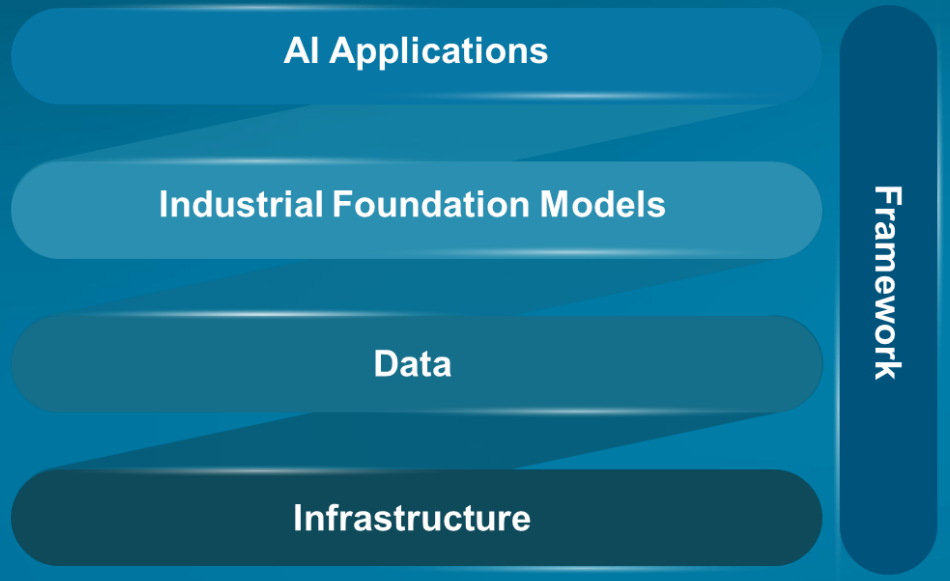
PLATTFORM INDUSTRIE 4.0

Scaling Data Spaces in the context of Industrial AI

Working together to apply and scale Industrial AI

Relaunch of Plattform Industrie 4.0 towards „Industry4AI“





Board Meeting on 03.07.2026

Members of the new leadershop team of Plattform Industrie 4.0 (v.l.n.r.):

Dr. Sebastian Beck (Festo SE + Co KG), Alexander Jakschick (VDMA e. V.), Dr. Thomas Koenen (BDI e. V.), Dr. Daniel Boese (emb-papst Gruppe), Dr. Tanja Rückert (Robert Bosch GmbH), Cedrik Neike (Siemens AG), Henrik Schunk (SCHUNK SE + Co KG), StS Rolf-Dieter Jungk (BMFTR), Dr. Raymond Wittmann (BMW AG), Elke Anderl (Deutsche Telekom AG), Stephan Ilaender (Schwarz Digits KG), Dr. Thomas Schneider (Trumpf SE + Co KG), BMin Katherina Reiche (BMWE), Klaus Kappen (Rheinmetall), Dr. Dirk Elvermann (BASF SE), Kathrin Günther (Tennet TSO GmbH), Dr. Bernhard Rohleder (Bitkom e. V.), Rainer Brehm (Siemens AG), Prof. Dr. Claudia Eckert (Plattform Lernende Systeme/Acatech), Ulrich Leidecker (ZVEI e. V.), Wolfgang Weber (ZVEI e. V.), Sina Scheidle (Mercedes-Benz AG), Sebastian Steinhäuser (SAP SE), Prof. Dr. Holger Hanselka (Fraunhofer-Gesellschaft). Der Leitungsrunde gehören darüber hinaus Airbus, DMG Mori und die Volkswagen AG an.

