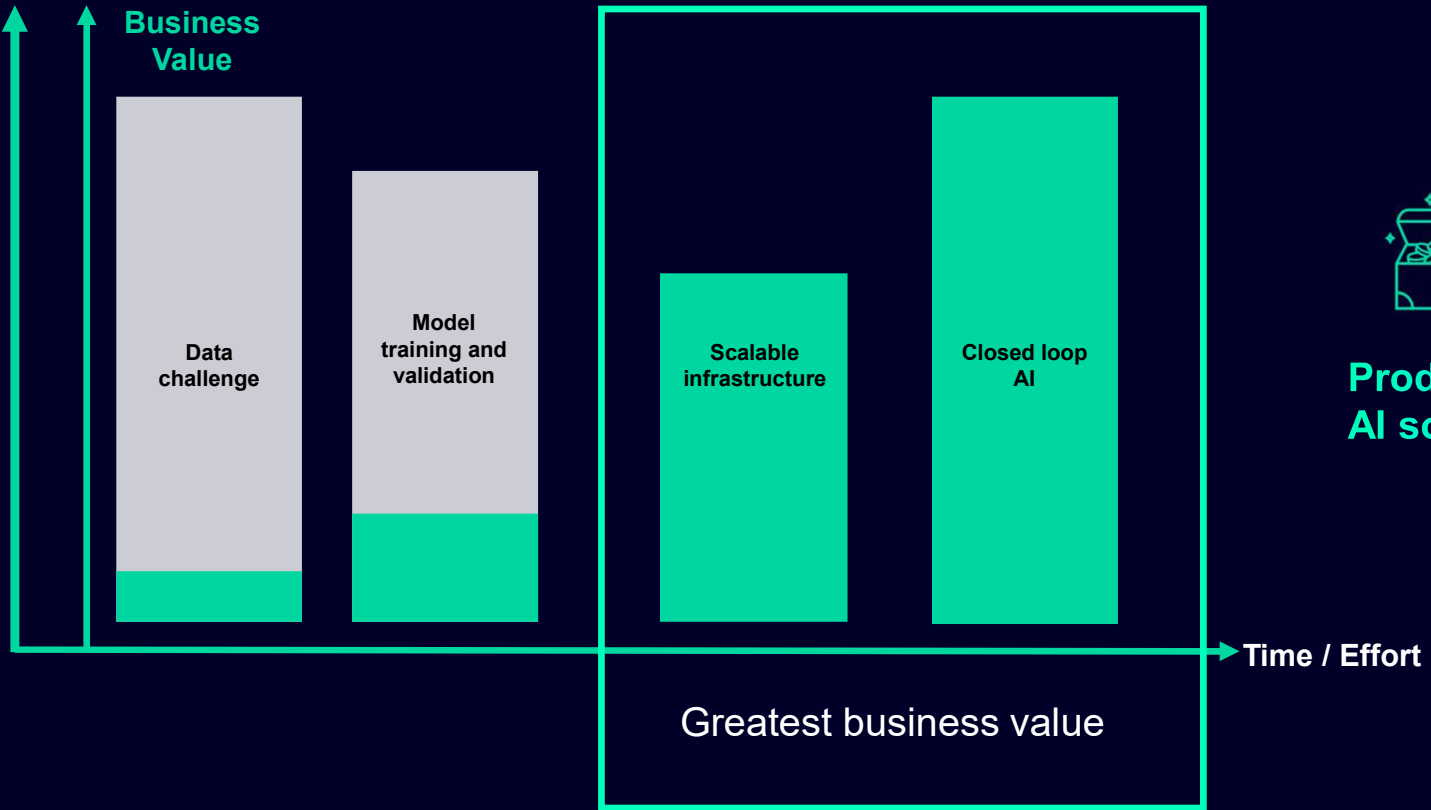


# What are they looking for?

Success of Implementation



Great AI use case

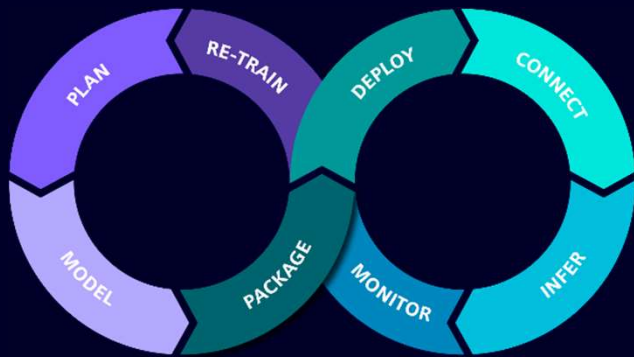


Productive AI solution

# The Machine Learning Operations (ML Ops) cycle

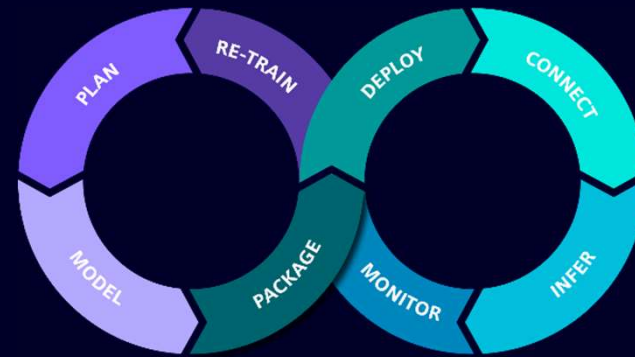
## Differences consumer vs. manufacturing industries

### In the consumer industry



AI is trained and runs in the cloud

### In the manufacturing industry



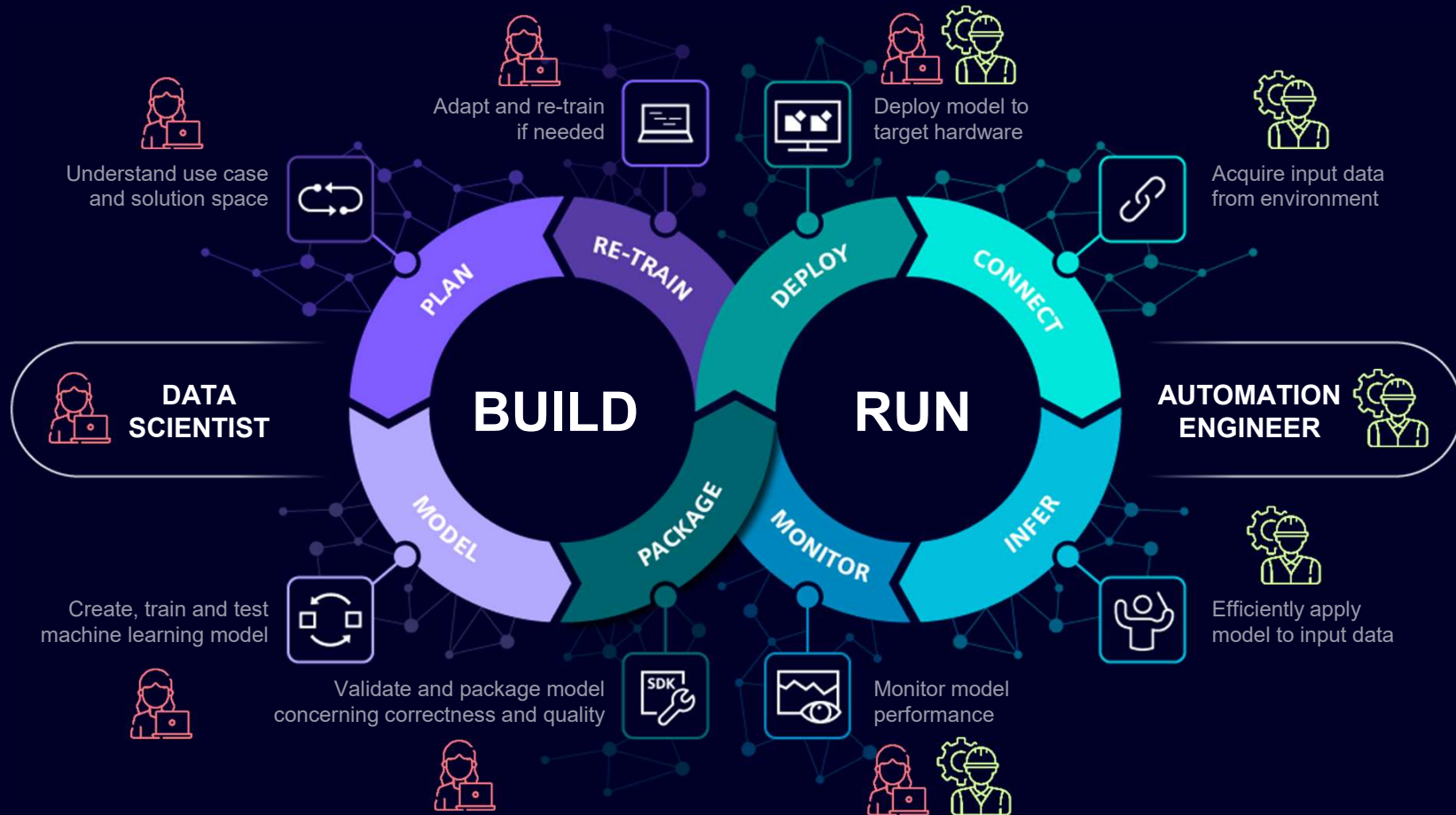
AI is trained in the cloud

AI runs in the shopfloor

(there are exceptions)

