INTERNATIONAL DATA SPACES ASSOCIATION

Boosting industrial innovation with data spaces

Data spaces for industry event

Hannover | April 24, 2024

HANNOVER MESSE

Boosting industrial innovation with data spaces

Program

Data spaces are rocking the industry ..... Lars Nagel, IDSA

Cross-continent data spaces between Japan & Europe:

Connecting Japanese & European industry ..... Masaru Dobashi, NTT Data

The Data Free Flow with Trust ..... Satru Tezuka, Keio University

Examples of how data spaces revolutionize industry:

Data ecosystem for mobility services, uniting cities, municipalities & companies ... Chris Langdon, T-Systems

Manufacturing: innovating asset management & predictive maintenance ..... Oscar Lazaro, Innovalia

Creation of an industrial machine dataspace ..... Jacopo Cassina, UCIMU | Holonix

Realizing the Digital Product Passport | Focus on the Battery Product Passport .... Sergio Gusmeroli, POLIMI

Unlocking the potential of the Circular Economy ..... Yann Le Chevalier, GDSO | Continental

Ways to realize data spaces:

IDS-Industrial – bridging the gap between IDS and Industry 4.0 | Using AI systematically in data spaces ..... Thomas Usländer, Fraunhofer IOSB

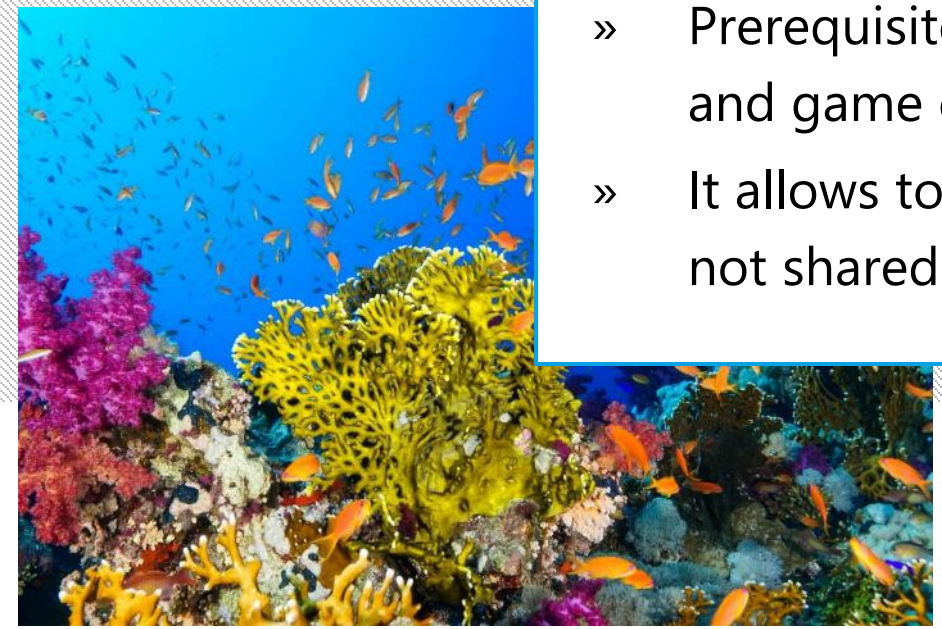
Connecting to a data space with Data Connectors | Building a data space with the Data Spaces Innovation Lab ..... Antti Kojola, VTT

INTERNATIONAL DATA SPACES ASSOCIATION

Data spaces are rocking the industry

Lars Nagel, IDSA

- Paradigm shift for the way we share data
- Prerequisite to make data economy and game changers like AI happen
- It allows to share data that is currently not shared yet (~98 %)



Motivation

Mission of IDSA as a global standardization organization

INTERNATIONAL DATA SPACES ASSOCIATION

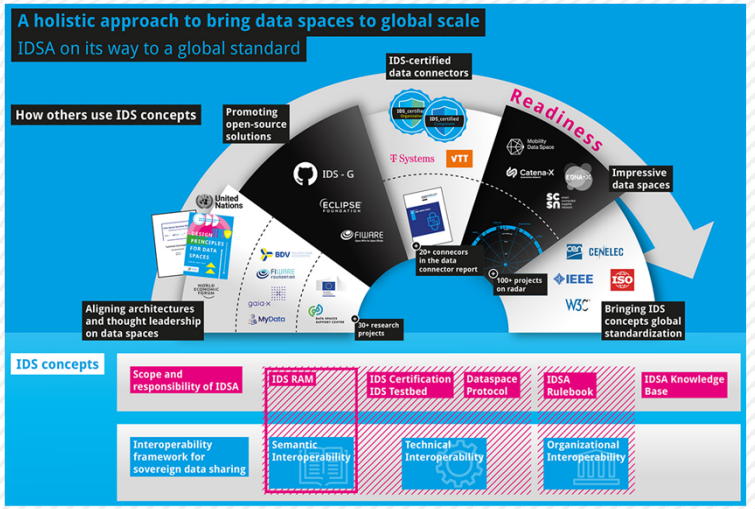
- Data is of strategic importance for **digital transformation** and future **wealth of societies**
- Data is of strategic importance for **Industry 4.0**. Core **Industry 4.0 technologies and concepts** are based on data
- Essentially all international companies are deeply engaged in **global supply chains.** To enable and secure **global trade** and **resilient supply chains** seamless **cross border data flow** is needed
- The **vision of data economy and enjoying the fruits of AI will not work with massively more data** being available
- To **mitigate the risk of climate change**, sustainability and emission data exchange is highly relevant!
- IDS Dataspace Protocol and data spaces are supporting **trusted data sharing**, developed into a **global standard** and ensure **scalability**
- Global data regulations are in place and IDS technology is an **enabler for compliance – as well as it allows for complying with any commercial or individual usage policies for data**

IDSA – state of the union

What we have achieved, where we are

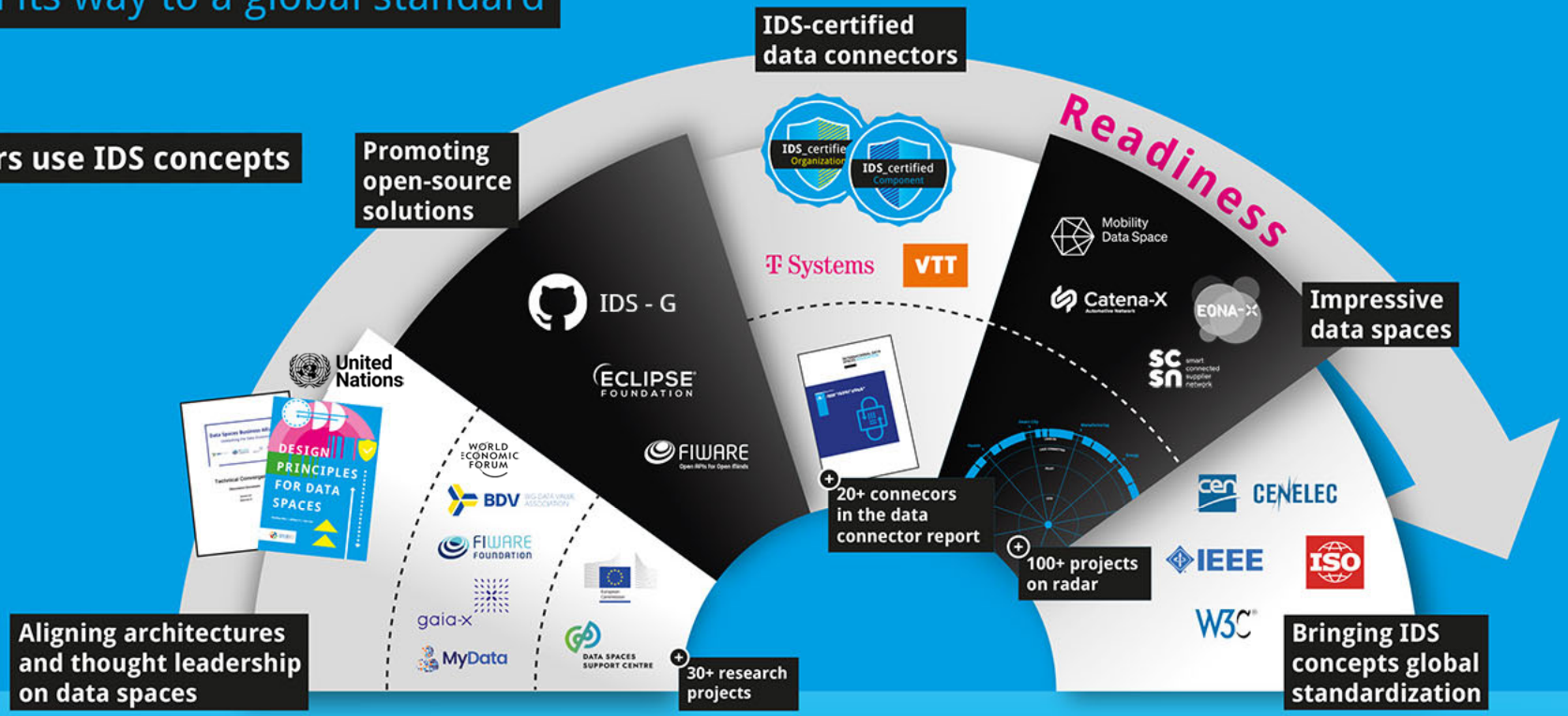
INTERNATIONAL DATA SPACES ASSOCIATION

- IDSA has set the **foundation for data spaces and coined the term** (national data strategies and business frameworks are built on IDSA groundwork)
- **IDSA is a neutral**, true international, member-driven and consensus-based organization
- **ONE framework for data spaces** as soft infrastructure for a flourishing data economy and to enable AI
- **All relevant players** on board (users, providers, policy makers)
- **Global reach** (members from all over the world – all continents, hubs and research centers in relevant economic areas)
- **All running data spaces are built upon IDSA concepts** (150+ data spaces on our radar)
- Relevant **technology is in place** and will be brought to broad commercial offerings
- **Global standardization** ensures industry grade quality and wide adoption



A holistic approach to bring data spaces to global scale

IDSA on its way to a global standard



IDS concepts

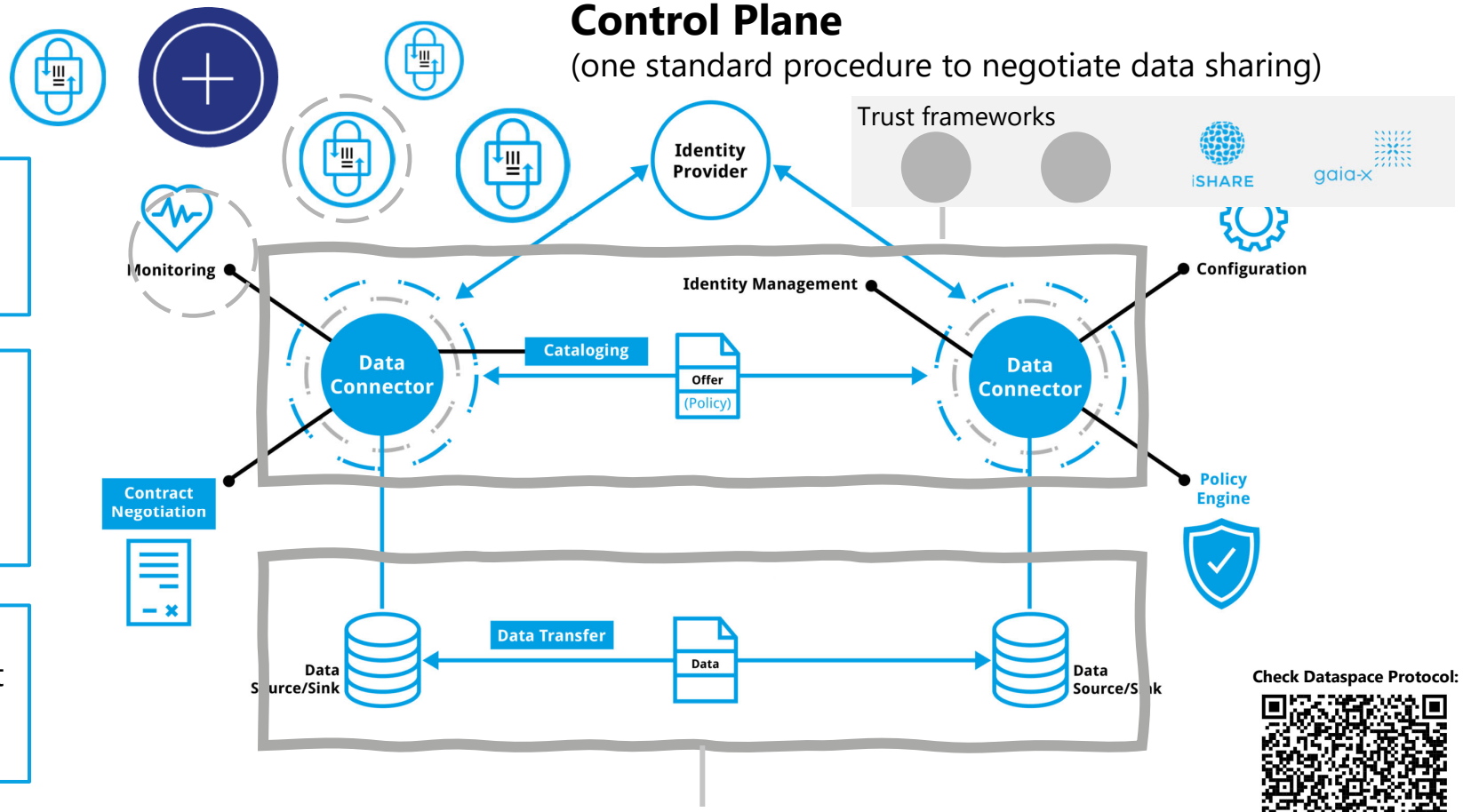
Scope and responsibility of IDSA	IDS RAM	IDS Certification IDS Testbed	Dataspace Protocol	IDSA Rulebook	IDSA Knowledge Base
Interoperability framework for sovereign data sharing	Semantic Interoperability	Technical Interoperability		Organizational Interoperability	

Dataspace Protocol V1.0 → ISO Standard

Enables standardized data exchange across different data space instances.

INTERNATIONAL DATA SPACES ASSOCIATION

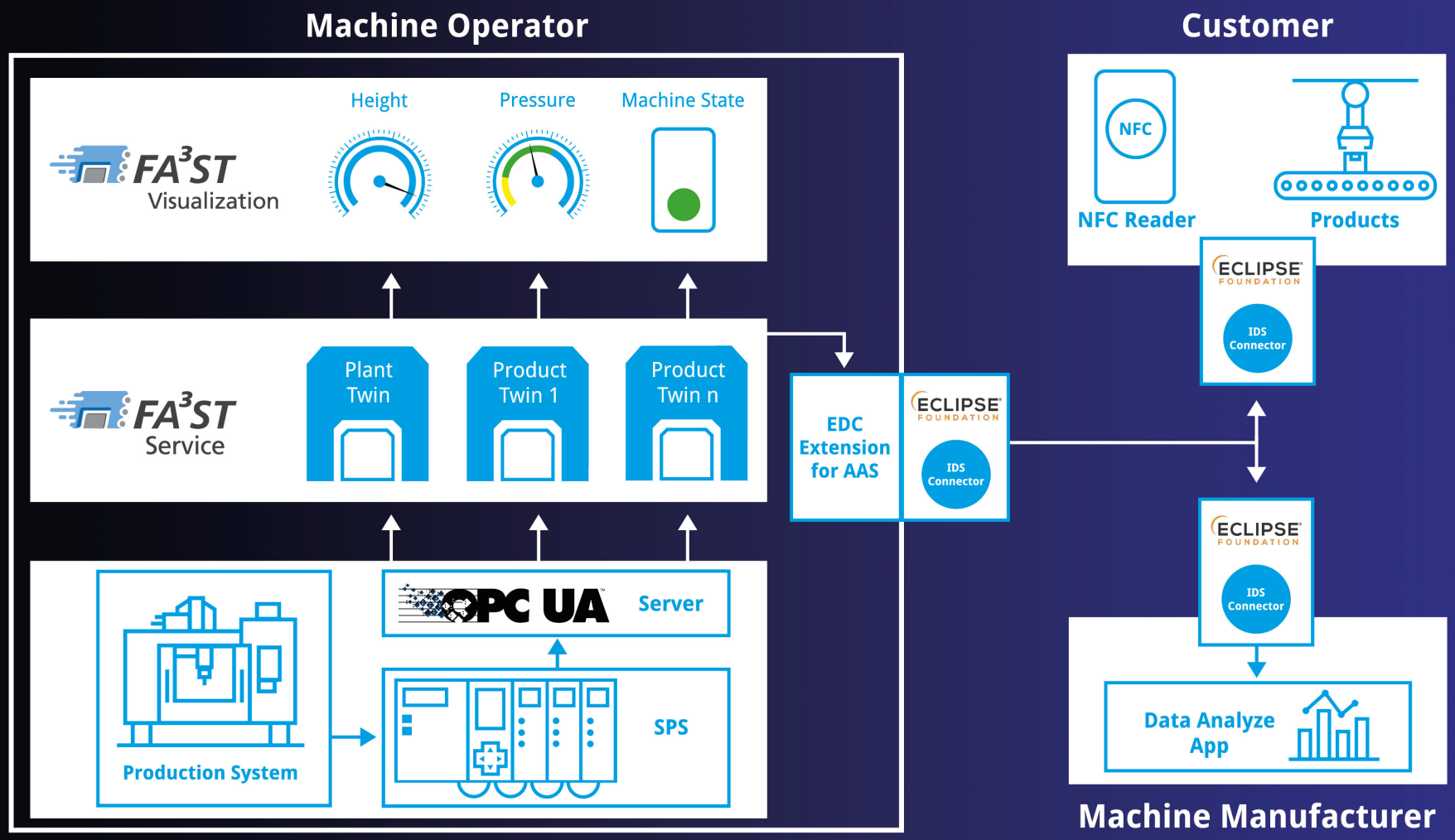
- Ensures standardized data exchange mechanism between different frameworks, products, or services.
- Provides the needed schemas and protocols for cataloging data, negotiating contracts and usage agreements, and accessing data within a data space.
- Organizations using this protocol can align with industry standards, foster best practices, and unlock new data-driven business models and opportunities.



Check Dataspace Protocol:

#DataSpacesTuesday

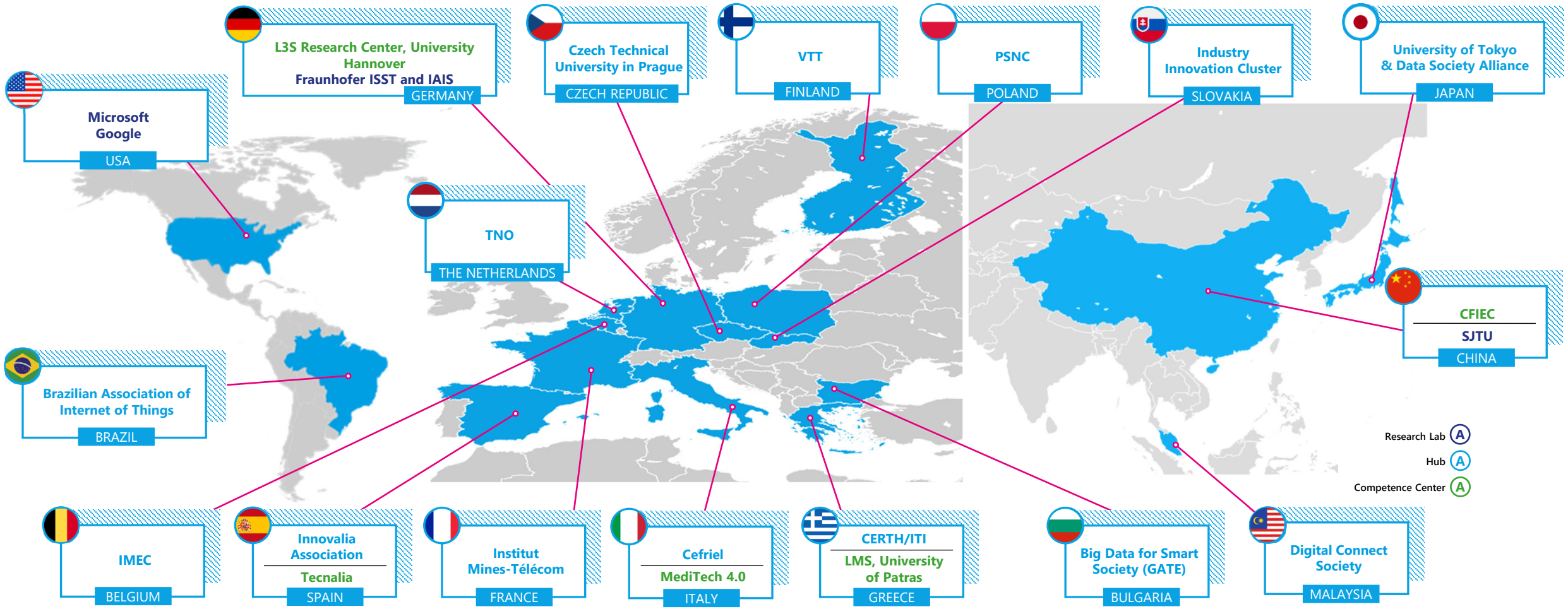
FA³ST ecosystem for I4.0-compliant and data-sovereign digital twins by Fraunhofer IOSB



IDSA Hubs, Competence Centers & Labs

Our partners are building momentum across Europe and around the world

INTERNATIONAL DATA SPACES ASSOCIATION

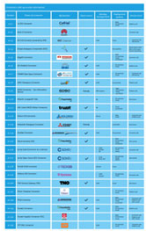


IDSA History of Core Assets

IDSA on its way to a global standard

INTERNATIONAL DATA SPACES ASSOCIATION

2016 *2017/18* *2019* *2021* *2023* *2023*



RAM and Certification in V1	RAM V2 and V3	IDSA Rulebook	Data Spaces Radar & RAM 4	Reports such as Connector Report	Dataspace Protocol and Standardization

IDSA Assets – From Theory to Practice

How we change the way data is shared

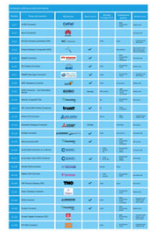
INTERNATIONAL DATA SPACES ASSOCIATION

IDSA Rulebook

Reference Architecture

Dataspace Protocol and Standardization

Certification



Reports such as Connector Report

omega-x

smart connected supplier network

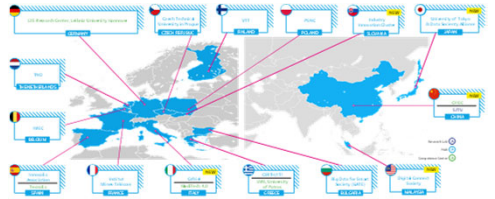
Catena-X

EDNA-X

Mobility Data Space

DATA-EX Data Society Alliance

Data Spaces Radar



IDSA Hubs

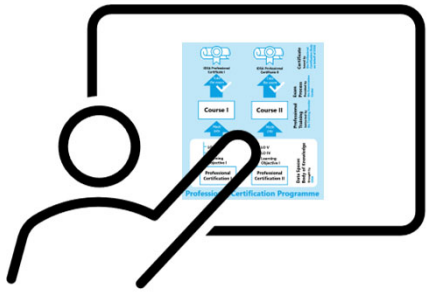
Theory

Practice

The Scale of Effort

Where shall I start my dataspace journey?

