EGI Council Participant: ULAKBIM

# Participating in EGI Impact Report: Türkiye

# 2024

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# Infographic

## 1,221 service users

In 2024, 1,221 researchers from Turkish institutions used the services provided by the EGI Federation

## 1,466 publications

The research communities, projects and scientific collaborations from Türkiye supported by the EGI led to 1,466 peer-reviewed scientific publications

## 11 Supported communities

In 2024, the Turkish infrastructure supported 11 research communities in the following disciplines: Climate Research, Health and Medicine, Physics

## Projects

Turkish partners participate in 4 collaboration projects.

## Compute Delivery

In 2024, the infrastructure providers from Türkiye federated in EGI delivered 9,371,800 HTC CPU Hours and 2,370,653 Cloud CPU Hours.

# Country overview

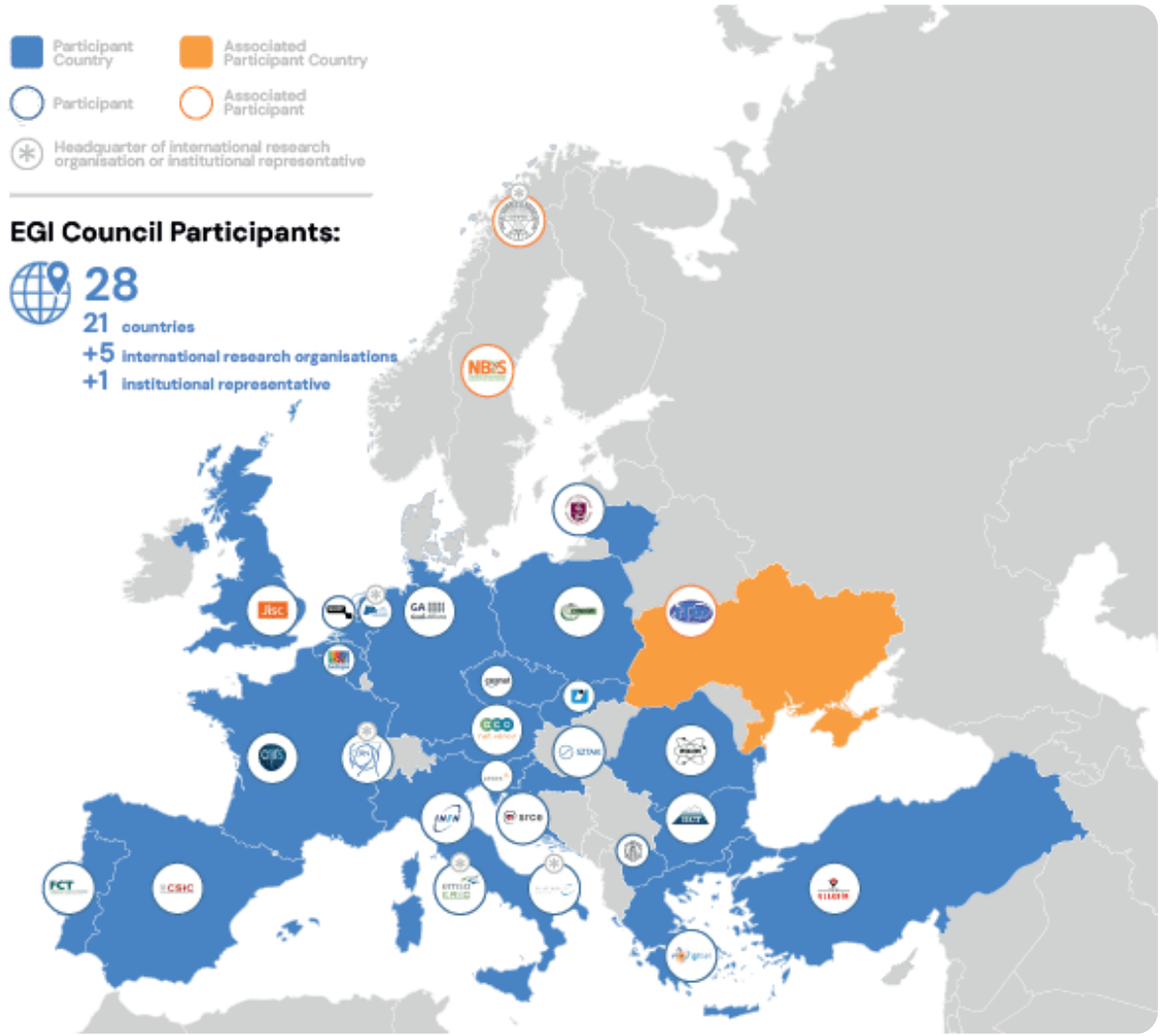| | |
|---|---|
| **Number of supported publications** | 1,466 |
| **Number of total service users** | 1,221 |
| **Scientific Communities supported** | 11 |
| **Data Centres contributing to the Federation** | 3 |
| **Collaboration projects** | 3 |
| **Total HTC CPU hours delivered** | 9,371,800 |
| **Total Cloud CPU hours delivered** | 2,370,653 |

