



European Cloud Accelerator

Bergamo | October 2025

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CEO, International Data Spaces Association

The journey from idea to impact

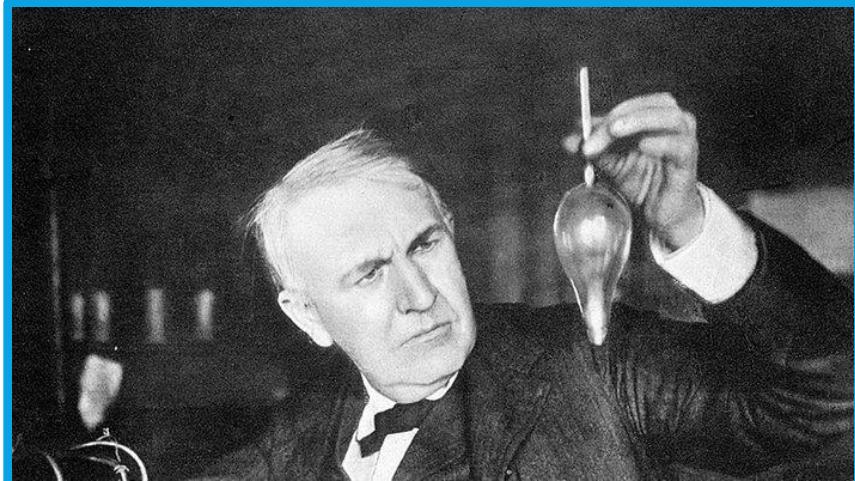
Why data spaces need users to thrive

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Every groundbreaking innovation starts as a concept, with immense potential.

History shows that inventions remain theoretical until embraced by users.



Only through integration into daily operations do innovations drive progress.

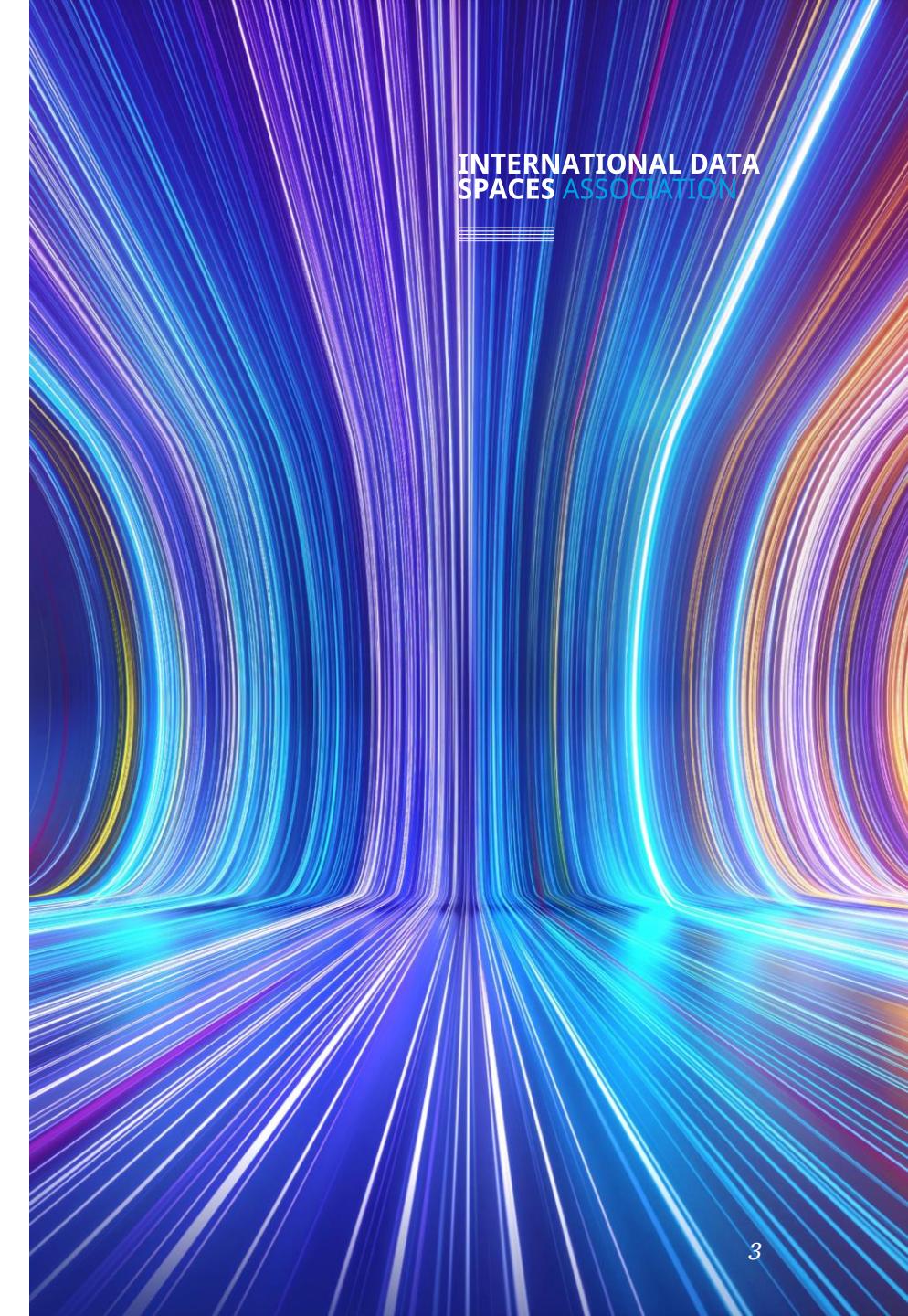
The same principle applies to data spaces today, requiring active user engagement.



IDSA's mission: from idea to impact

We embrace data spaces as a holistic endeavor

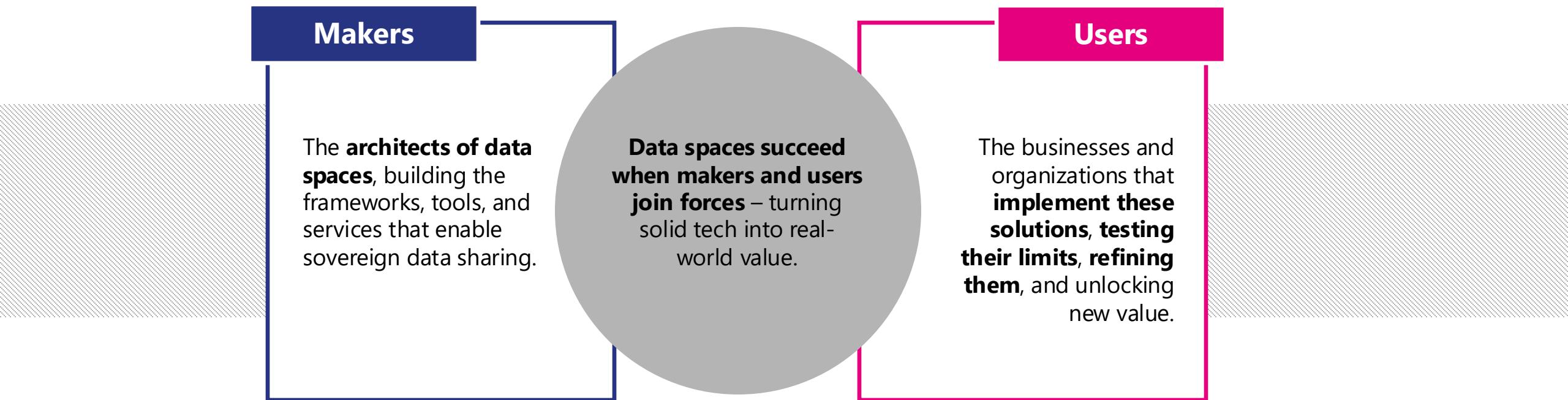
- 1 **Invention**
Technological breakthroughs begin as ideas with potential.
- 2 **Development**
Frameworks and standards establish the foundation.
- 3 **Adoption**
Users integrate solutions into their operations.
- 4 **Impact**
Wide adoption creates economic and social value.



