EUROPEAN BIG DATA VALUE FORUM

DATA SPACES SUPPORT CENTRE

Data Spaces

Common European Data Spaces and interoperability

25th October, 9:00 – 10:30

ORGANISED BY

BDV BIG DATA VALUE ASSOCIATION

IN COLLABORATION WITH

ITI INVESTIGATE TO INNOVATE

European Commission

INCLIVA | VLC Biomedical Research Institute

POLITÉCNICA

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

UNDER THE AUSPICES OF

EU23 SPANISH PRESIDENCY COUNCIL OF THE EUROPEAN UNION

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EU23

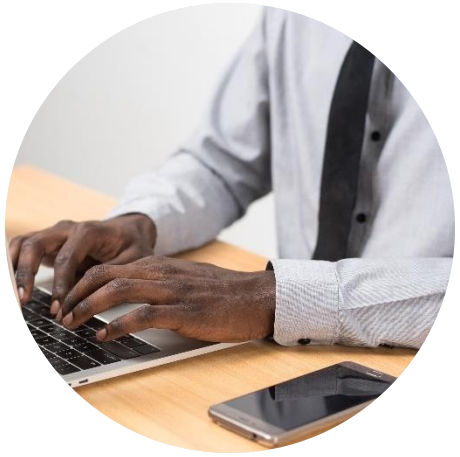
Deploying the European Strategy for Data through 4 Pillars

A cross-sectoral legal framework on data

including a legislative framework for European data governance and horizontal rules increasing legal certainty on data access and use

Enablers

Investments in data spaces and federated cloud infrastructures



Competences

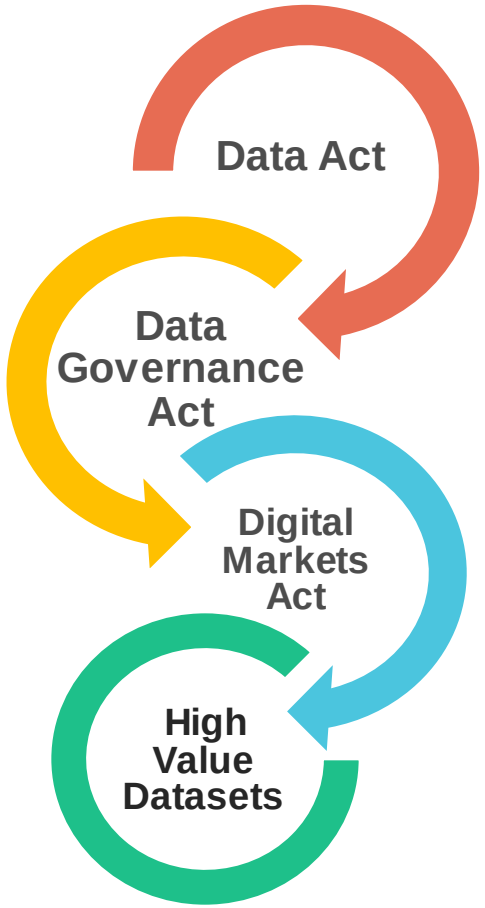
Empowering individuals, investing in digital skills & data literacy and in dedicated capacity building for SMEs.

Rollout of common European data spaces

in crucial economic sectors and domains of public interest, looking at data governance and practical arrangements.

European Commission

Cross-sectoral legislation to enable the EU Data Strategy



Overall aim: **Single EU Data Space** (free flow of data for innovation, research, etc)
Ensure **FAIRNESS** in the allocation of data value among the actors of the data economy (political agreement on 27 June 2023).
Ensure **TRUST** in data transactions (entered into application 24 September 2023)
Tackle imbalances caused by the **MARKET POWER** of gatekeepers (entered into application 2 May 2023)
Unleash the socio-economic potential of data as a raw material for **INNOVATION**, in particular for **SMEs** (adopted December 2022)

- ***GDPR:*** *The Data Act does not change or amend, but complements and builds on the rights existing under the GDPR.*
- ***Sectoral / domain-specific legislation:*** *Can impose further requirements on the availability and interoperability of public and private sector data.*

European Commission

European Data Innovation Board (EDIB)

New Expert group established under the Data Governance Act

Will facilitate the sharing of best practices, in particular on data intermediation, data altruism and the use of public data that cannot be made available as open data, as well as on the prioritisation of cross-sectoral interoperability standards.

Representatives:

- Member State competent authorities
- European Data Protection Board
- European Data Protection Supervisor
- European Union Agency for Cybersecurity (ENISA)
- EU SME Envoy/representative
- other representatives of relevant bodies (through a call for experts)

Sub-groups:

- Member State competent authorities
- Technical discussions on standardisation, portability and interoperability
- Stakeholder involvement

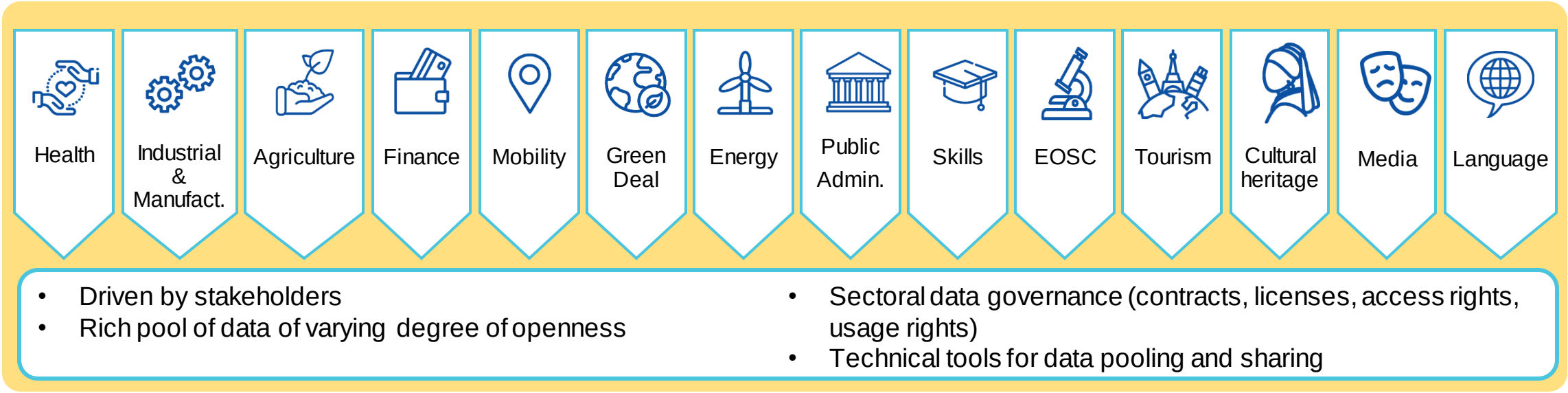
Start: **November 2023**

Data Governance Act explained | Shaping Europe's digital future (europa.eu)

European Commission

Common European Data Spaces

Digital Europe funding focuses on the creation of 14 data spaces, each linked to a strategic topic



Note: High Value Datasets (public sector) will also play a crucial role in the development of data spaces

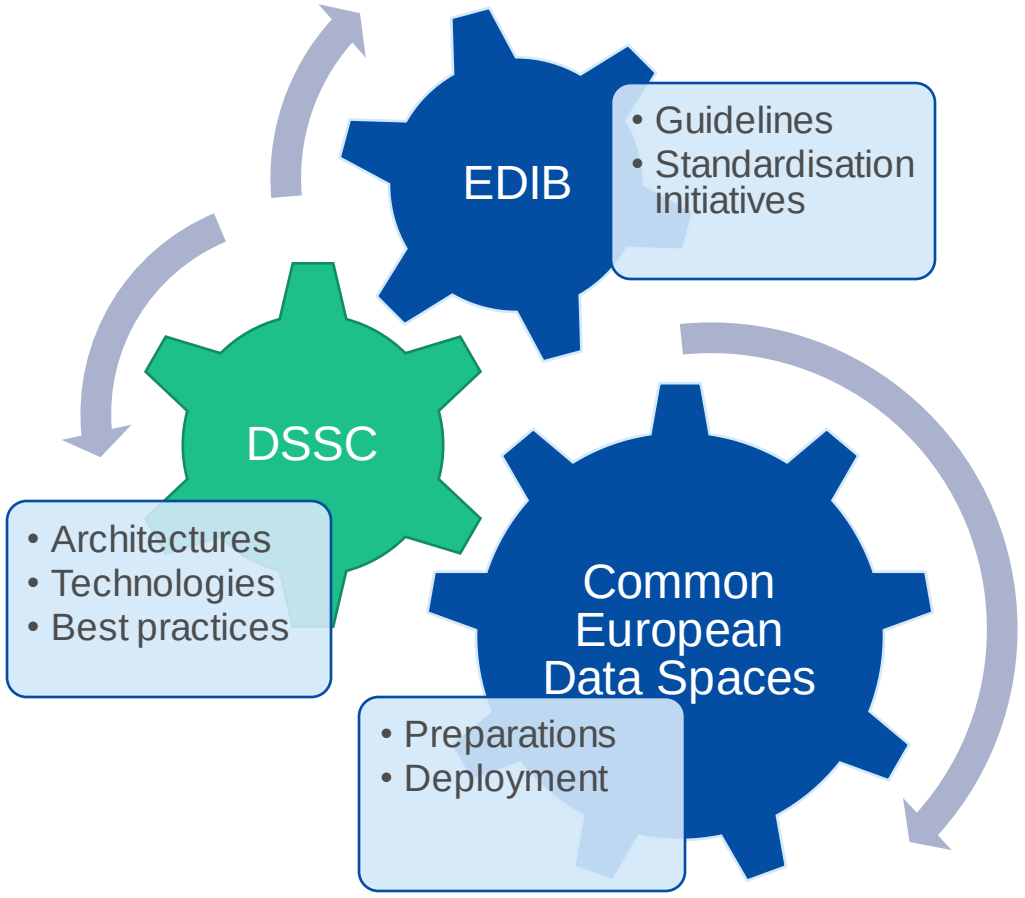
Data Spaces Support Centre (DSSC)

