



EOSC: From the EOSC EU Node to the EOSC Federation

E-IRG Workshop under Hungarian Presidency

(25-26 November 2024)

Yannis Rodopoulos
European Commission, DG Research & Innovation
Unit A4 Open Science & Research Infrastructures

#EOSC #EOSCTripartite
#OpenScience #EUResearchArea

Research and
Innovation



EOSC, for the digital transformation of research

What is EOSC?



- **A (policy) process**

- Accelerate Open Science, FAIR data management and use of digital methods and services
- Stimulate co-operation in science and research, new insights and innovations, higher research productivity and improved reproducibility in research.

- **An open and trusted Federation of collaborative and autonomous infrastructures (system of systems, web of distributed Nodes)**

- Applying agreed, consensus-based policies and rules of participation
- Enable European researchers to store, share, process, analyze, and reuse research digital objects (e.g. data, publications and software)

- **An evolving ecosystem**

- Bringing together the European Commission, the governments and the many R&I stakeholders involved in the European Research Area
- Co-created across European, national, and institutional levels

EOSC, an EU policy priority

- **EU Strategy for Data:** EOSC is the basis for a science, research and innovation data space that will be connected and fully articulated with the sectoral data spaces.
- **European Research Area (ERA) Policy Agenda - Priority Action 1:**
Enable the open sharing of knowledge and the re-use of research outputs, including through the development of the European Open Science Cloud (EOSC).



Outcomes of Priority Action 1:

1. Deploy Open Science Principles and identify Open Science best practices.
2. Deploy the core components and services of EOSC and **federate** existing data infrastructures in Europe, working towards the interoperability of research data.
3. Establish a monitoring mechanism to collect data and benchmark investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC.

EOSC, next ERA policy agenda, current proposals

Deepening an internal market for knowledge

- **Enabling Open Science**
- Equity in Open and Responsible Research
- **Research Infrastructures**
- Inclusive and intersectional gender equality
- Research Careers
- **Research Assessment**
- Fundamental research and scientific leadership
- Establishment of a European Science for Policy ecosystem
- Knowledge Valorisation
- Freedom of Scientific Research
- **AI in science and research in the EU**
- Global Approach to R&I
- Knowledge Security

I. Pact priority area

II. Pact priority area

III. Pact priority area

IV. Pact priority area

Green and digital transition

- Revamping the SET Plan (merger with Renewable Energy Valleys, tbc)
- Greening Research: first steps towards sustainable research practices
- Non-animal approaches in biomedical research and testing pharmaceuticals
- A harmonised framework to support integrity and ethics in R&I
- Unleashing the full R&I potential of Europe's universities
- Industrial transformation for Europe's competitive sustainability and strategic autonomy
- Citizen Engagement, including trust in science for a stronger and more democratic European society

Research and innovation excellence

- Improve EU-wide access to excellence
- An new ERA for Research Management

Investments and reforms

- An R&I foresight community of practice

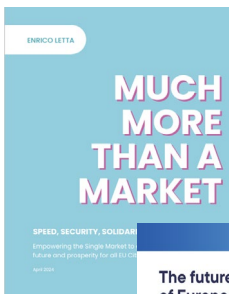


European Commission

EOSC, keeping the policy momentum

Letta

*Much more
that a Market*



“A central pillar of this strategy is the **creation of a European Knowledge Commons** – a centralised, digital platform providing access to publicly funded research, data sets, and educational resources. ...”

Draghi

*The future of European
competitiveness*



“An important factor that would enhance R&I capacity is the availability of **world-leading research and technological infrastructure, capable of serving the whole European ecosystem**”

“The EU’s efforts to hone its competitive edge need to be guided by European values, [...] such as academic freedom and independence, research integrity and ethics, transparency, diversity, inclusion, gender equality, **open science and open access to scientific publications and research data.**”

Heitor et al.

*Align, Act, Accelerate.
Research, technology and
innovation to boost European
competitiveness*



“The European Open Science Cloud (**EOSC**) is a **key enabler of the digitalisation of research infrastructures** while delivering the European Data Space for research data. **It has potential to become the most generally used infrastructure in Europe**”.

