

Data Interoperability and Semantics

< Part 5. The European Data Strategy >



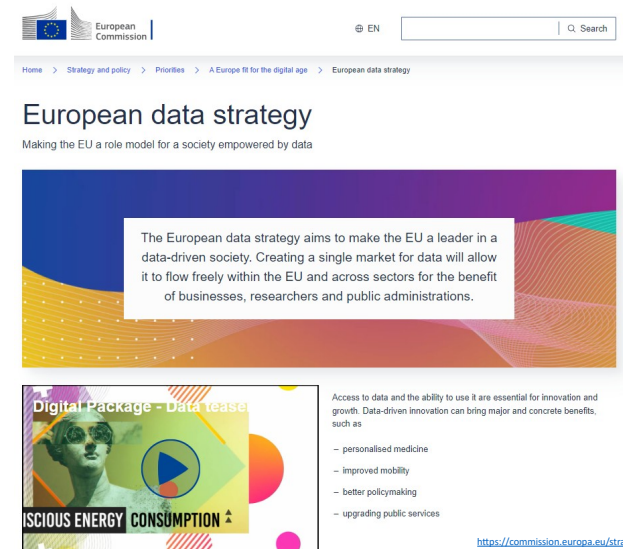
A guided tour !

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

Data Interoperability and Semantics Outline

- < Part 5. The European Data Strategy >
 - Part 5.1. The European legislation on open data
 - Part 5.2. The General Data Protection Regulation (GDPR)
 - Part 5.3. The Data Governance Act (DGA)
 - Part 5.4. The Data Act
 - Part 5.5. Data Spaces

ICM – Computer Science Major – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>



1)



https://ec.europa.eu/commission/presscorner/detail/en/fs_20_283

2)



<https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy>

Data Interoperability and Semantics

Part 5. The value of data

Part 5.1. The European legislation on open data

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

European legislation on open data

(adopted 05/2022 – applicable 09/2023)

The Directive on open data and the re-use of public sector information provides common rules for a European market for government-held data.

The “Open Data Directive” (EU) 2019/1024 entered into force on 16 July 2019

It replaced the **Public Sector Information (PSI) Directive** of 2003.

EU countries had to transpose Directive (EU) 2019/1024 by 16 July 2021.

The **Commission Implementing Regulation (EU) 2023/138** adopted a list of specific high-value datasets by way of an implementing act.

1)



<https://digital-strategy.ec.europa.eu/en/policies/legislation-open-data>

5

European legislation on open data

(adopted 05/2022 – applicable 09/2023)

20.1.2023

EN

Official Journal of the European Union

L 19/43

COMMISSION IMPLEMENTING REGULATION (EU) 2023/138

of 21 December 2022

laying down a list of specific high-value datasets and the arrangements for their publication and re-use

(Text with EEA relevance)

2)

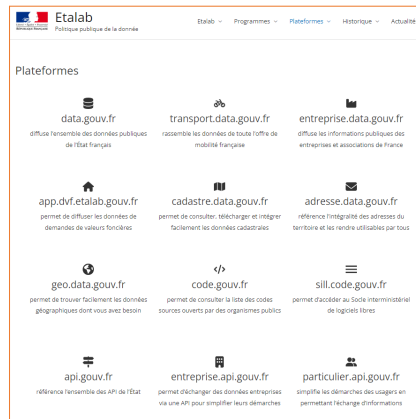


The **Commission Implementing Regulation (EU) 2023/138** adopted a list of specific high-value datasets by way of an implementing act.

