



EGI Council Participant: CSIC

Participating in EGI Impact Report: Spain

2023

egi.eu

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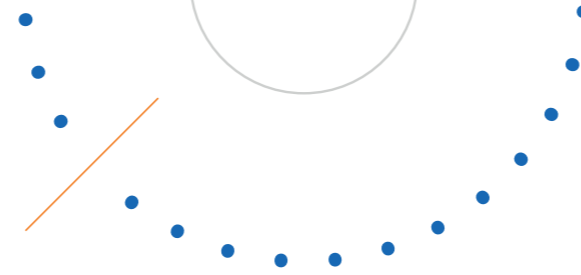
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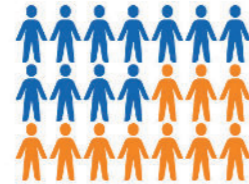
32 National institutional members of
supported research communities (table 2)

Infographic



+2,770 service users

In 2023, +2,770 researchers from Spanish institutions used the services provided by the EGI Federation



+840 publications

The research communities, projects and scientific collaborations from Spain supported by the EGI led to more than 840 peer-reviewed scientific publications

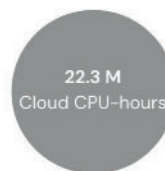
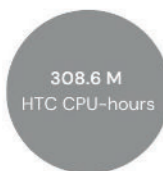
27 Supported communities

In 2023, the Spanish infrastructure supported 27 research communities in the following disciplines: Agriculture, Climate Research, Health and Medicine, Physics



Projects

Spanish partners participate in 27 collaboration projects + EGI-ACE, iMagine and interTwin



Country overview

Number of supported publications **846**

Number of total service users **2788**

Scientific Communities supported **27 (Agriculture, Climate Research, Health and Medicine, Physics)**