# 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 2024.



**EGI Council Participants:**

**28**
21 countries
+5 international research organisations
+1 institutional representative

Approved EGI Council map from 2024

# About ULAKBIM

Established in 1963, TUBITAK is the leading agency for the implementation of the R&D activities in Türkiye in line with the policies formulated by the Presidential Council for Science. More than 5000 researchers work in 20 different research institutes of TUBITAK where contracted research as well as targeted and nation-wide research is conducted. These research institutes cover a wide span of basic and applied research activities ranging from natural sciences, life sciences to various branches of engineering. Furthermore, TUBITAK conducts research on strategic areas, develops support programs for public and private sectors, publishes scientific journals, popular science magazines and books, organises science and society activities and supports undergraduate and graduate students through scholarships.

Additionally, TUBITAK serves as the national agency for the provision of services in high performance computing as well as connectivity, network management and storage in order to address the needs of the Turkish Research Area through ULAKBIM. ULAKBIM was founded as an Institute of TUBITAK in 1996. ULAKBIM's main objectives have been set as operating a high speed computer network enabling interaction within the institutional elements of the national innovation system, and providing information technology support and information services to help scientific production. TUBITAK ULAKBIM

High Performance and Grid Computing Centre is a national centre providing high performance computing and data storage services to academia and industry. This centre is referred to as the Turkish Science e-Infrastructure (TRUBA). The expanding and reinforcement of computing and data storage resources needed for our researchers to compete with their colleagues in the national and international levels is carried out by the recommendations of the Turkish Science e-Infrastructure Advisory Board.

Operating under the R&D institute ULAKBIM, TRUBA provides services such as high-performance, data-intensive computing, scientific data warehouses and cloud computing. TRUBA, which has more than 3900 researchers from 190 different universities, provides direct service to contribute to scientific studies, carries out joint projects with different public institutions and research institutes and took part in 20 European Union Framework Program Projects since its establishment, is an e-Infrastructure of strategic importance in the national sense. ULAKBIM has 18 years of experience in operating HPC and HTC, also 15 years of experience in operating Cloud Computing systems. With the current capabilities, ULAKBIM had already initiated preparations of building the framework of an e-Science Centre that should provide this expertise to national researchers.

# Overall EGI impact

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 2024, the EGI Federation served around 116,000 users (+23%). EGI users consumed 7,4 Billion HTC CPU hours (+5.7%), 62,7 Million Cloud CPU hours (-23,5%), ran over 402 M computational jobs (+8%) and published over 2,560 open access publications.

As of the previous year, the research community with the largest number of users is Medical and Health Sciences, while the community with most extensive HTC CPU/h consumption is CMS.

From the scientific communities engaged in 2024, the one with most extensive Cloud CPU/h consumption is WeNMR.

Moreover, EGI engaged with a total of 249 scientific communities; 11 SMEs and business pilots, and 2 additional Research Infrastructure included in the ESFRI Roadmap, raising the total of number of ESFRI partners/users of EGI to 25.

