# SmartFactoryOWL goes OI4

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IOSB-INA

# Agenda:

**12:30**

- Welcome and Introduction

- OWL Partners

- Challenges / Motivation

- SmartFactoryOWL goes OI4

- Next Steps

- End

**13:00**

# Welcome and introduction

**Sascha Heymann, Fraunhofer IOSB-INA**

- **Born 1985 in Herford (OWL),**

- **Studied electrical engineering and computer engineering at the Ostwestfalen-Lippe University of Applied Sciences in Lemgo,**

- **Since 2015, he has been a research associate for technology transfer and innovation management at the Fraunhofer IOSB-INA Institute for Industrial Automation.**

- **His main task at Fraunhofer and at the SmartFactoryOWL office in Lemgo is technology transfer between industry and research.**

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# it´s OWL – Technology Region OWL

## Excellence Cluster in Ostwestfalen - Lippe

- With almost 300 companies and over 42,000 employees, mechanical engineering and automation technology are core competencies of the OWL region.

- The region is characterized by a willingness to cooperate, a trusting relationship with one another and strong networking.

**Bielefeld:**
Kognition
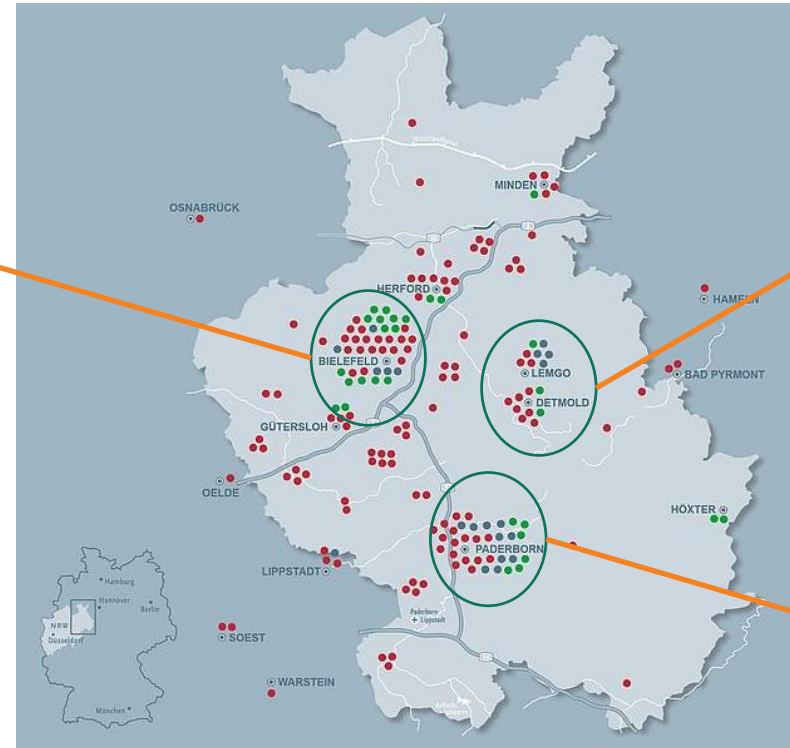
**Lemgo:**
Automation/
Industrial IT

**Paderborn:**
Mechatronics



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# Valuable partners, enriching contacts and new impulses

- Network for Mechanical Engineering, Automation and Production Technology in OWL

- Company-driven association, founded in 2003

- Strongly networked, both in the region and beyond

- Sustainable, independent, future-oriented

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# owl maschinenbau
## Network of competences

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# Part of a dynamic environment development

# CENTRUM INDUSTRIAL IT (CIIT)
Science-to-business center for industrial automation

Bundled expertise in the areas of industrial automation & digitization

Think tank for joint innovations

Application-oriented test factory bringing theory to the shopfloor

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# CENTRUM INDUSTRIAL IT (CIIT)
## Our partners

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# Fraunhofer IOSB-INA in Lemgo

www.iosb-ina.fraunhofer.de – Institute for Industrial Automation

**2009** founded; 2012 first application center of the Fraunhofer Gesellschaft in cooperation with HAW
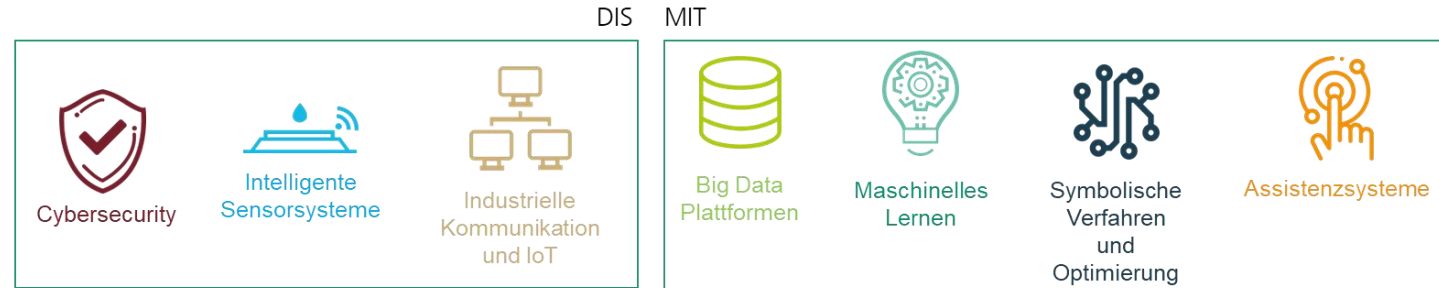
**7** Areas of expertise

**7.5** million euros Budget (2021)
- Operations and investments
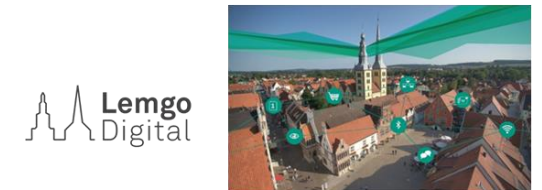
**2** Real labs (SmartFactoryOWL, Lemgo Digital)

**98** Employees (as of 06.2022)

DIS   MIT

Cybersecurity   Intelligente Sensorsysteme   Industrielle Kommunikation und IoT

Big Data Plattformen   Maschinelles Lernen   Symbolische Verfahren und Optimierung   Assistenzsysteme

**Anwendung** in zwei Domänen:

Industrie   FUTURE CITY SOLUTIONS

**Reallabore:**

Smart FactoryOWL

Lemgo Digital

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# SmartFactoryOWL
## Industrie 4.0 Reallabor in Ostwestfalen-Lippe



**5000** — **International visitors annually**
from industry, politics, science and society

**2000** — **sqm**
of which 800 sqm on the shopfloor

**28** — **Demonstrators**
Status February 2023

**5G** — **Model factory**

**KI** — **Real laboratory, acceleration area for start-ups, 20 student workstations**

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# Challenges
## Connected Factories & Plattform Economy



- **Complexity**

  - The complexity of factory equipment /components is increasing at an ever-faster rate
  - Perceived complexity must decrease due to skills shortages

- **Alternative supply chains and resilience require additional resources**

- **Set-up-time has an ever-increasing impact on convertibility**

- **Software updates and enhancements are the basis for trust in components**

- **Closed- / Vendor- platforms inhibit growth**

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# Motivation – Our Goal

Plattform Industrie 4.0: Industry 4.0 and sustainability



5 of 10 theses on how digital business models promote sustainability in Industry 4.0

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# Motivation – Our Goal

Plattform Industrie 4.0: Industry 4.0 and sustainability - 5 of 10 theses on how digital business models promote sustainability in Industry 4.0

*"Digital marketplaces are becoming the enabler of sustainability."*

*"De-materialization through digitization reduces resource consumption."*

*"Service-based business model patterns form the basis of circular economies."*

*"Information capability is becoming the value proposition of sustainable business models."*

*"Open partnership models are the driver of circular economies."*

Quelle: Publikation 9/2021 - Arbeitsgruppe „Digitale Geschäftsmodelle" der Plattform Industrie 4.0

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# Motivation - Digital Marketplaces
## Factory Operators

- **How to find a seriously open system?**

- **How to pick the best APPs and combine them?**

- **How to deal with my limited resources?**

- **How to update my machines in the field?**

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# Motivation
## Mechanical Engineers



- **Periphery developer (Sensors etc. )**

  - How to create APPs for my Products?

