



European Strategy for data

Shaping Europe's digital future – EU Data Spaces



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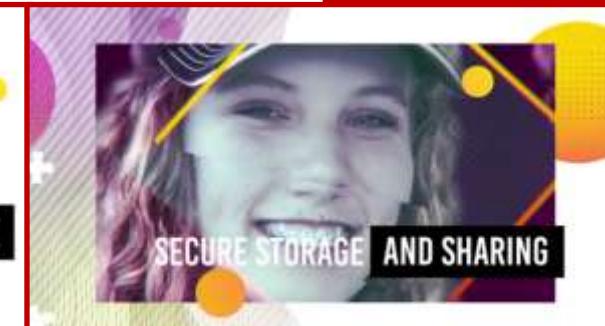
*Jordi Escriu
European Commission
Joint Research Centre
Digital Economy Unit (T.1)*



*European Core Data and Services for European Data Spaces
GeoE3-Project, Location Innovation Hub, EuroGeographics, EuroSDR
Workshop, 18th April 2023*

A new context is ahead

New European digital society



Push for new commitments

European Commission priorities 2019-2024

- The twin green & digital transition is at the top of the policy agenda.



A European Green Deal

Europe aims to be the first climate-neutral continent by becoming a modern, resource-efficient economy.



A stronger Europe in the world

The EU will strengthen its voice in the world by championing multilateralism and a rules-based global order.



A Europe fit for the digital age

The EU's digital strategy will empower people with a new generation of technologies.



Promoting our European way of life

Europe must protect the rule of law if it is to stand up for justice and the EU's core values.



An economy that works for people

The EU must create a more attractive investment environment, and growth that creates quality jobs, especially for young people and small businesses.



A new push for European democracy

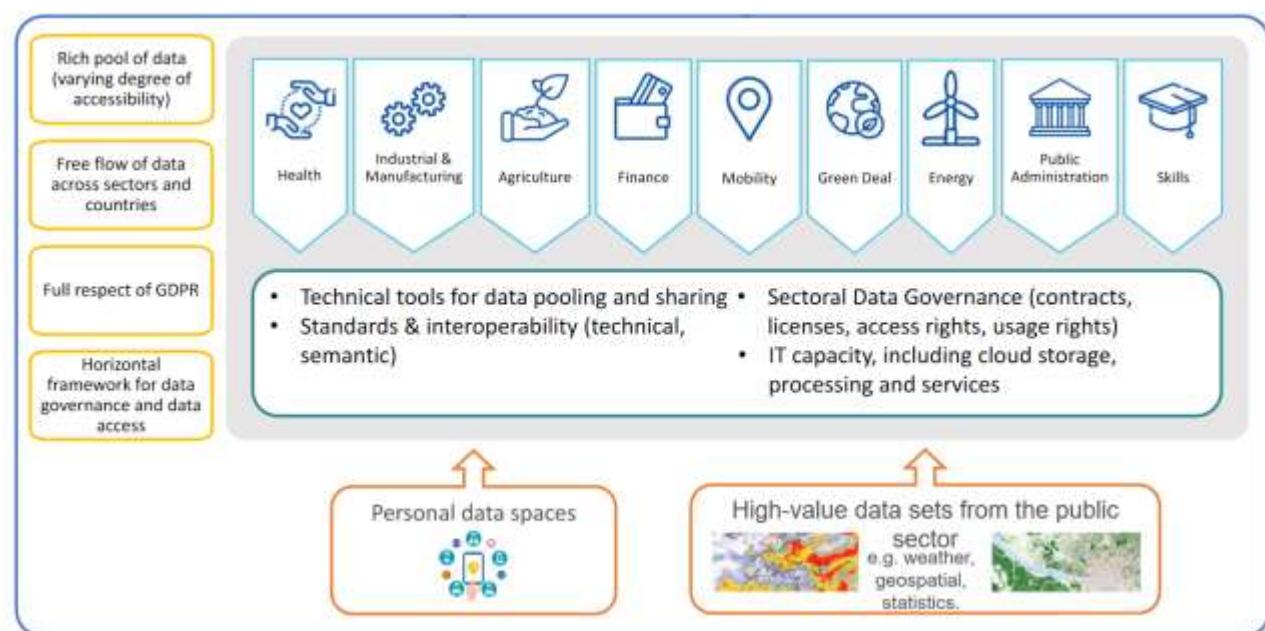
We need to give Europeans a bigger say and protect our democracy from external interference such as disinformation and online hate messages.

