



GREAT
Green Deal Data Space

Closing Event GREAT | Green Deal Data Space Project

23 April 2024 - Press Club, Brussels



greatproject.eu



Green Deal Data Space | GREAT Project



@GreenDealDS



Funded by
the European Union

GREAT Final Event

Time	Agenda
9:30 - 9:45	Welcome Coffee & Registrations
9:45 - 10:30	Opening remarks
10:30 -12:00	GREAT Project Results
12:00-12:40	<i>Lunch break</i>
12:40 -13:40	The Practitioners' Perspective - Why We Need Data Spaces
13:40-13:50	<i>Short break</i>
13:50 -14:50	The Implementers' Perspective - How Are We Going to Make Them
14:50 -15:00	Closing



Nevena Raczko
Moderator

GREAT Final Event

ONLINE AUDIENCE

<https://www.youtube.com/@BrusselsPressClubTV>

GREAT Final Event

23 April 2024 - Press Club, Brussels

Opening Remarks



Johan Bodenkamp
DG Connect



Ana Garcia
Data Space Support Center



Sotirios Kanellopoulos
DG ENV



Giorgio Micheletti
IDC



Nevena Raczko
Moderator



Johan Bodenkamp

Policy Officer, DG Connect



Sotirios Kanellopoulos

Policy Officer, DG ENV



Ana García Robles

BDVA Secretary General

DATA SPACES SUPPORT CENTRE


Ana García Robles
Secretary General BDVA
DSSC




DATA SPACES

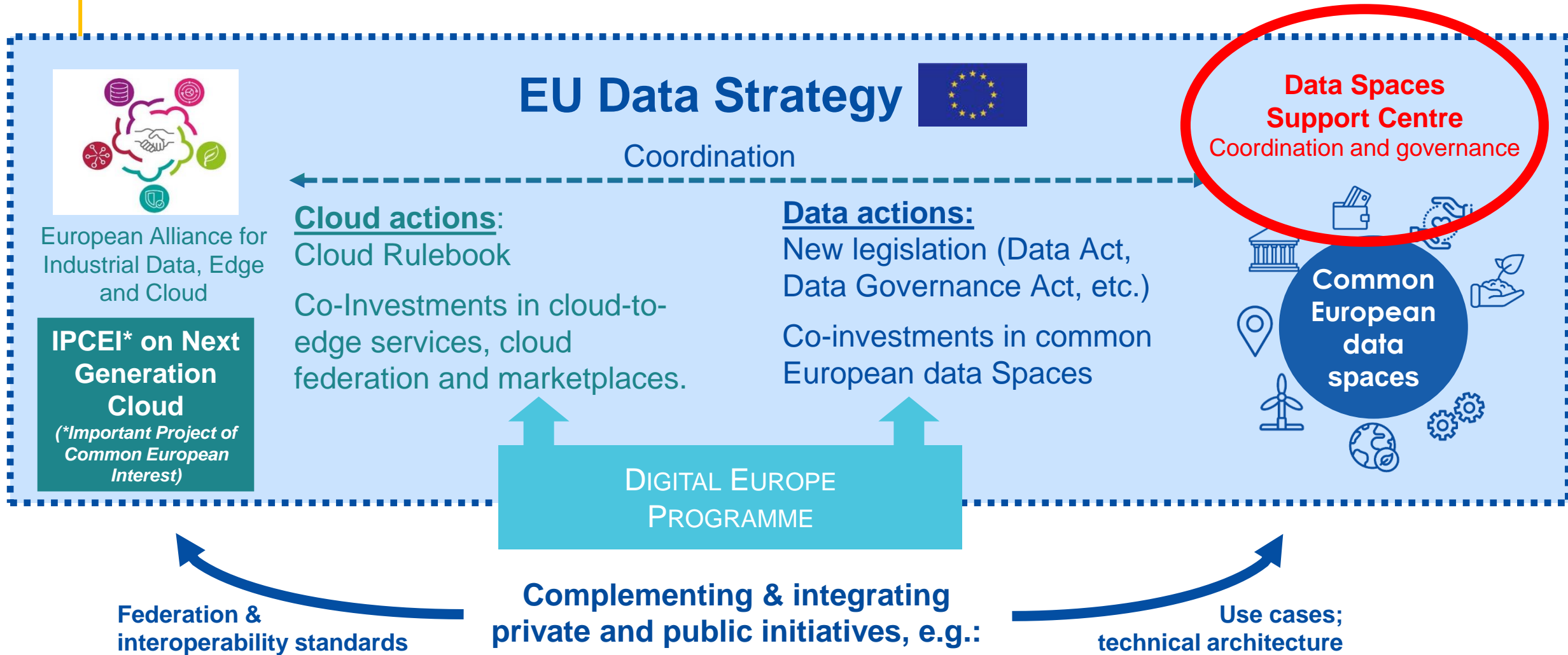
SUPPORT CENTRE

 **GREAT Final Event** 

 23 April 2024

 Brussels, Press Club

The European Data strategy



[Source: DG CNECT]



**DATA SPACES
SUPPORT CENTRE**

**Closely work with CSAs
and projects funded under
DIGITAL**

**Create a
network of
stakeholders**

**Identify the
common
requirements**

**Support the work of the
envisaged European
Data Innovation Board**

**Create a platform for
knowledge exchange**

Support the deployment of data spaces

[Source: DG CNECT]

DSSC.EU

Data Spaces Support Centre

- The virtual organization and EU-funded project which supports the deployment of common European data spaces and promotes the reuse of data across sectors



How can we help you?

Partners



Associated partners

DSSC offerings



- The Network of Stakeholders
- The Glossary and the Conceptual Model
- The Starter Kit
- The Blueprint
- The Co-Creation Method
- The Toolbox
- The Radar
- Impact monitoring and evaluation
- Support
- Communications

The collage features several key components:

- Building Blocks:** A diagram showing a grid of green and blue blocks.
- Overview of components:** A central diagram with multiple nodes and connecting lines.
- Implementations:** A diagram showing various implementation scenarios.
- Starter Kit for Data Space Designers:** A green document cover with the DSSC logo.
- The Data Spaces Radar:** A dashboard with a circular radar chart and data points.
- Business and organisational building blocks:** A green grid of boxes representing different business and organizational elements.
- Technical building blocks:** A blue grid of boxes representing technical elements.
- Network of Stakeholders:** A central hub diagram connecting various stakeholder groups.
- Support Center Website:** A screenshot of the DSSC Support Center interface with navigation options like 'Get Information', 'Get Support', and 'Get Involved'.
- Stakeholder Diagrams:** Various diagrams showing relationships between different entities like DS4Skills, DS4SCC, DSFT, etc.
- Operational Model Diagrams:** Flowcharts and diagrams illustrating operational models and data exchange processes.

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

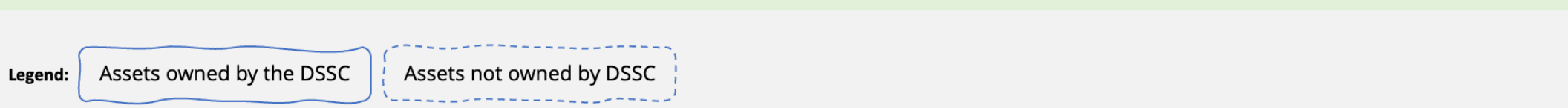
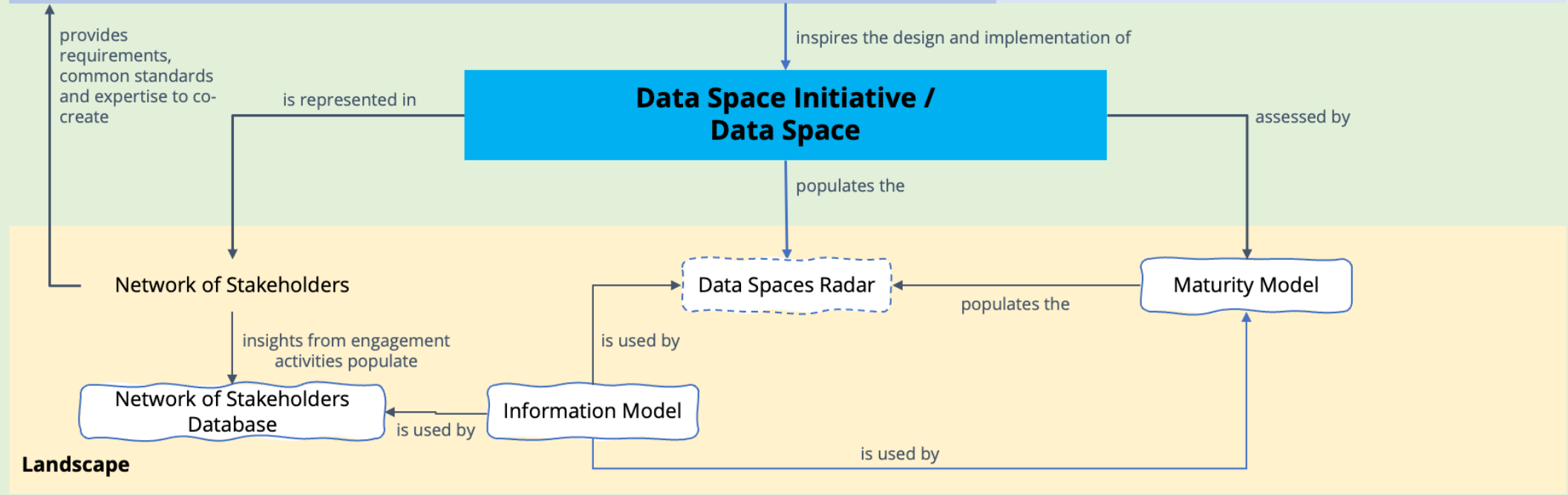
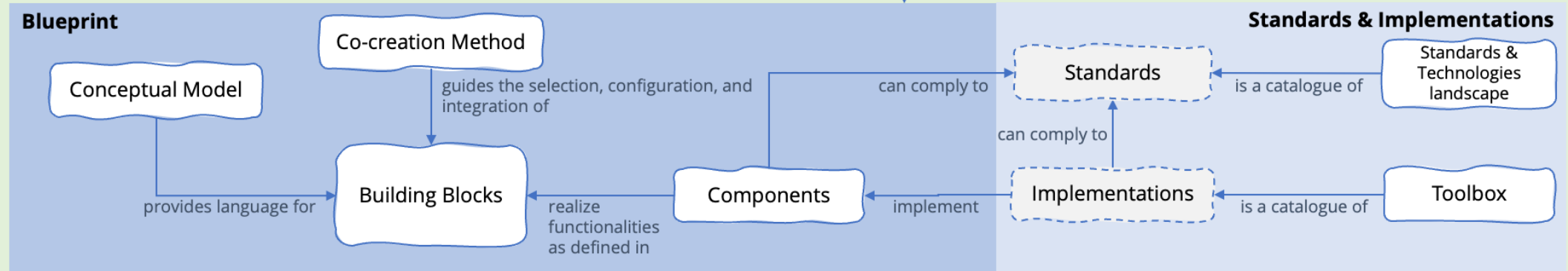


Overall support

Glossary

Starter Kit

acts as an entry point



Note: this figure represents the DSSC asset model. It shows relationships between assets, without adhering to a strict UML language. The conceptual model defines further concepts and language.

DSSC Network of Stakeholders (NoS)



**DATA SPACES
SUPPORT CENTRE**

DSSC Network of Stakeholders

Initiatives and bodies DS need to collaborate with for alignment and/or holistic picture
Bring requirements, knowledge, influence, alignment

Set up, run or provide technology for Data Spaces
Hands-on community
Learn from each other, align, contribute

Enablers, influencers and users of Data Spaces
Have expertise on the matter
They have committed resources
Advice, give direction and contribute

Collaborations and liaisons
Other relevant initiatives and bodies

EDIB

Community of Practice (CoP)

Data Space Initiatives

Simpl Building Blocks implementers

Strategic Stakeholder Forum (SSF)
Organisations with expertise in Data Spaces



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

DSSC Community of Practice (as per March 2024)



Agriculture

Green Deal

Language

Cultural Heritage

Skills

Manufacturing

Mobility

Smart cities

Media

Energy

Health

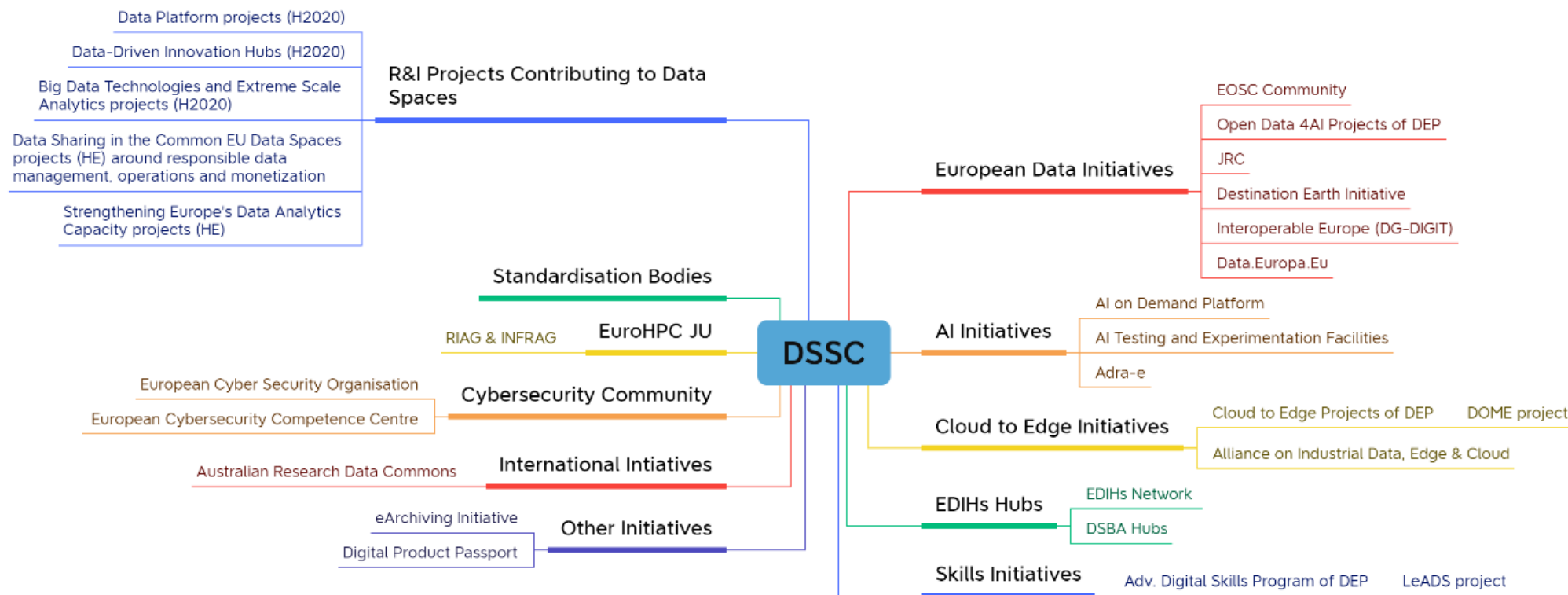
Completed projects

- Relationship Manager
- Regular group discussions
- Thematic Groups
- Expert groups
- Regular communications
- Insights and visibility
- Events
- Community Support

Collaboration with SIMPL started

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

Collaborations and liaisons (March 2024)

