



EGI Council Participant: IICT-BAS

# Participating in EGI Impact Report: Bulgaria

# 2024

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



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# Infographic

## 37 service users

In 2024, 37 researchers from Bulgarian institutions used the services provided by the EGI Federation



## 1,279 publications

The research communities, projects and scientific collaborations from Bulgaria supported by the EGI led to 1,279 peer-reviewed scientific publications

## 9 Supported communities

In 2024, the Bulgarian infrastructure supported 9 research communities in the following disciplines: Climate Research, Health and Medicine, Linguistics, Physics



## Projects

Bulgarian partners participate in 6 collaboration projects

# Country overview

Number of supported publications 1,279

Number of total service users 37

Scientific Communities supported 9 (Climate Research, Health and Medicine, Linguistics, Physics)

Data Centres contributing to the Federation 1

Collaboration projects 6

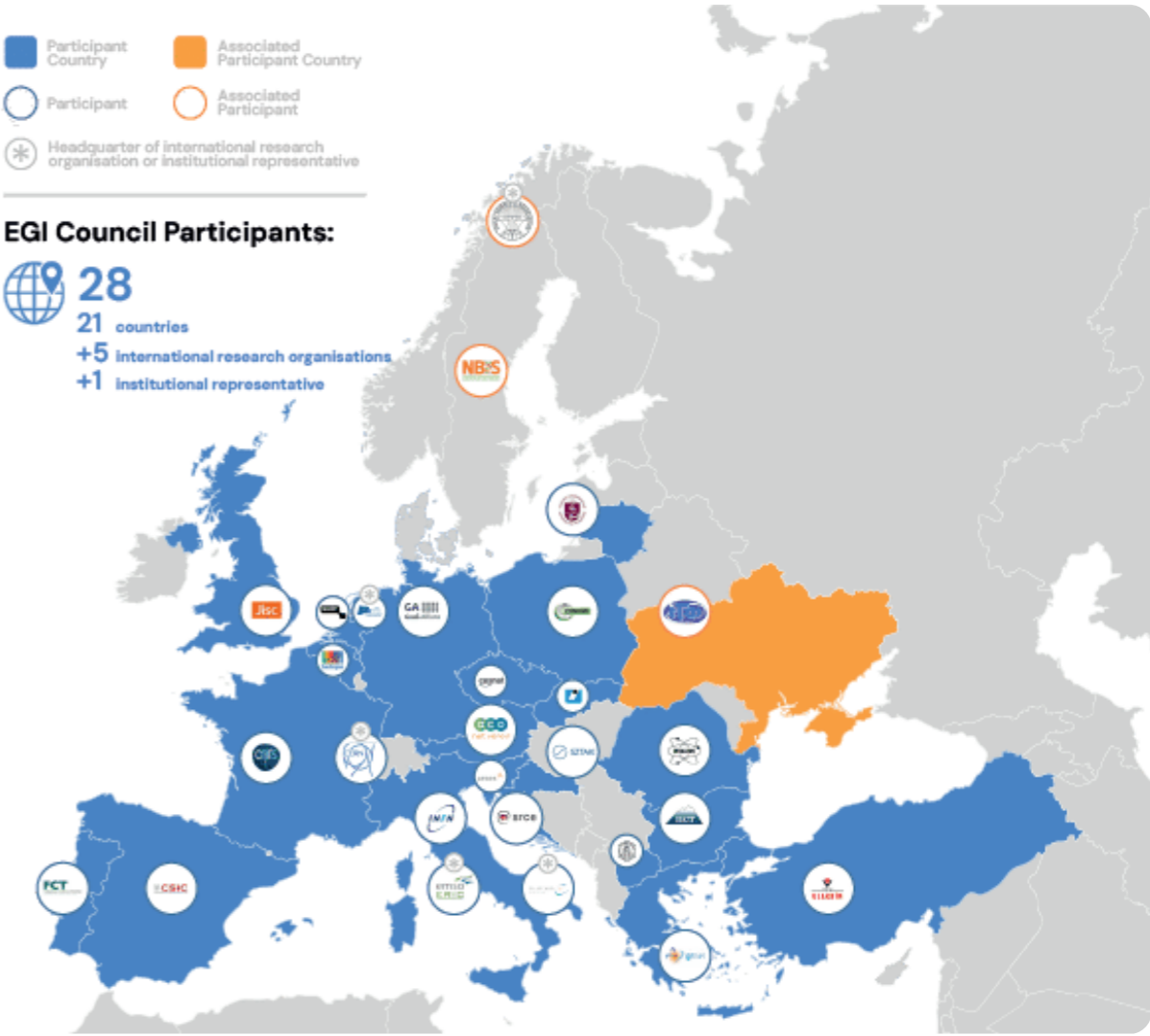
# About EGI

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.



Approved EGI Council map from 2024



# About IICT-BAS

Institute of Information and Communication Technologies – BAS is the coordinating entity of NCHDC.

