INTERNATIONAL DATA
SPACES ASSOCIATION

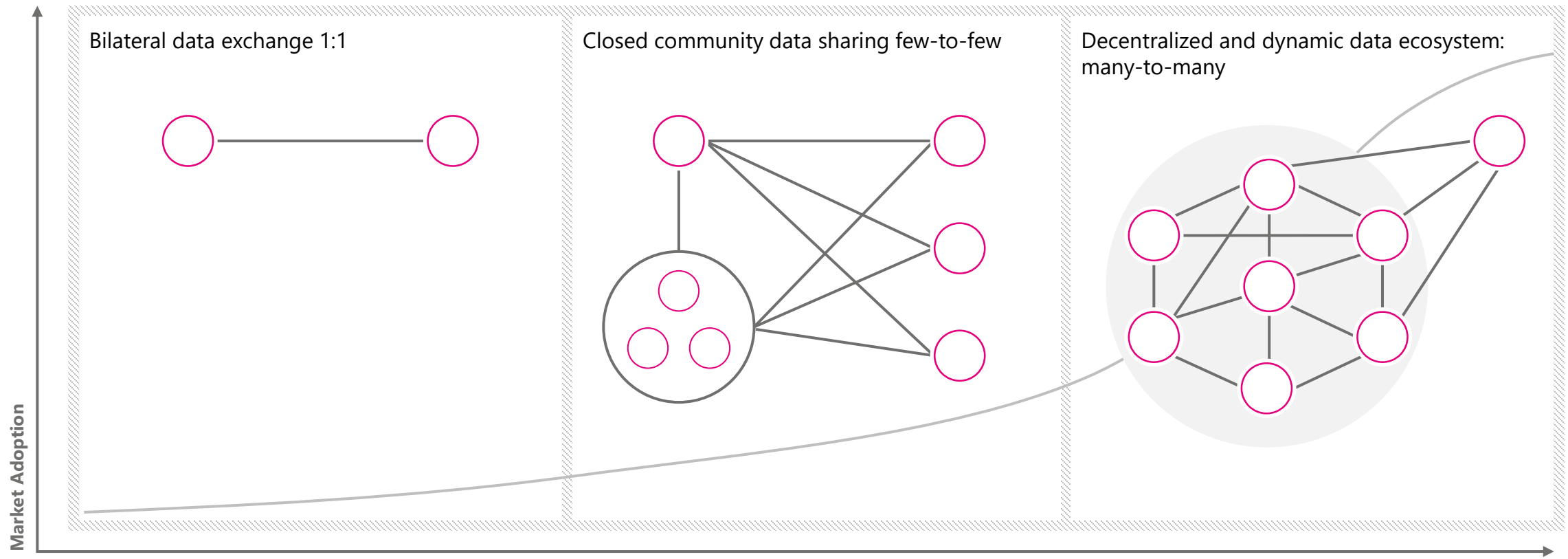# Data Spaces as a Foundation for Data Sharing

Anil Turkmayali, International Data Spaces Association

ISO-TC211/EC-JRC/EuroGeographics webinar on Data Spaces

The data economy involves many players
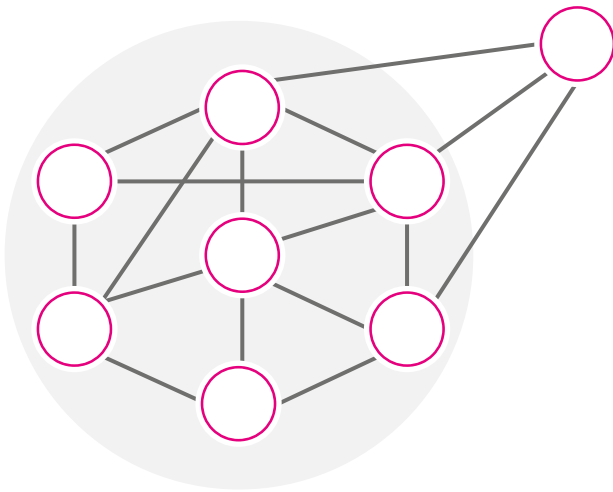
Evolution of data sharing

Bilateral data exchange 1:1

Closed community data sharing few-to-few

Decentralized and dynamic data ecosystem:
many-to-many

Market Adoption

The data space approach

...connecting all kinds of data endpoints

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.

