Data Spaces for Industry

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Data sharing

Within an organisation

Among organisations

Data base, data warehouse, data lake, data mesh, data fabric, …

Point-to-Point, Distributed Ledgers, Data Spaces, Data Ecosystems…

Strnadl, C., Schöning, H: Datenplattformen, Datenräume und (Daten-)Ökosysteme – Einordnung und strategische Aspekte
In: Weber, B. (ed.); Data Governance: Nachhaltige Geschäftsmodelle und Technologien im europäischen Rechtsrahmen, pp. 83-103

Why share?

Within organisations

- Shared knowledge
- Single source of truth
- More efficient processes (e.g. order to cash)
- AI training
- Benchmarking
- ….

Among organisations

- Shared knowledge
- Digital Twin
- More efficient processes along value chain
- AI training
- Circular economy
- ….

Why NOT share?

Within organisations

- Department competition
- Knowledge is power
- Complexity
- Need-to-know principle
- ….

Among organisations

- Company competition
- Business secrets
- Complexity
- Legal restrictions
- Lack of Trust
- Once shared – shared forever
- ….

Data sharing among organizations

- One to one (often unidirectional) “sharing” has been around since delivery chains exist
- Recently, data sharing among *multiple* organizations is more in focus. General label “Data spaces”
- Examples from *Science*
  - NFDI
  - EOSC
- Examples from *Industry*
  - Catena-X
  - Manufacturing-X

What is a Data Space?

- „The IDS standard enables **trustworthy data exchange** among **certified data providers** and **recipients**, based on mutually **agreed rules**. Data spaces improve cooperation, lower the barriers to entry and enhance innovation." (IDSA2022)
- „…an understanding of the data space notion as a form of **collaboration** on data, […] as a business collaboration format driven by the desire to achieve shared goals" (Otto2022)
- "A data space can be defined as a **decentralized** data ecosystem built around commonly agreed building blocks enabling an effective and **trusted** sharing of data among participants" (Ahle, Hierro 2022)
- "Data spaces are a **federated**, **open** infrastructure for **sovereign** data exchange based on shared rules and standards. A data space forms a unit that is **interoperable with other data spaces**." (Mobility Data Space 2022)
- "A data space is a coordinated set of **technical standards**, organizational **policies**, and core **services** under a specified **governance model** to enable and facilitate data exchange between its participants." (BITKOM 2022)
- "common European data spaces which are purpose or sector specific or cross-sectoral **interoperable** frameworks for common **standards** and practices to share or **jointly process** data for, inter alia, the development of new products and services, scientific research or civil society initiatives." (EU Data Act)

Data Spaces for inter-organizational data exchange

Data Spaces

A Data Space is a federated, open infrastructure for sovereign company-spanning data exchange based on mutually agreed rules and standards

Source: BMWK/ Gaia-X-Hub Germany, Whitepaper 09/2022

Federated

Access to several autonomous decentral sources of information without copying data

Open

Digital eco system with interfaces to the environment

Infrastructure

Components für operation and management of data space services and environments

Sovereignty

Completely self-determined control over the collection, storage, use and processing of own data