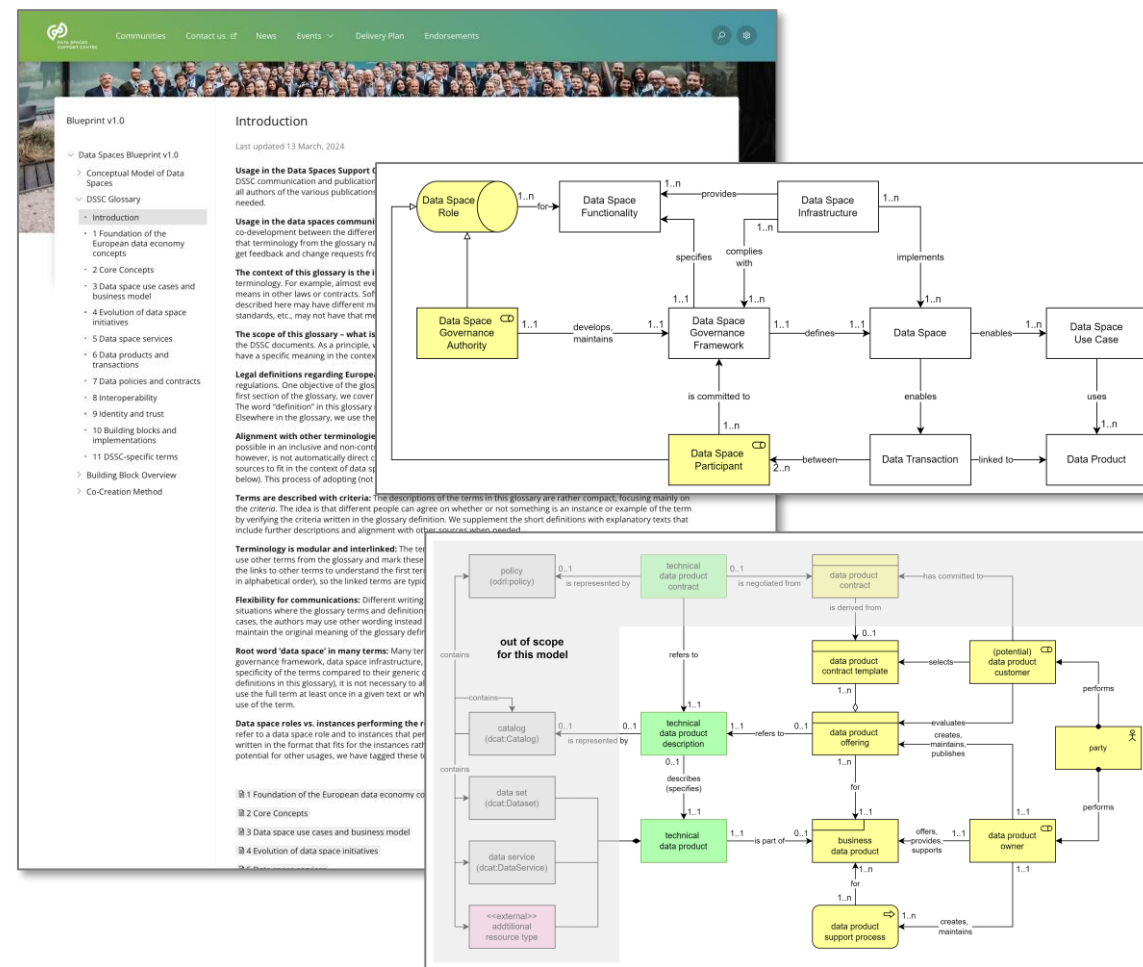


Coordination of synergies and matchmaking with CoP

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

The Glossary and the Conceptual Model

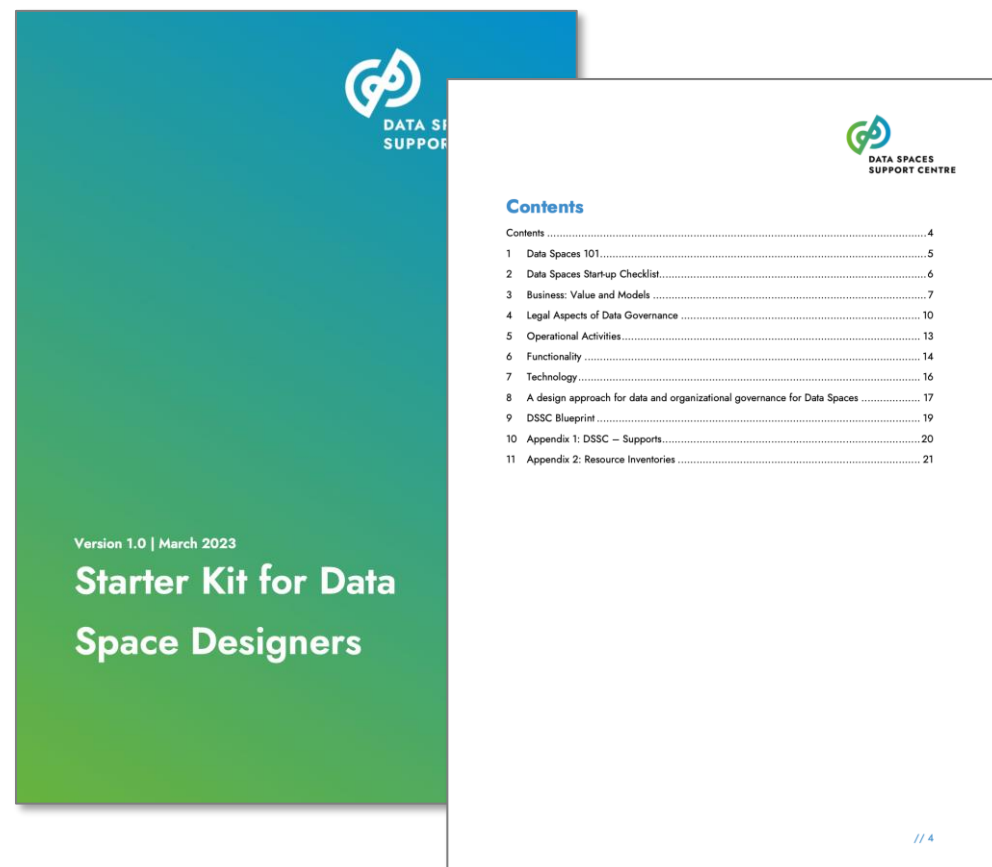
- Data Spaces is an innovative domain
- Among practitioners, concepts and terminology can be ambiguous or subject to different interpretation.
- Converging on language is necessary for clarity and collaboration



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

The Starter Kit

- An easy introduction to data spaces and Data Spaces Support Centre
- For data space designers, data producers, data consumers, providers of intermediary services, or services and business applications.
- To be updated later in 2024.

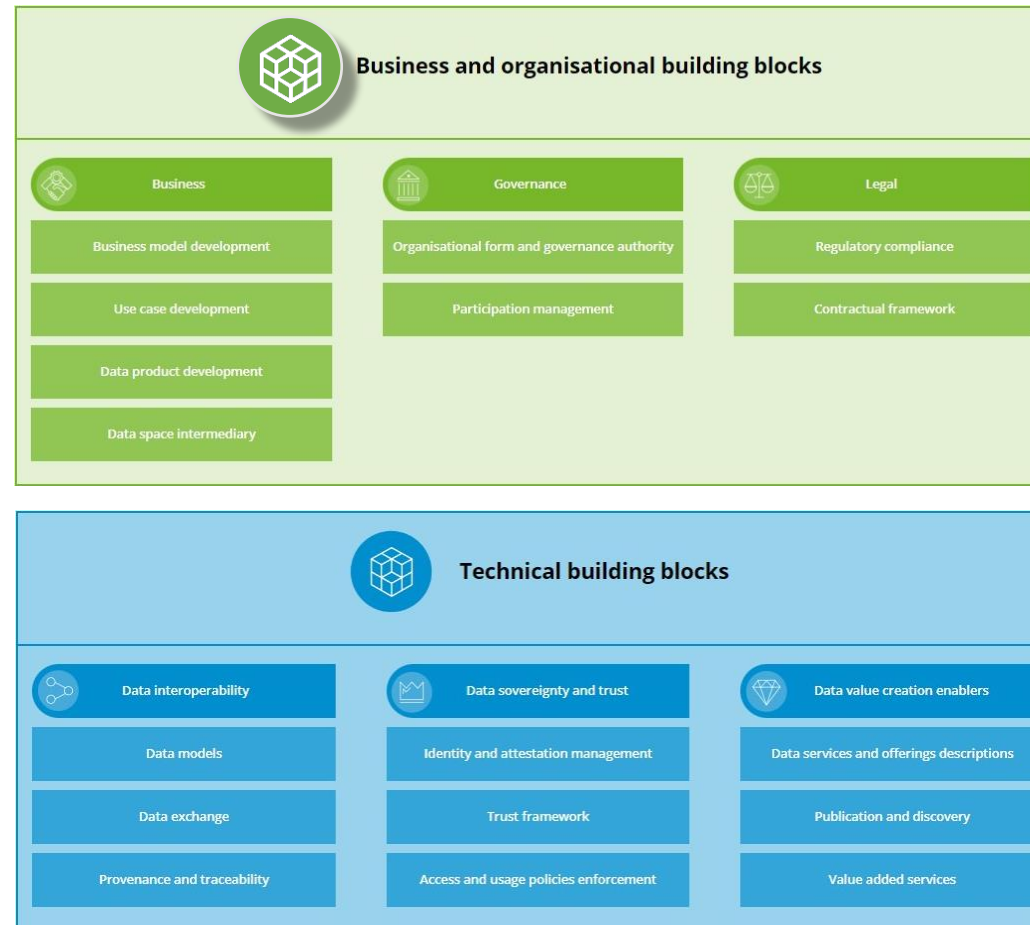


The Data Spaces Support Centre receives funding from the European Union Digital Europe Programme under grant agreement n° 101083412.



The Blueprint

- The collection of building blocks and components that make most typical data spaces.
- Functional description and related recommended standards.
- Supporting the choices you face in designing a data space or performing gap analysis vs pre-existing systems.

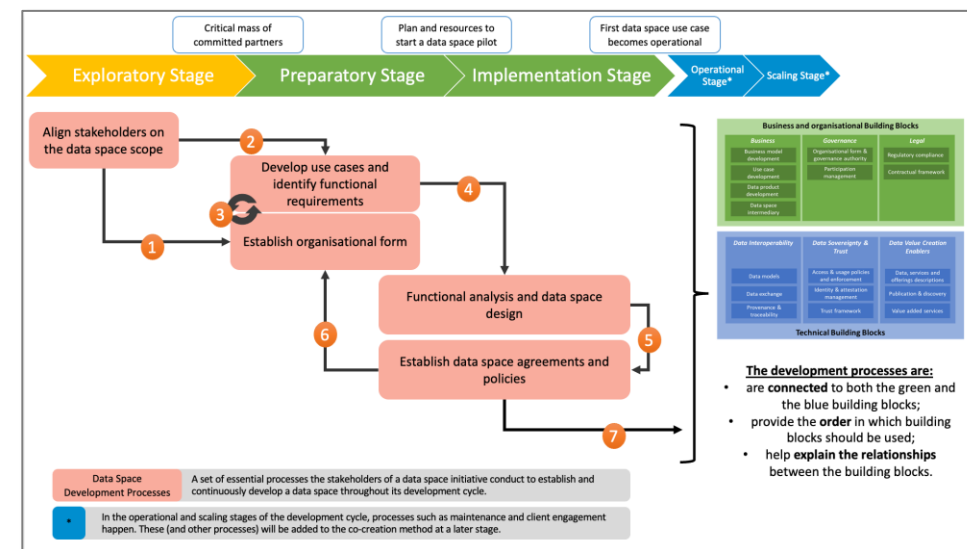
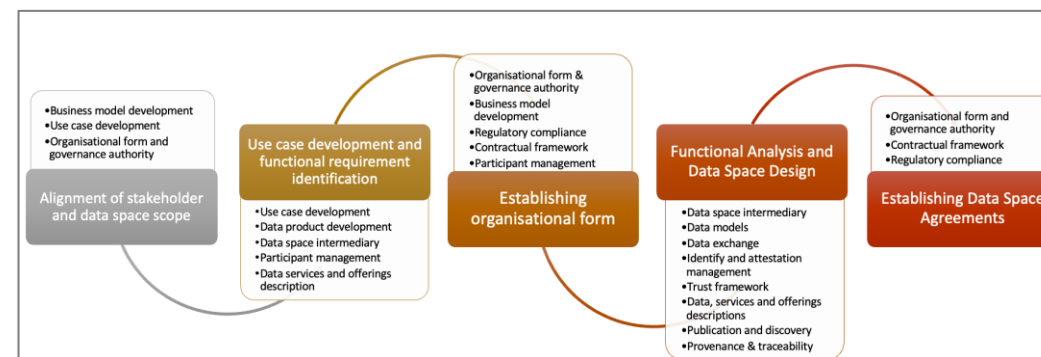


- ✓ Required capabilities
- ✓ Core design decisions
- ✓ Specifications & common standards
- ✓ Further reading

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

The Co-Creation Method

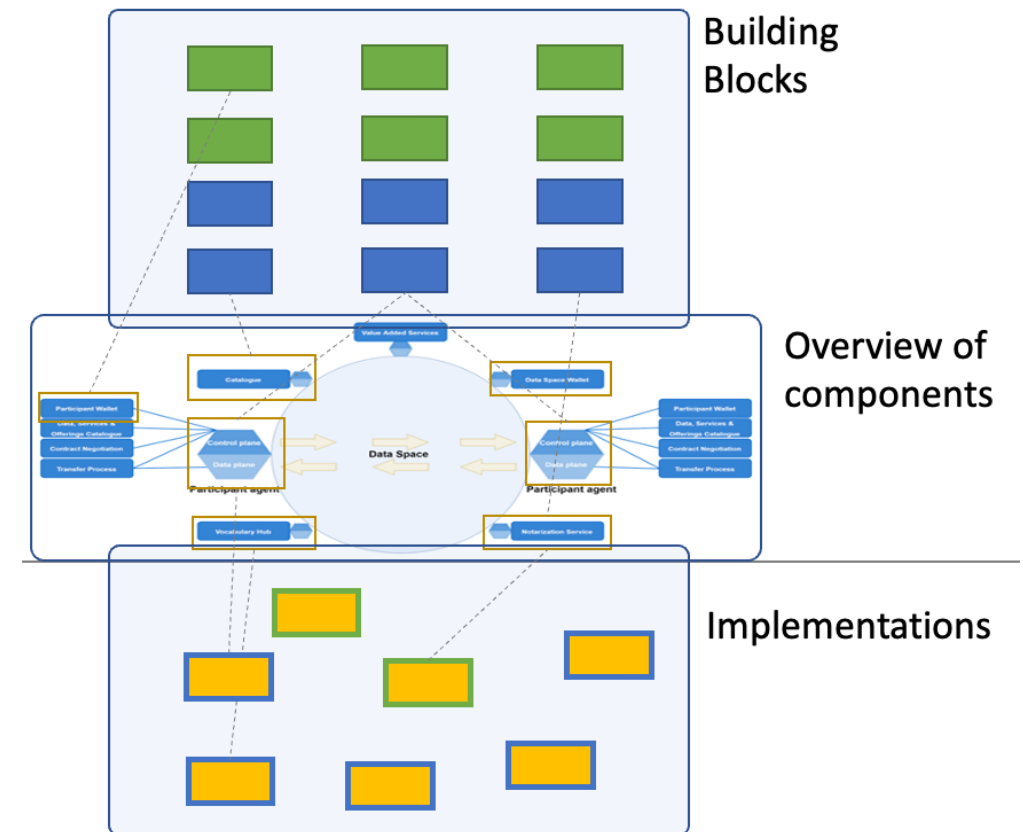
- A guide to select which building blocks and components are typically used to address your use case.
- Aligned to the maturity level of your data space.
- Enabling you to be agile in your implementation.



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

The Toolbox (coming late 2024)

- Translating the functional specification of building blocks and components into actual implementations available “in the wild”
- Not just technology implementations but also business and organisational



The Radar

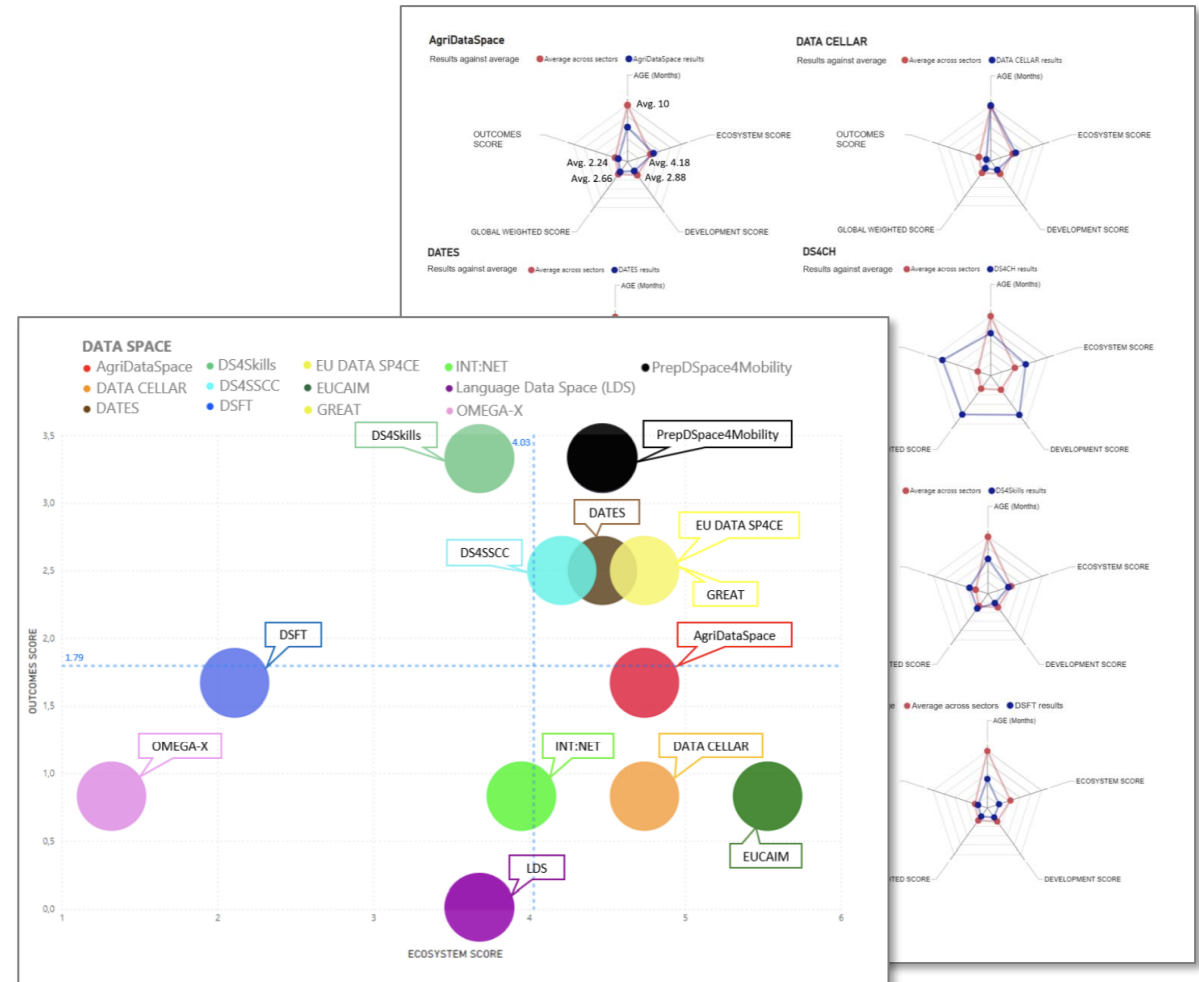
- A tool to collect and offer information back about data spaces and use cases, whether EU-funded or commercial
- >150 initiatives and use cases listed across 23 sectors



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

Impact monitoring and evaluation

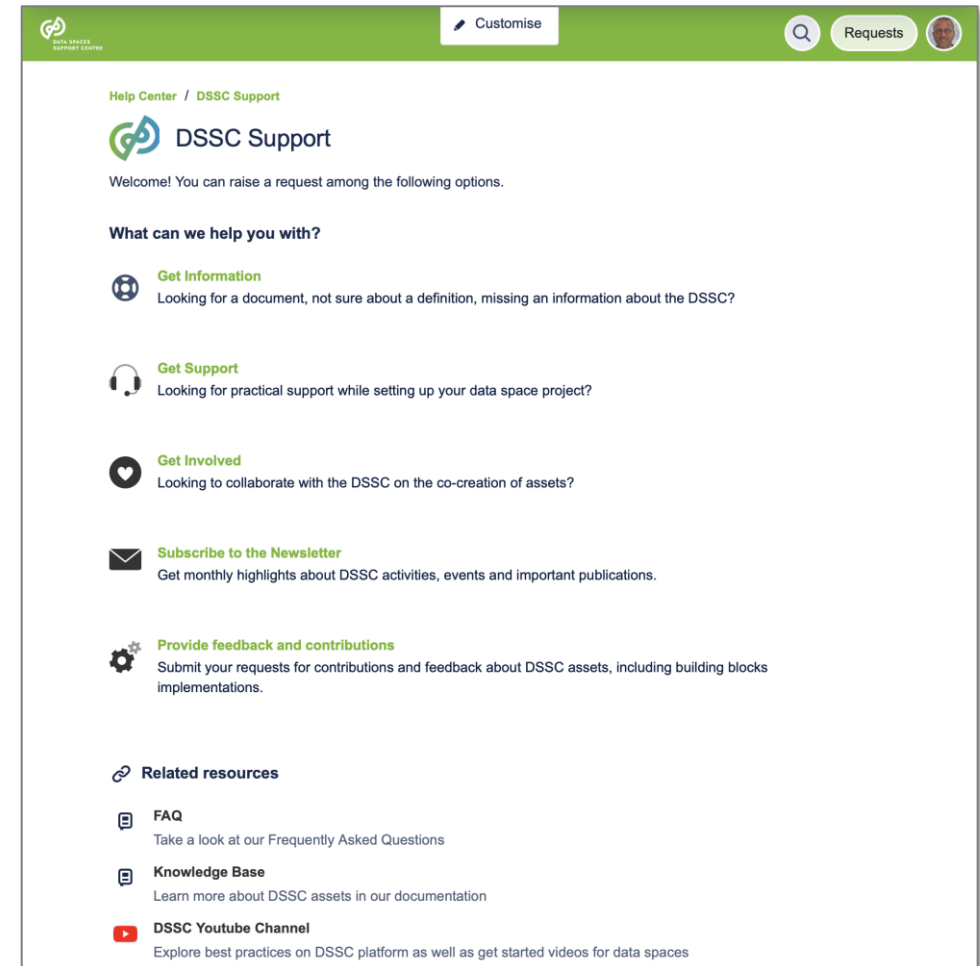
- The first “maturity model” offering a benchmark and a shared reference to evaluate our efforts designing and operating data spaces.
- To learn from the experience and challenges of others.



