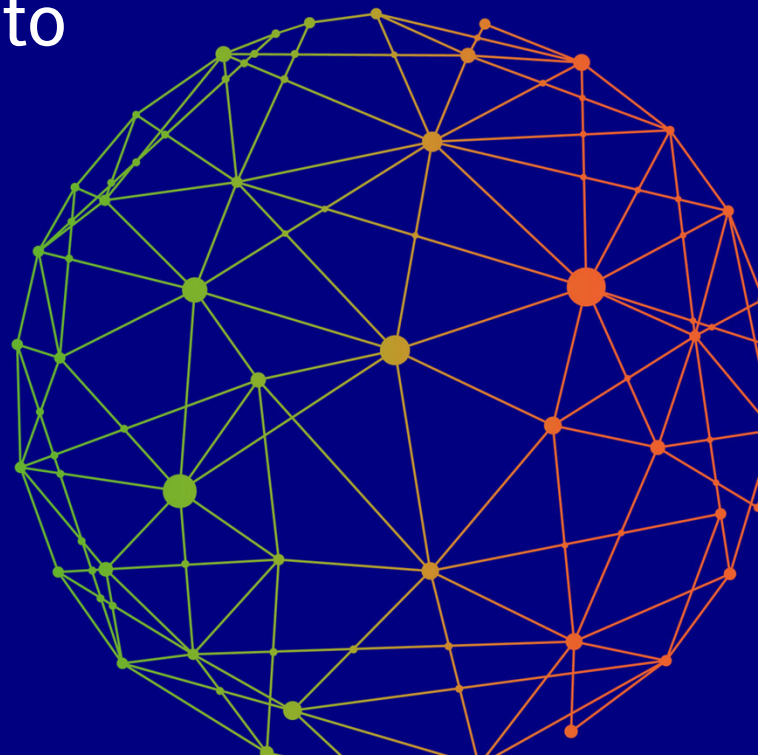
Data Spaces Symposium

9:00

First Symposium day recap: 5 highlights on how to share data, unlock value and boost impact

Ana Garcia, Boris Otto, Chandra Challagonda,
Lars Nagel, Ulrich Ahle



Data Spaces Symposium

Highlights of the first day

Full house

Data Spaces Symposium

Highlights of the first day

Hot workshop & panel topic: Business value

Data Spaces Symposium

Highlights of the first day

Another key topic: AI

Data Spaces Symposium

Highlights of the first day

Multilateral discussion

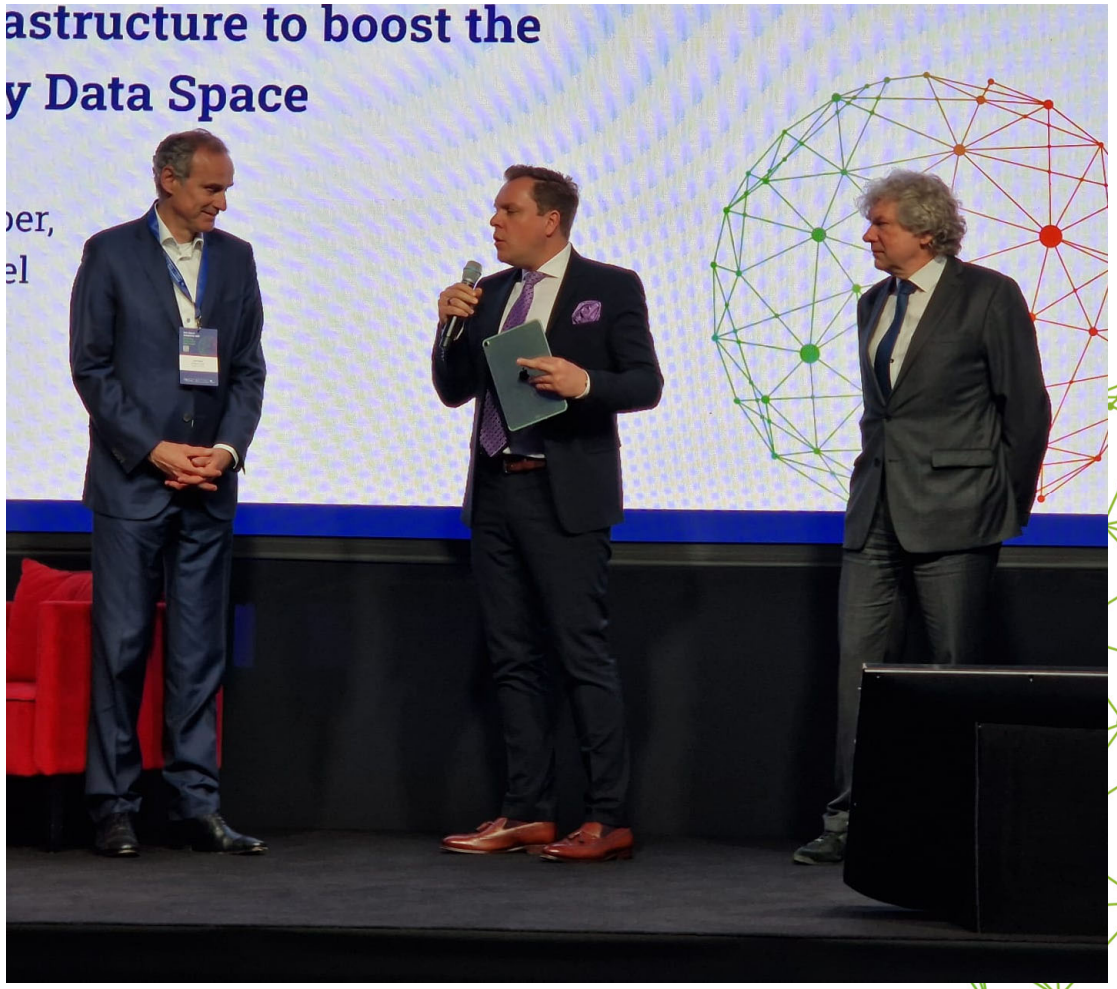
Data Spaces Symposium

Highlights of the first day

Involve all relevant stakeholders

Data Spaces Symposium

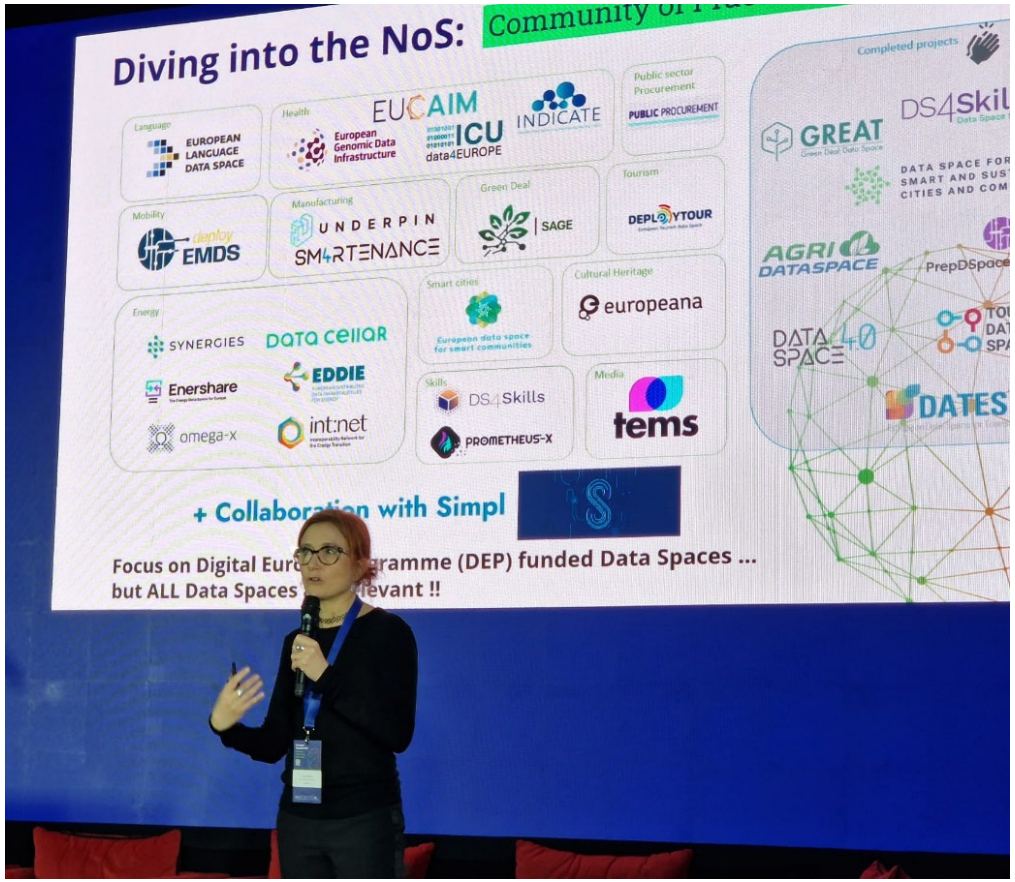
Highlights of the first day



Japan & The Netherlands: Very advanced in data spaces

Data Spaces Symposium

Highlights of the first day

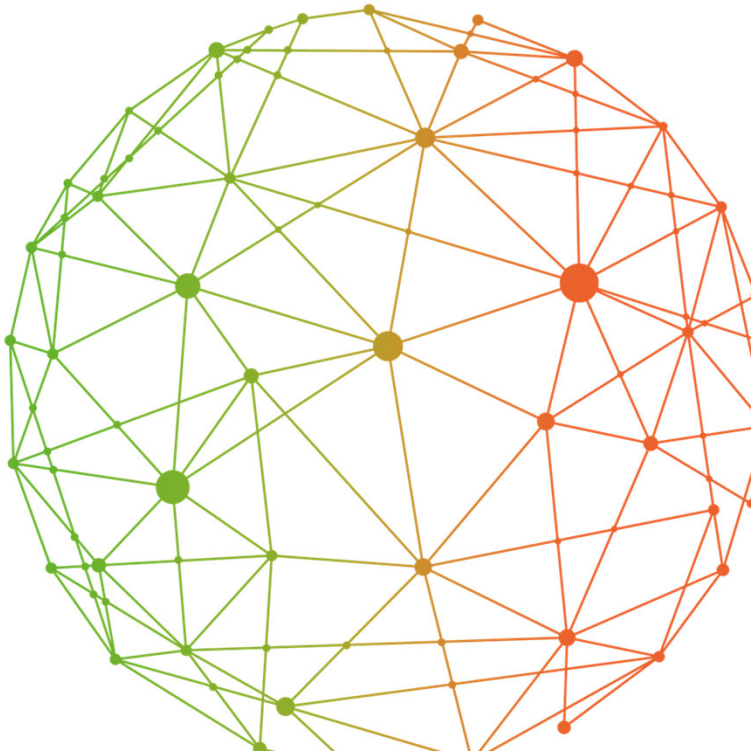


Achievements of DSSC and the Communities of Practice

Data Spaces Symposium

Highlights of the first day

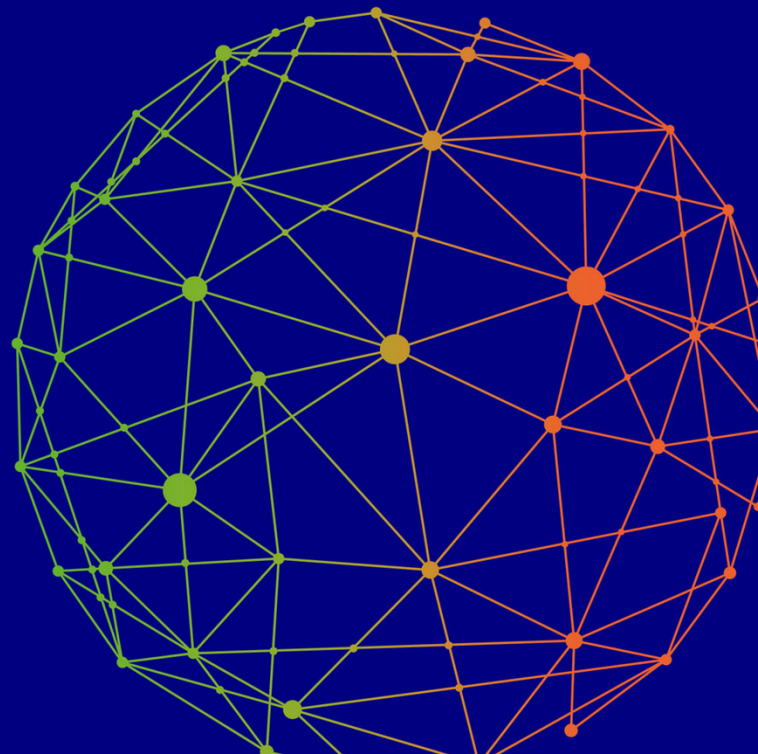
- 810 registrations from 40 countries
- Data Spaces are global
- Data Spaces technology is ready
- Interlink of Data Spaces and AI
- Economy of Data Spaces



Data Spaces Symposium

China’s hundred data spaces

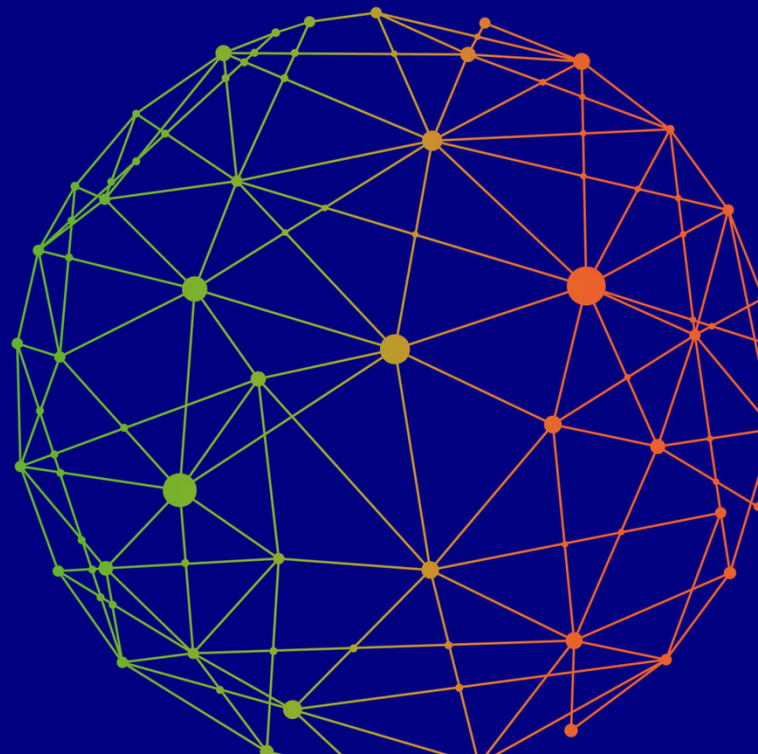
Liu Dong



Data Spaces Symposium

Data space in Flanders: a practical use case

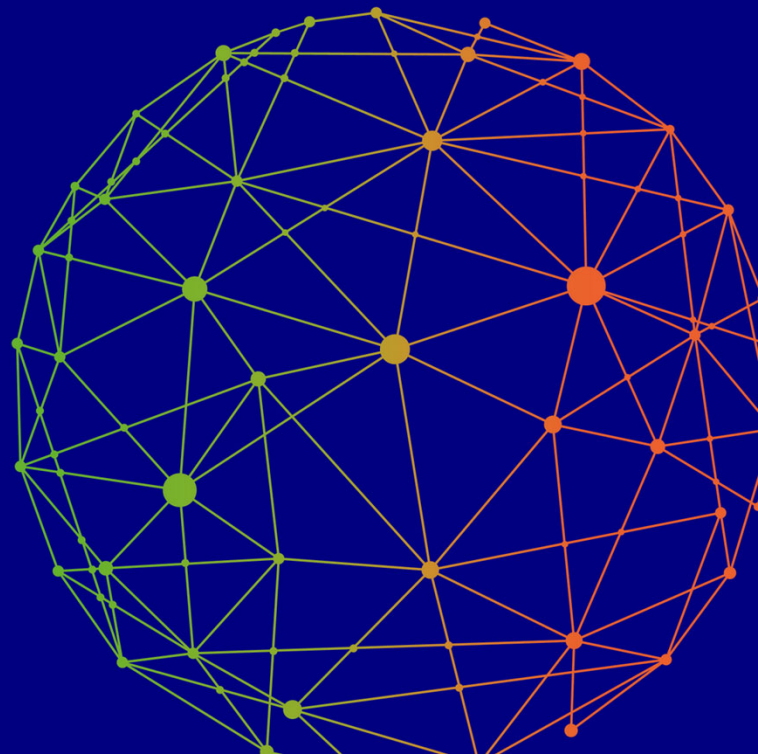
Justine Ottevaere &
Stefanie Kerkhof



Dataspaces in Flanders – learning by doing

Data Spaces Symposium 2025

Justine Ottevaere & Stefanie Kerkhof



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DATA SPACES SUPPORT CENTRE

Funded by the European Union

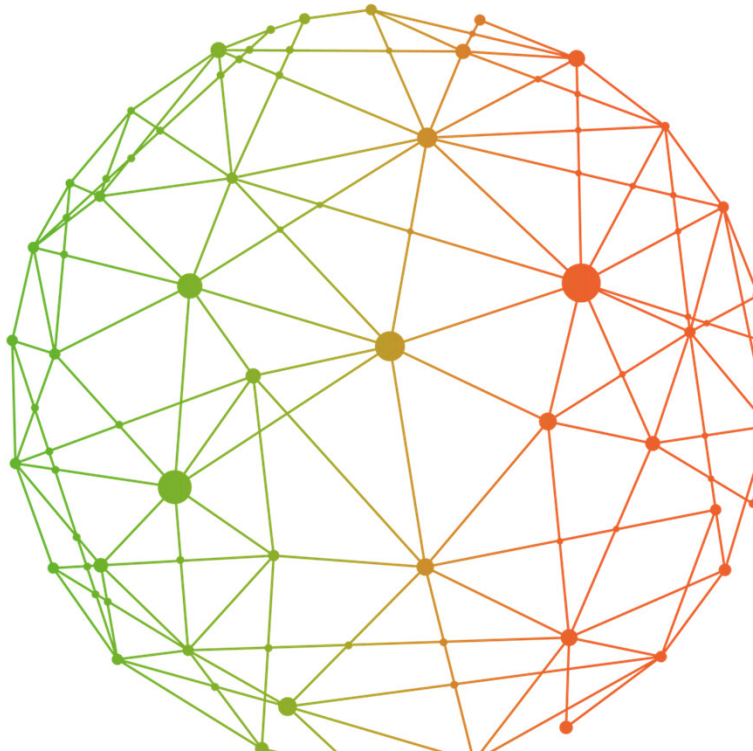
The Data Spaces Support Centre receives funding from the European Union Digital Europe Programme under grant agreement n° 101083412

