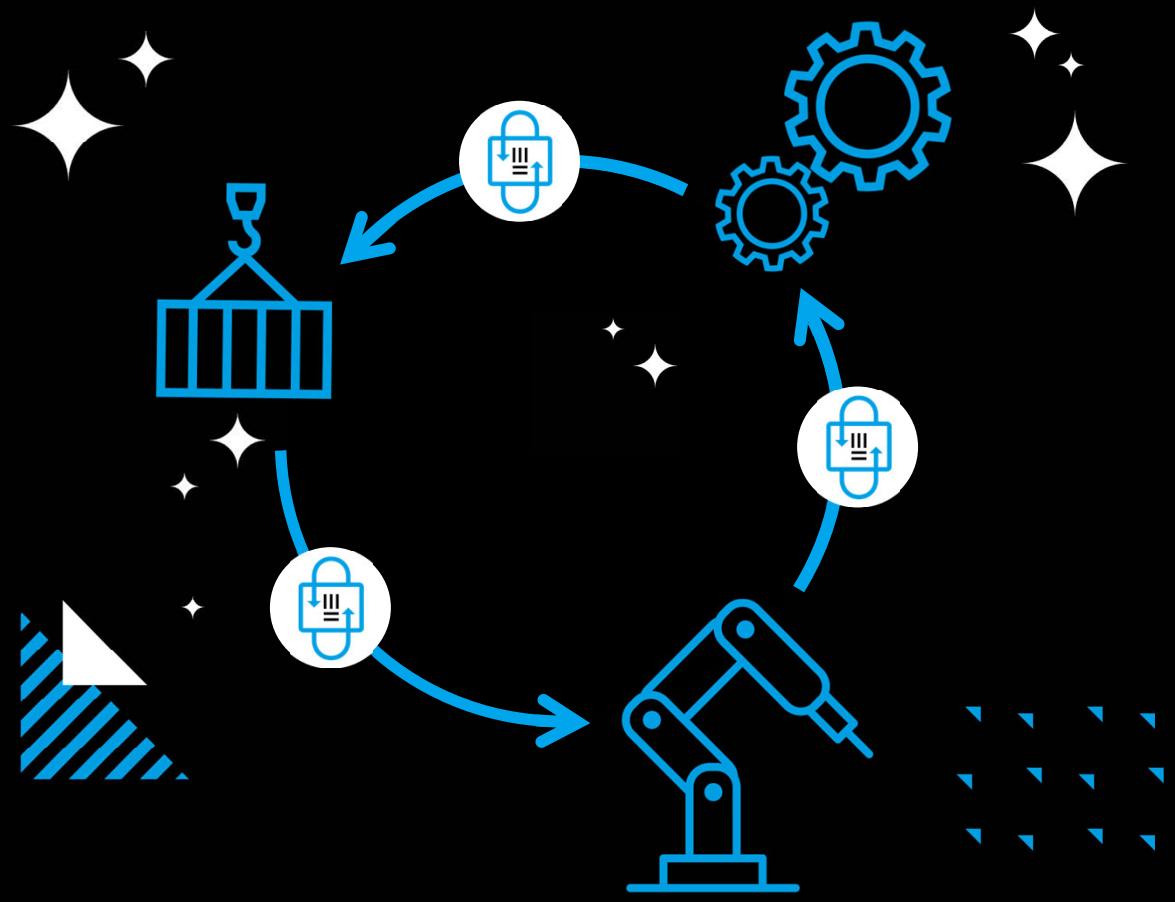
INTERNATIONAL DATA SPACES ASSOCIATION

VDMA Forum Manufacturing-X



Innovate, scale, compete with industrial data spaces

Data spaces for industry event

Hannover | April 2, 2025

HANNOVER MESSE

Innovate, scale, compete with industrial data spaces

Data Spaces for Industry event is jointly organized by:

INTERNATIONAL DATA SPACES ASSOCIATION

VDMA

On stage:

Continental

Brainport Industries

CESMII THE SMART MANUFACTURING INSTITUTE

flex

Ford

Fraunhofer IOSB

FUJITSU

GDSO STANDARDIZE. SHARE. SIMPLIFY.

HOLONIX BRING THINGS TO LIFE

Microsoft

NTT DATA

OPC FOUNDATION

rri

scsn smart connected supplier network

SICK Sensor Intelligence.

T Systems

VTT

ZF

Powered by:

accomplish

AgriDataValue

DATAPACT

Innovate, scale, compete with industrial data spaces

Program [1/2]

14:30	Networking over a cup of coffee	Marc Hüske, Forum Manufacturing-X
15:00	Welcome address	Lars Nagel, IDSA | Christian Mosch, IDTA
15:05	Data space user group – it takes a village to make data spaces a success	Shani Tiran, IDSA
15:15	Essential for successful data spaces: standardization and interoperability	Anil Turkmayali, IDSA
15:20	**Japan-Europe data spaces:** Embrace the diversity and connect | Discussion: Data spaces for cross-continent data-driven collaboration	Masaru Dobashi, NTT DATA Takahide Matsutsuka, Fujitsu | Yutaka Ukai, RRI Sven Löffler, T-Systems | Christoph Mertens, IDSA
15:40	**Industrial data spaces driven by the "two Americas":**	
	Ford, Flex and T-Systems: Successfully achieving carbon footprint regulation requirements	André Kremer, Ford | Shanawaz Sheik, Flex Chris Langdon, T-Systems
	Strengthening the U.S.' competitiveness through smart manufacturing	Douglas Ramsey, Axial GA | John Dyck, CESMII
	Brazil: Product carbon footprint of parts made by machines connected via OPC UA and data space transaction services [DSP]	Andreas Faath, VDMA | Sven Löffler, T-Systems
	MX-Port Solution by OPC UA with Companion Specitfications	Andreas Faath, VDMA

Innovate, scale, compete with industrial data spaces

Program [2/2]

16:05 Industrial data space innovations from Germany

Catena-X: Data ecosystem for the automotive industry ..... Jürgen Sturm, ZF Group

Industrial data spaces enabled by Data Space Connectors, OPC UA & AAS ... Erich Barnstedt, Microsoft | Stefan Hoppe, OPC Foundation

Data spaces supporting the engineering of AI Systems ..... Thomas Usländer, Fraunhofer IOSB

Interoperable digital twin – based on AAS and data space concepts ..... David Sonnenberg, SICK

16:40 Active data spaces from Europe and beyond

Tyre industry: Data sharing along the manufacturing & product lifecycle ..... Riccardo Giovannotti, GDSO; Yann Le Chevalier, Continental

Circular economy data spaces from Finland ..... Markus Taumberger, VTT

Machinery-X: Reducing operational costs, improving machine availability and performance ..... Jacopo Cassina, Holonix

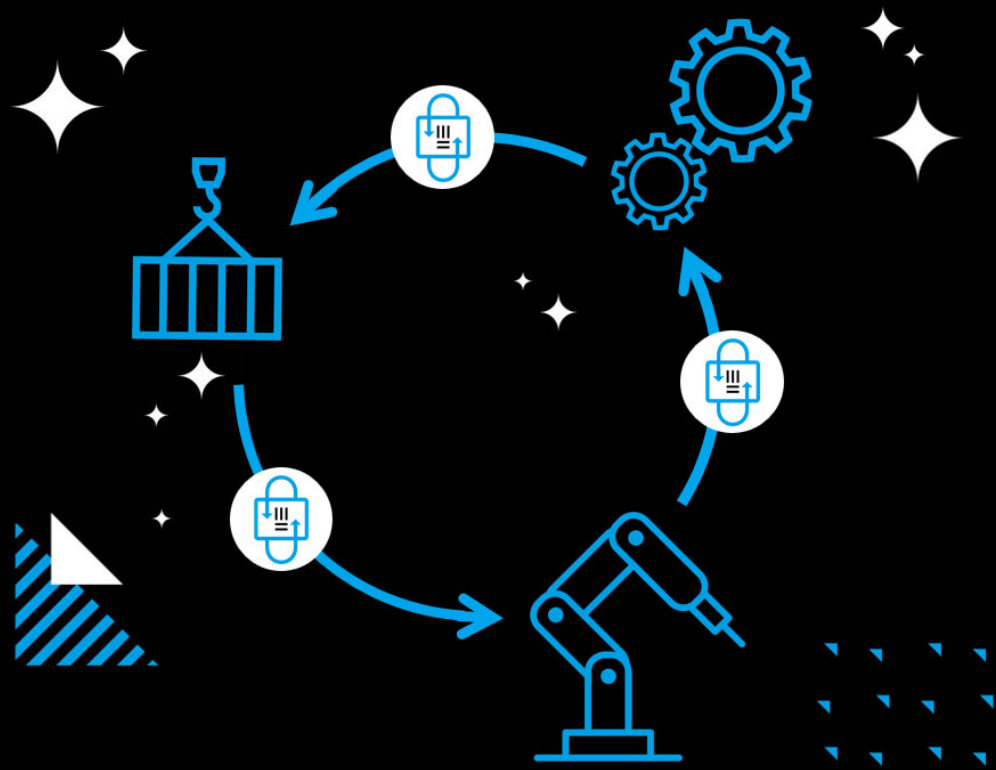
The Smart Connected Supplier Network: Increased productivity in the supply chain through fast and secure data sharing ..... John Blankendaal, Brainport Industries

17:15 Get together

www.internationaldataspaces.org/hm25

INTERNATIONAL DATA SPACES ASSOCIATION

VDMA



Welcome addresses

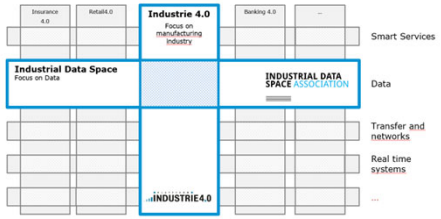
Marc Hüske, VDMA | Lars Nagel, IDSA

All domains. All countries. Global standards.

Your home for data spaces

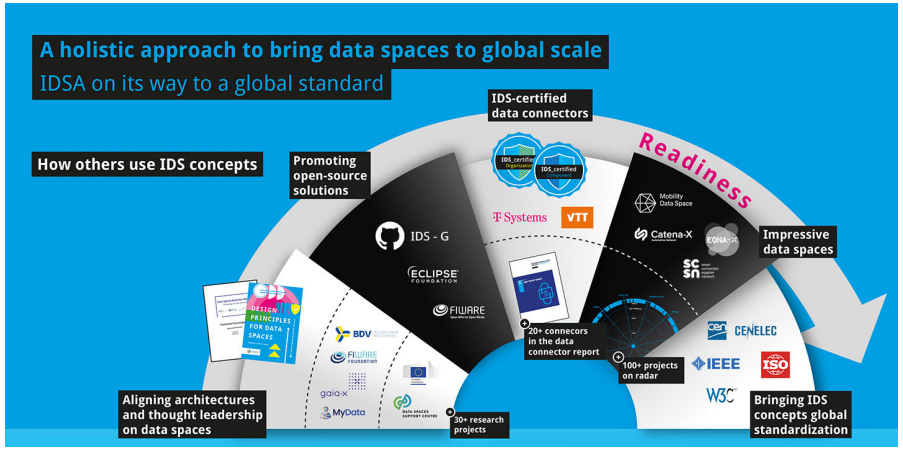
INTERNATIONAL DATA SPACES ASSOCIATION

COLLABORATION WITH „PLATTFORM INDUSTRIE 4.0“
FOCUS ON DATA



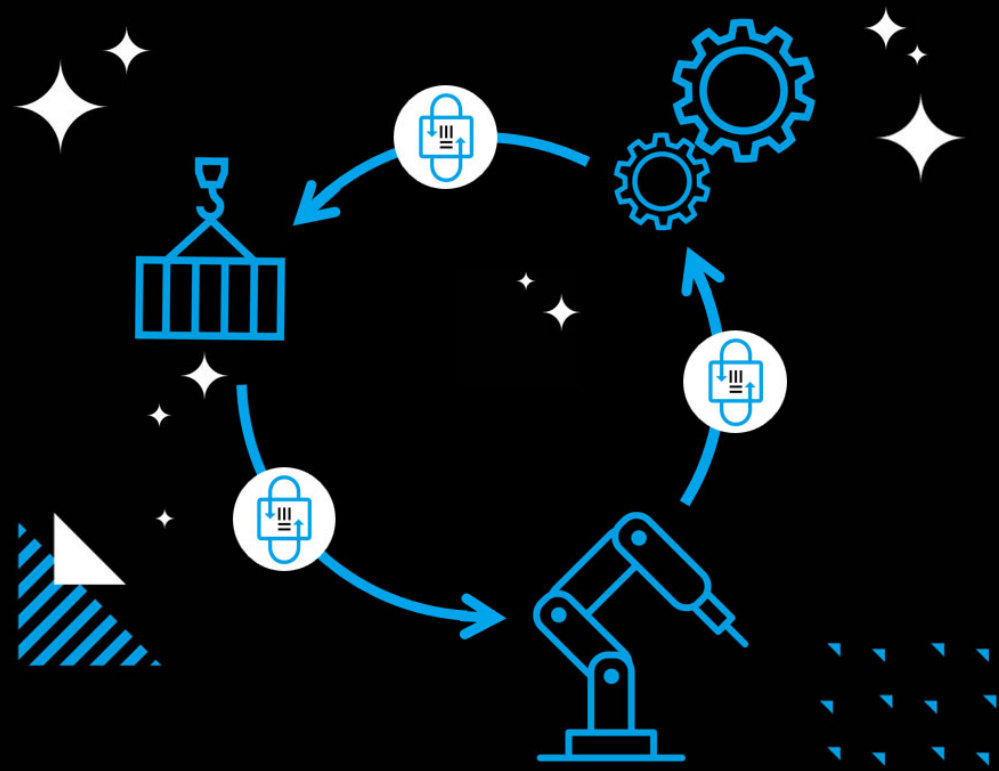
The development and promotion of the Industrial Data Space are being conducted in close cooperation with „Plattform Industrie 4.0“ initiative.

INDUSTRIAL DATA SPACE ASSOCIATION



INTERNATIONAL DATA SPACES ASSOCIATION

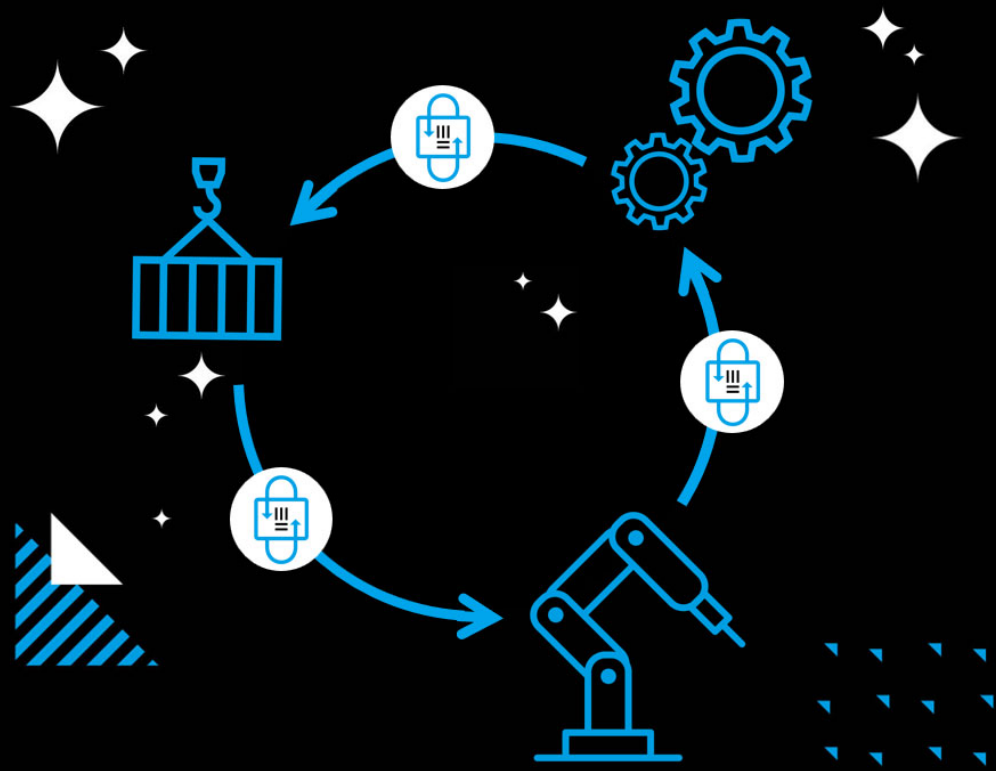
IDTA
Industrial
Digital
Twin
Association



Welcome address

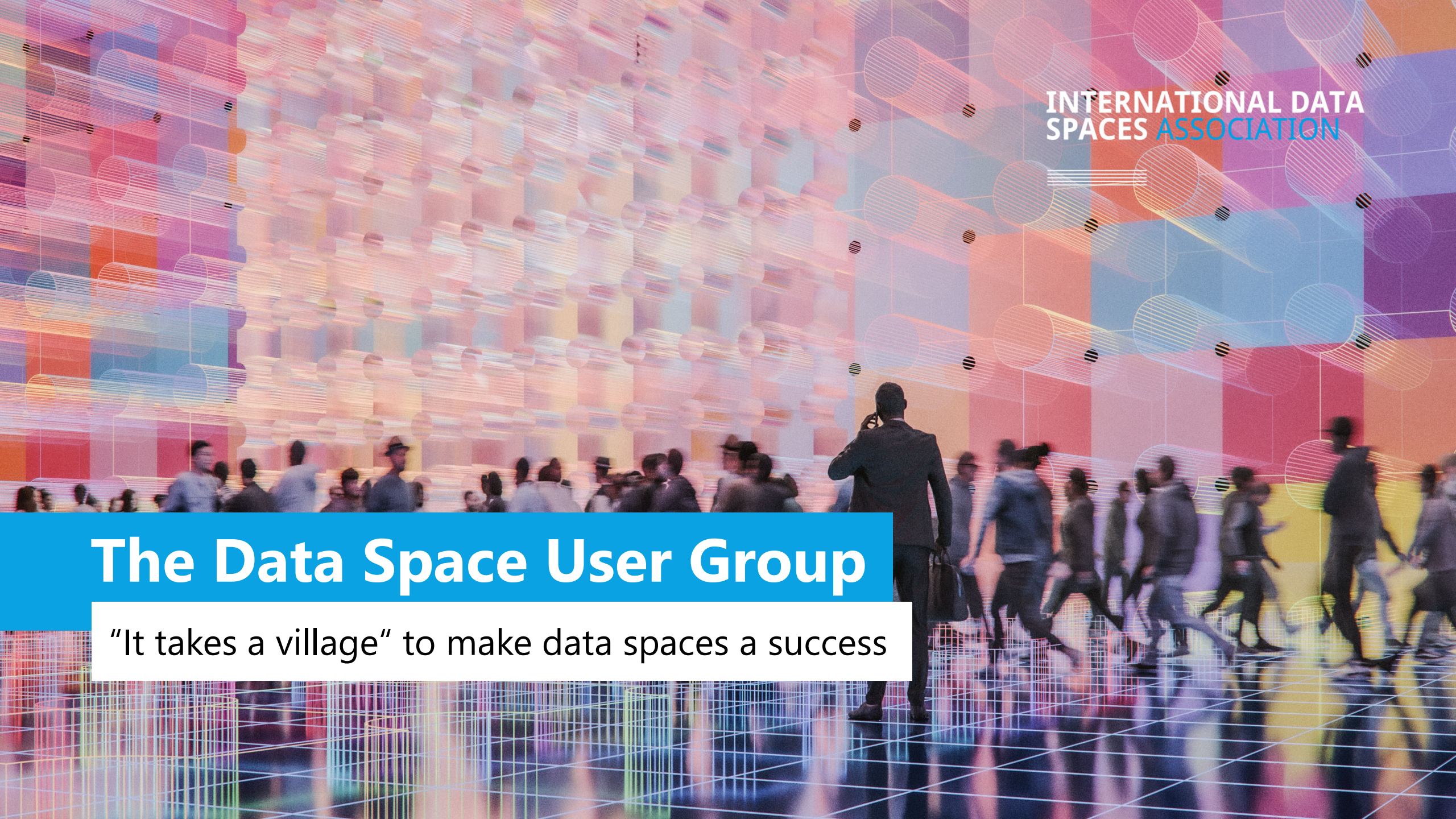
Christian Mosch, IDTA

INTERNATIONAL DATA SPACES ASSOCIATION



Data space users – innovate, scale and compete with data spaces!

Shani Tiran, IDSA



The Data Space User Group

"It takes a village" to make data spaces a success

Data space users need to…

… discover the partners that are the **best match** for their data **needs** and **offering** and the data spaces where to meet them

… understand **data spaces** and the **business opportunities** they enable

… choose and use **reliable software and services** to connect to data spaces

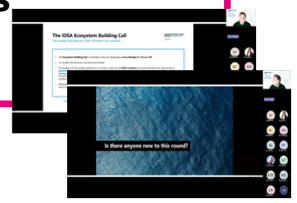
Introducing the Data Space User Group

A dedicated space to engage, learn and drive adoption

INTERNATIONAL DATA SPACES ASSOCIATION

Engagement

- ✓ **Weekly Ecosystem Calls –** Connect with peers & experts
- ✓ **A Dedicated channel** to voice needs and help shape IDSA's roadmap
- ✓ **Exclusive Collaboration Opportunities**



Business insights

- ✓ **Monthly "Executive Summary"** – Key trends & updates
- ✓ **Biannual "Data Spaces Now magazine" –** In depth ecosystem analysis

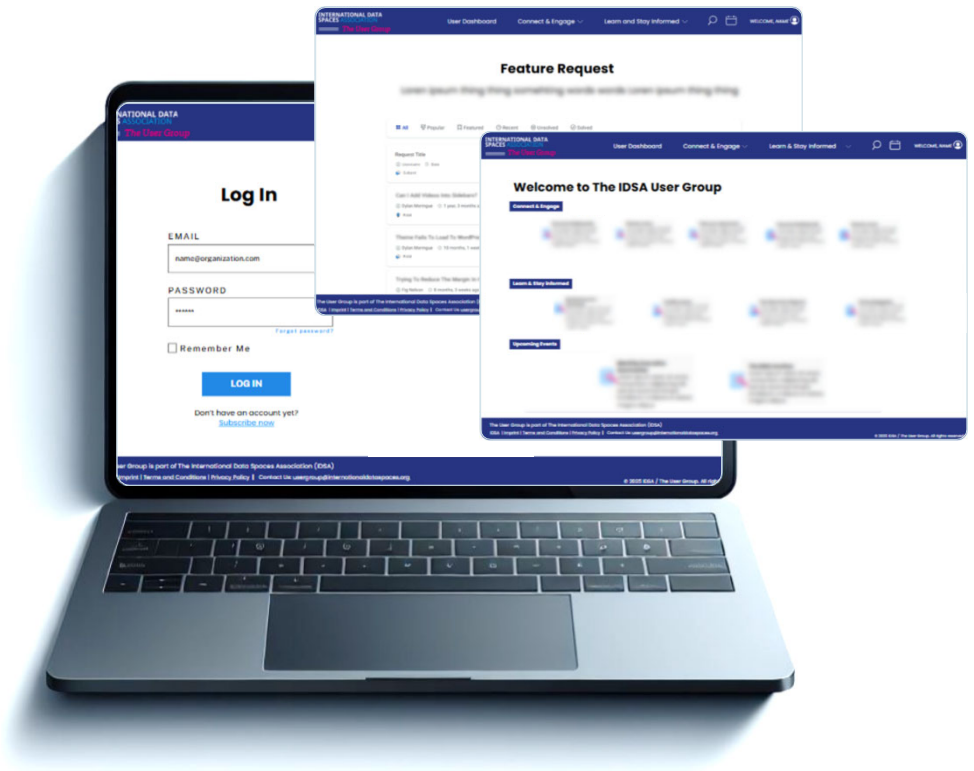
Knowledge: Tech and Beyond

- ✓ **Solutions Arena –** The ultimate hub for finding tools, solutions, and providers
- ✓ **The largest "Data Spaces" library**, with strategic, technical, and practical guidance all in one place

Join the Data Space User Group

Your fast track to data space adoption

INTERNATIONAL DATA SPACES ASSOCIATION



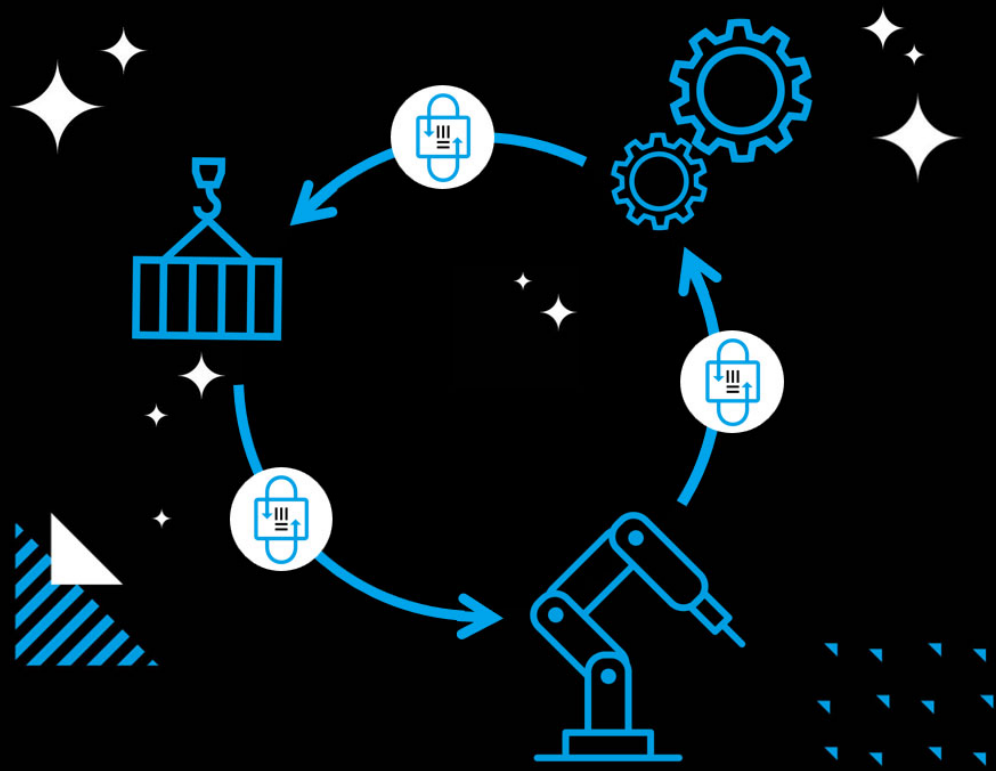
Now also accessible via a new subscription model

- Low entry barrier
- Fast and easy yearly ticket
- Tailored to your needs: options for one, three or five users

More info:

Launch event on May 15:

INTERNATIONAL DATA SPACES ASSOCIATION



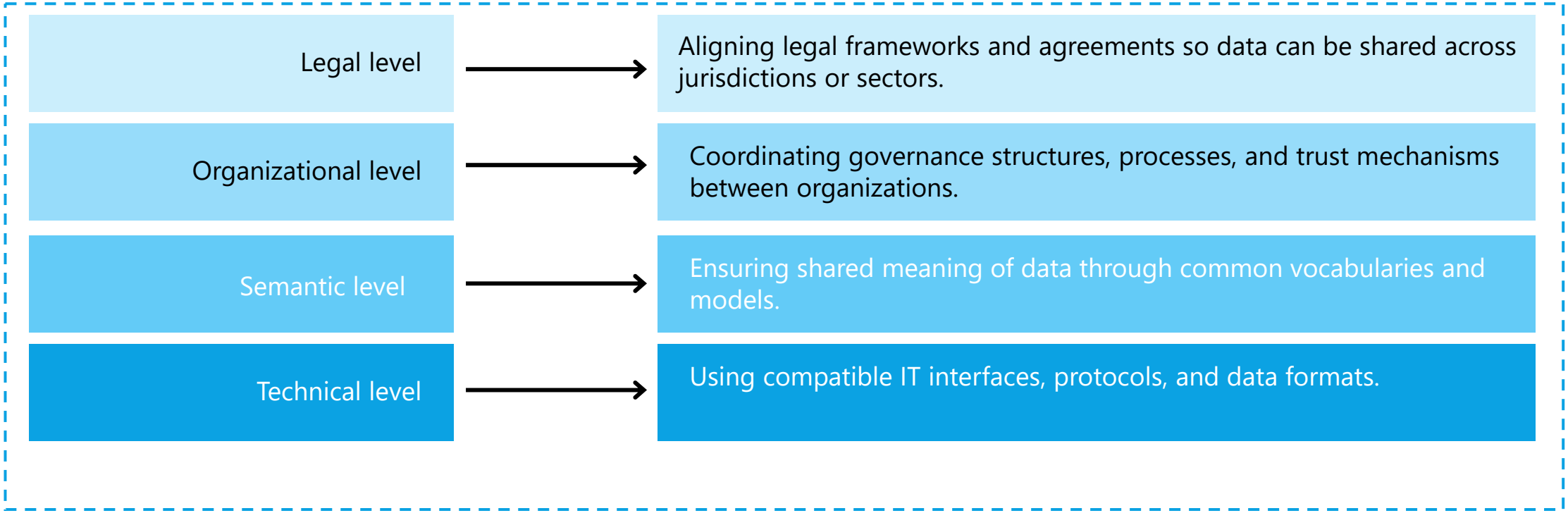
Essential for successful data spaces: standardization and interoperability

Anil Turkmayali, IDSA

Universal Standardized Protocols

Foundation for Interoperability

INTERNATIONAL DATA SPACES ASSOCIATION



Source: New European Interoperability Framework

- **Intra data space interoperability,** between the data space authority, processing, and data sharing building blocks within a single data space instance
- **Inter data space interoperability,** between multiple data space instances at each of the functional levels

Driving data spaces innovation

INTERNATIONAL DATA SPACES ASSOCIATION

Collaborators defining and embracing the Dataspace Protocol

Who co-defined it?

Who is currently using it?

Dataspace Protocol

Oversimplified Structure

INTERNATIONAL DATA SPACES ASSOCIATION

Catalog Protocol

- Defines how data is listed and organized by the provider.
- Makes data easy to find and understandable for potential consumers.
- Ensures data is described in a consistent, standard format.
- **You prepare and offer what is available**

Contract Negotiation Protocol

- Facilitates the agreement on data usage terms between provider and consumer.
- Defines how long, for what purpose, and under what conditions data can be used.
- Provides a clear process to negotiate and finalize these terms.
- **You negotiate and agree on how the data will be used**

Transfer Process Protocol

- Manages the actual transfer of data once terms are agreed upon.
- Ensures data is shared securely and follows the negotiated rules.
- Supports different types of data transfers (e.g., one-time or continuous).
- **You execute the data transfer according to the agreed terms**

Let us go for global standardization

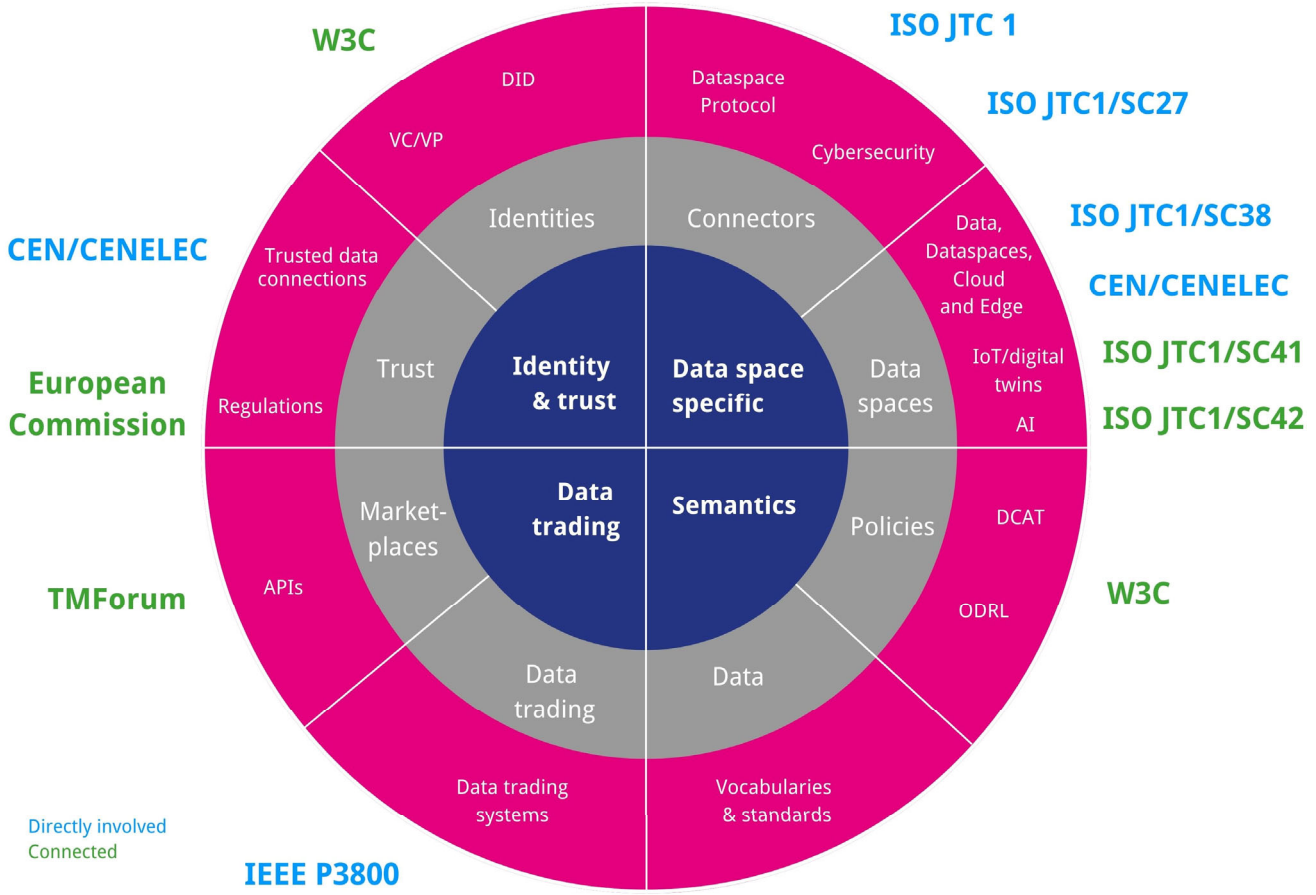
INTERNATIONAL DATA SPACES ASSOCIATION

Our standardization activities

1. IDSA does not consider domain specific standards.
2. IDSA supports the integration into domain specific standards

NEW: ISO/IEC JTC 1 SC 38 Cloud Computing and distributed platforms | WG 5 – Data in Cloud Computing and related technologies | ISO/IEC AWI 20151 Dataspaces concepts and characteristics

NEW: CEN/CENELEC Focus Group Data, Dataspaces, Cloud and Edge



The Time to Act is Now!