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

Support platform

- To get in touch with the experts in the team and get opinion and advice.
- >1200 requests addressed in ~1,5 years.



The screenshot shows the DSSC Support platform interface. At the top, there is a green navigation bar with the DSSC logo, a 'Customise' button, a search icon, and a 'Requests' button with a user profile picture. Below the navigation bar, the main content area is titled 'Help Center / DSSC Support' and 'DSSC Support'. A welcome message states: 'Welcome! You can raise a request among the following options.' Under the heading 'What can we help you with?', there are five options, each with an icon and a brief description:

- Get Information** (Icon: person with question mark): Looking for a document, not sure about a definition, missing an information about the DSSC?
- Get Support** (Icon: headset): Looking for practical support while setting up your data space project?
- Get Involved** (Icon: heart): Looking to collaborate with the DSSC on the co-creation of assets?
- Subscribe to the Newsletter** (Icon: envelope): Get monthly highlights about DSSC activities, events and important publications.
- Provide feedback and contributions** (Icon: gear): Submit your requests for contributions and feedback about DSSC assets, including building blocks implementations.

Below these options, there is a section for 'Related resources' with three items:

- FAQ** (Icon: document): Take a look at our Frequently Asked Questions
- Knowledge Base** (Icon: document): Learn more about DSSC assets in our documentation
- DSSC Youtube Channel** (Icon: play button): Explore best practices on DSSC platform as well as get started videos for data spaces

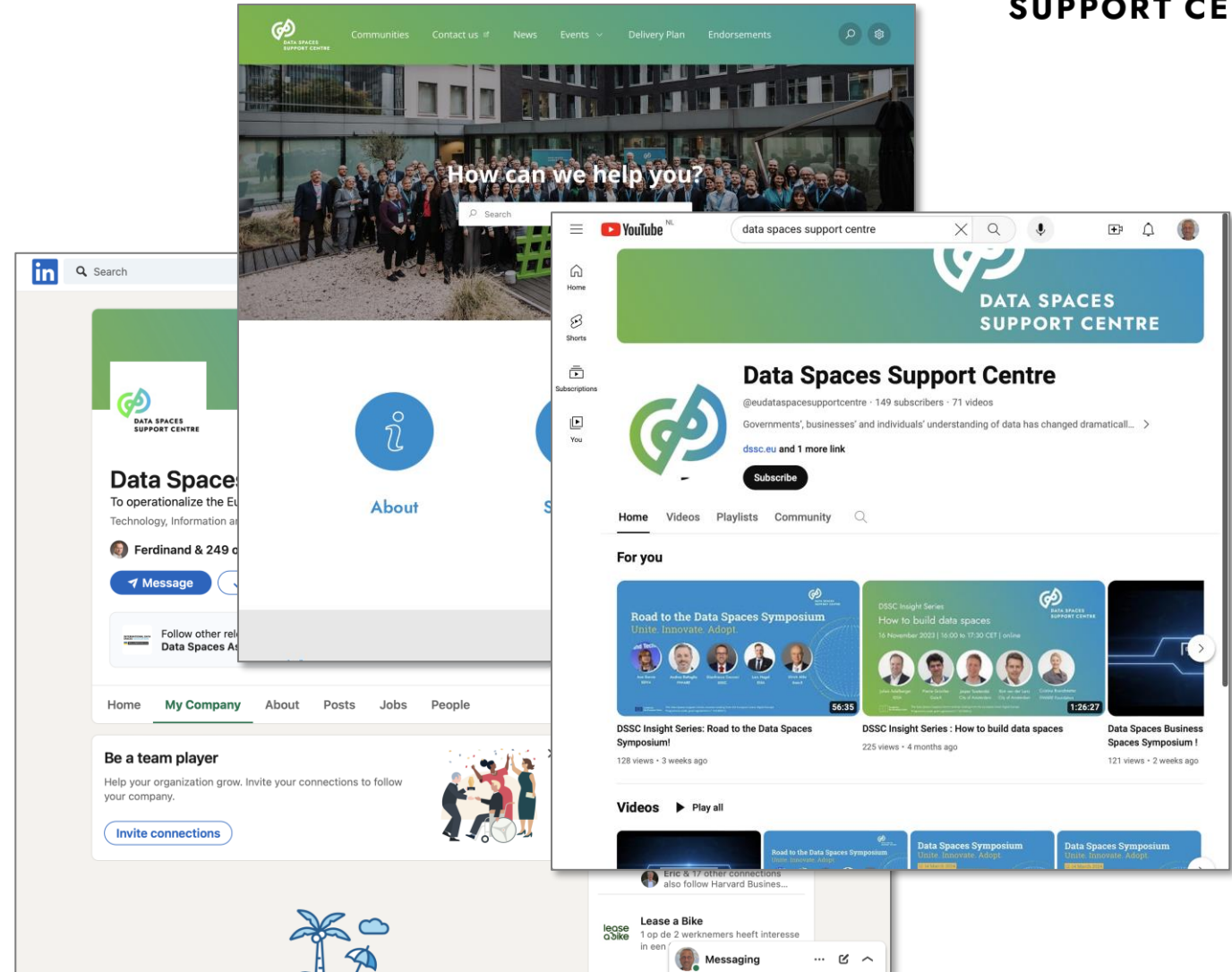
The Data Spaces Support Centre receives funding from the European Union Digital Europe Programme under grant agreement n° 101083412.



**DATA SPACES
SUPPORT CENTRE**

Communications

- Keeping you connected and informed.
- Subscribe to our newsletter! Engage with us!





DATA SPACES
SUPPORT CENTRE

DSSC and GREAT

The story of a 19-month “great” collaboration

DSSC Community of Practice (as per March 2024)



Agriculture

Green Deal

Language

Cultural Heritage

Skills

Manufacturing

Mobility

Smart cities

Media

Energy

Health

Completed projects

- Relationship Manager
- Regular group discussions
- Thematic Groups
- Expert groups
- Regular communications
- Insights and visibility
- Events
- Community Support

Collaboration with SIMPL started

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

Results of our collaboration



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



Participation in all **interviews and surveys** launched by the DSSC

Highlighting user needs → ***Why data spaces? A Business and user's perspective.***
Discussion paper

Data Space Synergies: First 3-day workshop organized by DSSC and GREAT (suggested by GREAT)

Identify and support the discussion with other key initiatives and stakeholders: EOSC, Destination Earth, JRC, DPP, etc

Active participation in Thematic Groups (technical, Governance, Business) and Experts Groups

Active participation in events (DSS, EBDVF, ...) and using the **DSSC comms channels**

Regular and active participation in all meetings and workshops (RM, CoP, ...)

Demanding, pro-active and participative partner!!

Outcome: Alignment of assets (Blueprint), co-learning, co-creation.



DATA SPACES
SUPPORT CENTRE

Thank you!!

Website: <https://dssc.eu/>
Engagement and support

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



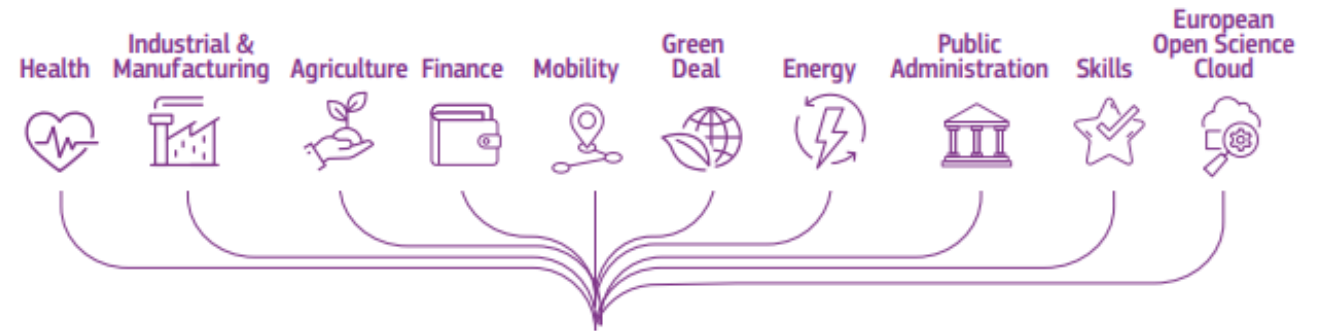


Giorgio Micheletti

Senior Director, IDC



GREAT | The Green Deal Data Space



Green Deal Data Space
 A federation of data ecosystems enabling policy makers, businesses, researchers and citizens, from Europe and around the world, to jointly tackle climate change.

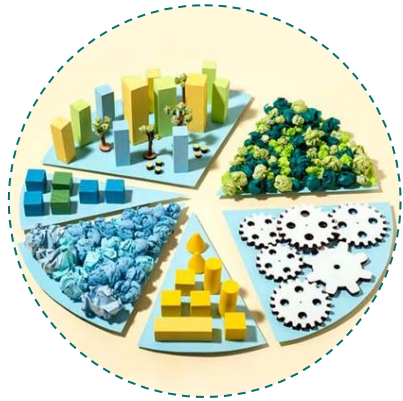
- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

- **Duration:** 20 Months
- **Running:** September 2022 –April 2024
- **Consortium:** 11 Partners 3 Associated Partners
- **Funding:** Digital Europe Programme (CSA)





Key Pillars



Community of Practice



Technical Blueprint



Governance & Business Models



High Priority Data Sets



Roadmap

Strategic EGD Actions





Follow us!



www.greatproject.eu



[@GreenDealDS](https://twitter.com/GreenDealDS)



[@Green Deal Data Space](https://www.linkedin.com/company/green-deal-data-space)



[@greendealdataspace](https://www.youtube.com/channel/UC...)



Public Deliverables



Thank you!

gmicheletti@idc.com

GREAT Final Event

23 April 2024 - Press Club, Brussels

Key Results & Outcomes



Francesca Piatto
EARSC



Mattia Santoro
CNR



Marta Gutierrez
EGI Foundation



Charis Chatzikyriakou
EODC



Mark Dietrich
Moderator



GREAT

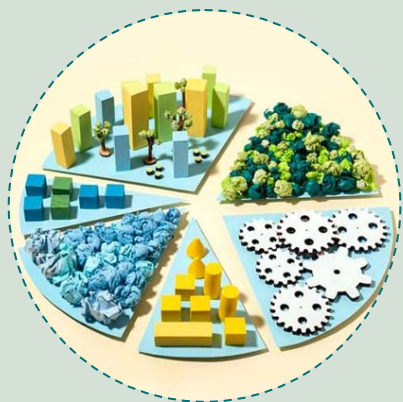


GREEN DEAL DATA SPACE COMMUNITY OF PRACTICE

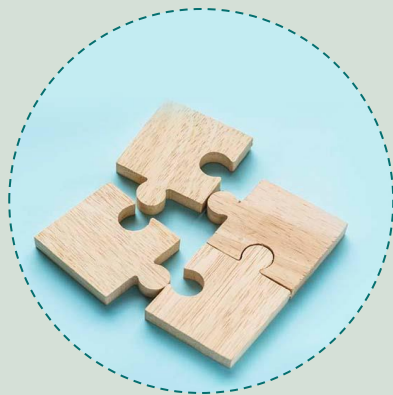


The Green Deal Data Space Community of Practice through the “Data community engagement” is the newly built community built by EARSC with the consortium, aiming at covering targeted Green Deal policies (Biodiversity Strategy, Climate Change Adaptation Plan, Zero Pollution Strategy) centered-around Green Deal Data Space, composed of data and service providers, users and intermediaries.

GREAT Green Deal Data Space Foundation & its pillars:



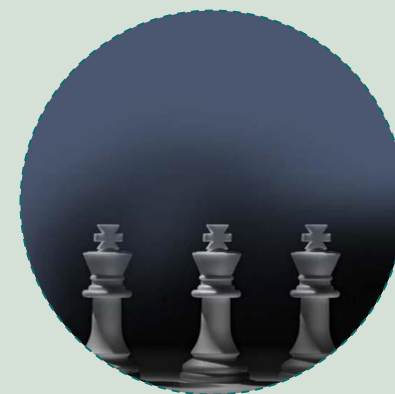
Community of Practice



High Priority Dataset



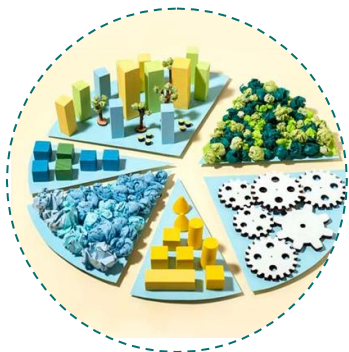
Blueprint



Governance & Business Models



Roadmap



Roadmap
Community:
Policy
stakeholders



Technical Blueprint
Community: Data users,
data providers,
infrastructures, data sharing
initiatives



Governance & Business
Models Community: Data
users, data providers,
infrastructures, data
sharing initiatives

Why the GDDS is important: A process of gather requirements feeding the work packages's objectives with the ultimate GDDS community creation, made also of WPs's own stakeholders.

GDDS Community of Practice



High Priority
Datasets
Community: Data
users, data
providers



Why Data Spaces and why now?

free flow of data & single market
regulatory frameworks cross-domain data access
standardise data sharing practices **ML**

AI data sovereignty Digital twin
values (privacy, security, fairness)

empower data innovation & new business models
data analytics connect data silos

We are tech ready!



Approach: Key Multidisciplinary Use Cases (phase I)



Marine Task Force

EMODnet

A long-term marine data initiative for in situ marine environmental and human activities data, funded by the European Maritime, Fisheries and Aquaculture Fund, bringing on board marine ecosystem

Biodiversity
Zero pollution
Climate change adaptation



Water Task Force

Global hydrology modeling

Seasonal forecasting of water resources

Global hydrological simulations with the PCR-GLOBWB2 hydrological model, which is being used in seasonal forecasting of water resources.

Zero pollution - water
Climate change adaptation - geohazards



EPOS

EPOS, the European Plate Observing System, is a multidisciplinary, distributed research infrastructure that facilitates the integrated use of data, data products, and facilities from the solid Earth science community in Europe.

Zero pollution
Climate change adaptation



GOS4M

Global Observation System For Mercury (GOS4M) is a GEO Flagship aimed to support the Minamata Convention on Mercury Secretariat

Zero pollution - air



BioGIS 360

Tool for biodiversity monitoring providing information on the possible environmental impacts during the new green power plants planning.