An integrated AI stack makes sovereign Industrial AI scalable

PLATTFORM INDUSTRIE 4.0

MISSION **Plattform Industrie 4.0 drives the systematic, safe, interoperable, and scalable use of artificial intelligence in industrial value creation systems.**

Across all layers of the AI technology stack

AI Applications	robust • explainable • integrable • compliant with regulations
Industrial Foundation Models	Foundation- and domain-specific models • physics-informed
Data	Interoperability • Data Alliances • Industry-grade Datasets
Infrastructure	AI Gigafactories • Cloud-Edge • Brownfield integration

FRAMEWORK

FRAMEWORK CONDITIONS

- Regulatory sandboxes & real-world labs
- Practical EU regulatory frameworks
- Cybersecurity, trustworthiness, functional safety

The Plattform Industry 4.0 is expanding with additional working groups for cross-functional topics and the AI layers

PLATTFORM INDUSTRIE 4.0

AI Projects
e.g. IPCEI-AI



Status, Findings& Results

Initiate new Projects

INDUSTRIAL AI STACK
„Layer Boards“

NEW

- Layer Board AI Applications
- Layer Board Foundation Models
- Layer Board Data
- Layer Board Infrastructure

Layer Board Framework

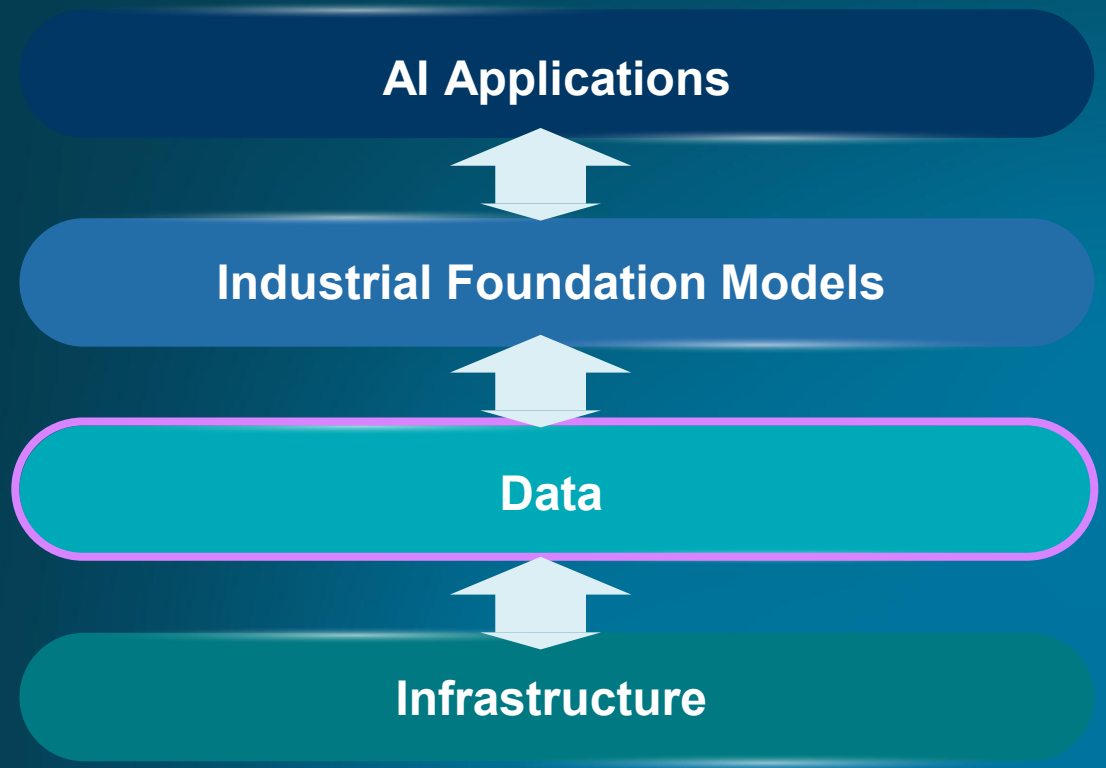
Use Cases & Requirements

WG-specific questions

Working Groups

- WG 1: Reference Architecture and Standards
- NEW **AG 2: Production**
- AG 3: Security of Collaborative Systems
- AG 4: Legal Framework
- AG 5: Work, Education, and Training
- AG 6: Digital Business Models
- NEW **AG 7: SMEs, Startups, and Scaling**
- NEW **AG 8: International Cooperations**

Layer 2 – Data
Position within the Industrial AI Stack



Strategic Importance:

- Foundation for industrial foundation models, specialized AI applications & autonomous agents
- Transforms raw data into usable industrial knowledge