Dataspaces in Flanders – learning by doing

Data Spaces Symposium 2025

Flanders
State of the art

Justine Ottevaere & Stefanie Kerkhof



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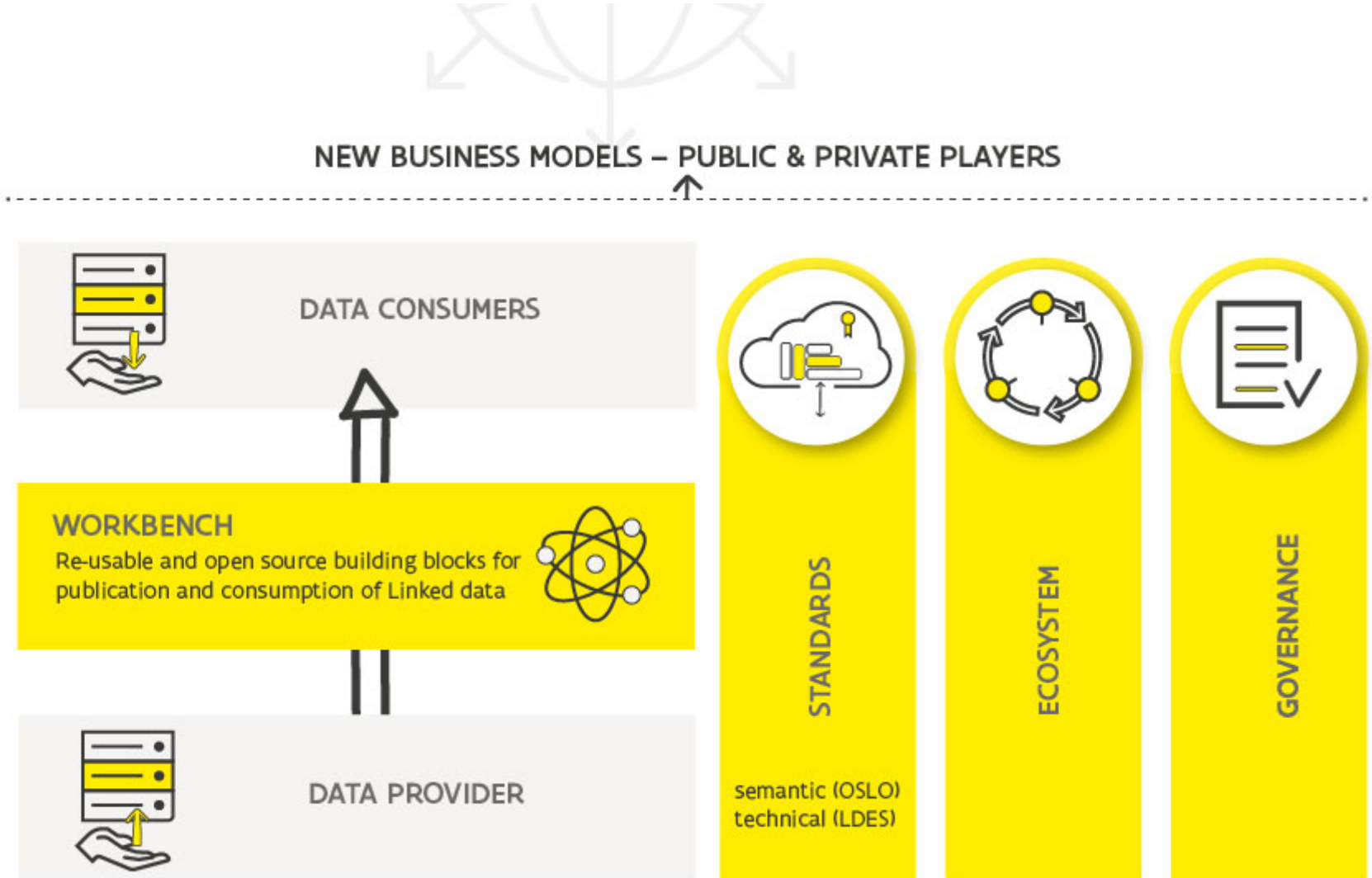
Flanders Smart Data Space – *the concept*

INTEROPERABILITY

The ability of different systems to interact and exchange data.

DECENTRAL

We facilitate, responsibility stays with providers and consumers of the data.



Context of Flanders' concept

supports

DATA CONSUMERS

WORKBENCH
Re-usable and open source building blocks for publication and consumption of Linked data

DATA PROVIDER

STANDARDS
semantic (OSLO)
technical (LDES)

ECOSYSTEM

GOVERNANCE

inspires
advises
anchors
collaborates

initiates

TECHNICAL INFRASTRUCTURE

BUILDING BLOCKS (Middleware)

DIGITAL TWIN

EDGE, CLOUD, COMPUTING

ARTIFICIAL INTELLIGENCE,

...

Flanders State of the art

European Commission

athumi

KENNISCENTRUM VLAAMSE STEDEN

.be

vvsg

Belgian Data Spaces Alliance

OPEN & AGILE SMART CITIES & COMMUNITIES

interoperable europe

INTERNATIONAL DATA SPACES ASSOCIATION

.AGORIA

DATA SPACES SUPPORT CENTRE

FIWARE FOUNDATION

imec

and many more...

4 data spaces – 4 reasons why – 4 roles

Mobility

- Use case driven
- Orchestrator

Water

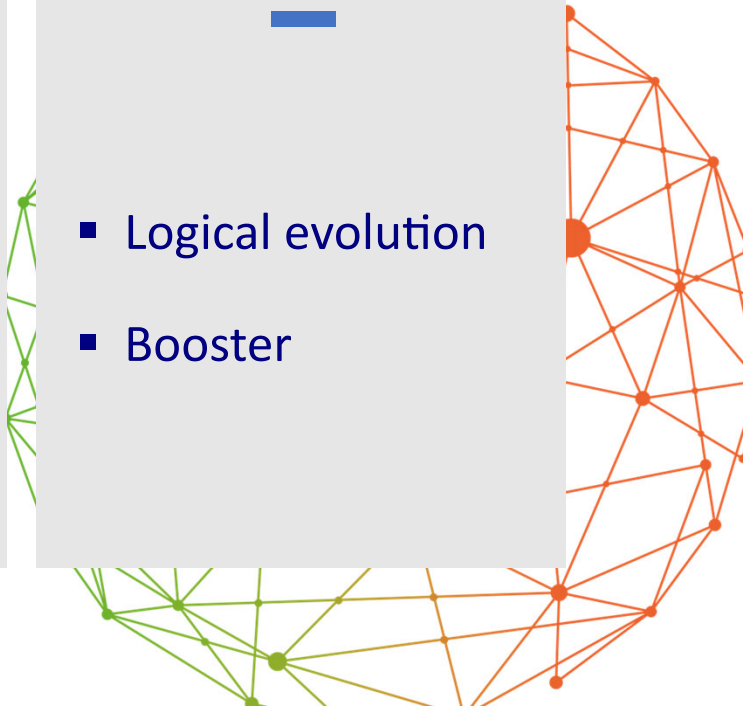
- Bottom up
- Expert

Health

- Regulatory obligation
- Facilitating

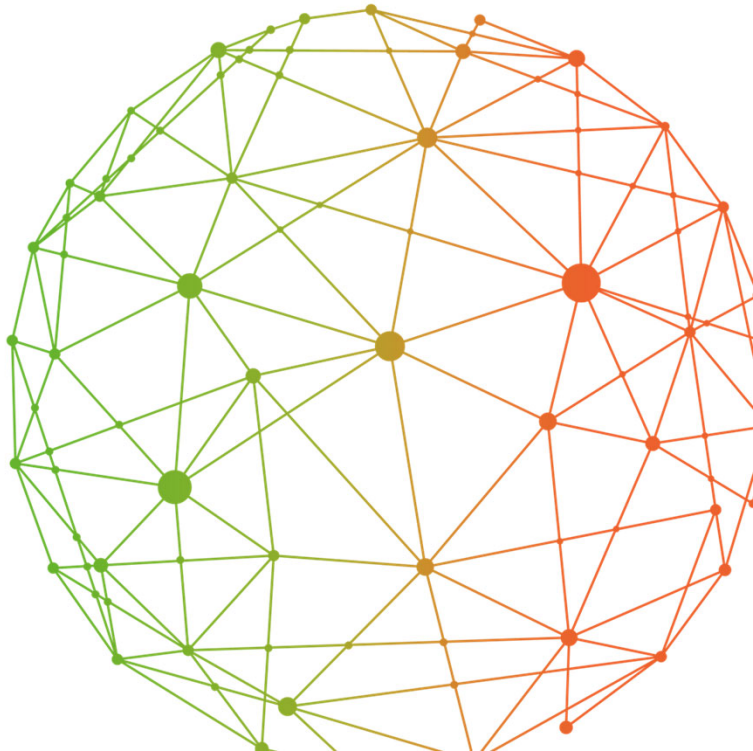
Public administration

- Logical evolution
- Booster

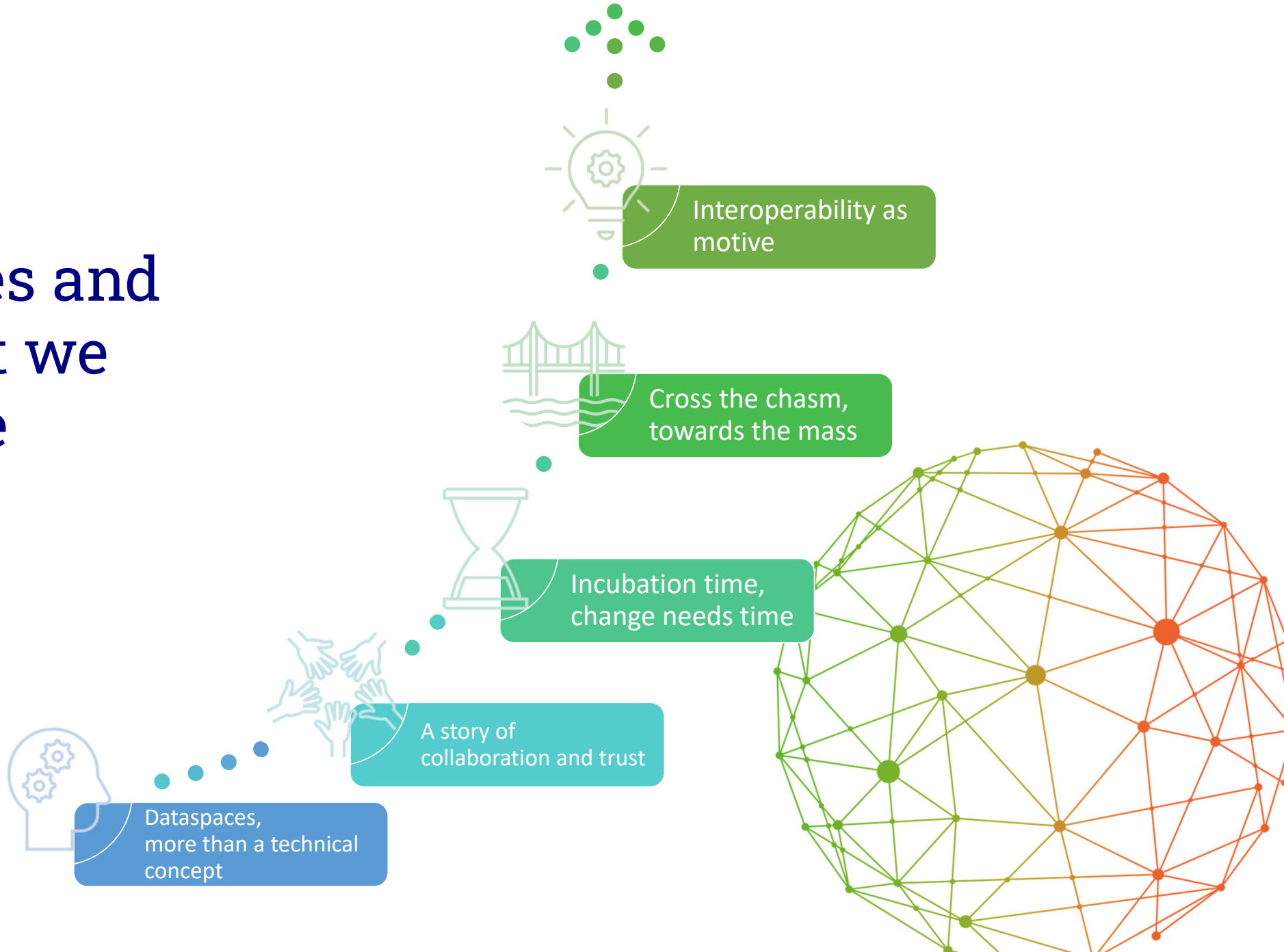


Our successes and how did we do that

- Living open source building blocks & connectors, that are well documented
- Growing adoption of semantic (OSLO) and technical (LDES) standards
- Living governance framework
- The concept ‘data space’ is a conversation starter for collaboration
- Our government talks about interoperability



Our challenges and learnings that we hope to tackle



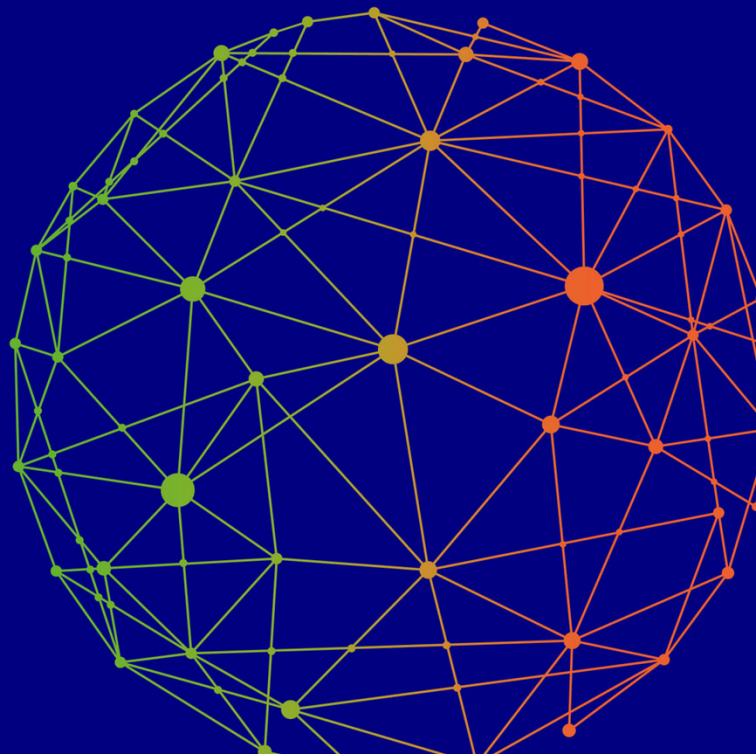
Flanders
State of the art

Thank you!
Justine Ottevaere & Stefanie Kerkhof

Data Spaces Symposium

Understanding each other is key: Semantic Interoperability in data spaces

Georges Lobo

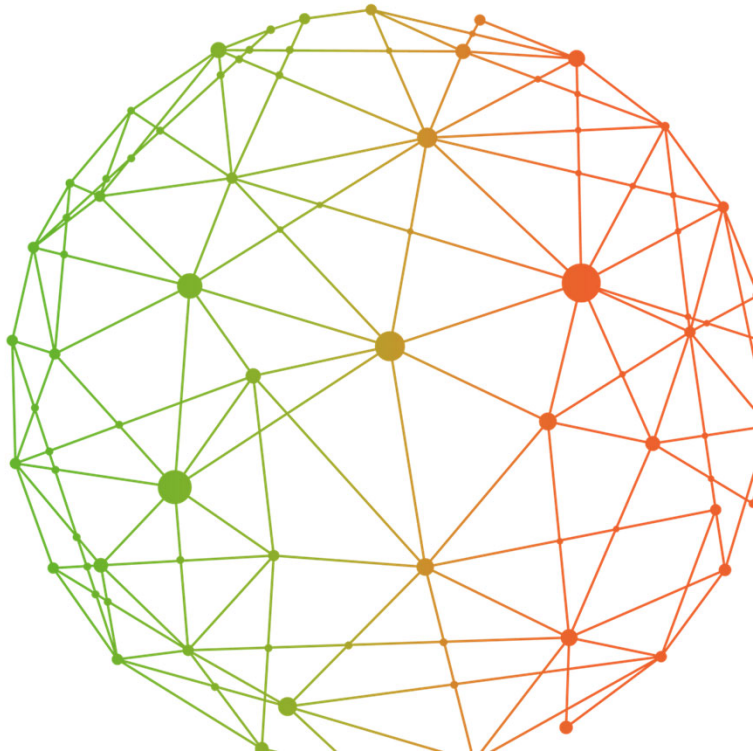


Semantic Interoperability in data spaces

Data sharing poses challenges, data spaces solve them

Data Spaces Symposium 2025

Georges Lobo – European Commission



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Interoperable Europe Act

Interoperable Europe Act

The Interoperable Europe Act entered into force on **11 April 2024**. The Act will support the creation of a **network of sovereign and interconnected digital public administrations** and will accelerate the digital transformation of Europe's public sector.

The Act proposes to introduce a structured and co-owned **EU cooperation framework for public administrations** with the following pillars:

- An Interoperable Europe Board
- Mandatory interoperability assessments to evaluate the impact of changes in IT systems related to cross-border interoperability in the EU
- An ‘Interoperable Europe Portal’ as a community platform
- Innovation and support measures

What is SEMIC?

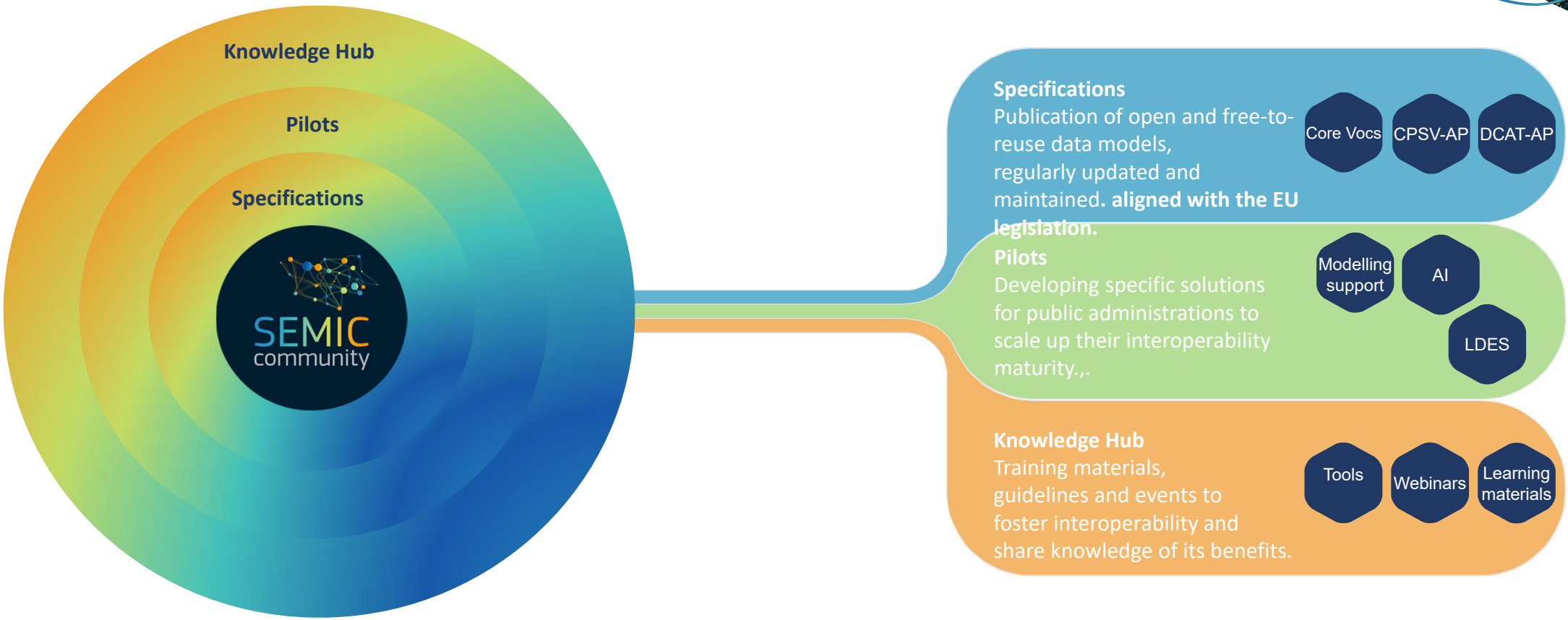
Introduction to SEMIC

The objectives of the SEMIC action are to promote Semantic Interoperability amongst the EU Member States by:

- Promoting the share and reuse of semantic assets, experience and tools and facilitating agreements in key areas.
- Identifying opportunities for alignment on semantic definitions, metadata and reference data sources with special focus on identification and definitions of Core Concepts / Vocabularies.
- Raising awareness on the importance of data and metadata management.