The makers and the users

A symbiotic ecosystem

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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"

USAGE CONTROL IS ESSENTIAL FOR DATA ECONOMY

*WHEN REGARDING DATA
AS AN 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

Make the connection and enable data economy

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

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- » **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.



Data Connector Report

INTERNATIONAL DATA SPACES ASSOCIATION

LAST UPDATED: 2 OCTOBER 2025

IDSA Data Space Connector Report

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Name of Connector	Maintainer	Open source	DSI certified	Identity management	Deployment systems	Service & API
Amadeus Open-Source EDC Connector	ADVANEO	✓	✓	On premises	Interoperability	
Amadeus Connector	ADVANEO		✓	On premises	Interoperability	
Amadeus Trusted Connector	ADVANEO		✓	Cloud	Interoperability	
AS2 DSW Connector	Cefriel		✓	On premises	Interoperability	
B2B Connector	Huawei		✓	On premises	Interoperability	
Data Space Integration	SAP		✓	Cloud	Interoperability	
EDS3 Connector powered by TSO	TSG		✓	Cloud	Interoperability	
Eclipse Dataspace Components (EDC)		✓		No support	Interoperability	
Egnyte Connector	EGNYTE		✓	On premises	Interoperability	
EnthuWeb Connector	ENTHUWEB	✓	✓	On premises	Interoperability	
EONA EDC Connector	AMADEUS	✓	✓	Cloud	Interoperability	
Fedex Data Space Connector	FLYFLY	✓	✓	On premises	Interoperability	
GATE DataSpace Connector	GATE	✓	✓	On premises	Interoperability	
GDS2 Connector - Type Information	GDS2	Horizon	✓	AMI Capital	Interoperability	
Global Health Data (GHD) EDC	Praesidio		✓	On premises	Interoperability	
DSI over EDNS3 (DSI)	trustz	✓	✓	Cloud	Interoperability	
Matrix EDS Connector	HOLONIX		Horizon	Cloud	Interoperability	
Mihub DataSpace Connector	Mihub	Horizon		Interoperability	Interoperability	
Mihub by Mihub	Mihub		✓	On premises	Interoperability	
MyData Connector	MyData	✓	✓	On premises	Interoperability	
OpenHealth DataSpace Connector	PROMETHEUS-X	✓		Cloud	Interoperability	
OpenEBC EDC	Praesidio	✓		Cloud	Interoperability	
OpenFHIR (Connector as a Service)	C-SOVID	✓	✓	On premises	Interoperability	
Open-Source EDC Connector	C-SOVID	✓	✓	On premises	Interoperability	
Project Connector	TANGO	Horizon	✓	On premises	Interoperability	
TSN2B EDC Connector	TECH2B			Cloud	Interoperability	
Wihub DataSpace Connector	Wihub	✓	✓	On premises	Interoperability	
Wihub DSN Connector	Wihub	✓	✓	Cloud	Interoperability	
TNO Security Gateway (TSG)	TNO	✓	✓	Cloud	Interoperability	
Urban Enterprise Connector	Trinom		✓	On premises	Interoperability	
WEF Connector	ADVANEO	✓	✓	Cloud	Interoperability	
Wihub Connector	Wihub	✓	✓	Cloud	Interoperability	
Wihub Connector (PSC)	Wihub	✓	✓	Cloud	Interoperability	
WPS EDS Connector	WPS		✓	On premises	Interoperability	

38
connectors

Why a Data Connector Report?

- » To explain what data connectors are and why they are crucial in data spaces
- » To provide transparency about the number of connector implementations available, their maturity and features, following their evolution over time
- » To explain how data connectors can be technically interoperable
- » To provide additional insights on related technologies and initiatives



<https://internationaldataspaces.org/data-connector-report/>

IDSA partners with Eclipse – EDC and EDWG

OSS ecosystem for building global standards and software components

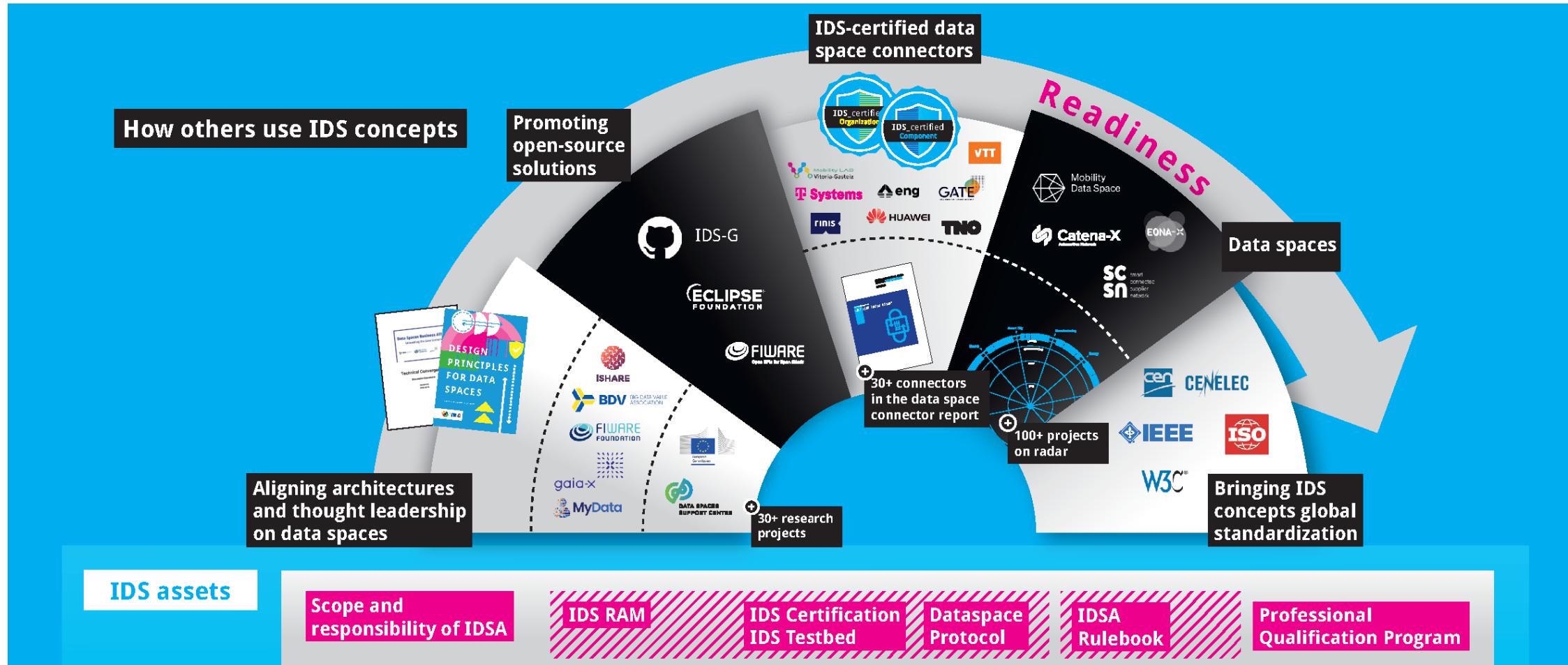
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- » IDSA and the Eclipse Foundation collaborate to build an **open-source ecosystem**
- » The **IDSA Rulebook** outlines organizational interactions, roles, and components in data spaces
- » The **IDS-RAM** details the technical implementation
- » An Eclipse Specification Project hosts the **Dataspace Protocol**, while IDSA defines functional requirements
- » The **Eclipse Dataspace Working Group (EDWG)** will coordinate multiple OSS projects (like DCP, Data Plane Core, Data Plane Signaling)

