An introduction to the EOSC Federation

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EOSC in a nutshell

What

> **EOSC is the European web of FAIR data and related services for research**
> Research data that is easy to Find, Access, Interoperate and Reuse (FAIR)
> Trusted and sustainable research outputs are available within and across scientific disciplines

Why

> **Unlock the full potential of research data to accelerate discoveries and innovation**

How

- **Ensure that Open Science practices and skills are rewarded and taught, becoming the 'new normal'**
- **Enable the definition of standards, and the development of tools and services, to allow researchers to find, access, reuse and combine results**
- **Establish a sustainable and federated infrastructure enabling open sharing of scientific results** → EOSC Federation

European digital and data sovereignty

EOSC stands at the intersection of Europe's strategic priorities

Offers solutions to critical challenges in research, innovation and societal development

Fosters digital sovereignty, inclusivity, trust, and transparency in research and innovation

Supports the Open Science movement

Underpins Europe's broader competitiveness agenda, reinforced by policy recommendations coming from the Letta report, the Draghi report, and the Heitor report on the next Framework Programme (FP10)

Europe's challenge
Underutilisation of vast pool of research data

Risk
Global entities better positioned to capitalise on data, potentially hampering European strategic autonomy and economic security

Solution
Create a European Knowledge Commons

EOSC embodies this ambition by establishing a system for researchers to store, share, process, analyse, and reuse FAIR research outputs

Security in research and data management

eosc

Data sharing in research faces **two challenges**

1 Ensuring **data owner control**

2 Providing a **secure environment** for collaboration

EOSC addresses these issues through its **federation model**

- **Complies with European regulations** such as GDPR, cybersecurity, directives and Data and AI Acts

- Provides a virtual environment where only **authenticated users** can upload high-quality, rigorously vetted data

- Offers **cross-discipline** and **cross-border** services

- Follows **robust security protocols,** ensuring that sensitive data remains protected while being available to drive scientific breakthroughs

Principles for Building the EOSC Federation

The vision for EOSC is to establish a system that enables researchers in Europe to store, share, process, analyse, and reuse FAIR research outputs—such as research data, publications, and software—across disciplines and borders.

- **System of systems approach**: Build on existing and planned infrastructures to create an interconnected ecosystem.
- **Inclusivity and accessibility**: Ensure low barriers to entry, ease of use, and broad participation.
- **Community-driven and participatory**: Engage the research community in co-creating and shaping the Federation.
- **Trust, security, and governance**: Establish clear rules, monitoring, and enforcement mechanisms to ensure a safe and reliable environment.
- **Flexibility and adaptability**: Allow for an evolutionary approach, adapting based on findings and lessons learned.
- **Autonomy and control**: Respect institutional autonomy while ensuring that data and service owners retain full control over shared resources and openness levels.
- **Broad engagement and transparency**: Keep all interested stakeholders informed and involved in key developments.

What is the added value that you see for you and for your users in contributing to the EOSC Federation?

Summary of responses

- Increased visibility and reach

- Collaboration and interoperability

- Support for Open Science and FAIR principles

- Access to broader resources and expertise

- Influence on policy and standardisation

- Sustainability and economic benefits

Scientific use-cases demonstrated
Multi-node scientific use cases

Marine microbiomes	Exploring the impact of marine microbiomes on carbon sequestration
REANA	Cross-node workflow for the analysis of CERN's ATLAS/CMS experiment's open data on the REANA reusable data platform
Galaxy	Cross-node workflow for the processing of imaging data from the environmental and life sciences using the Galaxy platform
Pan-Finder	The photon and neutron federated knowledge finder, PaN-Finder, an AI-enabled data search tool for navigating the large data sets of European Research Infrastructures
MCVAL	A prostate cancer screening tool, MCVAL, that employs multi-centric validation of AI models
AMR	Federated analysis of pathogen genomes

A small selection of the many use-cases being undertaken with the Nodes

OSCARS FIESTA: FAIR Image Ecosystem for Shared Tools & Analysis

Communities
with similar image analysis needs
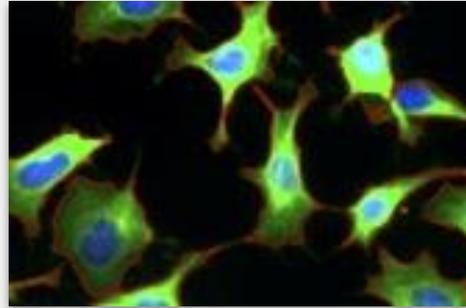
BIOIMAGING
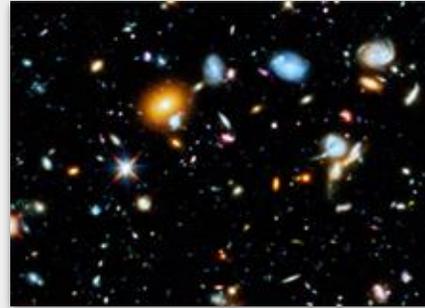
ASTRONOMY
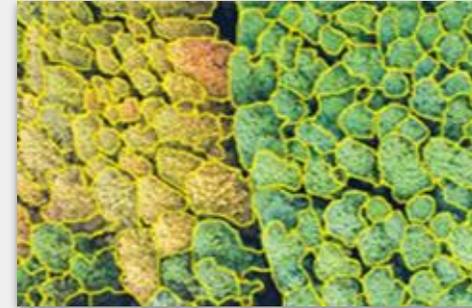
ENVIRONMENTAL SCIENCES