New policy context

European Strategy for Data



- Aims to create a European single market for data.
- Highlights the problems to address:
 - Data availability, interoperability, quality.
 - Governance & infrastructures.
 - Skills & data literacy.
 - Cybersecurity.
- Envisages the establishment of:
 - A common European data space.
 - Sectoral data spaces.



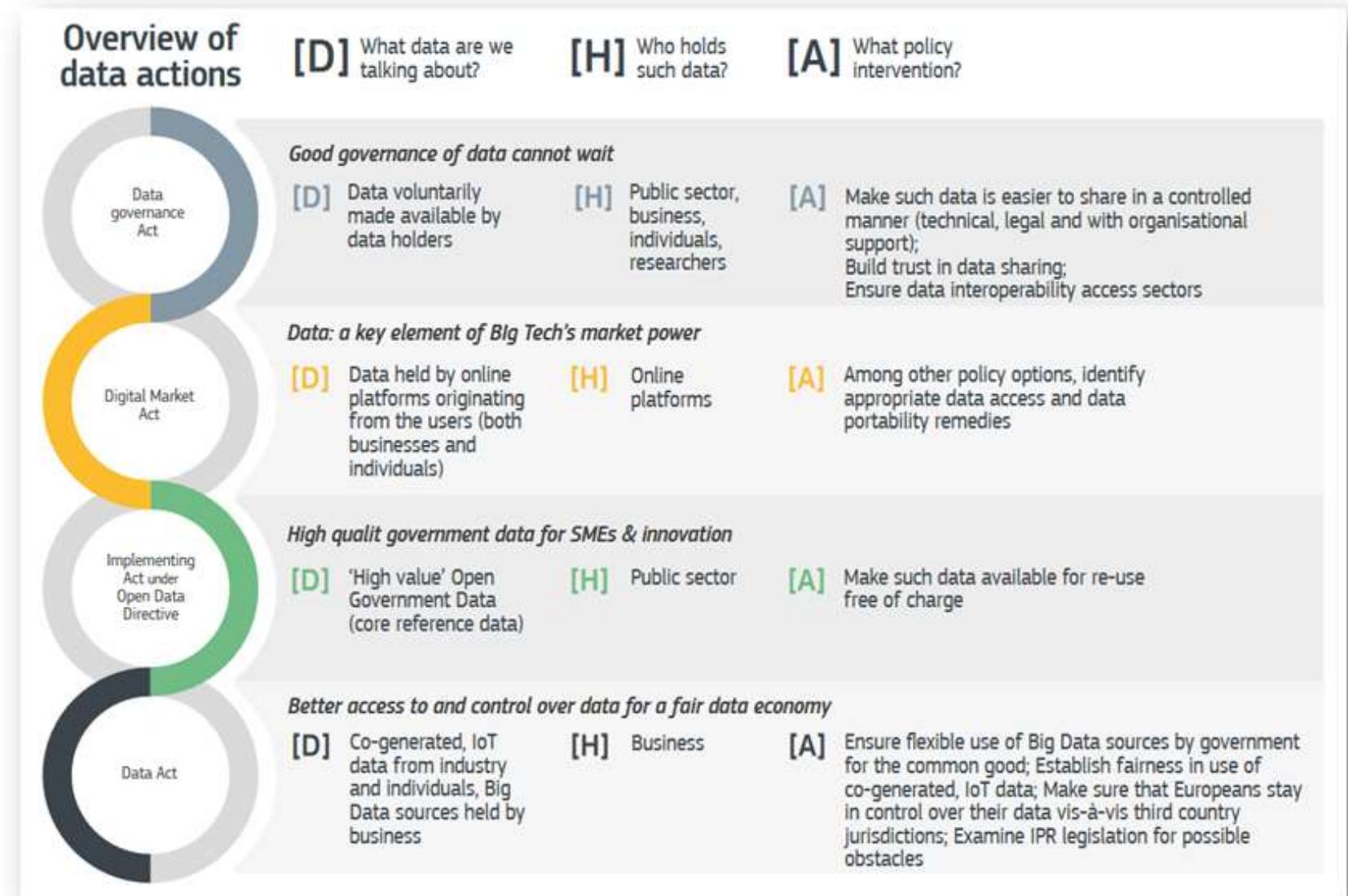
<https://digital-strategy.ec.europa.eu/en/policies/strategy-data>