Data Centres contributing to the Federation **15**

Collaboration projects **27**

Total HTC CPU hours delivered **308,620,343**

Total Cloud CPU hours delivered **22,367,357**

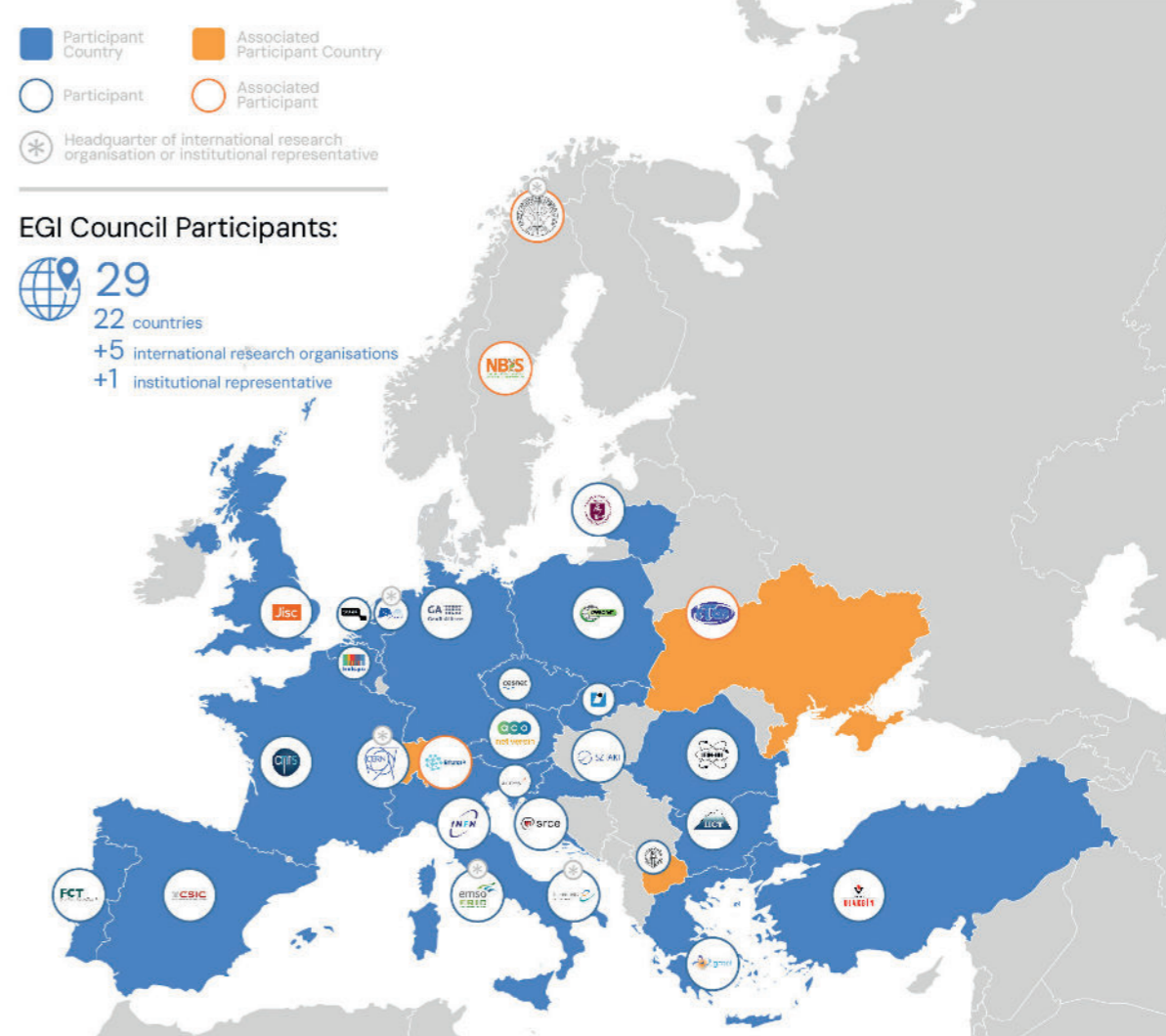
About EGI

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.

The latest Annual Report provides an extensive overview of the results that have been achieved through our collaborative efforts in 2023.



Approved EGI Council map from 2023



About CSIC

The Spanish National Research Council (CSIC) is a State Agency for scientific research and technological development, with a special legal status, its own assets and treasury, functional and managerial autonomy, full legal capacity and of unlimited duration (art. 1 Statutes – Articles of Association).

Overall EGI impact

ES-NGI coordinates the Spanish participation to the EGI Federation; CSIC represents the National grid initiative for Spain in the EGI Council. ES-NGI promotes the building and operation of a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries in Spain. This report provides an overview of the activities of ES-NGI in EGI, and the impact that was achieved thanks to this participation.

The annual membership fee contributed by ES-NGI to the EGI Foundation in 2023 was 75,000 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 Spain excellence in science

EGI federates hundreds of resource centres that are located at participant countries, organisations and at collaborating e-Infrastructures worldwide. This federated infrastructure supports data- and compute-intensive research across Europe and the world. In 2023, our federation was used by over 260 scientific communities, and has been accessed by around 95,000 users.

Research Infrastructures and multi-national research collaborations are the largest adopters of EGI Services, the main contributors of thematic portals, and operate community-specific compute, storage and data systems based on EGI federation capabilities.

Research Infrastructures and multi-national research collaborations are the largest adopters of EGI Services, the main contributors of thematic portals, and operate community-specific compute, storage and data systems based on EGI federation capabilities.

The services of the EGI federation have been used by 2788 researchers from Spain in 2023. The estimated annual scientific output in 2023 produced by research communities, projects and scientific collaborations from Spain and supported by the EGI Federation is estimated to amount to more than 820 peer reviewed scientific publications.

The EGI Federation is currently working with over 40 Research Infrastructures, 27 of which include Spanish partners. These EGI-enabled research infrastructures, their Spanish members and their 2023 scientific output (publications) are detailed in the following pages of the report.

Spain research collaborations in EGI

AMS-02 (Particle Physics)

- CIEMAT, Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas
- IAC Canarias & University of La Laguna

ALICE (High-Energy Physics)

- Valencia Polytechnic University, Valencia, Spain
- University of Valencia, Valencia, Spain

ATLAS (High-Energy Physics)

- Institut de Física d'Altes Energies (IFAE), Barcelona Institute of Science and Technology
- Departamento de Física Teórica C-15 and CIAFF, Universidad Autónoma de Madrid
- Instituto de Física Corpuscular (IFIC), Centro Mixto Universidad de Valencia
- CSIC

EGI supported activities and services

The AMS-02 experiment on the International Space Station has been using compute resources from EGI for more than a decade. The services from the EGI federation that AMS-02 uses include:

- EGI HTC services from sites in Italy 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)

ALICE 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)

ATLAS 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)

Number of scientific papers published in 2023

3

65

111

Spain research collaborations in EGI

AUGER (Astronomy)

- Universidad de Granada and C.A.F.P.E.
- Universidad de Santiago de Compostela

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)

