



EGI Council Participant: ULAKBIM

# Participating in EGI Impact Report: Türkiye

# 2023

[egi.eu](http://egi.eu)

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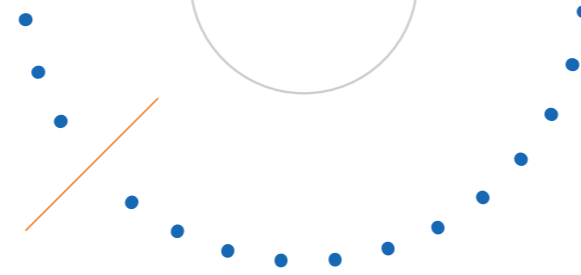
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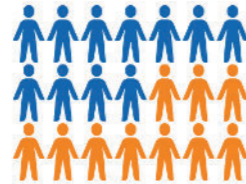
23 National institutional members of  
supported research communities (table 2)

# Infographic



## +540 service users

In 2023, +540 researchers from Turkish institutions used the services provided by the EGI Federation



## +930 publications

The research communities, projects and scientific collaborations from Turkey supported by the EGI led to more than 930 peer-reviewed scientific publications

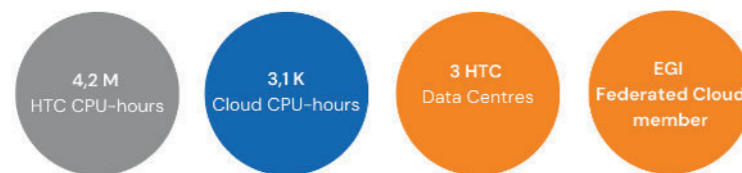
## 11 Supported communities

In 2023, 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 + EGI-ACE and iMagine