New policy context

European Strategy for Data

“Europe fit for the Digital Age”

1. Data Governance
2. Digital Market
3. Open Data
4. Data Act



New policy context

Data Governance Act



- **Data Scope**
 - Data voluntarily made available by stakeholders.
- **Main actors involved**
 - Public sector + Private sector (Business) + Individuals + Researchers
- **Policy intervention**
 - Make such data easy to share in a controlled manner (technical, legal and with organisational support), while ensuring data interoperability across sectors and Member States.
 - Build trust in data sharing.
- **Expected results.**
 - Facilitate data sharing by strengthening mechanisms to increase data availability and overcome technical obstacles to the reuse of data.
 - Development of common European data spaces in strategic domains in key sectors or domains.
 - Create wealth for society. Provide control to citizens and trust in companies.

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

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0868>

New policy context

Digital Markets Act



- **Data Scope**
 - **Data held by online platforms** originated by the users (from both businesses and individuals).
- **Main actors involved**
 - (Large) **Online platforms** (qualifying as 'gatekeepers') - important gateways between business users and consumers.
- **Policy intervention**
 - Identify appropriate data access and **portability** remedies.
- **Expected results**
 - Assure fair practices by companies that act as **gatekeepers** in the online platform economy.

https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/digital-markets-act-ensuring-fair-and-open-digital-markets_en

<https://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM%3A2020%3A842%3AFIN>

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1925&from=EN>



New policy context

Open Data Act

- Data Scope
 - 'High Value' Open data from Government.
- Main actors involved
 - Public sector.
- Policy intervention
 - Make such **data available** for re-use **free of charge**.
- Expected results
 - **Increased data availability and access**, especially in the scope of the High Value Dataset categories: geospatial, earth observation and environment, meteorological, statistics, companies and company ownership, mobility.
 - **Reduce heterogeneity in licensing** by setting a common European approach for the licensing of the data, reusing existing licensing frameworks, e.g. Creative Commons.

Open Data Directive entered into force on
16 July 2019

Implementing Act on High Value Datasets
https://eur-lex.europa.eu/eli/reg_impl/2023/138/oj

Adopted on 21 December 2022

Published on 20 January 2023
(Official Journal of the EU)

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

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L1024&from=EN>

New policy context > Open Data Act

Implementing Act on High-value datasets

- High-value datasets (HVD)
 - Datasets the **re-use** of which is associated with important **socio-economic benefits**.
- To be made available:
 - For **free**, under **open access** licenses (CC BY 4.0 or less restrictive).
 - In **machine-readable formats**, via **APIs** and (when relevant) as a bulk download.
- Thematic categories of HVD

Geospatial

*Earth observation
and environment*

Meteorological

Statistics

*Companies and
company
ownership*

Mobility

- The Implementing Act defines:
 - The **list of High-value datasets** for each thematic category.
 - The **requirements** for their provision: key attributes, granularity, formats, license, etc.



