



# Openness and environmental data sharing: a JRC perspective

**Marco Minghini**

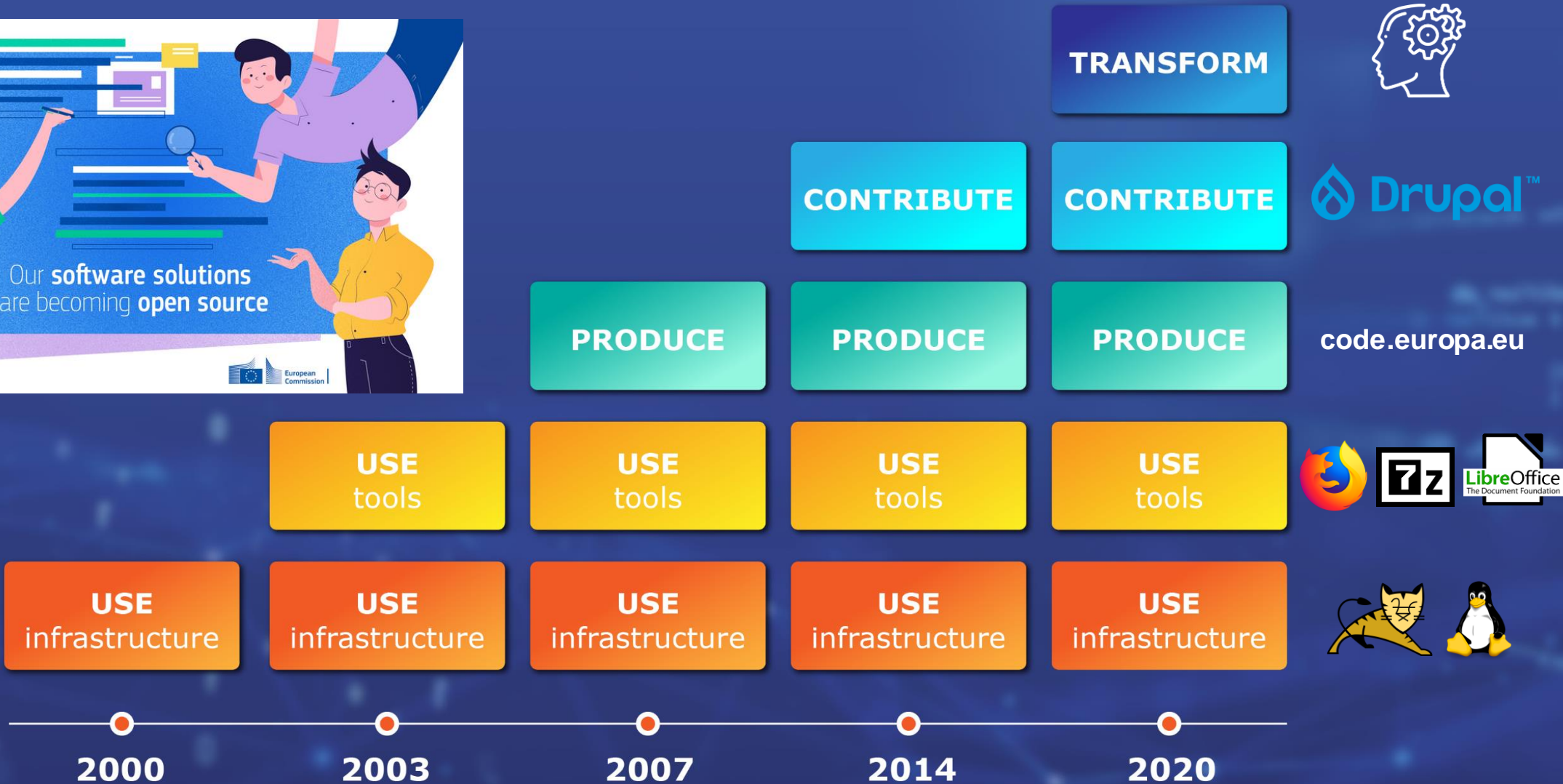
*2022 Open Innovation for EO Programmes Workshop – November 2-4, 2022*

# Outline

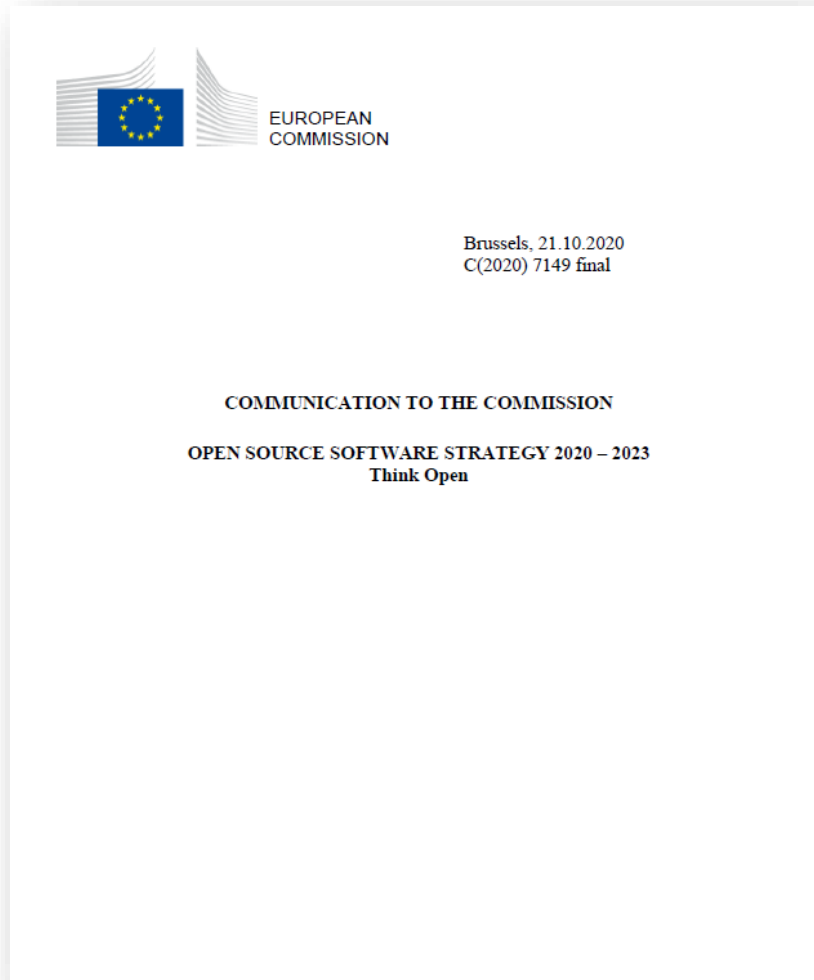
- Open source at the European Commission
  - strategy & policy
  - tools & actions
- Experiences at JRC – Openness in data sharing
  - INSPIRE
  - JRC contribution to GEO and EuroGEO
- Final recommendations