# Country overview

Number of supported publications **932**

Number of total service users **541**

Scientific Communities supported **11**

Data Centres contributing to the Federation **3**

Collaboration projects **4**

Total HTC CPU hours delivered **4,263,287**

Total Cloud CPU hours delivered **3,127,064**

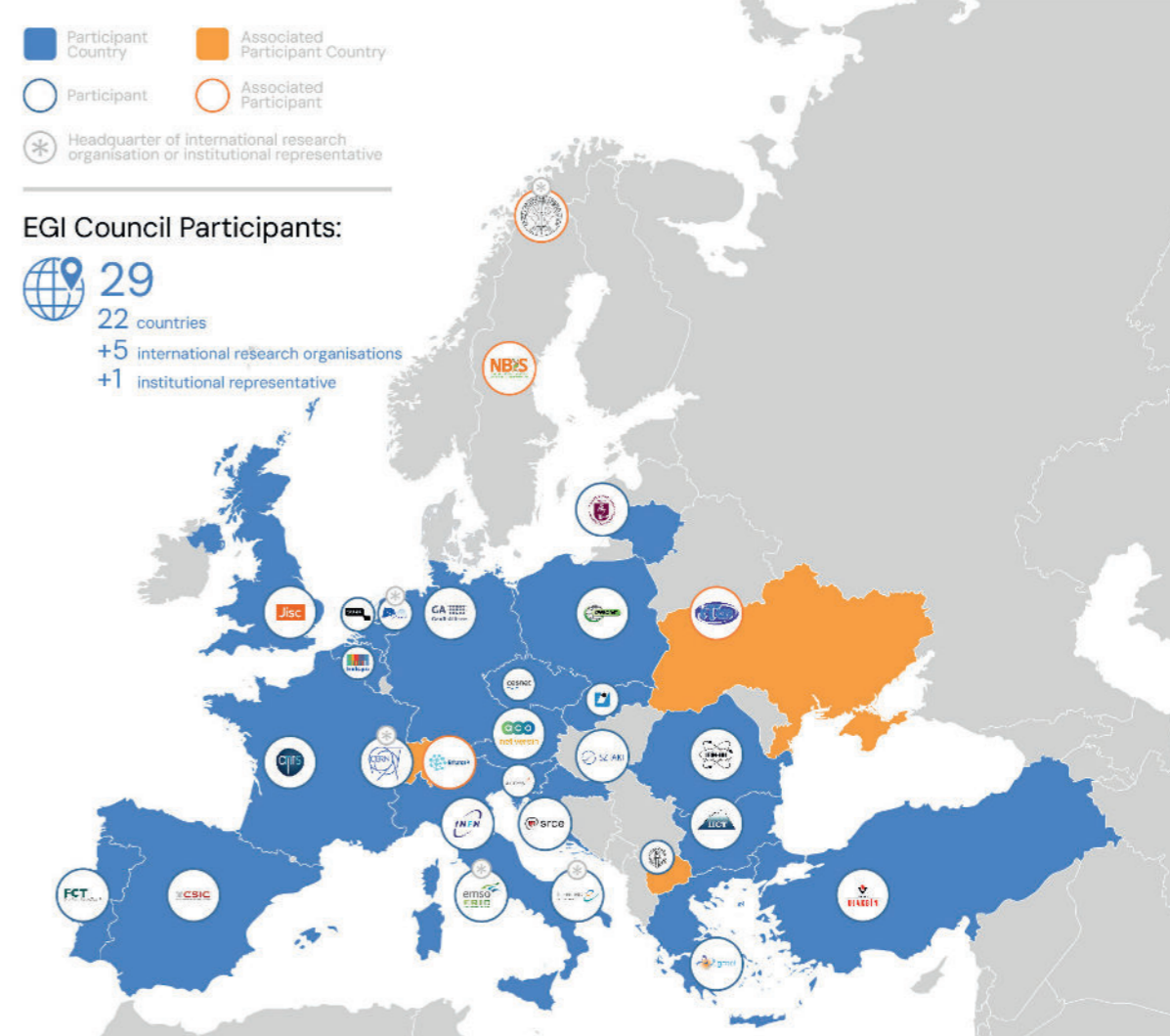
# About EGI

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 ULAKBİM

Established in 1963, TUBİTAK 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 TUBİTAK 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, TUBİTAK 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, TUBİTAK 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 ULAKBİM. ULAKBİM was founded as an Institute of TUBİTAK in 1996. ULAKBİM'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. TUBİTAK ULAKBİM

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 ULAKBİM, 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. ULAKBİM has 18 years of experience in operating HPC and HTC, also 15 years of experience in operating Cloud Computing systems. With the current capabilities, ULAKBİM 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 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'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 2023 was 75,000 EUR.

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.

The services of the EGI federation have been used by 541 researchers from Türkiye in 2023. The estimated annual scientific output in 2023 produced by research communities, projects and scientific collaborations from Türkiye and supported by the EGI Federation is estimated to amount to over 900 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 2023 scientific output (publications) are detailed in the following pages of the report.

## Turkish research collaborations in EGI

### AMS-02 (Particle Physics)

- METU, Middle East Technical University

### ALICE (High-Energy Physics)

- Yildiz Technical University
- Karatay University

## 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)

## Number of scientific papers published in 2023

3

65

## Turkish research collaborations in EGI

### ATLAS (High-Energy Physics)

- Ankara University
- Istanbul Aydin University
- University of Economics and Technology

## EGI supported activities and services

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

111

## Turkish research collaborations in EGI

### CMS (High-Energy Physics)

- Istanbul Technical University
- Istanbul University
- Bogazici University
- Middle East Technical University
- Çukurova University

## 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

### BELLE (High-Energy Physics)

- 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:

- 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)

- Beykent University
- 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:

- 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)

20

### ELI-NP (Nuclear Physics)

- Akdeniz University
- Selcuk University
- Karamanoglu Mehmetbey University

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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## Turkish research collaborations in EGI

### ENES (Climate Change)

- Czech Technical University (IEAP)

## EGI supported activities and services

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:

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

## Number of scientific papers published in 2023

50

### ILC (High-Energy Physics)

- Ankara Üniversitesi Fen Fakültesi
- Middle East Technical University
- 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:

- 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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### SeaDataNet (Oceanography)

