

**INTERNATIONAL DATA  
SPACES ASSOCIATION**



**10** years

**A decade of  
pioneering.**

**A future of  
impact.**



# An agnostic baseline for global data spaces

*IDSA's efforts of the last 10 years: a holistic perspective on data spaces*



## Common governance framework

- » describes the **technical, operational, and legal agreements** to enable the IDS ecosystem to be fully working in a real-world scenario.
- » outlines a **common governance framework** that all players need to abide to, for a smoothly running future data economy.
- » is **industry-agnostic**, and applicable in all verticals as a **horizontal standard**.



## Fundamental principles

- » 10 fundamental principles of trusted data sharing
- » It is both a call to action and a vision for a future in which trusted data sharing through international data space concepts is the norm, empowering organizations to responsibly harness the full potential of their data.
- » By adhering to these principles, we believe data spaces will catalyze the next wave of innovation, unlocking vast opportunities for organizations, communities, and society as a whole.



## Solutions



## IDSA: our mission for data spaces:

- **Holistic challenge** – from technical complexities, via legal uncertainties to undiscovered business benefits.
- We need to **make life easy**:
  - Giving guidance, support and best practices.
  - Crafting a common data spaces framework.
  - Stimulating market-ready, usable solutions that just work.

## Technology- and policy-agnostic architecture patterns

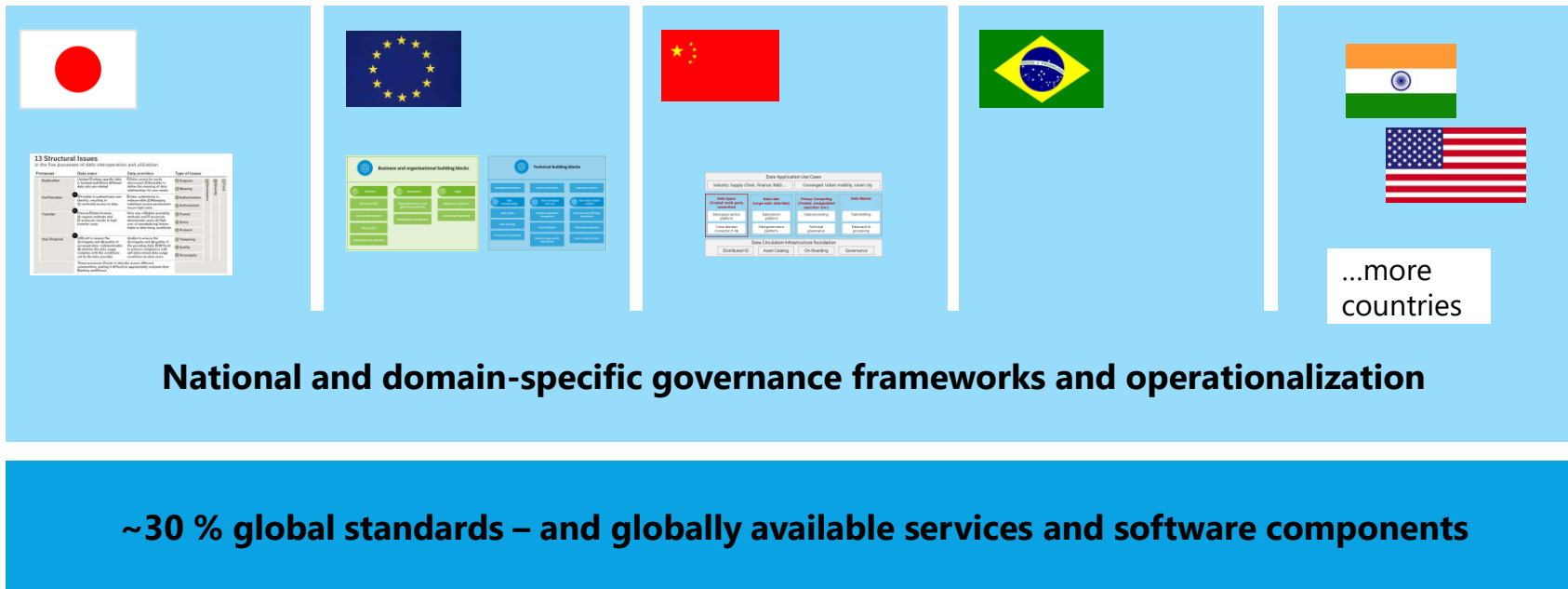
- » is a practitioner-oriented guide to designing and implementing **architectures for data spaces**
- » The RAM is both, an introduction to software architecture and a **handbook of well-established best practices**
- » The IDS RAM describes **how data spaces should be built**, the blueprint for maintaining data sovereignty in data driven business ecosystems.