INTERNATIONAL DATA SPACES ASSOCIATION



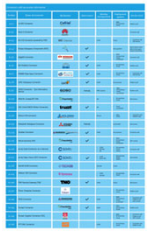
Rocket Science → **Piece of Cake**

RAM

Rulebook

Certification

DS Protocol



Reports

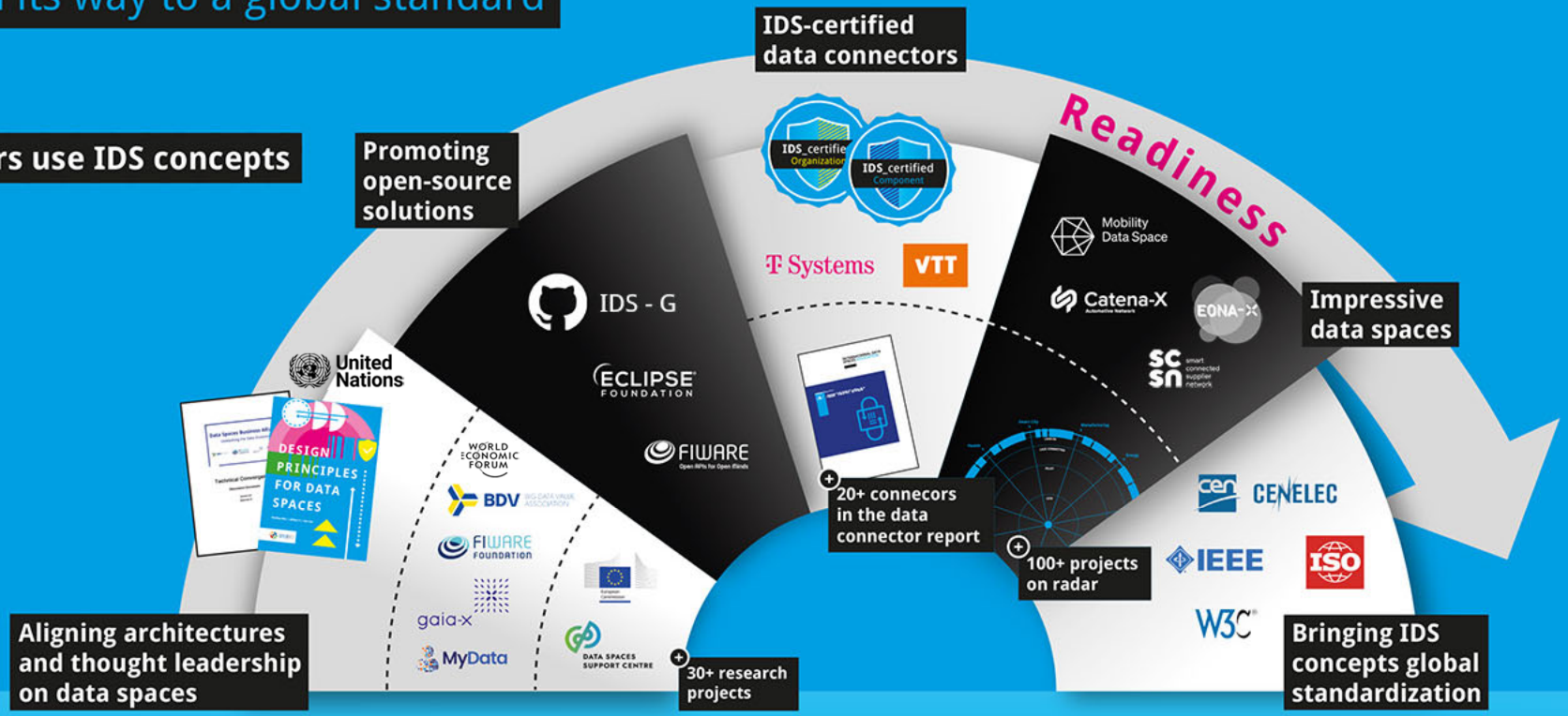
Open Source

Examples and Real Data Spaces

Ready to use solutions for Industry

A holistic approach to bring data spaces to global scale

IDSA on its way to a global standard



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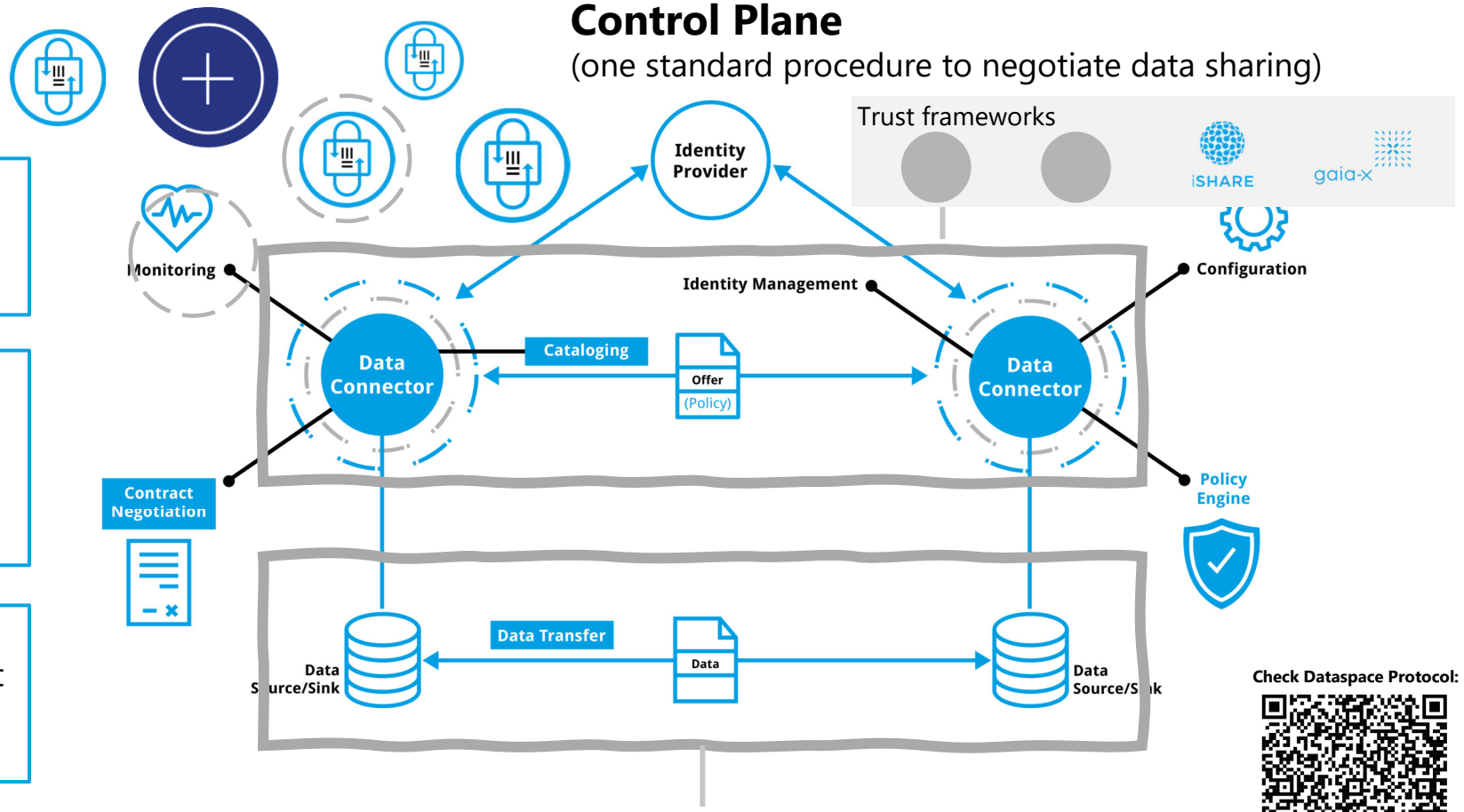


Check Dataspace Protocol:


INTERNATIONAL DATA
SPACES ASSOCIATION
Let’s build data spaces!

INTERNATIONAL DATA SPACES ASSOCIATION

Lars Nagel

CEO

www.internationaldataspaces.org

+49 173 2929140

lars.nagel@internationaldataspaces.org

NTT DATA

Connecting Japanese and European industries | International collaboration on data society

Masaru Dobashi, NTT Data

International collaboration on data society

24th April, 2024

Masaru Dobashi

Masaru Dobashi: Who Am I?

Affiliations

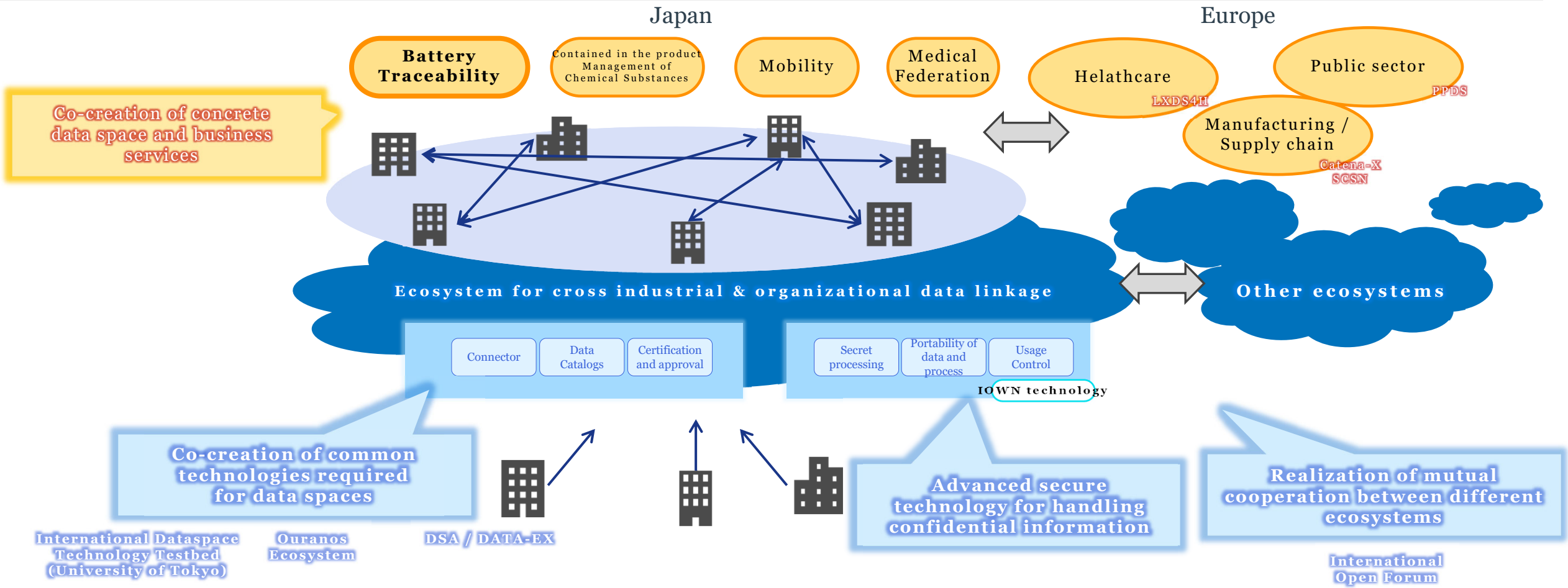
- NTT DATA Group
- Visiting researcher of University of Tokyo
- Data Society Alliance (DSA) member

Works

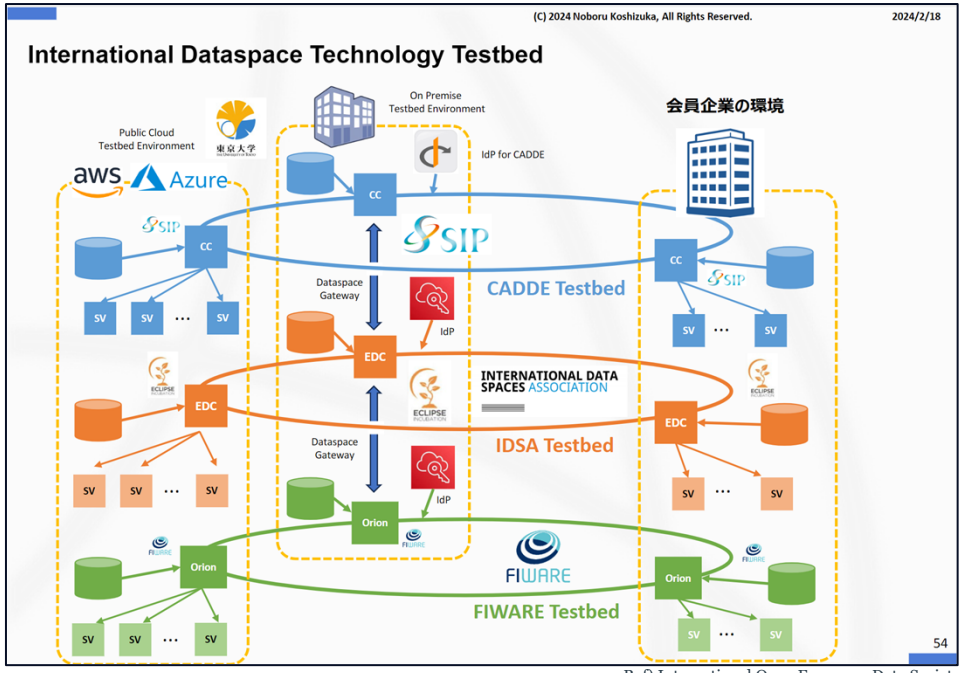
- R&D, system development and consultant of Data Platform
- R&D, system development and consultant of Data Spaces, cross-enterprise / cross-industrial data sharing
- Leading global data spaces activities in NTT DATA group

NTT DATA accelerates the development and the social adoption of trustworthy data spaces

NTT DATA as a global company leads multiple projects to realize an interoperable & federal data space ecosystem. We are realizing the collaboration between different ecosystems and developing technologies for advanced confidential use cases.



International collaboration for realizing data society has already started



Ref) International Open Forum on Data Society

International Dataspace Technology Testbed (University of Tokyo)

U. Tokyo has launched International testbed. Multiple connectors has been deployed and the collaboration trial is executed.

Ref) Data Spaces Symposium

Collaboration across the world

Telco, manufacturing, healthcare, etc.

International Open Forum on Data Society

European and Japanese associations and companies are collaborating to know each other. International Task Force for the alignment has started.

Ref) International Open Forum on Data Society

Ref) Data Spaces Symposium

慶應義塾大学
Keio University
Tokyo, Japan

Data Free Flow with Trust

Satoru Tezuka | Keio University

T · · Systems ·

Data ecosystem for mobility services, uniting cities, municipalities & companies [GX4FM]

Chris Langdon, T-Systems

gaia-x future mobility

Gaia-X Lighthouse Project

How to make your apps fit for mobility dataspaces with sandboxes

26.04.2024

Prof. Dr. Chris Schlueter Langdon

T-Systems International GmbH

Funded by the European Union
NextGenerationEU

Supported by:
Federal Ministry for Economic Affairs and Climate Action
on the basis of a decision by the German Bundestag

gaia-x

Catena-X the Association · Cofinity-X one of the Operating Companies · T Systems the Gaia-X Digital Clearing House

We are pioneers in Dataspaces for +7 years!

2018 - INTERNATIONAL DATA SPACES ASSOCIATION

130+ members: IDS architecture, rule book, certification, adoption … read more

Co-founded IDS Mobility Community, co-editor of *Next Mobility* anthology

2019 - 2021 NPM Nationale Plattform Zukunft der Mobilität

By the German Federal Government, 6 working groups …read more

Contributor: Identified tech/ data policy requirements for *Next Mobility*

2020 - 2021 RealLab Hamburg · Hamburg ITS World Congress 11 - 15 Oct 2021

"Test-driving" *Next Mobility* in real-life: 10 projects, 32 partners …read more

Project lead: Built minimal viable IDS dataspace to enable novel intermodal travel planning demo app

2020 - Mobility Data Marketplace mobilithek

German National Access Point for Mobility Data …read more

Building IDS platform 2.0
GoLive: Summer 2022
First Data Space in Germany

2020 - Mobility Data Space

Public IDS dataspace, 20+ use cases ..read more

Contributor of use cases, consulting on operations

2020 -2023 DaWID

Federal Ministry of Education & Research

Human digital twin and data monetarization with sovereignty … read more

Partner: Build IDS dataspace, broker, end user cockpit

2021 - gaia-x

Founding partner

Launched by German, French governments
Chairman of board and COO

2021 - Catena-X Automotive Network

Top auto companies, 8 pioneers, 28 partners: BMW, Daimler, VW… read more

Epic Owner, Product Manager, Product Owners: Design, build Gaia-X/ IDS dataspace & service ecosystem

2022 - esa European Space Agency · Copernicus

Data Space Ecosystem powering one of the world's largest data collections initiatives focused on collecting data samples from Earth's surface as well as the atmosphere...read more

2022 - Cloud Sovereignty. First Move.

Google Cloud · T Systems .let's power higher performance

T-Systems & Google Cloud partner to deliver sovereign cloud …read more

Telekom **Data Intelligence Hub** and Smart Mobility

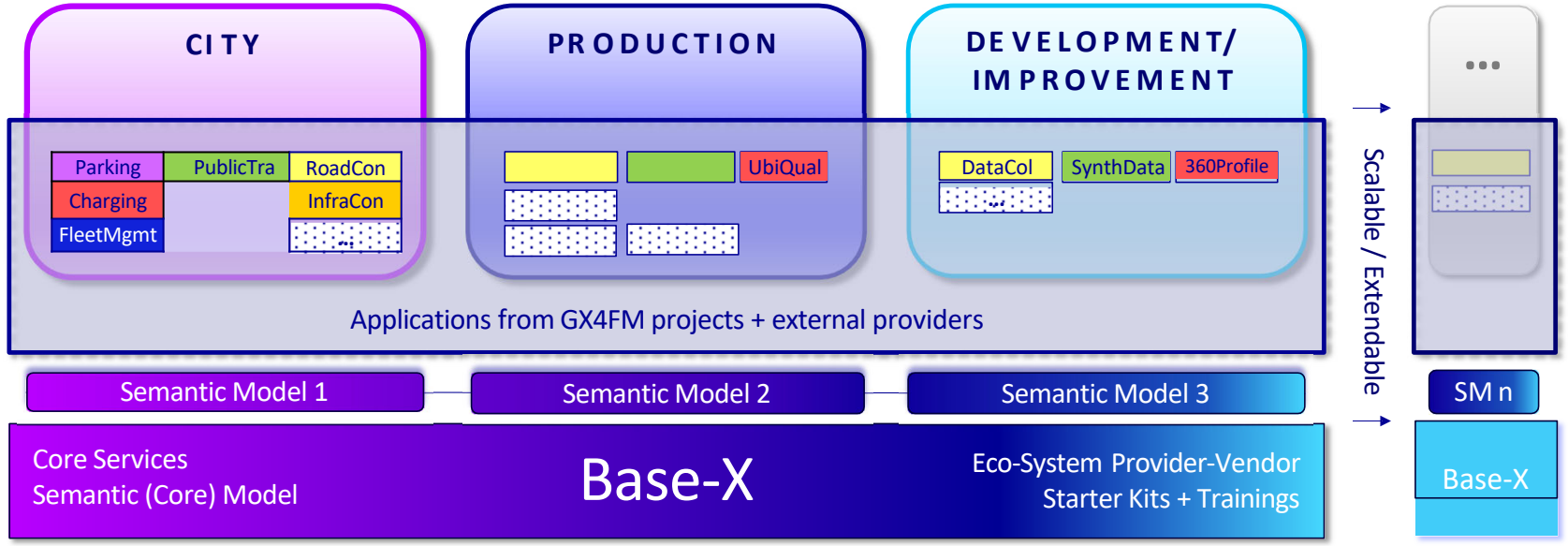
Mobility microsite: https://dih.telekom.com/en/data-move-people

Project Family – Relation to Other Domains and Initiatives

Base-X Architecture
Scalable Mobility Solutions & Foundation for System Innovation

gaia-x future mobility

HMI 04/2024



Catena-X

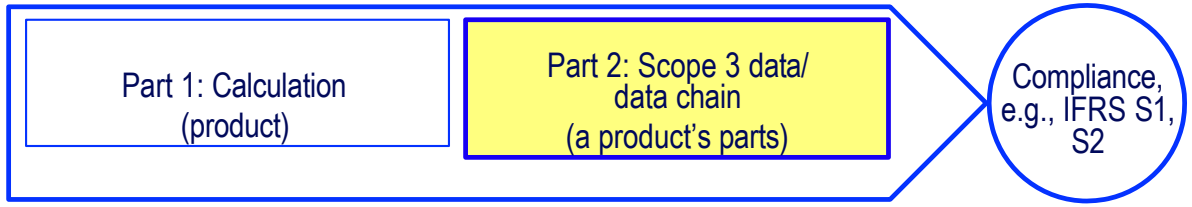
PCF-Pilot with Catena-X Technology

CES 2024 – Jan 8 - 12, Las Vegas

Ford flex IBM T-Systems

Supported by:
Federal Ministry for Economic Affairs and Climate Action
Funded by the European Union
NextGenerationEU
on the basis of a decision by the German Bundestag

Challenge: How to obtain data for your product's supply chain?