Number of scientific papers published in 2023

8

BELLE (High-Energy Physics)

- Instituto de Física Corpuscular (IFIC), University of Valencia - CSIC

The BELLE experiment has been using compute resources from EGI partners since 2016. The services from the EGI federation that BELLE 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)

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Spain research collaborations in EGI

CMS (High-Energy Physics)

- Universidad de Oviedo, Instituto Universitario de Ciencias y Tecnologías Espaciales de Asturias (ICTEA)
- Instituto de Física de Cantabria (IFCA), CSIC-Universidad de Cantabria
- Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT)
- Universidad Autónoma de Madrid

EGI supported activities and services

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)

Number of scientific papers published in 2023

117

CTA (Astronomy)

- Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)
- Departament d'Astronomia i Meteorologia, Institut de Ciències del Cosmos, Universitat de Barcelona
- Escuela Politécnica Superior de Jaén, Universidad de Jaén
- Grupo de Altas Energías, Universidad Complutense de Madrid.
- Grupo de Electrónica, Universidad Complutense de Madrid
- Instituto de Astrofísica de Canarias + many others

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

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DUNE (Astroparticle Physics)

- Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)
- Institut de Física d'Altes Energies, Universitat Autònoma de Barcelona (UAB)
- Instituto de Física Corpuscular (IFIC)
- Instituto Galego de Física de Altas Enerxías
- Universidad Autónoma de Madrid (Autonomous University of Madrid)
- University of Granada

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

- EGI HTC services from 6 EGI participant countries (CH, CZ, ES, FR, NL, 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)

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Spain research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

ELI-NP (Nuclear Physics)

- Centro de Laseres Pulsados Ultracortos Ultraintensos

ELI has been working with EGI since 2016 on exploring and validating approaches for off-site computing and data management. ELI-NP setup a High Throughput Compute Service on EGI resources and works with EGI providers on:

- Refining the user requirements and translating these to e-infrastructure requirements, and
- Identifying and validating services from EGI that can be relevant for ELI (besides HTC and compute).
- Mobilising already existing HTC compute, cloud compute and storage resources from EGI for ELI piloting and demonstration activities

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EMPHASIS (Agriculture)

- IRTA, Institute for Food and Agricultural Research and Technology

EMPHASIS has been supported through the establishment of a Data Space in the EGI-ACE project. Since 2017 EMPHASIS using the following services from EGI

- EGI Check-in
- EGI Cloud Compute
- EGI Online Storage
- EGI DataHub
- Technical support
- Software integration and piloting

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EMSO (Oceanography)

- PLOCAN

The collaboration with EGI started back in 2017 when 4 cloud providers of the EGI Federation agreed to support the EMSODEV project during the design and implementation of the EMSODEV Data Portal.

EMSO-ERIC setup the EMSO ERIC Data Management Platform on the EGI providers in order to harmonize the data sets following Oceansites specifications, FAIR principles, and EOSC guidelines.

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FUSION (Fusion)

- Barcelona Supercomputing Center (BSC)

The Fusion community has been using compute resources from EGI partners since 2018. The services from the EGI Federation used by the community include:

- EGI Cloud Compute
- EGI Online Storage

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Spain research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

ILC (High-Energy Physics)

- CIEMAT
- IFIC - Univ. Valencia + many others

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)

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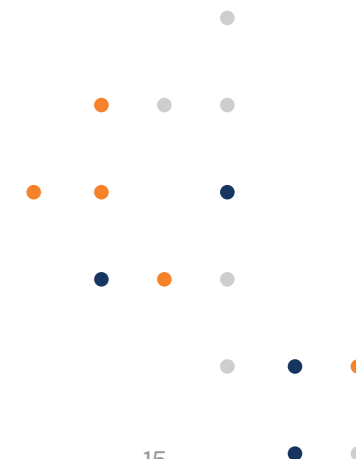
INSTRUCT (Structural Biology)

- CryoEM CNB-CSIC
- Instruct Image Processing Center
- Instruct Centre ES

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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Spain research collaborations in EGI

KM3NET (Neutrino Observatory)

- IFIC Instituto de Física Corpuscular (CSIC Universitat de València),
- Laboratori d'Aplicacions Bioacústiques, Centre Tecnològic de Vilanova i la Geltrú (Universitat Politècnica de Catalunya)
- Instituto de Investigación para la Gestión Integrada de las Zonas Costeras (Universitat Politècnica de València)
- Universidad de Granada & C.A.F.P.E.
- Instituto Español de Oceanografía, Unidad Mixta IEO-UPV