- Federated data architecture: no physical data integration, leave data where it is
- Interoperability: no silos, no vendor-dependency
- Data Sovereignty and traceability
- Trusted participants

Our members are the backbone of IDSA

Yoou a part of the change!

860+ **People contributing**

31 **Countries**

183

International. Data Spaces. Association.

We know what is going on and can help.

Harmonization of frameworks and data strategies on global level
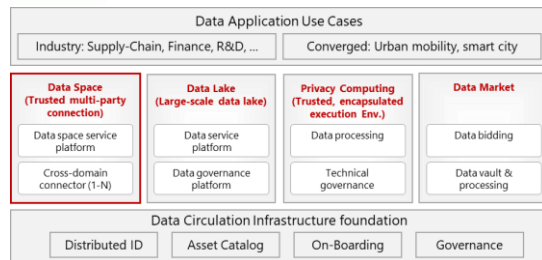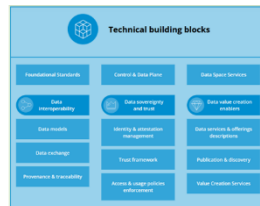
...and much more...

IDSA

Driving global standards

Strong link to relevant economic areas

860+ People contributing

31 Countries

175
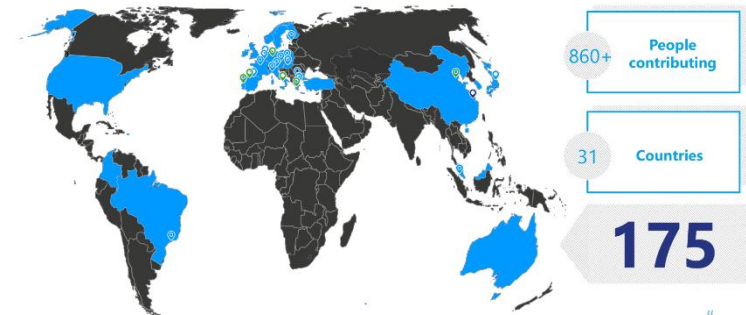
Global players to provide data space solutions globally

