EuroGEO Prototype Development

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Outline

Context background

Objectives

Towards an Innovative and Demand-driven EuroGEO

- Identification & Prioritisation of relevant use cases
- Prototype EuroGEO virtual ecosystem

Future developments

Context background - GEO

- European Commission co-chair of GEO
- Intergovernmental partnership implement GEOSS
- Initially: to support SDGs (capacity building, and EO infrastructure coordination, INCO)
- Today: improving the availability, access, understanding and use of Earth observations for the benefit of society
- Copernicus space infrastructure and services major contributor to GEOSS
- GEO MTE recommended to use the **Regional GEO** nodes to play a major role in achieving the acknowledged GEO value-chain

Context background – EuroGEO I

The regional nodes aims at filling the existing gap between the GEO up and downstream services by contributing to:

- supporting the regional policy priorities: the **European climate change and environmental policies** –notably, the EU Green Deal and Climate Change adaptation strategies.
- Build on the **existing European and National capacities and resources** (provided by the national **Governments**, the EU **Agencies**, and the **EC**) leaving them autonomous. Leverage the **knowledge on** the existing capabilities of the **European infrastructures** and **projects** landscape. Building on Copernicus Data access services (DAS) + Horizon Europe
- Advocating GEO Data Sharing Principles, promoting the dissemination of good practices and open standards.

Context background – EuroGEO II

The regional nodes aims at filling the existing gap between the GEO up and downstream services by contributing to:

- Discover and broker the Regional/National in situ data
- Identification of user's needs;
- exploration of untapped funding opportunities ;
- engagement with the commercial sector at regional level; the communication, the coordination and capacity building;
- Implement the necessary **pragmatic interoperability** to implement the GEO **value-chain** at the EU level

Objectives

Leveraging European data-sharing and exploitation practices within GEOSS (Global Earth Observation System of Systems) :

- Supporting GEO and in particular promoting the **values** that makes *Europe different from the rest of the world when dealing with digital transformation (legal aspects and technological innovations: Personal Data Spaces, KCs, etc.)*
- Leveraging existing assets (technological evolutions) building on existing projects and initiatives (H2020, GEO WP, ESA contribution to GEOSS; Horizon Europe WP; JRC scientific publications). Supporting the development and implementation of an evidence base for R&I policies and supporting various groups of stakeholders
- Improving ***coordination and reducing fragmentation of EO landscape*** in Europe to deliver services addressing planetary challenges (climate services). ***Towards an innovative demand driven approach to EuroGEO***

European Commission

Towards an Innovative and Demand-driven EuroGEO

1. Identify and document prominent **policy priority use cases** that require heterogeneous data to be effectively shared at scale
2. Design/Prototype **EuroGEO virtual ecosystem. Analyse and document novel approaches**, architectures, standards and technologies that can optimise the virtual infrastructure within the context of the European Green deal data space;
3. Mapping the advantages and disadvantages of different approaches for **operationalising and sustaining** the EuroGEOSS
4. **Contribute to the EuroGEO and GEO** communities and existing governance structures.

Identification and prioritisation of relevant use cases

- According to the mid-term evaluation, a **demand-driven approach** is needed for the evolution of GEO
- Excellent opportunity for **strengthening the link between policy and research** through the KCEO
- Identify, prioritise and further **develop prominent policy use cases** that require various data to be effectively shared
- KCEO to **strengthen the link** between HE projects, GEO activities and policy needs and priorities

Identification and prioritisation of relevant use cases

How

- **Framework** for identification and prioritisation of relevant use cases
- **Mining and analysis** of HE outcomes + mapping to policy needs
- Dedicated **Research section** in the KCEO
- Possible extension of the KCEO with an **international dimension**

Identification and prioritisation of relevant use cases

1. GREEN DEAL policy priority: the e-shape case: Pilot 3.2 | High photovoltaic penetration at urban scale;
2. COPERNICUS – DAS : Testing the platforms (OpenEO and CreoDias): use case on the Above-Ground Biomass (AGB) estimation using Machine Learning Techniques
3. MIDAS-GREEN: Interoperability of models used for Impact Assessments. A statistical model used to assess the impact of different nutrient sources, on freshwater and coastal waters.
4. AI-based Earth Observation apps - use case on AI tools for understanding the relation between air quality and health

Prototype EuroGEO virtual ecosystem: objectives

- Leveraging European data-sharing and exploitation practices (Horizon Europe WP)
- European GEOSS - a common, virtual digital infrastructure constituting the European contribution to GEOSS (pre-operational stage).