Biodiversity
Climate change adaptation

YOUR USE CASE

GET INVOLVED

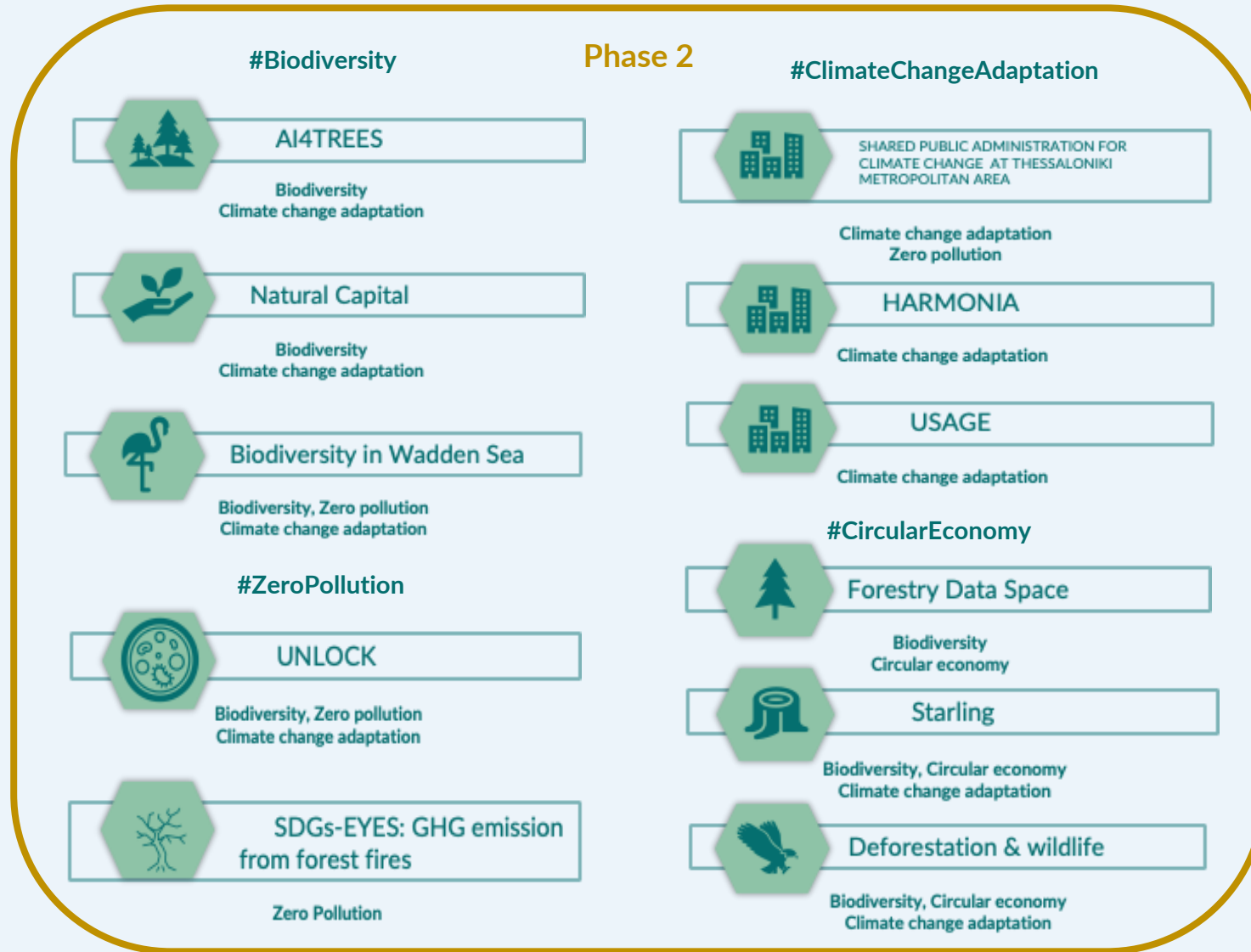
Biodiversity
Zero pollution
Climate change adaptation

Methodology phase II

GREAT Stakeholder Fora



Methodology phase II



16

Reference Use Cases & Initiatives



4

Stakeholder Fora



600+

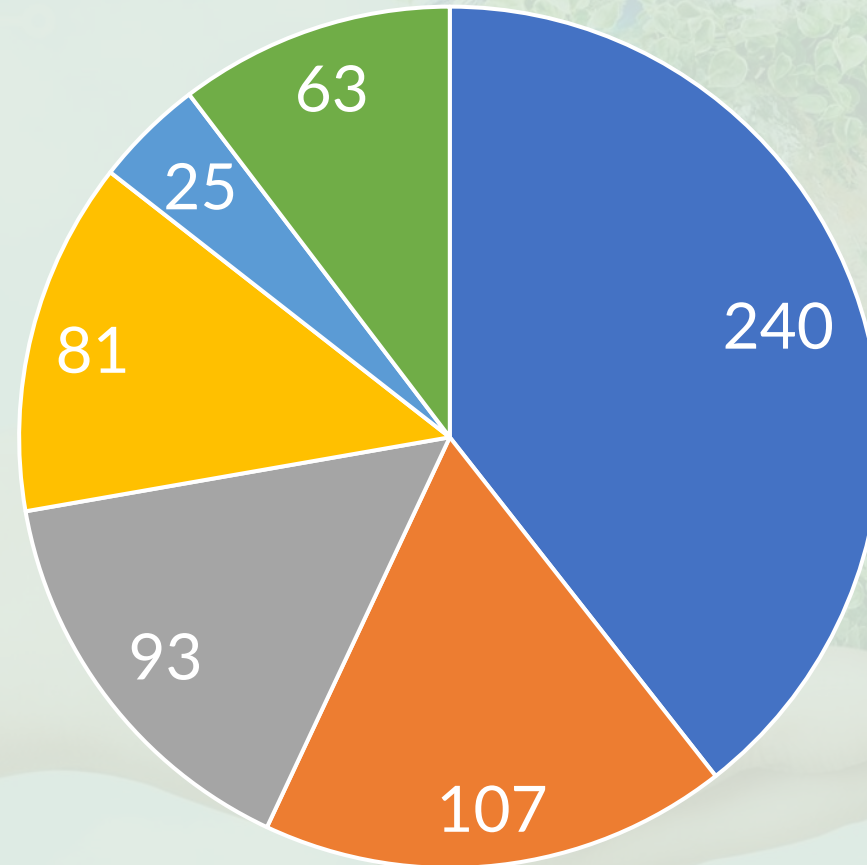
Stakeholders



GREAT Community of Practice

GREAT Community of Practice - Composition

- Private Sector (SMEs)
- Research & Academia
- Networks & Non-profits
- Public Sector
- Other & Projects & Initiatives
- Data Sharing Infrastructures



What our Community of Practice thinks about the GDDS?

“You have been going at a major challenge, for a very wide and heterogeneous domain. Given the limited timeframe, I think you have already achieved quite a lot, and I think you've built a useful foundation for the next steps”
(wetransform GmbH / Forest Data Space)

“The proposed roadmap and technical blueprints provide an excellent starting point for supporting environmental use cases in Europe and beyond”. (AIT Austrian Institute of Technology/Biodiversity Use Case)

“It was a real pleasure to join the GREAT Climate Change Adaptation Stakeholders Forum. We had the chance to share our experience and to find out that our difficulties in the process were shared by many others. Data are a huge challenge for the green deal, the GREAT project is really working on a solution and we loved being part of the process!” (USAGE)

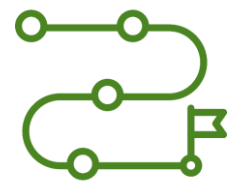
“The consortium and the GDDS Community of Practice ...has a been a great journey” (Final Stakeholder Forum participant)



REQUIREMENTS



Roadmap



WP2 supporting deliverables..

- ◆ D3.2 Final Blueprint of the GDDS Reference Architecture
- ◆ D4.2 Final Governance Requirements and Endorsed Governance Scheme
- ◆ D5.2 EGD Prioritised Data Sets and Gaps (Initial Inventory plus all Reference Use Cases)
- ◆ D6.2 Phase-2 refined and GDDS community endorsed roadmap



Thank you!

francesca.piatto@earsc.org



GREAT



Mattia Santoro, CNR

WORK PACKAGE 3 – TECHNICAL BLUEPRINT

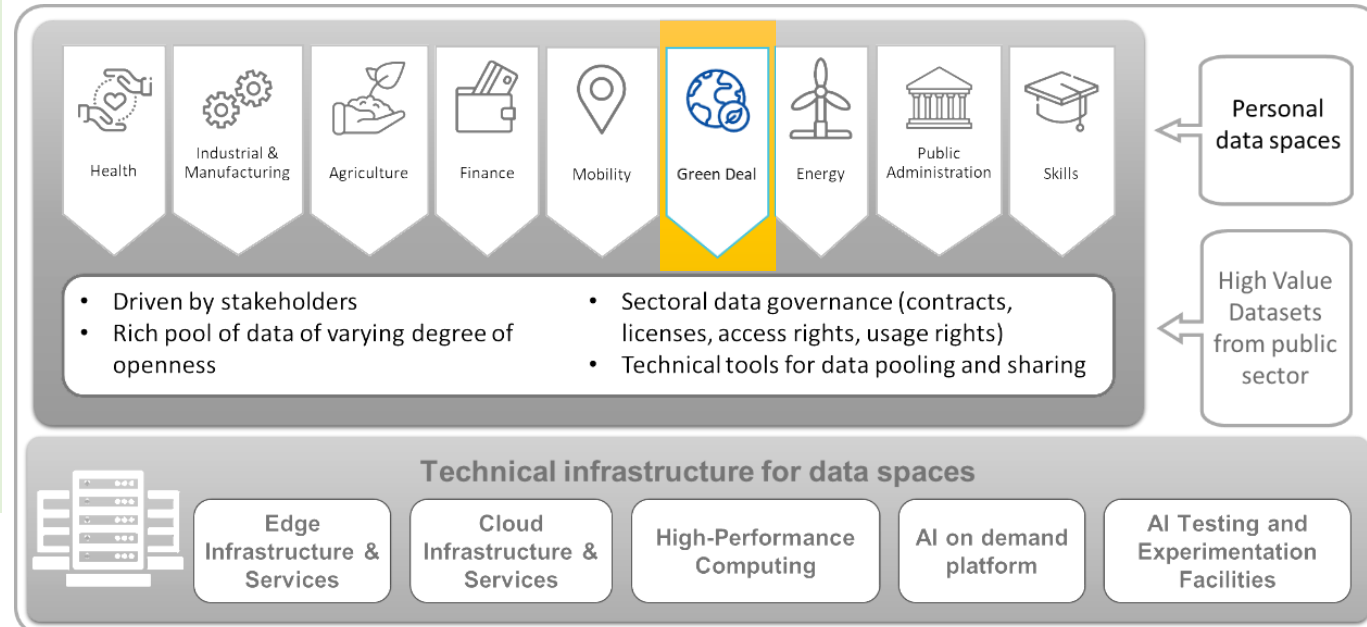


The Green Deal Data Space

THE GREEN DEAL DATA SPACE

- ❖ will interconnect **currently fragmented and dispersed data from various ecosystems**, both for/from the private and public sectors.
- ❖ will offer an **interoperable, trusted IT environment**, for data processing
- ❖ will provide a **set of rules** of legislative, administrative and contractual nature that determine the rights of access to and processing of the data.

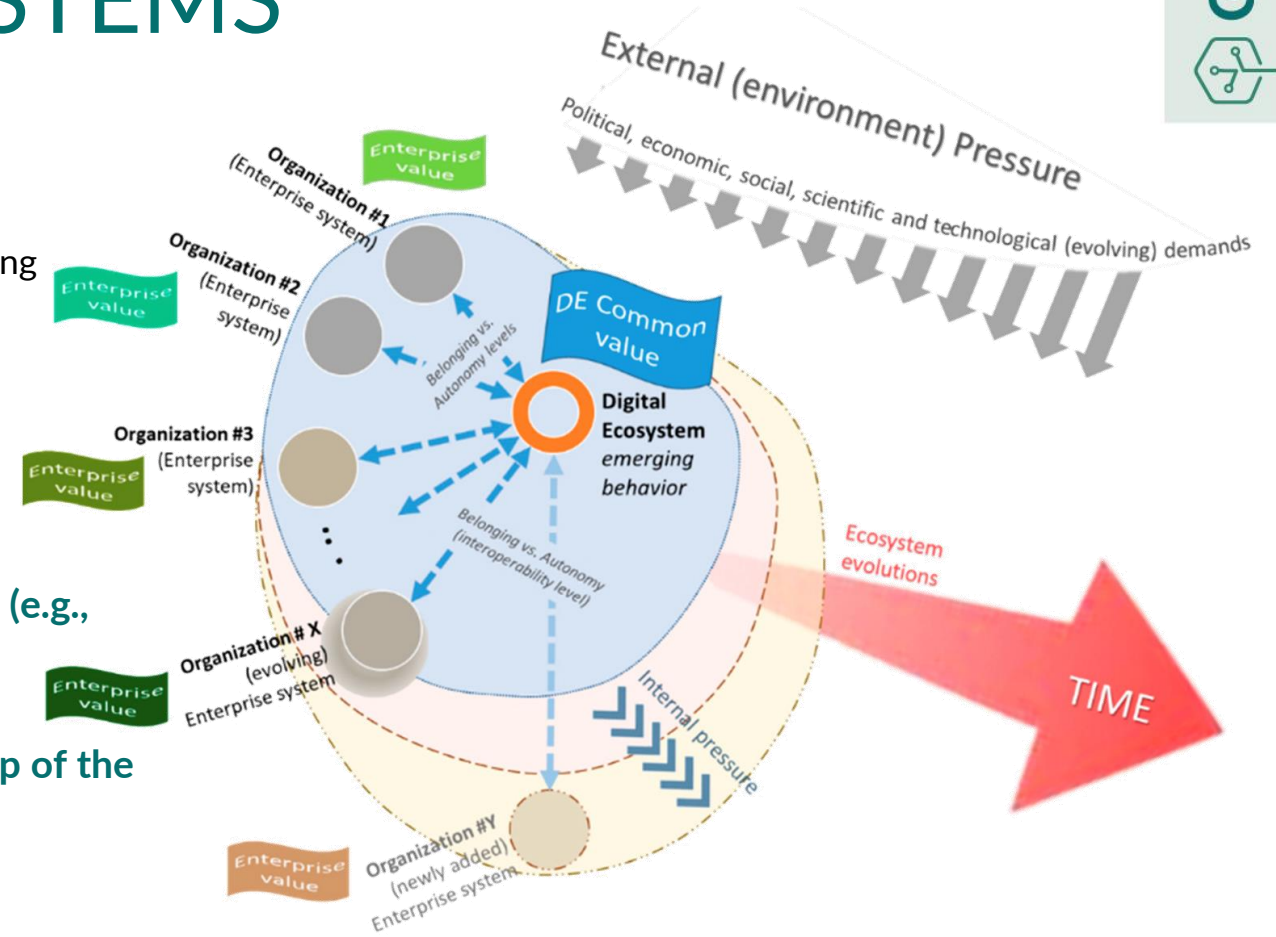
Define the technical blueprint of the GDDS reference architecture explaining how existing (and planned) data ecosystems (at national, regional, and local level) can be connected to provide an interoperable, secure data sharing environment which allows seamless discovery and use of available data
[GREAT Proposal]





DIGITAL ECOSYSTEMS

- **A Digital Ecosystem emulates Natural Ecosystems**
 - Multiple 'species' (autonomous entities) collaborating and competing
 - In a (digital) 'environment'
 - Carrying out different functions
 - Contributing to a 'service' for the human society
 - To be protected (governance)
- **No fixed set of participants ('species')**
- **No fixed set of requirements, only one or more general 'services' (e.g., generating Earth Intelligence, secure sharing)**
 - Ready to changes
- **Participants can enrich the DE providing tools and services on top of the existing ones**
 - Security and trust
 - Generation of knowledge for Earth Intelligence



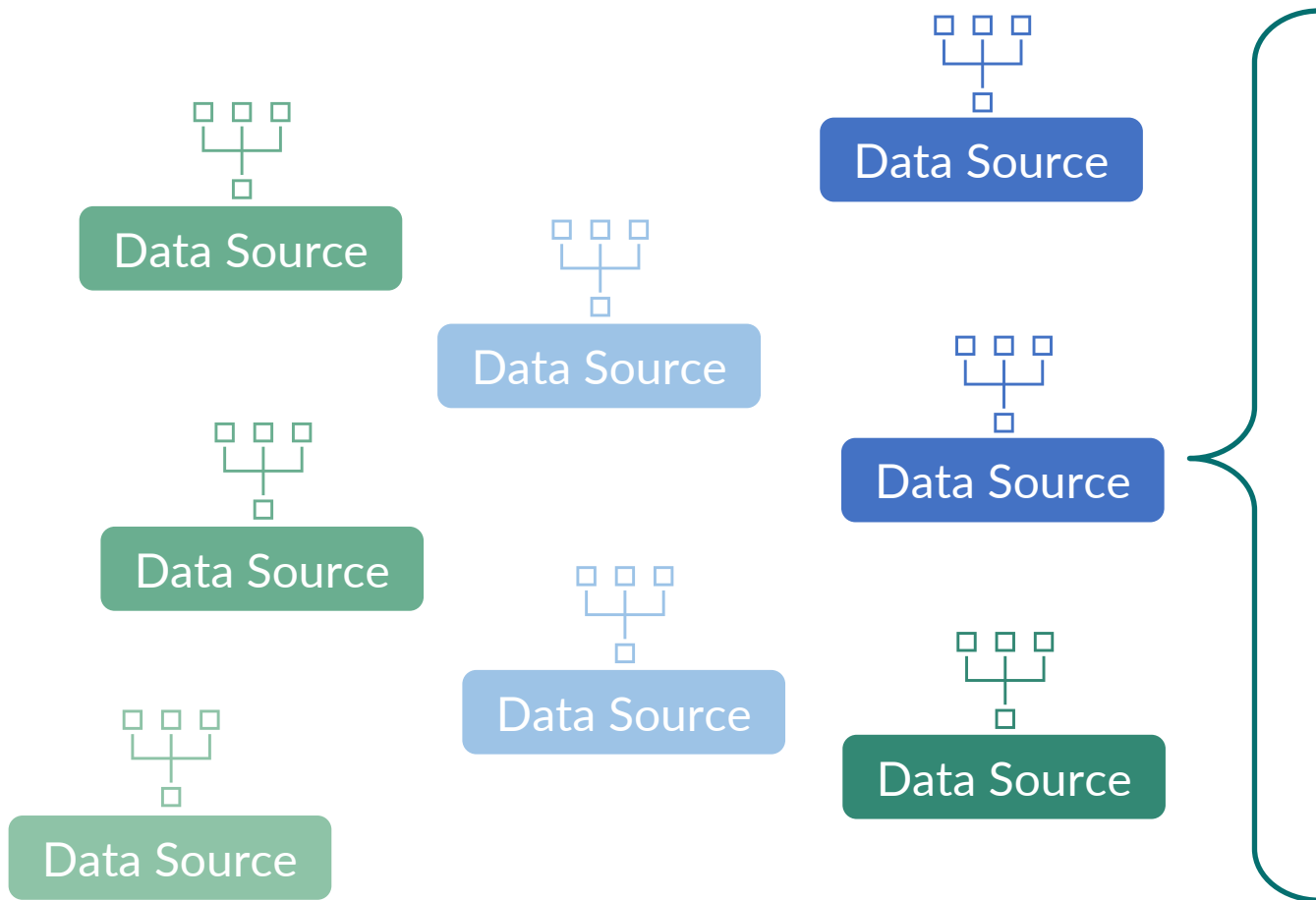
Source: Nativi, S.; Mazzetti, P.; Craglia, M. Digital Ecosystems for Developing Digital Twins of the Earth: The Destination Earth Case. Remote Sens. 2021, 13, 2119. <https://doi.org/10.3390/rs13112119>



Building on Existing (and Future) Capacities



Interoperability Interfaces



- **Metadata Format**
- **Discovery Service/API**
- **Thesaurus/Ontology**
- **Data format**
- **Data Access Service API**
- ...