Sharing-based value generation

Applications spanning multiple market partners and value chains

No data space without value proposition

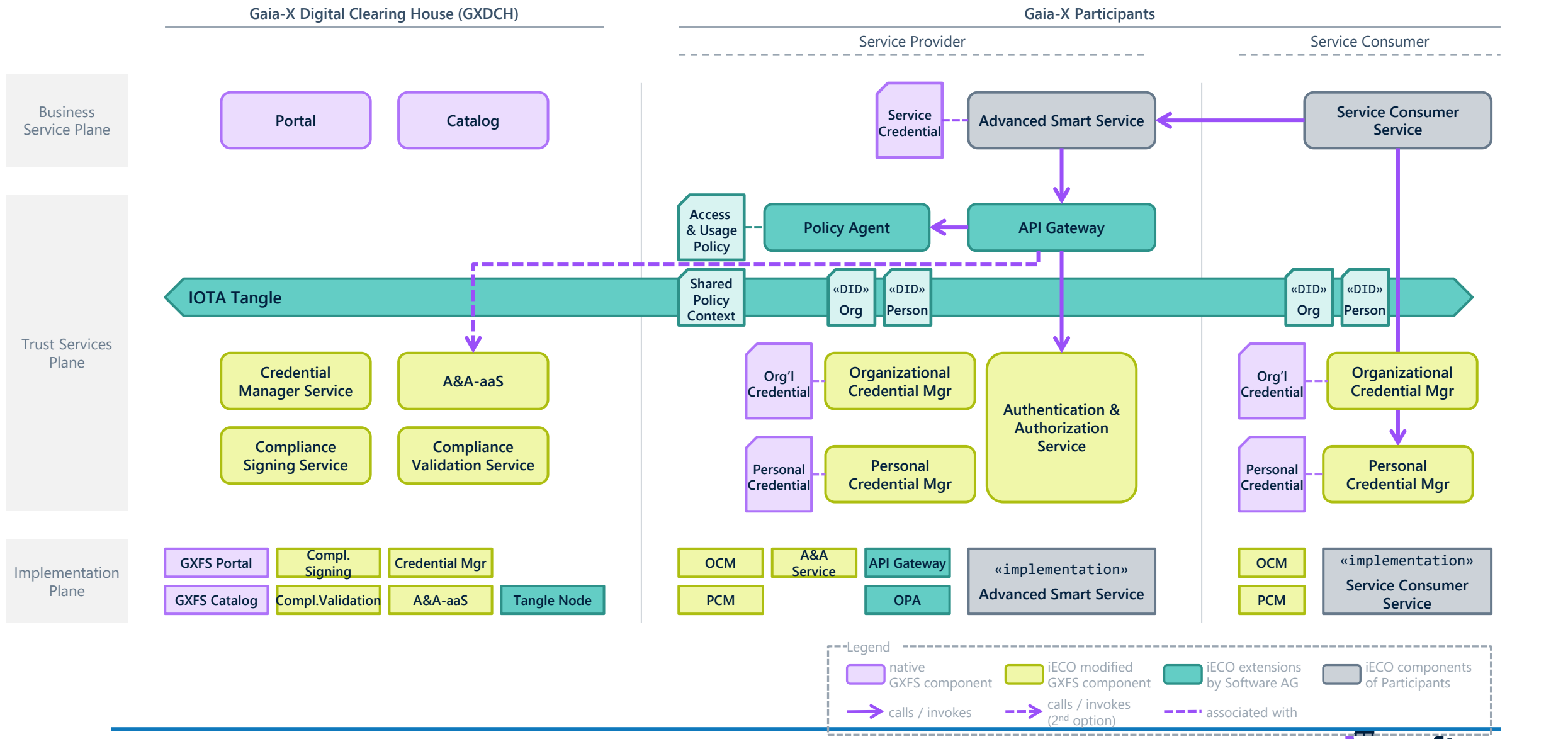
Some examples

iECO – intelligent Empowerment of Construction Industry

data space for construction industry

- companies can
  provide sensitive information
  and connect business processes.
- ensures the sovereignty of the data owner
- distributed digital twin
  over the entire life cycle of a building –
  from planning and approval
  to the actual construction and later dismantling.
- open ecosystem in which all companies in the construction industry as well as public sector

iECO Data Space Architecture



Gaia-X 4 AMS

Gaia-X 4 Advanced Mobility Services

Aims

GAIA-X 4 AMS will implement innovative, safety-critical mobility applications based on the concepts and technologies of Gaia-X. The aim is to explore a future ***federated*** ecosystem of services for highly connected vehicles.

19 Application and Research Partners, among them

Continental – The Future in Motion

DLR

ELEKTRA SOLAR

Fraunhofer

Technische Hochschule Ingolstadt

ZITiS

peregrine.ai

EuProGigant

European Production Giganet for calamity-reducing self-orchestration of value creation and learning ecosystems

Aim

A Gaia-X-compliant European ecosystem

- Make (industrial) value chains
- more resilient and
- more flexible
- Use inter-dependencies to increase efficiency

Application and Research Partners

EXOSCALE
ARBURG
CONCIRCLE manufacturing consultants
craftworks
eit Manufacturing CLC CENTRAL Funded by the European Union
HELLER
IGH INFOTEC AG
MTU Aero Engines
TU WIEN Pilotfabrik Industrie 4.0
Plasser & Theurer
PW TU DARMSTADT
ROEMHELD HILMA ▪ STARK
WFL MILLTURN TECHNOLOGIES

Supported by:

Federal Ministry for Economic Affairs and Climate Action

on the basis of a decision by the German Bundestag

Factory-X

The Digital Ecosystem for Factory Outfitters and Operators

Aims

- a ***federated*** data space for manufacturing companies
  and production equipment suppliers
- enable the secure exchange of data between different players in production
- promote digitalization and

47 funded partners and 10 associated partners, among them

Catena-X
DMG MORI
Fraunhofer
SAP
TRUMPF
SIEMENS

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

DS2

Data Space I Data Share

Aims

DS2 envisions the creation of Europe's first modular infrastructure for connecting diverse industry dataspaces. Focusing on urban planning, precision agriculture, and air pollution sectors, the project aims to develop and test an inter-sectoral toolkit with common standards and tools for dataspace federation.