IDSA assets – from theory to practice

How we change the way data is shared

IDSA Rulebook

IDS Reference Architecture Model

Dataspace Protocol and Standardization

IDS Certification

Reports such as Data Connector Report

Data Spaces Radar

IDSA Hubs, CC & Research Labs

Theory

Practice
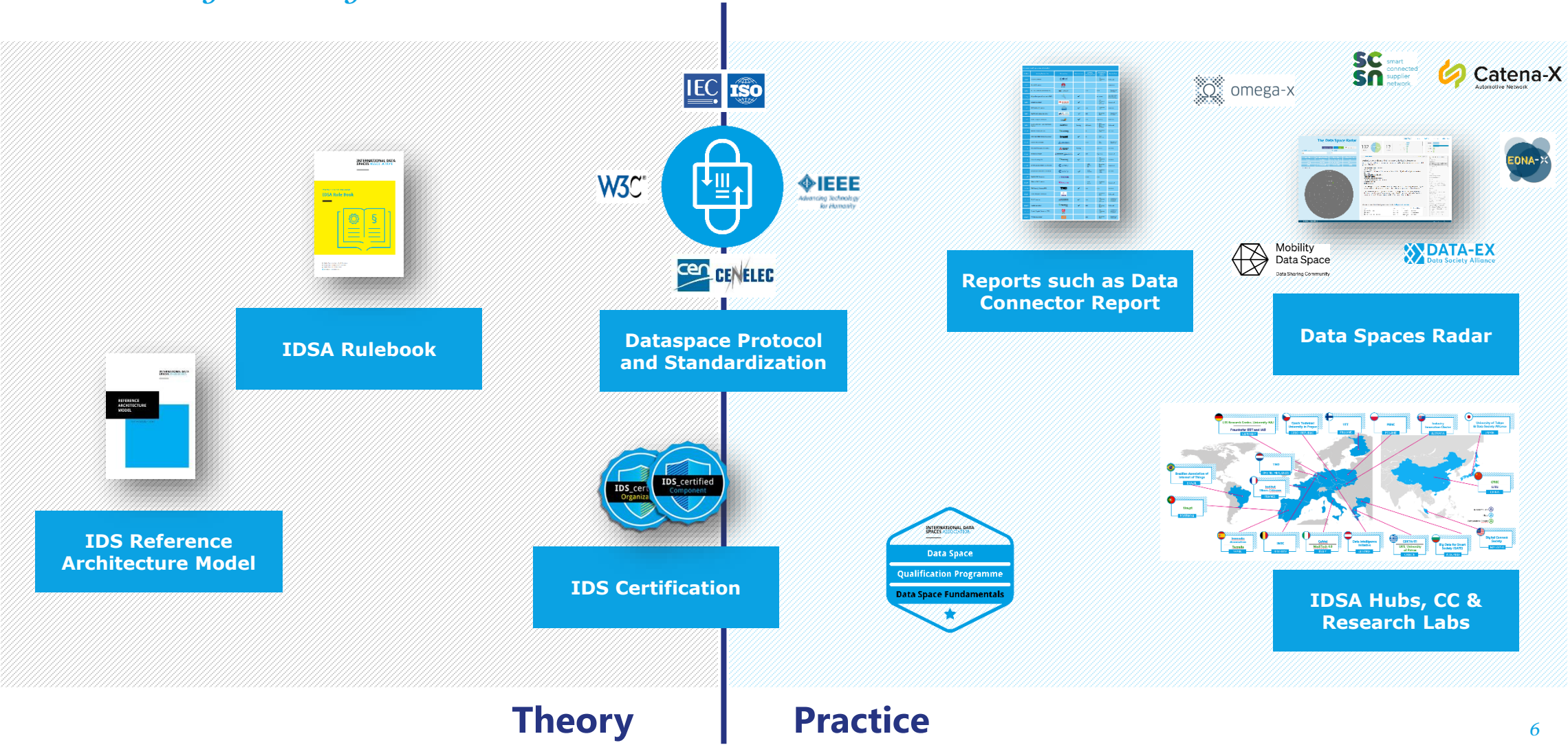
What is the Dataspace Protocol?