Trade-offs:

- **Data Sovereignty ↔ Data Sharing**: Sharing knowledge without giving up control
- **Competition ↔ Collaboration**: A shared database despite proprietary interests
- **Standardization ↔ Competitive differentiation:** Consistent semantics for heterogeneous assets

Goal:

- “Industry-grade datasets” as the foundation for robust, transparent, and reliable industrial AI applications

Data Layer
Specifics of industrial AI applications

Unlike generic AI, industrial AI applications must operate reliably in real-world, safety-critical value creation processes

Industrial AI needs context:

- Data originates from assets, machines, and processes and along value chains
- Physical plausibility and domain knowledge are mandatory
- Incorrect predictions affect quality, availability, safety, and compliance

Data barriers for AI:

- Availability & quality: incomplete metadata, scarce failure-case data.
- Heterogeneity & semantics: different formats and interfaces, missing contextualization and machine-readable domain know-how
- Sovereignty & trust: data is sensitive and competitively relevant

Specific data aspects:

- Data quality
- Information & data models: AAS, OPC UA Companion Spec., AutomationML, PLCopen XML, …
- Semantic vocabularies & ontologies: ECLASS, …
- Data spaces for data exchange
- Governance & Contracts
- Synthetic data (e.g., for failure data)
- Digital twins & simulation

Not exhaustive

What have we accomplished?

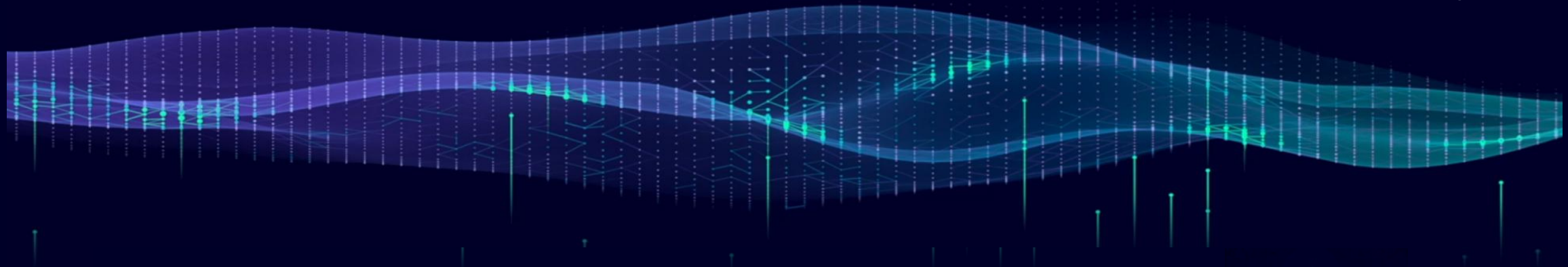
- Common Data Models / Semantics for Manufacturing Use Cases
- MX-Port Integration Architecture
- Standardized Connectors (e.g., EDC)
- International Alignment through the International Manufacturing-X Council
- Open and Industry-Ready Edge Computing Stack

(Mostly available as open source)

Gap to be closed

Where are we going?

- Interoperable data ecosystems for all industries
- Shared industrial datasets for non-differentiating process steps & data alliances
- Knowledge Fabrics
- Automatic data pipelines to create AI-ready data (real & synthetic)
- Sovereign training of AI models based on proprietary data
- Simulation framework for AI models and agents



Products | **Production** | **Machines** | **Supply Chain** | **Buildings** | **Other Industries**

International Manufacturing-X

International Manufacturing-X Council Vision

IMX will implement a federated, decentralized and collaborative data ecosystem for smart manufacturing. Open, global and cross-industry, following FAIR Data Principles



Reorganize and increase flexibility and autonomy of industrial value chains and networks.	**Resilience**
Increase efficiency and enable data-driven solutions for GHG/CO2 balancing and circular economy.	**Sustainability**
Accelerate digital innovations and enable new data-driven business models to create new value for manufacturing	**Competitiveness**

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IMX-Council has been a great success with now 15 countries. Let's build on that!