EGI supported activities and services

The Km3Net experiment has been using compute resources from EGI partners since 2013. The services from the EGI federation that Km3Net uses include:

- EGI HTC services from 2 EGI federated sites from IT and PL
- 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

58

LHCb (High-Energy Physics)

- University of Barcelona.
- University of Santiago de Compostela
- IFIC Valencia

LHCb has been supported since 2012 as part of the EGI – WLCG collaboration, formally agreed in an MoU. Federating 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)

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Spain research collaborations in EGI

LifeWatch (Biodiversity and Ecosystem Research)

- CSIC, CIEMAT and the Spanish Institute of Oceanography-IEO and INTA
- The Deputation of Huelva; the City Councils of Sevilla and Malaga-OMA, Port Authorities (Cartagena, Huelva and Seville),
- The Network of River Basin Authorities (led by the Guadalquivir River Basin Authority),
- Scientific, Technological and Innovation Parks (the Extremadura STIP Network one Andalusian STIP),
- Technological Centres (three Andalusian, one Galician),
- Five public-private foundations (including the MITECO Biodiversity Foundation), and a dozen universities and Centres of International Excellence in Andalusia, Cantabria, Extremadura, Madrid and Navarra.

EGI supported activities and services

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)

Number of scientific papers published in 2023

0

LSST (Astronomy)

- Barcelona-Madrid Consortium (BCN-MAD),
- Instituto de Astrofísica de Canarias (IAC) restrial Physics (MPE)

The LSST survey federates High Throughput Compute (HTC) resources from France and the UK and run an analysis campaign in 2020 to prepare for the opening of the Vera C. Rubin Observatory. The campaign consumed over 11 million CPU-hour in 2020 to analyse generated images, imitating the telescope images that are expected to become available from 2023. The LSST compute federation benefited from the following EGI services:

- 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)

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Spain research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

LZ (Physical Sciences)

- University of Valencia (IFIC)

The LZ survey federates High Throughput Compute (HTC) resources from UK. The LZ compute federation benefited from the following EGI services:

- 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)

1

MINKE (Oceanography)

- CSIC – ICM
- CONSORCIO PARA EL DISEÑO, CONSTRUCCIÓN, EQUIPAMIENTO Y EXPLOTACIÓN DE LA PLATAFORMA OCEÁNICA DE CANARIAS
- UNIVERSITAT POLITÈCNICA DE CATALUNYA
- ANEL-LIDES S.L.
- INSTITUT D'ARQUITECTURA AVANÇADA DE CATALUNYA, FABLAB BARCELONA

The collaboration with EGI started back in 2021. The services from the EGI federation that the experiment uses include:

- EGI HTC services from 1 EGI federated site from ES
- 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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OBSEA (Oceanography)

- SARTI
- Universitat Politècnica de Catalunya

The collaboration with EGI started back in 2019. The services from the EGI federation that the experiment uses include:

- EGI HTC services from 2 EGI federated sites from ES, IT
- 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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Spain research collaborations in EGI

EGI supported activities and services

Number of scientific papers published in 2023

OPENCoastS (Ocean Engineering)

- UC Universidad de Cantabria

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

- EGI Cloud services from 2 EGI federated sites from ES and PT
- EGI AAI Check-in

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SeaDataNet (Oceanography)

- Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC Central Organisation)

SeaDataNet has been supported by EGI partners in the EOSC-hub 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

SKA (Radioastronomy)

- Ministry of Science, Innovation & Universities

The Square Kilometre Array (SKA) is an intergovernmental radio telescope project being planned to be built in Australia and South Africa. 8 countries that participate in SKA are also represented in the EGI Council (France, Germany, Italy, Portugal, Spain, Switzerland, The Netherlands and the United Kingdom). Between 2017-2019 SKA worked with the EGI federation in the AENEAS Horizon 2020 project. The collaboration resulted in recommendations on how to:

- Organise federated service management within the SKA European Science Data Centre (ESDC) and across multiple SKA Regional Centres to address the management of the SKA community-specific services.
- Federate the ESDC services with existing e-Infrastructure federated services (Identity Provisioning, Authentication and Authorization, tools for federated service management)
- Collect SKA and e-Infrastructures requirements to federate and eventually enhance existing federation services.