Basic Principles

Inclusiveness

- We can expect a **high heterogeneity** of **data systems** in terms of supported metadata content and formats, data encoding, coordinate reference systems, ontologies. At least part of this heterogeneity is justified by the specificity of the community that generates and uses those data. Since the driving benefit of a **data space is to share all the valuable datasets**, data systems cannot be excluded only due to their diversity.

Fairness

- We can expect **high heterogeneity** also in terms of **'species' including big companies**, SMEs, public administrations, research and academic organizations, intergovernmental institutions, citizens. **A data space should be the common ground where collaboration and competition take place** for the benefit of the 'species' but, overall, for the ecosystem to serve data for generating knowledge. Therefore, no privileged access should be granted to anyone at the risk of changing the fairness of the data space.

Autonomy

- We expect that **some data sources** are **already part** of other SoS or ecosystems with their own mandate and governance – e.g., European Research Infrastructures, Copernicus Services, Space Agency ground segments, **Public Administration systems including INSPIRE**. It is necessary to respect such autonomy without imposing, de-iure or de-facto, the exclusive participation in the data space. This is strictly related to the autonomy vs. belonging conflict that will affect any data system. In a Common European Data Space, **belonging should be encouraged through soft means** mostly based on the overall value of the data space.



GDDS DE Soft Infrastructure

A soft infrastructure is invisible, made up of technology neutral agreements and standards, on how to participate in an ecosystem.

The GDDS is characterized by a high level of heterogeneity, with many already existing data sharing initiatives that offer their resources to diverse consumers, which mirrors the current state of (geospatial) data sharing globally.

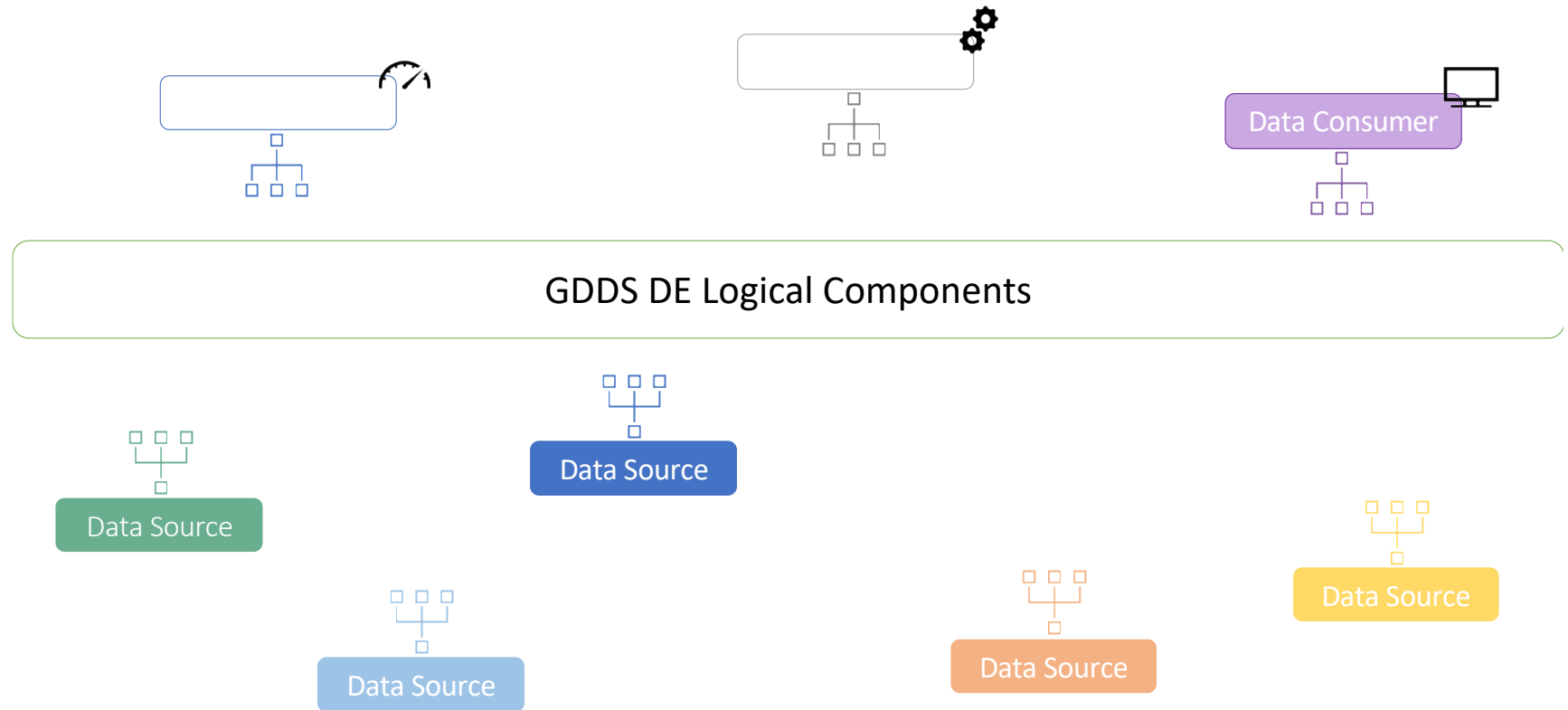
Establishing a single "common format" is not possible in a multidisciplinary context like GDDS.

The challenge is how to transform a collection of disparate systems that use different technical standards into a digital ecosystem. This requires a minimal set of logical components that enable the ecosystem's digital environment.



GDDS DE Soft Infrastructure

GDDS DE Soft Infrastructure

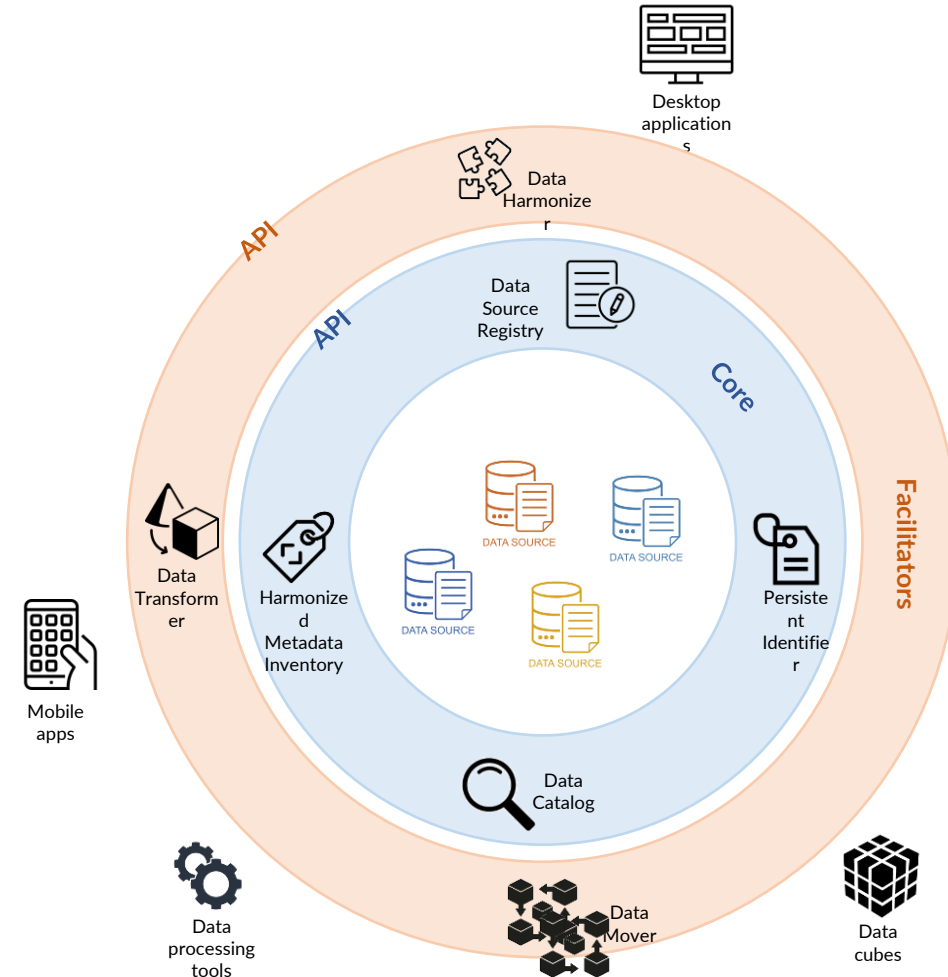




Logical Components

The **Core** components are expected not to evolve at a rapid pace, they constitute the foundation of the GDDS DE and are expected to be relatively stable in terms of basic functionalities.

Facilitators are designed to enable an as seamless as possible use of the GDDS content. These components are expected to evolve (both in number and in functionalities) more rapidly in response to both users' needs and the emergence of new technologies. In fact, the GDDS DE technical blueprint must be able to cope with a rapidly changing technological environment where we expect the emergence of new technologies, enabling now unpredictable scenarios.



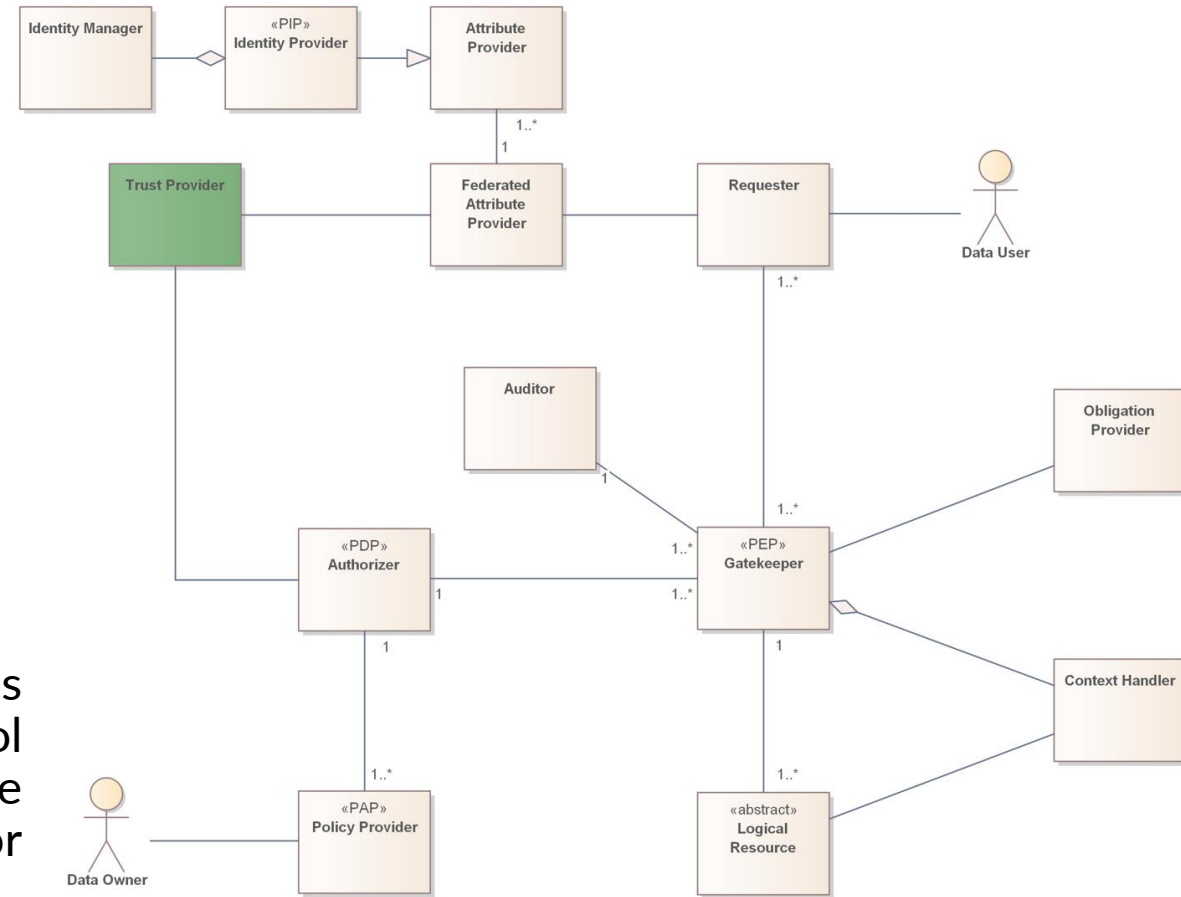


Security

Each provider of the GDDS **must be able to define its own data policies** and these must be supported at the GDDS level. This requires supporting a highly heterogenous set of data policies, resulting in a very complex and difficult to maintain access control framework.

Decoupling of Authentication and Authorization: the business logics for authentication and for authorization are separated. This is a good practice in general, but even more in a distributed system like GDDS.

Authorization Framework: the authorization (i.e., access control) framework is based on the Remote Access Control approach and compliant with XACML framework. This choice is driven by the recognition that such an approach has a minor impact on GDDS DE participants





Main Benefits

Final Users

Mediation/Harmonization functionalities to:

- Facilitate access to data from multiple communities
- Enable data exploitation in new scenarios



Intermediate Users

Flexibility to support changes in technological context



Data Providers

Low entry barrier for existing Data Providers
Support Data Owners' data policies



DATA SOURCE



Final Blueprint of the GDDS Reference Architecture



Grant Agreement N°: 101083927
Topic: DIGITAL-2021-CLOUD-AI-01
Type of action: CSA



GREAT
Green Deal Data Space

Green Deal Data Space Foundation and its
Community of Practice

D3.2: Final Blueprint of the GDDS Reference Architecture



<https://www.greatproject.eu/great-project-resources/public-deliverables/>



GOVERNANCE AND BUSINESS MODELS

MARTA GUTIERREZ, MARK DIETRICH EGI FOUNDATION






Funded by
the European Union



Green Deal Data Space Governance: Challenges



Scale	Citizens  DestinE, Copernicus, GEO, ENVRI, INSPIRE
Scope	Local , Regional , National , EU , Global  Thematic
Business Models	Public Good/ Altruism  Commercial Data Businesses
Objectives	L0-Community, L1-FAIR, L2-Quality, L3-Analytics, L4-Insights, L5-Aggregation, L6-Monitoring, L7-Policy
Sector	Agriculture, Mobility/Transport, Smart Cities, Manufacturing, Tourism, Health, Energy, Finance, Skills
Legislation	National , Horizontal data legislation (DGA, DA, AI Act), Sectorial legislation (CSRD, Climate Lwa), Global treaties
Ethical Cultural remarks	Sharing with no laws, sharing by directive, sharing with rewards, gain/lose competitive advantage, political national interests.

What is a Data Space?

A useful definition from Data Spaces Support Centre (DSSC):

“A distributed system defined by a **governance framework** that enables secure and trustworthy **data transactions** between **participants** while supporting trust and **data sovereignty**. A data space is implemented by one or more **infrastructures** and enables one or more **use cases**.”

Infrastructure:

Digital infrastructures , more than one !

Data transactions:

More than just data transfer, terms and conditions, etc.

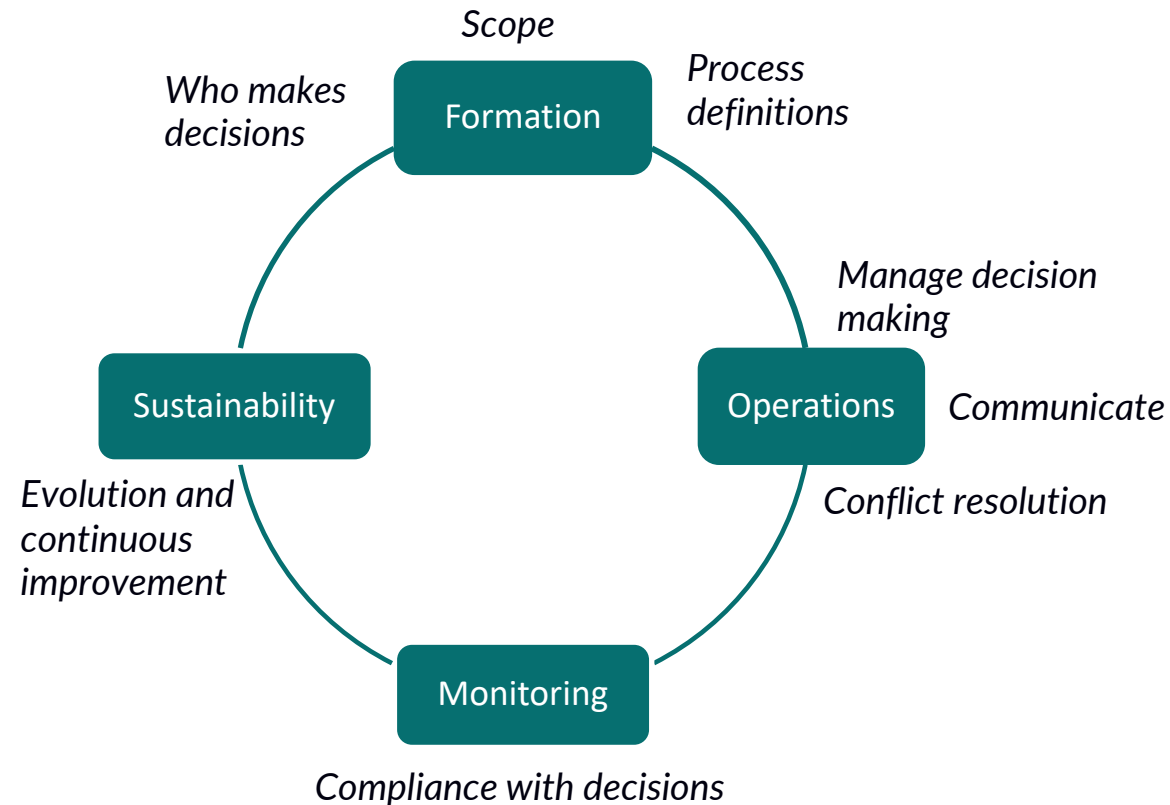
Governance framework:

Key characteristics of the DS, purpose, objectives, rules (e.g. membership), standard Ts & Cs for data transactions



What is governance ?