First line of support to the **common European data spaces**

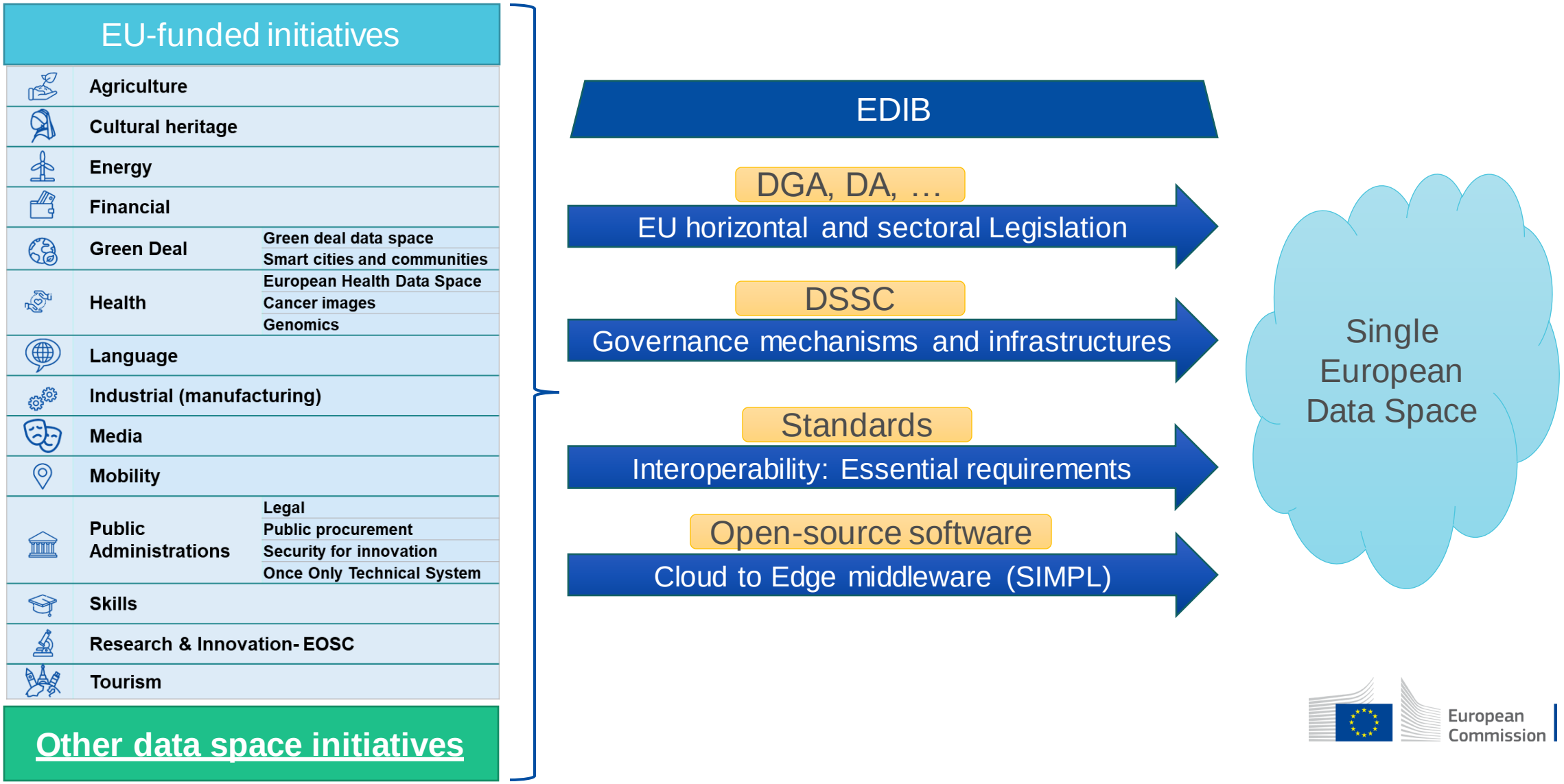
- helping to create synergies and to ensure interoperability

Advisory and supporting role to the **European Data Innovation Board**

- signalling implementation issues
- advising on feasibility of proposed measures
- supporting the implementation of approved initiatives



Towards a single European data space



European Commission

Article 28 of the Data Act

Essential requirements regarding interoperability of data spaces

Discover

Use

Share

Agree

1. Participants of data spaces that offer data or data services to other participants, shall comply with, the following essential requirements to facilitate interoperability of data, data sharing mechanisms and services as well as of the common European data spaces (…):

(a) the dataset content, use restrictions, licences, data collection methodology, data quality and uncertainty shall be sufficiently described, where applicable, in machine-readable format, to allow the recipient to find, access and use the data;

(b) the data structures, data formats, vocabularies, classification schemes, taxonomies and code lists, where available, shall be described in a publicly available and consistent manner;

(c) the technical means to access the data, such as application programming interfaces, and their terms of use and quality of service shall be sufficiently described to enable automatic access and transmission of data between parties, including continuously, in bulk download or in real-time in a machine-readable format where that is technically feasible and does not hamper the good functioning of the product;

(d) where applicable, the means to enable the interoperability of tools for automating the execution of data sharing agreements, such as smart contracts.

INSTRUMENTS

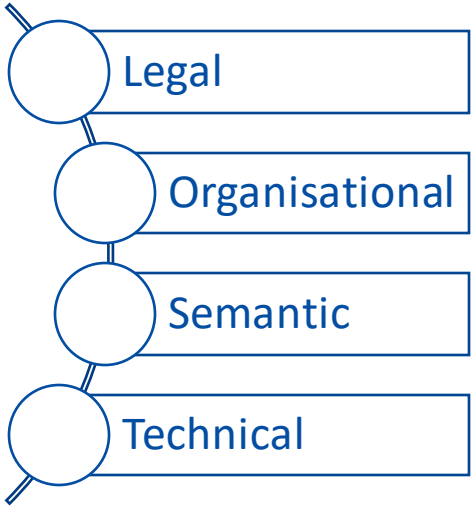
1. **Delegated acts** (to further refine the essential requirements if needed)
2. **Harmonised standards** (published in the Official Journal, to implement essential requirements)
3. **Common specifications** (through *implementing acts*, to fill standards gaps in cases where no Harmonised Standard is available, again aiming to implement the essential requirements)

European Commission

Standardisation

- High-Level Forum for Standardisation (HLF)
- HLF Workstream 14: Data Interoperability
- Report with recommendations (by end of the year) → EDIB, EC

- *HLF Digital Sherpas*
- *Multi Stakeholder Platform on ICT Standardisation*
- *Data Spaces Support Centre*
- *CEN Workshop on Trusted Data Transactions*
- *DG DIGIT (Interoperable Europe)*
- *JRC*



Interoperability layers

Focus areas

European Commission

Finding the right balance

Data standards stack

Process rules
- Choreographies, rulebooks, certification schemes, …

Messages / APIs
- Styles: SOAP, REST, GRAPHQL, …
- Contents: Query / Response, Subscription, Download, …

Vocabularies
- Semantic standards: RDF, Linked Data
- Ontologies: Generic (Data Privacy, …), Domain-specific

Identification & trust
- Identification of parties, verifiable credentials

Data formats / syntaxes
- JSON, Parquet, XML, CSV, …

Communication protocols
- HTTPS, SFTP, FTPS, streaming protocols …

Uniformity

Allow for diversity	Be selective
Risk of divergence	Lack of relevance (low adoption)
Can be manageable (tool support)	Mass adoption, long-term investment e.g. IBAN)

Speed

Official standards	Industry standards / specifications	De facto standards	No standards
Long lead time	Risk of silos	Risk of vendor lock-in	No scale effect
Very reliable	Agile	Fast, innovative	Fast

European Commission

DATA SPACES SUPPORT CENTRE

EU Data Spaces Support Centre: Assets and Ecosystem

Boris Otto · European Big Data Value Forum · Valencia · 25.10.2023

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

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The European Data Strategy

A real **data economy**, on the other hand, would be a powerful engine for innovation and new jobs. And this is why we need to secure this data for Europe and make it widely accessible. **We need common data spaces** — for example, in the energy or healthcare sectors. This will support innovation ecosystems in which universities, companies and researchers **can access and collaborate on data.«**

State of the Union Address on 16 September 2020

Source: European Commission (2020).