16 Application and Research Partners, among them

ATC
ATHENS TECHNOLOGY CENTER

Digiotouch

IBM

ITC
INOVACIJSKO TEHNOLOŠKI GROZD
INNOVATION TECHNOLOGY CLUSTER

University of Southampton

UNIVERSITY OF THESSALY

VTT

funded by

Wait a minute

What about the infrastructure?

- Compatibility?
- Interoperability?
- Re-Use?

What about semantics of data?

What about data location?

Just data or also data-related services?

….

GAIA-X

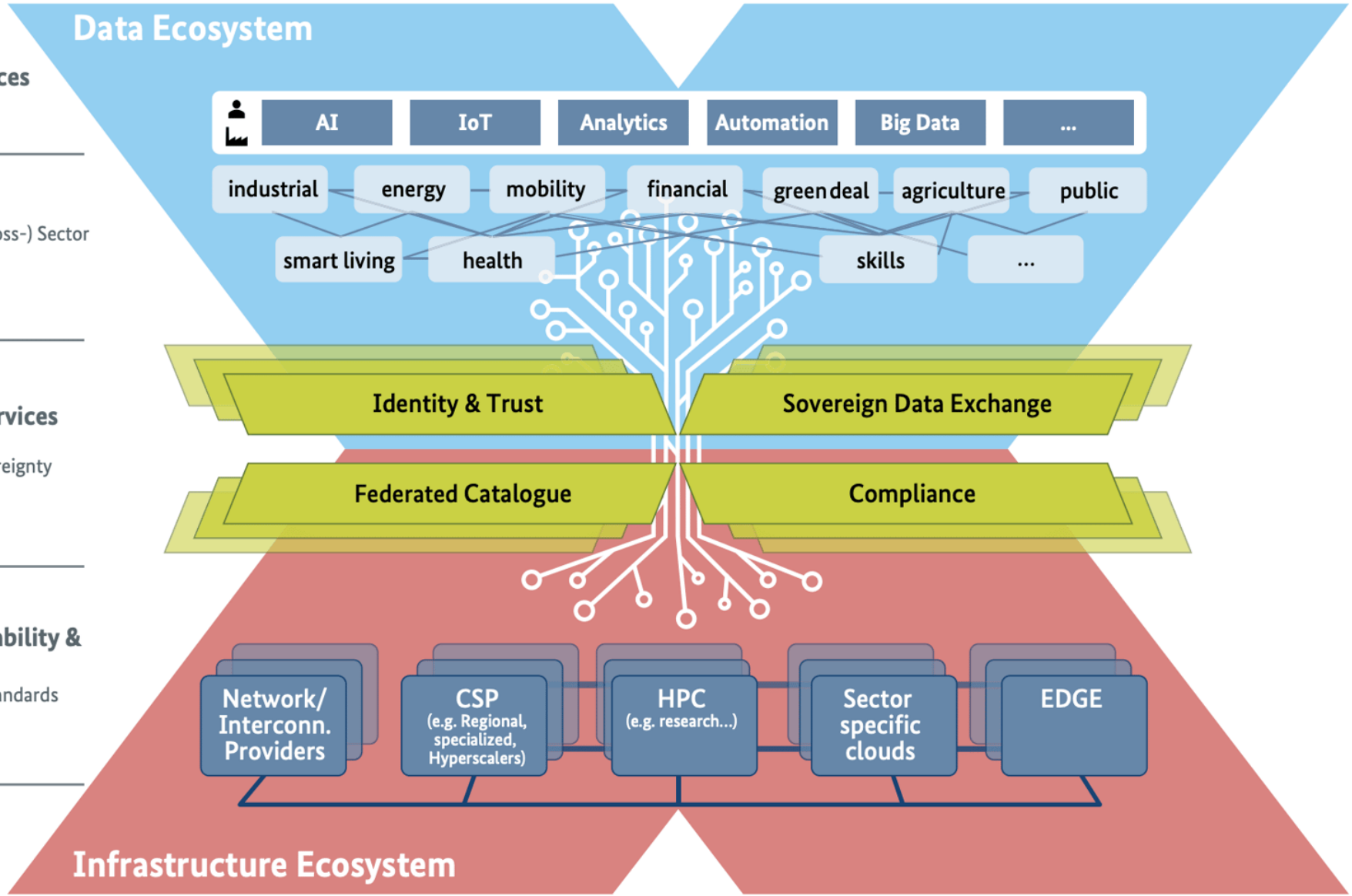
Advanced Smart Services
(Cross-) Sector Innovation/
Marketplaces/Applications