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Spain research collaborations in EGI

VIRGO (Astrophysics)

- Departamento de Astronomía y Astrofísica, Universitat de València
- Departamento de Matemáticas, Universitat Autònoma de Barcelona
- Departamento de Matemáticas, Universitat de València
- Institut de Ciències del Cosmos (ICCUB), Universitat de Barcelona
- Institut de Física d'Altes Energies (IFAE), Barcelona Institute of Science and Technology, and ICREA
- Instituto de Física Teórica UAM-CSIC, Universidad Autónoma de Madrid

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 (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)
- 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

Service Level Agreements

During 2023, Spanish providers including BIFI, CESGA, and IFCA-LCG2 supported 18 Service Level Agreement for international scientific communities via EGI, delivering Cloud Computing, Online Storage, and HTC services.

WeNMR (Structural Biology)

- CSIC
- Universitat Pompeu Fabra Barcelona
- EUSKAL HERRIKO UNIBERTSITATEA
- Institute of Computational Chemistry and Catalysis (IQCC)
- UNIVERSITAT AUTÒNOMA DE BARCELONA
- UNIVERSIDAD DE CASTILLA-LA MANCHA
- UNIVERSITY OF ZARAGOZA
- UNIVERSITAT INTERNACIONAL DE CATALUNYA
- VALENCIA CATHOLIC UNIVERSITY
- Barcelona Super Computer Centre
- INSTITUTE FOR RESEARCH IN BIOMEDICINE (IRB BARCELONA)
- UNIVERSIDAD CARLOS III DE MADRID
- VALL D'HEBRON RESEARCH INSTITUTE
- INSTITUT DE QUÍMICA COMPUTACIONAL I CATÀLISI
- UNIVERSITAT OBERTA DE CATALUNYA
- UNIVERSITY OF CORDOBA
- and many others

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, EOOSC-hub and EGI-ACE.

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Participated projects

The EGI Foundation coordinated one Horizon 2020 projects, 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 Spanish 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
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	<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"> • Instituto Tecnológico de Informatica • Univerdisad de Zaragoza • Barcelona Supercomputing Center
	<p>EGI is involved in the activities around Cloud-based AI Tools for Citizen Centric & Autonomous Policy, in particular with the Dynamic provisioning of Cloud and HPC. Moreover, it leads the integration of Validated AI-based Applications and Tools, contributes to dissemination and communication, and leads the the business modelling and sustainability planning.</p>	<ul style="list-style-type: none"> • Universidad Politecnica de Madrid
	<p>EGI contributes with the services Cloud computing, Notebooks and Applications on demand, FTS, data archiving. It participates to the EOSC Integration processes and the sustainability business plan.</p>	<ul style="list-style-type: none"> • CSIC • LifeWatch ERIC • Quanta Systems SL • Science for Change SL • Marsabased SL • DRIBBA • MEDCITIES • Federacio Catalana de Activitats Subaquatiques
	<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"> • Atos Spain • Cartif Technology Center • Saint Cugat Municipality • Veolia

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



EGI contributes with the services Cloud computing, Notebooks and Applications on demand, FTS, data archiving. It participates to the EOSC Integration processes and the sustainability business plan.

- SOCIB



EGI is involved in developing a detailed roadmap, analyzing state-of-the-art technology, and designing a modular architecture framework. Moreover, It works to improve data monetization strategies for EU companies and define KPIs for fair dataset valuation. EGI will help develop business cases for data sharing platforms, explore non-monetary data value dimensions, and prepare pilots for framework deployment. Demonstration and validation tests will be conducted at pilot sites. Additionally, EGI contributes to disseminating results, managing innovation and sustainability, participating in standardization activities, and coordinating with the Data Spaces Support Centre.

- Instituto Tecnológico de Informatica
- Fundacion Tecnalía Research & Innovation
- GIMENO DIGITAL TECHNOLOGIES SOCIEDAD LIMITADA



DIGIT BRAIN

EGI leads the processes related to setup and operate of testbed infrastructure, the Edge/cloud/HPC orchestration, to secure resource access and user management. It also works on the commercial exploitation and sustainability plan and on dissemination activities..

- Instituto Tecnológico de Aragon
- Enide Solutions .S.L
- Fundacion Corporacion Tecnologica de Andalucia
- Inyecciones Montañana Sa



DATA SPACES SUPPORT CENTRE

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.

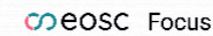
- ITI
- Innovalia Association

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.

