



EGI Council Participant: BELSPO

Participating in EGI Impact Report: Belgium

2023

egi.eu

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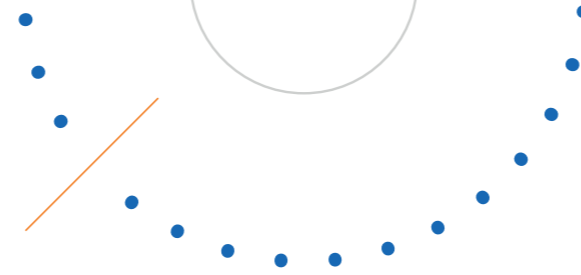
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28 National institutional members of supported research communities (table 2)

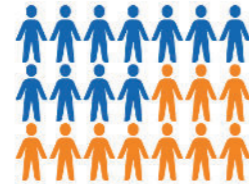
Infographic



Country overview

+1,230 service users

In 2023, +1,230 researchers from Belgian institutions used the services provided by the EGI Federation



+640 publications

The research communities, projects and scientific collaborations from Belgium supported by the EGI led to more than 640 peer-reviewed scientific publications

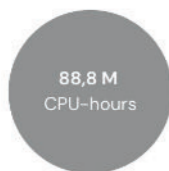
16 Supported communities

In 2023, the Belgian infrastructure supported 16 research communities in the following disciplines: Climate Research, Health and Medicine, Linguistics, Physics



