EGI Council Participant: CESNET

Participating in EGI Impact Report: Czech Republic 2023

egi.eu

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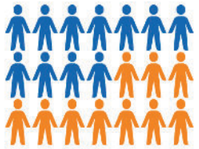
Infographic

+790 service users

In 2023, +790 researchers from Czech institutions used the services provided by the EGI Federation



+880 publications

The research communities, projects and scientific collaborations from Czech Republic supported by the EGI led to more than 880 peer-reviewed scientific publications

22 Supported communities

In 2023, the Czech infrastructure supported 22 research communities in the following disciplines: Agriculture, Astronomy, Linguistics, Health and Medicine and Physics

Projects

Czech partners participate in 10 collaboration projects + EGI-ACE and interTwin

151,6 M HTC CPU-hours

16,4 M Cloud CPU-hours

2 HTC Data Centres

EGI Federated Cloud member

Country overview

Number of supported publications	791
Number of total service users	883
Scientific Communities supported	22
Data Centres contributing to the Federation	3
Collaboration projects	10
Total HTC CPU hours delivered	151,673,803
Total Cloud CPU hours delivered	16,413,433

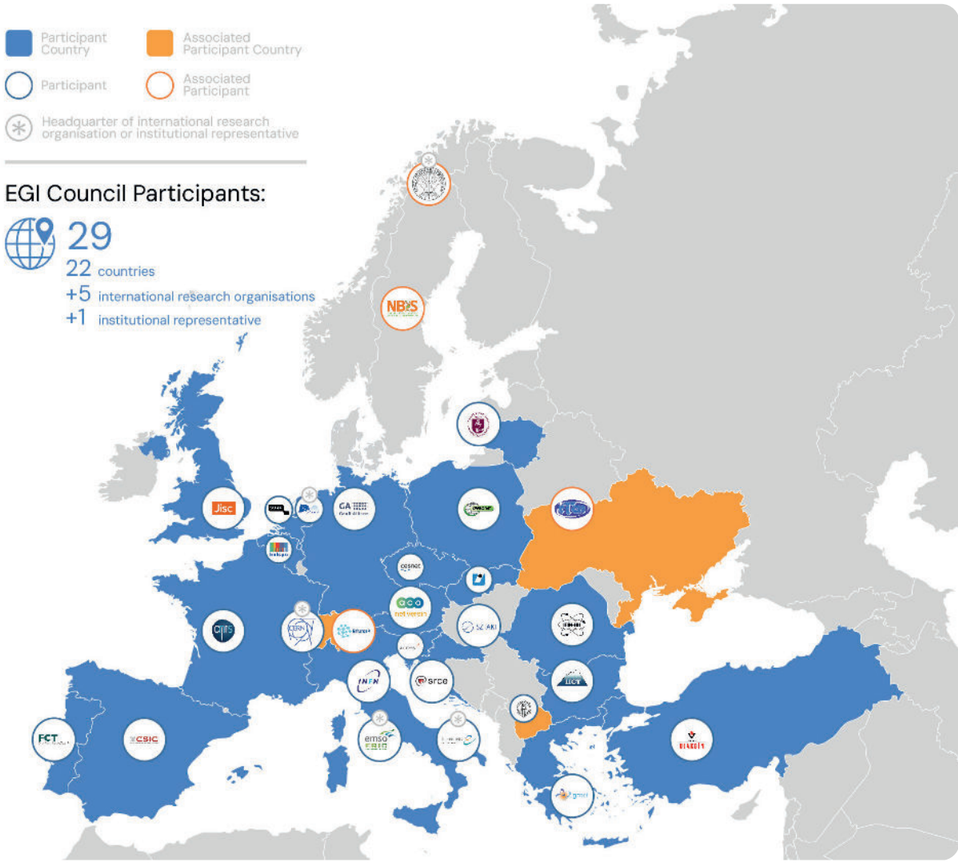
About EGI

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 CESNET

The National Grid Infrastructure is operated by MetaCentrum; CESNET is the department responsible for coordinating and managing grid activities in the Czech Republic on behalf of the Czech NGI. Long-term goal of the MetaCentrum project is operation and coordination of distributed computing and data storage infrastructure in the Czech Republic as a dynamic network of resources across different locations and administrative domains, as a part of the pan-European infrastructure built in the framework of the EGI project, accompanied by an appropriate support environment and continual expansion of available computational capacities.