# Open source at the European Commission

# Open source at the European Commission



# 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



Brussels, 8.12.2021  
C(2021) 8759 final

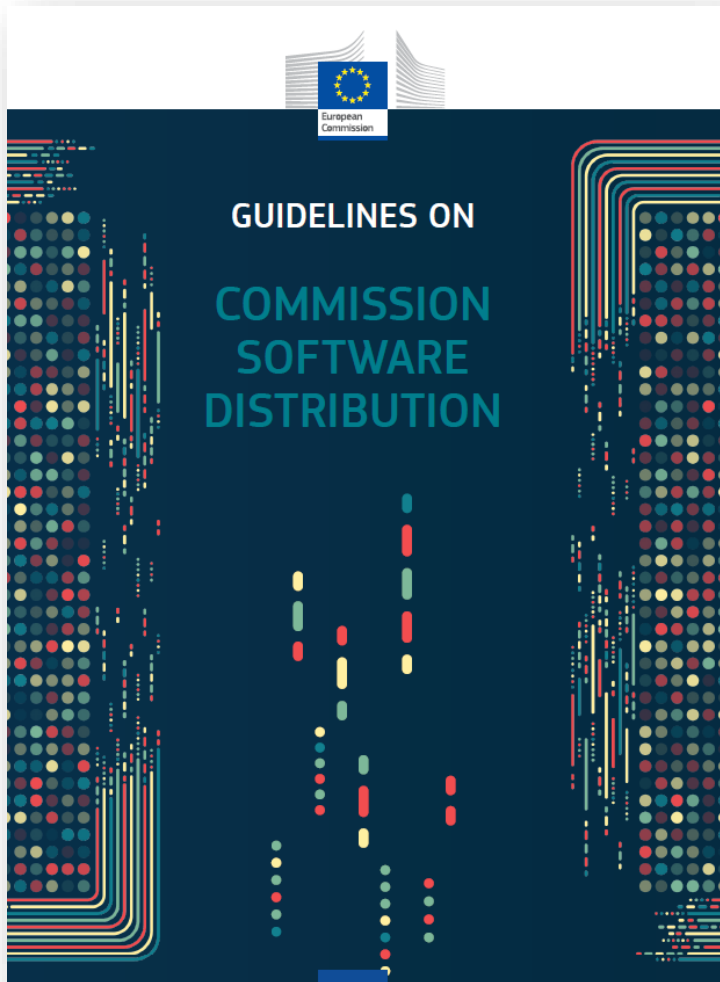
## COMMISSION DECISION

of 8.12.2021

on the open source licensing and reuse of Commission software

- 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

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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

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[https://joinup.ec.europa.eu/sites/default/files/custom-page/attachment/eupl\\_v1.2\\_en.pdf](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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README.md 3.09 KiB

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## 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

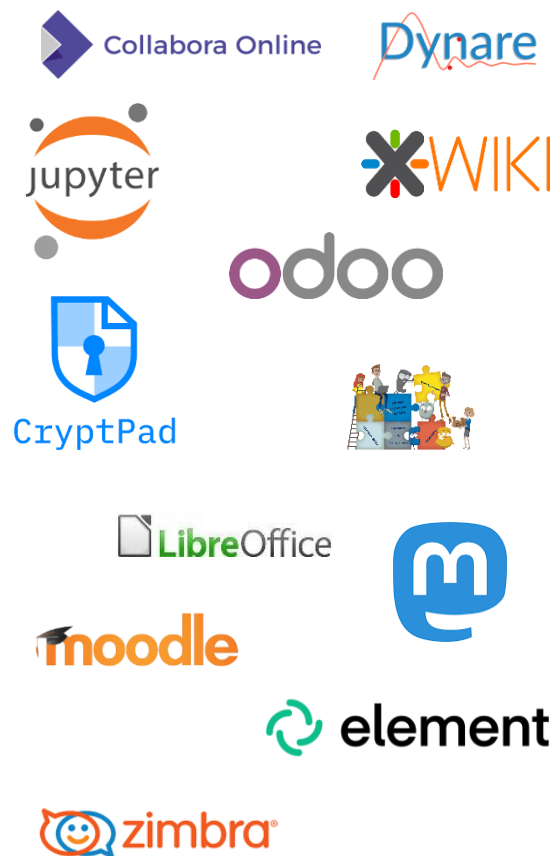
Start exploring projects [here](#). All of these projects are open to all visitors. Software developers who wish to interact and collaborate with the development teams of the projects: please, get in touch with these projects, this will help with your registration on the platform.