Bring the fundamental data spaces concepts to global adoption and standards

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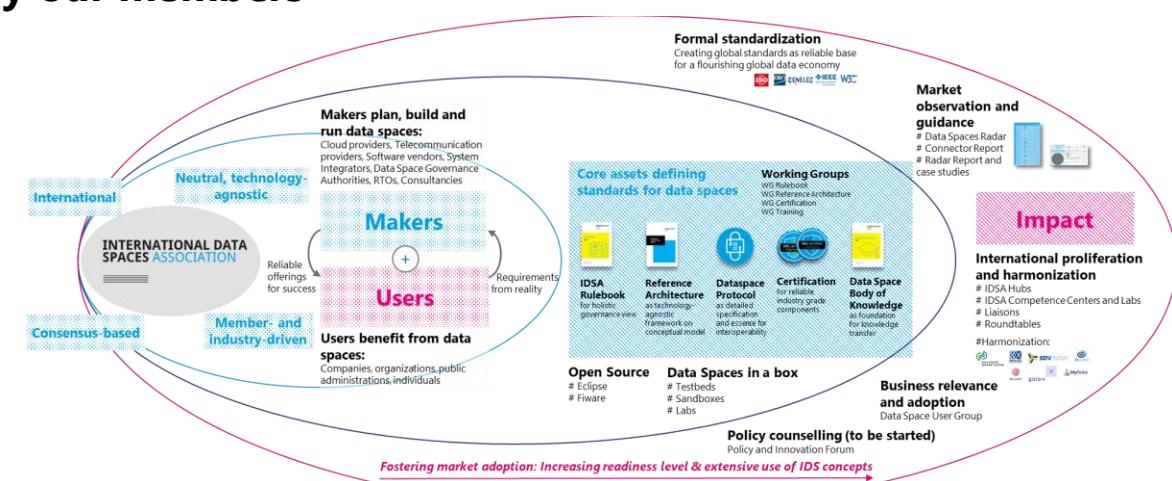


IDSA – State of the union

What we have achieved, where we are

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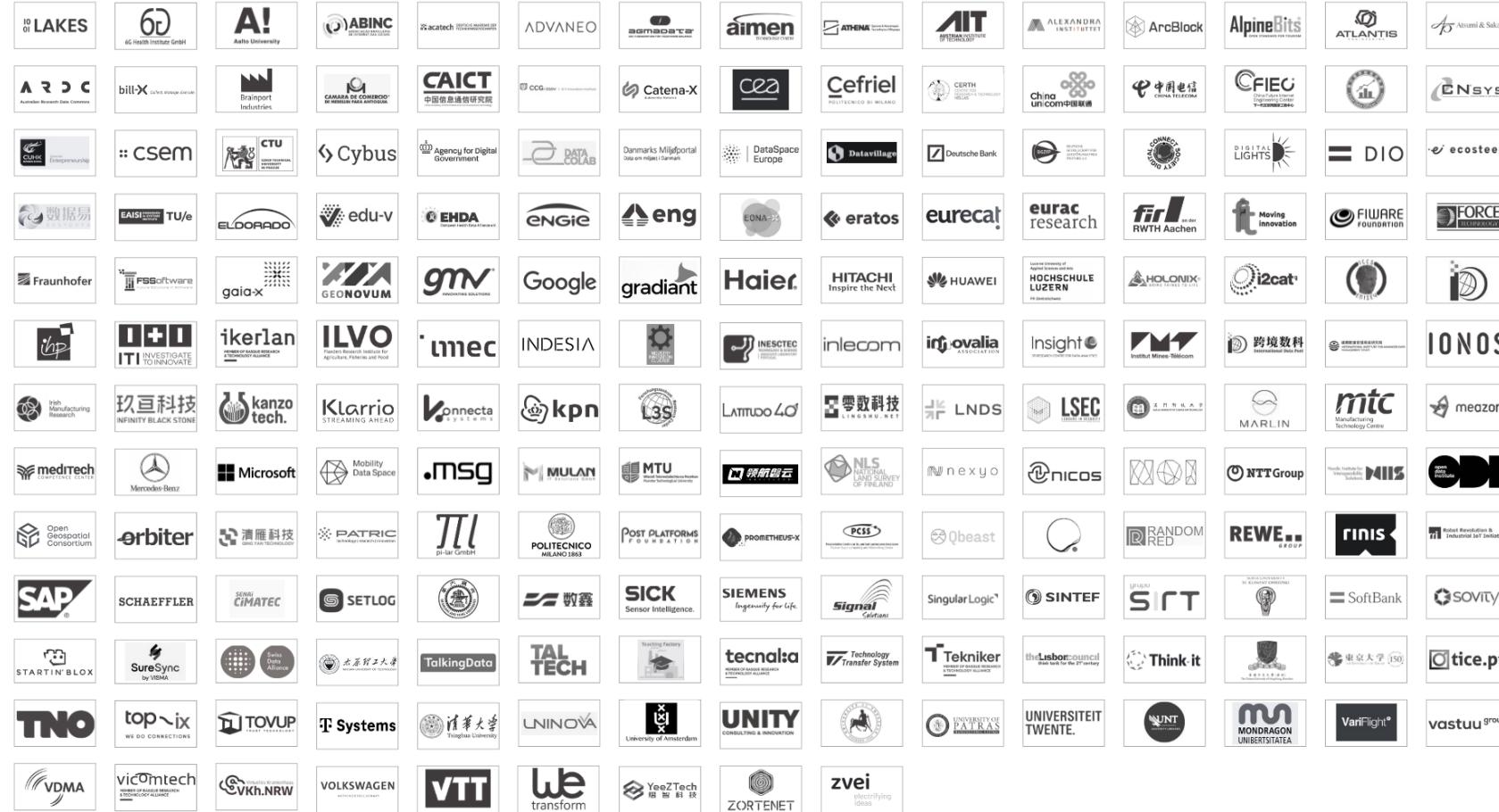
- IDSA is the industry association that set the **foundations for data spaces** across technology and business practices since 2016
- Those foundations concretize in **one consistent, global framework for data spaces** as soft infrastructure for data economy and enabling data-hungry applications like AI
- **IDSA is global and neutral**, and genuinely **driven by our members**
- As of today, **200+ data spaces and use cases across 20 industry sectors are built on IDSA guidance** (see our [Radar](#))
- **All relevant players** are on board (users of data spaces, providers of services, policymakers)
- IDSA is **focused on delivering the next wave of specifications and technology to become international standards**, like our Dataspace Protocol with ISO