The essence for interoperability

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Fragmented structure

Unclear Terms

Conflicting formats

Limited interoperability

Incompatible standards
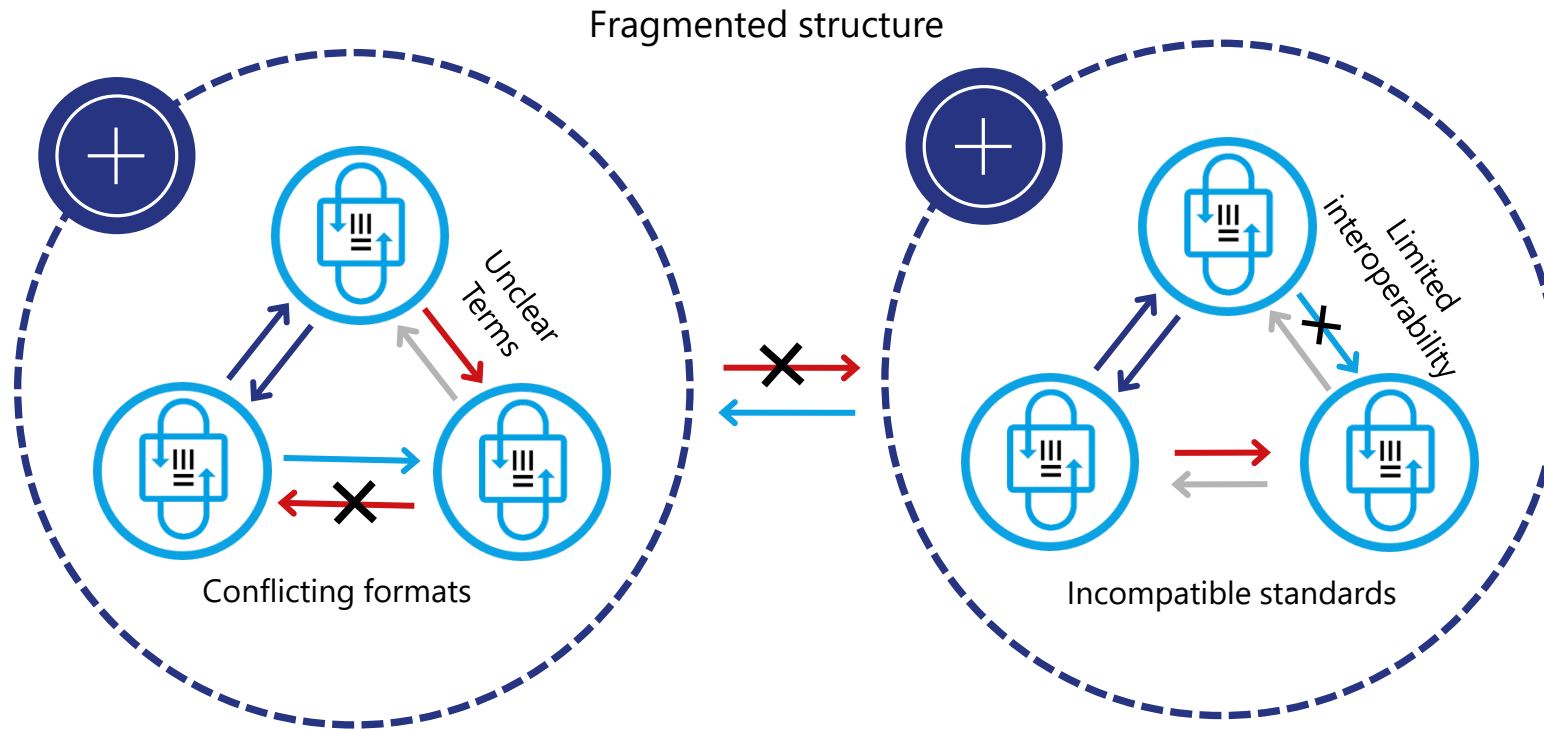
Data Spaces Require:

- Data Sovereignty
- Interoperability
- Scalability
- Trustworthiness

Remember these:

HTTP

GSM

SWIFT

We Need a Structure

That tells us what to do during data sharing

Before HTTP, there wasn't a common way for computers to communicate over the web. HTTP became the universal protocol for transferring and sharing hypertext across different systems.

Before SWIFT, financial messaging across borders was difficult and insecure. SWIFT created a global standard for secure and simple communication between banks.

Before Bluetooth, short-range device communication was unreliable. Bluetooth standardized wireless connections between devices.

Prior to GSM, mobile communication lacked a global standard. GSM unified mobile networks, enabling global connectivity.

Driving data spaces innovation

Collaborators defining and embracing the Dataspace Protocol

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

TECH2B · X-ROAD · Open

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Dataspace Protocol

Protocol's Structure

Catalog Protocol

» Defines how data is listed and organized by the provider.

» Makes data easy to find and understandable for potential consumers.

» Ensures data is described in a consistent, standard format.

» **You prepare and offer what is available**

Contract Negotiation Protocol

» Facilitates the agreement on data usage terms between provider and consumer.

» Defines how long, for what purpose, and under what conditions data can be used.

» Provides a clear process to negotiate and finalize these terms.

