



Openness and environmental data sharing: a JRC perspective

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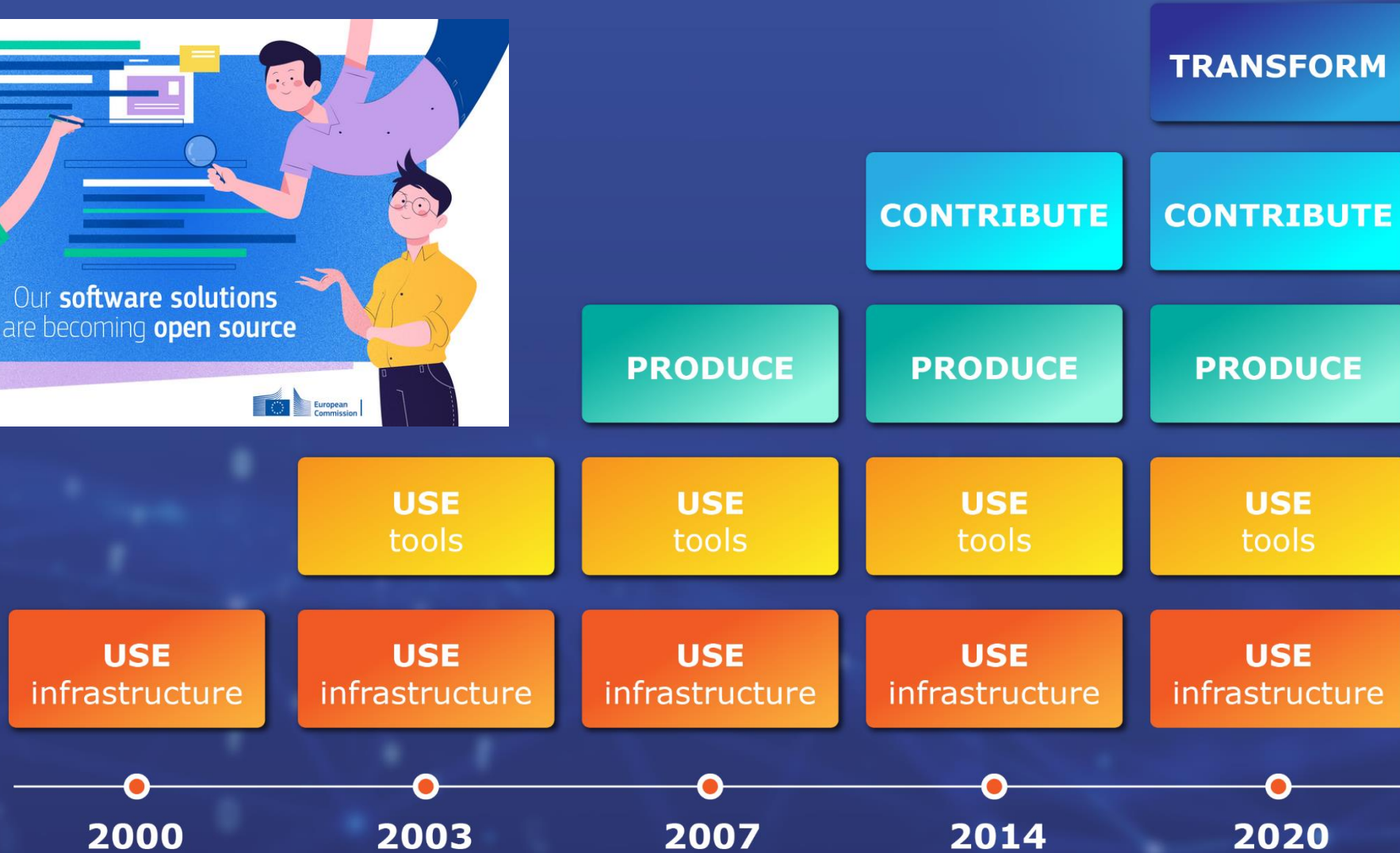
2022 Open Innovation for EO Programmes Workshop – November 2-4, 2022

Outline

- Open source at the European Commission
 - strategy & policy
 - tools & actions
- Experiences at JRC – Openness in data sharing
 - INSPIRE
 - JRC contribution to GEO and EuroGEO
- Final recommendations

Open source at the European Commission

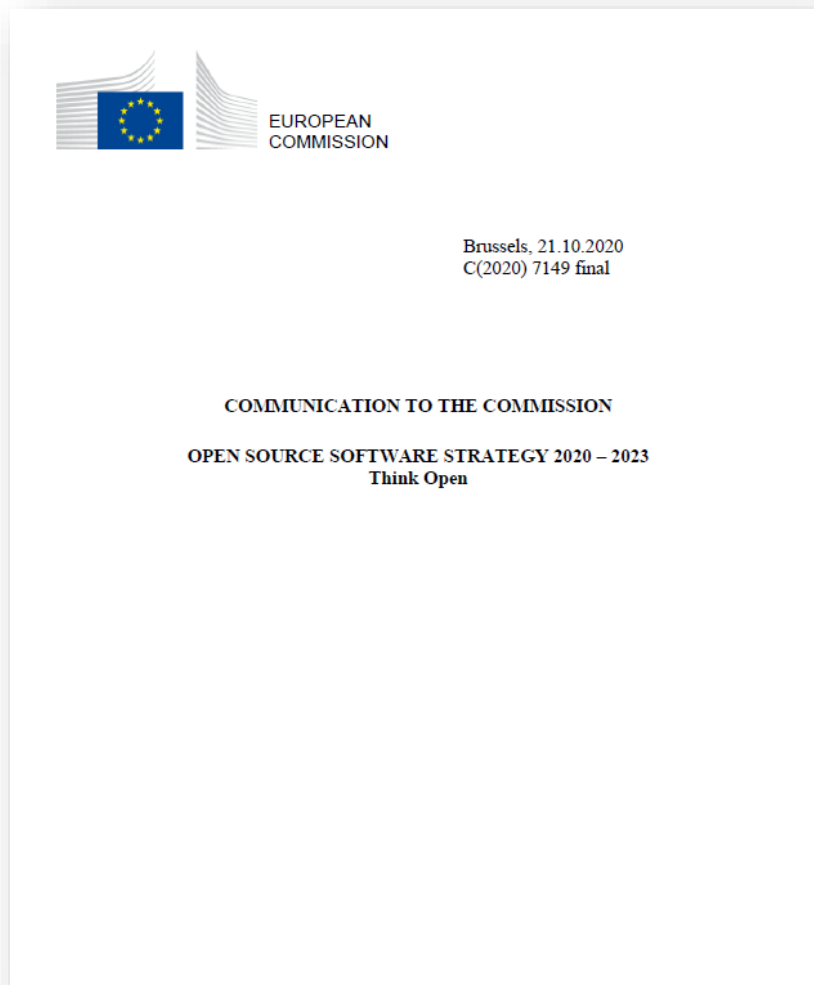
Open source at the European Commission



code.europa.eu



European Commission's open source policy



- Open Source Software Strategy 2020-2023 – October 2020

- impacts the entire organisation
- links EC policy goals to open source
- 6 governing principles