Our members are the backbone of IDSA

Be part of the global change

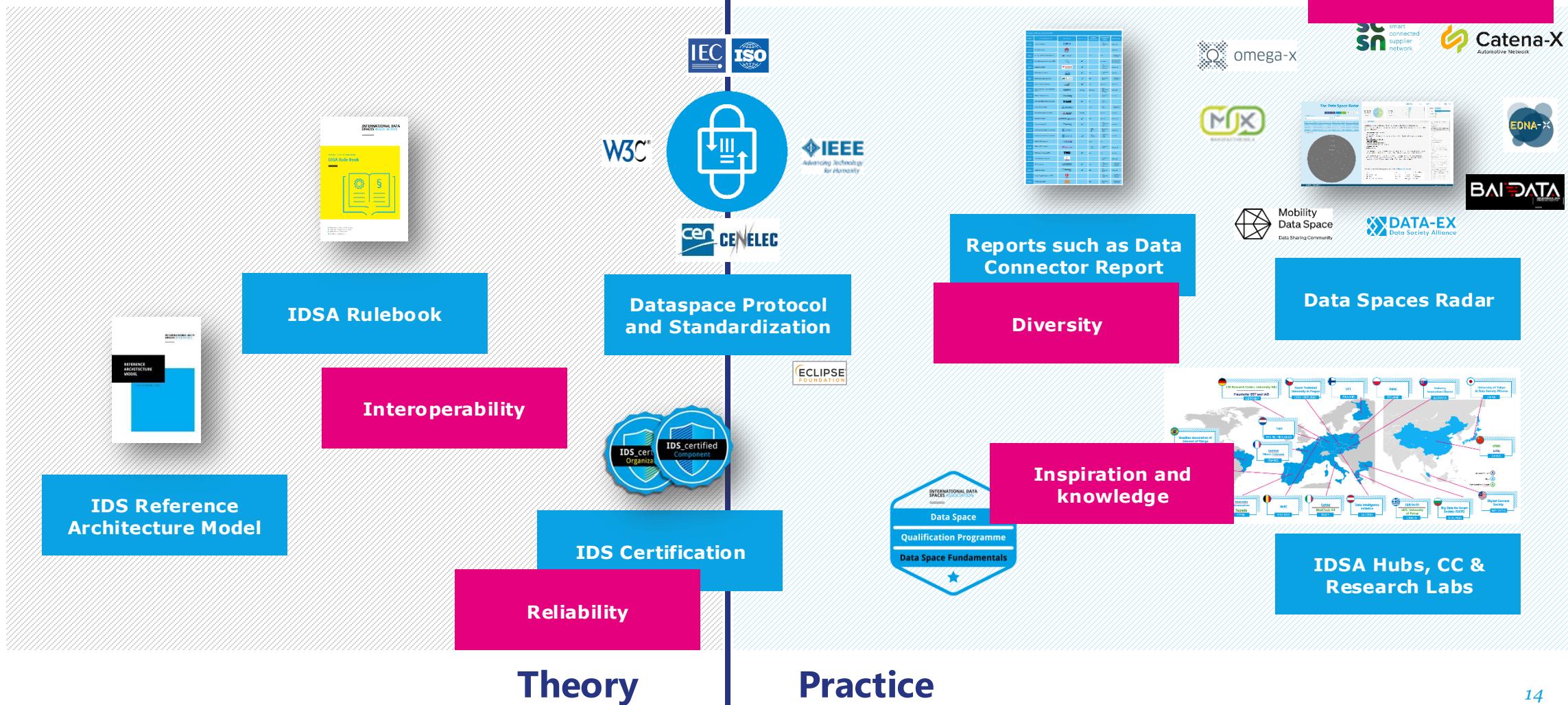
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IDSA assets – from theory to practice

How we change the way data is shared

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An agnostic baseline for global data spaces

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

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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.



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.

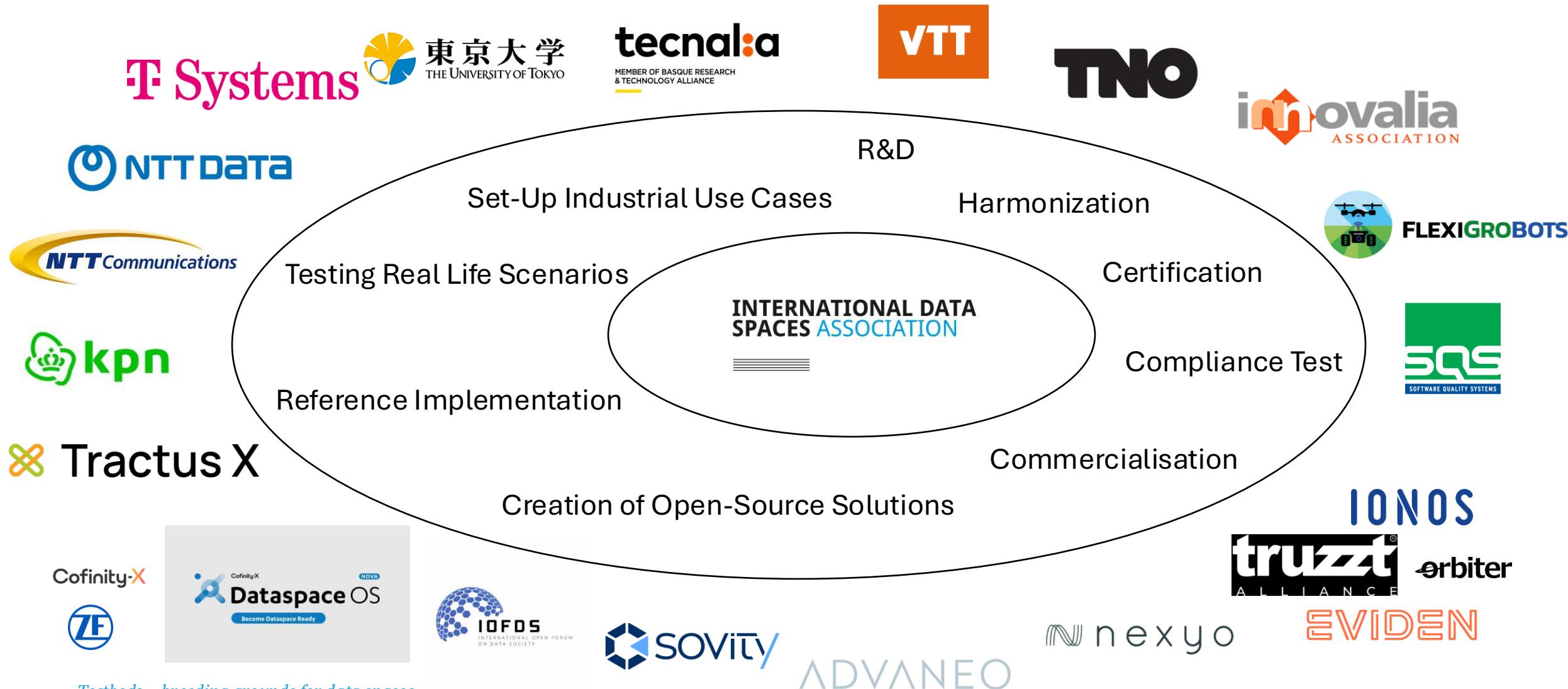


Minimal interoperability



Test Beds: One Base – Multi Purpose

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IDSA and the footprint in the manufacturing sector