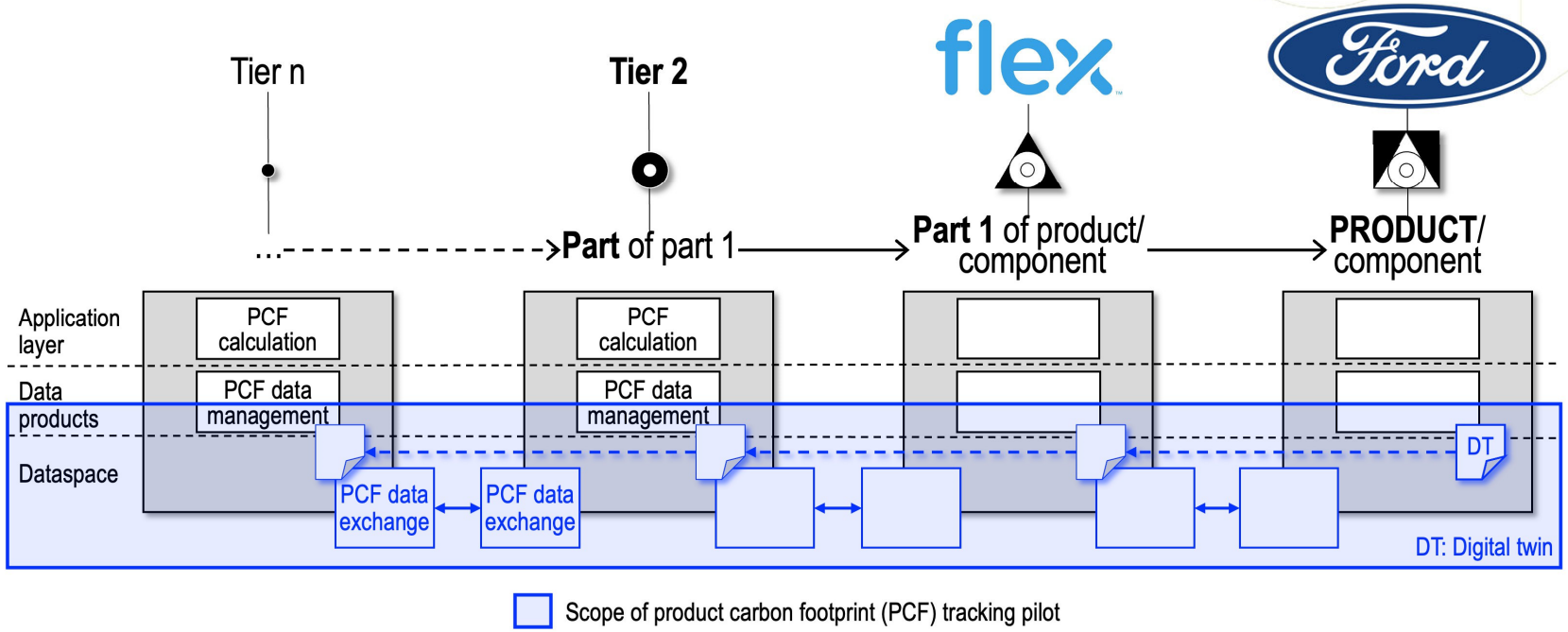


Source: Schlueter Langdon, C. 2024. CES 2024: How this Web3 tech breakthrough can help with primary CO2 emission data in automotive - visit us. Research Note (version 2, 2024-01-07), Drucker Customer Lab, Peter Drucker School of Management, Claremont Graduate University, link

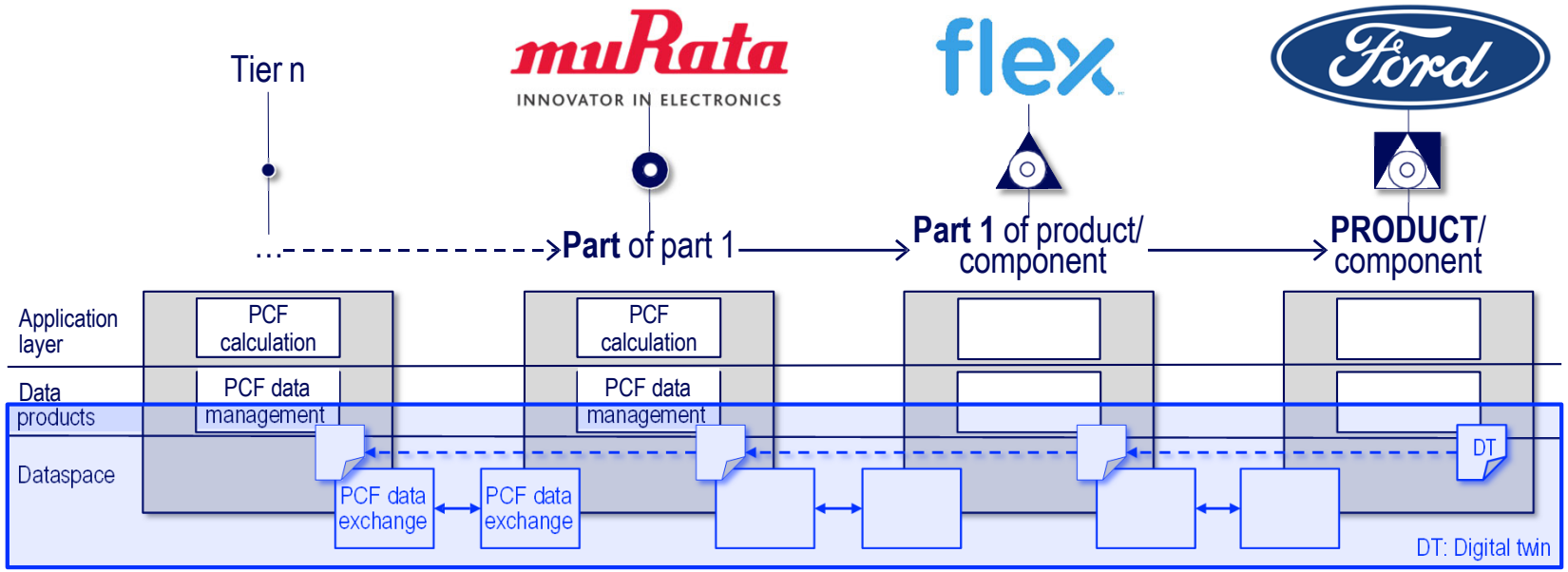
PILOT@CES2024

Data chain – data exchange focus

1 CX | 2 CARRIER | 3 APPS | PILOT



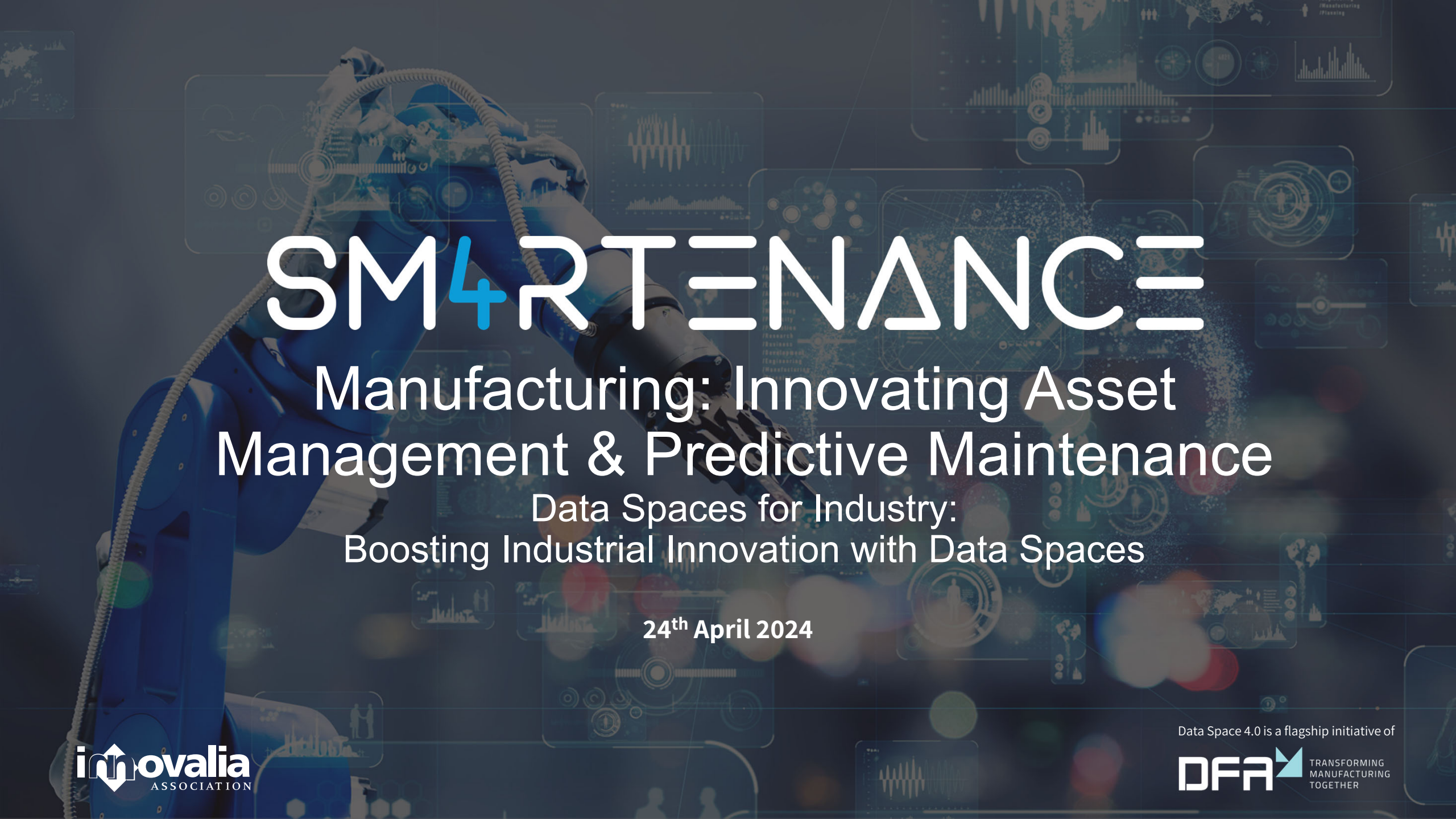
Next steps: More suppliers joining



innovalia

Manufacturing: innovating asset management & predictive maintenance

Oscar Lazaro, Innovalia



SM4RTENANCE

Manufacturing: Innovating Asset Management & Predictive Maintenance

Data Spaces for Industry:
Boosting Industrial Innovation with Data Spaces

24th April 2024

innovalia ASSOCIATION

Data Space 4.0 is a flagship initiative of

DFA TRANSFORMING MANUFACTURING TOGETHER

EU Economic Spaces

1993

European Single Market

European Economic & industrial transformation

2023

European Common Data Spaces

Industrial & public administration digital transformation. European data economy pillar

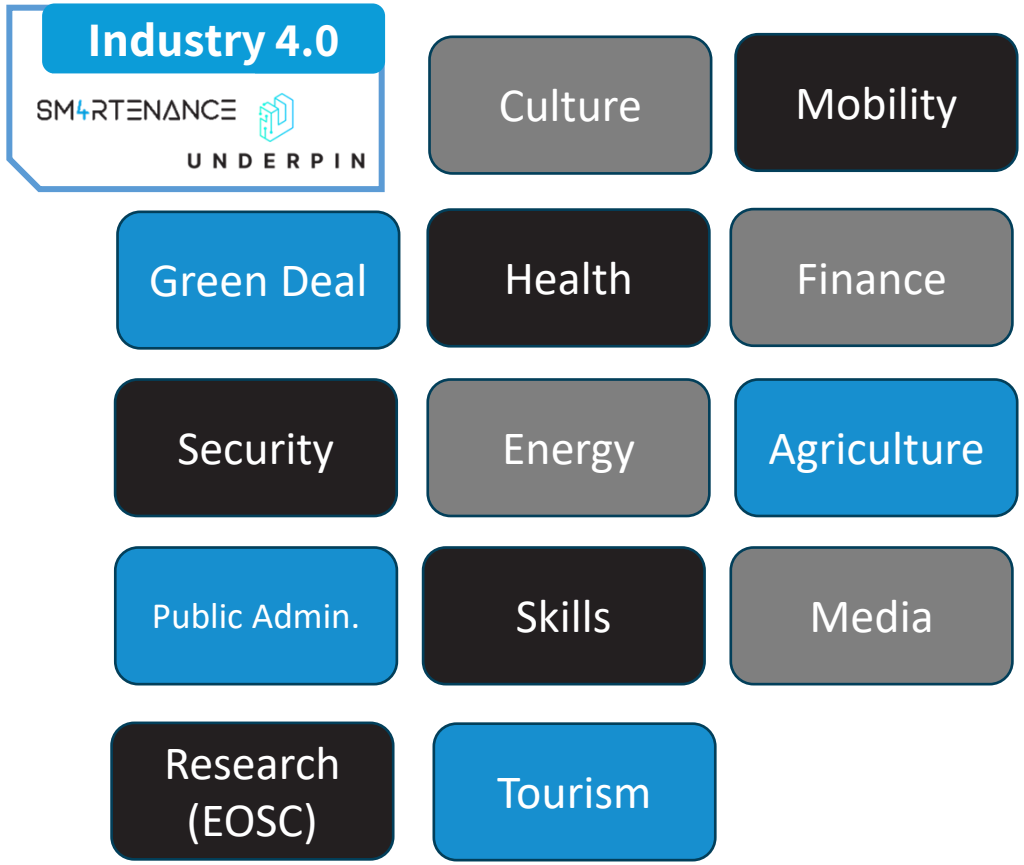
2030

European Net-Zero Space

Industrial green transformation

EU Data Strategy

14 European Common Data Spaces



EOSC (European Open Science Cloud)