INTERNATIONAL DATA SPACES ASSOCIATION

FUJITSU

NTT DATA

rri

T Systems

Embrace the diversity and connect: Data spaces for cross-continent data-driven collaboration

Discussion

INTERNATIONAL DATA SPACES ASSOCIATION

FUJITSU NTT DATA rri T Systems

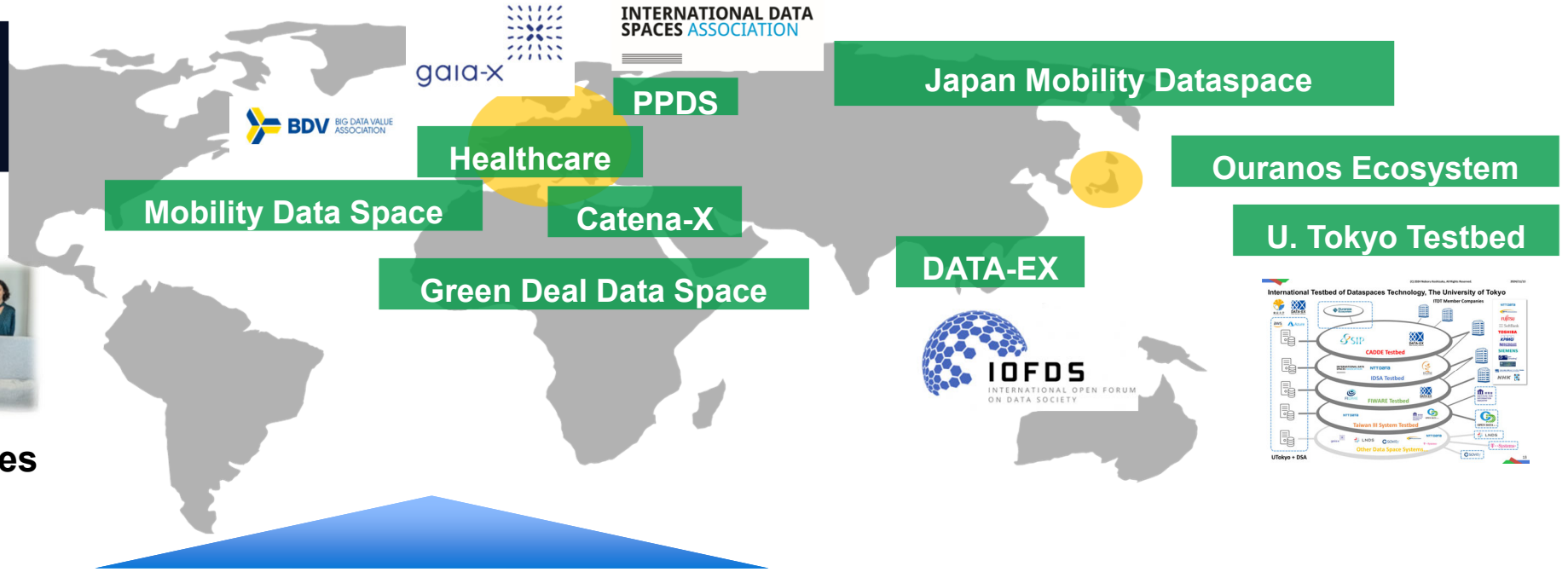
Embrace the diversity and connect: Data spaces for cross-continent data-driven collaboration

Discussion | Input from Masaru Dobashi, NTT DATA

NTT DATA leads actions related to Data Spaces collaborating with international initiatives as the global company

NTT DATA is a global company that collaborates with international initiatives, contributes to technology development, and supports projects in Japan, Europe, and elsewhere.

Global One team for Data Spaces



Our identity is rooted in developing and managing social infrastructure worldwide.

Health Care	Finance	Logistics	Payment
ehCOS, InfoBancho, etc.	*Zengin* System, etc	*IoTrace, etc*	*CAFIS, etc*

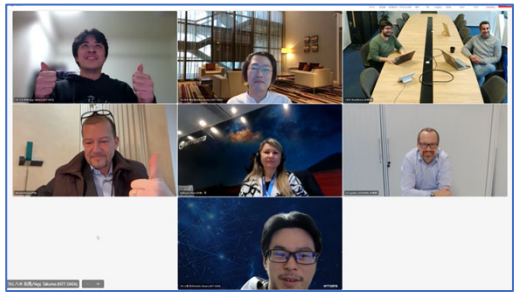
etc.

Vision by NTT Communications and NTT DATA

Realize Data Spaces ecosystems that are safe, secure, and easy to use anytime, anywhere, with Anyone

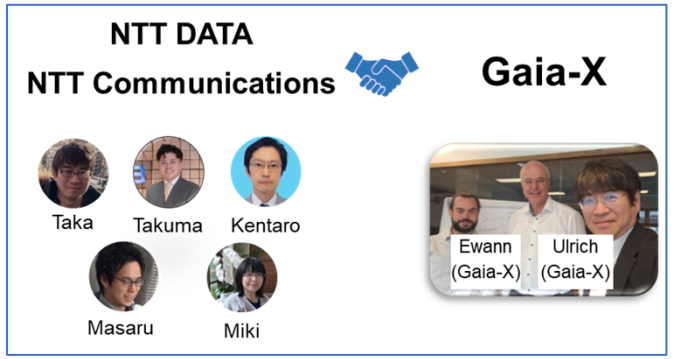
- **Realizing and providing Data Spaces functionalities as a network service, contributing to digital public infrastructures**
- **Leading open innovations with experts and users (e.g. with Gaia-X Hub, IDSA Japan Hub, University of Tokyo, IOFDS, DSA, etc.)**
- **Enabling multi-use of the diverse and different ecosystems**

Success in fostering connections between Europe and Japan.



w/ IDSA, etc.

Challenge of achieving mutual utilization of different trust frameworks



INTERNATIONAL DATA SPACES ASSOCIATION

FUJITSU NTT DATA rri T Systems

Embrace the diversity and connect: Data spaces for cross-continent data-driven collaboration

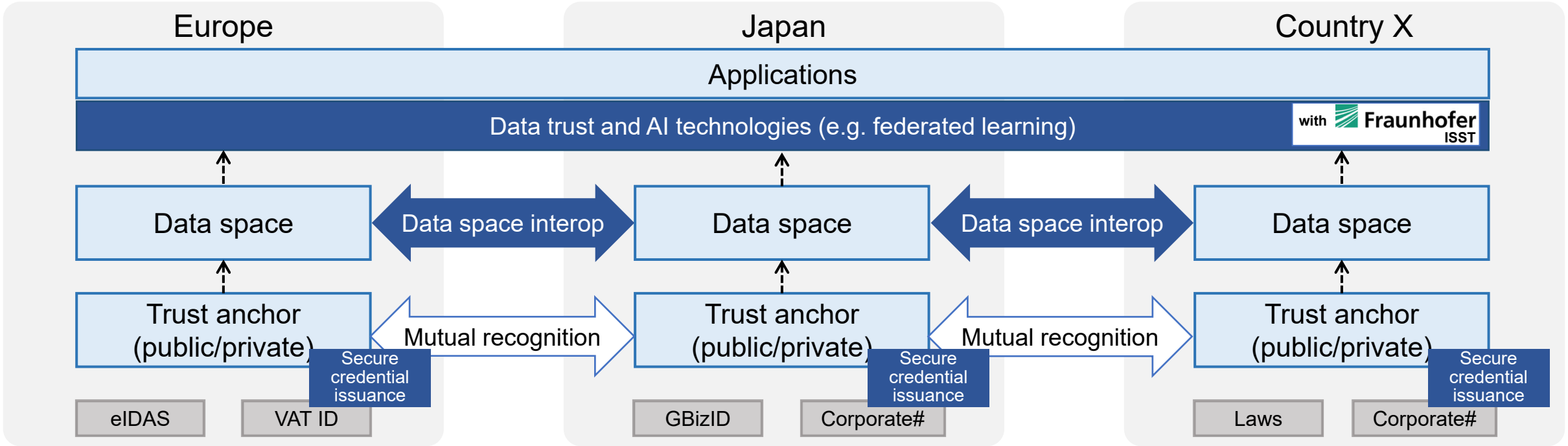
Discussion | Input from Takahide Matsutsuka, Fujitsu

Fujitsu's technology for trust interoperability

Technology for connecting diverse data spaces with trust

- Enable cross-boarding between different countries / data spaces.
- Leverage data spaces for AI while protecting data sovereignty.

Fujitsu technology



INTERNATIONAL DATA SPACES ASSOCIATION

FUJITSU NTT DATA rri T Systems

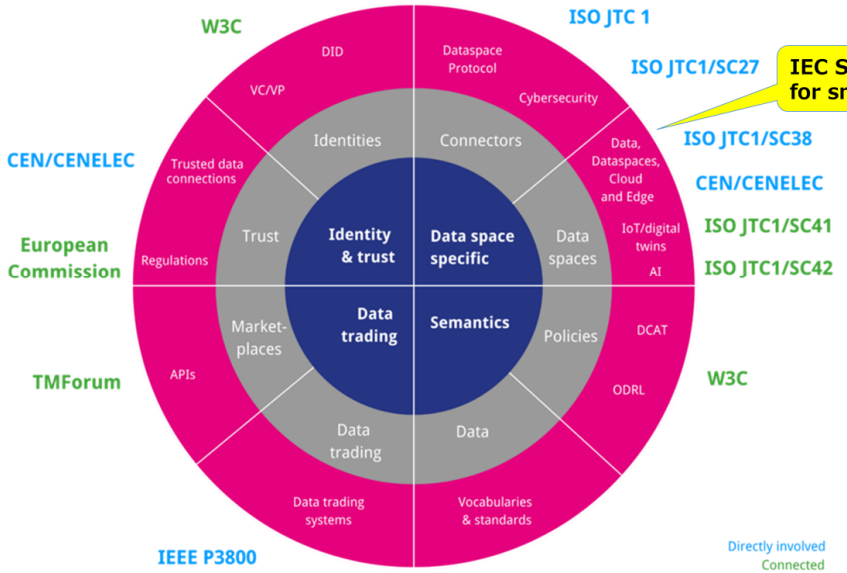
Embrace the diversity and connect: Data spaces for cross-continent data-driven collaboration

Discussion | Input from Yutaka Ukai, RRI

RRI (Robot Revolution & Industrial IoT Initiative)

- **Established in 2015 under the new robot strategy led by Japan government**
- **Manufacturing transformation and international standardization through robots and industrial IoT are the pillars of our activities**

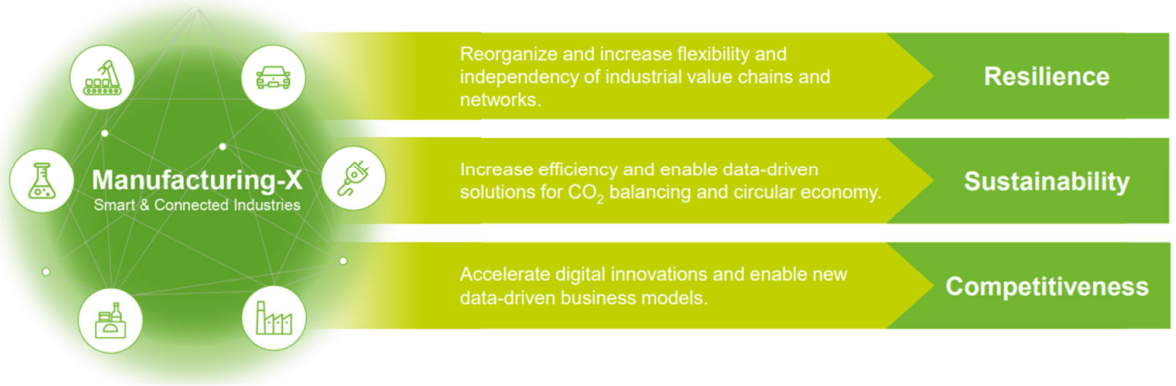
Participation into global activity (standardization)



RRI hosts Japan's mirror committee of SyC SM (System committee, Smart Manufacturing)

source : IDSA

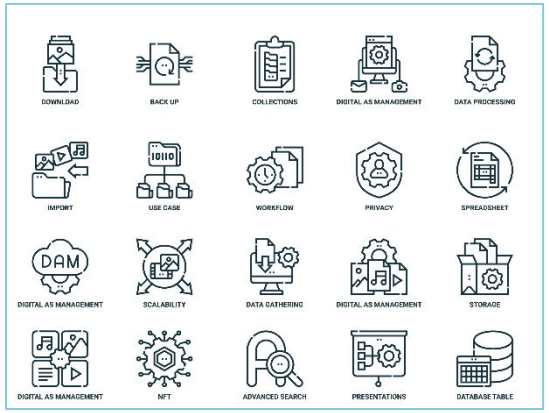
Participation into global activity (International Manufacturing-X Council)



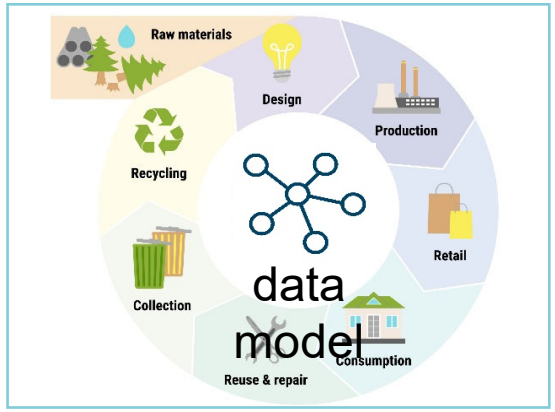
RRI's Manufacturing Data Space Action Group (AG4)

TF1: Establish common understanding of Manufacturing data Spaces in Japan

TF2: Use Cases and core feature derived from use case study



TF3: Engineering innovation and revolution



TF4: Communication & disseminating Data Space concept

Society 5.0

- Balance between social issues and economic development.
- Multiple CPSs Connected.
- Manufacturing Data Spaces as an enabler for Society5.0.

INTERNATIONAL DATA SPACES ASSOCIATION

FUJITSU

NTT DATA

rri

T Systems

Embrace the diversity and connect: Data spaces for cross-continent data-driven collaboration

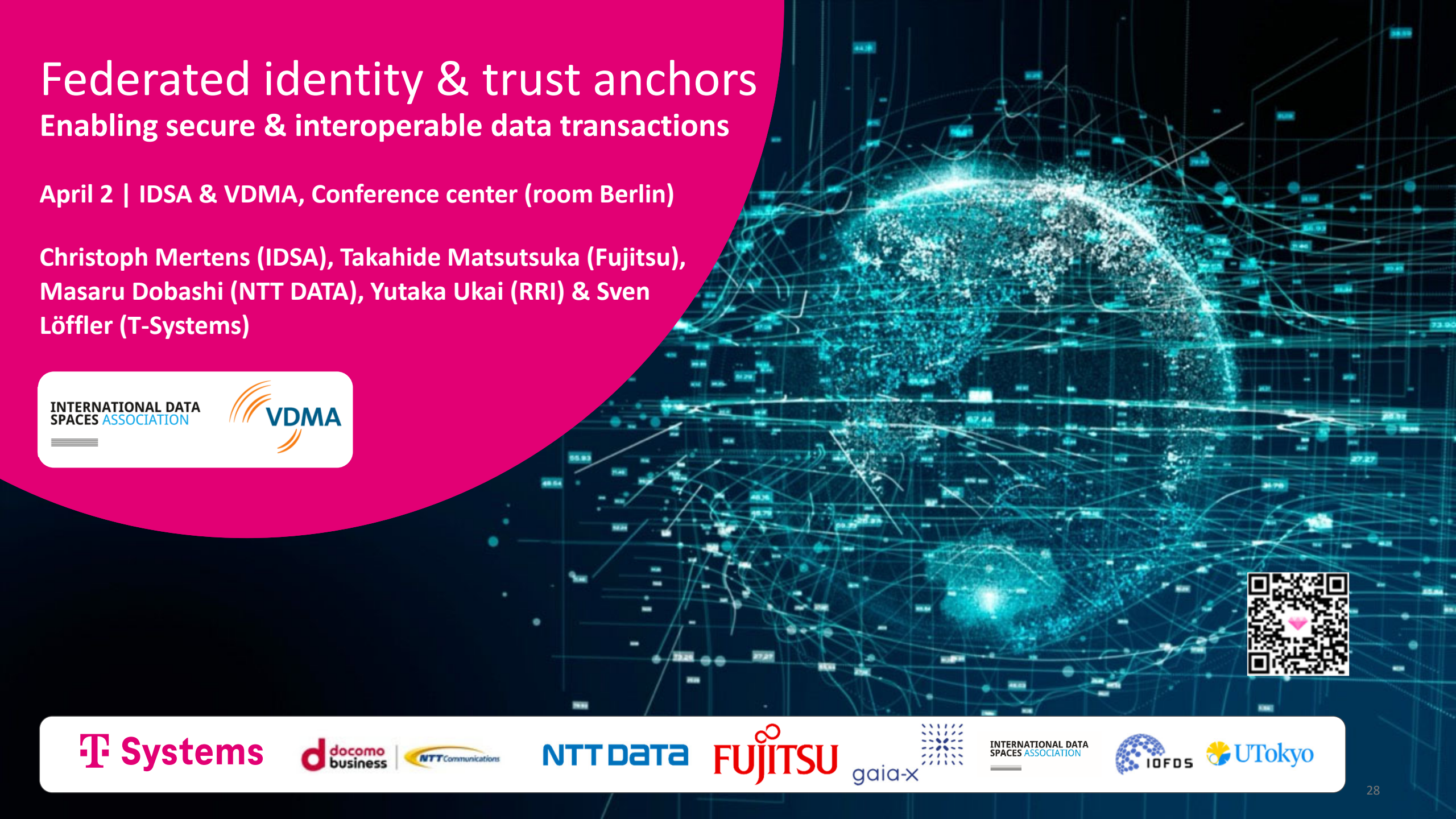
Discussion | Input from Sven Löffler, T-Systems

Federated identity & trust anchors

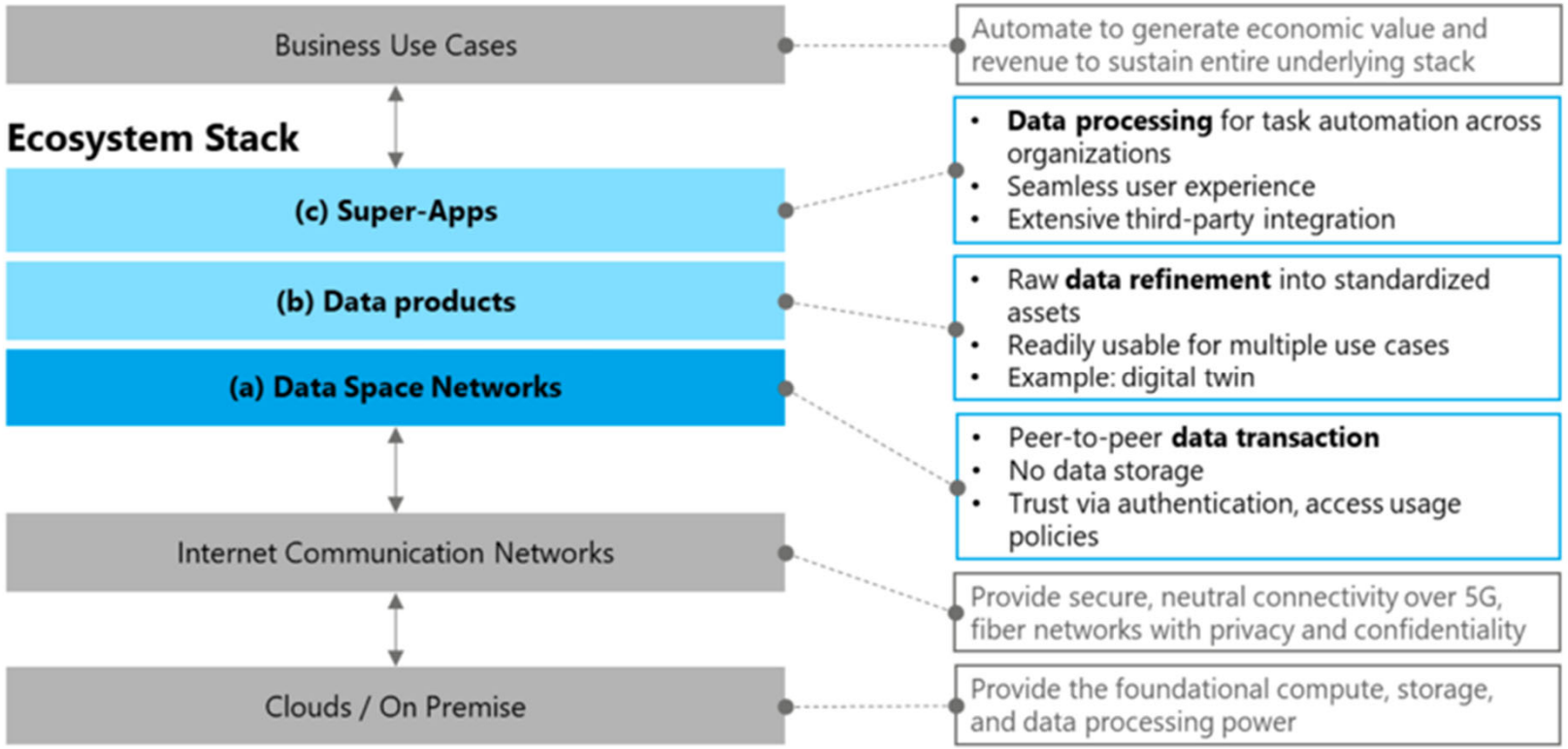
Enabling secure & interoperable data transactions

April 2 | IDSA & VDMA, Conference center (room Berlin)

Christoph Mertens (IDSA), Takahide Matsutsuka (Fujitsu), Masaru Dobashi (NTT DATA), Yutaka Ukai (RRI) & Sven Löffler (T-Systems)



Toward ecosystems powered by dataspace networks



Source: International Data Spaces Association

=> The dataspace network layer for data transactions is the foundational layer of a data ecosystem

Enabling global trust framework initiative for dataspaces

gaia-x · INTERNATIONAL DATA SPACES ASSOCIATION · UTokyo · NTT Communications · NTT DATA · FUJITSU · T Systems

Our vision

- Establish **technical federation** of trusts across countries (e.g. trust anchors and trust services)
- Foster **interoperability** among dataspace initiatives worldwide
- Ensure secure and efficient data collaboration
- Prepare to establish a **governance body**

Technical pilot overview

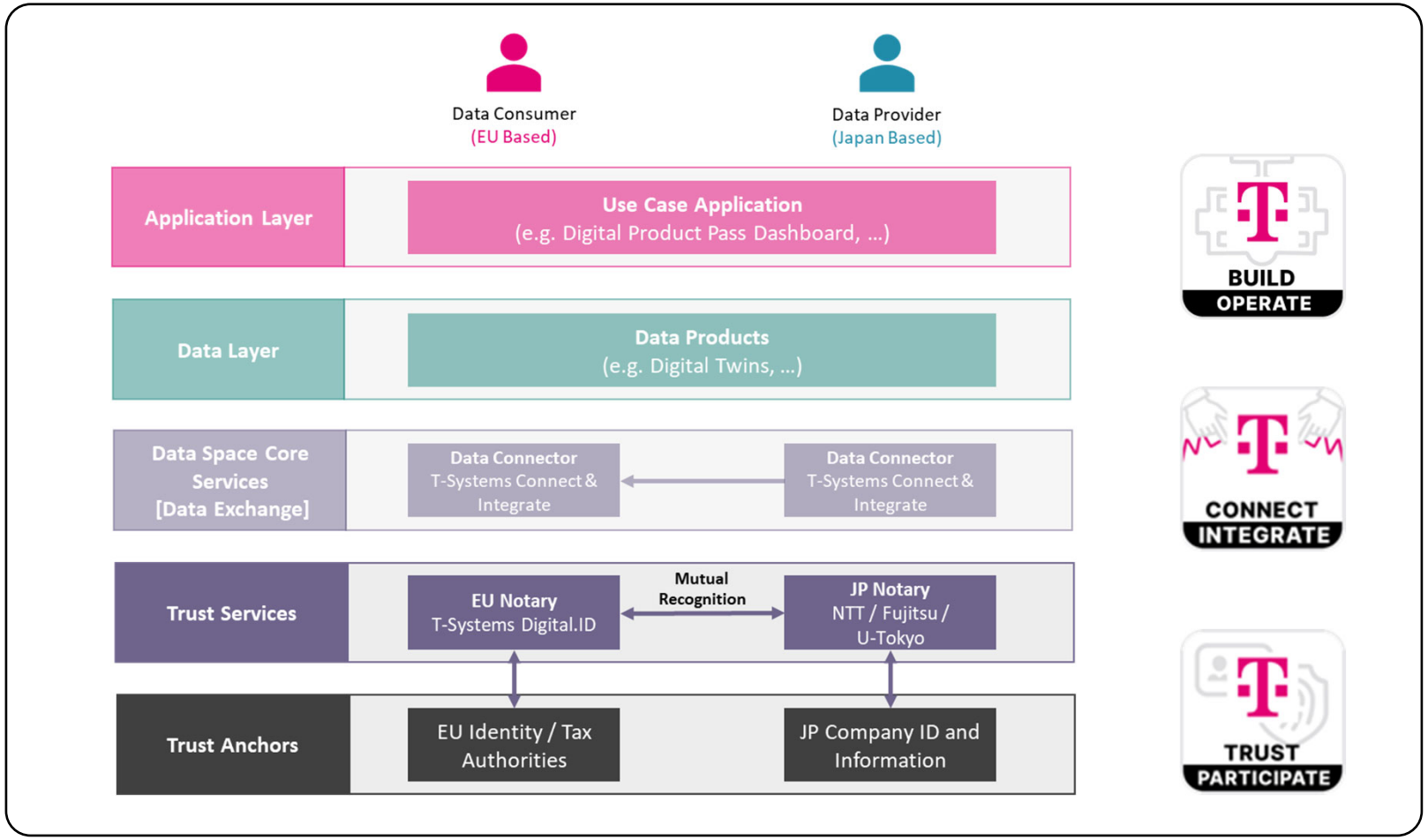
- **Phase 1:** Prototype the trust anchor on a testbed in Japan for broad participation.
- **Phase 2:** Integrate Tractus-X sandbox to test interconnectivity with the prototype of the trust anchor and identify technical gaps
- **Phase 3:** Deploy cross-regional use cases with partners to assess interoperability
- **Phase 4:** Develop tools for technical mutual recognition and international interoperability of trust services and anchors

Technical infrastructure

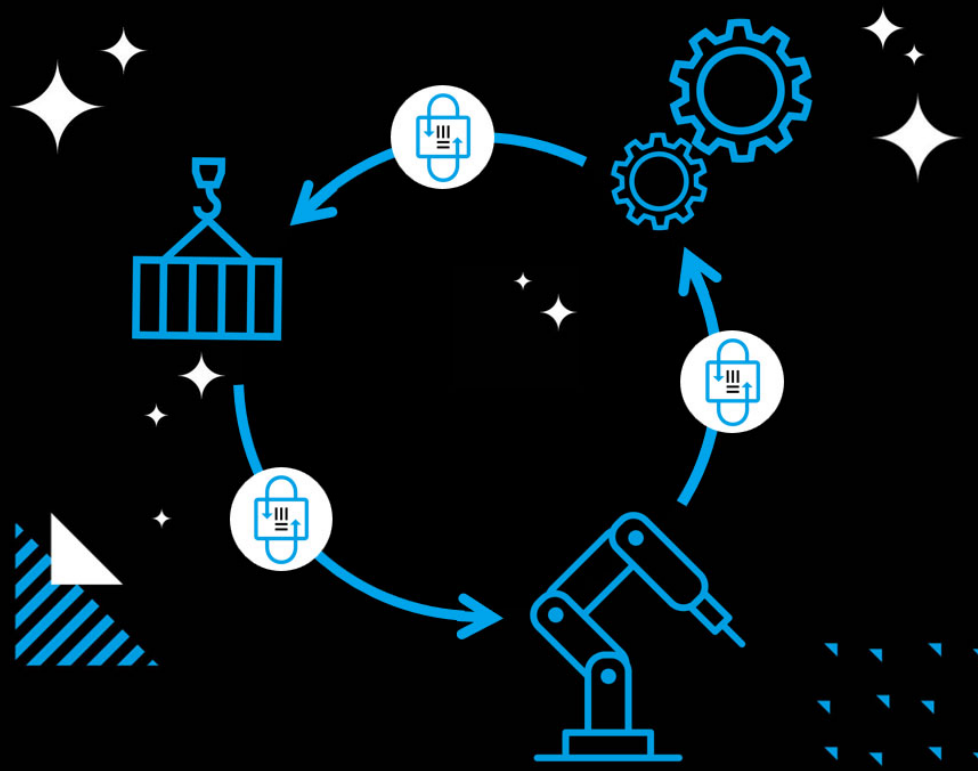
Use existing components and knowledge, examples are:

- **Gaia-X solutions:** Leverage Trust & Participate and Gaia-X Digital Clearing House by T-Systems and NTT
- **Federation expertise:** Use Fujitsu & NTT‘s trust service and trust anchor federation knowledge and technology
- **Catena-X / Tractus-X Sandbox:** Use T-Systems’ IDSA & Gaia-X compliant testbed at University of Tokyo

Prototype set up



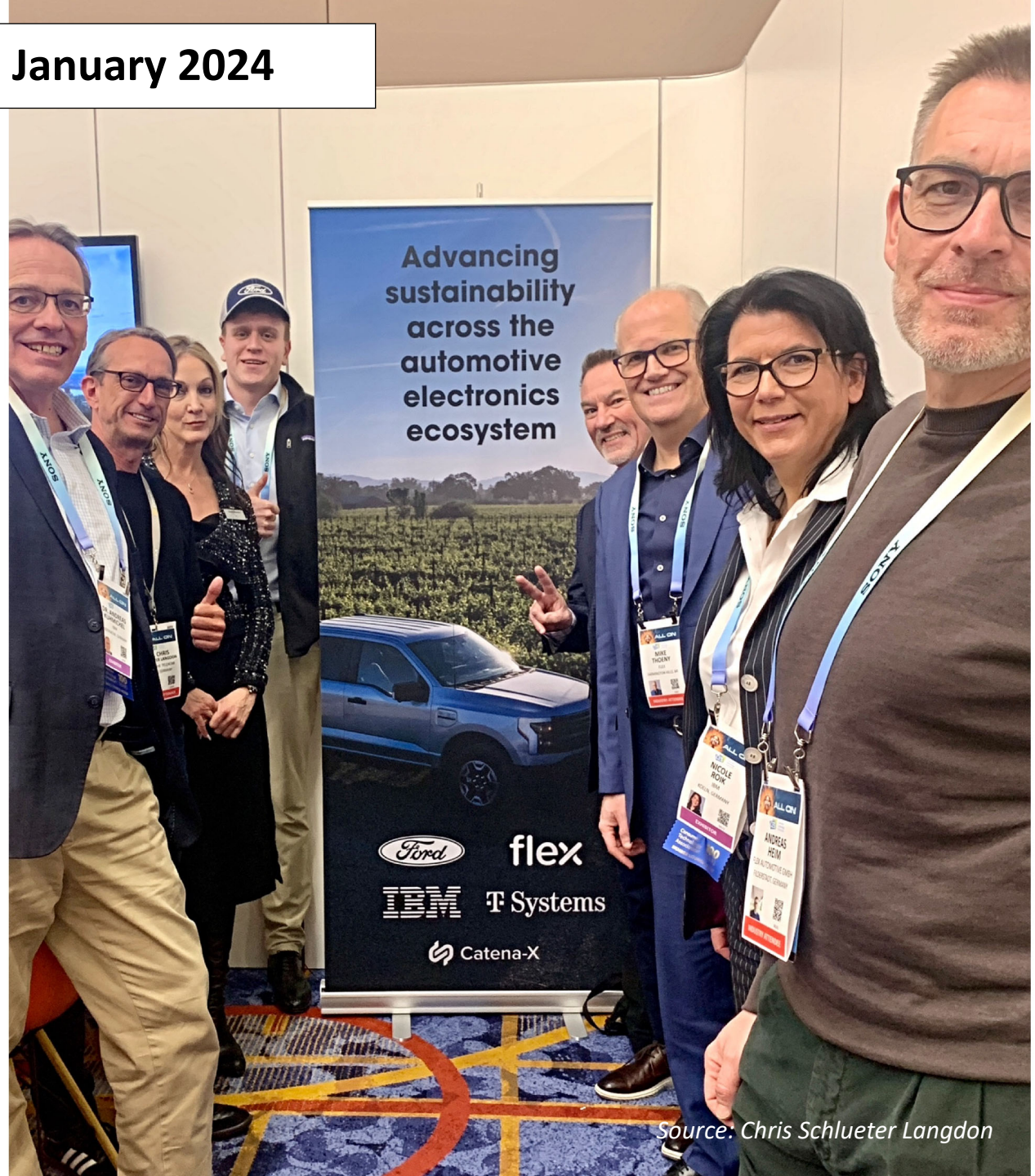
=> Enabling two participants—one in the EU and the other in Japan—each with a local trust anchor



Ford, Flex and T-Systems: Successfully achieving carbon footprint regulation requirements