### Project creation

<https://code.europa.eu>

# Outreach to communities

## Bug Bounties

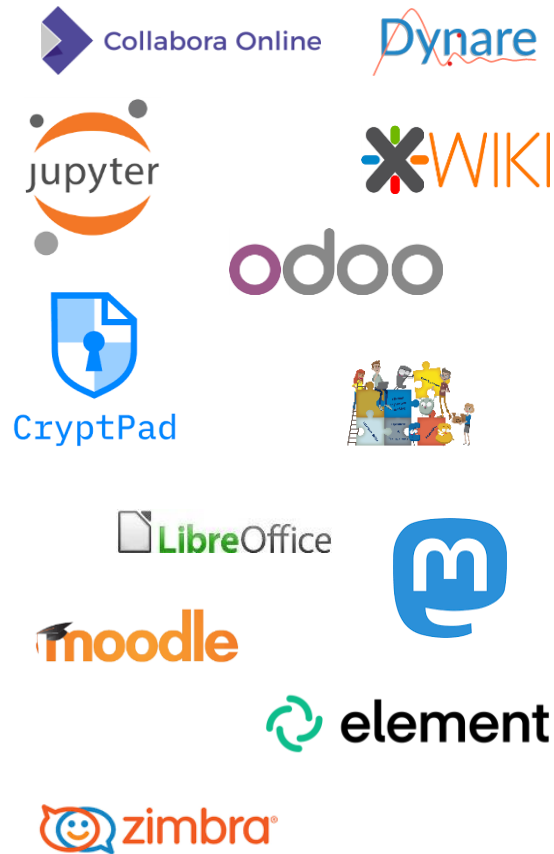


## Hackathons

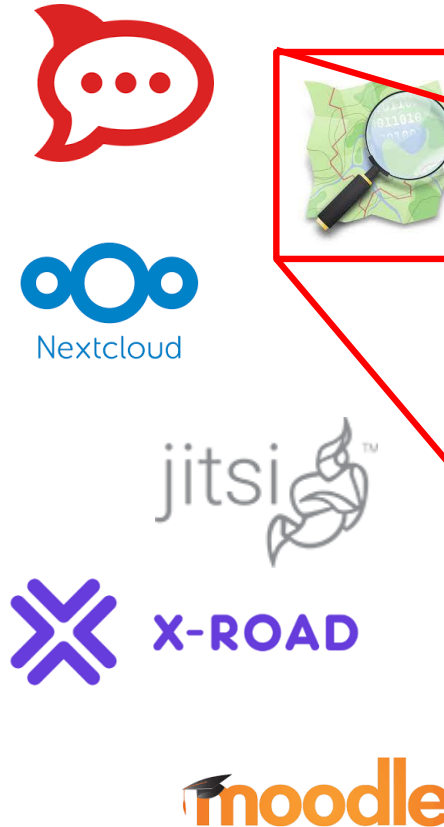


# Outreach to communities

## Bug Bounties



## Hackathons



<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

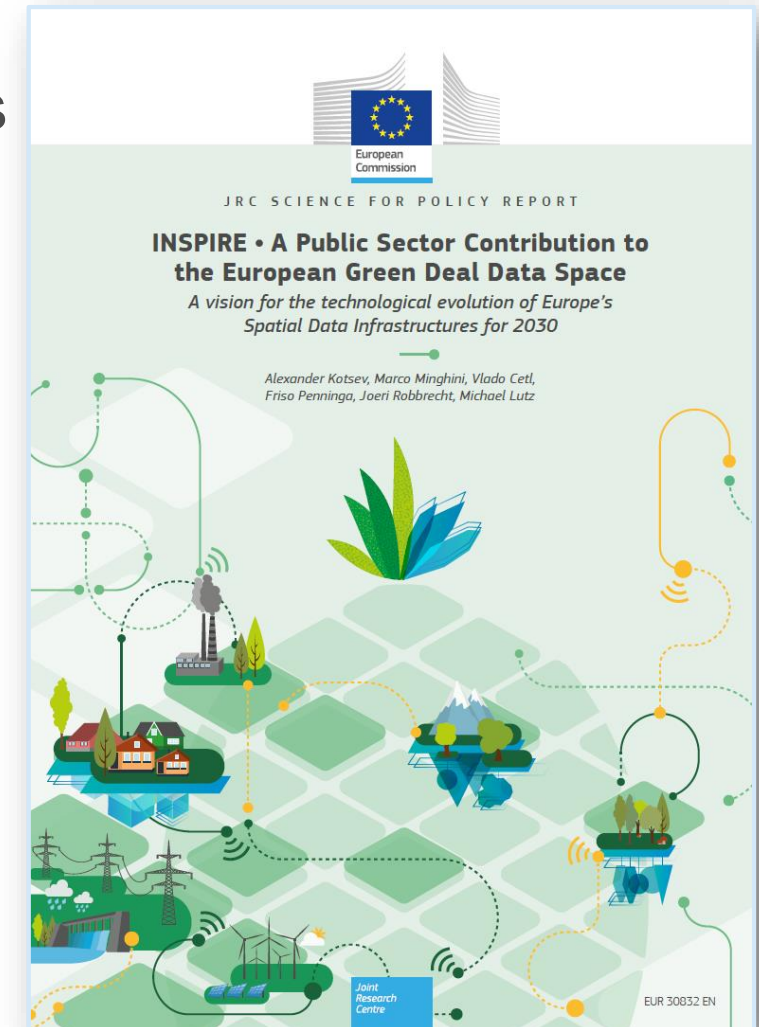
of 14 March 2007

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

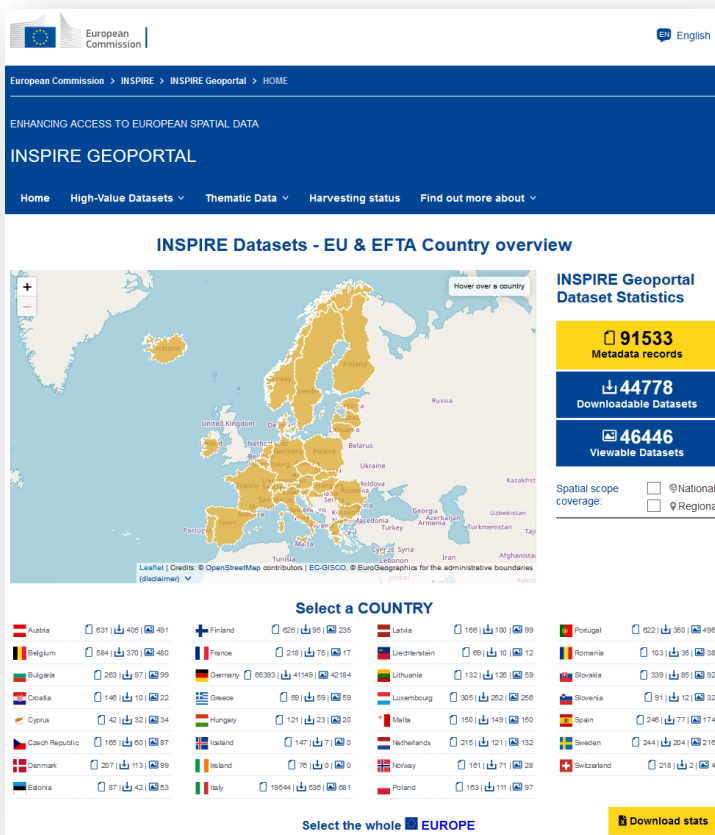
<https://inspire.ec.europa.eu>

<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



INSPIRE Geoportal, based on GeoNetwork opensource

The screenshot shows the 'INSPIRE Validator - Test selection' page. The navigation bar includes 'European Commission > INSPIRE > Validator > Test selection'. The main heading is 'INSPIRE Validator - Test selection'. A navigation menu includes 'Home', 'Test selection', 'Test reports', 'Get support', and 'More on the INSPIRE Reference Validator'. The section 'Configure your test' has three sub-sections: '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's an 'Advanced options' button. The 'Provide the resource to test' section has a text area for the input type and a file upload button. Below this, there's a text area for the label and a 'Start test' button.


INSPIRE Reference Validator, based on the ETF testing framework

The screenshot shows the 'INSPIRE registry' page. The navigation bar includes 'European Commission > INSPIRE >'. The main heading is 'INSPIRE registry'. The page displays the URI 'http://inspire.ec.europa.eu/registry', the label 'INSPIRE registry', and a content summary. The 'Registry Manager' is 'European Commission, Joint Research Centre' and the 'Insert date' is '2013-05-28 15:30 PM CEST'. The 'Available formats' are listed as [XML Registry], [XML ISO 19135], [RDF/XML], [JSON], [CSV], [ATOM], and [ROR]. The 'Available items' section shows a list of 10 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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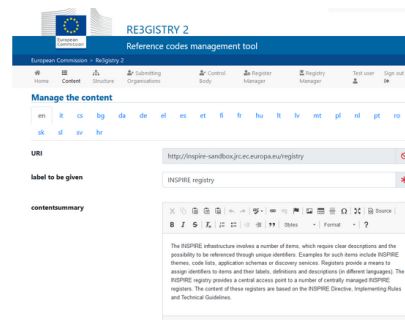
## Re3gistry

### 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](#)

## 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.

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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 - 21.08.2022 with test suite Common conformance classes										
Status	Failed				Total Count Skipped Passed Warnings Manual					
Started	31/05/2022 16:14:47 GMT				Test suites	5	0	2	0	2
Duration	1.101 s				Test cases	12	1	2	0	9
					Test cases	34	0	2	0	4
+ Conformance class: INSPIRE GML encoding <span>13</span>										
+ Conformance class: Reference systems, General requirements <span>Failed 7.1</span>										
+ Conformance class: Information accessibility, General requirements <span>Failed 7.1</span>										
+ Conformance class: INSPIRE GML application schemas, General requirements <span>13</span>										
+ Conformance class: Data consistency, General requirements <span>2</span>										
Report generated by ETF										

[https://live.osgeo.org/en/overview/ETF\\_overview.html](https://live.osgeo.org/en/overview/ETF_overview.html)  
[https://live.osgeo.org/en/overview/re3gistry\\_overview.html](https://live.osgeo.org/en/overview/re3gistry_overview.html)

