EGI Annual Report 2023

Propelling Research and Innovation Through Collaboration and Support

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Foreword

Tiziana Ferrari

Director of the EGI Foundation

In 2023 EGI Federation celebrated 20 years of activity, and it is a privilege for me to open this annual report which I hope will reach many of those who contributed with their passion, dedication and excellence to this milestone.

This report well illustrates how the collective efforts of our participants and partners contributed to the reliable operation of our federated infrastructure, while always keeping an eye on innovation to advance data-intensive computing for research excellence in Europe and beyond, in all domains of science. I believe the ultimate measure of our success rests on the ability to continuously support the day-by-day needs of large-scale distributed computing and data access, while advancing our technical solutions together with research collaborations from all domains of science. It is not an easy task but the pooling of our efforts from hundreds of data centres and research collaborations worldwide, makes all of this possible.

2023 saw the successful closure of the EGI-ACE project, a flagship project of the EOSC initiative, which demonstrated how research can be accelerated by democratising access to federated computing resources, data and data analytics tools through transnational access and tailored technical support. In 30 months we supported more than 200 different research projects and collaborations, impacting 77,000 active researchers worldwide. EGI Federation currently services hundreds of different research initiatives, including 20+ Research Infrastructures from the ESFRI roadmap and 55 different international research projects.

We increased effort in supporting existing and new research collaborations. Some of these efforts resulted in new project collaborations in physics, environmental sciences, cancer research and the digital humanities. But the number of domain-specific support actions is broader and this report gives a good illustration of the span of this community effort.

I am also proud to say that the EGI Foundation continued its efforts in increasing the quality and professionalism of our mandated community coordination tasks. In 2023 we achieved our first ISO 27001 certification and much more...

Happy reading!

Volker Guelzow

EGI Council Chair

I am honoured to introduce you to our Annual Report 2023. After one year at the helm of the EGI Council, I am happy to say that the EGI Federation has already achieved a lot of progress in many of the future directions I set at the beginning of my mandate.

First and foremost I am happy to see how the EGI Community is increasing its innovation efforts to empower researchers meeting the requirements of the coming decade.

The amount of data gathered, shared and processed in frontier research is set to increase steeply in the coming decade, leading to unprecedented data processing, simulation and analysis needs. In particular, High Energy Physics and Radio Astronomy are gearing up for groundbreaking instruments, necessitating infrastructures many times larger than the current capabilities. In this context, in 2023 we prepared the grounds to the EU-funded SPECTRUM project, bringing together leading European science organisations and e-Infrastructure providers to formulate a Strategic Research, Innovation, and Deployment Agenda (SRIDA).

In the domain of environmental science, we joined efforts with the ENVRI Science Cluster to consolidate and advance the robust conceptual and technical structure to provide interdisciplinary data-driven services. These services will support climate change research, including the development of mitigation and adaptation measures and strategies, and the assessment of the climate change risks. With this action we are delighted to put sustainable development goals at the centre of our activities.

Next to this, I am delighted to see that the community is joining forces with major research collaborations and research infrastructures to address the need of AI/ML solutions combined with large distributed research data and model training and servicing. The iMagine project is tackling this challenge focusing on AI/ML applied to imaging data from aquatic science, an AI/ML application use case that is expected to bring breakthrough improvements in the ability of scientists to extract knowledge from vast amounts of data. Complementing this, with the interTwin project we are also conducting research and innovation to co-design and implement the prototype of an interdisciplinary Digital Twin Engine (DTE) – an open source platform based on open standards that has the ambition to integrate with application-specific Digital Twins (DTs) accelerating the process of AI/ML scientific software development.

All these efforts are setting a new chapter of EGI, where existing capabilities of our technical infrastructure are increasingly expanded with dedicated research and innovation actions together with research communities.

Advanced Computing Services for a Data-Driven Future

In 2023, the ever-growing volume of scientific data continues to drive the need for powerful and sophisticated computing solutions. EGI, Europe's leading infrastructure of advanced computing services, remains at the forefront. For the past two decades, EGI has empowered a vibrant community of **over 95K researchers from Europe and beyond** by prioritising complex and large-scale research computing needs. This strategic focus allows EGI to provide in-depth support and expertise, fueling groundbreaking discoveries in diverse scientific disciplines.

20 years with EGI campaign

View our 20 years with EGI campaign by scanning this QR code.

egi.eu/20-years-with-egi

20 Years on the Road to Empower Research

2002

2002 A first large scale experimental facility for distributed computing is successfully demonstrated by the partners of the DataGrid project.

2010

2010 The EGI Foundation is created and the first EGI flagship project EGI-Inspire is launched.

2013

2013 The scientific accomplishments of LHC are formally acknowledged with the Nobel Prize in Physics 2013 awarded to François Englert and Peter W. Higgs. LHC conceptualised distributed computing as a new approach to data-intensive science and successfully proved its viability at worldwide scale.

2017

2017 LIGO/Virgo scientists behind the detection of gravitational waves are awarded the Nobel Prize in Physics 2017. The collaboration relied on some of the largest European research data centres that are part of the EGI Federation.

2019

2019 The EGI infrastructure breaks the record of +1 Million core hours and +1 Exabytes of research data federated worldwide.

Today

Today, EGI is proud to support over 95,000 users with their advanced computing needs.

Key Highlights

2023

January

EGI reaches a new record, delivering more 7B CPU Hours through the EGI High-Throughput Compute platform

February

EGI celebrates 20 years of operations

May

A new service catalogue was published, highlighting real-world applications of our services across different user communities

June

EGI2023 took place in Poznań, Poland – over 240 participants attended the conference, project meetings, and training sessions in person, with an additional 85 joining online.

July

EGI receives a positive evaluation for three new flagship project proposals: EOSC-Beyond, ENVRI-Hub NEXT and SPECTRUM

September

EGI-ACE partners concluded a successful project review, further validating its excellence and impact. EGI-ACE served more than 104K users and its service orders represented 35% of all EOSC service access orders.

November

The Commission announces winners of the public procurement action for the delivery of the EOSC EU Node, Procurement with EGI Foundation and partners participating in the delivery of both EOSC Core components and EOSC Exchange services.

At EBDVF 2023, EGI showcased its commitment to excellence by securing the prestigious BDVA i-Space GOLD label.

Accelerating Research in 2023

2.8K[1]
Enabled articles

+7.0B
HTC CPU hours consumed

+372M
Computational jobs

95K
Users

+82M
Cloud CPU hours consumed

29
EGI Council participants

36
EU funded projects

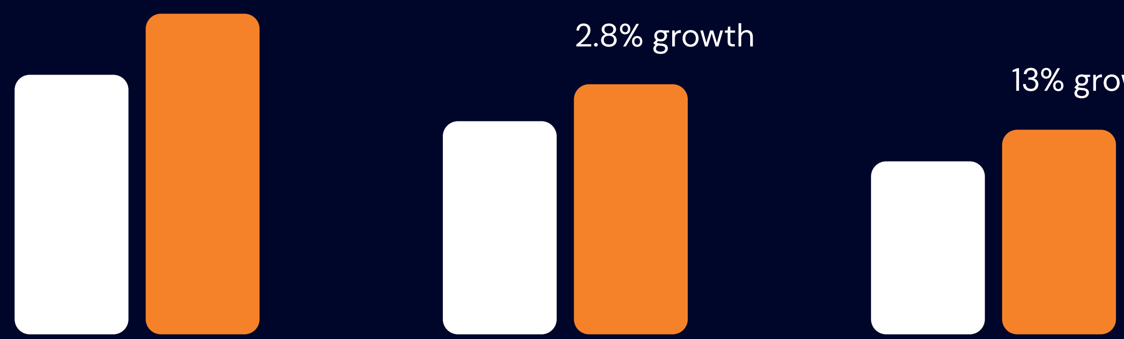
[1] The number of publications is based on data provided by OpenAIRE Explore.

Our Trends in Numbers

17% growth

2.8% growth

13% growth



82M
Cloud CPU hours consumed

37
EU funded projects

95K
Users

60.1% growth

-1.4% growth

2.8K
Enabled articles [2]

7.0B
HTC CPU hours consumed [1]

2022

2023

[1] GPU usage accounting data is not included in these statistics. It is expected to get deployed in production in 2024, and the decrease is related to an increased use of GPU by certain research collaborations.

[2] The number of publications is based on data provided by OpenAIRE Explore.

About EGI

EGI - Advanced Computing for Research

At EGI, we firmly believe that research is the driving force behind human progress. We aim to empower data-intensive research by providing a comprehensive suite of advanced computing services. Our offerings encompass high-throughput and cloud computing, storage and data management, analytics, consultancy and support, as well as training and co-development opportunities. Through continuous innovation, we enhance our services and technology, fostering international collaborations, sharing knowledge, and creating avenues for professional growth and acquiring expertise.

EGI Guiding Principles

Vision

EGI

All researchers should have seamless access to services, resources and expertise to collaborate and conduct world-class research and innovation.

Mission

EGI Federation

Deliver open solutions for advanced computing and data analytics in research and innovation.

EGI Foundation

Enable the EGI Federation to serve international research and innovation together.

EGI Structure

EGI Federation

EGI is a federation of computing and storage resource providers united by a mission of delivering advanced computing and data analytics services for research and innovation.

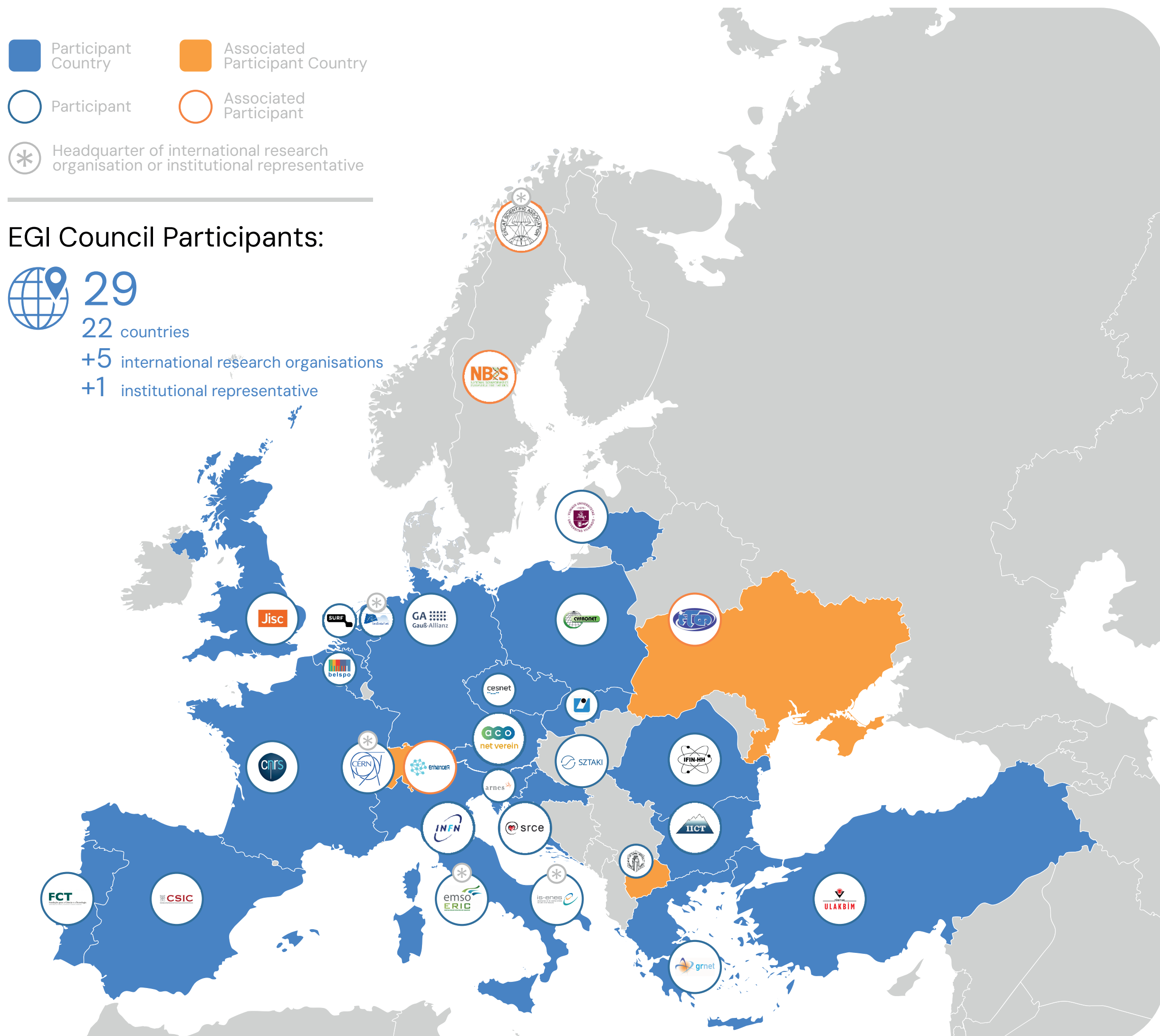
EGI Foundation

EGI Foundation is a not-for-profit organisation created to coordinate and develop the EGI infrastructure and engage diverse users of our broad service portfolio.