The main aim of the project is the constitution of a virtual computer that allows effective utilization of installed facilities and solving tasks whose memory and/or CPU requirements exceeds possibility of individual single computing centers. MetaCentrum structure is flexible enough, any academic subject within the Czech Republic is able to fully integrate any computing capacities in current MetaCentrum infrastructure getting significant higher computing power for research.

One of the purposes of MetaCentrum is to establish a fully-fledged National Grid Initiative (NGI) in the Czech Republic with connection to the international environment.

MetaCentrum offi cially represent the interests of the national Grid community towards other national and international bodies. Ultimately, MetaCentrum aims to provide computational power that would not have been possible without a Grid infrastructure.

Overall EGI impact

MetaCentrum coordinates the Czech participation to the EGI Federation; MetaCentrum is represented by CESNET in the EGI Council. MetaCentrum promotes the building and operation of a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries in Czech Republic. This report provides an overview of the activities of MetaCentrum in EGI, and the impact that was achieved thanks to this participation. The annual membership fee contributed by MetaCentrum to the EGI Foundation in 2023 was 40,000 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 Czech Republic excellence in science

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 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 883 researchers from Czech Republic in 2023.

The estimated annual scientific output in 2023 produced by research communities, projects and scientific collaborations from Czech Republic and supported by the EGI Federation is estimated to amount to more than 790 peer reviewed scientific publications.

The EGI Federation is currently working with over 40 Research Infrastructures, 22 of which include Czech partners. These EGI-enabled research infrastructures, their Czech members and their 2023 scientific output (publications) are detailed in the following pages of the report.

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
ALICE (High-Energy Physics) • Institute Of Physics Of The Czech Academy Of Sciences, Greybook, Prague • Faculty Of Nuclear Sciences And Physical Engineering, Czech Technical University In Prague, Greybook, Prague • Nuclear Physics Institute Of The Czech Academy Of Science, Greybook, Rez U Prahy	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)	65
ATLAS (High-Energy Physics) • Palacký University, • Charles University, • Czech Technical University in Prague, • Institute of Physics of the Czech Academy of Sciences	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)	111

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
AUGER (Astronomy) • Charles University Prague, Institute of Particle and Nuclear Physics • Institute of Physics (FZU) of the Czech Academy of Sciences, Czech Republic • Palacky University, RCPTM, Olomouc	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 benefi ts 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)	8
BELLE (High-Energy Physics) • Charles Univ. Prague	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)	21
CLARIN (Linguistics) • LINDAT/CLARIAH-CZ Charles University Prague	CLARIN thematic services has been supported by EGI since 2018. CLARIN has a Service Level Agreement with EGI, using the following services: EGI services: • EGI Cloud (Compute + Online Storage) for hosting the Virtual Language Observatory (VLO) • Technical support • Service integration	38

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
CMS (High-Enery Physics) • Czech Republic Charles 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: • 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)	117
CTA (Astronomy) • Astronomical Institute of the Czech Academy of Sciences, • Charles University, Institute of Particle & Nuclear Physics, • Palacky University Olomouc	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)	0
Comet.j-parc.jp (Physical Sciences) • Charles University in Prague, Prague • Czech Technical University in Prague	The collaboration with EGI started back in 2015. The services from the EGI federation that the experiment uses include: • EGI HTC services from 7 EGI federated sites from FR 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)	2

