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Global collaboration through data spaces: IDSA's governance and interoperability approach.

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DATA TREASURES
ARE CREATED BY SHARING DATA
AND BY GLOBAL COLLABORATION

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USAGE CONTROL IS ESSENTIAL FOR DATA ECONOMY

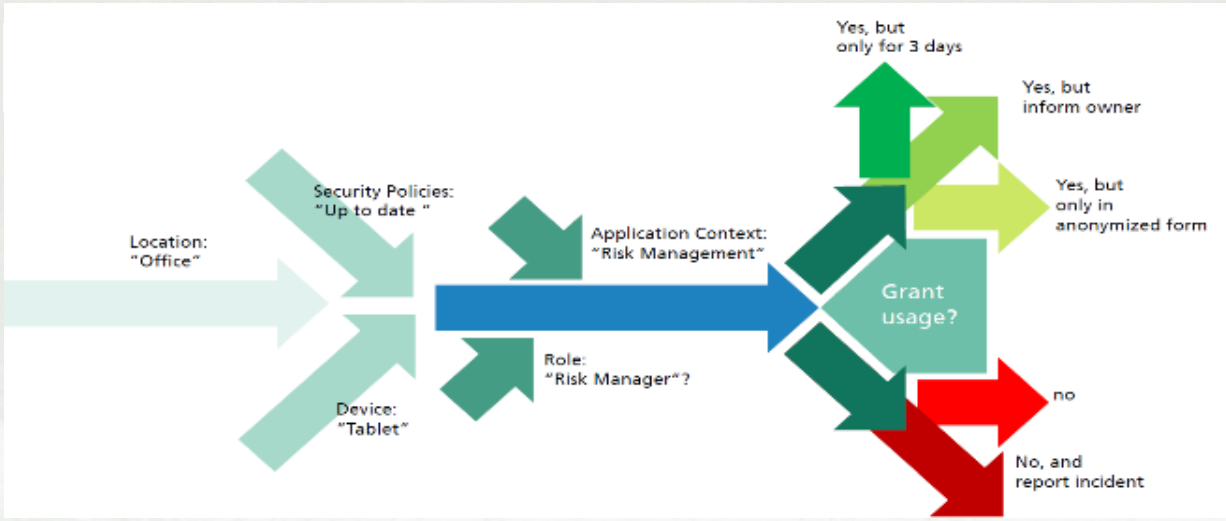
WHEN REGARDING DATA AS AN ECONOMIC ASSET

www.internationaldataspaces.org

DATA USAGE CONTROL

DATA USAGE CONTROL
AN EXTENSION OF ACCESS CONTROL

- Fine-grained policies specify how data is handled after access has been granted
- Formalization of data sovereignty requirements and their technical enforcement



Data spaces are built in many domains, we need to avoid fragmentation

Integrating global standards through the Dataspace Protocol

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Automotive, Supply Chain and Manufacturing

- Carbon footprint tracking, Digital Product Passport, Master Data
- Core players: OEMs (BMW, Mercedes, VW, Nissan, Renault, …), Suppliers

Green, Agriculture and Smart Cities

- Carbon Neutrality, Resilience, SDGs
- Governments, municipalities, geo data, weather, farmer, telco operators,

Mobility and Logistics

- Seamless transport, resilient supply chains, new mobility concepts, EVs
- Mobility service providers, Logistics service providers, governments, shippers

Media, Cultural Heritage

- Fighting fake news, copyright issues, digitalization of cultural heritage
- Newspapers, publishers, broadcasting stations, museums

Health

- Genom Data, Cancer Imaging, Improved medication, Digital hospital
- Government, doctors, pharma, hospitals

Energy

- Carbon Neutrality, Network balancing, renewables,
- System operators, energy providers, governments, cities

So much more.

Data Spaces as enabler for a brighter future

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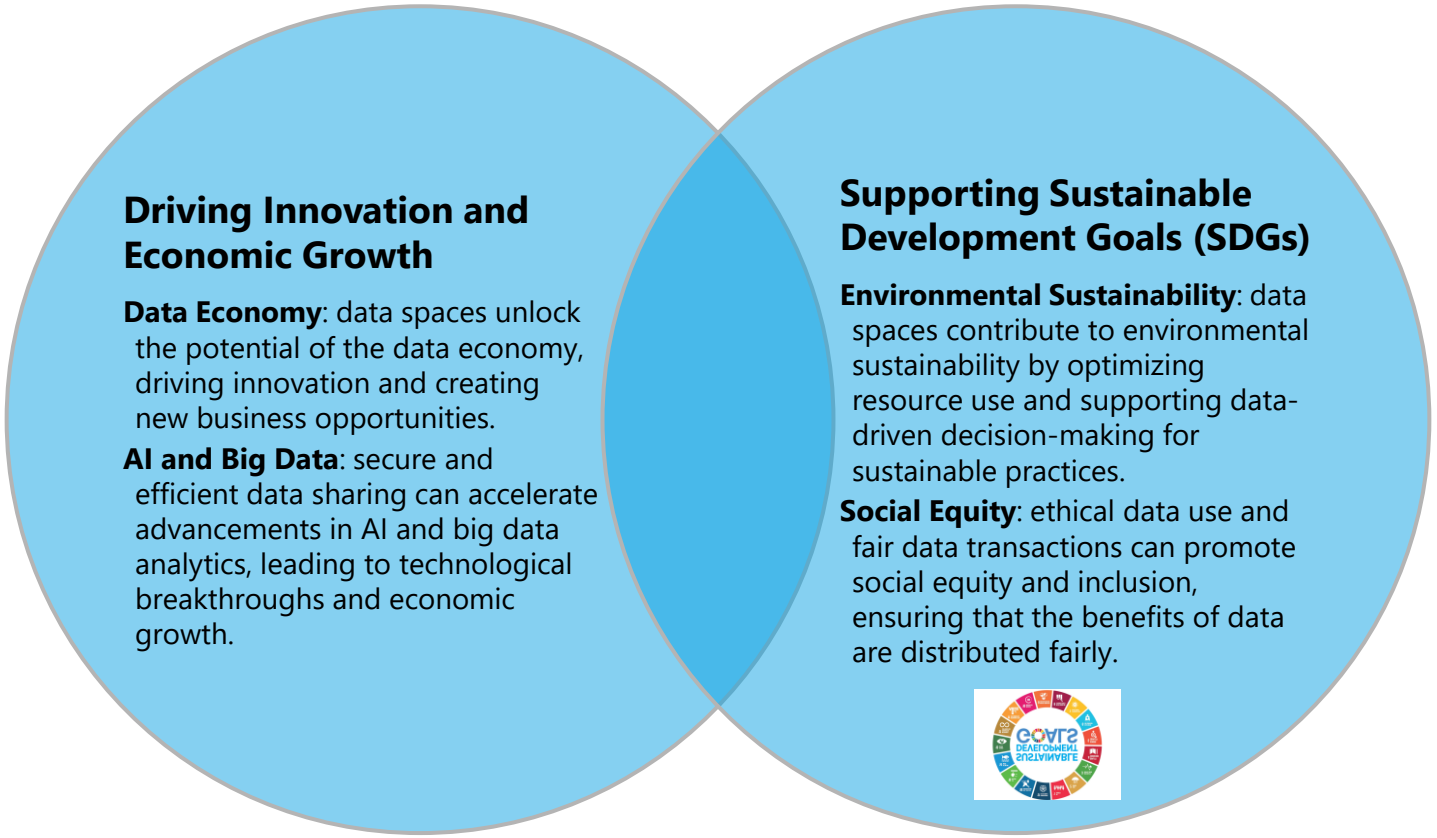

Data Spaces

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A game changer for data economy

It is the concept of data spaces:

- Protected environments in which participants can freely share data by
- adhering to clear rules that protect data sovereignty,
- ensure transparency and fairness, and thus generate economic value.