An overview of partners and technology

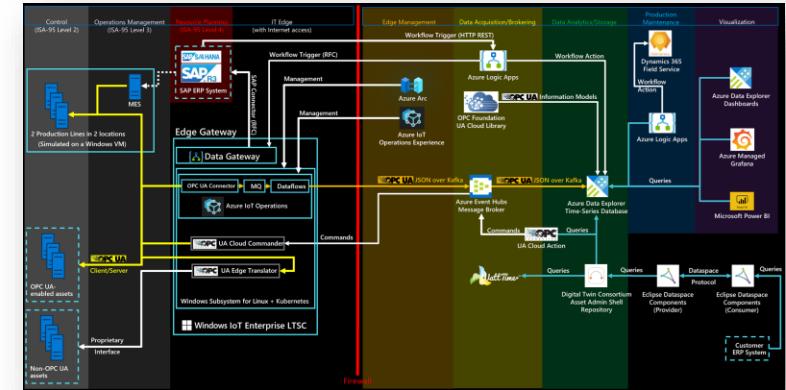
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Partners – strong collaboration via projects and MoUs

- VDMA
- ZVEI
- RRI (Robot Revolution Initiative)
- **OPC Foundation**
- IDTA (Industrial Digital Twin Association)
- DFA (Digital Factory Alliance)
- Our members all over the world which build industrial data spaces and components and services for them
- We pool activities in IDSA industrial community

Projects

- Current EU funded projects: e. g. Smartenance, Cirpass, Underpin, ...
- National funding projects of global scale: Manufacturing-X, SCSN, Machinery-X, ... - Japanese projects: Ouranos, ... - Chinese projects
- Others – see the relevant section on manufacturing in the data spaces radar



*Technology and architecture designs are no longer a miracle. There are **implementation patterns existing of how industrial data spaces can be designed**, encompassing different components, semantic models:*

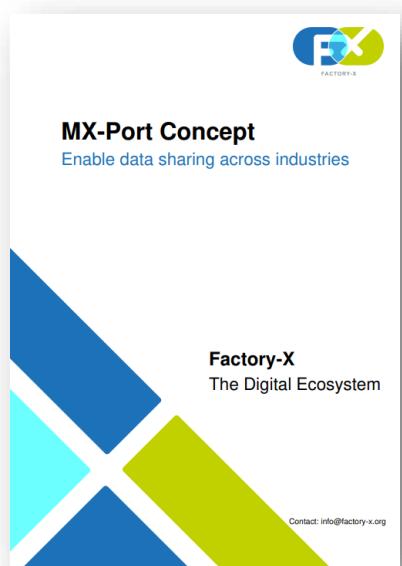
- Dataspace connectors: EDC, others
- Asset Administration Shell
- OPC Unified Architecture, Cloud Initiative Reference Architecture and companion specs

→ The **dataspace protocol** enables data sharing between data spaces and domains – it opens the door for industrial data spaces to create even more value in larger ecosystems.

IDSA Dataspace Protocol (DSP) as configuration option for Manufacturing-X

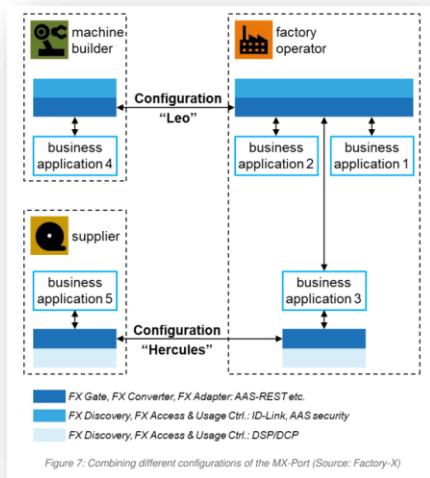
Configuration „Hercules“

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Layer	MX-Port “Hercules” ³
L5	Discovery
L4	Access & Usage Control
L3	Gate
L2	Converter
L1	Adapter

Figure 5: MX-Port configuration "Hercules" (Source Factory-X)



Scaling data spaces – a joint and global endeavor

Why standardization matters

Interoperability: Connect seamlessly with partners across industries and regions.

Trust: Ensure sovereign and secure data sharing with verified partners.

Scalability: Grow your data sharing ecosystem without technical limitations.

Compliance: Meet global regulatory requirements.

Stability: Avoid costly rework and secure long-term ROI

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- Standards may appear abstract, but they are what makes collaboration possible at scale.
- Think of how container sizes transformed global trade, or how GSM made mobile networks interoperable across borders.
- Data spaces need the same kind of common understanding if they are to grow beyond isolated pilots.

More to do: The work of IDSA in the context of other standardization efforts

Integrating global standards

Align with European Standardization Bodies

- CEN\CENELEC JTC 25 Data management, Dataspaces, Cloud and Edge – workinggroups 1 - 4
 - Harmonized standards on European Trusted Data Framework

Alignment with legal and regulatory requirements

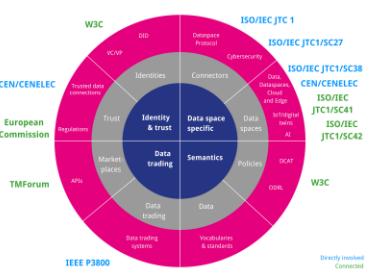
- DATA ACT, Data Governance Act
 - AI ACT
 - PIPL/GDPR
 - ...

International Standardization Efforts

Ensuring global applicability and adoption:

- ISO/IEC AWI 20151 Dataspace Concepts and Characteristics – is now DIS!
 - ISO/IEC TS 10866 Digital Sovereignty and organizational autonomy
 - NEW PWI in ISO/IEC JTC1 SC38: use-cases for data spaces
 - NEW PWI in ISO/IEC JTC1 SC38: Dataspace Trust Frameworks
 - Ongoing :Support for semantic interoperability (W3C) DCAT and ODRL policy model

Holistic Standardization



Asian Standardization efforts

- China: TC609 – trusted data spaces, collaboration with CESI
 - Japan: ODS RAM – collaboration with DADC
 - Japan: IEEE P3800, 3800.1, 3800.2
 - ...

Open-source specification projects

Eclipse Foundation:

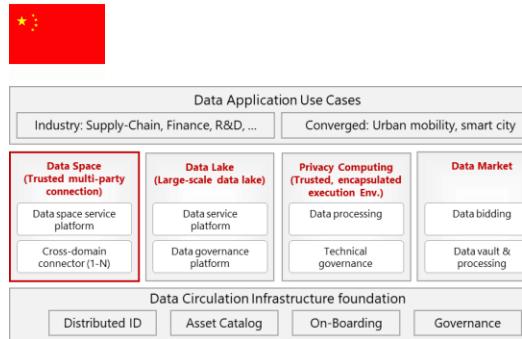
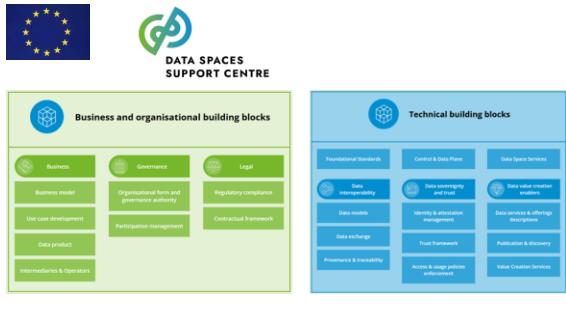
- Dataspace Protocol
 - Decentralized Claims Protocol
 - NEW: Data Plane Signaling
 - NEW: Data Plane Core

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



Strong link to relevant economic areas

Our members are building momentum all around the world.