André Kremer, Ford | Shanawaz Sheik, Flex | Chris Langdon, T-Systems

CES Las Vegas January 2024



Source: Chris Schlueter Langdon

Hannover Fair April 2024

Source: Chris Schlueter Langdon

Catena-X Consortium June 11 Munich

SAP | Siemens | SupplyOn | T-Systems

Source: Chris Schlueter Langdon

PILOT@CES2024

Data chain – data exchange focus

1 CX | 2 CARRIER | 3 APPS | PILOT

Tier n → Tier 2 → flex → Ford

…→ **Part** of part 1 → **Part 1** of product/ component → **PRODUCT/** component

iPoint

Application layer

Data products

Dataspace

PCF calculation | PCF data management

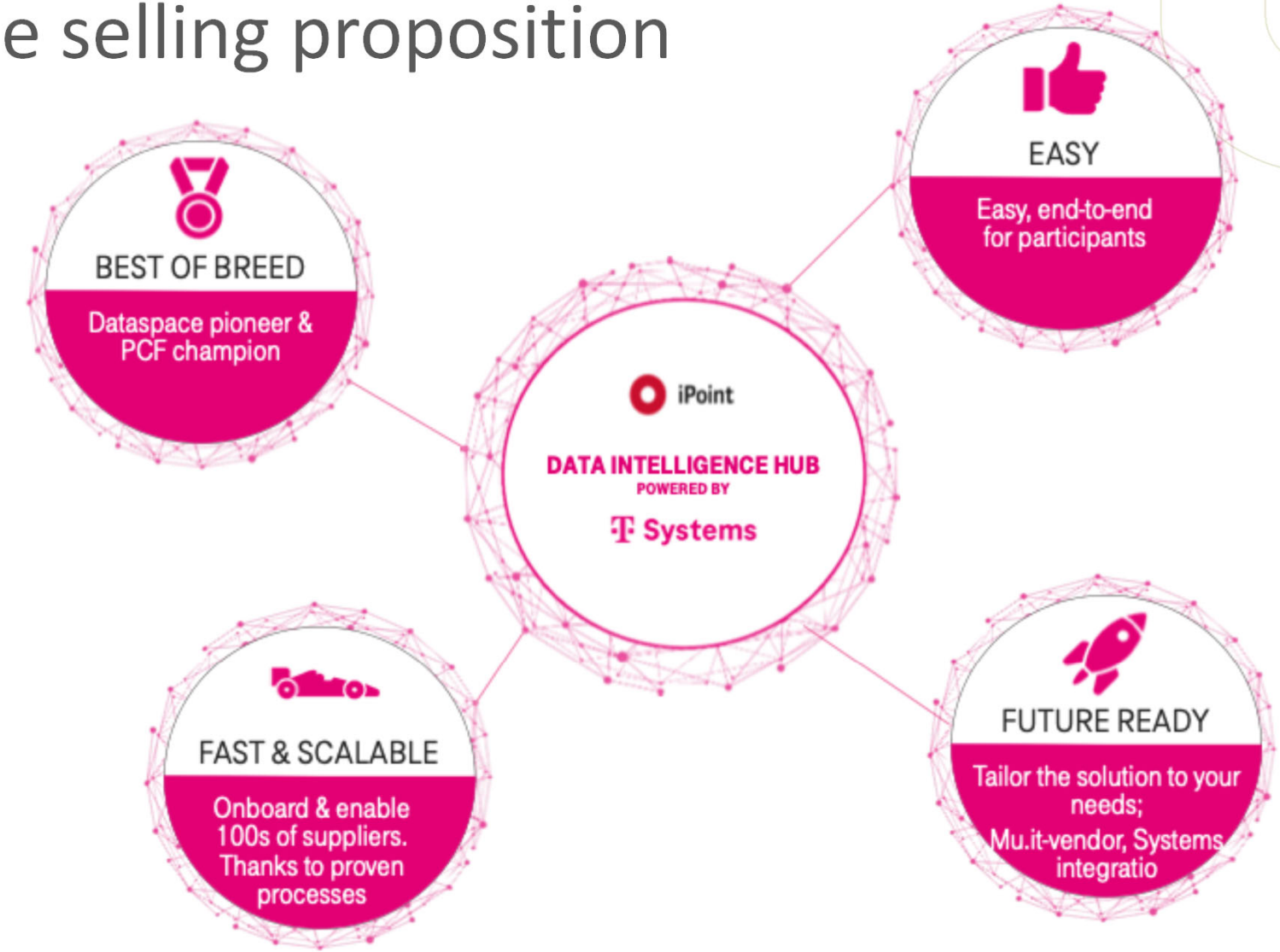
PCF data exchange | PCF data exchange

DT

DT: Digital twin

Scope of product carbon footprint (PCF) tracking pilot

Our unique selling proposition



iPoint | The PCF champion in industry & standards

Pioneer in PCF Solution

30 years

1.000+

Customers

1.000.000+

PCF Calculations/ year

Co-Developed Catena-X

PCF Rule book

1st

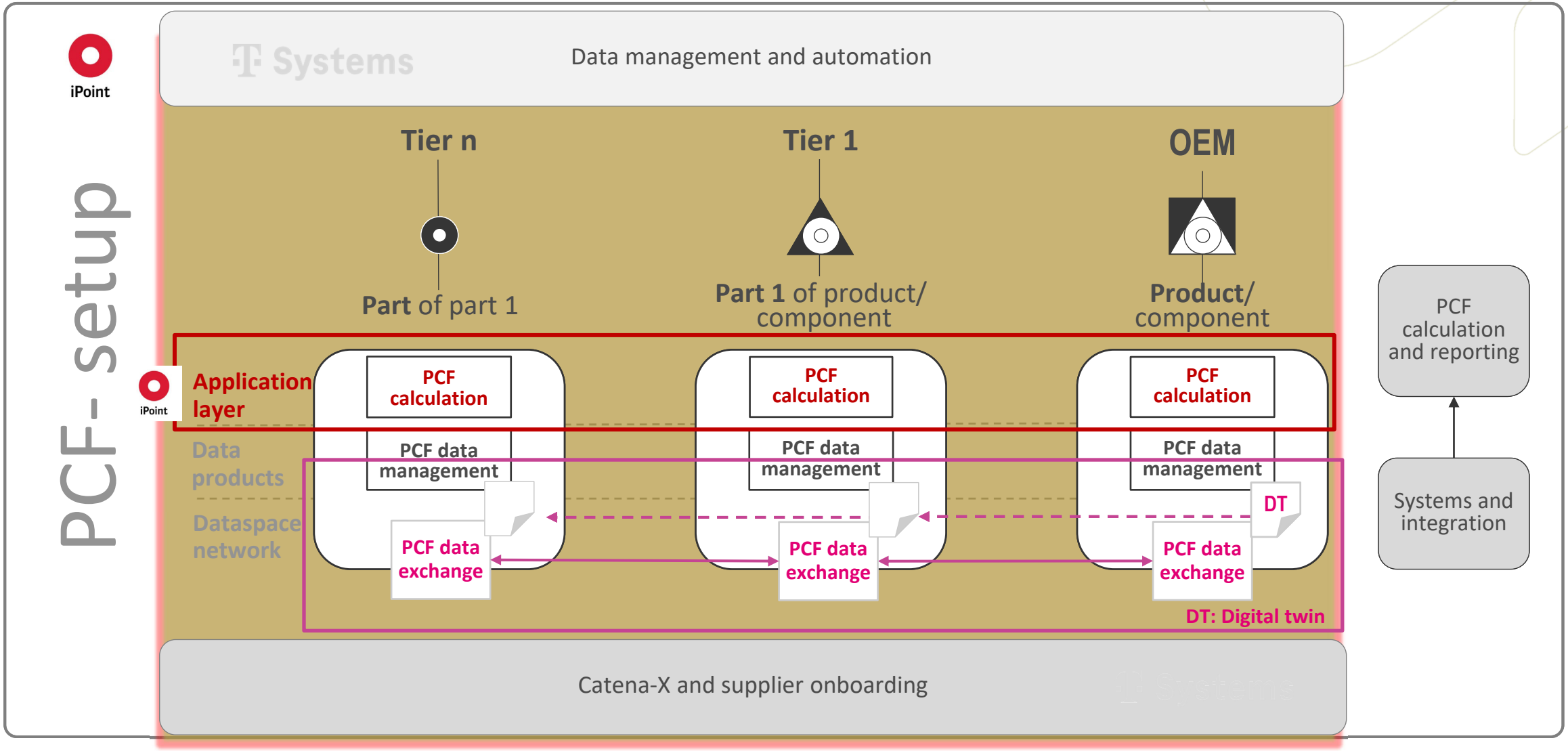
using Material Data

(i.e.IMDS) to easy create PCFs

Easy to use for non-Expert

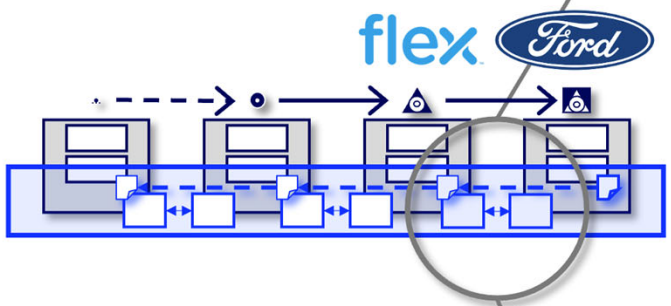
Safe and proven solution for scalable PCF calculations

Solution design: Evolving to success



Implementation on AWS

aws T-Systems
Sustainability dataspace event
Hannover Fair 2024



dDTR Distributed Digital Twin Registry
EDC Eclipse Dataspace Components
EKS Elastic Kubernetes Service by AWS
SDE Simple Data Exchanger

* T-Systems product

Catena-X Certified Solution

** T-Systems Sandbox (commercially available as LivingLab) based on

Eclipse Tractus-X

Eclipse Tractus-X, Tractus-X, Eclipse, the Eclipse logo and the Eclipse Tractus-X project logo are trademarks of the Eclipse Foundation

*** In Catena-X certification process

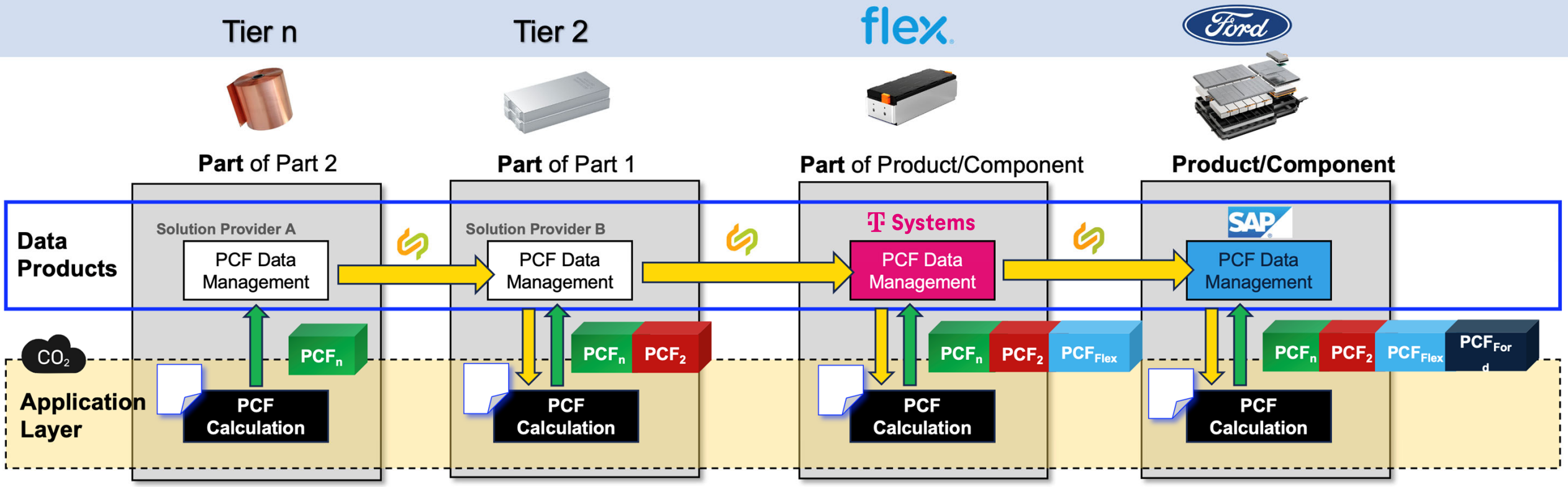
IBM Visualization: IBM Supply Chain Intelligence Suite ***

AWS Account
S3 Bucket
S3 Bucket
EKS Cluster
Tractus-X Sandbox **
Connect & Integrate Standard * flex
SDE
dDTR
EDC Connector
API
Connect & Integrate Standard * Ford
SDE
dDTR
EDC Connector
API
Data exchange with CO2 data
AWS Cloud

Proprietary

Demonstration of live and interoperable PCF data exchange

Data Chain: Solutions' Interoperability Focus



IMDS SIEMENS SiGREEN **PCF values provided by calculation tools such as SiGreen in sync with IMDS**

PCF_n PCF_2 PCF_{Flex} PCF_{Ford} = $PCF_{PRODUCT}$

Demo

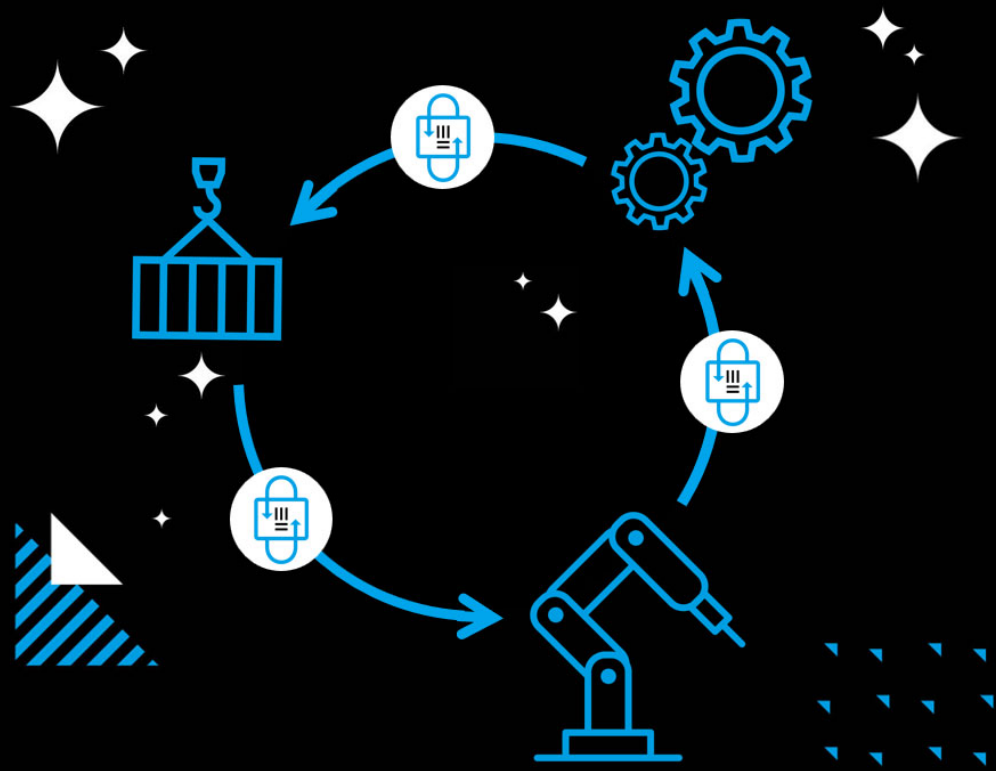
Scope of product carbon footprint (PCF) tracking pilot

PCF Data Exchange: Catena-X compliant

DT: Digital Twin

PCF Interoperable Solutions Pilot - Catena-X technology at AIAG 2024 Cofinity-X Ford flex SAP T Systems

CESMII
THE SMART MANUFACTURING INSTITUTE



Strengthening the U.S.' Competitiveness Through Smart Manufacturing

Douglas Ramsey, Axial GA | John Dyck, CESMII

MARCH 2025

Strengthening the U.S.' Competitiveness Through **Smart Manufacturing**

CESMII
THE SMART MANUFACTURING INSTITUTE

mission. strategy. role.

Driving the **next wave** of manufacturing productivity, energy productivity and competitiveness through smart manufacturing innovation.

U.S. Department of ENERGY

2017

Founded by the D.O.E, a Program in UCLA

$200M+

Private/public partnership

Improve energy productivity through sensing, control, modeling, analytics & platform technologies

How.

Fund the Innovation and R&D necessary to **dramatically** reduce the **cost** & **complexity** of using **real time operations data** to drive **revenue** & **cost improvements** and **generate cash.**

*CESMII represents the **voice of manufacturing;** engaging the smart manufacturing community through a membership model*

Manufacturers
Small, Medium & Large

System Integrators & Consultants

Machine Builders

Technology Providers

Academia & Labs

Accelerating the Democratization of Smart Manufacturing

CESMII is enabling smart, sustainable operations for ALL manufacturers, driving the next wave of manufacturing productivity, energy productivity and competitiveness through smart manufacturing innovation.

Technology

Enabling technologies and standards advocacy that enable data access and interoperability, decreasing cost & complexity

- ☑ **Interoperability through Open Specifications**
- ☑ **OT Data Foundations**

Knowledge

Business and technology strategies, best practices & education to equip leadership, upskill current workforce and train the next generation workforce

- ☑ **Align Manufacturing Strategy with Digital Capabilities & Roadmap**
- ☑ **Next Gen Connected Workforce**

Ecosystem

Convene all relevant stakeholder groups to prioritize and address industry constraints no one organization can solve on its own

- ☑ **Engage, Learn & Serve**
- ☑ **Cultivate a Smart Manufacturing Mindset**

SM Imperative #1

Open Information-Modeling Strategy for Manufacturing

A Smart Manufacturing Profile… the Foundation of a Global Production Language

…Is an Information Interface Contract

- Describe the data type (including unit of measure), semantic and structure for manufacturing data
- Provide type safety, ensuring that data sets (objects) can be traced back to their definition

…Supports Communication Abstraction

- Consumers of the Information Model data do not need to know how to communicate with underlying systems
- Multiple disparate data sources can be mapped to a single, modern, type/graph-aware API.

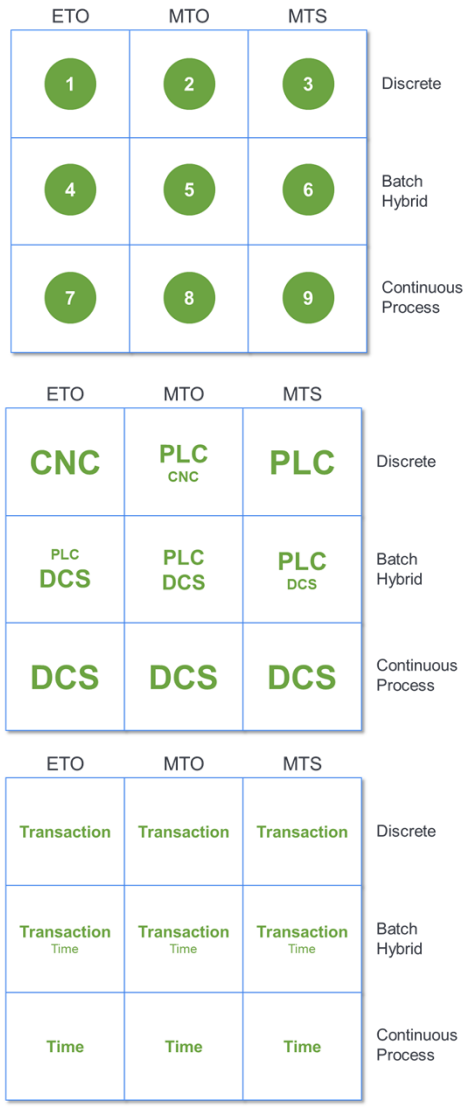
…Provides a reliable Feature set and structure for AI

- Information Model ‘instances’ found in a running operation represent canonical truth about the data in the operation and can reliably be used for AI training and model execution (bottoms up)
- Information Model standards can be adopted by an operation through adaption at the Edge, without requiring re-engineering the physical system

SM Profiles are an extension to the OPC UA Information Model (part 5) that can be distributed to automate the creation of information value throughout a software architecture

- ☑ **Dramatic Reduction in Cost & Time-to-Value**
- ☑ **Application Interoperability and Standardization**
- ☑ **Support Standardization Efforts**
- ☑ **Information Model Portability and Reusability**
- ☑ **Application Portability and Reusability**

SM Imperative #2



Smart Manufacturing Interoperability Platform (SMIP) Requirements*

CESMII THE SMART MANUFACTURING INSTITUTE

- ☑ Ingest SM Profiles from the SM Marketplace
- ☑ Persist instance objects & relationships (present and past) in a graph
- ☑ Support hierarchical and non-hierarchical structures
- ☑ Supports all data types, structured and unstructured, relational and time-series…
- ☑ Support multiple open & standard data sources
- ☑ Support the Open SM API to enable discovery of plant models, equipment & process profile instances & relationships
- ☑ Scale effectively from small sites to large enterprise

SM Imperative #3

An Industry First… Standard Manufacturing Information API

A Joint Working Group Following W3C Best Practices for Standards-Development, Est. 2024

i3-X (Industrial Information Interoperability eXchange) Objectives

- Create a common API, consisting of a base set of server primitives that a wide array of platforms can implement to commoditize access to manufacturing data
- Encourage a proliferation of portable apps to help spur adoption of such platforms
- Create a vibrant marketplace of apps bringing value to end-users

Note: Apple and Android users benefit from common APIs for access to device and platform capabilities exposed to app developers that have led to App Stores full of creative, useful, and enjoyable app experiences. Those platform vendors have benefited, but more importantly, the user has benefited.

- Foster Competition and Accelerate Innovation
- Reduce Time to Build, Implement & Sustain Apps
- Eliminate Data Silos & Stovepipe Architectures
- Reduce Vendor Lock-In

GitHub

LEARN MORE

CESMII THE SMART MANUFACTURING INSTITUTE · aws · GE APPLIANCES · HighByte · Microsoft · Rockwell Automation · SAS · SIEMENS · SymphonyAI · ThinkIQ

Global Smart Manufacturing Harmonization

Standards Advocacy, Community Engagement
Supply Chain and Manufacturing Data-Space Development

CESMII Working with a Strategic Group of Manufacturing Nations to Form the International Manufacturing-X Council

MANUFACTURING-X

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

Connect value chains and manufacturing data networks across industries and countries.

Implement global foundations for data-driven resilient, sovereign and climate-neutral production covering the full life cycle of production and products.

Enable innovative value creation in an interoperable and sovereign data ecosystem.

LEARN MORE

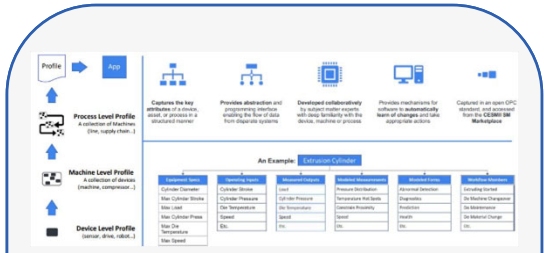
INDUSTRIE 4.0 ÖSTERREICH · Alliance Industrie du Futur · ロボット革命イニシアティブ協議会 Robot Revolution & Industrial IoT Initiative · smart industry · CESMII THE SMART MANUFACTURING INSTITUTE · KOSMO 스마트제조혁신추진단 · CONFINDUSTRIA · PLATTFORM INDUSTRIE 4.0 · Observatoire de la Transformation Numérique · AUSTRALIA

International Partnerships & Ongoing Outreach

International Collaboration Milestones

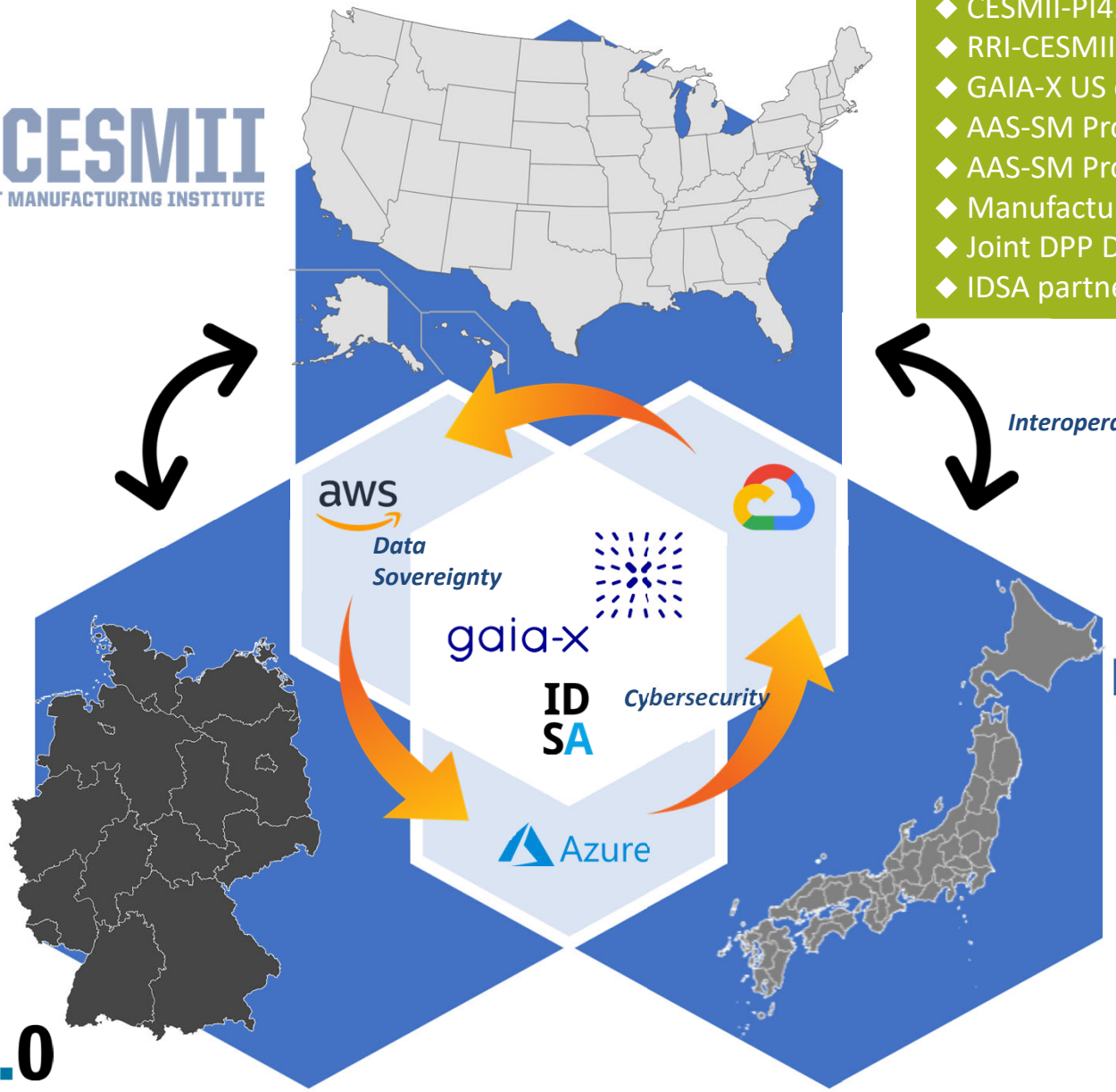
- CESMII-PI4.0 partnership (April 2020)
- RRI-CESMII partnership (Oct. 2021)
- GAIA-X US discussions (Oct. 2021)
- AAS-SM Profile Carbon Tracing Demo (April 2022)
- AAS-SM Profile Scope 3 Tracing Demo (April 2023)
- Manufacturing-X Partnership (November 2023)
- Joint DPP Demonstration (April 2024/March 2025)
- IDSA partnership discussion underway (March 2025)

CESMII
THE SMART MANUFACTURING INSTITUTE



SM Profiles

Asset Administration Shells (AAS)

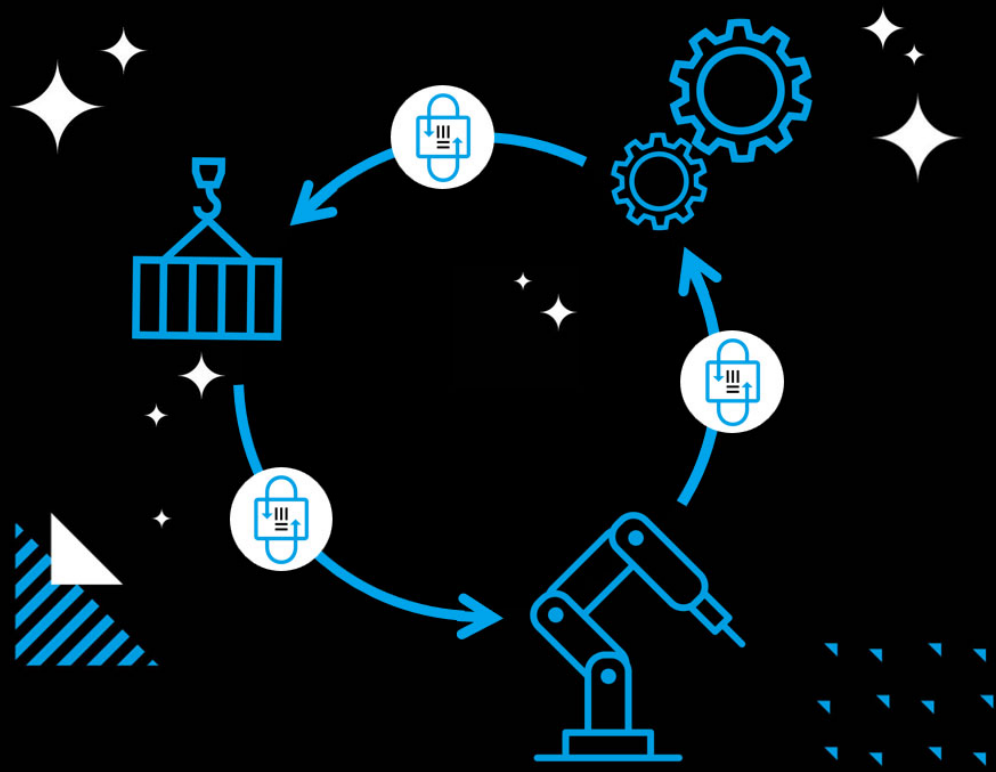


Robot Revolution & Industrial IoT Initiative
ロボット革命・産業IoTイニシアティブ協議会

PLATTFORM INDUSTRIE 4.0

T Systems

VDMA



Product carbon footprint of parts made by machines connected via OPC UA & data space transaction services

Sven Löffler, T-Systems | Andreas Faath, VDMA

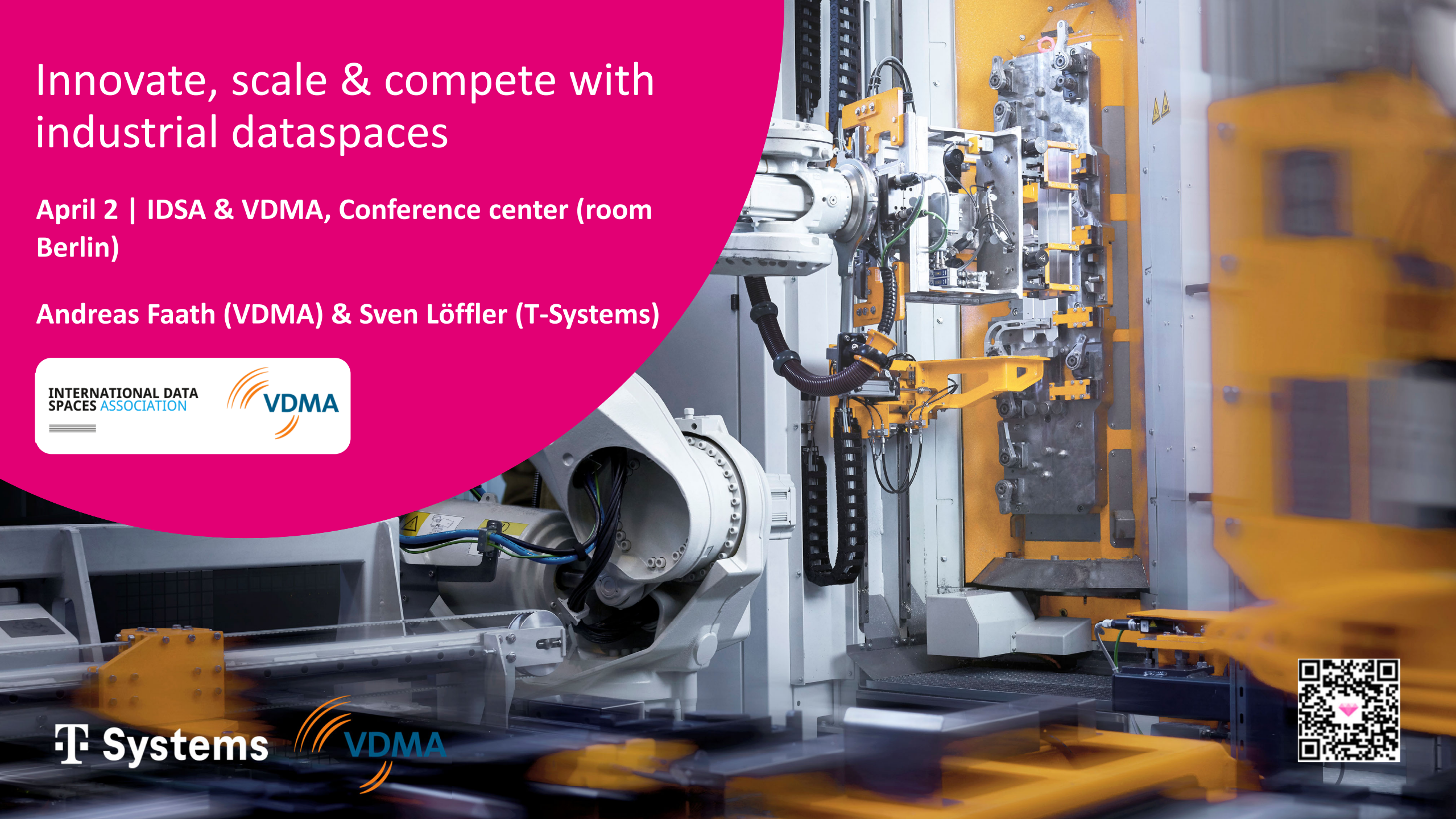
Innovate, scale & compete with industrial dataspaces

April 2 | IDSA & VDMA, Conference center (room Berlin)

Andreas Faath (VDMA) & Sven Löffler (T-Systems)

INTERNATIONAL DATA SPACES ASSOCIATION

VDMA



T Systems

VDMA

Your speakers today

Visit our website!