PLATTFORM INDUSTRIE 4.0





History



July 2023

Initiation
Brussels, Belgium



October 2023

Inauguration
Tokio, Japan



February 2024

Kick-off
Paris, France



November 2024

USA / CESMII



May 2025

Athens / Greece



November 2025

Copenhagen / Denmark



May 2026

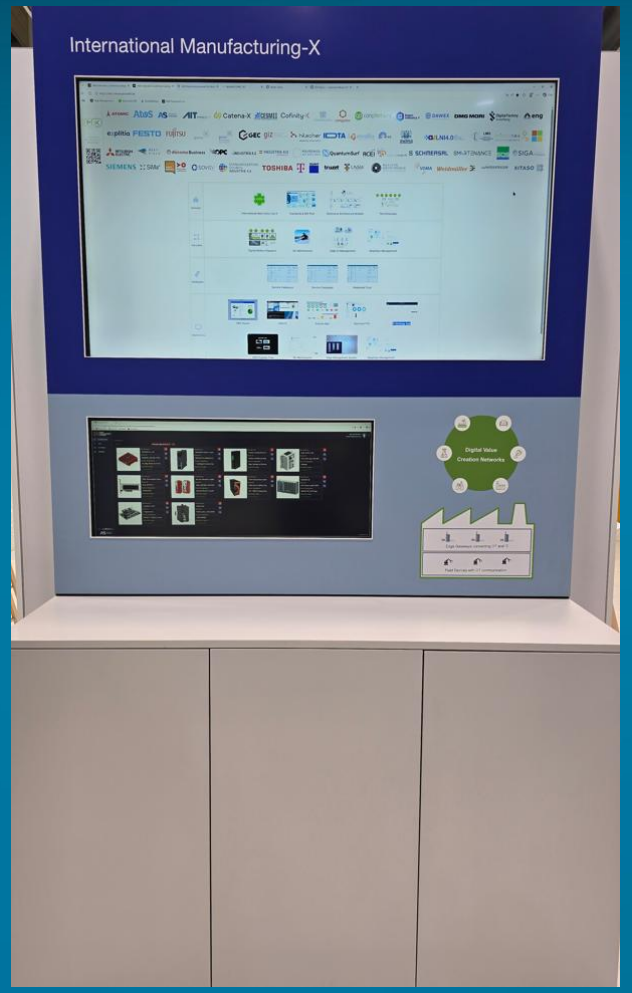
Oslo / Norway

International Manufacturing-X Council Showcase



- **15** Countries participate
- **Four** use cases (DPP, Shop Floor Management, Edge AI and Maintenance)
- **Joint** Understanding and Realization of Federated **Trustworthiness**





We need to continue working on common data standards AND prepare for Industrial AI

PLATTFORM INDUSTRIE 4.0

Global Manufacturing Initiatives		International Manufacturing-X Council
Manufacturing initiatives Plattform Industrie 4.0, CESMII, RRI, KOSMO, Industry Associations …	›	**Orchestrate and cooperate**
Infrastructure initiatives EDC/Eclipse, DATA-EX, IDSA, Gaia-X, …	›	**Influence and use**
Standards and regulations OPC UA, AAS, ECLASS, … PCF reports, Battery Passport, …	›	**Define and lobby**

Challenges ahead of us:



1. **How to harmonize different approaches**
   (e.g. MX-Port, ODS, CESMII i3X)

2. **How to make dataspaces interoperable**
   E.g. Worldwide accepted Identities

3. **How to approach AI use cases, e.g.**
   - Preparation of data for AI model training
   - Generation of synthetic data
   - Federated and distributed training of AI models
   - …

Four steps to an industrial-grade data foundation

PLATTFORM INDUSTRIE 4.0

Goal

High-quality, connected and industrial-grade data foundation

1

Expand and scale industrial data spaces

Build and scale industrial, federated data spaces.

2

Connect data spaces to AI systems

Develop reference architectures for connecting data spaces to AI systems.

3

Create shared datasets

Provide commonly usable datasets for the evaluation, validation and further development of AI models.

4

Build common knowledge fabrics

Semantic knowledge base for AI agents that makes domain knowledge and regulatory requirements machine-readable