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The Voice of the Customer

DATA SPACES SUPPORT CENTRE

- What is a data space? What is needed to build one? Where can I buy one?
- Who runs a data space for me? Can I speak to the DSSC with regard to this?
- What are relevant standards (for IDM, for data catalogues, etc.)?
- What do I get from Gaia-X, IDSA, FIWARE? Do I have to become a member in all of those? What's the difference to the DSSC?
- Is it OK to consume a data space service run by a non-European service provider?
- How do I build an ecosystem? Where do I have to start? How to drive adoption?
- How exactly does the DSSC help me? I have to start now; how long do I have to wait for the DSSC to help me out?
- …

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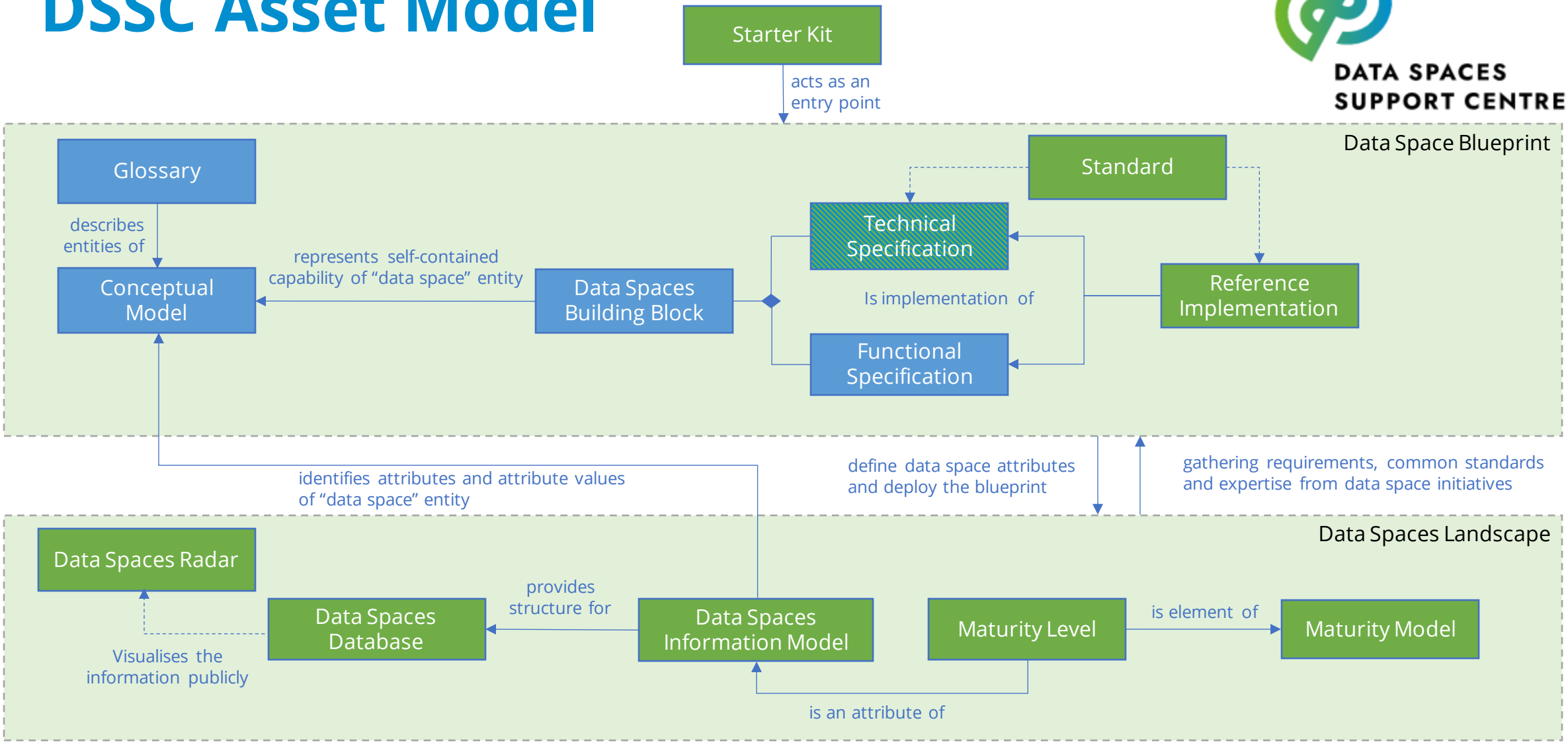
Legend: DSSC – Data Spaces Support Centre.

DSSC Asset Model



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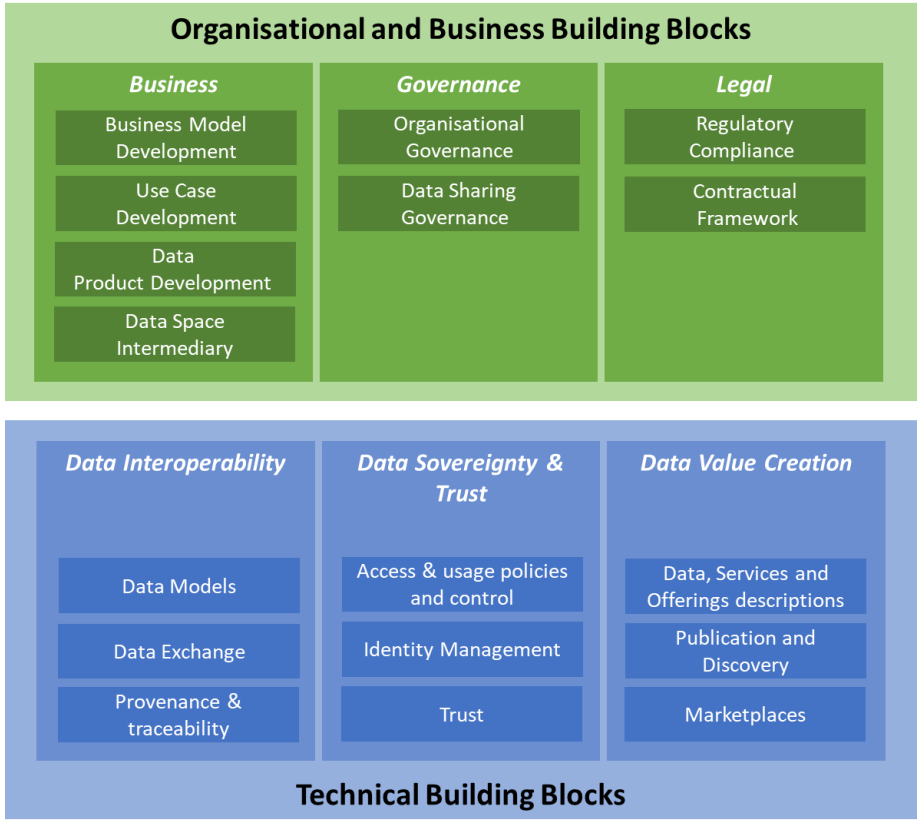
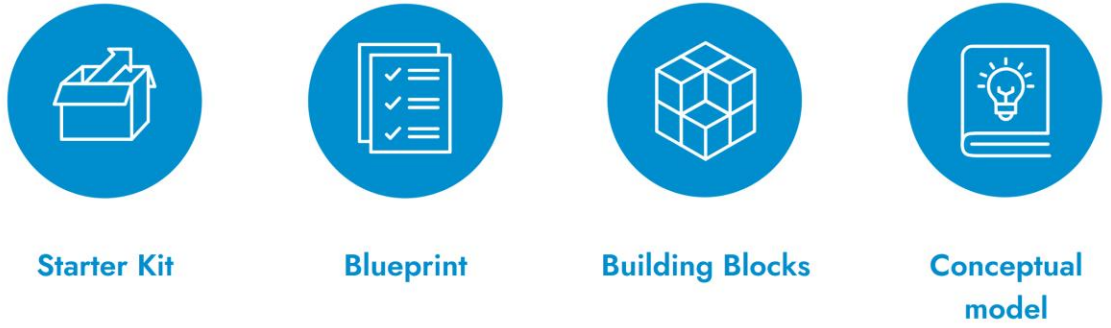
NB: As of September 2023; Assets in blue are part of the Blueprint V0.5 published in by September 2023.