» **You negotiate and agree on how the data will be used**

Transfer Process Protocol
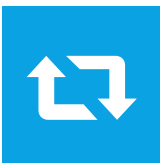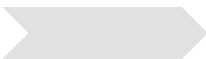
» Manages the actual transfer of data once terms are agreed upon.

» Ensures data is shared securely and follows the negotiated rules.

» Supports different types of data transfers (e.g., one-time or continuous).

» **You execute the data transfer according to the agreed terms**

Standardized data exchange

What does this mean? How does Dataspace Protocol ensure that?

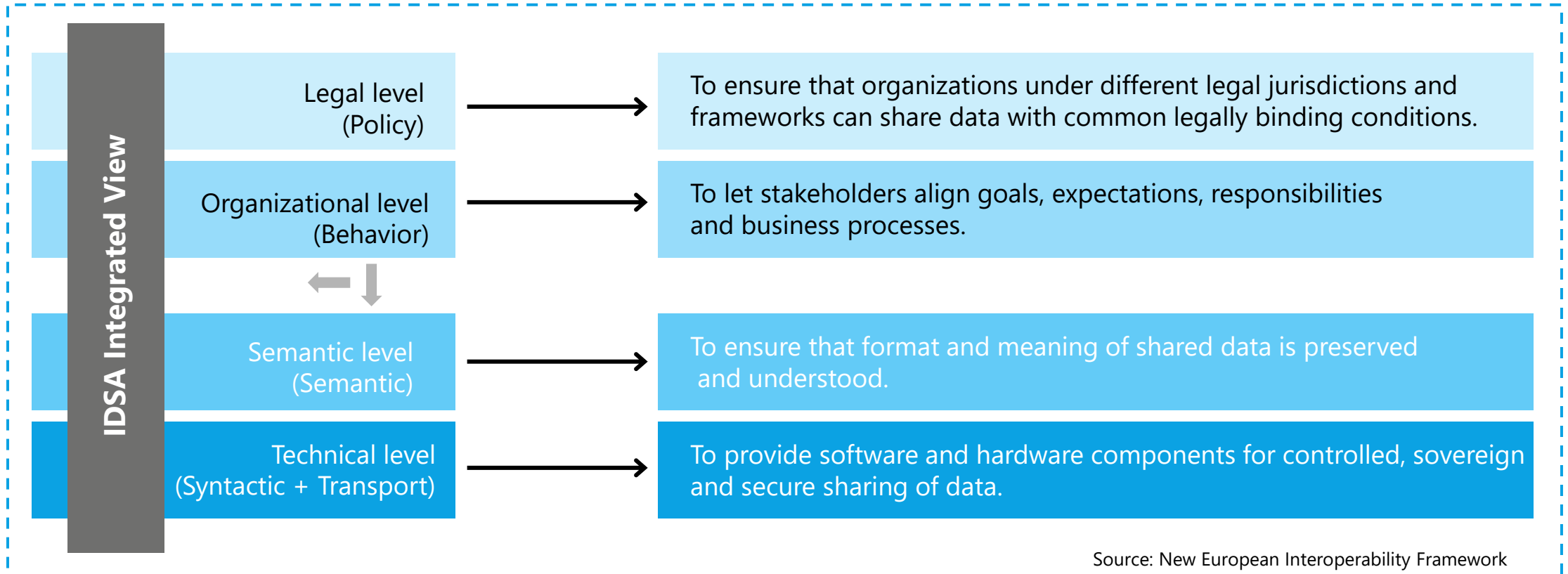|	*Catalogue*	*Contract Negotiation*	*Transfer Process*
What is done?	Represent the entire dataset catalog (DCAT)	Enter the details of the contract negotiation	Execute secure and sovereign data exchange
Example	**Title:** Transit Schedules **Description:** Schedules for public transit in City X, including buses, trams, and subways. **Keywords:** transit, schedules, public transport, City X **Theme:** Transportation **Access URL:** http://cityx.gov/transit/schedules	**Provider:** City X Government **Consumer:** Research Institution **Contract Start:** 2024-01-01 **Contract End:** 2024-06-30 **Permissions:** Use data for academic research. **Prohibitions:** Commercial use of the data.	**Source:** City X Government **Destination:** Research Institution **Transfer Method:** IDS Connector **Type:** Pull Transfer **Security:** TLS encryption **Authentication:** OAuth 2.0