  - How can my APPs run on any Edge Hardware?

- **Edge/PLC Hardware Developer**

  - How to create a shared IIOT market?

  - How to sell more hardware functions?

  - How to focus on my core abilities?

- **Machine Builder**

  - Where can I get ready-made solution modules?

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# Motivation
## APP Developer / OEMs

- **How to promote our APP?**

- **Time to market?**

- **How to test pricing models?**

- **How to sell additional features?**

- **How to get the APP to our customers?**

- **How to update the APP?**

- **Reach of marketplace?**
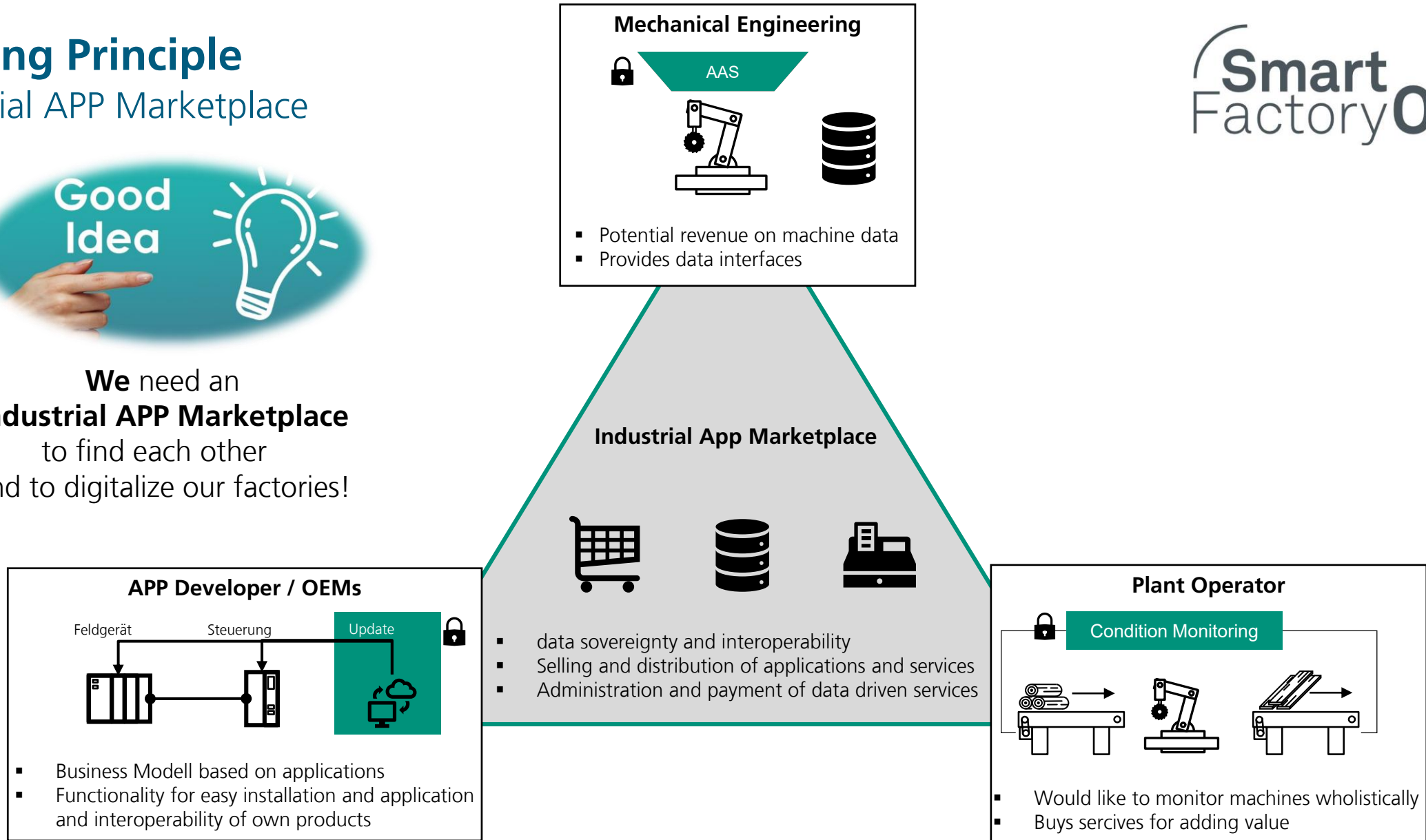
- **What hardware to use?**

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# Guiding Principle
## Industrial APP Marketplace

**We** need an
**Industrial APP Marketplace**
to find each other
and to digitalize our factories!

### Mechanical Engineering

AAS

- Potential revenue on machine data
- Provides data interfaces

### Industrial App Marketplace

- data sovereignty and interoperability
- Selling and distribution of applications and services
- Administration and payment of data driven services

### APP Developer / OEMs

Feldgerät    Steuerung    Update

- Business Modell based on applications
- Functionality for easy installation and application and interoperability of own products

### Plant Operator

Condition Monitoring

- Would like to monitor machines wholistically
- Buys sercives for adding value
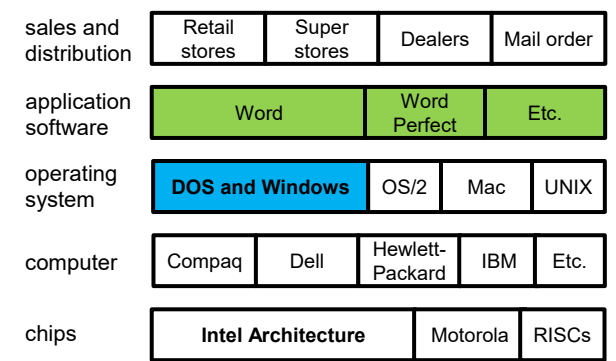
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# Using lessons learned from the past
The unbundling of the computer industry led to enormous growth