Sven Löffler

Director for Dataspaces & Data Products, **T-Systems International**

Andreas Faath

Managing Director
VDMA MII

Secure data exchange with data sovereignty protection should be as easy as a telephone call today

CONTROL

Enablement of **data driven ecosystems** for **secure data exchange of any data** where **data owners keep control over data usage**

TRUST

Trustworthy AI with dataspaces on sovereign data infrastructure

T Systems VDMA

Semantic interoperability

OPC UA

Communication technology
and basic functionalities
universal with open options

→ **how** to communicate

„speak the same language“

+

Companion specifications
defining contents
for different applications

→ **what** to communicate

„use the same dictionary“

=

semantic interoperability

„understand each other“

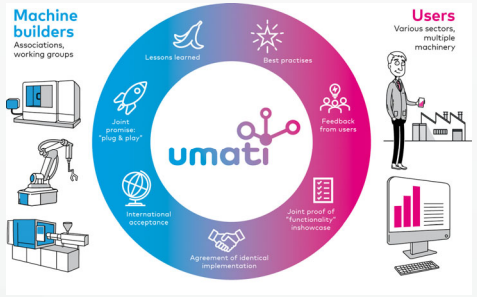
Plug & play
Identical implementation
of companion specifications
for the machinery sector

umati

Global community
Promoting the use
of common standards

Valuable partnerships | VDMA, VDW, IDSA & OPC-UA
Secure data exchange in manufacturing

2019



Start of the partnership

- Goal of developing a secure, **efficient data exchange solution for the industrial sector**
- Partnership culmination in the creation of a powerful, **data-driven environment**
- Focus on enhancing **supply chain transparency**

2023

New data spaces for Manufacturing-X

T-Systems and the German Mechanical and Plant Engineering Association are linking their data spaces

New dataspaces for Manufacturing-X

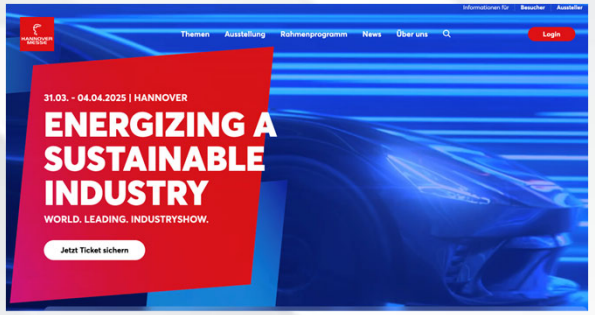
- Umati offers **standardized production data** from 300 partner companies
- T-Systems LivingLab supports **application testing and data analysis**
- Enables direct machine-to-machine data exchange via **OPC UA standards**

2024

Hannover Messe 2023 & 2024

- **Showcased Umati** at HMI 2023 and 2024
- Demonstrated the **Tool Lifecycle Management** application in real time
- Supported **Industry 4.0 and smart manufacturing** initiatives

2025

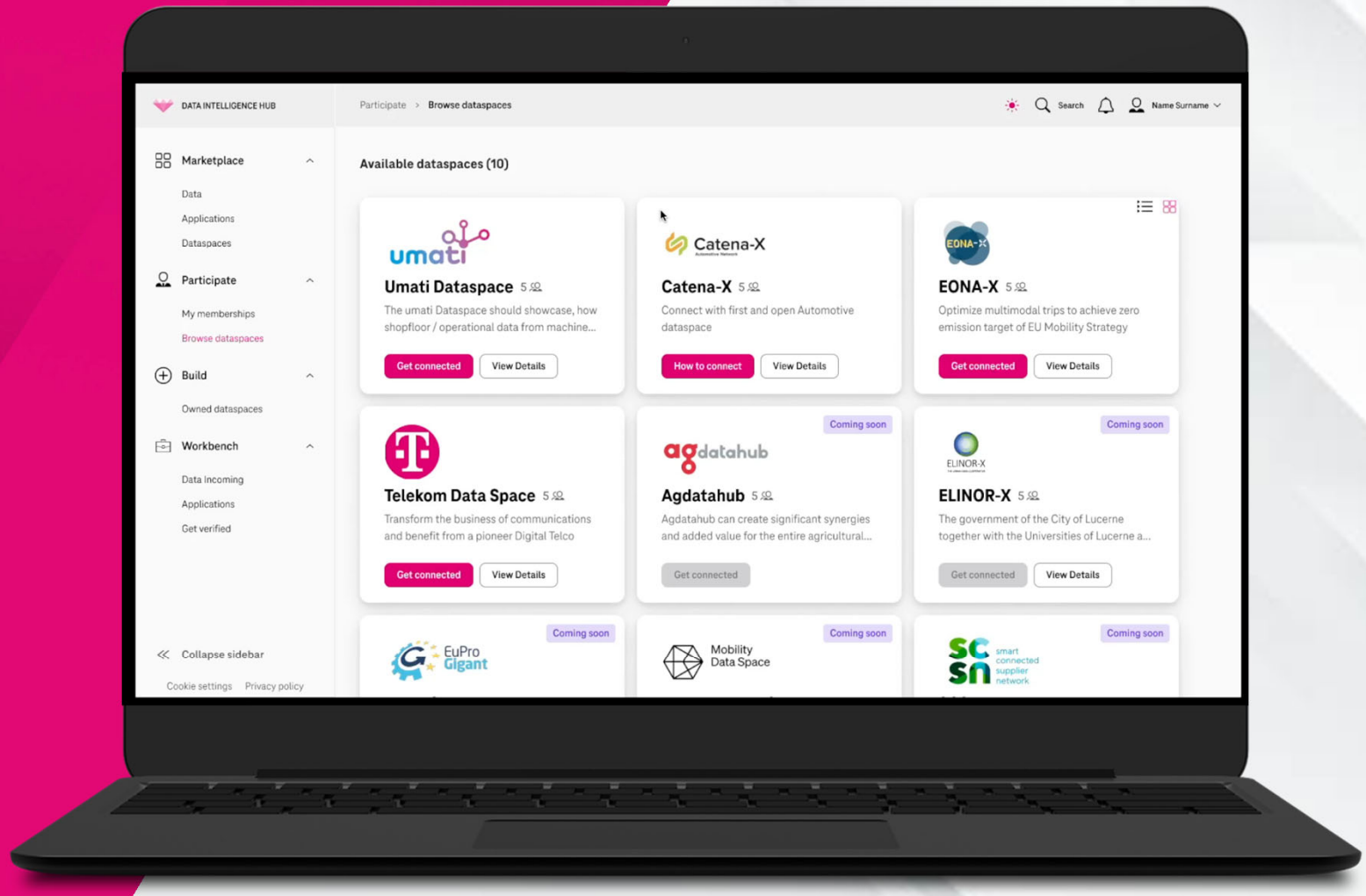


Hannover Messe 2025

- Showcase **first global Manufacturing-X demonstrator**
- Distributed supply chain across **EU, Asia and USA**
- Use of **Digital Product Passports & Product Carbon Footprint** to track environmental impact

T Systems VDMA VDW

Business APP Demo | User-friendly Umati application



Marketplace

Data

Applications

Dataspaces

Participate

My memberships

Browse dataspaces

Build

Owned dataspaces

Workbench

Data Incoming

Applications

Get verified

Collapse sidebar

Available dataspaces (10)

Umati Dataspace 5

The umati Dataspace should showcase, how shopfloor / operational data from machine...

Get connected | View Details

Catena-X 5

Connect with first and open Automotive dataspace

How to connect | View Details

EONA-X 5

Optimize multimodal trips to achieve zero emission target of EU Mobility Strategy

Get connected | View Details

Telekom Data Space 5

Transform the business of communications and benefit from a pioneer Digital Telco

Get connected | View Details

Coming soon

Agdatahub 5

Agdatahub can create significant synergies and added value for the entire agricultural...

Get connected

Coming soon

ELINOR-X 5

The government of the City of Lucerne together with the Universities of Lucerne a...

Get connected | View Details

Coming soon

EuPro Gigant

Coming soon

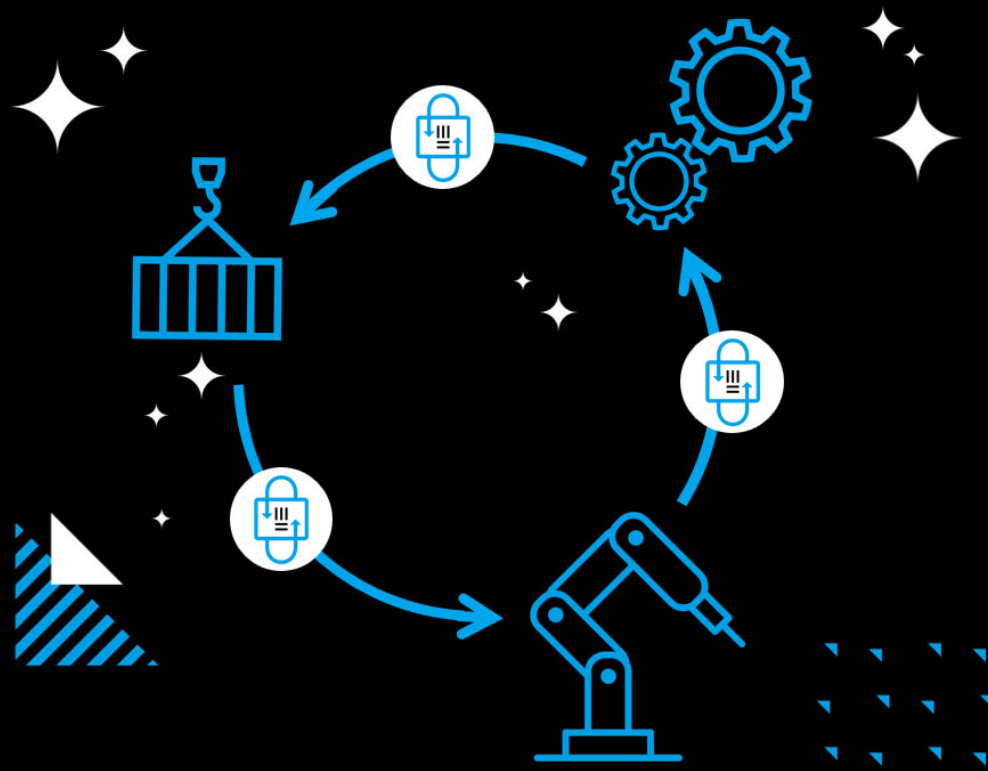
Mobility Data Space

Coming soon

smart connected supplier network

Thank you!

T Systems VDMA



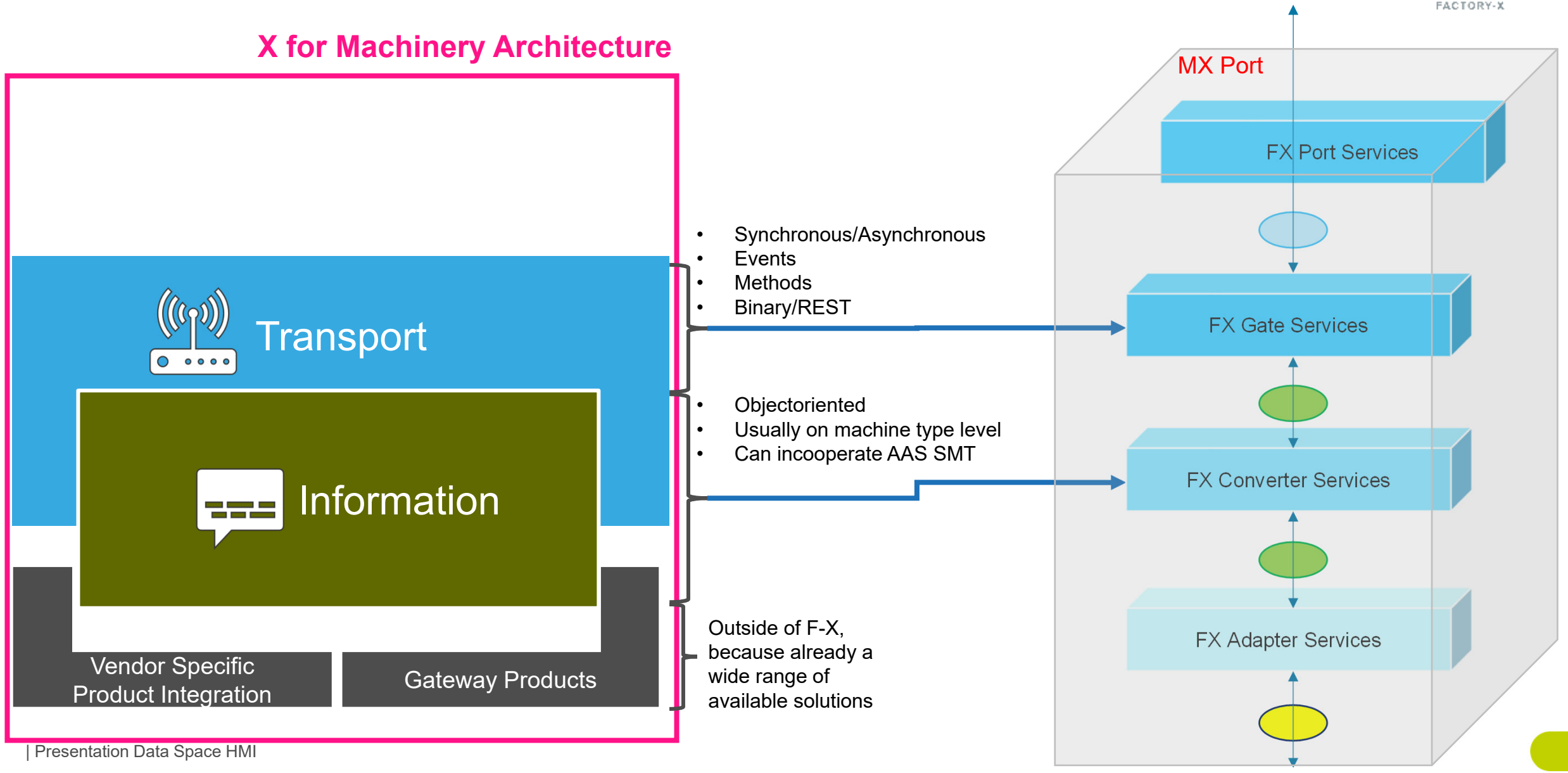
Machinery Architecture: MX-Port Solution by OPC UA with Companion Specifications

Andreas Faath, VDMA

MX-Port Solution by OPC UA with Companion Specifications

Using OPC UA as Integration technology for MX Port

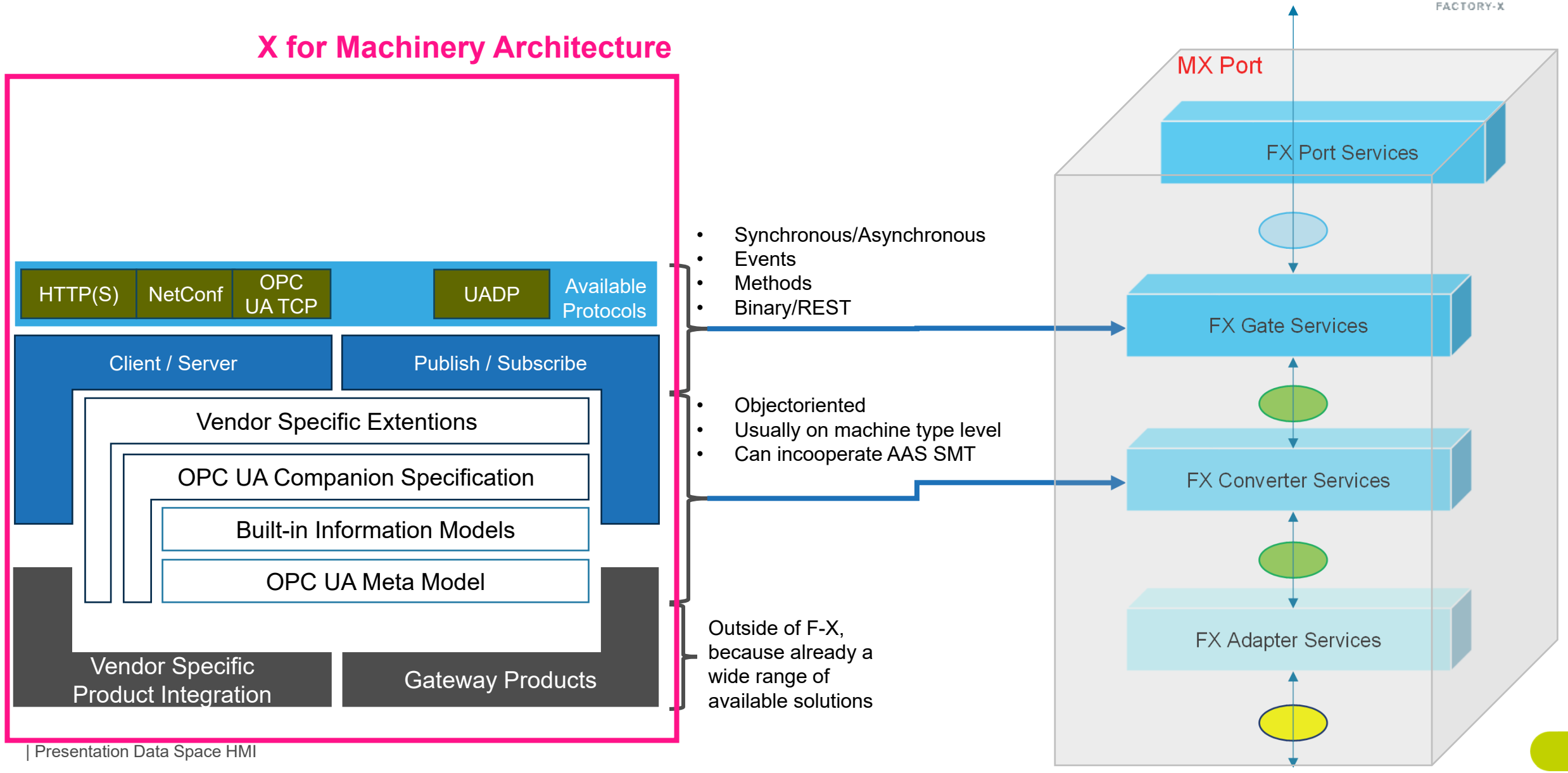
X for Machinery Architecture



MX-Port Solution by OPC UA with Companion Specifications

Using OPC UA as Integration technology for MX Port

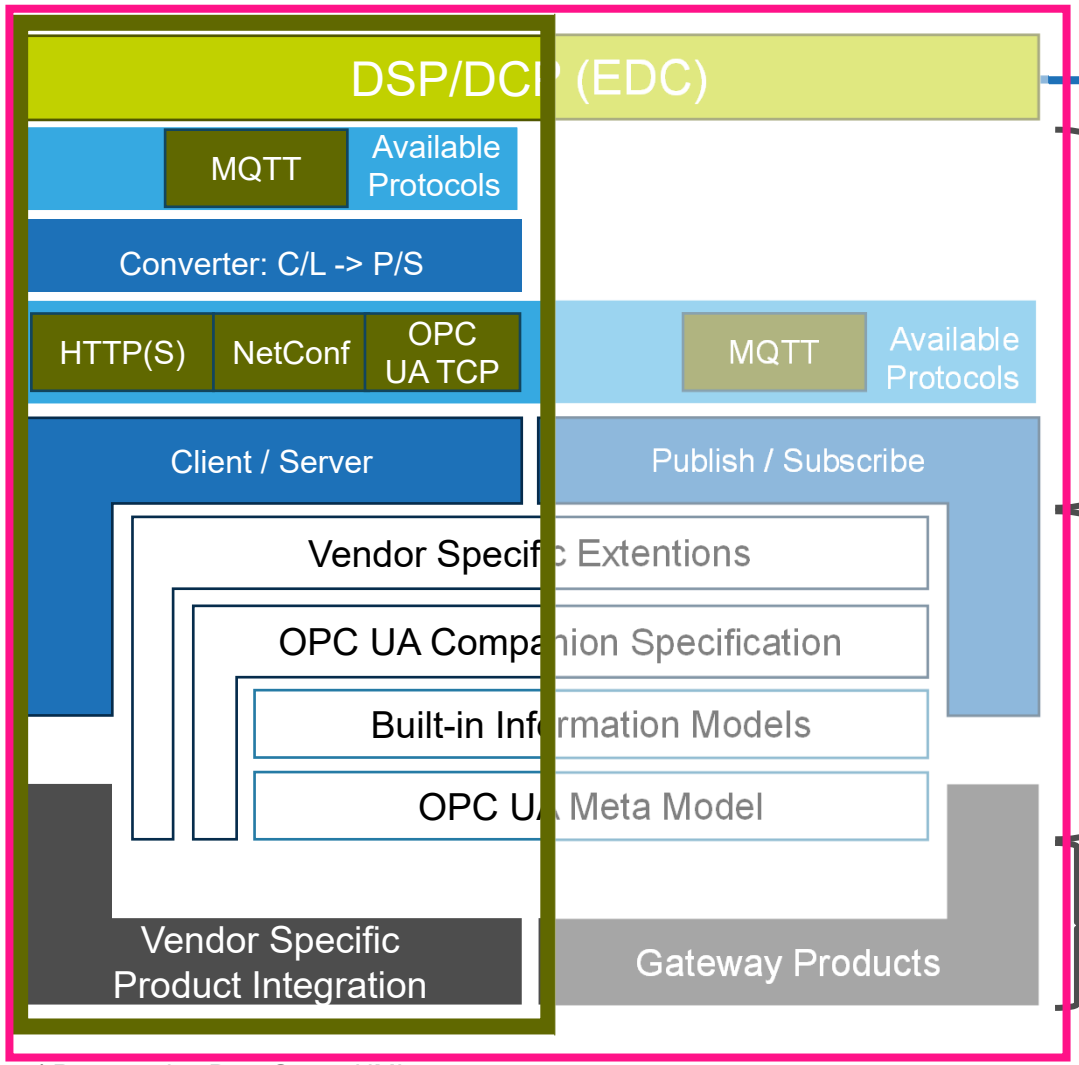
X for Machinery Architecture



MX-Port Solution by OPC UA with Companion Specifications

Already PoC existing since HMI 2024

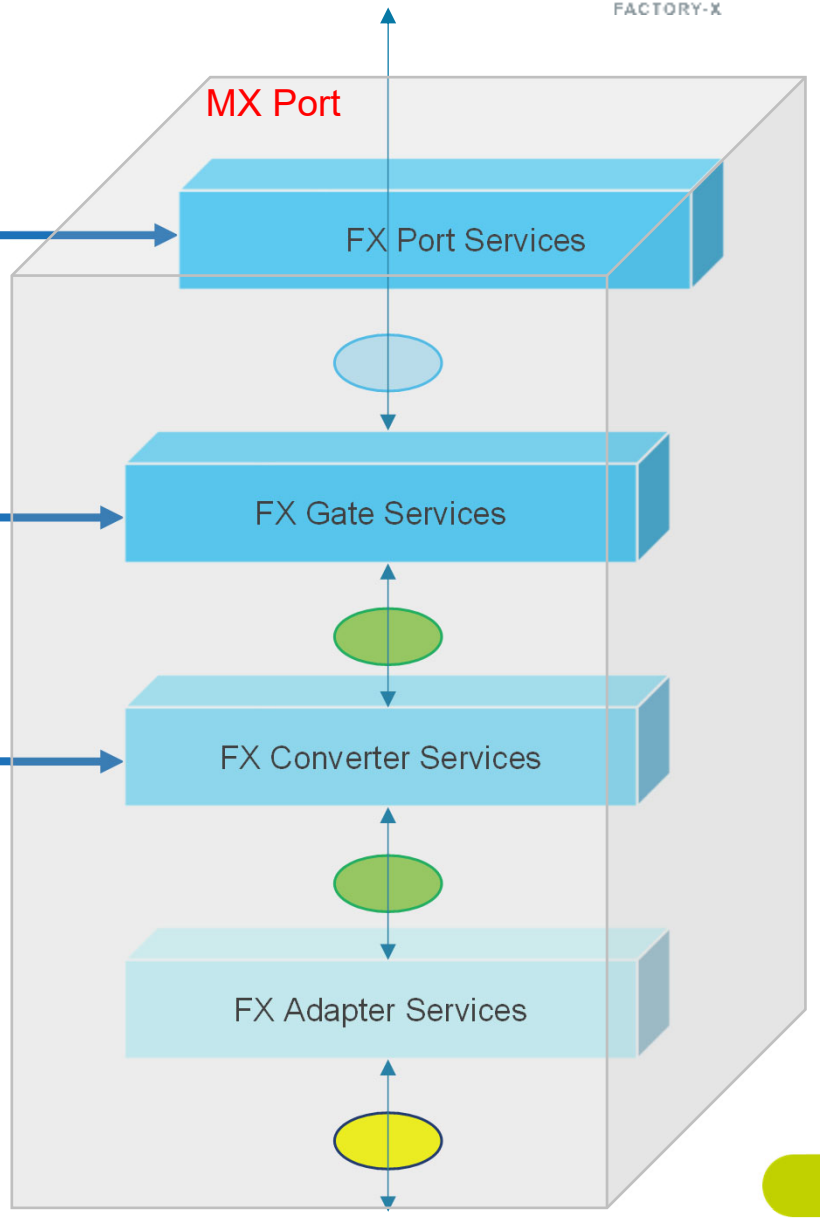
X for Machinery Architecture



- Synchronous/Asynchronous
- Events
- Methods
- Binary/REST

- Objectoriented
- Usually on machine type level
- Can incooperate AAS SMT

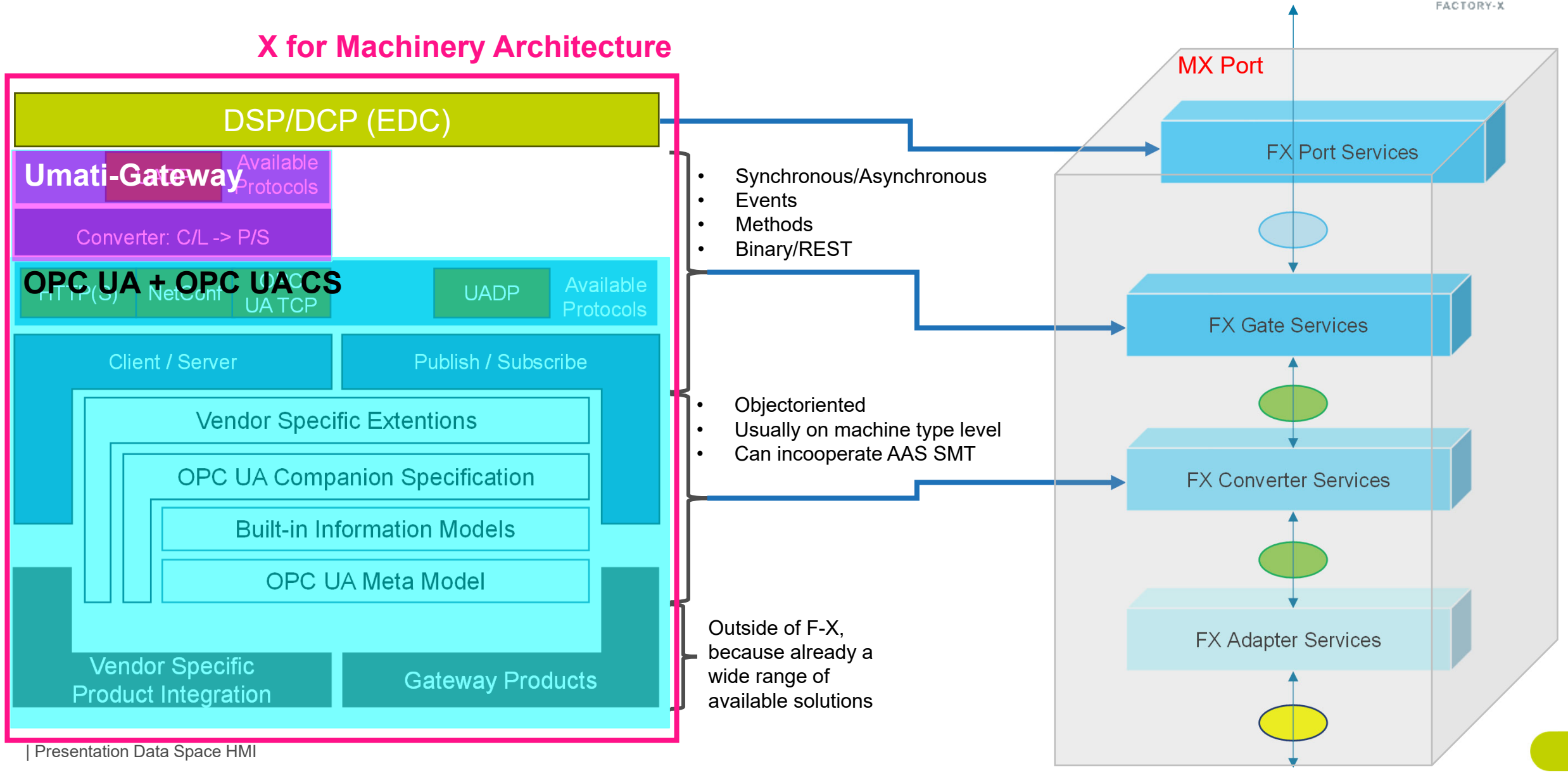
Outside of F-X, because already a wide range of available solutions



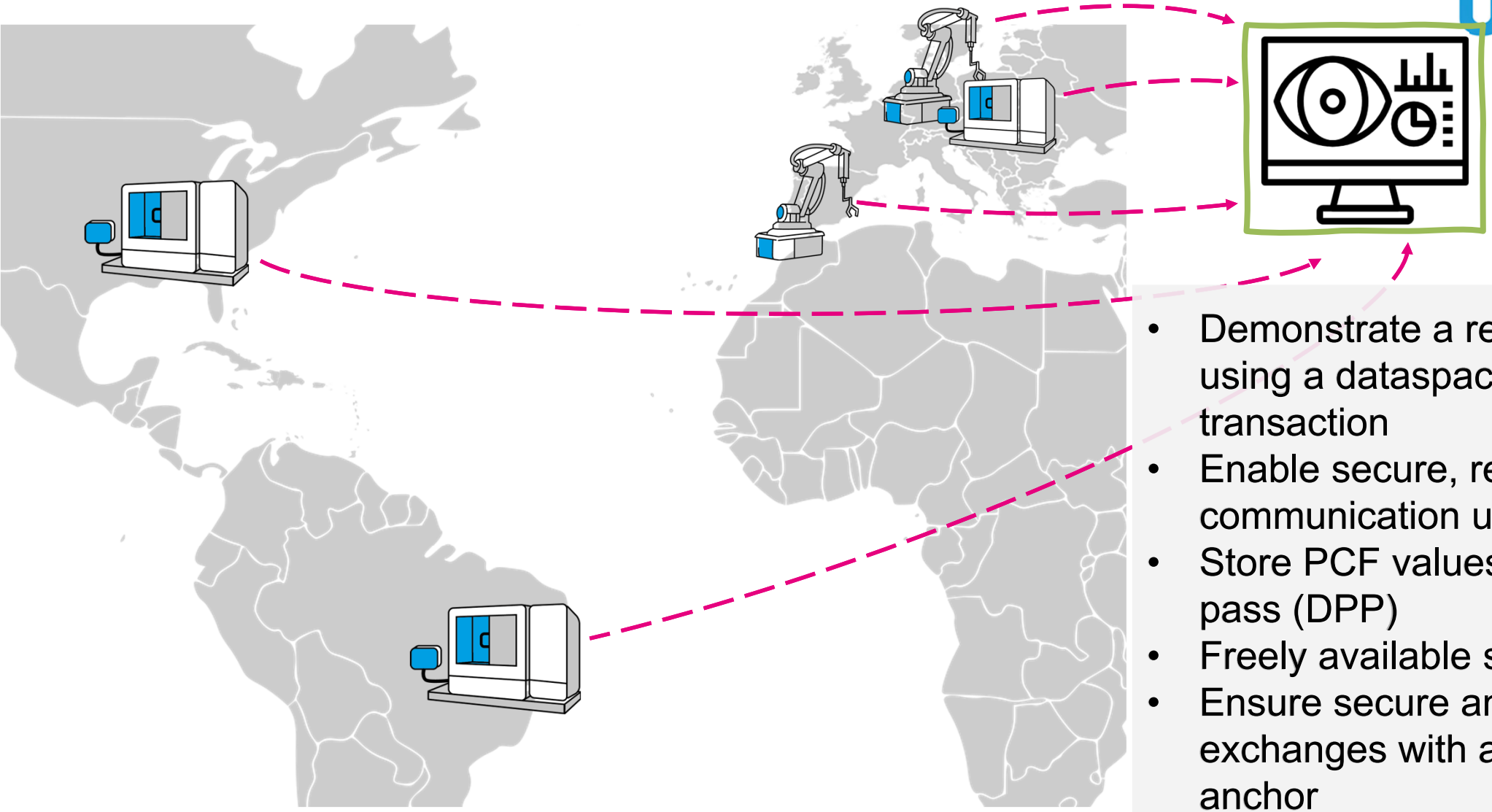
MX-Port Solution by OPC UA with Companion Specifications

Already PoC existing since HMI 2024

X for Machinery Architecture

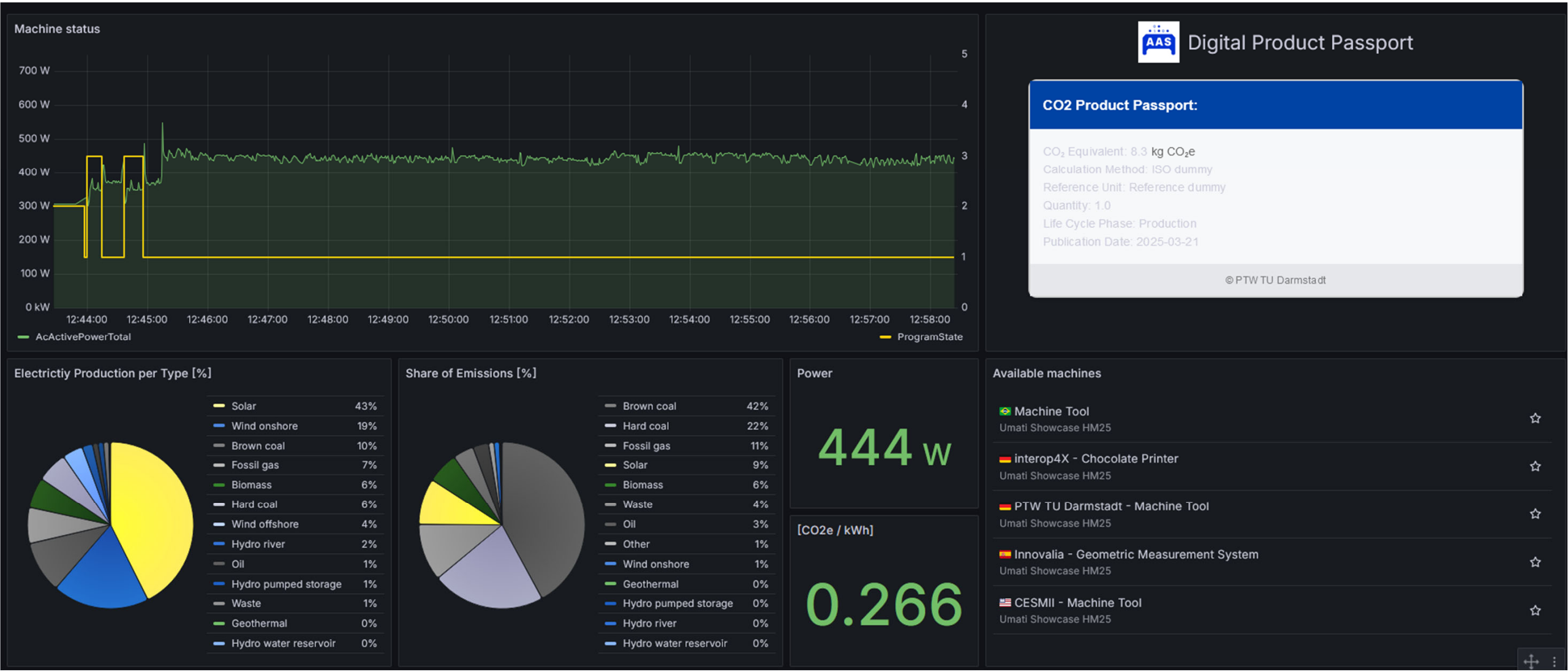


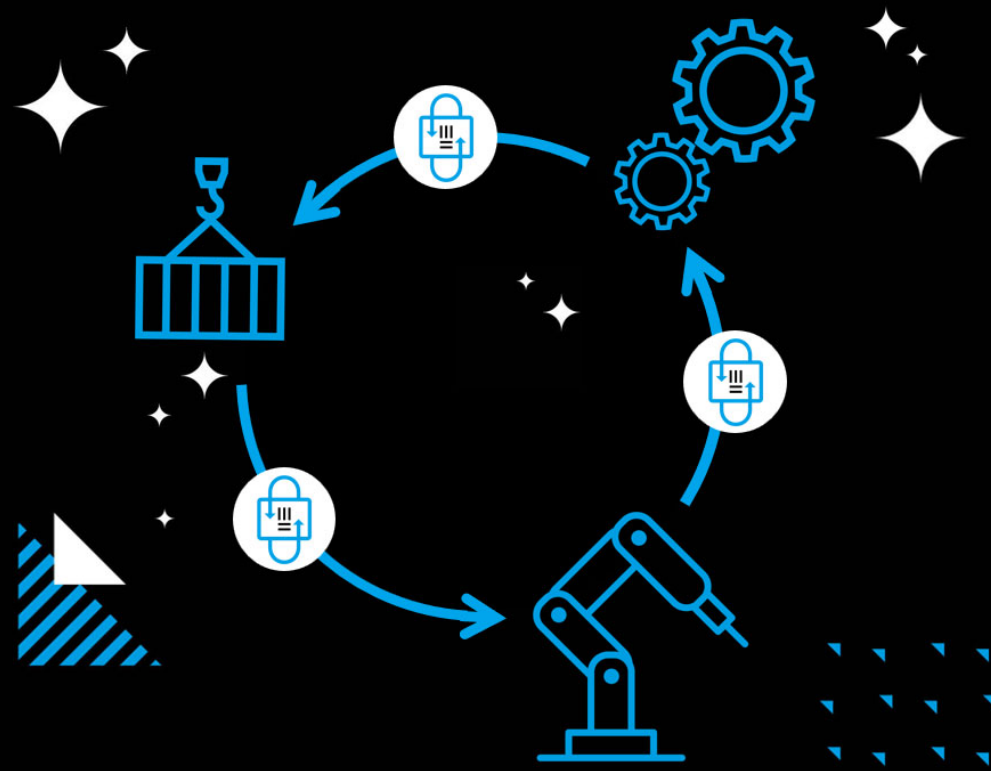
Demonstrator of X for Machinery Architecture