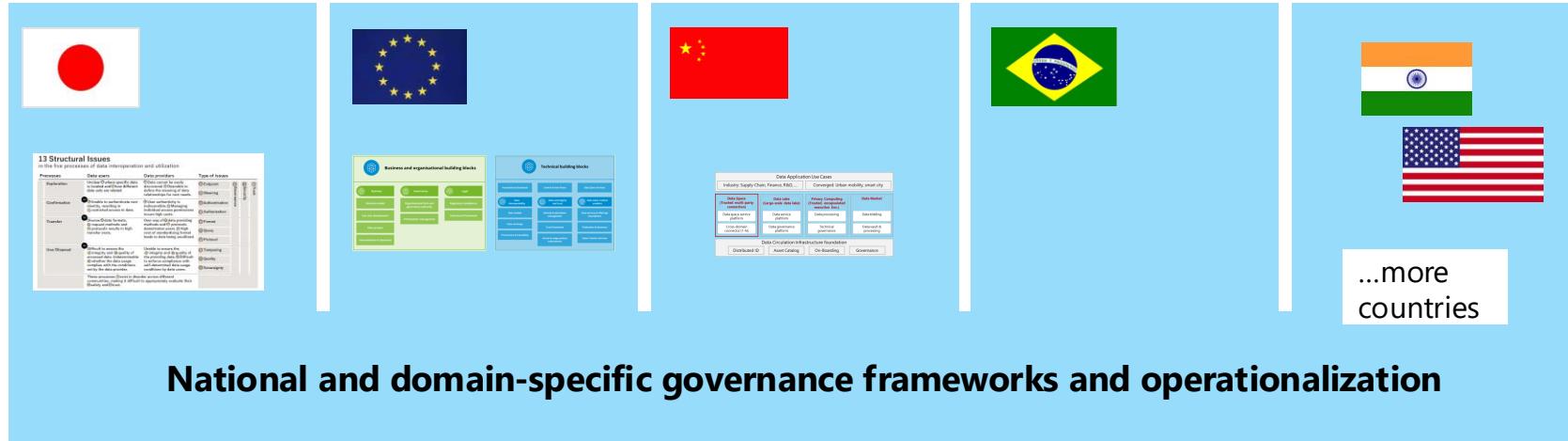
Global players to provide data space solutions globally



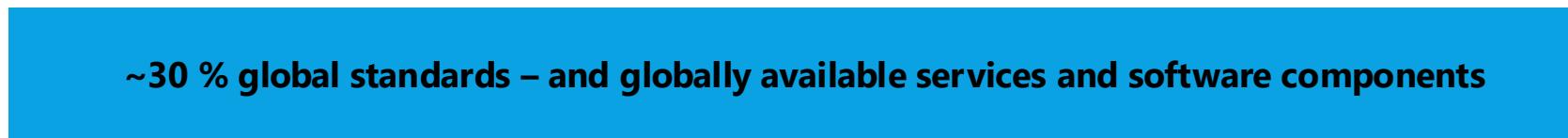
>>> A global soft infrastructure for data spaces – like GSM for mobile telecommunication

One baseline for global success

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National and domain-specific governance frameworks and operationalization



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

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.



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

National flavors and power by using global standards

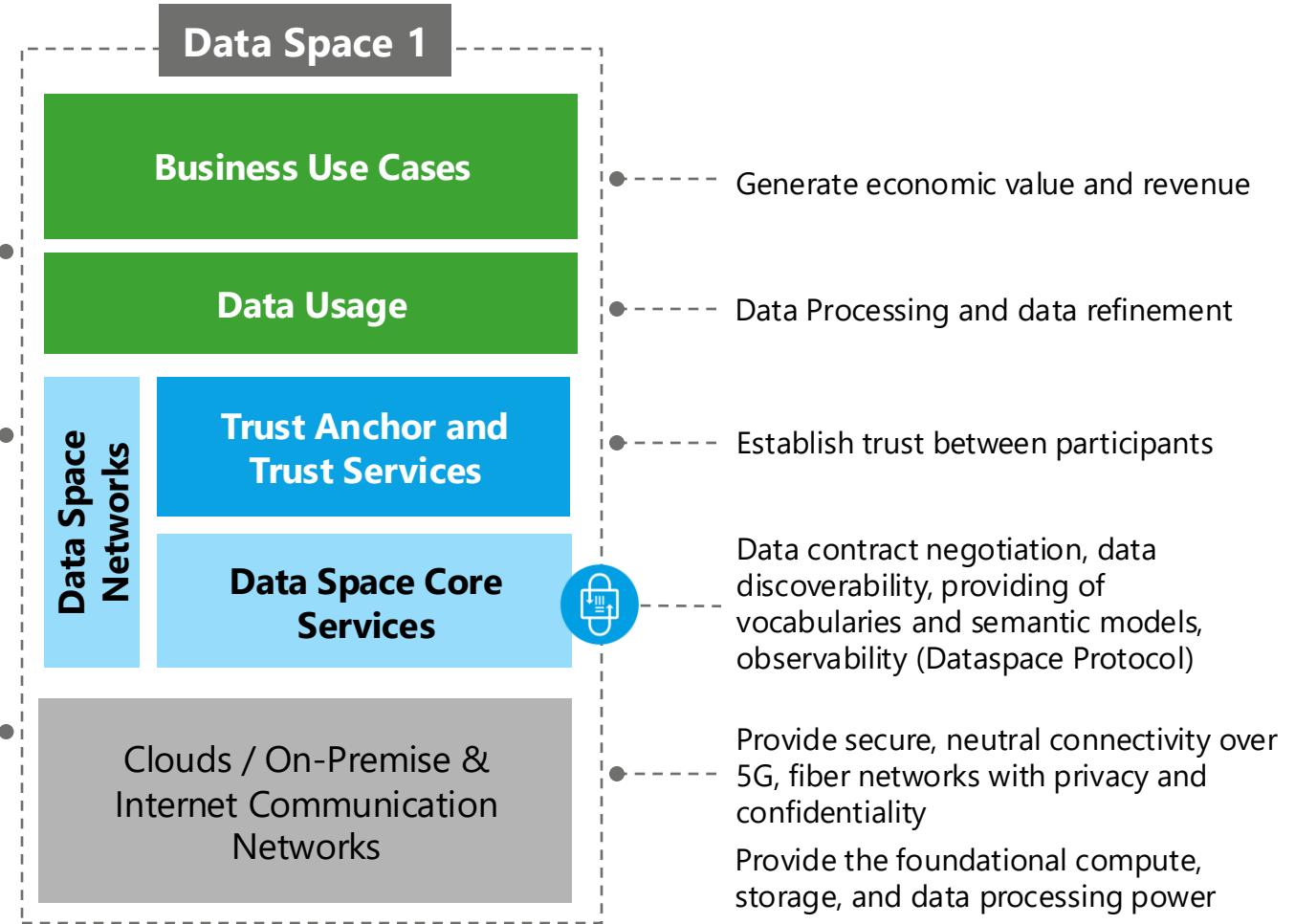
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Specific data strategies and standards in
different economic areas and domains