EGI Community

The EGI community is a community of researchers, developers, funders, technologists, dreamers and do-ers: anyone with a stake in advanced computing for research.

EGI Members



Why to Join Us?

Join the EGI Federation

View the Join the EGI Federation brochure here

egi.eu/publication/joining-the-egi-federation/

EGI Services

Services for Research

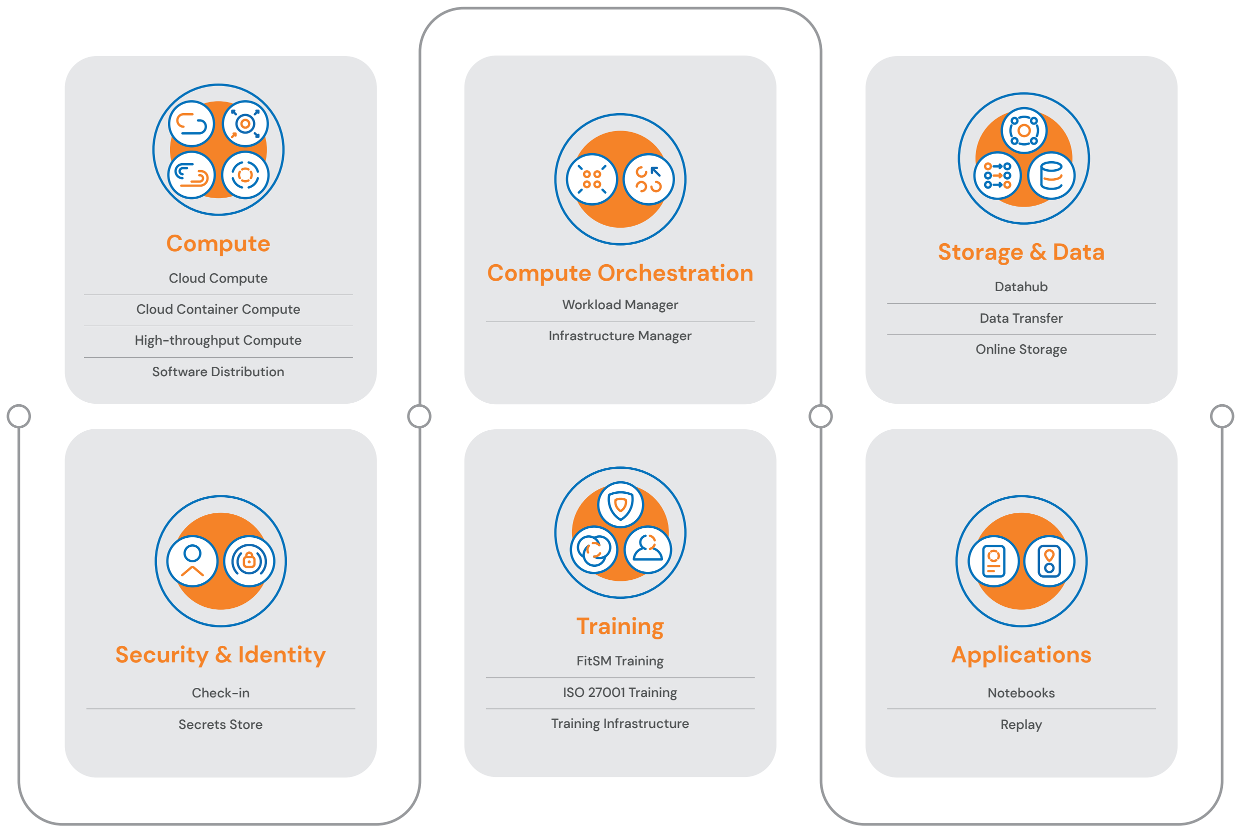
Our large-scale computing and data analytics services are helping scientists to accelerate the process leading to research outputs.

Services for Federation

Our internal services are primarily serving the EGI Council members and affiliated organisations. They improve how we, as a federation, work together.

Services for Business

Our business engagement programme is organised within EGI DIH, a virtual space where companies and technical service providers meet to test solutions before investing.



Services for Research

You can read in detail about all the services on our website[2].

[2] https://www.egi.eu/services/research/

Service Catalogue

Service Catalogue

View the Service catalogue brochure here

egi.eu/publication/egi-service-catalogue

Our Users

Research Sector
Research communities and research infrastructures
International research projects and research collaborations
Small international groups and individual researchers

Private Sector
Small medium enterprises
Industry

Public Authorities & Policy Makers
Public Authorities
Policymakers

Key Numbers

95,000
Total number of users

+10.200
New users in 2023

Top 5 Cloud Communities

WeNMR	NBIS	Biomed	BioISI	ENVRI
41K	21K	1.5K	1K	967

By number of registered users

Top HTC Communities

Atlas, CMS, ALICE, LHCb, Belle II, Virgo

Essential Partners and the Largest Adopters

Research infrastructures (RI) and research communities

13 new scientific communities

23 RIs from the ESFRI roadmap

49 RIs of pan-European scope using our services

1 new RIs engaged in 2023

WeNMR: A worldwide e-Infrastructure for NMR and structural biology
NBIS: National Bioinformatics Infrastructure Sweden
Biomed: Life Science Grid community
BioISI: Biosystems and integrative sciences institute
ENVRI: Community of environmental research infrastructures

ATLAS: is a general-purpose particle physics experiment at CERN
CMS: The Compact Muon Solenoid experiment at CERN
ALICE: A Large Ion Collider Experiment at CERN
LHCb: The Large Hadron Collider beauty at CERN
Belle II: is a particle physics experiment designed to study the properties of B mesons and other particles
Virgo: is a gravitational-wave detector

Physical Sciences & Engineering
Landmarks
CTA, ELI ERIC,
HL-LHC
SKAO
European XFEL

Projects
KM3NeT 2.0

Data Computing & Digital RIs
Projects
SoBigData++
EBRAINS
SLICES

Environment
Landmarks
ACTRIS ERIC
EPOS ERIC,
Euro-Argo ERIC
IAGOS
ICOS ERIC

Projects
DANUBIUS-RI
DiSSCo
eLTER RI

Social & Cultural Innovation
Landmarks
CLARIN ERIC
DARIAH
CESSDA ERIC

Projects
E-RIHS
OPERAS

Health & Food
Landmarks
ELIXIR
INSTRUCT ERIC
BBMRI
EU-OPENSCREEN ERIC

Projects
EMPHASIS
METROFOOD-RI

ESFRI research infrastructures supported by EGI

New RIs engaged in 2023
EGI Federation member

EGI Federated Cloud User Groups

46
Active Service Level Agreements using capacities from 33 federated research clouds from 17 countries[1]

19.3%
increase in Cloud CPU/h consumption in 2023.

vo.ai4eosc.eu 6M Cloud CPU/h
The resources offered by the EGI Infrastructure are used to support piloting activities in the context of the AI4EOSC EC-funded project

[1] EGI Cloud Federation consists of 33 sites, 31 certified and 2 undergoing certification

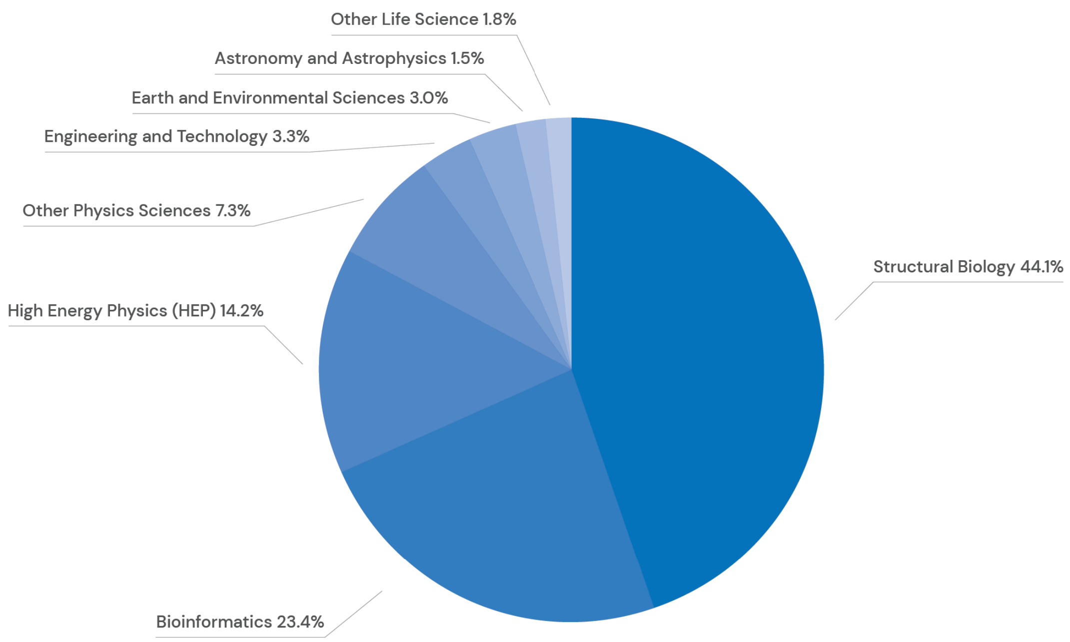
Top 5 Cloud compute user communities based on CPUh consumption:

perla-pv.ro 4.1M Cloud CPU/h
In 2023, the allocated computational resources were used to perform ab initio DFT calculations for band alignments between the perovskite layer and electron transporter layers and numerical analysis of bias stress test in order to anticipate the PSC degradation. In addition, two papers concerning iodine migration were published.

vo.pangeo.eu 4.6M Cloud CPU/h
See success stories table below

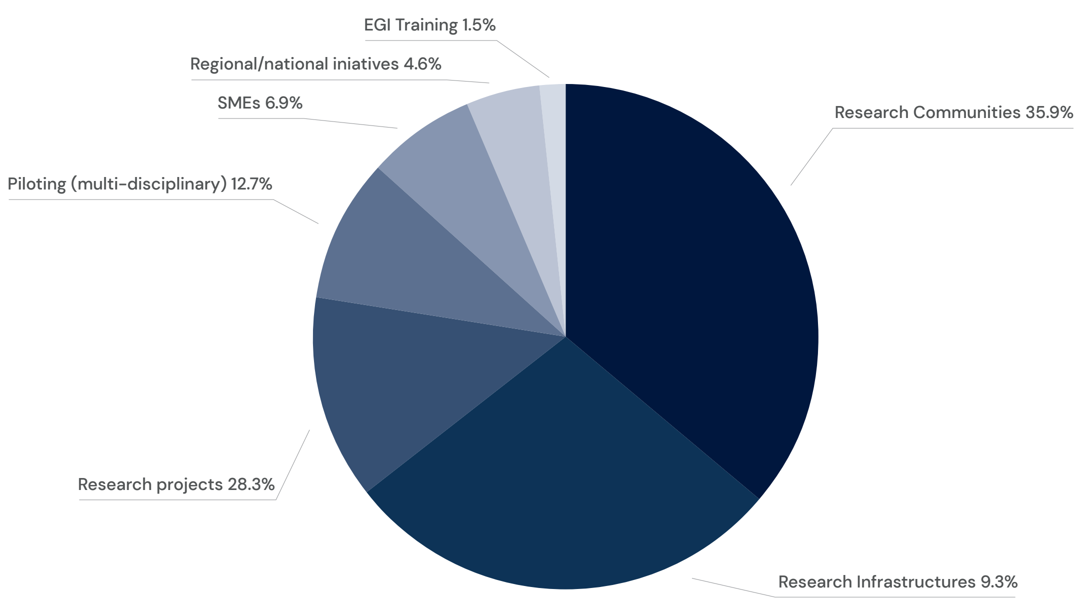
vo.access.egi.eu 2.7M Cloud CPU/h
Running piloting activities in the EGI Infrastructure

vo.deltares.nl 1,8M Cloud CPU/h
The EGI infrastructure contributed to further speed up the multi-threaded scaling of the distributed hydrological models. Over the last year the use case pilot switched to Docker and moved from Python to Julia to use the available CPU more efficiently and shorten the duration of the job execution. Now, run times are 2 to 11 times faster, depending on the chosen routing scheme. The improved performance achieved allows the use of distributed hydrological models in large-scale hydrological forecasting and climate-change applications, which is currently often limited to lumped models. Two publications were submitted.