FAIR-enabling resources
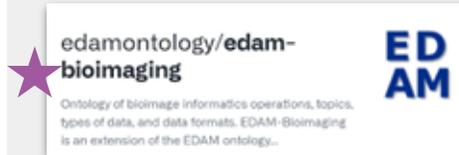
Workflows
as a service

★ Resource listed in the EOSC EU Node

https://www.oscars-project.eu/projects/fair-image-analysis-across-sciences

1 Develop **reusable** image analysis workflows between scientific domains

2 Embed the **FAIRification** of the diverse image data, analysis tools and workflows into the research process

3 Raise **awareness**, foster **knowledge transfer** and strengthen **capacity building** efforts across disciplines

Nodes engaged in 2025

∽ eOSC | Federation

∽ eOSC Node | PaNOSC
Physical Sciences & Engineering

∽ eOSC Node | Digital Twin of the Ocean
Environment

EOSC Node | European Commission

∽ eOSC Node | Poland

∽ eOSC Node | Italy

∽ eOSC Node | CERN
Physical Sciences & Engineering

∽ eOSC Node | Slovakia

∽ eOSC Node | Germany

∽ eOSC Node | Data Terra
Environment

∽ eOSC Node | EUDAT
Data, Computing and Digital
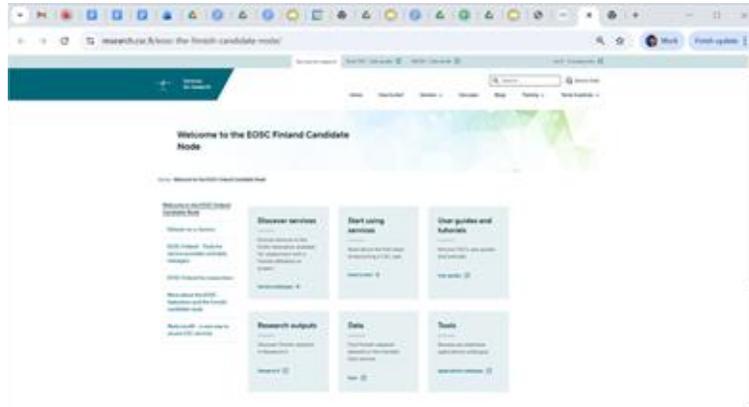
∽ eOSC Node | Finland