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



# 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

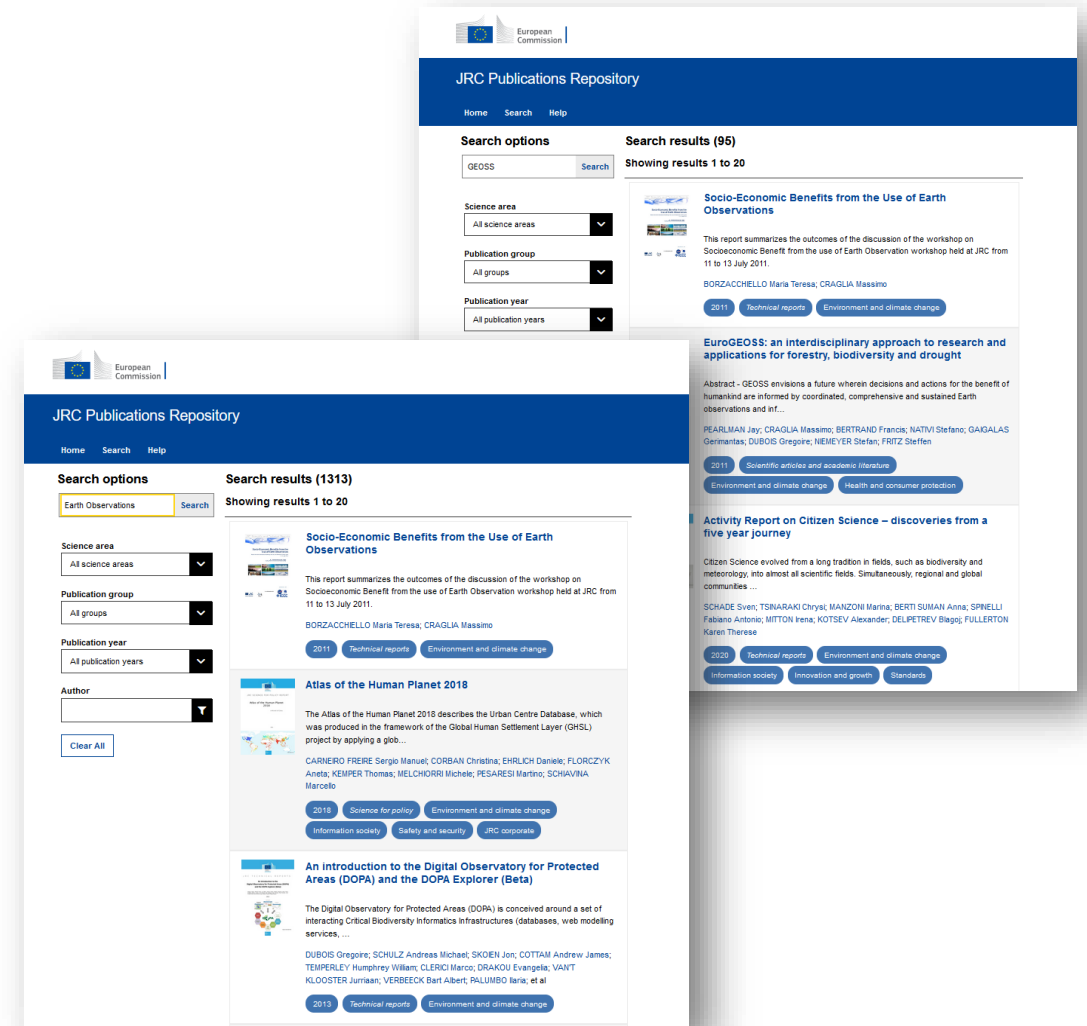
### Good Practice documents

Candidate	Endorsed
<a href="#">GeoPackage encoding of INSPIRE datasets</a>	<a href="#">GeoDCAT-AP</a>
<a href="#">Data-Service Linking Simplification</a>	<a href="#">SDMX for Human Health and Population Distribution</a>
	<a href="#">OGC API – Features as an INSPIRE download service</a>
	<a href="#">OGC SensorThings API as an INSPIRE download service</a>
	<a href="#">Building one access point to dispersed data sources</a>
	<a href="#">Making spatial data downloadable via WMS services</a>
	<a href="#">OGC compliant INSPIRE Coverage data and service implementation</a>