# EGI's contribution to Turkish excellence in science

TÜBİTAK – ULAKBİM coordinates the Turkish participation in the EGI Federation. TÜBİTAK – ULAKBİM promotes the building and operation of a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries in Türkiye.

This report provides an overview of the activities of TÜBİTAK – ULAKBİM in EGI, and the impact that was achieved thanks to this participation. The annual membership fee contributed by TÜBİTAK – ULAKBİM to the EGI Foundation in 2024 was 75,000 EUR.

EGI federates hundreds of resource centres that are located at participant countries, organizations and at collaborating e-Infrastructures worldwide. This federated infrastructure supports data- and compute-intensive research across Europe and the world. In 2024, our federation was used by over 260 scientific communities, and has been accessed by around 116.000 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.

The services of the EGI federation have been used by 1,221 researchers from Türkiye in 2024. The estimated annual scientific output in 2024 produced by research communities, projects and scientific collaborations from Türkiye and supported by the EGI Federation is estimated to amount to over 1,460 peer reviewed scientific publications. The EGI Federation is currently working with over 40 Research Infrastructures, 11 of which include Turkish partners. These EGI-enabled research infrastructures, their Turkish members and their 2024 scientific output (publications) are detailed in the following pages of the report.

## Turkish research collaborations in EGI

## EGI supported activities and services

## Number of scientific papers published in 2024

### AMS-02 (Particle Physics)
- METU, Middle East Technical University

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)

**1**

### ALICE (High-Energy Physics)
- Yıldız Technical University
- Karatay University

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)

**47**

| Turkish research collaborations in EGI | EGI supported activities and services | Number of scientific papers published in 2024 | Turkish research collaborations in EGI | EGI supported activities and services | Number of scientific papers published in 2024 |
|---|---|---|---|---|---|
| **ATLAS (High-Energy Physics)**<br>• Ankara University<br>• Istanbul Aydin University<br>• University of Economics and Technology | 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:<br><br>• Software support (consultancy to users and system administrators, (software maintenance and validation)<br>• Infrastructure and operations Services (infrastructure catalogue, accounting repository and portal, helpdesk, monitoring, operations portal, AAI)<br>• Software distribution services (UMC, CMD, operations documentation)<br>• Operations coordination (middleware deployment campaigns, procedures, innovation of tools)<br>• Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution) | **126** | **CMS (High-Enery Physics)**<br>• Istanbul Technical University<br>• Istanbul University<br>• Bogazici University<br>• Middle East Technical University<br>• Çukurova University | 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:<br><br>• Software support (consultancy to users and system administrators, (software maintenance and validation)<br>• Infrastructure and operations Services (infrastructure catalogue, accounting repository and portal, helpdesk, monitoring, operations portal, AAI)<br>• Software distribution services (UMC, CMD, operations documentation)<br>• Operations coordination (middleware deployment campaigns, procedures, innovation of tools)<br>• Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution) | **109** |
| **BELLE (High-Energy Physics)**<br>• Middle East Technical University | The BELLE experiment has been using compute resources from EGI partners since 2016. The services from the EGI federation that BELLE benefits from include:<br><br>• EGI HTC services from 9 EGI participant countries (CZ, DE, IT, FR, ES, NL, RO, PT, SI)<br>• Software distribution services (UMC, CMD, operations documentation)<br>• Operations coordination (middleware deployment campaigns, procedures, innovation of tools)<br>• Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution) | **9** | **DUNE (Astroparticle Physics)**<br>• Beykent University<br>• Antalya Bilim University | 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:<br><br>• EGI HTC services from 6 EGI participant countries (CH, CZ, ES, FR, NL, UK)<br>• Software distribution services (UMC, CMD, operations documentation)<br>• Operations coordination (middleware deployment campaigns, procedures, innovation of tools)<br>• Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution) | **37** |
| | | | **ELI-NP (Nuclear Physics)**<br>• Akdeniz University<br>• Selcuk University<br>• Karamanoglu Mehmetbey Universitye | 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:<br><br>• Refining the user requirements and translating these to e-infrastructure requirements, and<br>• Identifying and validating services from EGI that can be relevant for ELI (besides HTC and compute).<br>• Mobilising already existing HTC compute, cloud compute and storage resources from EGI for ELI piloting and demonstration activities | **19** |