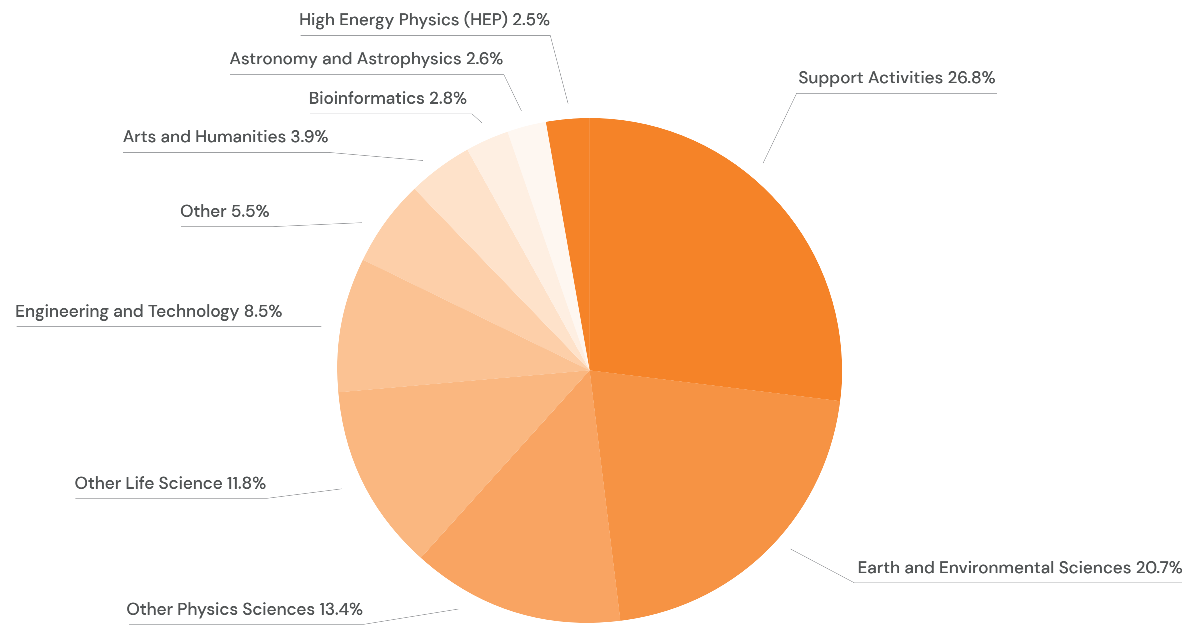
Spread of EGI users across disciplinary areas

In 2023, the Medical and Health Sciences and Bioinformatics domains confirmed the positive trends starting in 2022 and reported an increase in terms of numbers of users. The Medical and Health Science domain is still dominated by the WeNMR structural biology that in 2023 registered a total of 41.5K users.



Spread of cloud CPU/h across type of activity

Also in 2023, The EGI Federation continued to promote its open call for scientific use cases. This campaign contributed to generating interest from diverse stakeholders as reported by the pie-chart. Compared to the previous year, a significant increase of scientific and business use cases supported was reported in 2023. This Open Call officially continues after the end of the EGI-ACE flagship project.



Spread of EGI Cloud CPU-hour use across disciplinary areas

In the Medical and Health Sciences domains a significant increase in terms of Cloud CPU/h usage in 2023 was reported by OpenRiskNet, eBrain-Health and LETHE projects. For all of them EGI offers computing resources, services and technical consultancy for hosting domain-specific services for serving the needs of the scientific communities. In terms of CPU/h usage, the total amount of CPU/h consumed by the Structural Biology domain is going down steadily. This is justified by fewer COVID-19 jobs submitted by the users in 2023, and the less CPU needs from user's jobs. Compared to the previous year, piloting activities with business use cases contributed to increase the amount of Cloud CPU/h used by the Engineering and Technology domain.

EGI Community Flagship Projects

To accomplish our strategic objectives and meet the needs of our expanding user base, EGI actively collaborates with or provides support to a range of EU-funded projects.

In 2023, EGI secured positive evaluations for three new coordinated projects: EOSC-Beyond, ENVRI-Hub NEXT and SPECTRUM.

36 Projects running in 2023

9 Projects initiated in 2023

The Newest Coordinated Projects

FLAGSHIP PROJECT

Spectrum

Elevating Data-Intensive Science in Europe

Period	Total Budget	EGI Budget	Website
01/01/2024 - 30/06/2026	EUR 2.5M	EUR 878K	spectrumproject.eu

Mission

Create an Exabyte-scale research data federation and compute continuum, fostering data-intensive scientific collaborations across Europe

Relevance for EGI

SPECTRUM gives EGI the opportunity to co-create the long-term strategy and technical blueprint for data-intensive science infrastructures for radio astronomy (RA) and high-energy physics (HEP)

FLAGSHIP PROJECT

EOSC Beyond

Advancing Innovation and Collaboration for Research

Period	Total Budget	EGI Budget	Website
01/04/2024 - 31/03/2027	EUR 10M	EUR 2.5M	egi.eu/project/eosc-beyond

Mission

Improve existing EOSC Core services and framework. Develop new EOSC Core services

Relevance for EGI

Throughout EOSC Beyond, EGI will be able to introduce advanced solutions into EOSC, contributing to the establishment of a FAIR data and service ecosystem.

FLAGSHIP PROJECT

ENVRI-Hub NEXT

Bringing Environmental Science to the Next Level

Period	Total Budget	EGI Budget	Website
01/02/2024 - 31/01/2027	EUR 5M	EUR 951K	egi.eu/project/envri-hub-next

Mission

Deliver an open access Hub and NEXT-level interdisciplinary research framework

Relevance for EGI

ENVRI-Hub NEXT directly aligns with EGI's strategic goals by fostering a strong link between RIs and e-infrastructures like EGI

Already Running Coordinated Projects

FLAGSHIP PROJECT

interTwin

interTwin co-designs and implements the prototype of an interdisciplinary Digital Twin Engine (DTE) – an open source platform based on open standards that offers the capability to integrate with application-specific Digital Twins (DTs).

Its functional specifications and implementation are based on a co-designed interoperability framework and conceptual model of a DT for research – the DTE blueprint architecture.

Timeline	01/09/2022-31/08/2025
Total Budget	€ 12.3M
EGI Budget	€ 1.8M
Website	intertwin.eu

10 Resource Providers

are delivering cloud, HTC, and HPC resources and access to Quantum systems.

11 Technology Providers

are delivering the Digital Twin Engine infrastructure and core capabilities.

14 Community Representatives

from 5 scientific areas are bringing requirements and developing DT applications and thematic modules.

37 Software components

have been developed or extended.

FLAGSHIP PROJECT

iMagine

iMagine delivers an AI platform designed for aquatic sciences that operates on a federation of EGI clouds. The project aims to offer AI-based application services for image analysis in aquatic sciences. These services include segmentation and object recognition and are currently undergoing final validation before starting production operation.

Additionally, iMagine provides a range of labelled datasets that have been utilised to train the image application services. These datasets can be useful for retraining and developing new models.

Timeline	01/09/2022-31/08/2025
Total Budget	€ 4.5M
EGI Budget	€ 829K
Website	imagine-ai.eu

8 Use Cases

addressing marine and freshwater research and its technical implementation. 3 additional use cases were selected through a project open call in 2023

12 Research Infrastructures

and relevant EU initiatives in the marine and inland waters domains involved in the project

1 iMagine AI Platform

Provides access to a diverse portfolio of AI-based image analysis models, application services and image repositories from multiple RIs. 5 trained models are already available for reuse in the platform, and 3 labelled datasets available in Zenodo

Coordinated Projects Completed in 2023

FLAGSHIP PROJECT

EGI-ACE

EGI-ACE was a 30-month project coordinated by the EGI Foundation with a mission to empower researchers from all disciplines to collaborate in data- and compute-intensive research through free-at-point-of-use services. The project concluded in June 2023. It presented tangible instances and stories of success, showcasing the capabilities and potential of federated resources within EOSC to drive science and support innovation. The project concretely contributed to the design and implementation of EOSC through its three Key Exploitable Results (KERs).

KER 1
EOSC Compute Platform services

KER 2
Services enabling federated computing in EOSC

KER 3
Data Spaces and processing tools for EOSC

EGI-ACE delivered 36 free-at-point-of-use compute services through the EOSC Portal, comprising 19 services in the Compute Platform and 17 services in Thematic Data Spaces and Processing Platforms. These services addressed various computing needs, including interactive and batch data processing, AI model training, scalable cluster management, and high-throughput compute applications. Remarkably, these services constituted 9% of all services accessible on the EOSC Portal.

Highlight

EGI-ACE service orders represented **35% of all EOSC service access orders**. 10 EGI-ACE services are in the **'most ordered top 20'**.

EGI-ACE engaged with the scientific community through various channels, attracting **189 access requests** via the EOSC Marketplace and **42 additional requests** through the EGI-ACE Open Call. Impressively, these services were used by nearly **77K users** during the project's 30-month duration, representing a significant portion of all service access orders in EOSC.

The project worked closely with scientific communities, resulting in the creation of **53 Thematic Services** across various disciplines. These services served **144 user communities** and contributed to the publication of **69 research papers**. EGI-ACE also received **78 citations** in scientific publications, underscoring its impact on research.

Impact of EGI-ACE

Read more about the impact of EGI-ACE

egi.eu/publication/egi-ace-impact-report

EGI community Participated Projects

Research sector				
ExPaNDS	01 Sep 2019	28 Feb 2023	https://expands.eu/
TRIPLE	01 Oct 2019	31 Mar 2023	https://project.gotriple.eu
C-SCALE	01 Jan 2021	30 Sep 2023	https://c-scale.eu
EOSC Future	01 Apr 2021	31 Mar 2024	https://www.eoscfuture.eu
METROFOOD EPI	01 Jan 2024	31 Dec 2024	https://www.metrofood.eu/
SoBigData++	01 Jan 2020	31 Dec 2024	http://project.sobigdata.eu
EUreka3D	01 Jan 2023	31 Dec 2024	https://eureka3d.eu/
LABPLAS	01 Jun 2021	31 May 2025	https://labplas.eu
PITHIA-NRF	01 Apr 2021	31 May 2025	https://pithia-nrf.eu
LETHE	01 Jan 2021	31 May 2025	https://www.lethe-project.eu
TANGO	01 Sep 2022	31 Aug 2025	https://tango-project.eu/
EuroScienceGateway	01 Sep 2022	31 Aug 2025	https://galaxyproject.org/projects/esg/
SoBigData RI	01 Oct 2022	30 Sep 2025	http://www.sobigdata.eu/
AI4Europe	01 Jul 2022	31 Dec 2025	https://www.ai4europe.eu/
GraspOS	01 Jan 2023	31 Dec 2025	https://graspos.eu/
DATAMITE	01 Jan 2023	31 Dec 2025	https://datamite-horizon.eu/
CRAFT-OA	01 Jan 2023	31 Dec 2025	https://www.craft-oa.eu/
AARC Tree	01 Mar 2024	28 Feb 2026	https://aarc-project.eu/
Blue-Cloud 2026	01 Jan 2023	30 Jun 2026	https://blue-cloud.org/
EUCAIM	01 Jan 2023	31 Dec 2026	https://cancerimage.eu
ANERIS	01 Jan 2023	31 Dec 2026	https://aneris.eu/
GreenDIGIT	01 Mar 2024	28 Feb 2027	https://www.egi.eu/article/green-digit-project-kicks-off/
PHENET	01 Jan 2023	31 Dec 2027	https://www.phenet.eu/en

Private sector

	StairwAI	01 Jan 2021	31 Dec 2023	https://stairwai.nws.cs.unibo.it
	BD4NRG	01 Jan 2021	31 Dec 2023	http://www.bd4nrg.eu
	EUHubs4Data	01 Sep 2020	31 Dec 2023	https://euhubs4data.eu/
	DIGITbrain	01 Jul 2020	31 Dec 2023	https://digitbrain.eu
	UNLOCK CEI	01 Jun 2022	30 Nov 2024	https://eucloudedgeiot.eu/

Public administration

	DECIDO	01 Mar 2021	29 Feb 2024	https://www.decido-project.eu
	AI4PublicPolicy	01 Mar 2021	30 Apr 2024	https://ai4publicpolicy.eu

Multi-stakeholder

	Pre-PAI	01 Nov 2022	31 Jul 2023	https://www.egi.eu/project/pre-pai/
	HealthyCloud	01 Mar 2021	31 Aug 2023	https://healthycloud.eu
	GREAT	01 Sep 2022	30 Apr 2024	https://www.greatproject.eu/
	EOSC-Focus	01 Jun 2022	31 May 2025	https://eosc.eu/eosc-focus-project/
	DSSC	01 Oct 2022	30 Sep 2026	https://dssc.eu/
	IRISCC	01 Apr 2024	01 Oct 2028	www.iriscc.eu

See all projects

egi.eu/projects/

Progress Towards Strategic Goals

GOAL

01

Be a Trusted Service & Technology Partner for Research and Innovation

Goal 1

Be a Trusted Service & Technology Partner for Research and Innovation

Research Sector

Private Sector

By actively engaging with 265 scientific communities and 19 SMEs in 2023, the EGI engagement programme empowered the Federation to deliver advanced research support services, facilitating significant growth and impact

Highlights

265
Scientific communities engaged

1
New partnership with RIs listed on the ESFRI Roadmap

19
Collaboration with SMEs

13
New communities engaged

EGI's Support for CESSDA

EGI strengthens its commitment to supporting cutting-edge research by partnering primarily with Research Infrastructures (RIs) large-scale scientific networks in Europe. In 2023, EGI added another RI from the prestigious ESFRI roadmap, bringing the total number of EGI's ESFRI partners to 23. In more detail, EGI established a new collaboration with CESSDA ERIC (Consortium of European Social Science Data Archives), a leading provider of large-scale, integrated data services for social science research. By empowering CESSDA users with access to EGI Notebooks, a powerful platform for data analysis and collaboration, we aim to:

Enhance data sharing and accessibility:

EGI Notebook service facilitates seamless data sharing within the secure EGI infrastructure, fostering collaboration among social scientists.