Building Blocks

DATA SPACES SUPPORT CENTRE





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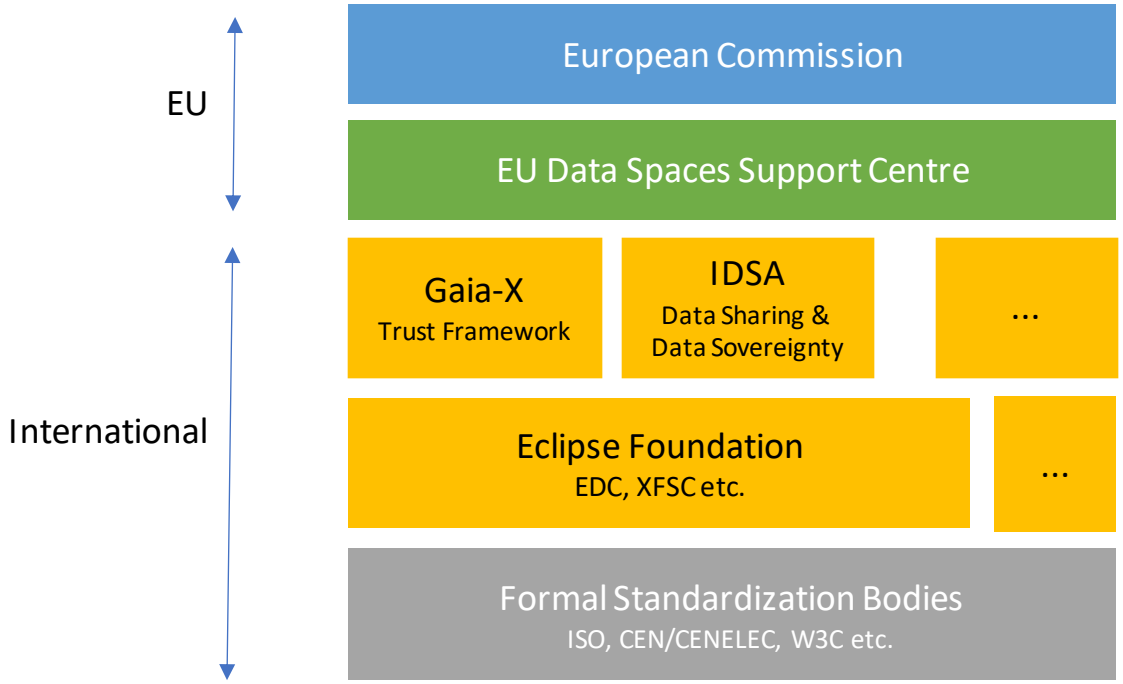
NB: Please see https://dssc.eu/page/knowledge-base.

DSSC in the Data Space Landscape



Legal framework for the Single European Market

Official mandate for EU data space blueprints and building blocks, data spaces support

Voice of the communities, business requirements and "business design"

Technical spec and implementation in OSS, place for the developer community

Long-term investment security, adoption support etc. through norms and standards

To be successful, everyone must stay in their lane of the respective color, being aligned at all times and committed to the stack.

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NB: Viewgraph does not aim at completeness.

Contact Information

DATA SPACES SUPPORT CENTRE

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Member of the Board of Directors of Gaia-X AISBL and IDS Association

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DATA SPACES SUPPORT CENTRE

Common European data spaces and interoperability

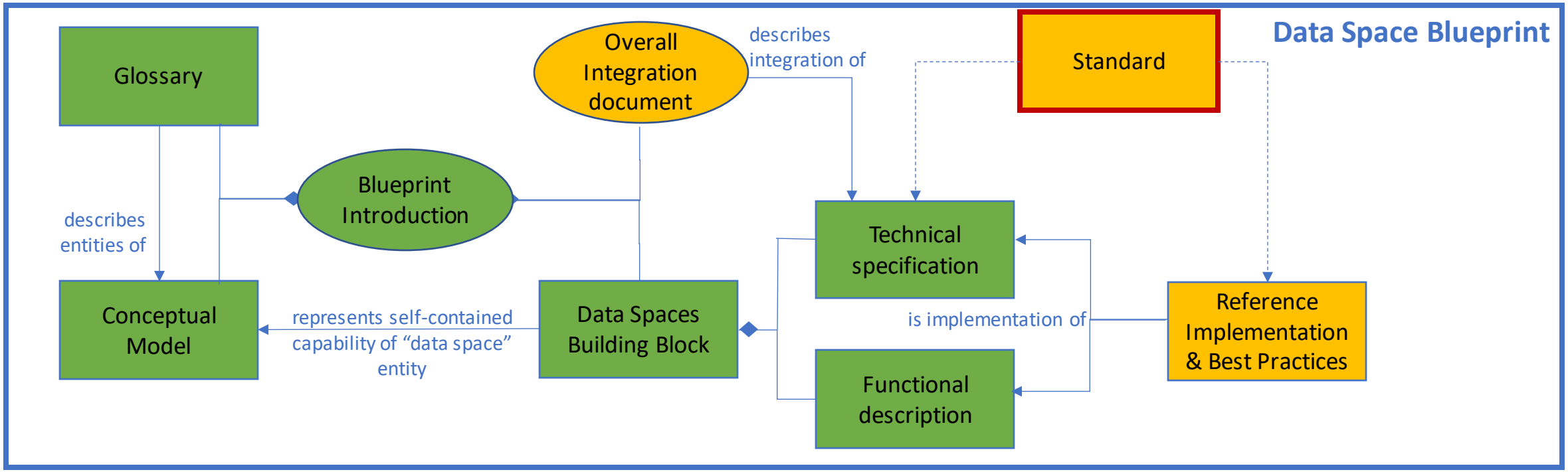
DSSC standardization activities

Clara Pezuela (FIWARE Foundation)

25 October 2023, Valencia, EBDVF

Standards in DSSC Blueprint

DATA SPACES SUPPORT CENTRE



Collection of existing standards as candidates for BBs tech specs → V0.5 – Publication: September 2023

Recommended standards included in the tech specs of BBs → V1.0 – Publication: April 2024

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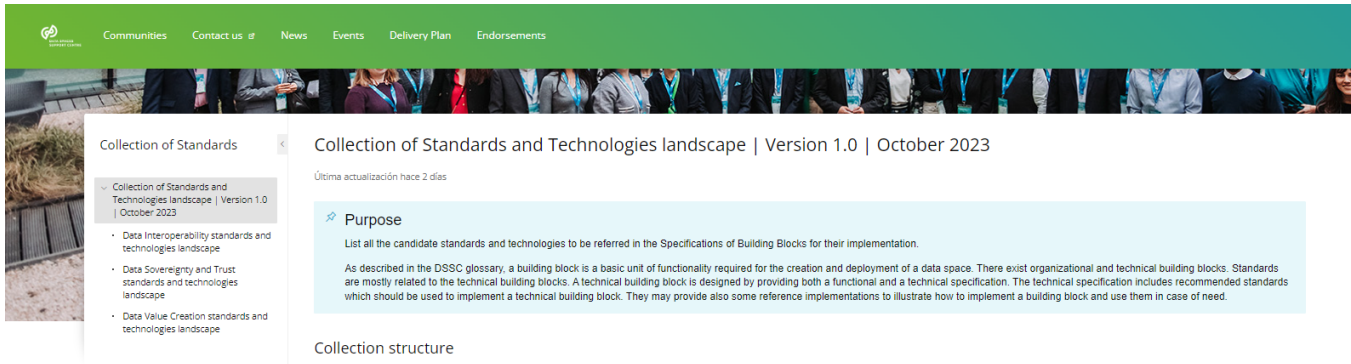
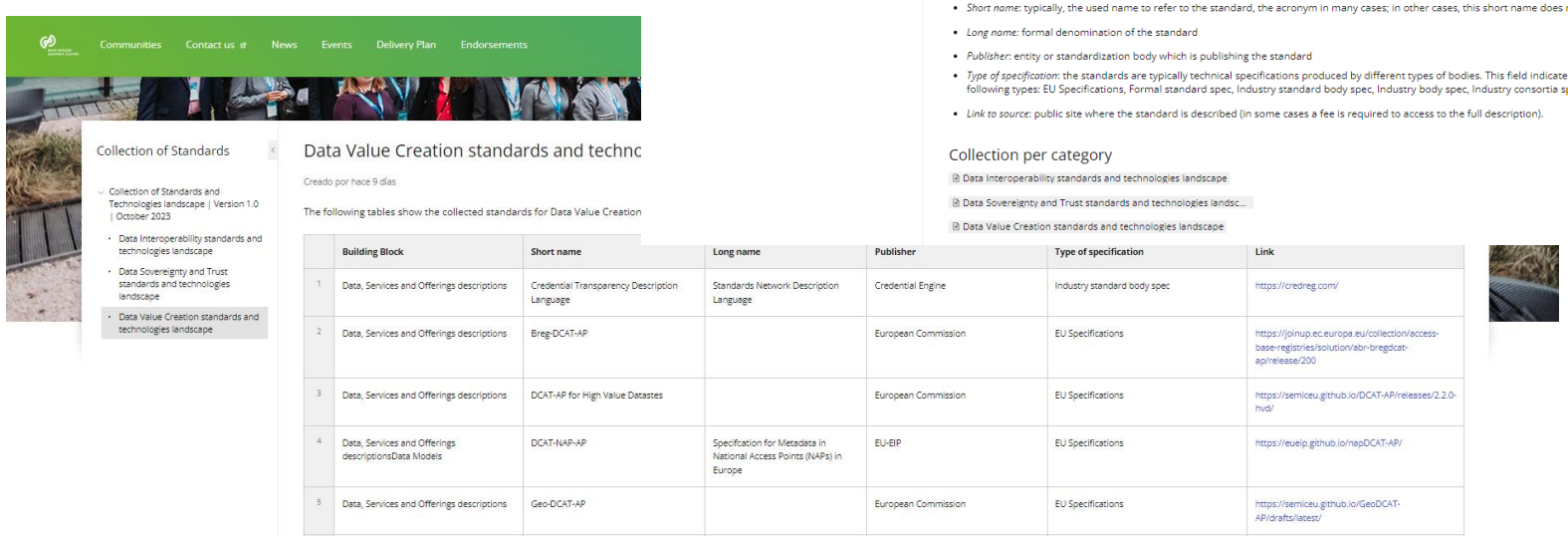
Collection of standards to build the Building Blocks