Layered model for interoperability

IDSA Integrated View

Level	Description
Legal level (Policy)	To ensure that organizations under different legal jurisdictions and frameworks can share data with common legally binding conditions.
Organizational level (Behavior)	To let stakeholders align goals, expectations, responsibilities and business processes.
Semantic level (Semantic)	To ensure that format and meaning of shared data is preserved and understood.
Technical level (Syntactic + Transport)	To provide software and hardware components for controlled, sovereign and secure sharing of data.

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

Let us go for global standardization

Our standardization activities

1. IDSA does not consider domain specific standards.

2. IDSA supports the integration into domain specific standards

NEW: ISO/IEC JTC 1 SC 38 Cloud Computing and distributed platforms | WG 5 – Data in Cloud Computing and related technologies | ISO/IEC AWI 20151 Dataspaces concepts and characteristics

NEW: CEN/CENELEC Focus Group Data, Dataspaces, Cloud and Edge

The Time to Act is Now!
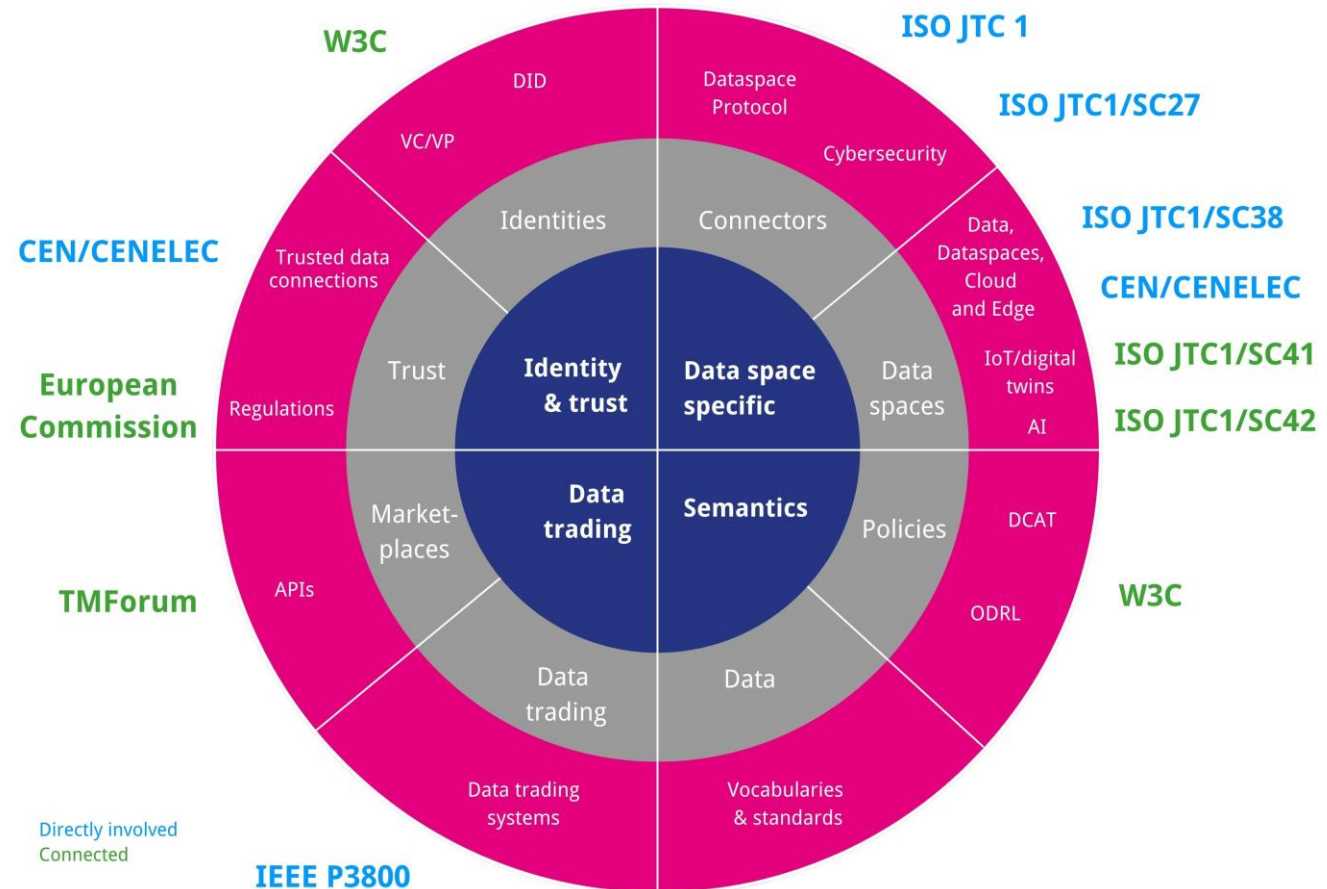
The path to standardisation