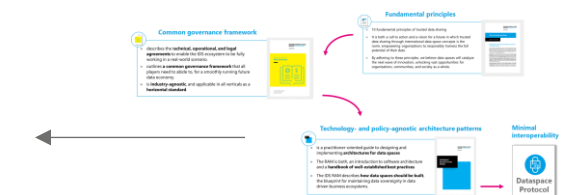
## Minimum interoperability



# One baseline for global success



← We align with, co-operate with and consult organizations and governments to design this layer based on global standards for maximum acceptance and value of data sharing.



↑ We partner with organizations to jointly build and define this layer.

# A global soft infrastructure for data spaces – like GSM for mobile telecommunication

*National flavors and power by using global standards*

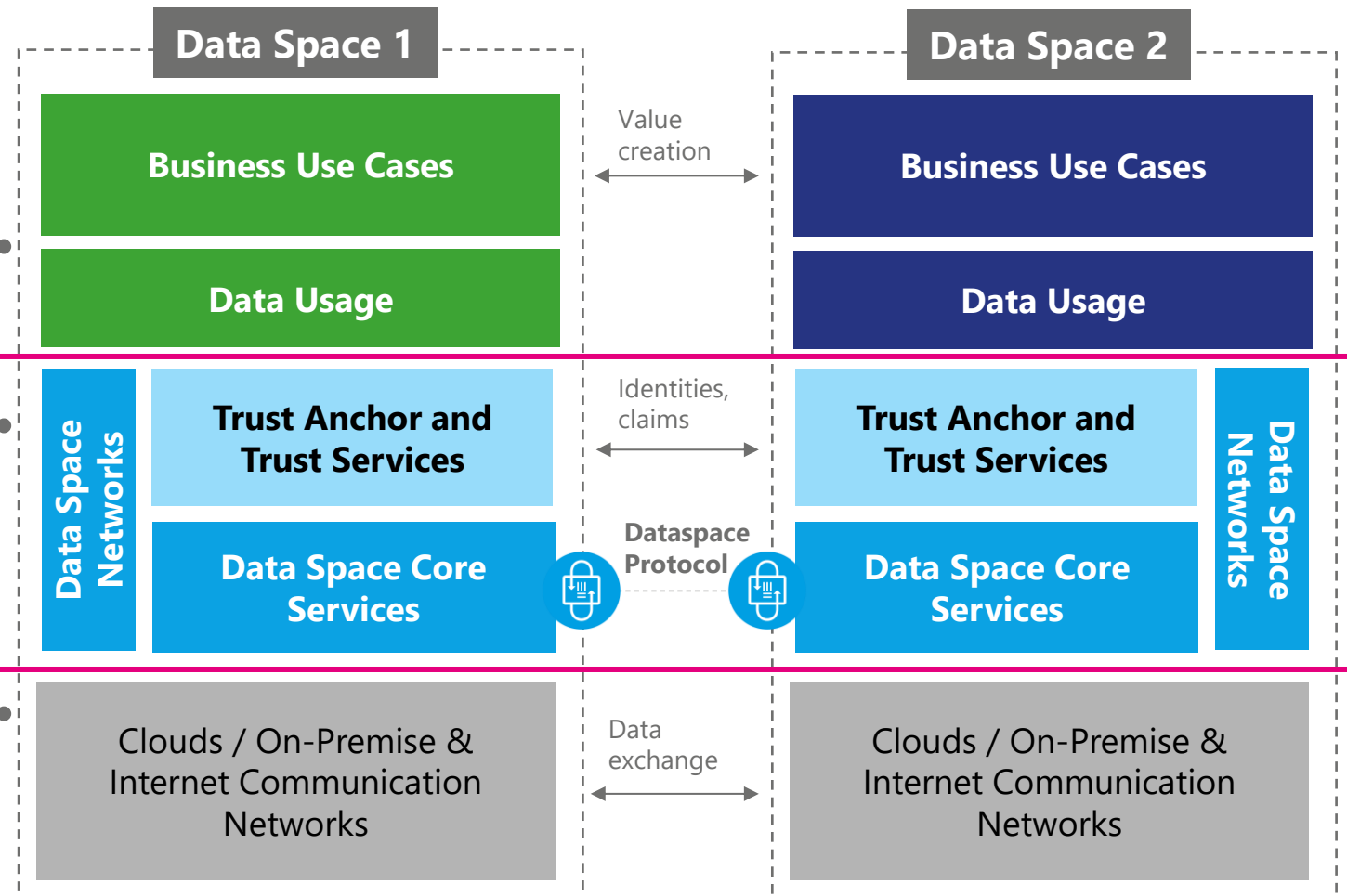


Specific data strategies and standards in different economic areas and domains

Global standards to ensure global value creation

**Interoperability – while complying with national data strategies, national standards, regulation and infrastructure**

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



# Facets of a dataspace

*Three primary facets, each serving distinct functions*



## » **Legal and governance facet**

- » enforces rights, obligations, and regulatory compliance across participants.
- » Roles: Data Rights Holders (EU), Data Subject (EU), Data Intermediation Services (EU), Data Users, Data Recipients