Data spaces **provide data sovereignty** - a great benefit in itself and a game changer for the data economy of the future.

What does a data space do? How does this concept help?

Generic concept for data spaces

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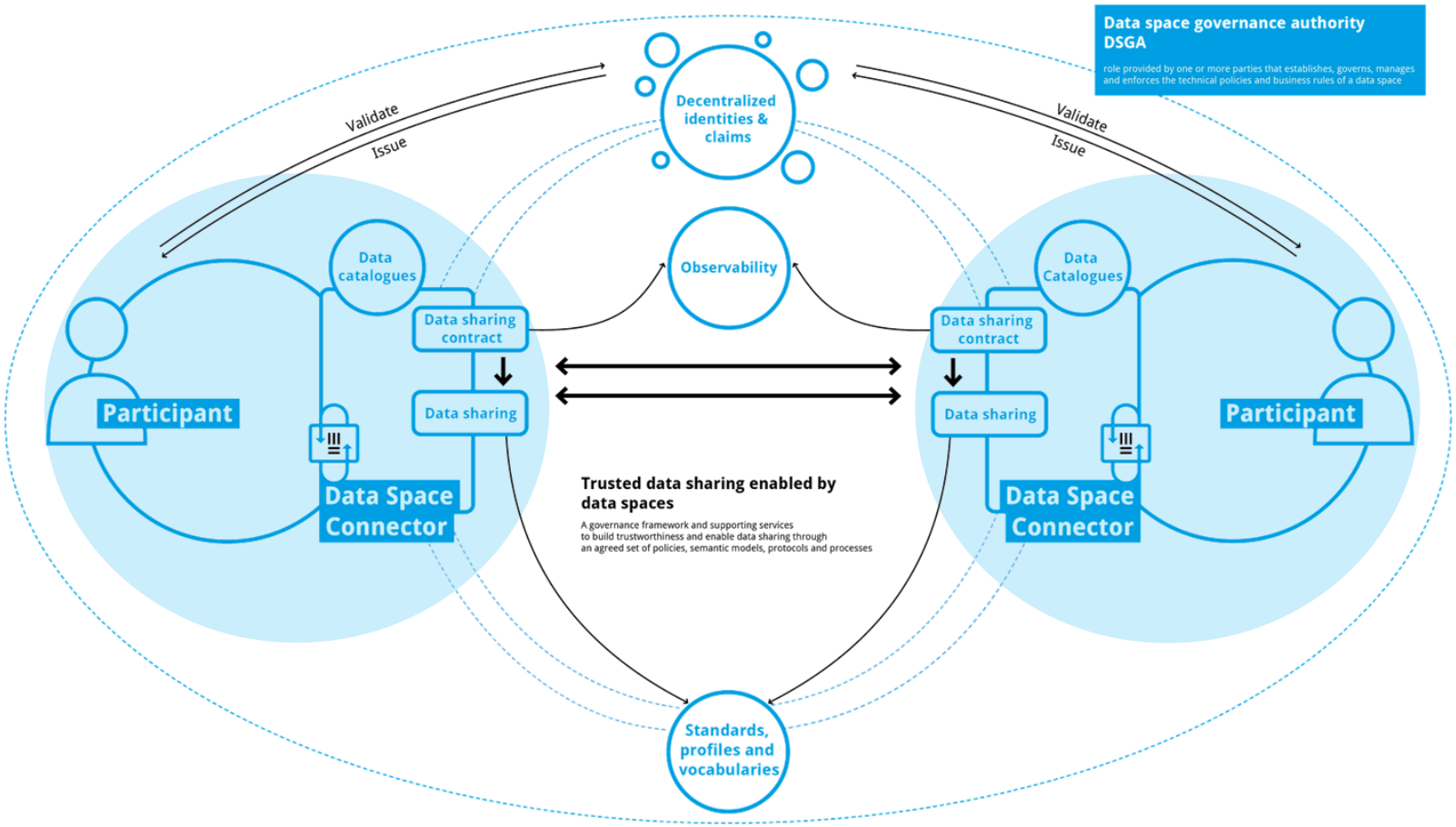

Machine readable policies and claims

AI, Trust and Trustworthiness, Data Governance

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- **Data Governance** is about the **decisions humans take**.
  (human-based system comprising directing, overseeing and accountability)
- In General, **trust** is about **humans deciding** to trust someone or something, especially in the field of AI.
- But in Data Spaces Trust is a decision based on the **reconciliation of claims and policies**. Machines can decide that too.
  [ISO/IEC 20151: decision by an entity to assume that a product, service or entity will behave as expected for a given circumstance]
- **Trustworthiness** is a set of **verifiable evidence** that can be used to form trust.
- data management are functions that provide **access to data,** performs or monitors the storage of data, and **controls input-output operations** all within a data processing system

Rules & policies for the data economy

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Data spaces enables the enforcement of different policy systems

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

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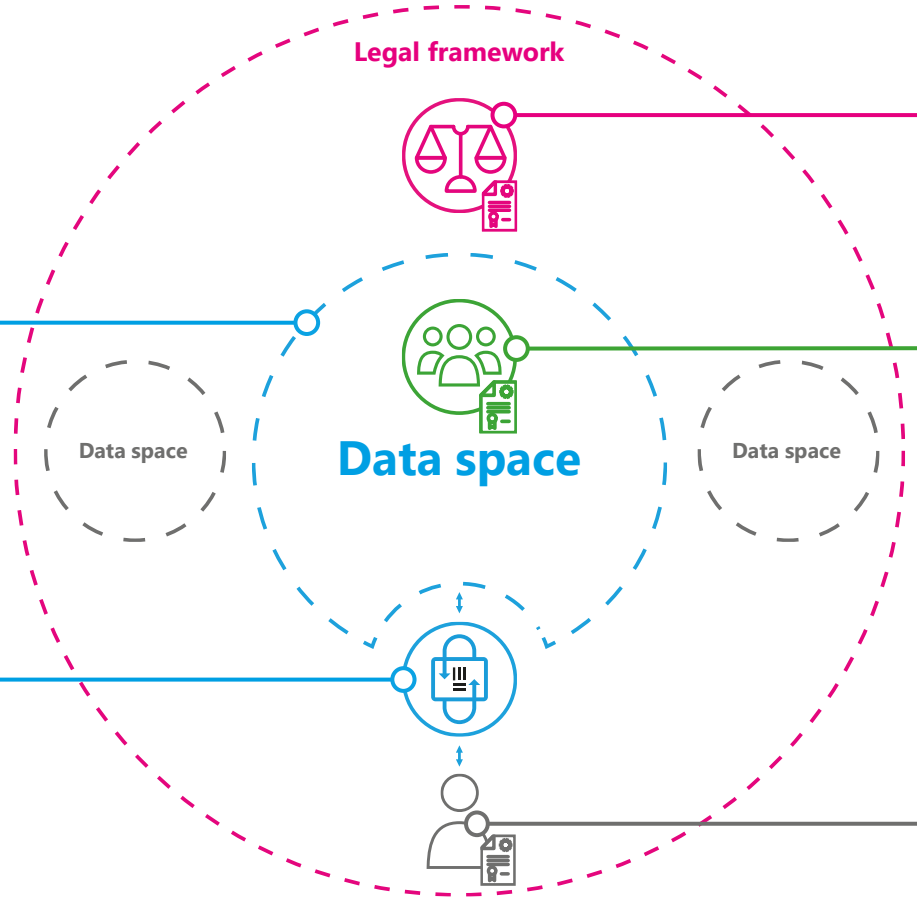
The **IDS-based data space connector** connects participants with the data space.