# The Machine Learning Operations (ML Ops) cycle

## Jobs to be done



# Use cases





# Achieving smarter and efficient production across various application fields with Artificial Intelligence

## Anomaly Detection

Identification of unusual production behavior or parameter

### Concrete benefits

- Detection of process weaknesses
- Direct removal of faulty pieces



## Quality Prediction

Predicting product quality from analyzing process parameter from previous production steps

### Concrete benefits

- Reduction of End-of-Line inspection
- Minimizing unneeded processing of bad parts



## Process Improvement

Optimization of production by analyzing process parameter

### Concrete benefits

- Improved product quality



## Predictive Maintenance

Identifying the need of maintenance before a problem happens

### Concrete benefits

- Reduction of downtimes with planable maintenance
- Typical example: Indust. Edge Spindle Case

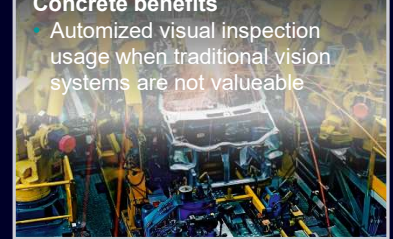


## Visual Inspection

Camera based approach for the inspection or classification of quality and the detection of parts

### Concrete benefits

- Automated visual inspection usage when traditional vision systems are not valueable



## Parts Life Span Prediction



## Automatic Sorting



## Audio Diagnostics



## Smart Assistant



## Line optimization





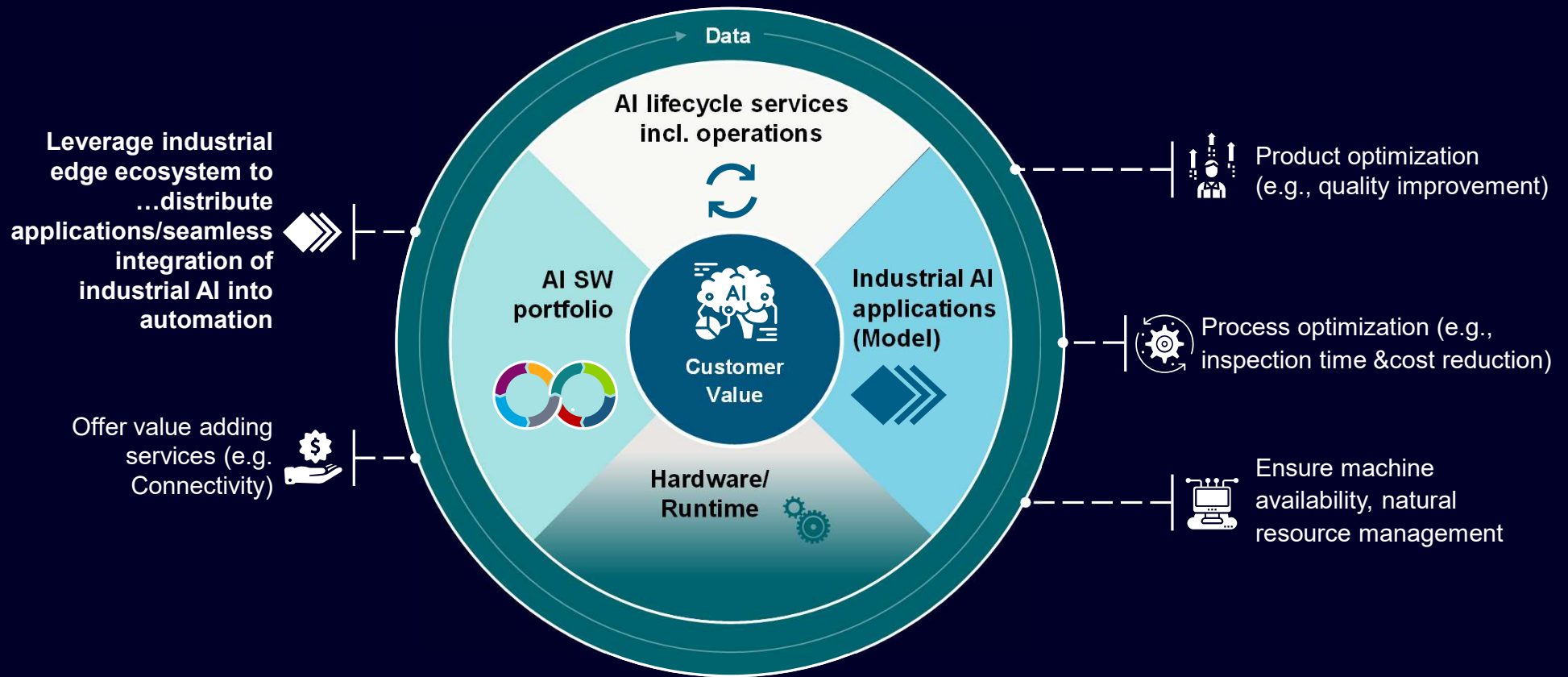
# Industrial AI Portfolio overview

## Dia 10

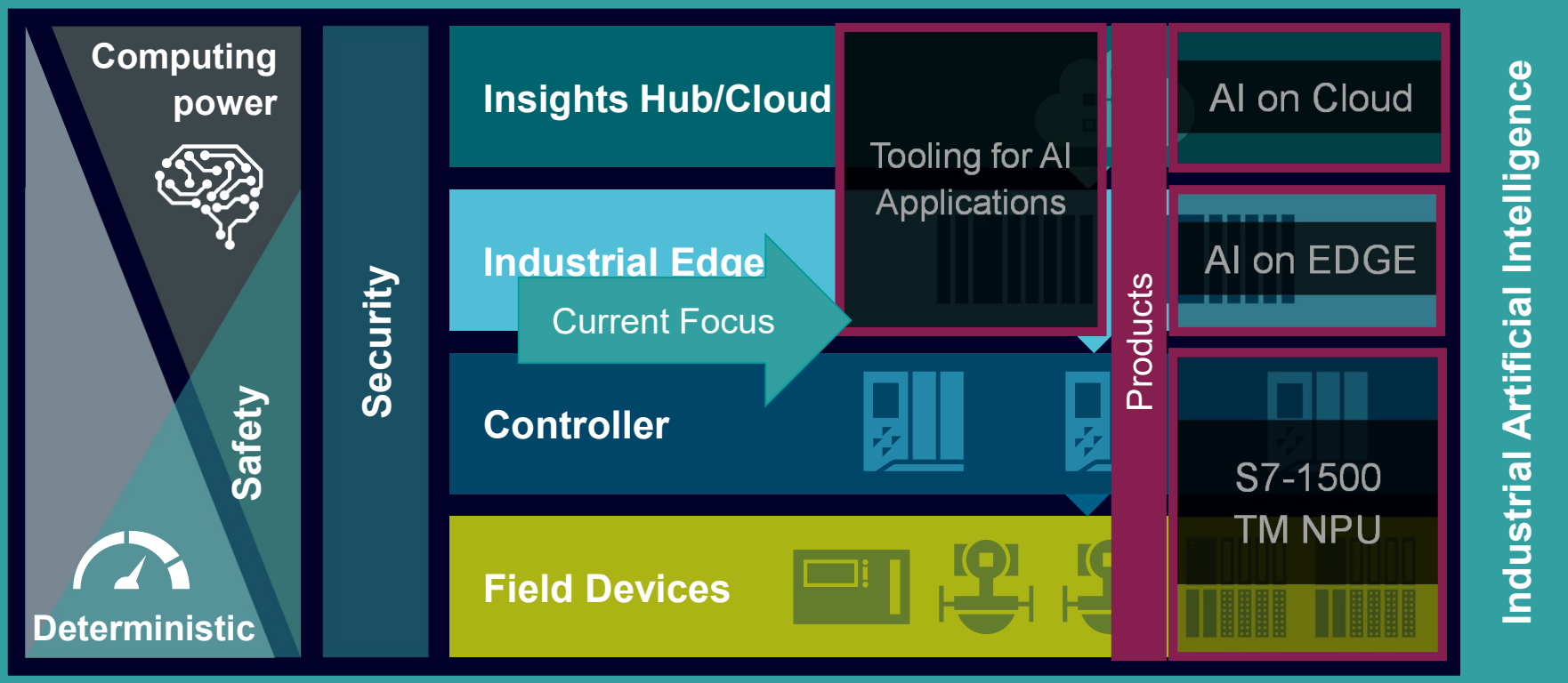
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**CZO** [[@Kupser, Johannes \(DI FA CTR SVC&AI IAI PO\)](#)] Könntest du den Teil übernehmen?  
Zillner, Christian (DI CS DE&DS; 2023-10-05T11:25:25.520)

# AI-enabled shopfloor: Siemens delivers customer value with end-to-end AI offerings: Integrated hardware, software, models and services



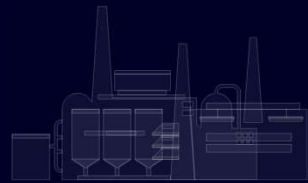
# Our future Industry AI portfolio will enable AI across all levels of Ecosystem



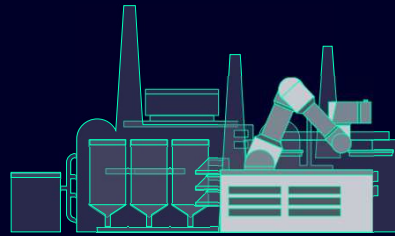
# What is Industrial Edge and industrial AI?