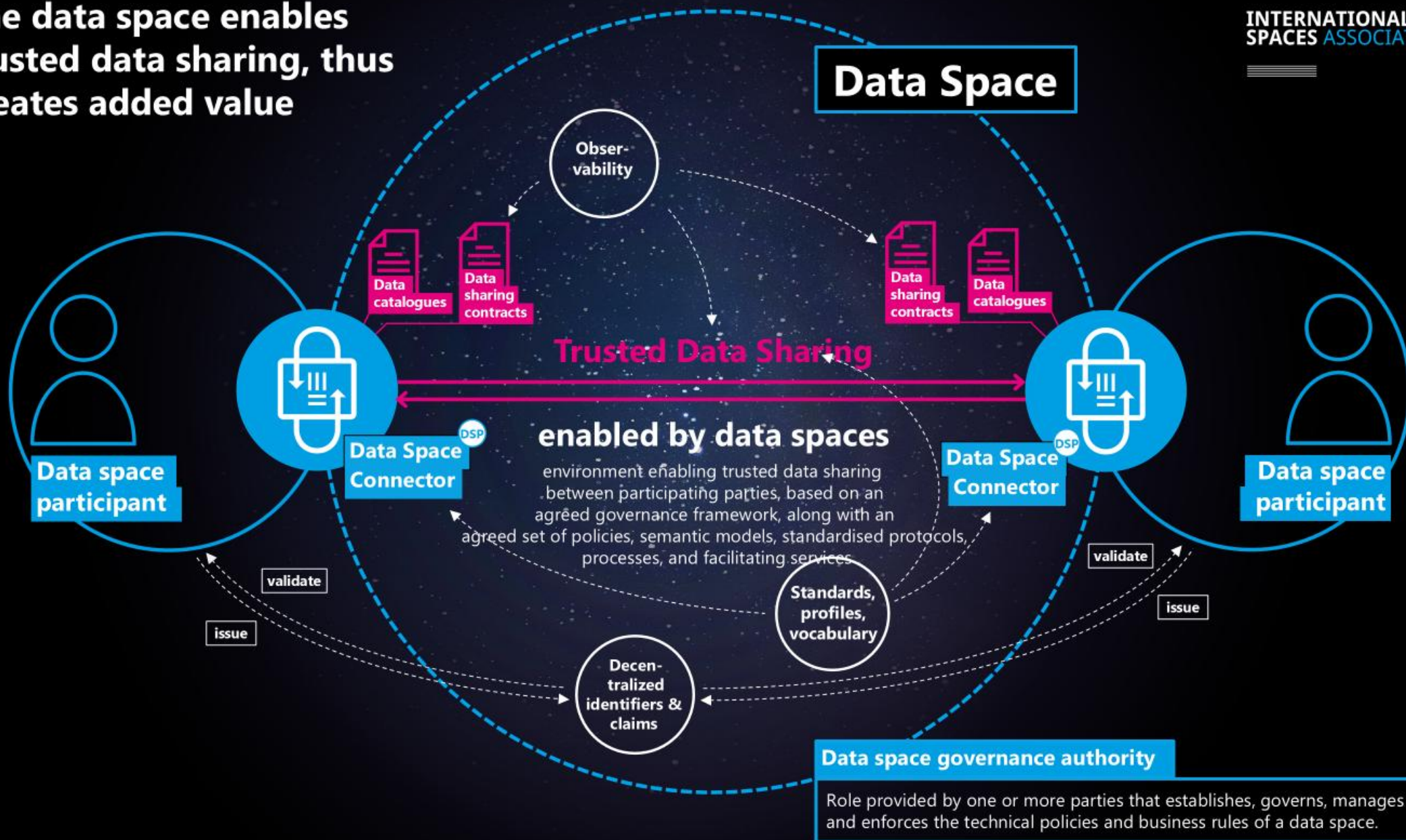
## » **Economic facet**

- » manages the services, interactions, and workflows that enable value generation and marketplace activity. Notably, terms for this facet are also **Business** or **Operational Facet**.
- » Roles: Data Providers, Data Consumers, Observers, Intermediaries, Marketplaces, Individuals, Service Providers