- Agencia Estatal Consejo Superior De Investigaciones Científicas
- Universitat de Valencia
- Fundació Institut Mar D'Investigacions Mèdiques Imim
- Universidad Del País Vasco/ Euskal Herriko Unibertsitatea
- Universidad de Vigo
- Universitat Pompeu Fabra



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.

- CREAM



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.

- LifeWatch ERIC



EGI contributes to the project activities related to innovation management, policy development, and project activities and results communications and dissemination.

- CSIC
- Universitat Politecnica de Valencia
- Indra Sistemas Sa



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.

- Instituto Tecnológico de Informatica
- Fundacio Eurecat
- Instituto Tecnológico de Aragon
- Zabala Innovation Consulting, S.A.
- Consultores de Automatizacion y Robotica Sa

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



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.

- Instituto Aragonés de Ciencias de la Salud
- Universitat de Barcelona
- Barcelona Supercomputing Center
- Servicio Andaluz de Salud
- Fundacio Centre De Regulacio Genomica



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.

- Universidad de Vigo
- Universidade da Coruna
- Contactica SI



In the project, EGI co-designs and deploys AI models on edge resources, enhancing capacity through its federation's computational and storage resources. EGI expands resource allocations, provides a two-tier e-infrastructure for validation and large-scale data processing, and ensures sustainable setups by coordinating national funding. EGI addresses data management challenges, integrates distributed storage solutions, and connects PHENET with the European Open Science Cloud.

- IRTA – Instituto de Investigación y Tecnología Agroalimentarias



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.

- Observatorio del Ebro Fundacion
- Universitat Politecnica de Catalunya



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

- FUNDINGBOX COMMUNITIES SL

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



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.

- UNIVERSITAT ROVIRA I VIRGILI
- Barcelona Supercomouting Center
- Universidad Pompeu Fabra



The EGI Foundation is leading the technical requirements, service layer design and integration with the platform defining and describing. Additionally, EGI Foundation participates to build Vertical Matchmaking and hardware marketplace and to Open Call Management.

- Universitat Politecnica de Catalunya



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.

- ATOS
- LSTECH ESPANA SL
- Anysolutions
- Universidad de Murcia
- IDIADA AUTOMOTIVE TECHNOLOGY
- CESSGARDEN
- Playa de Muro



Unlock the potential for accelerating the deployment of the Cloud-to-Edge-IoT (CEI) computing continuum in Europe by focusing on the demand-side drivers and challenges to identify technology-driven innovation and business opportunities driving demand value chains.

- BLUSPECS SL

Infrastructure contributions

The EGI Federation offers two complementary compute capabilities: the High-Throughput Compute (HTC) federation and the Cloud federation. 15 Spanish data centres contribute to these federations:

HTC Federation:

- CESGA (Centro de Supercomputacion de Galicia)
- CETA-GRID (Resource Center CETA-CIEMAT)
- CIEMAT-LCG2 (CIEMAT)
- ifae (IFAE)
- IFCA-LCG2 (Instituto de Fisica de Cantabria)
- IFIC-LCG2 (Instituto de Fisica Corpuscular, Valencia)
- pic (port d'informacio cientifica)
- UAM-LCG2 (UAM, Madrid)
- USC-LCG2 (University of Santiago de Compostela)

Cloud Federation:

- CESGA (Centro de Supercomputacion de Galicia)
- CESGA-CLOUD (Centro de Supercomputacion de Galicia)
- BIFI (Instituto de Biocomputacion y Fisica de Sistemas Complejos at Universidad de Zaragoza)
- CETA-GRID (Resource Center CETA-CIEMAT)
- IFCA-LCG2 (Instituto de Fisica de Cantabria)
- UPV-GRyCAP (Universidad Politecnica de Valencia - Grupo de Redes y Computacion de Altas Prestaciones)

The data centres provided 54 service endpoints and delivered 308,620,343 CPUhours in total to EGI communities in 2023. The data centres responded to 83 support tickets through the EGI Helpdesk.

The most active international user groups of the Spanish compute resources were:

- ATLAS 43.59%,
- CMS 48.7%,
- LHCb 5.63%,
- VIRGO 1.23%,
- CTA 0.52%
- DUNE 0.32%

With the help of the EGI Security Vulnerability Group, the Spanish sites avoided 44 critical vulnerabilities in foundational software systems during 2023.

Map of the data centres and methodology - update if needed with additional communities Storage takes into account both online and archival storage provided by the data centres

Please note that the number of users is calculated to the best of our knowledge based on the available APIs and on the customers' report.

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_

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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