# Siemens accelerates the step from automated production to adaptive production – and beyond

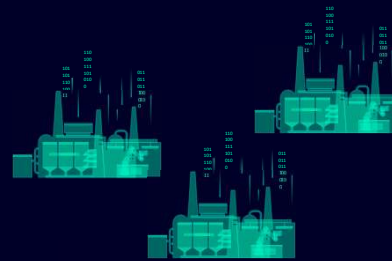
Extending integrated automation towards holistic industrial operations



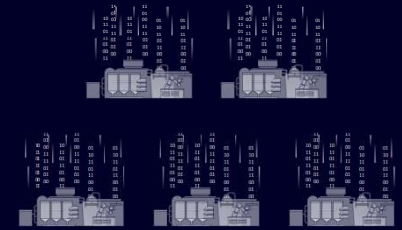
Manual production



Automated production



Adaptive Production



Future production  
(e.g. Autonomous Factory, Industrial Metaverse)

Improvement is only possible with data!

When deciding for an edge solution, requirements from OT and IT need to be considered for a rollout at scale and a company wide adoption

OT

## Requirements

- Robust and stable solution
- Little dependence on “online” services
- Error-free operation by factory personnel
- Plug-and-play for existing, heterogenous production
- Long-term support

IT

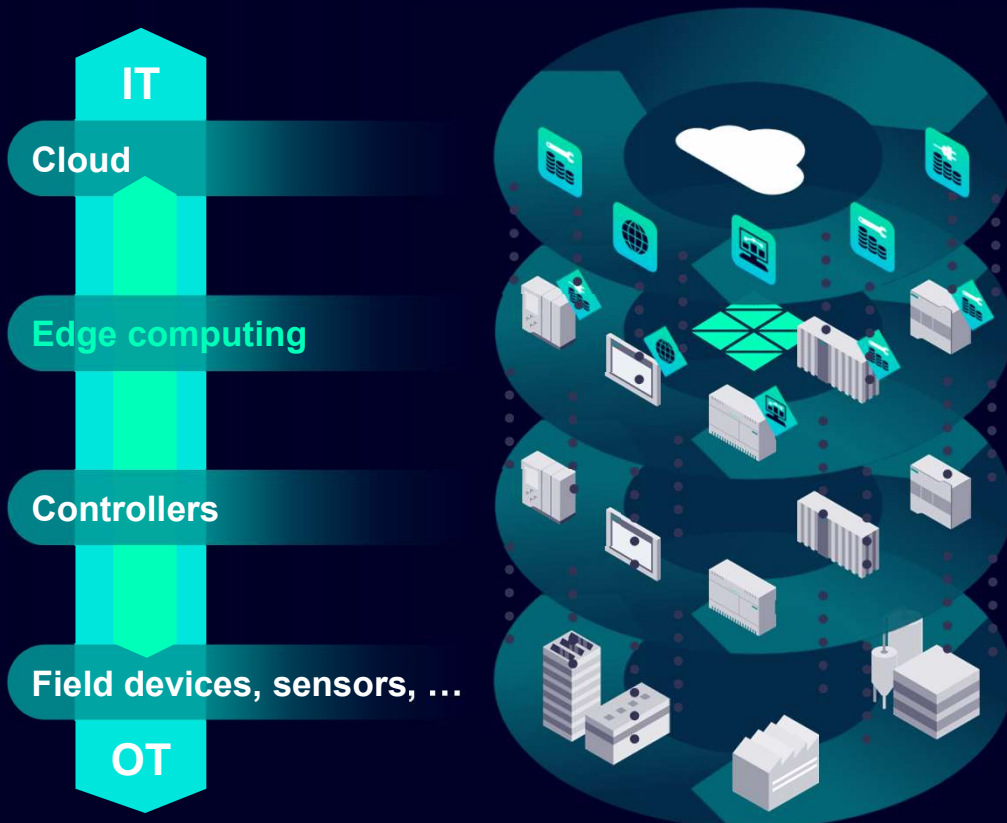
## Requirements

- Can be integrated into existing IT systems
- Up-to-date IT security
- Expandable through open interfaces
- Use of “state of the art” technology
- Available worldwide & can be operated flexibly e.g., factory level



# Industrial Edge

Bring IT to the shopfloor – Simple, scalable and manageable

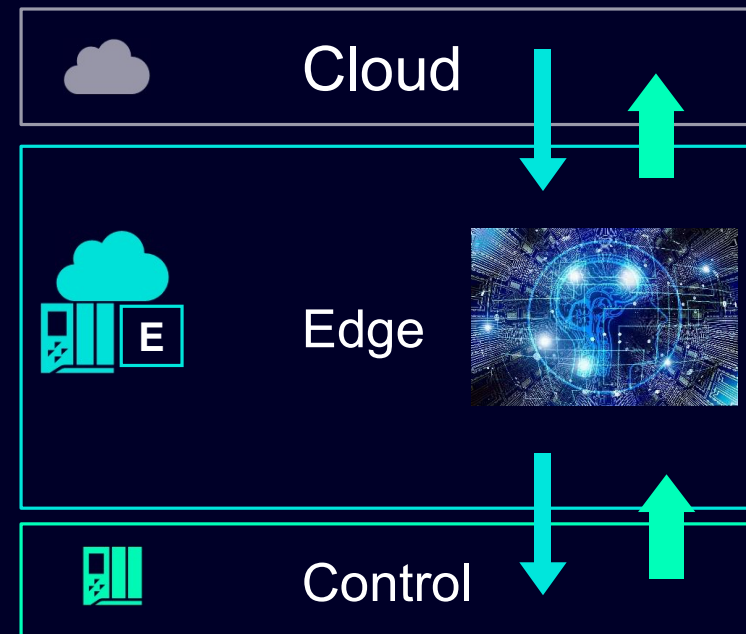


Decentral computing & storage with device runtime, apps and central management

**Solution to scale industrial AI adoption**  
Providing AI infrastructure leveraging Industrial Edge

# Industrial Edge & AI

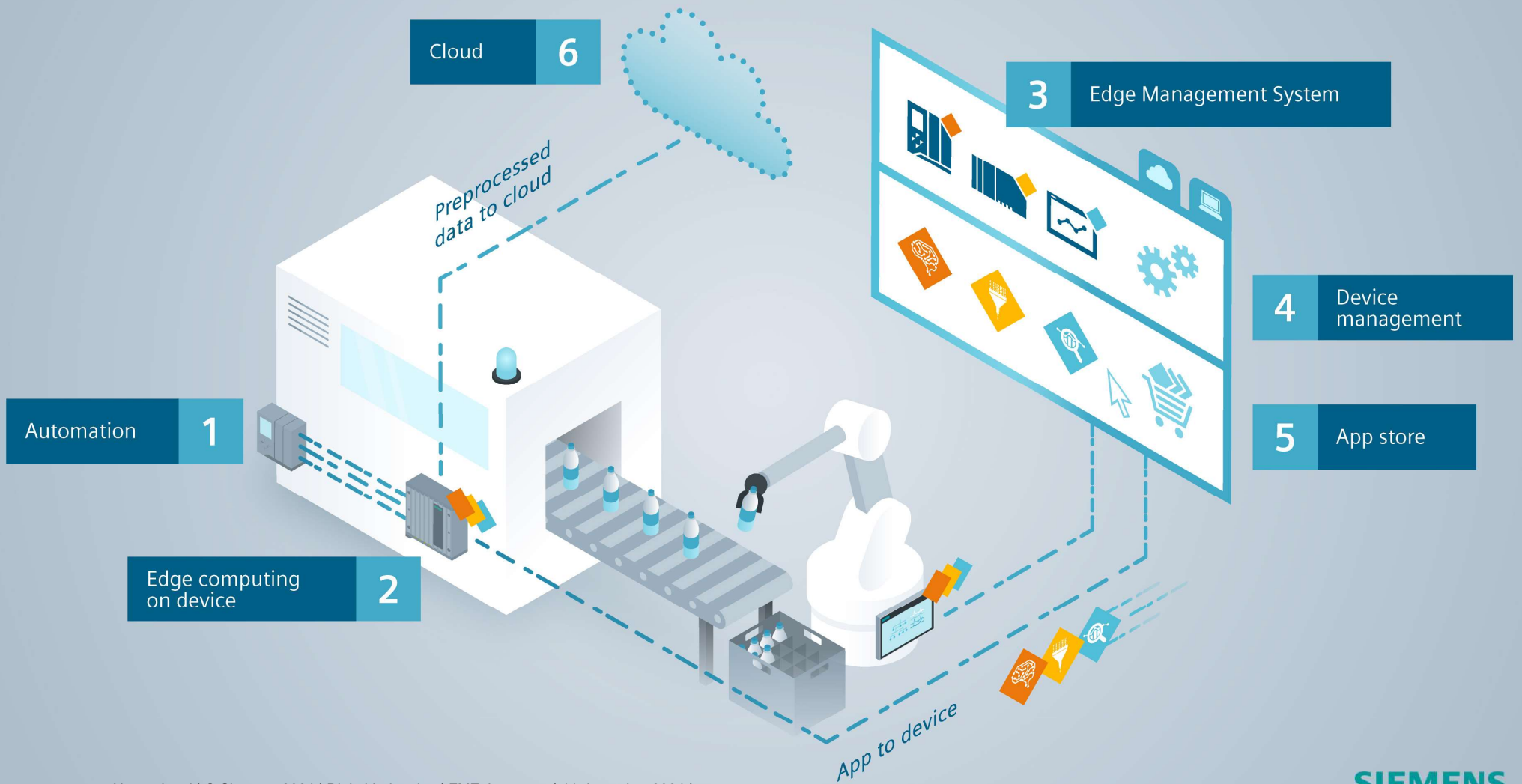
- Easy data connectivity and collection
- Run and operate industrial-grade AI