DATA SPACES SUPPORT CENTRE

- A map of existing de-facto/de-jure standards and reference implementations candidates for the technical descriptions of the Building Blocks
- In co-creation with the data spaces initatives (10 out of 12) and stakeholders
- 128 collected standards (Sep 2023)
- Available through DSSC web site
- Open for contributions – create a request with label [STANDARD_CONT]





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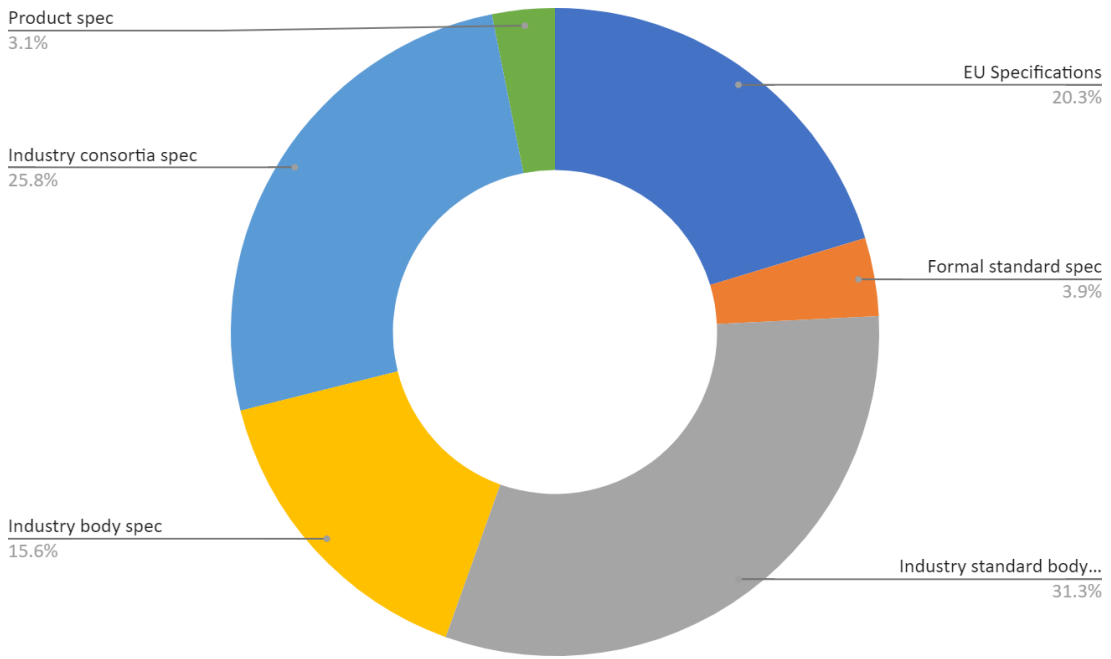
Collection of standards: source analysis

DATA SPACES SUPPORT CENTRE

- 31% from Industry Standard Body (W3C, TMForum, OASIS…)
- 26% from Industry Consortia Body (Catena-X, OGC, FIWARE, OpenID…)
- 20% from EU specifications
- 16% from Industry Body (GAIA-X, IDSA, Platform Industrie 4.0…)
- 4% from Formal Standardization bodies (ISO, ETSI, ITU…)



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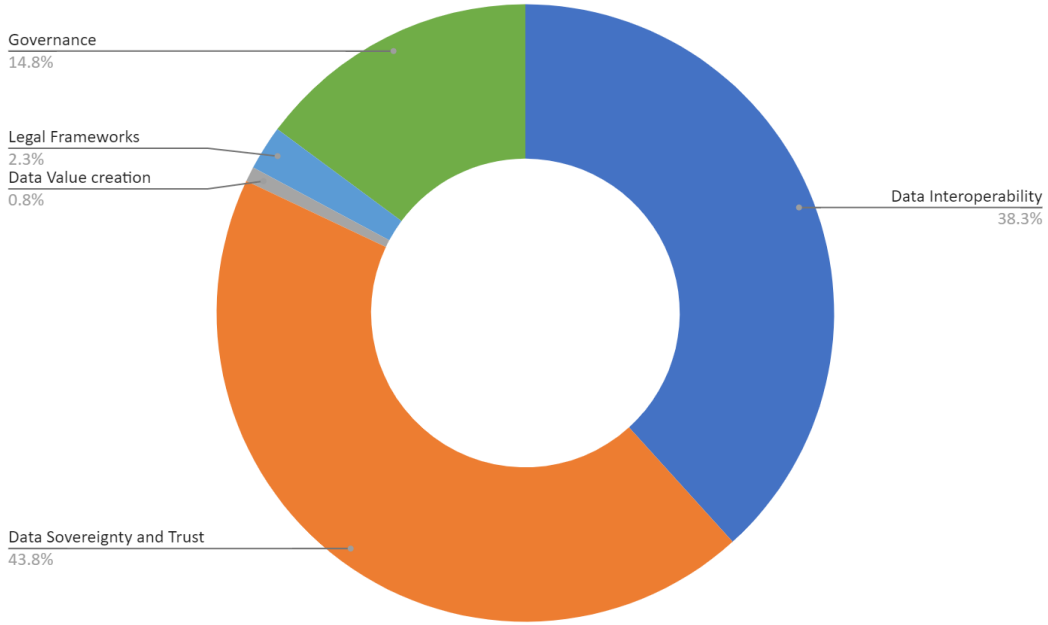
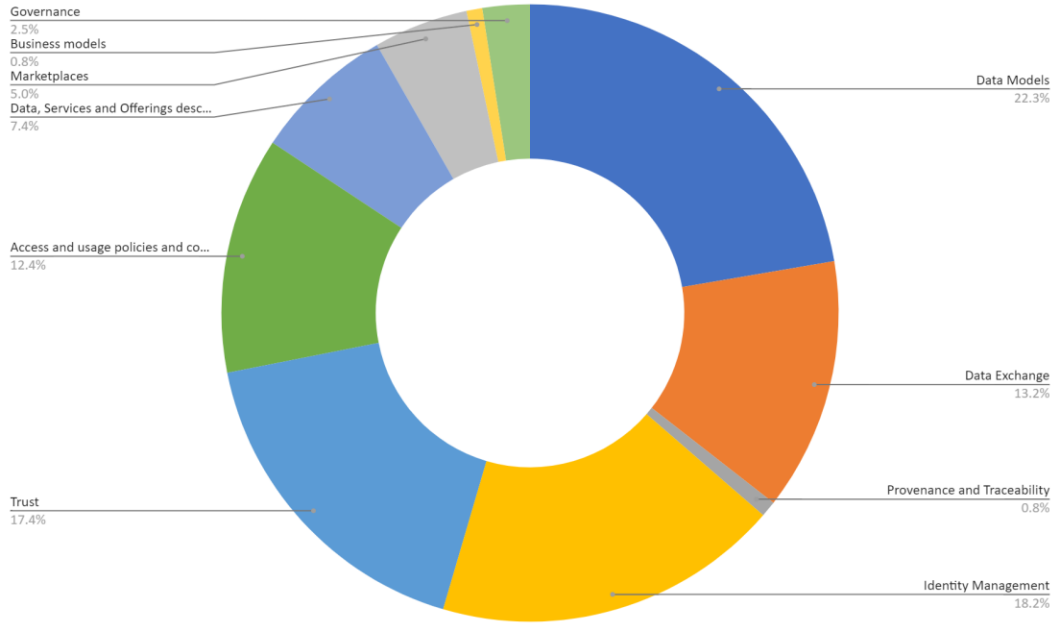
Collection of standards: type analysis