Main objectives of a strategy?

- Mission Letter: “... I would like you to prioritise the foundations that foster knowledge and innovation, notably through a long-term strategy to boost European Research Infrastructure, with the aim of **creating a pan-European ecosystem of research infrastructures and services ...**”
 - Answers to questionnaire: “... a European Strategy on Research Infrastructures will **address the accessibility, resilience, and security of our infrastructures**, to allow researchers to test and develop their ideas ...” & “... I will present a European Strategy on Research Infrastructures to **ensure European researchers and innovators have access to world-class facilities and services and make full use of them**, with a **focus on industry, SMEs and startups ...**”
 - Hearing: “... I ... support **investment** in research and technology infrastructures ...” & “... the research infrastructure ... is really important ... that's why one of the priorities for my mandate will be to propose research and technology in a strategy to **develop our infrastructure ...**” & “... I think this is the way forward, to **create a better environment for our young researchers** to improve the research and innovation infrastructure as well ...” ...
-
- “Ecosystem”: streamlining, prioritising – based on landscape analysis, performance monitoring, roadmapping ...
 - “Investment”; “resilience and security”: funding resources, energy and supply, digitalisation, greening of RIs, research security ...
 - “Accessibility”: integrated and sustainable scheme for access to RIs, adapting to user communities, incl. industry ...
 - Also: attracting and growing talents, RIs as hubs for international collaboration ...

EOSC, the **Federation** and its value proposition

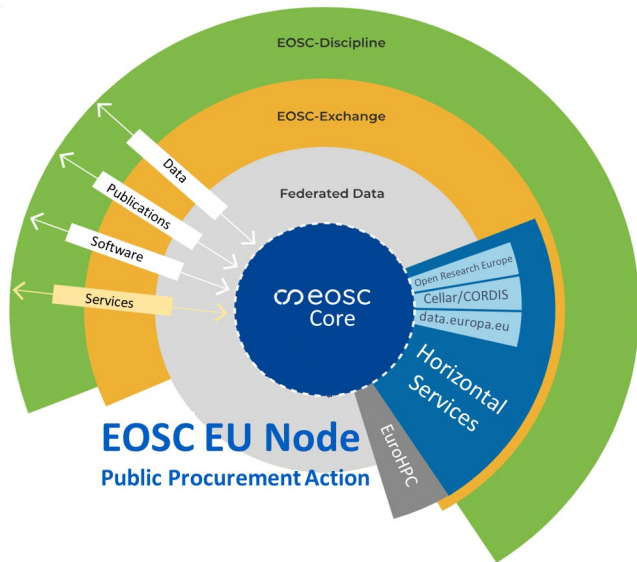
EOSC as an open and trusted **Federation of collaborative and autonomous infrastructures, a web of distributed **EOSC Nodes**:**

- **Economies of scale:** **EOSC Nodes** will take advantage of commonly pooled resources and functionalities, enabling them to focus on their core business.
- **Interdisciplinarity:** EOSC will make a step change in fertilizing research that cuts across established disciplinary boundaries, while increasing visibility and re-use of discipline-specific data and services.
- **Research security:** Researchers will find in EOSC a trusted and sovereign environment where they can securely store, analyse and share their results and collaborate within and across disciplines.
- **Enabling AI:** By pooling massive amounts of high-quality FAIR research data, software and compute, and by connecting to other common European data spaces, EOSC aspires to become a key driver of European leadership in AI for science.
- **Policy implementation:** Infrastructure and service providers that will enrol in EOSC will seamlessly comply-by-design to the EU's research and digital policies that are enshrined in the rules and policies of the **EOSC Federation**.