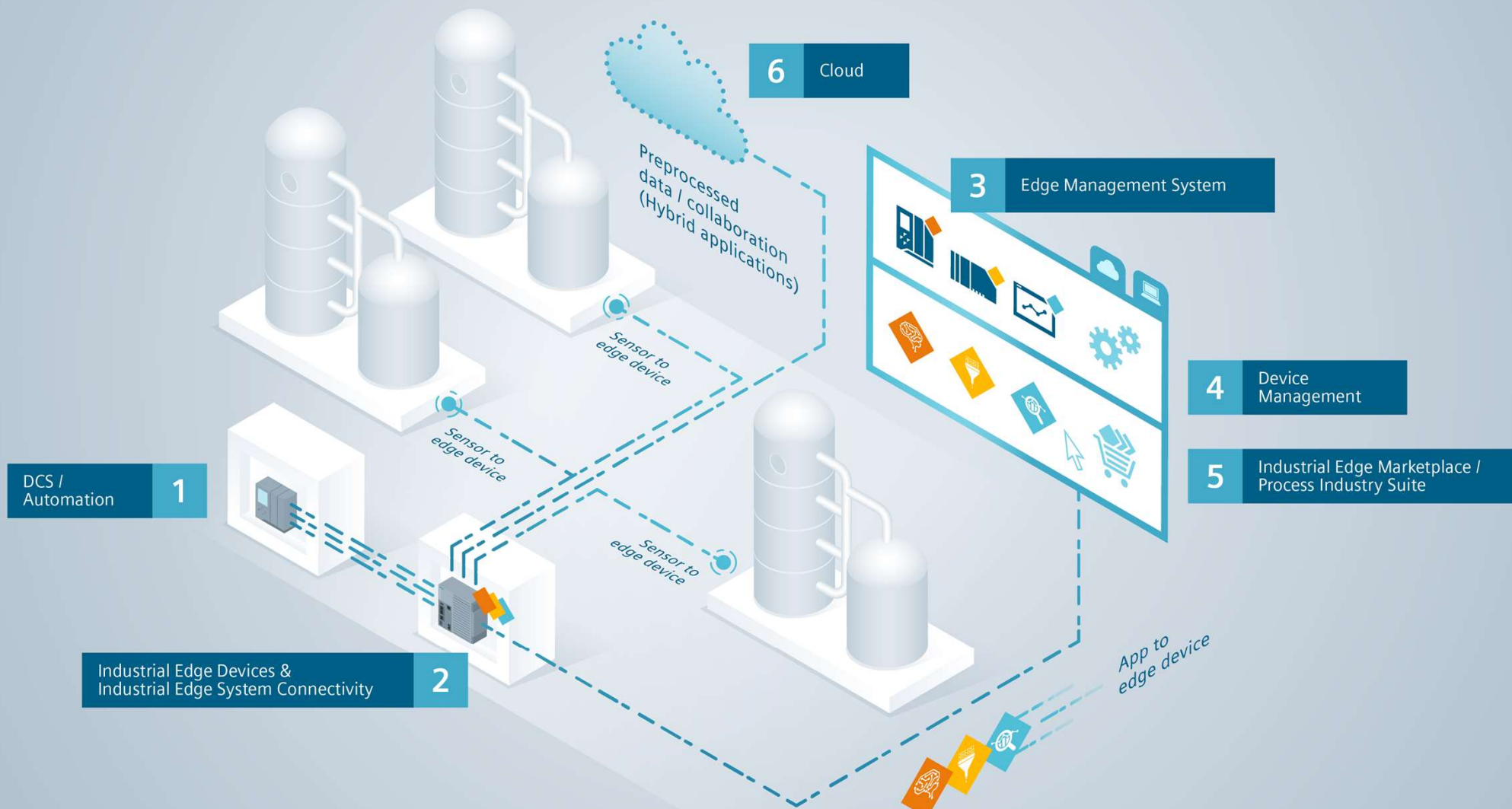


# Industrial Edge

An open platform to integrate IT mechanisms into the shopfloor in a way software- & data handling becomes **scalable**, **reliable**, **secure** and **easy to use**.







# Example of Use Case

 <p><u>Remote Maintenance</u></p>	 <p>AWS IoT SiteWise</p>	 <p><u>Predictive Service for Drive Systems</u></p>	 <p>Visual Inspection</p>	 <p>Network Operation Analyzer</p>	 <p>AI on Edge</p>
 <p><u>Shopfloor to cloud connectivity</u></p>	 <p>MSSQL Connector</p>	 <p><u>Drive Data Analytics</u></p>	 <p>Vision Connector</p>	 <p><u>Low Code on Industrial Edge</u> SIEMENS</p>	 <p>Virtual Sensing</p>
 <p><u>Data acquisition and aggregation</u></p>	 <p>MySQL Connector</p>	 <p>Energy Analytics</p>	 <p>SIMATIC Automation Tool SIEMENS</p>	 <p><u>Bring your own apps to the shopfloor</u></p>	 <p>Anomaly Detection</p>
 <p>Industrial Connectors</p>	 <p>Connector for LoRaWAN</p>	 <p><u>Performance Analytics</u></p>	 <p><u>Central App &amp; Device Management</u></p>	 <p>Unified on Edge SIEMENS</p>	 <p>CPU 1517V SIEMENS</p>

Unlocking the Power of Data

## Bring IT to the shopfloor – Simple, scalable and manageable

### Industrial Edge Apps

Siemens apps, third-party partners apps and/or bring your own applications

### Industrial Edge Devices

Wide range of devices (gateways, IPC's, AI-enabled hardware), virtual and own hardware

### Industrial Edge Management

Central Software en Device Management  
Infrastructure



## Benefits of Industrial Edge



### Local data processing and cost-efficient productive roll-outs

Process data in real time with one or more apps simultaneously directly at the machine and scale these across machines, lines and sites: Everything manageable from one location.



### Leverage technology and domain knowhow from open ecosystem

Get started quickly and directly with industry-proven, ready-to-use apps from the Industrial Edge Hub and the Industrial Edge Marketplace. Or use your own software – based on any IT language, if it can be packaged in a Docker container.



### Convenient data storage and secure IT connectivity

Lighten the load on IT infrastructure through local data storage and decide what data to keep on premise and what to securely transmitted to upper-level systems via the IT network.

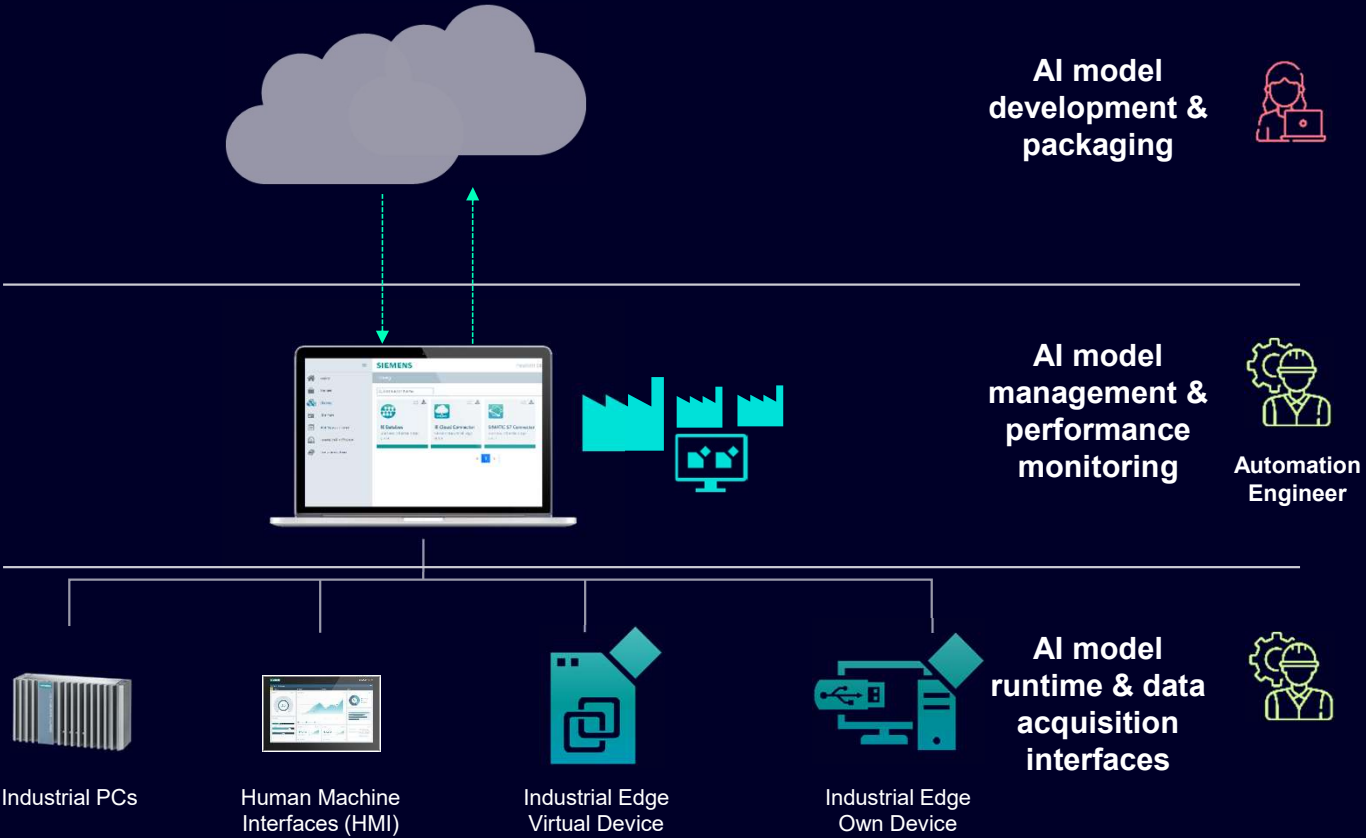
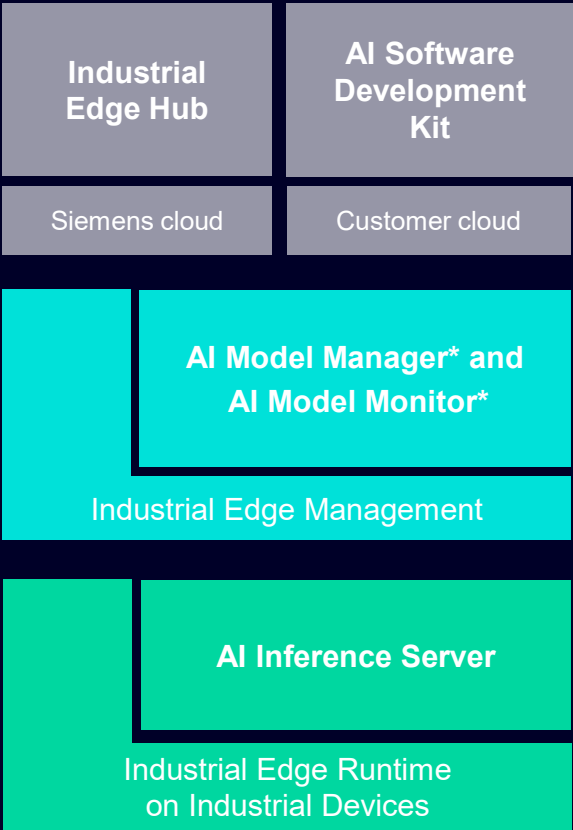