<http://data.europa.eu/eli/reg/impl/2023/138/oj>

6

Actual impact (FR)



<https://www.etalab.gouv.fr/>



<https://transport.data.gouv.fr/>

7

Data Interoperability and Semantics

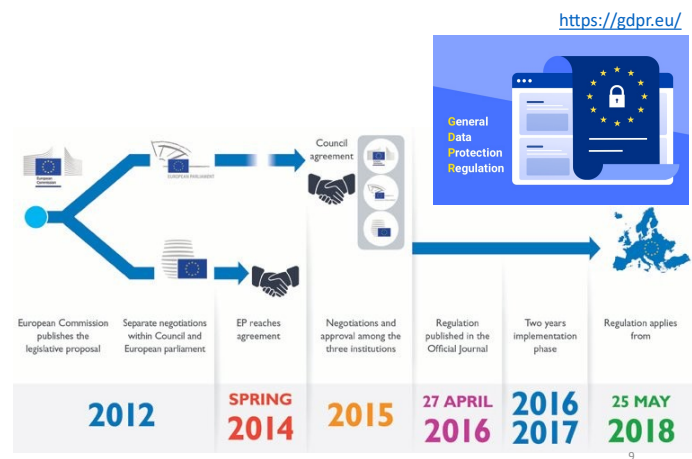
Part 5. The value of data

Part 5.2. The General Data Protection Regulation (GDPR)

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

General Data Protection Regulation (GDPR) (2016)

- Requiring the consent of subjects for data processing
- Anonymizing collected data to protect privacy
- Providing data breach notifications
- Safely handling the transfer of data across borders
- Requiring certain companies to appoint a data protection officer to oversee GDPR compliance



General Data Protection Regulation (GDPR) (2016)

The screenshot shows the homepage of the GDPR.EU website. It features a search bar, navigation links for Home, Checklist, FAQ, GDPR, and News & Updates, and a main banner titled 'Complete guide to GDPR compliance'. A QR code is also present on the right side of the page.

Data Interoperability and Semantics

Part 5. The value of data
Part 5.3. The Data Governance Act (DGA)

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

The screenshot shows the official page for the European Data Governance Act (DGA) on the European Commission website. It includes the title 'The European Data Governance Act' and the adoption date '(adopted 05/2022 – applicable 09/2023)'. Below the title is a graphic with the text 'EUROPEAN DATA GOVERNANCE' and 'A NEW APPROACH FOR THE DIGITAL DECADE'. A QR code is also present on the right side of the page.

The European Data Governance Act

(adopted 05/2022 – applicable 09/2023)

3.6.2022 EN Official Journal of the European Union L 152/1

REGULATION (EU) 2022/868 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 30 May 2022
on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act)
(Text with EEA relevance)

<http://data.europa.eu/eli/reg/2022/868/oj>

Setting up a new European way of data governance will facilitate data sharing across sectors and Member States. It will create wealth for society, and provide control to citizens and trust to companies.

2)



<https://digital-strategy.ec.europa.eu/en/policies/data-governance-act-explained>

13

Data Interoperability and Semantics

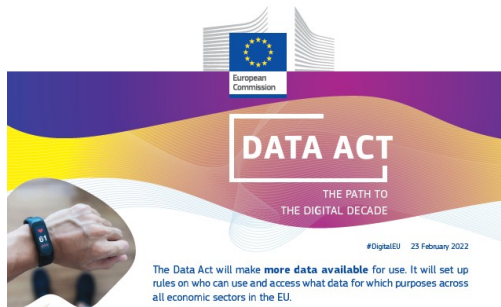
Part 5. The value of data

Part 5.4. The Data Act

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

The European Data Act

(adopted 01/2024 – applicable 09/2025)



1)



<https://ec.europa.eu/newsroom/dae/redirection/document/83517>

15

The European Data Act

(adopted 01/2024 – applicable 09/2025)

Official Journal of the European Union EN Series L

2023/2854

22.12.2023

REGULATION (EU) 2023/2854 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 13 December 2023

on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act)

(Text with EEA relevance)

<http://data.europa.eu/eli/reg/2023/2854/oj>

The Data Act will make **more data available** for use. It will set up rules on who can use and access what data for which purposes across all economic sectors in the EU.