- Demonstrate a real-world application using a dataspace-enabled data transaction
- Enable secure, real-time machine communication using OPC UA
- Store PCF values in a digital product pass (DPP)
- Freely available software components
- Ensure secure and trusted data exchanges with a decentralized trust anchor

Demonstrator of X for Machinery Architecture





Catena-X: Data ecosystem for the automotive industry

Jürgen Sturm, ZF Group

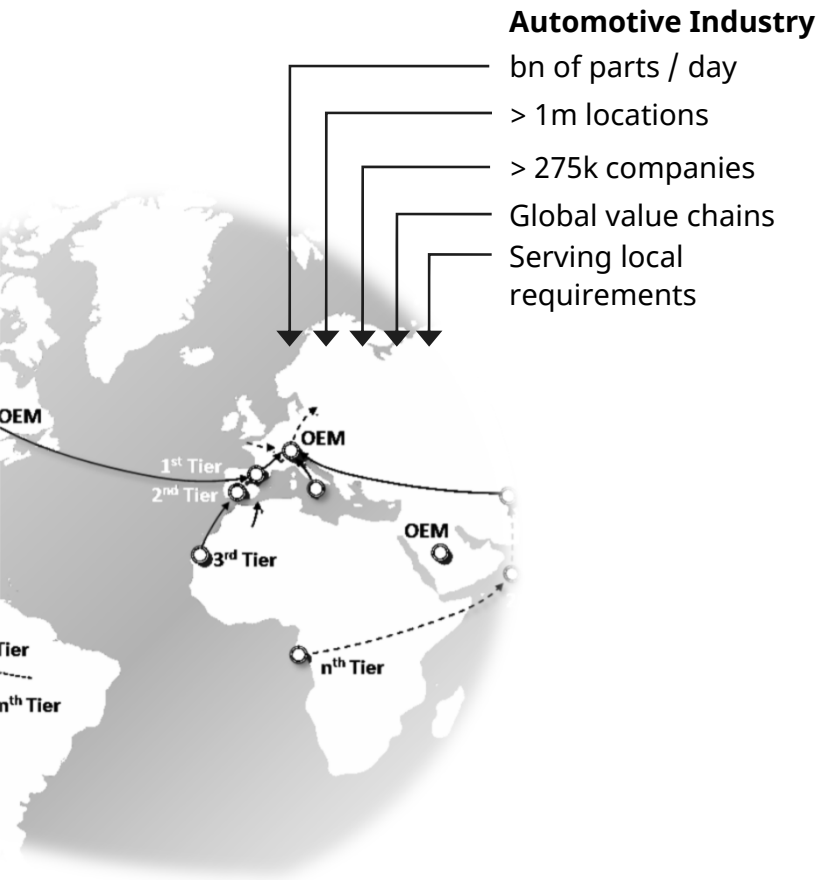
Catena-X is LIVE and ready for industrial scalability

Hannover Messe 2025 | Data Spaces for industry event | Innovate, scale, compete with industrial data spaces

Hannover Messe Convention Center
April 2, 2025 | 14:30-17:30

Our automotive business processes require an update of the industry operating model

Motivation: “License to operate and grow”



Resiliency

Resilient Supply Chains

- Business Partner Identification
- Location Certification
- Bolster supply performance
- Optimize inventory / logistics
- …

Compliance

Trusted Sustainability

- Report validated CO^2_e-Values
- Cover regional variance
- Release of Product Passports
- Supply Chain Due Diligence
- …

Cost down

Effective Quality

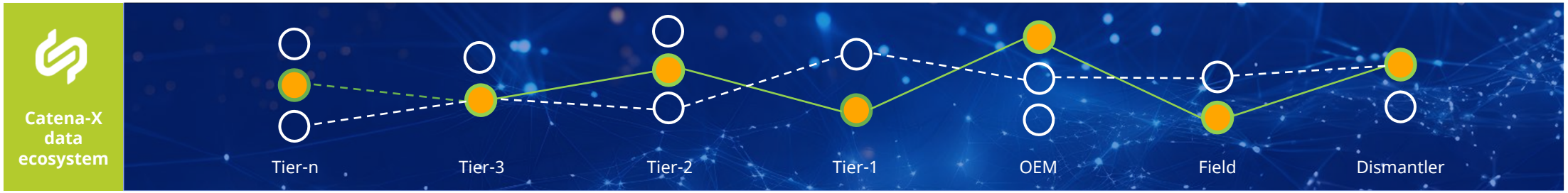
- Trace parts / campaign mgt.
- Live quality loops
- Behavior Twins
- …

require

multi-tier collaboration along the value chain

It is a digital challenge!

Catena-X developed an open, collaborative ecosystem for data exchange along the value chain



Trusted Identities

Verified and unique company identities

Self Souvereignty

Decentral Architecture with full control over your data

Interoperability

Unified open-source-based standards and KITs

Industry Governance

One global operating model and framework

Catena-X is **not a database** to store and collect data but an **open ecosystem** to share data in a better way – **standardized, secure and simple.**

Catena-X results as of 12/2024:

- → **Scalable / trusted standards for top industry problems** (21x KITs, >40 certified services)
- → **Fully operational development** (Tractus-X) **& operating environment** (Cofinity-X)
- → **Global and cross Industry Alignment** (US, EU, CN)
- → **Conformity Assessment Body** (Deloitte / TÜV)

Catena-X Development Environment

7,7 %

7,6 %

SW-Development "ready to use" CX **KITs**

Open Source Tractus-X [Eclipse Foundation]
Metric: # Commits Q4/2024

Standards for Top Industry Problems

Resiliency
Resilient Supply Chains

- Demand & Capacity Mgt.
- PURIS (Short term supply mgt.)
- Business Partner Mgt.
- Certificate Mgt.

Compliance
Trusted Sustainability

- CO_2 Footprint (CSRD, IKB)
- EcoPass / BatteryPass
- Environmental and Social Services
- Circularity

Cost Down
Effective Quality

- Quality Mgt.
- Traceability
- Remaining Useful Life
- Health Indicator

Network Foundation

- Industry Core
- Connector
- Data Chain
- Digital Twin
- Operating Model
- and many more

Solution overview

Catena-X Solution Portfolio

Catena-X
Qualified Advisors

8020 · abat · accenture · BearingPoint · Capgemini · CGI · codecentric · Cofinity-X · CONSILEON · ekan management · NEXUSCOGNITIVE · MATERNA · NOVATEC · NTT DATA · OPITZ CONSULTING · polygran · SAP · SIEMENS · SOVITY · SSC · T Systems · VW · WITTE AUTOMOTIVE · MHP

Catena-X Capabilities

Final Step:
Create Value

Step 4:
Manage Identity

Step 3:
Get Connected

Step 2:
Get Registered

Step 1:
Get Informed

Resilient Supply Chains

Demand & Capacity
SAP · CatX · Solutions · BMW

Sustainability & Regulation

Ecopass · BASF · SIEMENS · circulor · EVIDEN · DENSO

Circularity
SAP

Product Carbon Footprint
SIEMENS · T Systems · SUPPLYON · SAP · BASF · IBM

Quality Improvement

Quality
SAP

Traceability
SOVITY · Cofinity-X · GEC · SAP

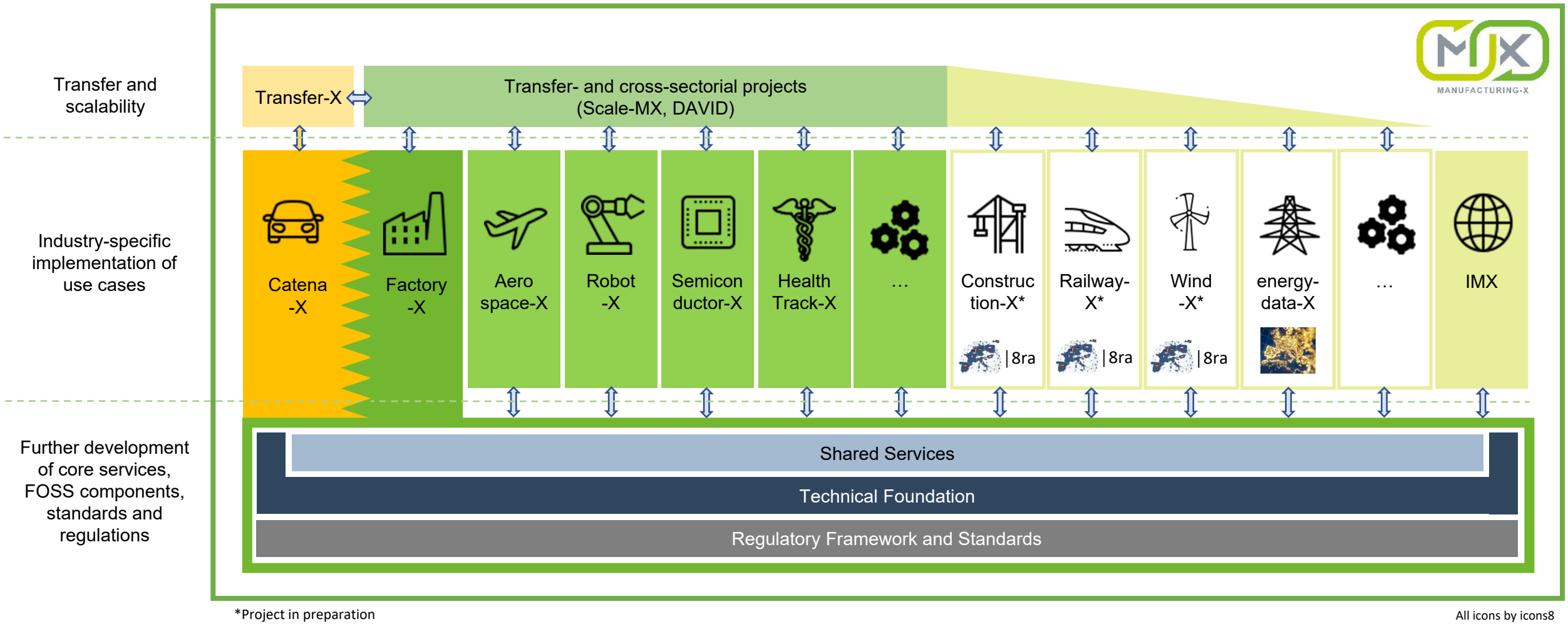
Value Added Services
aws CM · Cofinity-X CM · Cofinity-X BPDM

Enablement Service Provider (ESP)
Cofinity-X · T Systems · polygran · aws · SUPPLYON · VW · SOVITY · BOSCH · e2open

Onboarding Service Provider (OSP)
polygran · T Systems · Cofinity-X · NTT Communications

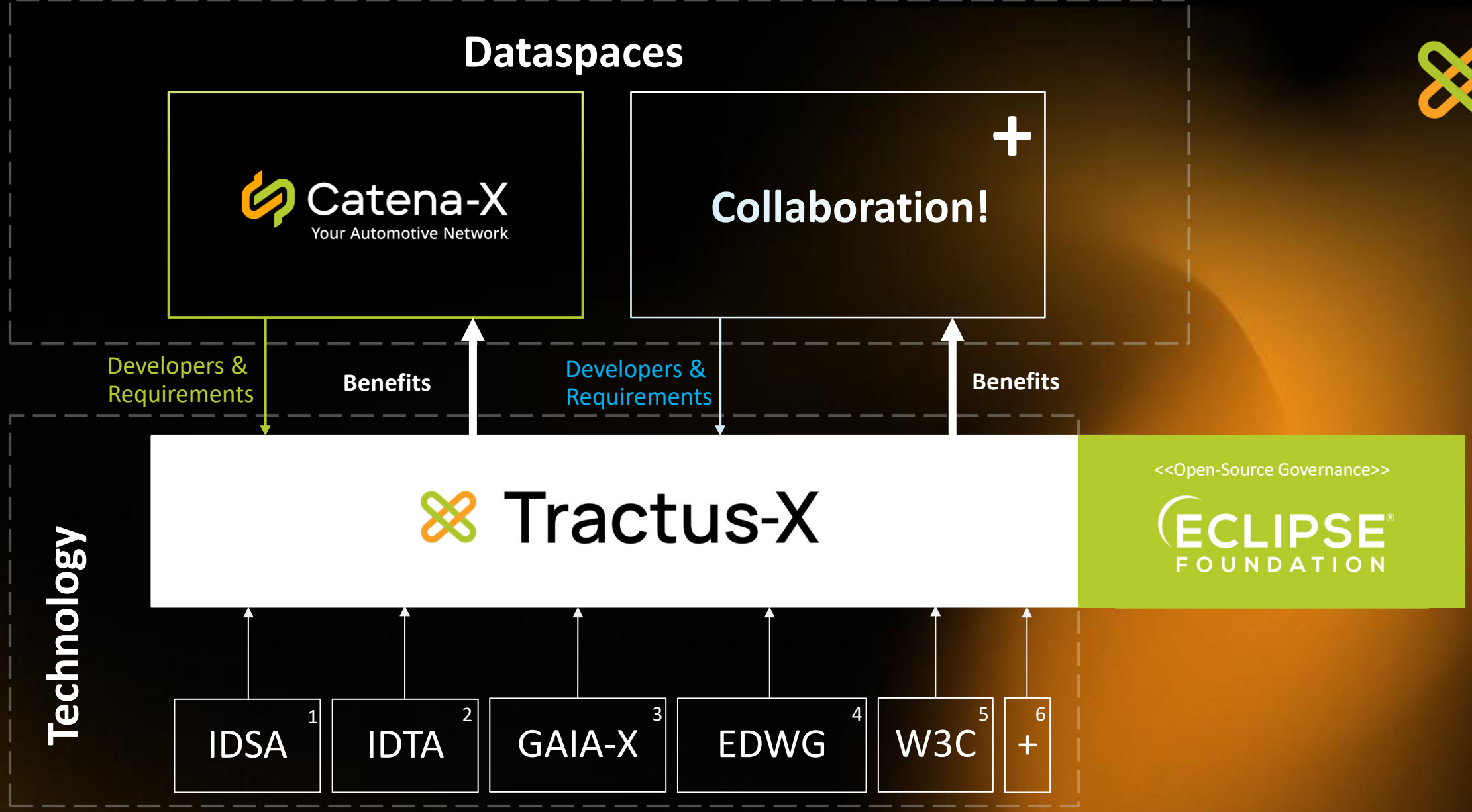
Catena-X
CATENA-X Readyness Booster Programm

Interoperability across industries requires the same Technical Foundation and Framework of Standards for Data Spaces



*Project in preparation

All icons by icons8



1. International Dataspace
2. Industrial Digital Twins & More
3. Data Sovereignty
4. Decentral Data Exchange
5. Secure + Web3.0
6. Innovative

Cofinity-X

Smooth Operator of Industry Dataspaces

We are on a mission to bring global industries together and empower sovereign data exchange.

Oktober 2024
Go-Live of Catena-X Dataspace, powered by Cofinity-X

Cofinity-X is a Joint Venture founded in January 2023 by 10 Shareholders

BASF We create chemistry · BMW GROUP · Henkel · Mercedes-Benz · SAP · SCHAEFFLER · SIEMENS · T-Systems · VOLKSWAGEN · ZF

Unlock the Power of Dataspaces

Cofinity-X

Dataspace Lab

https://www.cofinity-x.com/dataspace-lab

***Exclusive Offer for Dataspace Pioneers**

30-day free trial, then €4,000 per year*

Dataspace Access

Get exclusive access to a fully functional Test Environment, based on Tractus-X Tech-Stack.

Dataspace Connector

Dataspace OS connects you seamlessly and provides all essential tools for participation.

Customer Support

Best-in-class Customer Support, delivered by Dataspace Pioneers and Integration Experts.

Cofinity-X Portal & Marketplace

Cofinity-X Dataspace OS

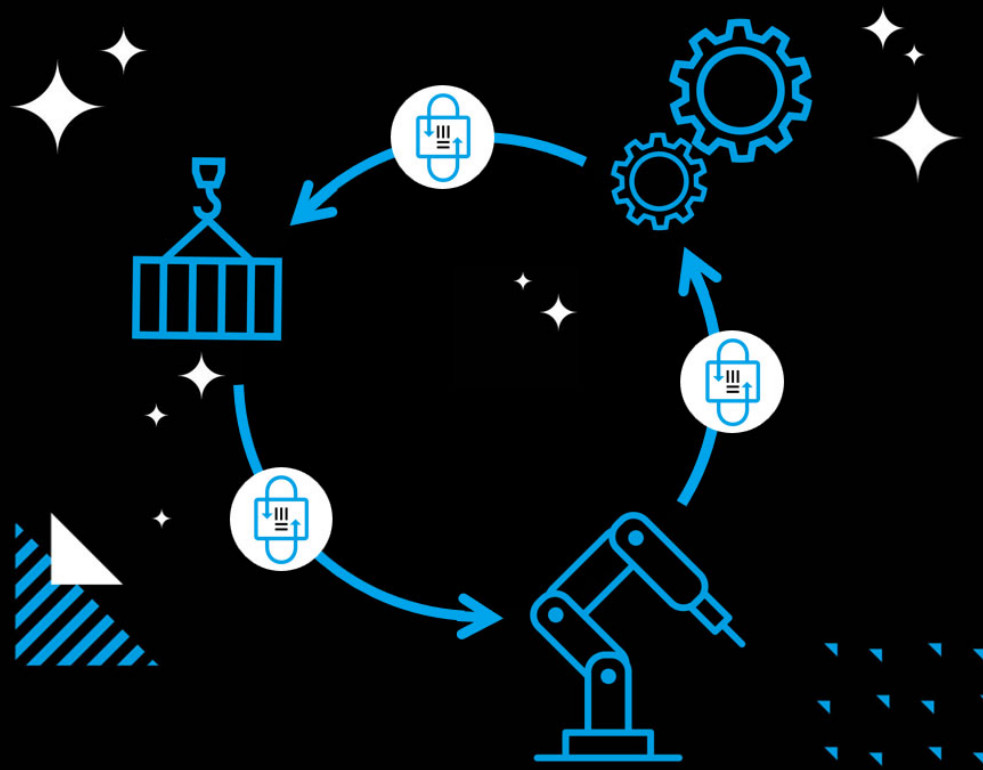
Cofinity-X

Q&A

Thank You

Dr. Jürgen Sturm
Board Member Catena-X Automotive Network e.V.
SVP Automotive Data Ecosystems, Catena-X, Digital Twin Technologies, ZF Friedrichshafen AG

Catena-X
Your Automotive Network



Industrial data spaces enabled by Data Space Connectors, OPC UA & AAS

Stefan Hoppe, OPC Foundation | Erich Barnstedt, Microsoft

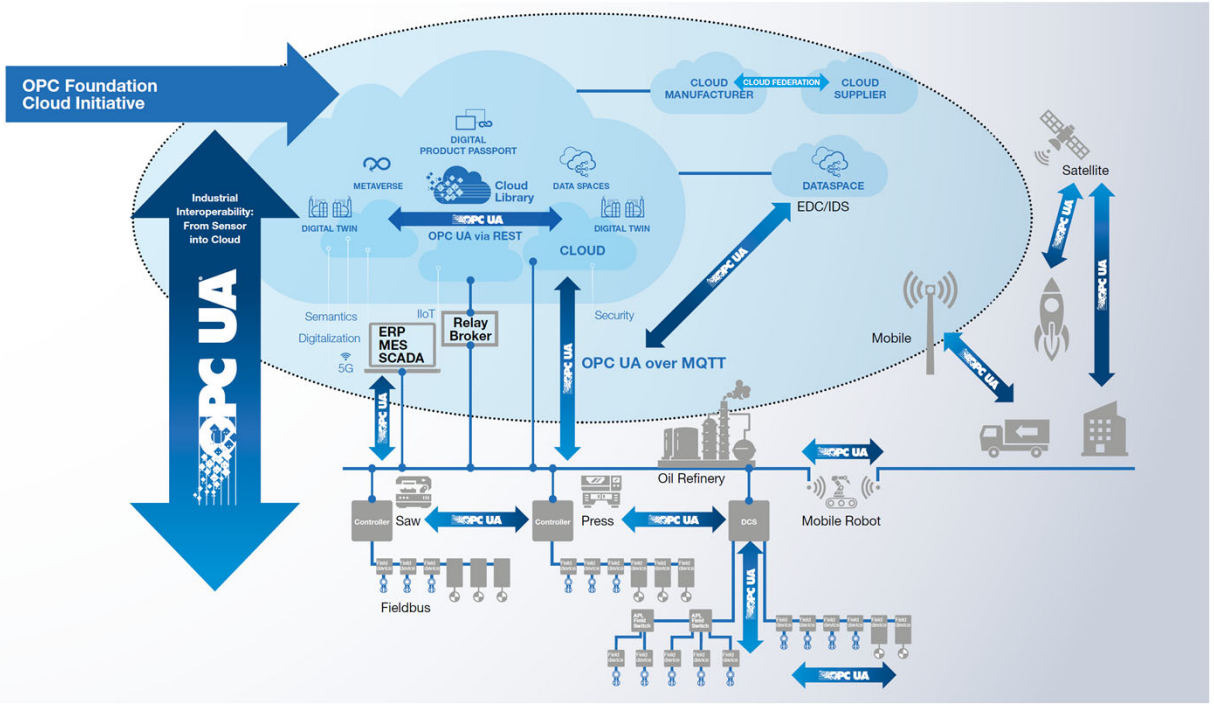
OPCF Partnership with IDSA

- **OPC UA connects assets to International Data Spaces**
- **This collaboration will empower companies to leverage both standards seamlessly in their architectures and update their existing environments quickly with governance for the sharing of the data collected and provided with OPC UA.**

IDSA: Governance
OPCF: Interoperability

OPC Foundation Cloud Initiative: Information Flyer Who & What

Vision: Accelerate the interoperability of IT and cloud applications through the OPC UA standard.
Find more information www.opcfoundation.org/cloud



Download flyer:

March 31st, 2025
Hannover Messe, Germany

Interested?
Join us!

Supporting cloud providers

Alibaba Cloud · aws · Google Cloud · HUAWEI · Microsoft · SAP

Supporting end-users

Boehringer Ingelheim · Continental CONTITECH · equinor · L'ORÉAL OPERATIONS · Miele · Mondelēz International SNACKING MADE RIGHT · Renault Group · JTI · Tetra Pak PROTECTS WHAT'S GOOD · VOLKSWAGEN

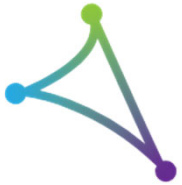
Supporting automation providers

ABB · BECKHOFF · Honeywell · MITSUBISHI ELECTRIC Changes for the Better · Rockwell Automation · Schneider Electric · SIEMENS · YOKOGAWA Co-Innovating tomorrow

OPC FOUNDATION

HEADQUARTERS / USA
OPC Foundation
16101 N. 82nd Street
Suite 3B
Scottsdale, AZ 85260-1868
Phone: (1) 480 483-6644
office@opcfoundation.org

Digital Product Passport and Digital Battery Passport
powered by AAS, EDC & OPC UA



Digital product passports (DPP) as part of European broader regulatory

European Green Deal

EU Plan: climate-neutral by 2050, safeguard biodiversity, establish a circular economy and eliminate pollution, while boosting the competitiveness of the European industry

agreed

Ecodesign for Sustainable Product Regulation (ESPR)

- Proposed in Mar 2022, as central part to the Commission's strategy for eco-friendly and circular products
- Aims to promote environmental sustainability across a broader range of products

Requires **digital product passports based on harmonized European Standards (hEN)**

Entered into force

Battery Regulation

- Entered into force in Aug 2023 replacing the EU Battery Directive
- Provides a legal framework aiming to promote sustainability, circularity, safety and transparency

Mandates a **battery passport** for all EV, LMT, and industrial (>2kWh) batteries starting Feb 2027

Proposal

End-of-Life Vehicle Regulation

- Proposed in Jul 2023
- Will replace the End-of-life Vehicle Directive
- Governs the entire vehicle lifecycle, from design to end-of-life treatment

Mandates a **circularity vehicle passport**

DPP with an IEC standardized interface & data format/model/semantics

Interface: OpenAPI-compatible (OPC UA REST and Data Space Protocol)

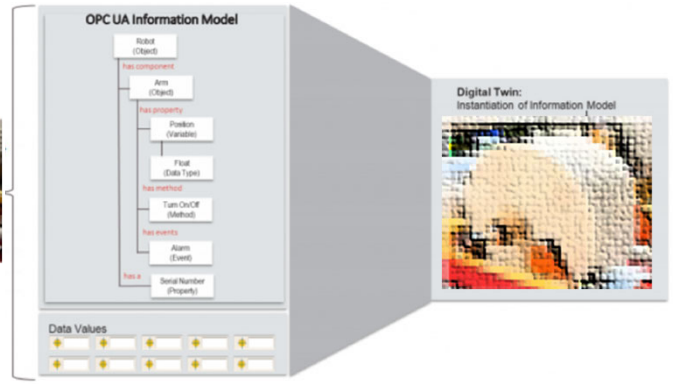
Data Format: OPC UA Nodeset file

Data Model: OPC UA Modelling Language

Semantics: Companion Specs & Asset Admin Shell Submodel Templates

Use Case: Combining Ecosystems – OPC UA & AAS implementing EU Digital Product Passport Together with OPCF/DTC/CESMII/Manufacturing USA

Physical Manufactured Product



Create

SM PROFILE
OPC UA

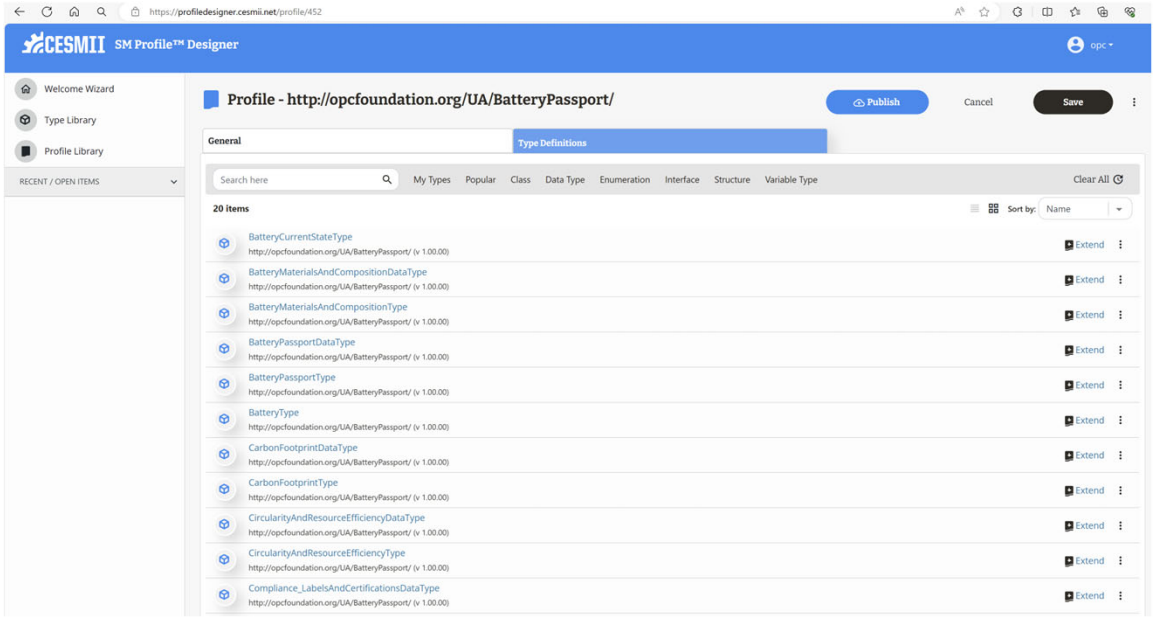
Embed

AAS
SM PROFILE
OPC UA

Store

AAS Repository

Store

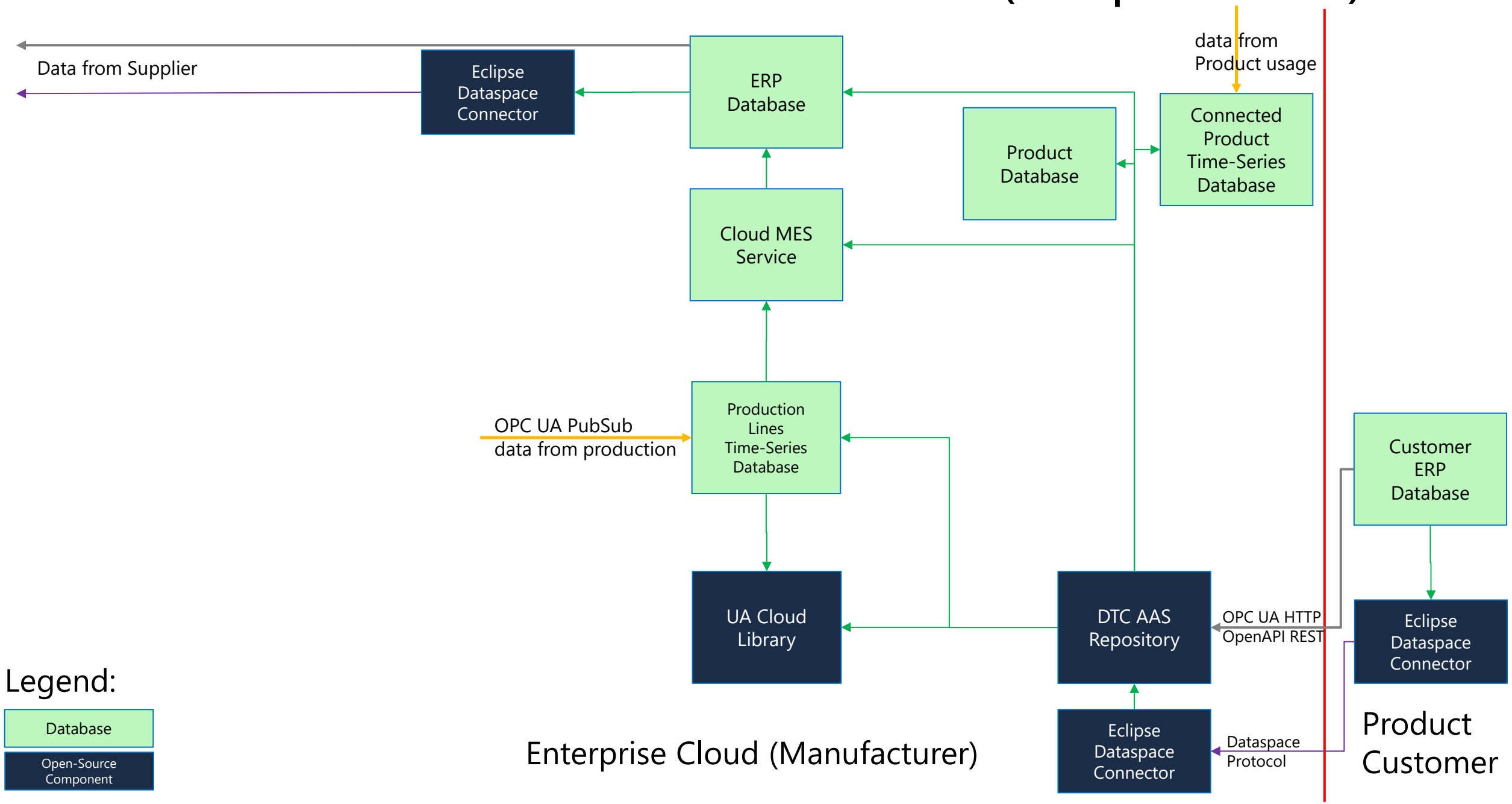


UA Cloud Library

CESMII THE SMART MANUFACTURING INSTITUTE | OPC FOUNDATION

profiledesigner.cesmii.net (free online OPC UA editor)

OPC Foundation Cloud Initiative Reference Architecture (Dataspace-relevant)



65/1120/NP

NEW WORK ITEM PROPOSAL (NP)

PROPOSER:	DATE OF PROPOSAL:
Secretariat	**2025-02-21**
DATE OF CIRCULATION:	**CLOSING DATE FOR VOTING:**
2025-02-28	**2025-05-23**

IEC TC 65 : INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION

SECRETARIAT:	SECRETARY:
France	Mr Didier GIARRATANO
NEED FOR IEC COORDINATION:	HORIZONTAL FUNCTION(S):
SC 3D,SC 41	

ASPECTS CONCERNED:

Digital content,Information security and data privacy

TITLE OF PROPOSAL:

Industrial Automation Product Data

☒ STANDARD	☐ TECHNICAL SPECIFICATION	☐ PUBLICLY AVAILABLE SPECIFICATION

PROPOSED PROJECT NUMBER:

SCOPE
(AS DEFINED IN ISO/IEC DIRECTIVES, PART 2, 14):

The document contains Industrial Automation Product Data as information models and interfaces with defined semantics for digital use for industrial manufactured products, small and big assemblies and manufacturing systems.