Global standards to ensure global
value creation

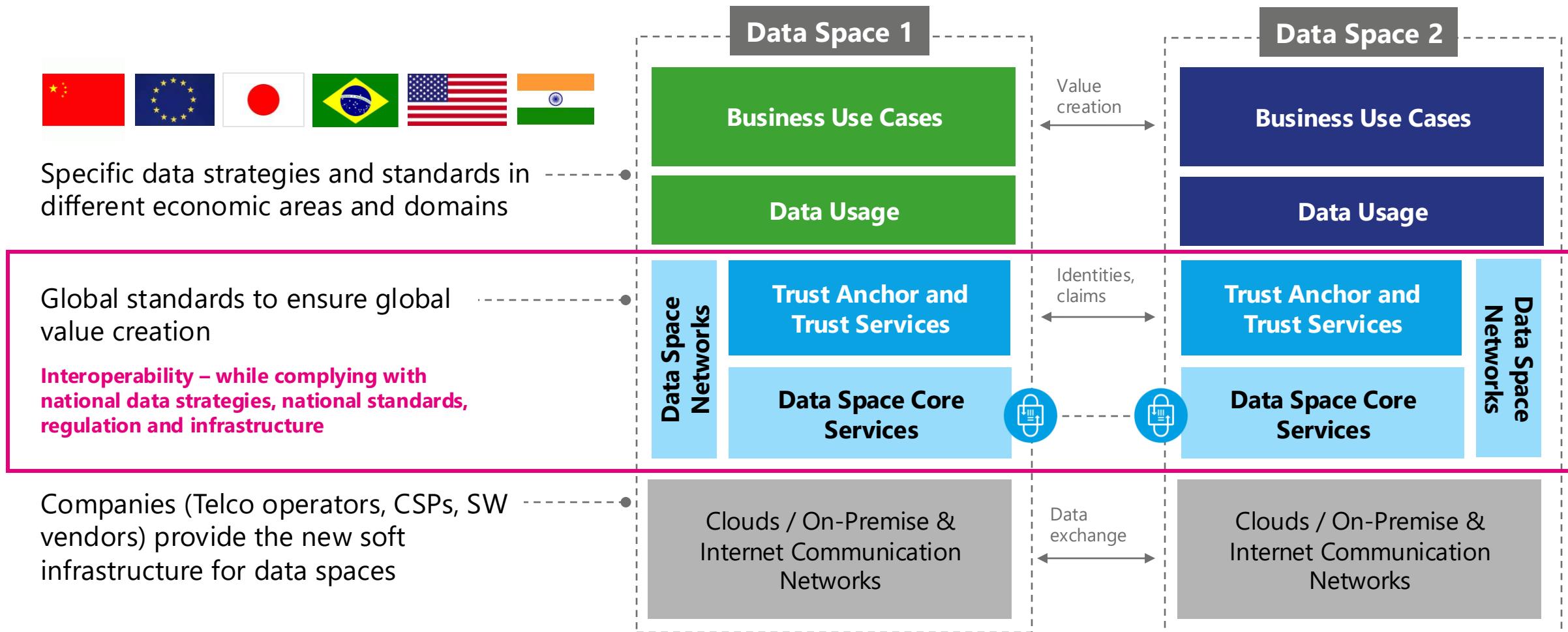
Companies (Telco operators, CSPs, SW
vendors) provide the new soft
infrastructure for data spaces



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

National flavors and power by using global standards

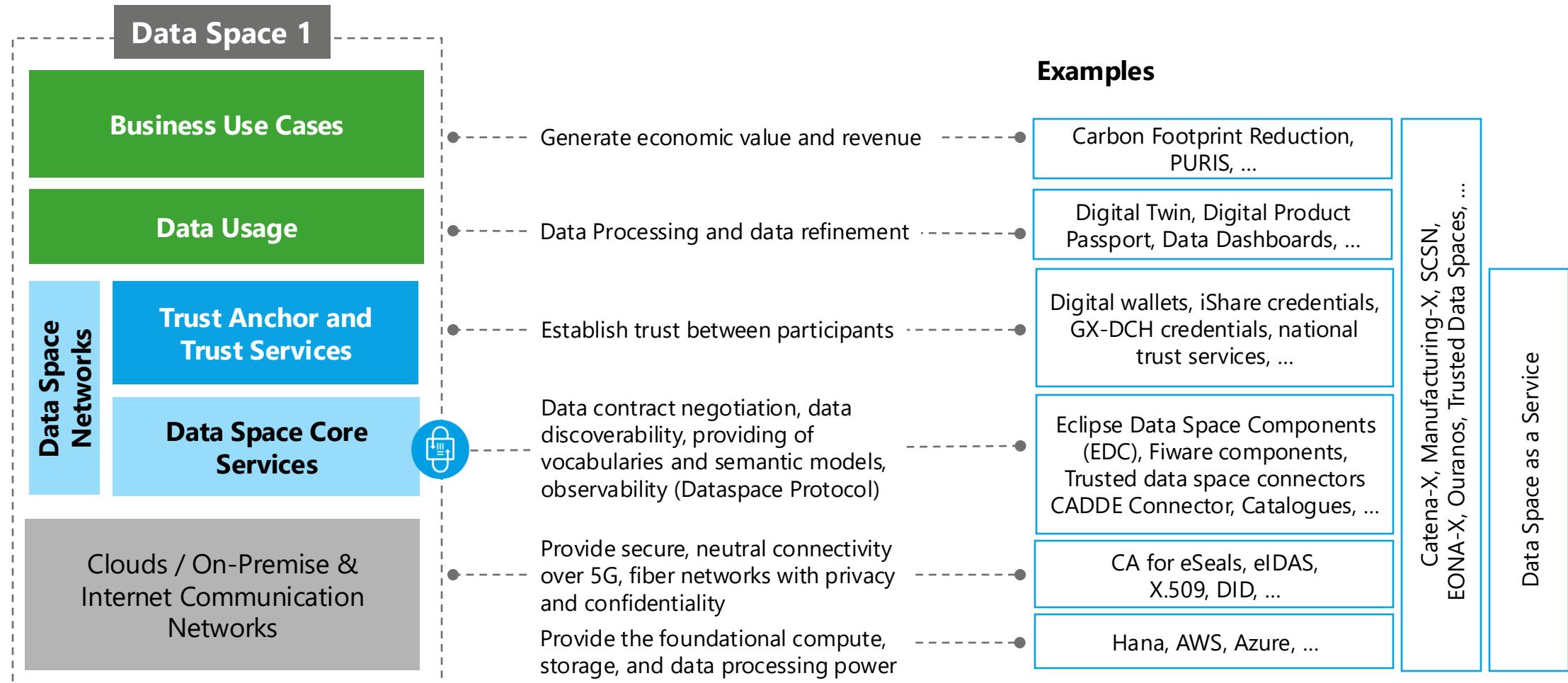
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A global soft infrastructure for data spaces – like GSM for mobile telecommunication

National flavors and power by using global standards

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The IDSA Telco Provider Community

A step towards standards for trusted network services

The goal:

We establish **international de-facto standards for trusted network and interoperability services** mainly in the B2B area, ensuring fair, secure, and interoperable data sharing on global scale.

The vision:

To become the leading provider of global **data space connectivity services**, enabling companies to seamlessly and securely access data spaces with the **simplicity and reliability** of a phone call - leveraging the existing infrastructure of national telecom carriers to drive digital transformation and collaboration worldwide.