**The old vertical computer industry - around 1980**
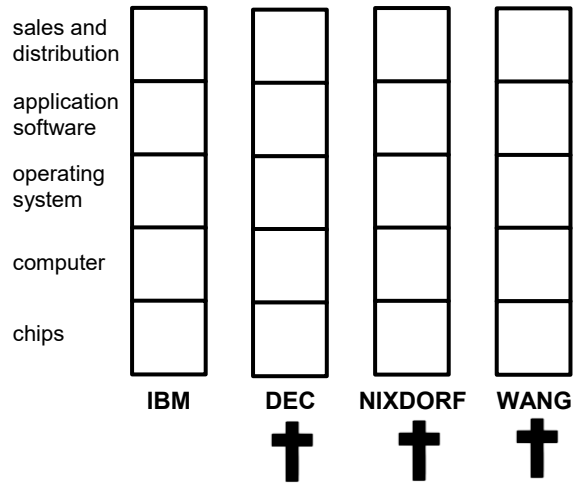
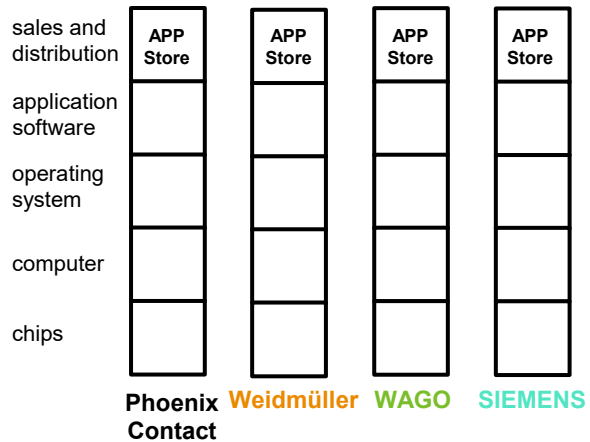**The new horizontal computer industry - as of ca. 1995**

| | | | | |
|---|---|---|---|---|
| sales and distribution | | | | |
| application software | | | | |
| operating system | | | | |
| computer | | | | |
| chips | | | | |

**IBM DEC NIXDORF WANG**

| | | | | |
|---|---|---|---|---|
| sales and distribution | Retail stores | Super stores | Dealers | Mail order |
| application software | Word | | Word Perfect | Etc. |
| operating system | DOS and Windows | | OS/2 | Mac | UNIX |
| computer | Compaq | Dell | Hewlett-Packard | IBM | Etc. |
| chips | Intel Architecture | | Motorola | RISCs |

BEST BUY

Lotus

Microsoft

COMPAQ

Intel

GROWTH

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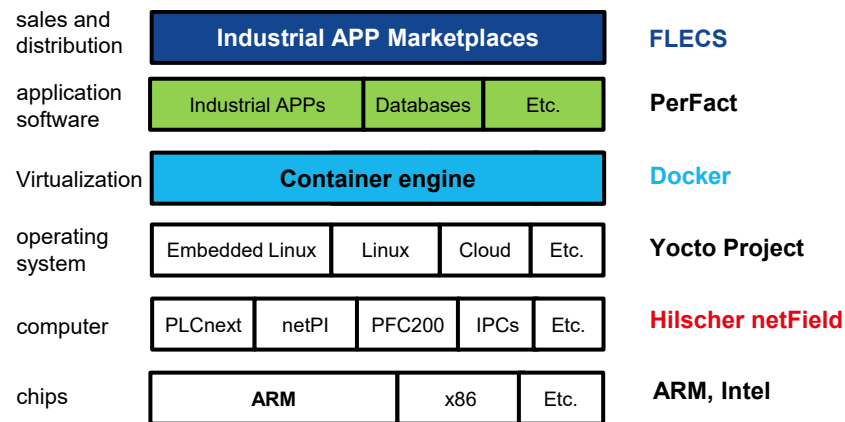February 28th - March 2nd

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# Using lessons learned from the past

The unbundling of the automation industry will also lead to enormous growth
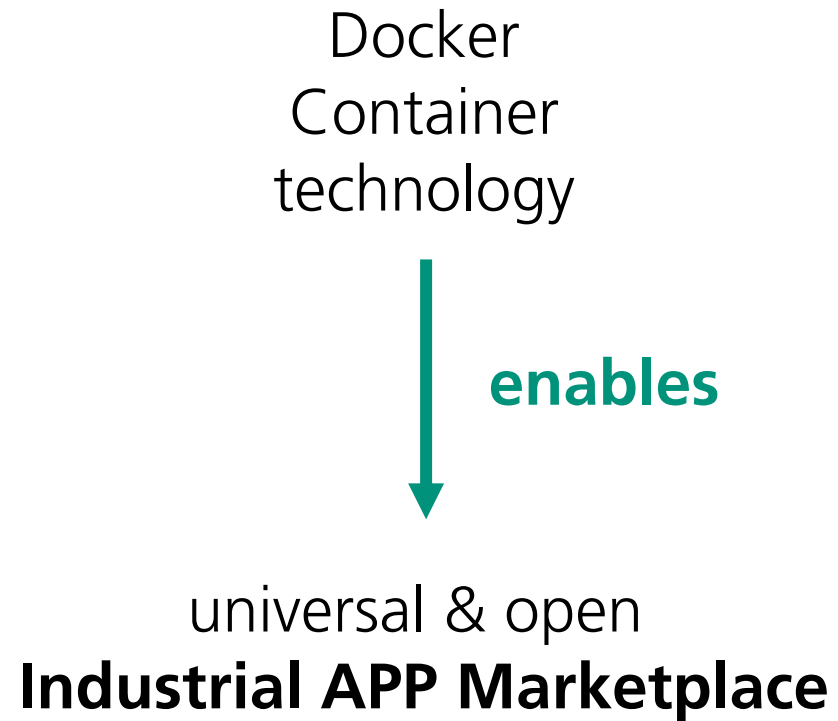
## Many company eco systems



| | APP Store | APP Store | APP Store | APP Store |
|---|---|---|---|---|
| sales and distribution | | | | |
| application software | | | | |
| operating system | | | | |
| computer | | | | |
| chips | | | | |

**Phoenix Contact**   **Weidmüller**   **WAGO**   **SIEMENS**

## One industry eco system

| | | |
|---|---|---|
| sales and distribution | **Industrial APP Marketplaces** | **FLECS** |
| application software | Industrial APPs · Databases · Etc. | **PerFact** |
| Virtualization | **Container engine** | **Docker** |
| operating system | Embedded Linux · Linux · Cloud · Etc. | **Yocto Project** |
| computer | PLCnext · netPI · PFC200 · IPCs · Etc. | **Hilscher netField** |
| chips | **ARM** · x86 · Etc. | **ARM, Intel** |

Phoenix Contact PLCnext   WAGO PFC200   Weidmüller UC20   Raspberry Pi based

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# The solution is obvious
Container technology

Docker
Container
technology

**enables**

universal & open
**Industrial APP Marketplace**



DOCKER

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# New possibilities
## Platform independence / Roll-out



Industrial APP Marketplace | APP Roll-out

Cloud: Amazon, Microsoft, Google

On-Premises:
- Kubernetes Cluster
- Server
- Industrial PC
- Edge/Field

Targets

DOCKER

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# Ecosystem
## IAM

# Three pillars
IAM



**Industrial APP Marketplace**

**APP Roll-out**

**Targets**

Zone 1

Zone 2

HawkBit
Bosch Rollouts
-> Open Source

HawkBit Client
Hbloader
-> Open Source

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# IAM two Concepts for deplyment