The National Center for High-performance and Distributed Computing (NCHDC) provides computing resources and software services for research and innovation to the individual researchers and scientific groups in Bulgaria.

The main objective of the NCHDC is to provide stable and reliable services in a sustainable way, in the long term, with maximum flexibility, exceptional cooperativity and understanding of users from different disciplinary fields, which pose problems specific to them and need support for the use of electronic infrastructure. This is an extremely difficult task requiring experienced, highly knowledgeable and motivated e-Infrastructure specialists in order to match the NCHDC infrastructure to modern hardware and software developments.

# 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 contribution to Bulgaria excellence in science

IICT-BAS coordinates the Bulgarian participation to the EGI Federation. IICT-BAS coordinates NCHDC, that provides computing resources and software services for research and innovation to the individual researchers and scientific groups in Bulgaria. This report provides an overview of the activities of IICT-BAS in EGI, and the impact that was achieved thanks to this participation. The annual membership fee contributed by SURF to the EGI Foundation in 2024 was 25,000 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 37 researchers from Bulgaria in 2024. The estimated annual scientific output in 2024 produced by research communities, projects and scientific collaborations from Bulgaria and supported by the EGI Federation is estimated to amount to 1,279 peer reviewed scientific publications.

The EGI Federation is currently working with over 40 Research Infrastructures, 9 of which include Bulgarian partners. These EGI-enabled research

| Bulgarian research collaborations in EGI  | EGI supported activities and services  | Number of scientific papers published in 2024 |
|---|--|---|
| <p><b>ALICE (High-Energy Physics)</b></p> <ul style="list-style-type: none"><li>Institute For Advanced Physical Studies (IAPS), Sofia</li></ul>   | <p>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:</p> <ul style="list-style-type: none"><li>Software support (consultancy to users and system administrators, (software maintenance and validation) &gt;Infrastructure and operations Services (infrastructure catalogue, accounting repository and portal, helpdesk, monitoring, operations portal, AAI)</li><li>Software distribution services (UMC, CMD, operations documentation)</li><li>Operations coordination (middleware deployment campaigns, procedures, innovation of tools)</li><li>Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)</li></ul>   | 47  |
| <p><b>CMS (High-Energy Physics)</b></p> <ul style="list-style-type: none"><li>Institute for Nuclear Research and Nuclear Energy (INRNE)</li><li>Institute for System Engineering and Robotics, Sofia, Bulgarian Academy of Sciences</li></ul> | <p>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:</p> <ul style="list-style-type: none"><li>Software support (consultancy to users and system administrators, (software maintenance and validation)</li><li>Infrastructure and operations Services (infrastructure catalogue, accounting repository and portal, helpdesk, monitoring, operations portal, AAI)</li><li>Software distribution services (UMC, CMD, operations documentation)</li><li>Operations coordination (middleware deployment campaigns, procedures, innovation of tools)</li><li>Security services and activities (CSIRT, Software vulnerability group, international security coordination, policies, IGTF distribution)</li></ul> | 109   |
| <p><b>CLARIN (Linguistics)</b></p> <ul style="list-style-type: none"><li>CLaDA-BG, Bulgarian Academy of Sciences, Kiril Simov</li></ul>   | <p>CLARIN thematic services has been supported by EGI since 2018. CLARIN has a Service Level Agreement with EGI, using the following services:</p> <ul style="list-style-type: none"><li>EGI Cloud (Compute + Online Storage) for hosting the Virtual Language Observatory (VLO)</li><li>Technical support</li><li>Service integration</li></ul>   | 13  |

## Bulgarian research collaborations in EGI

## EGI supported activities and services

## Number of scientific papers published in 2024

### CTA (Astronomy)

- Astronomy Department of Faculty of Physics
- Sofia University
- Institute for Nuclear Research and Nuclear Energy, BAS

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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### ELI-BEAM (Physical Sciences)

- Institute of Electronics, BAS

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.

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### ELI-NP (Nuclear Physics)

- University of Ruse "Angel Kanchev"

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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## Bulgarian research collaborations in EGI

## EGI supported activities and services

## Number of scientific papers published in 2024

### LifeWatch (Biodiversity and Ecosystem Research)

- Agricultural University-Plovdiv

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)

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### SeaDataNet (Oceanography)

- Institute of Oceanology, BAS

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.

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### WeNMR (Structural Biology)

- Medical University of Sofia
- Institute of Biophysics and Biomedical Engineering at the Bulgarian Academy of Science

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

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

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# Participated projects

The EGI Foundation 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.