## » **Technical facet**

- » encompasses the architecture and protocols that facilitate secure and interoperable data exchanges.
- » Roles: Data Space Participants

The data space enables trusted data sharing, thus creates added value

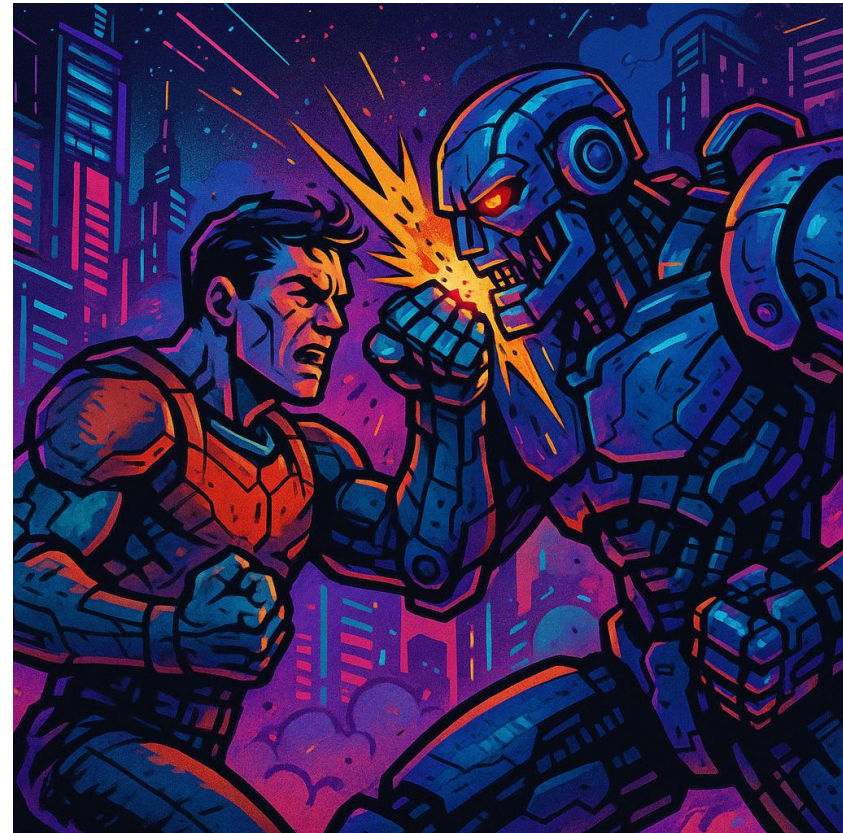


# The everlasting and epic fight between humans and machines



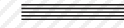
## *AI, Trust and Trustworthiness, Data Governance*

- **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



# Collaborative models for data sharing matter

*Why Data Spaces and AI are a perfect fit*



The practice of indiscriminate data collection has led to a backlash, with previously open datasets now being restricted.

Many other valuable datasets remain untapped because they aren't strictly for sale. These are datasets that individuals or **organizations may be willing to share under specific conditions:**

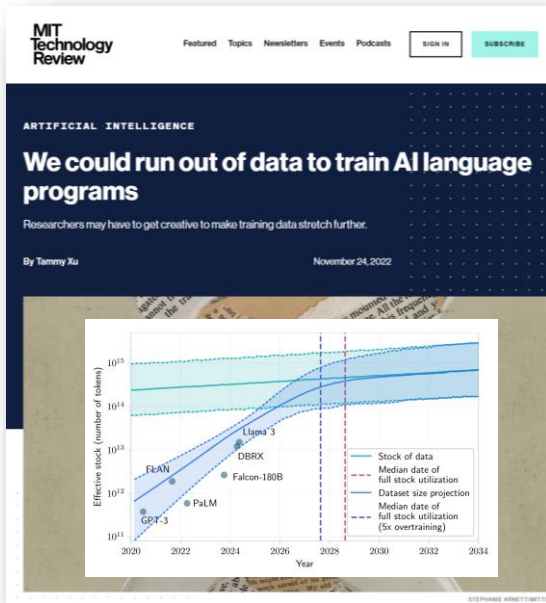
- 1. Data sovereignty:** They want control over their data rights and usage consent
- 2. Trust:** They need confidence in the data requester's identity
- 3. Fair value exchange:** They may look for benefits that go beyond money, like partnership opportunities

This is exactly **what data spaces can enable** – thanks to the Dataspace Protocol. It's a standardized set of rules for secure and interoperable data sharing.