<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

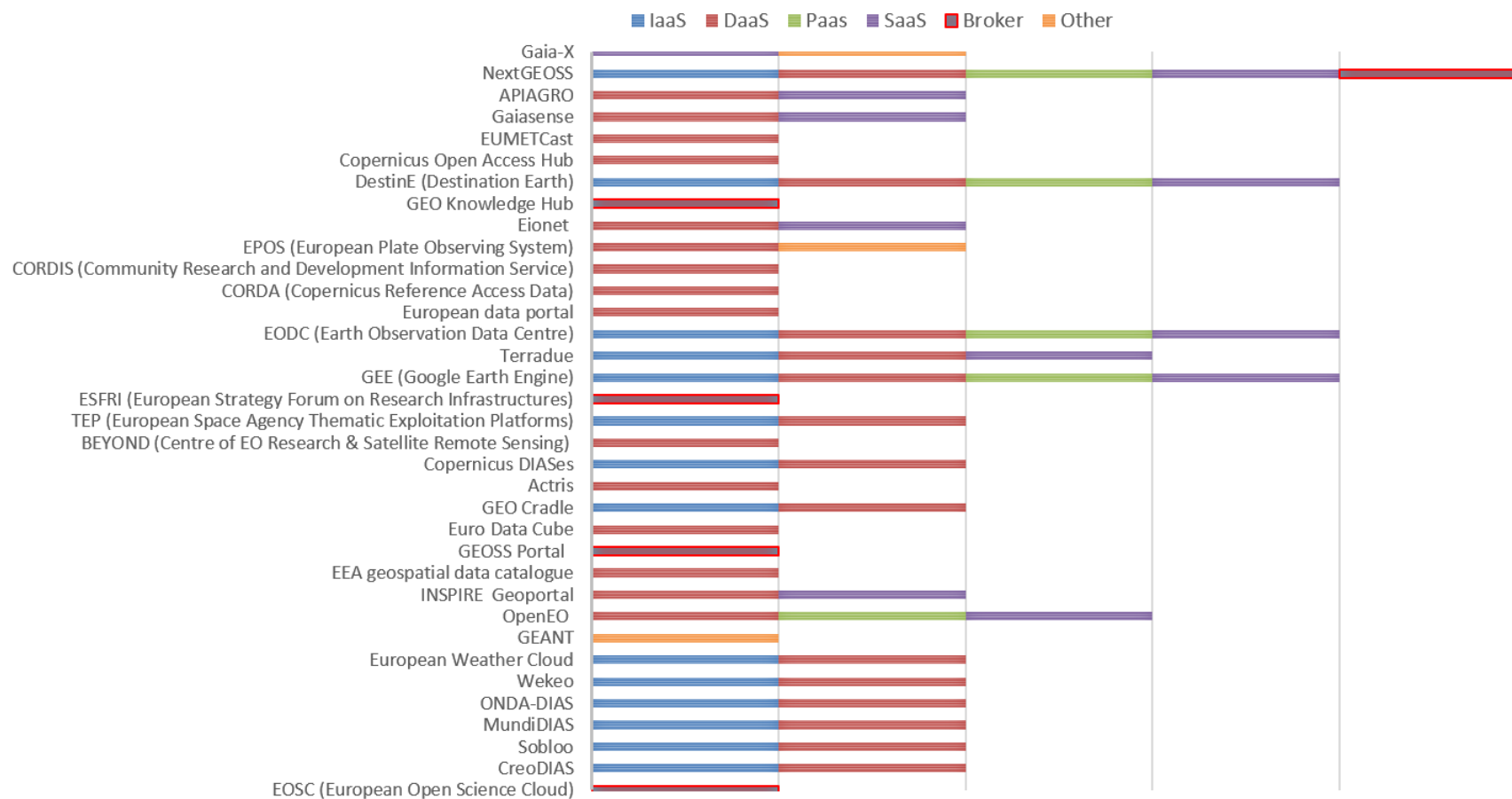


# JRC contribution to EuroGEO

- 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

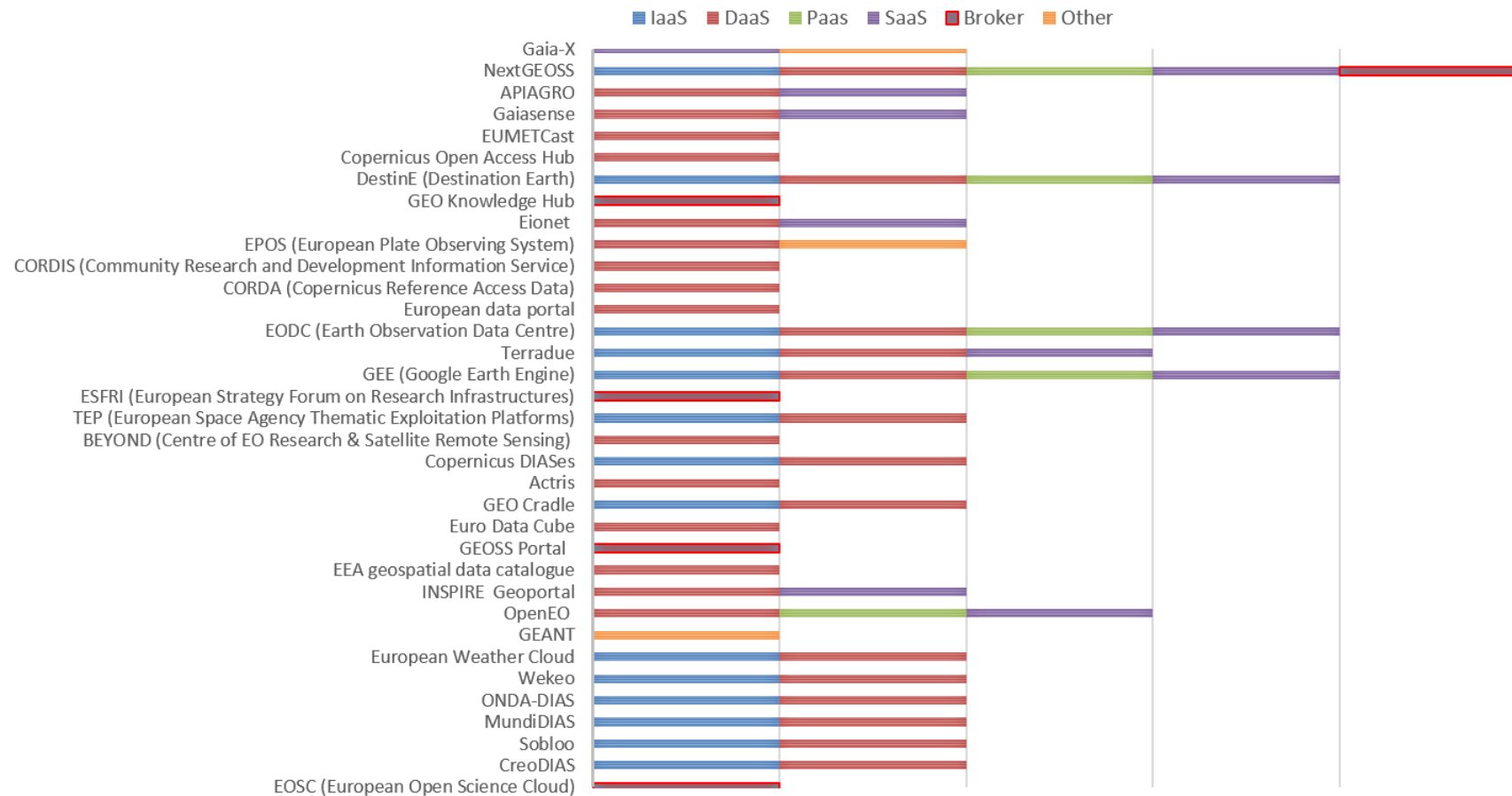
# Mapping the existing landscape

- Fragmentation