Projects

Belgian partners participate in 24 collaboration projects + EGI-ACE and iMagine



Number of supported publications 643

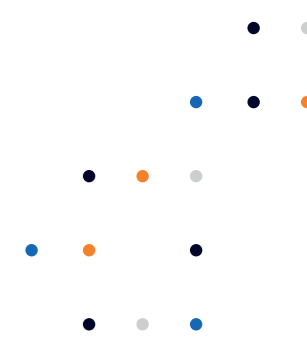
Number of total service users 1,238

Scientific Communities supported 16

Data Centres contributing to the Federation 4

Collaboration projects 24

Total CPU hours delivered 88,899,929

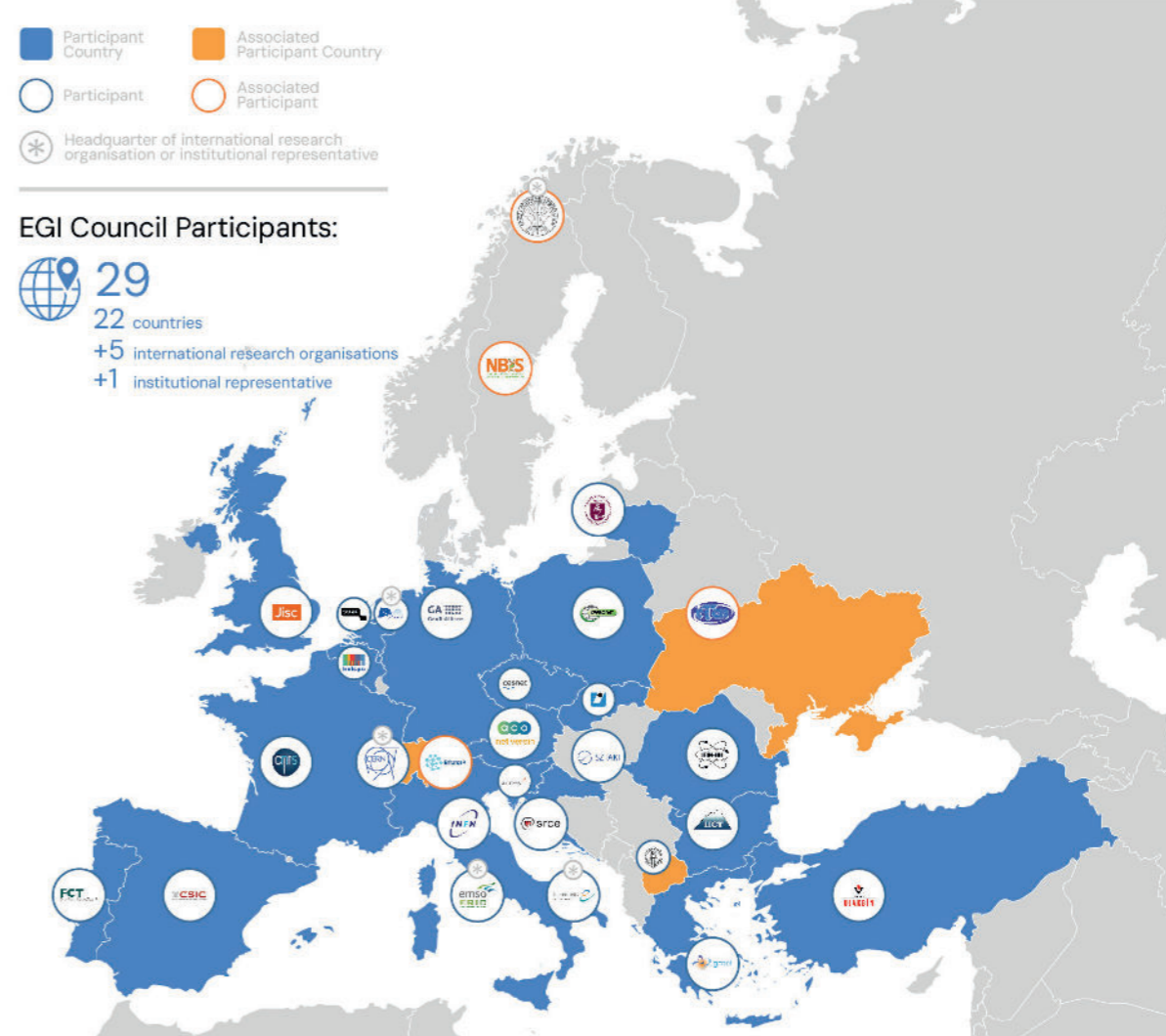


About EGI

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

The EGI Federation believes that all researchers should have seamless access to services, resources and expertise to collaborate and conduct world-class research and innovation. The EGI Federation is coordinated by EGI Foundation, an organisation with headquarters in Amsterdam. The Foundation offers a service federation and management platform, enabling the data centres to harmonise and integrate their services by connecting to a common hub. Moreover, it engages with international research communities using these services in order to understand and satisfy their demands for advanced computing for research.

The mission of EGI is pursued by coordinating and provisioning an international federated infrastructure that pools together service providers from both the public and private sectors in Europe to develop, integrate and deliver digital services for compute and data-intensive research and innovation. As an open initiative with a global outlook, the EGI Federation also connects service providers beyond Europe, following the collaboration needs of the served communities.



Approved EGI Council map from 2023



About BELSPO

The Federal Science Policy coordinates the Belgian participation to European research programmes with the Communities and Regions. It undertakes also a number of initiatives to inform the researchers on the presented opportunities. Through the major research programmes we manage, we also offer the government reliable, validated data, allowing it to take decisions with full knowledge of the facts in areas such as sustainable development, the fight against climate change, biodiversity, energy, health, mobility and the information society.

The Federal Science Policy also co-ordinates the research effort lead by all the country's authorities and is responsible for introducing our researchers into international research networks. In this sense, it lies at the heart of the Belgian research space and represents a major centre in the European Research Area.

The Federal Science Policy alone represents almost 30% of the entire Belgian public budget in terms of research.

Overall EGI impact

BELSPO coordinates the Belgian participation to the EGI Federation; BELSPO is represented by BEGRID in the EGI Council. BELSPO promotes the building and operation of a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries in Belgium. This report provides an overview of the activities of

BELSPO in EGI, and the impact that was achieved thanks to this participation. The annual membership fee contributed by BELSPO to the EGI Foundation in 2023 was 55,000 EUR.

The EGI Federation is composed of e-infrastructure providers from national and community initiatives, forming one of the largest distributed computing infrastructures for researchers in the world, integrating about 1,243,400 CPU cores and over 1,4 Exabyte of storage space from hundreds of data centres.

In 2023, the EGI Federation served around 95,000 users (+12%) from over 260 research communities.

EGI users consumed 7 Billion HTC CPU hours (-1.04%), 12 Million Cloud CPU hours +17%), ran over 372 M computational jobs (+13.4%) and published over 2,900 open access publications.

As of the previous year, the research community with the largest number of users is Medical and Health Sciences (+43% annual increase in 2023), while the community with most extensive HTC CPU/h consumption is WLCG.

From the scientific communities engaged in 2023, the one with most extensive Cloud CPU/h consumption is Pangeo (+2959% annual increase in 2023).

Moreover, EGI engaged with a total of 265 scientific communities (10 new communities); 19 SMEs and business pilots, and 1 additional Research Infrastructure included in the ESFRI Roadmap, raising the total of number of ESFRI partners/users of EGI to 23.

EGI contribution to Belgium excellence in science

The services of the EGI federation have been used by 1238 researchers from Belgium in 2023. The estimated annual scientific output in 2023 produced by research communities, projects and scientific collaborations from Belgium and supported by the EGI Federation is estimated to amount to around 640 peer reviewed scientific publications.

The EGI Federation is currently working with over 40 Research Infrastructures, 16 of which include Belgian partners. These EGI-enabled research infrastructures, their Belgian members and their 2023 scientific output (publications) are detailed in the following pages of the report.