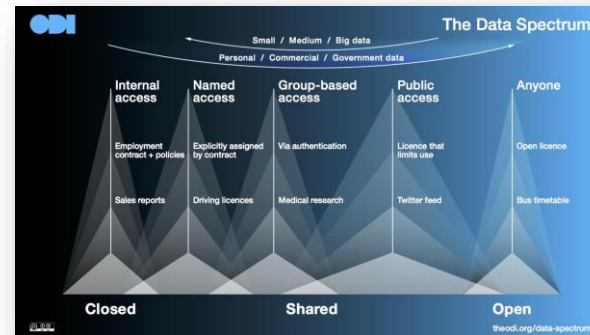
# AI's growing appetite: more data and high quality data

*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.
- **Scalable Analytics:** Shared data infrastructures allow for scalable AI analytics, making it easier to derive insights from large datasets.

# Data Spaces and AI

*AI can now act. That changes the question*



- AI has moved from answering questions to taking actions: planning, negotiating and transacting on our behalf.
- An agent can now do what a person does in a business process, at machine speed and across company boundaries.
- But an agent has no inherent identity, mandate or accountability.

**The bottleneck for enterprise AI is no longer intelligence. It is trust.**

# Data Spaces solves several issues with AI discussed today

*Integrating autonomous agents in data spaces*

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## Issue

- **Data Quality**
- **Selection of data**
- Adequate **compensation** of the data provider
- **Observability** of training data used

## Solution

- ✓ Data Spaces offer **defined data quality**. The data provider is known and is responsible for the quality of the data provided.
- ✓ **Usage conditions** specify the data which can be transferred.
- ✓ Usage conditions support **adequate compensation**.
- ✓ **Observability** is part of the definition of ISO 20151

→ *The usage conditions of Data Spaces offer definitions what data can be used under what conditions and for what cost.*

# Data spaces are the trust layer AI is missing



## *Activities so far*

### *Data Spaces for AI*

- » Sovereign access to quality data from known, responsible providers.
- » Clear rules: what an agent may use, for what purpose, at what price.
- » Provenance, compensation and a full audit trail.
- » AI agents are the data plane in a data space connector
- » AI agents can use data space connectors as a skill

### *AI for Data Spaces*

- » Agents that discover, negotiate and map data at machine speed.
- » The slow processes in data sharing become automated.

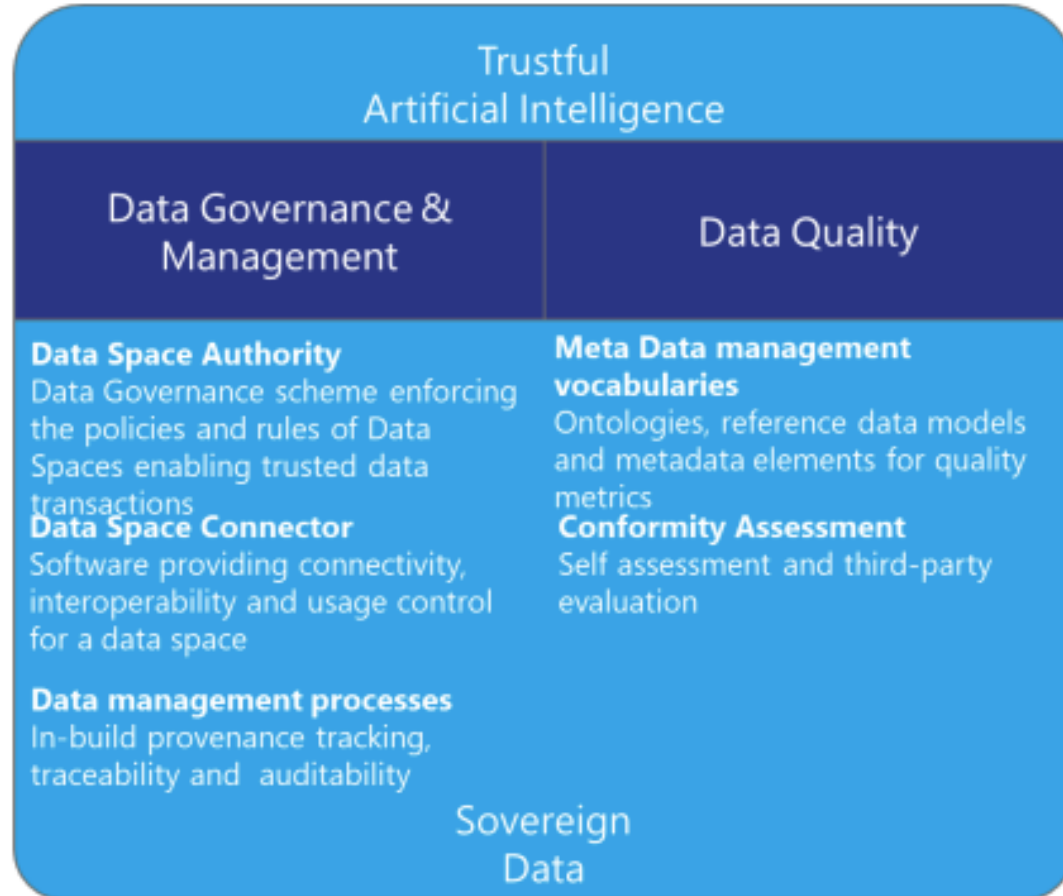
# The “Dataspace and AI Burger”