# | Example Architectures



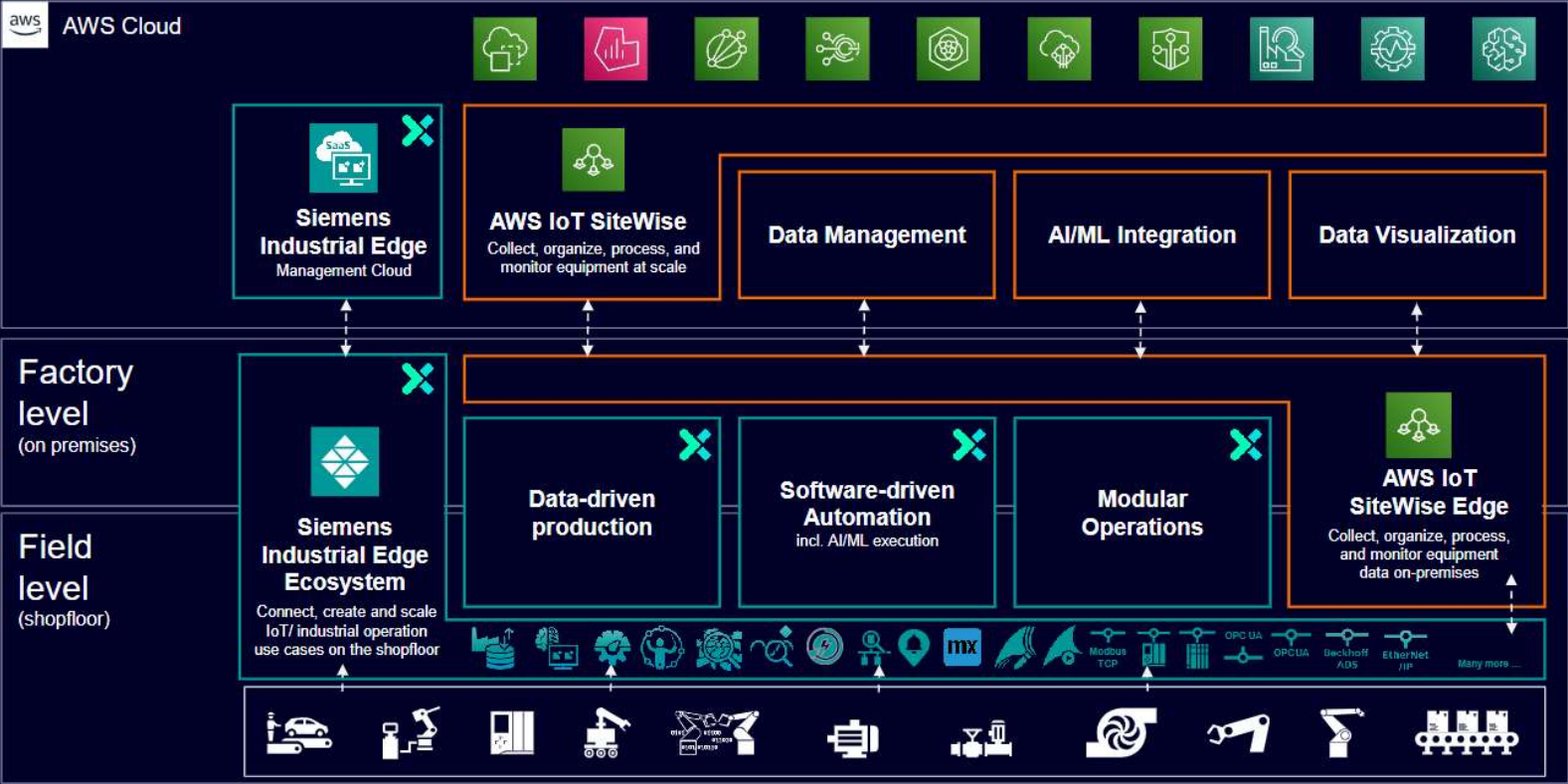
# Scalable Industrial AI architecture

## Deployment and monitoring from cloud to shopfloor



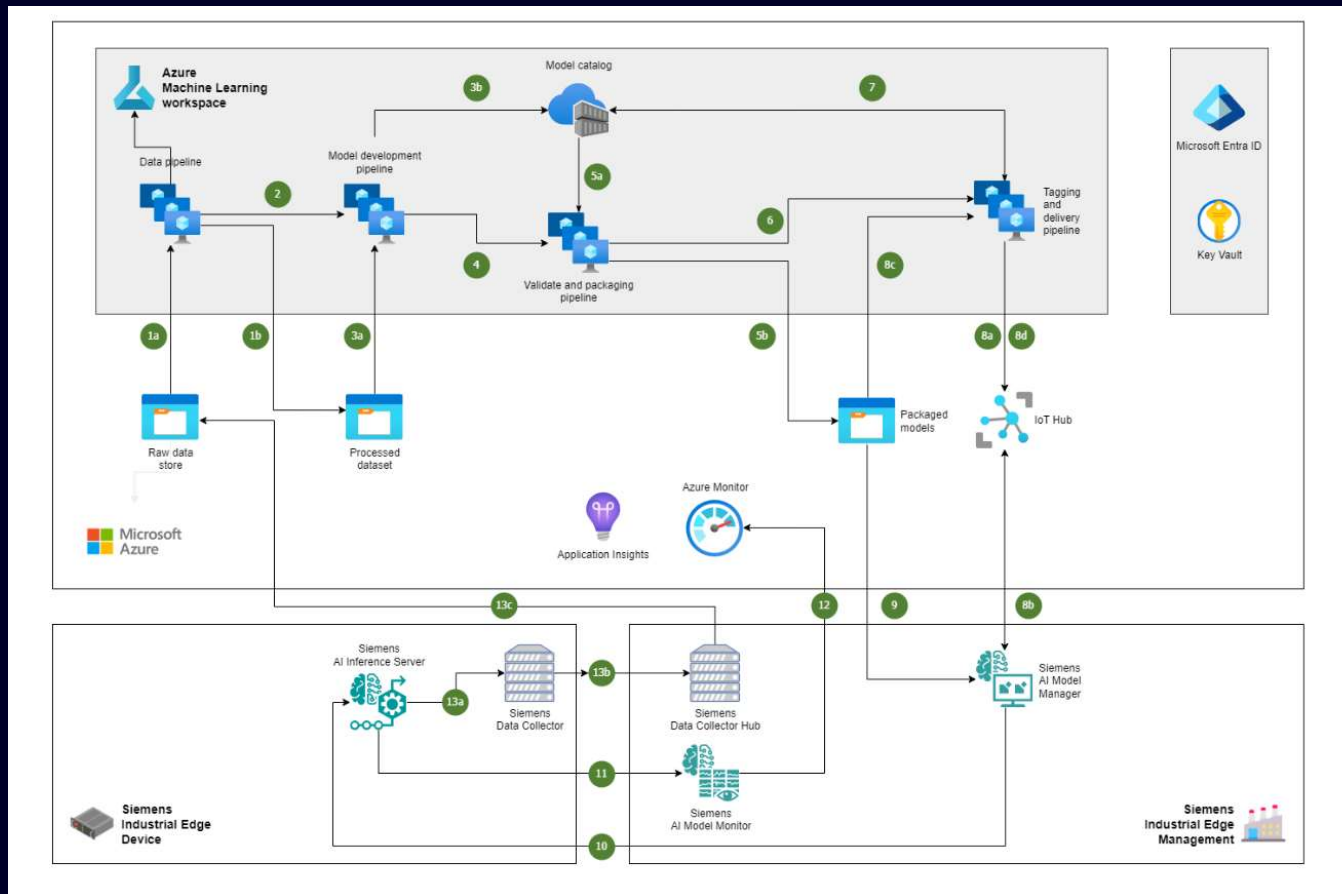
\* Descriptive titles, product name might change