Connectors understand and exchange data based on:
- Global/general policies
- Data space policies
- Data usage policies



The **government** establishes the legal and organizational framework, the **general policies** for data sharing in a country or region.

The **data space authority** defines the **data space policies**.

Which policies are mandatory depends on the design and its requirements.

Participants may choose additional **data usage policies** in their data contracts to further restrict access and use.

Vision: The Data Space

A hypothesis

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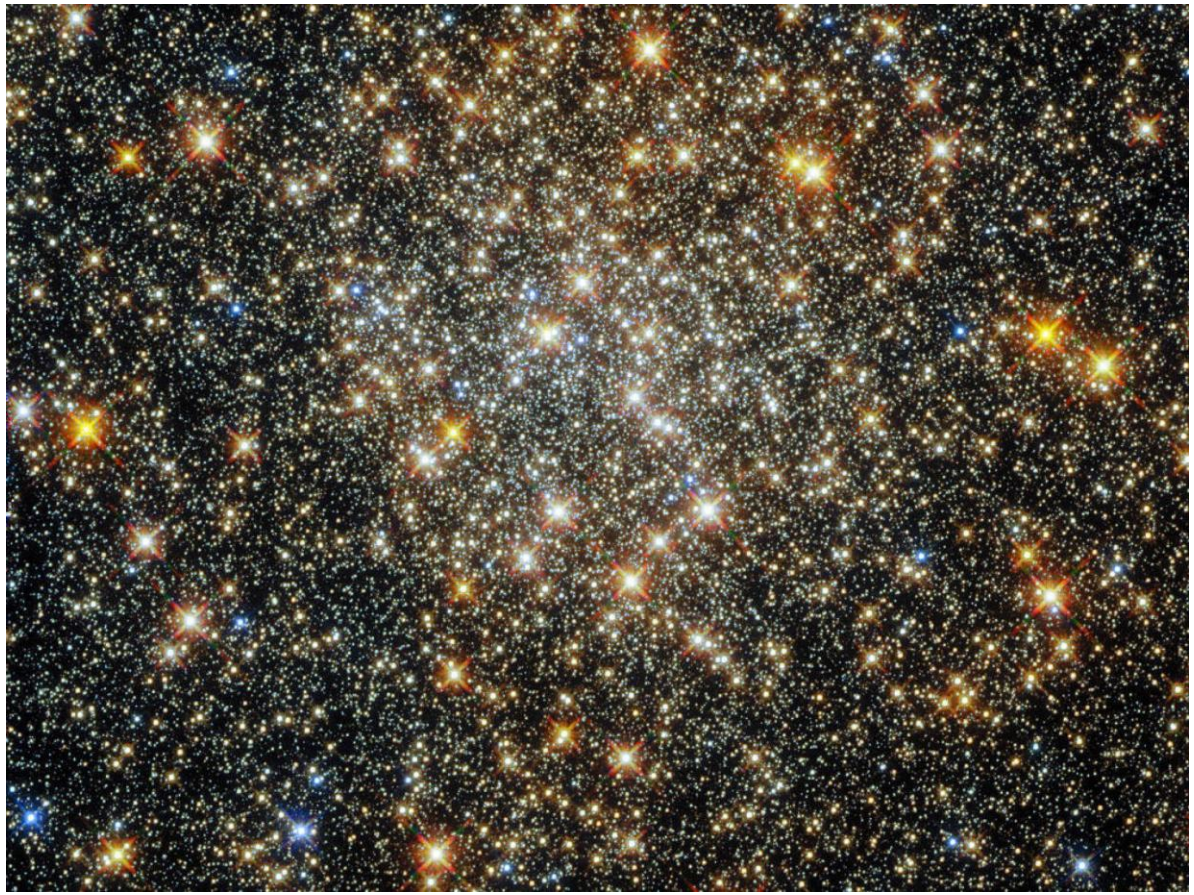
If there is a foundational layer for data spaces, is there maybe only one „Data Space“ (in the sense of the universe) and all the other „Data Spaces“ are just defined by the Data Space Governance Authorities and their specific rules, policies and trust mechanisms (on the organizational layer of interoperability)?



Source: ESA / HUBBLE AND NASA / R. COHEN

Interoperability has many faces

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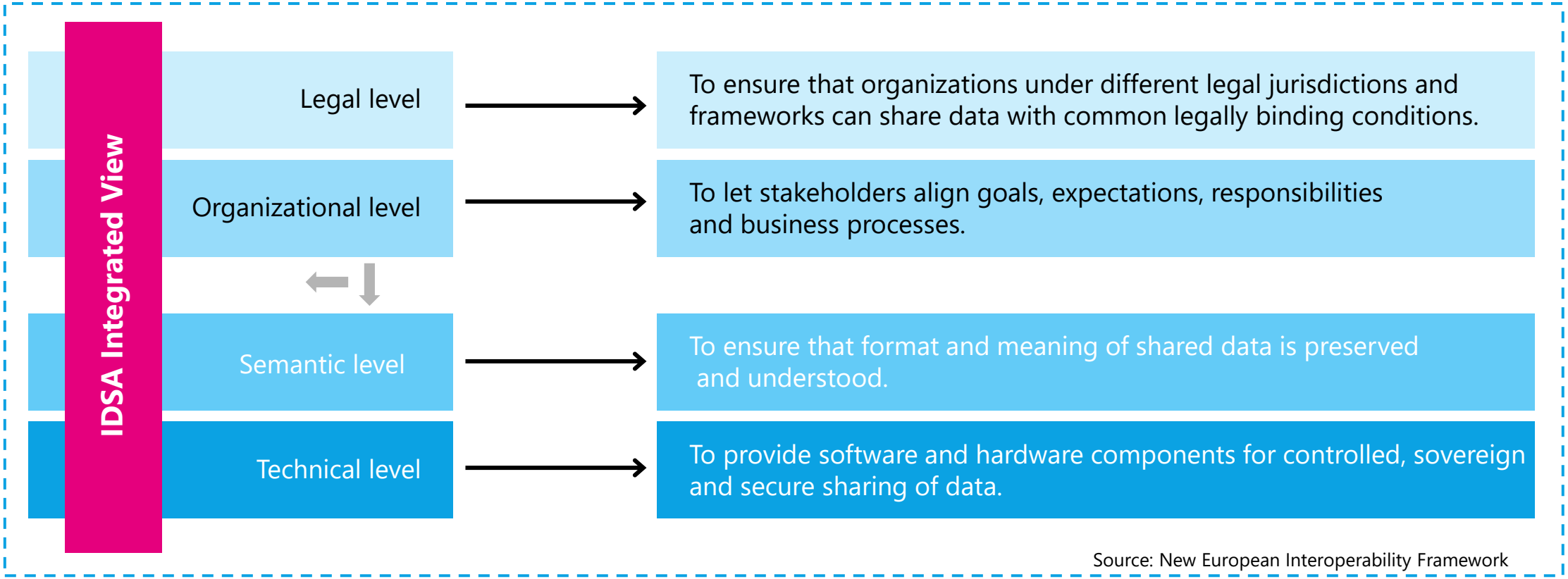
Common governance models help achieving inter dataspace interoperability



Source: New European Interoperability Framework

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

IDSA Rulebook – design and governance scheme for data spaces

We play an ecosystem game

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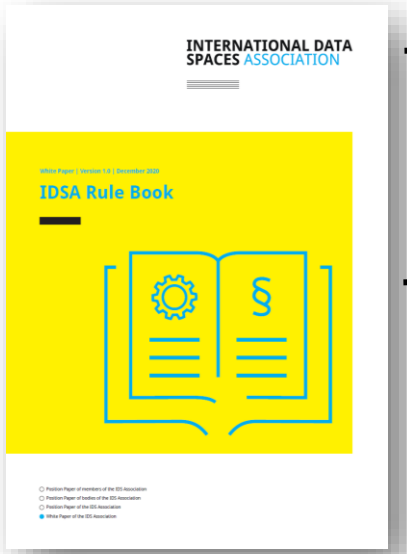