It supports the entire lifecycle and supply chain. Specifically, the data covers lifecycle stages from planning, designing, producing, using, maintaining, repairing, and disposing.

Industrial Automation Product Data with standardized digital information supports industrial digital twins and circular economy, as well as carbon footprint aggregation with the relevant environmental impact factors.

The following standards are leveraged as a baseline: IEC 63283-2 Smart manufacturing - Part 2: Use cases and IEC 63278-4 Asset Administration Shell for industrial applications - Part 4: Applications of Asset Administration Shell. In addition, the IEC 62264 Enterprise-control system integration series is used to define IEC CDD properties with their semantics.

The Industrial Automation Product Data standard defines the semantic of properties in sufficient detail for the general usage e.g. for digital product passports and production systems. The standard specifies how the data are created, collected, used and maintained along the supply chain.

New Working Group in IEC TC65

TARGET DATE(S)	FOR FIRST CD: 2025-12-31	FOR PUBLICATION: 2027-12-31	
ESTIMATED NUMBER OF MEETINGS:	FREQUENCY OF MEETINGS:	DATE OF FIRST MEETING:	PLACE OF FIRST MEETING:
40	20 per year	2025-06-18	web

RELEVANT DOCUMENTS TO BE CONSIDERED:

IEC 61360 Common data dictionary

IEC 63278-1 Asset Administration Shell for industrial applications - Part 1: Asset Administration Shell structure

IEC 62541-5 OPC Unified Architecture - Part 5: Information Model

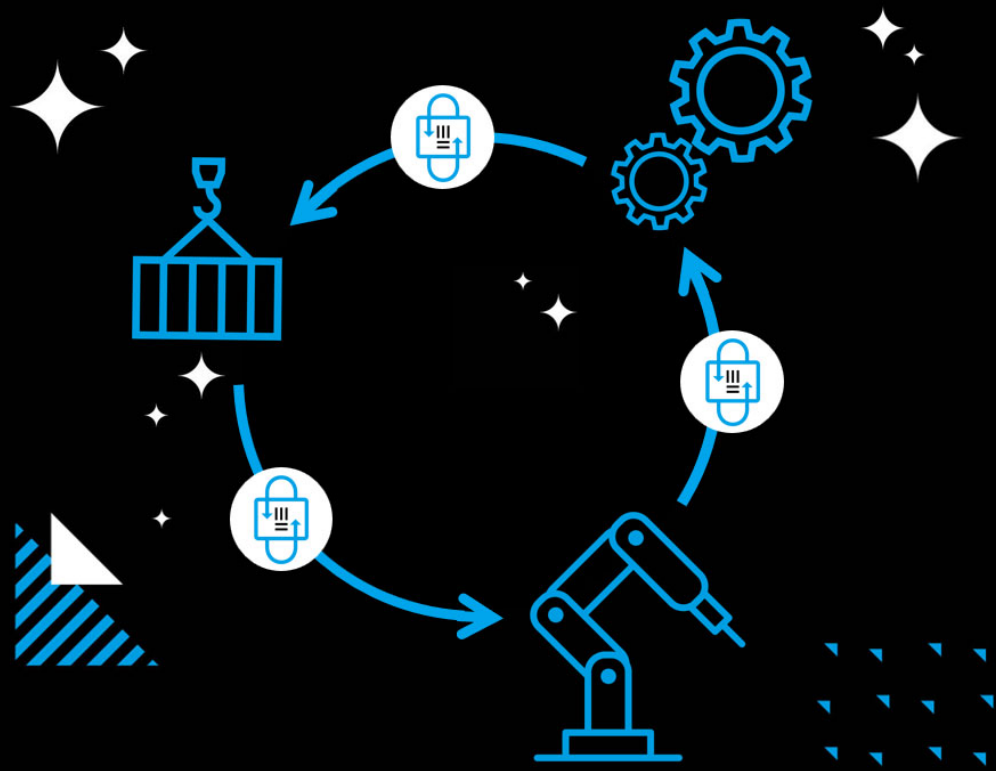
IEC 62541-6 OPC Unified Architecture - Part 6: Mapping

IEC 62541-14 OPC Unified Architecture - Part 14: PubSub

RELATION TO AND IMPACT ON EXISTING WORK:

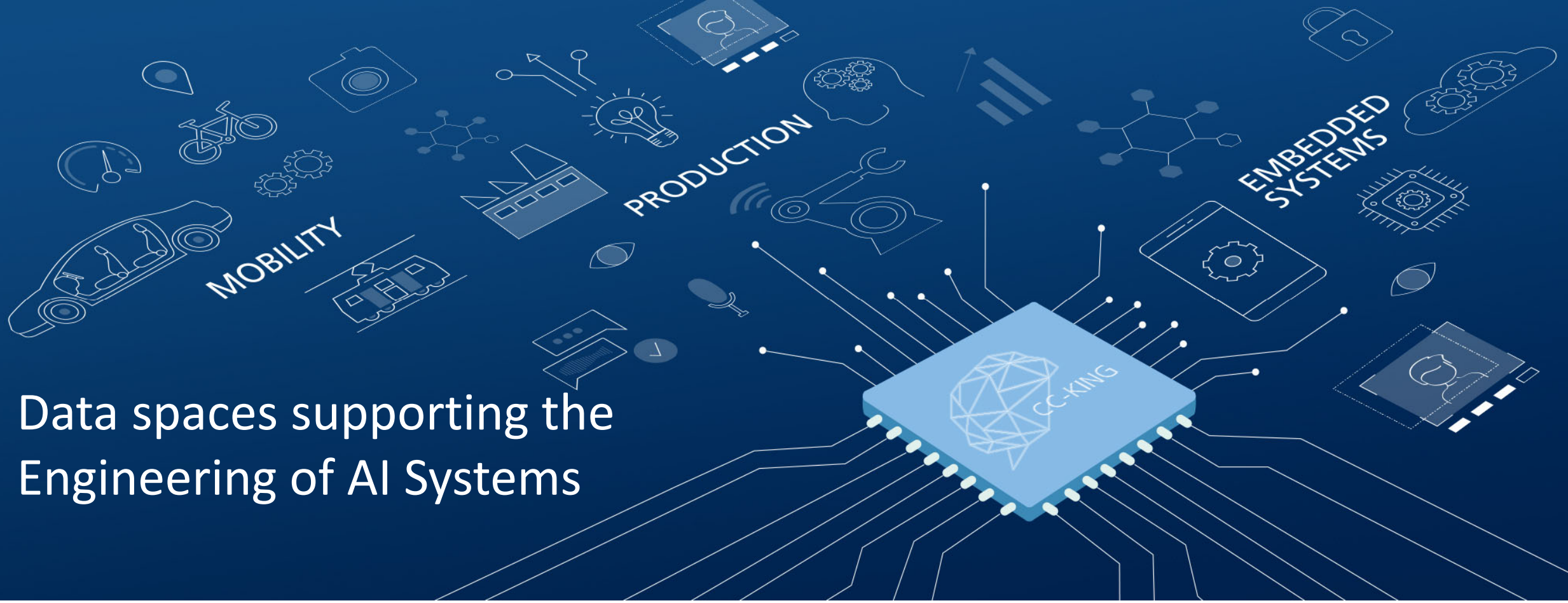
Standards for the DPP developed in CEN/CLC/JTC 24.

Fraunhofer IOSB



Data spaces supporting the engineering of AI Systems

Thomas Usländer, Fraunhofer IOSB



Data spaces supporting the Engineering of AI Systems

Hannover Messe 2025 | Data spaces for industry event: Innovate, scale, compete with industrial data spaces

Dr. Thomas Usländer, Fraunhofer IOSB

Business Manager AI Systems Engineering

Project Manager KI-Allianz Baden-Württemberg

KI-ALLIANZ Baden-Württemberg

Fraunhofer IOSB

Digital Production (AI) Ecosystems

open and secure system architectures
making internationally accepted standards usable

Data spaces

AI Systems

Physical World

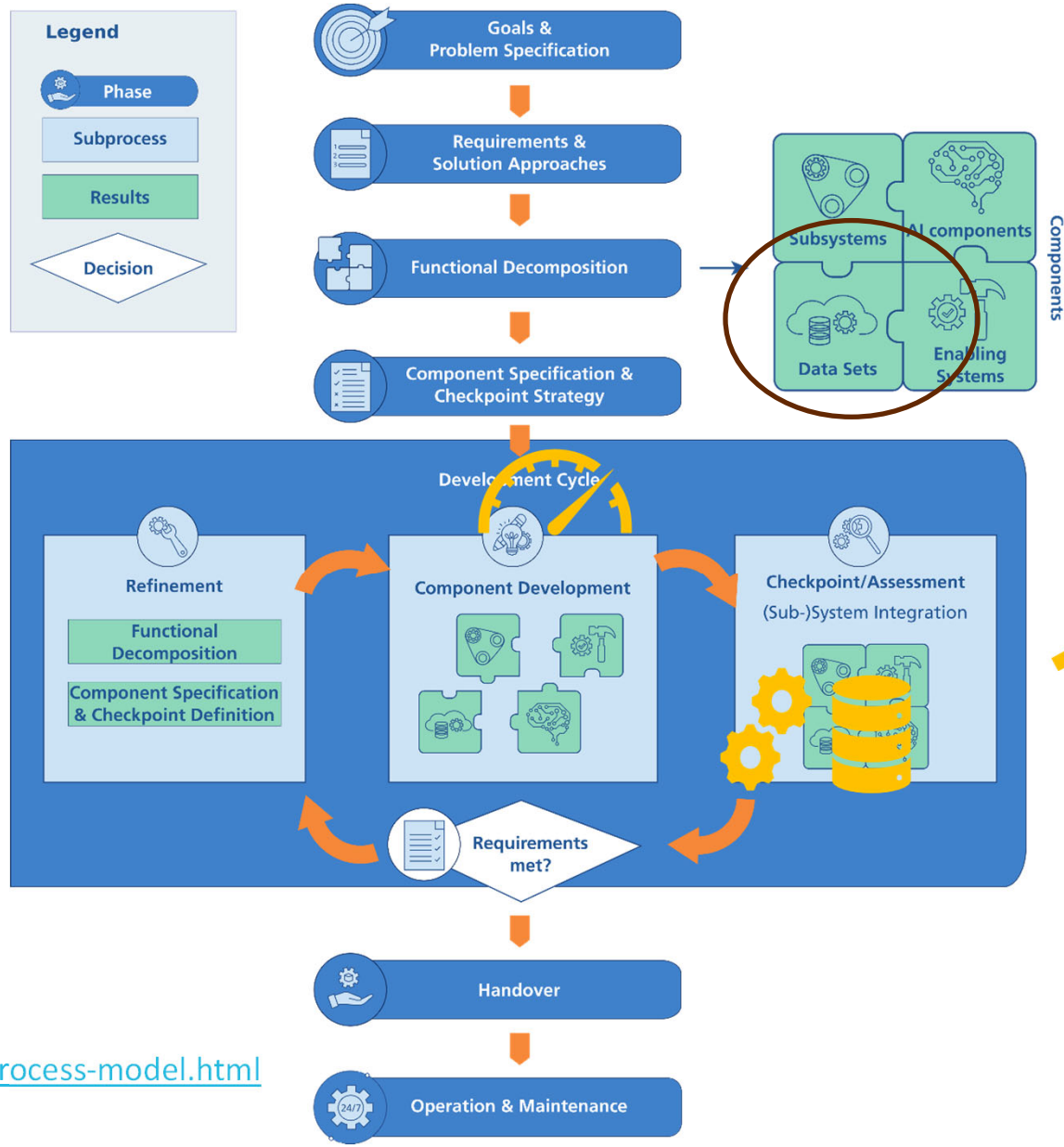
Virtual World

interoperability – physical assets

interoperability – virtual assets

PAISE®

Process Model for AI Systems Engineering



Datasets as sub-systems !

Information and Dokument:

https://www.ki-engineering.eu/en/know-how-tools/paise-process-model.html

Integrating Technological Initiatives and Enablers

Datenplattform KI-ALLIANZ Baden-Württemberg

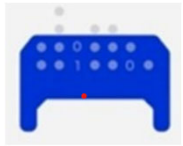
AI Data Platform
- Data publishing and finding
- W3C DCAT-AP

Eclipse Dataspace Components (EDC)
- Data publDshing, finding and sharing
- Data sovereignty / usage control
- ISO/IEC CD 20151 dataspace concepts

integrated solutions (e.g. DPP)

PLATTFORM INDUSTRIE 4.0

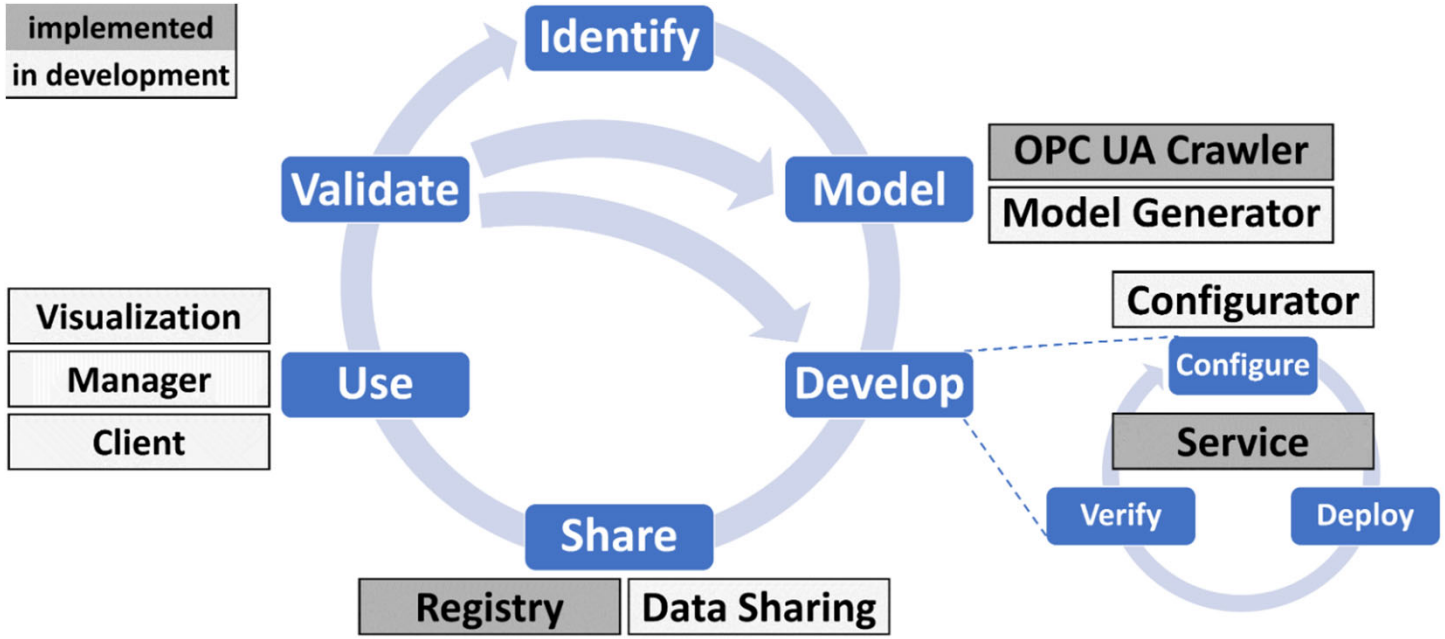
IDTA



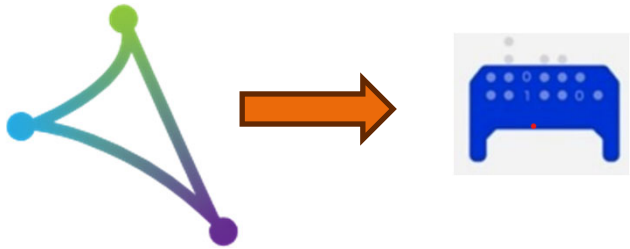
IEC 61360-x
- information model(ing)
- sub-model templates
- communication / interaction

IEC 62541 OPC UA
- information model(ing)
- communication / interaction

Fraunhofer IOSB FA³ST

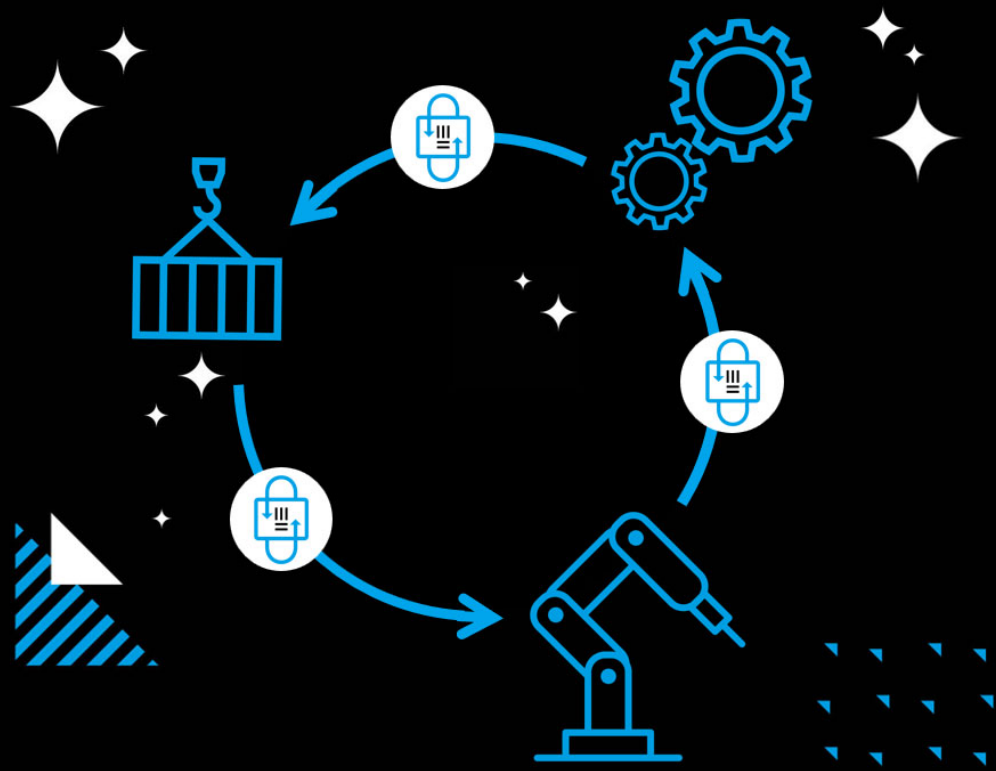


- The FA³ST service fully implements the AAS specification open-source
- FA³ST is a collection of tools for the entire lifecycle of a digital twin.
- FA³ST provides the “missing link” to connect EDC to AAS



See https://www.iosb.fraunhofer.de/en/projects-and-products/faaast-tools-digital-twins-asset-administration-shell-industrie40.html

SICK
Sensor Intelligence.



Interoperable digital twin – based on AAS and data space concepts

David Sonnenberg, SICK

SICK
Sensor Intelligence.

Data spaces for Industry
Interoperable digital twin –
based on AAS and data space concepts

Dr. David Sonnenberg

Senior Director Digitalization Enabling

Hannover, 2nd April 2025

Motivation

Cross-company use cases

Product Supplier

Machine Builder

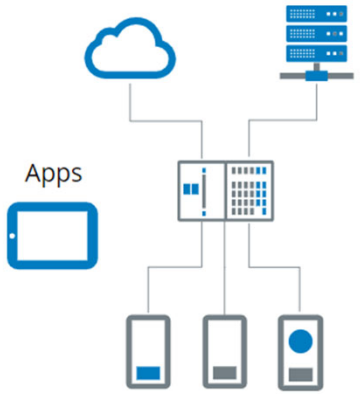
Plant Operator

PLM

Engineering

PLM

Engineering



Value by

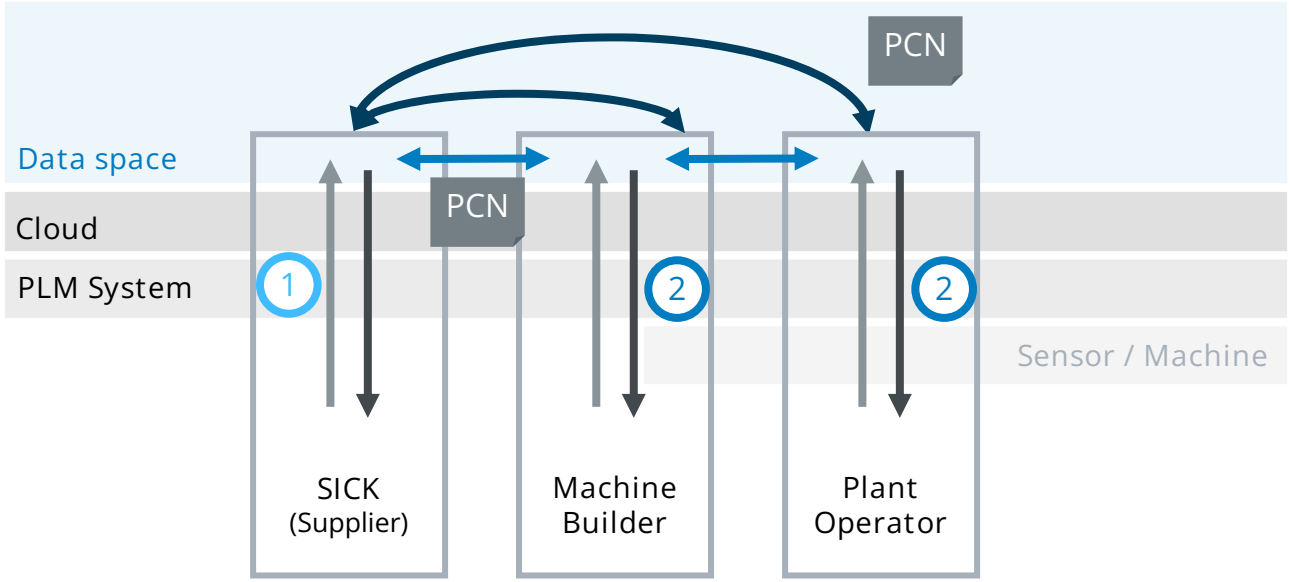
- Efficiency in Engineering
- Efficiency in Life-Cycle

Digital Twins for Product Change Notifictaions

Keeping firmware of machines with components from different suppliers up-to-date

What where our goals?

- Reduce efforts within the product change process, by utilizing standardized mechanisms and data models, avoiding manual efforts. (e.g., for writing E-Mails)
- Learn fast and make the learnings transparent in larger rounds such as IDTA working groups, Factory-X, IDSA etc.



1 Customer relevant change

- The SICK product engineering team releases a new firmware
- A Product Change Notification (PCN) is created (IDTA Submodel Template 02036)
- PCN is published to the SICK Demo AAS Server

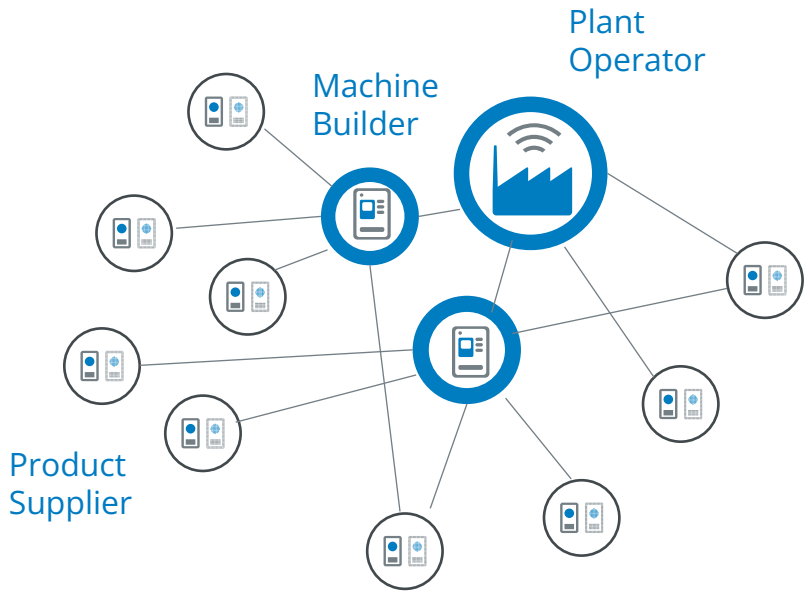
2 Machine Builder & Factory Operator receive the PCN

- The PLM system user displays the changes in a demo PLM system and decides whether they are relevant or not
- The new firmware can be downloaded
- The new data set can be imported into the PLM system

Multi-Party Orchestration

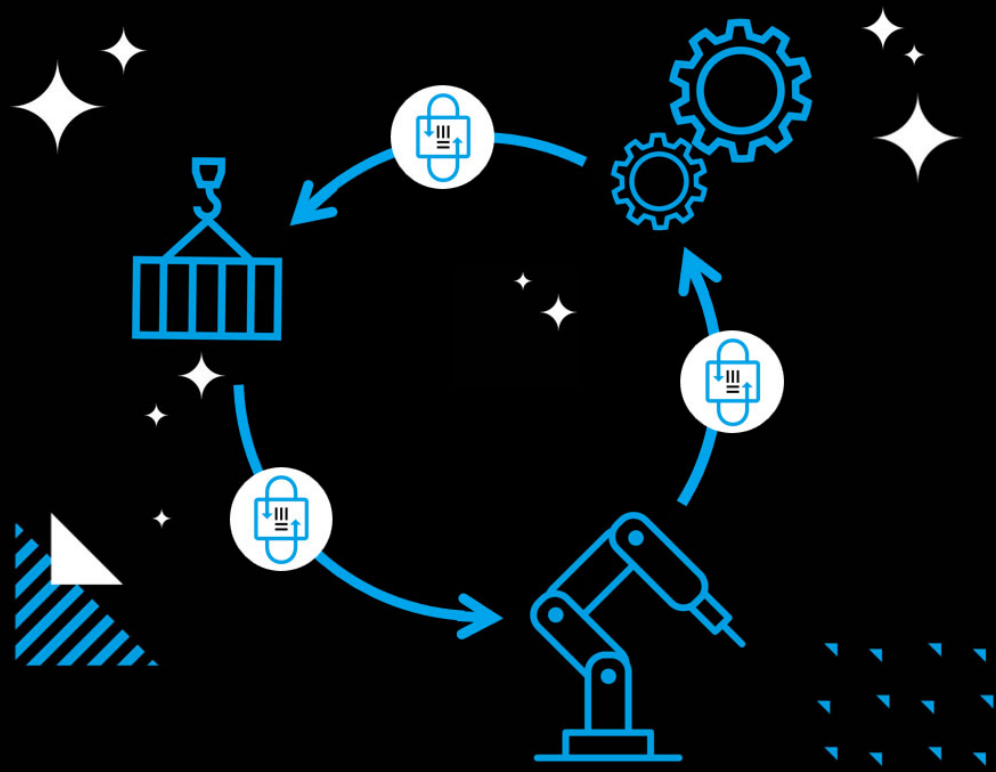
Factory / Logistics Operations

- Need standards for various digital twins (AAS, OpenUSD etc.)
- Need standardized, flexible, automated, decentral approach for data sharing (Data Spaces)
- Need to consider company-internal data streams and tool chains (e.g., PLM etc.)



Continental

GDSO
STANDARDIZE. SHARE. SIMPLIFY.



Tyre industry: Data sharing along the manufacturing & product lifecycle

Riccardo Giovannotti, GDSO | Yann Le Chevalier, Continental

Global Data Service Organisation
for Tyres and Automotive Components (GDSO)

International Non-Profit Association
Established in Belgium in January 2022

Brussels - Belgium

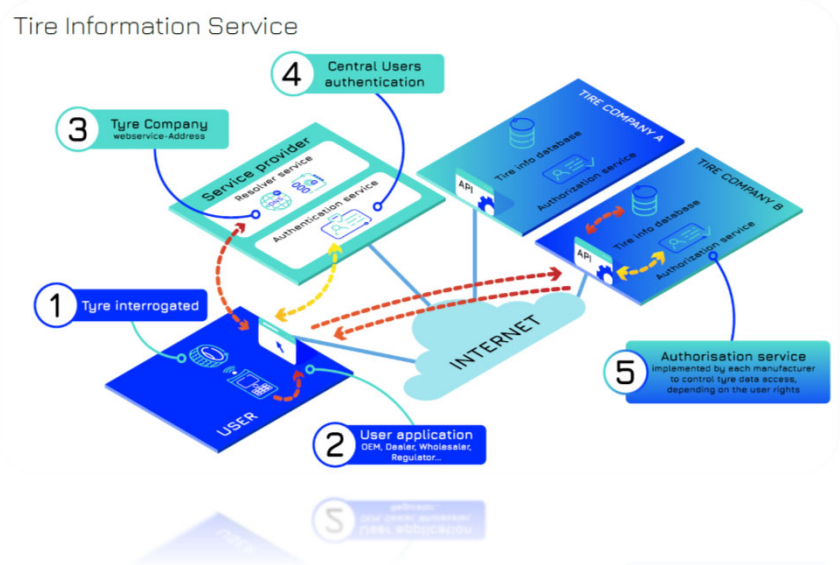
2025 MEMBERSHIPS

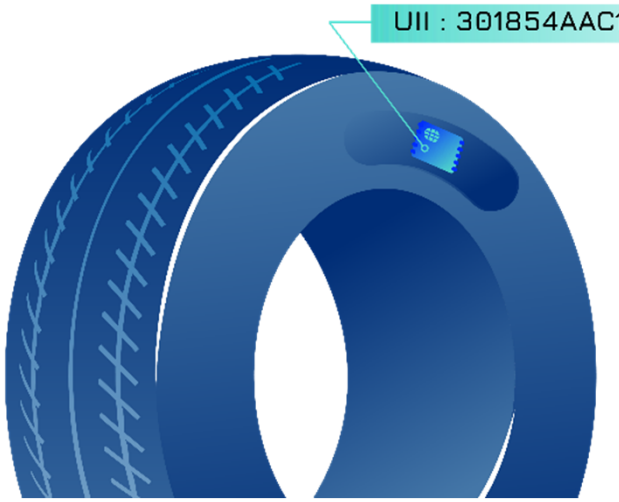
12 MEMBERS

BRIDGESTONE
Continental
Giti
GOODYEAR
HANKOOK driving emotion
KUMHO TIRE
MICHELIN
NEXEN TIRE we got you
PIRELLI
PROMETEON
SUMITOMO RUBBER INDUSTRIES
YOKOHAMA

7 ASSOCIATES:

ETRMA European Tyre & Rubber manufacturers' association
ETRTO European Tyre & Rim Technical Organisation
JATMA
KOTMA Korea Tire Manufacturers Association
Tire and Rubber Association of Canada
U.S. TIRE MANUFACTURERS ASSOCIATION





UPDATES

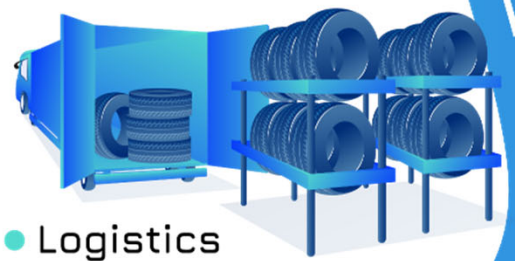
- SEMANTIC: new parameters for OEMs
- SERVICE: query by batch (up to 100 ids)

Brief use cases description : Along the value chain

Tire manufacturers

Good receipt, manage stock, communicate tire details to any 3rd party contractor (tire supplier, lease company etc.) tire hotel & repairing

Distributors / Wholesalers



Logistics

Warehouse entry and exit versus order, systems stock

OEMs

Warehouse, logistics, tire/rim fitment, wheel/vehicle fitment, sensors feed (speed, kms, advanced features like grip levels)

Fleet management

Asset track, tire position on vehicle, vehicle load/tire i.p., tires in stock, tire movements tracked

Quality insurance

Tire identity in case of claim, tracking back to production data

Retreading

Casing identification, traceability, updated identity

End of life

Ensure tires are removed from the market and scrapped, allow recyclers to segregate tires

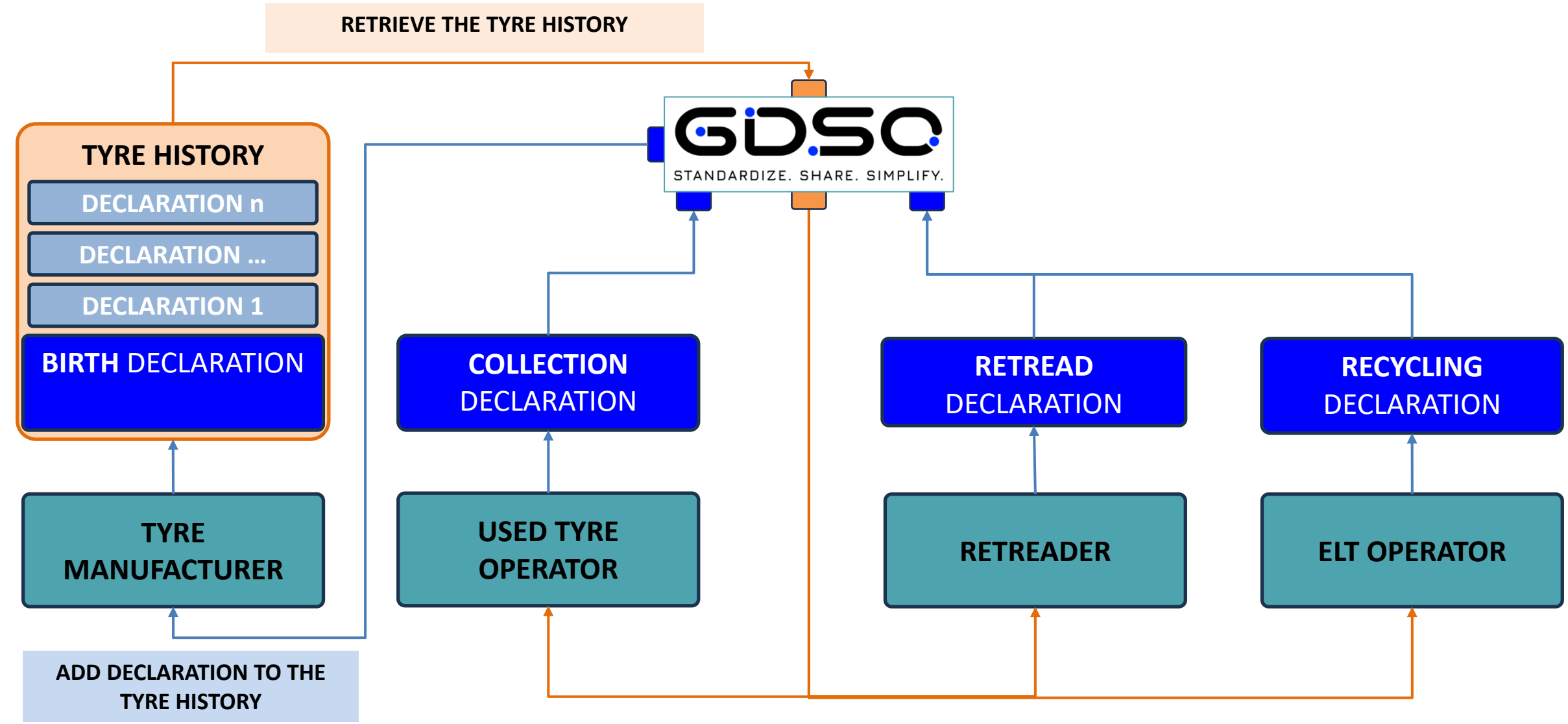
GDSO
STANDARDIZE. SHARE. SIMPLIFY.