- 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

### WeNMR (Structural Biology)

- DOKUZ EYLUL UNIVERSITY
- EGE ÜNİVERSİTESİ
- ISTANBUL TECHNICAL UNIVERSITY
- ACIBADEM UNIVERSITY
- SULEYMAN DEMIREL UNIVERSITY
- ISTINYE UNIVERSITY
- İZMİR BIOMEDICINE AND GENOME CENTER
- MARMARA UNIVERSITY
- MUĞLA UNIVERSITY
- PAMUKKALE UNIVERSITY
- BAHCESEHIR UNIVERSITY
- BOĞAZIÇI UNIVERSITY
- MALATYA TURGUT ÖZAL UNIVERSITY
- GİRESUN UNIVERSITY
- ISTANBUL AREL UNIVERSITY
- + many others

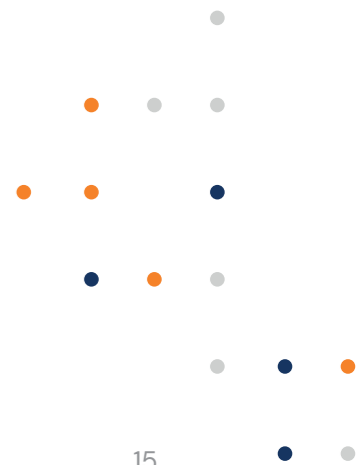
## EGI supported activities and services

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, Turkey, 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.

## Number of scientific papers published in 2023

136





# Service Level Agreements

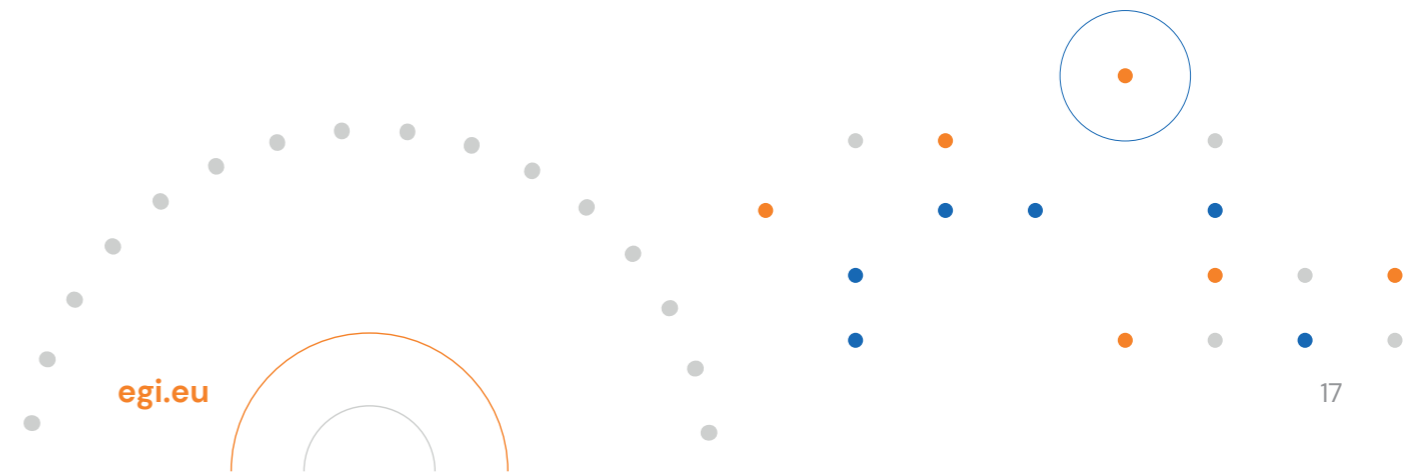
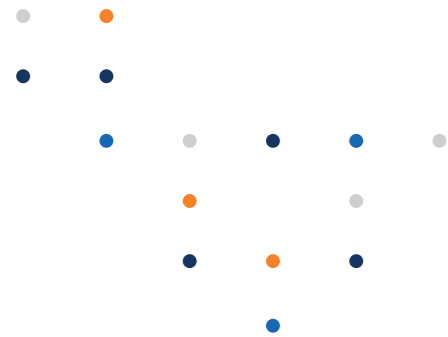
During 2023, TR-FC1-ULAKBIM supported 5 Service Level Agreements for international scientific communities via EGI, delivering Cloud Computing and Online Storage services.