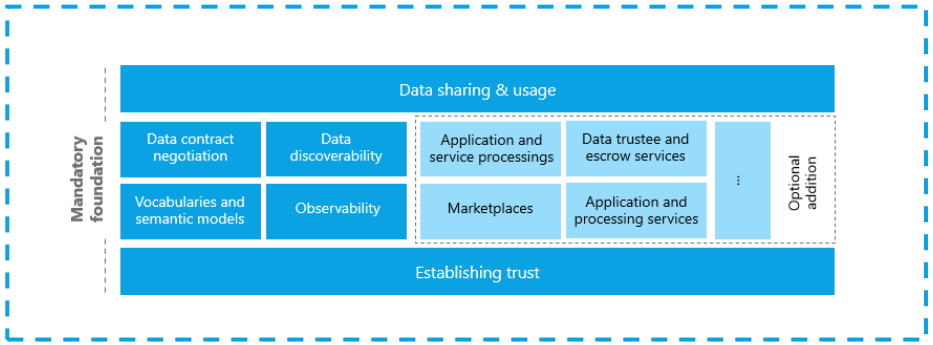

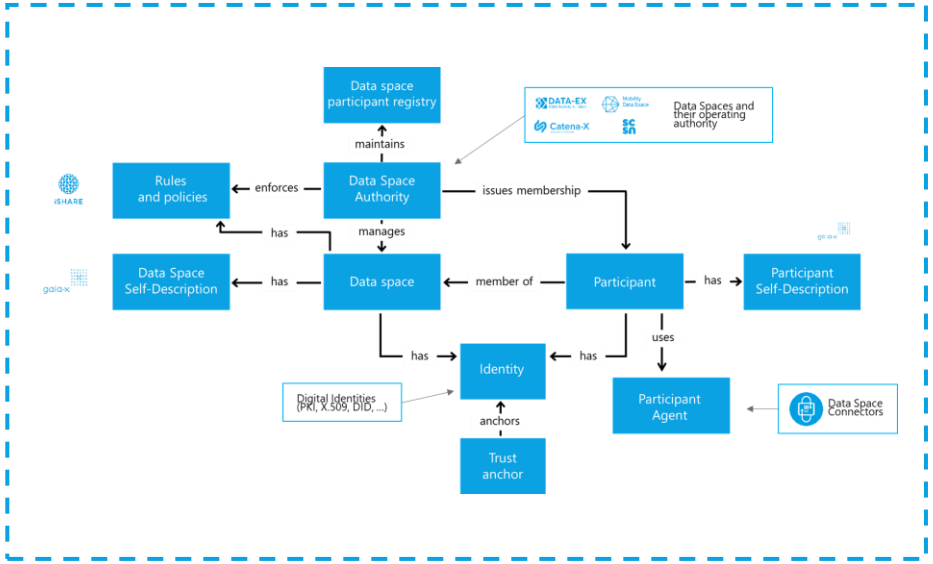

The **IDSA Rulebook** brings together …

- the requirements from data economy …
- with measures for technical, semantic and organizational interoperability.

Establishing trust in a data space

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A data space needs to define policies that specify what attributes an applicant must meet to become a trusted participant. This is achieved through a **Data Space Self-Description (DSSD),** that allows new members to provide attributes in their **Participant Self-Description (PSD)** in a format that can be understood by the **Data Space Governance Authority (DSGA).**

Deciding which **trust anchors** and **trust frameworks**, and thus which rules and procedures of issuing and validating attributes are used, is the responsibility of the DSGA and of the participants of the data space.

The DSGA is responsible for

- establishing the policies and rules of the data space
- issuing membership credentials
- regulating the lifecycle of membership (participant discoverability, issuing of membership credentials, verification services for membership proofs)

The DSGA can provide other optional services: observability and auditing, brokering and marketplaces, providing vocabularies or other services required by the data space members.

Different policies in data spaces

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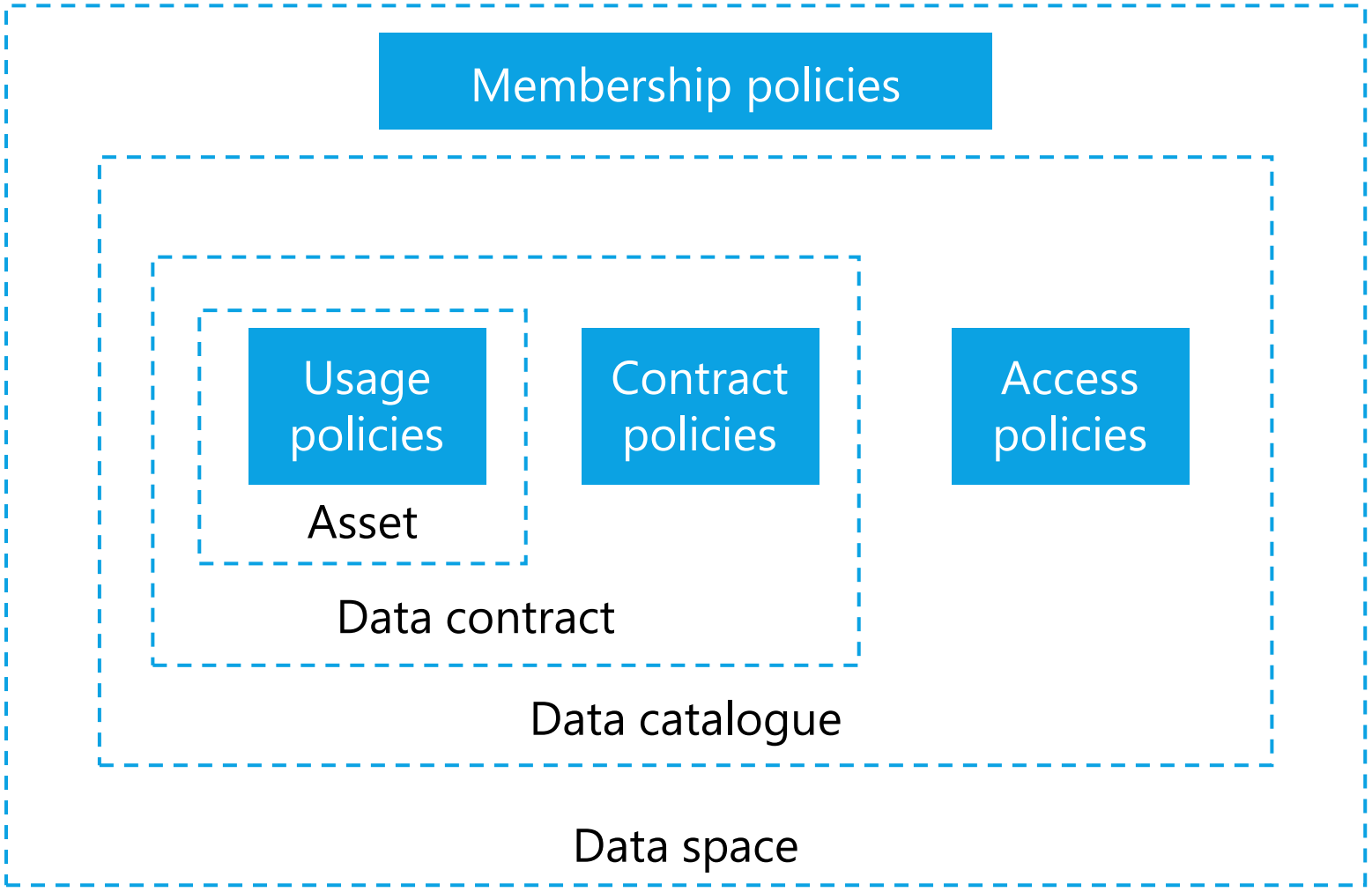

Make the connection and enable data economy

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Data space connectors (participant agents) lay the basis for interoperable trustful data sharing

- **Connects participants in a data space** – to share, utilize, benefit from data.
- Ensures **trust through IDS Certification** and **cyber security** assessment.
- Connects to **trust frameworks** and **identity management**
- Includes **identity & policy management**, ensures **data usage control**.
- Guarantees **interoperability**.
- Understands and enforces **data usage policies**.
- **Neutral master** for other connectors of diverse feature sets.