Volatility
Complexity
VUCA
Uncertainty
Ambiguity

DATA EXCHANGE FOR VUCA

BIG

Factory internal

COMMON

Supplier network

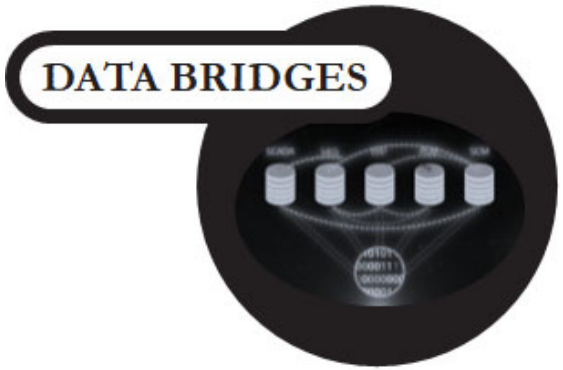
Cross-factory manufacturing network

OPEN

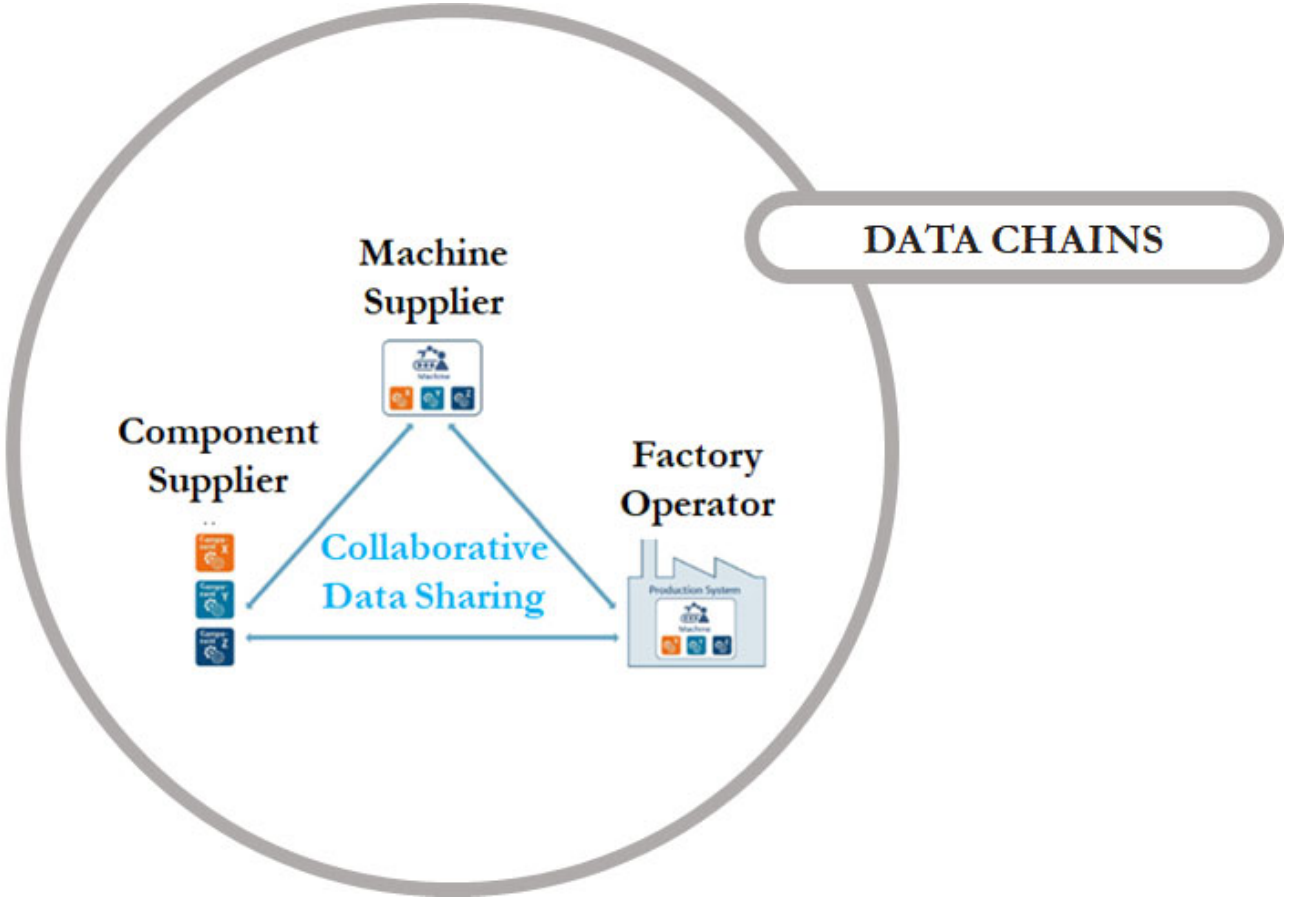
TRANSFORMING MANUFACTURING TOGETHER


innovalia
ASSOCIATION
ONE DATA
ONE USE

GLOBAL MANUFACTURING NETWORK
EVOLUTION

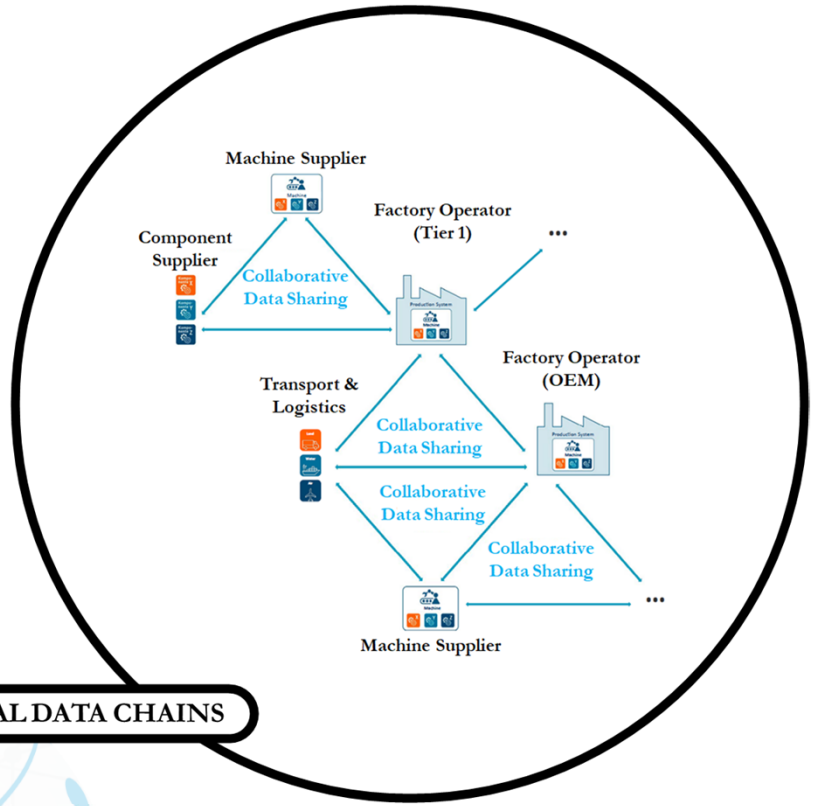


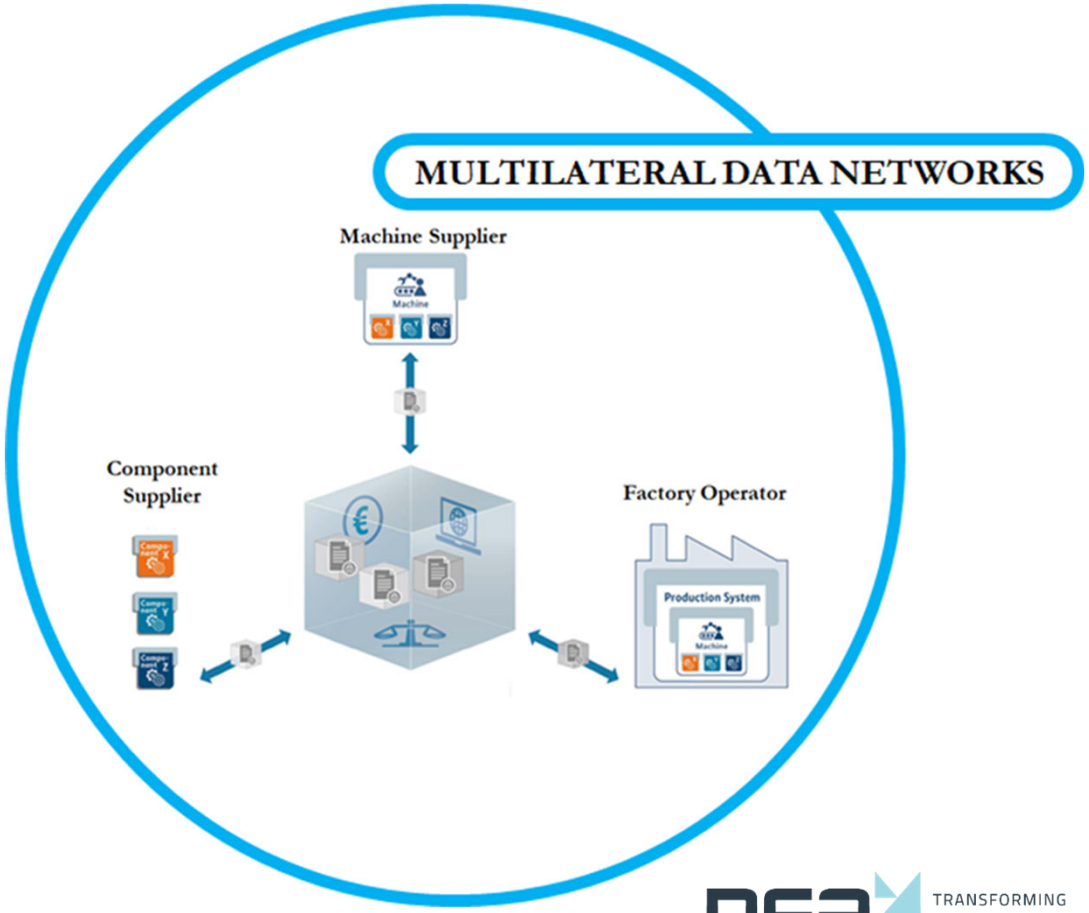
One Data •
One Use



One Partner, One Project

GLOBAL MANUFACTURING NETWORK
EVOLUTION





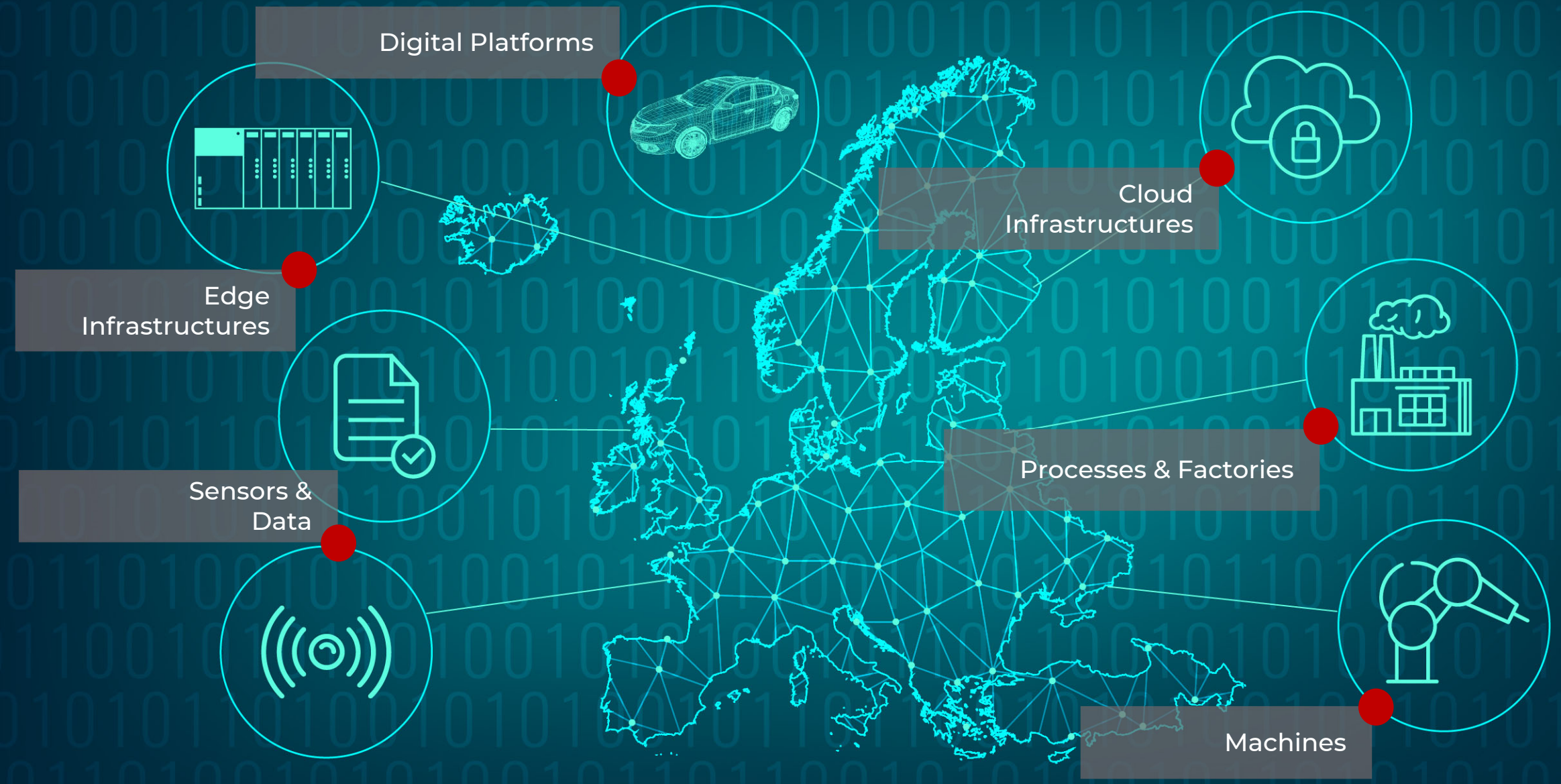
One Partner •
One Project

03 ASSET MANAGEMENT & PREDICTIVE MAINTENANCE VISION

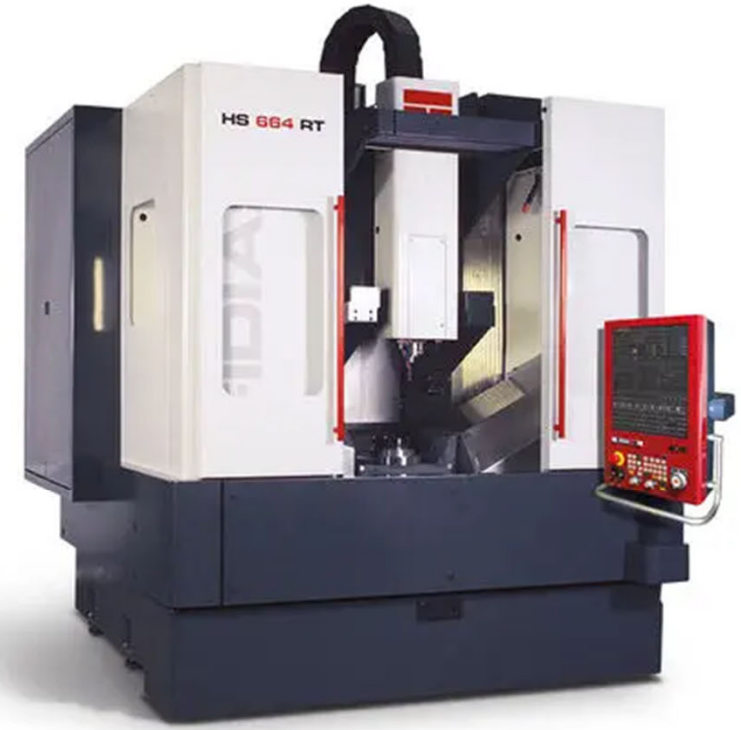

From
Egosystem
To
Ecosystems

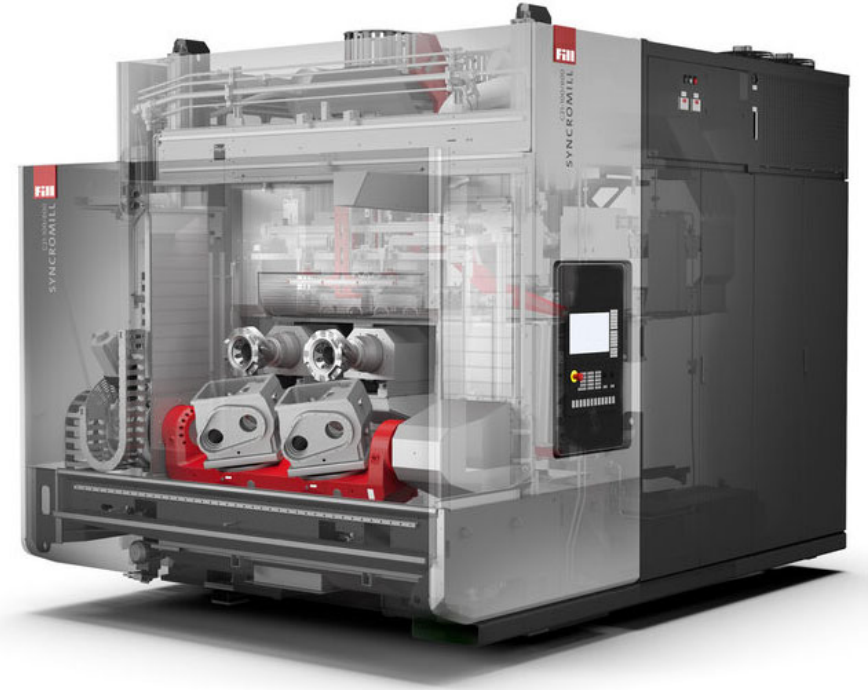
European Industrial Data Space

innovalia ASSOCIATION



innovalia ASSOCIATION

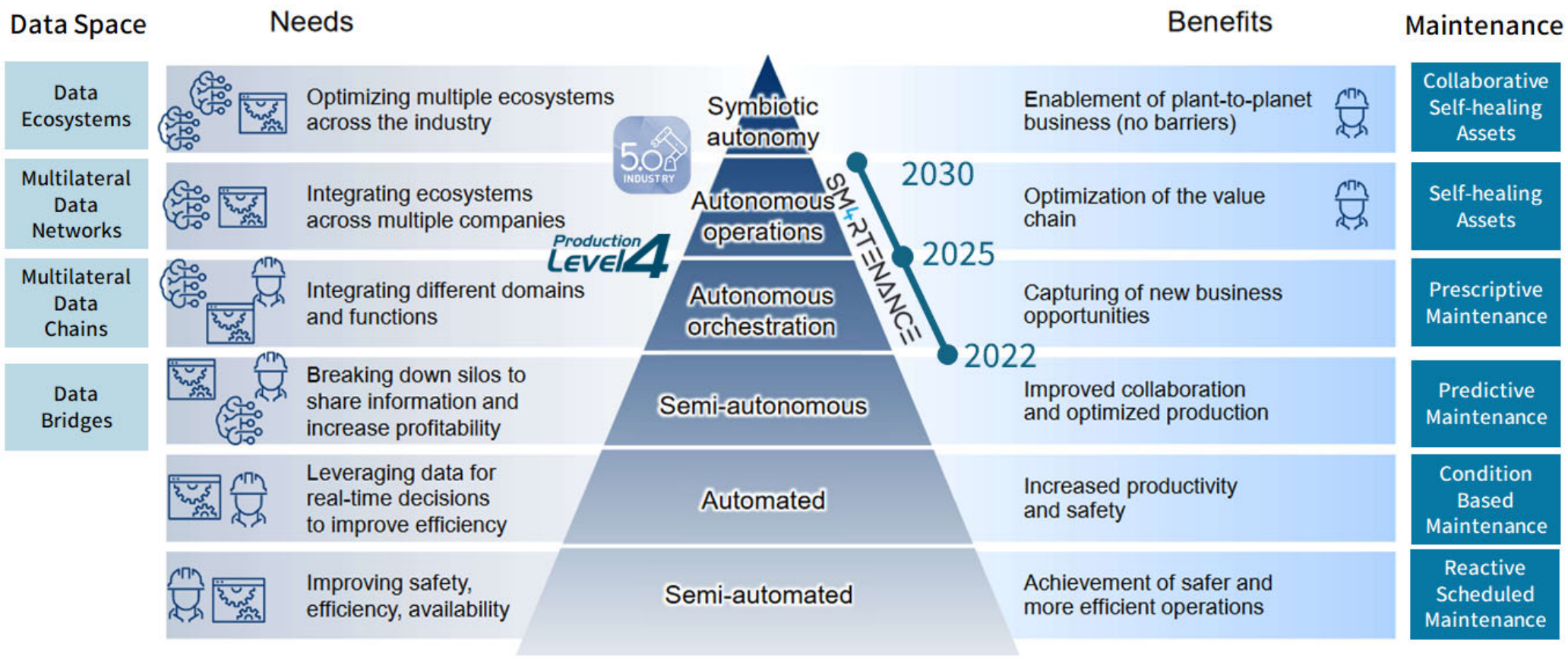




ASSETS 4.0

CROSS-SECTORIAL GLOBAL DATA SPACES

DATA-DRIVEN ASSET 4.0 MANAGEMENT VISION

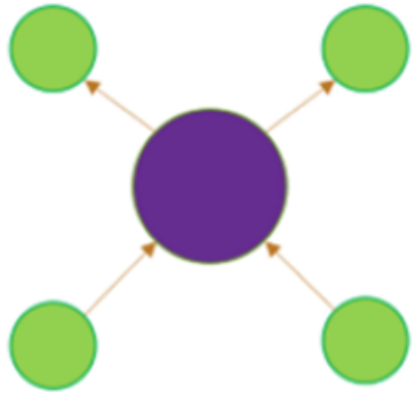


DFA TRANSFORMING MANUFACTURING TOGETHER


360°
360º Data Integration

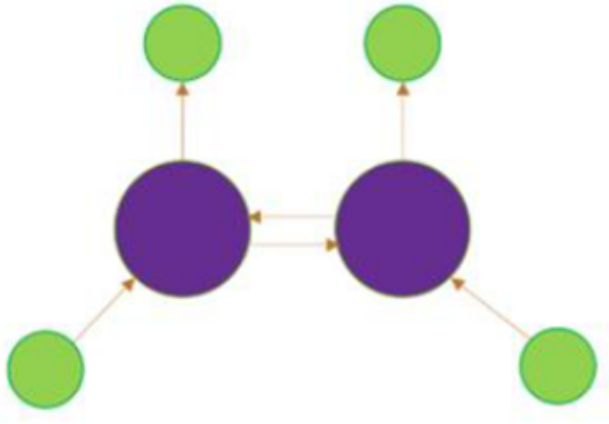
Pathway Towards Data Space 4.0 Continuum

Today

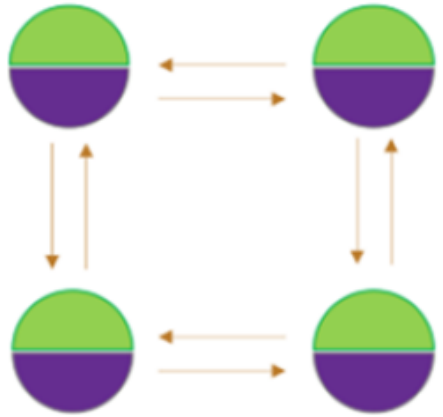


Centralized Data Space Authority

2026

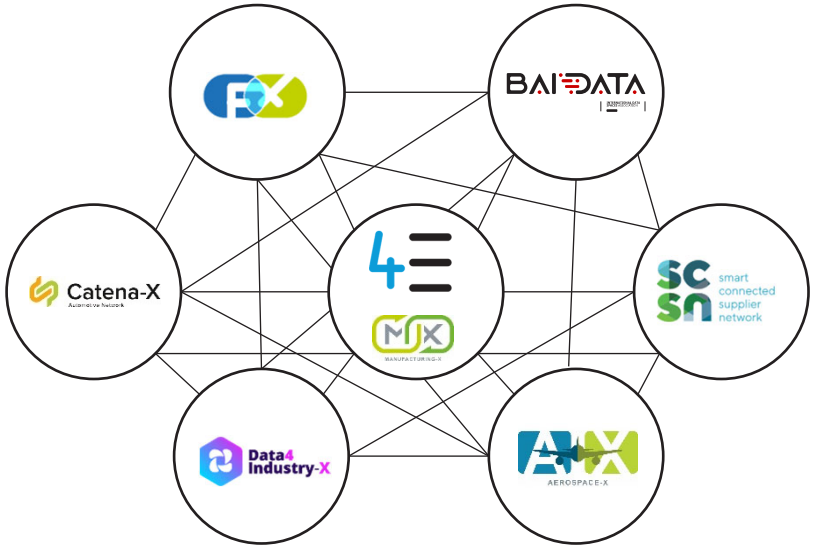


Federated/Distributed Data Space Authority

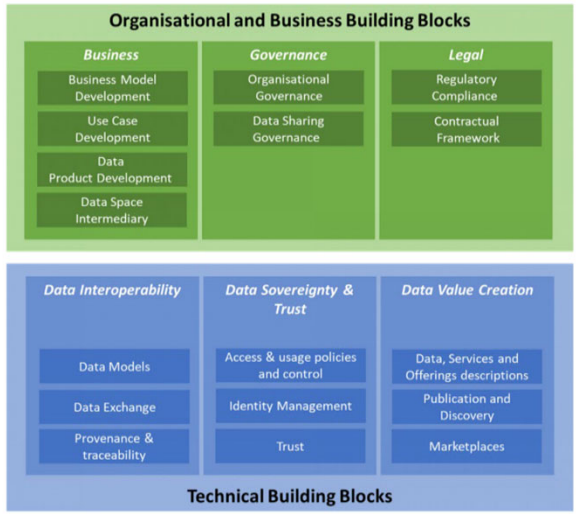


Decentralized Data Space Authority

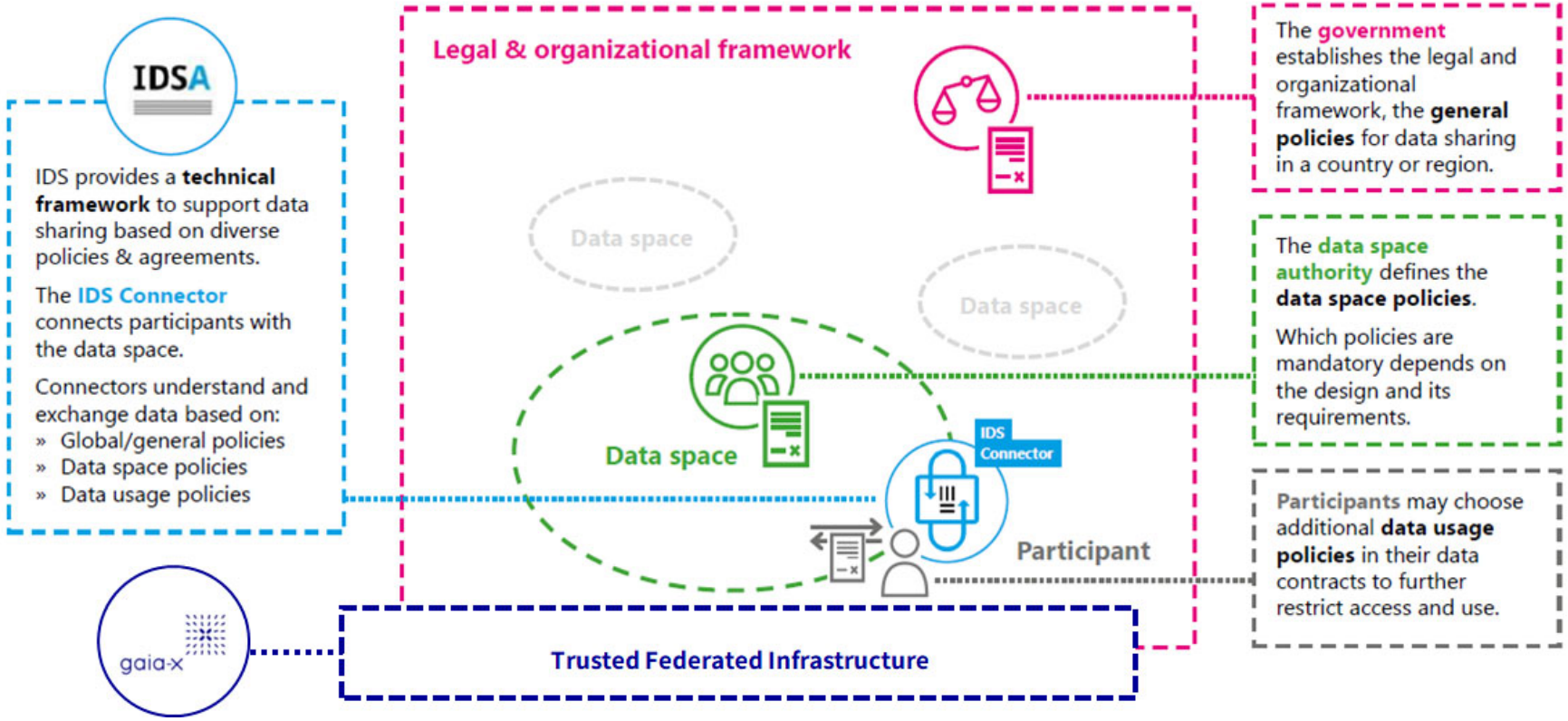
Embryonic



360° DATA INTEGRATION: GLOBAL MULTILATERAL DATA VALUE CHAINS



Building Blocks



TRANSFORMING MANUFACTURING TOGETHER

360° DATA INTEGRATION

DATA SPACE FEDERATION

VISION

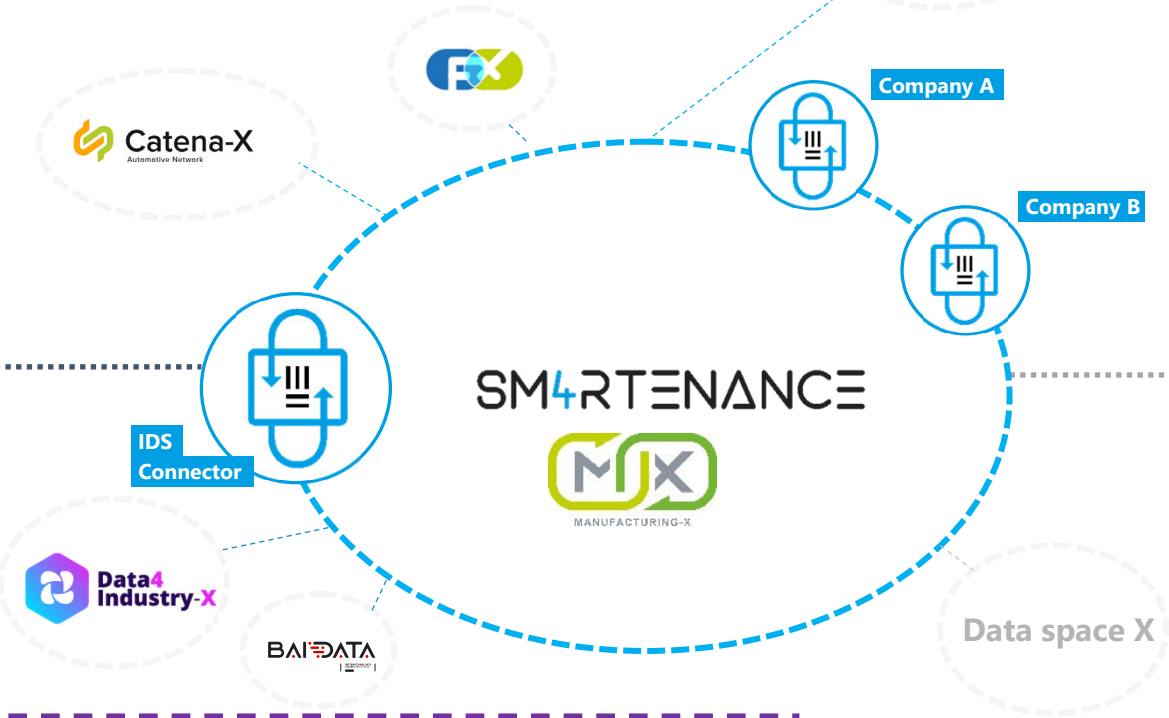
IDS provides a **technical framework** to support data sharing based on diverse policies & agreements.