Belgian research collaborations in EGI

AUGER (Astronomy)

- Université Libre de Bruxelles (ULB)
- Vrije Universiteit Brussel

CMS (High-Energy Physics)

- Ghent University,
- Université de Mons,
- Université Catholique de Louvain,
- Université Libre de Bruxelles,
- Universiteit Antwerpen

CLARIN (Linguistics)

- CLARIN BE Instituut voor de Nederlandse Taal (INT), Vincent Vandeghinste

EGI supported activities and services

The Pierre Auger Observatory has been using compute resources from EGI partners for more than a decade. The services of the EGI federation that the Auger observatory benefits from include:

- EGI HTC services from 9 EGI participant countries (CZ, DE, IT, FR, ES, NL, RO, PT, SI)
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

CMS has been supported since 2012 as part of the EGI WLCG collaboration, formally agreed in an MoU. Federated services delivered in the context of the WLCG MoU, including: >Software support (consultancy to users and system administrators, (software maintenance and validation)

- Infrastructure and operations Services (infrastructure catalogue, accounting repository and portal, helpdesk, monitoring, operations portal, AAI)
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

CLARIN thematic services has been supported by EGI since 2018. CLARIN has a Service Level Agreement with EGI, using the following services:

EGI services:

- EGI Cloud (Compute + Online Storage) for hosting the Virtual Language Observatory (VLO)
- Technical support
- Service integration

Number of scientific papers published in 2023

8

117

38

Belgian research collaborations in EGI

EISCAT_3D (Incoherent Scatter Radar)

- National Instruments Belgium Nv

EGI supported activities and services

EISCAT_3D has been supported through competence centre activities in the EGI-Engage and EOSC-hub projects. Since 2021 the EISCAT Association is member of the EGI Council. Since 2018 the EISCAT_3D experiment is using the following services from EGI:

- EGI Workload Manager
- EGI High Throughput Compute
- Technical support
- Software integration and piloting

From 2021 the EISCAT Association is working with EGI in the EGI-ACE Horizon 2020 project as an early adopter of the EOSC Compute Platform.

Number of scientific papers published in 2023

43

Belgian research collaborations in EGI

ILC (High-Energy Physics)

- Vrije Universiteit Brussel, 2, Brussels
- Université Libre de Bruxelles, Bruxelles
- University of Ghent, Department of Subatomic and Radiation Physics, Gent
- Université catholique de Louvain, Center for Cosmology, Particle Physics and Phenomenology (CP3), Institute of Mathematics and Physics, Louvain-la-Neuve

EGI supported activities and services

The ILC experiment has been using compute resources from EGI partners since 2004. The services from the EGI federation that ILC experiments uses include:

- EGI HTC services from 27 EGI federated sites from IL, DE, FR, ES, NL, PL, UK
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

Number of scientific papers published in 2023

43

IceCube (Neutrino Observatory)

- UCLouvain
- Université libre de Bruxelles
- Universiteit Gent
- Vrije Universiteit Brussel

The IceCube experiment has been using compute resources from EGI partners for more than a decade. The services from the EGI federation that IceCube uses include:

- EGI HTC services from 8 sites of 4 EGI participant countries (Belgium, Denmark, Germany and UK)
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

EGI is currently expanding its resource pledge to IceCube with an increase of GPU capacity

20

INSTRUCT (Structural Biology)

- Instruct Centre BE
- Belgian Federal Science Policy Office (BELSPO)
- Nanobodies4Instruct
- Robotein for Instruct
- Vrije Universiteit Brussel

The WeNMR structural biology community is supported by EGI since 2011 and have an Service Level Agreement since 2016. WeNMR is part of INSTRUCT and operates online Virtual Research Environments on top of the EGI services. The EGI Services used by the community include:

- High-Throughput, Cloud + Online Storage services from 23 EGI federated data centres from the Netherlands, Italy, France, Belgium, UK, Poland, the Asia Pacific region, IberGrid (Spain and Portugal), Italy, the Latin America region.
- EGI Workload Manager
- Trust and identity management with Check-in
- Technical support: WeNMR benefited from continual support through dedicated support activities in various EGI flagship projects: EGI-Engage, EOSC-hub and EGI-ACE.

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JUNO (Neutrino Observatory)

- Université Libre de Bruxelles

The JUNO experiment has been using compute resources from EGI partners for more than a decade. The services from the EGI federation that JUNO uses include:

- EGI HTC services from 4 EGI federated data centres from France, Italy, Russia and China.
- Software distribution services (UMC, CMD, operations documentation) Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

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Belgian research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

LifeWatch (Biodiversity and Ecosystem Research)

- Flanders Marine Institute (VLIZ)
- Research Institute for Nature and Forest (INBO)
- Université catholique de Louvain
- Université de Liège/Gembloux-ABT
- Royal Belgian Institute of Natural Sciences (RBINS)
- Royal Museum for Central Africa (RMCA)
- BELSPO

The LifeWatch experiment has been using compute resources from EGI partners since 2018. The services from the EGI federation that LifeWatch uses include:

- EGI Cloud services from 2 EGI federated data centres from ES and PT
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

0

LOFAR (Astronomy)

- Vrije Universiteit Brussel

LOFAR has been supported by EGI partners in the EOSChub project in the setup and validation of a data access and transformation workflow on High Throughput Compute (HTC) resources. Since 2021 LOFAR (represented by ASTRON) participates in the EGI-ACE Horizon 2020 project where SURF (EGI member from NL) supports the setup, operation and promotion of the LOFAR Data Space, an online service that produces and make 'LOFAR science ready data' available in EOSC for broad uptake. The setup will rely on EGI HTC, Check-in, Helpdesk and consultancy/ technical support services.