System Layer – The Connector concept

The connector or participant agent – functional components

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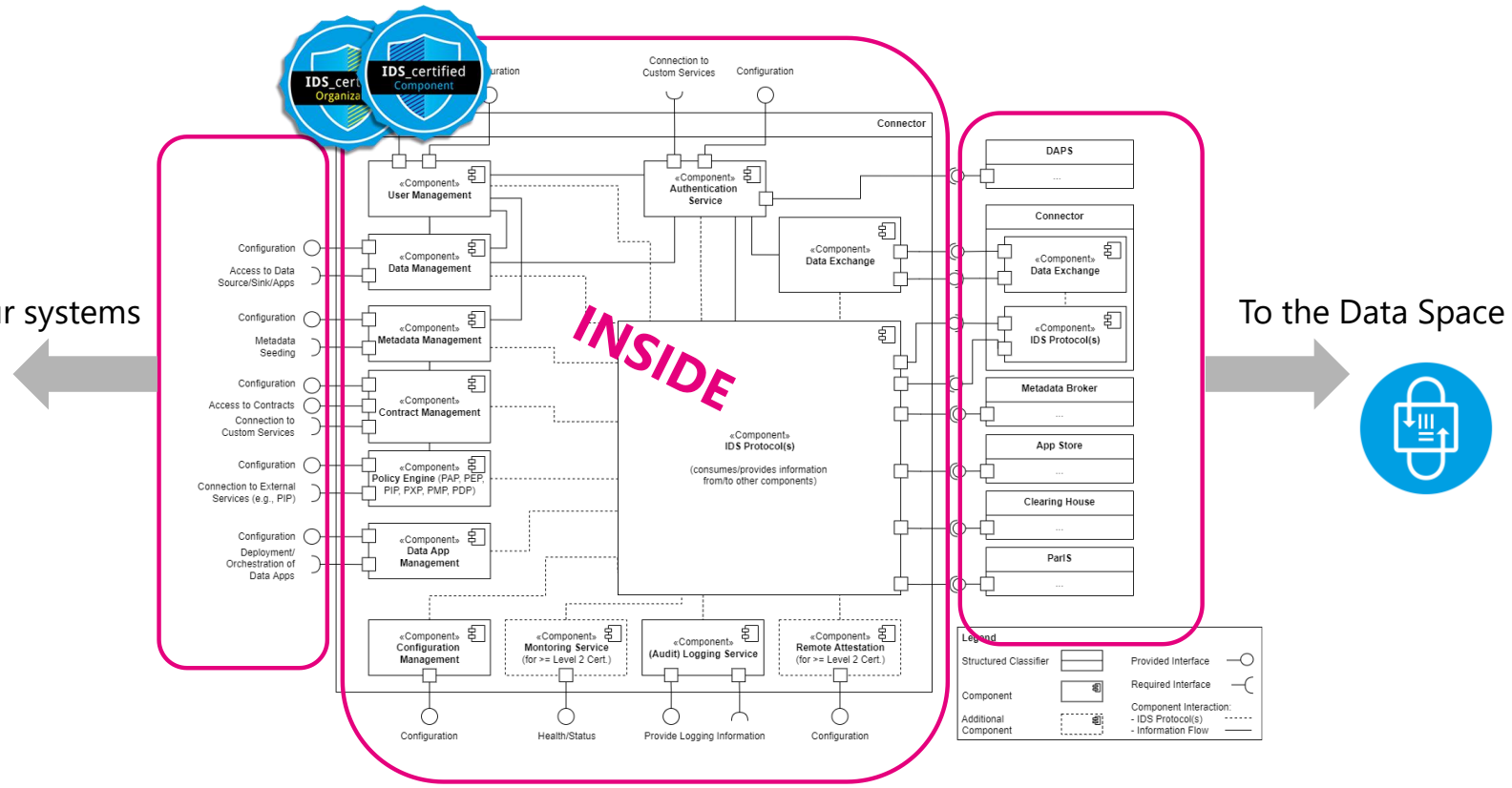
- **Software component** that is being defined by IDSA community since 2016
- Enables **data sharing** between different parties under predefined policies
- **Strictly controlled** environment to enable trust and data sovereignty
- Different **implementation patterns** (embedded, cloud, as a service, …)

We strive for **diversity of solutions** that fit different requirements.



The need for Dataspace Protocol

Ensuring data space interoperability

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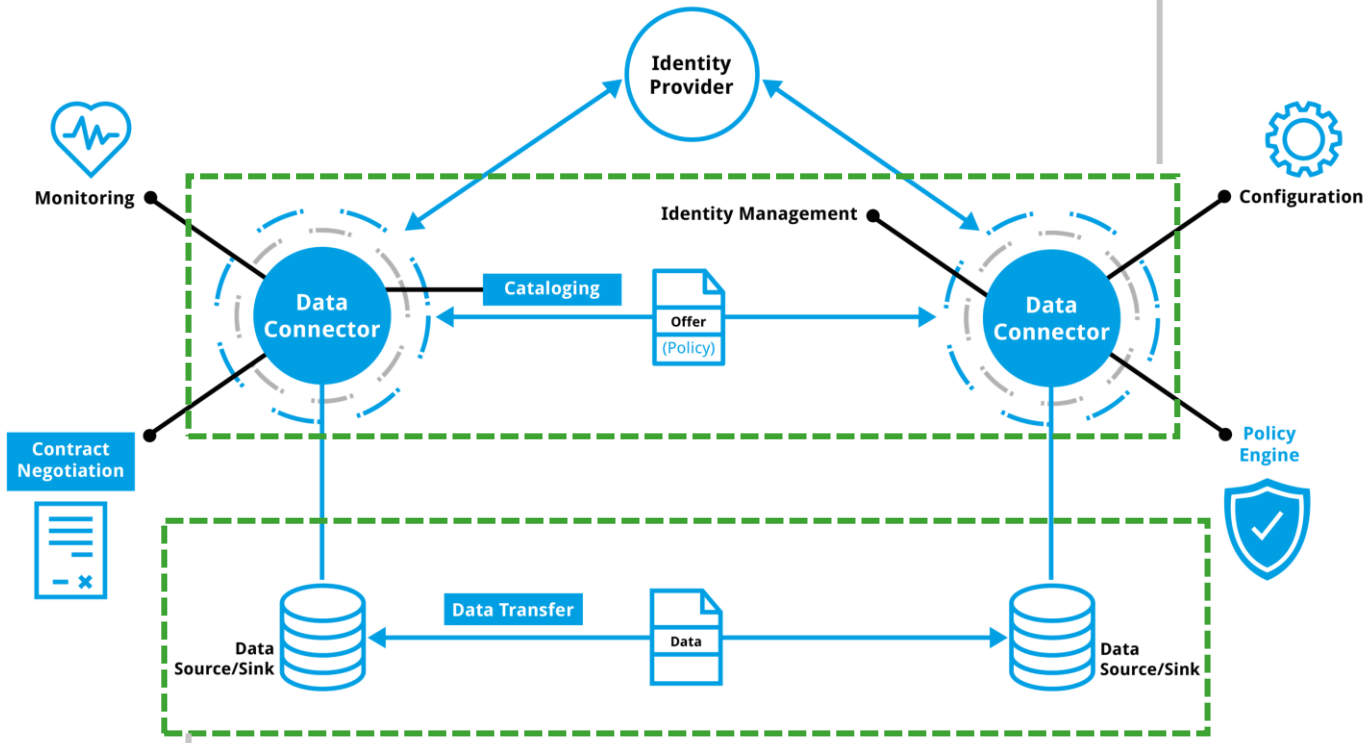
Control Plane
(one standard procedure to negotiate data sharing)



Data Plane
(several possible for different data sharing scenarios:
confidential data sharing, streaming data, event based data, edge devices, ...)