DATA SPACES SUPPORT CENTRE

- Most numerous standards are coming for:
  - **Category**: “Data Sovereinty & Trust (44%)” and “Data Interoperability (38%)”
  - **Building Blocks**: “Data Models (22%)”, “Trust (17%)”, “Identity Management (18%)” and “Data Exchange (13%)”





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Most endorsed cross-domain standards by data spaces (more than 3)

DATA SPACES SUPPORT CENTRE

Candidate Specification	Related Building Block	Publisher	Data Spaces endorsing
NGSI-LD	Data Exchange	ETSI	DS4SSCC, int:net, DATES, DS4.0
OpenAPI Spec	Data Exchange	OpenAPI initiative	DS4SSCC, LDS, DATES
JSON-LD	Data Models	W3C	DS4SSCC, int:net, LDS, DS4SKILLS, GREAT
Smart Data Models	Data Models	SDM initiative	DS4SSCC, DATES, DS4.0
XACML	Access and usage policies &control	OASIS	DS4SSCC, LDS, DATES, GREAT
eIDAS/eIDAS2	Identity Management	EU	DS4SSCC, int:net, LDS, DS4SKILLS, GREAT
ODRL	Access and usage policies &control	W3C	DS4SSCC, LDS, DATES
EUDI RAF	Identity Management	EU	DS4SSCC, LDS, DS4.0
Oauth2	Identity Management	IETF	DS4SSCC, int:net, LDS, DATES, DS4SKILLS, GREAT
OpenID	Identity Management	OpenID Foundation	DS4SSCC, LDS, DATES, GREAT
ICAM	Identity Management	GAIA-X	int:net, LDS, DATES
SAML 2.0	Identity Management Access and usage policies &control	IETF	DS4SSCC, LDS, DATES, DS4SKILLS, GREAT
DCAT-AP	Publication & Discovery	W3C	DS4SSCC, int:net, LDS, DATES, GREAT
DID	Identity Management	W3C	LDS, DATES, DS4SKILLS
SOLID	Identity Management	MIT	DS4SSCC, LDS, DS4SKILLS
Verifiable Credentials Data Model	Identity Management Trust	W3C	LDS, DATES, DS4SKILLS
Dublin Core	Data Models	ISO	DATES, DS4SSCC, GREAT
Electronic Signatures and infrastructures	Identity Management	ETSI	DS4SSCC, LDS, GREAT
Federated catalogue	Marketplaces	GAIA-X	LDS, DS4.0, GREAT
IDS information model	Publication and discovery	IDSA	Int:net, LDS, GREAT
OGC	Data models	Open Geospatial Consortium	DS4SSCC, LDS, GREAT
XML	Data Models	W3C	Int:net, LDS, GREAT

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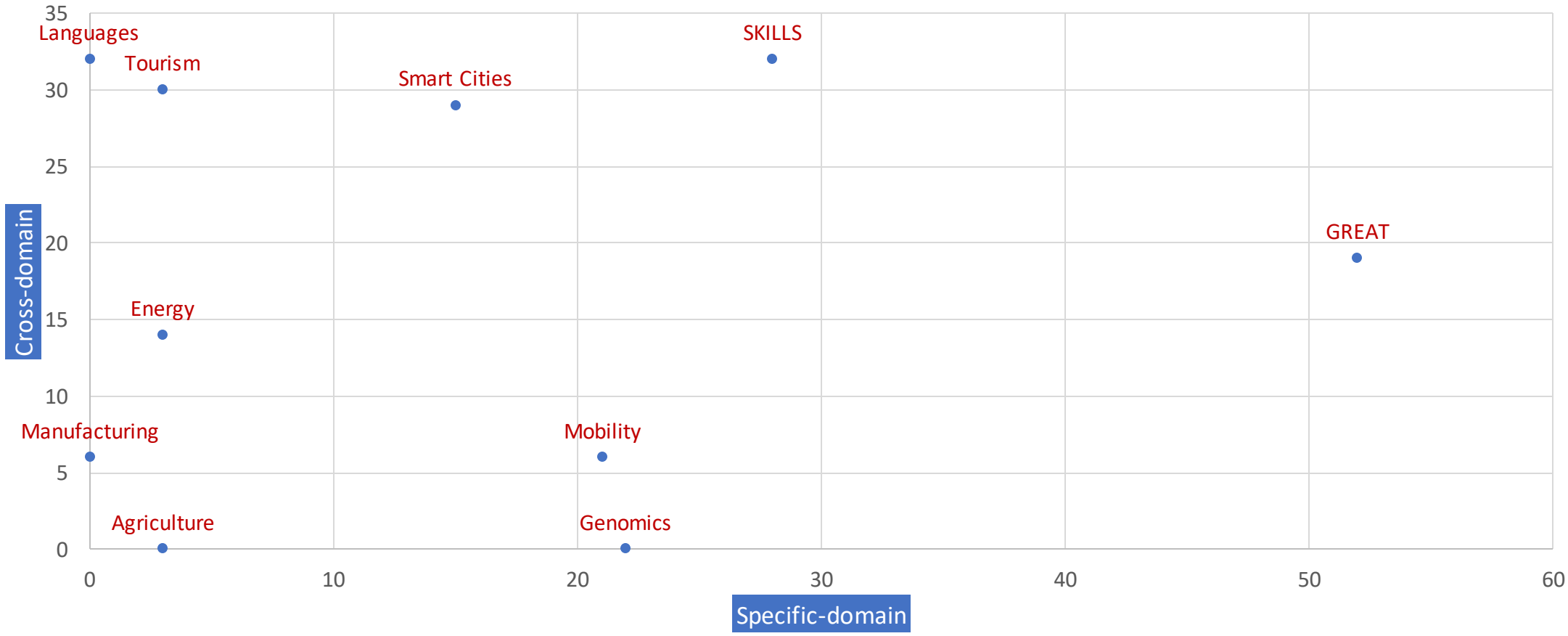
Cross-domain vs specific-domain standards



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Standardization plan at DSSC

DATA SPACES SUPPORT CENTRE

Purpose and strategy

- Foster DSSC partners and data spaces community to participate in standardization actions
- Liaison with standardization bodies as an advisor
- Joint recommendations with other initiatives (HLF, Multistakeholders platform)
- Elaborate a unified standardization message on behalf of DSSC

Ongoing work

- Alignment activities with EC and initiatives
- Scanning of standardization committees in regard to data spaces
- Collection of DSSC partners activities in standardization
- Mapping of committees and activities with data spaces building blocks
- Identify gaps for new standardization requests
- Continuous liaison with standardization init iatives

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Related committees to data spaces

DATA SPACES SUPPORT CENTRE

Committee	Related topic	Involved DSSC partners
ISO/IEC JTC 1	Data interoperability, metadata, and data quality	
ISO/IEC JTC 1/SC 27	Data protection	
ISO/IEC JTC 1/SC 38 (WG 5)	Data in cloud computing, distributed platforms, and related technologies. Two projects started: - ISO/IEC AWI TS 10866 Information technology – Cloud computing and distributed platforms – Framework and concepts for organizational autonomy and digital sovereignty - ISO/IEC PWI 20151 Information technology – Cloud computing and distributed platforms – Data spaces	Fraunhofer, IDSA
ISO/IEC JTC 1/SC 32	Data Management related to data spaces	
ISO/IEC JTC 1/SC 42	AI standardization	BDVA
W3C - Dataset Exchange WG	Update DCAT and application profiles	
W3C - Decentralized Identifier WG	DID schema, syntax, specifications	
W3C – RDF WG	Unique and deterministic hash of RDF Datasets.	
W3C - Verifiable Credentials WG	Verifiable Credentials Data Model specification	
IEEE - P3800 Data Trading System workshop	Data Trading (IDS-RAM)	
CEN-CENELEC Trusted Data Transaction workshop	Trust in data transactions	Fraunhofer, TNO, BDVA, IDSA, GAIA-X, FIWARE
ETSI CIM ISG	Context Information Management – NGSI-LD data Exchange API	FIWARE

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Conclusions and next steps

DATA SPACES SUPPORT CENTRE

- Data Spaces technology includes many other areas: data management, security, interoperability, cloud/Edge, AI…
  - Nothing is being developed from scratch but leveraging on existing implementations/standards
  - Involve either cross-domain and specific-domain standards/technologies
- DSSC aims at coordinating and supporting all data space initatives by providing a blueprint (technical and organizational)
  - Including standards as required element to provide technical specifications for building blocks
- In relation to standardization,
  - Alignment with other initiatives in progress (High Level Forum, Multistakeholders platform for ICT standardization)
  - Joint recommendations based on the mapping between existing standards and expected functionalities for data spaces

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DATA SPACES
SUPPORT CENTRE

Thanks!