Objectives

- Strengthened and give additional visibility to the EU's long-term commitment to GEO and GEOSS
- Showcase and promote a European way of data and use sharing i.e. alternative to the existing corporate approach
- A demand-driven approach anchored within the European strategy for data
- Leverage the opportunities for uptake of Earth Observation within the foreseen European Data Spaces: Green Deal; Agricultural; Health, Smart Cities

Prototype EuroGEO virtual ecosystem: How

- **Not another platform!** Leverage on
  - Open Interoperability **Standards** (normative and de facto)
  - Interconnect novel **technologies:** Emphasis on open source tech; Proven to work through extensive experimentation; Technologies developed in the DIGITAL programme
  - Leverage on **existing communities and initiatives:** Open Source Communities; INSPIRE (7000k providers, 90K datasets)
  - Scalable **interoperable infrastructures:** Cloud federation and multi-cloud infrastructures; GAIA-X; IDSA; DestinE, etc.
- Identify a **sustainability scenario:** Incl. governance approach and business model

Prototype EuroGEOSS virtual ecosystem: components

- **Single Sign On (SSO) Provider:** The EuroGEO portal should work as an SSO provider to facilitate access to the various resources for users.

- **Meta Catalogue**: A catalog based on a set of metadata for the different kind of resources offered (metadata for datasets, models, infrastructures, services, etc.).

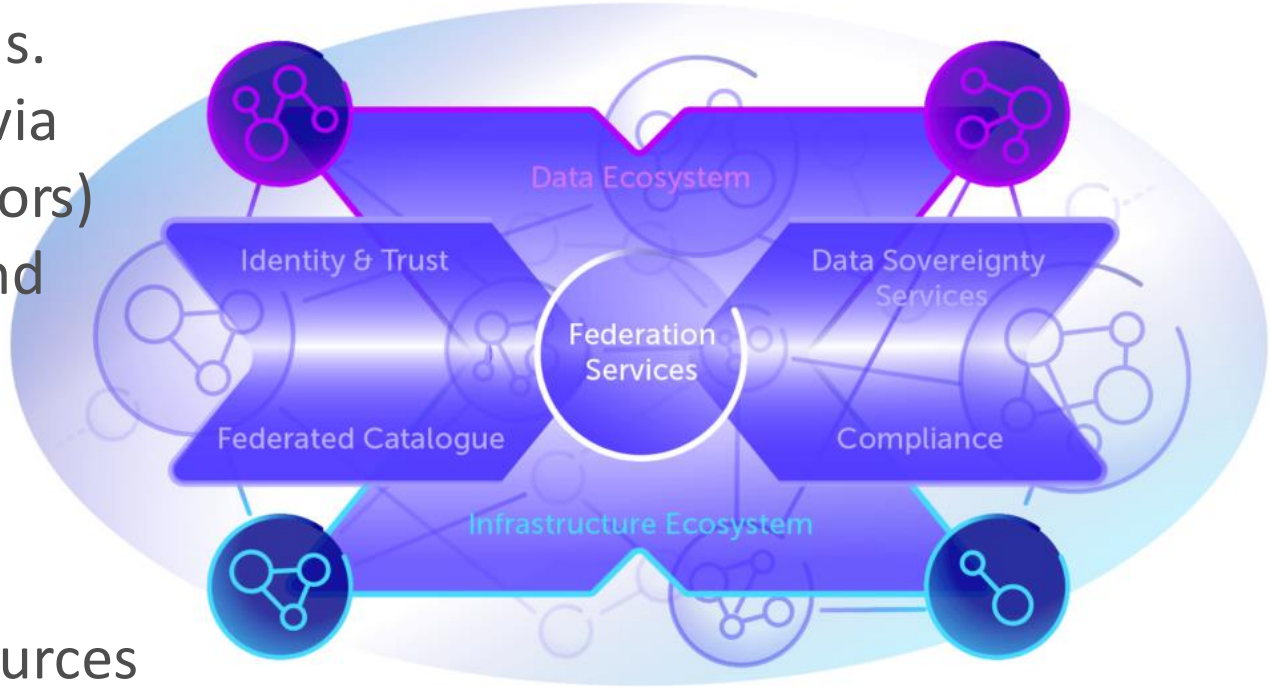
- **Technological enablers:**
  - Federated infrastructure: interoperability, accessibility, discoverability (JRC currently testing Gaia-x)
  - **MLOPs & Modular development.**
  - Develop dedicated cloud-based sandboxes