GOVERNANCE is the process for making decisions about an **entity**
Choosing the questions that must be decided – “Requirements”



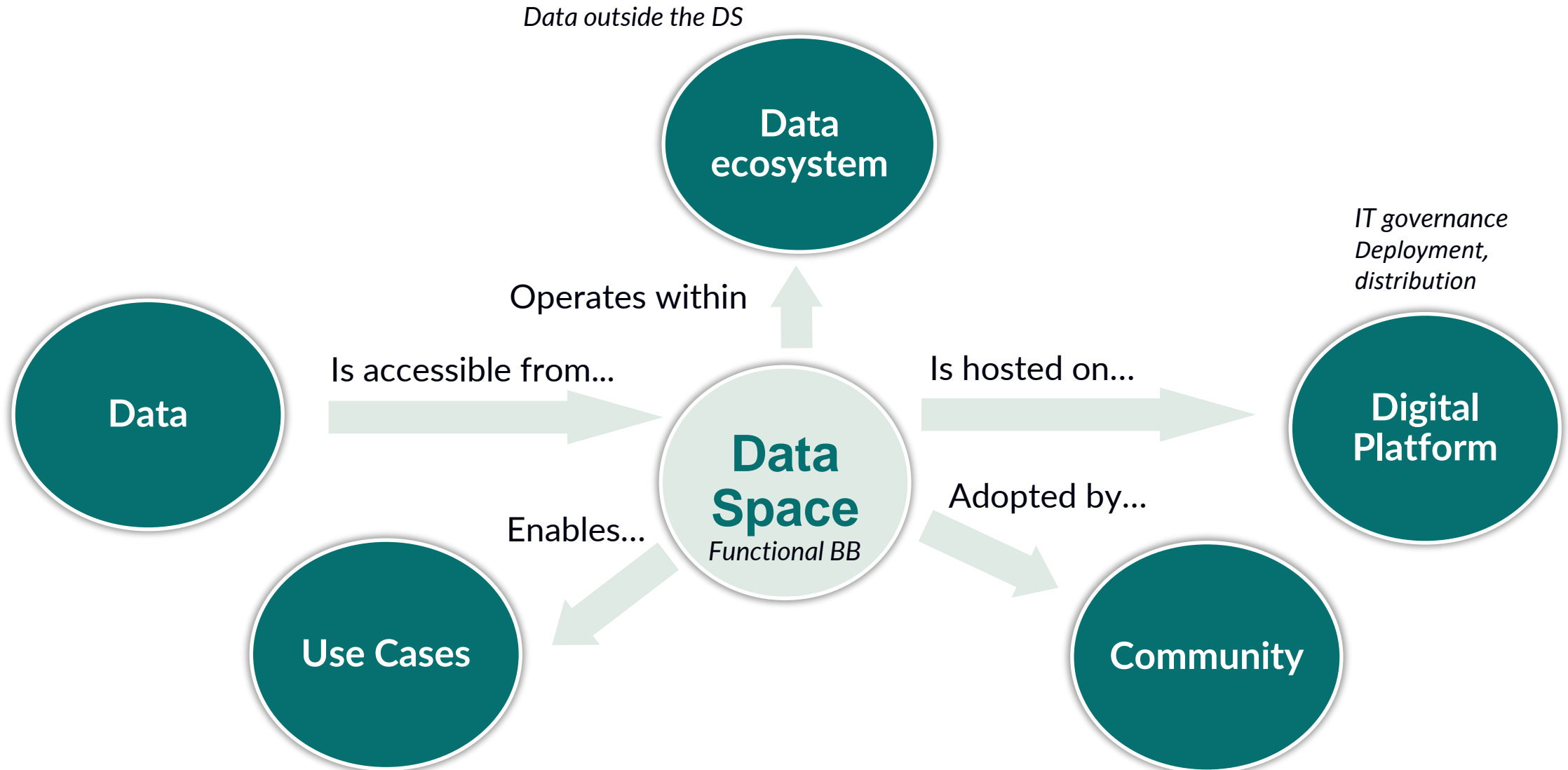


Requirements differ depending on type of data

	Research, Public Data	Sensitive Data	Industry Confidential
Security	?	✓	✓
Known Parties	Anonymous OK	Strong assurance	Strong assurance
Visibility	Open; 1:Many or 1:Any	Sovereignty, GDPR; 1:1 or 1:Few	Sovereignty; 1:1 or 1:Few Data Act → 1:Few or 1:Many
Findability	✓	Five Safes	Sovereignty, tempered by Data Act
Accessibility	✓		
Interoperability	increasing		
(Re)usability	✓		
Quality Fit for Purpose	Peer Review	Ethics Review, GDPR	Opportunistic, tempered by AI Act?
Purpose Objectives	Advancement of Knowledge	MUST be defined up front	Solve my problem, Competitive advantage



Entities that require governance





Business models - value proposition

Value capture for different parties in their different roles:
Data providers, Data Consumers, Data Intermediaries

What is the value of a data space for ?

- **A lawyer:** regulatory enforcement, case laws
- **A policy maker:** Do I have enough indicators for targets?
- **A scientist:** data for research, publications
- **SME/Public administrations:** easy data access for value added services, public services. An opportunity to share data in a cost effective way
- **DS Community:** Consensus that value is good use cases
- **Industry:** increase competitiveness in data economy. I want my data everywhere !
Standardised data license agreements
- **Existing well established data initiatives** (e.g. EMODNet, GEO): Access to cross-domain data. Promotion of their solutions in the wider community. Tech support
- **Big techs:** Access to open data (freemium models)
- **Citizens:** where shall I put my data?



Data Providers/Users Onboarding

SUPPLY



DEMAND

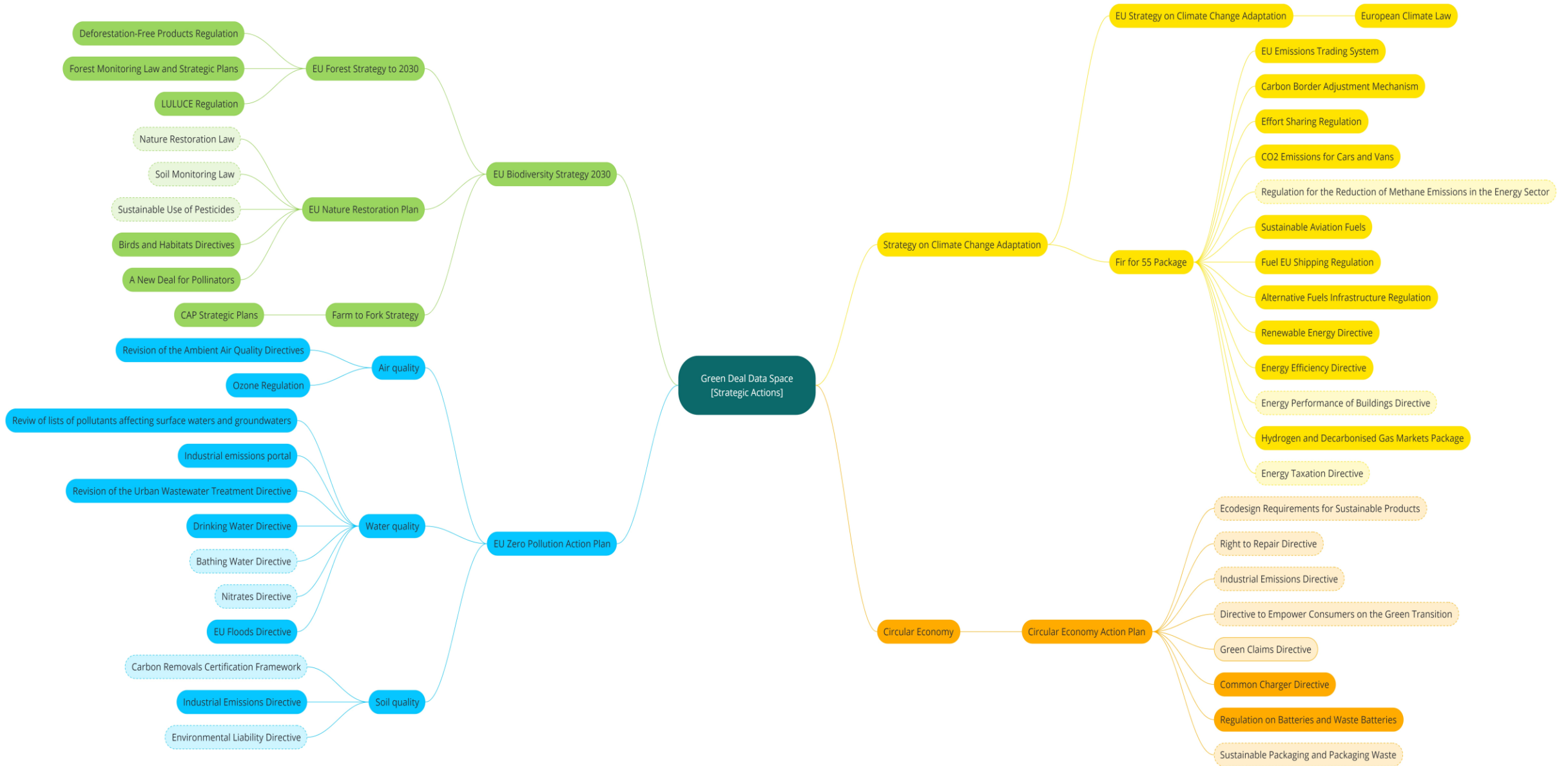
Data Providers	Data Users
Natural persons, Legal Entities, Projects that abide to the governance rules with data holdings relevant to the Green Deal strategic objectives.	Provision of identity with the right level of assurance
Legal right to share the data. Compliance with applicable Acts/Directives according to data holdings.	Acceptance of terms and conditions of data providers
Metadata descriptions, M2M access APIs, documentation, access and usage T&C.	Responsible and ethical data usage
Specification of the quality procedures applied to data.	Provision of the purpose for which the data is being used
Specification of the security measures according to site. e.g. critical infrastructure	Definition of use cases
Specification of the service levels offering (uptimes, load, response times, continuity of data offering)	Reingestion of data outputs in the GDDS
Adherence to the standards/formats agreed by participating members	

Break Data Silos



Do not reinvent the wheel

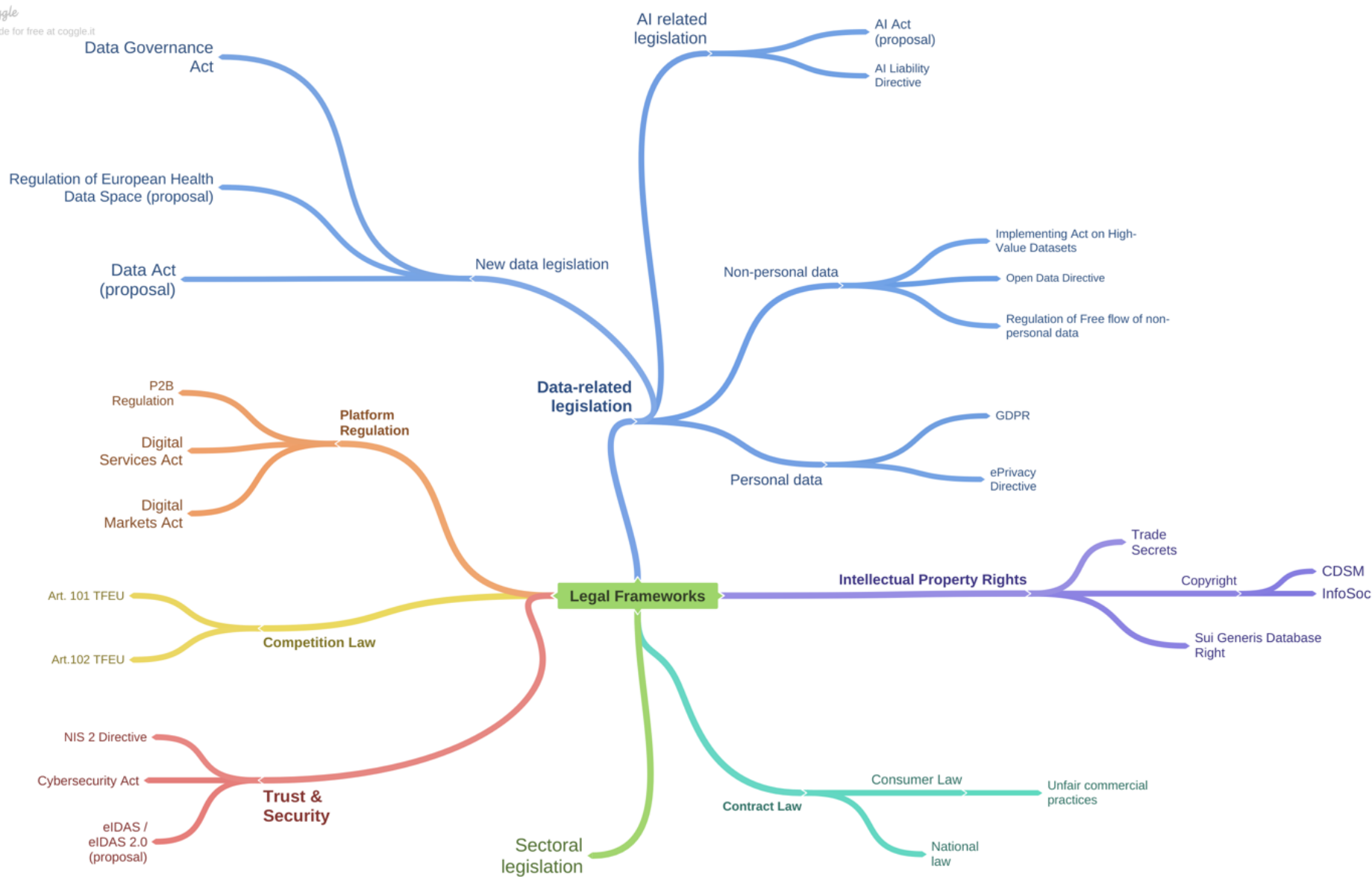
Sectoral Legislation





Horizontal Legislation

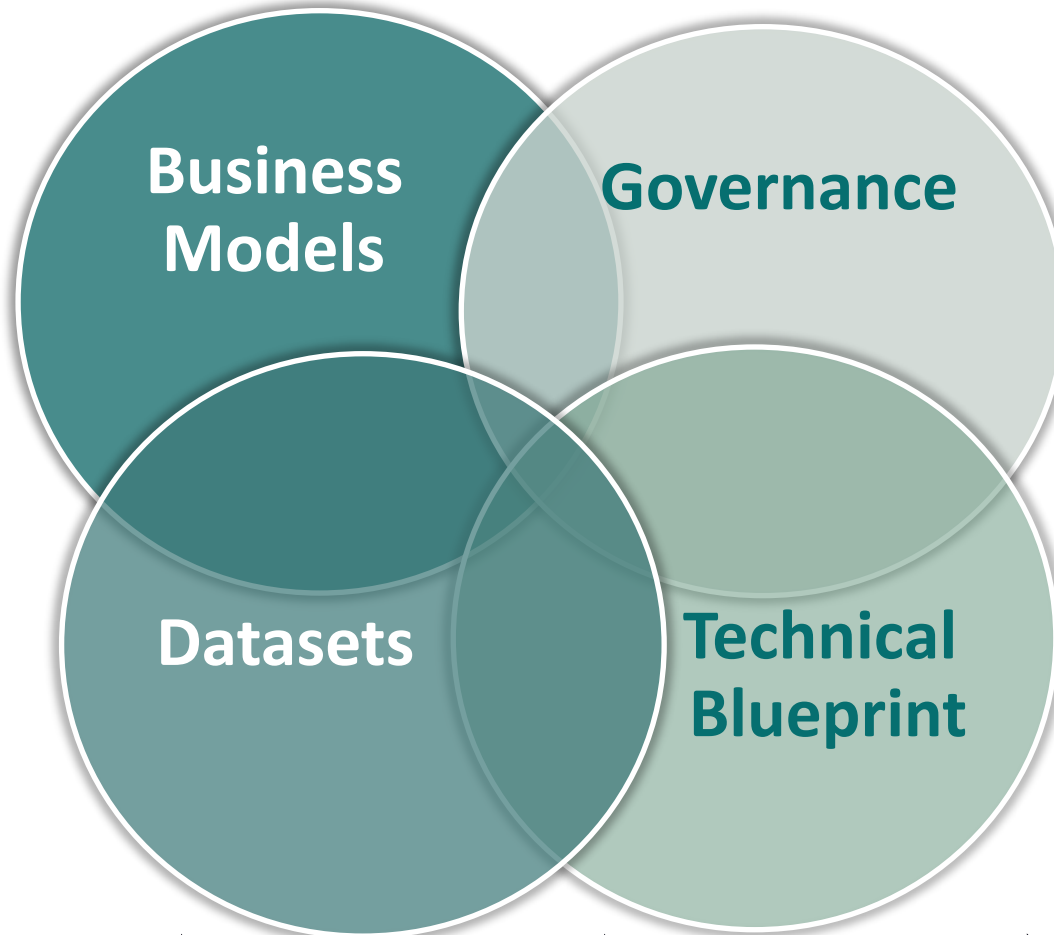
coggle
made for free at coggle.it





Fitting the pieces together

- **For each Data Space entity:**
Supporting BM for Service/Data/infrastructure/platform providers



- **Governance Authorities:**
Legal entities for legal compliance
Contractual Framework(s)

- **GD binding targets**
- **Data economy**
- **Quality/verification**
- **Fit for purpose**

- **Decentralised**
- **Integration of legacy systems**
- **Trusted/secured environments**

ROADMAP



OPERATIONS



Boiling all this down to Governance Requirements

Number of Major Requirements identified

Ensuring Legal Compliance:	17
High-Level Strategic Alignment:	5
Service Architecture:	7
Technical Architecture:	8
Governance Architecture:	2 (some of them are complex!)
Use Cases & Value Creation:	5
Operations & Monitoring:	25 (NB: not really covered by DSSC)



Final Remarks: Considerations to go forwards

- Legal compliance first - > minimum set of requirements -> Open Data Directive, INSPIRE, DGA, DA , AI act, NIS directive
- Lower entry barrier requirements (e.g. integration, adherence to standards) -> Higher costs of GDDS - > revenue models
- All inclusive governance- > stakeholder representation - > Decision making process
- Science based approach - > Thematic governance structure (scientific expertise) – Quality
- Collaboration agreements -> Legal form establishment - > (EDICS, DGA Intermediary, Not For Profits)
- Establishment of trust framework - > trusted participants (providers & consumers), trusted claims (e.g. net zero).