think open



transform



share



contribute

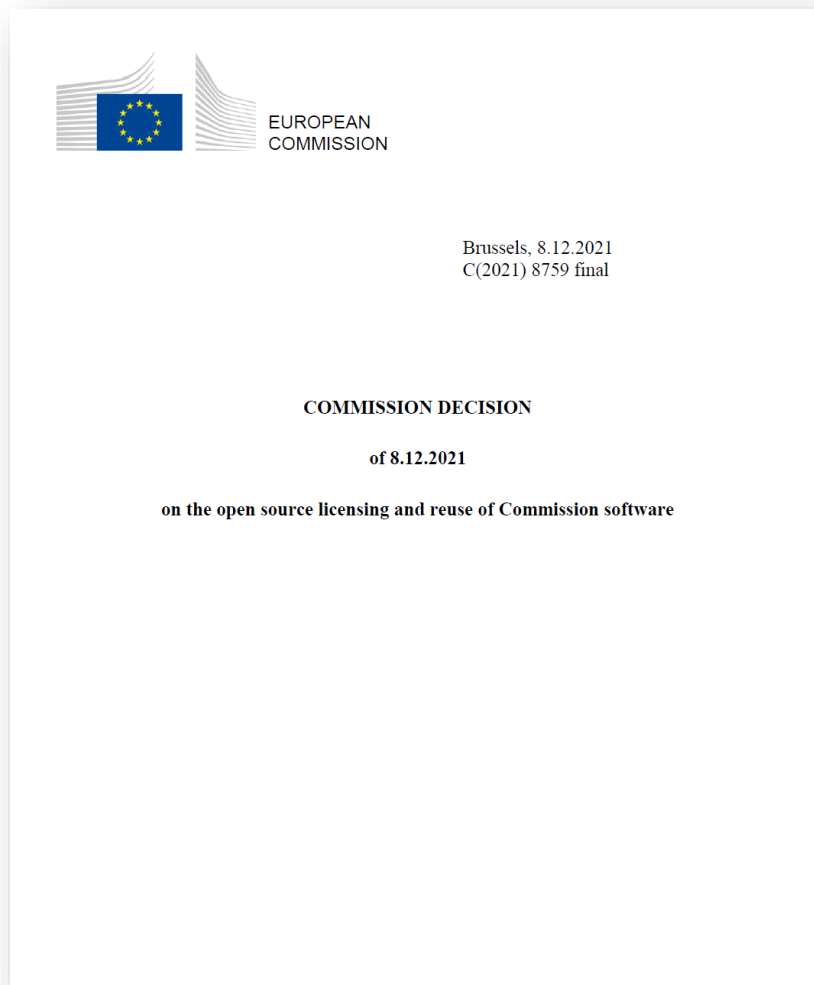


secure



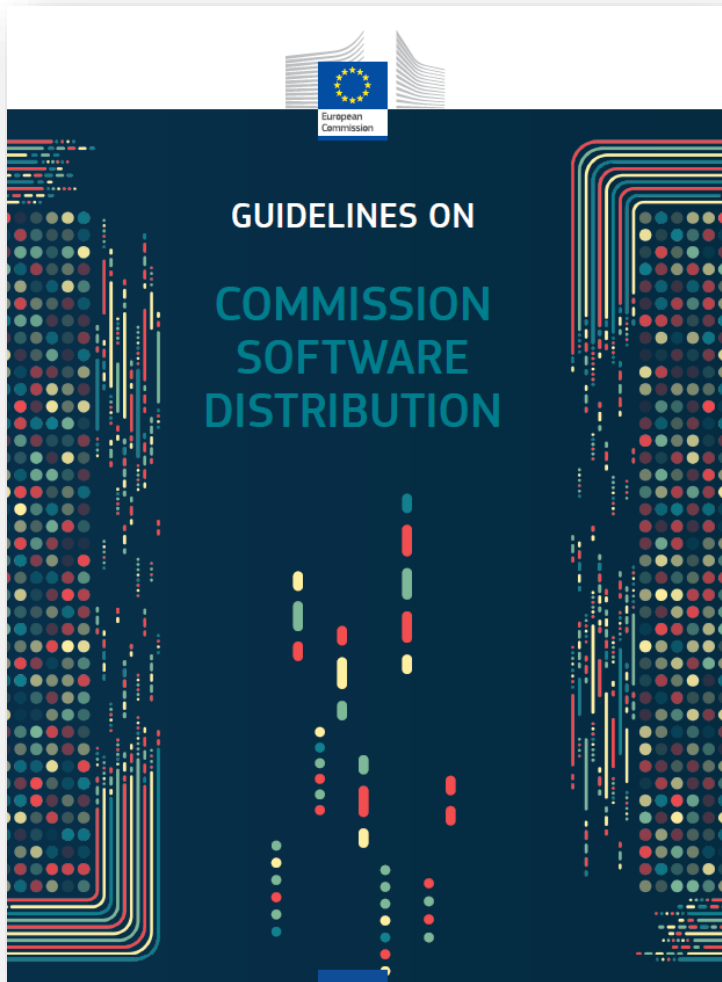
stay in control

European Commission's open source policy



- Commission Decision on the open source licensing and reuse of Commission software – December 2021
 - simplifies publication of software as open source
 - default license: **EUPL**
 - alternative open source licenses can be used
 - requires a **repository** as a single point of access to Commission software
 - allows Commission services to **contribute** to open source projects
 - including **transfer of the ownership of IP rights** on the contributed code

European Commission's open source policy



- Guidelines on Commission software distribution – October 2022
 - internal guidelines for open source distribution
 - software identification
 - IP clearance
 - vulnerability assessment

European Union Public License



- Designed by the European Commission to be fully compliant with EU law
 - open source, approved by the OSI, [copyleft](#)
 - latest version v.1.2 (2017) available in 23 EU languages
- Highly [compatible license](#)
 - GPL v.2 & v.3, LGPL v.2.1 & v.3, AGPL v.3, CeCILL v.2.0, v.2.1, OSL v.2.1 & v.3.0, EPL v.1.0, MPL v.2

 **EUPL-1.2** European Union Public Licence, Version 1.2 or later (EUPL)

Can	Use/reproduce, Distribute, Modify/merge, Sublicense, Commercial use, Use patents, Place warranty
Must	Incl. Copyright, Royalty free, State changes, Disclose source, Copyleft/Share a., SaaS/network, Include licence
Cannot	Hold liable, Use trademark
Compatible	GPL, Other copyleft, Linking freedom, Multilingual, For data, For software
Law	EU/MS law, Licensor's law, Venue fixed
Support	Strong Community, Governments/EU, OSI approved, FSF Free/Libre

Licence comment:

Official Licence of the European Union (EC Decision, part of European law). The licence is **interoperable** (no restrictions on linking in order to facilitate the integration of multiple components), **reciprocal** (third parties distributing improvements or derivatives must publish and provide back the modified source code) and **compatible**: no global relicensing permitted, but the source code could be reused in other projects under GPL/AGPL, EPL, LGPL, MPL, OSL, CeCILL, LiLiQ. EUPL covers SaaS / network distribution. EUPL covers "the Work" (software and ancillary data). Original in 23 EU languages. Replaces EUPL-1.1 for works "Licensed under the EUPL" without specifying licence version, or adding "or later". Applicable law and court: licensor seat in EU (or specific additional agreement), otherwise Belgium. Support from the [Joinup.eu](#) community. Free legal support provided.

<https://joinup.ec.europa.eu/collection/eupl/eupl-text-eupl-12>

https://joinup.ec.europa.eu/sites/default/files/custom-page/attachment/eupl_v1.2_en.pdf

Open source repository

Code development platform for open source projects from the European Union institutions

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- Branches
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README.md 3.09 KiB

Open in Web IDE

Welcome to code.europa.eu



This is the code development platform for open source projects shared by the institutions of the European Union. More precise, it is the code development platform for open source software projects for which European Union institutions, bodies, offices and agencies hold the intellectual property rights.

Code.europa.eu was created following Commission Decision of 8 December 2021 on the open source licensing and reuse of Commission software 2021/C 495 I/01, which you can read [here](#). It is one of the outcomes of the Commission Open Source Software Strategy C (2020) 7149 final. You can find the strategy and more information about open source at the Commission [here](#).