of services offered by existing European EO digital platforms



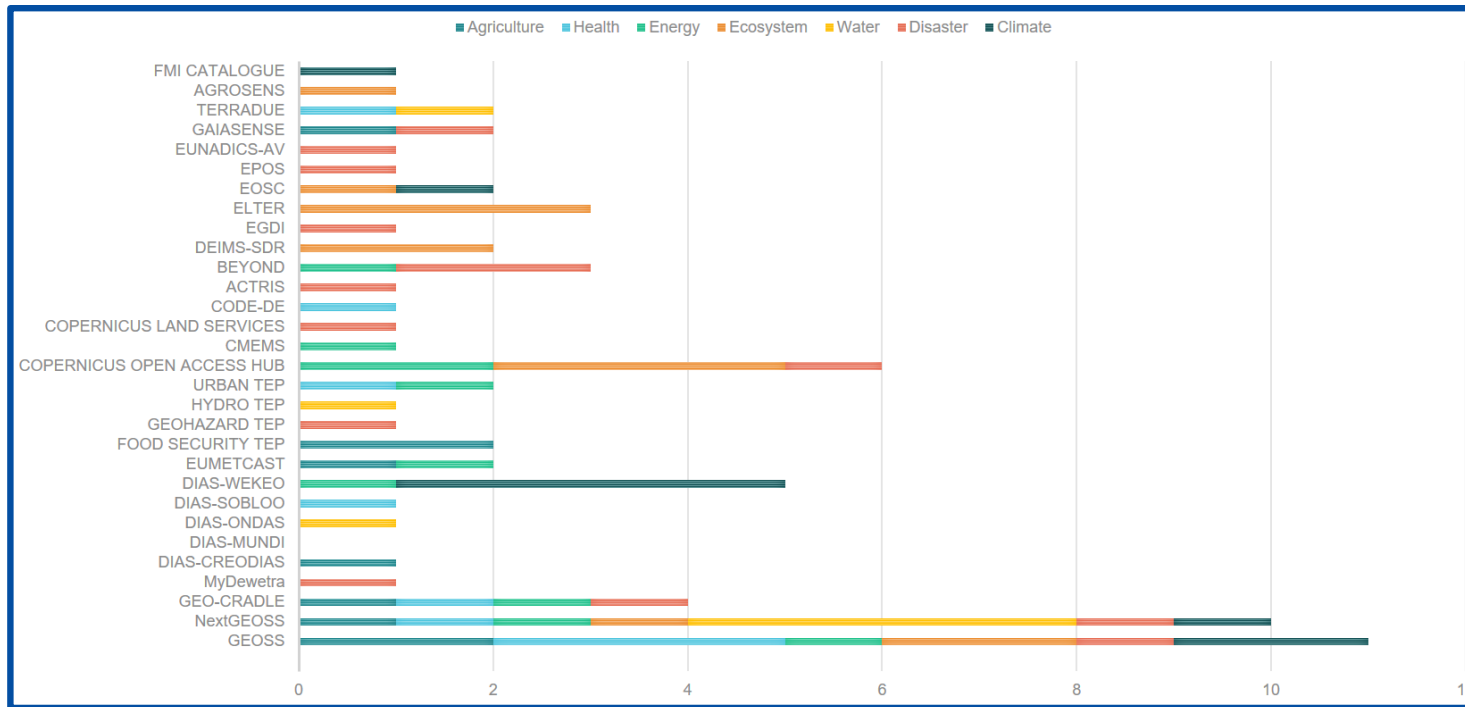
# Mapping the existing landscape

- **Fragmentation** of services offered by existing European EO digital platforms
  - elicitation of **requirements** for EuroGEOSS