Advance data analysis capabilities:

CESSDA users can leverage the computational power of EGI Notebooks for complex data analysis, leading to deeper research insights

Through this strategic partnership, EGI and CESSDA ERIC are committed to fostering a robust data ecosystem that empowers social science research across Europe. Besides the newly established collaboration, EGI continued providing technical support to various other ESFRI RIs. The following examples highlight some of the key collaborations in 2023:

OPERAS
Social Science

EGI kicked off the migration of OPERAS' critical GoTriple services to the secure EGI Federated Cloud Infrastructure.

SoBigData++
Social Science

EGI actively supports establishing SoBigData++'s ERIC legal structure. This vital support helps SoBigData define and manage a robust service portfolio.

LifeWatch ERIC
Biodiversity and Ecosystem Research

LifeWatch ERIC opted to adopt a dedicated instance of EGI's Check-in service, built on Keycloak technology. This simplifies the management of their services and communities and empowers them with robust authentication and authorisation functionalities. EGI further provided training and deployment support to ensure a smooth implementation.

e-RIHS
Heritage Science

EGI provided the cloud resources needed for e-RIHS to operate a high-performance web portal within the EGI infrastructure. This portal allows scientists to leverage standardised analytical techniques for characterising cultural heritage objects. Since its deployment on the EGI Cloud infrastructure in 2022, the portal offers access to a vast collection of over 15,000 datasets with rich metadata, empowering in-depth analysis of cultural heritage.

EU-OPENSCREEN-ERIC
Chemical Biology

EGI contributed to establishing a centralised storage solution based on DataHub. This solution facilitates collecting and securely sharing cell painting data among collaborating scientific partners. EGI configured a dedicated 6 TB storage space within DataHub, enabling streamlined data exchange across multiple institutes. Access to the data is secured and controlled through the EGI Check-in service.

> **Large high-content imaging datasets from three Screening units originating from two different EU countries (Czechia, Spain) were transferred via EGI servers to the FMP in Berlin (Germany) for downstream analysis. In total, about 2.7 TB of data with more than a million image files were transferred with the help of the EGI services, which otherwise would have necessitated expensive investment in Data transfer infrastructure at EU-OPENSCREEN ERIC.**

Christopher Schmied

Lead Data Scientist at EU-OPENSCREEN

From Biomedicine to Big Data: EGI's Support for Research Across Disciplines

In 2023, we didn't just forge new partnerships with ESFRI RIs. We also made significant strides in supporting existing research communities. Here, we celebrate some of the year's most remarkable achievements.

Health and Medicine

Biomed's Virtual Imaging Platform (VIP)

Research Community

Biomed is a large-scale international Virtual Organisation (VO) operating the flagship science gateways Virtual Imaging Platform (VIP), providing access to multiple applications, as well as important amounts of storage and computing resources, without required technical skills beyond the use of a web browser. The main target groups: medical image analysis, bioinformatics and drug discovery. A notable increase of HTC CPU/h was registered in the EGI Accounting Portal in 2023.

In 2023, national compute capacit used y exceeded **10M CPU HTC/h**.

Supported by:
AUVERGRID, CIEMAT-LCG2, CNR-ILC-PISA, CREATIS-INSA-LYON, CYFRONET-LCG2, GRIF, IFCA-LCG2, IN2P3-CPPM, IN2P3-IRES, IN2P3-LPC, INFN-TRIESTE, JINR-LCG2, NCG-INGRID-PT, PSNC, RAL-LCG2, TR-03-METU, TR-10-ULAKBIM, UKI-LT2-Brunel, UKI-LT2-IC-HEP, UKI-LT2-RHUL, UKI-NORTHGRID-LANCS-HEP, UKI-NORTHGRID-LIV-HEP, UKI-NORTHGRID-MAN-HEP, UKI-SCOTGRID-GLASGOW, UKI-SOUTHGRID-RALPP

Physical Sciences

PHENO - Tuning the Herwig Event Generator

HEPs Experiment at CERN

EGI played a crucial role in supporting CERN researchers by providing computing resources for theoretical studies. This included significant tuning work on the latest version of the "Herwig" event generator (https://arxiv.org/abs/2312.05175), a tool used to make precise predictions for processes at the Large Hadron Collider (LHC).

In 2023, EGI provided over **11M CPU HTC/h** to support these efforts.

Supported by:
RAL-LCG2, UKI-LT2-Brunel, UKI-LT2-IC-HEP, UKI-LT2-QMUL, UKI-LT2-RHUL, UKI-NORTHGRID-LIV-HEP, UKI-NORTHGRID-MAN-HEP, UKI-SCOTGRID-DURHAM, UKI-SCOTGRID-ECDF, UKI-SCOTGRID-GLASGOW, UKI-SOUTHGRID-BHAM-HEP, UKI-SOUTHGRID-OX-HEP, UKI-SOUTHGRID-RALPP (UK)

Earth Science

C-SCALE - Enabling Copernicus Big Data Analytics

H2020 project

EGI members were key stakeholders in the C-SCALE project and, among others, piloted new approaches to scientific computing, provided technical expertise, training, and compute resources to support nine Earth Observation pilots.

In 2023, a total of **5M Cloud CPU/h** was consumed by the 9 C-SCALE pilots.

Supported by:
CESNET-MCC (CZ), INFN-CLOUD-CNAF (IT), NCG-INGRID-PT (PT), EODC (AT), GRNET (GR

GeoScience

Pangeo – Big Earth Science Data

International Research Collaboration

Supported by:
CESNET-MCC (CZ)

EGI supported the full-day training on the Pangeo and openEO ecosystems for developing efficient Big Earth science data pipelines in the context of the 6th edition of the Big Data from Space 2023 (BiDS) event.

The training equipped 35 participants with the skills to develop efficient Big Earth science data pipelines using open, reproducible, and scalable tools. EGI's contributions included providing the JupyterHub/Binder Service Infrastructure, which formed the foundation of the "Pangeo Training Infrastructure as a Service (PTIaaS)". The Pangeo & OpenEO communities have successfully run a workshop using PANGEO@EOSC that makes use of the following EGI services: EGI Check-in, EGI Online Storage and the EGI Cloud Container Compute.

In 2023, a total of **4,8M Cloud CPU/h** was consumed by the community via EGI.

Climate Change

ENES – Unveiling Climate Insights

International Research Community

Supported by:
CESNET-MCC (CZ) and TR-FC1-ULAKBIM (TR)

EGI supported the international ENES research community by providing them with the resources and services needed to establish an open, scalable, and cloud-based data science environment for climate data analysis on top of the EOSC Compute Platform. By leveraging the support offered by EGI, the ENES community operated its Data Space for large-scale climate data analysis and provided technical users with support and training activities. The ENES Data Space offers AI/ML use cases in the climate domain.

The list of EGI services used by the ENES community includes (i) EGI Cloud Compute and the cloud-based EGI Online Storage for computing and storage resources; (ii) EGI Check-In to enable user registration, authenticated and authorised access to the ENES Data Space; (iii) the Infrastructure Manager (IM) and Elastic Cloud Compute Cluster (EC3) to allocate computing capacity on demand.

In 2023, a total of **1,4M Cloud CPU/h** was consumed.

Social biomedical science

LETHE – Digital Cognitive Biomarkers for Brain Health

H2020 project

Supported by:
IN2P3-IRES (FR)

LETHE researches the prevention of cognitive impairment in the elderly population at risk, ranging from asymptomatic to subjective or mild cognitive impairment to prodromal dementia. Through a two-year clinical trial, knowledge gained is evaluated and validated.

EGI led the architectural design of the LETHE platform and components. EGI supports LETHE with a cloud compute infrastructure to deploy a Big Data collection platform and analysis system that offers personalised risk detection and intervention on cognitive decline. Data for analysis, consisting mainly of retrospective and prospective study data, is managed through DataHub. The deployment of the different cloud components and clusters is automated with the Infrastructure Manager, allowing the entire system to be efficiently recreated systematically with minimal human intervention. EGI Check-in protects different platform components and various measures are taken to encrypt the confidential data of trial participants, both in transit and at rest.

LETHE has deployed different services, such as a Data Lake, a Data Warehouse or a Dashboard for clinicians.

1 publication was submitted in 2023.

Biology

EuroScienceGateway – Community-Driven Life Science Research

Horizon Europe project

Supported by:
INFN-CLOUD-BARI (IT), IISAS-FedCloud (SK), CNRS (FR), CYFRONET (PL), GRNET (GR)

EGI supports EuroScienceGateway's mission to deliver a robust, scalable, seamlessly integrated open infrastructure for data-driven research, contributing an innovative and customisable service for EOSC that enables operational open and FAIR data and data processing, empowering European researchers.

EGI Cloud Compute, EGI Online Storage, and EGI Check-in enable researchers to deploy and scale virtual machines on demand thanks to guaranteed computational resources in the cloud. In the context of EuroScienceGateway, EGI demonstrated how to deploy and configure clusters of virtual machines equipped with HTCondor and Pulsar. These clusters can seamlessly connect to Galaxy, facilitating the efficient execution of workloads, and connect compute and storage resources in the EGI Federated Cloud with the UseGalaxy.eu platform, following a Bring Your Own Compute (BYOC) and Storage (BYOS) approach.

In 2023, a total of **690K Cloud CPU/h** was consumed from federated cloud resources.

Artificial Intelligence

vo.ai4eosc.eu – Fuelling AI applications

H2020 project

EGI Federation resources supported the running the AI4EOSC platform with a subset of the cloud providers that participate in the project. The platform was used by the AI4EOSC scientific communities and other external use cases to the project that are leveraging the platform to develop AI applications.

In 2023, EGI members provided over**6M CPU Cloud/h** to support the initiative

Manufacturing

DIGITbrain – Empowering manufacturing innovation

H2020 project

Supported by:
100%IT (UK), GRNET (GR)

In 2023, EGI significantly contributed to the success of DIGITbrain, an EU initiative transforming manufacturing through Digital Twins. DIGITbrain's vision aimed to unleash manufacturers' innovation potential by providing easy access to Digital Twins, enabling companies to optimise manufacturing processes, predict machine failures, and anticipate maintenance needs. The experiments from the manufacturing companies focused on customising and optimising their processes, paving the way for cost-effective demand production.
Thanks to EGI's support, DIGITbrain advanced the forefront of digital manufacturing, empowering companies to embrace agile and efficient production methods for innovation and competitiveness.

In 2023, a total of **1,1M CPU hours** was used by DIGITbrain to execute **21** experiments, validating its innovative approach to Digital Twins.

Beyond research: Empowering User Communities From Different Sectors

Private Sector

EGI actively fosters collaboration with industry and small and medium enterprises (SMEs) through the EGI Digital Innovation Hub (EGI DIH). This partnership empowers the private sector to leverage advanced computing for groundbreaking projects.

Industry Success Stories in 2023:

- 12 pilots received technical support via the EOSCFuture project, tackling challenges in diverse sectors like agriculture, mobility, open science, and energy. (Supported by EGI-ACE and C-SCALE)
- 3 experiments in cybersecurity, robotics, and energy were enabled by the EUH4D project with direct support from EGI.