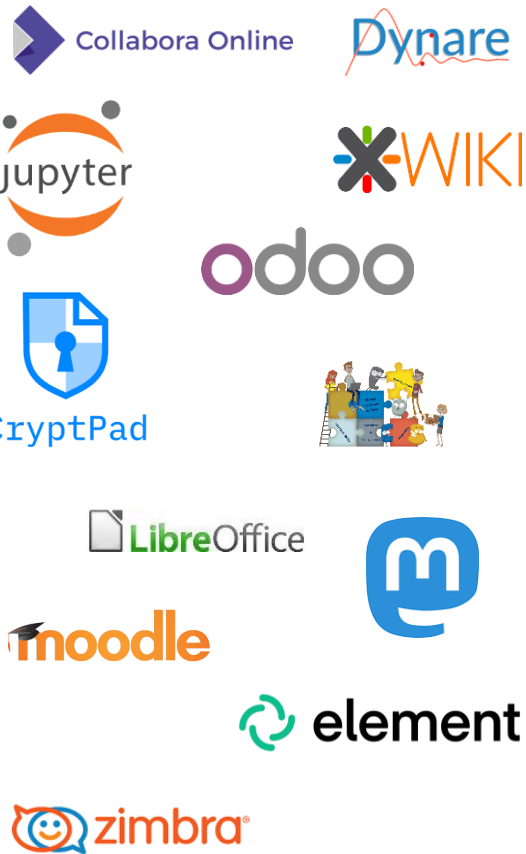
Public access

Start exploring projects [here](#). All of these projects are open to all visitors. Software developers who wish to interact and collaborate with the development teams of the projects: please, get in touch with these projects, this will help with your registration on the platform.

Project creation

Outreach to communities

Bug Bounties



Hackathons



Outreach to communities

Bug Bounties

Collabora Online Dynare

jupyter X-WIKI

odoo

CryptPad

LibreOffice

moodle

element

zimbra

Hackathons

Nextcloud

jitsi

X-ROAD

moodle

Sustainable Smart Cities

OSS4SDG
Open Source Software for Sustainable Development Goals

UNITED NATIONS OFFICE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

European Commission

OpenStreetMap

<https://ideas.unite.un.org/sdg11/Page/Overview>

Experiences at the JRC – Openness in data sharing

INSPIRE

DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 March 2007

establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

- Directive from 2007 establishing a European **Spatial Data Infrastructure** for environment policies
 - 7k+ data providers from Member States public sector
 - currently about 90k datasets shared
- JRC is the Technical Coordinator
 - operation, maintenance & evolution of the infrastructure
 - technological and organisational focus

<https://inspire.ec.europa.eu>

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



INSPIRE open principles – Software

- INSPIRE (legal framework) as a catalyst for technological innovation:
 - central components based on reusable, open source software solutions

The screenshot shows the INSPIRE Geoportal interface. At the top, it features the European Commission logo and navigation links. Below the header, there's a navigation bar with 'Home', 'High-Value Datasets', 'Thematic Data', 'Harvesting status', and 'Find out more about'. The main content area is titled 'INSPIRE Geoportal' and includes a map of Europe with a 'Hover over a country' tooltip. To the right of the map, there are three statistics boxes: '91533 Metadata records', '44778 Downloadable Datasets', and '46446 Viewable Datasets'. Below the map, there's a 'Select a COUNTRY' section with a grid of country flags and their respective dataset counts. At the bottom, there are buttons for 'Download stats' and 'Select the whole EUROPE'.

INSPIRE Geoportal, based on GeoNetwork opensource


The screenshot shows the 'INSPIRE Validator - Test selection' page. It has a search bar at the top right and a navigation bar with 'Home', 'Test selection', 'Test reports', 'Get support', and 'More on the INSPIRE Reference Validator'. The main section is titled 'Configure your test' and contains several configuration options: 'Select the INSPIRE resource you would like to test' (with radio buttons for Metadata, View Service, Download Service, Discovery Service, and Data set), 'Select the Technical Guidelines version' (with radio buttons for Version 1.3 - DEPRECATED and Version 2.0), and 'Select the type of metadata record(s) to be tested' (with radio buttons for Data sets and data set series, Network Service, and Spatial Data Service). There is an 'Advanced options' dropdown menu. Below this, the 'Provide the resource to test' section includes a 'File upload' button and an 'Upload file*' section with a note about the 50 MB maximum size and restrictions on encrypted documents and macros. At the bottom, there's a text input field for a label and a 'Start test' button.

INSPIRE Reference Validator, based on the ETF testing framework

The screenshot shows the 'INSPIRE registry' page. It features a search bar at the top right and a navigation bar with 'Home' and 'Test selection'. The main section is titled 'INSPIRE registry' and includes a 'URI' field with the value 'http://inspire.ec.europa.eu/registry'. Below this, there are fields for 'Label' (INSPIRE registry), 'Content summary', 'Registry Manager' (European Commission, Joint Research Centre), 'Insert date' (2013-05-28 15:30 PM CEST), and 'Available formats' (listing various file formats like XML, JSON, CSV, etc.). At the bottom, there's a section for 'Available items' with a dropdown menu for 'Show 10 entries' and a 'Filter:' field. Below this, there's a list of available items, including 'INSPIRE application schema register', 'INSPIRE code list register', 'INSPIRE enumeration register', 'INSPIRE feature concept dictionary', 'INSPIRE glossary', 'INSPIRE layer register', 'INSPIRE media-types register', 'INSPIRE metadata code list register', 'INSPIRE reference document register', and 'INSPIRE theme register'.

INSPIRE Registry, based on the Re3gistry

INSPIRE open principles – Software

- INSPIRE (legal framework) as a **catalyst** for technological innovation:
 - central components based on reusable, open source software solutions
 - decentralised **governance** with multiple (open source) actors 
 - ETF and Re3gistry included in the OSGeoLive, ETF proposed as OSGeo Community Project

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Re3gistry

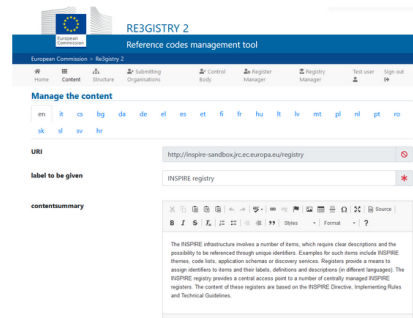
About

The Re3gistry 2 is a reusable open source solution for managing and sharing "reference codes". Initially developed as a central component of the EU's INSPIRE infrastructure, it provides a consistent central access point where labels and descriptions for reference codes can be easily browsed by humans and retrieved by machines. Reference codes are exchanged between applications to uniquely reference some 'thing'. They can be used to define sets of permissible values for a data field or to provide a reference or context for the data being exchanged. Examples are enumerations, controlled vocabularies, taxonomies, thesauri or, simply, 'lists of things'. The Re3gistry 2 supports organisations in managing and updating reference codes in a consistent way. The Re3gistry software version numbers comply with the Semantic Versioning Specification 2.0.0.



Core Features

- User-friendly editing interface to easily add, edit and manage the registers and reference codes
- Management of the full lifecycle of the reference codes (based on the ISO 19135 Standard)
- Highly flexible and customisable data models
- Multi-lingual content support
- Support for versioning
- RESTful API with content negotiation (including OpenAPI 3 descriptor)
- Free-text search
- Supported formats: HTML, ISO 19135 XML, JSON
- Service formats can be easily added or customised (default formats: JSON and ISO 19135 XML)
- Multiple authentication options
- Externally governed items referenced through URIs
- INSPIRE register federation format support (option to automatically create the RoR format)
- Web-app to access the reference codes in a human readable way




Home » Projects » ETF

[Back to projects](#)

ETF

ETF is a testing framework for validating data and APIs in Spatial Data Infrastructures (SDIs). It is used by software solutions and data providers to validate the conformity of geospatial data sets, metadata and APIs.



[Visit our website](#)

Goals in designing the ETF software were to create test reports that are user-friendly and self-explanatory as well as to be able to validate large amounts of data, which can be several hundred GB in size. In order to cover different validation tasks and present them in a unified report, the architecture is modular and different test engines can be used. Currently the following test engines are supported: [SoapUI](#) for testing web services, [BaseX](#) database for testing XML data, [TEAM Engine](#) to validate WFS and OGC Web APIs using the OGC CITE tests, NeOTL Engine for testing WFS, OGC Web APIs and datasets.

ETF is the underlying framework used by the [INSPIRE Reference Validator](#) to validate metadata, datasets and services against the [INSPIRE](#) requirements. ETF is also used extensively in Germany by the Surveying Authorities of the Laender to validate their datasets. Other European Union (EU) Member States are also reusing the ETF to allow their data providers to test resources against national requirements. Finally, some software tools include validation based on the ETF API in their workflow.