Data Spaces
Interoperable & portable (Cross-) Sector data-sets and services

GAIA-X Federation services
Federated & distributed for interoperability Trust & Sovereignty services

Portability, Interoperability & Interconnectivity
Technical: Architecture of Standards
Commercial: Policies

Compliance
Legal: Regulation & Policies



Source: BMWi

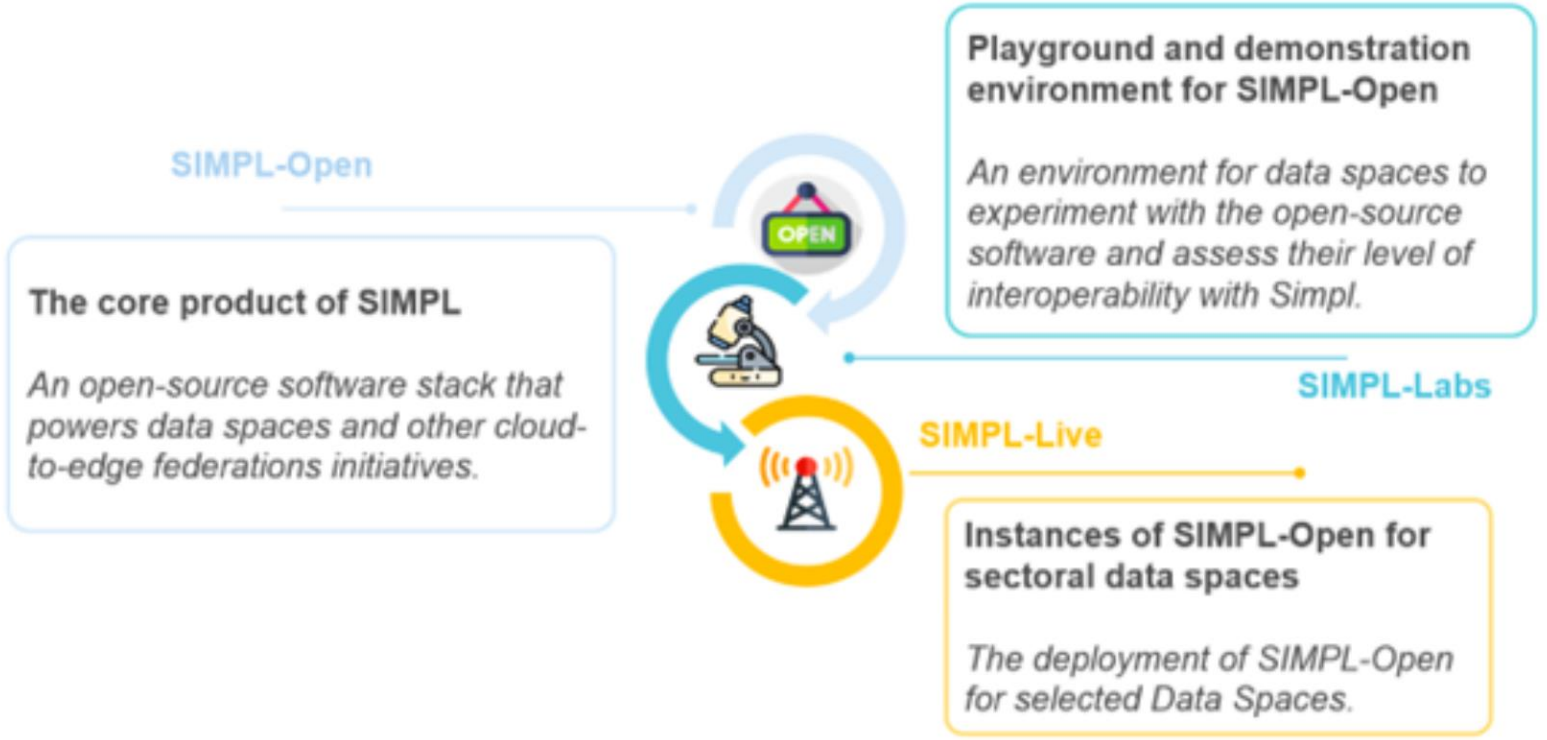
software AG

Common European Data Spaces

EU has commissioned its own data space infrastructure SIMPL

as basis for Common European Data Spaces for

- Health
- Language
- Etc…



Other aspects

- Semantics
- Scaling (data spaces support center)
- Business model?
- Legal

    regulation (Data Governance Act, Data Act)

    national law

    contractual

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