## Concept 1:
## Online IoT / M2M Setup
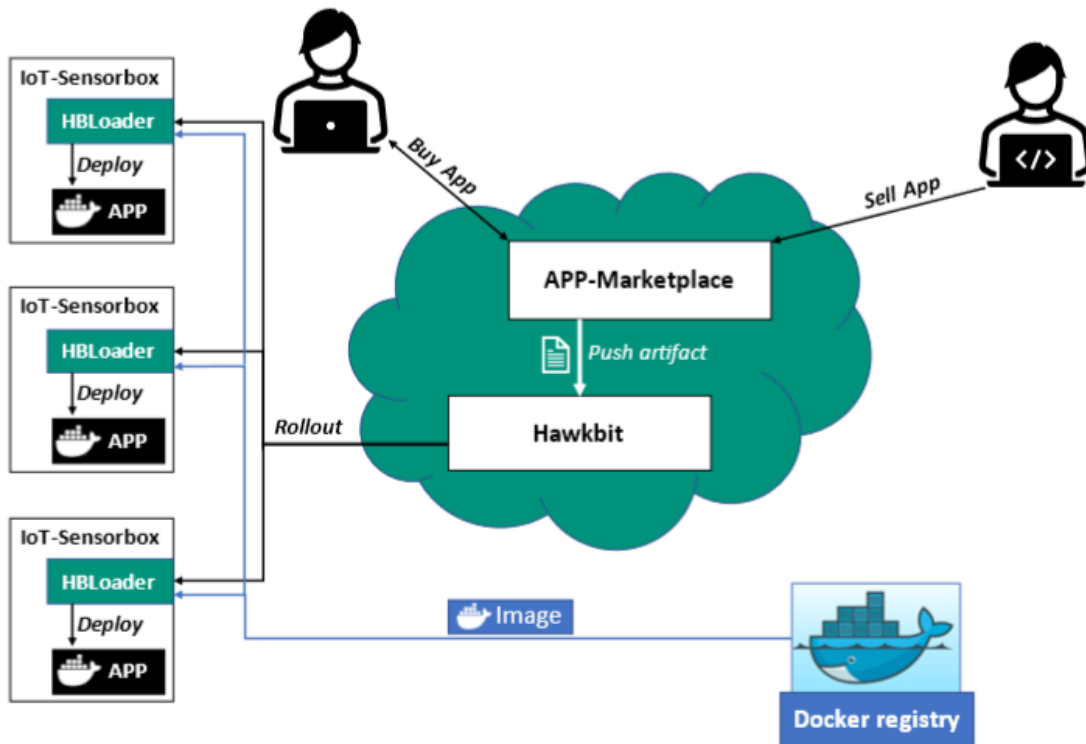
## Concept 2:
## Offline Shopfloor with EDGE Setup
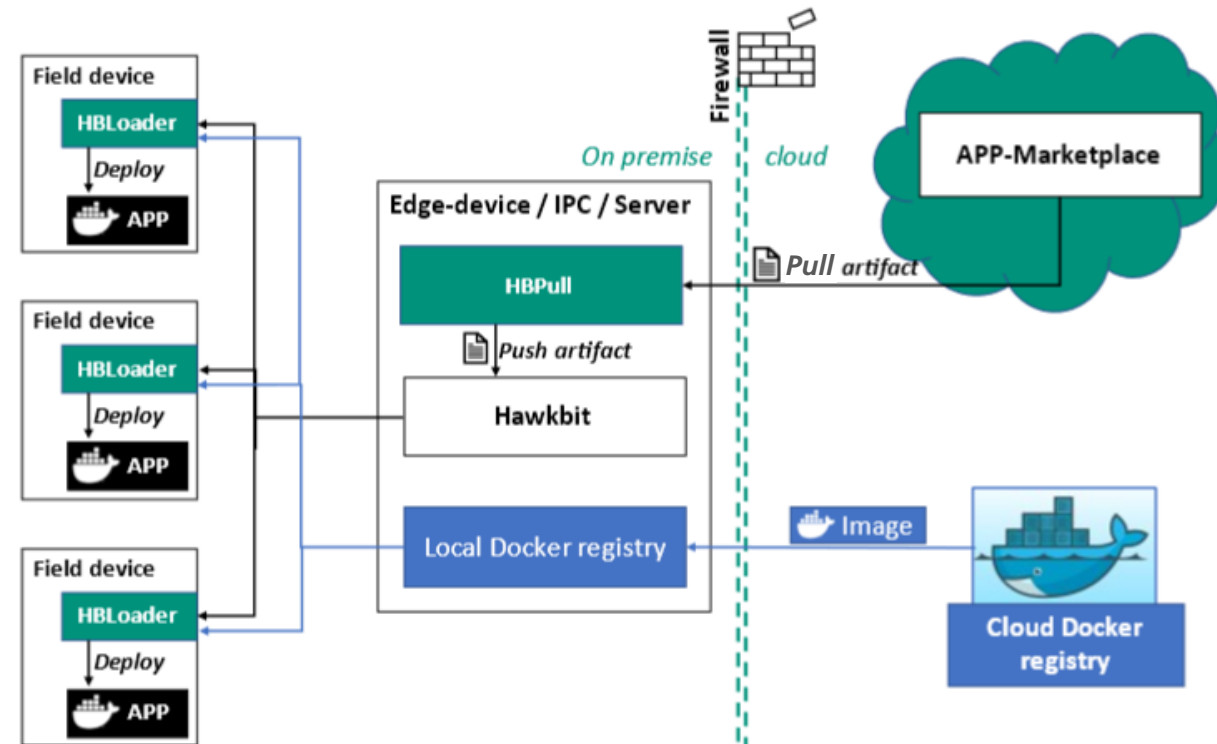
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## IAM Demonstrator