Test run on 18:14, 31.05.2022 with test suite Common conformance classes									
Status	Failed	Total Count	Skipped	Passed	Warning	Manual	Test suites	Test cases	Assertions
Normal	0	10	0	0	0	0	1	10	0
Duration	1:20 s								

- + Conformance class: INSPIRE GML encoding [\[Expand\]](#)
- + Conformance class: Reference systems, General requirements [\[Expand\]](#)
- + Conformance class: Information accessibility, General requirements [\[Expand\]](#)
- + Conformance class: INSPIRE CIM application schemes, General requirements [\[Expand\]](#)
- + Conformance class: Data consistency, General requirements [\[Expand\]](#)

Report generated by ETF

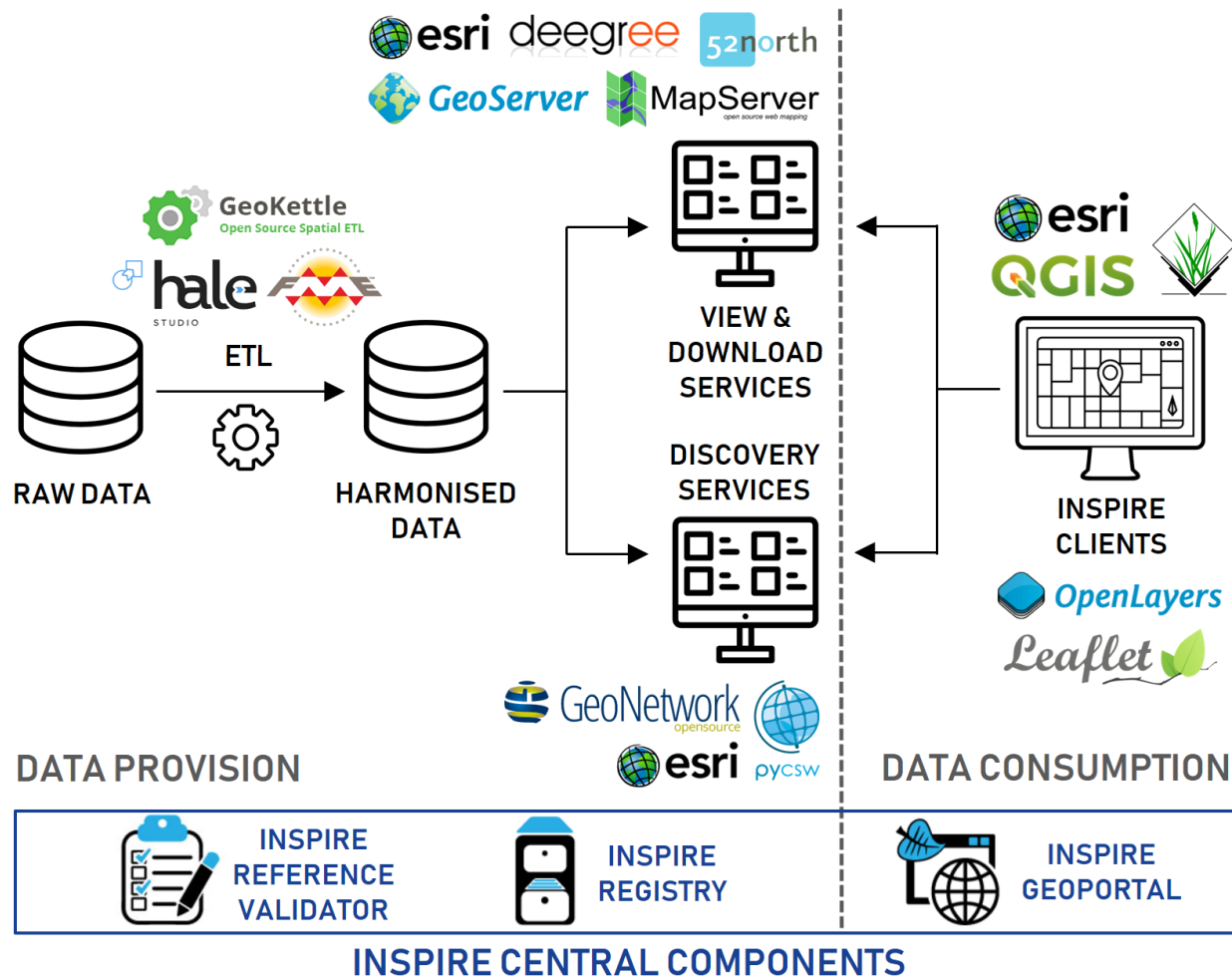
https://live.osgeo.org/en/overview/ETF_overview.html
https://live.osgeo.org/en/overview/re3gistry_overview.html

<https://www.osgeo.org/projects/etf>



INSPIRE open principles – Software

- INSPIRE-related software for data search, provision & consumption



INSPIRE open principles – Standards

- By nature based on open standards
 - probably the largest uptake of OGC standards worldwide
 - benefits for all: data providers, users & standardisation bodies



INSPIRE open principles – Governance

- Active community
 - conferences, discussion forums, helpdesks
- Community-driven processes
 - inclusive approach since the beginning
 - **INSPIRE Good Practices** to introduce new approaches (standards, technologies, etc.) in INSPIRE
 - **governance process** to manage changes/updates to INSPIRE artefacts (Technical Guidelines, schemas and UML models)



Good Practice Library

Good Practice documents

Candidate

[GeoPackage encoding of INSPIRE datasets](#)

[Data-Service Linking Simplification](#)

Endorsed

[GeoDCAT-AP](#)

[SDMX for Human Health and Population Distribution](#)

[OGC API – Features as an INSPIRE download service](#)

[OGC SensorThings API as an INSPIRE download service](#)

[Building one access point to dispersed data sources](#)

[Making spatial data downloadable via WMS services](#)

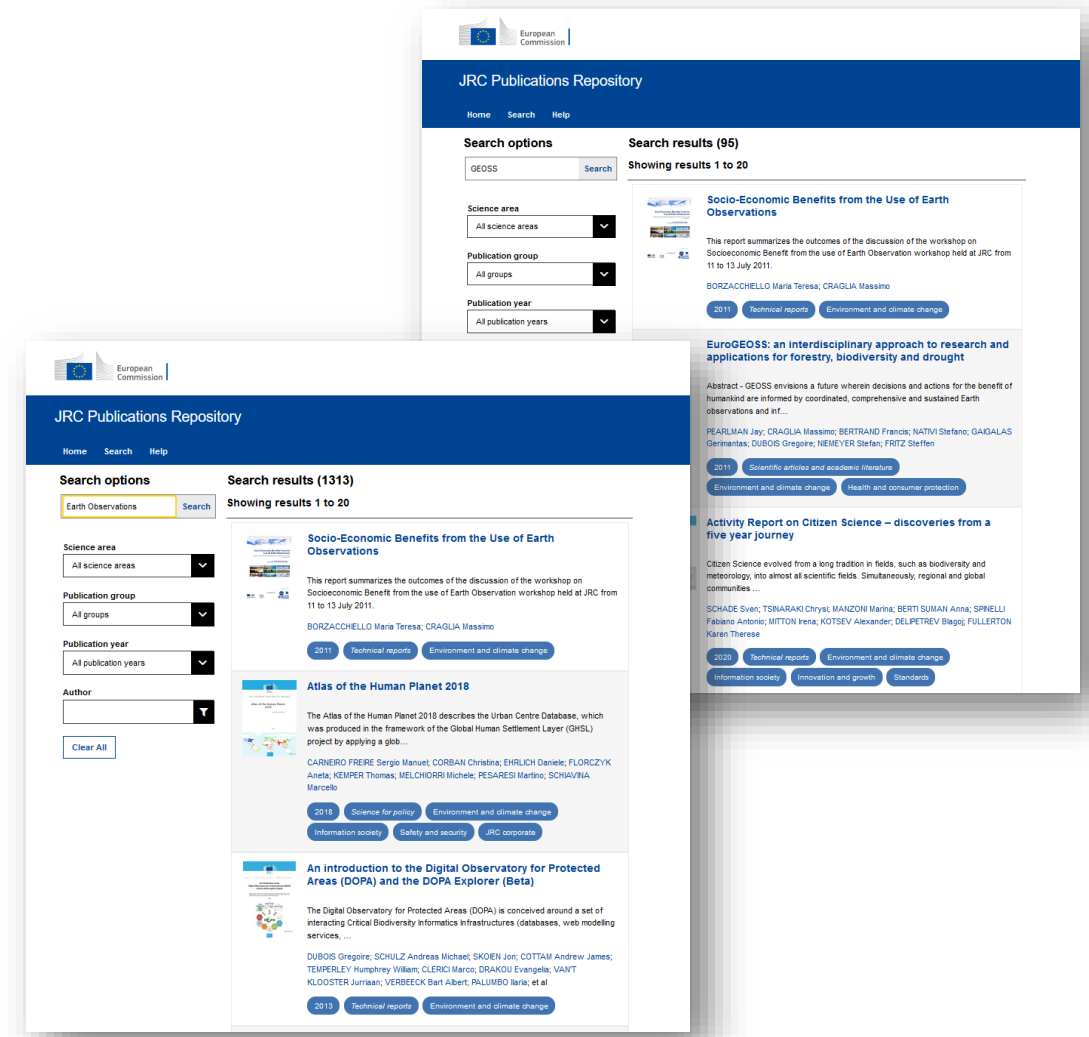
[OGC compliant INSPIRE Coverage data and service implementation](#)