Public Administration

In 2023, the DECIDO project successfully integrated key EGI services - EGI Check-in, EGI Cloud Compute, EGI DataHub, and EGI Notebooks - into their portal. This integration was tested in real-world scenarios through four distinct pilot use cases: **1) Forest Fire Management:** Kajaani, Finland, leveraged EGI services to enhance forest fire prevention and protection efforts, **2) Flood and Weather Response:** Turin, Italy, utilised EGI to improve emergency policies related to floods and weather alerts, **3) Public Infrastructure Power Management:** Halki, Greece, adopted EGI services to optimise power outage management for public infrastructure, **4) Wildfire Management:** Aragon, Spain, employed EGI to design emergency policies and manage controlled fires.

The DECIDO project's feedback on these EGI services has been instrumental in improving them, and their successful application in the public sector paves the way for the European Open Science Cloud (EOSC) to address the challenges faced by public administrations.
Additionally, the AI4PublicPolicy project further refined the VPME, a virtualised environment for policy management. The VPME is deployed on the EGI Federated Cloud and utilises services offered by both EGI and the project's marketplace.

During EGI2023, the workshop "EOSC Support, Engagement and Exploitation of Services" brought together Data Driven Policy Cluster Projects AI4PublicPolicy and DECIDO, to share key learnings and success stories from technologies developed to improve decision-making processes, and exploitation challenges were discussed related to public sector.

In the EOSC Symposium 2023, the unconference session "Why are Public Authorities not (yet) a relevant user group for EOSC, and what can we do to foster this?" discussed the opportunities and challenges for public administration to become a relevant Stakeholder for EOSC emerging from the experience and uptake of EGI Services. As such, it was discussed the need for more user-friendly tools, support and commercial access to guide public authorities on their digitalisation purposes. On the other side, there is a huge opportunity for public authorities to become data and service suppliers to enrich the EOSC ecosystem.

As a result, the EOSC Competence Center for Public Authorities concept was introduced to foster bilateral collaboration between representatives from the Public Sector with EOSC, providing a channel for the two communities to interact and benefit from each other. A collaboration and membership charter has been established to enable the continued collaboration beyond the projects' scope.

GOAL

02

Evolve the Service Offering to Meet the Needs of Researchers

Goal 2

Evolve the Service Offering to Meet the Needs of Researchers

EGI prioritises keeping pace with the ever-changing needs of researchers. Through continuous collaboration and innovation, we consistently enhance our service and solution offerings. Our dedication to a secure and seamless user experience is evident in the use of federated identities for access through EGI Check-in.

Recognising the growing demand for advanced functionalities, EGI has extended and improved its service portfolio. This includes the addition of cloud orchestrators, advanced data management solutions, and tools specifically designed to manage information confidentiality.

User-Driven Innovation: New and Improved Services

Improved in 2023

Infrastructure Manager (IM)

Use cloud orchestrator to deploy and configure complex virtual infrastructures

Provider
This service is offered by Valencia Polytechnic University

Get started
im.egi.eu/im-dashboard/login

Infrastructure Manager (IM) revolutionises infrastructure deployment by offering an open-source solution for creating complex and tailored virtual infrastructures across multiple clouds. With IM, the time-consuming and error-prone manual processes are automated, enabling seamless deployment, configuration, software installation, monitoring, and updates of virtual infrastructures. IM is designed to be versatile, supporting a wide range of public and on-premises cloud back-ends. This cloud-agnostic approach ensures that user applications can be deployed effortlessly regardless of the underlying cloud infrastructure.

Incorporating DevOps capabilities based on Ansible, IM takes infrastructure management to the next level. Users can easily install and configure their required applications, creating a fully functional infrastructure that meets their specific requirements.

Value

- Simplified deployment of complex, well-known application architectures on virtual infrastructures with ease, all through a user-friendly web interface.
- Scalability: more advanced users can rely on IM's cloud orchestration APIs to deploy TOSCA topologies on top of EGI Cloud Compute resources.
- Seamless integration of DevOps principles enhances efficiency, collaboration, and scalability, enabling users to unlock the full potential of their infrastructure.

new

Secrets Store

Easily retrieve, manage, and rotate credentials, API keys, and other secrets through their lifecycle

Provider
IISAS

Unlock the potential of your applications and services with our Secrets Store — a robust solution designed to safeguard the secrets crucial for accessing your resources. Whether it is database credentials, API keys, certificates, or other sensitive information, the Secrets Store empowers you to manage, rotate, and retrieve secrets throughout their lifecycle and securely share them with your team.

Value

- Enhanced security without compromise.
- Seamless integration with applications and workloads.
- Audit trail for usage and breach assessment.
- Lifecycle management made easy.

improved in 2023

EGI DataHub

Publish a dataset and make it available to a specific community or worldwide across federated sites.

Provider
This service is offered by providers of the EGI Federated Cloud Platform and the EGI Federated HTC Platform

Get started
egi.eu/service/datahub

EGI DataHub is a high-performance data management solution that offers unified data access across globally distributed environments and multiple types of underlying storage. It allows researchers to easily share, collaborate and perform computations on the stored data.

Users can bring data close to their community or to the compute facilities they use, toin order to exploit it efficiently. This is as simple as selecting which (subset of the) data should be available at which supporting provider.

Value

- Discovery of data spaces via a central portal.
- Policy-based data access.
- Replication of data across providers for resiliency and availability purposes.
- Integration with EGI Check-in allows access using community credentials, including from other EGI services and components.
- File catalogue to track replication of data and manage logical and physical files.

New Services on the Horizon

In addition to ongoing service enhancements, EGI is pioneering the development of two new innovative solutions in 2024, the Data Orchestrator, currently in the Alpha phase, ready for early adopters, and the FedEarthData, developed in the context of the EU-funded project C-SCALE[1], now transitioning to the EGI portfolio:

FedEarthData:

the Federated Earth System Simulation and Data Processing Platform (FedEarthData) provides a distributed infrastructure of data and compute providers to support the execution of Earth System Simulation and Data Processing workflows at scale. It offers a flexible cloud-based data processing capacity to create and scale data processing pipelines that run on optimised execution environments near the data. Jupyter Notebooks and openEO API offer user-friendly and intuitive processing of a wide variety of Earth Observation datasets on these computing providers, including the ability to integrate these data with modelling and forecasting workflows leveraging specialised compute resources.

Data Orchestrator:

a software framework based on Rucio that provides functionality to organise, manage, and access large volumes of scientific data using customisable policies. The data can be spread across globally distributed locations and heterogeneous data centres, uniting different storage and network technologies as a single federated entity. The Data Orchestrator offers advanced features such as distributed data recovery or adaptive replication and is highly scalable, modular, and extensible.

[1] c-scale.eu

Major Improvement: Enhancement of Existing Services

Researchers are at the heart of everything we do at EGI. We understand their needs evolve constantly, so we continuously enhance our integrated service portfolio. Our commitment to innovation and best practices ensures researchers have access to the most advanced tools, enabling them to achieve their sorrys with greater efficiency and effectiveness.

Research Sector

Public Administration

Private Sector

Security & Identity

We enabled federated login to HTCondor-CE and ARC-CE using EGI Check-in tokens, allowing site admins to map users and groups based on information encoded in the tokens (e.g. user identifier, token issuer, audience scopes and group/role information).
Additionally, we have completed the migration of the OIDC services to a new keycloak-based Check-in service proxy and developed a Keycloak extension for group management integrated with Check-in. This new extension offers user-driven enrollment, time-based membership, hierarchical group structures, and role-based permissions within groups.
Furthermore, we have implemented a new Metrics Tracking Platform to collect and analyse authentication events, user registrations and group memberships. The platform provides insights through dashboards with visualisations like pie charts and maps. Finally, we have established a dedicated space for EGI within Perun featuring custom settings, an EGI-compliant visual style and the new Perun GUI.

Data

We enhanced the Data services portfolio with new capabilities and improved maturity.

We released a new version of the DataHub service, which includes new functionalities like Space Marketplace, Data Workflow Automation and Datasets archive support.

In the area of Sensitive Data handling, we set up a new EGI Working Group on Trusted Research Environments to pilot and test new technologies together with research communities.

Applications

We aligned the Notebooks and Replay design with the EGI guidelines.

We upgraded the Notebooks components to the latest JupyterHub versions, introducing better group management and customisation of user profiles.

We improved the usage accounting of the services with a broader set of metrics and integrated it with EOSC accounting.

Compute

We created a new repository for hosting the TOSCA deployment recipes of Infrastructure Manager. This repository includes recipes for commonly used templates and facilitates community contributions in the form of Pull Requests.

EGI included in AppDB a FAIRness score following the FAIR Principles for Research Software by the FAIR4RS RDA working group. AppDB provides guidelines for improving the FAIRness of software entries in the repository.

We updated the EGI Cloud Container Compute to deliver access to managed Kubernetes clusters with an integrated registry to store container images.

Service Integrations

EGI Data Transfer

We integrated the EGI Data Transfer service with the EOSC Explore portal in order to ease the transfer of datasets from EOSC registered data sources to Computing facilities.

EGI Cloud Compute

We have developed a Pulsar recipe for the Infrastructure Manager, a powerful tool for automating deployments. This recipe simplifies the process of setting up Pulsar endpoints with HTCondor on cloud resources from EGI.
In essence, it acts as a bridge, allowing seamless integration between EGI Cloud Compute and Galaxy installations

EGI Check-in

We integrated Check-in with the ENES Data Space, an open, scalable, cloud-enabled data science environment for climate data analysis on the EOSC computing platform. Check-in has been integrated with the EGI Workload Manager service (DIRAC) to enable token support in the EGI HTC infrastructure.

“

Collaborating with EGI has been highly beneficial for the Pangeo community. Their guidance in leveraging EOSC and their consistent support has made it possible to deploy an open, scalable Pangeo platform for European researchers. This teamwork has significantly impacted users and the broader community. We look forward to continuing this productive partnership. Thank you!

Anne Fouilloux

Senior Research Engineer at Simula Research Laboratory | Pangeo

Meeting User Needs: Our Service Improvements in Action

In 2023, we improved the EGI services to facilitate their adoption and usage and, organised tutorials and hands-on sessions to show how to exploit our service offer. Various requirements were gathered and analysed, leading us towards new developments described below.

Security & Identity

Through 2023, the EGI Identity and Access Management services (Check-in and Perun) supported 21 new communities and have been integrated with 147 new services to provide user authentication and authorisation functions.

As part of EGI's annual webinar programme, the EISCAT community presented a contribution about how to access their tools and services via EGI Check-in.
During the EGI Conference 2023, two training events were organised by the EGI, GRNET, and CESNET teams: one introducing the EGI Identity and Access Management services for international communities, and one for service providers about possible integration scenarios.

Furthermore, the VIP Community held a training event in which they presented the use of the Check-in service as part of their platform tutorial.

Finally, a webinar on how to integrate community services with EGI Check-in was delivered in the context of the CRAFT_OA project.

Compute and Orchestration

In 2023, EGI Compute and Orchestration services were featured in tutorials and presentations at EGI2023, IBERGRID 2023, and ISGC2023 (International Symposium of Grids and Clouds 2023) events. EGI Notebooks and Replay bring a user-friendly interface for training and webinars with support for interactive analytics and AI-based workflows, thanks to the Elyra extension, included in the service during 2023 as an outcome of the collaboration with the AI4EOSC project.

In the context of the interTwin project, the interLink component was developed to deliver access to heterogeneous providers (e.g. HPC resources) through a common abstraction layer exploitable with native Kubernetes APIs. The system enables compatibility with world-class supercomputers, such as the EU first EuroHPC supercomputer, Vega.

EGI led the definition of a new EOSC interoperability guideline for Compute Services, as an extension of the EOSC profile v4.00. The extension describes computing resources in the EOSC resource catalogue with a flexible metadata schema, and is applicable to the compute continuum: clouds, HTC, HPC and potentially the edge, including access to hardware accelerators (e.g. GPUs).

Data and Storage

Tutorials and presentations have been delivered for Data services at EGI2023 and at the EOSC Symposium.

In the context of the interTwin project, a Data Orchestration service has been set up, based on Rucio and made available to user communities for the development of digital twins. In the context of the PITHIA-NRF project, a DataHub-based distributed storage has been made available to the research community studying the upper atmosphere and near-Earth space with digital models and related research outcomes.

In addition, given the demand from user communities, a new S3 gateway has been developed for the EGI DataHub service and will be rolled out to production in 2024.

[1] https://rancher.com

Technical Highlights From Projects

EGI-ACE

EGI-ACE boosted the cross-national delivery of HTC, cloud and container compute services to international communities with the combination of national funding, pay-for-use funding and Virtual Access funds. The project piloted a federated High Performance Compute infrastructure, and established thematic data spaces on top of the compute-storage layer in the domains of environmental sciences and astrophysics.