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NA62 (High-Energy Physics)

- Université Catholique de Louvain (UCL)

The NA62 experiment has been using compute resources from EGI partners since 2012. The services from the EGI federation that NA62 uses include:

- EGI HTC services from sites in the UK, Italy, Belgium and CERN
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

5

Belgian research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

PANOSC (Photon and Neutron)

- Association Internationale Extreme-Light-Infrastructure Delivery Consortium

PaNOSC has been using compute resources from EGI partners since 2018. The services from the EGI federation that PANOSC uses include:

- EGI Cloud services from 2 EGI federated data centres from CZ and DE
- EGI AAI Check-in
- EGI Notebooks
- EGI DataHub

5

SeaDataNet (Oceanography)

- Royal Belgian Institute of Natural Sciences
- Flanders Marine Institute
- University of Liège, GeoHydrodynamics and Environment Research (ULg-GHER)

SeaDataNet has been supported by EGI partners in the EOSChub project in the setup and validation of a data access service on federated cloud resources. Since 2021 the SeaDataNet community is represented in the EGI Council by MARIS, and works with several EGI members in the EGI-ACE Horizon 2020 project. In EGI-ACE, SeaDataNet and EGI partners from Spain are setting up and operating a WebOcean Data Analysis service in the EGI cloud federation, and deliver the service in EOSC.

1

Solid Experiment (High-Energy Physics)

- Universiteit Antwerpen
- Vrije Universiteit Brussel
- Universiteit Gent
- SCK-CEN, Belgian Nuclear Research Centre

The collaboration with EGI started back in 2017. The services from the EGI federation that the experiment uses include:

- EGI HTC services from 2 EGI federated sites from BE and UK
- Software distribution services (UMC, CMD, operations documentation)
- Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
- Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)

0

Belgian research collaborations in EGI

VIRGO (Astrophysics)

- Katholieke Universiteit Leuven
- Université catholique de Louvain
- Université de Liège
- Université libre de Bruxelles
- Universiteit Antwerpen
- Universiteit Gent
- Vrije Universiteit Brussel

EGI supported activities and services

- The Virgo experiment has been using compute resources from EGI partners for more than a decade. The services from the EGI federation that VIRGO uses include:
 - EGI HTC services from 8 data centres from France, Italy, The Netherlands, Spain and UK
 - Software distribution services (JMC, CMD, operations documentation)
 - Operations coordination (middleware deployment campaigns, procedures, innovation of tools)
 - Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)
- Since 2021 Virgo works with EGI in the EGI-ACE Horizon 2020 project to evaluate and adopt data analysis, federated authentication-authorisation and data management services for thematic applications.

Number of scientific papers published in 2023

5

WeNMR (Structural Biology)

- KU Leuven
- Vrije Universiteit Brussel

WeNMR is supported by EGI since 2011 and has a Service Level Agreement since 2016. The EGI Services used by the community include:

- High-Throughput, Cloud + Online Storage services from 23 EGI federated sites from the Netherlands, Italy, France, Germany, UK, Poland, the Asia Pacific region, IberGrid (Spain and Portugal), Italy, the Latin America region.
- EGI Workload Manager
- Trust and identity management with Check-in
- Technical support: WeNMR benefited from continual support through dedicated support activities in various EGI flagship projects: EGI-Engage, EOSC-hub and EGI-ACE.

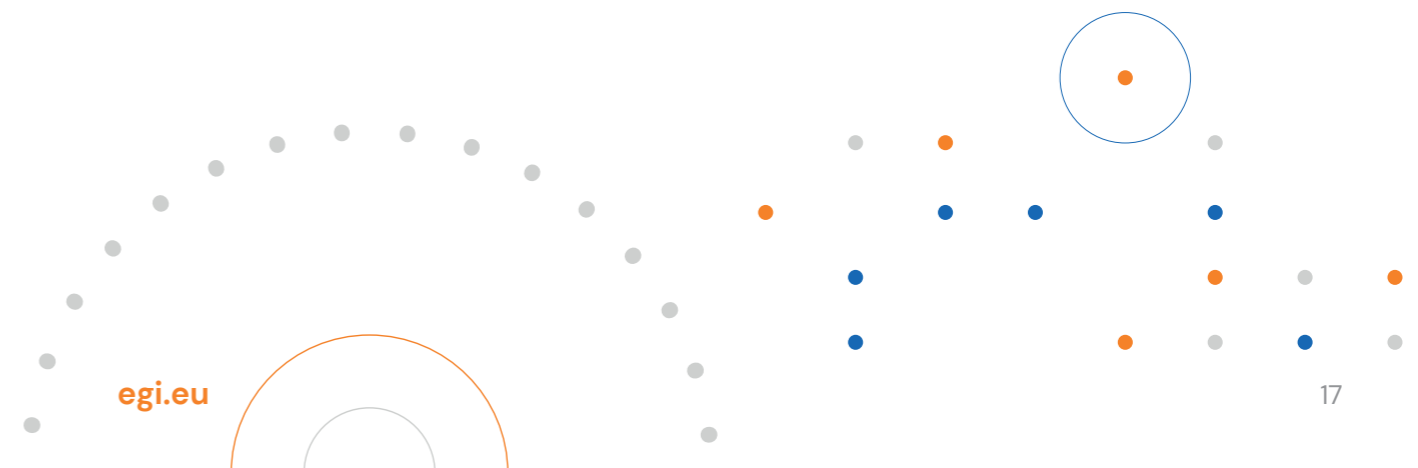
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Participated projects





The EGI Foundation coordinated one Horizon 2020 project, EGI ACE (January 2021-June 2023). Moreover, it leads two Horizon Europe Projects, iMagine (September 2022-December 2025) and interTwin (September 2022-August 2025).