Rollout of the **EOSC Federation** (I), the **EOSC EU Node**

The **EOSC EU Node** provisioned from the European Commission and its value proposition:

- **Facilitate** the creation of the “*Web of FAIR data and interoperable services*” (aka. **EOSC Federation**) under the Open Science Policy
- **Put** a “*seed in the ground*” by operationalizing the first recognised **EOSC Node** at the European level for the initial 3 years
- **Offer** “*core services*” for scientific research infrastructures to federate (single-sign-on, catalogues, knowledge graph, application workflow, monitoring, accounting, helpdesk) and common “*horizontal services*” for end-users to benefit from (compute, containers, data transfer, notebooks, file sharing, open research data)
- **Define** the *pathway and blueprint* (EOSC Interoperability Framework) for other potential **EOSC Node** operators to join the federation

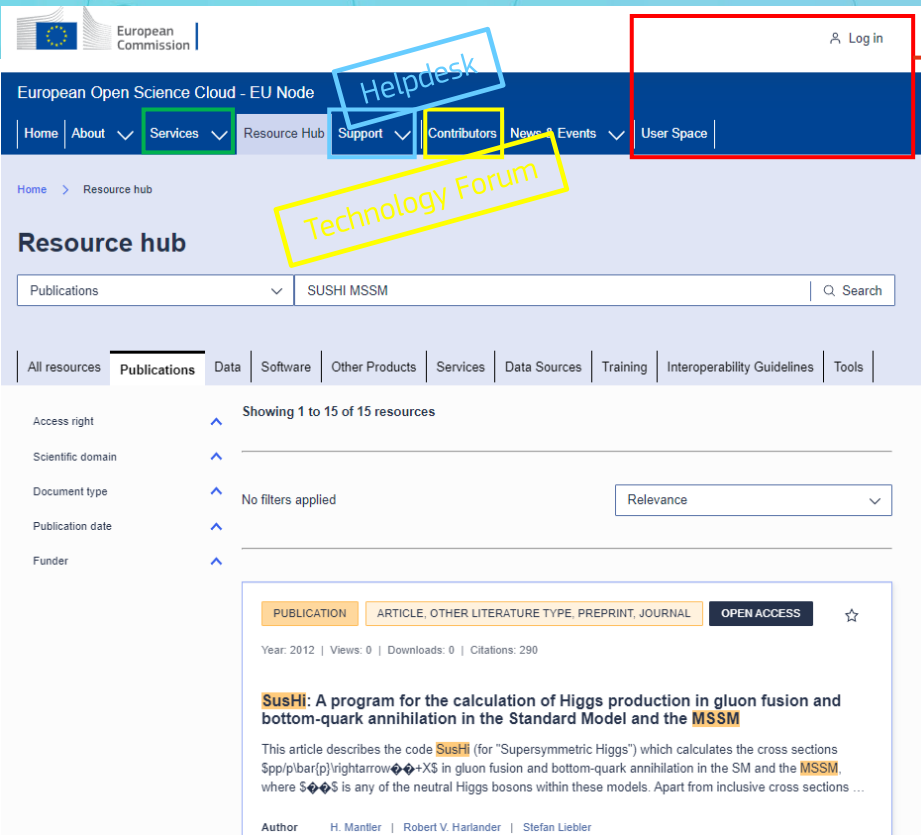
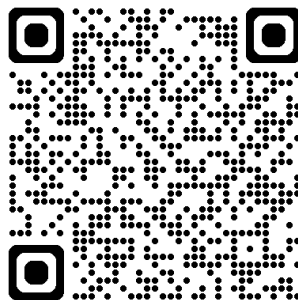


Can I use it? Yes, you can! Launched at EOSC Symposium in Oct. 2024!

Rollout of the **EOSC Federation (I)**, the **EOSC EU Node**

How can I use it? Go to:

<https://open-science-cloud.ec.europa.eu/>



European Commission

European Open Science Cloud - EU Node

Home | About | Services | Resource Hub | Support | Contributors | News | Events | User Space | Log in

Home > Resource hub

Resource hub

Publications | SUSHI MSSM | Search

All resources | **Publications** | Data | Software | Other Products | Services | Data Sources | Training | Interoperability Guidelines | Tools