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
COMPASS (Physical Sciences) • Faculty of Mathematics and Physics, CZ • Czech Technical University in Prague • Institute of Scientific Instruments The Czech Academy of Science • Technical University of Liberec • NCBJ • Institute of Radioelectronics and Multimedia Technology	COMPASS has been supported since 2017 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)	0
DUNE (Astroparticle Physics) • Czech Technical University in Prague • Institute of Particle and Nuclear Physics of the Faculty of Mathematics and Physics of the Charles University in Prague • Institute of Physics of the Czech Academy of Sciences (IOP CAS)	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-BEAM (Physical Sciences) • Czech Academy of Sciences	ELI works with EGI since 2016 on exploring and validating approaches for off-site computing and data management. ELI-Beams 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.	37

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
ELI-NP (Nuclear Physics) • Czech Academy of Sciences	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	48
EMPHASIS (Agriculture) • Centre of the Region Haná for Biotechnological and Agricultural Research, Palacký University in Olomouc • CEITEC, Masaryk University in Brno • Photosystems Instruments, s.r.o.	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	0
ILC (High-Energy Physics) • Czech Technical University in Prague, Institute of Experimental and Applied Physics (IEAP),Praha • Czech Technical University, Faculty of Nuclear Science and Physical Engineering, Prague • Charles University, Institute of Particle & Nuclear Physics, Faculty of Mathematics and Physics, Praha • Institute of Physics, ASCR, Academy of Science of the Czech Republic, Division of Elementary Particle Physics, Prague	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)	43

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
INSTRUCT (Structural Biology) • Instruct Centre CZ • BIOCEV • CEITEC	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, Belgiany, UK, Poland, the Asia Pacifi c region, IberGrid (Spain and Portugal), Italy, the Latin America region. • EGI Workload Manager • Trust and identity management with Check-in • Technical support: WeNMR benefi ted from continual support through dedicated support activities in various EGI flagship projects: EGI-Engage, EOSC-hub and EGI-ACE.	87
JUNO (Neutrino Observatory) • Charles University Prague	The JUNO experiment has been using compute resources from EGI partners for more than a decade. The services from the EGI federation that JUNO uses include: • EGI HTC services from 4 EGI federated data centres from France, Italy, Russia and China. • Software distribution services (UMC, CMD, operations documentation) • Operations coordination (middleware deployment campaigns, procedures, innovation of tools) • Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)	43

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
LSST (Astronomy) • The Institute of Physics of the Academy of the Czech Republic	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)	11
MOEDAL-MAPP (Physical Sciences) • Czech Technical University (IEAP)	MOEDAL-MAP has been supported since 2016 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)	0

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
NA62 (High-Energy Physics) • Charles University	The NA62 experiment has been using compute resources from EGI partners since 2012. The services from the EGI federation that NA62 uses include: • EGI HTC services from sites in the UK, Italy, Belgium and CERN • Software distribution services (UMC, CMD, operations documentation) • Operations coordination (middleware deployment campaigns, procedures, innovation of tools) • Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)	5
PANOSC (Photon and Neutron) • ELI-DC AISBL • Extreme Light Infrastructure – ELI ERIC	PaNOSC 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 data centres from CZ and DE • EGI AAI Check-in • EGI Notebooks • EGI DataHub	5
VIRGO (Astrophysics) • Institute of Physics of the Czech Academy of Sciences	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.	5

Czech research collaborations in EGI	EGI supported activities and services	Number of scientific papers published in 2023
WeNMR (Structural Biology) • UNIVERSITY BRNO • INSTITUTE OF VERTEBRATE BIOLOGY • CHARLES UNIVERSITY IN PRAGUE • MASARYK UNIVERSITY CEITEC • FACULTY OF SCIENCE • UNIVERSITY OF SOUTH BOHEMIA • IOCB • UCT PRAGUE	WeNMR is supported by EGI since 2011 and has a Service Level Agreement since 2016. The EGI Services used by the community include: • High-Throughput, Cloud + Online Storage services from 23 EGI federated sites from the Netherlands, Italy, France, Germany, UK, Poland, the Asia Pacific region, IberGrid (Spain and Portugal), Italy, the Latin America region. • EGI Workload Manager • Trust and identity management with Check-in • Technical support: WeNMR benefited from continual support through dedicated support activities in various EGI flagship projects: EGI-Engage, EOSC-hub and EGI-ACE.	136