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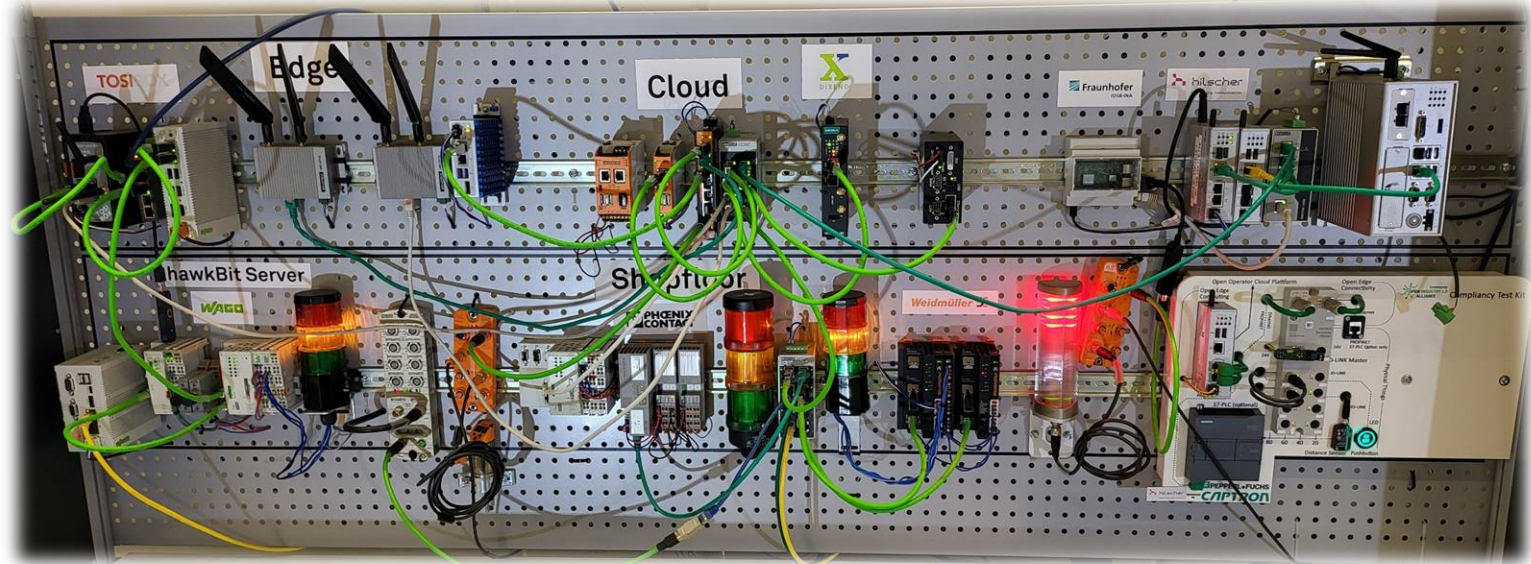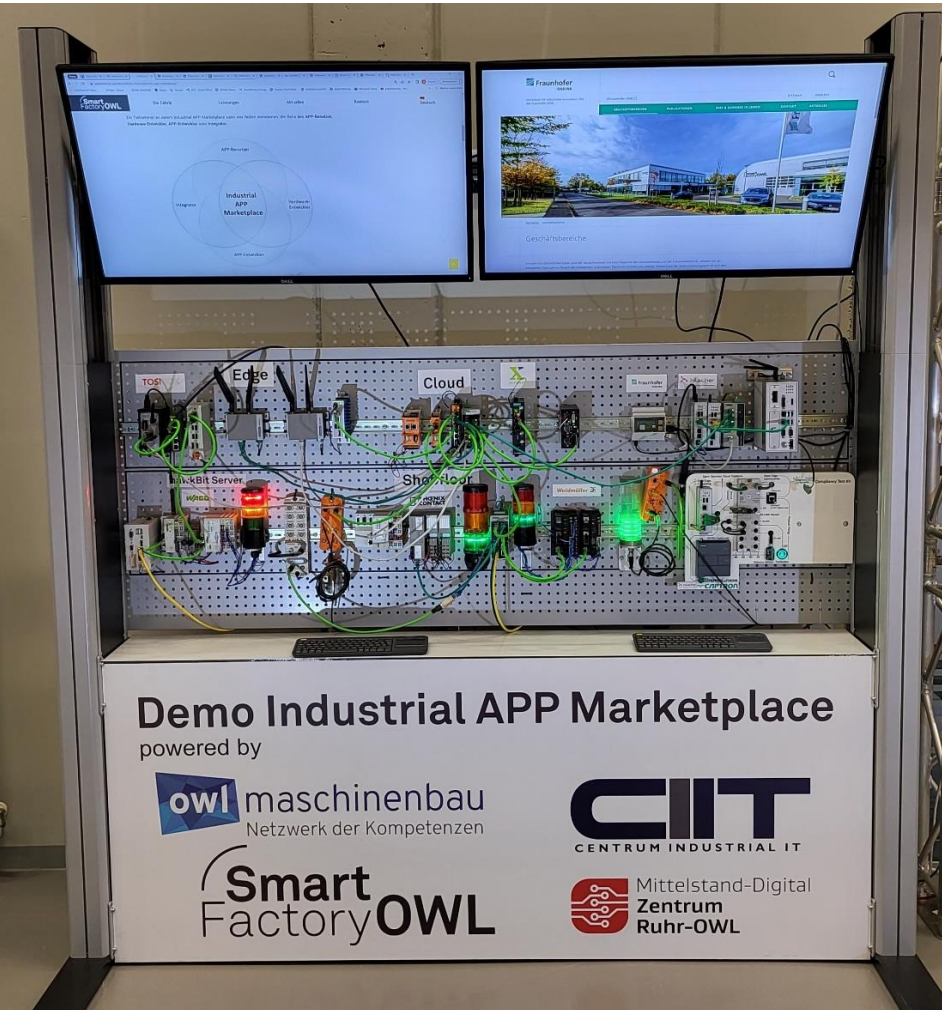
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## IAM Demonstrator