New policy context

Data Act

- **Data Scope**
 - Co-generated, IoT data from industry and individuals.
 - Big Data sources held by business.
- **Main actors involved**
 - Private sector (Business).
- **Policy intervention**
 - Ensure **flexible use of Big-Data sources** by government for the public good.
 - Establish **fairness use of Co-generated, IoT data**.
 - Make sure that **Europeans stay in control over their data** vis-à-vis third country jurisdictions.
 - Examine **Intellectual Property Rights (IPR)** legislation for possible **obstacles**.
- **Expected results**
 - **Making more data available** for innovative use in line with EU rules and values.
 - Harmonised rules on fair access to and use of data, preserving **incentives** to invest in data generation.

Proposed by EC on
23 February 2022

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

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A68%3AFIN>

INSPIRE & new policy context

JRC Science for Policy Report

- **INSPIRE - A Public Sector Contribution to the European Green Deal Data Space**

<https://publications.jrc.ec.europa.eu/repository/handle/JRC126319>

- **Evolution to a data ecosystem** (Green Deal Data Space).
- Broadening the scope:
 - New sectors: public, private/businesses, academia.
 - New communities: developers, users.
- Widening the range of applications and use cases.
- Making INSPIRE framework more simple, flexible and agile.
- Lowering the knowledge entry-level for implementing and/or using data.
- Reusing well-adopted standards and technologies.



Prepared by JRC, Geonovum and DG ENV



Defining now the future! Common & Sectoral EU data spaces



Rich pool of data
(varying degree of accessibility)