GREAT



GREAT Closing Event- High Priority Data Sets

Charis Chatzikyriakou 

23rd April 2024



Objective



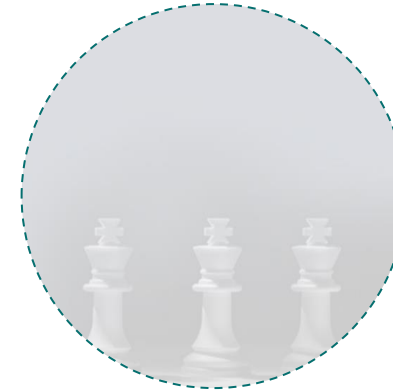
Community of Practice



High Priority Data Sets



Blueprint



Governance & Business Models



Roadmap



Establish a minimum viable data space for the EGD identifying an **expandable set of data sets** required to **support key use cases** required to enable achievement of EGD objectives.





Approach



Information collection from:

- ❑ 16 GREAT Reference Use Cases and Initiatives (RUCIs)
 - Questionnaires and interviews with experts from various GD domains – data users and/or providers
 - Collection of data requirements, products and gaps
 - **Data Sets Inventory:** list of specific data sets required by the RUCIs

- ❑ GREAT Community of Practice
 - Engagement with different types of stakeholders from domains related to the EGD
 - **Data Services inventory:** list of data services/portals/catalogues



Data Sets Inventory - Reference Use Cases and Initiatives

Phase 1

Phase 2 Biodiversity



Water Task Force



Global hydrology modeling

Seasonal forecasting of water resources



Marine Task Force



European Marine Observation and Data Network (EMODNET)



Global Observation System for Mercury (GOS4M)



European Plate Observing System European Research Infrastructure Consortium (EPOS ERIC)



BioGIS 360 - Biodiversity Monitoring Tool



AI4TREES: AI for Climate Sensitive Tree Growth Modelling and Maximum Carbon Segregation (AI4TREES)



Biodiversity in Wadden Sea



Natural Capital Modelling



Climate Change Adaptation



Shared Public Administration For Climate Change At Thessaloniki Metropolitan Area



HARMONIA: Development of Support System for Improved Resilience and Sustainable Urban areas



Urban Data Space for Greener Deal (USAGE)



Zero Pollution



UNLOCK: Open infrastructure for exploring new horizons for research on microbial communities



SDGs-EYES: Global emission from forest fires



Circular Economy



Starling: Deforestation monitoring and supply chain mapping



Deforestation & wildlife



Forestry Data Space



Destination Earth

- [Sustainable Forest Management](#) (ECMWF)
- [CITYNEXUS: A novel urban DESP application](#) (ESA)
- [Pakistan Flood 2022](#) (EUMETSAT)



Data Sets Inventory - Reference Use Cases and Initiatives

Phase 1

Water Task Force

Global hydrology modelling
Seasonal forecasting of water resources

Marine Task Force

European Marine Observation and Data Network (EMODNET)

Global Observation System for Mercury (GOS4M)

European Plate Observing System European Research Infrastructure Consortium (EPOS ERIC)

BioGIS 360 - Biodiversity Monitoring Tool

RUCI name	Biodiversity	Climate Change Adaptation	Zero Pollution	Circular Economy
Global hydrology modelling & Seasonal forecasting of water resources		×	×	
EMODnet	×	×	×	
GOS4M			×	
EPOS EPIC		×	×	
BioGIS 360	×	×		
AI4TREES	×	×		
Biodiversity in Wadden Sea	×	×	×	
Natural Capital Modelling	×	×		
Shared Public Administration For Climate Change At Thessaloniki Metropolitan Area		×	×	
HARMONIA		×		
USAGE		×		
UNLOCK	×	×	×	
SDGs-EYES			×	
Starling	×	×		×
Deforestation & wildlife	×	×		×
Forestry Data Space	×			×

UNLOCK
UNLOCK: Open infrastructure for exploring new horizons for research on microbial communities

SDGs EYES
SDGs-EYES: GHG emission from forest fires

AIRBUS
Starling: Deforestation monitoring and supply chain mapping

planet.
Deforestation & wildlife

we transform
Forestry Data Space

Continuation Earth
[Simple Forest Management](#) (ECMWF)
[\(US: A novel urban DESP application\)](#) (ESA)
[Flood 2022](#) (EUMETSAT)



Data Sets Inventory

94 specific data sets: RUCI's data requirements and products, described by mandatory or optional tags.

Thematic categories	Climate, meteorology, biodiversity, hydrology, agriculture, aerosols and other.
Data providers	Local, European and global programmes and initiatives, national and international organisations, universities, private data providers and the public sector
Data types	Gridded data, native sensor data, model outputs, maps in vector format, point cloud data and imagery and other
Data formats	netCDF and GeoTIFF (raster data), GeoJSON, GML and Shapefile (vector data), CSV, PNG, and point cloud formats (.las and .laz)
Metadata standards	INSPIRE, ISO 19115, OGC GeoTIFF standard, ESRI Shapefile standard and other
Licences	Creative Commons (e.g., CC BY, CC BY-NC), GNU General Public License (GPL), and the Open Database License (ODbL) and specific licenses like the Copernicus, the HydroSHEDS and CCI licences.
Various spatial and temporal resolutions and extends	From local and national to European and global datasets

Tags	Mandatory/optional
Dataset/service name	Always mandatory
Data owner	Always mandatory
Provider Name	Always mandatory
data format	Always mandatory
Free of charge	Always mandatory
Data source/generation type	Optional
Spatial Resolution x,y,z	Conditionally mandatory
Number of dimensions	Conditionally mandatory
Spatial Extent	Conditionally mandatory
Temporal Extent	Conditionally mandatory
HVD Category	Optional
Essential Variable category	Optional
Essential Variables	Optional
License	Optional
Machine-readability	Optional
Availability (API, on-request)	Optional
Metadata Standard	Optional
Data linking Documentation	Conditionally mandatory
Timeliness / Frequency of acquisition	Optional
Country of origin/storage	Optional
DOI/Resource URL	Conditionally mandatory
FAIRness assessment (Using F-UJI)	Optional

- FAIRness assessment using [F-UJI](#), developed by [FAIRsFAIR](#).



Access the full High Priority Data Sets inventory here: [Datasets & Data Services Inventory](#)



Data Services Inventory



406 Green Deal related data services:

- From various data providers and intermediaries
 - European (and beyond) agencies, programmes and initiatives
 - Inter-/governmental agencies and organisations
 - Private data providers – from global scale to local SMEs
 - Public sector - regional, national and local geoportals, national meteorological and statistical agencies
 - European RIs, research institutes and universities
 - Citizen science initiatives and other
- With different access mechanisms
 - HTTP, FTP, and APIs
 - [OGC standards \(WMS, WFS\)](#)
 - [STAC](#)
- Collected information:

Data service Information

- Service name (and service owner)
- URL to the API of the service

Access information

- Type of endpoint/access technology

High Value Data set categories that it belongs to

Prioritisation information





Prioritisation

 Identification of data sets/services with the highest priority for the future implementation of the GDDS.

- **All collected data sets are considered of high priority** as they are required by the GREAT RUCIs to achieve their objectives.
- **The data services were prioritised** by 4 GREAT project members according to the following criteria:

Relevance to the Reference Use Cases and Initiatives (30%)

How many RUCIs use this data set/service?

Relevance to the strategic actions that GREAT focuses on and their objectives (25%)

- 2030 Biodiversity Strategy
- Zero Pollution Action Plan
- Climate Change Adaptation Strategy

Service Sustainability (20%)

Sustainability of the data service and whether someone can rely on the provisions of a given data service in the future

Relevance to EGD initiatives and programmes (15%)

- Copernicus services
- CDSE
- WekEO
- JRC Catalogue
- EEA Datahub
- Destination Earth
- GEOSS
- INSPIRE
- EMODNET
- Eurostat

Data offering completeness (10%)

- What is the spatial coverage of this data set/service?
- What is the temporal coverage of this data set/service?





30 Top Priority GD Data Services

Copernicus Open Access Hub  

Copernicus Global Land Service  

EEA Data Hub 

INSPIRE  

EEA Indicators 

ECMWF forecasts 

EIONET Central Data Repository  

USGS Earth Explorer 

Urban Atlas   

Data Catalogue Destination Earth  
 Funded by the European Union
 Implemented by   

EMODNET  

GWIS Statistics Portal    

Copernicus Reference Data Access (CORDA)   

Sentinel Hub EO Browser 

GWIS Situation viewer    

Joint Research Centre Data Catalogue 


European Data Portal  

ISRIC - World Soil Information 




Eurostat  

ESA CCI Data portal 


Copernicus Data Space Ecosystem   

NOAA National Centre for Environmental Information - Paleoclimatology Data 

Copernicus Marine Service   

Water Information System for Europe   

EEA Analysis and Data 

Publieke Dienstverlening Op de Kaart (PDOK)  

European Forest Fire Information system   

Copernicus Atmosphere Monitoring Service   

EPOS - European Plate Observing System 

Ramsar Sites Information Service 





Data gaps

The interactions with the GREAT Community of Practice revealed **lack** of:

Data harmonisation

- Cross-border data harmonisation
- Geospatial data are in different data formats, resolutions and from different sources
- INSPIRE datasets are in native languages

In situ data

- Hydrology: In situ data from water reservoirs
- Marine: high-res in situ data in coastal areas and high-res bathymetric data
- Forestry: frequently updated Terrestrial Laser Scanning and dendrometer data
- In situ data in the Global South

Real-time data

- Real-time in-situ meteorological and hydrological observations in a unified cross-border specification
- Real-time electric energy consumption of regions and its live CO₂ footprint
- IoT and citizen science data

Biodiversity data

- Data on vegetation, trees, hedges etc. in NL
- Data on benthic habitats
- Data on illegal activities (logging, waste dumping, illegal fishing, use of pesticides)
- Plans, permits and programmes to protect specific areas
- Biomass data in sufficient temporal res. (...)

Health data

The quantitative effect of:

- particulate matter and its removal from the air on human health
- mercury and its removal from the environment on human health

Socio-economic data

- National socio-economic data are rarely updated, often have coarse spatial resolution and come with stringent usage restrictions
- Economic data, e.g. energy performance certificates are not consistently publicly available.

Business value data

- Time series of the morphology in Wadden Sea provided under specific contracts and cannot be publicly available

Translating data into actionable insights

Dataset quality level and control



Final remarks

- ❑ Implementation of GDDS: in an iterative manner with **stepwise defined KPIs** that are driven by **technical implementations** and the experience gained by the in parallel deployment of **key use cases**.
- ❑ The initial selection of datasets shall be guided by the **identified list of priority datasets and data providers** and should then be **extended** according to the needs of the identified initial **use cases** being in the centre of the development.
- ❑ The **identified gaps** need to be addressed from the very beginning with a prioritisation driven by the use cases and the general defined KPIs.
- ❑ Existing datasets might need to be **transformed “on the fly”** to other formats or data structures to support the different analysis needs (spatial vs. temporal analysis, parallelisation, etc.).
- ❑ Next to the offerings of public organisations, the GDDS needs to attract the **commercial sector** to (1) consume the GDDS service and (2) to extend the GDDS service offering by additional commercial data presented to the users via the GDDS in a FAIR way.
- ❑ Close link to the activities of **Copernicus, Destination Earth** as well as **regional, national, and local geodata holders** needed.



Final Prioritised Data Sets & Gaps





GREAT

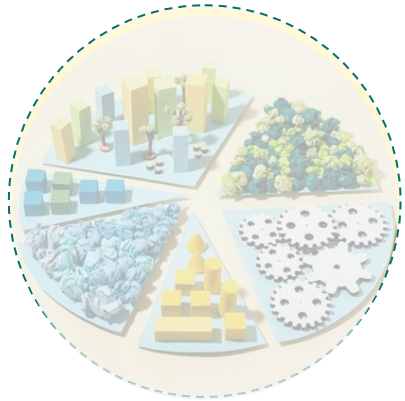


IMPLEMENTATION ROADMAP

Mark Dietrich, EGI (on behalf of Sebastien Denvil, ECMWF)



Objective



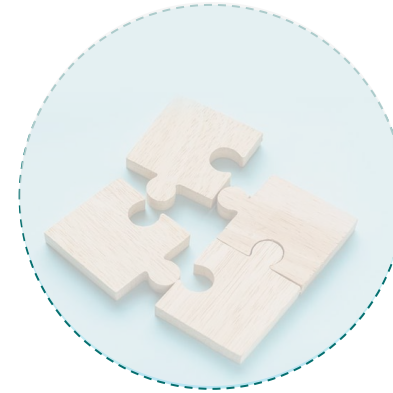
Community of Practice



Technical Blueprint



Governance & Business Models



High Priority Data Sets



Roadmap



Establish a minimum viable data space for the EGD identifying an **expandable set of data sets** required to **support key use cases** required to enable achievement of EGD objectives.





Mission

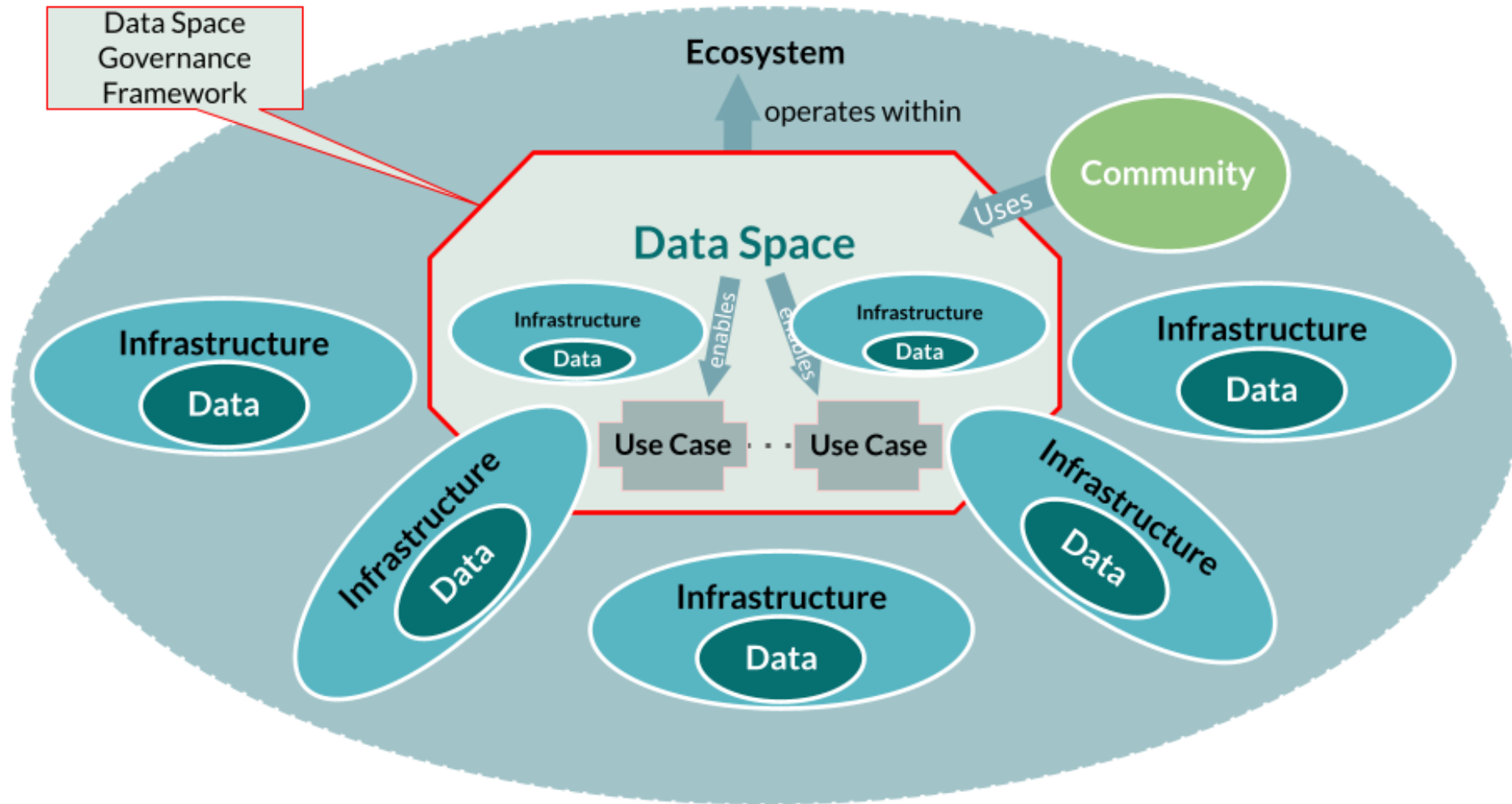
GDDS Target: achievement of EGD priority actions, growth of the circular economy

- Make data more accessible and exploitable
- Seamlessly connect existing digital infrastructures
- Include growing amounts of data from digital twins like Destination Earth, other data sources
- Secure environment that holders of sensitive data can rely upon for sharing and exchanging data
- Enable/facilitate implementation of current and new legislation and regulations
- Help enhance provided data to be FAIR, with clear indications of quality and fitness for use
- Enable data-driven value creation within use cases, through the data economy, by downstream data-driven businesses
- Fill data gaps, especially data required by data-driven businesses

Support and monitor the fair transition towards climate neutrality, including ensuring a fair and effective green and digital transition that leaves no one behind.