Furthermore, the EGI Federation was involved in 8 additional projects, increasing the innovation potential of its participants.


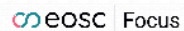



The EGI Federation participates in Horizon 2020 and Horizon Europe projects together with Belgian institutions to facilitate the uptake and use of e-infrastructure services for science. A summary of these projects, the involved institutes and the scope of the collaboration is provided in the next table.










Project title	Scope of collaboration	Participating beneficiaries from the country
	<p>EGI is contributing to the architectural design and implementation of open distributed software to ensure that AI4Europe evolves as a distributed ecosystem. EGI is also providing its expertise on physical resources, usability, development of systems, distributed systems and new technologies to develop mechanisms for the AI tools to deploy/make use of private/public Cloud and HPC resources.</p>	<ul style="list-style-type: none"> EIT DIGITAL EUROPEAN DIGITAL SME ALLIANCE
	<p>EGI co-leads the activities around technology Integration and validation on large RIs. It leads the work on the computing continuum infrastructure and contributes to the development of a Virtual Research Environment for the analysis of the genomics data, the creation of the imaging-Biooptics gateway and pipeline integration, as well as of the participatory Sciences gateway and pipeline integration. Moreover, EGI coordinates the overall integration and EOSC synergies. Last but not least, EGI leads the project's innovation management and exploitation activities.</p>	<ul style="list-style-type: none"> VLIZ
	<p>The EGI Foundation delivers a reference architecture for Smart Energy and extend COSMAG specification to enable B2B multi-party data exchange, while providing full interoperability of leading-edge big data technologies with smart grid standards and operational frameworks; evolve and upscale a number of TRL 5-6 technology enablers; delivers a TRL8 open modular big data analytic toolbox as front-end for one-stop-shop analytics services development by orchestrating legacy and/or third party assets (data, computing resources, models, algorithms); validates such framework through the delivery of predictive and prescriptive edge AI-based big data analytics on 13 large scale pilots, deployed by different energy stakeholders.</p>	<ul style="list-style-type: none"> Entso-e European Network Of Transmission System Operators For Electricity Restore IMEC
	<p>EGI leads the task on "Blue-Cloud VRE interaction with EOSC projects" and participates in other project activities, such as the development and deployment of sub-setting services at BDIs and BlueCloud Data Lake, the DTO Taskforce for tuning Blue-Cloud data lakes with DTO developments, the Blue-Cloud VRE evolution of common services and operation, the Blue-Cloud VRE expansion by federating multiple e-infrastructures, and the Blue-Cloud VRE interoperability with EOSC core services. EGI also joins the activities around establishing a sustained community dialogue and developing an exploitation plan for Blue-Cloud's assets.</p>	<ul style="list-style-type: none"> SEASCAPE BELGIUM VLIZ UNIVERSITE DE LIEGE EuroGOOS

Project title	Scope of collaboration	Participating beneficiaries from the country
	<p>EGI the project coordination and led the activity to setup the C-SCALE Compute Federation, leveraging on its extensive experience on setup and managing large distributed infrastructures. EGI also took care of the interactions with other EOSC initiatives and projects and had a leading role on defining C-SCALE business and sustainability.</p>	<ul style="list-style-type: none"> VITO
	<p>EGI coordinates the task dedicated to the Single Sign-On access with the EGI Check-in service.</p>	<ul style="list-style-type: none"> OPERAS
	<p>EGI, as a very active player in the Data Space landscape in Europe, joined the project as Associated and collaboration Partner and participates in the Strategic Stakeholder Group (SSG) that will act as a think-and-do-tank to support the project in delivering to the policy objectives.</p>	<ul style="list-style-type: none"> DAIRO CAPGEMINI GAIA-X KU Leuven DigitalEurope aNewGovernance Open & Agile Smart Cities
	<p>Within EUCAIM, EGI works on the development of the platform core services in addition to supporting the creation of the platform central storage and infrastructure. Moreover, EGI leads the activities around the design and implementation of a federated learning and data analysis infrastructure, and ensures access to HPC/Cloud resources across Europe.</p>	<ul style="list-style-type: none"> COCIR KU Leuven Radiomics Sciensano
	<p>EGI Foundation collaborates to the definition of the technical requirements, to the authentication and authorisation infrastructure of the project, and will support the project services onboarding to the EOSC Marketplace.</p>	<ul style="list-style-type: none"> IMEC