Free flow of data
across sectors and countries

Full respect of GDPR

Horizontal
framework for data
governance and data
access

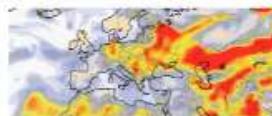


- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

Personal Data Spaces



High Value Data sets



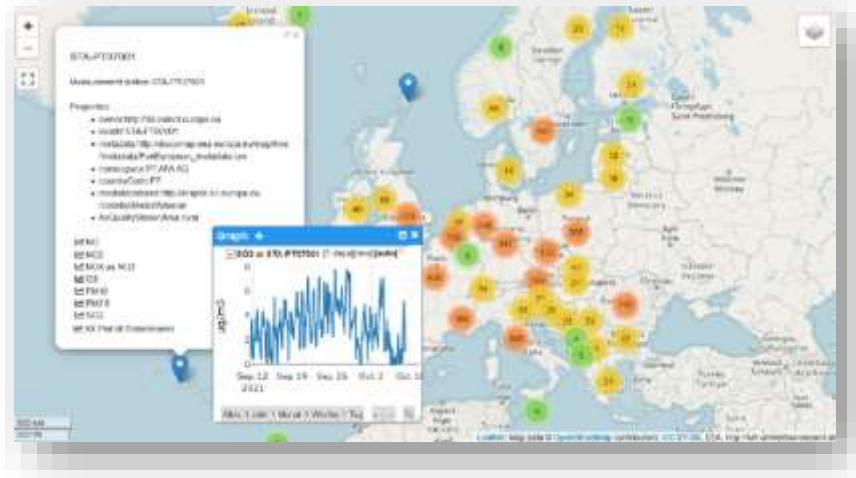
Public
Sector



JRC Research on European Data Spaces

Technology trends: New data sources

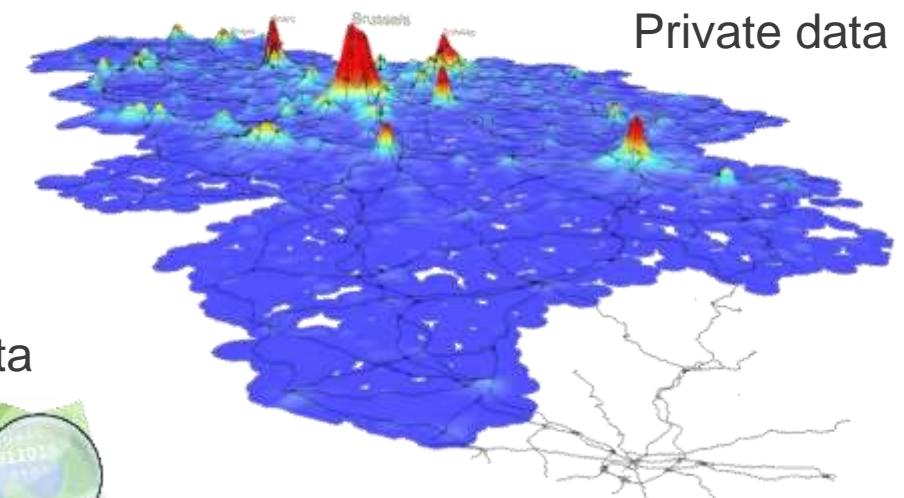
Internet of Things



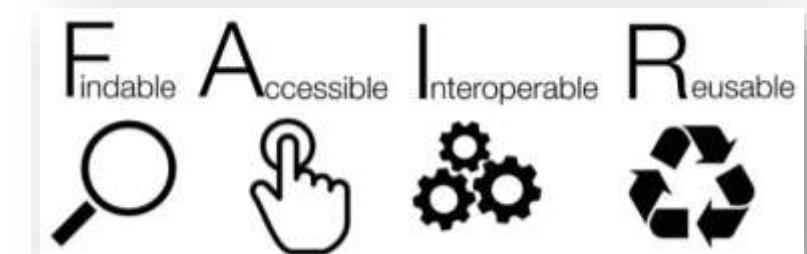
Copernicus



Citizen-generated data



Open research data



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Technology trends

- Extensive use of APIs – From data collection to data connection.
- Agile standards.
- Mature tools.
 - Multiple approaches for using & serving data.
 - Powerful ETL instruments.
- Novel architectures:
 - Federated cloud
 - edge/fog
 - Solid



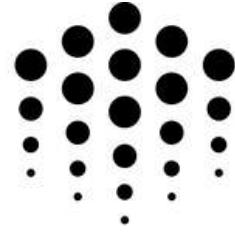
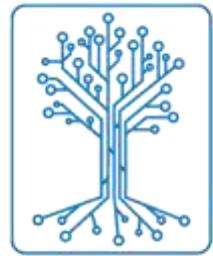
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Analysis of relevant data sharing initiatives



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Analysing technical and non-technical requirements

Key features of a data space

- A secure and privacy-preserving IT infrastructure to pool, access, process, use and share data.
- A data governance mechanism, comprising a set of rules of legislative, administrative and contractual nature that determine the rights of data subjects to use, access, process, pool, reuse and transparent manner.
- Data holders are in control of who can access data and which conditions it can be used.
- Presence of vast amounts of data that are made available on a voluntary basis and can be reused against remuneration or for free.
- Participation by an open number of organisations.

- Respect of EU rules and values: data spaces should respect the EU legal framework on data protection and privacy, as well as the principles of portability and other rules relevant for provision of data services in the EU. In particular, reasonable technical, legal and organisational measures should be taken to ensure that data subjects can exercise their rights in a simple, effective, timely and transparent manner.

- Provide a full cloud stack with a clear technical baseline, foreseeing the subsequent integration of data spaces and the reuse of existing infrastructure.
- Provide a technical baseline to be used by data space providers to harmonise effort and overlaps and to ensure a proper alignment of the various implementation approaches;
- Allow state-of-the art data management between cloud and edge, enabling seamless ultra-fast data workload balancing between them, and intelligent data porting between centralised and decentralised data infrastructures;
- Ensure performance and quality of service in the execution of applications across multiple cloud and edge providers;

- **Technical data infrastructure:** participants in the creation of common European data spaces will be encouraged to use the common technical infrastructure and building blocks which will allow to efficiently build data spaces in a coordinated manner. The common technical infrastructure should integrate the cybersecurity-by-design and privacy-by-design principles.

- common European data spaces should be able to pool, access, process, use and share all types of data. Data subjects should be able to give their consent and to change access rights and specify new conditions of how their data can be accessed and reused.