| Turkish research collaborations in EGI | EGI supported activities and services | Number of scientific papers published in 2024 |
|---|---|---|
| **ENES (Climate Change)**<br>• Czech Technical University (IEAP) | ENES has been supported through the establishment of a Data Space in the EGI-ACE project. Since 2021 the ENES Data Space is using the following services from EGI:<br><br>• EGI Check-in<br>• EGI Cloud Compute<br>• EGI Online Storage<br>• EGI DataHub<br>• Technical support<br>• Software integration and piloting | 104 |
| **ILC (High-Energy Physics)**<br>• Ankara Universitesi Fen Fakultesi<br>• Middle East Technical University<br>• Ege University | The ILC experiment has been using compute resources from EGI partners since 2004. The services from the EGI federation that ILC experiments uses include:<br><br>• EGI HTC services from 27 EGI federated sites from IL, DE, FR, ES, NL, PL, UK<br>• Software distribution services (UMC, CMD, operations documentation)<br>• Operations coordination (middleware deployment campaigns, procedures, innovation of tools)<br>• Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution) | 75 |
| **SeaDataNet (Oceanography)**<br>• Institute of Marine Sciences, Middle East Technical University (IMS-METU) | 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 |

| Turkish research collaborations in EGI | EGI supported activities and services | Number of scientific papers published in 2024 |
|---|---|---|
| **WeNMR (Structural Biology)**<br>• DOKUZ EYLUL UNIVESITY<br>• EGE ÜNIVERSITESI<br>• ISTANBUL TECHNICAL UNIVERSITY<br>• ACIBADEM UNIVERSITY<br>• SULEYMAN DEMIREL UNIVERSITY<br>• ISTINYE UNIVERSITY<br>• İZMIR BIOMEDICINE AND GENOME CENTER<br>• MARMARA UNIVERSITY<br>• MUGLA UNIVERSITY<br>• PAMUKKALE UNIVERSITY<br>• BAHCESEHIR UNIVERSITY<br>• BOĞAZIÇI UNIVERSITY<br>• MALATYA TURGUT ÖZAL UNIVERSITY<br>• GIRESUN UNIVERSITY<br>• ISTANBUL AREL UNIVERSITY<br>• + 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:<br><br>• High-Throughput, Cloud + Online Storage services from 23 EGI federated sites from the Netherlands, Italy, France, Turky, UK, Poland, the Asia Pacific region, IberGrid (Spain and Portugal), Italy, the Latin America region.<br>• EGI Workload Manager<br>• Trust and identity management with Check-in<br>• Technical support: WeNMR benefited from continual support through dedicated support activities in various EGI flagship projects: EGI-Engage, EOSC-hub and EGI-ACE. | 939 |

# Service Level Agreements

**During 2024, TR-FC1-ULAKBIM supported 5 Service Level Agreements for international scientific communities via EGI, delivering Cloud Computing and Online Storage services.**

# Participated projects

The EGI Foundation leads five Horizon Europe Projects, three of which started in 2024:

- iMagine (September 2022–December 2025)
- interTwin (September 2022–August 2025)
- ENVRI-Hub NEXT (February 2024–January 2027)
- EOSC Beyond (April 2024–March 2027)
- SPECTRUM (January 2024–June 2026)

Furthermore, the EGI Federation was involved in 3 additional projects, increasing the innovation potential of its participants.

The EGI Federation participates in Horizon 2020 and Horizon Europe projects together with Austrian 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

**BD4NRG**
Big Data for Next Generation Energy

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.

- TÜBİTAK

**eosc EuroScienceGateway**

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.