## Traffic light use case in the SmartFactoryOWL
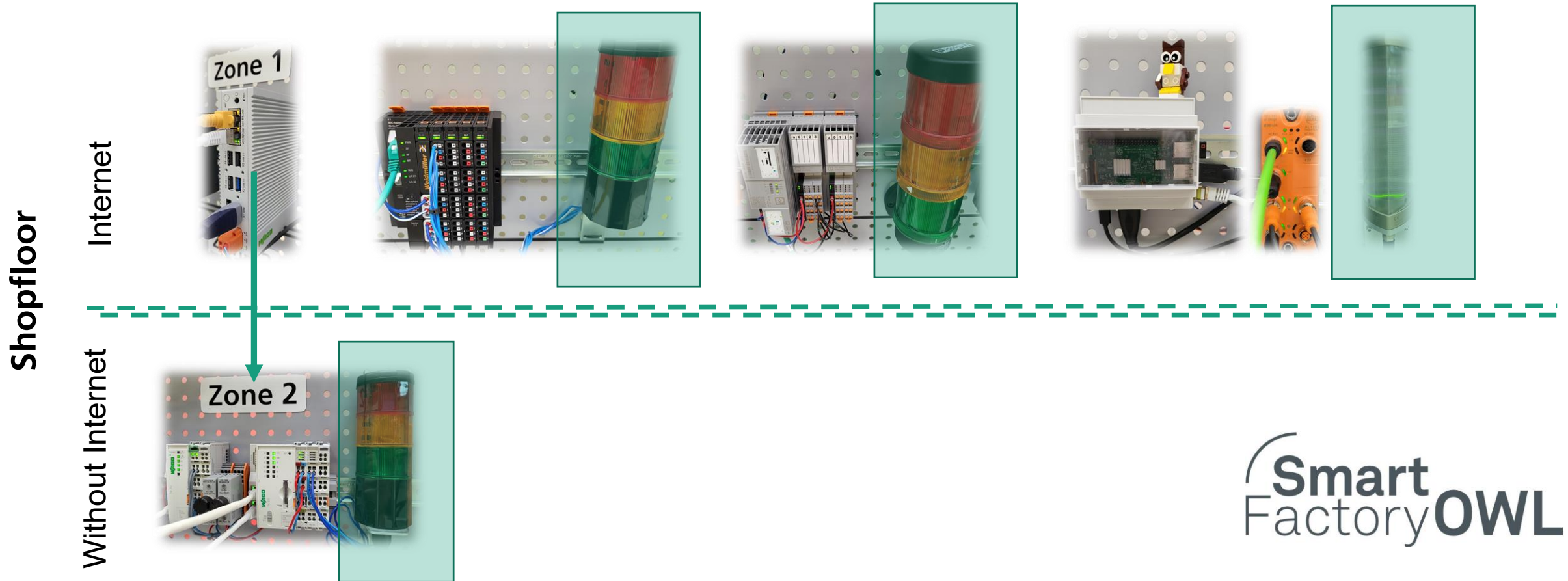


**Shopfloor**
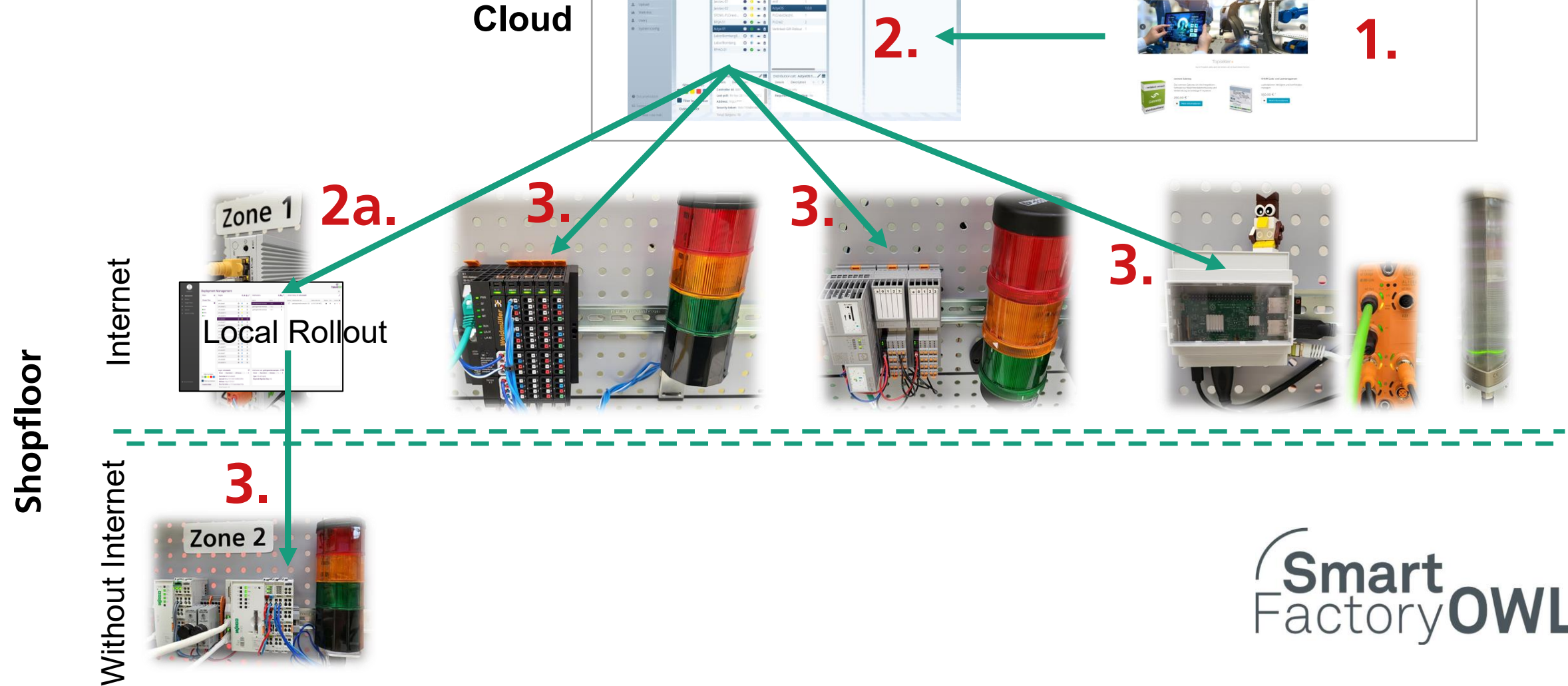
Internet

Without Internet

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## IAM Demonstrator

Cloud Rollout

Industrial APP Marketplace

Cloud

1.

2.

2a.

3.

3.

3.

Zone 1

Internet

Local Rollout

Shopfloor

Without Internet

3.

Zone 2

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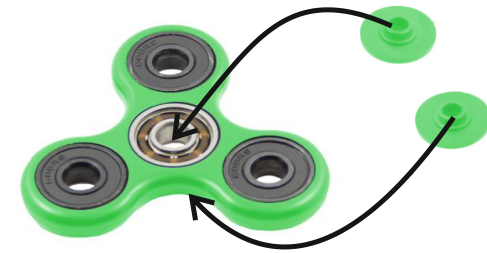
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## VDMA Demonstrator @SmartFactoryOWL (Home Base)



Fidget Spinner:

LINK to the Demonstrator: https://my.matterport.com/show/?m=PuRYVM8a8xr&sr=-2.75,-1.09&ss=6

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# SmartFactoryOWL goes OI4
VDMA Demonstrator @SmartFactoryOWL (Home Base)

## VDMA R+A IAS Working Group:



André Mankowski

inIT - Institut für industrielle
Informationstechnik der TH-OWL
eMail: andre.mankowski@th-owl.de

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The virtual VDMA OPC UA Demonstrator as a Digital Twin of a real assembly machine in which the viewer is virtually immersed.