EOSC Future

EGI co-coordinated with GEANT the technical activities of the project that led to new releases of the EOSC Platform, and gradual improvements to the EGI Core, and was tasked with the operational delivery of these between 2021-2024 then handover to the EOSC Procurement projects.

Blue-Cloud 2026

In the Blue-Cloud 2026 project, EGI developed extensions to the EGI Notebooks service to better integrate with the D4Science VREs, with automated discovery of user capabilities and seamless access to the user's workspace delivering transparent access to personal and shared data.

EuroScienceGateway

Galaxy has been integrated with the EGI Check-in to enable federated Authentication and Authorisation of users. EGI facilitated the integration of existing computing resources into Galaxy with the automated deployment of Pulsar server and computing clusters on the EGI federated cloud with the help of Infrastructure Manager.

AI4PublicPolicy

EGI, through SZTAKI, its member from Hungary, has continued to provide computing and storage resources as well as related consultancy and user support for the project. The cloud resources are complemented with Check-In, DataHub, Notebooks and the Kubernetes instance used for the deployment of the components of the Virtualized Policy Management Environment (VPME), a fully-fledged policy development and management system based on AI technologies.

PITHIA-NRF

EGI has further contributed to the architecture of the PITHIA e-Science Center, and supplied compute and storage resources as well as related user support from IN2P3-IRES. The allocation of resources more than doubled in 2023 as the e-Science Center progressed towards production. We worked closely with the PITHIA community to understand their needs for a single sign-on solution, and helped them define the necessary roles and policies. DataHub has been deployed on top of redundant storage to allow users to upload their models and save the results of their simulations.

SoBigData++

EGI provides the interactive computing service for SoBigData++ users, with a dedicated instance of the EGI Notebooks customised to meet the technical needs of the D4Science platform. We have created tailored user environments that include libraries developed by SoBigData++ researchers. For the execution of workflows, we have deployed a dedicated Galaxy instance integrated with D4Science's authentication and authorisation system.

EUhubs4data

EGI coordinated the deployment of the Federated Data Catalogue in the project including a CKAN service hosted on EGI Cloud and supported three SMEs experiments with services from the portfolio: EGI Notebooks, EGI Cloud Compute (including GPUs) and EGI Online Storage. The extension for EGI DataHub for the integration with IDS has been published on the IDSA Data Connector report. Cloud resources have been supplied by BIFI (Spain), IFCA (Spain), and IISAS (Slovakia).

BD4NRG

EGI, based on cloud resources from IISAS (Slovakia), has continued to provide computing and storage resources and related user support for the project testbeds, in particular to host the BD4NRG Data Governance Layer composed of several free and open source frameworks (Apache Druid, Linkedin DataHub, Kafka, Minio) and of components from the FIWARE framework (Keyrock and Orion-LD).

AI4Europe

We contributed to the new architecture design of the European AI-on-Demand platform as a federated system, then actively participated in its implementation including the supply of technical elements from the EGI portfolio.. The AI-on-Demand platform was integrated with the EGI Check-in as a user Authentication and Authorisation layer.

C-SCALE

EGI led the definition and set-up of the Federated Earth System Simulation and Data Processing Platform (FedEarthData) service that brings together C-SCALE's distributed infrastructure of data and compute providers to support the execution of Earth System Simulation and Data Processing workflows at scale. FedEarthData brings together two types of computing providers: cloud and HTC/HPC via a set of interfaces for a flexible approach to analytics: IaaS for running Virtual Machines (VM)s and containers, HTC/HPC batch systems to run scalable jobs, Notebooks interface for interactive computing and openEO for an EO-specific batch-oriented processing system.

DATAMITE

EGI contributed to the analysis of the pilots in the project, helping them refine their goals, their architecture, and the roadmap for reaching those goals using the DATAMITE service and other monetisation tools provided by the project. EGI also helped define the metadata stored by the DATAMITE catalogue and will work on the implementation of a connector that allows publishing datasets to EU data portals.

DECIDO

EGI, based on cloud resources at INFN Bari (Italy), has continued to provide computing and storage capacities and related user support for the project. Additional services delivered to the DECIDO Portal, supporting evidence-based policy-making are Check-In, DataHub, and Notebooks.

[13] https://www.ai4europe.eu/

[14] https://internationaldataspaces.org/use/ids-components/

iMagine

The project setup the iMagine AI platform and integrated it with EGI check-in for user Authentication and Authorisation. The platform supports the entire lifecycle of AI model training, validation and and is now seamlessly accessible with federated identities by the European aquatic science and marine communities. Furthermore, the iMagine platform has been extended with 4 clouds of the EGI federation (CSIC, LIP, TUBITAK, Walton), and was onboarded into the EOSC marketplace.

LETHE

EGI designed and delivered a 'sensitive data cloud' infrastructure for the LETHE project. The system adheres to strict security measures to deal with highly confidential patient data related to dementia prediction. The LETHE platform integrates EGI Federated Cloud services, Storage, DataHub, Notebooks, Accounting, Service Monitoring and Infrastructure Manager. User authentication and authorisation is based on EGI Check-In.

interTwin

EGI, as coordinator of the technical activities of the project, led the architecture design activities for the Digital Twin Engine and delivered the first two versions of the Blueprint architecture. Particular emphasis has been given to HPC integration, reaching the first pilots for cloud-HTC-EuroHPC interoperability with EuroHPC VEGA and Juelich supercomputers.

TANGO

EGI has contributed to the gap analysis on distributed data management technologies, end-users perceptions regarding trust management and privacy-preserving mechanisms. EGI is also involved in the user requirements collection that led to the evolution of the TANGO platform.

StairwAI

EGI was primarily responsible for service requirement collection, analysis and service architecture design, but we also delivered, together with INFN, a server infrastructure for application development and piloting. The resulting system provides a matchmaking service for users of the AI-on-demand platform, such as low tech SMEs, so they can easily find AI assets, experts, knowledge, hardware resource providers and much more.

CRAFT_OA

EGI is responsible for the definition of Trust & Identity best practices to enable single sign-on for new Diamond Open Access journal partners. Additionally, EGI is tasked with designing the technical architecture for a Trust & Identity Open Journal Platform, including the related interoperability framework and standards.

GOAL

03

Improve Skills of Users/Operators and Maturity in Service Providers

Goal 3

Improve Skills of Users/ Operators and Maturity in Service Providers

EGI recognises the importance of skilled users and operators for maximising performance and efficiency. To address this, EGI offers comprehensive training programmes tailored to the specific needs of the EGI Federation community. In 2023, EGI successfully delivered training programmes, with a significant portion conducted as face-to-face sessions during EGI2023.

Impact of EGI Training:

- 67 attendees from the EGI Federation community benefited from the training programmes.
- Enhanced Skills: These programs equip users and operators with the necessary skill sets to utilise EGI services effectively and to contribute to a stronger EGI ecosystem.
- Increased Efficiency: Improved skills lead to more efficient workflows and, ultimately, to a better overall performance.

Research Sector

Training and Consultancy for IT Experts from Research Communities

The EGI-ACE flagship project played a pivotal role in fueling the EGI Training Programme in 2023. The project's training activities provided valuable resources for 1) Sustaining Scientific Community Engagement: Training helped maintain the active participation of scientific communities within EGI, and 2) Upskilling the EGI Ecosystem: Consortium members, users, and external service providers all benefited from enhanced knowledge and skills.

During the EGI-ACE project closing event at EGI2023, delegates participated in 7 live training sessions. These included: FitSM certification (Foundation level), a security workshop, and a session to learn more about the details of specific EGI services such as Check-in, Notebooks and Replay, Workload Manager, DataHub. In 2023, the EGI Training Programme expanded its audience through 4 webinars, and 2 extended training events organised for the Asian Pacific region and the Austrian scientific communities to significantly advance research and innovation. These events focused on promoting open and reproducible science practices, exchanging knowledge on big data processing and analytics in science, and enhancing research and innovation. Additionally; 3 Security workshops to target the needs of the service operators were organised.

The EGI Training Programme attracted a larger audience and community participation throughout the year, including scientific communities, RIs, and representatives from international EU funded projects. Notably, in 2023 the EGI Training Programme was attended by over 330 participants.

Highlights

Distributed Deep Learning with Horovod

33 participants

14 countries

280+ views on YouTube

Key numbers

330 Participants of the EGI Training Programme

7 FitSM training courses

20 Training events

7 Training event at EGI2023

Research Sector

Until June 2023, we continued providing technical consultancy and support to various scientific use cases and scientific communities who were selected through the EGI-ACE open call. The effort came from a scalable and distributed team of experts composed of service and resource providers, scientific domain experts, and federation members. The program saw a strong demand with 23 support requests: 5 from scientific communities and EU-funded projects across diverse scientific domains, and 18 from business use cases chosen through the EOSC DIH and forwarded for EGI based on matching interest.

Recognising the importance of the open call, the EGI community made the decision to extend it beyond the EGI-ACE project, and generalise it as 'EGI Open Call'.. This ensures continued access to essential resources and services with community support for compute and data-intensive scientific endeavours. These resources and services, sponsored by various national funding agencies and EC projects, are free to access for use cases selected through the EGI Open call. Applicants further benefit from the expertise of a network of 22 consultants from 9 institutes across Europe, including CMCC (IT), UPV, CSIC (ES), INFN (IT), CYFRONET (PL), Fraunhofer SCAI (DE), IN2P3, CNRS (FR), and EGI Foundation (NL).

Interested in EGI Open Call for Use Cases?

Apply and get Access to Services, Tools, Training & Support sponsored by various National Funding Agencies.

egi.eu/egi-open-call

Standardising Service Delivery in the EGI Federation

EGI Federation

Throughout 2023, EGI prioritised the continuous improvement of service delivery. Here's how:

- Empowering Service Operators: We delivered 7 dedicated training courses to 64 service operators across the EGI Federation. These trainees successfully completed the programme and earned formal certifications accredited by the APMG certification authority. This investment equips our operators with the expertise needed to deliver exceptional service to our users.
- Enhanced Operational Level Agreements (OLAs): We introduced improvements to the OLAs underpinning EGI Core Services. These enhancements guarantee a higher standard of service quality and ensure mature, high-level service management practices are implemented throughout the Federation.

GOAL

04

Align Business Models to Support Cross-Border Service Provisioning

Goal 4

Align Business Models to Support Cross-Border Service Provisioning

A crucial objective of the federation is to harmonise and simplify cross-border access to digital services for research, creating a European-level access channel. This needs suitable business models that accommodate various target groups and their respective constraints.

EGI Federation

Over the course of this year, we have made significant progress in developing the necessary knowledge and assets to participate as a group in public tenders. Our efforts included acquiring the knowledge and skills required to participate in commercial contracts, as well as developing joint bidding agreements and subcontracting agreements. The primary driving force behind this work was the EC public procurement action for EOSC.

Research Sector

Public Administration

The EGI Federation offered market-driven access to services and resources against payment to the following projects: PITHIA-NRF, AI4PublicPolicy, DECIDO, EUHubs4Data, DIGITbrain, ANERIS, LETHE, BD4NRG and Blue-Cloud 2026. The allocation during 2023 considered the national/institutional interest and long-term commitment of providers for the respective project areas.

Private Sector

The EGI DIH (Digital Innovation Hub), an evolution from the previous business engagement program, continued its validation with multiple companies during 2023. Our primary focus is on coordinating and developing human and technical support for business-oriented pilots and collaborations, empowering innovation and growth.

EGI DIH promoted the active participation of innovative companies in the EGI community both on the demand (as beneficiaries of services and support) and supply side (as providers of valuable service for the research community). A free-trial period was launched and tested to stimulate the adoption of the partnership model among the current companies. With the finalisation in 2023 of several projects where experiments and pilots were supported (EUH4D, DigitBrain, EOSC Future) the possibility to keep on working with EGI was shared, with some companies under discussion to join during 2024.

GOAL

05

Strengthen the Governance and Broaden the International Presence

Goal 5

Strengthen the Governance and Broaden the International Presence

EGI, EUDAT, GÉANT, PRACE and OpenAIRE joined efforts under the e-Infrastructure Assembly, a lightweight form of collaboration to pursue the following objectives in support to the Research and Education community:

- Promote e-infrastructure activities in Europe to European Commission and Member States increasing awareness and visibility of e-Infrastructure contributions to European excellence in science.
- Seek dialogue and foster interaction with new e-infrastructure players, the ESFRI Research Infrastructure ecosystem, as well as projects funded through European funding programmes with the aim of increasing collaboration and avoiding duplication of efforts and fragmentation.
- Align and coordinate activities in areas of work of common interest.
- Improve the e-Infrastructure interface towards international initiatives of pan-European and international relevance, complementing existing individual collaborations and aligning individual efforts and contributions.