<https://inspire.ec.europa.eu/portfolio/good-practice-library>

<https://github.com/INSPIRE-MIF>

JRC contribution to GEO & GEOSS

- Long-term contribution to GEO
 - defined in the Horizon Europe WP
 - EAG, Programme Board, WGs
- in close **collaboration** with other EC services (RTD, DEFIS, CNECT, ENV, etc.) and the GEO community
- multiple **research outputs** with a science for policy emphasis
 - datasets
 - services
 - analyses tailored to the needs of the GEO community

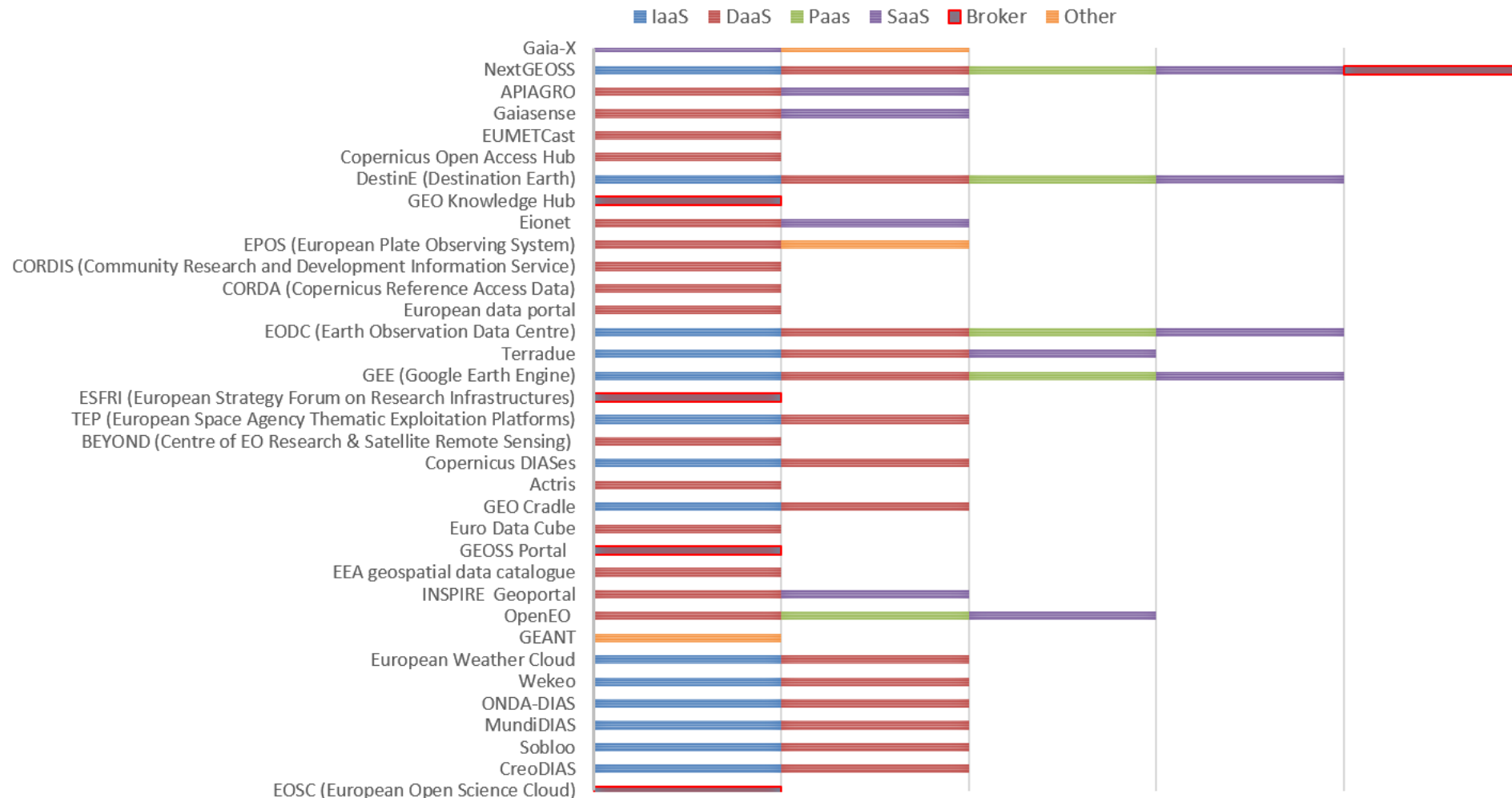


JRC contribution to EuroGEO

- European regional GEO initiative
 - umbrella framework to showcase and scale-up **European user-driven products/services**: Copernicus DIAS, INSPIRE, ESA TEPs, in-situ data sources, citizen observatories, etc.
 - **EuroGEOSS** virtual digital infrastructure as European contribution to GEOSS to address environmental use cases
- Identification of approaches for modernising data sharing in EuroGEO
 - alignment with the European policy context around **data spaces**
 - tackling **fragmentation** of open EO infrastructures
 - streamlining **end-to-end process** from raw data to insights for decision makers
 - **user-driven** and **demand-driven**
 - changing context – hyperscalers