2)



<https://digital-strategy.ec.europa.eu/en/factpages/data-act-explained>

16

The European Data Act

(adopted 01/2024 – applicable 09/2025)

Chapter VIII – Interoperability

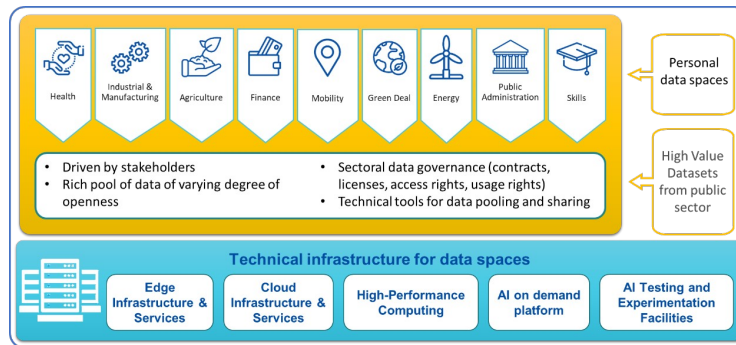
Article 33 – Essential requirements regarding interoperability of data, of data sharing mechanisms and services, as well as of common European data spaces

- Participants in data spaces that offer data or data services to other participants **shall comply with the following essential requirements** to facilitate the interoperability of data, of data sharing mechanisms and services, as well as of common European data spaces which are purpose- or sector-specific or cross-sectoral interoperable frameworks for common standards and practices to share:
 - the dataset content, use restrictions, licences, data collection methodology, data quality and uncertainty shall be sufficiently described, where applicable, in a machine-readable format, to allow the recipient to find, access and use the data
 - the data structures, data formats, vocabularies, classification schemes, taxonomies and code lists, where available, shall be described in a publicly available and consistent manner
 - 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 connected product
 - where applicable, the means to enable the interoperability of tools for automating the execution of data sharing agreements, such as smart contracts shall be provided

17

Common European data spaces

“purpose or sector specific or cross-sectoral interoperable frameworks for common standards and practices to share or jointly process data for, inter alia, the development of new products and services, scientific research or civil society initiatives.”
[source: Data Act]



19

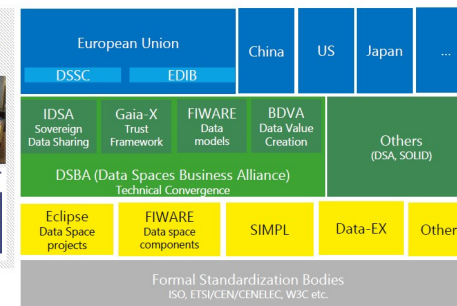
Data Interoperability and Semantics

Part 5. The value of data

Part 5.5. Data Spaces

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>

Regulatory, business, and technical foundation for Data Spaces within the Edge-Cloud-Continuum



Data regulations in economic regions
Data strategies implementation

User requirements, Voice of the communities, coordinate technical specs and business requirements, support to "business design"

Technical implementation driven by OSS, place for the developer communities

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

20

The Data Spaces Business Alliance

Unleashing the European Data Economy



<https://data-spaces-business-alliance.eu/>

Accelerating Business transformation in the Data Economy

The Data Spaces Business Alliance (DSBA) accelerates business transformation in the data economy. It's the first initiative of its kind, uniting industry players to realize a data-driven future in which organizations and individuals can unlock the full value of their data. Data spaces are key to achieving sovereign, interoperable and trustworthy data-sharing across businesses and societies – a key step to the data economy of the future. The Alliance embraces this reality, converging the best skills, assets, and experience in Europe into a one-stop-shop for data spaces, from inception to deployment.

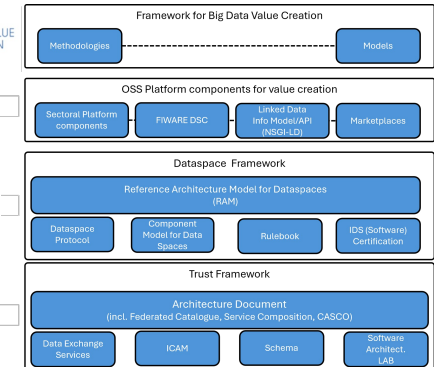
The Data Spaces Business Alliance are **Gaia-X** European Association for Data and Cloud AISBL, the **Big Data Value Association (BDVA)**, **FIWARE Foundation**, and the **International Data Spaces Association (IDSA)**. Together they represent 1,000+ leading key industry players, associations, research organizations, innovators, and policymakers worldwide. With this cross-industry expertise, resources and know-how, the Alliance drives awareness, evangelizes technology, shapes standards, and enables integration across industries.