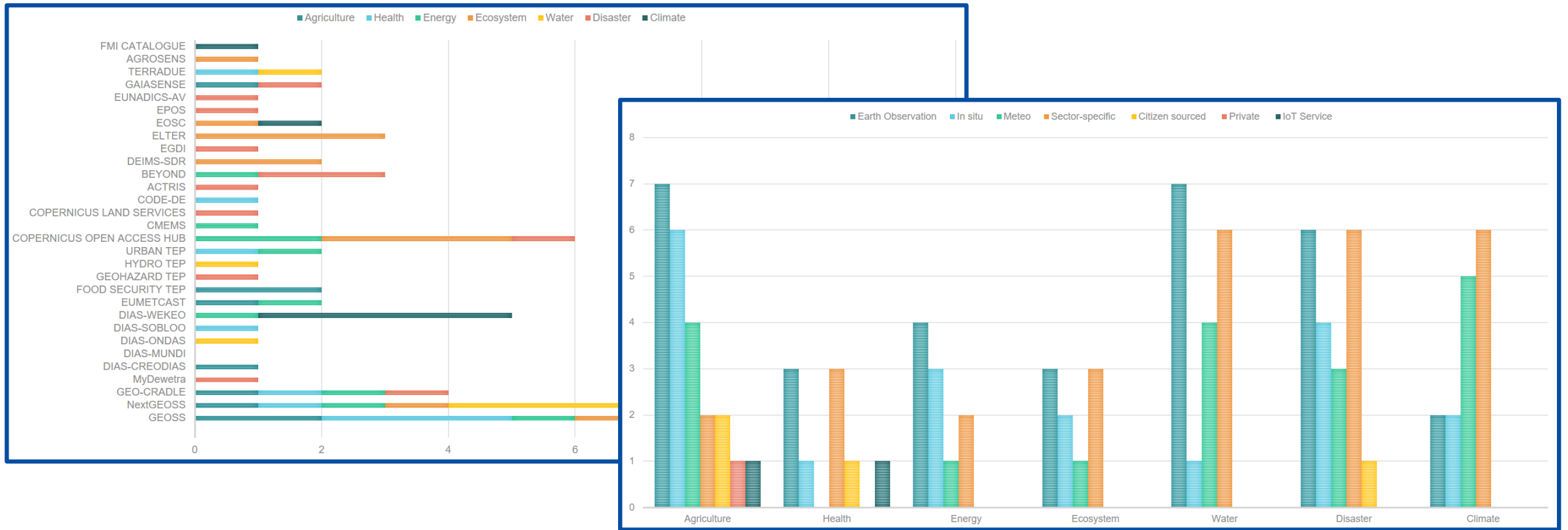
# Mapping the existing landscape

- Identification of policy use cases from *e-shape* pilots



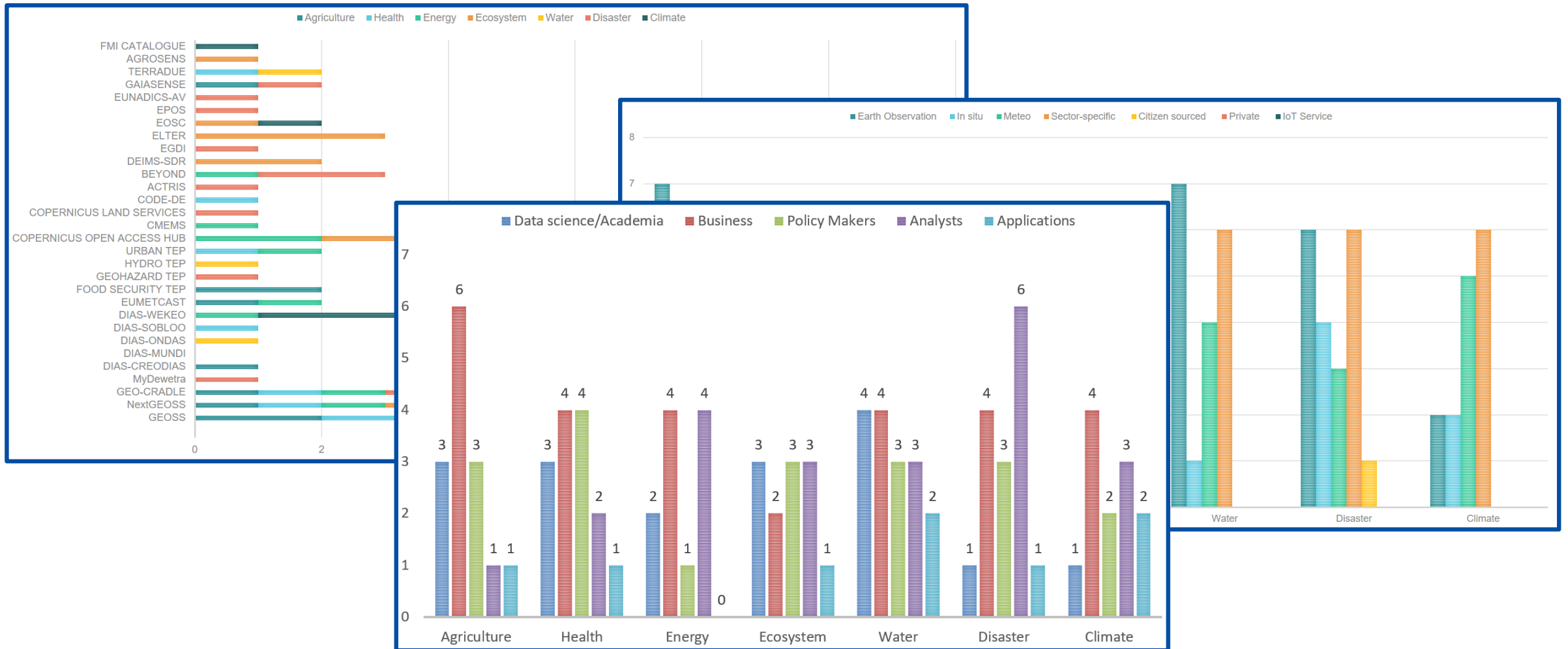
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# Mapping the existing landscape