Promotes seamless technical interoperability, while addressing certain aspects of semantic interoperability.

Enables standardized data exchange across different data space instances.

Provides flexibility and scalability through the separation of control plane and data plane.

Driving data spaces innovation

Collaborators defining and embracing the Dataspace Protocol

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Who co-defined it?

SAP
Microsoft
IONOS
Fraunhofer
SOVITY
FIWARE
eng
HUAWEI
TNO
Tekniker
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
T Systems
BOSCH
ZF
Catena-X
BMW

Who is currently using it?

Catena-X
Tekniker
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
ONENET
one network for Europe
IONOS
ZF
AMADEUS
VTT
SOVITY
Cofinity-X
PROMETHEUS-X
T Systems
NTT DATA
HUAWEI
SAP
truzzt
tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
MANUFACTURING-X
X-ROAD
Open
... and many more

We need a soft infrastructure for data spaces like GSM for mobile telecommunication

National flavors and power by using global standards

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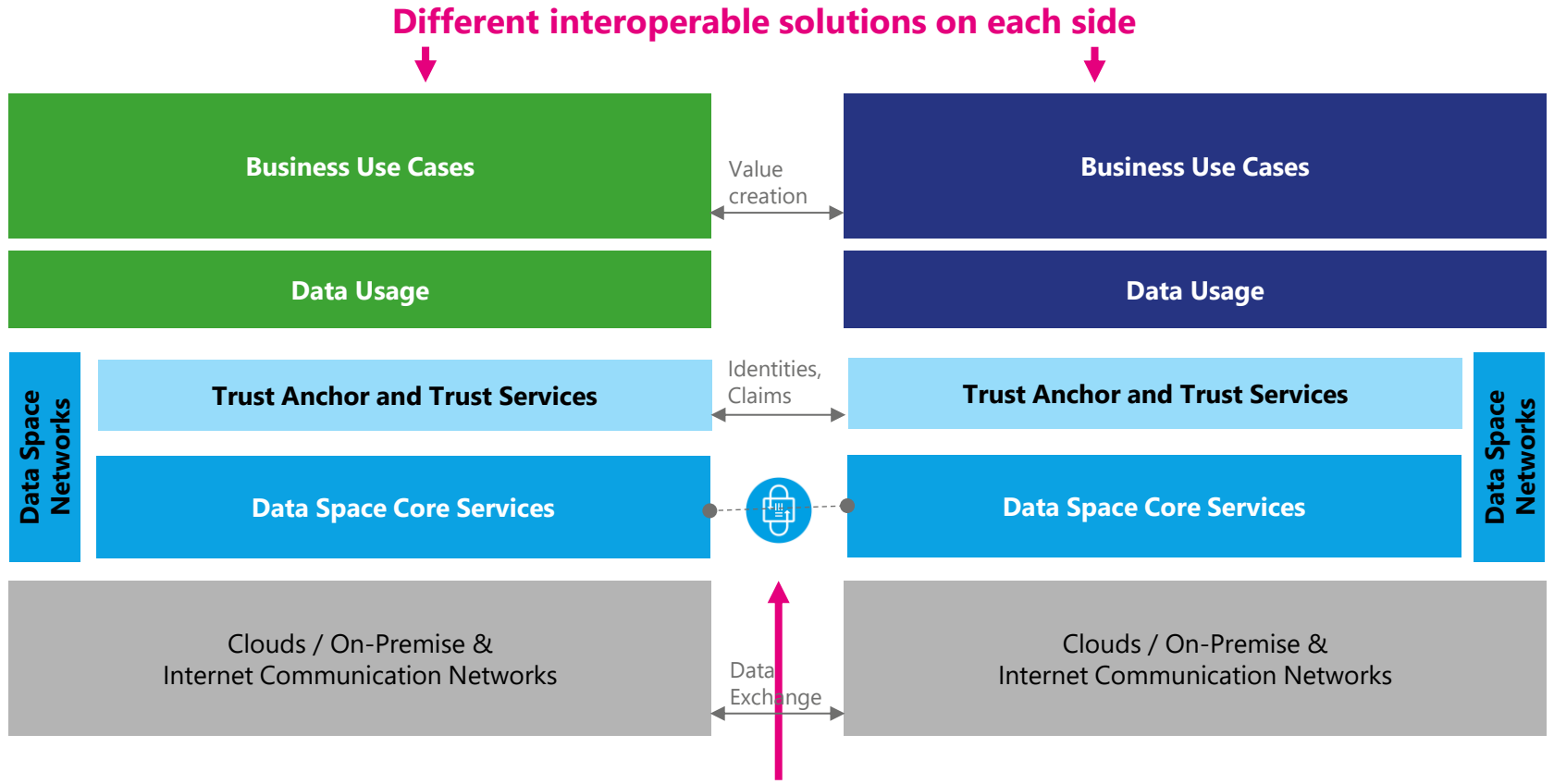
Specific data strategies in different economic areas

Global standards to ensure global value creation

Companies (Telco operators, CSPs, SW vendors) provide the new soft infrastructure for data spaces



We need a soft infrastructure for data spaces like GSM for mobile telecommunication

National flavors and power by using global standards

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Specific data strategies in different economic areas