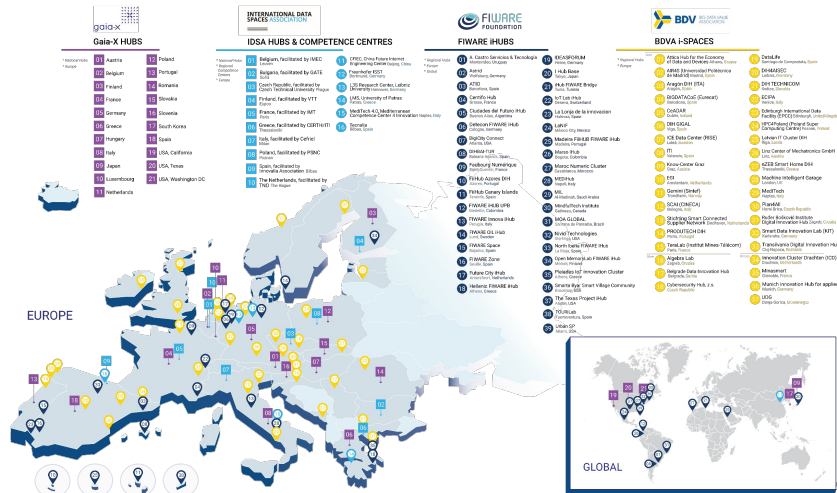
<https://data-spaces-business-alliance.eu/>