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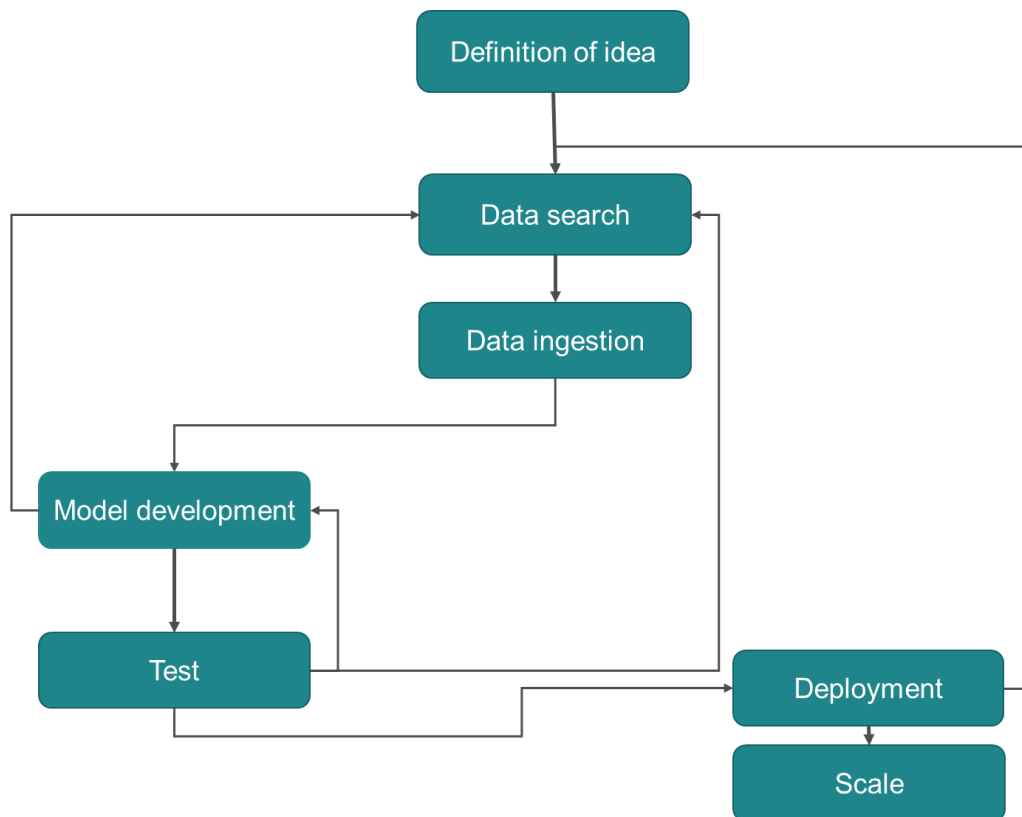


# Development life cycle & available options

- Definition of a **developer journey**

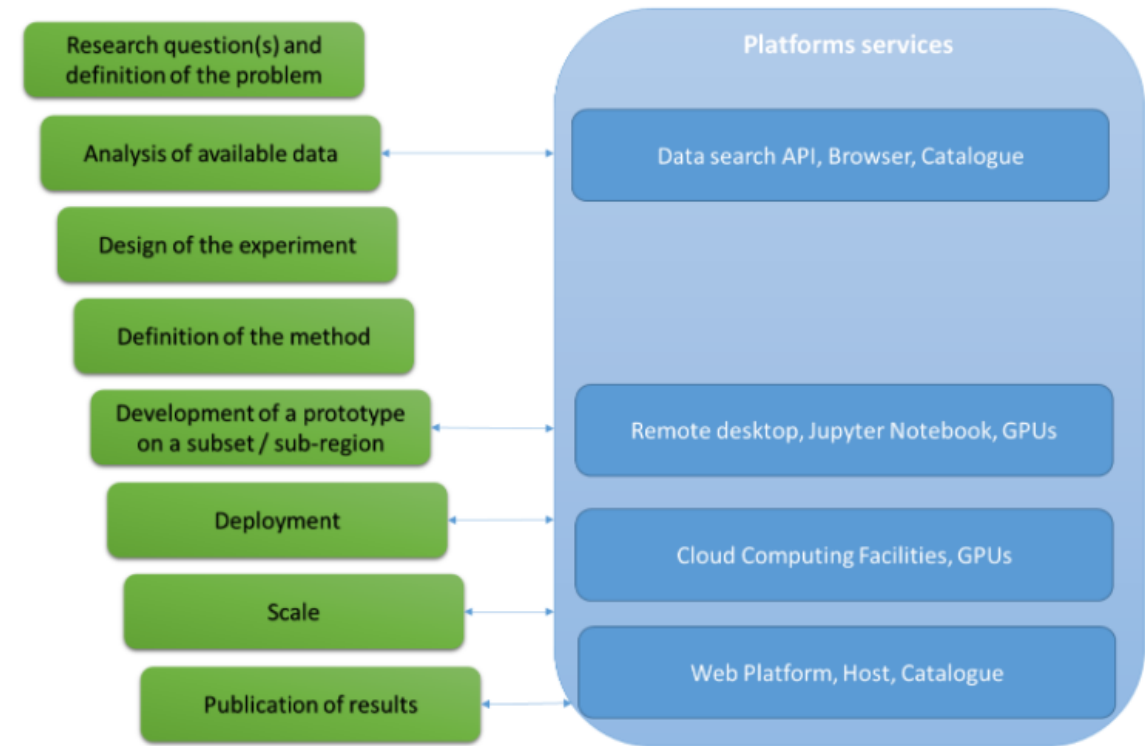
- considering **emerging technologies & trends**
- based on some **principles**:

- 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



# 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**
  - **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



marco.minghini@ec.europa.eu



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