Discover more



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Community Founders

T-Systems



New Members



NEW

SoftBank
Group

Interoperability in Data Spaces by the IDSA Telco Provider Community

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Position Paper | Version 1.0 | March 2025

Establishing a Unified, Sovereign, and Open Digital Infrastructure: A Vision for Telecommunication Providers



ISDA Rulebook

Position Paper of members of the ISDA Association
Position Paper of bodies of the ISDA Association
Position Paper of the ISDA Association
White Paper of the ISDA Association

1. Interoperability

From a general perspective the topic of interoperability is elaborated on in the ISDA Rulebook with a dedicated chapter called "Interoperability in Data Spaces". Here the four main levels of interoperability are described as follows (cf. Figure 1):

- Technical interoperability** refers to syntactic and logical connections between systems or data sources, such as protocols, interfaces, and formats. This includes syntactic interoperability which refers to the structure and syntax of the data exchanged, such as schemas, models, and vocabularies.
- Semantic interoperability** refers to the meaning and interpretation of the data, such as concepts, relationships, and ontologies.
- Organizational interoperability** refers to the processes, policies, and governance of data ecosystems, such as data sharing agreements.
- Legal interoperability** refers to the acceptance of legal equivalence of contracts and contractual clauses between different data ecosystems. These ecosystems can have differences on multiple dimensions, based for example on industry regulations, or national laws but also contractual statements with identical wordings might have diverging interpretations in different data ecosystems.¹

Figure 1: The European Interoperability Framework



and characteristics² bases its work on interoperability in Data Spaces on ISO/IEC 19941.

When zooming into the technical layer, the 3-layer model of system software stack which is a helpful framework to orchestrate existing software stacks and identify gaps in the IT infrastructure of companies who want to become a participant in data spaces. The following part will give better insights into this model.

Maturity of data ecosystems: A 3-layer model of the system software stack

Data ecosystems may seem complex, but technology has matured to simplify their adoption. Businesses can now seamlessly connect, leverage their capabilities, and stay focused on solving problems for faster results and measurable benefits.

Figure 2: 3-layer model of a data ecosystem's software stack³

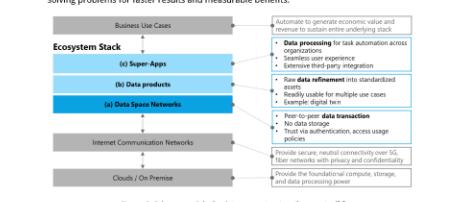


Figure 2 illustrates how a data ecosystem seamlessly integrates into your existing IT landscapes by operating atop cloud or on-premises hardware and communication networks to support the automation of your business use case. Drawing on established conceptualizations of information systems⁴ – including the abstraction layers of the Open Systems Interconnection (OSI) model, a reference framework by the International Organization for Standardization (ISO/IEC 7498-1:1994-0) – it has been established how three

¹ <https://www.iso.org/standard/66689.html>
² <https://www.iso.org/standard/66689.html>, C. Schlueter, J. C. Schlueter, and B. Otto, 2025, "Data Spaces as Meta-Organisations: European Journal of Information Systems, January, doi:10.1080/09600830.2023.245120, 1-21.
³ Schlueter Langdon, C., and K. Schlueter. 2022. Database First Applications in Mobility and Industry. In Otto, B. et al. (eds.), *Databases – Part IV: Solutions & Applications*. Springer Nature, Switzerland, 489-511. https://doi.org/10.1007/978-3-030-95000-6_17
⁴ See for example: Turban, E., L. Volonino, G. R. Wood, and R. D. H. Watson. 2022. *Information technology for management: Advances in theory and practice*. 12th ed. Hoboken, NJ: Wiley.
⁵ ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model* (Ed. 1, 1994, last reviewed and confirmed in 2010)

New position paper:

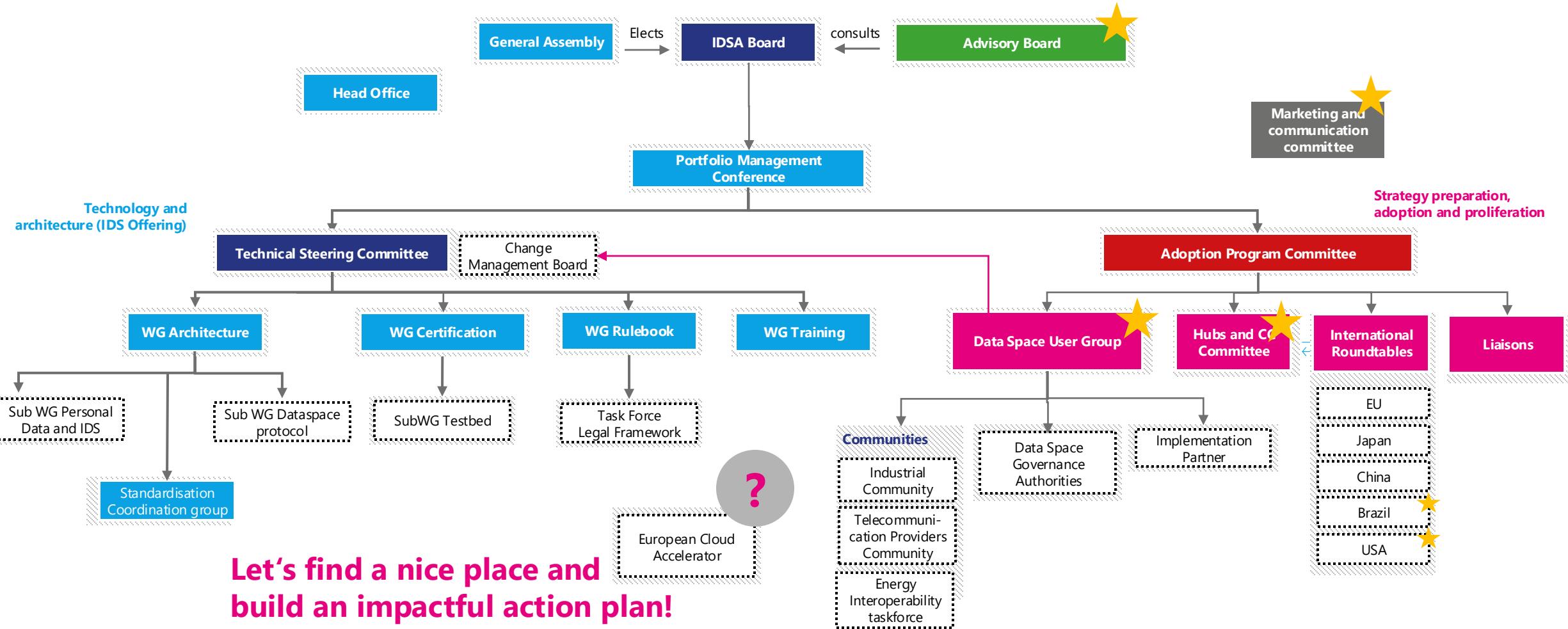
- » **Telcos as Key Enablers:** Their expertise in global networks positions them to drive data space development.
- » **Lessons from GSM:** Collaboration and standardization can ensure interoperability in data spaces.
- » **Interoperability Model:** A structured framework addresses technical, semantic, organizational, and legal layers.
- » **Case studies** from major telcos showcase successful implementations and collaborations



Take a look inside!

Happy to give „European Cloud Accelerator“ a home for further acceleration

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Join the data spaces pioneers

Become a member of IDSA

Name, Date

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



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