The Data Spaces Business Alliance

Unleashing the European Data Economy



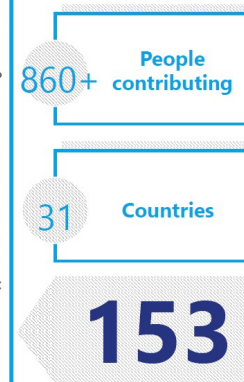
DSBA HUBS LANDSCAPE



Our members are the backbone of IDSA



INTERNATIONAL DATA SPACES ASSOCIATION

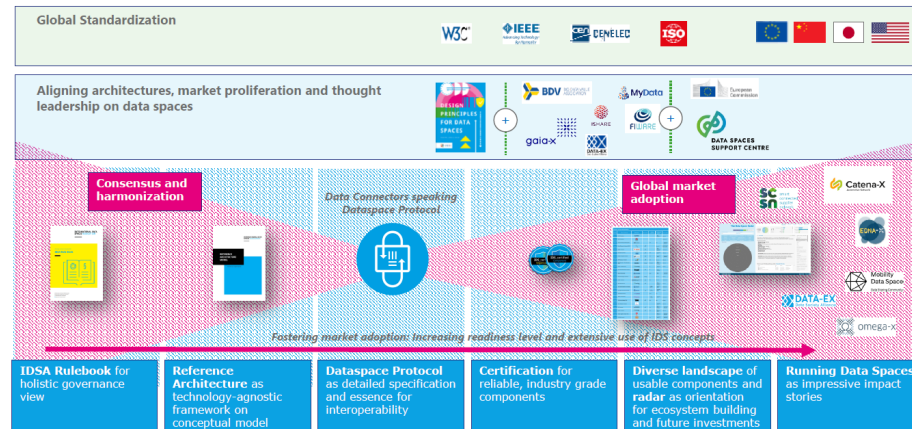


Adapted from a presentation by L. Nagel at the Data Spaces Symposium 2024

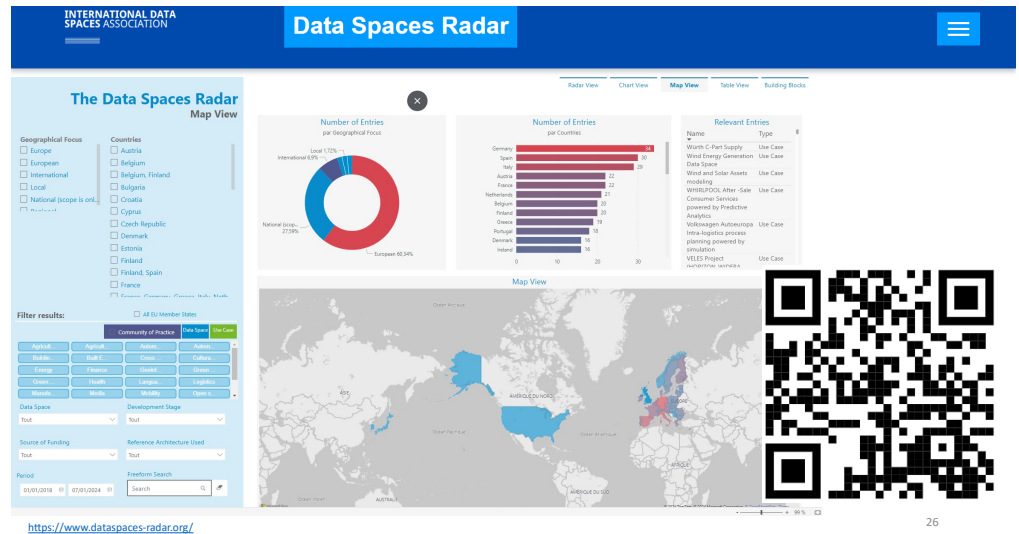
A holistic approach to bring data spaces to global scale

IDSA on its way to a global standard – with the dataspace protocol in its core

INTERNATIONAL DATA SPACES ASSOCIATION



Adapted from a presentation by L. Nagel at the Data Spaces Symposium 2024

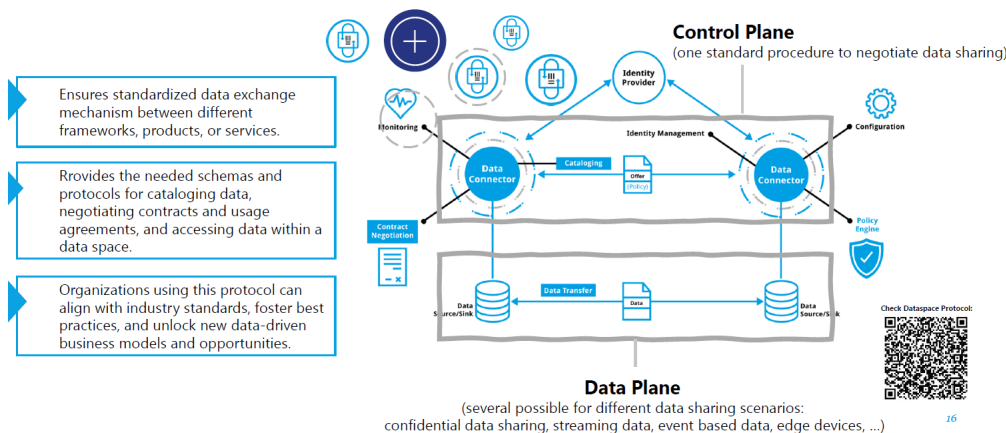


26

Dataspace Protocol V1.0 → ISO Standard

Enables standardized data exchange across different data space instances.