The **IDS Connector** connects participants with the data space.

The connector understands the data space policies and shares data according to these policies.

Legal & organizational framework

The European Commission is the governing body that establishes the legal framework for data sharing in Europe.



Data space federation policies

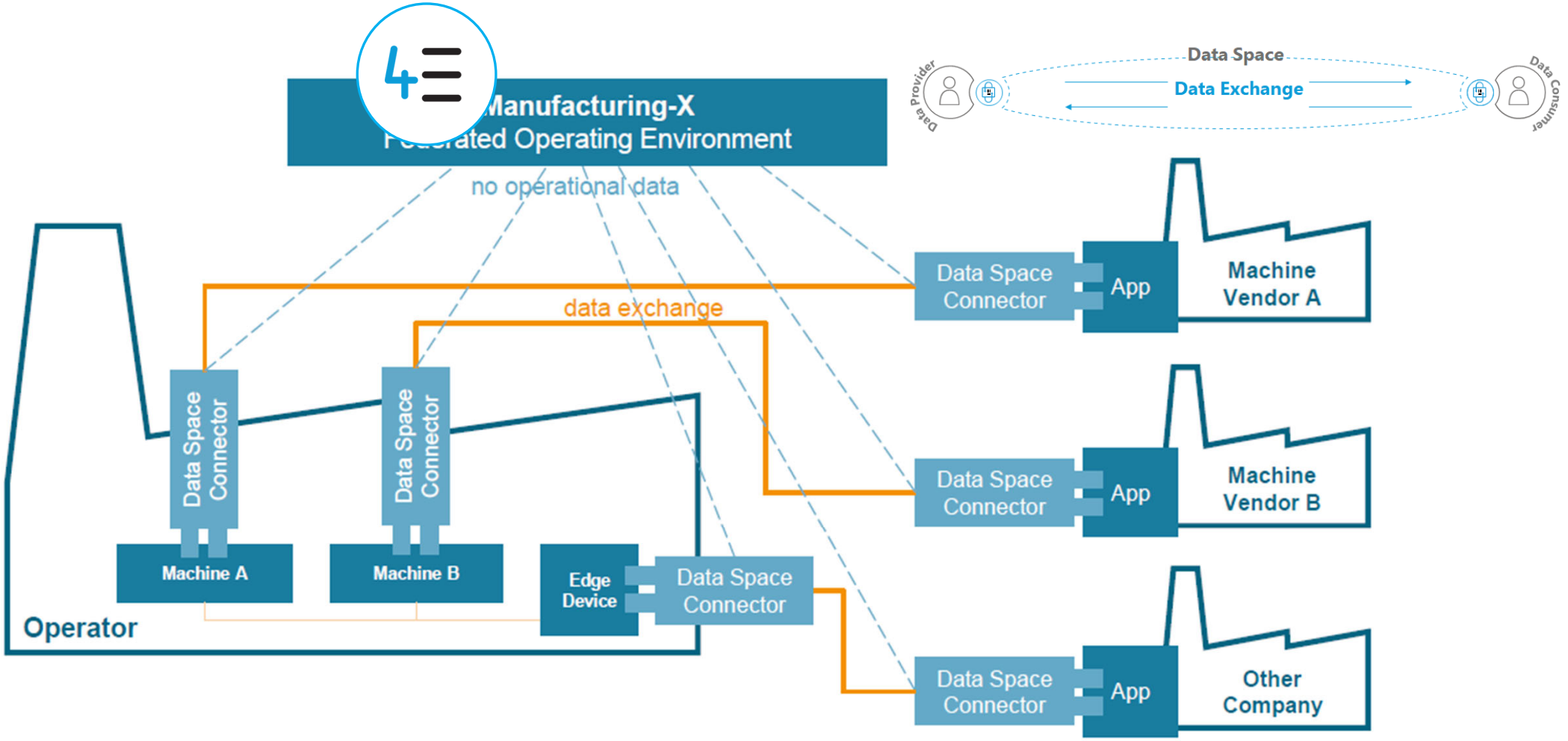
Sm4rtenance **builds and sets the federation & interoperation policies of the data space federation**.

As the **data space federation authority**, it defines the organizational rules and policies for this specific asset 4.0 network federation.

Trusted & Federated Infrastructure

TRANSFORMING MANUFACTURING TOGETHER

360° DATA INTEGRATION: GLOBAL MULTILATERAL DATA VALUE CHAINS



TRANSFORMING MANUFACTURING TOGETHER

Data Moves at The Speed of Trust

Project No: 101123490

SM4RTENANCE

SM4RTENANCE

European Deployment of Smart Manufacturing Asset 4.0 MultilateRal DaTa Sharing SpacEs for an AutoNomous Operation of CollAborative MainteNance and Circular Services

Duration: 36 Months

Start Date: 1st October 2023

Consortium: : 42 full partners, 5 associated partners, distributed across 11 EU countries.

Strategic Objective: DIGITAL-2022-CLOUD-AI-03-DS-MANUFACT

Total Budget: 14 M €

EC Contribution: 8M€

Project Website: SM4RTENANCE.EU

SM4RTENANCE is a flagship initiative of

DFA TRANSFORMING MANUFACTURING TOGETHER

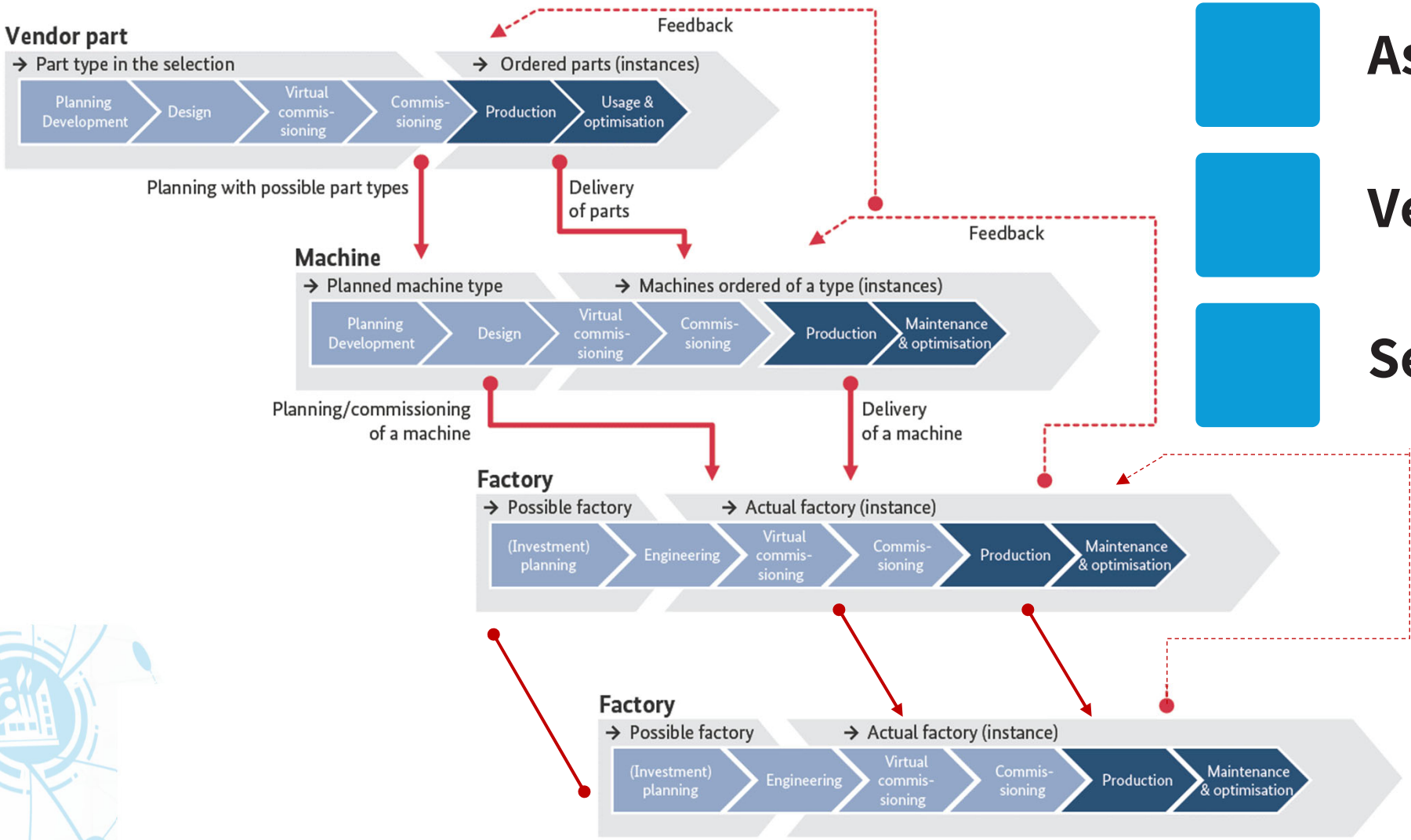

innovalia ASSOCIATION
DAWEX data exchange technology
top-ix WE DO CONNECTIONS
NTT DATA
OTE GROUP OF COMPANIES
SCSN smart connected supplier network
domina data management
FIWARE FOUNDATION
SOVITY
DGS BUILDING THE FUTURE
SQS SOFTWARE QUALITY SYSTEMS
TRIMEK METROLOGICAL ENGINEERING
Cefriel POLITECNICO DI MILANO
PRIMA INDUSTRIE
FIDIA
COMAU
Schneider Electric
FILL YOUR FUTURE
DATAPIXEL QUALITY CONTROL ENGINEERING
TNO
TXT
core
IJSSEL
UNIMETRIK METROLOGY AND CALIBRATION
ATLANTIS ENGINEERING
SYXIS innovate together
Fraunhofer IOSB
INDUSTRIE 4.0 AUSTRIA
UiO
CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS
PIACENZA
AVL
BEMAS
cea
BAI DATA
MADE Competence Center i4.0
AFNeT Services
INTELLIMECH CONSORZIO PER LA MECCATRONICA
VDMA
carsa
eit Manufacturing CLC SOUTH
ASSOCIATED PARTNERS
efnms
INTERNATIONAL DATA SPACES ASSOCIATION
VDI
SIEMENS
VTT

The European Data Space For Assets 4.0

SM4RTENANCE
OBJECTIVE

"TO FACILITATE A NEUTRAL CROSS-SECTORIAL DATA SPACE WHERE DATA CAN BE PROVIDED ALONG THE COMPLETE ASSET LIFECYCLE FROM THE DIFFERENT STAKEHOLDERS INTERACTING WITH THE ASSET 4.0".

SM4RTENANCE DATA SPACE VISION



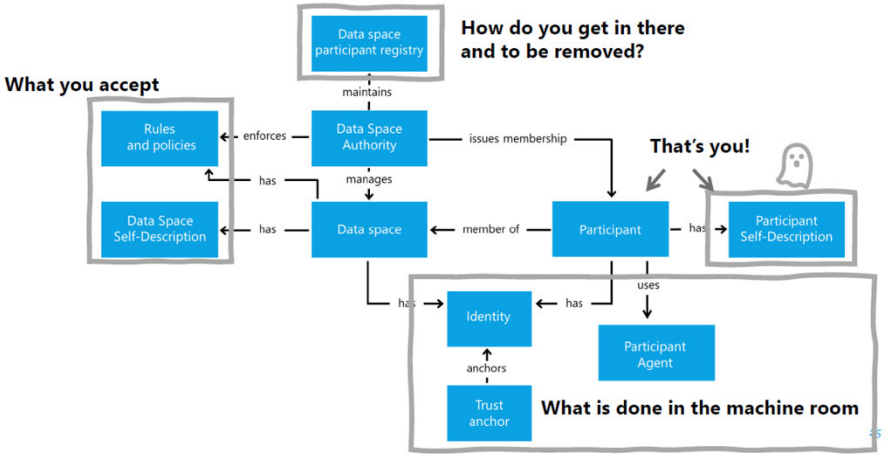
Asset Centric

Vertical Integration

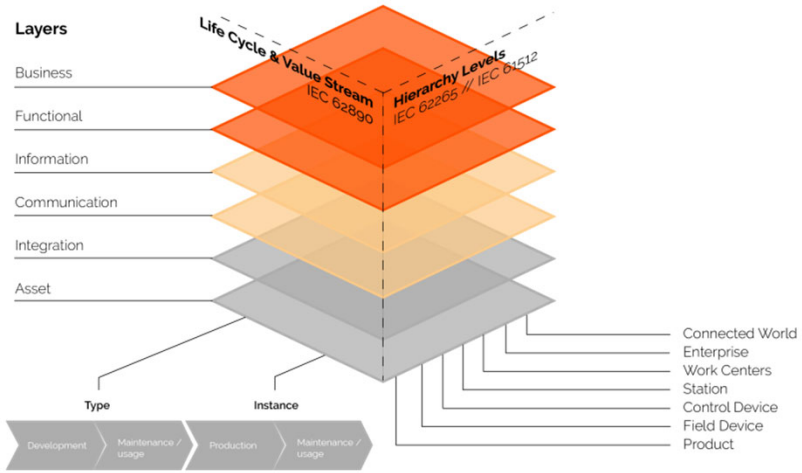
Service Driven

DFA TRANSFORMING MANUFACTURING TOGETHER

DATA SPACE 4.0 REFERENCE OPERATION



RAMI 4.0



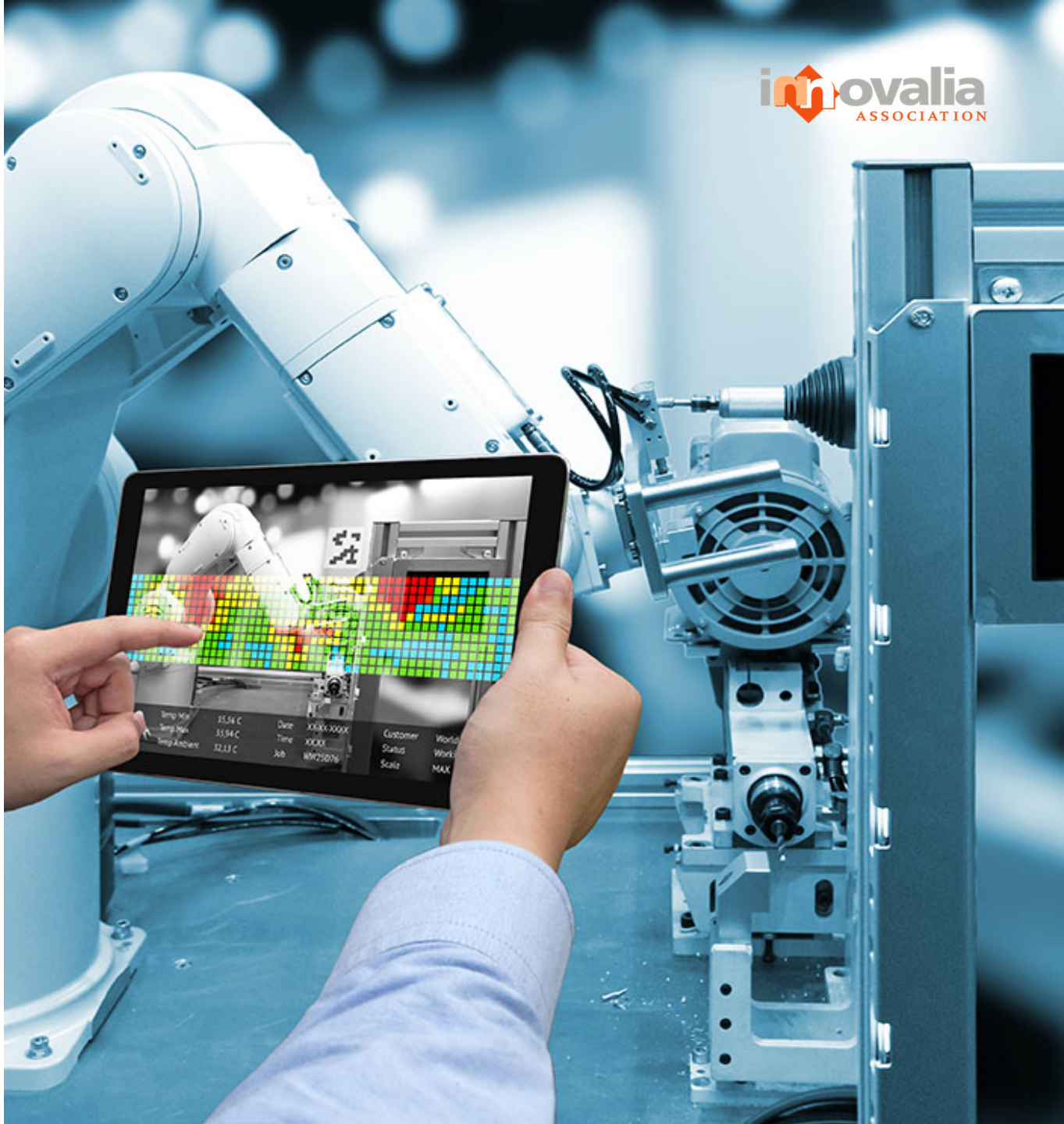
"European Data Space 4.0 **Federation**"

Reference implementation, Standardisation

DATA SPACE 4.0 · FIWARE FOUNDATION · BDV BIG DATA VALUE ASSOCIATION · STANDARDIZATION COUNCIL INDUSTRIE 4.0 · Catena-X Automotive Network · EFFRA EUROPEAN FACTORIES OF THE FUTURE RESEARCH ASSOCIATION · MANUFACTURING-X · gaia-x · INTERNATIONAL DATA SPACES ASSOCIATION

“Digital Platform Integration & 360° Data Governance”

Certification & Compliance



Edge, data-center, cloud, interworking

“Pan-European **Ecosystem** of Smart Asset Data Sharing Service Providers”

Make Data Work

“Collaborative Industrial Applications Trials”

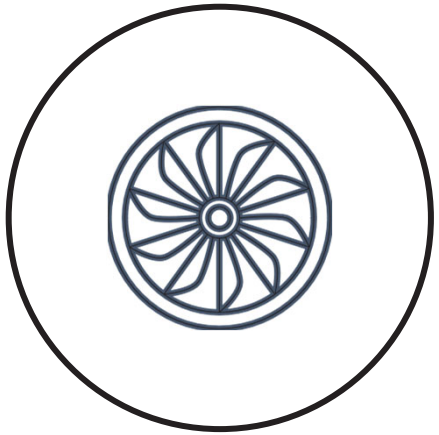
Controlled, Coordinated, Collaborative and Cooperative Engineering, Production, Service and Circular Processes