∽ eOSC Node | SURF
The Netherlands

∽ eOSC Node | BBMRI-ERIC
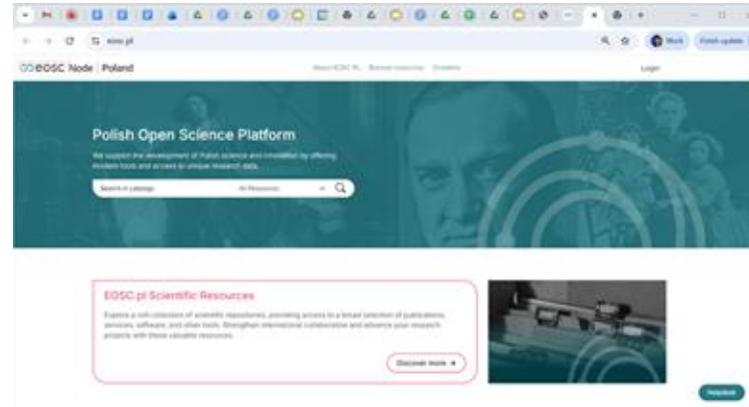Health & Food

∽ eOSC Node | Life Sciences Connect
Health & Food

Federating many service and research product catalogues - and growing!
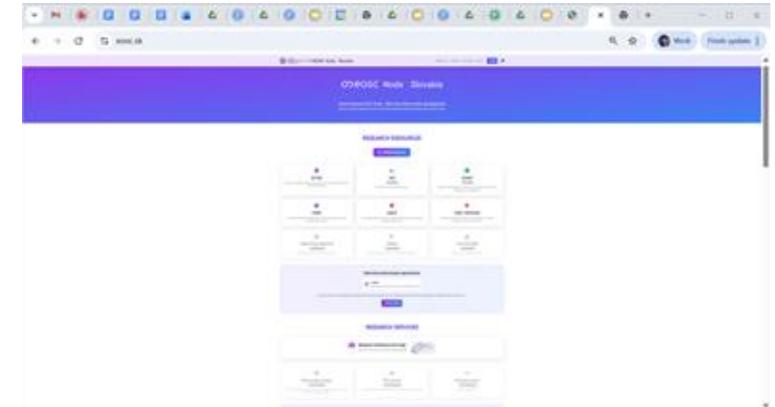
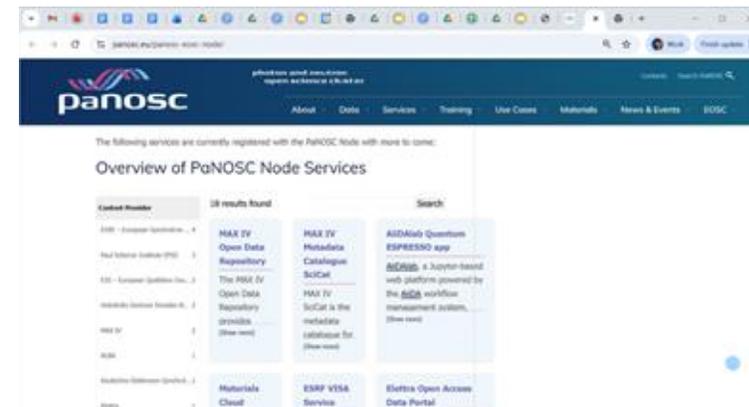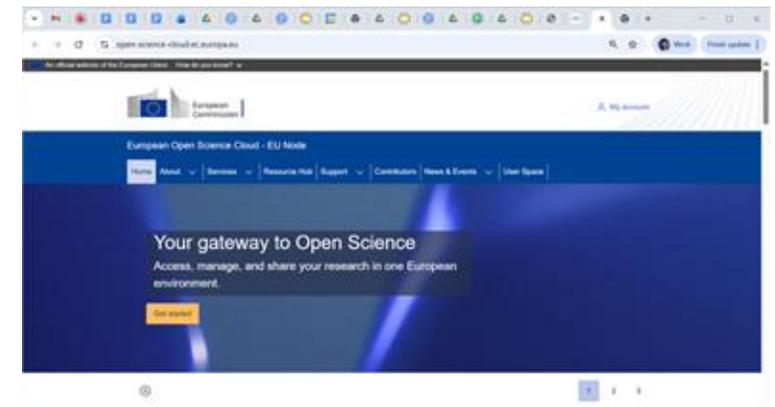# EOSC Federation Node examples

Finland

Poland

Slovakia

Digital Twin of the Ocean

PaNOSC

EU Node

https://eosc.eu/building-the-eosc-federation

Available via the EOSC EU Node

Discover European Research Outputs

Search in all resources   🔍 Search

Search by Resource type

PUBLICATIONS   DATA   SOFTWARE   OTHER PRODUCTS   SERVICES

DATA SOURCES   TRAINING RESOURCES   INTEROPERABILITY GUIDELINES

Explore the Resource Hub >

Services offered by EOSC EU Node

- **Bulk Data Transfer:** Move data effortlessly to data-intensive execution environments
- **Large File Transfer:** Streamline large file transfers online with added security and integrity
- **Virtual Machines:** Design and conduct experiments with flexibility while ensuring reproducibility
- **Cloud Container Platform:** Deploy cloud-native containerised applications that can easily scale
- **Interactive Notebooks:** Create and share documents with real-time code execution
- **File Sync & Share:** Enable automatic file syncing and secure sharing across locations and teams

EOSC Federation Handbook

EOSC | Tripartite
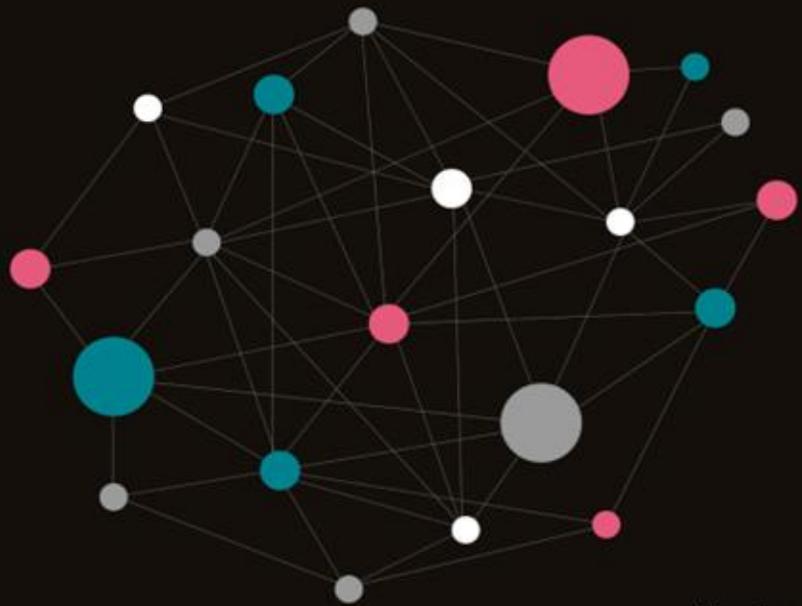
Version 2.0

Revised in January 2026 with first wave deployment experiences

The EOSC Federation Handbook has been written by a group of **volunteers**

The Handbook provides an overview of the organisational and operational structure, services and characteristics, of the EOSC Federation

Thank you for your attention.