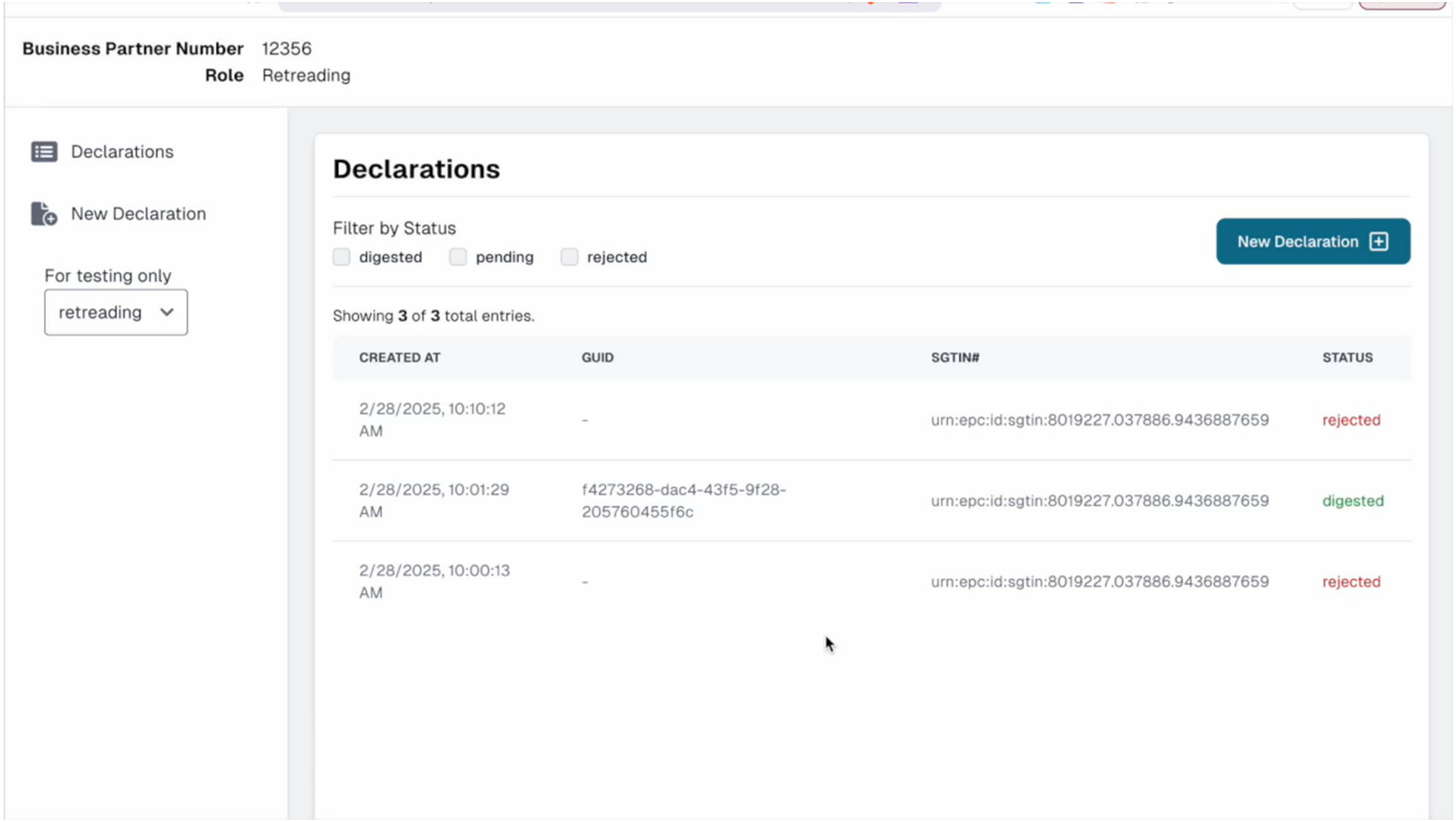
STANDARDIZE. SHARE. SIMPLIFY.

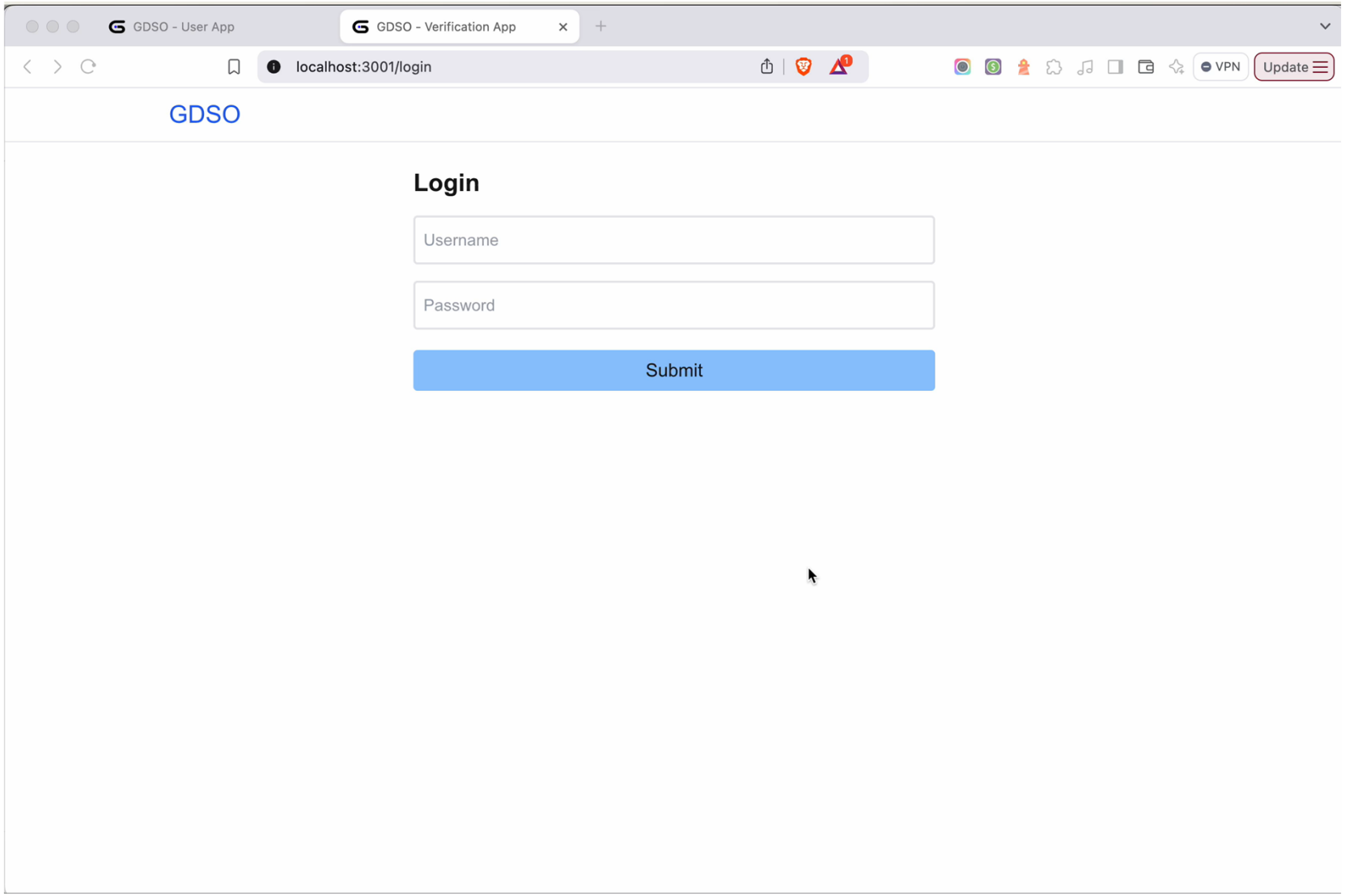
NEW CONNECTOR
DATA CRADLE TO GRAVE

- **TYRE LIFECYCLE DATA SERVICE**
  EVENTS ALONG TYRES' LIFE

STAKEHOLDER | DECLARATION | TYRE HISTORY


RETRIEVE THE TYRE HISTORY
TYRE HISTORY
DECLARATION n
DECLARATION …
DECLARATION 1
BIRTH DECLARATION
GDSO
STANDARDIZE. SHARE. SIMPLIFY.
COLLECTION DECLARATION
RETREAD DECLARATION
RECYCLING DECLARATION
TYRE MANUFACTURER
USED TYRE OPERATOR
RETREADER
ELT OPERATOR
ADD DECLARATION TO THE TYRE HISTORY
STAKEHOLDER
DECLARATION
TYRE HISTORY


Business Partner Number 12356
Role Retreading
Declarations
New Declaration
For testing only
retreading
Declarations
Filter by Status
digested pending rejected
New Declaration
Showing 3 of 3 total entries.
CREATED AT GUID SGTIN# STATUS
2/28/2025, 10:10:12 AM - urn:epc:id:sgtin:8019227.037886.9436887659 rejected
2/28/2025, 10:01:29 AM f4273268-dac4-43f5-9f28-205760455f6c urn:epc:id:sgtin:8019227.037886.9436887659 digested
2/28/2025, 10:00:13 AM - urn:epc:id:sgtin:8019227.037886.9436887659 rejected


GDSO - User App
GDSO - Verification App
localhost:3001/login
VPN
Update
GDSO
Login
Username
Password
Submit

GDSO

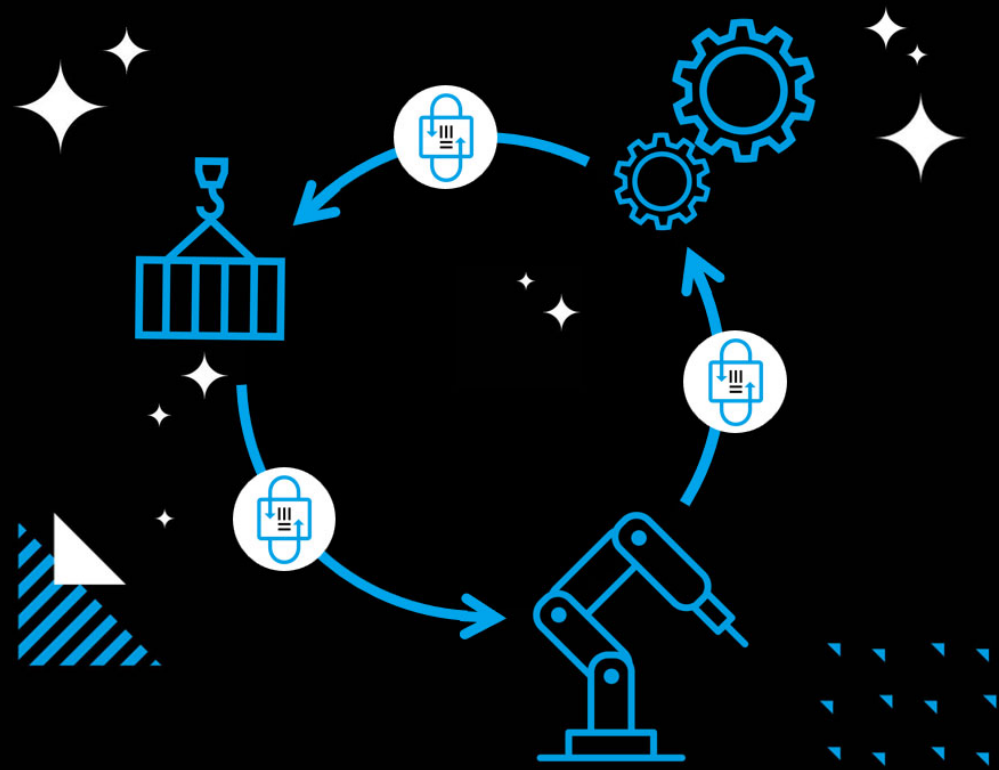
STANDARDIZE. SHARE. SIMPLIFY.

Beyond tyre's identification

www.gdso.org info@gdso.org

AVENUE D'AUDERGHEM 22-28 BTE 9 • 1040 ETTERBEEK (BRUSSELS - BELGIUM)

VTT



Circular economy data spaces from Finland

Markus Taumberger, VTT

Circular economy data spaces from Finland

Markus Taumberger

Hannover Messe 2025 | Data spaces for industry event: Innovate, scale, compete with industrial data spaces

03/04/2025 **VTT – beyond the obvious**

DSIL Infrastructure

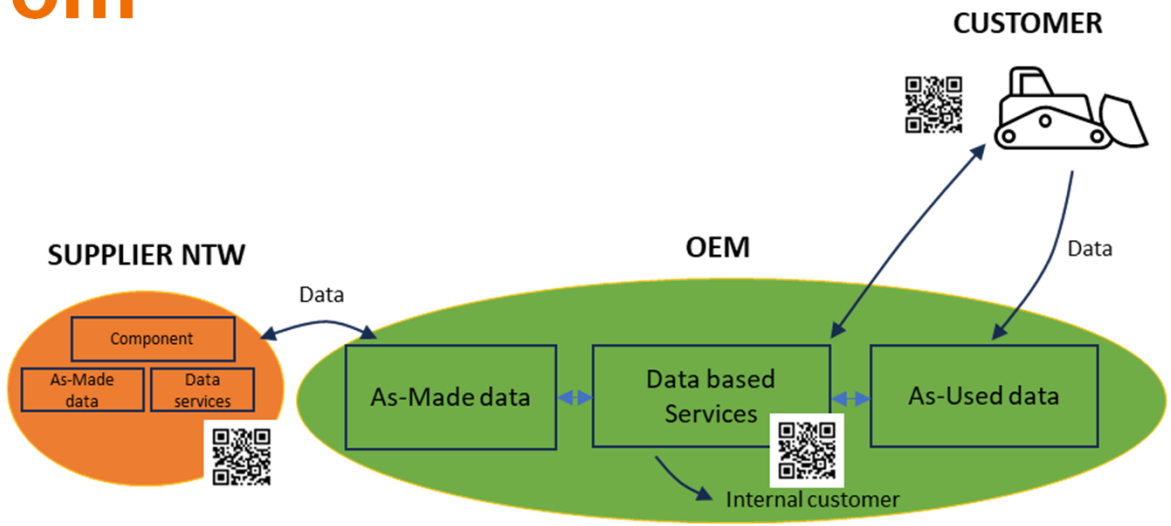
- Sandbox environment for data spaces co-creation with partners
- Private Cloud infrastructure for GDPR-compliant hosting (servers in Tampere and Oulu)
- Certified components with extended features
  - OPC UA support
  - Support for user and role-based access management (Keycloak)
- VTT is IDSA Hub Finland
- Ready solutions for FIWARE, GAIA-X, IDS

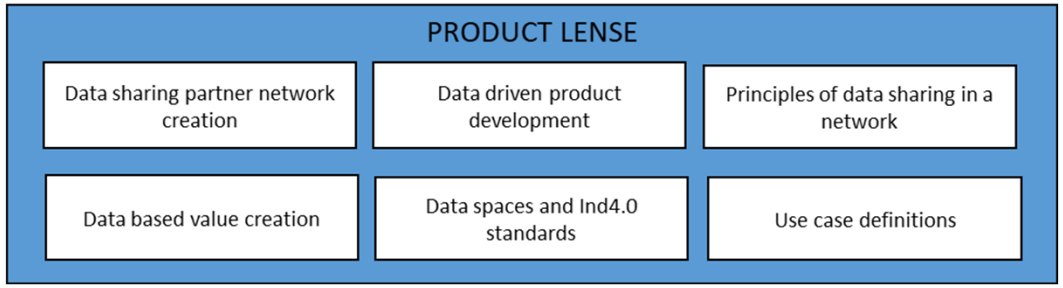
=> www.vttresearch.com/en/ourservices/data-spaces

Product Lense: New value from manufacturing data

VTT offers consultancy on a Product Lense, which is a globally scalable methodology that enables data driven value creation for any existing manufacturing network utilizing data spaces and data sharing principles.

- It takes a close look through manufacturing value chain partners, their production and products to identify what data is there and how it can transformed to new value in data based services.
- It allows companies to offer their customers lifecycle services based on individual product identity linked as-made and as-used data.
- Use cases e.g. quality monitoring, recall, product testing, sustainability reporting and lifecycle optimisation.
- References: DAPONET (Finnish rock drill supply network data space), DaCapo (Ind4.0 AAS DPP), DSSC (Data space building blocks).



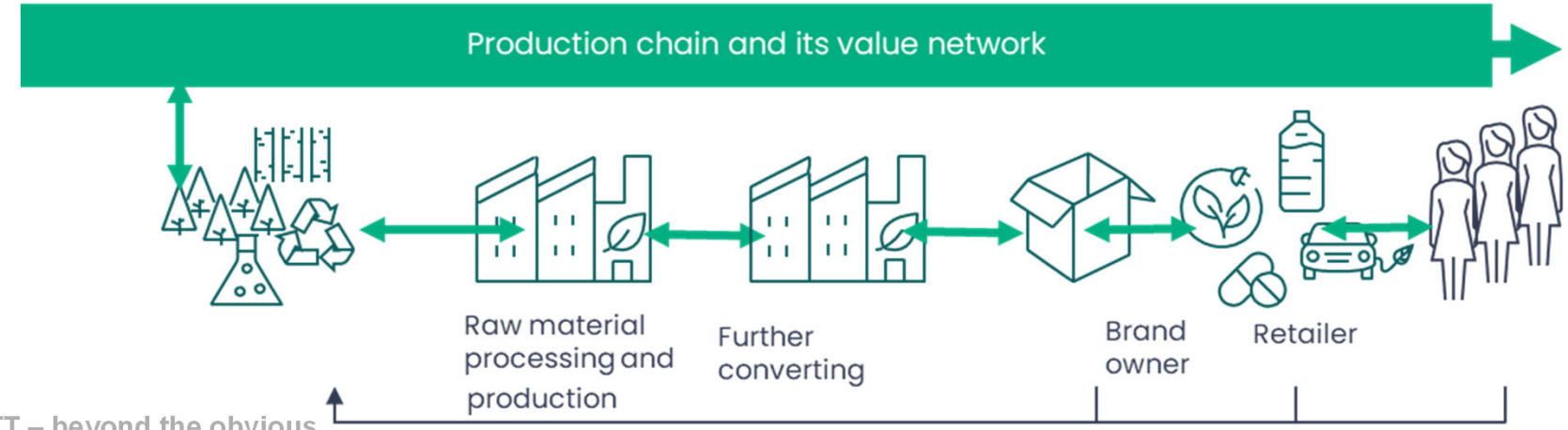


DAPONET partners:

VTT SANDVIK Tampere University IOXIO nomet SITRA ITANORDIC SALON KONEPAJA HANZA JTA CONNECTION TASOWHEEL

Digital SCOPE3 passport and its value creation

- **Goal**: A concept for transparent and reliable SCOPE3 emission data collection for the forest industry. It enables optimization of production chain upstream and downstream operations to minimize emissions, and it provides new value addition to a passport owner's customers.
- **Context framing** for the concept:
  - Value chains of Flex pack + Logistics
  - Sustainability parameters related to SCOPE3: emissions due to energy and fuel consumption, fuel and energy quality – in production, use and logistics
  - Sustainability KPI frame: SCOPE3 is analysed through environmental, social and economic aspects
- **Solution**
  - To address this need, VTT is developing a smart data model for sustainability data sharing for the forest industry
    - The Smart Data Models initiative is a joint collaboration initiative by FIWARE Foundation, TM Forum, IUDX and OASC to foster interoperable and replicable smart solutions in multiple sectors
  - We validate this data model in real settings with companies
  - We can demonstrate data sharing with the data spaces approach with the services provided by the VTT Data Spaces Innovation Lab



VTT

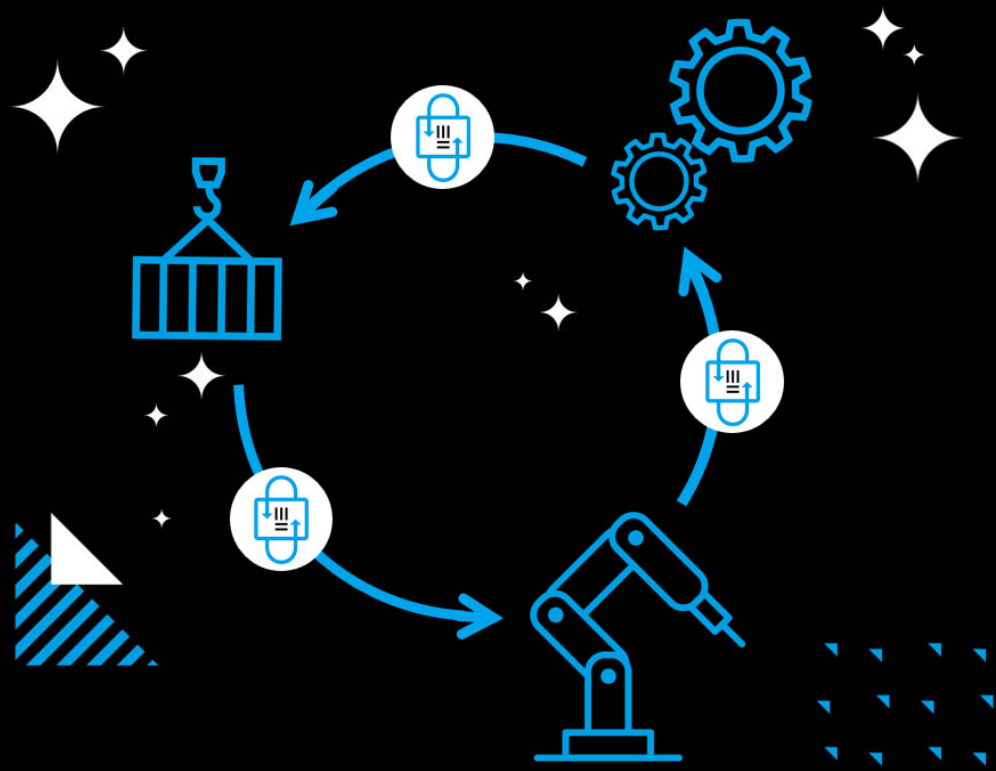
beyond

the obvious

Thank you!

vttresearch.com

HOLONIX®
BRING THINGS TO LIFE



Machinery-X: Reducing operational costs, improving machine availability and performance

Jacopo Cassina, Holonix

machinery-X

rete di imprese in linea con IDS

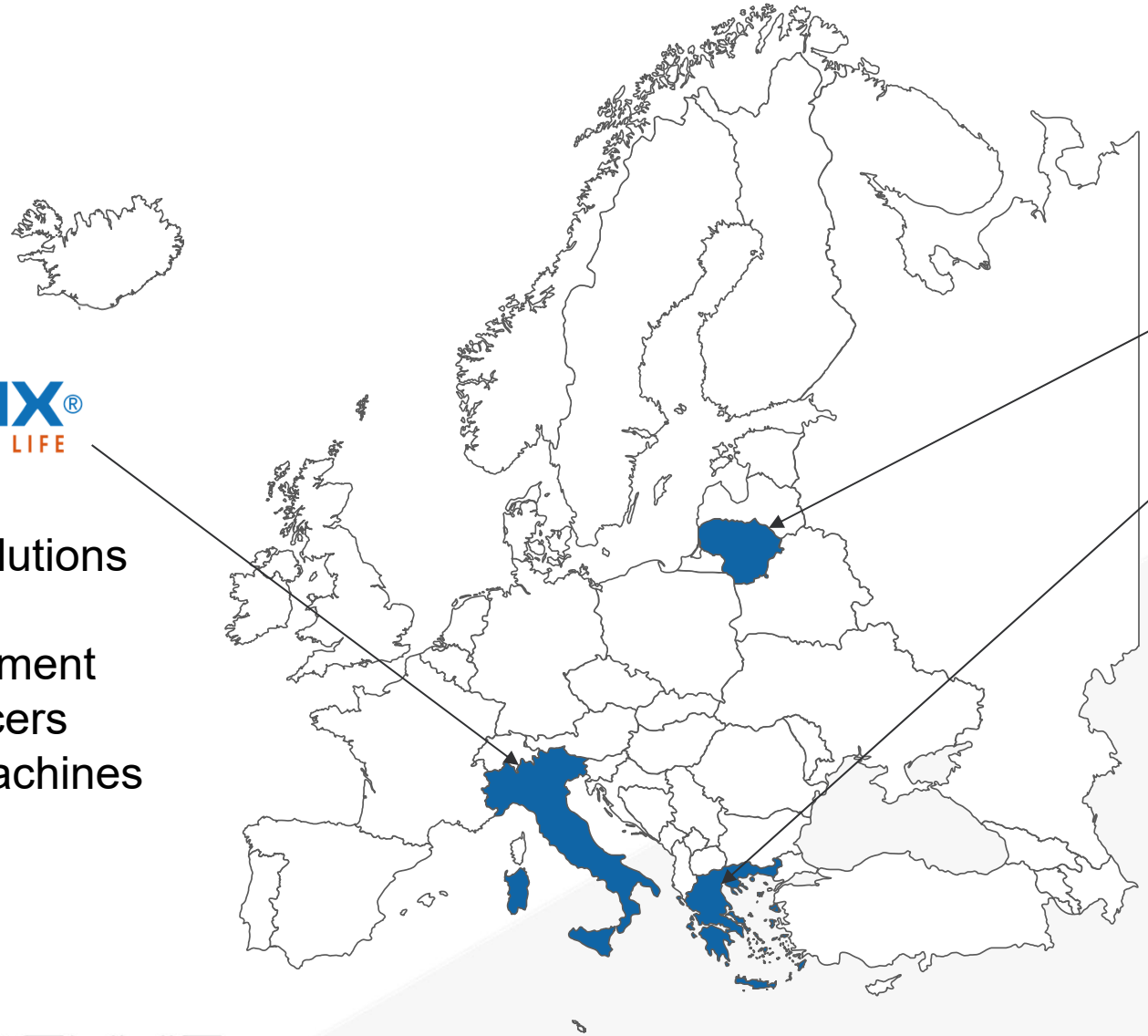
Jacopo Cassina

HOLONIX®
BRING THINGS TO LIFE

SYXIS
innovate together

2/04/2025

Holonix-Syxis Group



HOLONIX®
BRING THINGS TO LIFE

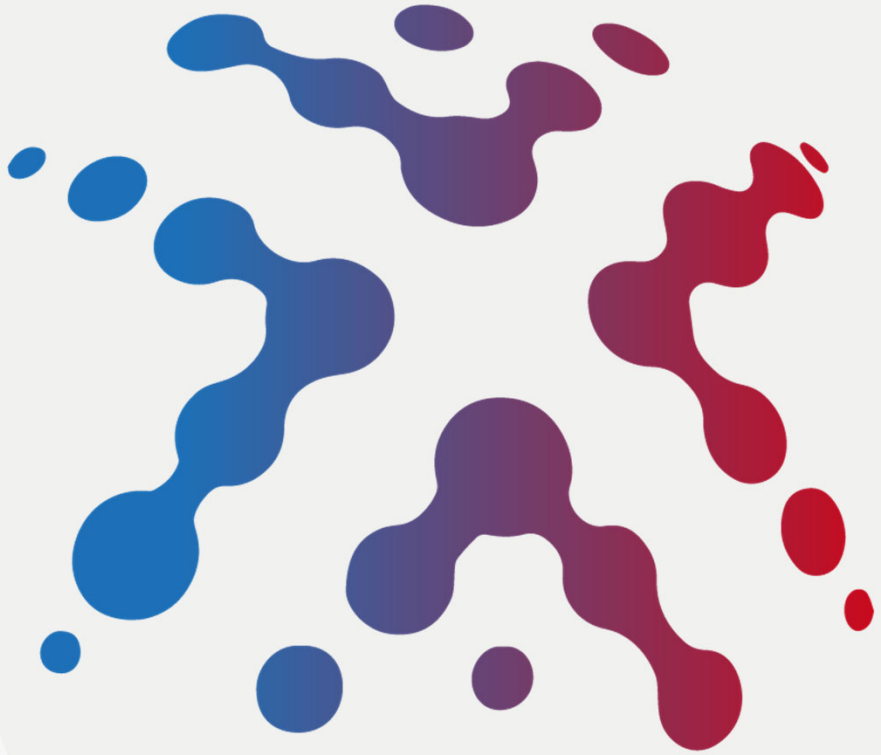
Commercial IoT Solutions
- Traceability
- Assets management
- Machine producers
- Construction machines
- Buildings
- Ships
- Maintenance

SYXIS
innovate together

Innovation consortium
- Circularity
- Networking (open/crowd innovation)
- Innovative IT solutions

What is Machinery-X

Machinery X is a consortium of companies in the industrial machinery sector, **supported by UCIMU**, which manages a shared data space. The goal is to promote, manage, and administer the use of Data Spaces inspired by IDS (International Data Spaces) standards in the world of industrial machinery, providing the core solutions of the dataspace.



The consortium is open to:

- Technical Providers of industrial machine solutions (e.g. IoT)
- Providers of machinery that have their software own solution

The consortium customers are:

- Providers of machinery that uses others Tech providers solutions
- Users of industrial machines

HOLONIX® BRING THINGS TO LIFE

UCIMU-SISTEMI PER PRODURRE

The starting point…

Where did we start from…

Workshop in UCIMU about PREDICTIVE MAINTENANCE in the Industry 4.0

HOLONIX® BRING THINGS TO LIFE

SYXIS innovate together

What has started there…

Use case: PREDICTIVE MAINTENANCE

- **Fully industrially funded activity on voluntary basis from UCIMU association companies**
- **Bottom- up approach**
- **Incremental approach**
- **Target BIMU 2024 trade fair**

Motivation: I4.0 as is today

- Industry 4.0 (and incentives in Italy and other countries) have pushed toward connected machines.
- Used mainly for:
  - Remote assistance
  - Production and logistic information exchange
  - Quality data information inside the factory
- But is it really all?
- Isn’t there any more value to catch?

Use cases for interconnected machines

- Exploit the joint knowledge of machine producers, components producers and users
  - To optimize the performances;
  - For predictive diagnostic and maintenance
  - To improve machine design
  - For repetitive faults due to design
  - For supplied parts issues
  - To understand potential new machines
- To cooperate with other knowledge intensive actors
  - Share training data with data companies
  - Federated learning
  - Financial linked analysis

Why not fully working yet?

IOT systems for producers are there, often also for OEM producers

- 1° Issue: lack of real business model
  - What do the user get sharing its data?
  - What's the advantage over local solution?
- 2° Issue: trust and confidence:
  - Users have little or no control over exchanged data
  - Cybersecurity is seen as a threat
- 3° Issue: complexity
  - Standard for user: 20-30 machines of 15-35 different producers
  - Many more components
  - Too many elements to control

Why not fully working yet?

IOT systems for producers are there, often also for OEM producers

- 1° Issue: lack of real business model
  - What do the user get sharing its data?
  - What's the advantage over local solution?
- 2° Issue: trust and confidence:
  - Users have little or no control over exchanged data
  - Cybersecurity is seen as a threat
- 3° Issue: complexity
  - Standard for user: 20-30 machines of 15-35 different producers
  - Many more components
  - Too many elements to control

Within UCIMU DataSpace Committee

Diagnostics in return for Data

Use of DataSpace

Use of the connector as gateway

Data For Predictive Maintenance

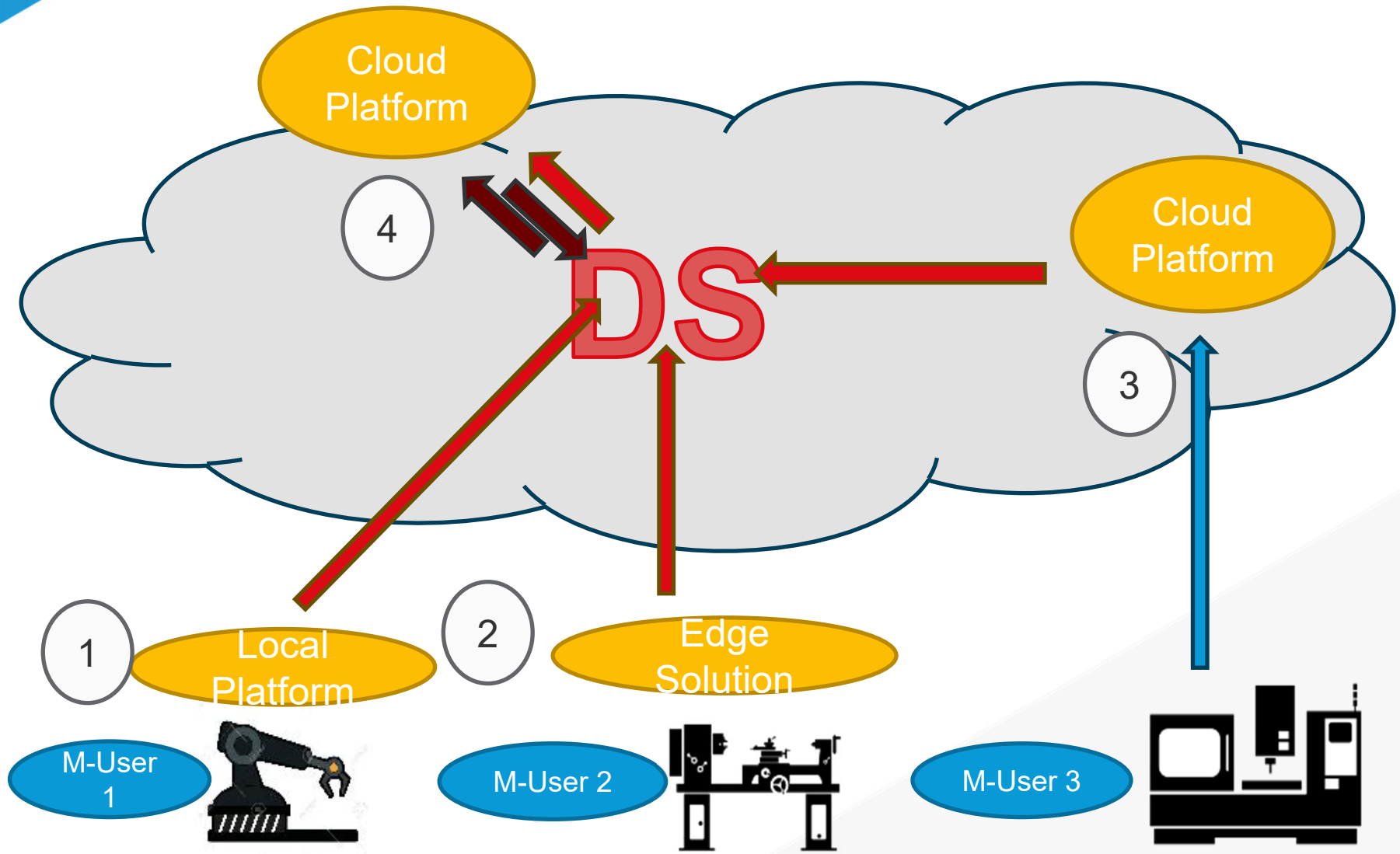
The implementation and training of a predictive maintenance system require the availability of data from:

- the machine during its operating cycle
- intelligent and sensorized components
- auxiliary subsystems

Therefore, a **secure and controlled exchange** of data is necessary between the **user of the machine, the supplier of the same, and the suppliers of components and subsystems**.