*Sovereign data sharing enables trustful AI*



## Trustful AI needs:

- specifications for adequate **data governance and data management procedures** to be implemented by providers of AI systems (with specific focus on data generation and collection, data preparation operations, design choices, procedures for detecting and addressing biases or any other relevant shortcomings in data).
- specifications on **quality aspects of datasets** used to train, validate, and test AI systems (including representativeness, relevance, completeness, and correctness).



# Data Spaces and AI

## *Task Force Data Spaces and AI Position Paper*



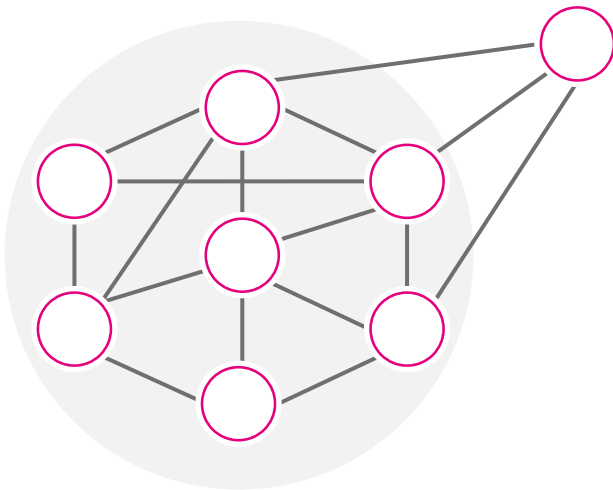
- 2. Data Spaces and AI: why they belong together?..... 4**
  - 2.1 The dual framing: AI for Data Spaces and Data Spaces for AI ..... 4
  - 2.2 How AI and data space concepts match ..... 5
  - 2.3 Where data spaces complement and improve the AI stack..... 6
  
- 3. Today's AI Challenges and how data spaces solve them..... 6**
  - 3.1 Trust ..... 6
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  - 3.5 Observability and traceability..... 8
  - 3.6 Governance, automation and the data space governance model..... 8
  - 3.7 Agent discovery ..... 8
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- 4. How AI adds value to data spaces..... 10**
  - 4.1 Knowledge architecture: knowledge graph, knowledge core, knowledge engine ..... 10
  - 4.2 Agent roles in a data space..... 10
  - 4.3 AI capabilities for data space operation ..... 10

# Trustful data sharing takes place in data spaces

*Where participants share one common trust framework*



A decentralized and dynamic data ecosystem:  
with many-to-many interactions



A **data space** is the sum of all end points that are able to share data with each other.




- **Decentralized/Centralized/Federated data architecture**: no physical data integration, leave data where it is
- **Interoperability**: no silos, no vendor-dependency
- **Data Sovereignty** and **traceability**
- **Trusted** participants, services, components
- **Usage control** for data as economic asset



# Data space characteristics | ISO/IEC 20151




Maintain control




Establish trust



Discover data




Negotiate data sharing contracts



Orchestration of data sharing



Observability of action



Interoperability

## Functional components

- Multi-level policies
- Semantic models
- Communication protocols
- Processes and Rules



ISO/IEC CD 20151  
Dataspaces concepts  
and characteristics

# Thorough ground for data spaces

*IDSA Manifesto for Data Spaces*

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## 10 Principles of Trusted Data Sharing in data spaces



- 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 separate 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"