- Federation, Multi-tier, Portability: the common technical infrastructure should facilitate the integration of data spaces into interconnected data ecosystems in the European Union, by the adoption of common standards and protocols.

- Data Storage: built-in identification and security features, such as data masking services; and data storage services based on crosscutting, low power, and energy efficient technologies.
- Integrate an environmental tracking performance system to ensure services operate in a low power mode;
- Provide secure resource efficient data storage services;
- Be tested in use cases in areas of public interest including the areas of trust services and electronic identity, modernisation of public administration, mobility, as well as industrial data spaces.

Findings



1



2



3



4

JRC Research on European Data Spaces

EU Data Spaces – Scientific insights into data sharing and utilisation at scale

- Technical Report: [Publication approved](#) – Soon online!
ISBN 978-92-76-53522-5 (online), doi:10.2760/400188 (online), JRC129900
- Integrates JRC's knowledge base on data sharing - [Easy entry point](#) to data spaces JRC findings.
 - Ingredients: JRC research findings from articles, reports.
 - Mapped to the technical and non-technical requirements for data spaces as defined in the European Strategy for Data (2020) and SWD(2022) 45 final.
- Co-created and validated by different services (ENV, SANTE, GROW, DIGIT, JRC, AGRI, CNECT).
- Two products derived from the same knowledge base:
 - Living document (wiki).
 - Interactive component (chatbot, Q&A system).
- Complements the Data Spaces Support Centre and European Innovation Board.

JRC Research on European Data Spaces

EU Data Spaces – Scientific insights into data sharing and utilisation at scale

- Dashboard:

JRC resources mapped to the requirements for Data Spaces

Interactive browsing

The dashboard displays JRC resources mapped to requirements for EU Data Spaces, organized into 12 categories:

- Data Transfer & Exchange:** The core functionality of data spaces, enabling participants to benefit data to other participants.
- Identity, Authentication, Access Control:** These are key features upon which trust is built in the data sharing ecosystem, enabling participants to control who can access their data assets.
- Data Publication & Discovery:** An effective mechanism for publication and discovery is expected to be a key functional requirement of data spaces, especially given the large amount of heterogeneous data expected to be made available in them.
- Privacy-preserving mechanisms / Data protection:** Ensuring data privacy is a key requirement for certain data spaces handling sensitive data (e.g., personally identifiable information or intellectual property). Data spaces should comply with the EU General Data Protection Regulation (GDPR) and also provide data privacy features, such as anonymization and masking services – they may in the future incorporate more advanced privacy-preserving technologies such as federated learning, secure multi-party computation and homomorphic encryption.
- Data Interoperability:** Features supporting the integration of heterogeneous data services to facilitate data sharing and exchange, involving mapping services, query endpoints and other features based on semantic technologies.
- Usage Control Policies:** Building on access control functionality, additional features should enable participants in data spaces to determine not only who is allowed to access their data, but also the manner in which these data can be used, providing effective monitoring and enforcement functionality.
- Data Compliance and Auditing:** This functional category encompasses features that enable participants in data spaces to attest and verify claims made by their peers regarding compliance with standards, regulations and generic terms and conditions for using data and services. Such features include preconditions for making data available that are defined by their owners or by any other governing authorities.
- Data Federation, Orchestration and Portability:** Data spaces should provide development-ready for multi-platform services that are supported by a wide range of underlying computing architectures, as well as interfaces for their orchestration – this is a key aspect of digital sovereignty.
- Data Processing & Analytics:** The functional of data spaces extends beyond making data available, and includes the utilization of data for value-add activities, notably through data analytics and statistical inference. Tools to enhance the development of AI solutions would be beneficial, especially if they target not only AI specialists but also domain-experts from the different sectors, e.g., through low-code, no-code, AutoML, and other AI for non-experts approaches.
- Data Profiling and Collaboration:** Collaboration tools are required to enable the joint development and exploitation of products and services by multiple participants in data spaces, possibly from different organizations and even different sectors. Profiling and collaboration services would support and simplify this design, implementation and management of distributed processing workflows across ecosystem participants, ensuring an effective shared governance.
- Data Governance:** Data governance can be defined as the set of rules, policies, relations, decision-making structures and processes determined among different kinds of entities to control, share and use data. It concerns the ways in which data is used, can be governed, managed and made accessible to third parties.
- Data Storage:** Supporting access to data, storage services can be either physical, i.e., based on independent copies of participant data within the ecosystem, or virtual, providing logical access to data assets which are physically located in their owners' infrastructure.