Controlled
Coordinated
Collaborative
Cooperative

Collaborative Services

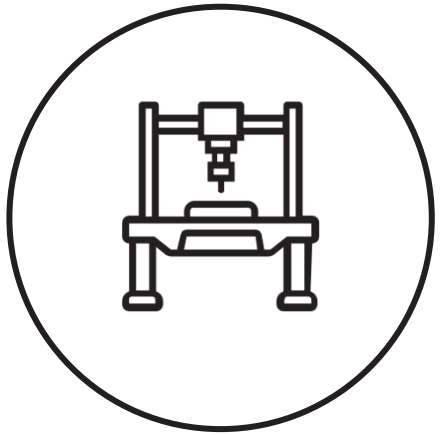
SM4RTENANCE SECTORS

Automotive

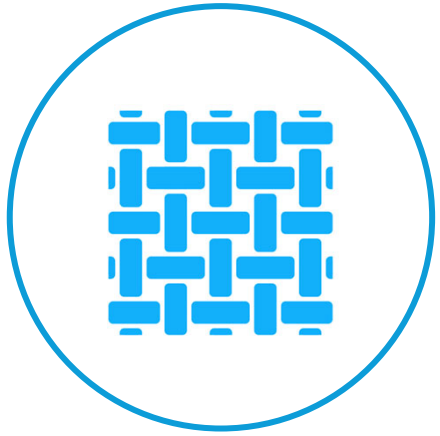


Aero / Space

E-Battery



Machine Tool & Automation

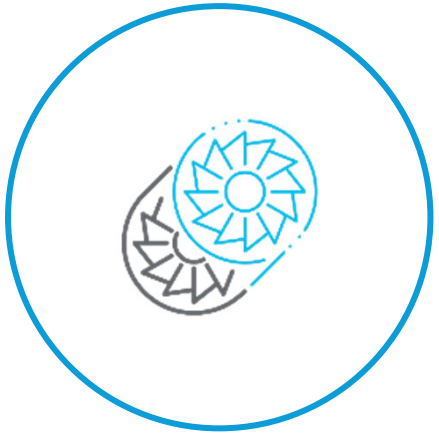


Textile

Process

TRANSFORMING MANUFACTURING TOGETHER

SM4RTENANCE APPLICATIONS



Generative Engineering

Asset Resilience By Design

Collaborative Net-Zero Operations

Energy Efficiency & Low CO2 Footprint

Collaborative Condition Monitoring

Optimised OEE & Accuracy

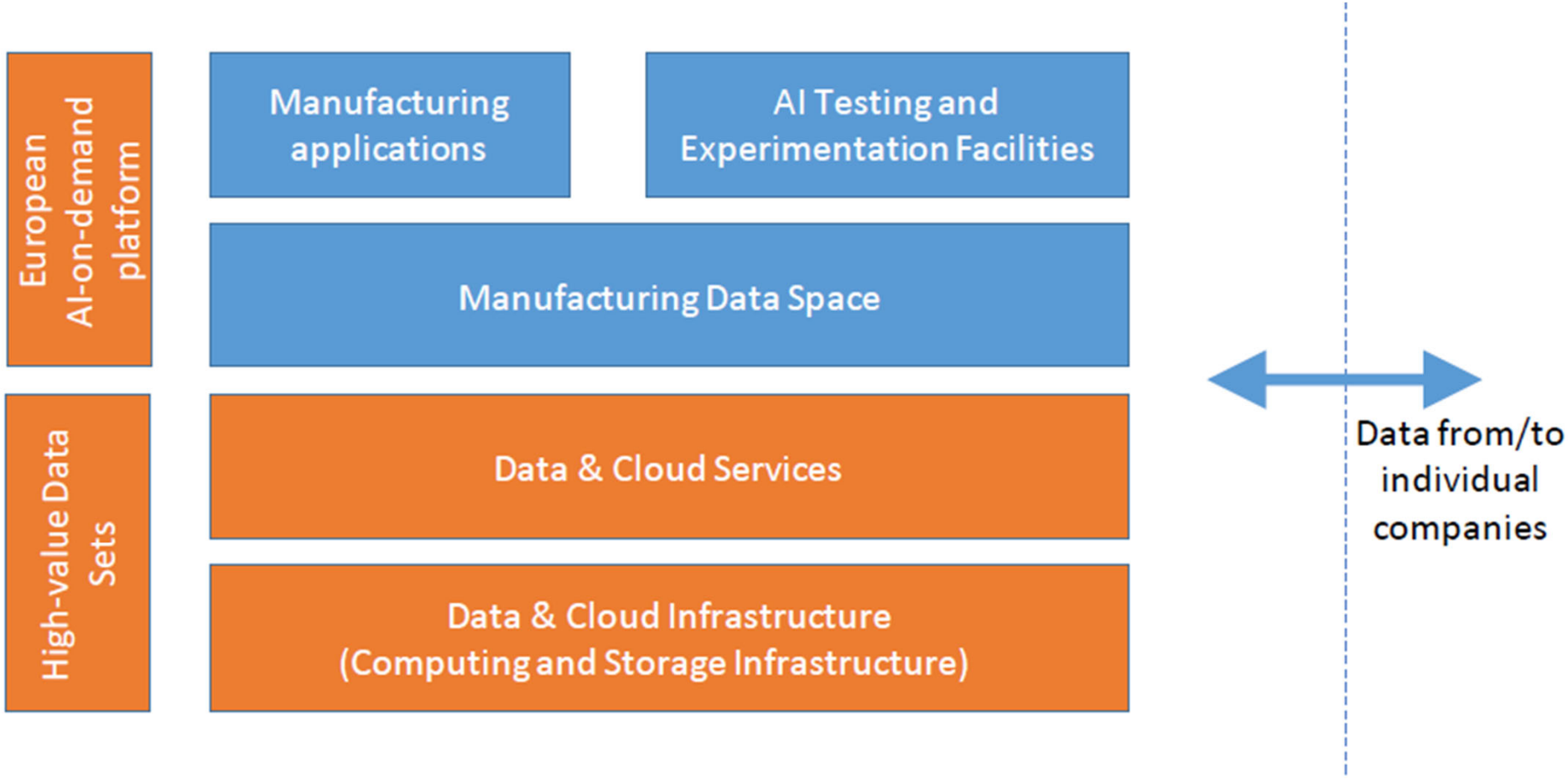
Circular Asset Management

Extended Asset Lifetime

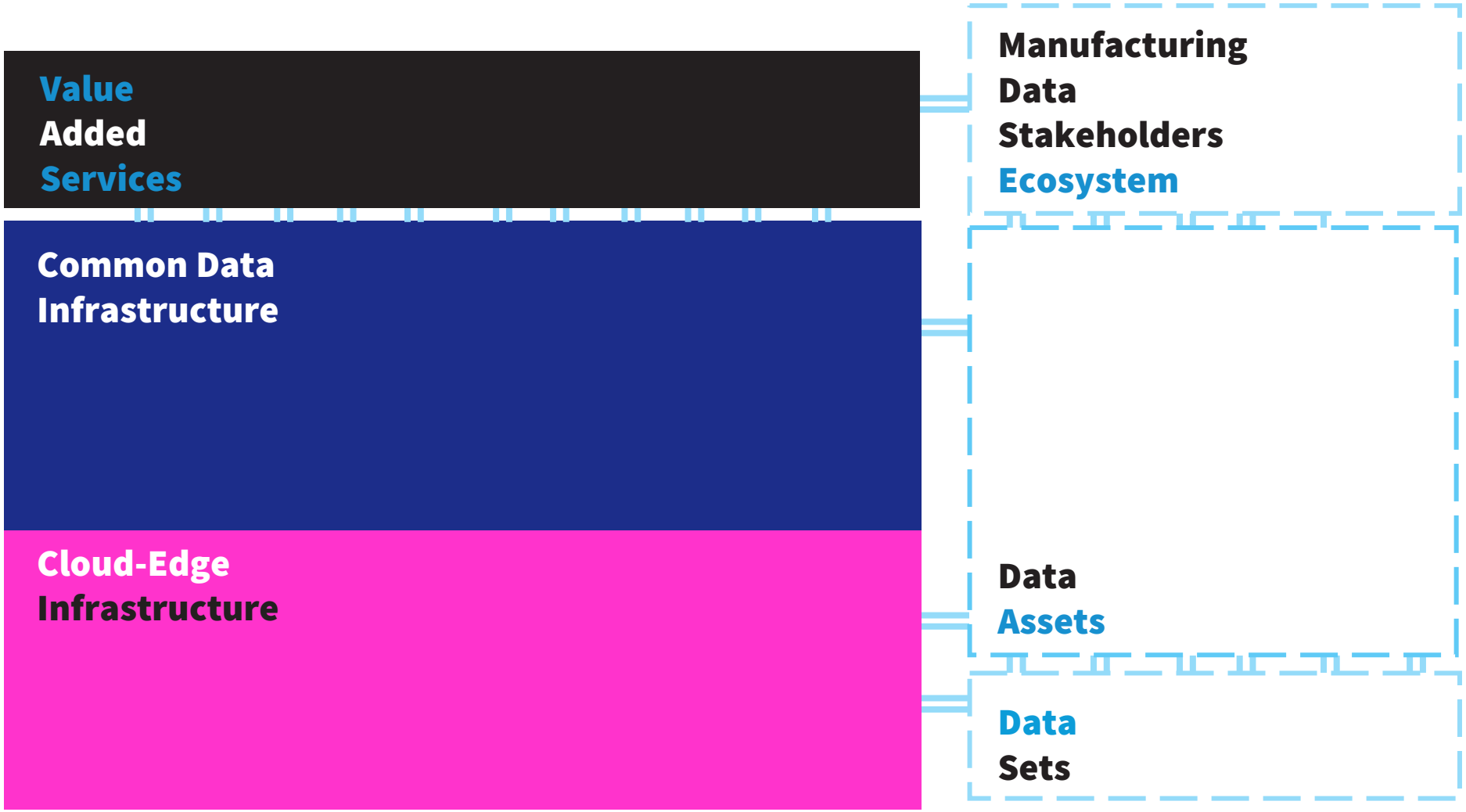
DFA TRANSFORMING MANUFACTURING TOGETHER

ASSET 4.0
DATA SPACE

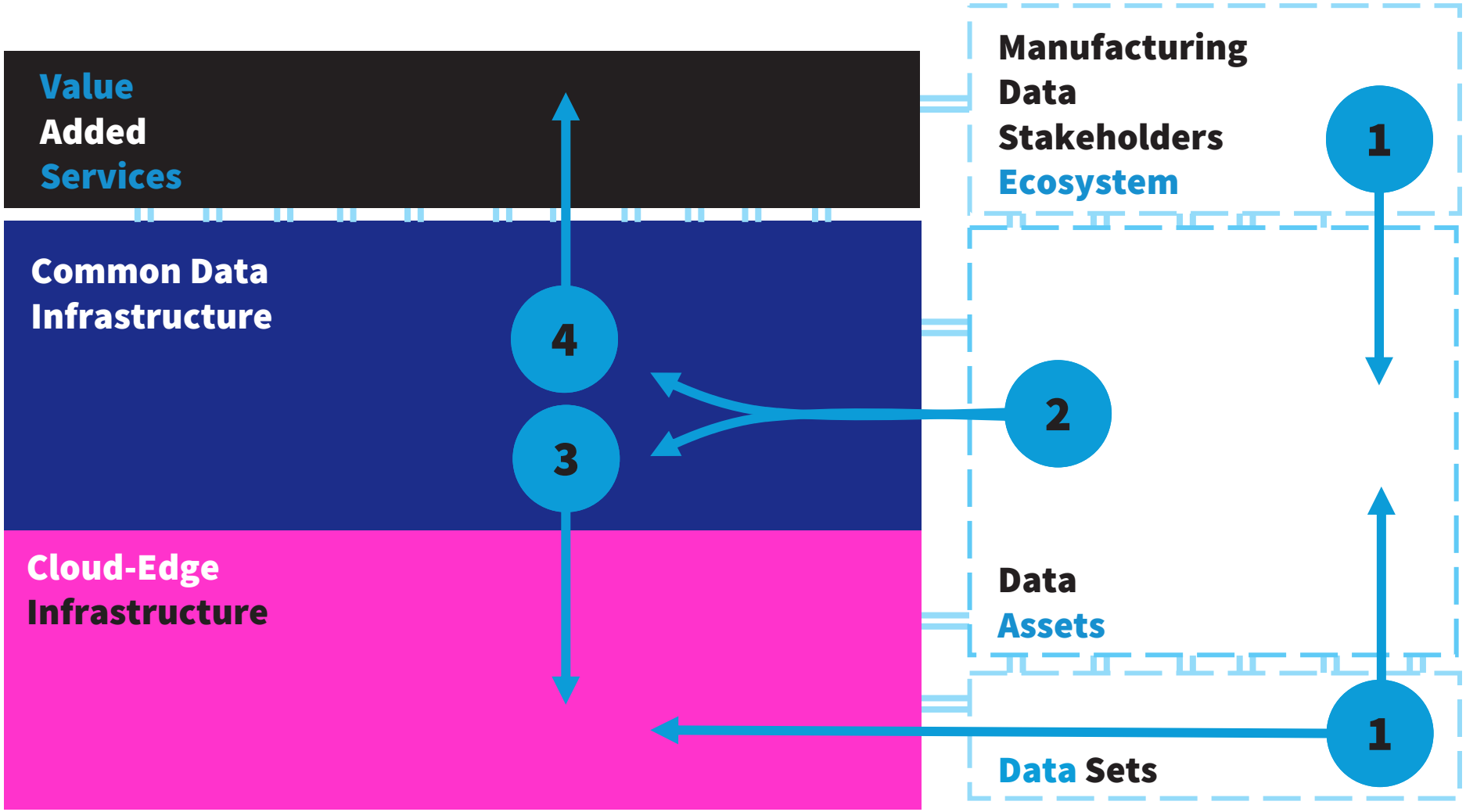
EU Manufacturing Reference Model



EU Manufacturing Reference Model



EU Manufacturing Reference Model



Value Added Services

Collaborative Services based on Multilateral Data Networks

Common Data Infrastructure

AI On-demand Platforms

APPs

Digital Platforms

AI Testing & Experimentation Infrastructure

Common Data Space Services

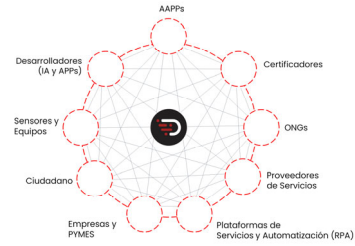
Cloud-Edge Infrastructure

Cloud & Data Federation Services
(Management Plane ● Trust Plane)

Smart Interoperability Middleware Platform
(SIMPL)

Cloud & Data Infrastructure
(Data Storage & Computing Infrastructure)

Manufacturing Data Stakeholders Ecosystem



B2B2G

Trusted Data Networks

Data Marketplaces

Open data
(High Value Data Sets)

Data Assets

Data Sets

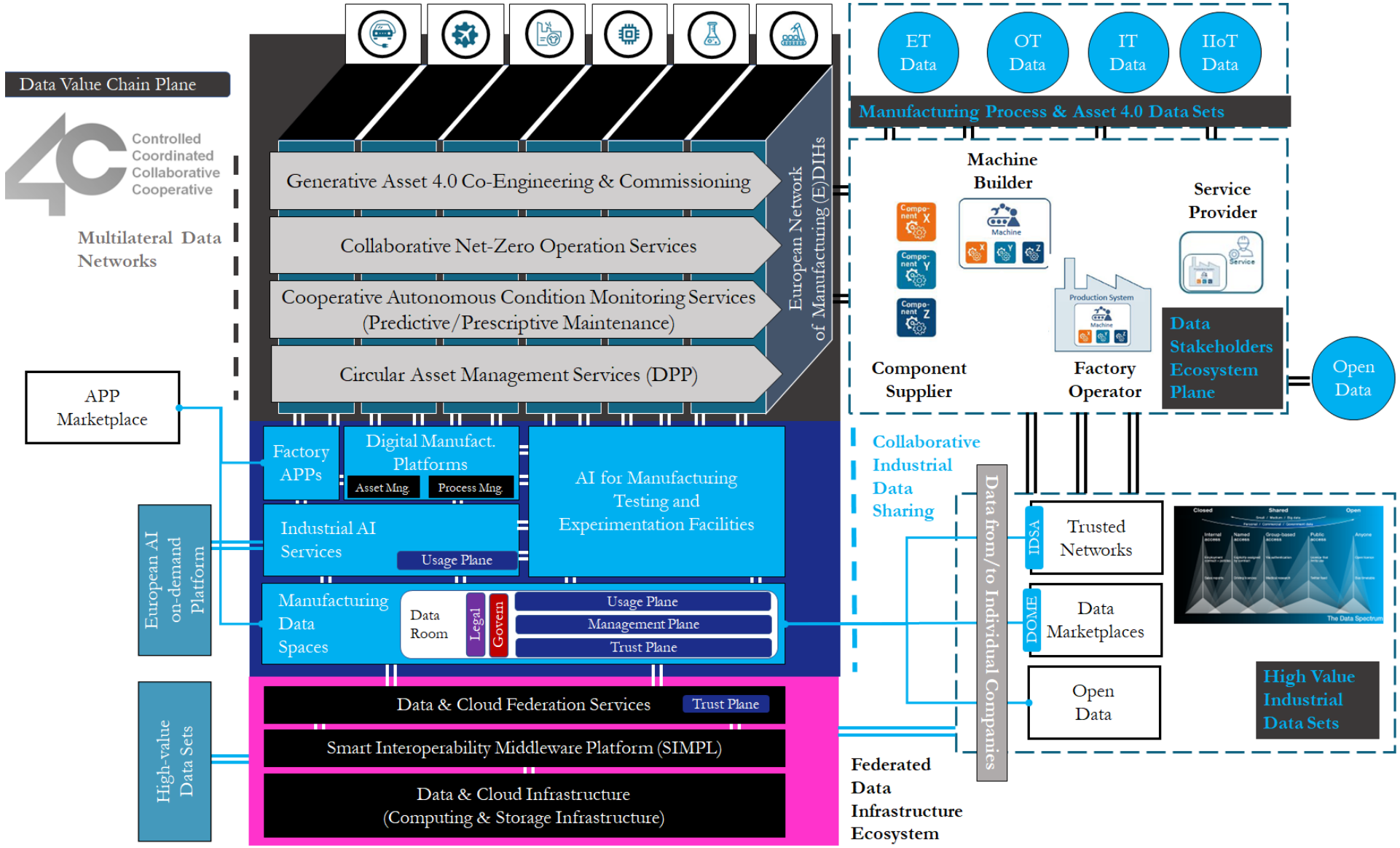
Structured Data Sets

Unstructured Data Sets

IoT Data Sets

DFA TRANSFORMING MANUFACTURING TOGETHER

EU Manufacturing Data Space Reference Model



innovalia ASSOCIATION

Thank you!

RE4DY MANUFACTURING DATA NETWORKS

SM4RTENANCE

DATA SPACE 4.0

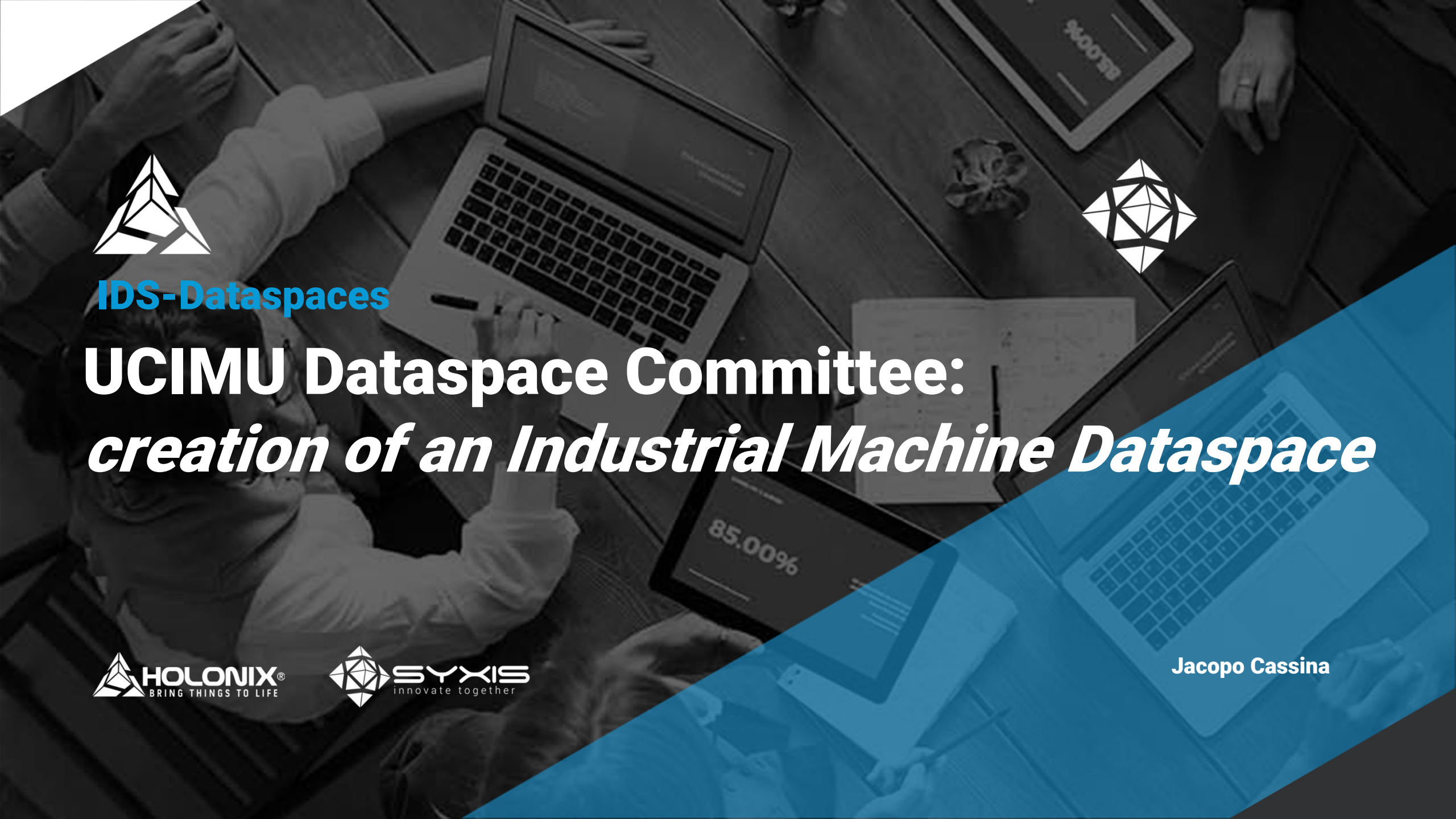
EDIH European Digital Innovation Hubs Network

Dr Oscar Lazaro
olazaro@innovalia.org

HOLONIX®
BRING THINGS TO LIFE

UCIMU Dataspace Committee: Creation of an industrial machine dataspace

Jacopo Cassina, Holonix



IDS-Dataspaces

UCIMU Dataspace Committee: *creation of an Industrial Machine Dataspace*

HOLONIX® BRING THINGS TO LIFE

SYXIS innovate together

Jacopo Cassina

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 maintenace
  - To improve machine design
  - For ripetitive 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

Start small, go fast

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**

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.