# Features to enable data economy and AI



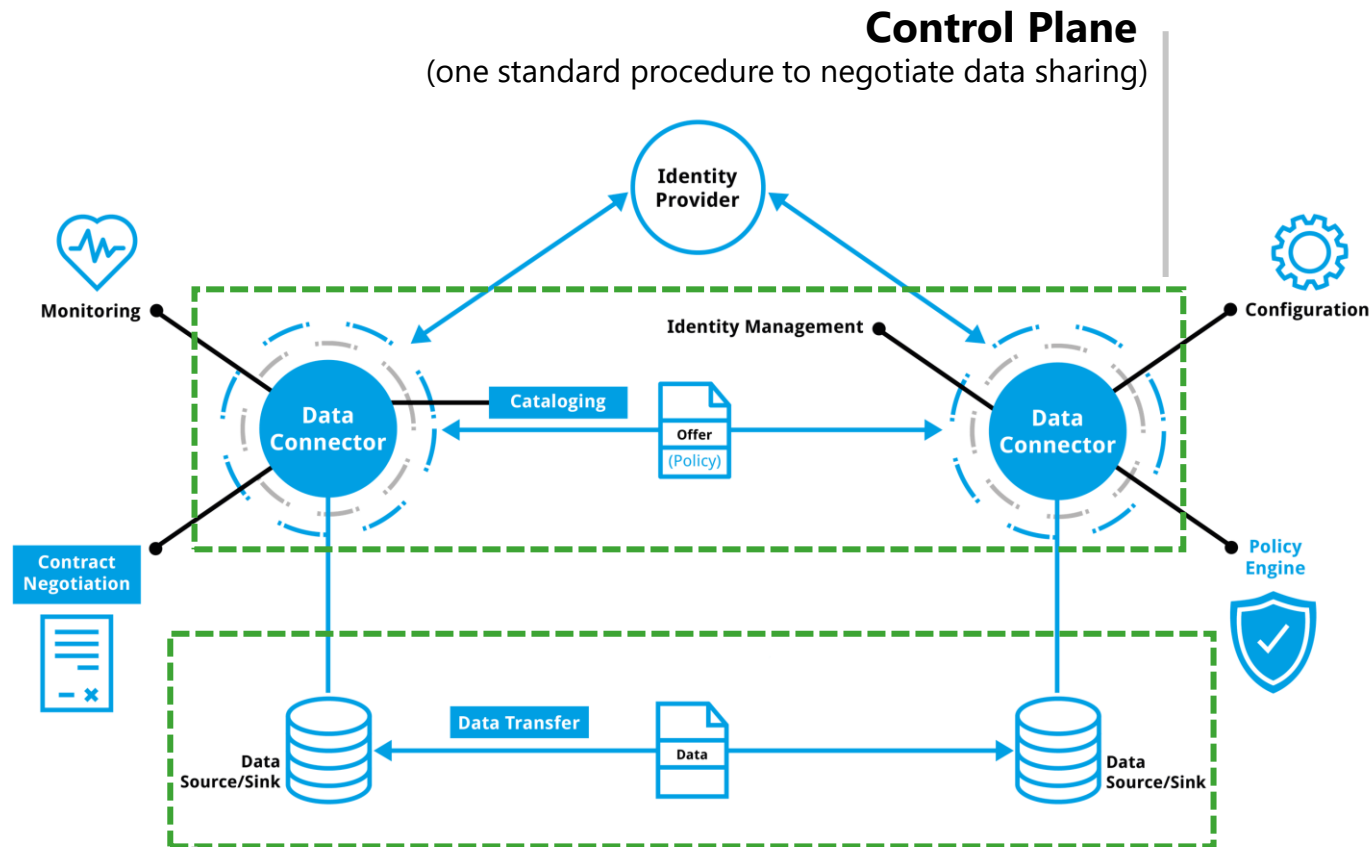
*Data space connectors (participant agents) lay the basis for interoperable trustful data sharing*

- » **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.



# The need for Dataspace Protocol

*Ensuring data space interoperability*



## Data Plane

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

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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.

# Standardization overview



## *IDSA standardisation paper - Europe & International Landscape*

A practical reference mapping data space standardisation from concepts and gaps to international standards, European regulation and global developments.

### 1 PURPOSE AND SCOPE

- Why standards are essential for operational data spaces
- Key areas: trust, discovery, semantics, contracts and conformity assessment
- What is inside and outside IDSA's standardisation scope

### 2 INTERNATIONAL STANDARDS

- ISO/IEC 20151: data space concepts
- ISO/IEC 26450 DSP
- ISO/IEC 26451 DCP
- ISO/IEC TS 10866:2024 organizational autonomy
- ISO/IEC 19941: Interoperability
- IEEE 3800 on data trading
- IEEE P1988.