The GDDS Landscape





GDDS Objectives – MVP (2025) is Level 2



Objective Level	Description
Level 0: Presence of Many Parties, Relevant Parties	A well identified Community of Practice with Participants that have a good understanding of their role and commitment towards the data space is in place.
Level 1: Level 0 + Broad Sovereign Information Resource	Relevant data and services from possibly diverse sources are available with easy search, browse, access, use, consistent metadata and interoperable with each other. Data sovereignty including access and usage conditions is respected throughout the data space. Data is packaged as “data products” to support these objectives.
Level 2: Level 1 + Quality	Data is labelled to specify the quality processes it has been subject to, which may include indicators such as accuracy, precision, defined collection procedures, mechanisms for review and quality control, errata and retraction, fitness for different purposes, spatio-temporal consistency and sustainability or reliability of the data in the future and accessibility over time. Separately data can be verified by trusted parties, following documented procedures and protocols, with different levels of assurance.
Level 3: Level 2 + Analysis	Various analytical tools are available, not just to transform grids, subset or visualise on individual datasets, but to bring different data across domains together to allow insights, enabling data integration and data fusion capabilities. Quality information is incorporated into the resulting product(s) so that analytical results have their own quality indicators.
Level 4: Level 3 + Actionable Insights	Analysis , or even data without analysis, can be targeted to a user’s needs (e.g., “give me data as well as forecasts and risk assessment about my farm, about all my corporate locations, about my house”). This can include alerts if the situation changes, or new data shows a new trend.
Level 5: Level 4 + Aggregation/ Analysis of impact	Data can be aggregated across sectors, jurisdictions, etc.; impact of actions taken in the past can be analysed, impact of current actions can be modelled. Overall assessments are updated as new data arrives.
Level 6: Level 5 + Performance Monitoring	Forecast impacts of various actions can be developed, and then new observations can be compared against the forecast.
Level 7: Level 6 + Target Setting	To support some use cases, particularly policy development use cases, different scenarios need to be modelled, forecasts produced, and then performance assessed against targets. As new data arrives, forecasts are updated, target status is updated and alerted



GDDS Objectives

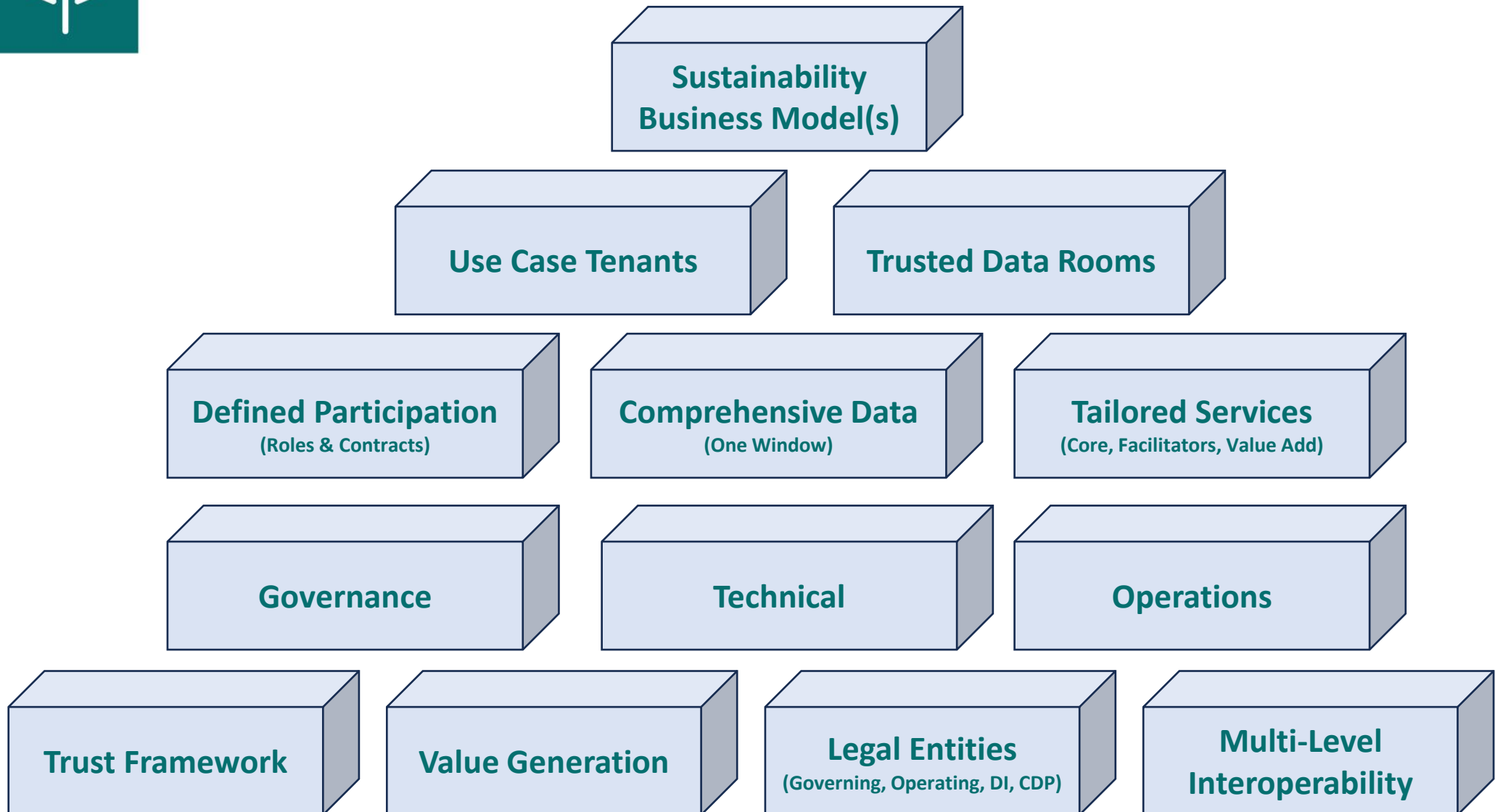
Objective Level	Description
Level 0: Presence of Many Parties, Relevant Parties	A well identified Community of Practice with Participants that have a good understanding of their role and commitment towards the data space is in place.
Level 1: Level 0 + Broad Sovereign Information Resource	Relevant data and services from possibly diverse sources are available with easy search, browse, access, use, consistent metadata and interoperable with each other. Data sovereignty including access and usage conditions is respected throughout the data space. Data is packaged as “data products” to support these objectives.
Level 2: Level 1 + Quality	Data is labelled to specify the quality processes it has been subject to, which may include indicators such as accuracy, precision, defined collection procedures, mechanisms for review and quality assurance, fitness for different purposes, spatio-temporal consistency and sustainability or reliability . Separately data can be verified by trusted parties, following documented procedures with different levels of assurance.
Level 3: Level 2 + Analysis	Various analytical tools are available, not just to transform grids, subset or visualise on individual datasets, but to bring different data across domains together to allow insights, enabling data integration and data fusion capabilities. Quality information is incorporated into the resulting product(s) so that analytical results have their own quality indicators.
Level 4: Level 3 + Actionable Insights	Analysis , or even data without analysis, can be targeted to a user’s needs (e.g., “give me data as well as forecasts and risk assessment about my farm, about all my corporate locations, about my house”). This can include alerts if the situation changes, or new data shows a new trend.
Level 5: Level 4 + Aggregation/ Analysis of impact	Data can be aggregated across sectors, jurisdictions, etc.; impact of actions taken in the past can be analysed, impact of current actions can be modelled. Overall assessments are updated as new data arrives.
Level 6: Level 5 + Performance Monitoring	Forecast impacts of various actions can be developed, and then new data is compared against the forecast.
Level 7: Level 6 + Target Setting	To support some use cases, particularly policy development use cases, different scenarios need to be modelled, forecasts produced, and then performance assessed against targets. As new data arrives, forecasts are updated, target status is updated and alerted

Essential Variables

Binding Targets

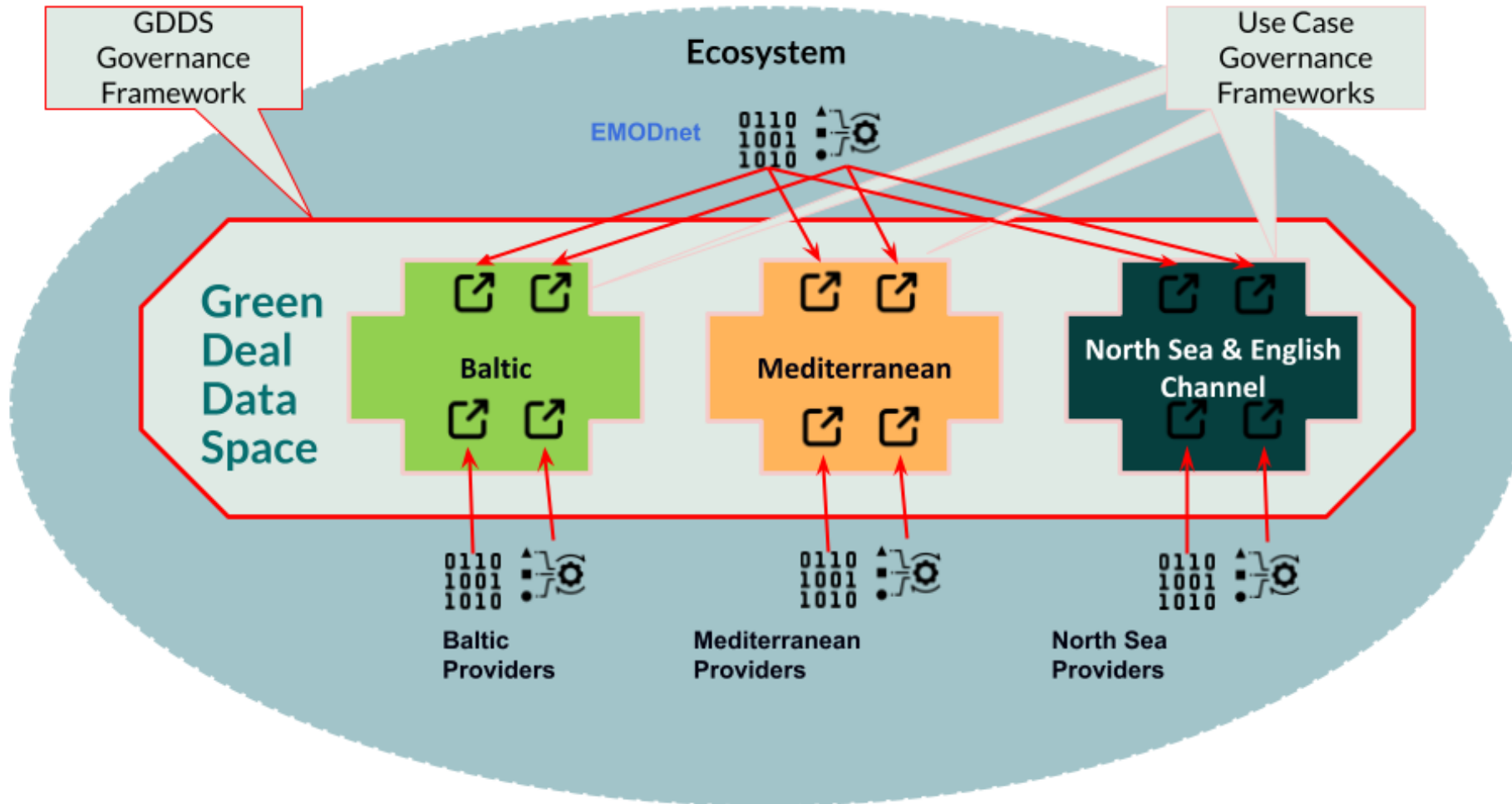


Business Concept – Key Components



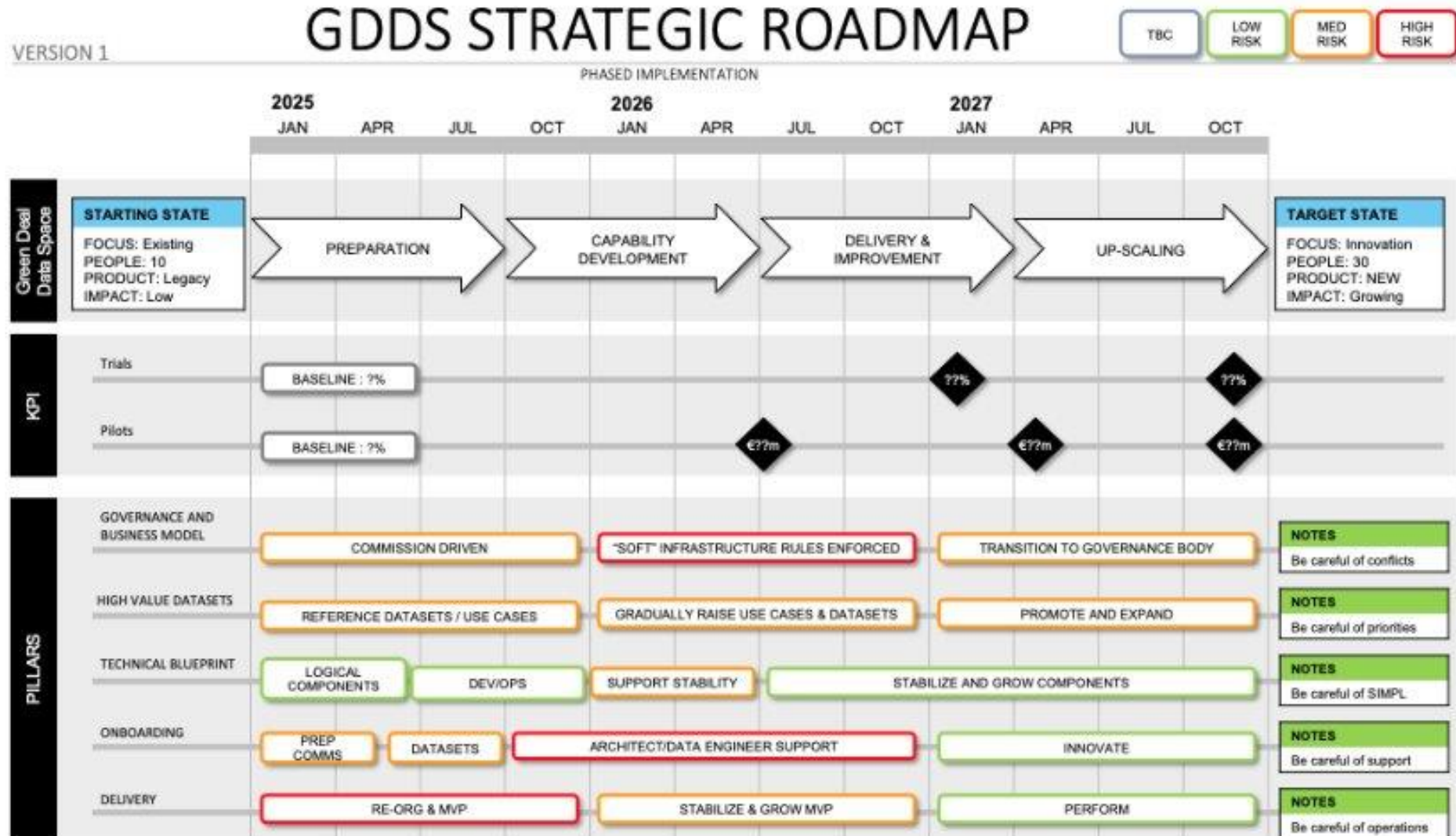


Separate Use Case “Tenants” of GDDS





Overview of Strategic Roadmap + Timeline





Thank you!

info@greatproject.eu

GREAT Final Event

23 April 2024 - Press Club, Brussels

Key Results & Outcomes



Francesca Piatto
EARSC



Mattia Santoro
CNR



Marta Gutierrez
EGI Foundation



Charis Chatzikyriakou
EODC



Mark Dietrich
Moderator



LUNCH BREAK



GREAT Final Event

23 April 2024 - Press Club, Brussels

The Practitioners' Perspective - "Why We Need Data Spaces"



Julie Hollis

Secretary General
EuroGeoSurveys



Panos Ilias

Senior Engineer
ILVO



Sophie Meszaros

Project Coordinator
Open & Agile Smart Cities
(OASC)



Stefano Nativi

Permanent Representation
of Italy to the European
Union and CNR



Christian Briese

EODC
Moderator

GREAT Final Event

23 April 2024 - Press Club, Brussels

The Implementers' Perspective - "How Are We Going to Make Them"



Tiziana Ferrari
Director
EGI Foundation



Leona King
Legal Researcher
KU Leuven



Thorsten Reitz
Founder/CEO
Wetransform



Louisa Barker
Senior Research Manager
IDC



Marta Gutierrez
EGI Foundation
Moderator

Thank you!