The "data space" paradigm can be a way to enforce this requirement, providing support at the **technical and legal-contractual** level.

4 scenarios



1: local production / maintenance platform
2: edge solution integrated with local sw
3: full stack solution from machine to cloud
4: cloud platform

Steps carried out…

Objectives of the DataSpace Committee

Background

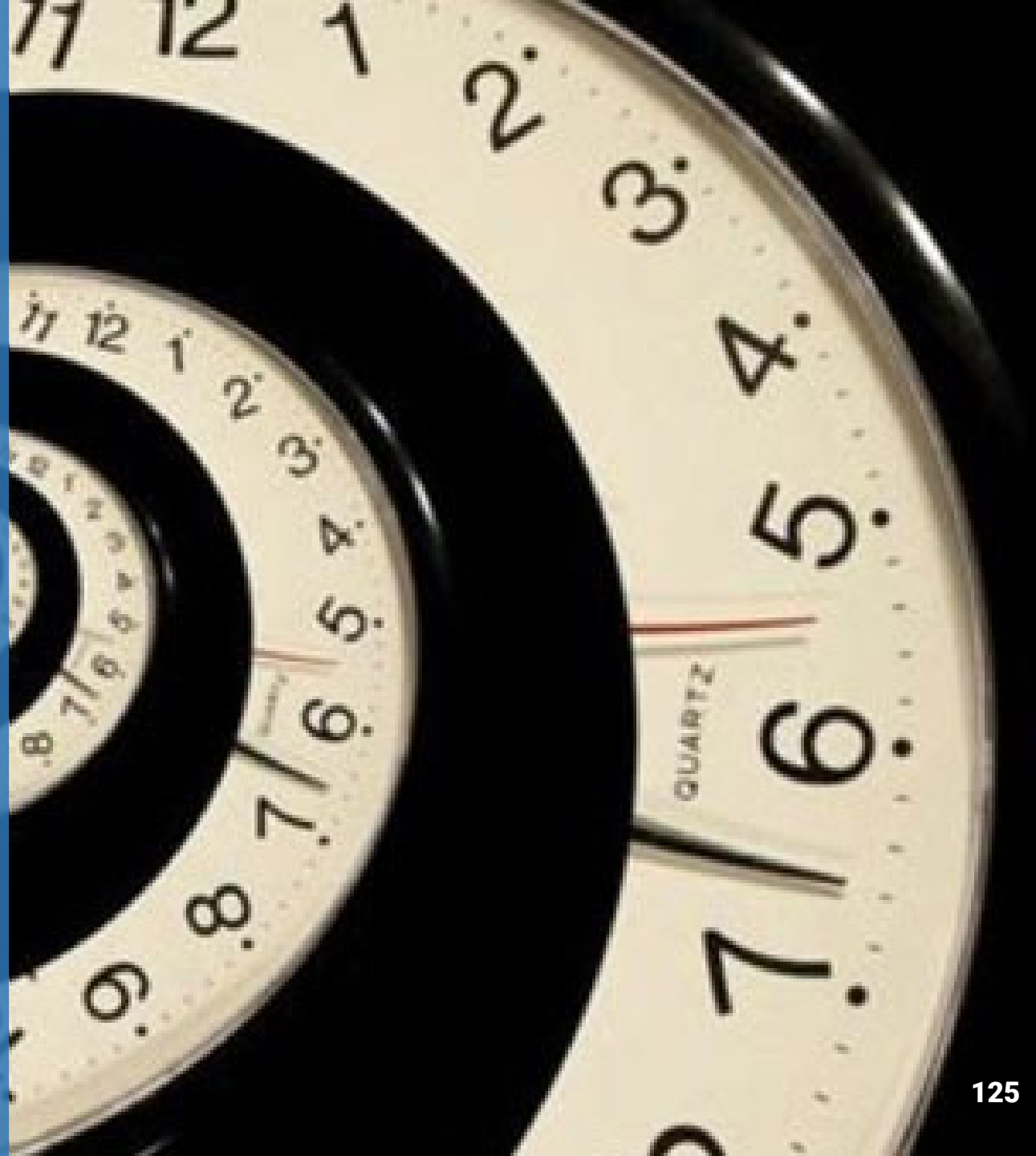
- Machines produce a lot of data.
- Systems to acquire and manage them exist.
- Algorithms and methodologies for predictive maintenance have been developed.
- There is difficulty in creating a connection between the various actors in the data supply chain

AIM of the proof of concept

- Is it possible to use a DataSpace effectively for these scenarios?
- Which are the advantages?
- What is a DataSpace enabling?

In the months of execution of the project…

- Pilots for different companies, connecting machines or machines simulators with third party systems.
- Pilots covered all 4 scenarios aforementioned
- Planned to be carried out using the «Trusted Connector» and then on the «**Eclipse DataSpace Connector**» which has been used until this spring for the tests



Work Vs Committment

Results

Is it possible to use a DataSpace effectively for these scenarios?

- **Possible: YES**

- **Effectively: No without quite a lot of work**

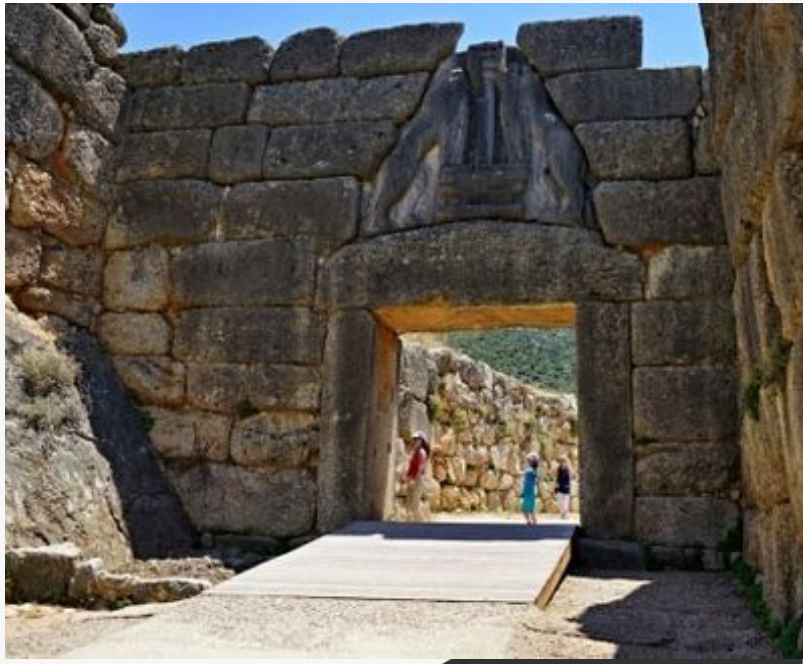
- Tools change quickly and seems not designed for this kind of scenario (and for manufacturing in general !!!)
- It is possible to use existing tools with specific adjustments.
- New tools are being developed, and efforts are being made to make the Data Spaces federated, but it's unclear how, when…
- Learning curve is very steep.

- **All involved IT personnel from all companies has very unfavorable opinions on the topic**

- It is necessary to extend the general-purpose dataspace components in solutions tailored for manufacturing/industrial machinery as it's too complex for automation engineers and doesn't merge with their tools

Which are the advantages?

- A dataspace requires aligning technological management with legal management with clarity on the following:
  - Without a signed contract, there can be no data exchange.
  - It gives machine users full control over what enters/exits, the ability to verify it, and the option to "turn on-off" contracts as needed.
  - It reduces the complexity of managing many contracts with many suppliers
- *It could imply having a single (or few) entry-exit points in client companies (connector).*
- **All involved management and legal personnel from all the companies had a very favorable opinion on the topic**



What does the DataSpace Enable?

- It allows increasing the effectiveness of existing business models (e.g., IoT platforms).
- It enables new business models based on data exchange or sale.
- Data is the foundation for creating artificial intelligenc
- Regulatory compliance

The Creation of the CONSORTIUM

We decided as legal form to use a consortium:

Consortium will manage

- the core parts of the dataspace (Identity, metadata broker)
- The onboarding process of consortees (not automated, to verify members)
- The onboarding process (with human verification

- The software backend of the connector will be “Shared source” among consortees

- Each partner will embed the backend into its solution and offer to its customers a “Machinery-x enabled tool”

HOLONIX BRING THINGS TO LIFE

SYXIS innovate together

The Creation of the CONSORTIUM

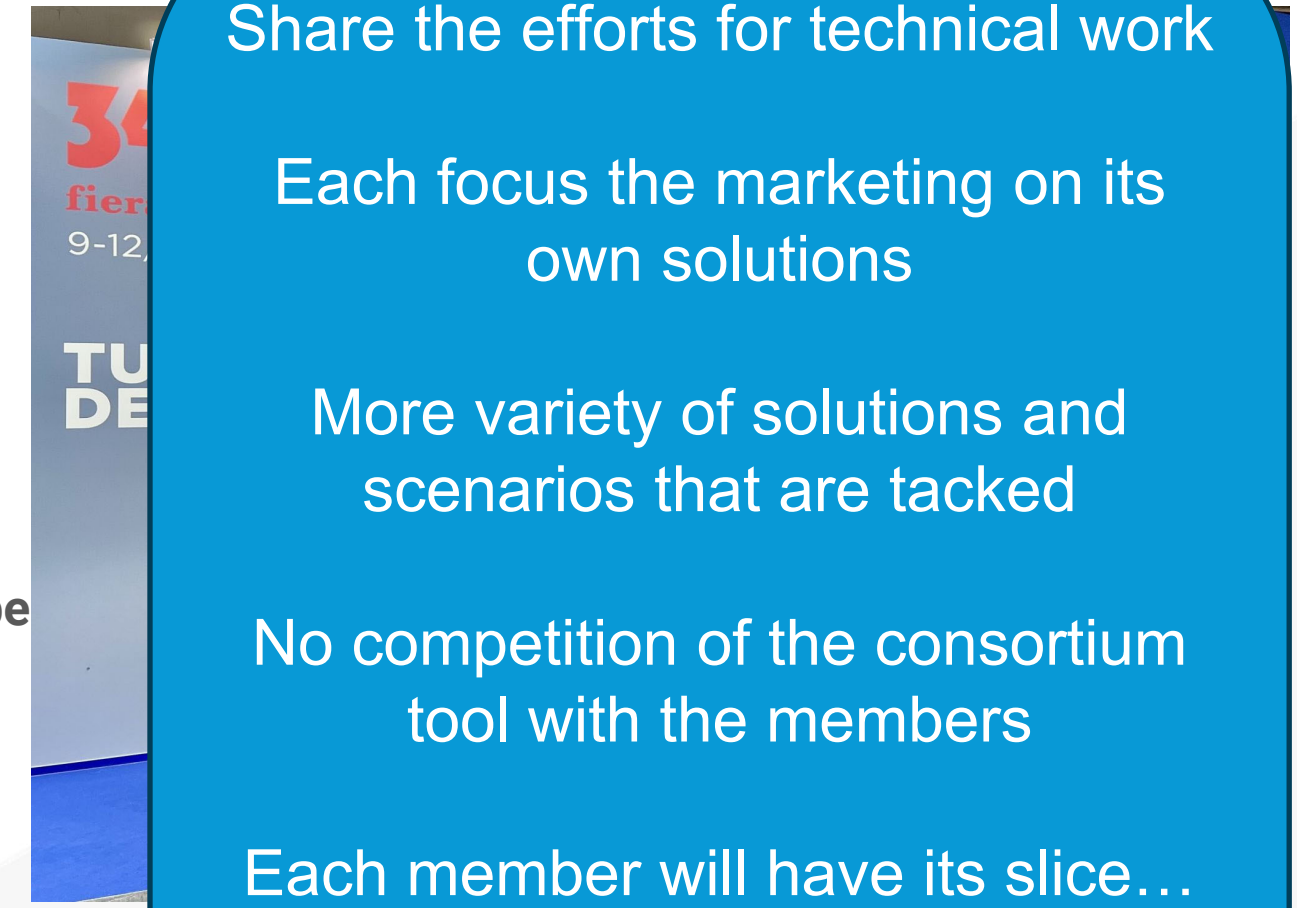
We decided as legal form to use a consortium:

Consortium will manage

- **the core parts of the dataspace (Identity, metadata broker)**
- **The onboarding process of consortees (not automated, to verify members)**
- **The onboarding process (with human verification**

- **The software backend of the connector will be “Shared source” among consortees**

- **Each partner will embed the backend into its solution and offer to its customers a “Machinery-x enabled tool”**



Share the efforts for technical work

Each focus the marketing on its own solutions

More variety of solutions and scenarios that are tacked

No competition of the consortium tool with the members

Each member will have its slice… of a bigger cake

HOLONIX BRING THINGS TO LIFE

SYXIS innovate together

The Creation of the CONSORTIUM

The consortium will:

Administer a dataspace for industrial machinery

- Make the core components of the dataspace available to members
- Define and manage the access rules to the dataspace
- Define and manage the rules and semantics of the dataspace
- Define an additional process to IDS certification to certify members' systems

Support members in:

- preparing their systems to interconnect with the dataspace
- Integrating with the connector

HOLONIX® BRING THINGS TO LIFE

SYXIS innovate together

European Commission

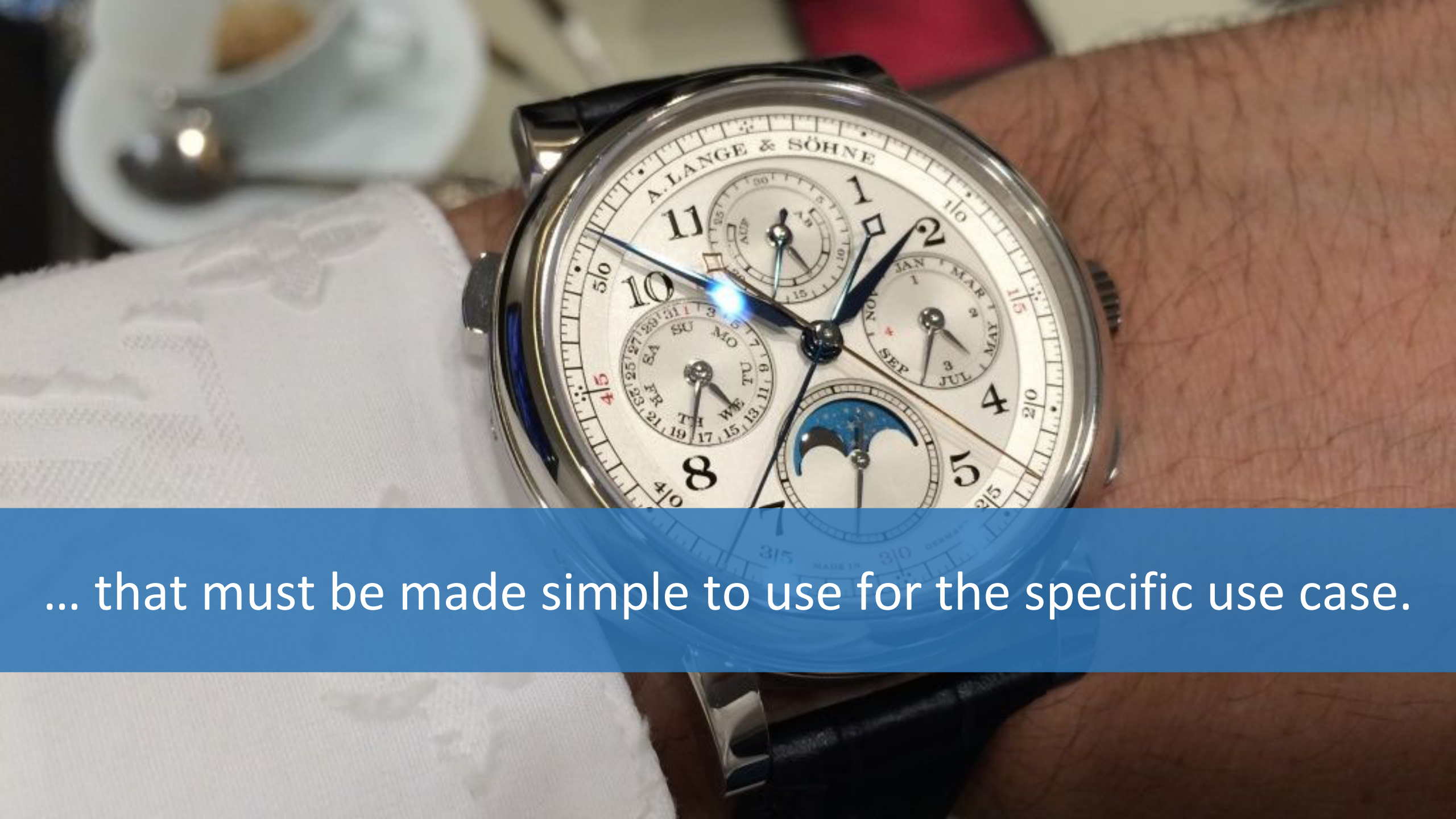
DATA ACT

THE PATH TO THE DIGITAL DECADE

The deadline…

Perfect communication…

…high complexity…



… that must be made simple to use for the specific use case.

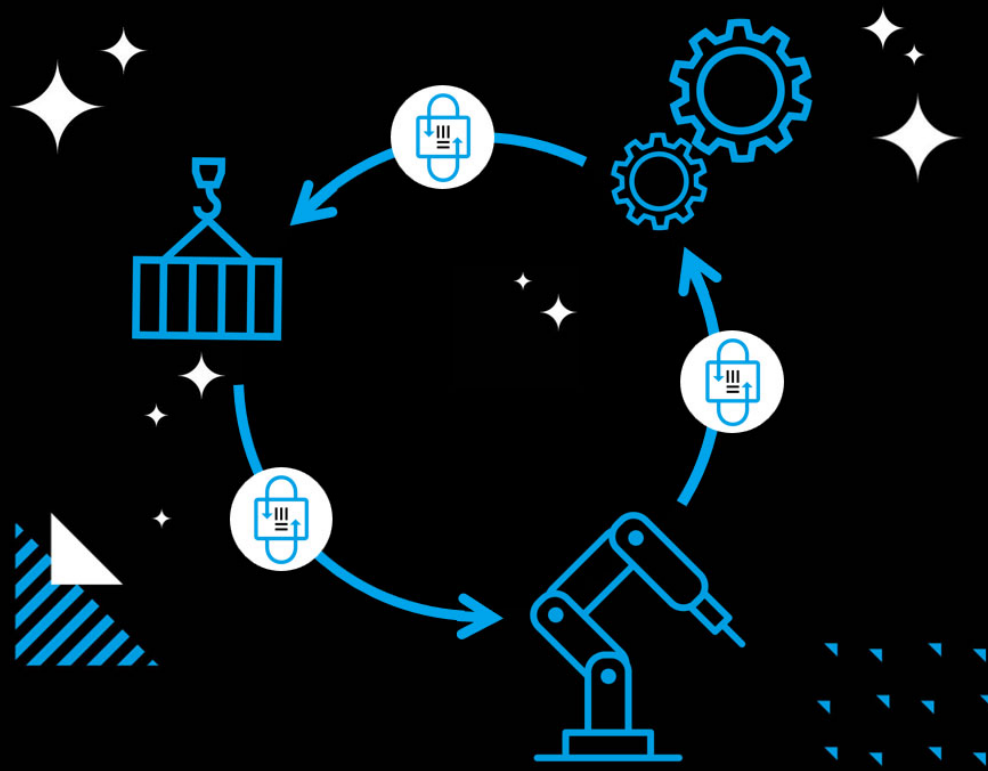
Thanks!

Jacopo.cassina@holonix.it

HOLONIX®
BRING THINGS TO LIFE

Brainport Industries

scsn smart connected supplier network



The Smart Connected Supplier Network: Increased supply chain productivity through fast & secure data sharing

John Blankendaal, Brainport Industries

Brainport Industries

TNO

POWERING smart industry

BDV i-Space GOLD

INTERNATIONAL DATA SPACES ASSOCIATION

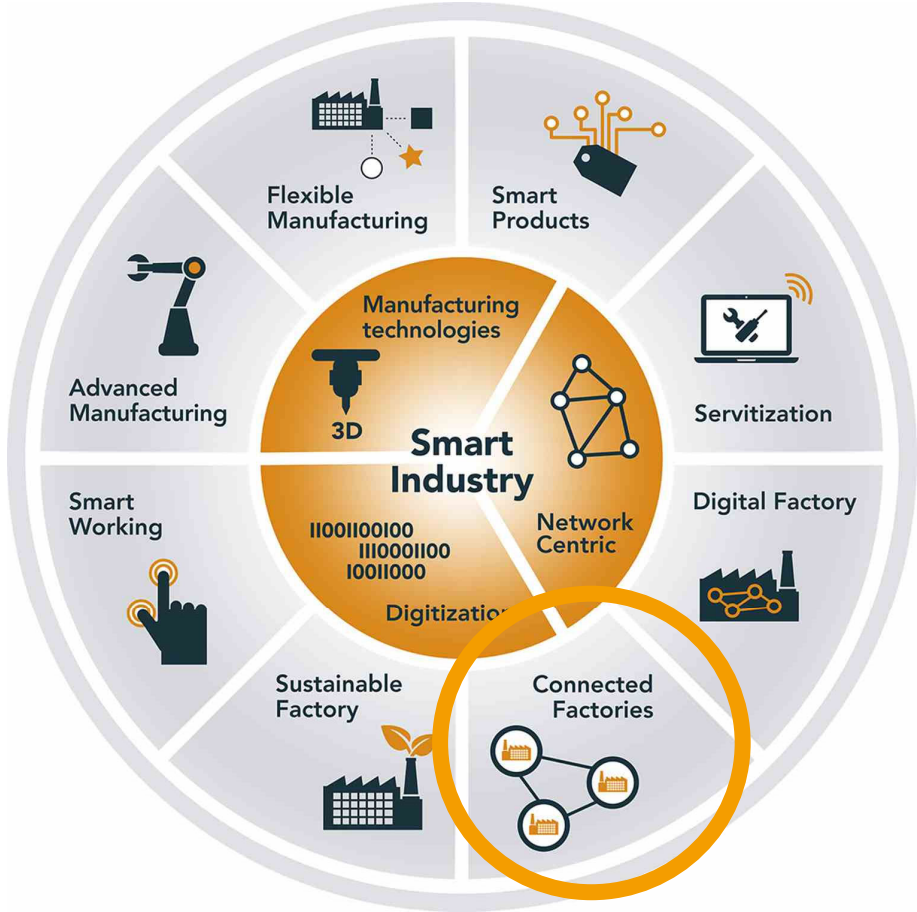
SC SN smart connected supplier network

Data sharing in the manufacturing industry

CONNECTED FACTORIES

Data sharing in the manufacturing industry

- Connected Factories is one of the 8 Smart Industry transformations.
- Safe and securely data sharing in the manufacturing supply chain is the main focus
- **Smart Connected Supplier Network** aims to achieve this.



CONNECTED FACTORIES

The challege: sharing data in supply chains

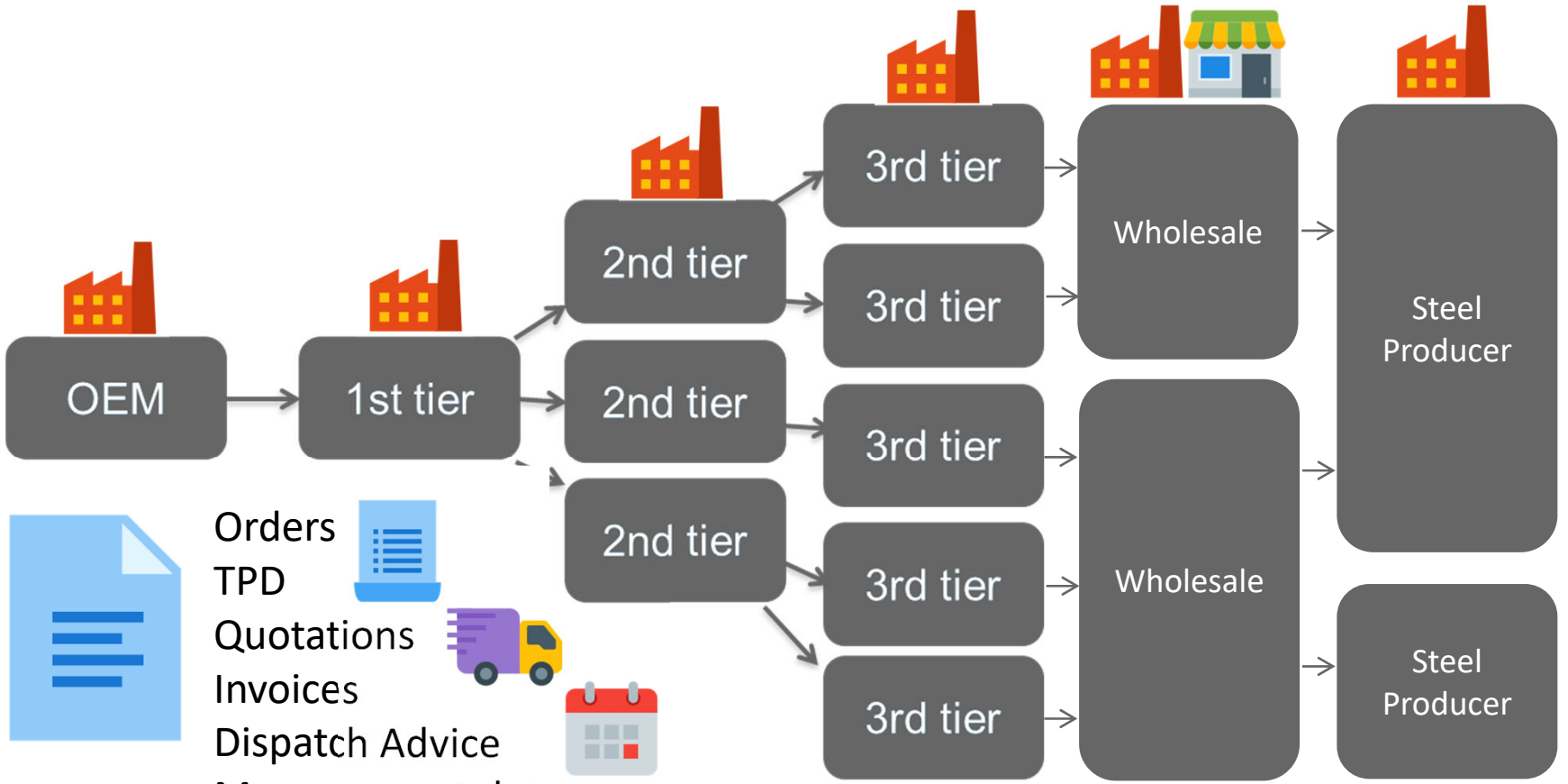
- It becomes increasingly important to collaborate in the supply chain
- Especially for the low volume, high mix, high complexity industry
- Sharing data is crucial!

Problem: different systems, standards, and semantics...

Cause: manual error-prone administrative work, inefficiency, slower time-to-market …

CONNECTED FACTORIES

The challenge



Orders
TPD
Quotations
Invoices
Dispatch Advice
Measurement data
Steel certificates
What-If?

Manually copy information in ERP systems and webportals

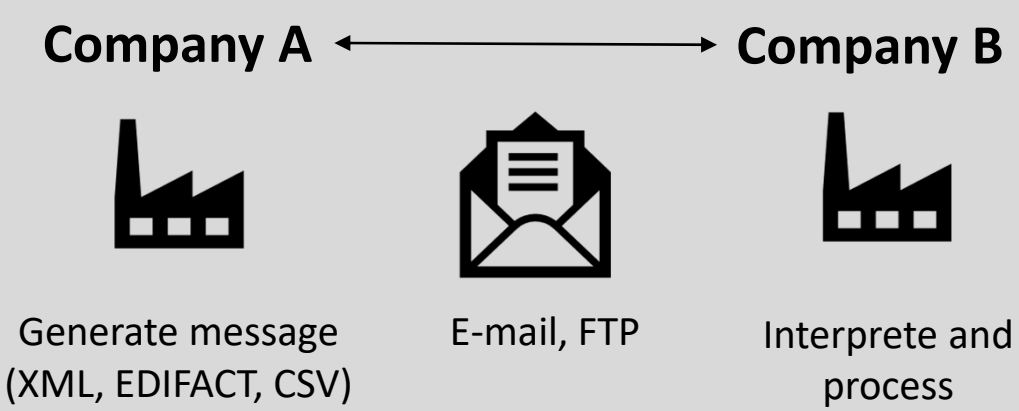
Administrative burden

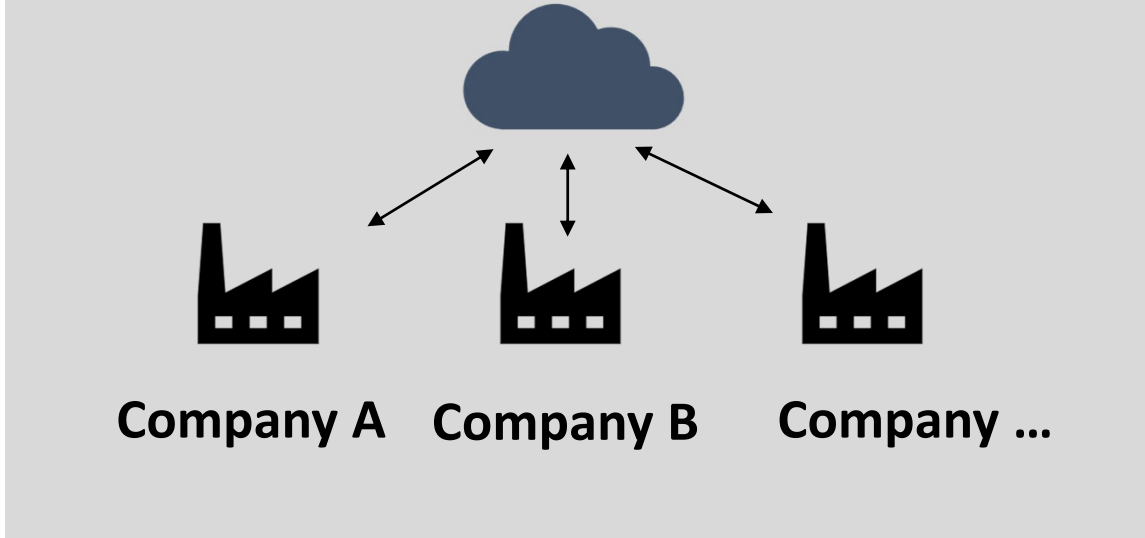
Error-prone

Sub-optimal supply chain

Traditional approach

Data sharing via EDI or a central platform





! Each connection is custom-made and thus costly. Therefore, not scalable.

! Dependency on a single Service Provider who can have access to all data transactions.

How does it work?

Service Providers:

- Digital platforms, interconnected using IDS
- Independent ‘address book’ for routing communication
- Several providers. Choose the most suitable for your business

Manufacturing companies:

- One-time integration with own ERP system
- Registration in the SCSN address book

ERP systems:

- A manufacturing company can choose their preferred ERP system.

INTERNATIONAL DATA SPACES ASSOCIATION

smart connected supplier network

OPEN INITIATIVE, OPEN STANDARD

Manufacturing companies, Service Providers, Knowledge Institutes

15 Service Providers

Approx. 400 manufacturing companies, growing to 2000+ the coming years

exact
eci Gatewise
FUJITSU FUJITSU GLOVIA
SUPPLYDRIVE
KetenlinK
INAD easy2trade
NTT
tradecloud supply chain platform
TECH2B
isah BUSINESS SOFTWARE

VANRAAKSTAAL
Euro-Techniek
norma MCB
NEWAYS
VISCON GROUP
FAESGROUP
kloeckner metals ODS Nederland
KMWE
SUPLACON
NTS GROUP
TATA STEEL

Roadmap

Scale up Manufacturing Dataspaces

- Standardization and Interoperability
- Robust Technological Framework
- Governance & Trust Management
- Ecosystem & Community Development
- Business Model Development
- Capacity building & Training
- Legal & Regulatory Alignment
- Continuous Innovation & Improvement

DATA SPACE 4.0

MANUFACTURING-X

SM4RTENANCE

Data Spaces Support Centre

gaia-x


SC
SN
smart
connected
supplier
network


Be Smart, Get Connected!

Thank you!

Data Spaces for Industry event is jointly organized by:

INTERNATIONAL DATA SPACES ASSOCIATION

VDMA

On stage:

Continental · Brainport Industries · CESMII THE SMART MANUFACTURING INSTITUTE · flex · Ford · Fraunhofer IOSB · FUJITSU · GDSO STANDARDIZE. SHARE. SIMPLIFY. · HOLONIX BRING THINGS TO LIFE

Microsoft · NTT DATA · OPC FOUNDATION · rri · scsn smart connected supplier network · SICK Sensor Intelligence. · T Systems · VTT · ZF

Powered by:

accomplish · AgriDataValue · DATAPACT

INTERNATIONAL DATA SPACES ASSOCIATION

IDSA Data Space User Group Launch

It takes a village

May 15, 2025 | 9:30 am CEST [UTC +2]
Online