# How AWS and Siemens are integrating IT and OT



<https://aws.amazon.com/blogs/app/automated-cloud-to-edge-deployment-of-industrial-ai-models-with-siemens-industrial-edge/>

# How MS Azure and Siemens are integrating IT and OT



<https://learn.microsoft.com/en-us/azure/architecture/example-scenario/manufacturing/azure-ai-siemens-industrial-edge>

# | Case studie



 VDL Steelweld

## Introduction

- Introduction: VDL Steelweld, a leading company in the Netherlands, implementing Siemens' Industrial Edge since 2022. Industrial Edge empowers VDL Steelweld to monitor, optimize, and predictively maintain production lines, driving cost savings and enhanced operational efficiency

## Challenge

- Fluctuation of the overall asset or line performance with no transparency
- Average throughput times for assembly lines differ and delay for unknown reasons
- No information on possible root causes of machine downtimes
- Demand of transparency about energy consumptions and CO<sub>2</sub> footprints along the value chain

## Solution

- Gather and harmonize machine or line data with the Industrial Edge Connectivity
- Real-time performance visualization and insights (including alarms & diagnostics)
- Flexible analytics, dashboarding and reporting capabilities
- Central management of Industrial Edge apps and computing devices
- Simplified energy data collection from several production assets
- Out-of-the-box applications from the Industrial Edge Marketplace

## Value

- Performance monitoring: visualize and analyze performance remotely, eliminating on-site visits.
- Fault Diagnosis: Through remote monitoring, VDL Steelweld can detect and analyze issues in real-time, reducing downtime and improving overall productivity.
- Energy Monitoring: By leveraging the Energy Manager app, VDL Steelweld is mapping energy usage to identify opportunities for optimization and cost reduction.
- Predictive Maintenance: The company is exploring the potential of Industrial Edge for predictive maintenance, aiming to reduce maintenance costs and prevent unplanned downtime.
- Manageability and Scalability: Gradually expand implementation for various use cases.

## Recommendations

- Start Small and Start Now: Begin with a test setup and gradually scale up the implementation.
- Continual Learning: Invest time in understanding and interpreting the data to make informed decisions.
- Cybersecurity: Ensure data security by encrypting data at the source and implementing proper network segmentation. Use Industrial Edge to enhance cybersecurity.



**DATAHUB**

## FourCo: SLTN Modern Infrastructure Practice

SLTN (Hilversum):  
600FTE, € 300M  
turnover

Modern Infrastructure  
practice, 25 FTE

Experts proven  
knowledge and  
experience

Focus: (multi) cloud,  
containerization ,  
Infrastructure as Code,  
Automation

Certified: AWS  
Advanced Partner,  
Azure Gold Partner,  
Nvidia, Red-Hat,  
Kubernetes

ISO27001:2017 certified

Organizations are facing radical changes in the way they are operating caused by disruptions in the field of IT. After many years of incremental improvements on the IT systems, an explosive combination of changing technologies, technology stacks and ways of working is impacting how organizations work.

We help your organization in making the right choices in IT Platform/Infrastructure and take ownership of the delivery of these choices. All this in a controlled way and at a reasonable cost, maintaining the availability, performance and security of your IT environment.



## Modern IT infrastructure services



**Consult:** Strategic consulting to align IT infrastructure with business goals.



**Build:** End-to-end infrastructure development, including automation and deployment.



**Design:** High-level and detailed architecture tailored for security, scalability, and resilience.



**Run:** Comprehensive infrastructure management, including monitoring, maintenance, and support

### Specialties

(Hybrid) Cloud transitions  
Data platforms  
No-ops/low-ops

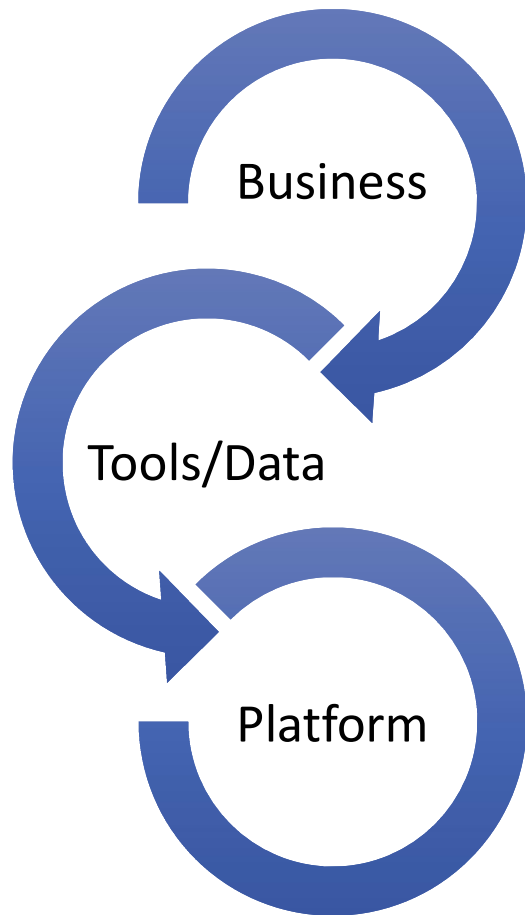
Infrastructure as Code  
Automation  
Containerization

## **Supporting AI successfully is a challenge for organisations**

The new world of data can be very beneficial if implemented in the right way.

What is needed to make it successful??

# Implementing AI requires new IT, new tooling and new ways of working



- New insights
- Real time
- Predictive
- New data, combinations

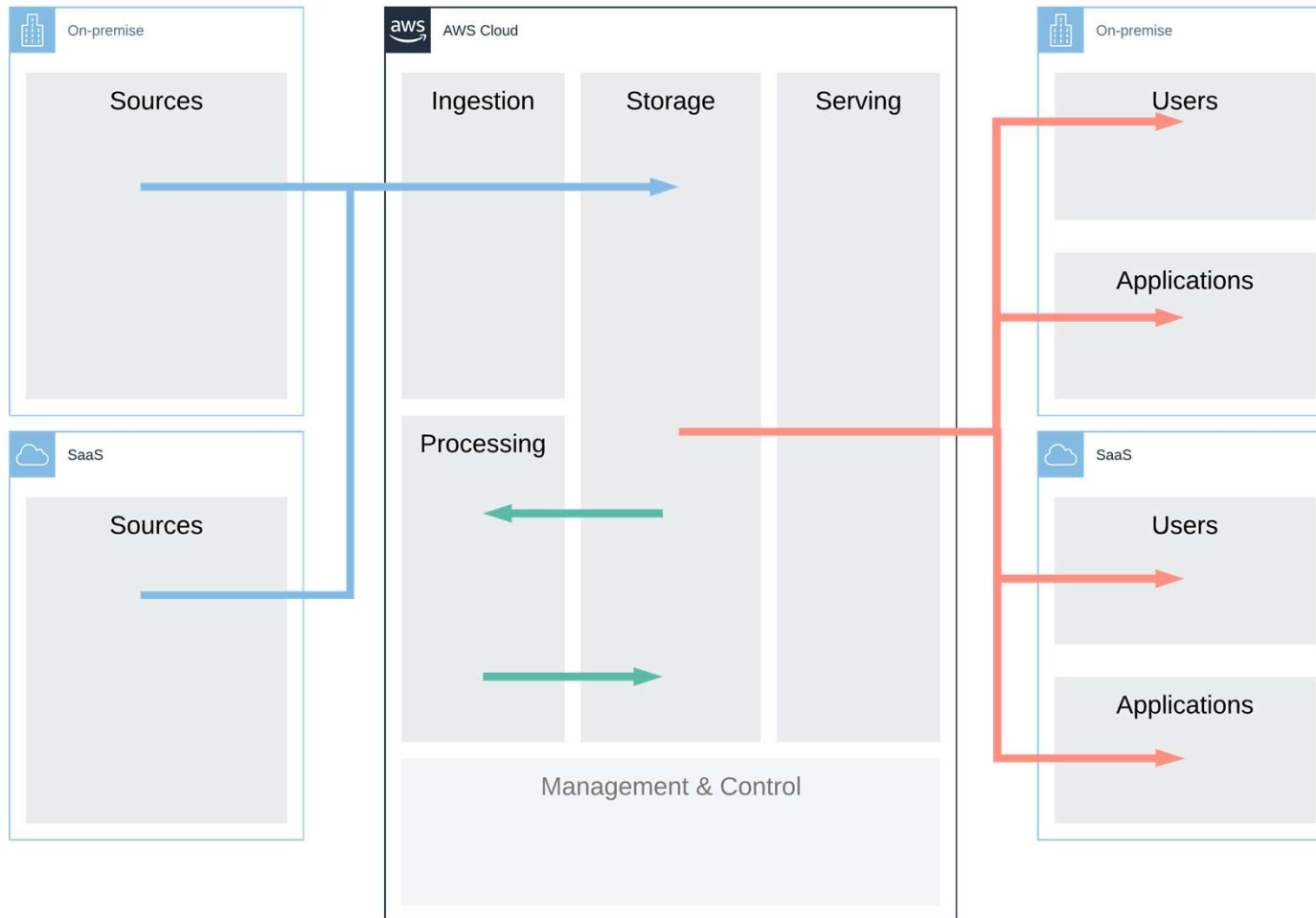
- Python, “R”, other
- Machine learning, deep learning, neural networks
- Real time,
- Events
- Datavolumes