Project title	Scope of collaboration	Participating beneficiaries from the country
	EGI contributes to EOSC-LIFE by supporting the creation and operation of a life science AAI (LS AAI) that is fully interoperable with the EOSC AAI.	<ul style="list-style-type: none"> European Research Infrastructure On Highly Pathogenic Agents Vlaams Instituut Voor De Zee Universiteit Gent
	EGI works on the activities related to the SRIA update and technical development, in particular, interacting with the EOSC task forces and liaising with European partnerships and other initiatives. Moreover, EGI works on the sustainability of the EOSC, with specific activities towards the definition of the EOSC rules of participation, the collaboration expansion.	<ul style="list-style-type: none"> EOSC-A BELNET
	EGI contributed to the design, operation and interoperability of EOSC Core services, to running the EOSC Digital Innovation Hub, as well as to resource strategy and the processes for onboarding new groups to EOSC. EGI was responsible for requirements collection and analysis for both the EOSC Back Office and Front Office. It also leads all operational aspects of the EOSC Portal. Finally, EGI played a leading role in developing the EOSC SMS.	<ul style="list-style-type: none"> Entso-e European Network Of Transmission System Operators For Electricity Restore IMEC
	EGI contributes to the Federation sustainability model and the expansion of the DIH ecosystem. Moreover, it collaborates to the development and maintenance of the service catalogue, to the training programme, and to the dissemination and outreach of the project activities and results.	<ul style="list-style-type: none"> Katholieke Universiteit Leuven Data Ai And Robotics Dairo European Digital Sme Alliance
	EGI was involved in coordinating the Green Deal Data Space, establishing a stakeholder network, and managing dissemination and online presence. Also, EGI contributed to developing the Technical Architecture. Moreover, EGI coordinated efforts on Governance and Business Models, analyzing current governance schemes and proposing appropriate governance for the Green Deal Data Space. Additionally, EGI contributed to the implementation roadmap for the Green Deal Data Space.	<ul style="list-style-type: none"> SeaScape EARSC

Project title	Scope of collaboration	Participating beneficiaries from the country
	EGI leads the development of new functionality to bring support for new computing and storage systems and to deliver meta scheduling of computing jobs in a distributed infrastructure delivered by EOSC providers and beyond. EGI also leads the activities for the development of a sustainability model to maximize the project and collaborates in the activities to integrate EuroScienceGateway in EOSC.	<ul style="list-style-type: none"> VIB VZW
	EGI Foundation leads the task on the analysis of the existing computation infrastructures with a special view on health research and will propose a reference architecture for computational services to serve the Health Research and Innovation Cloud ecosystem.	<ul style="list-style-type: none"> Sciensano
	EGI works on the deployment and operation of a FAIR federated data repository, promoting enhanced exploitation of project outputs (data and results). It also provides expertise in order to formulate a strategy regarding data preservation. In particular, EGI will implement a DataHub and a Data preservation service for the project.	<ul style="list-style-type: none"> Katholieke Universiteit Leuven
	EGI Foundation is leading the design of LETHE system architecture and building a data collection and big data framework, including set-up of the LETHE big data infrastructure, set-up the authentication scheme for the LETHE project and registration of the LETHE infrastructure and services in EOSC.	<ul style="list-style-type: none"> The Lisbon Council For Economic Competitiveness Asbl
	EGI contributes to the project with the AAI service and Marketplace integration. Moreover, it collaborates to the project's outreach activities.	<ul style="list-style-type: none"> VITO

Project title **Scope of collaboration** **Participating beneficiaries from the country**



The EGI Foundation supports the project in defining interoperability standards among the participating facilities, and with the broader landscape, including EOSC, and leads the design of sustainable services and activities that will last beyond the project. EGI members deliver a federated cloud environment with a cloud-based 'EGI Notebooks' service for the PITHIA e-science centre to offer a scalable and customisable web environment for writing workflows, exchanging workflows, accessing, analysis and sharing of data.

- Institut Royal d'Aeronomie Spatiale de Belgique
- Katholieke Universiteit Leuven
- Koninklijke Sterrenwacht van België
- Institut Royal Meteorologique de Belgique



EGI contributes supporting HPC, Cloud and Edge, and to the strategic engagement with the European AI Ecosystem and connected communities.

- EIT Digital
- Open & Agile Smart Cities
- European DIGITAL SME Alliance
- BDVA



EGI is one of the main contributors to the design and definition of the EOSC architecture and the federated service management framework, and coordinates service pilots participates by the scientific demonstrators. EGI also contributed to the definition of the governance framework and to the works on Rules of Participation. In the project EGI will enhance the SoBigData platform with two services: Jupyter Notebooks and the Workflow manager Galaxy

- Re-Imagine Europa



EGI leads the work on Services Provision, which collects information about the services that the RI can provide and creates a plan for a unified single access point RI, including access policies for the distributed resources. EGI also contributes to the development of the financial aspect of the future RI, defines the business cases and the cost book, supports the strategy and enhance the impact of the RI, contributes to the Dissemination and Communication plans (WP5), and to the creation of the Italian central Hub for the preparation phase.