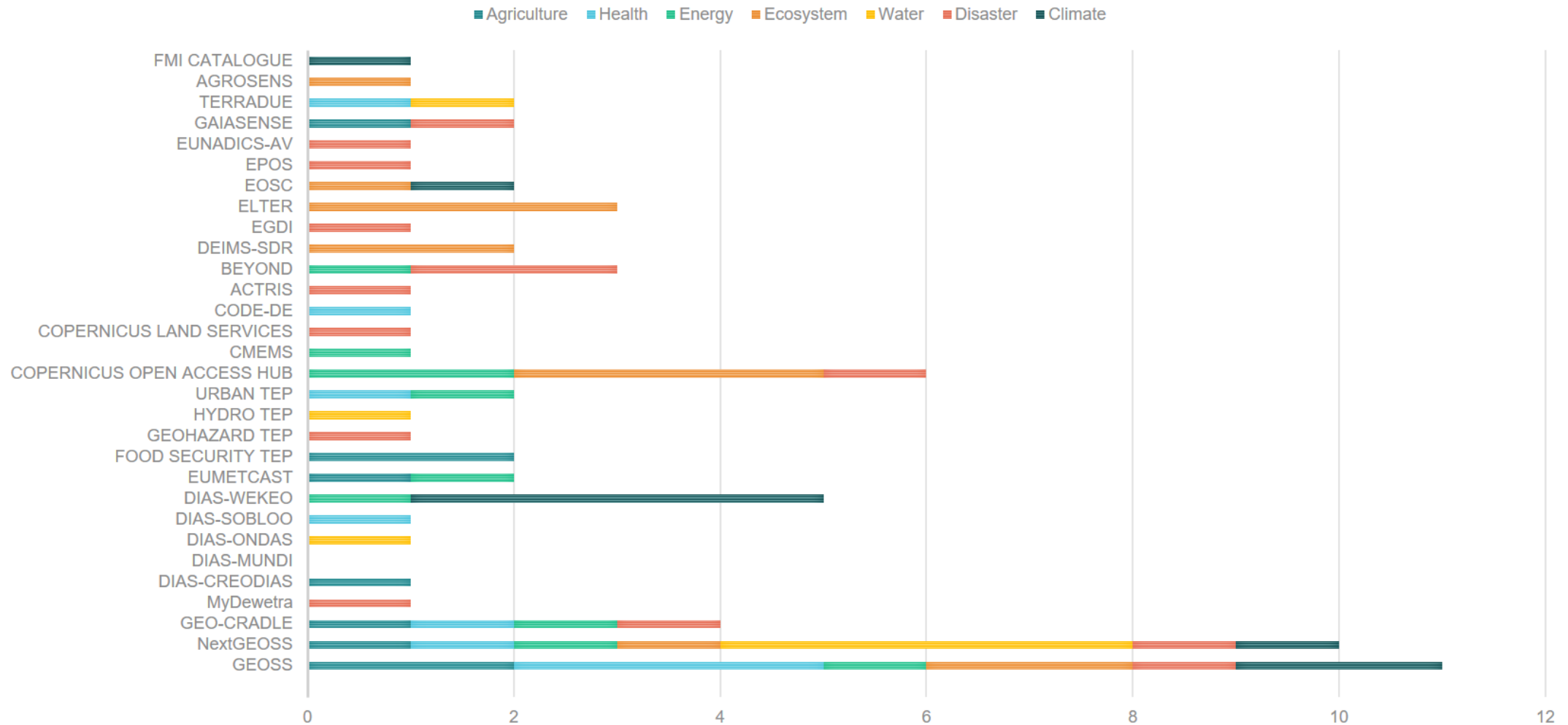
Mapping the existing landscape

- Categories of services offering by existing European EO digital platforms



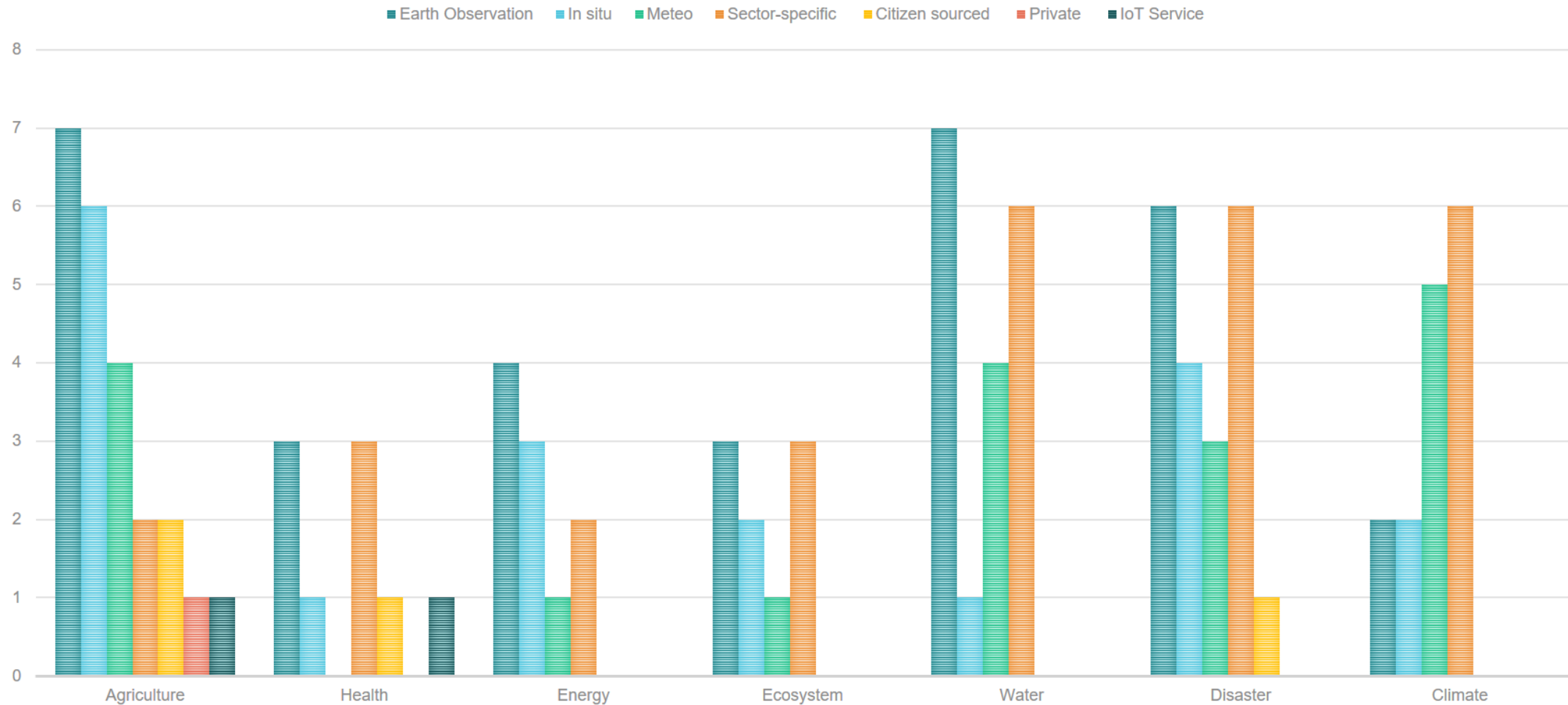
Mapping the existing landscape

- Platform usage by e-shape pilots, classified by showcase



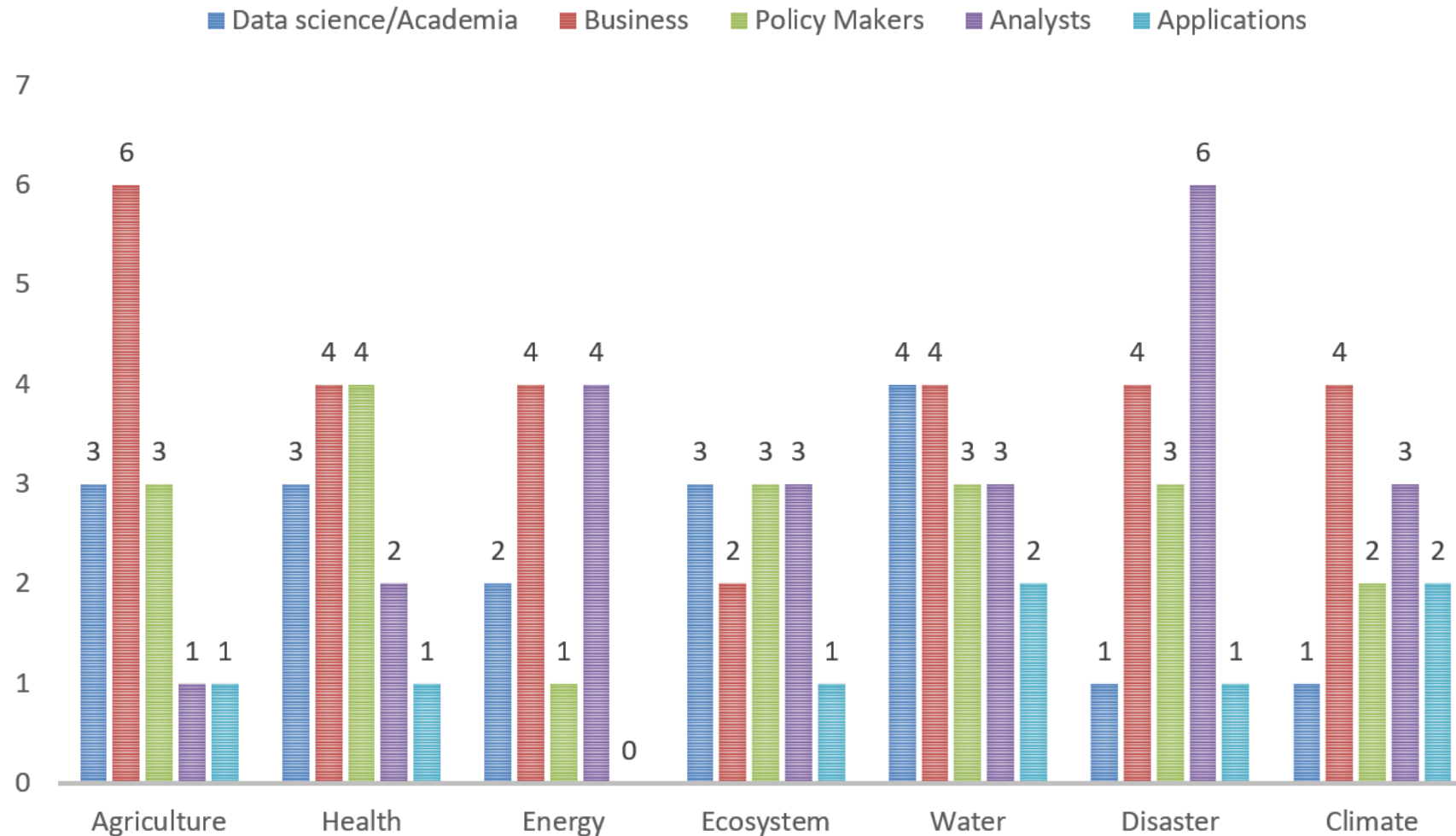
Mapping the existing landscape

- Source datasets used in e-shape pilots, classified by showcase



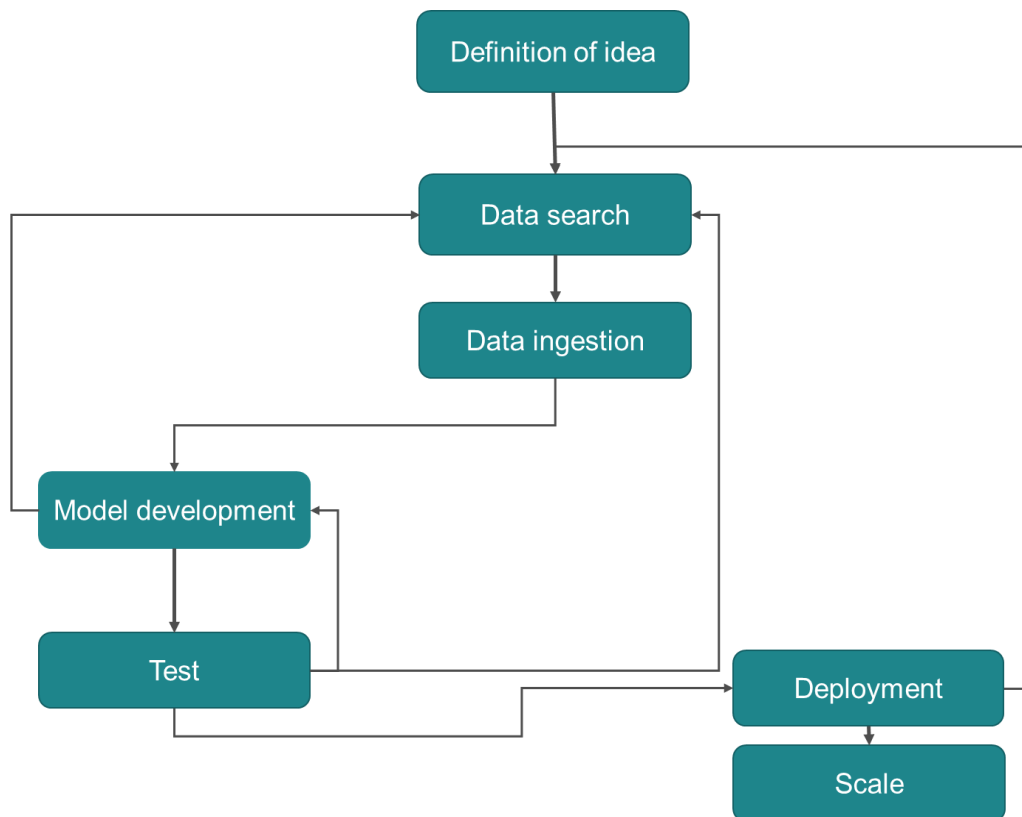
Mapping the existing landscape