At the bottom of the dashboard, there is a navigation bar with links to HOME, JRC HOMEPAGE, and SITE, and a search bar. The status bar at the bottom right shows the date (01/12/2022) and time (16:20).

JRC Research on European Data Spaces

EU Data Spaces – Scientific insights into data sharing and utilisation at scale

- JRC resources on Data Spaces

How-To's on Data Sharing



European Commission

Health 2020

DATA ENHANCEMENT

HOW CAN VOLUNTARY DATA SHARING BE LEVERAGED IN A DATA SPACE?

Problem statement

More data sharing is required to deal with today's societal, economic and environmental challenges. But despite the numerous benefits of data sharing, there is a lack of incentives to do so in a timely manner. In many cases, the main barrier to key actors in any field access to it because there are strong reasons to securely share it on a voluntary basis. Privacy issues and fears of losing competitive advantage, are some of the most common concerns expressed by those who would be willing to share their data. Against this background, data spaces offer a promising environment to exchange data for the public interest.

Example

The study of rare diseases would benefit from health data voluntary initiatives by patients and hospitals. The combination of data from various sources can generate new insights into rare diseases and support the development of treatments in this field. In this regard, a trustworthy data intermediary that collects, manages, and distributes the data from the parties involved is needed. Chapter IV of the EU Data Governance Act right provides a suitable data altruism organisation.



DATA ALtruISM SPACE

Recommendations to stakeholders (indicative)

- **Providers**
 - Share data on an altruistic grounds
 - Collaborate with data altruism organisations
 - Establish a data altruism organisation
- **Data users**
 - Create contributions of data
 - Create incentives for data holders to share data on an altruistic basis
- **Authorities**
 - Authorise and support data altruism organisations
 - Reward collaboration

Additional resources (JRC)

- [Catalina Smulders, B., Dutch Brown, H. & Marques, B. "To pool or to pull first? An economic analysis of health data pooling". JRC Working Papers on Digital Economy 2021-08, Joint Research Centre \(Seville site\)](#)
- [EU DATA GOVERNANCE ACT: A PRACTICAL GUIDE FOR THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on European data governance \(July 2020\) \(Act\) 2020](#)
- [Jones, C. I. and Torress, C. \(2020\). "Normativity and the Economics of Data". *Journal of Economic Review*, 120 \(9\), 2019-202](#)
- [Porto H. & Coaglio M. *Open data governance for public policy*. European Commission, Spain, 2020. JRC202012](#)

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Scientific support for establishing EU Data Spaces

JRC Research activities under GreenData4All

- Studies in support of the GreenData4All (revision of the INSPIRE Directive) impact assessment, for DG ENV (on-going)
 - Possible role of intermediaries in the Green Deal data space (extending on-going research on intermediaries by JRC for CNECT).
 - Options for including citizen science and user consent data (including data altruism) mechanism in the Green Deal data space, building on top of Data Governance Act and Data Act.
 - Options to review the interoperability provisions/approach under INSPIRE in view of the upcoming Interoperable Europe Act, High Value Datasets Implementing Regulation and data space interoperability provisions in the Data Act.

Building European Data Spaces

Actors: Coordination and Support Actions

- Data Spaces Support Centre (DSSC)
 - Main Coordination and Support Action.
 - Mission: Coordination of all relevant actions on sectoral data spaces in Europe.

Blueprint

Best practices

Common standards

Support activities

Knowledge transfer

- Sectoral Coordination and Support Actions (CSAs)
 - One CSA envisaged for each sectoral data space.
 - Mission: Coordination of each specific sectoral data space.