- Re-Imagine Europa



EGI contributes to the GAP analysis, User needs and requirements, Definition of System Requirements and Technical Specifications, and Security, in addition to the Self-sovereign Identity Management and Dissemination and Communication. EGI coordinates the task dedicated to Policy recommendations on Distributed Infrastructures, Secure Data Exchange & Data Spaces.

- DBC EUROPE
- SQUAREDEV
- KU Leuven
- Lisbon Council
- FLANDERS MAKE

Project title **Scope of collaboration** **Participating beneficiaries from the country**



EGI is involved in the work ensuring the integration of the TRIPLE solution into the EOSC; also, it collaborates to the sustainability and innovation activities by setting up the processes to prepare maturity assessment and innovative agile management. Last but not least, it guides the implementation of the EGI AAI service in TRIPLE.

- KNOW Center
- Open Knowledge Maps

Infrastructure contributions

The EGI Federation offers two complementary compute capabilities: the High-Throughput Compute (HTC) federation and the Cloud federation. 3 Belgian data centres contribute to these federations:

HTC Federation:

- BEgrid-BELNET
- BEgrid-ULB-VUB (Universite Libre de Bruxelles - Vrije Universiteit Brussel)
- BelGrid-UCL (Universite Catholique de Louvain, Louvain-la-Neuve)
- VITO (Flemish Institute for Technological Research)

The data centres provided 9 service endpoints and delivered 88,899,929 CPUhours in total to EGI communities in 2023. The data centres responded to 42 support tickets through the EGI Helpdesk. The most active international user groups of the Belgian compute resources were:

- CMS 98.68%
- solidexperiment.org 1.32%

Storage takes into account both online and archival storage provided by the data centres.

Methodology

Data for this impact report has been collected from the following sources.

- Infrastructure contributions, infrastructure usage by research communities: [EGI Accounting System](#)
- List of research publications by supported research communities (table 1)

AMS-02

<https://ams02.space/publications>

ILC

https://inspirehep.net/literature?sort=mostrecent&size=25&page=1&q=international%20Linear%20Collider%20&earliest_date=2021--2021

ALICE

<https://alice-publications.web.cern.ch/publications>

INSTRUCT

<https://instruct-eric.eu/content/publications-list>

ATLAS

<https://cds.cern.ch/collection/ATLAS%20Papers?ln=en>

JUNO

<https://inspirehep.net/>

AUGER

<https://www.auger.org/science/publications/journal-articles>

KM3NET

<https://www.km3net.org/about-km3net/publications/publication/>
https://inspirehep.net/literature?q=collaboration:KM3NeT_year:2021

BELLE

<https://belle.kek.jp/belle/publications.html>; https://inspirehep.net/literature?q=collaboration:belle_year:2021

LifeWatch

<https://www.lifewatch.eu/catalogue-of-virtual-labs/medobis/publications/>

BIOMED

<https://vip.creatis.insa-lyon.fr/documentation/>

LOFAR

<http://old.astron.nl/radio-observatory/lofar-science/lofar-papers/lofar-papers>; <https://lofar-surveys.org/publications.html>, or [https://ui.adsabs.harvard.edu/search?q=full%3A\(%22designed%20and%20constructed%20by%20ASTRON%22\)%20OR%20title%3A%22LOFAR%22%20year%3A2021-2021%20property%3Arefereed%20-bibstem%3A\(%22AN%22%20OR%20%22MNRAS.tmp%22\)&sort=date%20desc%2C%20bibcode%20desc&p_0](https://ui.adsabs.harvard.edu/search?q=full%3A(%22designed%20and%20constructed%20by%20ASTRON%22)%20OR%20title%3A%22LOFAR%22%20year%3A2021-2021%20property%3Arefereed%20-bibstem%3A(%22AN%22%20OR%20%22MNRAS.tmp%22)&sort=date%20desc%2C%20bibcode%20desc&p_0)

CTA

<https://www.cta-observatory.org/science/library/>

LCHb

<https://cds.cern.ch/collection/LHCb%20Papers?ln=en>

CLARIN

<https://beta.clarin.openaire.eu/search/advanced/research-outcomes?sortBy=resultdateofacceptance,descending&type=publications&year=range2021:2021>

LSST

<https://ui.adsabs.harvard.edu/> with - year:2021 author:("LSST*" OR "Vera C. Rubin*") collection:astronomy property:refereed

CMS

<http://cms-results.web.cern.ch/cms-results/public-results/publications/CMS/index.html>