SEMIC

SEMIC's mission is to promote Semantic Interoperability amongst the EU Member States and deliver pragmatic support to help build an Interoperable Europe.



European Commission

SEMIC – Key figures

Over the years, SEMIC has managed to bring together a high number of experts in their fields to discuss diverse topics and bring semantic interoperability to the next level.

800
COMMUNITY MEMBERS
AND COUNTING…

25
EVENTS & WEBINARS IN 2023

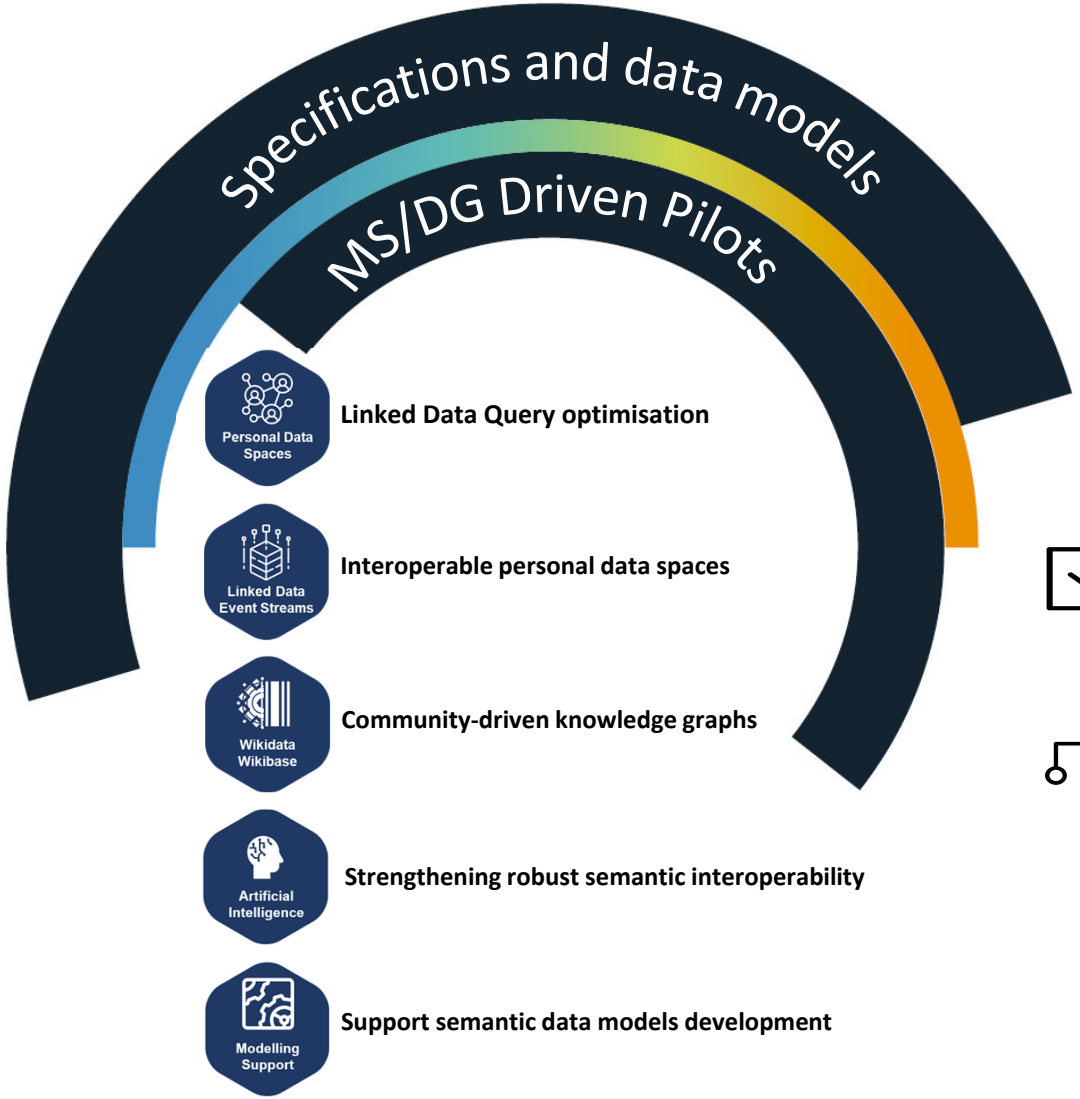
1200
ATTENDEES TO SEMIC2023 IN MADRID

15
CONTINUOUSLY MAINTAINED SPECIFICATIONS

95
SOCIAL MEDIA POSTS IN 2023

Semantics-as-a-service

Horizontal & sectoral support



Support specific domains…

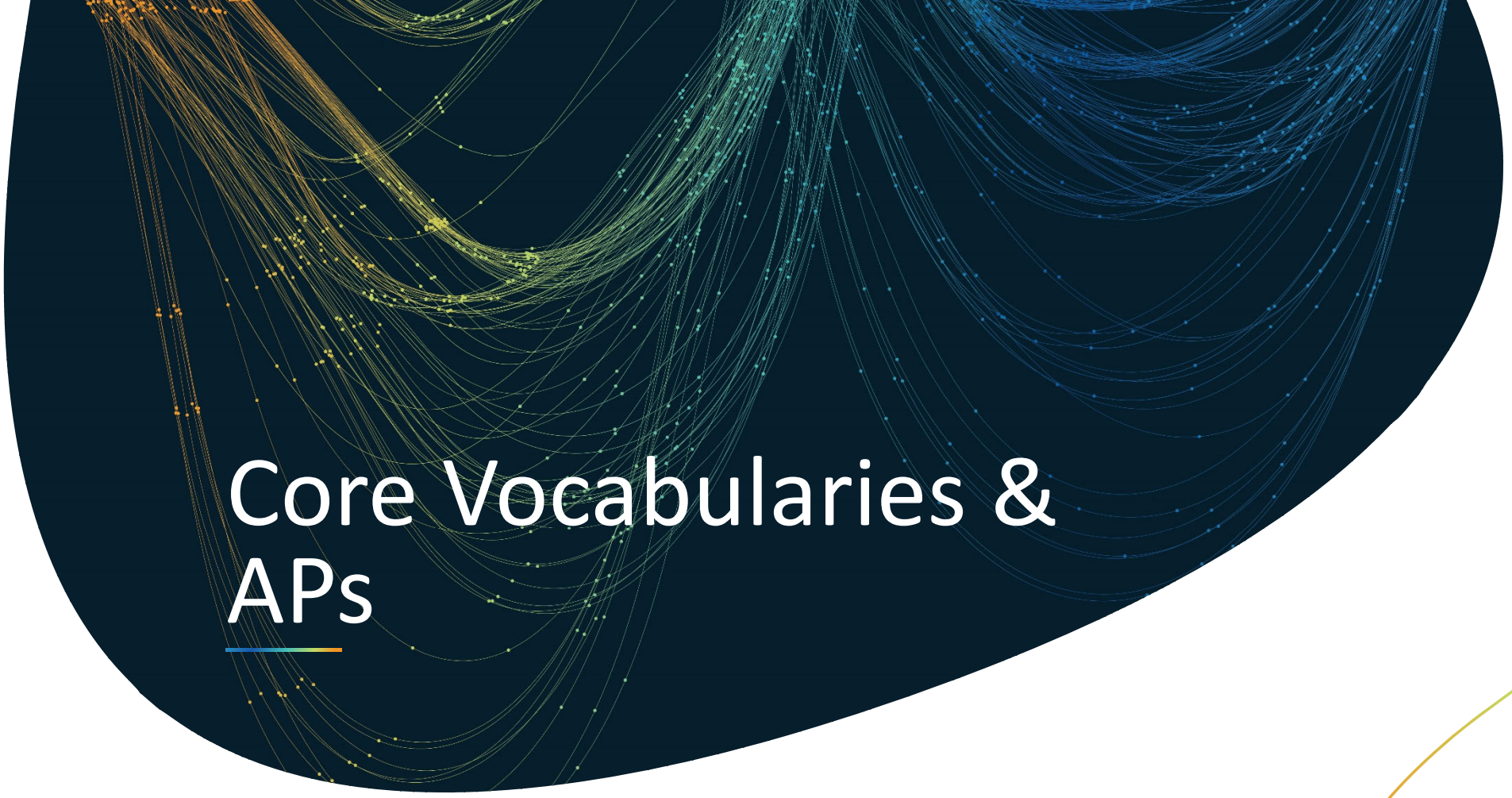
…

…for different use cases

- Accessing different datasets
- Data management
- Linking across domains
- Semantic interoperable data

Semantic interoperability

ensures that the meaning of the data is understandable and reusable by the participating systems in their specific context



Core Vocabularies & APs

GL0

Specifications

SEMIC specifications enable interoperability:

- They make data **transparent** and **available**
- They support the **coherent** implementation of laws and policies
- They help implement **cost efficiencies**
- They help **digitalisation** and **harmonising** processes

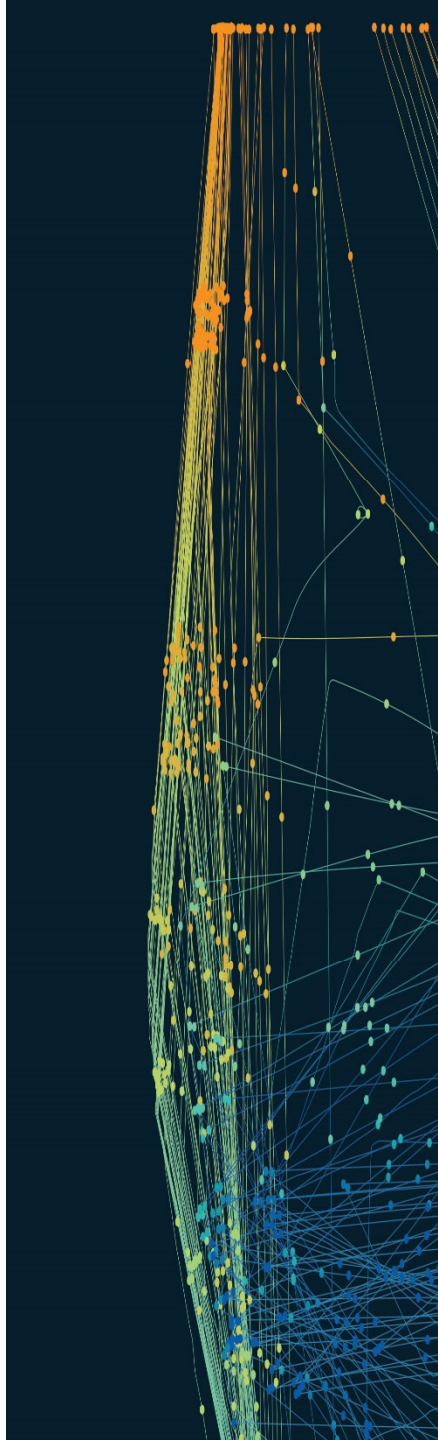
The SEMIC specifications are co-created on GitHub. Join the GitHub community here.

Core Vocabularies

Core Vocabularies are a cornerstone element of semantic interoperability. They provide a standardised approach for describing key concepts such as locations, businesses, organisations and natural persons.

Application Profiles

Application Profiles make use of vocabularies for a detailed set of use cases to define mandatory relations, constraints and relationships.



European Commission

Folie 30

GL0 Mention here or following slides, that we are co-creating the specifications on GitHub and that everybody who wants to contribute should do it and join the Community.
LOBO Georges (DIGIT); 2025-01-18T08:27:20.052

J(0 0 General
Jean-Christophe Haffner (BE); 2025-01-20T09:25:47.056

AP0 1 Solved.
Alexander Potloot (BE); 2025-01-24T09:58:14.047

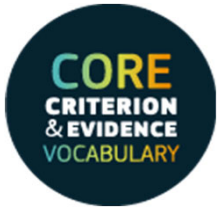
SEMIC specifications

Vocabularies

A person's name(s), date and place of birth/death, identifier, addresses, citizenship, etc.
eIDAS

The legal name, address, identifier, company type, and activities of a legal entity.
At the basis of **BRIS**.

The different ways of describing a location, e.g. via an address, a geographic name, or a geometry, in alignment with **INSPIRE**.



The requirements and evidence of a procedure or formal process.
Connected to **SDG / OOTS**.

The administrative information, hierarchy, identifiers, events and classification of a public organisation.

A public event, its time, audience, location, etc.

Technical

To exchange Linked Data – Supporting **Data Space** initiatives and **Data.Europa.EU**

Application Profiles

To support the Catalogue oof Public services
Connected to **SDG/OOTS**

For data portals in Europe – **Open Data Directive**

For base registries

For geospatial datasets
Connected with **INSPIRE**

For statistical datasets

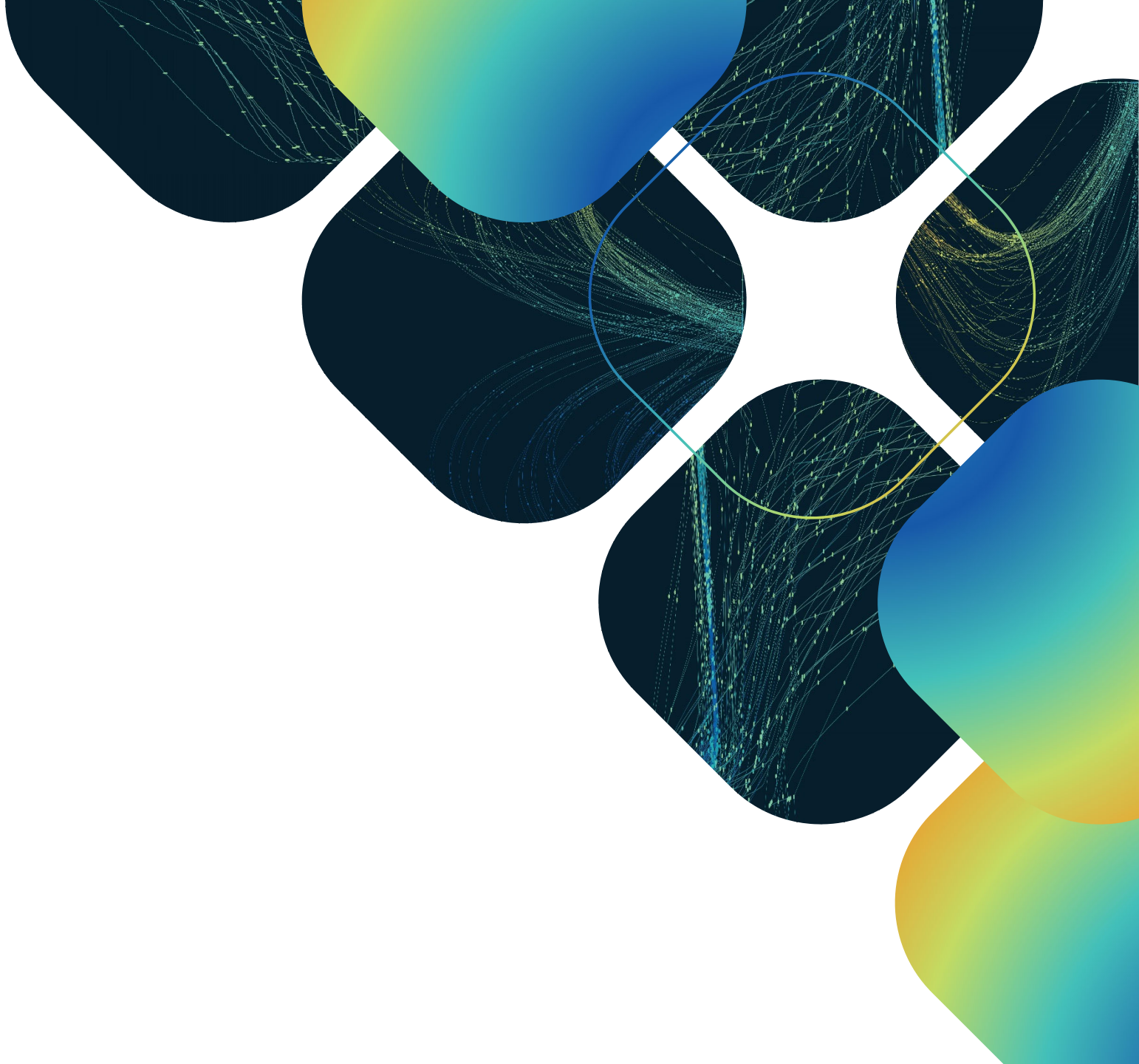
For High-Value Datasets – **Open Data Directive**

Asset description metadata schema
Supporting the **Interoperable Europe Portal**

Data Cataloguing for AI systems – Supporting the **AI Act**

GL0

DCAT-AP for Data Spaces



Folie 32

GL0 Also this secton seems disconnected from the other sectoin about Data Spaces. Include the part of DCAT-AP into the data space section.
LOBO Georges (DIGIT); 2025-01-19T08:41:02.077

JCH(0 0 Portugal
Jean-Christophe Haffner (BE); 2025-01-28T15:10:59.782

Proven track record

W3C STANDARD

Using DCAT (W3C) as a basis

MATURE IMPLEMENTATIONS

Such as data.europa.eu

COMMUNITY

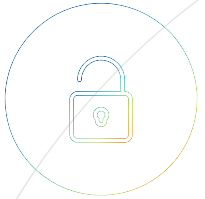
Vibrant DCAT-AP community

- GitHub DCAT-AP
- Webinars
- Interoperable Europe Portal

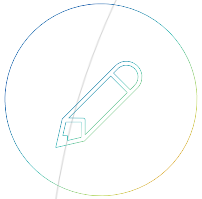
DCAT-AP as a solution

An EU-wide specification that enables interoperability across data spaces through

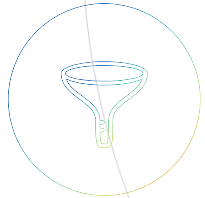
A common set of constraints



Description of metadata of datasets in a unified manner



Possibility to go beyond the common specification and create domain-specific data space extensions in a stackable way



Resulting in:

Stable and long-term management of metadata and data

Reduced amount of metadata management

Benefits of the DCAT-AP ecosystem

Enhances the findability and accessibility of data

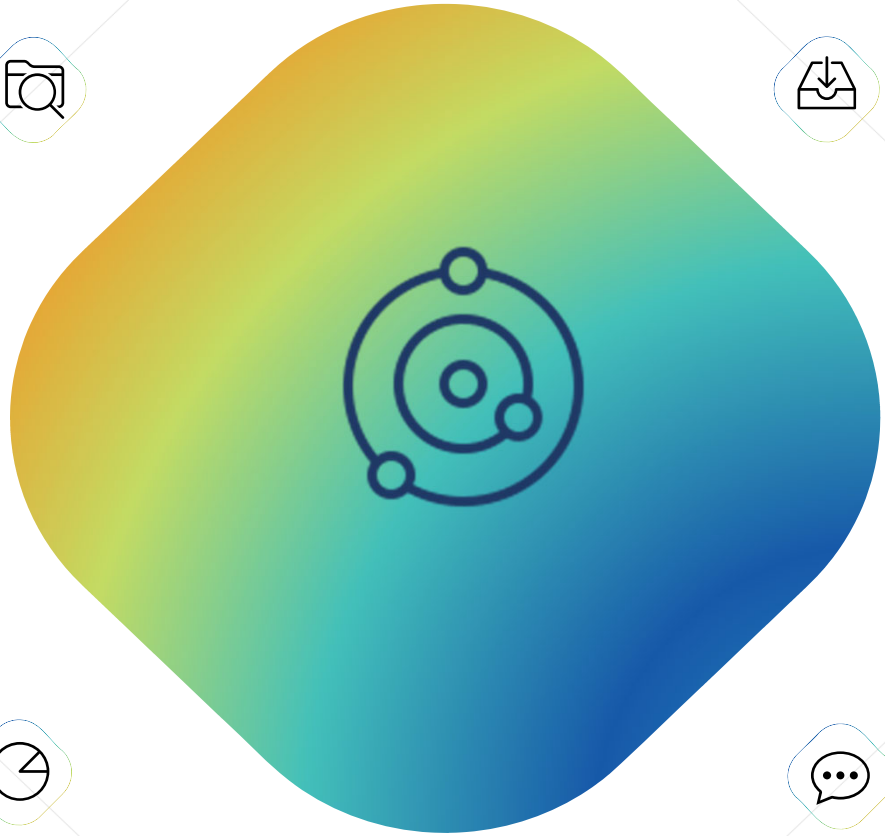
Enables data spaces to make **data catalogues findable**
→ A harvesting network is made possible

Comes with a decade of **experience** of documenting, maintaining metadata records; sharing through harvesting, etc.