Showing 1 to 15 of 15 resources

Access right | Scientific domain | Document type | Publication date | Funder

No filters applied | Relevance

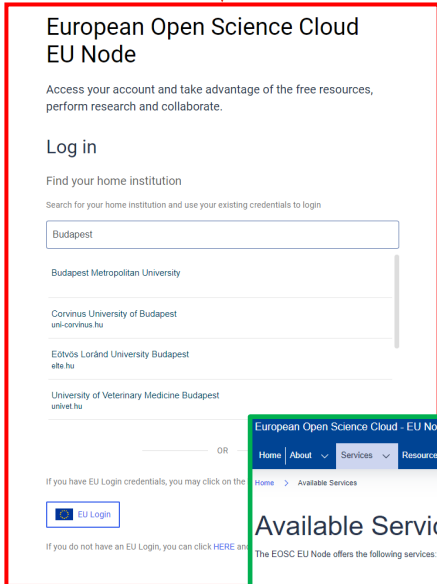
PUBLICATION | ARTICLE, OTHER LITERATURE TYPE, PREPRINT, JOURNAL | **OPEN ACCESS**

Year: 2012 | Views: 0 | Downloads: 0 | Citations: 290

SushI: A program for the calculation of Higgs production in gluon fusion and bottom-quark annihilation in the Standard Model and the MSSM

This article describes the code **SushI** (for "Supersymmetric Higgs") which calculates the cross sections $\sigma_{pp \rightarrow b\bar{b}(\gamma)} \rightarrow X S$ in gluon fusion and bottom-quark annihilation in the SM and the **MSSM**, where S is any of the neutral Higgs bosons within these models. Apart from inclusive cross sections ...

Author: H. Mantler | Robert V. Harlander | Stefan Liebler



European Open Science Cloud EU Node

Access your account and take advantage of the free resources, perform research and collaborate.

Log in

Find your home institution

Search for your home institution and use your existing credentials to login

Budapest

Budapest Metropolitan University

Corvinus University of Budapest
uni-corvinus.hu

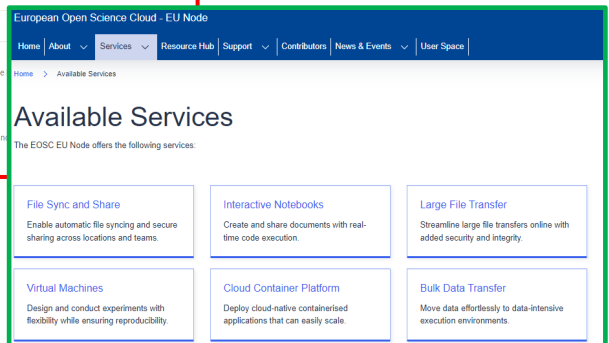
Eotvos Lorand University Budapest
elte.hu

University of Veterinary Medicine Budapest
univet.hu

OR

If you have EU Login credentials, you may click on the **EU Login**

If you do not have an EU Login, you can click [HERE](#) and



European Open Science Cloud - EU Node

Home | About | Services | Resource Hub | Support | Contributors | News & Events | User Space

Available Services

The EOSC EU Node offers the following services:

- File Sync and Share**
Enable automatic file syncing and secure sharing across locations and teams.
- Interactive Notebooks**
Create and share documents with real-time code execution.
- 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.
- Bulk Data Transfer**
Move data effortlessly to data-intensive execution environments.

EOSC EU Node: User Space

European Commission

EOSC EU Node

Resource Hub

Stefan LIEBLER user

Logout

Overview

Notifications

Tools Hub

SERVICES

File Sync & Share

Interactive Notebooks

Large File Transfer

Cloud Container Platform

Virtual Machines

Bulk Data Transfer

Other Services

GENERAL

Groups

Orders

Credits

Favourites

Settings

QUICKLINKS

Helpdesk

Resource Hub

Monitoring

Training Platform

Credits

Overview of your credits.

Your credits

90

Remaining credits

78 days

Next refresh

Services

File Sync & Share

10 credits consumed in this period

[View Service >](#)

Interactive Notebooks

Access enabled

[View Service >](#)

Virtual Machines

Not available
Please read our [User Access Policy](#) for more information

[View Service >](#)

Cloud Container Platform

Not available
Please read our [User Access Policy](#)

[View Service >](#)

What are credits?

