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EOSC Infrastructure, Resources and services

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European Open Science Cloud (EOSC) Initiative - Historical Context

- EOSC aims to offer a virtual environment for open access to services to store, share, process and reuse research data and other research digital objects, such as software.
  - The EOSC initiative was proposed in 2016 by the EC as part of the European Cloud initiative, funded through the so-called H2020-INFRAEO-SC-2018-2020 (€ 157M).
  - Main objective of HEU destination 2 with 89M€ in the HORIZON-INFRA-2021/22-EOSC-01 calls.

First report from the HLEG EOSC “Realising the European Open Science Cloud”

EOSC Declaration

Launch of the European Open Science Cloud

EOSC-5B Regional Projects

EOSC A foundation

EOSC-A 1st GA

Set-up of the EOSC-A Task Forces

INFRAEO-SC Projects

Start of EOSC-Secretariat

EOSC EB Working Groups

EOSC Future
EOSC Objectives Tree

- It structures the aims of EOSC in terms of people, data and infrastructures.

- Three General Objectives identified.
The Strategic and Research Agenda (SRIA)

• A key document for the implementation of EOSC is the “Strategic Research and Innovation Agenda” (SRIA)

• It states three General Objectives
  • GO1. Ensure that Open Science practices and skills are rewarded and taught, becoming the ‘new normal’.
  • GO2. Enable the definition of standards, and the development of tools and services, to allow researchers to find, access, reuse and combine results.
  • GO3. Establish a sustainable and federated infrastructure enabling open sharing of scientific results.
Stage 1 (2021–2022): Development towards added value from a functional federation of infrastructures. Enabling the EOSC operations (the EOSC-Core) to provide necessary core functions of the Minimum Viable EOSC (MVE) that allow federation of existing and future infrastructures.

Stage 2 (2023–2024): Expansion to production that generates added value. During this period, activities will build on pilots/demonstrators and work towards linking EOSC beyond the research communities.

Stage 3 (2025–2027 and beyond): Expansion to develop impact from Open Science Deployment of federated research infrastructures for European researchers with functionality that provisions actors from multiple communities to deliver impactful Open Science.
EOSC Future

Vision
- Operational EOSC Platform
  - Consisting of data, services, open research products
  - Accessed and used by European researchers
    - Engaged, facilitated, trained, supported

Mission
- To bring the e-Infrastructures and Science Cluster communities together to implement an operational EOSC Platform focusing on technology and interoperability, resources, user engagement and user experience.

Credits: EOSC-Future, Mission and Outcomes, EOSC Symposium 2021
The EOSC MVE Concept:
- **EOSC-Core**: Enabling services required to operate the EOSC.
- **EOSC-Exchange**: Federation services registered to the EOSC by RIs and clusters to serve the needs of users.
- **EOSC Interoperability Framework**: Scientific services provided by RIs and Clusters to the respective communities.
EOSC Core

- EOSC Portal.
- EOSC Resource Catalogue, including a provider portal.
- EOSC Federated AAI.
- Monitoring and Accounting.
- Helpdesk and Security Coordination.
EOSC Exchange

- Horizontal Services provided by e-Infrastructures and Science Cluster Communities.
- Cluster, Community and Regional specific resources such as Thematic/Regional Resources and Portals.
- Execution Framework allowing composability for EOSC resources complying to the EOSC Interoperability Framework.
- The EIF will enable connecting different kinds of resources across thematic domains and infrastructure boundaries.
- The EIF will provide guidelines for providers to connect resources to EOSC-Exchange and EOSC-Core, supporting the composability of resources.
EOSC Future Vision for the Users

• Users have a personalised dashboard integrating ALL services and data necessary for their work
  • Thematic (vertical) - European, regional, national
  • Generic (horizontal) - European, regional, national

• Users log in with their credential (AAI - Authentication and Authorization Infrastructure) and see the personalised environment.

• Users look for new services/datasets and the system is intelligent to recommend relevant services/datasets available (Artificial Intelligence)

• The system includes various metrics, #downloads, ratings and comments, as in modern marketplaces.

• Not a single portal for everybody

Source: EOSC Future, EOSC Services for the Users, 3rd ESFRI RIs - EOSC Workshop: What does EOSC bring to RI users?
EOSC Portal today
https://eosc-portal.uk

Gateway for:
- information about EOSC Users
- discovering resources
- ordering resources
- accessing resources
- composing resources

Resource providers
- onboarding resources
- discovering new users
- integrating with the Core
**EOSC Portal Marketplace – resources**


Currently onboarded:

- **237** Providers
- **312** Resources
- **52** Communities and Infrastructures
- **17** defined target groups

Now started to onboard Catalogues
Next: Training, Data/research products and EIF guidelines
From Infrastructure to Usecases ...

Funded Science Projects within EOSC Future:

1. Climate Change Impact on Biodiversity and Ecosystems in Europe - Assessing the impact of Non-Indigenous Invasive Species (NIS) in European ecosystems (ENVRI FAIR)
2. Dashboard on the State of the Environment (ENVRI-FAIR)
3. COVID-19 metadata findability and interoperability in EOSC (EOSC Life)
4. Imaging Data in EOSC - COVID-19 as Demonstrator (EOSC Life)
5. Indirect Detection of Dark Matter (ESCAPE)
6. Extreme Universe and Gravitational Waves (ESCAPE)
7. Tracing Biostructures (PaNOSC)
8. Dynamics of Biological Processes (PaNOSC)
9. Climate neutral and smart cities (SSHOC and ENVRI-FAIR)
10. Access Management for distributed RIs (SSHOC, EOSC Life)
... and Showcase Integration Stories (SISs)

Demonstrating to Scientists and Researchers how to use EOSC

The beginning...

- Explain the issue to be resolved

Discovery of relevant (thematic) data → Discovery/provision of needed services/resources → Execution of workflow. Visualize the results → Publish the results onto the Research Graph

EOSC and the EOSC Portal

The end...

Summary of how EOSC helped

Supplementary demonstratable functionality: Helpdesk/Ordering
Example SIS - *Indirect detection of Dark Matter using Open Science Tools on EOSC*

- Workflow already possible on ESCAPE resources & published code
- SIS will demonstrate its porting to EOSC
- Input data from Fermi-LAT detector, hosted on ESCAPE RUCIO DataLake
- Core resources needed: EOSC AAI, Portal, Marketplace
- Horizontal resources needed: Jupyter Notebook, Fedcloud VM + storage (EGI-ACE) and Zenodo
- Improved future exploitation via OpenAIRE

[Image: Indirect Detection of DM diagram]

https://indico.cern.ch/event/1173792/contributions/4968444/attachments/2483298/4263342/EOSC-Future_P-Bhattacharjee.pdf
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