Enables data spaces to express their **metadata in a common language**

Provides tooling to **validate the implementation** data.

Collaborative environment that allows data spaces to express their needs and additional requirements (specialisations)



Other maintained extensions

In Data Spaces

EHDS **HealthDCAT-AP**

mobilitydcat-ap **MobilityDCAT-AP**

EUROPEAN LANGUAGE DATA SPACE **LanguageDCAT-AP**

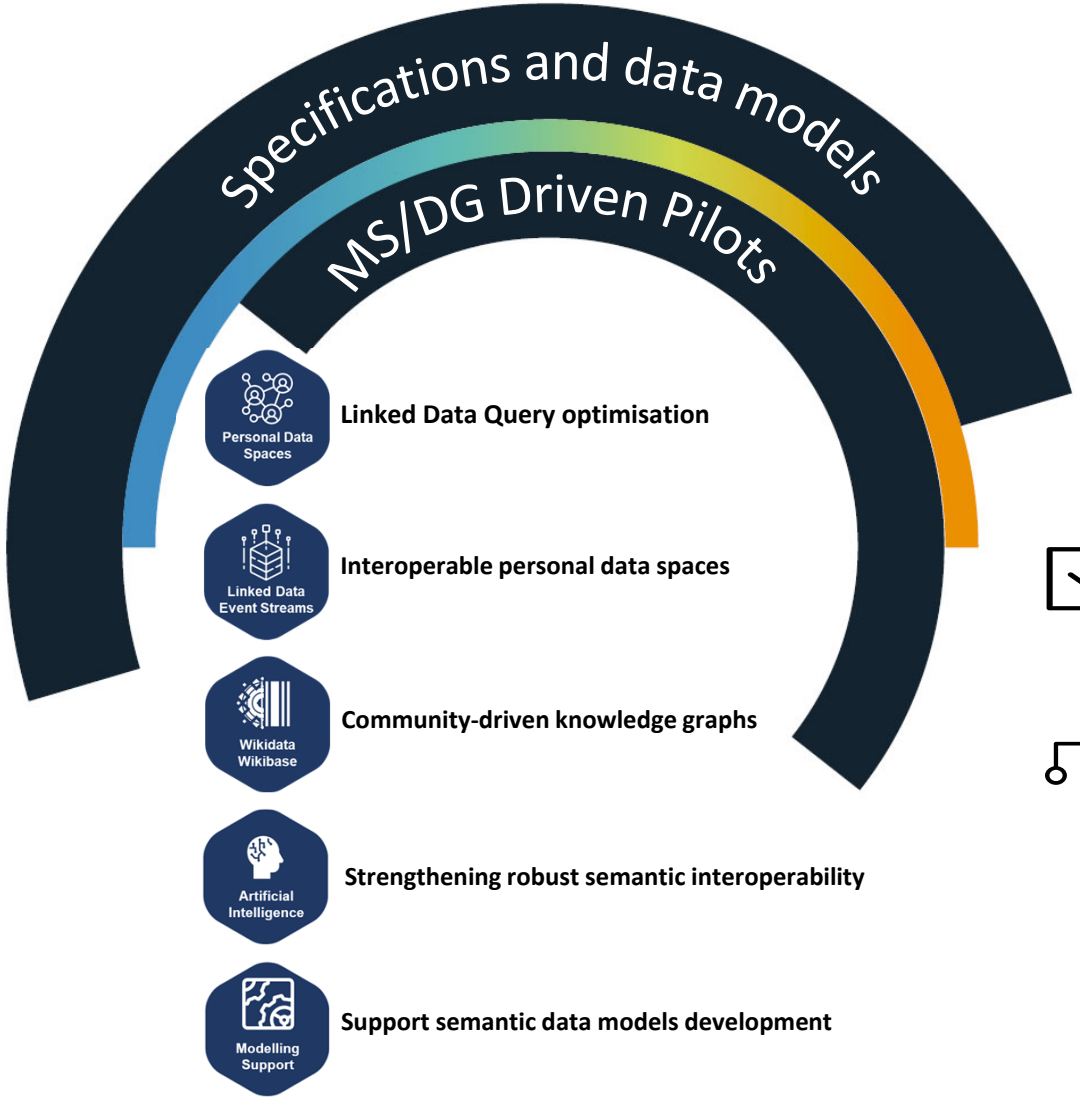
uses **BregDCAT-AP**

EPOS EUROPEANPLATEOBSERVINGSYSTEM **EPOS-DCAT-AP**

+ National extensions:

Semantics-as-a-service

Horizontal & sectoral support



Support specific domains…

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…for different use cases

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Semantic interoperability

ensures that the meaning of the data is understandable and reusable by the participating systems in their specific context

SEMIC Service offering

SEMIC's goal is to deliver pragmatic support to help build an interoperable Europe.

Specifications

Publication and maintenance of open and free-to-reuse data models, with regular updates

Pilots

Developing specific solutions for public administrations to scale up their interoperability maturity

Toolkit

Provision of an accessible European Toolchain for data extraction, transformation and loading

Knowledge Hub

Training materials, guidelines and events to foster interoperability and share knowledge of its benefits

European Commission

A Linked Data Event Stream (LDES)

A publication technology to share information with multiple parties

Allowing everyone to replicate and stay up-to-date regarding the unique source of truth

interoperable europe

What is a LDES?

A Linked Data Event Stream (LDES) is a collection of immutable objects whereby you do not change the data itself but simply add new data record to the stream. For business purposes, it is a publication strategy to share your data.

It allows data users to:

- Have up to date data
- Be aware of changes
- Access to historic data
- Relate historic data to current data

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What is a LDES? - Example

Classical model

Data supplier

2019

Name	**Living** place
Willem	Paris

copy →

Data user

Name	Living place
Willem	Paris

2020

Name	Living place
Willem	Paris
Ann	Lyon

copy →

Name	Living place
Willem	Paris
Ann	Lyon

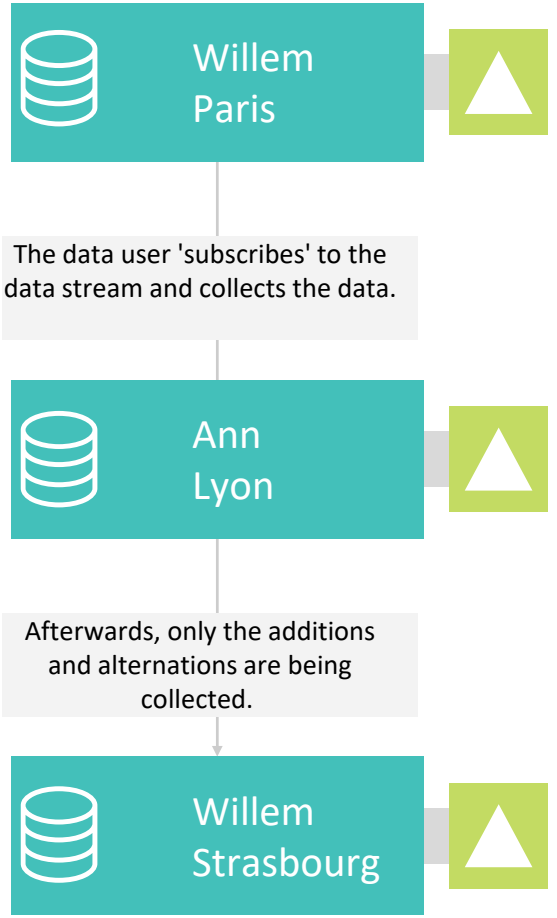
2021

Name	Living place
Willem	Strasbourg
Ann	Lyon

copy →

Name	Living place
Willem	Strasbourg
Ann	Lyon

Linked Data Event Stream



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Main problems | Solution

LDES helps you to structure your data as stream data, enabling you and your users to keep track of what changed at the data level, independently from the data format.

With LDES, users of your Base Registry:

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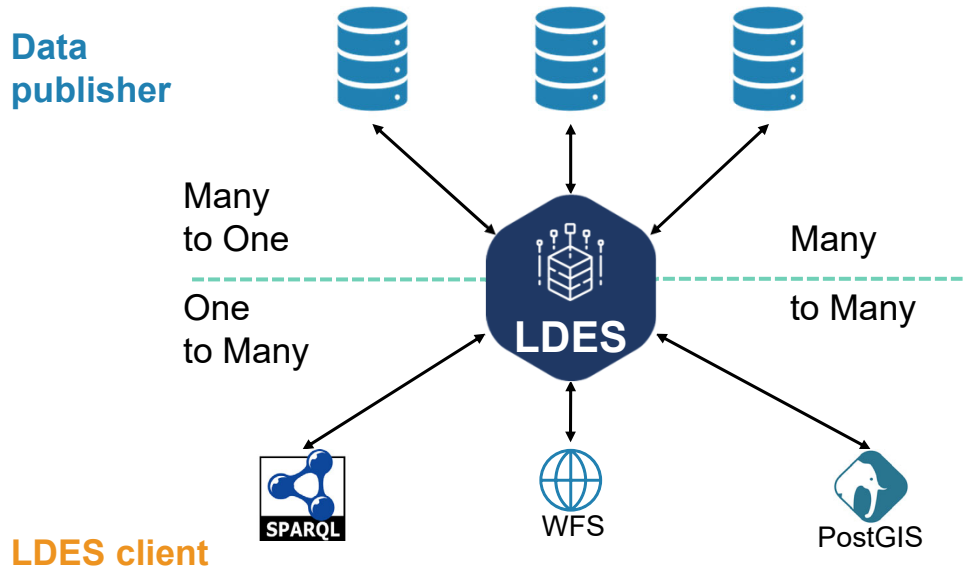
DCAT-AP feeds

- A new specification built on LDES which simplifies and standardises LDES' usage to DCAT-AP.
- Focussed on the aggregation and redistribution of DCAT-AP data
- Successful PoCs have been made for Swedish and Flemish registries
- Initial steps have been tested for LDES as a data harvester for DEU



Problems when publishing data

Synchronise data with users

Different clients request different release schedules.

Collect or distribute

Do you need different approaches to collect data and then distribute it again?

Users

Do you have too many users for your current setup?

Is it difficult to discover your data?

How can user explore the data without opening it?

Different usage Profiles?

Are you under pressure to provide use different publishing technologies for different stakeholders?

Existing set up?

Are you dependent on your current system and afraid to change?

Users request older versions?

Some Data Users prefer to work with an older data set or want to roll back to a previous state

Is collecting and updating data from multiple sources a nightmare?

How to achieve interoperability with other data sources and platforms?

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Update speed

Data Users and Data Providers can independently access/change the data.

No effort required to synchronise with users

How?

A Data User can update their view on an event per event basis at any time.

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Decentralised

Due to the decentralised nature and uniform approach, it can be used to collect data from multiple sources and share data to multiple users.

One approach for multiple usage types

Ideal approach for Collecting and sharing Base Registry Data

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Cost effective scalability

With an LDES only one publishing system is required. Costs are independent from quantity of usage.

Reduced maintenance cost

How?

Only one end point is required serving multiple users.

No need for multiple types of APIs.

A query on the data by the user no longer results in an additional API call.

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Customisable by the data user

LDES allows to recreate the data. Allowing data users to attach intermediary publishing systems.

Data users with varying needs can be serviced

Customisation is the responsibility of the data user

How?

Data users can build any API they desire on the LDES.

The Data provider is no longer responsible for all APIs

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Extendable and Flexible

LDES can be build next to existing publishing systems. Existing publishing systems can rebuild/reconfigured on the LDES.

Maintain Business continuity during transition

Existing agreements can be maintained

How?

Any API can be built on the LDES.

Based on SLAs the provider can chose to maintain it or let the user maintain the API

Standards facilitate LDES rollout

LDES requires a common data structure, if this in place the effort required to implement an LDES is significantly reduced.

Reduced implementation cost

How?

These existing standards can be used as a basis to define the LDES data model.

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Historic Search and Roll Back

Due to the streaming of versions anybody can use the LDES to access a specific historic version of the data.

No separate access point needs to be maintained for the historic versions of the data

How?

LDES is a stream of immutable objects → Historic data remains available and quarriable

Events can be reversed allowing the roll back to a previous state

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Discoverability

LDES is rich in meta data allowing the datasets to be more easily discovered using Data portals.

The right user will more easily find the correct Dataset for them

How?

Only the root node needs to be exposed it contains all meta data to navigate the LDES both manually and automatically.

Semantic interoperability

A LDES is built on common Linked Data standards. Using these standards increases interoperability with other data platforms.

Increased semantic interoperability

How?

Reusing existing linked data models and concept to define the LDES data model establishes interoperability with systems reusing the same concepts.

SEMIC advises the reuse of the SEMIC Core Vocabularies and Application Profiles

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Contact us

- Interoperable Europe | LinkedIn
- Interoperable Europe | YouTube
- (@InteroperableEU) | X
- DIGIT-SEMIC-TEAM@ec.europa.eu
- Interoperable Europe Portal

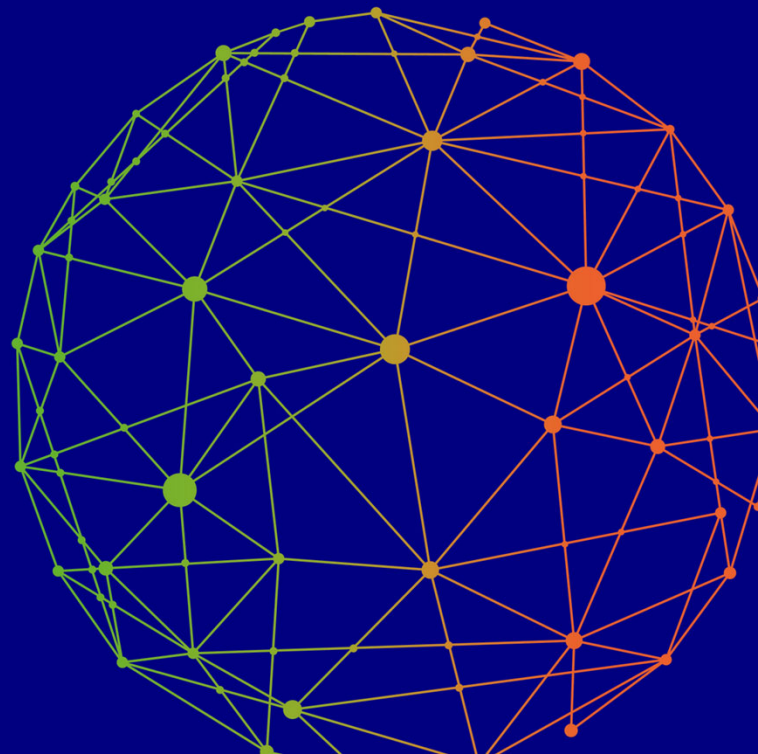
Subscribe to the SEMIC mailing list: https://ec.europa.eu/eusurvey/runner/SEMICmailinglist

Need support or interested in a pilot? Please contact: DIGIT-SEMIC-TEAM@ec.europa.eu