How DSP achieves recognition through ISO and CEN/CENELEC

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IDSA Working Group Architecture → **Eclipse Dataspace Working Group** → **PAS Submission** → **JTC1** → **Dataspace Protocol**
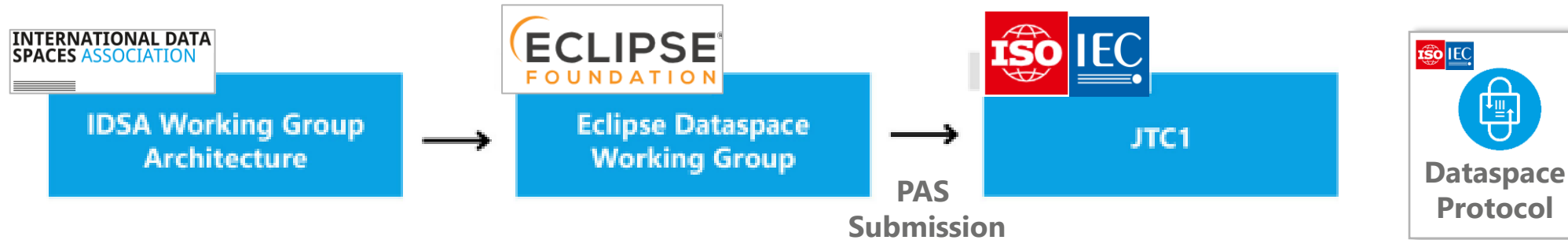
IDSA contribute to data spaces standardisation committees

Dataspace Protocol

Data spaces standardisation committees

CEN CENELEC — **AWS Trusted Data Transaction**
<u>Part 1: Concepts, terminology, and Mechanisms - published</u>

CEN CENELEC — <u>JTC 25 - Data management, Dataspaces, Cloud and edge</u>

ISO IEC — <u>ISO/IEC JTC 1/SC 38 Cloud computing and distributed platforms</u>
<u>ISO/IE CD 20151 Dataspaces concepts and characteristics</u>

Dataspace Protocol + Decentralized Claims Protocol

As a basis for interoperability across four layers

Legal level	- Negotiate and enforce usage policies (ODRL). - Provides verifiable credentials for legal identity, roles, and compliance claims.
Organizational level	- Standardized data-sharing processes across connectors. - Federated trust and credential-based onboarding across domains.
Semantic level	- Metadata and policy expression via DCAT and ODRL standards. - Identity-related semantics through structured claims and credentials.
Technical level	- Core APIs and workflows for catalog, contract negotiation, and data transfer. - Protocols secure authentication and credential exchange.