- intended user categories for e-shape pilots, classified by showcase



Development life cycle & available options

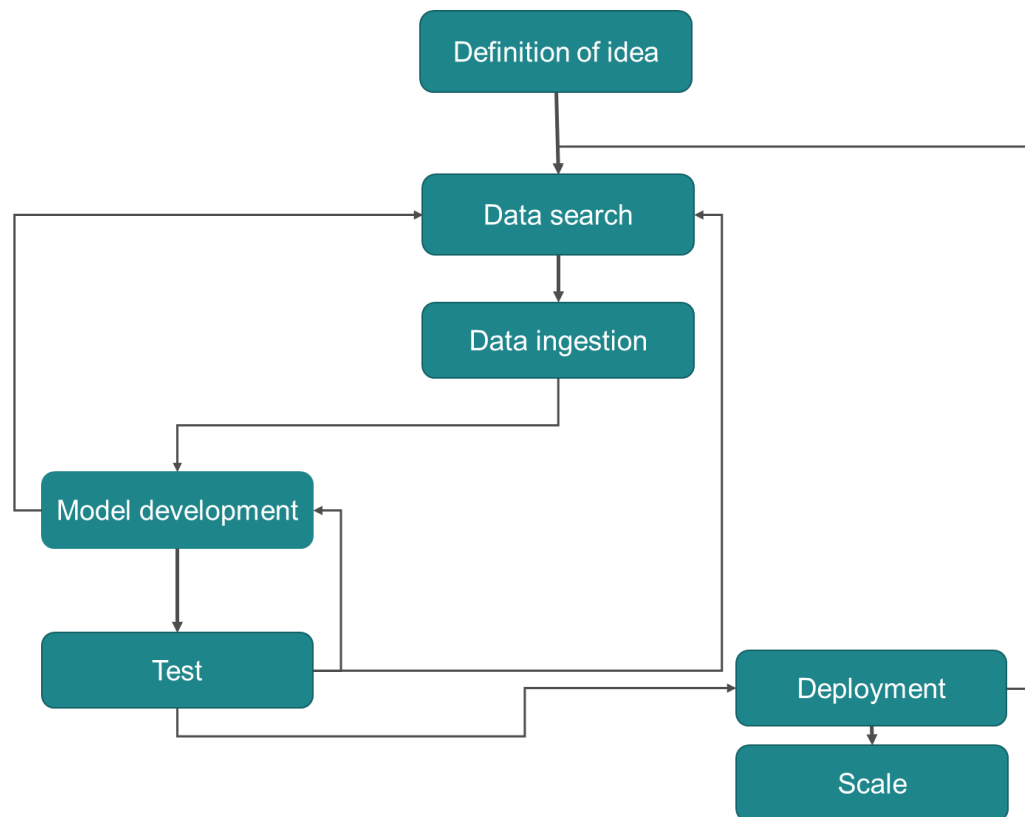
- Definition of a developer journey
 - considering emerging technologies & trends
 - based on some principles:



- prefer open source software
- avoid vendor/technology lock-in
- avoid approval processes for user projects as much as possible
- limit data movement as much as possible
- reuse existing tools/modules
- combine data from different infrastructures/services
- adhere to FAIR principles