Global standards to ensure global value creation

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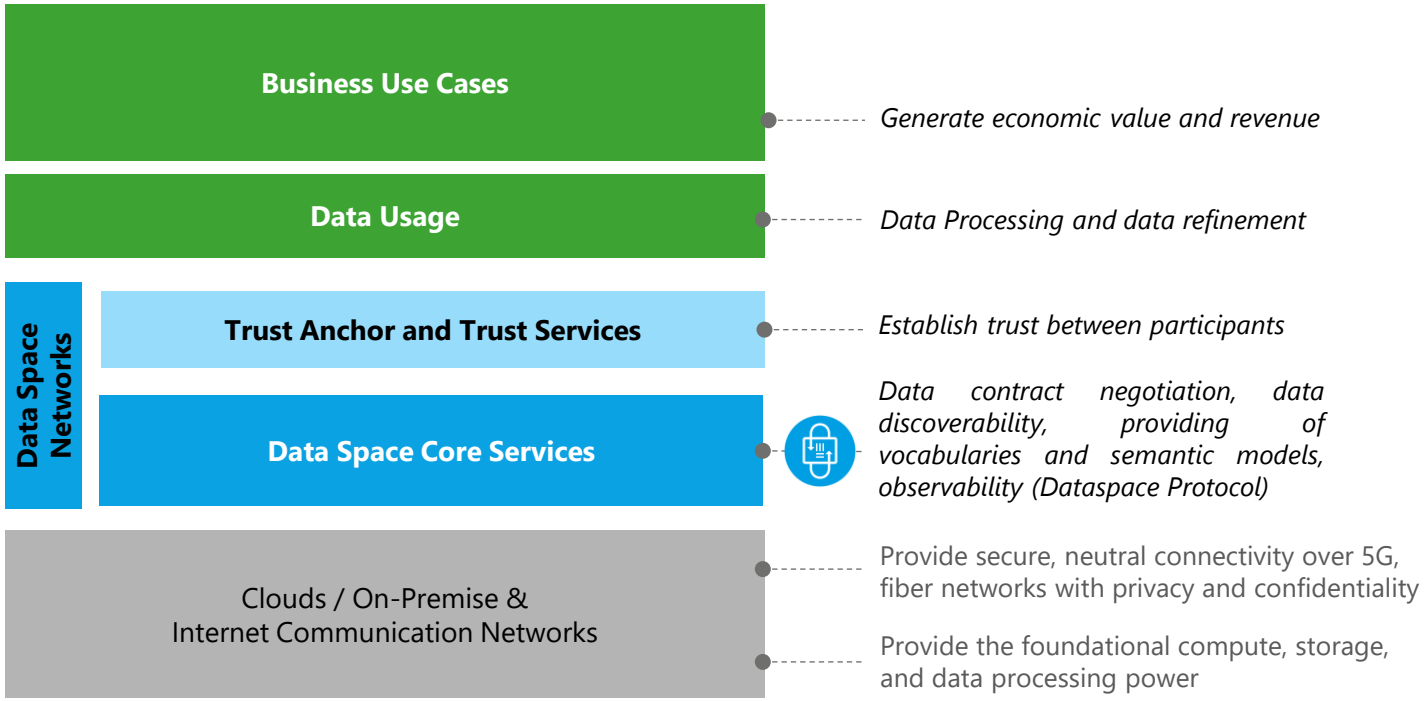

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National flavors and power by using global standards

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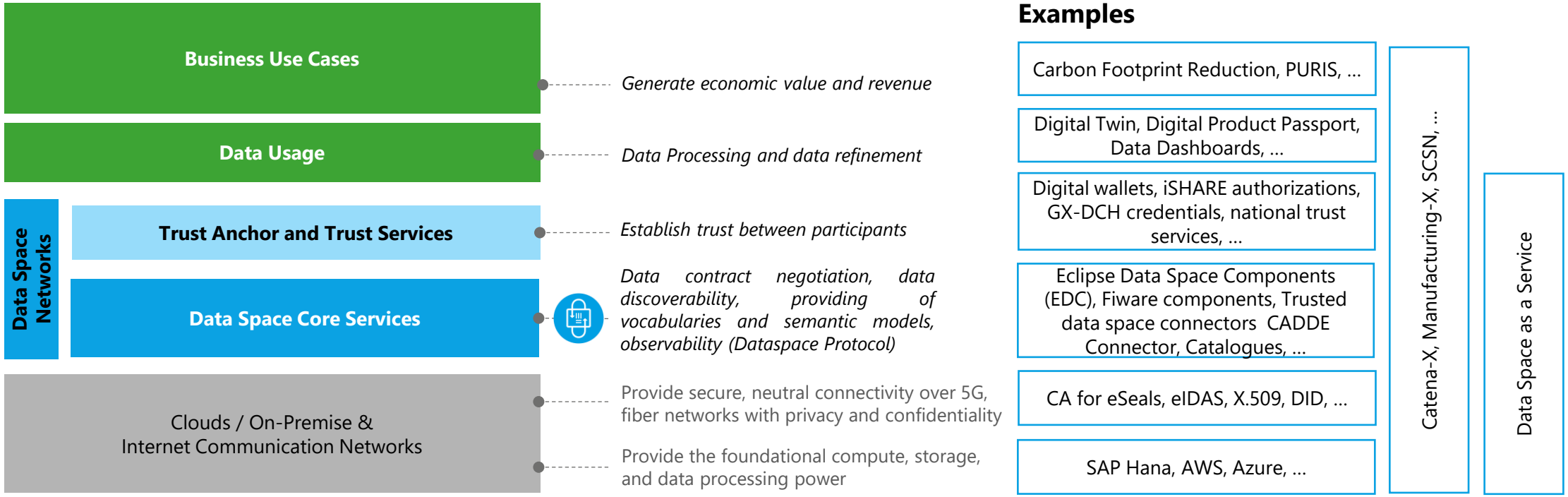

International. Data Spaces. Association.

We know what is going on and can help.

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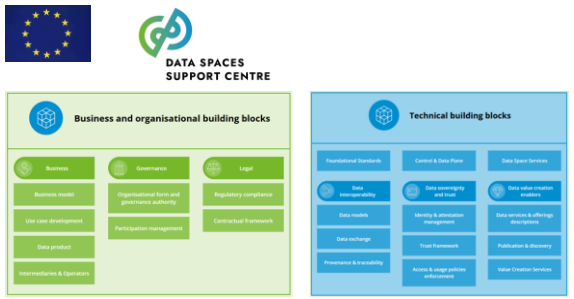
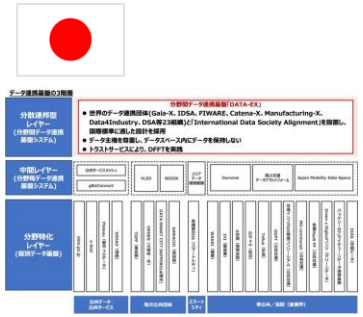
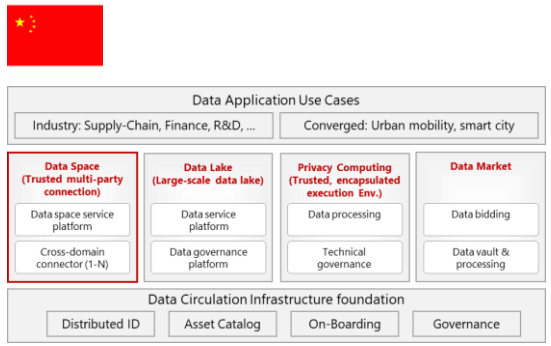
Harmonization of frameworks and data strategies on global level







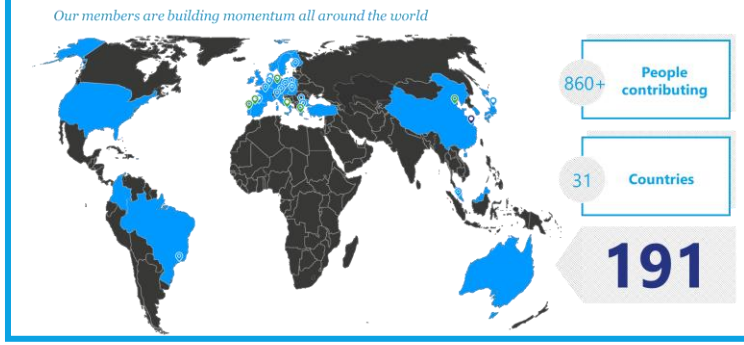
...and much more...

IDSA is the only **true international** organization about data spaces.