Data Spaces Symposium

A primer on data spaces: A 40,000 ft intro to data spaces for the newbies

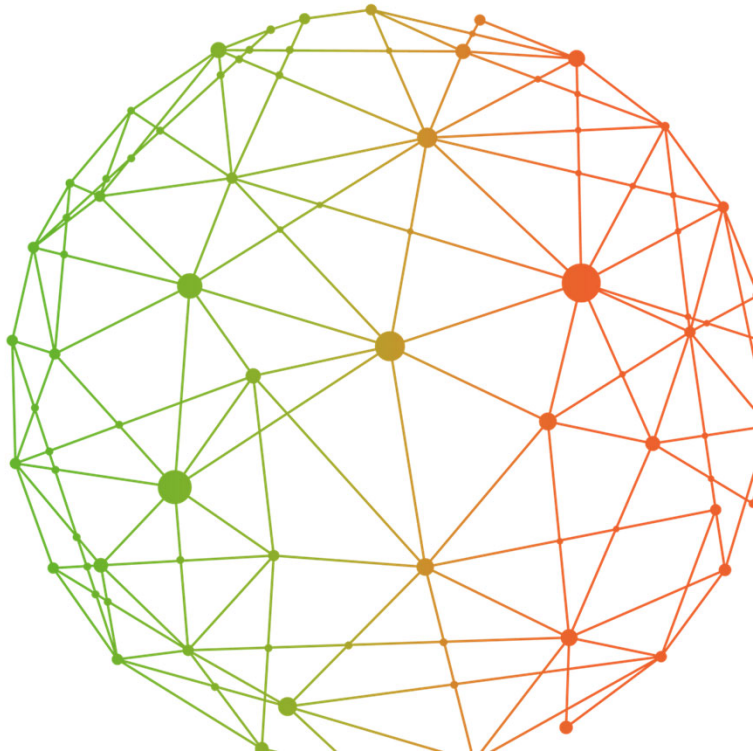
Eric Samson



A primer on dataspaces
A 40,000 ft introduction to dataspaces

Dataspaces Symposium 2025

Eric Samson
Technical Diplomat
Microsoft – Corporate Standards Group

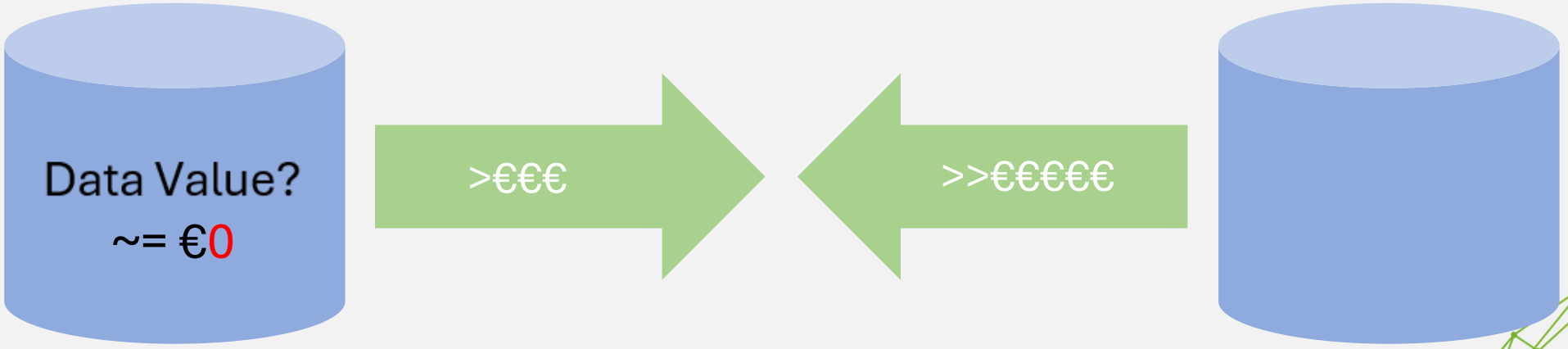


DSBA ■ BDV BIG DATA VALUE ASSOCIATION FIWARE FOUNDATION gaia-x INTERNATIONAL DATA SPACES ASSOCIATION

DATA SPACES SUPPORT CENTRE

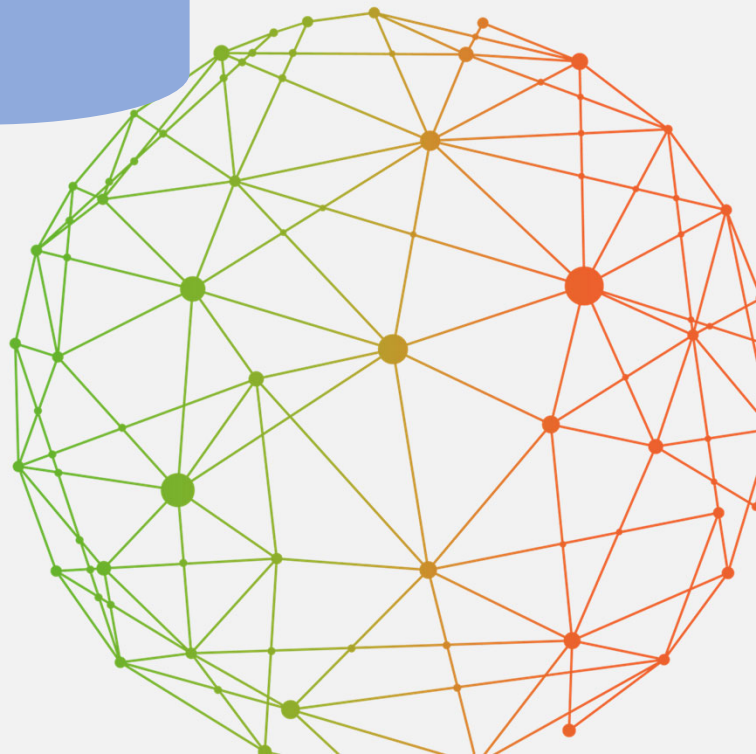
Funded by the European Union

Why? →Data value

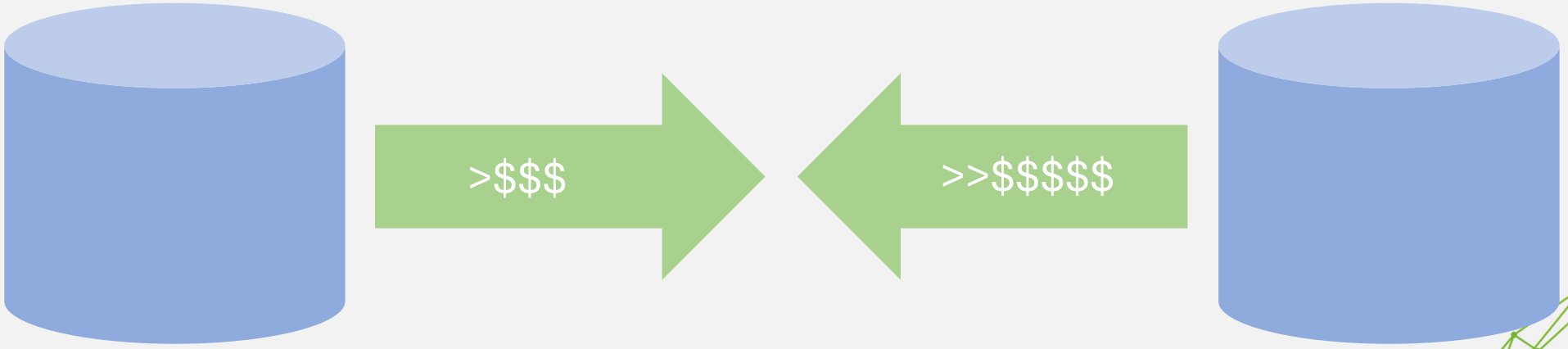


Create value from data:

- Data at rest has little to zero value.
- Data only has value when it is **shared, used and analyzed** in combination with other's data.
- → value = f(share)

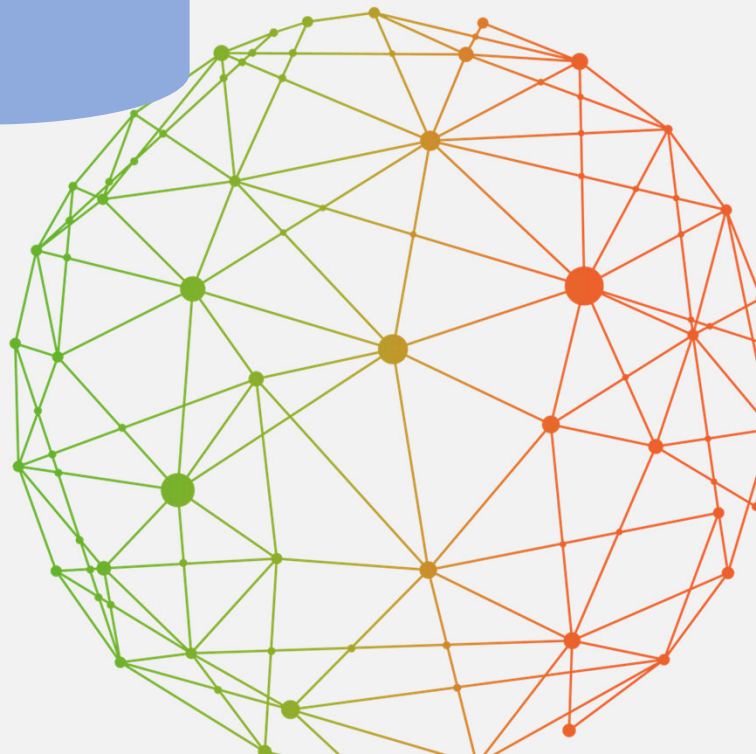


Why? →Compliance

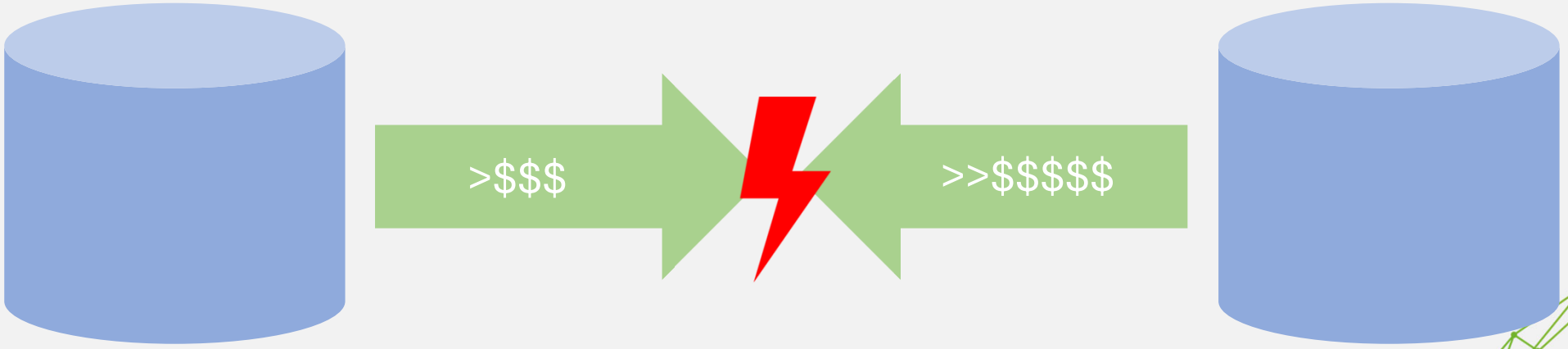


Enable a new **economy of data**

Be **compliant** with data regulations

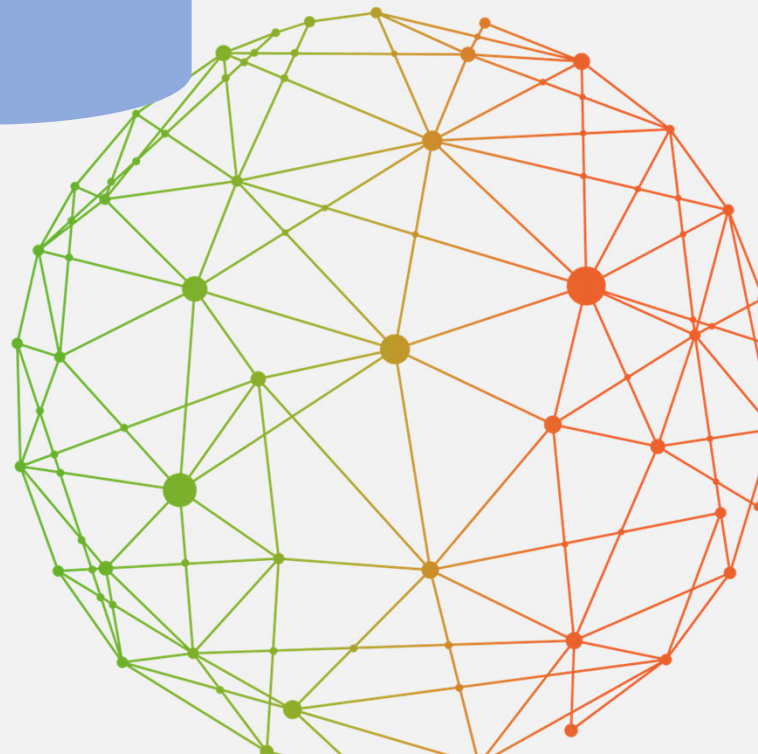


Why? →Risks

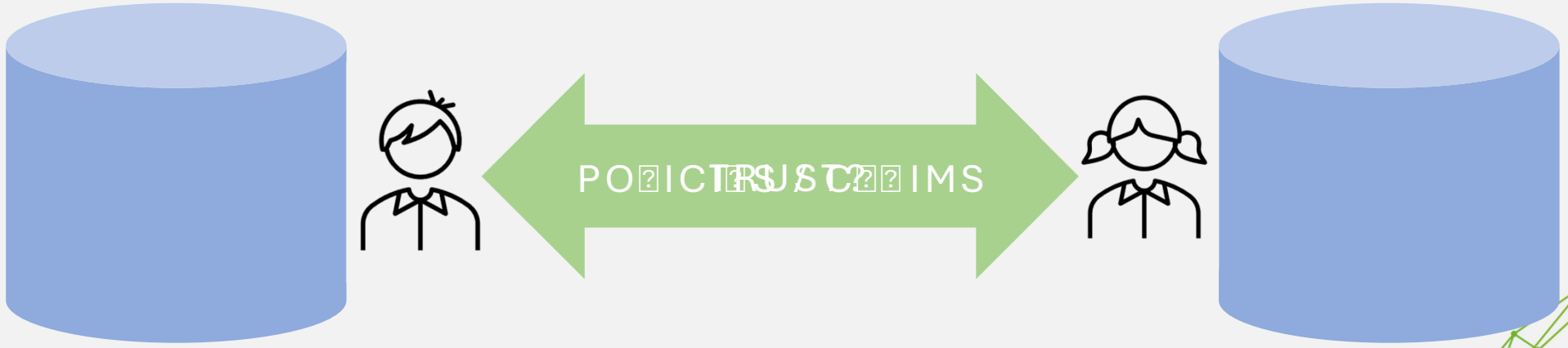


Risks increase with data sharing:

- Transfer of data to non legitimate users
- Misuse of data
- → risk = f(share)



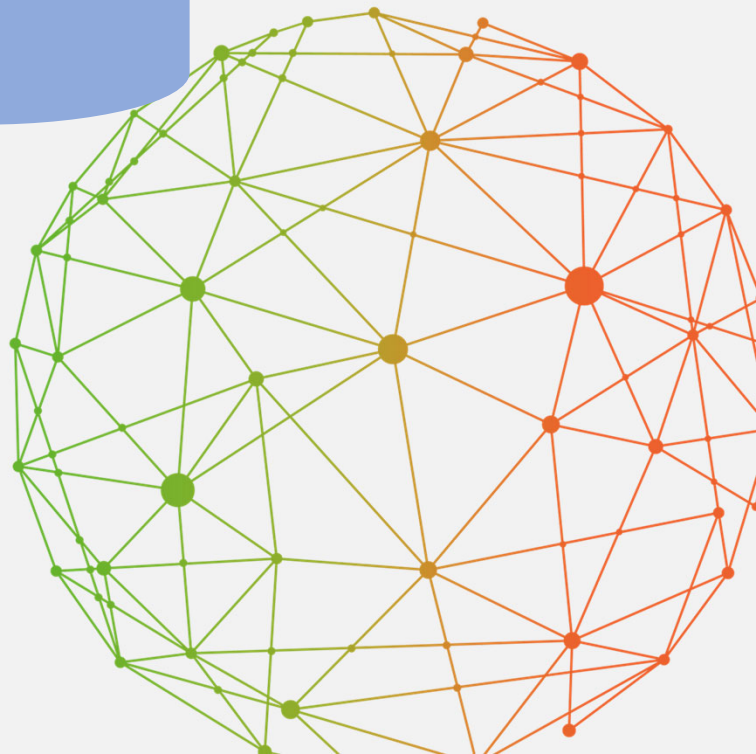
What? → Trust contexts

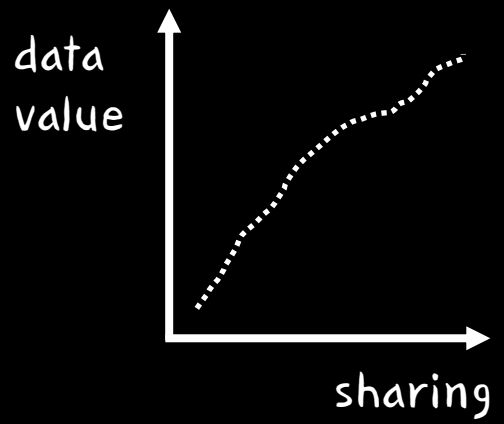


Data sharing policies define **conditions, constraints, obligations, interdictions** about how data can be shared

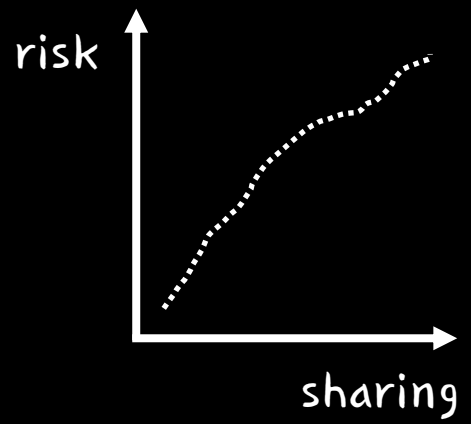
Trust context:

- Combination of **legal and technical components** to establish trust between participants
- With trust, data can be shared with accepted, known, limited risks
- → risk = 1 / f(trust)

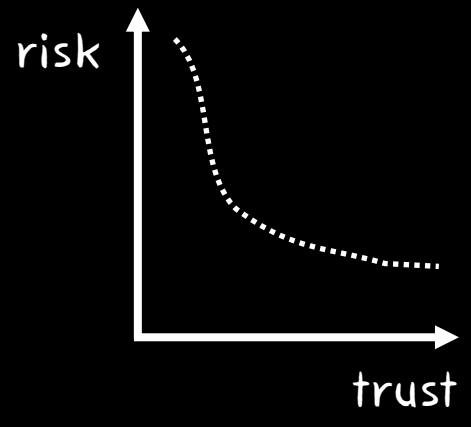




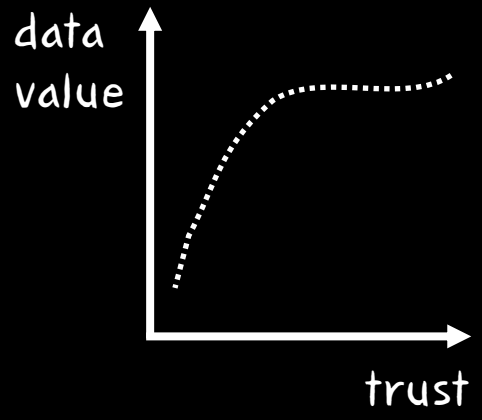
Data value increases with sharing



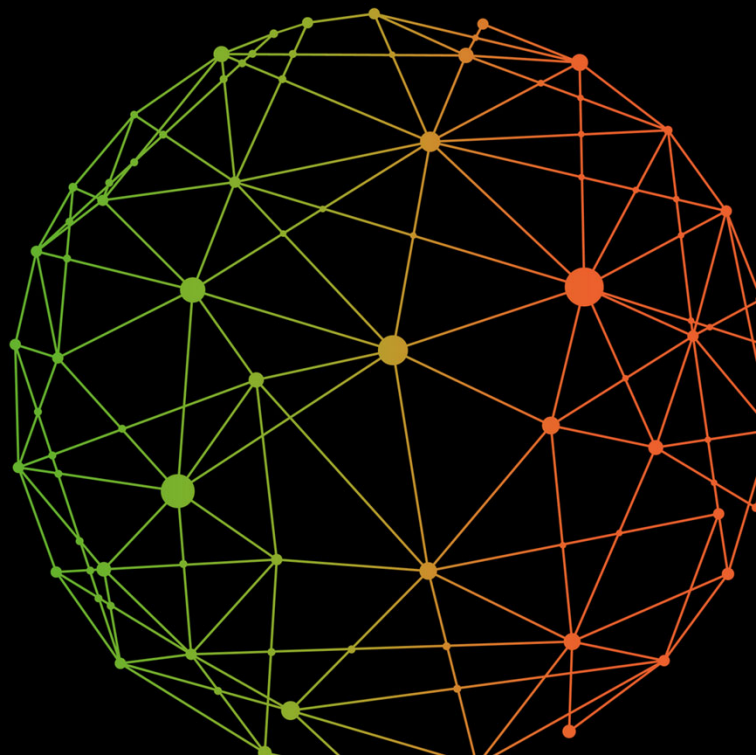
But risk also increases with sharing



However, risk decreases with trust



Trust enables
A new
economy of data

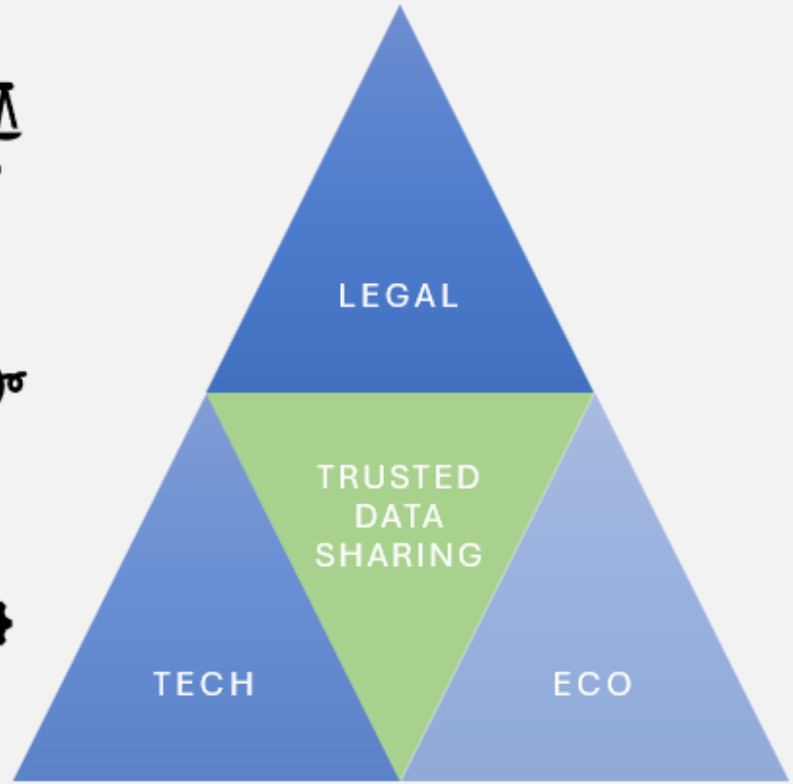


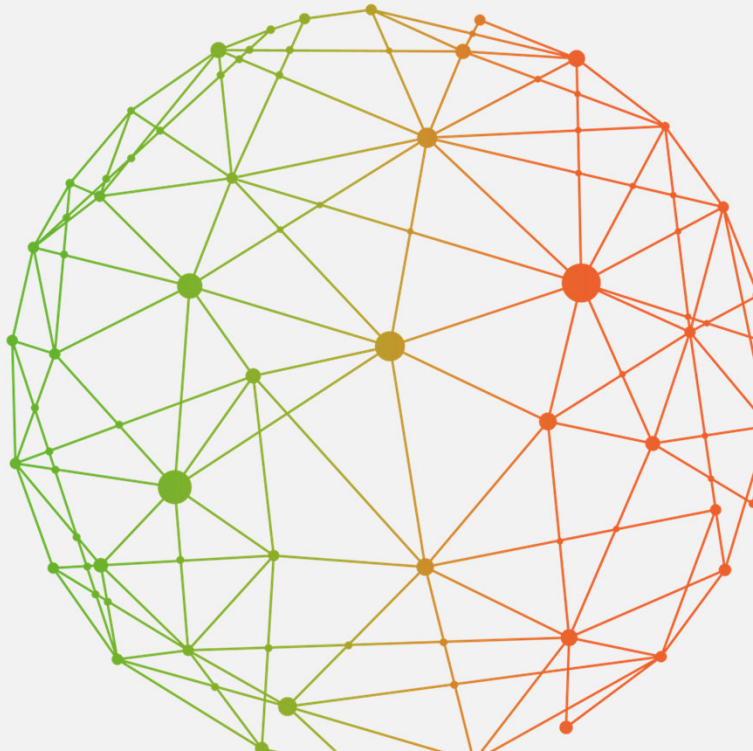
3 dimensions of trusted data sharing

Legal or regulatory
How to guarantee that participants are respecting all applicable laws and regulations.