LINK to the 3D Model:
https://digitaltwin-vdma.org

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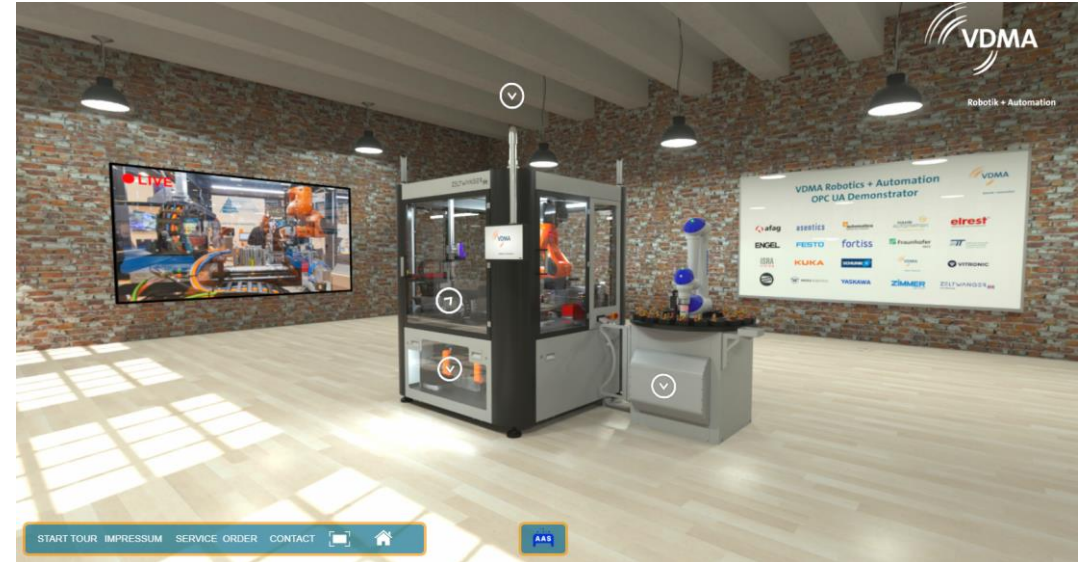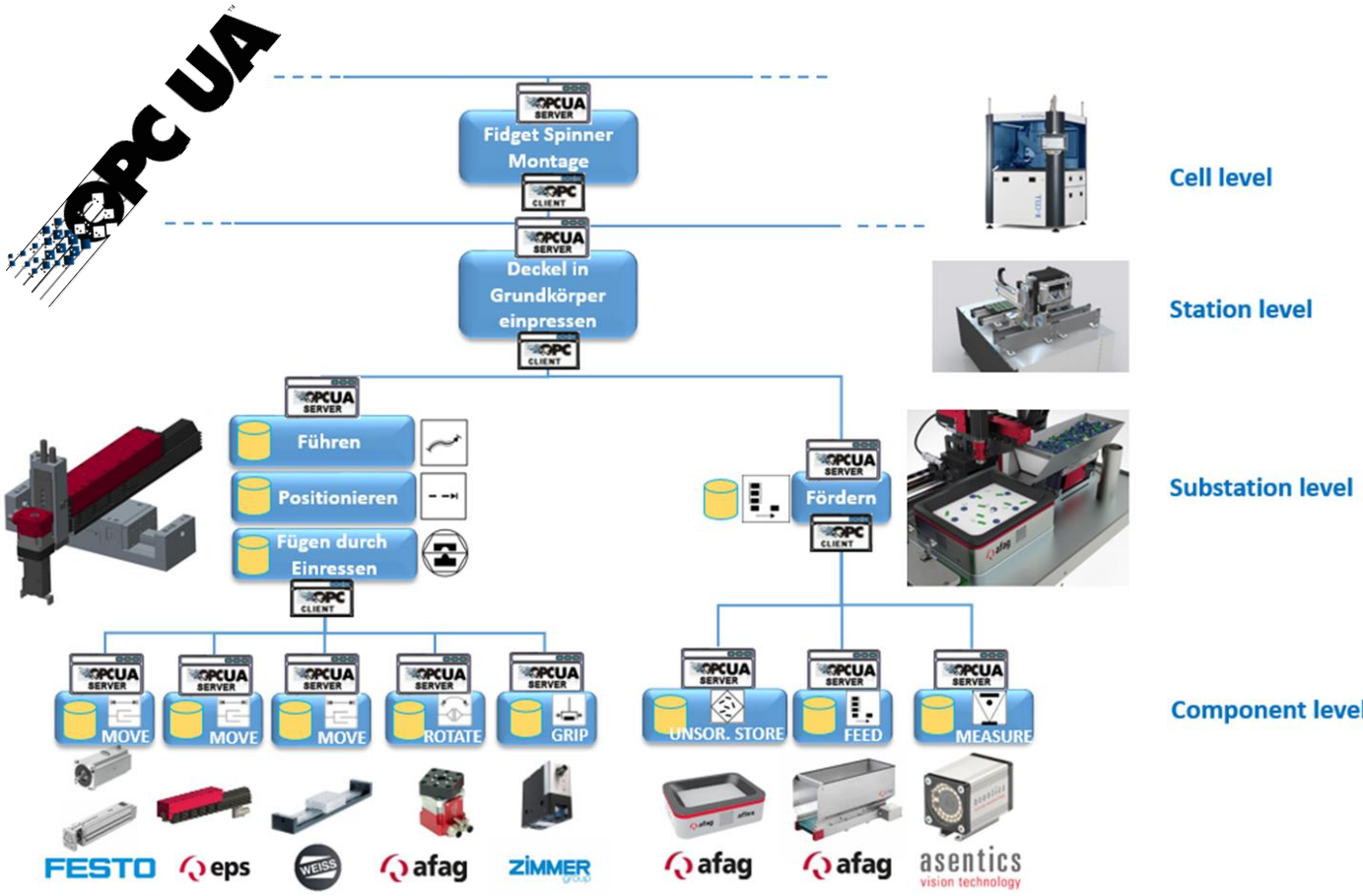
# SmartFactoryOWL goes OI4
## VDMA OPC UA Demonstrator as Marketplace Demonstrator?!

2 Production plant parts
    11 Substations
        19 Controllers / PLCs
   51 OT components

**ca. 60 OPC UA Nodes!**

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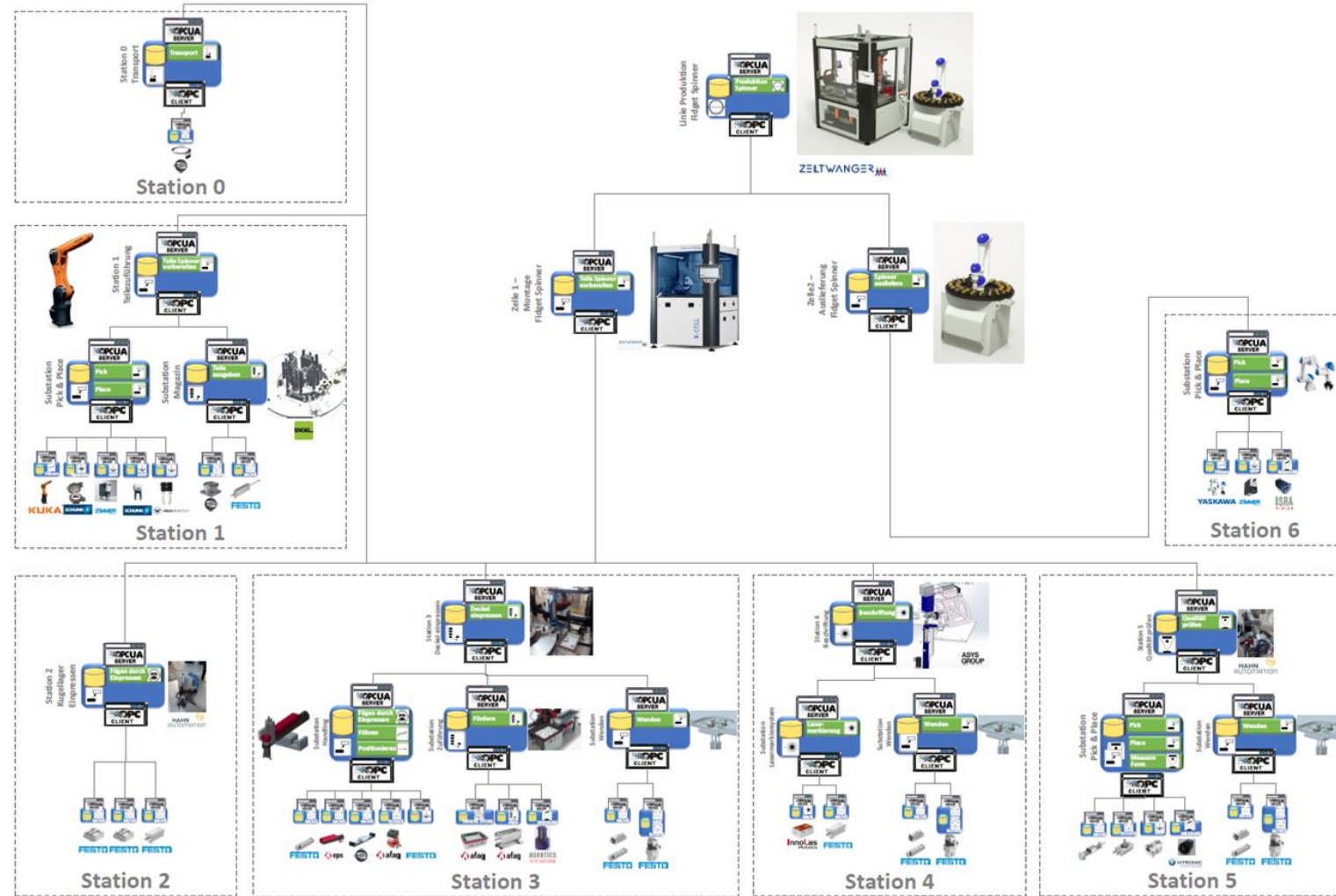
# SmartFactoryOWL goes OI4
## Data-Driven Business Models