# Participated projects

The EGI Foundation 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 Turkish 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



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



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:

With the help of the EGI Security Vulnerability Group, the Turkish sites avoided 46 critical vulnerabilities in foundational software systems during 2023.

### HTC Federation:

- TR-03-METU (METU)
- TR-10-ULAKBIM (ULAKBIM)

### Cloud Federation:

- TR-FC1-ULAKBIM (TUBITAK ULAKBIM)

The data centres provided 10 service endpoints and delivered 4,263,287 CPUhours in total to EGI communities in 2023. The data centres responded to 37 support tickets through the EGI Helpdesk.

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

- ATLAS 34.2%,
- CMS 59.07%
- BELLE 6.01%

# 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)

<b>AMS-02</b> <a href="https://ams02.space/publications">https://ams02.space/publications</a>	<b>ILC</b> <a href="https://inspirehep.net/literature?sort=mostrecent&amp;size=25&amp;page=1&amp;q=international%20Linear%20Collider%20&amp;earliest_date=2021--2021">https://inspirehep.net/literature?sort=mostrecent&amp;size=25&amp;page=1&amp;q=international%20Linear%20Collider%20&amp;earliest_date=2021--2021</a>
<b>ALICE</b> <a href="https://alice-publications.web.cern.ch/publications">https://alice-publications.web.cern.ch/publications</a>	<b>INSTRUCT</b> <a href="https://instruct-eric.eu/content/publications-list">https://instruct-eric.eu/content/publications-list</a>
<b>ATLAS</b> <a href="https://cds.cern.ch/collection/ATLAS%20Papers?ln=en">https://cds.cern.ch/collection/ATLAS%20Papers?ln=en</a>	<b>JUNO</b> <a href="https://inspirehep.net/">https://inspirehep.net/</a>
<b>AUGER</b> <a href="https://www.auger.org/science/publications/journal-articles">https://www.auger.org/science/publications/journal-articles</a>	<b>KM3NET</b> <a href="https://www.km3net.org/about-km3net/publications/publication/">https://www.km3net.org/about-km3net/publications/publication/</a> ; <a href="https://inspirehep.net/literature?q=collaboration:KM3NeT_year:2021">https://inspirehep.net/literature?q=collaboration:KM3NeT_year:2021</a>
<b>BELLE</b> <a href="https://belle.kek.jp/belle/publications.html">https://belle.kek.jp/belle/publications.html</a> ; <a href="https://inspirehep.net/literature?q=collaboration:belle_year:2021">https://inspirehep.net/literature?q=collaboration:belle_year:2021</a>	<b>LifeWatch</b> <a href="https://www.lifewatch.eu/catalogue-of-virtual-labs/medobis/publications/">https://www.lifewatch.eu/catalogue-of-virtual-labs/medobis/publications/</a>