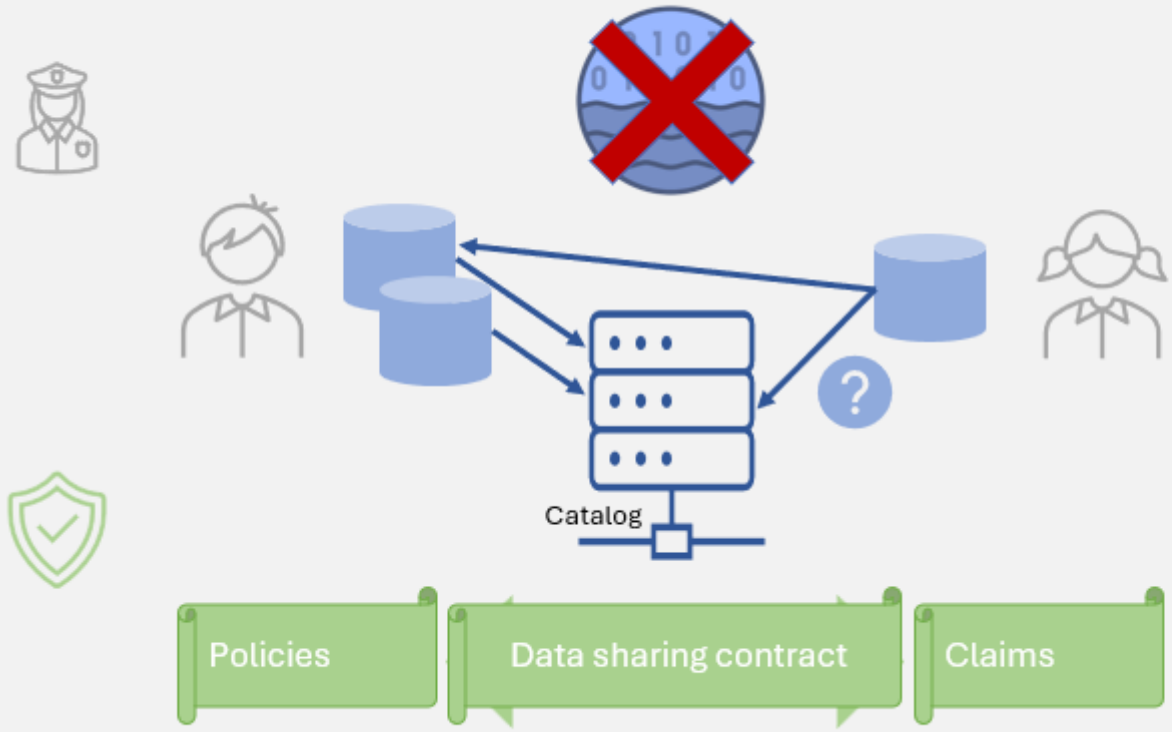
Economic or operational
Economic aspects of trusted data sharing, like data monetization, for instance.

Technical
Atomic building block, the simplest mechanism to establish trust between 2 participants.
Increases interop, robustness, scalability





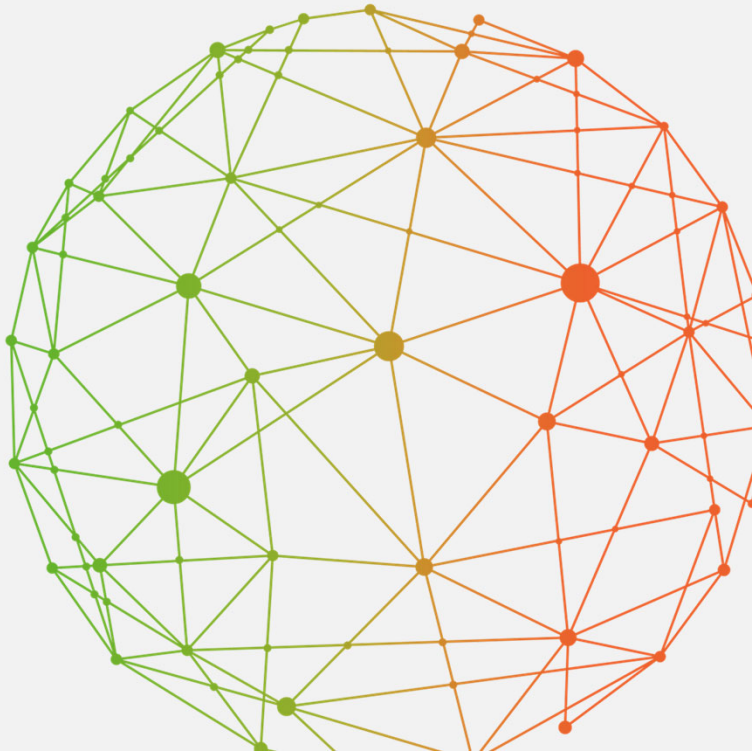
How? →Key concepts



Participants
- Data providers
- Data users
- Dataspace authority

Data assets
- Data description
- Sharing policies

Trust framework
- Semantic models
- Reconciliation
- Trust anchors



How? →Implementations

Connectors

- DISCOVER
- NEGOCIATE
- ORCHESTRATE

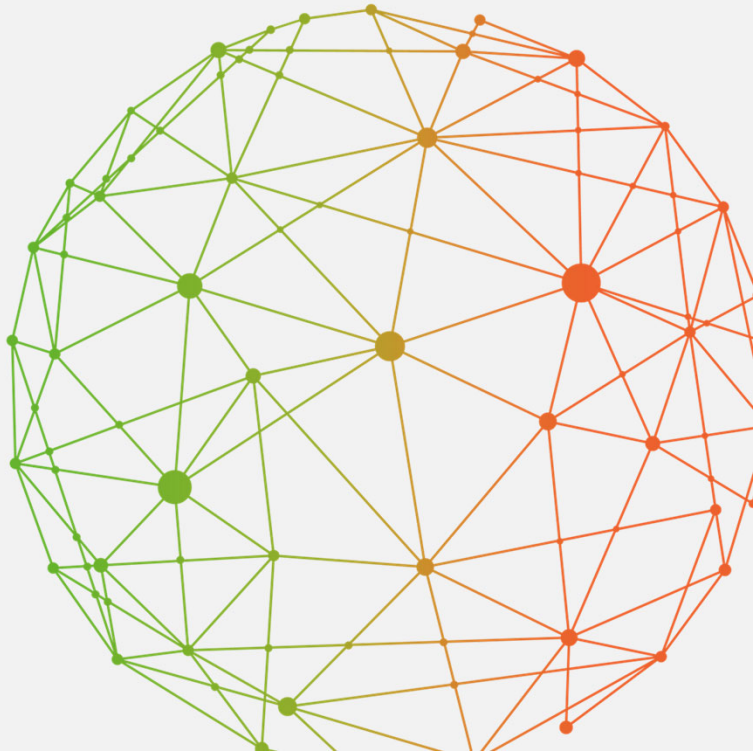
Principles

- OPEN SOURCE
- INTEROPERABLE
- DECENTRALIZED
- MULTI-CLOUD

IDSA / DSSC

- RULEBOOK
- REF. ARCH.
- BLUEPRINT
- SUPPORT

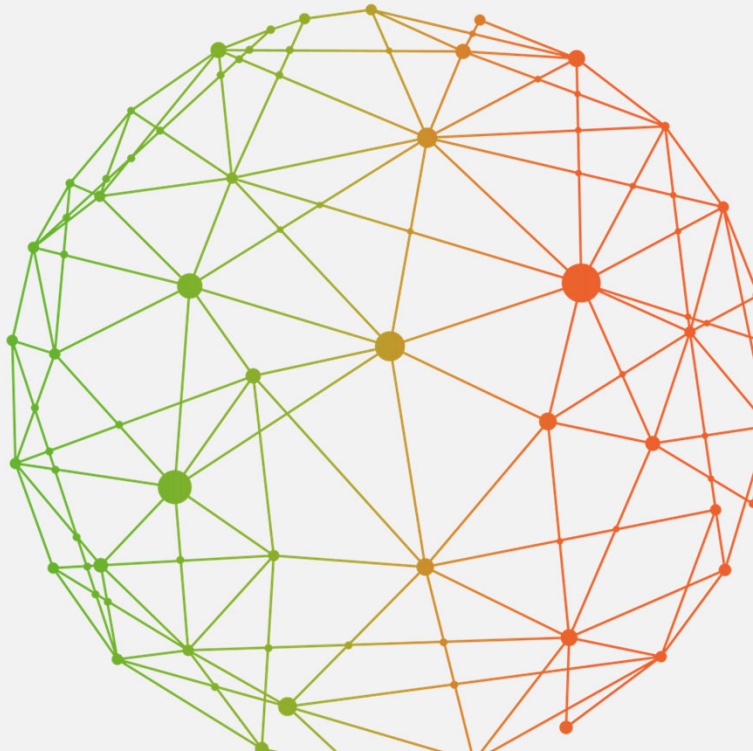
Eclipse Dataspaces Components



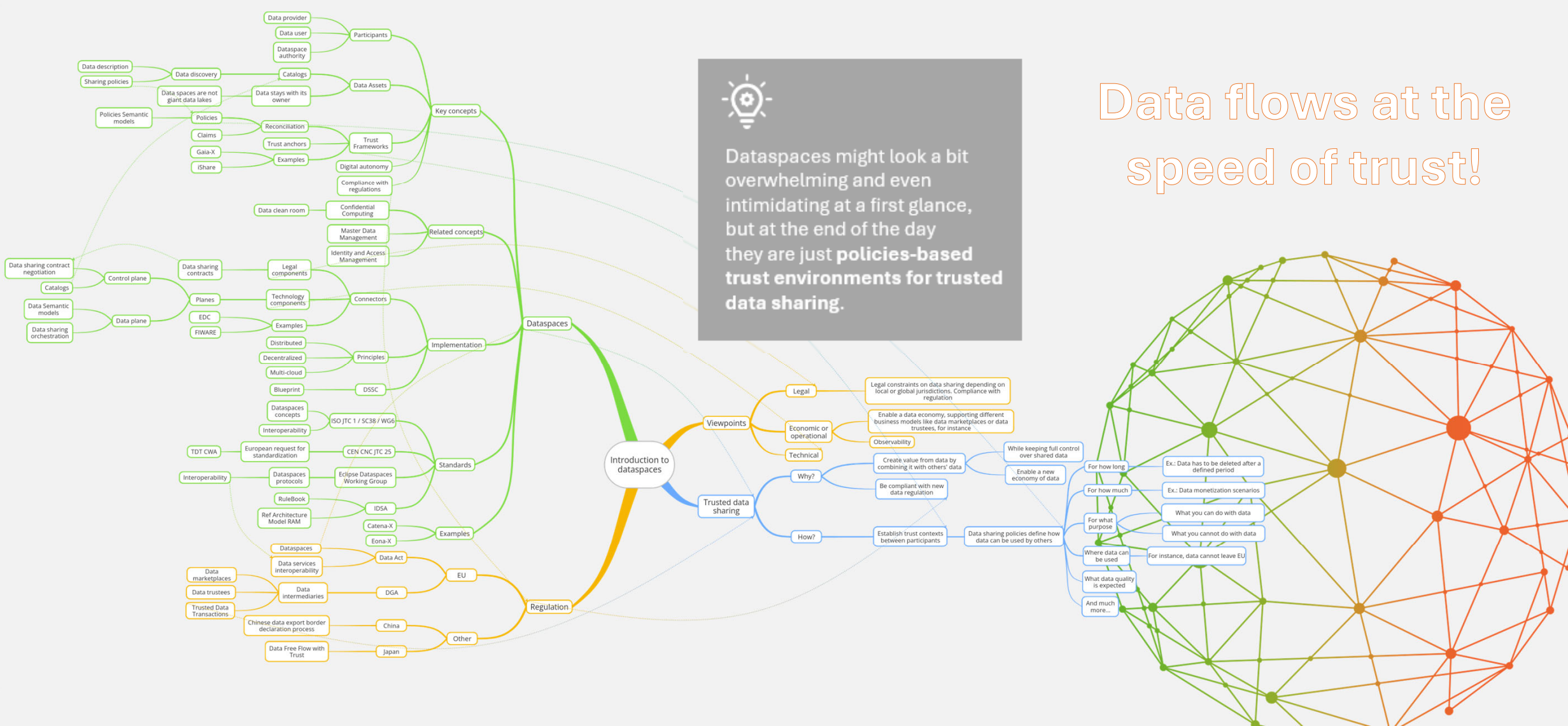
How? →Standards

ISO JTC 1 / SC38 / WG6	CEN CENELEC JTC 25	Eclipse Dataspaces WG
20151: dataspaces 19944 : interop	WG2 : trusted data transact. WG4: interop	Dataspaces protocols: DSP, DCP, CAP, DRP...

LIAISONS



Holistic view



Dataspaces Symposium 2025

Eclipse Dataspace Components | projects.eclipse.org

https://github.com/eclipse-edc

The dataspace manifesto

https://www.youtube.com/channel/EclipseDataspacesComponents

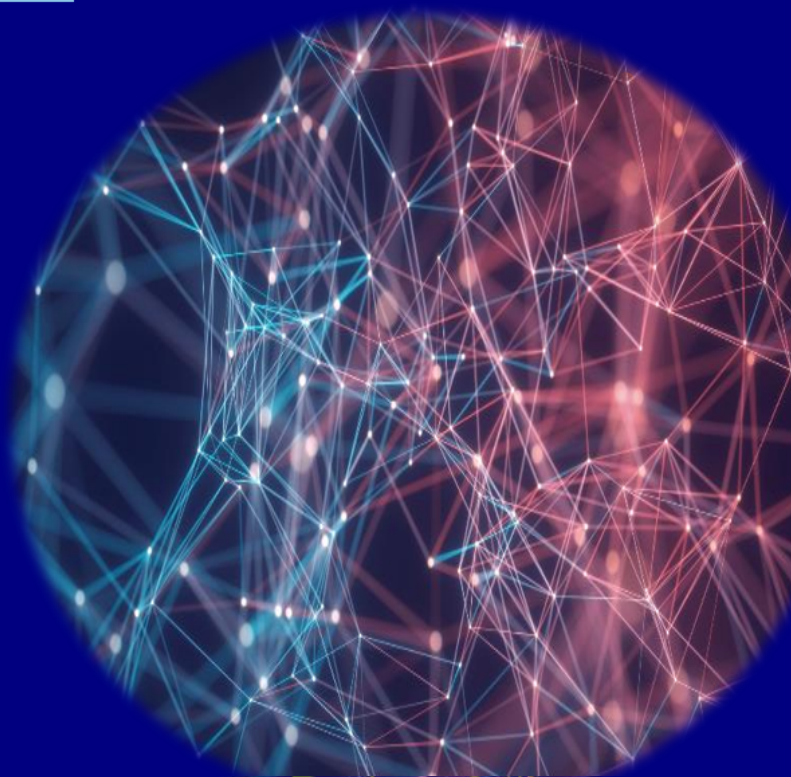
Eclipse Dataspace Working Group

IDSA Knowledge Base

DSSC Knowledge-base

eric.samson@microsoft.com

in/ericsamsonmsft

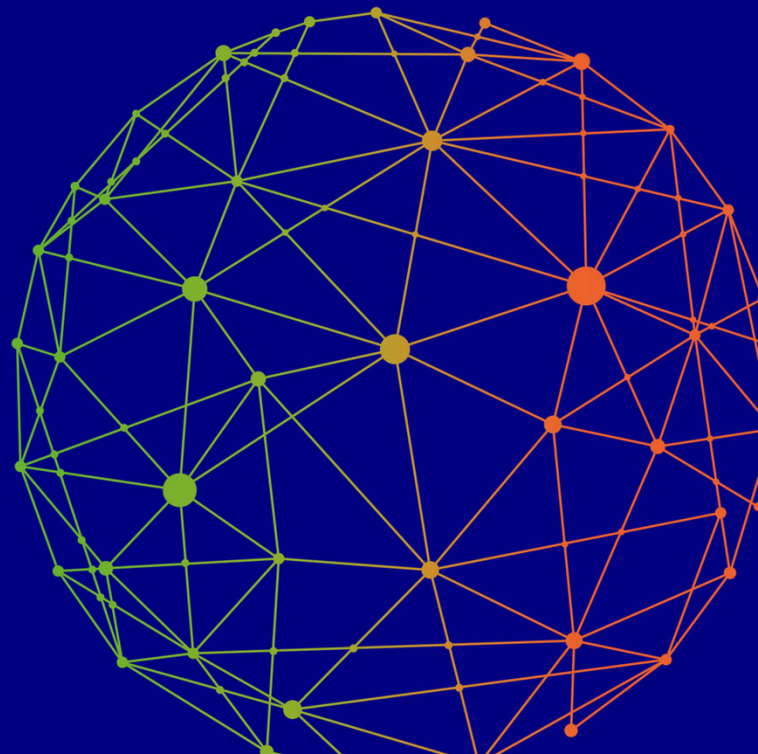


Thank You!