**Newly set up research group at Fraunhofer IOSB-INA:**

- Combination of **leading technology know-how**, **business model expertise**, and knowledge about **business processes** and **organisation**

- We **support** and **accompany partners** in **identifying**, **developing**, **marketing**, and **operating data-driven business models**

- Assessment of **market potential** and **concept studies**

- Portfolio of **solutions** for specific **use cases** of data-driven business

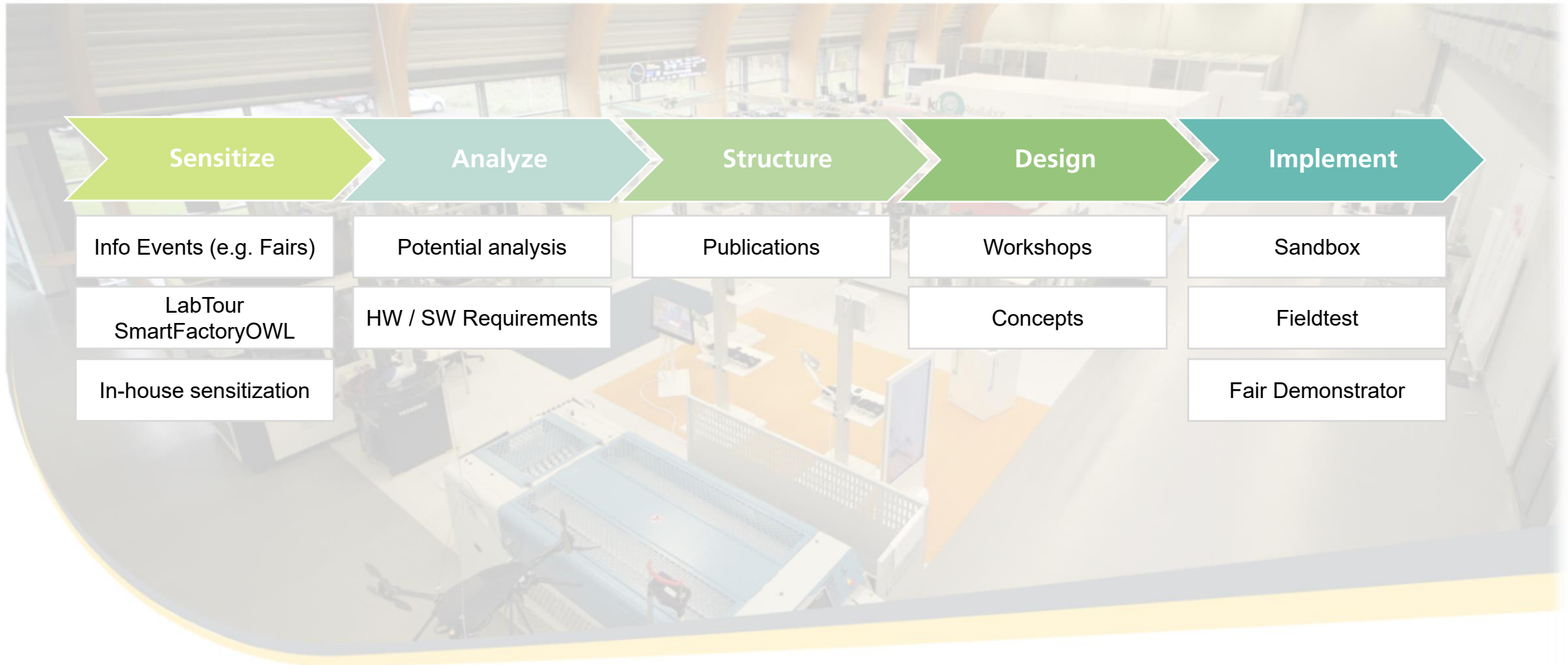- **Scientific monitoring** and support for partners interested in implementing **end-to-end solutions**
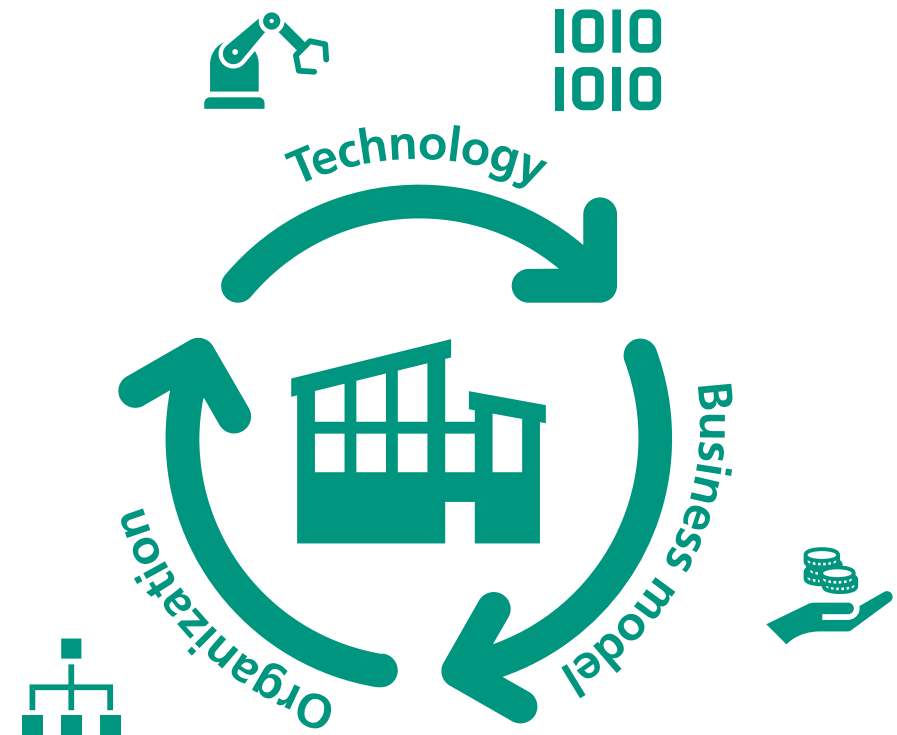
▶ **Interested in monetizing industrial data and developing new data-driven business models?**

**Get in touch!**

Technology

Business model

Organization

© Fraunhofer IOSB-INA | Prof. Dr. Tobias Schäfers

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# Would you like to become active?

## Support for the systematic implementation of marketplace technologies

| Sensitize | Analyze | Structure | Design | Implement |
|---|---|---|---|---|
| Info Events (e.g. Fairs) | Potential analysis | Publications | Workshops | Sandbox |
| LabTour SmartFactoryOWL | HW / SW Requirements | | Concepts | Fieldtest |
| In-house sensitization | | | | Fair Demonstrator |

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# Thank you
## for your attention!

Kontakt:

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