<b>BIOMED</b> <a href="https://vip.creatis.insa-lyon.fr/documentation/">https://vip.creatis.insa-lyon.fr/documentation/</a>	<b>LOFAR</b> <a href="http://old.astron.nl/radio-observatory/lofar-science/lofar-papers/lofar-papers">http://old.astron.nl/radio-observatory/lofar-science/lofar-papers/lofar-papers</a> ; <a href="https://lofar-surveys.org/publications.html">https://lofar-surveys.org/publications.html</a> , or <a href="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)&amp;sort=date%20desc%2C%20bibcode%20desc&amp;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)&amp;sort=date%20desc%2C%20bibcode%20desc&amp;p_0</a>
<b>CTA</b> <a href="https://www.cta-observatory.org/science/library/">https://www.cta-observatory.org/science/library/</a>	<b>LCHb</b> <a href="https://cds.cern.ch/collection/LHCb%20Papers?ln=en">https://cds.cern.ch/collection/LHCb%20Papers?ln=en</a>
<b>CLARIN</b> <a href="https://beta.clarin.openaire.eu/search/advanced/research-outcomes?sortBy=resultdateofacceptance,descending&amp;type=publications&amp;year=range2021:2021">https://beta.clarin.openaire.eu/search/advanced/research-outcomes?sortBy=resultdateofacceptance,descending&amp;type=publications&amp;year=range2021:2021</a>	<b>LSST</b> <a href="https://ui.adsabs.harvard.edu/?with_year:2021+author:(%22LSST%22+OR+%22Vera+C.+Rubin%22)+collection:astronomy+property:refereed">https://ui.adsabs.harvard.edu/?with_year:2021+author:(%22LSST%22+OR+%22Vera+C.+Rubin%22)+collection:astronomy+property:refereed</a>
<b>CMS</b> <a href="http://cms-results.web.cern.ch/cms-results/public-results/publications/CMS/index.html">http://cms-results.web.cern.ch/cms-results/public-results/publications/CMS/index.html</a>	<b>NA62</b> <a href="https://cds.cern.ch/collection/NA62%20Papers?ln=en">https://cds.cern.ch/collection/NA62%20Papers?ln=en</a>
<b>DUNE</b> <a href="https://inspirehep.net/literature?q=collaboration:DUNE_year:2021">https://inspirehep.net/literature?q=collaboration:DUNE_year:2021</a>	<b>OPENCOASTS</b> <a href="http://opencoasts.lnec.pt/index_en.php">http://opencoasts.lnec.pt/index_en.php</a>
<b>EISCAT_3D</b> <a href="https://eiscat.se/scientist/publications/">https://eiscat.se/scientist/publications/</a>	<b>PANOSC</b> <a href="https://www.panosc.eu/publications/">https://www.panosc.eu/publications/</a>

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

## 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](https://www.eli-np.ro/scientific_papers.php)

## SKA

[https://ui.adsabs.harvard.edu/search/fq=%7B!type%3D%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%3D%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](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=](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=](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=](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=](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>

## AMS-02

<https://ams02.space/collaboration/institute>

## ILC

<https://linearcollider.org/team/>

## ALICE

[https://alice-collaboration.web.cern.ch/General/Members/List\\_Institutes.html](https://alice-collaboration.web.cern.ch/General/Members/List_Institutes.html)

## INSTRUCT

<https://instruct-eric.eu/countries>

## ATLAS

<https://atlas.cern/discover/collaboration>

## JUNO

<https://juno.ihep.ac.cn/collaboration.php>

## AUGER

<https://www.auger.org/collaboration/institutions>, <https://www.auger.org/collaboration/funding-agencies>

## KM3NET

<https://www.km3net.org/about-km3net/collaboration/members/>

## BELLE

<https://belle.kek.jp/bdocs/collaboration.html>

## LifeWatch

<https://www.lifewatch.eu/organisation-governance/>

## BIOMED

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

## LOFAR

<https://www.astron.nl/telescopes/>

## CTA

<https://www.cta-observatory.org/about/cta-consortium/>

## LCHb

<https://lhcb-public.web.cern.ch/en/collaboration/Collaboration-en.html>

## CLARIN

<https://www.clarin.eu/content/participating-consortia>

## LSST

<https://www.lsstcorporation.org/international-contributors>

#### CMS

<https://cms.cern/collaboration/cms-institutes>

#### NA62

<https://greybook.cern.ch/experiment/detail?id=NA62>

#### DUNE

<https://bnf-dune.fnal.gov/about/countries-and-institutions-participating-in-dune/>

#### OPENCOASTS

[http://opencoasts.inec.pt/index\\_en.php](http://opencoasts.inec.pt/index_en.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/>

#### ELI-BEAM

<https://www.eli-beams.eu/about/cooperation/science/>

#### SeaDataNet

<https://www.seadatanet.org/About-us/SeaDataNet-AISBL/Members>

#### ELI-NP

[https://www.eli-np.ro/scientific\\_collaborations.php](https://www.eli-np.ro/scientific_collaborations.php)

#### SKA

<https://www.skatelescope.org/participating-countries/>

#### EMSO-ERIC

<http://emso.eu/organization/>

#### SNO+

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

#### FUSION

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

#### VIRGO

<https://apps.virgo-gw.eu/vmd/public/institutions>

#### 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](https://science.purdue.edu/xenon1t/?page_id=27)



## EGI Membership Impact Report

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