contact@dssc.eu

support@dssc.eu

Panel discussion

How to enhance interoperability within and across data spaces

European Commission

Join at

slido.com

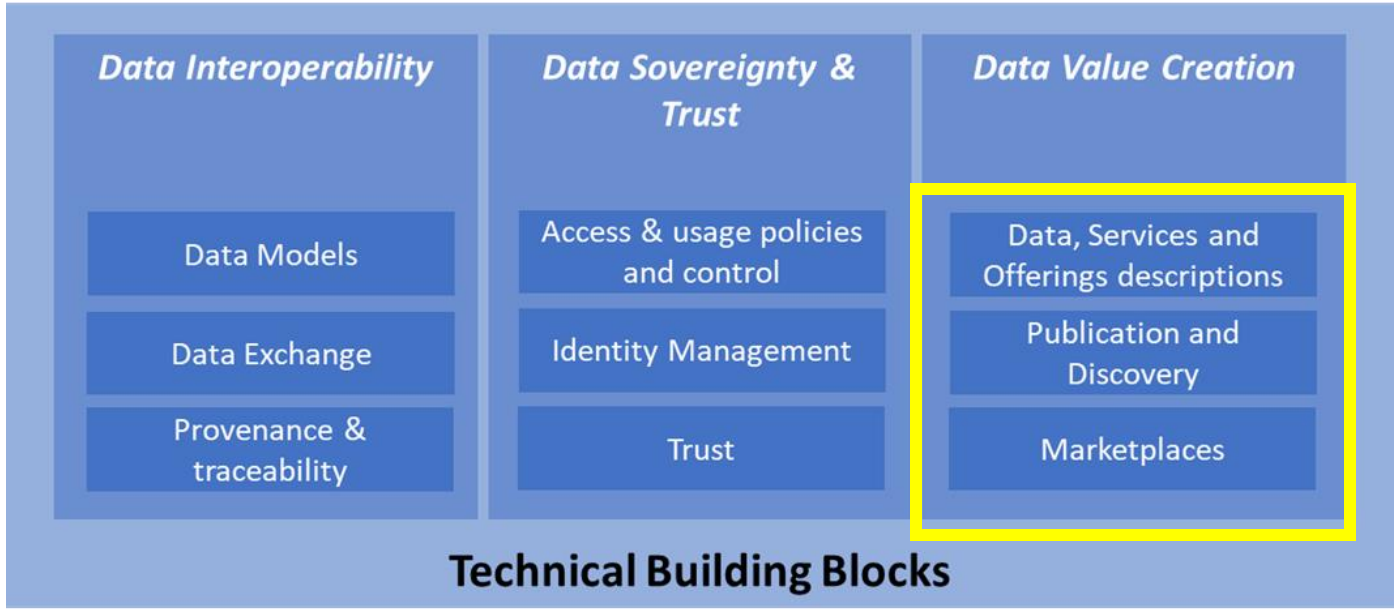
#EBDVF2023

European Commission

Data discovery

- Enables data holders to publish information about available data sets
- Enables (potential) data users to query the information
- Data (space) intermediaries can offer facilitating services

(a) the **dataset content, use restrictions, licences, data collection methodology, data quality and uncertainty** shall be sufficiently described, where applicable, in machine-readable format, to allow the recipient to find, access and use the data;



Catalogue
- Centralized
- Distributed
- Peer-to-peer

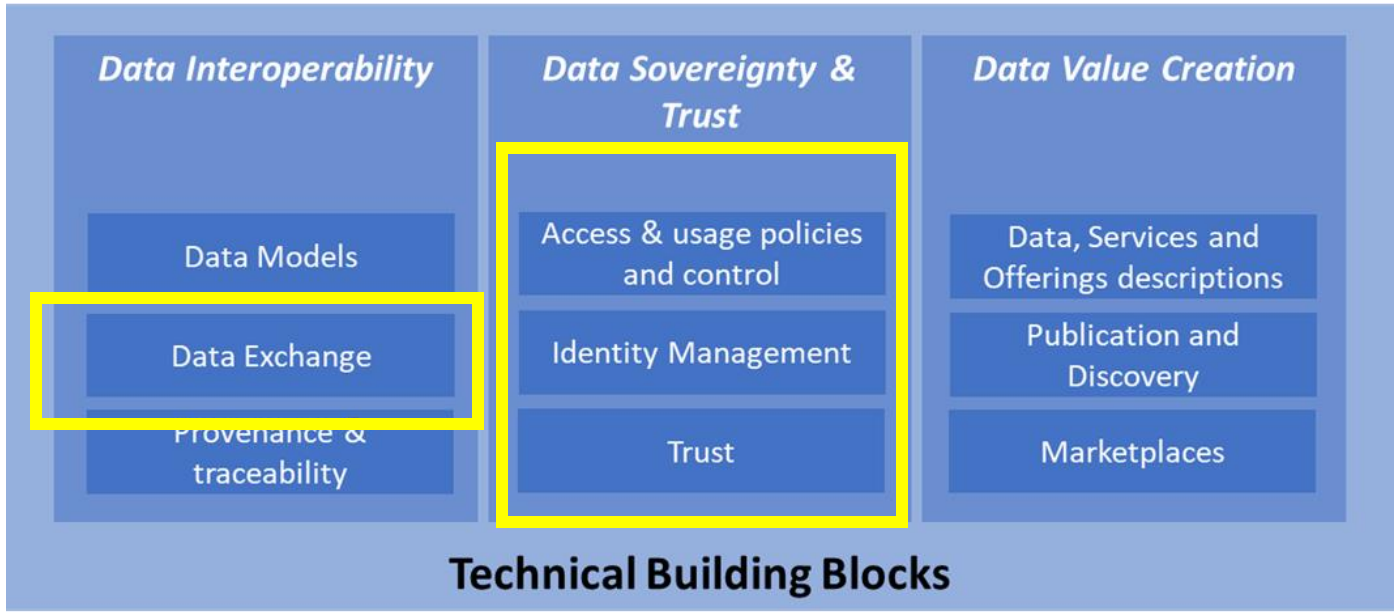
European Commission

Data discovery – sli.do questions

- How do you rate the standards support for this process?
  1 = insufficient → 5 = perfect (chart)
- Which standards are key?
  Open question (word cloud)
- What could be improved?
  Open question (word cloud)

Data sharing (data transactions)

- Agreement between data holder and data user
- Including terms of use, service levels, pricing, …
- Actual data access / data exchange
- Role of data intermediaries and data altruism organisations



(c) the technical means to access the data, such as **application programming interfaces**, and their **terms of use** and **quality of service** shall be sufficiently described to enable automatic access and transmission of data between parties, including **continuously**, in **bulk download** or in **real-time** in a machine-readable format where that is technically feasible and does not hamper the good functioning of the product;

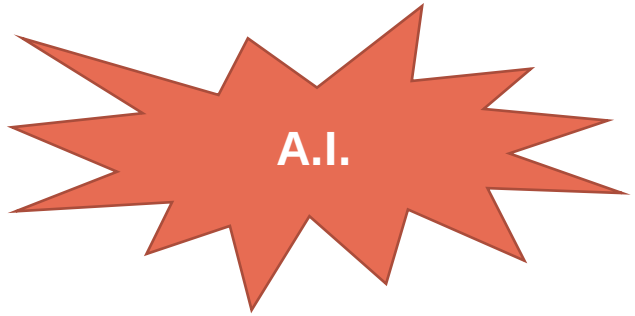
Control plane: identification of users and the handling of access and usage policies
Data plane: actual exchange of the data

European Commission

Data sharing – sli.do questions

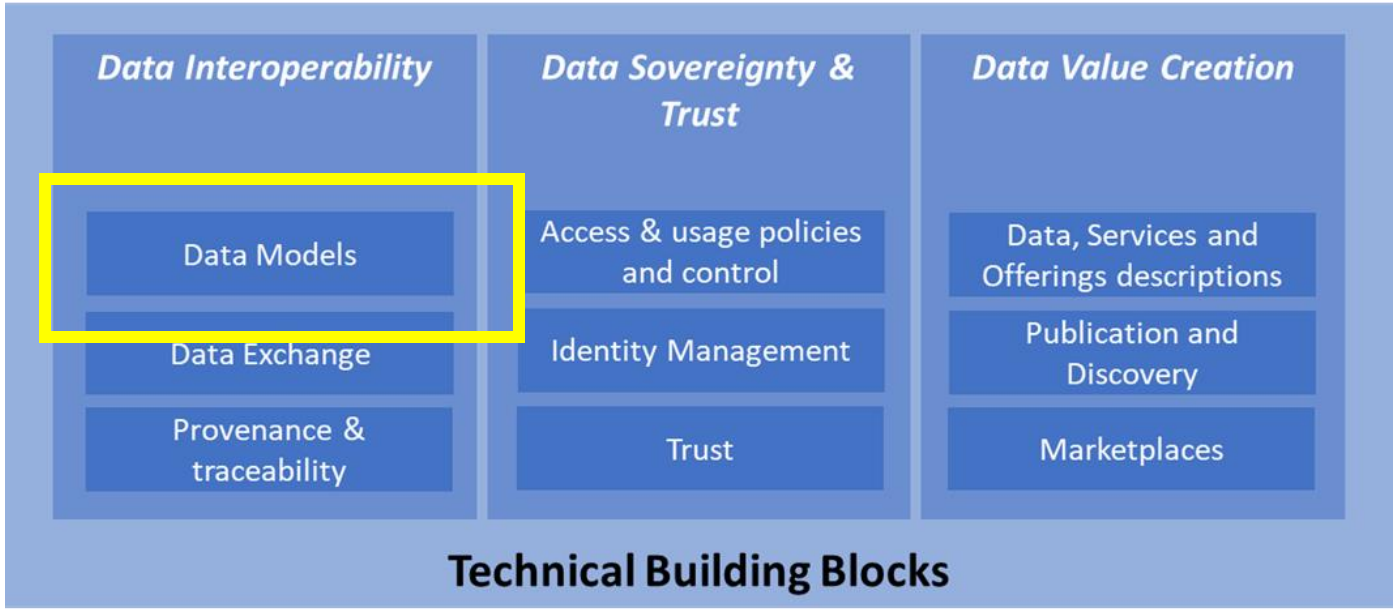
- How do you rate the standards support for this process?
  1 = insufficient → 5 = perfect (chart)
- Which standards are key?
  Open question (word cloud)
- What could be improved?
  Open question (word cloud)