Resource Card

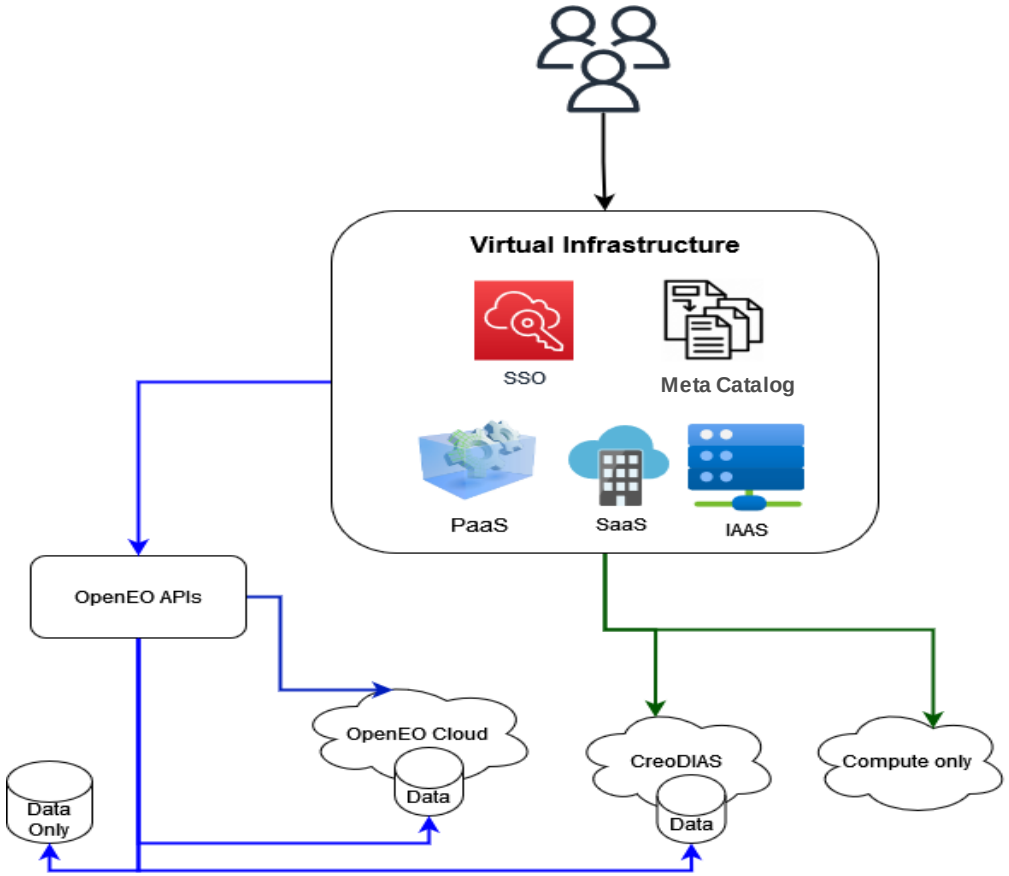
- Id
- Description
- Keywords
- Type (e.g., data, service, model, infrastructure, paper,…)
- Inputs
- Outputs
- Url (e.g., for services)
- Price (?)
- Licensing/Terms of Service
- …

Prototype EuroGEOSS virtual ecosystem: GAIA-X

- Open source
- Gaia-X as a framework for reducing fragmentation and enforce standards.
- Already implements single sign on (via verifiable credentials and trust anchors)
- Trusted identities permit to verify and authorize both providers and users
- Permits to manage infrastructure orchestration
- Facilitate rules enforcement on data
- Descriptors for diverse types of resources



Future developments



Developing the proof of concept of the Virtual infrastructure

Towards a protocol for (self) assessment of the digital platforms based on user's needs:

Interoperability; Accessibility; User's onboarding and satisfaction; Customer care, documentation, webinars, tutorials etc; Customisation; Cost transparency; Discoverability of services; Adoption of open standards and APIs; Licensing; Community

(presentation of M. Di LEO on Friday on "Digital Earth Observation infrastructures and initiatives: a review framework based on open principles")

European Commission

Thank you

European Commission