interTwin






| Project title   | Scope of collaboration  | Participating beneficiaries from the country  |
|---|---|---|
|    | EGI is one of the main contributors to the design and definition of the EOSC architecture and the federated service management framework, and coordinates service pilots participates by the scientific demonstrators. EGI also contributed to the definition of the governance framework and to the works on Rules of Participation. In the project EGI will enhance the SoBigData platform with two services: Jupyter Notebooks and the Workflow manager Galaxy   | <ul style="list-style-type: none"><li>• Center for the Study of Democracy</li></ul> |
|    | 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. | <ul style="list-style-type: none"><li>• Center for the Study of Democracy</li></ul> |
|  | 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.                           | <ul style="list-style-type: none"><li>• Borealis Global Designs Eood</li></ul>      |
|  | EGI Foundation is leading the task which provide technologies to allocate cloud and HPC resources based on the policy under-development, which will be dynamically updated during runtime based on emerging situations; the task which will integrate information, content and demonstrators about the project's outcomes to the on-line portal of the market platform. The task will integrate all the exploitable assets of the project in the market platform.   | <ul style="list-style-type: none"><li>• Obshtina Burgas</li></ul>                   |

Project title

Scope of collaboration

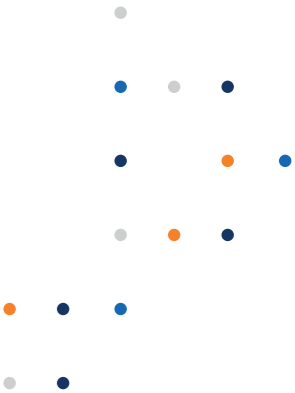
Participating beneficiaries from the country

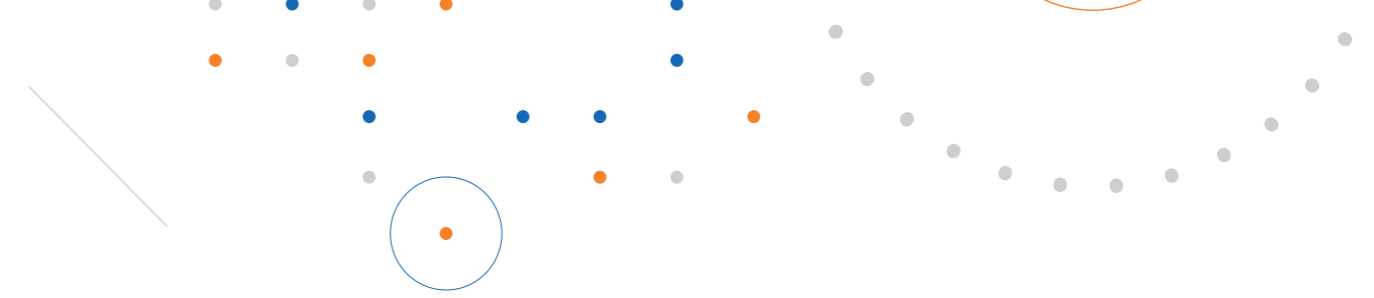
|   |   |   |
|---|---|---|
|    | <p>EGI, as a very active player in the Data Space landscape in Europe, joined the project as Associated and collaboration Partner and participates in the Strategic Stakeholder Group (SSG) that will act as a think-and-do-tank to support the project in delivering to the policy objectives.</p>   | <ul style="list-style-type: none"><li>Sofia University</li></ul>          |
|    | <p>EGI co-leads the activities around technology Integration and validation on large RIs. It leads the work on the computing continuum infrastructure and contributes to the development of a Virtual Research Environment for the analysis of the genomics data, the creation of the imaging-Biooptics gateway and pipeline integration, as well as of the participatory Sciences gateway and pipeline integration. Moreover, EGI coordinates the overall integration and EOSC synergies. Last but not least, EGI leads the project's innovation management and exploitation activities.</p>   | <ul style="list-style-type: none"><li>Pensoft Publishers</li></ul>        |
|  | <p>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.</p> | <ul style="list-style-type: none"><li>PRAVO Internet Foundation</li></ul> |

# Infrastructure contributions

The EGI Federation offers two complementary compute capabilities: the High-Throughput Compute (HTC) federation and the Cloud federation. 1 Bulgarian data centre contributes to the HTC Federation: BG05-SUGrid (Univeristy of Sofia (Faculty of Mathematics and Informatics, Faculty of Physics))

The data centres provided 1 service endpoints. The data centres responded to 8 support tickets through the EGI Helpdesk.





# Methodology

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

## Users

EGL uses the following methodology to capture the number of EGL users who rely on EGL services

- EGL 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 EGL services in different ways (e.g., by using Services for Federation or Services for Research).
- EGL 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 EGL.

EGL Virtual Organisations (VOs) can rely on different technical and non-technical mechanisms to manage their own members. Depending on their choice, the EGL Federation coordinator (EGL 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 EGL Foundation uses the following mechanisms to obtain information about the VO users:

- Obtain user number statistics from the EGL Operations Portal for VOs, where the members register personally in a ‘VO membership management’ system that is either operated by EGL or can be accessed by EGL.
- Obtain user number statistics from Community VRE REST APIs for VOs that operate Virtual Research Environments (VREs) on top of EGL 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. EGL 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

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





# EGI Membership Impact Report

## Contact us

Science Park 140  
1098 XG Amsterdam  
Netherlands

Phone:  
+31 (0)20 89 32 007

Email:  
[contact@egi.eu](mailto:contact@egi.eu)



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