Community of practice

Priority datasets

Stakeholder engagement

Governance & Business models

Roadmap

- European Data Innovation Board (EDIB)
 - Consultative and advisory body established in the Data Governance Act.
 - To be set up in September 2023.
 - Mission: Identification of guidelines for interoperability of common EU data spaces.

European Data Spaces Data Spaces Support Centre

Main Coordination and Support Action (CSA)



- Aimed to build a strong and innovative data ecosystem in Europe through the development of common data spaces in strategic economic sectors and domains under the EU Data Strategy.
- General CSA ruling the specific and sectoral CSAs on Data Spaces - Mission:

<< The Data Spaces Support Centre will explore the needs of data space initiatives, define common requirements and establish best practices to accelerate the formation of sovereign data spaces as a crucial element of digital transformation in all areas >>

- Funded by



<https://dssc.eu>



European Data Spaces Great project

Coordination and Support Action (CSA) for shaping the **Green Deal data space**



- www.greatproject.eu
Establishing the foundations of a
Minimum Viable Green Deal Data Space.

- Reference blueprint architecture.
- Governance & Business Models.
- Priority list of datasets.



Building European Data Spaces

Cooperation at multiple levels needed



International Society for
Digital Earth

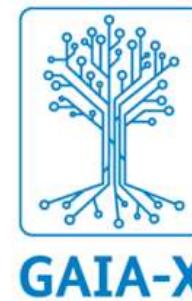
INTERNATIONAL DATA
SPACES ASSOCIATION



Open
Geospatial
Consortium

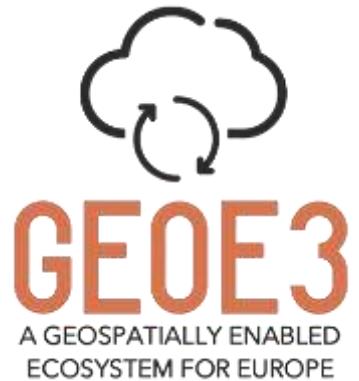


UN-GGIM
UNITED NATIONS INITIATIVE ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT



Building European Data Spaces

Cooperation > Green Deal data space



European Data Spaces

The role of NMCA



- Data providers play a **crucial role** in EU data spaces:
 - Long **experience** producing and **sharing data** (own business, national SDIs, INSPIRE, EuroGeographics products, Open Data portals).
 - **EU Core data and services** are key to achieve data spaces' ambitions and goals.
 - Focus on data availability and **accessibility**. Data intermediaries will support integration and interoperability efforts.
- Approach for integrating NMCA data in the Common EU data spaces:
 - Gradually **build capacities** and **adopt emerging standards** and **technologies**, mainly those considered for data spaces.
 - Closely **follow-up CSAs** put in place. Consider **collaborating**.
 - **Participate and influence** in relevant actions:
e.g. ISO/TC211 Ad-hoc group on Input to EU Data spaces
 - Apply an **open licensing** framework, when possible.
 - Make **High-value datasets** freely available via standard **APIs**.



ISO/TC 211 "Geographic Information/Geomatics"
Secretary: Mr. ISB
Committee manager: Jüri Mäe MR

ISO/TC 211 N 5842



N 5842 Draft Resolutions from the 58th hybrid plenary meeting, 2022-12-09

CR Resolutions 2022-27 [AG 2]

Ad-hoc group on Input to EU Data spaces

ISO/TC 211 makes the opportunity presented by the EU Open Data Directive, ISO/TC 211 resolves to create an Ad-hoc group to prepare a document describing the use of standards to enable the publication of geographic information from European Union Data Spaces. ISO/TC 211 welcomes the offer of Mr. Jari Rehn of Finland and agrees him as chairman. The Ad-hoc group shall present a report to ISO/TC 211/WG 2 Advisory group on strategy before the 58th plenary week.

Keep in touch



EU Science Hub: ec.europa.eu/jrc



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Thank you!



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