The e-Infrastructure Assembly supports Action 8 of the ERA Policy Agenda, which calls for "Increased cooperation between Research Infrastructures, e-infrastructures and related stakeholders, including through EOSC". It improves the dialogue and alignment between e-Infrastructures and closely collaborates with e-IRG, the e-Infrastructure Reflection Group.

Highlights

The e-Infrastructure Assembly actively participated in the e-IRG workshop held during the Spanish EU Presidency (November 29-30, 2023). They ensured their voice was heard by presenting their needs and recommendations on e-infrastructure sustainability.

events.geant.org/event/1529/

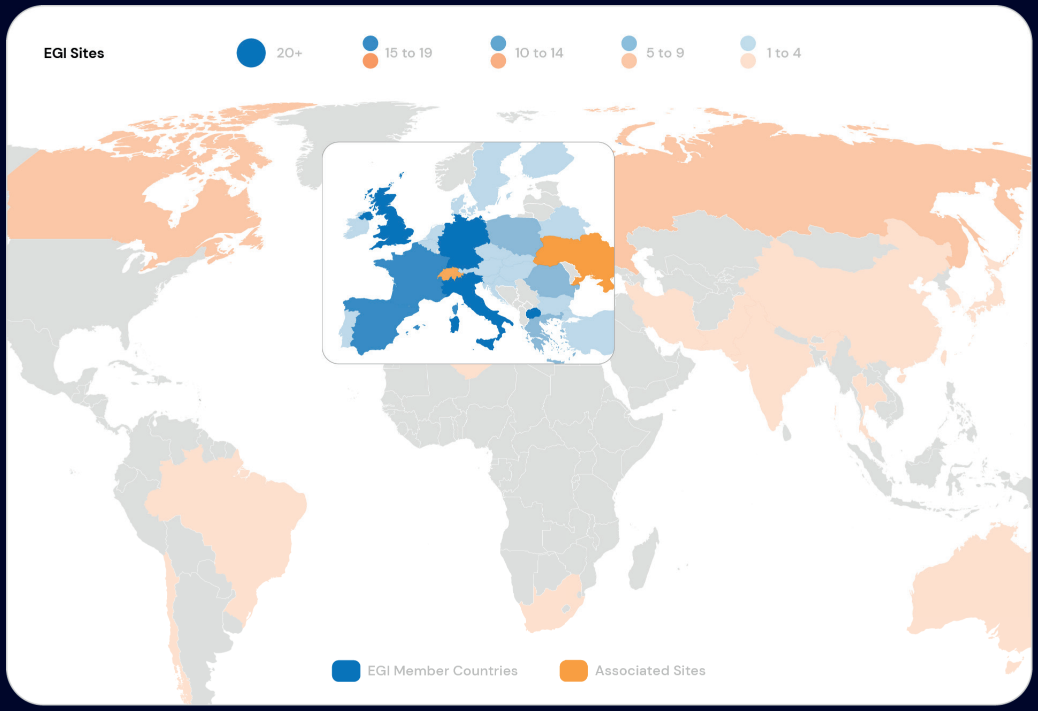
Partnering for Success: EGI's Memoranda of Understanding

In 2023, EGI signed the following collaboration agreements:

FedEarthData MoU

This MoU establishes a partnership between the EGI Foundation and EODC, Deltares, CESNET, INFN, SURFSARA, VITO, GRNET, CLOUDFERRO, INCD, TUWIEN to contribute to the FedEarthData service, developed within the C-SCALE project. FedEarthData is a cloud-based platform that supports large-scale Earth system simulations and data processing. Providers of the Copernicus Data Processing Platform already have an extensive collection of Copernicus datasets, managed according to the FAIR principles, which may be further extended with new datasets requested by platform users.

EGI's global footprint: A heatmap depicting the worldwide distribution of EGI's member and associated sites.



The robust solutions provided by EGI, coupled with the close collaboration with their team and their willingness to find the optimal mix of models and solutions tailored to our needs, will enable RedCLARA and SCALAC* to advance the management of our distributed HPC resources in Latin America. This will facilitate the R+D community's access to infrastructures capable of effectively addressing the region's challenges and opportunities.

Carlos González

Services Manager, RedCLARA

* SCALAC is Sistema de Cómputo Avanzado de Latinoamérica y el Caribe

Partnering for Global Impact: Expanding our Reach through New International Collaboration

2023 marked the end of the EGI-ACE project and therefore the closure of several partnership agreements that have been signed for the project duration with organisations external to the EGI Council. However, the year also marked the start of new collaborations with institutes in Asia, South America and Australia. These new collaborations represent a significant step towards a more inclusive and geographically diverse open science ecosystem.

Collaboration with KISTI (South Korea)

The Foundation started collaboration with KISTI from South Korea to align their services and approaches for the support of open science, and support of international communities. The work is focusing on the alignment of KISTI's "KOREA RESEARCH DATA COMMONS" system with policies and protocols used in the EGI federation, and in EOSC. The partnership aims to deliver alignments in 2024, and serve as a basis for coordinated service delivery from 2025. The partnership broadens existing collaboration in the federated HTC compute area that supports the CMS experiment for over a decade.

Collaboration with RedClara (South America)

The EGI Foundation and RedClara, the Latin American Cooperation of Advanced Networks started collaboration in 2023 to provide enhanced support to scientific communities in the Latin-American region based on good practices and services from EGI. The work is focusing on enhancing Cloud Computing and HPC facilities with Notebook interfaces and single sign on using Check-in, and on improving the EGI compute infrastructure with federated HPC capabilities integrating experiences from South America.

Collaboration with ARDC (Australia)

Representatives of the "Australian Research Data Commons" (ARDC) initiated collaboration with the EGI Foundation, as a key player of the European Data Spaces landscape. The work in 2023 focused on the exchange of experiences and approaches of building data spaces for various scientific disciplines respecting the needs of both academic and commercial entities. The EGI - ARDC collaboration is continuing in 2024 when the Green Deal Data Space will enter into implementation. Piloting activities are under discussion with EGI Communities and Australian SME Eratos to showcase the capabilities of a data space platform. The Queensland government expressed high interest in data landscape activity and invited EGI to present its activities in the Government Data, Information Sharing, and Analytics Community of Practice (DISA CoP). EGI also collaborated with The Australian National Computing Infrastructure (NCI) to organise a scientific session and a meeting at the European Geoscience Union Conference 2023 focusing on environmental data sharing, open science, and data spaces.

GOAL

06

Be a Recognised Foundation of EOSC

Goal 6

Be a Recognised Foundation of EOSC

The European Research Area's policy agenda 2022-2024[2] describes the ambition of the European Open Science Cloud (EOSC) as being to provide European researchers, innovators, companies and citizens with a federated and open multi-disciplinary environment where they can publish, find and re-use data, tools and services for research, innovation and educational purposes. It sees the ultimate aim of EOSC as being to develop a 'Web of FAIR Data and services' for science in Europe, upon which a wide range of value-added services can be built. These range from visualisation and analytics to long-term information preservation or the monitoring of the uptake of open science practices".

During 2023, EGI continued its strong commitment to EOSC, contributing to its successful implementation through leadership and completion of the ECI-ACE project, continuing its major roles in the EOSC Future project, active engagement and contribution in the EOSC Association and the EOSC Focus project, and through participation in the winning consortia for two of the three procurement Lots for operating the EOSC EU Node.

Highlight

Implementation of EOSC - EOSC Procurement

The outcome of the European Commission's public procurement tender for managed services for the European Open Science Cloud platform was announced in November 2023. EGI is delighted to be part of the winning consortia bidding for two of the three procurement lots: Lot 1 - Core Federation Services for the EOSC EU Node, and Lot 3 - Exchange Application Services for the EOSC EU Node. The procured services will provide operations, maintenance and support for 36 months, providing components of the EOSC Core and Exchange. The EOSC EU Node will provide the first fully operational enabling infrastructure for EOSC, taking another step along the way in the implementation of the EOSC, with EGI playing a major role. It will also play a role as a reference EOSC Node in the nascent Federation of EOSC Nodes now emerging.

[2] European Research Area (ERA) Policy Agenda 2022-2024, bit.ly/ERA-policy-agenda-2021

EOSC Nodes and the EOSC Compute Platform

Research Sector

Private Sector

Supporting Project:

The Compute Platform is a key component of EOSC. EGI draws on its successful experience of federated service delivery to provide the EOSC Compute Platform as a dedicated decentralised and federated infrastructure where, with dedicated training and support, EOSC users can access, process and analyse open data. Compute, storage, research objects, services and analytics tools are integral to the Open Science Commons and the realisation of the EOSC vision. The EOSC Compute Platform has an essential contribution to make to the EOSC Node architecture.

The concept of EU Nodes was introduced early in spring 2024 by the European Commission and their definition – Nodes' functions, and aspects of their federation – has been the subject of much discussion within the community, led by the EOSC Association the support of the EOSC Focus project, including contributions from EGI.

The EOSC Compute platform is built on top of the EGI infrastructure thanks to the resources provided by the NGIs and to thematic data and applications delivered by research communities in a joint partnership with EGI. Funded through EGI-ACE, the EOSC Compute Platform can host thematic services leveraging research and national investments and ensuring the sovereignty of data and digital infrastructures. It is built on hybrid facilities comprising cloud computing resources, High-Throughput computing sites, and High-Performance Computing centres.

Discussion continues to identify and agree a legal vehicle and funding models for EOSC from 2027 onwards. EGI-ACE experimented with use of the EC's Virtual Access funding mechanism, demonstrating very clearly the potential of this mechanism for multi-country scientific collaborations of direct relevance for EOSC.

Highlight

EGI is an active member of the EOSC Association, contributing through membership of four of the Association's 13 Task Forces as well as within the EOSC Focus project which provides support to the Association. As co-chair of two Task Forces, EGI led delivery of important reports contributing to the ongoing definition of EOSC.

The Technical Interoperability of Data and Services Task Force published its report Design Considerations for Technical Interoperability in EOSC in October 2023, describing the main capabilities, implementation status and key technical design considerations of the EOSC Interoperability Framework.

The Financial Sustainability Task Force published its Statement on Funding EOSC in November 2023. The Statement summarises the main findings and conclusions of the Task Force's work over the preceding two years, as input towards the ongoing considerations of the governance and funding model for the EOSC from 2027.

Within EOSC Focus, EGI is contributing to work to coordinate between the EOSC-related Horizon Europe projects, to the definition of the EOSC Rules of Participation, and to consideration of EOSC as a European common Data Space and its relationship to other Data Spaces.

The EOSC Core Platform and Integration

Research Sector

Supporting projects:

The EOSC Future project was the major ongoing EOSC technical implementation project. The project, originally due to conclude during autumn 2023, was extended by six months. EGI Foundation continued to co-lead coordination of the project's technical work to develop the EOSC Core. In the project, EGI applied its expertise in federation governance and best practices in service management and business models. It also contributed to the development and day-by-day provisioning of the EOSC Core services and central processes, including EOSC Marketplace, AAI Federation with the EOSC Core Infrastructure AAI proxy, Accounting, Collaboration Systems, Configuration Management, Helpdesk, Order management and Service management. EGI also leads the Innovation Management activity of the project, coordinating gathering of intellectual property details and definition of exploitation plans for the project's key exploitable results.

EGI also contributed its expertise in operating federated infrastructure to jointly lead the coordination of the integration of the EOSC Future Science Projects with the Core services. This activity ensured the interoperability of services, meaning users can share and compose them as required for their work.

Research Sector

Private Sector

Supporting project:

EOSC DIH

EGI coordinated the EOSC Digital Innovation Hub (EOSC DIH), fostering collaboration between industry and research community. The DIH leveraged EOSC services and data to facilitate innovation for businesses. It provided a platform for pilot programs, allowing companies to test and validate new concepts using EOSC's capabilities. Notably, 27 pilots were established, with 22 successfully completing their goals, some even advancing their technology maturity. 12 pilots directly benefited from EGI services.

Beyond demand-side support, the DIH also catered to the supply side. Following a demand analysis, Poznań University of Life Sciences (PULS) partnered with the DIH to co-develop a solution for analysing the impact of climate change on crops and ecosystems. Through a transparent public tender process, ran by EGI as an official contractor, a Polish software company, SETH, was selected to build the solution. This collaboration resulted in a successful outcome: an innovative commercial service was onboarded onto the EOSC marketplace. The knowledge gained from this project will prove valuable for similar future endeavours.

Sharing our Story: EGI's Communications Strategy

2023 marked a significant year for EGI's communication efforts. Recognising the importance of a strong voice and a vibrant community, EGI embarked on a series of initiatives to elevate its outreach, showcase its impact, and foster deeper engagement with researchers across Europe and beyond.