Service Level Agreements

During 2023, CESNET supported 15 Service Level Agreements for international scientific communities via EGI, delivering Cloud Computing, Online Storage, Notebooks and DataHub services

Participated projects

The EGI Foundation coordinated one Horizon 2020 projects, EGI ACE, ended in 2023 (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 Czech 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
CRAFT-OA eosc	EGI coordinates the task dedicated to the Single Sign-On access with the EGI Check-in service.	• Masaryk University
EUCAIM	Within EUCAIM, EGI works on the development of the platform core services in addition to supporting the creation of the platform central storage and infrastructure. Moreover, EGI leads the activities around the design and implementation of a federated learning and data analysis infrastructure, and ensures access to HPC/Cloud resources across Europe.	• Masaryk University
graspos	EGI contributes to the definition of requirements, metrics, specifications and pilots for the assessment of thematic services and platforms	• CESNET
GREAT Green Deal Data Space	EGI was involved in coordinating the Green Deal Data Space, establishing a stakeholder network, and managing dissemination and online presence. Also. EGI contributed to developing the Technical Architecture. Moreover, EGI coordinated efforts on Governance and Business Models, analyzing current governance schemes and proposing appropriate governance for the Green Deal Data Space. Additionally, EGI contributed to the implementation roadmap for the Green Deal Data Space.	• CESNET
C-SCALE	EGI the project coordination and led the activity to setup the C-SCALE Compute Federation, leveraging on its exstensive experience on setup and managing large distributed infrastructures. EGI also took care of the interactions with other EOSC initiatives and projects and had a leading role on defining C-SCALE business and sustainability.	• CESNET
PITHIA-NRF	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.	• Ustav Fyziky Atmosfery Av Cr

Project title	Scope of collaboration	Participating beneficiaries from the country
EOSC-Life	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.	• Masaryk University • Ústav Molekulární Genetiky Akademie Ved Ceske Republiky Veřejná Výzkumná
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.	• CESNET
EOSC SYNERGY	EGI contributes to the project activities related to innovation management, policy development, and project activities and results communications and dissemination.	• CESNET
Triple	EGI is involved in the work ensuring the integration of the TRIPLE solution into the EOSC; also, it collaborates to the sustainability and innovation activities by setting up the processes to prepare maturity assessment and innovative agile management. Last but not least, it guides the implementation of the EGI AAI service in TRIPLE.	• Lexical Computing CZ s.r.o.

Infrastructure contributions

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

HTC Federation:

- prague_cesnet_lcg2_cert (CESNET)
- praguelcg2 (institute of Physics of the Czech Academy of Science)

Cloud Federation:

- CESNET_MCC (CESNET)

The data centres provided 17 service endpoints and delivered 151,673,803 CPUhours in total to EGI communities in 2023 (+123% compared to 2022). The data centres responded to 30 support tickets through the EGI Helpdesk.

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

- ATLAS 77.03%
- ALICE 19.58%
- BELLE 2.84%
- AUGER 0.22%
- DUNE 0.22%
- FERMILAB 0.12%

With the help of the EGI Security Vulnerability Group, the Czech 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/pubblication/; 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

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

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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.lnec.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

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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

EMSO-ERIC
from the community representative; SLA https://documents.egi.eu/document/3539

SNO+
https://snoplus.phy.queensu.ca/results/collaboration-papers.html

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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&sciodt=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&sciodt=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/

ALICE_
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://lbnf-dune.fnal.gov/about/countries-and-institutions-participating-in-dune/

OPENCOASTS
http://opencoasts.lnec.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

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

EGI Membership Impact Report

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