Planned Scenario A

IoT solution from Component OEM 1

IoT solution from Component OEM 2

IoT solution from Component OEM 3

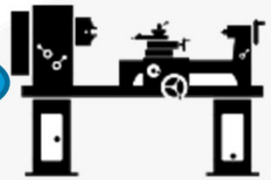
IoT solution from Component OEM 3

IoT Solution Machine Producer A

IoT Solution Machine Producer B

M-User 1

M-User 2



M-User 3

Planned Scenario B

IoT solution from Component OEM 1

IoT solution from Component OEM 2

IoT solution from Component OEM 3

IoT Solution Machine Producer A

IoT Solution Machine Producer B

End User Interface

Machine User 1

IoT solution from Component OEM 3

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SYXIS innovate together

Planned Scenario C

IoT solution from Component OEM 1

IoT solution from Component OEM 2

IoT solution from Component OEM 3

IoT Solution Machine Producer A

Data and Knowledge intensive user

Machine User 1

IoT solution from Component OEM 3

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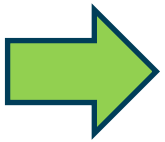
SYXIS innovate together

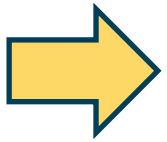
Plan and current work

- Machine usage
- Faults (alarms)



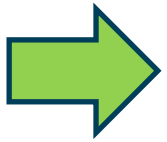
- Demo prepared and executed involving currently 4 partners

- We plan to structure them using OPC-UA UMATI



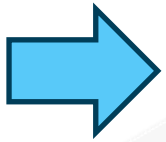
- Use it as reference without «vocabulary» implementation

- Use rules and trends or existing algorithms for diagnostics



- Existing from involved producers

- Feedback diagnostics from different tools into a single element



- Ongoing

Issues faced

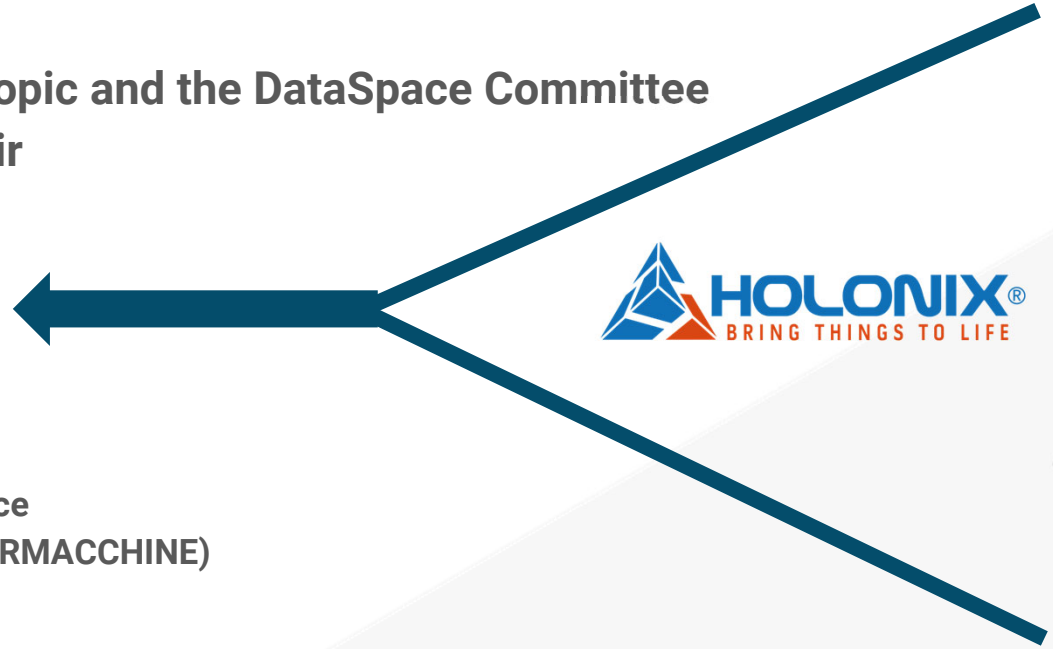
- IDS not thought from the beginning for the scenario
  - Data frequency
  - Internet access from machines
  - Certificates
  - Identity services? Federated? How to cooperate with other DS?
- Complex evolution of reference implementations (which to use?)
- Documentation sometime confusing
- Differences between implementation (Eclipse) and IDS documentation
- The fact it's planned in the near future (when?) a rework (DSBA?) causes uncertanty and concerns

SM4RTENANCE

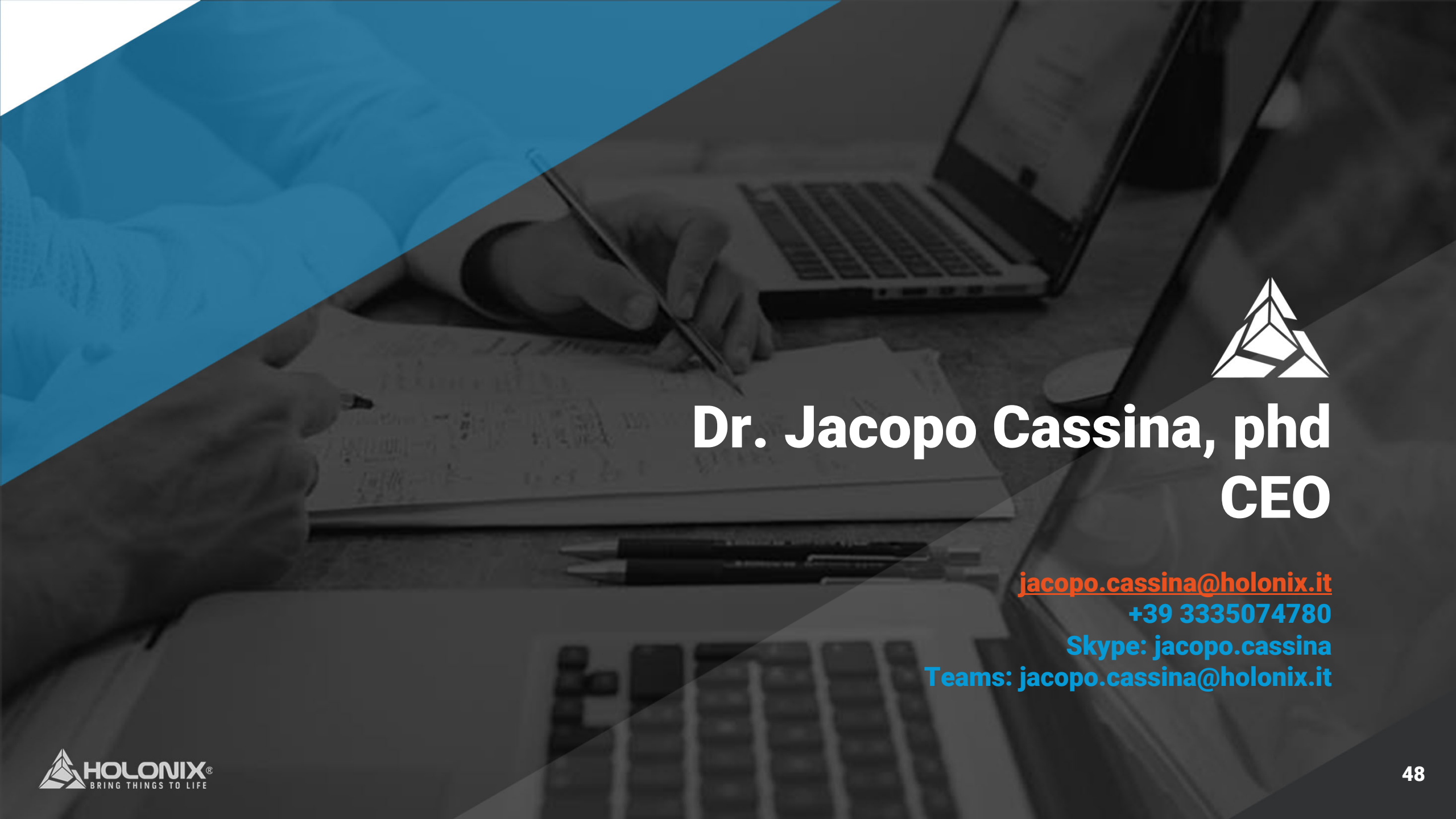
Next Steps

- Create an ad-hoc association (a legal entity representing an Enterprise Network)
- Starting from UCIMU expertize on the topic and the DataSpace Committee
- With Technical Demo in BIMU Trade Fair

- Full deployment of the Dataspace



- Scope revision
  - Involving more Machine users
  - Other use cases than predictive maintenance
  - Involve also other kinds of machines (FEDERMACCHINE)
- Connection with other Data Spaces
- Focus Group «Data, DataSpaces, Cloud and Edge»
  - Created in CEN-CENLEC
  - Guided by UNINFO (federated with UNI, whose UCIMU is member of)
  - Involvement of UCIMU



Dr. Jacopo Cassina, phd
CEO

jacopo.cassina@holonix.it
+39 3335074780
Skype: jacopo.cassina
Teams: jacopo.cassina@holonix.it

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POLITECNICO MILANO 1863

CIRPASS Digital Product Passport

Realizing the Digital Product Passport | Focus on the Battery Product Passport [CIRPASS]

Sergio Gusmeroli, POLIMI

Digital Product Passports and Data Spaces for Circular Manufacturing

April 2024

Sergio Gusmeroli, Politecnico di Milano

Co-funded by the European Union

Circular TwAIn GA n. 101058585

CONTEXT: the IDSA focus group on Data Spaces for Manufacturing, and Digital Product Passports for circularity

Circular TwAIn

INTERNATIONAL DATA SPACES ASSOCIATION

Overview

Title: **How to drive business value with Digital Product Passports and dataspaces: An open dialogue on Circular Economy use cases from different domains**

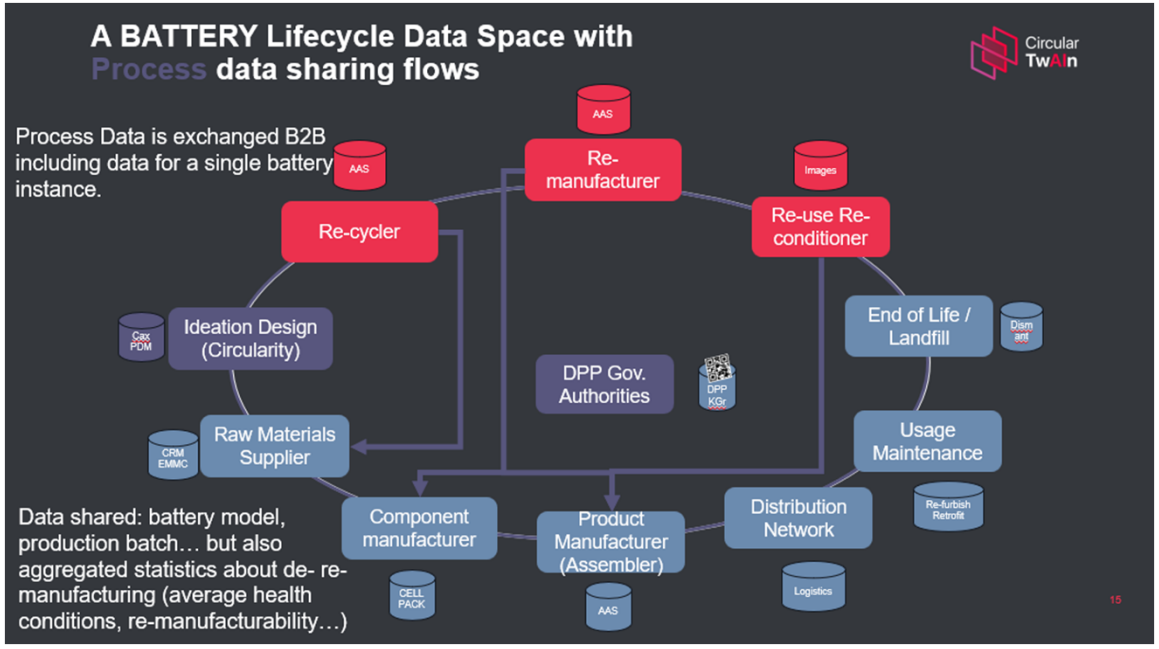
Organized by DS 4.0 and International Data Spaces Association (IDSA)

Date: Dec 1 morning (9:00 am CET tentatively)

Proposed duration: 120 mins, online

CIRPASS · Circular TwAIn · DaCapo · RE4DY · DATA SPACE 4.0 · Funded by the European Union

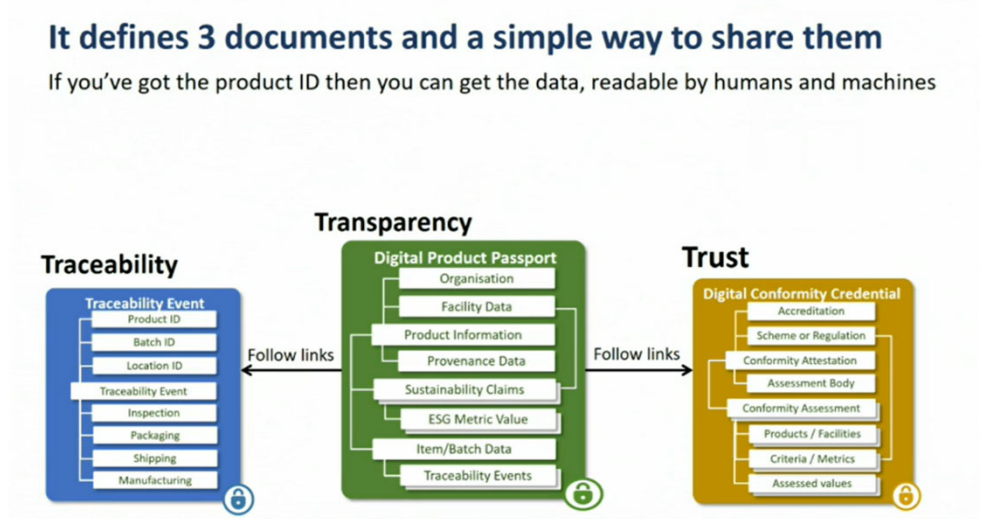
DaCapo



Digital Product Passport in a Nutshell

A **Digital Product Passport (DPP)** is a structured collection of *product related data* with pre-defined scope and agreed data ownership and access rights conveyed through a unique identifier and that is *accessible via electronic means* through a data carrier. The intended scope of the DPP is information related to sustainability, circularity, value retention for re- use, remanufacturing, and recycling.

The DPP is an **information system for the circular economy.**

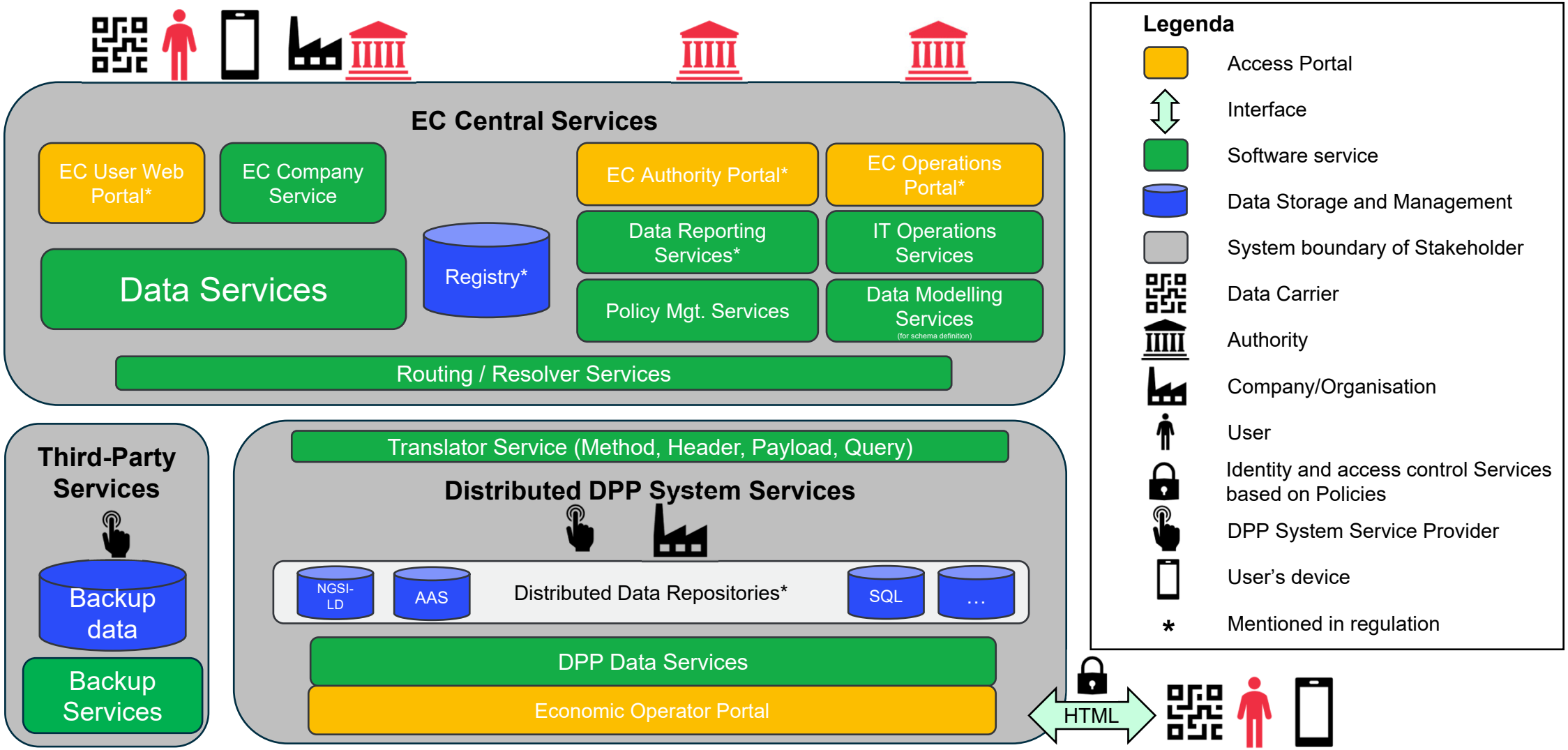


Funded by the European Union

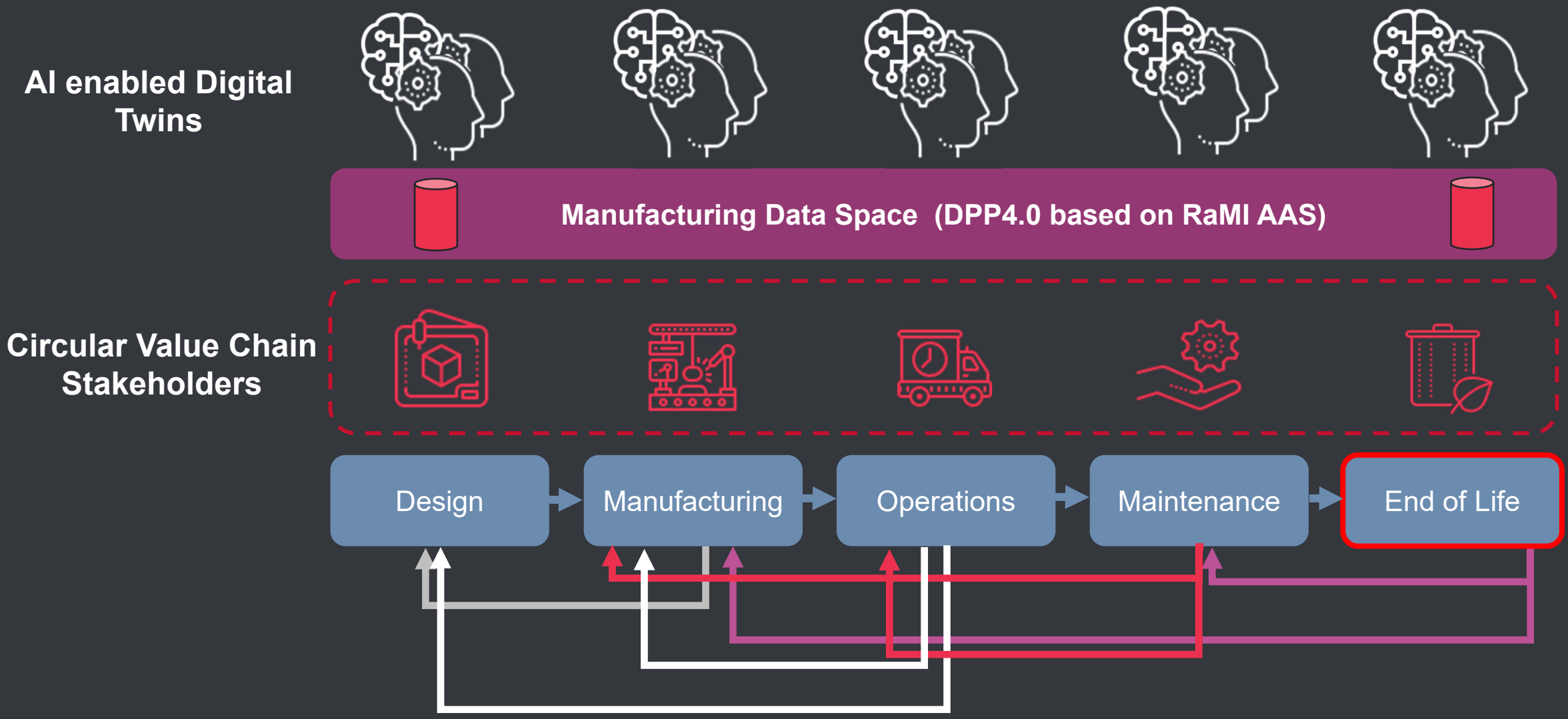
CIRPASS Digital Product Passport

Battery Pass

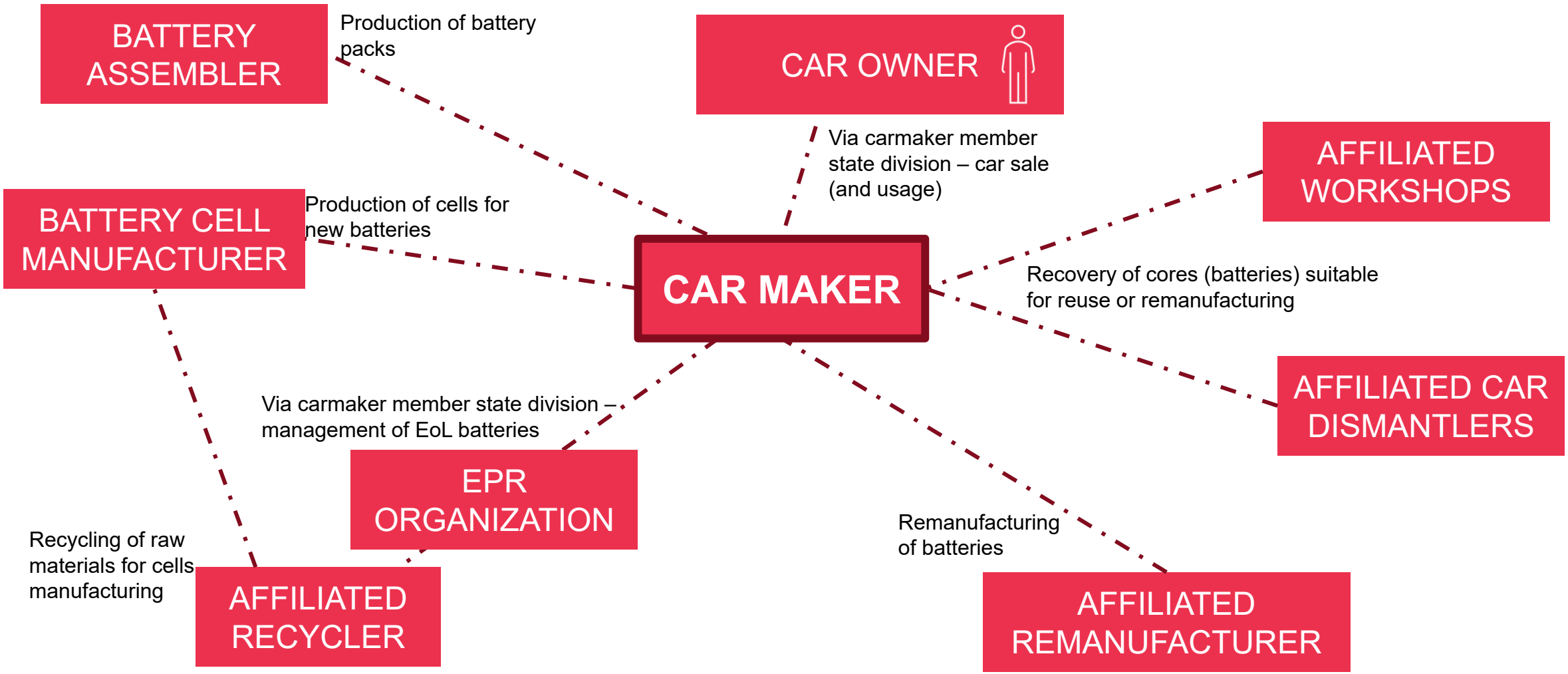
DPP System architecture for the BATTERY domain