- Real time, streaming
- Data volumes
- Elasticity
- GPU
- Edge
- New tools

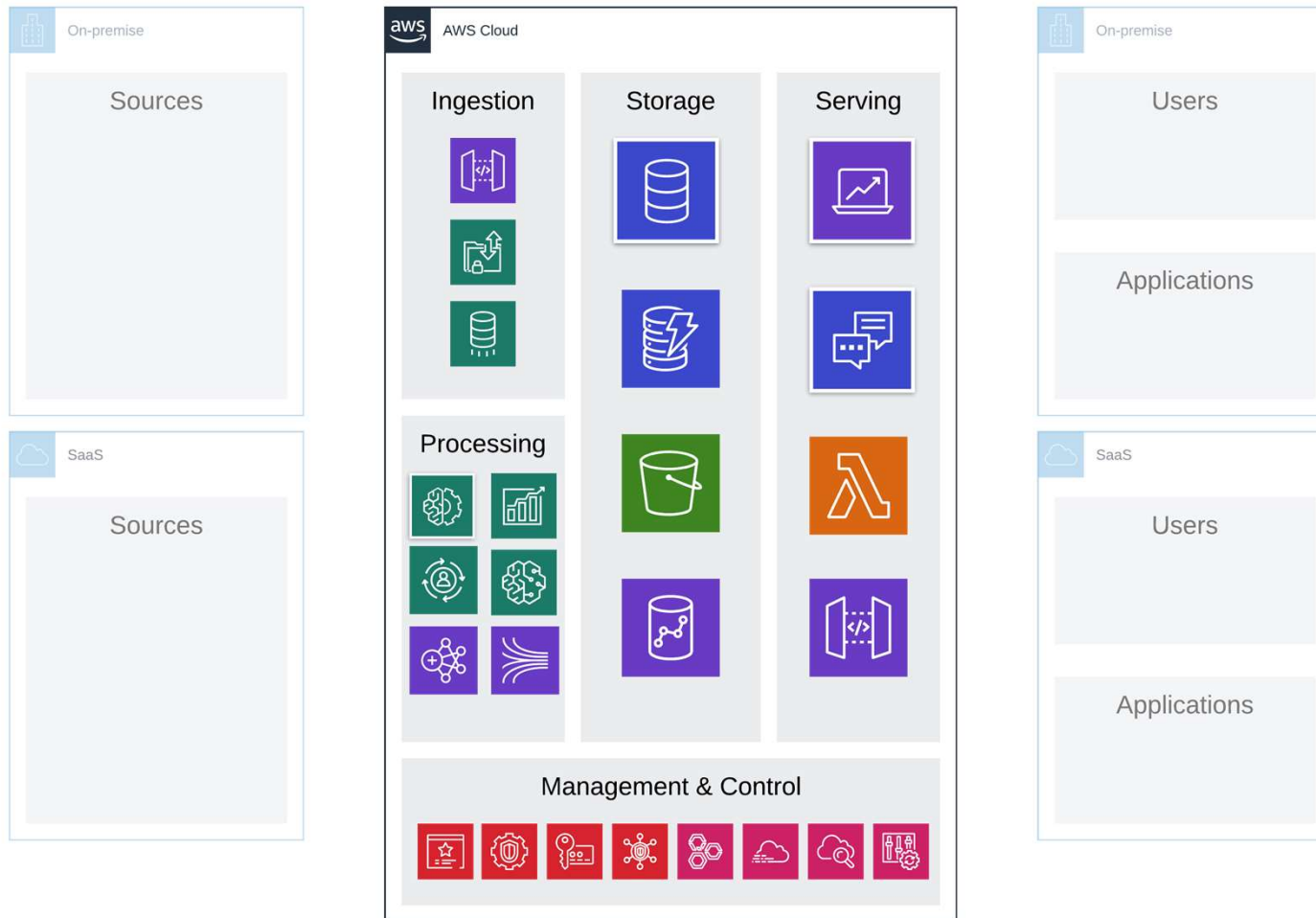
- Agile/Scrum
- Innovation
- Flexibility
- PoC, PoV
- Production

- Security and control
- Compliancy
- High Availability
- Monitoring
- Cost-Transparent

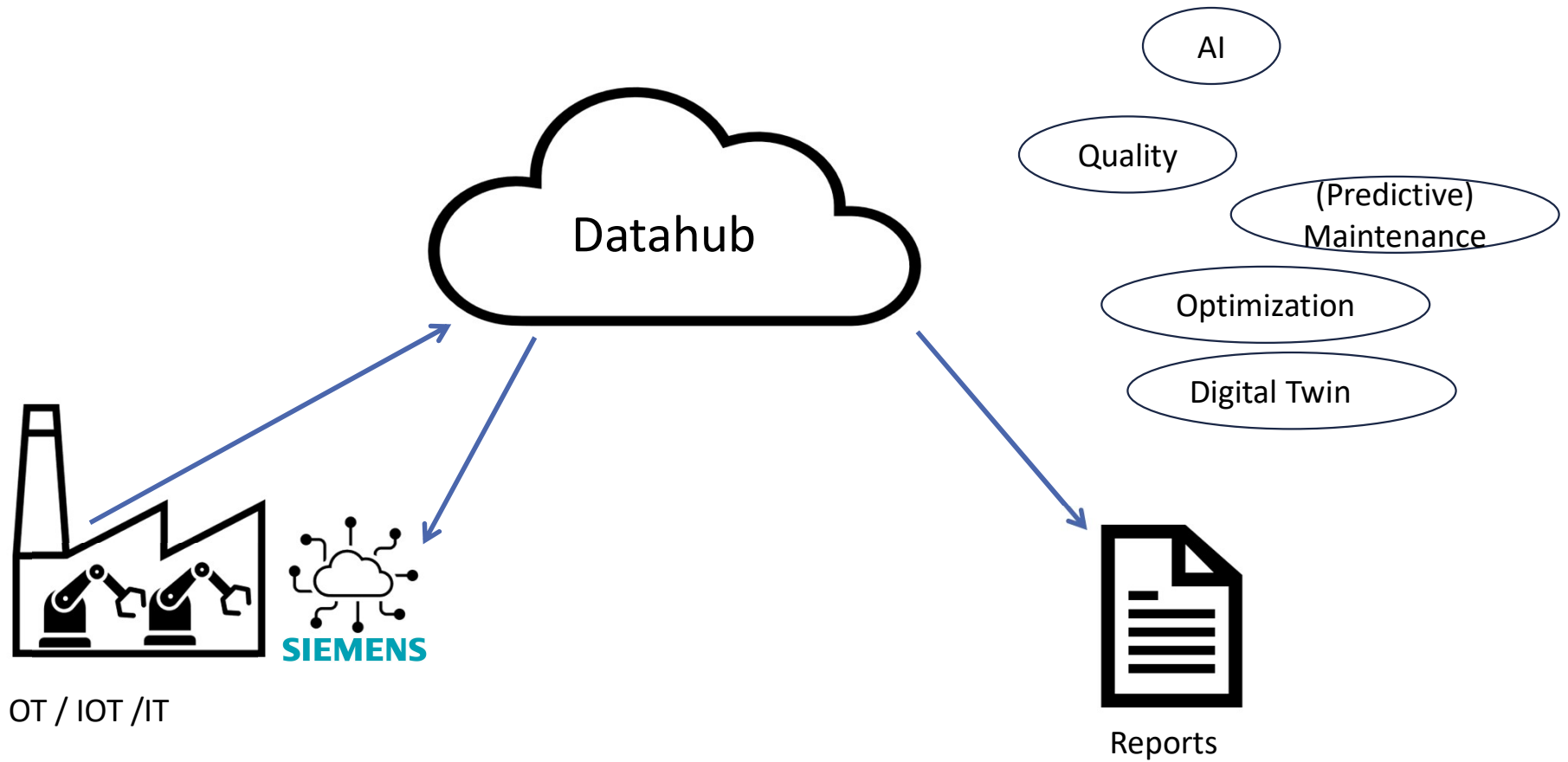
# High Level Platform Architectuur



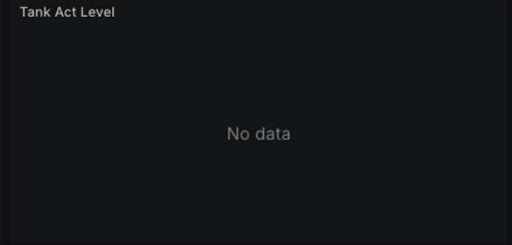
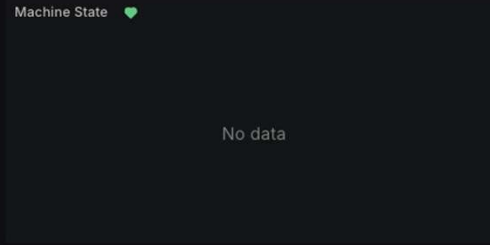
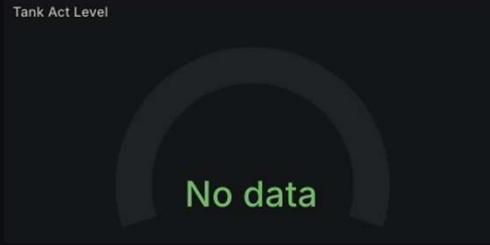
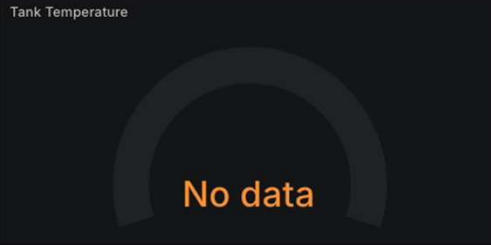
# High Level Platform Architectuur