Data Spaces Symposium

How different practices and technologies complement each other in data spaces

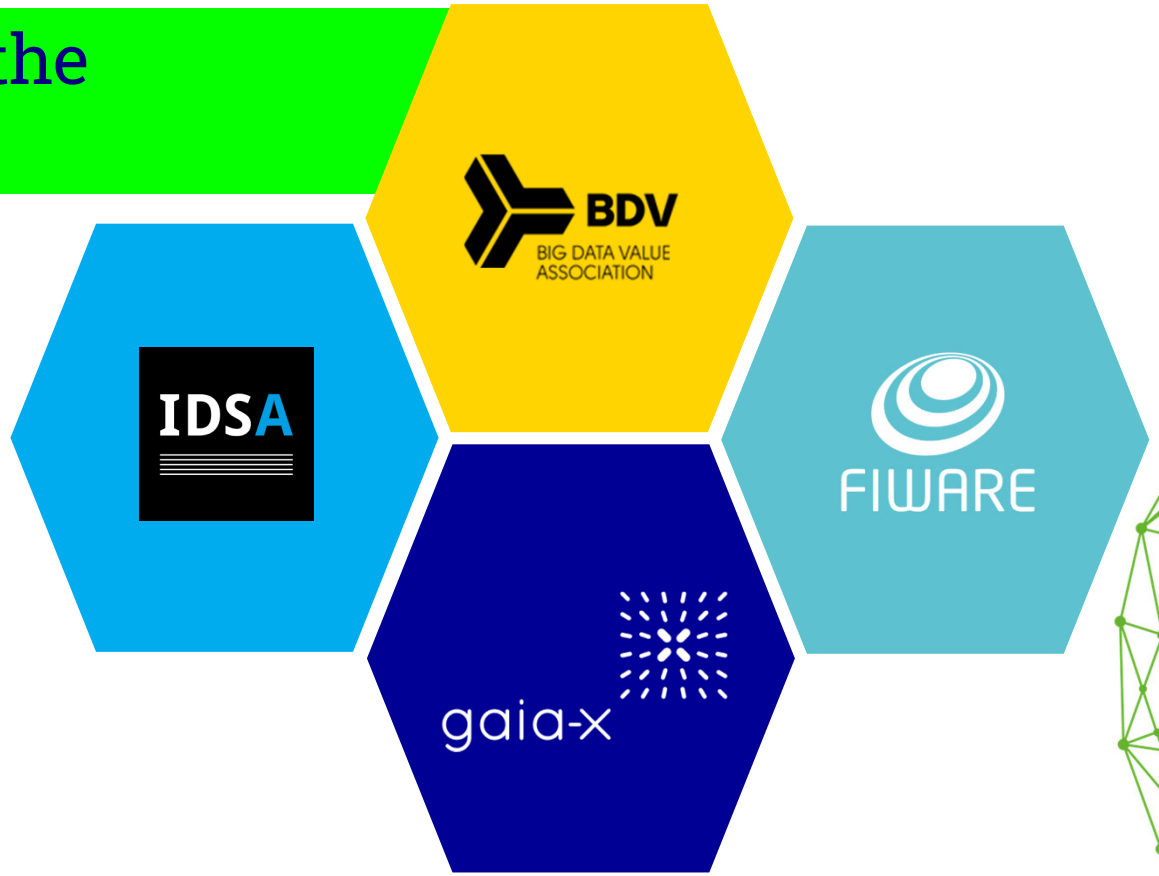
Daniel Alonso, Juanjo Hierro,
Klaus Ottradovetz, Sebastian Steinbuss



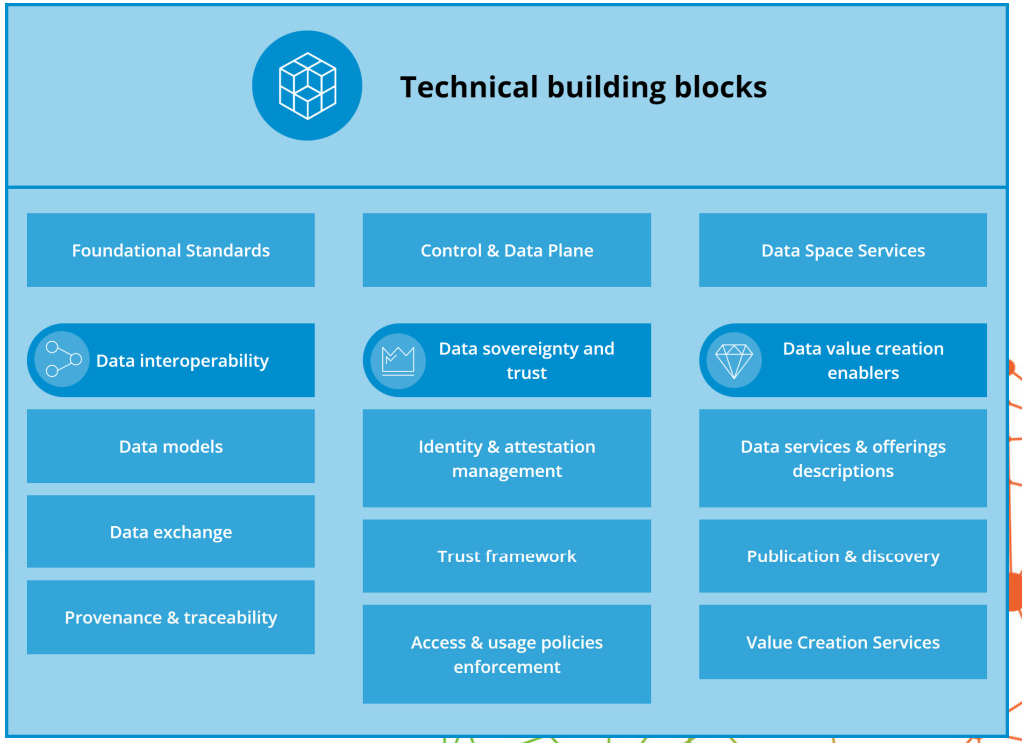
Data Spaces Business Alliance

Achieving Data Space tech convergence

Joint position of the
DSBA members

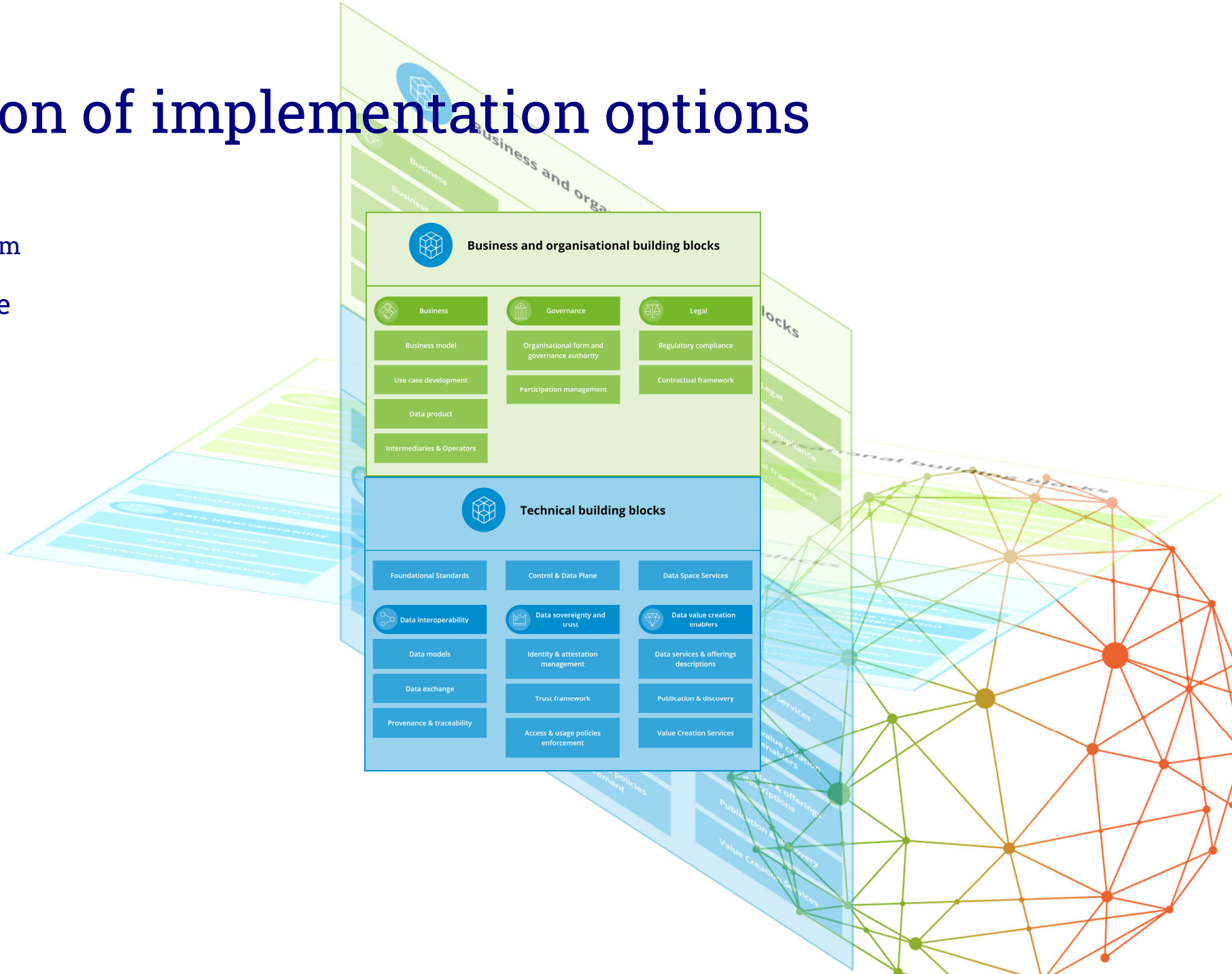


DSSC Building Blocks...

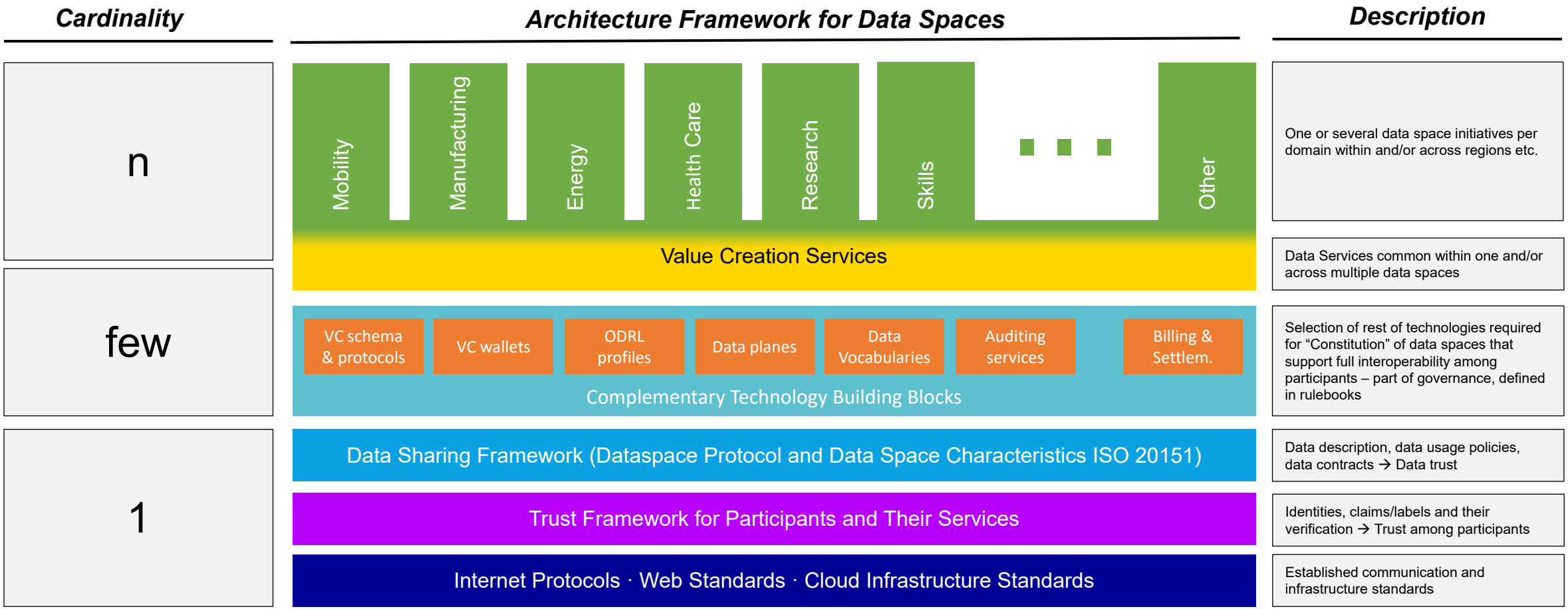


…require selection of implementation options

- Governance Plane
  - Regulatory, Domain, Ecosystem
- Technology Specification Plane
  - Distributed Model
  - Description Models
  - Trust & Identities
  - Publication & Discovery
  - Policies
- Software & Services Plane
  - OSS Community projects
  - Commercial software
  - Software Services
  - Platforms
- Economical Plane
  - Operationalization
  - Data & Service Platforms
  - Marketplaces
  - Billing