NA62

<https://cds.cern.ch/collection/NA62%20Papers?ln=en>

DUNE

<https://inspirehep.net/literature?q=collaboration:DUNE year:2021>

OPENCOASTS

http://opencoasts.inec.pt/index_en.php

EISCAT_3D

<https://eiscat.se/scientist/publications/>

PANOSC

<https://www.panosc.eu/publications/>

ELI-BEAM

<https://www.eli-beams.eu/publikace/>

SeaDataNet

<https://www.seadatanet.org/Publications/Scientific-publications>

ELI-NP

https://www.eli-np.ro/scientific_papers.php

SKA

[https://ui.adsabs.harvard.edu/search/fq=%7B!type%3Daqp%20v%3D%24fq_database%7D&fq_database=database%3A%20astronomy&q=pubdate%3A%5B2021-01%20TO%202021-12%5D%20title%3A\(SKA\)&sort=date%20desc%2C%20bibcode%20desc&p_0](https://ui.adsabs.harvard.edu/search/fq=%7B!type%3Daqp%20v%3D%24fq_database%7D&fq_database=database%3A%20astronomy&q=pubdate%3A%5B2021-01%20TO%202021-12%5D%20title%3A(SKA)&sort=date%20desc%2C%20bibcode%20desc&p_0)

EMSO-ERIC

from the community representative; SLA <https://documents.egi.eu/document/3539>

SNO+

<https://snoplus.phy.queensu.ca/results/collaboration-papers.html>

FUSION

<https://documents.egi.eu/public/ShowDocument?docid=3484>

VIRGO

<https://pnp.ligo.org/ppcomm/Papers.html>

HESS

<https://www.mpi-hd.mpg.de/hfm/HESS/pages/publications/>

WeNMR

<https://explore.openaire.eu/> - advanced search - project outcomes. field to search - "project" - enter project name; Citation of HADDOCK web server: https://scholar.google.nl/scholar?hl=en&as_sdt=2005&cites=10355645612647046441&scipsc=&as_ylo=2021&as_yhi=2021; Citations of the AMBER web portal publication: https://scholar.google.com/scholar?as_ylo=2021&hl=en&as_sdt=0.5&scioldt=0.5&cites=6696812766870837905&scipsc=; Citations of the FANTEN web portal publication: https://scholar.google.com/scholar?as_ylo=2021&hl=en&as_sdt=0.5&scioldt=0.5&cites=10578718345045994565&scipsc=; Citations of the DISVIS/POWERFIT web portals publication: https://scholar.google.com/scholar?as_ylo=2021&hl=en&as_sdt=2005&cites=6482114501244947208&scipsc=; Citations of the SpotON web portal: https://scholar.google.com/scholar?as_ylo=2021&hl=en&as_sdt=2005&cites=6482114501244947208&scipsc=

Ice-Cube

<https://icecube.wisc.edu/science/publications/>

XENON

<https://inspirehep.net/literature?q=collaboration:XENON year:2021>

National institutional members of supported research communities (table 2)

AMS-02 https://ams02.space/collaboration/institute	ILC https://linearcollider.org/team/	CMS https://cms.cern/collaboration/cms-institutes	NA62 https://greybook.cern.ch/experiment/detail?id=NA62
ALICE https://alice-collaboration.web.cern.ch/General/Members/List_Institutes.html	INSTRUCT https://instruct-eric.eu/countries	DUNE https://lbnf-dune.fnal.gov/about/countries-and-institutions-participating-in-dune/	OPENCOASTS http://opencoasts.lnec.pt/index_en.php
ATLAS https://atlas.cern/discover/collaboration	JUNO https://juno.ihep.ac.cn/collaboration.php	EISCAT_3D https://eiscat.se/wp-content/uploads/2016/12/EISCAT-Organogram-202x.jpg ; https://eiscat.se/scientist/document/information/	PANOSC https://www.panosc.eu/partners/
AUGER https://www.auger.org/collaboration/institutions ; https://www.auger.org/collaboration/funding-agencies	KM3NET https://www.km3net.org/about-km3net/collaboration/members/	ELI-BEAM https://www.eli-beams.eu/about/cooperation/science/	SeaDataNet https://www.seadatanet.org/About-us/SeaDataNet-AISBL/Members
BELLE https://belle.kek.jp/bdocs/collaboration.html	LifeWatch https://www.lifewatch.eu/organisation-governance/	ELI-NP https://www.eli-np.ro/scientific_collaborations.php	SKA https://www.skatelescope.org/participating-countries/
BIOMED https://vip.creatis.insa-lyon.fr/	LOFAR https://www.astron.nl/telescopes/	EMSO-ERIC http://emso.eu/organization/	SNO+ https://snoplus.phy.queensu.ca/collaboration.html
CTA https://www.cta-observatory.org/about/cta-consortium/	LCHb https://lhcb-public.web.cern.ch/en/collaboration/Collaboration-en.html	FUSION https://documents.egi.eu/public/ShowDocument?docid=3484	VIRGO https://apps.virgo-gw.eu/vmd/public/institutions
CLARIN https://www.clarin.eu/content/participating-consortia	LSST https://www.lsstcorporation.org/international-contributors	HESS https://www.mpi-hd.mpg.de/hfm/HESS/pages/collaboration/	WeNMR https://documents.egi.eu/document/2751
		Ice-Cube https://icecube.wisc.edu/collaboration/institutions/	XENON https://science.purdue.edu/xenon1t/?page_id=27



EGI Membership Impact Report

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