Data usage



- Requires data holders to provide structured semantic information on the shared data
- Enables data users to easier integrate and interpret the data

(b) the **data structures, data formats, vocabularies, classification schemes, taxonomies and code lists**, where available, shall be described in a publicly available and consistent manner;



Domain ontology
Semantic tagging / mapping
Integration

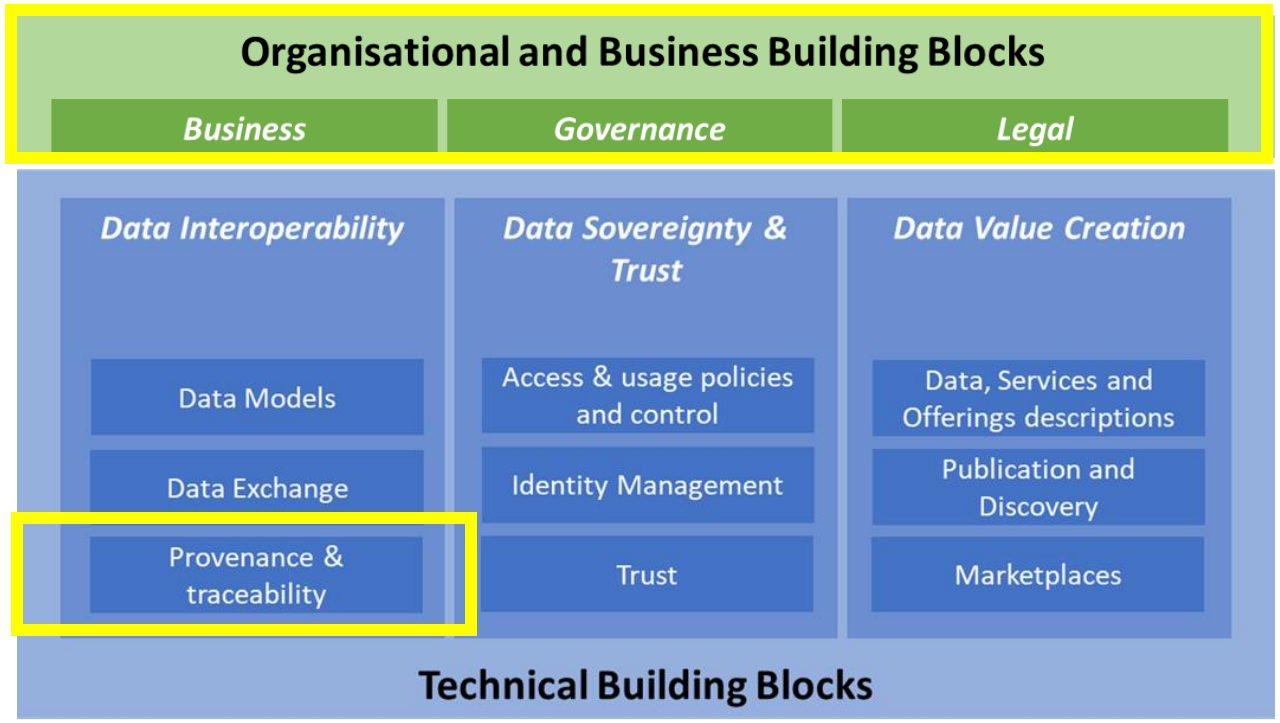
Data usage – sli.do questions

- How do you rate the standards support for this process?
  1 = insufficient → 5 = perfect (chart)
- Which standards are key?
  Open question (word cloud)
- What could be improved?
  Open question (word cloud)

Data governance

- Manage data access, data retention, data quality, legal compliance, … (also for data originating from other parties)
- Productization of data: identify suitable data assets, evaluate the cost and benefits
- Responsibilities of data intermediaries and data altruism organisations

- GDPR
- Data Governance Act
- Data Act
- Digital Markets Act
- AI Act
- …



Data space level
Rules, verification mechanisms

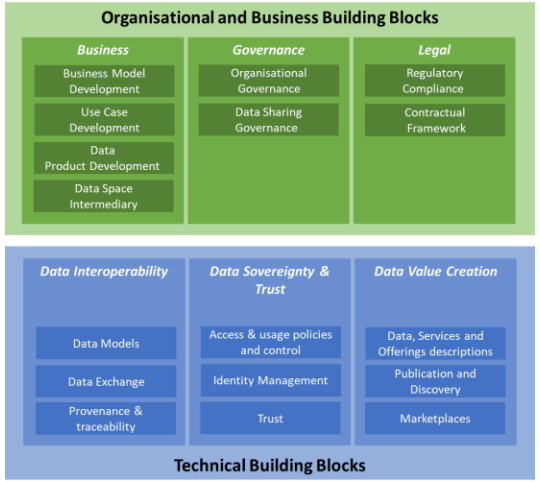
Participant level
Rules, certification mechanisms
Audit logs of data transactions
Management of data assets

European Commission

Data governance – sli.do questions

- How do you rate the standards support for this process?
  1 = insufficient → 5 = perfect (chart)
- Which standards are key?
  Open question (word cloud)
- What could be improved?
  Open question (word cloud)

Common European Data Spaces “scorecard”



Part I - Governance and Enablers:
KPIs that measure the way that the data space is managed, the available features, etc.

- ❑ KPI
- ❑ KPI
- ❑ KPI

Part II - Participation and Activity:
KPIs that measure the level of activity within the data space, and qualitative aspects such as standards adoption

- ❑ KPI
- ❑ KPI
- ❑ KPI

Periodical report

Benchmarks (maturity)
Trends (evolution)

DATA SPACES SUPPORT CENTRE

European Commission

CEDS scorecard – sli.do questions

- Do you think introducing a CEDS scorecard would be a good idea?
  1 = opposed → 3 = neutral → 5 = strongly in favour (chart)
- Which KPIs would you suggest for the scorecard?
  Open question (word cloud)
- What are the risks you see in introducing a scorecard?
  Open question (word cloud)

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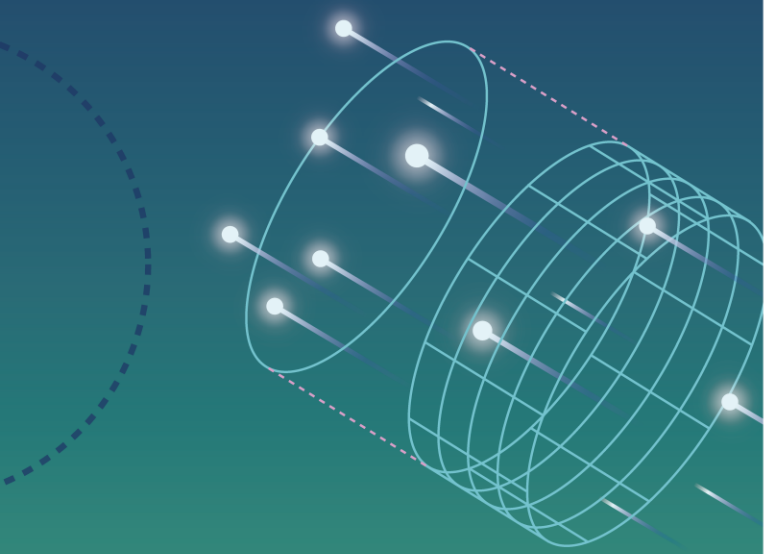

DATA AND AI IN ACTION: SUSTAINABLE IMPACT AND FUTURE REALITIES

ORGANISED BY: BDV Big Data Value Association

IN COLLABORATION WITH: ITI Investigate to Innovate · European Commission · INCLIVA | VLC Biomedical Research Institute · Politécnica · Universitat Politècnica de València

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Thank you!

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