Circular TwAIn – adding Circularity to Data Spaces



BATTERY EoL: VALUE NETWORK ACTORS



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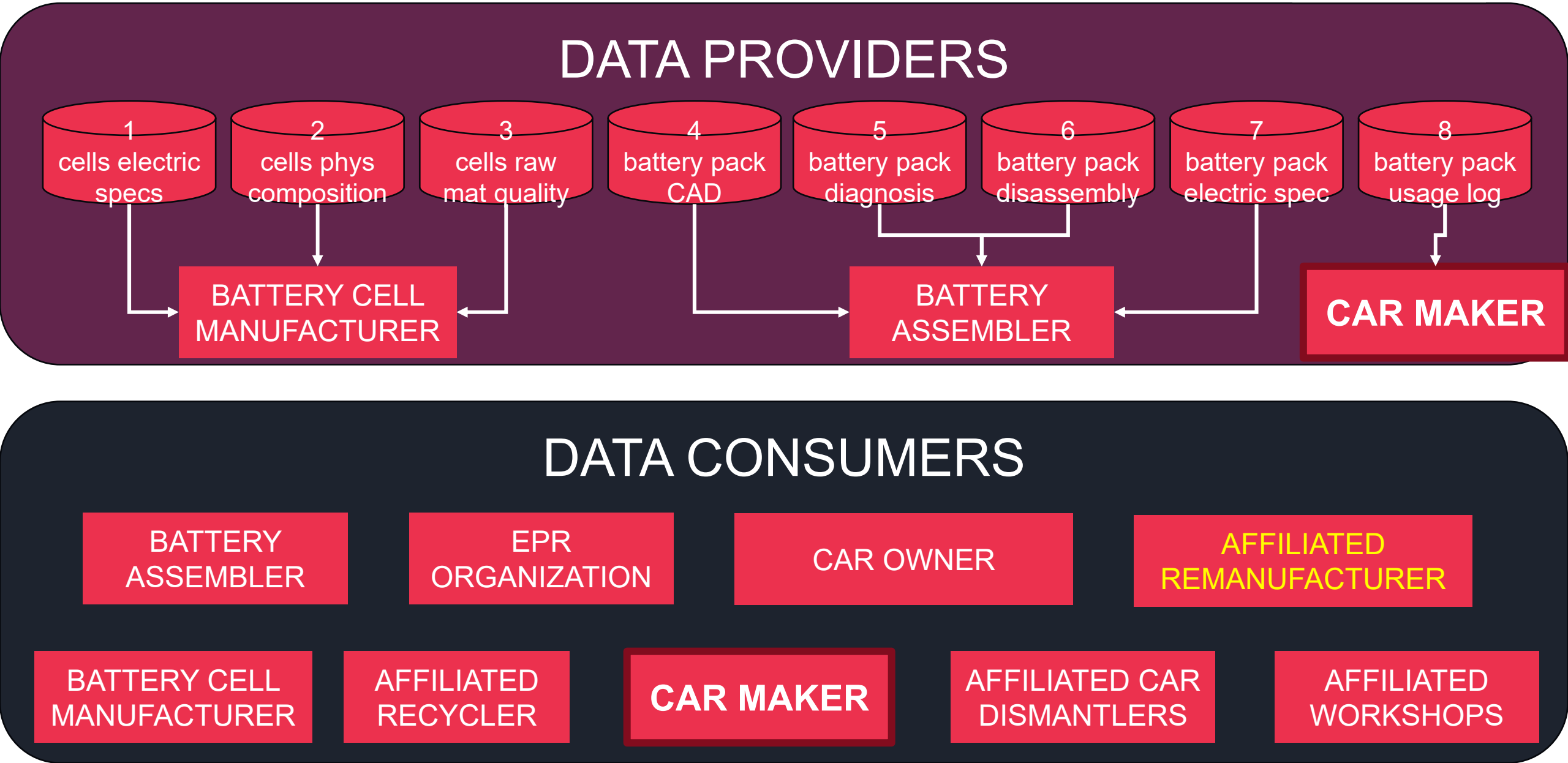
The BATTERY End of Life Data Space



Re-Manufactured BATTERY Digital Passport

Categories	Sub-categories
1: General battery and manufacturer Information	Identification
	General characteristics
2: Compliance, labels & certifications	Conformity
	Symbols
3: Battery materials and composition	Materials
	Substances
4: Carbon footprint	Carbon footprint
5: Supply chain due diligence	Due Diligence Report
	Additional voluntary
6: Circularity and resource efficiency	Design for circularity
	Safety requirements
	Recycled content
	Renewable content
	End-of-Life information
7: Performance and durability	Capacity, energy, SoH & voltage
	Power capability
	Round trip energy efficiency & self-discharge
	Internal resistance
	Battery lifetime
	Temperature conditions
	Negative events

BATTERY CELL MANUFACTURER

BATTERY ASSEMBLER

AFFILIATED REMANUFACTURER

Digital Product Passports and Circular Manufacturing Data Spaces: lessons learned and recommendations

Circular TwAIn

DPPs implement guidelines from the ESPR new directive (many DGs)

B2B Circular Manufacturing Data Spaces introduce new EoL Actors

DPP System extends B2B Data Spaces to Gov Authorities & Citizens

DPP Data Infrastructure is enabled by Circular Manufacturing DSs

THANK YOU VERY MUCH FOR YOUR ATTENTION!

GDSO
STANDARDIZE. SHARE. SIMPLIFY.

Continental

Unlocking the potential of the Circular Economy

Yann Le Chevalier, GDSO | Continental

Global Data Service Organisation
for tyres and automotive components

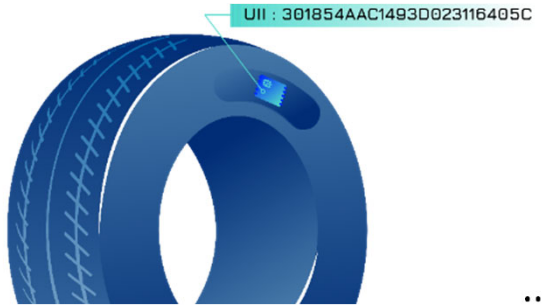
STANDARDIZE. SHARE. SIMPLIFY.

UNLOCKING THE POTENTIAL OF THE CIRCULAR ECONOMY

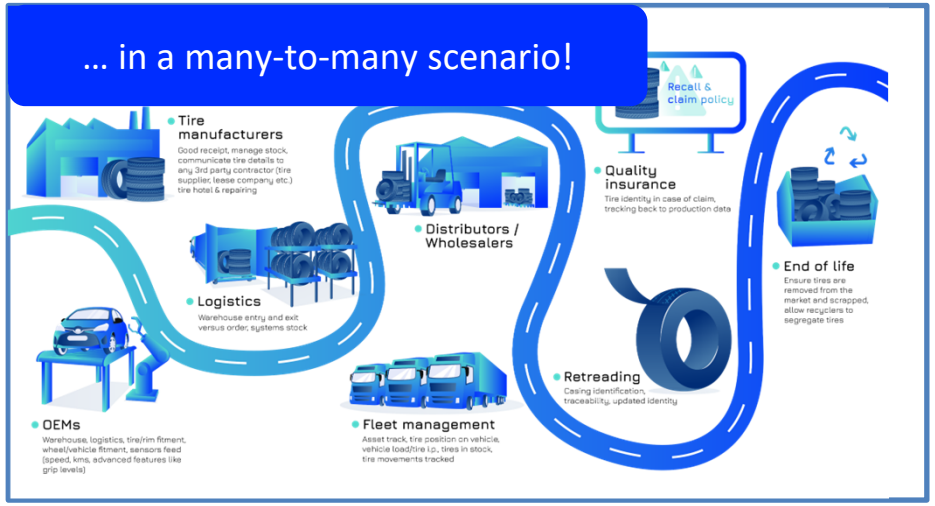
Yann LE CHEVALIER
CONTINENTAL TIRES – A GDSO MEMBER

DATA, ECOSYSTEM AND COLLABORATION TOWARDS NEW BIZ MODELS

A digital biz model should start with an electronic identification…



… continue with data…

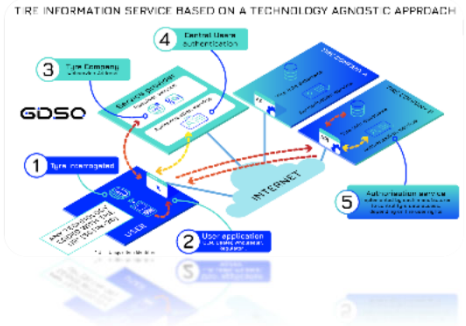


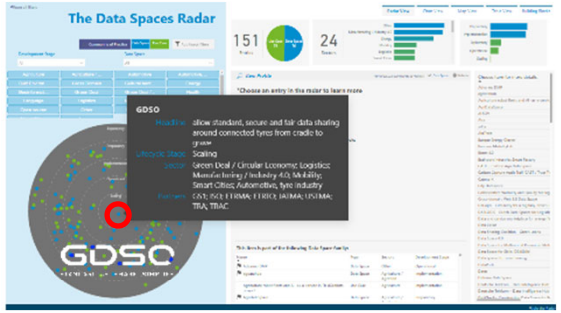
- One Tyre Manufacturer cannot overcome on its own the challenges of data sharing
- Technical **collaboration** is needed to grant **interoperability**, leveraging on **IDS Architecture**

TYRE INDUSTRY DATA SPACE WITH ITS CONNECTOR(S)

BRIDGESTONE · Continental · PIRELLI · PROMETEON · Giti · GOODYEAR · SUMITOMO RUBBER INDUSTRIES · YOKOHAMA · MICHELIN · NEXEN TIRE we got you

1. TYRE INFORMATION SERVICE – USE CASE: TYRES' IDENTIFICATION AND TRACEABILITY (SCALING-UP)





2. TYRE LIFECYCLE DATA SERVICE (TLDS) – UNDER DEVELOPMENT

USE CASE: SUPPORT CIRCULAR ECONOMY **CRADLE TO GRAVE**, WITH **TRANSPARENCY** AND **TRACEABILITY**

- **GDSO MEMBERS provide data access through TLDS for better tyre retread / better recycle operations**
- **USERS provide their « declaration » to the relevant GDSO Member through TLDS**
- **GDSO to grant trust and security among the parties (data reliability at stake)**

BY END 2024 MINIMUM VIABLE PRODUCT
BY 2025 GO LIVE FORESEEN

GDSO Members: Database and **Tyre design quality improvements / forthcoming sustainability requirements** (e.g. EU DPP)
USERS: diagnostics, efficiency **optimization**, enhanced **working conditions** (Automation, focus on added value operations)

- **Better tyres sorting / reuse**
- **Higher valorization** of feedstock for recycling (more homogeneous based on data)

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)

Fraunhofer IOSB

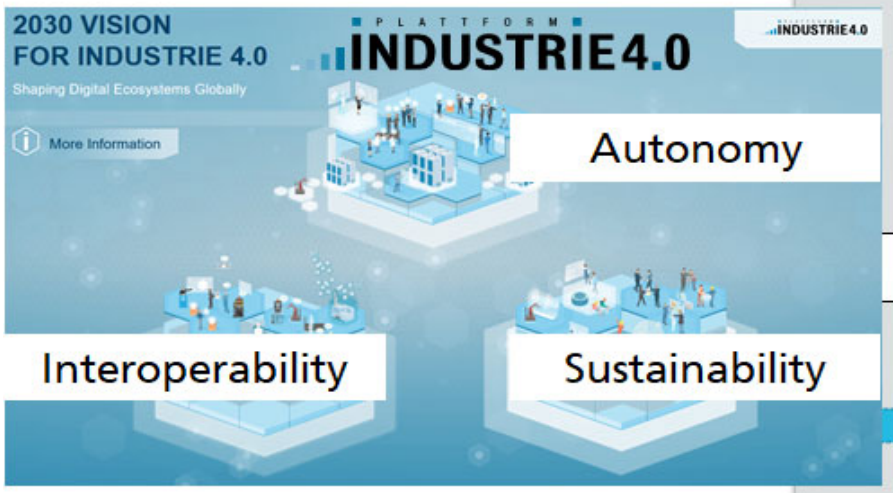
Bridging the gap between IDS & Instry 4.0 | Using AI systematically in data spaces

Thomas Usländer, Fraunhofer IOSB

IDS-Industrial - Bridging the gap between IDS and Industry 4.0

Dr. Ljiljana Stojanovic / Dr. Thomas Usländer
Fraunhofer IOSB
HM 2024

Vision of the IDS-Industrial community



gaia-x

INTERNATIONAL DATA SPACES ASSOCIATION

Industrial Production

Application Domains

requirements

validation

I4.0 Solutions	*interoperability*	**IDS Solutions**
I4.0 Specifications	*compatibility*	**IDS Specifications**
Reference Architecture Model Industrie 4.0 (RAMI4.0)	*co-existence*	**Reference Architecture Model (IDS-RAM)**

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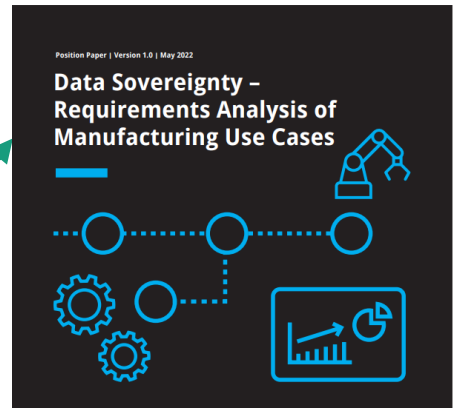
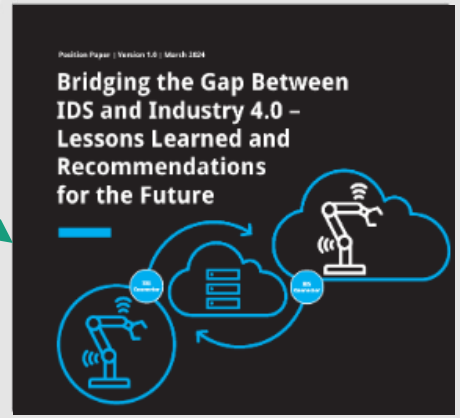
Series of IDS-I Position Papers

Position paper #1, April 2021



Position paper #2, Mai 2022



Position paper #3, March 2024

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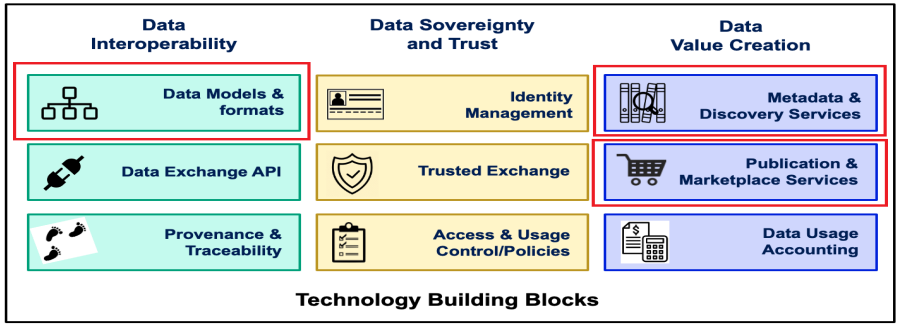
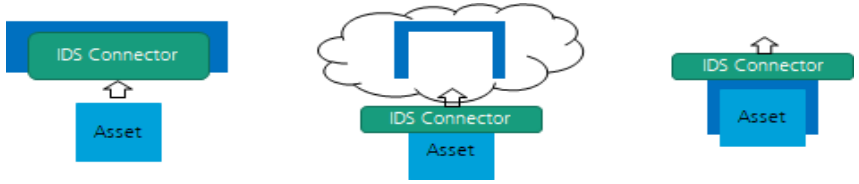
IDS-Industrial: 3rd Position Paper

- Overview of 4 tools that combine at least one IDS and one I4.0 componen (e.g. EDC Extension for AAS)
- Information on 8 research projects that use both IDS and I4.0 technologies (e.g. Catena-X)
- Analysis of the integration possibilities between the technical components of IDS and I4.0
  - The role of digital twins in a data space
  - Integration options between an IDS connector and an AAS
- Discussion
  - Type of IDS connectors (Base, Trusted, DSC, EDC, etc.)
  - AAS-related aspects (AAS Implementations, AAS Registry, Deployment)
  - Usability

2.2 EDC Extension for Asset Administration Shell
- Short description
- Relevant parts of the architecture
- Usage of I4.0 & IDS concepts and compo
- Lessons learned from the joint use I4.0 &
- Further plans related to better use or use
- Link to the tool

3.1 Catena-X
- Short project description
- Project-relevant scenario(s)
- Architecture
- Usage of I4.0 & IDS concepts/components
- Lessons learned from the joint use I4.0 & IDS concepts/compon.
- Project results related to the IDS-I position paper
- Project contribution to IDS-I
- Project benefit from IDS-I
- Link to the project and relevant results





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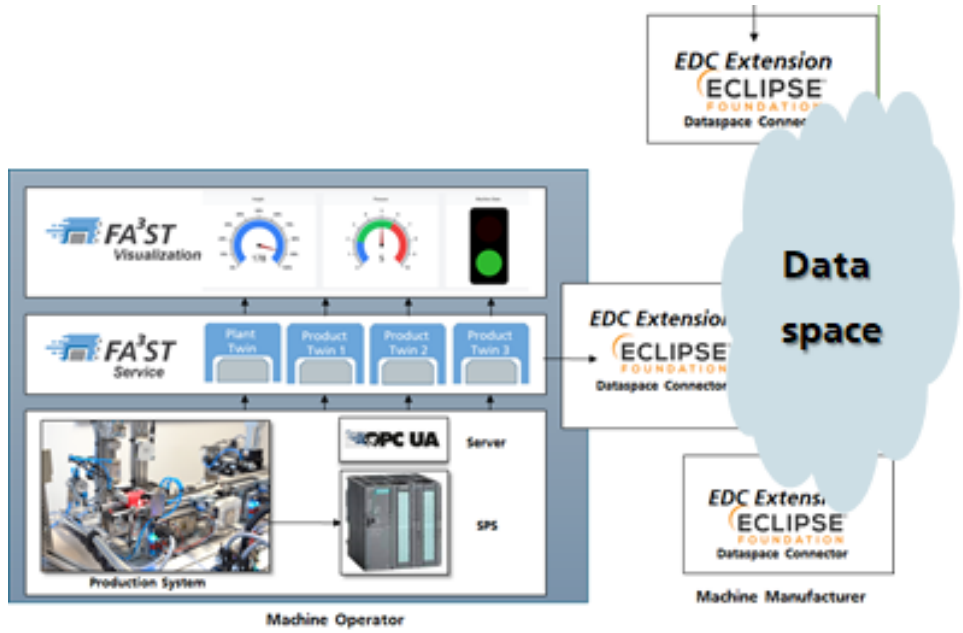
Next steps: Minimal-viable Circular Data Space based on AAS-compliant DPPs

- Goal:
  - Provide an **experimental environment** to test integration possibilities between the technical components of IDS and I4.0
  - Demonstrate how **circular aspects** can be represented by AAS-compliant DTs/DPPs and exchanged via a circular data space
  - Toolbox to **help SMEs** experiment with DT-aware, circular data spaces
- The demonstrator includes:
  - **multiple AASs** (e.g., for the inspection line, for the robots, etc.)
  - **AAS-compliant DPPs** for the products
  - **EDC connectors**
- Part of the demonstrator can be seen at our HMI booth: **Hall 14/15, Booth A06**



If you want to be involved in technical discussions or even in providing relevant tools/services, contact us!

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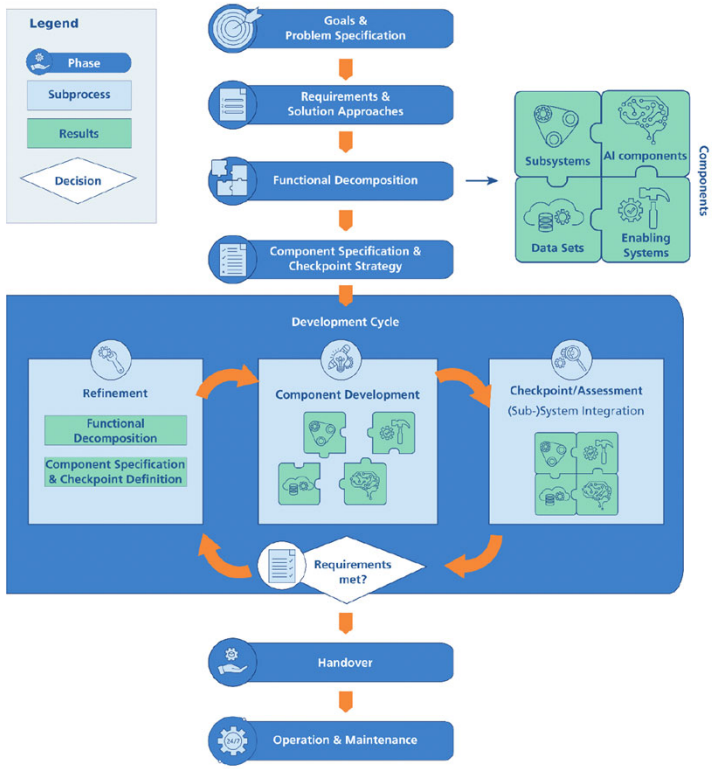
Outlook: AI Systems Engineering in Industrial Production

Fraunhofer

Whitepaper



PAISE® - Process Model for AI Systems Engineering

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

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Contact

Dr. Thomas Usländer
Business Developer KI-Engineering
Phone +49 721 6091-480

thomas.uslaender@iosb.fraunhofer.de

Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB
Fraunhoferstraße 1
76131 Karlsruhe, GERMANY
www.iosb.fraunhofer.de

VTT

Connecting to a data space with Data Connectors | Building a data space with the Data Spaces Innovation Lab

Antti Kojola, VTT

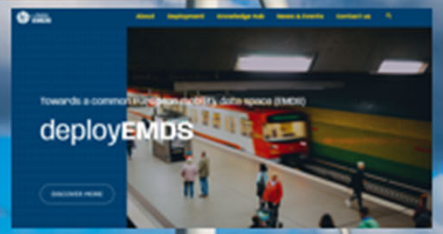
Data Space Support Centre

Circular economy in manufacturing

Data Market

Trust technology

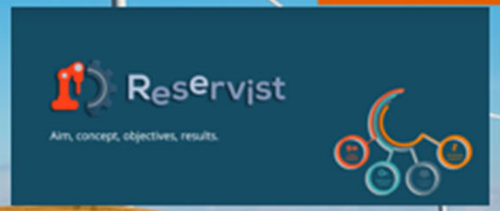
Mobility data space



Agriculture

Manufacturing

Manufacturing



Energy

Data Spaces Innovation Lab

experience from 40+ projects

VTT – beyond the obvious

VTT

MIRACLES OFTEN BEGIN ON MONDAYS.

beyond the obvious

Phot credit: Markus Killi

www.vttresearch.com/en/ourservices/data-spaces Hall 17, Stand D40 dataspaces@vtt.fi