Driving global standards

IEC ISO IEEE W3C CEN CENELEC

Strong link to relevant economic areas



Global players to provide data space solutions globally

Thorough ground for data spaces

IDSA Manifesto for Data Spaces and global standards

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10 Principles of Trusted Data Sharing in data spaces

+

ISO/IEC CD 20151
Dataspaces concepts and characteristics

+

Dataspace Protocol

1. **Dataspaces enable Trusted Data Sharing**
   "Dataspaces are a mechanism of trust"
2. **You shall have full autonomy in deciding with whom you share data with and under what conditions**
   "Your data, your choice"
3. **You shall be responsible for ensuring that you are free to act and can act autonomously**
   "With great responsibility comes great power"
4. **All participants shall be treated equitably in their rights and obligations**
   Dataspaces are decentralized & neutral
5. **Data Sharing is executed on seperate peer-to-peer channels**
   "Data does not flow through the Dataspace"
6. **Dataspaces shall be based on open standards**
   "unity in standards, freedom in implementation"
7. **Dataspaces shall be infrastructure agnostic**
   "there is no single platform to rule them all"
8. **Dataspaces are building blocks for Data Ecosystems**
   "Dataspaces are not data ecosystems"
9. **Dataspaces shall be business model agnostic**
   "the opportunity is boundless"
10. **You shall honor your data contracts and its associated policies and verify adherence by others**
    "act in good faith, but verify"

IDSA assets – from theory to practice

How we change the way data is shared

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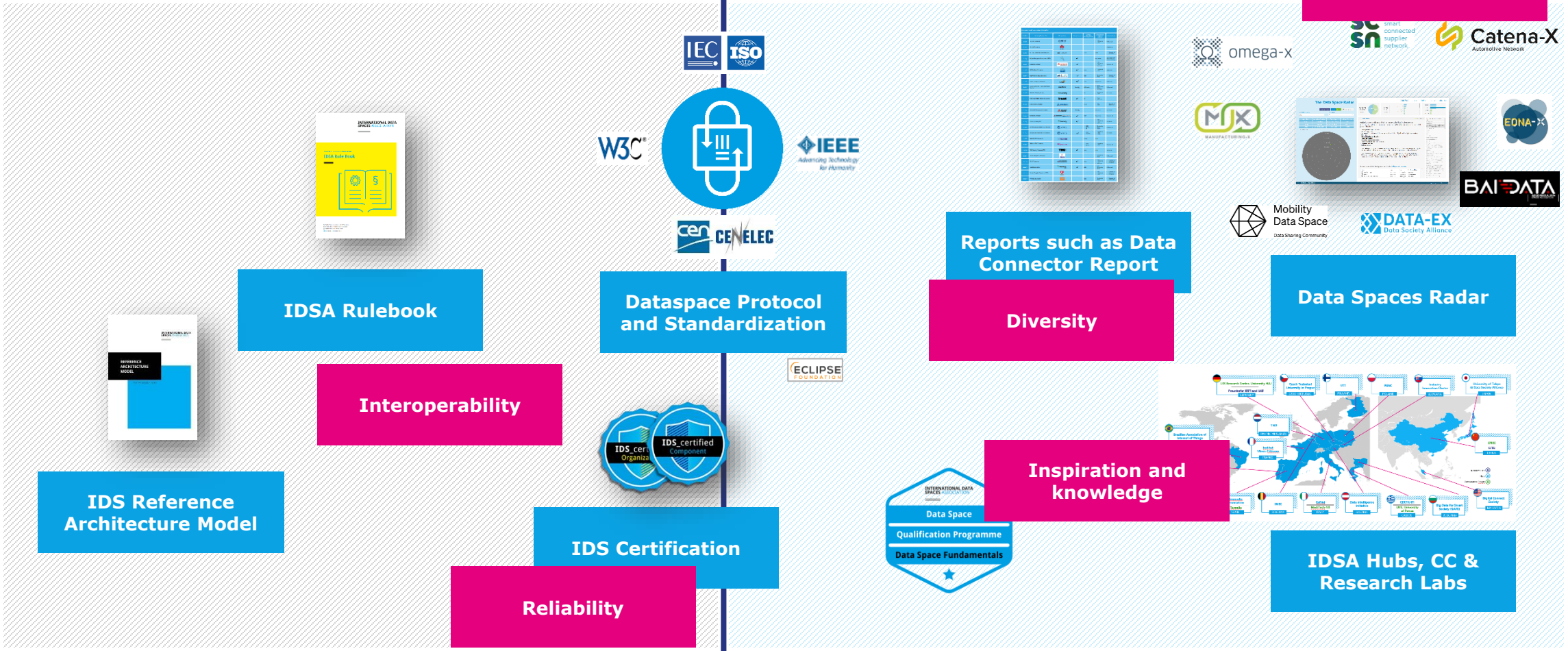

Why now?

It's time to provide clarity

- Market demand for **mature, standardized data spaces** is increasing
- Existing definitions **lack prescriptive clarity** – ISO/IEC 20151 fills this gap
- Standardizing data spaces aligns with the growing need for **standardized digital business environments**, such as cloud

ISO/IEC 20151: Dataspace concepts and characteristics

AI's growing appetite: more data and high quality data

Most of the data is yet not shared

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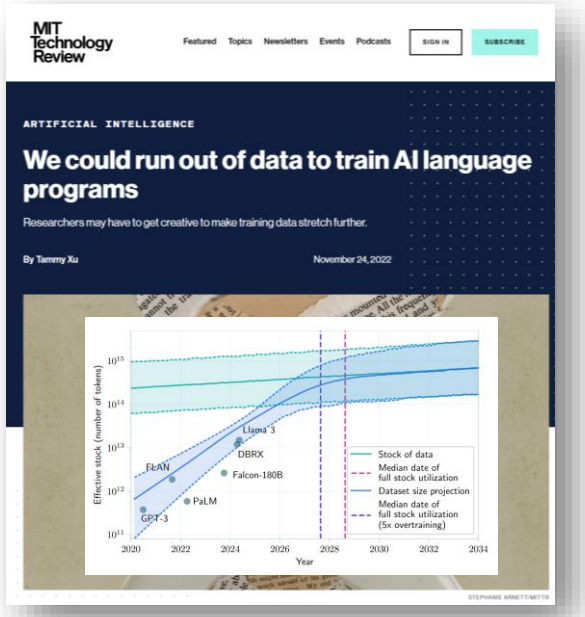
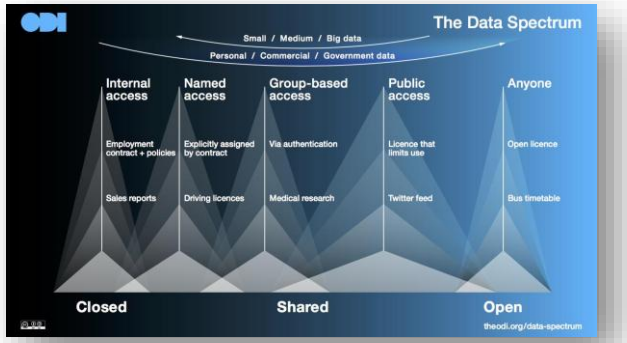


Source of graph: https://arxiv.org/pdf/2211.04325



Source: Open Data Institute

Data spaces enable the aggregation and sharing of vast amounts of data from various sources, which can be used to train more robust AI models. This leads to:

- **Enhanced Data Quality**: Access to diverse datasets improves the quality and reliability of AI models.
- **Collaborative Innovation**: Organizations can collaborate, leading to innovative solutions and faster development cycles because they can access data that was not available before (e. g. RAG concept).
- **Scalable Analytics**: Shared data infrastructures allow for scalable AI analytics, making it easier to derive insights from large datasets.

You don’t need to build a data space

You need to use one

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What can I actually *do* with a data space in my industry?

How do I know if I’m even ready to join or use a data space?

How do I find trustworthy partners within a data space?

What’s one easy first step I can take?

What technical, legal, or strategic aspects should I consider?

Choose your path to success

Subscription or membership – Choose what best fits to your needs

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Subscribe to the User Group

*Best suited for **data space users** looking for business opportunities, best practices and resources to make the most of participating in data spaces*

Includes access to all User Group activities

Plans start at €1,800 per year

Become an IDSA Member

*Ideal for **data space makers** focused on building data spaces and offering products and services*

Full access to all of the Association's activities, including the User Group's

Membership fees between €3,000 – €42,000 for corporates, depending on turnover*

***Special rates for startups and non-for-profits**

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