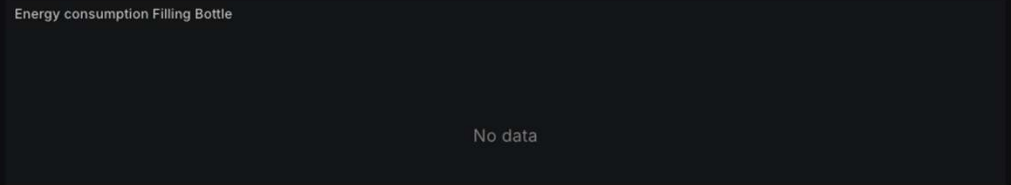
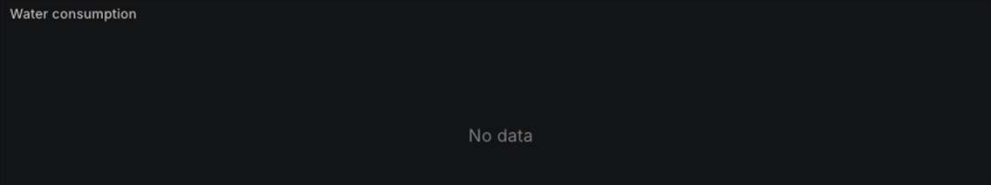
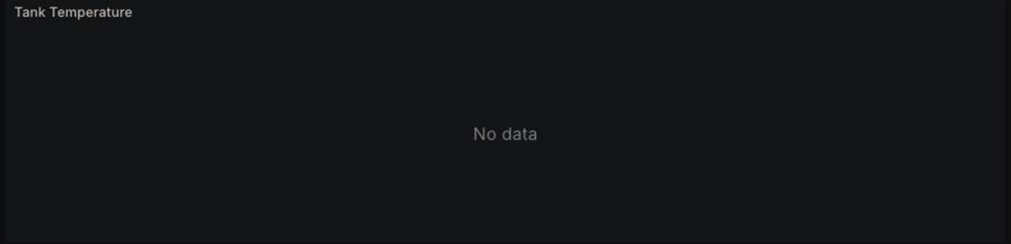
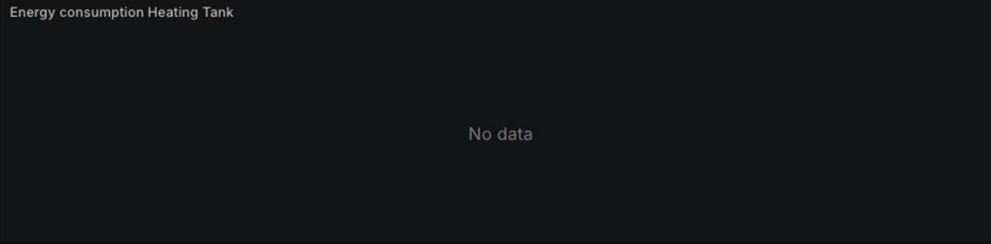
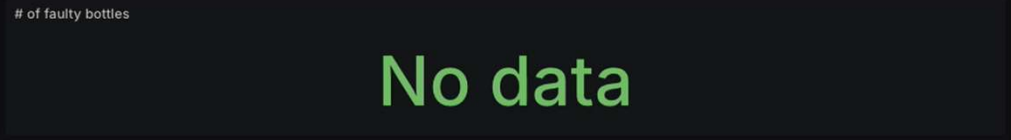
## Schematic View



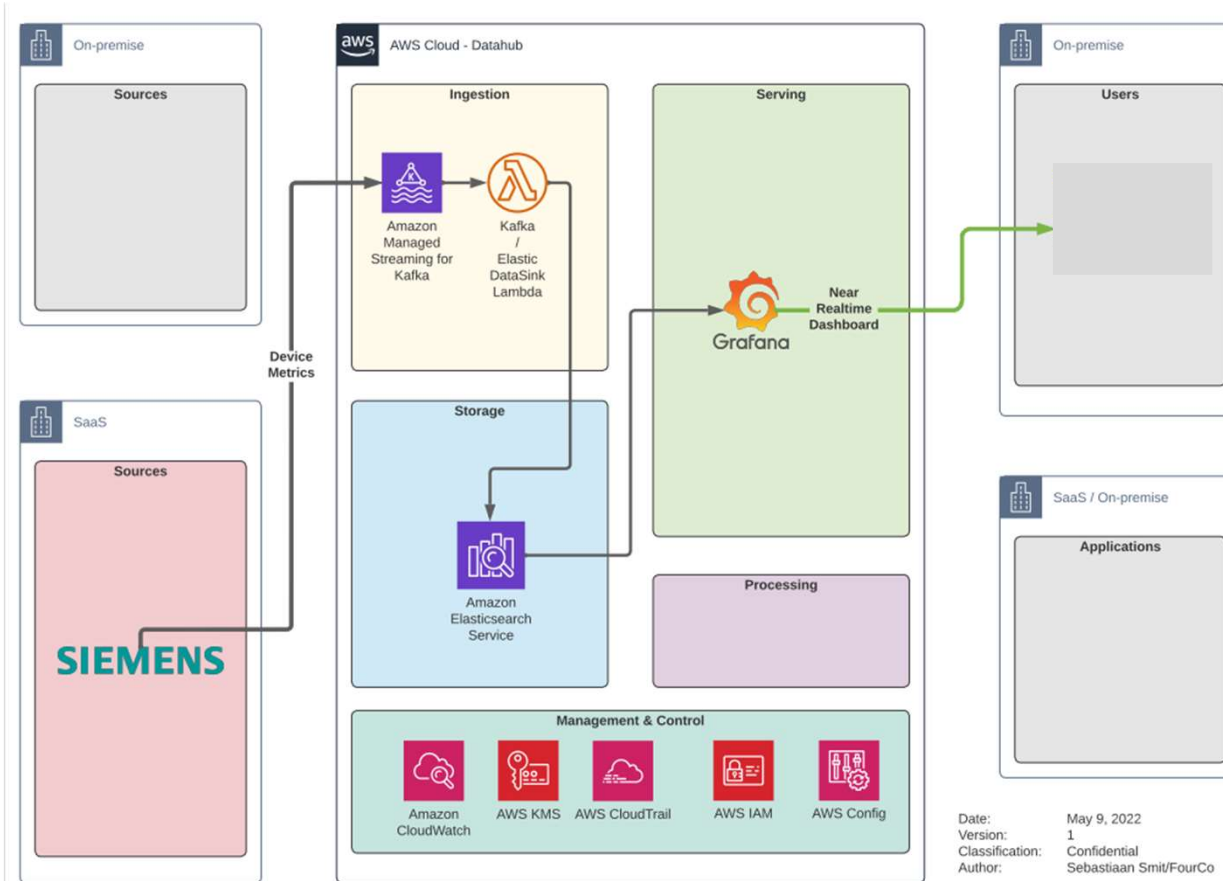
~ Small overview



~ Tank Simulation



# Example Setup



Date: May 9, 2022  
Version: 1  
Classification: Confidential  
Author: Sebastiaan Smit/FourCo



## AI requires new cloud infrastructure, so how to start?

Promise: your own cloud based datahub up and running in 3 weeks:

- Proven setup
- Your ownership, you are in control
- 80% out of the box, 20% adjusted to your personal requirements
- Knowledge transfer
- Optional: managed and maintained by FourCo

FME PLATFORM AI FOR INDUSTRY

**BEDANKT VOOR JE AANDACHT!**

**Meer informatie:**

- Joost Willems – Siemens: [joost.willems@siemens.com](mailto:joost.willems@siemens.com)
- Meyad Brojerdyan – Siemens: [meyad.brojerdyan@siemens.com](mailto:meyad.brojerdyan@siemens.com)
- Arjen van Wijngaarden – FourCo: [arjen@fourco.nl](mailto:arjen@fourco.nl)

**FME Platform AI for Industry:**

Patrick Blommerde – FME: [patrick.blommerde@fme.nl](mailto:patrick.blommerde@fme.nl)

# FME AI FOR INDUSTRY JAAAREVENT



**Bedankt voor  
je aandacht!**