- OEDAS

# Infrastructure contributions

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

**HTC Federation:**
- TR-03-METU (METU)
- TR-10-ULAKBIM  (ULAKBIM)

**Cloud Federation:**
- TR-FC1-ULAKBIM (TUBITAK ULAKBIM)

The data centres provided 3 service endpoints and delivered 9,371,800 HTC CPUhours and 2,370,653Cloud CPUHours to EGI communities in 2024. The data centres responded to 31 support tickets through the EGI Helpdesk.
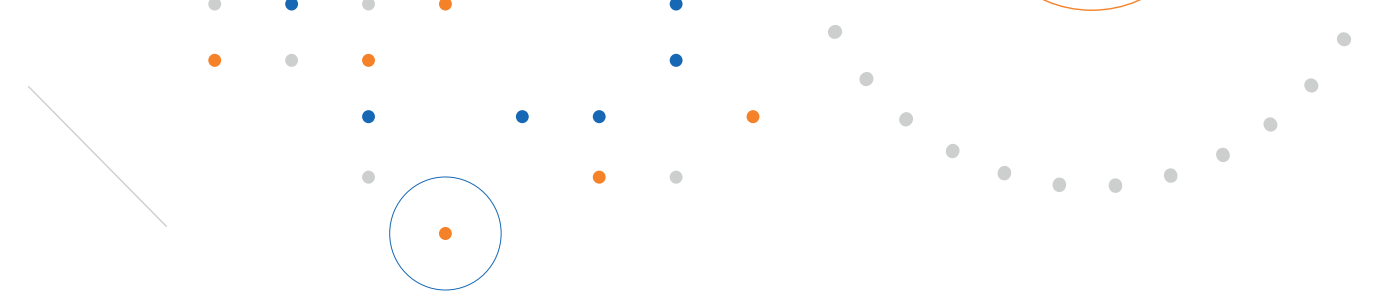
The most active international user groups of the Turkish HTC compute resources were:

- ATLAS 87.78%
- CMS 10.72%
- BELLE 1.29%

While for Cloud compute resources, these were the most active user groups:

- NBIS 36.47%,
- iMagine project 28.37%

With the help of the EGI Security Vulnerability Group, the Turkish sites avoided 50 critical vulnerabilities in foundational software systems during 2024.

# Methodology

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

**Users**
EGI uses the following methodology to capture the number of EGI users who rely on EGI services

- EGI serves users in the form of 'communities', called 'Virtual Organisations' (VO in short). A VO's members can range from one to tens of thousands. Members of a VO benefit from and use EGI services in different ways (e.g., by using Services for Federation or Services for Research).
- EGI establishes knowledge about its VOs as part of the user community support lifecycle; therefore, baseline information about VOs is collected through the Customer Relationship Management process (CRM).

At the end of 2024, there were 135 VOs in EGI.

EGI Virtual Organisations (VOs) can rely on different technical and non-technical mechanisms to manage their own members. Depending on their choice, the EGI Federation coordinator (EGI Foundation) has to follow different, corresponding approaches to know the number of members in a given VO, and to obtain additional information about these members (e.g. their 'country'). The EGI Foundation uses the following mechanisms to obtain information about the VO users:

- Obtain user number statistics from the EGI Operations Portal for VOs, where the members register personally in a 'VO membership management' system that is either operated by EGI or can be accessed by EGI.
- Obtain user number statistics from Community VRE REST APIs for VOs that operate Virtual Research Environments (VREs) on top of EGI resources. Those VREs implement a specific API to report users (e.g., WeNMR, Virtual Imaging Platform (VIP), NBIS).
- Obtain user number statistics from interviews with VO coordinators for VOs coordinated by one person.

**Publications**
Publications are collected from each community's public repository, if existing. Additional details are checked with the VO coordinators during the interviews to complement this information. EGI also consults OpenAIRE services to countercheck the data. You can check the list of repositories for each VO here (requires login): https://operations-portal.egi.eu/vo/#collapseVoListOther.

**Institutional members supporting research communities**
EGI relies on the information on each community's website to list institutions supporting research communities at the national level. Additionally, EGI appreciates the feedback from its national representatives to refine and improve those lists.

# EGI Membership
# Impact Report

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