INTERNATIONAL DATA SPACES ASSOCIATION



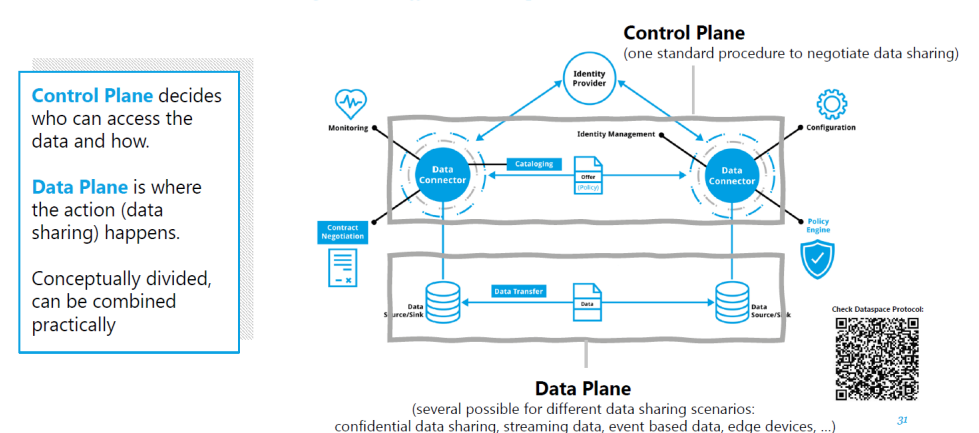
Adapted from a presentation by L. Nagel at the Data Spaces Symposium 2024

27

Dataspace Protocol V1.0 → ISO Standard

Enables standardized data exchange across different data space instances.

INTERNATIONAL DATA SPACES ASSOCIATION



Adapted from a presentation by L. Nagel at the Data Spaces Symposium 2024

31

The key to data spaces is the data connector



IDSa Story

Adapted from a presentation by L. Nagel at the [Data Spaces Symposium 2024](#)

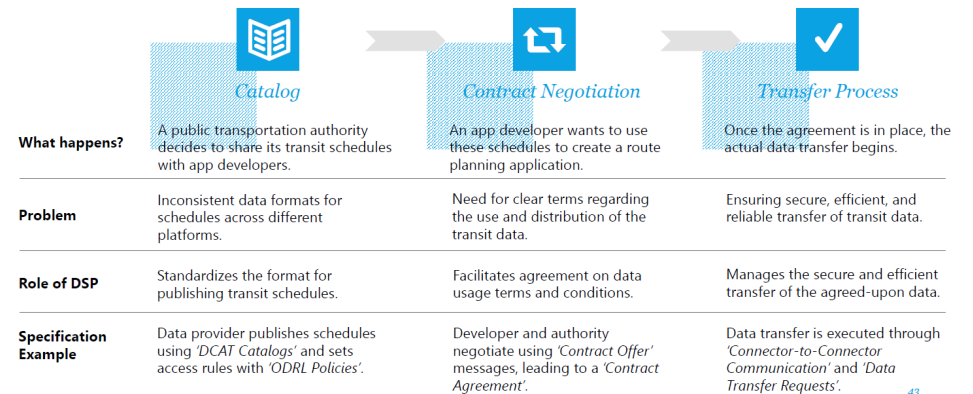
INTERNATIONAL DATA
SPACES ASSOCIATION

39

29

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

INTERNATIONAL DATA
SPACES ASSOCIATION



Adapted from a presentation by L. Nagel at the [Data Spaces Symposium 2024](#)

43

30

Verifiable Credentials Data Model v1.1
ISO/IEC JTC1/SC38
10 March 2022

Decentralized Identifiers (DIDs) v1.0
ISO/IEC JTC1/SC38
10 July 2022

Data Cataloging Vocabulary (DCAT) - Version 3
ISO/IEC JTC1/SC38
10 March 2022

ISO JTC 1

ISO JTC1/SC27

ISO JTC1/SC38

CEN/CENELEC

ISO JTC1/SC41

ISO JTC1/SC42

W3C

TMForum

IEEE P3800

CEN/CENELEC

Directly involved

Connected

31

Adapted from a presentation by L. Nagel at the [Data Spaces Symposium 2024](#)

< Part 5. The European Data Strategy >



A guided tour !

ICM – Toolbox Engineering and Interoperability of Software Systems – Course unit on Data Interoperability and Semantics
M1 Cyber Physical and Social Systems – Course unit on Data Interoperability and Semantics
Maxime Lefrançois <https://maxime-lefrancois.info>
Course unit URL: <https://ci.mines-stetienne.fr/cps2/course/data>