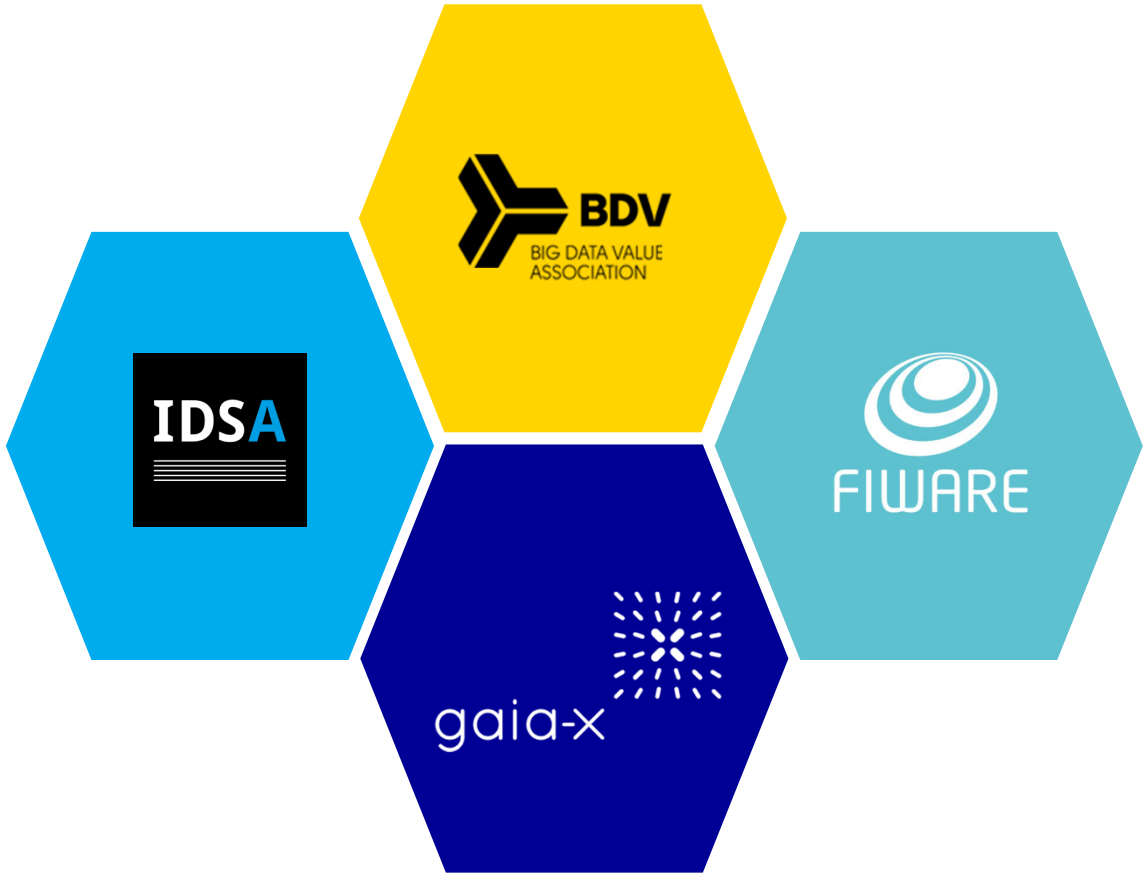


Architecture Stack for Data Spaces

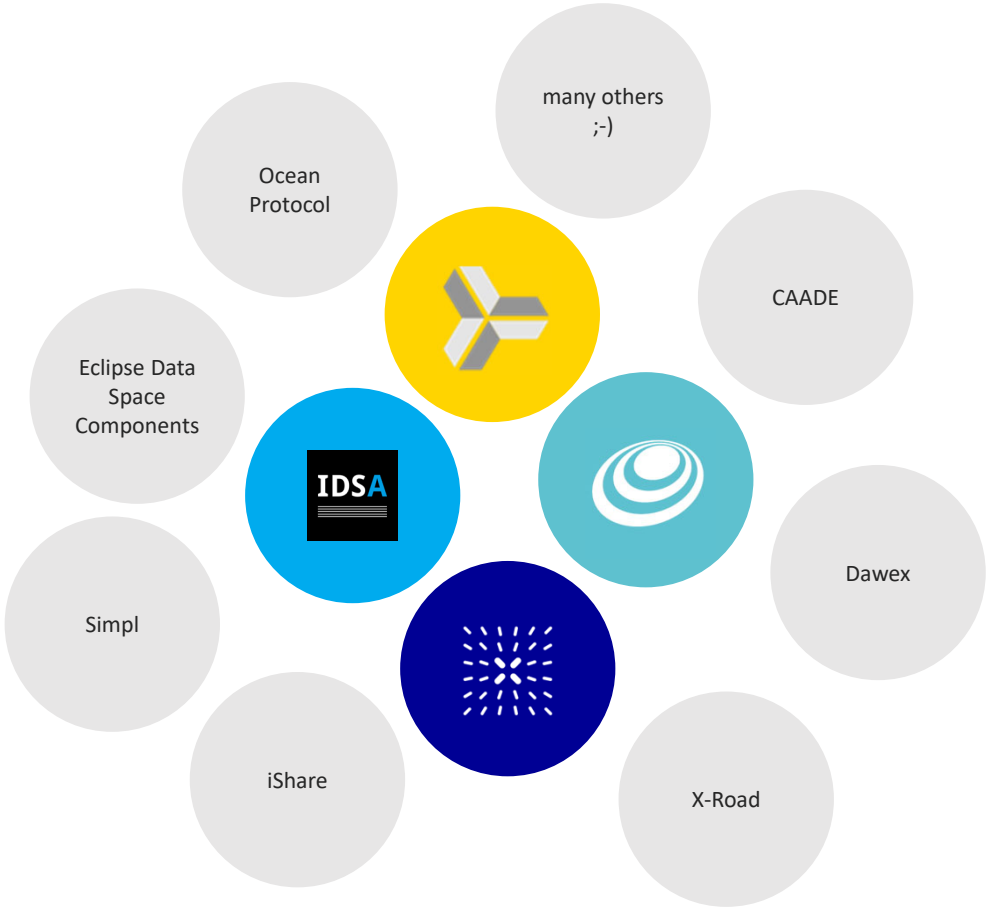


DSBA deliverables

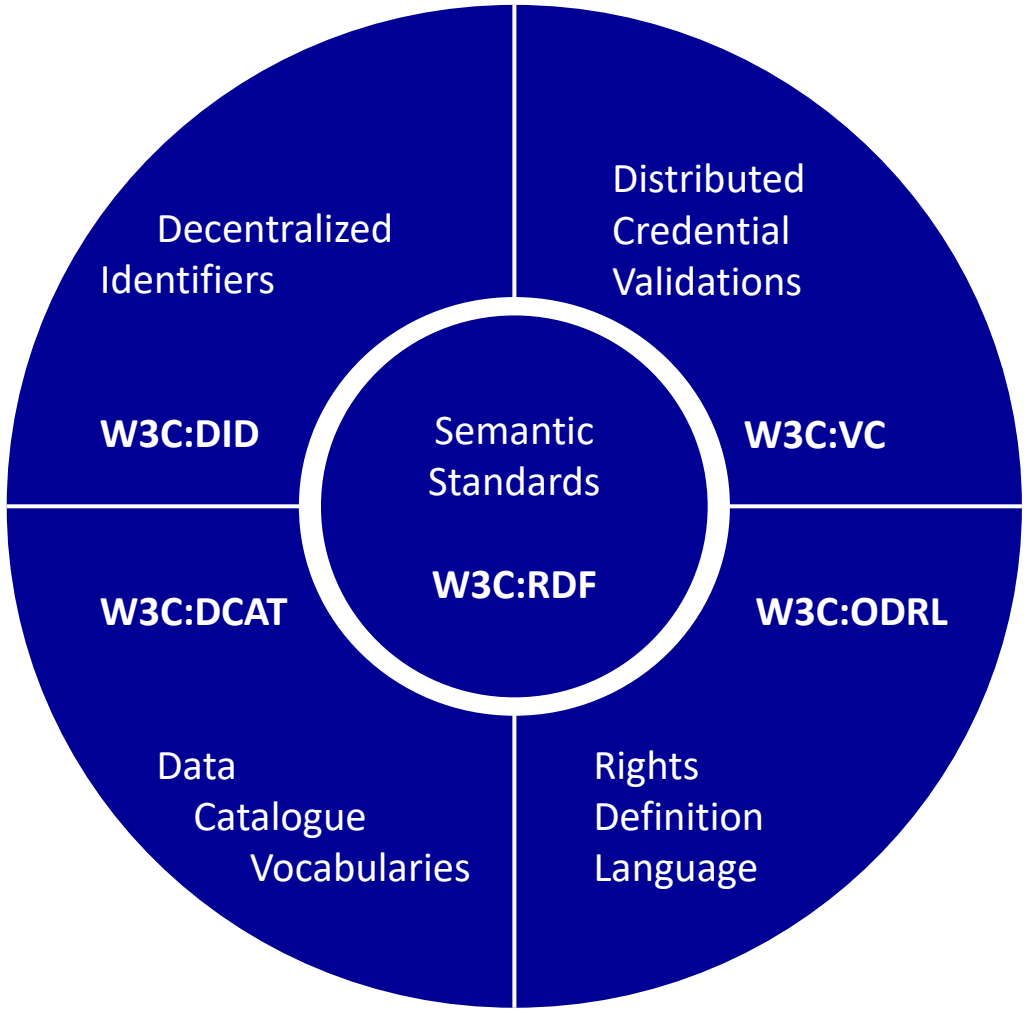
- An integrated framework

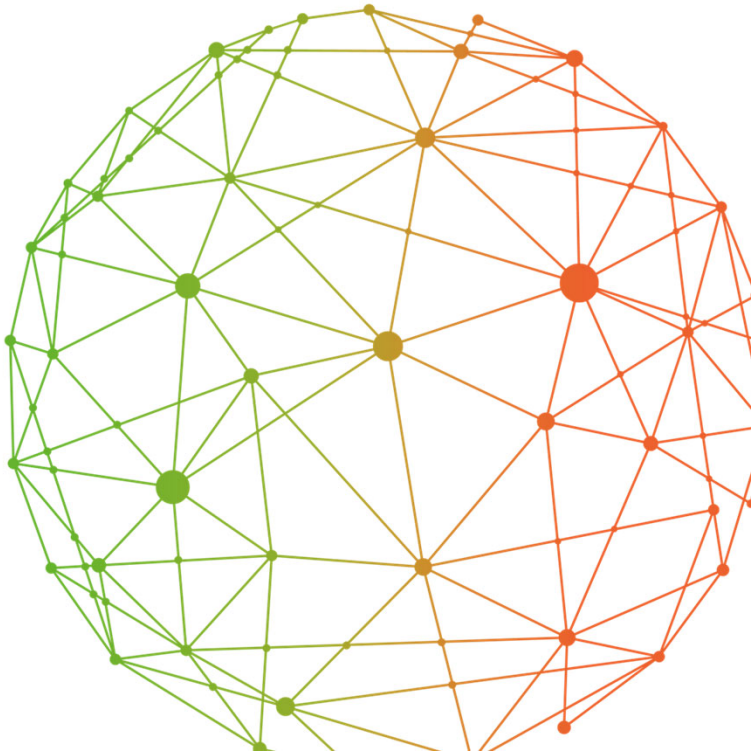


- Components for the various building blocks to implement a Data Space

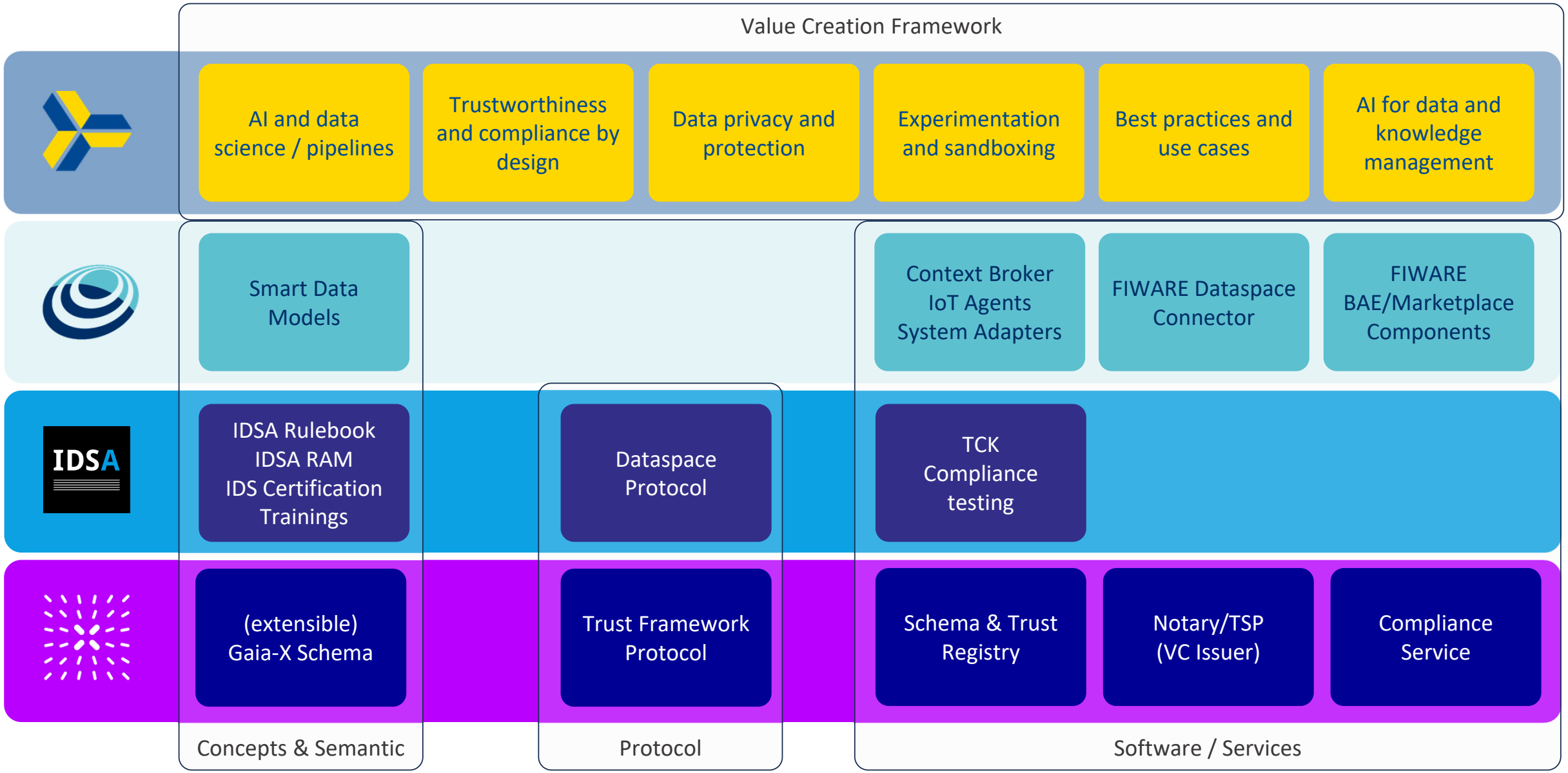


Common Web Standards used by DSBA

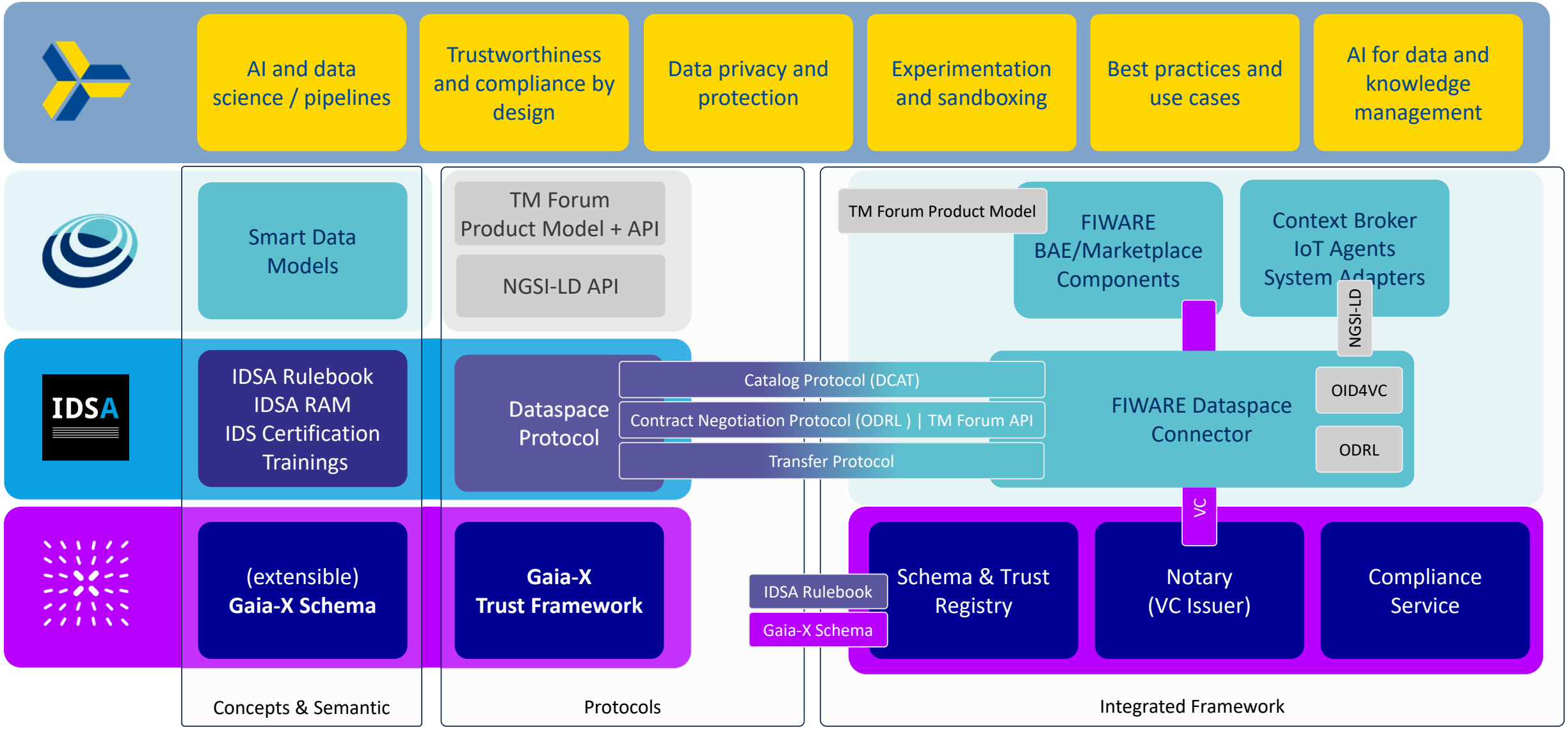




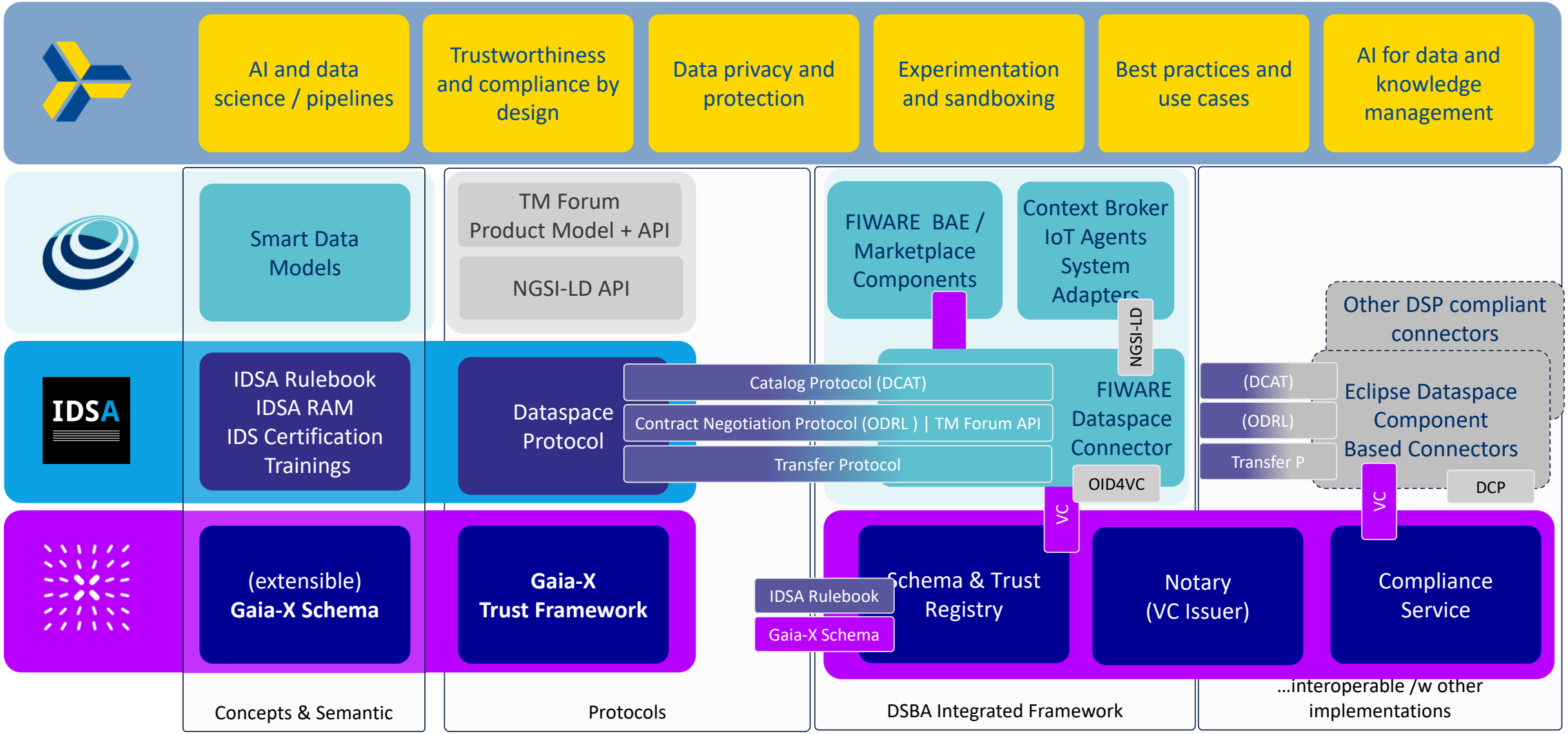
DSBA Assets


Value Creation Framework
AI and data science / pipelines
Trustworthiness and compliance by design
Data privacy and protection
Experimentation and sandboxing
Best practices and use cases
AI for data and knowledge management
Smart Data Models
Context Broker
IoT Agents
System Adapters
FIWARE Dataspace Connector
FIWARE BAE/Marketplace Components
IDSA
IDSA Rulebook
IDSA RAM
IDS Certification
Trainings
Dataspace Protocol
TCK
Compliance testing
(extensible) Gaia-X Schema
Trust Framework Protocol
Schema & Trust Registry
Notary/TSP (VC Issuer)
Compliance Service
Concepts & Semantic
Protocol
Software / Services

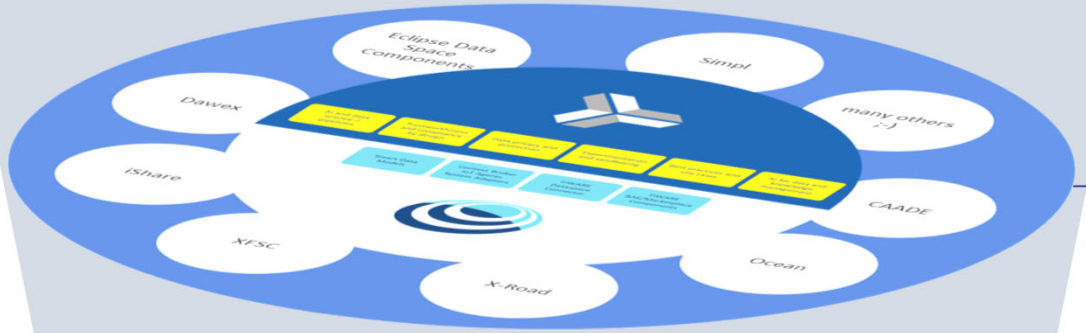
DSBA based Dataspace blueprint



Dataspace blueprints options…



Setting up Data Spaces with DSBA



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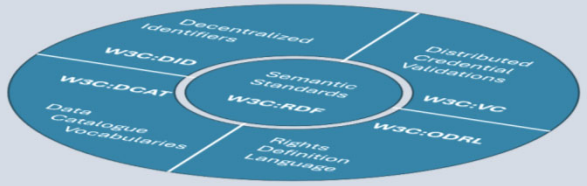
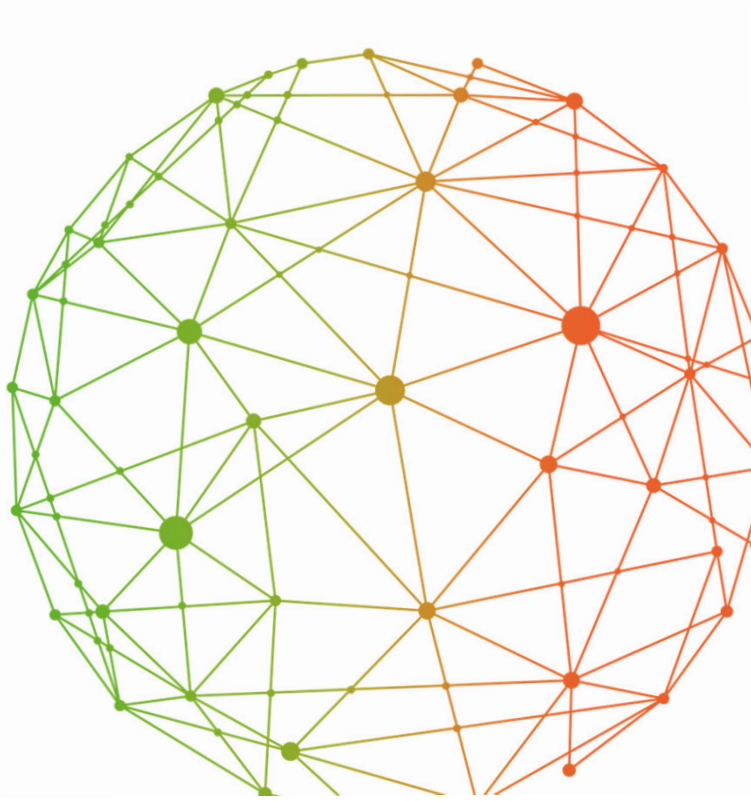
One set of
Foundational Data Space Standards

- Trust Framework
- Dataspace Protocol
- ISO 20151 Concepts & Characteristics



Foundational global standards for distributed systems


IDSA



Data Spaces Symposium

Let’s not wait too long for the first coffee

These are the sessions you can choose from at 11:00:

Track 1:

Focus session on data spaces for AI

Data Spaces unlocking AI Innovation

Track 2:

Domain session on healthcare data spaces

The future of healthcare: Unlocking value creation through data sharing

Track 3:

Domain session on language, media, and cultural data spaces

Societal impact of data spaces – Sharing language data and media resources trustworthy and effectively

Breakout track 1 on the 2nd floor:

Interactive session

From idea to business: Use case creation and data space onboarding

Breakout track 2 on the 3rd floor:

Interactive session

Does Europe need to reconsider the international design of its data laws?