Development life cycle & available options

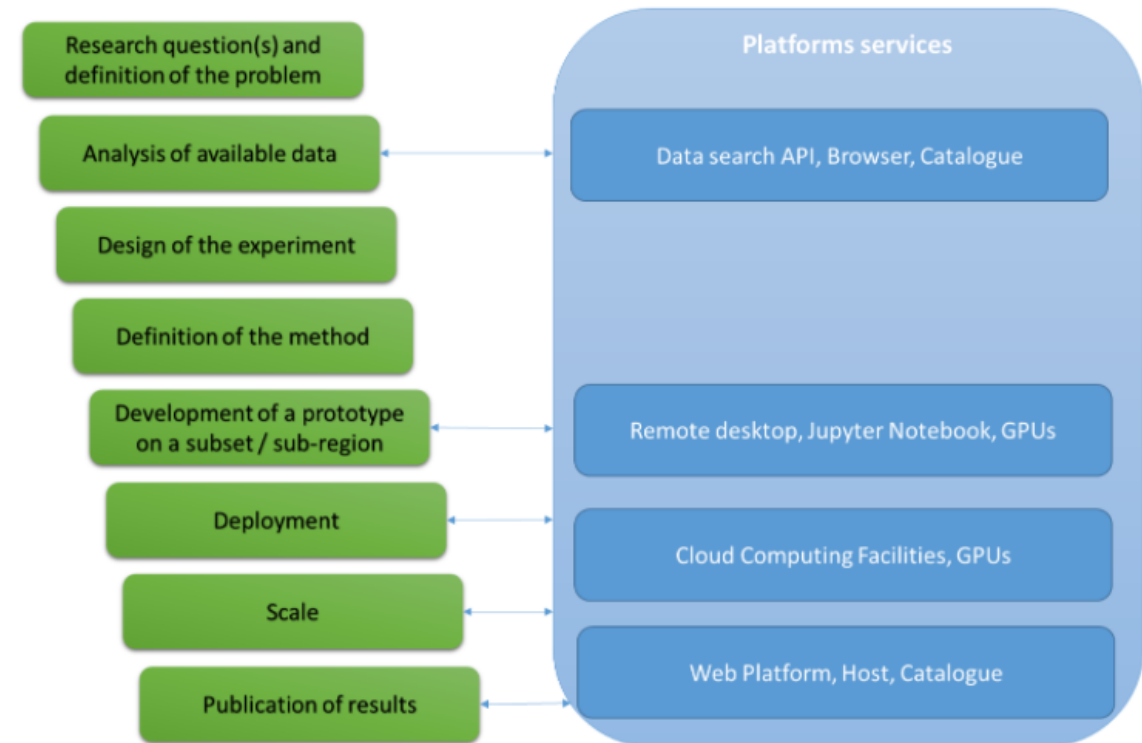
- Definition of a **developer journey**
- High-level **infrastructure landscape/analysis**
 - GEO ecosystem vs. DIASes vs. GEE



	Google Earth Engine	GEOS ecosystem	DIASes
Data search	Google Datasets	GEODAB	EO browser (Copernicus data only)
Data ingestion	Earth Engine APIs	GEODAB	S3, NFS, APIs, OGC
Model development	Integrated development env or Google colab	ESA TEPs, Online Jupyter Hubs/Labs	Jupyter Hubs/Labs
Test			
Deployment	GCP (VM or serverless), Google AI Platform	ESA TEPs, VLAB, other thematic platforms. DIASes	Manual deploy
Scale	Autoscaling can be managed through GCP	In some environment should be possible to handle it programmatically	Not all DIASes support automatic scaling.

Use-case driven requirement analysis

- Setup of prototypical data-driven EO applications
 - based on the knowledge from existing European pilots & the development life cycle
 - using **European infrastructure** (GEO portal and DIAS platforms)
 - **2 use cases** from different domains, addressed in an independent way
- Target
 - identify inefficiencies and **bottlenecks**
 - identify **potential areas of improvement**
 - **document** the utility, maturity and reusability of the technical stack
 - **distill recommendations** for GEO and EuroGEO



Final recommendations

Final recommendations

- When starting/developing an open source project
 - when possible, **reuse the existing** rather than developing new tools
 - choose an established **license maximising compatibility and reuse** (no custom licenses)
 - design with a **user-driven & demand-driven approach**
 - **validate** that user needs are satisfied
 - establish a **governance** and a **community** around the project to ensure sustainability

Final recommendations

- When starting/developing an open source project
 - when possible, **reuse the existing** rather than developing new tools
 - choose an established **license maximising compatibility and reuse** (no custom licenses)
 - design with a **user-driven & demand-driven approach**
 - **validate** that user needs are satisfied
 - establish a **governance** and a **community** around the project to ensure sustainability
- Openness as a **working culture**
 - not only open source software, but open data, open standards, FAIR principles, etc.
 - partner with existing **projects & communities** (outreach, sponsor, etc.)
 - consider **taking a role in the governance** of software projects, open source communities, standardisation bodies, EO initiatives, etc.

Thank you!

and thanks to: Alexander Kotsev, Josep Soler Garrido, Jordi Escriu, Margherita Di Leo, Nicholas Spadaro, Gijs Hillenius



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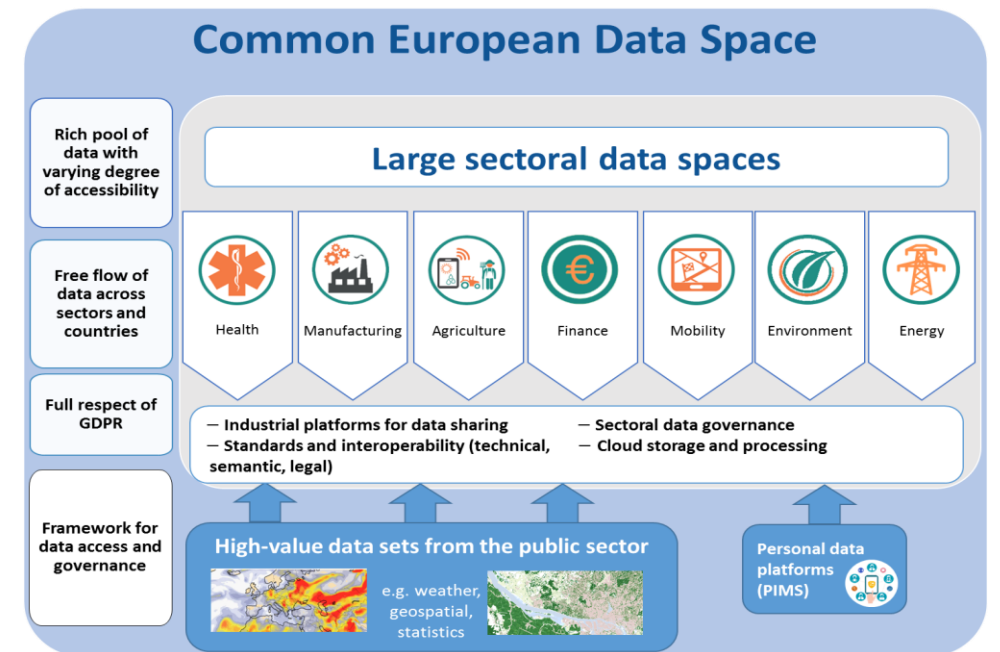
Common European data spaces



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

- European strategy for data – February 2020
 - vision: create a European single market for data
 - problems: data availability, licensing, governance, quality, interoperability, infrastructure, technology, skills, data literacy, cybersecurity

- Creation of common European data spaces
 - no formal definition, only characteristics
 - goal is to create value to make better decisions
 - data from all actors, personal & non personal
 - legal, organisational, semantical & technical focus
 - based on European values and legal framework



European Data Spaces Cookbook (coming soon)



- A **practical guide** to setting up, operating and maintaining European data spaces
 - target audience: **stakeholders** of data spaces
 - data providers, data users, data intermediaries, open source communities, standardisation bodies, etc.
- Content:
 - technical requirements of data spaces
 - **data sharing how-to's**
 - JRC knowledge base