### 3 EUROPEAN STANDARDISATION

- European Trusted Data Framework and Standardisation Request M/614
- CEN-CENELEC JTC 25 work on TDT, data governance and maturity models
- Links with the Data Act, DGA and AI Act

### 4 GLOBAL LANDSCAPE & NEXT STEPS

- Developments in Australia, Japan, China, the US and other jurisdictions
- Gaps: metadata governance, trust frameworks, data quality, usage policies and interoperability
- Future work: trust frameworks, use cases and broader adoption



### READER TAKEAWAY

**A comprehensive overview of the data spaces standardisation landscape in Europe and internationally**

**How IDSA connects industry implementation, compliance tooling and formal standardisation to support trusted, interoperable and scalable data spaces.**



# UN CSTD Working Group on Data Governance

*Four tracks as workingstreams for the report to UN General Assembly*



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## Track 1 – Data Governance Principles

**Core message:** *Build trust-based, rights-anchored data governance frameworks.*

- Ground governance in **international human rights law**
- Ensure **trust** through privacy, security, accountability & transparency
- Promote **equity, data justice & inclusion** (communities, Indigenous peoples)
- Enable **interoperability with context-sensitive implementation**

## Track 3 – Sharing the Benefits of Data

**Core message:** *Ensure data creates shared, inclusive development value.*

- Benefits are **multi-dimensional** (economic, social, cultural, environmental)
- Promote **Data Commons, data trusts & collaborative models**
- Invest in **digital public goods & infrastructure**
- Address **power asymmetries, fair value distribution & FPIC**

## Track 2 – Interoperability of Data Systems

**Core message:** *Make data systems work together without losing sovereignty.*

- Interoperability across **technical, semantic, legal & governance layers**
- Preference for **open, voluntary, international standards**
- **Federated & decentralized architectures** to keep data at source
- **Capacity-building & trust** as prerequisites for participation

## Track 4 – Data Flows

**Core message:** *Enable safe, secure and trusted (cross-border) data flows.*

- Balance **openness, security, privacy & sovereignty**
- Use **interoperability over full legal harmonization**
- Rely on **trusted data intermediaries & standards**
- Combine **law + infrastructure investment** to avoid dependency

# Data Spaces and Data Governance

- Data Spaces are the manifestations of data governance - data spaces are the collaborative environments where value creation based on data happens. On regional level, on domain level, cross-domain, cross-border.
- Many governments have already chosen data spaces as their instrument for their data strategy and data governance
- they allow for multi policy execution, they provide trust and allow for self-determination of data sharing. They provide the features that most colleagues have asked for
- Attaching usage policies - which are defined in the context of data governance - can be attached to data sets
- Provide trust and appropriate technical functionality to create confidence to any data originator to share more data - which currently is one of the biggest problems for further grow of data economy



# We want to make Industrial AI happen

*IDSA focusses on real world, adoption, scaling*



## Data Spaces Support Centre 2

Sector orchestration, value coaching, AI continent.



## Data Spaces Adoption Forum

Faster deployment, distribution via CSP, onboard the millions, connector fabric manager

**Data Space Adoption Forum**

## Data Spaces Accelerator

Giving evidence to data spaces success. Enable 1.000 participants to do data spaces.



## Tractus-X Accelerator

Empower Tractus-X for all domains as foundation for many and new data spaces.



## IPCEI AI

Data Spaces as one pillar for Industrial AI.



**Taskforce AI and Data Spaces**

new

Cooking

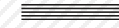
new

new

# The technology foundation

*An open, extensible stack that enables many onboarding platforms*

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SMEs, Enterprises, Integrators

## Onboarding Platforms

CSP/MSP-specific UX, billing, support - built on the shared foundation

### Virtual Connector

EDC-V · Apache 2.0 · Eclipse Foundation

#### Tenant 1

own identity · policies · catalog

#### Tenant 2

own identity · policies · catalog

#### Tenant 3

own identity · policies · catalog

### Shared Control Plane

Policy Engine, Identity, Protocols

### Data Plane

Independently scalable

*No single platform  
can reach every SME:  
an open foundation  
lets many compete  
and complement each  
other.*

*Trusted data sharing, made scalable*



# Data Space *Accelerator*

*A publicly funded study for SMEs & Mid-Caps  
to lower the entry barriers into industrial data spaces.*

# Data Space Accelerator Study

## Purpose and Outputs

The **Data Space Accelerator** is a study funded by the German Ministry for Economic Affairs and Energy (BMWE) and coordinated by the International Data Spaces Association (IDSA).

### What the study delivers:

- Empirical evidence on economic and organizational benefits of data sharing
- Actionable recommendations to strengthen digital readiness
- Case-based insights from multiple Use Cases



Public Funds

> € 20 M.

15k or 30k €      Year 2026

<b>Coordinator</b> IDSA	<b>Governance</b> Catena-X	<b>Operator</b> Cofinity-X
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**Notice:** For participants based outside Germany, the reimbursement amount is recalculated using a purchasing power index. Details can be found in the program [tender documents](#).

# Join the data spaces pioneers

*Become a member of IDSA*



Download the [membership application](#) form.

01

Send the filled form to our [email](#).

02

**Welcome aboard!**  
We will personally guide you through your onboarding.

03

Name, Date

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**10** years

**A decade of  
pioneering.**

**A future of  
impact.**