Credits are your virtual currency within the EOSC EU Node which you can spend to consume select services according to your needs.

Credits have no monetary value and are used exclusively in the EOSC EU Node to allow a fair, transparent, and equal access to its services across the entire European research community.

Credits are provided to you for **free of charge (at the point of use)** by the European Commission the first time you log in and are **automatically** renewed every three months. You can find all your spending history and remaining credits in your personal wallet. Please remember that you cannot transfer your credits to another person or between periods.

File Sync & Share

Enable automatic file syncing and secure sharing across locations and teams.

ownCloud infinite Scale can be accessed via a web browser, desktop app or mobile app. To find instructions on how to use these features, please refer to the [ownCloud](#) and [ownCloud Infinite Scale](#) documentation. You may also check out the [ownCloud Web for Users](#), the [Desktop App for Windows, Linux, and macOS](#), the [Desktop App for Android](#), and the [Mobile App for iOS](#) documentation.

Note: The directory "notebooks_service" will automatically sync files to the Interactive Notebooks service. The "notebooks_service" directory will not be visible in the Interactive Notebooks service.

[Open in OwnCloud](#)

Personal Shared with me

Root

Create folder

Upload file

	Name	Size	Owner
	notebooks_service	189.71 mb	Stefan LIEBLER

European Commission | EOSC EU Node | File Sync & Share Platform

Enter search term

Personal

+ New Upload

Personal

Shares

Spaces

Deleted files

notebooks_service 198.9 MB

1 item with 198.9 MB in total (0 files, 1 folder)

Interactive Notebooks

Create and share documents with real-time

About the service

90

Credits

Actual total credits remaining in this period. Refreshes every 90 days.

Running Servers (1)

Small

vCPUs:	2
GPU:	-
RAM (GB):	4
Storage (GB):	50

More info

0.04 credits / hour

Stop

View externally

The screenshot shows the 'Launcher' interface with a sidebar on the left containing navigation icons for IP, a search icon, a list icon, and a star icon. The main area is divided into three sections: 'Notebook', 'Console', and 'Other'. The 'Notebook' section contains icons for Python 3 (ipykernel), Julia 1.10.4, Octave, Pluto Notebook, R, and RStudio. The 'Console' section contains icons for Python 3 (ipykernel), Julia 1.10.4, Octave, and R. The 'Other' section contains icons for Terminal, Text File, Markdown File, Julia File, Python File, R File, and Show Contextual Help. The 'Terminal' icon is highlighted with a blue box.

```
#!/usr/bin/bash

echo "Result of EOSC Federation build-up:" > result.txt

timestamp() {
  date +"%T" #current time
}

echo "Time: $(timestamp)" >> result.txt

for i in 1 2 3 4 5
do
  echo "EOSC Federation loading: $i Nodes" >> result.txt
done

echo "Time: $(timestamp)" >> result.txt

echo "EOSC Federation is a success." >> result.txt
```

EOSC EU Node: User Space

The screenshot shows a terminal window titled 'Terminal 2' with the following output:

```
Result of EOSC Federation build-up:
Time: 14:26:33
EOSC Federation loading: 1 Nodes
EOSC Federation loading: 2 Nodes
EOSC Federation loading: 3 Nodes
EOSC Federation loading: 4 Nodes
EOSC Federation loading: 5 Nodes
Time: 14:26:33
EOSC Federation is a success.
```

Real scientific use cases:
 EOSC Symposium 2024, Day 3
 Deep dive into the EOSC EU Node
<https://eosc.eu/eosc-symposium-2024-outcomes-and-resources/>

Live demo at the Technical launch event:
<https://open-science-cloud.ec.europa.eu/news/technical-launch-european-open-science-cloud-eosc-eu-node-sets-stage-successful-deployment>

Rollout of the **EOSC Federation** (II)

EOSC Tripartite Group (EC, MS/AC, EOSC Association):

Established in April 2024 by the *EOSC Tripartite Governance* with the aim of developing commonly agreed positions and providing strategic steering for what concerns the establishment, operation, and future development of the **EOSC Federation**.