Building a Stronger Voice

A comprehensive communications strategy was developed to guide EGI's outreach efforts and messaging. New style and writing guidelines ensure a homogeneous register across all EGI communications, including publications, reports, and social media content.w

EGI Communications Strategy

2024-2026

egi.eu/publication/egi-communications-strategy-2024-2026/

Engaging the Community

EGI prioritises fostering a vibrant and engaged user community. To achieve this, we organised or contributed to several events that catered to a wide range of EGI users. The EGI Community Managers Network was actively managed to foster collaboration and engagement among EGI members, and the first steps were taken towards establishing the EGI Communications Network.

Sharing Success Stories

New publications showcasing the EGI services and impact, including the EGI service catalogue with success stories for each service, the 2022 Annual Report, and Impact Reports for all EGI members were delivered. Targeted social media campaigns leveraged success stories to highlight EGI's value to the research community. Finally, a wealth of new success stories were documented, showcasing the diverse applications of EGI services in scientific research.

Expanding Visibility

Like every year, in 2023, EGI organised its annual EGI conference, bringing together international scientific communities, computing and service providers, European projects, security experts, community managers, and policymakers, to discuss the latest advancements in open science and advanced research computing. In addition to EGI2023, we maintained a significant presence at major events like the EOSC Symposium, the IBERGRID conference and the Data Space Symposium. Proactive communications activities and support were provided for flagship projects like EGI-ACE, interTwin, and iMagine. Contributions were also made to EUH4D, C-SCALE, EOSC Synergy, EOSC-Future, and other participated projects. Efforts were undertaken to achieve visual alignment across EGI platforms, further solidifying the brand identity.

Our Plans

The EGI Federation is dedicated to enhancing and extending its services to cater to the evolving requirements of the research community. In 2024, the focus will be on expanding the EGI service portfolio capabilities, fostering new business models for service delivery, scaling user support, consolidating the EGI's positioning within the EOSC, and launching three new coordinated projects.

01 To expand the EGI service portfolio, the federation will integrate more High-Performance Computing (HPC) providers, develop combined data and compute provider services, identify and promote services for sensitive data processing, and release a first version of a Digital Twin Engine framework and related test applications

02 In the area of new business models for service delivery, the focus will be on developing pricing models for key services of the EGI service catalogue and nurturing mature SME relationships.

03 To scale user support, the Foundation will continue to run the EGI Open Calls for access and onboard new communities, provide training for Community Support Specialists (CSSs), and enhance self-service capabilities.

04 In 2024, the EGI Foundation will kick off three new coordinated projects: EOSC Beyond will support the growth of the EOSC and establish a pilot Node network; SPECTRUM will develop a strategy and blueprint for the European compute and data continuum in Radio Astronomy and High-Energy Physics; ENVRI-Hub NEXT will provide an open access Hub and a framework for interdisciplinary research to advance science and society. Additionally, several participated projects, including EOSC delivery projects with EGI Federation members playing key roles, will commence.

By fostering collaboration, innovation and professional service delivery, the EGI Federation aims to consolidate a world-class research infrastructure that facilitates scientific and technological progress.

Finances

Income

Items	Actual 2023 (€)
Projects Income* adjusted to provision	4.835.014
Other Income	(paid service delivery) 93.475
EGI.eu Participants fee	1.202.500
TOTAL INCOME	**6.130.989**

Expenditure

Items	Actual 2023 (€)
Employee expenses	4.437.014
Other operating expenses Core activities grant to Council	677.313
ICT (incl depreciation)	92.153
Facilities	116.726
Non Project Travels	28.648
Project Travels	193.514
General expenses	138.847
Communications expenses	93.238
Other project expenses	452.599
Financial income/expense	23.722
VAT	108.956
TOTAL	**6.315.743**

Expenses 2023
€ 6.315.743

Income 2023
€ 6.130.989

Equity 2023
€ 1.719.310

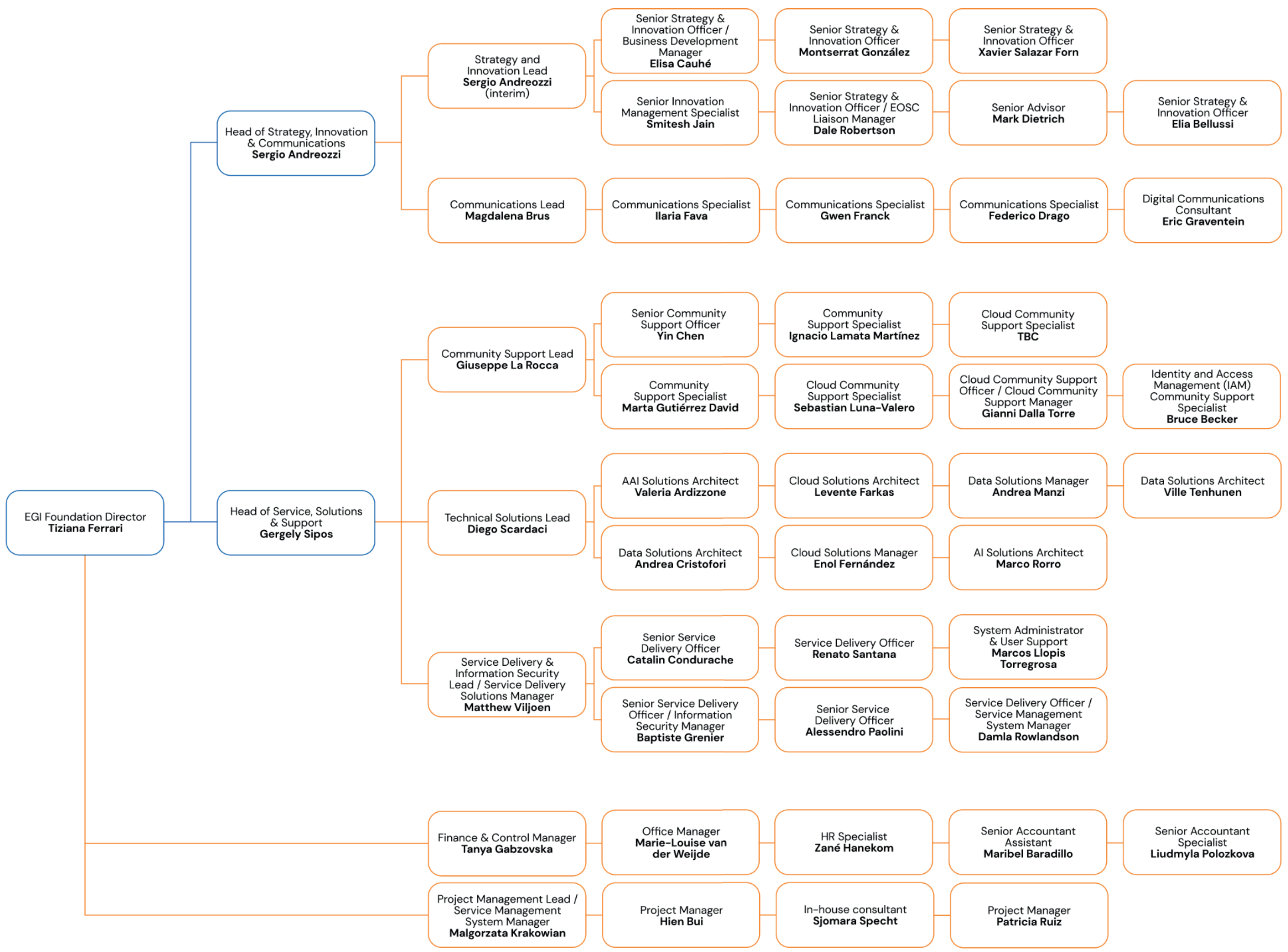
Our Team

The EGI Foundation is the coordinating body of the EGI Federation. It was established in 2010 with a headquarters in Amsterdam, Netherlands.

The foundation staff is distributed across many countries and it ensures that the internal capabilities sustaining the federation are delivered professionally.

Our team is distributed in the following countries:

It comprises individuals from **19 different nationalities**, fostering a rich tapestry of diverse perspectives and cultural backgrounds.



Glossary

The entire glossary can be found at go.egi.eu/glossary

- **EGI:** Abbreviation of EGI Federation. Note: if EGI is mentioned, this only refers to the EGI Federation.
- **EGI Federation:** EGI Foundation, EGI Foundation Participants and Associated Participants, their linked organisations (e.g. service and resource providers) represented within EGI Foundation that contribute to the objectives of the foundation.
- **EGI Foundation:** The legal entity whose objective is to coordinate and develop, in collaboration with its Participants, the EGI infrastructure that provides long-term distributed compute and storage resources for performing research and innovation activities.
- **EGI community:**The EGI Federation plus the served research communities, the technology providers or any other organisation linked via an agreement with the EGI Foundation and contributing to the mission of the EGI Federation.
- **EOSC:** Initiative to offer researchers a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines.
- **HPC:** Abbreviation of High-Performance Computing. A computing paradigm that focuses on the efficient execution of compute-intensive, tightly-coupled tasks.
- **HTC:** Abbreviation of High-Throughput Compute. A computing paradigm that focuses on the efficient execution of a large number of loosely-coupled tasks.
- **NGI:** The national federation of shared computing, storage and data resources that delivers sustainable, integrated and secure distributed computing services to the national research communities and their international collaborators. The federation is coordinated by a National Coordinating Body providing a single point of contact at the national level and has official membership in the EGI Council through an NGI legal representative. Note: the name comes from "National Grid Infrastructure", which is now deprecated.
- **Virtual Organisations:** A group of people (e.g. scientists, researchers) with shared interests and requirements, who need to work collaboratively and/or share resources (e.g. data, software, expertise, CPU, storage space) regardless of geographical location.

Key Publications

EGI Annual report 2022

The annual report offers a comprehensive overview of the remarkable achievements stemming from our collaborative endeavors in 2022. Uncover the notable milestones, projects, and initiatives that shaped the year.

egi.eu/publication/annual-report-2022/

EGI Service Catalogue

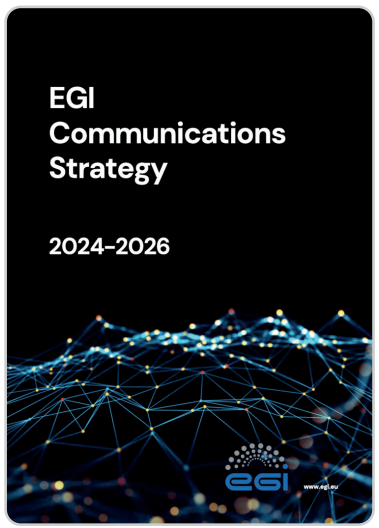
Discover the power of our large-scale computing and data analysis solutions.

egi.eu/publication/egi-service-catalogue/

EGI-ACE Impact report

Discover the profound impact of the project through our comprehensive EGI-ACE Impact Report, showcasing the Key Exploitable Results, Success stories and Impacts on different areas.

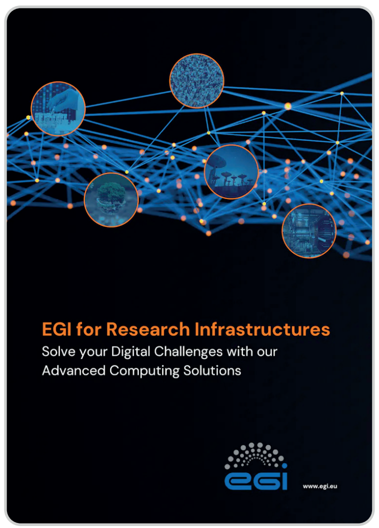
egi.eu/publication/egi-ace-impact-report/



EGI Communications Strategy 2024-2026

This summary provides an overview of the strategic direction that allows for greater consistency of communications actions over time, which will ultimately help EGI to achieve its vision and fulfil its goals.

egi.eu/publication/egi-communications-strategy-2024-2026/



EGI for Research Infra-structures

Solve your Digital Challenges with our Advanced Computing Solutions (2022)

egi.eu/publication/egi-for-research-infrastructures/

EGI Brochure

Supporting data-intensive research with advanced computing services.

egi.eu/publication/2024-egi-brochure

You can find all our publications at: egi.eu/publications

Acknowledgements

EGI extends its deepest gratitude to all individuals who contributed to this annual report and, more importantly, to the ongoing advancements of the EGI federation.

We offer special thanks to the EGI Foundation for its support and to our federation members whose tireless efforts are the backbone of EGI's success.

We are also profoundly grateful to the European Commission for its continued trust and vital funding, which empowers EGI to support research and industry, and to push the boundaries of open science.

Funded by the European Union

Contact us

Science Park 140
1098 XG Amsterdam
Netherlands

Phone:
+31 (0)20 89 32 007

Email:
contact@egi.eu

egi_einfra EGI Foundation EGI

www.egi.eu