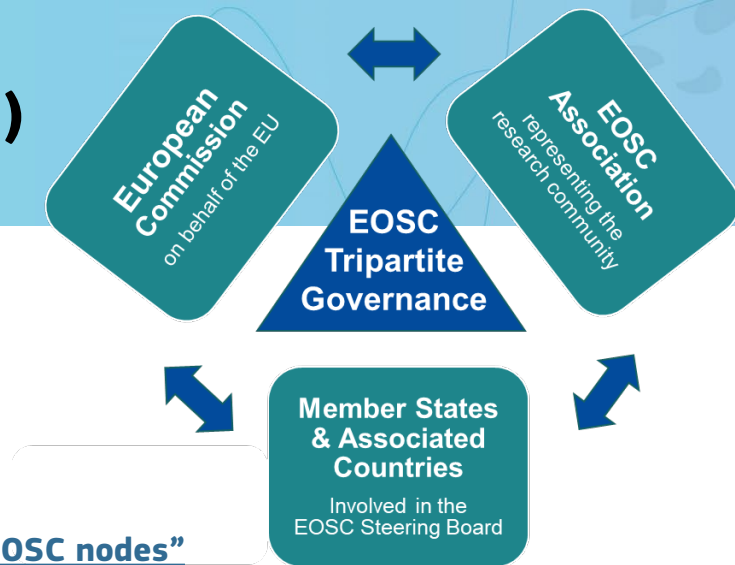
Document on “ **Building the EOSC Federation: requirement for EOSC nodes**”

Set requirements on: Legal status, quality service provision, capacity to onboard third-party services and to contribute to EOSC core capabilities, compliance with EOSC Federation rules and standards, monitoring, community engagement and sustainability.

EOSC Federation Handbook (in progress, led by EOSC-A)

Questionnaire for parties interested in joining the build-up phase of the EOSC Federation

121 organizations replied to the questionnaire between June and August 2024.



Rollout of the EOSC Federation (III)

Build-up phase of the EOSC Federation (kick-off early 2025):

Goal: to achieve a first realization of an operational EOSC Federation towards the end of 2025, with several nodes (including the EOSC EU Node) interconnected and enabling the sharing of resources, i.e. data and services, and the demonstration of EOSC added value in practice.

Identification of Potential Candidate Nodes

- Readiness contribute to the goals of the build-up phase
- Maturity and accessibility of resources
- Diversity (geographic scope, thematic, type, etc.)

Dialogue phase

- Improved understanding of the vision and readiness (organisational aspects, technical capabilities, compatibilities, maturity, offered resources, etc.)
- Co-creation of roadmap for the build-up phase

Identification of Candidate Nodes

- Organisations invited to kick-off the build-up phase.
- Voluntary work. No financial support foreseen for orgs joining the build-up phase.

Successive waves of enrolment on nodes and onboarding of services (timing & frequency tbd)

Continuous engagement of all interested organizations on relevant developments and decisions

EOSC, alongside the Federation

EOSC post-2027: Discussion of the Tripartite Governance on future governance, finance and operations of EOSC

- Further development and deployment of the Federation
- Providing input to the next EU Framework Programme

Horizon Europe support to EOSC:

Horizon Europe (2021-2027) support to EOSC ~ EUR 490 million

2021-23

- **27 funded projects**, 587 participations
- **1 procurement** action for EOSC EU node

2024

- **9 new projects** selected for funding

2025-27: INFRAEOSC destination fully embedded in the Strategic Orientations for 2025-27 Research Infrastructures Work Programme.

- WP25: adoption expected for April 2025
- WP26-27: adoption expected for December 2025

Key Inputs for WP25:

- EOSC Partnership and the EOSC Strategic Research & Innovation Agenda
- EOSC Steering Board opinion papers
- ESFRI-EOSC Task Force recommendations
- Stakeholder consultations



Thank you!



© European Union 2024

Unless otherwise noted the reuse of this presentation is authorised under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license. For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders.