



Annual Report

2019

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Advanced Computing for Research

— Foreword: EGI Council Chair

“The EGI Federation shows that the integration of discipline-specific analytics services and data with scalable computing infrastructures is key for their successful adoption by users.”

- Arjen van Rijn

With pride I present the 2019 Annual Report of the EGI Federation, the first year in which I had the honor of serving as the chairperson of the EGI Council and Executive Board.

It was an important year for the long-term prospects of the EGI Federation, as a thorough update of the strategy has been made. Priorities for the coming five years were identified, based on new aspects in the ecosystem and our core mission to deliver open solutions for advanced computing and data analytics. In this annual report, you will find many developments and achievements that have contributed to our exercise of identifying these priorities. And let us not forget about our growing contribution to the European Open Science Cloud (EOSC).

In 2019 the EOSC Executive Board and Governing Board had their first full year of operation. Working groups have been established addressing issues of governance, sustainability, landscaping, architecture and rules of participation. The European Commission has defined the EOSC as a virtual environment to offer *free at the point of use* open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines.

Thus the EOSC concept is extremely relevant for the future positioning of the EGI Federation. Or better: EGI's activities are extremely relevant for a smooth operation of the EOSC. The current use by research communities in physics, earth sciences, neuro-informatics, computational chemistry, structural biology and many more, are proof of this.

The EOSC will be implemented as a federation of infrastructures. The EGI Federation is spanning hundreds of datacenters, operating as a remarkably smooth whole, to serve research communities in Europe and beyond: a federation par excellence!

The updated EGI Federation Strategy, adopted by the Council in its December meeting, reflects this: EGI strives to be a recognised foundation of the EOSC, positioning the services and expertise of the EGI Federation as key assets for the EOSC, especially for the Federating Core.

2019 has seen the farewell of Yannick Legré as director of the EGI Foundation for almost 6 years. We thank Yannick again for all his efforts in leading the EGI Foundation. After an intensive procedure Tiziana Ferrari has been selected as the new director, starting in 2020. Congratulations, Tiziana!

Finally I thank Rosette Vandenbroucke and Lukasz Dutka for serving EGI as members of the Executive Board for many years. Sigve Haug and Patrick Fuhrmann have been elected as their successors.

Moving on to an exciting future!

Arjen van Rijn



Arjen van Rijn,
Chairperson EGI Council and Executive Board

"I was very glad to see that collaborations intensified and service adoption increased due to the EOSC initiative"

- Tiziana Ferrari



Tiziana Ferrari
Director EGI Foundation

— Foreword: EGI Foundation Director

It is an honour for me to introduce the Annual Report 2019, the publication that provides you with updated information about the activities and achievements of the EGI Federation.

2019 was marked by a number of remarkable results. Environmental science, astronomy, astrophysics, cosmology, high energy physics, computational chemistry, neuroinformatics and structural biology are some examples of the many scientific communities that benefited from the compute, storage and infrastructure federating services delivered by the participants of our Federation. Our user communities grew and expanded in diversity thanks to our complementary HTC and Cloud compute federations.

Usage of the infrastructure increased by 13%, the registered users by 17% with 20 new research communities starting production activities on the Federated Cloud, the infrastructure that pools tens of national research clouds from our partners.

2019 has been a year of consolidation for our EGI Federated Cloud¹. Adoption is primarily fuelled by data and analytics tools hosted for earth sciences, accompanied by technical support for new communities. EGI has been a precursor in designing and running a cloud federation for research. After 6 years of production activities, the EGI Federated cloud is now a key European asset for Virtual Research Environments (VREs).

It is good to see how 2019 was a year of engagement of our community in technical innovation projects, such as AARC2 for AAI², AENEAS for the support of the SKA³, AGRINFRAplus⁴ in the Food and Agriculture sector, ENVRI+⁵ for environmental sciences and XDC⁶ for extreme data analytics. Thanks to projects like these, the EGI Federation can grow into a reference platform where new solutions can be customised for and shared across disciplines, maximizing the exploitation of

developments from our community. These efforts are clearly visible: 27% of the user communities have been in co-design and piloting - showing the high demand for our services, as well as indicating future increase in production runs. Technical support has been expanded thanks to the EOSC-hub project and thanks to the European Commission's financial support. Within EOSC-hub we expanded our portfolio of integrated thematic data analytics and simulation services; we participated in competence centres and early adopter pilots; and coordinated support with colleagues from EUDAT, OpenAIRE, and the INDIGO DataCloud collaboration.

Our contribution to EOSC does not end with EOSC-hub. Through projects like PaNOSC, EOSC-Synergy, ExPaNDS and national initiatives the EGI community is contributing to the implementation of the EOSC compute and data platform in various ways. I was very glad to see that collaborations intensified, service adoption increased due to the EOSC initiative. The achievements of 2019 were possible thanks to the dedication of hundreds of people contributing to the EGI Federation at all levels: in the data centres, at national level and in scientific collaborations.

A special thank goes to our Executive Board members and Council representatives for their support and leadership, and to the staff at the EGI Foundation, whose organisation have been adapted to better serve the needs of the EGI community. Thanks to many of you and happy reading!

¹ <https://www.egi.eu/federation/egi-federated-cloud/>

² <https://aarc-project.eu/>

³ <https://www.aeneas2020.eu/>

⁴ <http://plus.aginfra.eu/>

⁵ <https://www.envriplus.eu/>

⁶ <http://www.extreme-datacloud.eu/>

— EGI services in 2019

User communities: an overview

The EGI Federation runs two separated infrastructures providing complementary capabilities: the High-Throughput Compute (HTC) federation and the Cloud federation. For the HTC federation the largest user community operates in the structural biology field, with more than 16,000 registered users at the end of 2019, while the LHC experiments (High Energy Physics) lead the league of user communities in terms of consumed CPU hours. In the EGI Cloud Federation, LifeWatch (biodiversity conservation), and environmental science and earth observation research projects were the most active communities in 2019.

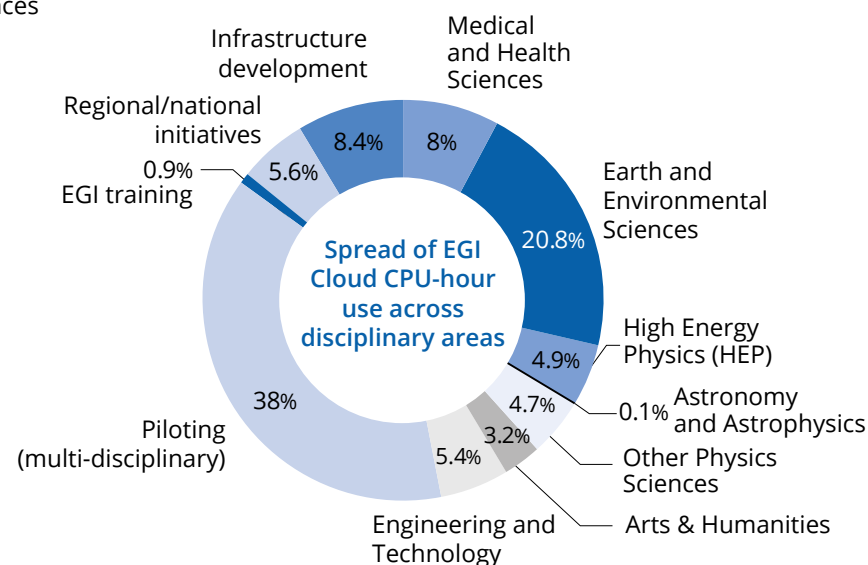
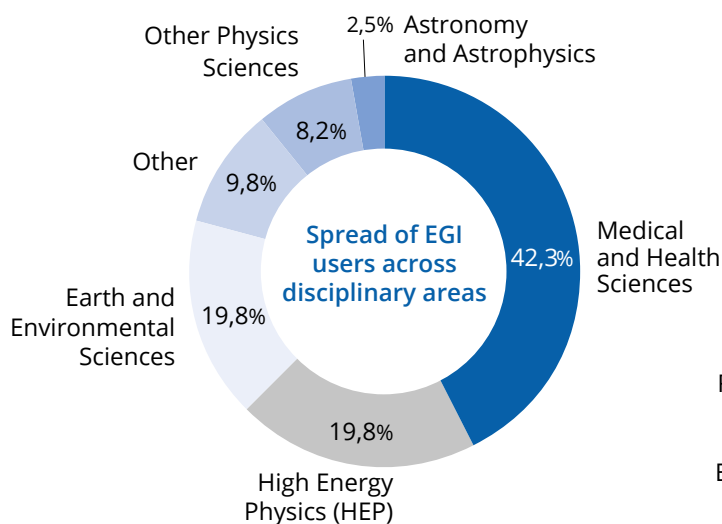
Number of users

The number of active users registered with communities supported by the EGI Federation saw a significant **jump in 2019 from 63,000 to 74,000**, scoring an annual increase of about **+17%**. This was achieved thanks to the many collaborations established through the Competence Centres run during the EGI-Engage project and the technical support and training activities that were significantly strengthened with the start of EOSC-hub in 2018.

CPU-time consumed

The size of the EGI federated infrastructure continued to grow during 2019. **The number of federated CPU cores** increased by **+13%**, from 1,000,000 to over 1,130,000. The majority of this capacity is allocated in the 'High Throughput Compute' service (HTC) and is dominantly used by high energy physics, astrophysics and life science communities. These communities used **61,457,057,834 HEPSPEC-06 CPU-hours** worth of capacity in 2019, which is a 23% increase compared to the previous year.

The EGI Cloud service is smaller in size, but dynamically growing as response to user demand, and with the help of funding at different levels: institutional, regional and national.



Remarkable achievements



ATLAS, one the LHC experiments at CERN, was the scientific collaborations which generated the largest scale data processing and analytics workload on the EGI Federation. ATLAS is seeking answers to fundamental questions, such as: What are the basic building blocks of matter? What are the fundamental forces of nature? Could there be a greater underlying symmetry to our universe?



The Large Synoptic Survey Telescope (LSST) community reached a 12-fold increase of HTC CPU consumption in 2019 on EGI. LSST is using HTC resources from 14 resource centres from EGI (NGI_FRANCE, and NGI_UK) to produce the deepest, widest, image of the Universe.



The Obsea community reached operational setup in the EGI Federated cloud in 2019, reaching 2900 research users by the end of the year. The Obsea portal provides data analysis services for real time observations in marine sciences.



The OpenCoast community became the 3rd most active user of cloud CPU-time on EGI in 2019, increasing their use by 600% in one year. OpenCoastS provides a scalable service in the EGI cloud for diverse user groups to forecast ocean circulation along the North Atlantic coast.



WeNMR is the largest user community of the EGI Federation, serving thousands of researchers in structural biology worldwide. EGI Federation HTC resources. GridPP (United Kingdom), IberGrid (Portugal and Spain), IHEP (China), INFN (Italy), MetaCentrum (Czech Republic), PLGrid (Poland), SURF (Netherlands), the Ukrainian National Grid, and the National Center for High-Performance Computing (Taiwan), collectively provided more than 3.5 Million of CPU hours.

Innovation with user communities

The EGI Foundation Community Support Team, in strong cooperation with user support teams in the NGIs is responsible for identifying and reaching new users and customer groups, providing consultancy for them, and supporting them in the uptake of our services.

The number and maturity of international research communities and research infrastructures supported by the EGI Federation significantly increased in 2019. Over 21 new communities entered the support pipeline in 2019, and we supported over 60 communities in service uptake within a year. 7 communities reached production use of our services, with Service Level Agreements and Operation Level Agreements signed between those and 6 providers from the NGIs: RECAS-BARI, CESGA, UNIV-LILLE, INFN-CATANIA, IFCA-LCG2, CESNET-MCC.

Compute area:

- Porting scientific applications to hybrid infrastructures
- Workload management on distributed network of compute centres
- Container technologies for application portability

Data area:

- Scalable access to scientific datasets in the cloud
- Federating distributed data for integrated analysis
- Large-scale data transfer among community sites and compute centres

Data analytics:

- User and community-defined analysis workflows
- Notebook environments for interactive analysis
- Distributed analysis in notebooks

— Services for research: achievements

The catalogue of services for research includes: compute, storage, cloud, federated data management and compute management services, user Authentication-Authorisation and thematic tools for simulation, data analytics, artificial intelligence. The users of these services are researchers affiliated to research performing organizations, academics and students from universities, and research staff from industry and SMEs conducting research activities in the context of national and/or international projects, communities of practice and research experiments. A researcher is identified within the services through unique identity credentials brought from the home institute or some social platform. The annual total consumption of CPU hours amounted to 5.3 Billion hours scoring a record of +19.5% annual increase.



— Cloud Compute

- [Cloud Compute](#) provides the ability to deploy and scale virtual machines on-demand. Provided by 21 cloud providers.
- More than 540,000 Virtual Machines instantiated, consuming over 31 Million CPU hours.



— Applications on Demand

- [Applications on Demand](#) gives access to online applications and application-hosting frameworks for compute-intensive data analysis.
- Capacity pledge reached 1000 vCPU cores, 2TB of RAM and 43 TB of storage from 11 providers. Counts active users from 14 countries.



— High-Throughput Compute

- [High-Throughput Compute](#) allows running computational jobs at scale on the EGI Federation infrastructure. Provided by 200+ cloud providers.
- Ran more than 500 millions computation jobs, consuming a total of 600,000 years (!) compute time.



— Notebooks

- [Notebooks](#) serves as a browser-based tool for interactive analysis of data using EGI storage and compute services. Provided by CESGA and INFN-CATANIA.
- Operated 1 catch-all and 3 community instances (agINFRA+, LABSS, Training), supporting over 300 users in total.



— Online Storage

- [Online Storage](#) allows data storing in a reliable and high-quality environment and sharing it across distributed teams. Provided by 225 cloud providers.
- Online storage capacity from the data centers and cloud providers reached 500 PB.



— Data Transfer

- [Data Transfer](#) enables moving any type of data files asynchronously from one place to another. Provided by CERN and STFC
- Signed Operation Level Agreement with STFC and CERN to ensure production delivery.



— Cloud Container Compute

- [Cloud Container Compute](#) offers the ability to deploy and scale Docker containers on-demand. Provided by 21 cloud providers.
- Delivered more than 700,000 CPU hours on Kubernetes and Docker containers.



— Workload Manager

- [Workload Manager](#) allows management and distribution of computing tasks in an efficient way while maximising the usage of computational resources. Provided by CYFRONET and CNRS.
- Brokered 13 millions compute jobs - an increase of 58% from 2018.



— FitSM Training

- [FitSM Training](#) teaches the fundamentals of IT service management and how to implement FitSM in your organisation through a combination of lessons and examples. (provided by the EGI Foundation)
- Held 15 courses, with more than 160 individual certifications issued across Foundation and Advanced levels.



— Check-in

- [EGI Check-in](#) is a proxy service that operates as a central hub to connect federated Identity Providers (IdPs) with EGI service providers. Provided by GRNET.
- Connected 80 service providers with 3700 identity providers and reached 1800 monthly average logins from 1800 registered users.



— Training infrastructure

- The [Training Infrastructure](#) is a cloud-based computing and storage resources for training events. Provided by CESNET, INFN-CATANIA, IISAS, IFCA.
- Hosted 6 training courses with 140 attendees, PhD students at Universities; members of scientific projects and research staff at organizations.



Internal services: achievements

The internal service catalogue includes services to enable organisations of the EGI Federation to work together as a distributed infrastructure. It provides capabilities such as: distributed usage accounting, monitoring, technical support, security and incident response coordination. The users of the internal service catalogue are the data centres that participate in the EGI Federation to integrate their physical compute facilities. The EGI Federation currently comprises about 250 data centres worldwide from 24 participants and collaborating cyber infrastructures.



Check-in

- The documentation has been updated with a new section for Community Manager describing how to manage the entitlement attribute in order to apply groups and roles requirements.



Collaboration Tools

- A major reorganisation of the services took place, including splitting services in isolated environments, reviewing backup procedures and upgrading to the most recent versions.



Community Coordination

- The user community board has been updated, with a renewed membership based on the SLAs and most active communities.



Configuration Database

- 2,800 people are registered in the database involved in delivering thousands of services registered across the EGI Foundation infrastructure.



Security Coordination

- The Software Vulnerability Group assessed 38 vulnerability reports and issued 12 advisories. The CSIRT team coordinated the response to 6 incidents.



IMS Coordination

- The Integrated Management System (IMS) with 19 processes has been improved and it passed the annual audit to retain ISO 9001:2015 and ISO/IEC 20000-1:2011 certifications.



Helpdesk

- 5400 tickets were triaged and managed by EGI Federation experts.



Project Management and Planning

- 1 EGI-led project (EOSC-Hub) and 14 non-lead projects were supported.



Strategy and Policy Development

- Approved the new 5-year EGI Federation strategy and managed the Strategic and Innovation Fund with 4 projects approved.



Validated Software and Repository

- There were 6 total releases within the service. Two new products were included (HTCondor and HTCondor-CE) as well as 20 updates across a total of 15 software products.



Service Monitoring

- About 1,000 hosts are monitored by the ARGO Monitoring service through the execution of more than 100 probes in order to produce reliability reports with an hourly granularity.



Operations Coordination and Support

- Development of GDPR-compliant Data Processing Agreement (DPA) templates for core services. The creation of a Cloud Badging proof of concept which introduces an easy way of defining the most mature cloud providers.



Accounting

- Almost 500 million HTC jobs were accounted for as well as over 30 million hours of cloud jobs.



Attribute Management

- Perun-Check-In integration has been deployed in production environments.

Impact

The EGI Federation impact was wide and diverse. It reached many different scientific disciplines and at all scales, from individual researchers to large research communities and Research Infrastructures. The most tangible indicator of the EGI Federation contribution to excellent science is the annual scientific production enabled by the infrastructure and support services, which in 2019 exceeds 2,000 open access publications. Our impact is presented in 4 areas below: on research, on innovation, on collaboration and on skills & expertise.

On research	On innovation
<p><i>Our large-scale computing and data analytics services are helping scientists to accelerate the process leading to research outputs.</i></p> <p>More capacity - Faster results</p> <ul style="list-style-type: none"> More than 1 million computing cores 2 new cloud providers (DESY and Lille) <p>Diverse services</p> <ul style="list-style-type: none"> Support for research platforms and portals Different computing architectures Storage and data management <p>High quality - High impact</p> <ul style="list-style-type: none"> More than 2000 peer reviewed open access scientific papers published in 2019 	<p><i>We continuously innovate our services and technology to meet the needs of researchers worldwide.</i></p> <p>Cloud container service - package and run anywhere</p> <ul style="list-style-type: none"> New ways to package and run scientific applications <p>Federated authentication - more options to access services</p> <ul style="list-style-type: none"> 3700 identity providers supported Access to more than 80 services <p>Improved Service Level Agreements - clear guarantees</p> <ul style="list-style-type: none"> 7 new SLAs for research communities <p>New analytics platform</p> <ul style="list-style-type: none"> Jupyter Notebooks for communities and for the long tail of science

On collaboration	On skills and expertise
<p><i>We foster international collaborations and knowledge sharing.</i></p> <p>Accelerating co-creation and development</p> <ul style="list-style-type: none"> Working with more than 40 research infrastructures Supporting more than 15 Competence Centres (in EOSC-hub) <p>Creating a space for ideas</p> <ul style="list-style-type: none"> Annual conference and thematic workshops with hundreds of international participants <p>Promoting innovation</p> <ul style="list-style-type: none"> Active business engagement program Tens of SMEs supported in service uptake 	<p><i>We create opportunities for professional development and acquiring know-how.</i></p> <p>Increased service management expertise</p> <ul style="list-style-type: none"> 160 FitSM training attendees who achieved certifications <p>Increased diversity of technical training in distributed computing</p> <ul style="list-style-type: none"> Delivered/contributed to tens of training events and workshops Provided cloud infrastructure to 6 hands-on courses



— Innovating our services

International projects and other EGI-participated projects provided new opportunities for us to capture emerging needs for advanced computing from scientific communities. The project outputs resulted in enhanced service capabilities and bespoke solutions to meet the specific requirements of user communities.

- We worked in 'Competence Centres' within EOSC-hub, bringing together scientific institutes, software developers and compute centres into close collaborations.
- We organised a 'Design workshop' for new communities to better understand their requirements and constraints and to co-design services and infrastructures together.
- We selected and ran 'Early Adopter Pilots' with research infrastructures in the EOSC-hub project to seamlessly integrate services from EGI, EUDAT, and Indigo-DataCloud.
- We run 6 business pilots in the EOSC Digital Innovation Hub to support SMEs establish compute-based services.



All these activities helped us advance our services in EGI, and advance the broader European compute ecosystem too. Our service innovation resulted outcome in four areas:



Authentication-authorisation:

- EGI Check-in was improved with several new features: support of the OAuth 2.0 Service Provider (SP) interface, user interface improvements with the adoption of a new theme, and support of the most relevant AARC guidelines.
- The EGI Federation contributed to the definition of the new AARC Blueprint 2019 from the AARC2 project and from AEGIS (AARC Engagement Group for Infrastructures).
- An authentication-authorisation proxy has been integrated with the EOSC Portal based on Check-in. The proxy offers seamless authentication across providers for users of the European Open Science Cloud.



Compute:

- OpenID Connect based authentication and authorisation was enabled in all the EGI cloud providers, removing the need for users to manage X.509 certificates.
- Consolidation of OpenStack as main Cloud Software in the EGI Cloud Federation was completed.
- Adoption of Kubernetes for powering the EGI Cloud Container Compute service was implemented.
- Inclusion of HTCondor-CE as Computing Element for the High Throughput Computing service was conducted.
- Development and implementation of GlueSchema 2.1 for information discovery was recorded.



Data:

- Operation Level Agreements (OLAs) were agreed with STFC and CERN to offer a Data Transfer service based on the FTS technology to EGI user communities.
- Community-specific datasource integration using EUDAT B2DROP, D4Science Workspace and EGI Datahub was demonstrated.



Analytics:

- We launched the Notebooks service with two access options: (1) Preconfigured environment for individual researchers (2) Customisable environment for Communities (e.g. specialised hardware, custom libraries, remote storage, custom AAI).
- The use of Binder to enable reproducible Open Science analysis using EGI Notebooks was validated.
- New access layers have been made available for software integrators in the 'Applications on Demand' service: the Science Software On Demand (SSOD), Prominence, and the DIRAC based EGI Workload Manager.

Business Engagement

The EGI Federation has continued its business engagement programme and worked with private entities both within and outside EC projects. The main focus was on the coordination and development of the EOSC Digital Innovation Hub providing both human and technical support to 8 business pilots. This has resulted in the distribution of ~€45,000 to EGI Federation providers who delivered services for those pilots.



Several industry partnerships continued such as with Terradue, an Italian SME for geohazards and hydrology thematic exploitation platforms. Terradue has also provided an integral part of being able to serve 12 pilots (6 business oriented) via the NextGEOSS project, with distribution of ~€70,000 to EGI Federation providers to date. In addition, EODC, an Austrian based SME, played a crucial role in not only bridging Earth Observation community to federate data, cloud resources and data products for research exploitation, but also bringing Austria back into the EGI Council through their close collaboration with the University of Wein.



The EGI Foundation has continued to be an active member of the Big Data Value Association (BDVA) also serving on the BDVA Board of Directors and continued to develop the federation as a recognized iSpace. The work led to the participation in a successfully funded project set to kick-off in 2020, unlocking the potential of EGI providers to participate in experiments via a reserved budget of €2M.



EGI ran a pay-for-use commercial contract (€8,000) with Exprivia for DIAS benchmarking across multiple providers/countries with 4 EGI Cloud Providers selected. The success has led to continuing with a 2nd contract.

Projects

Participation in projects is essential to support the implementation of the EGI Federation strategy, as adopted by the members of the EGI Council. The projects that concern the majority, if not all, of the members of the EGI Council are usually led by the EGI Foundation on behalf of the Council.



EOSC-hub

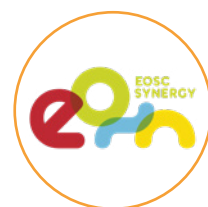
1 Jan 2018 - 31 Dec 2020
Coordinator: EGI Foundation
(100 partners)
EC grant: 30M

EOSC-hub brings together multiple service providers to create the Hub: a single central contact point for European researchers and innovators to discover, access, use and reuse resources for advanced data-driven research.

► The EGI Foundation plays a key role in EOSC-hub as the project coordinator, contributing to a number of critical activities for the operations of the European Open Science Cloud, including:

- The EOSC federated AAI, allowing EOSC users to login through single sign on.
- The Hub: a service integration and management system for all EOSC service providers.
- The EOSC Marketplace, a core EGI Federation service and a component of the EOSC Portal.
- EOSC service portfolio management, i.e. the processes for the EOSC catalogue of live resources and its portfolio.
- EOSC federated monitoring and accounting and the maintenance of key grid and cloud middleware.
- The EOSC competence centres and training, taking care of piloting, user experience and the collection of technical requirements. The Digital Innovation Hub, a platform that facilitates engagement between private industry and public institutions participating in the EOSC.

"Thanks to the leadership of the EGI Foundation, via the EOSC-hub project, EGI participants contribute to the implementation of the EOSC with contributions summing up to 45% of the total budget. On top of this, the EGI participants involved in delivering core services receive an additional contribution of 1ME from the EGI Foundation budget over the project duration."



EOSC Synergy

1 Sep 2019 - 28 Feb 2022
Coordinator: CSIC
(16 partners)
Project budget: 5.6M
EGI budget: 372K

EOSC-Synergy extends the EOSC coordination to the 9 participating countries by harmonising policies and federating relevant national research e-Infrastructures, scientific data and thematic services, bridging the gap between national initiatives and EOSC.

► The EGI Foundation takes care of communication of outreach for EOSC-synergy, building on extensive network of contacts of the organization.



EOSC Enhance

1 Dec 2019 - 30 Nov 2021
Coordinator: University of Athens (15 partners)
Project budget: 2M
EGI budget: 105K

EOSC Enhance improves the discoverability of scientific services and data resources by further developing the EOSC catalogue.

► The EGI Foundation provides expertise on privacy policies and EOSC rules of participation, expertise in standards for service management, change management and software release and validation.



EOSC Pilot

1 Jan 2017 - 30 April 2019
Coordinator: STFC
(33 partners)
Project budget: 9.9M
EGI budget: 570K

The EOSCpilot project supported the first phase in the development of the European Open Science Cloud (EOSC) as described in the EC Communication on European Cloud Initiatives. It established the governance framework for the EOSC and contribute to the development of European open science policy and best practice.

► EGI contributed to the definition of the EOSC architecture, EOSC service portfolio and federated service management, service pilots in collaboration with scientific demonstrators, the governance framework and the rules of engagement.



XDC

1 Nov 2017 - 1 Feb 2020
Coordinator: INFN (8 partners)
Project budget: 3.5M
EGI budget: 147K

XDC was set up to develop scalable technologies for federating storage resources and managing data in highly-distributed computing environments.

► The EGI Foundation is contributing to XDC quality assurance, to ensure that the software outputs of XDC can be easily used on e- infrastructures. The foundation team is also supporting dissemination, training and technical exploitation activities.



AARC2

1 May 2017 - 30 Apr 2019
Coordinator: GÉANT
(25 partners)
Project budget: 3M
EGI budget: 247K

AARC2 was set up to address the need for federated access and for authentication and authorisation mechanisms.

► The EGI Foundation contributed to the analysis of technical requirements, the definition of the AARC Blueprint Architecture and supported the dissemination effort. CESNET, CYFRONET and CERN provided key contributions in the policy development area and to the AARC pilot programme.



ExPaNDS

1 Sep 2019 - 31 Aug 2022
Coordinator: DESY
(11 partners)
Project budget: 6M
EGI budget: 382K

ExPaNDS aims to deliver standardised and integrated data sources and data analysis services for photon and neutron facilities.

► EGI provides technical support and tools to integrate the ExPaNDS service and data providers into the EOSC-hub. ExPaNDS relies on a cloud computing infrastructure leveraging the federated services offered by EGI.



OPERAS-P

1 July 2019 - 30 June 2021
Coordinator: CNRS
(16 partners)
Project budget: 2M
EGI budget: 98K

OPERAS-P supports the OPERAS, the European research infrastructure for open access publications in the social sciences and humanities.

► EGI participates in the E-Needs projections task, supports integration in the EOSC portal, and leads the user authentication implementation task.



TRIPLE

1 OCT 2019 - 31 Mar 2023
Coordinator: CNRS
(18 partners)
Project budget: 5.6M
EGI budget: 259K

TRIPLE enables researchers and projects to discover and reuse social sciences and humanities data.

► The EGI Foundation is mainly involved for the single-sign on service, to facilitate the connection with the EOSC and to contribute to the business strategy.



AGINFRAplus

1 Jan 2017 - 31 Dec 2019
Coordinator: Agroknow
(8 partners)
Project budget: 2.8M
EGI budget: 200K

The AGINFRA+ project exploited core existing e-infrastructures such as EGI, OpenAIRE and D4Science, to serve European scientists from user communities around agriculture and food.

► The EGI Foundation supported the uptake of e- infrastructures in the agriculture domain via three use cases: food security, agro-climatic & economic modelling, food safety risk assessment.



NextGEOSS

1 Jan 2016 - 31 Dec 2020
Coordinator: DEIMOS
(27 partners)
Project budget: 10M
EGI budget: 230K

NextGEOSS is developing a next generation centralised hub for Earth Observation data.

► The EGI Foundation contributes with technical advice and consultancy to identify the best solutions to get scientific and commercial applications up and running on an integrated cloud platform.



AENEAS

1 Jan 2017 - 31 Dec 2019
Coordinator: ASTRON
(28 partners)
Project budget: 3M
EGI budget: 216K

AENEAS aimed at developing a functional design for a distributed European Science Data Centre, enabling the astronomical community to make new discoveries with the largest radio telescope in the world - the Square Kilometre Array (SKA).

► The EGI Foundation contributed to the piloting of solutions for federated AAI in SKA, distributed HTC and cloud and computing, and federated service management.



RISCAPE

1 Jan 2017 - 31 Dec 2019
Univ. of Helsinki (10 partners)
Project budget: 2M
EGI budget: 104K

The RISCAPE project had a mission to map the international landscape of research and digital infrastructures.

► The EGI Foundation's role was to identify international e-Infrastructures in different geographical areas, to examine their common technical features and the areas of societal challenges that they focus on.



ENVRI+

1 May 2015 - 31 Jul 2019
Coordinator: ICOS ERIC
(37 partners)
Project budget: 15M
EGI budget: 403K

ENVRIplus brought together scientists and technical specialists to create an interdisciplinary and interoperable cluster of Environmental & Earth Systems Research Infrastructures.

► The EGI Foundation contributed to technical training activities, provided support for data solutions, and participated in dissemination and community building actions. Thanks to the leadership of the EGI Foundation, via the EOSC-hub project, EGI participants contribute to the implementation of the EOSC with contributions summing up to 45% of the total budget. On top of this, the EGI participants involved in delivering core services receive an additional contribution of 1ME from the EGI Foundation budget over the project duration.



PaNoSC

1 Dec 2018 - 30 Nov 2022
Coordinator: ESRF (7 partners)
Project budget: 12M
EGI budget: 640K
Category: EOSC

PaNOSC is a European project for making FAIR data a reality in 6 strategic European research infrastructures providing services for scientific data and connecting them to the EOSC.

► For the project, EGI Foundation provides technical support and service provisioning via the EGI Federated Cloud, EGI Notebooks service, EGI Data Transfer service.

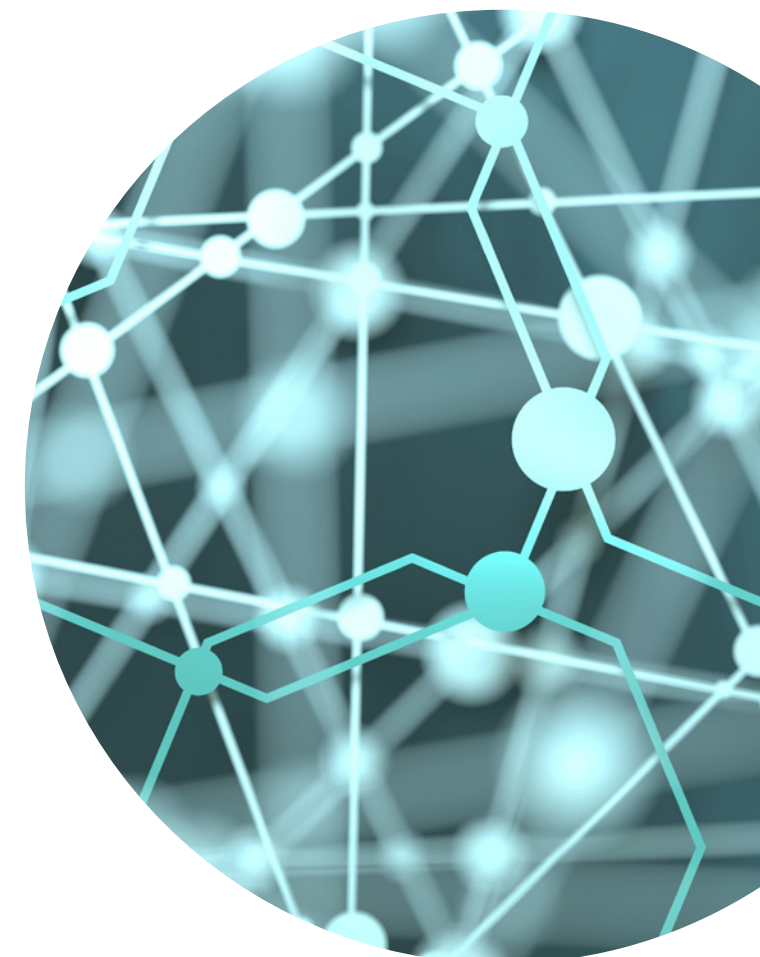


eInfraCentral

1 Jan 2017 - 30 Jun 2019
Coordinator: EFIS Centre
(9 partners)
Project budget: 1.5M
EGI budget: 81K

eInfraCentral's mission was to help users discover and access Europe's e-Infrastructure services.

► The EGI Foundation contributed to the collection of requirements and best practices for an harmonised service classification and with advice on the specifications of the eInfraCentral service catalogue.



— Security activities

The EGI Computer Security Incident Response Team (CSIRT) coordinates operational security activities within the EGI infrastructure to deliver a secure and stable infrastructure.

To conduct a successful attack on an IT infrastructure, an adversary needs to exploit a vulnerability. EGI CSIRT's vulnerability management cycle largely reduces the attack surface. EGI has now evolved to multi-purpose clusters that is used in other contexts as well. This flexibility has a disadvantage of allowing the same security incidents to spread across multiple communities. EGI CSIRT and its members are now embedded in the global security communities and take an active role in the GÉANT TF-CSIRT, a community of over 300 security teams from different sectors.



Main activities:

- **Service monitoring** to ensure that the minimum obligations defined in service OLAs are met. Security monitoring is paramount as it enables the automatic detection of known security vulnerabilities affecting software. This monitoring is fundamental to the daily activities of the EGI CSIRT team.
- **Evaluation and response of security threats** on an ongoing basis, dealing with security response. The EGI Software Vulnerability Group (SVG) together with the CSIRT and distributed operations team work to constantly evaluate new threats that become known, monitor and respond to vulnerabilities. The response includes notification of affected sites, monitoring the upgrading of affected software and ultimately acting to suspend sites who fail to react to deal with vulnerabilities. The EGI Security and Policy Group (SPG) also participates in the international WISE initiative and represents EGI there.
- **ISO/IEC 27000 Information Security Management Systems trainings** were provided to EGI Foundation staff to increase expertise in this area. Also EGI Foundation ratified its involvement in the EGI CSIRT team through formal membership of EGI Foundation operations staff - an example of strengthening ties between Information Security Management between EGI Foundation and EGI Federation.
- **Service request and incident response** enabling users to submit problem tickets or requests for new functionality and know that they will be routed to the correct team. EGI SDIS oversees first and second level support that is managed centrally and complemented by third level support provided by the developers' teams. The SDIS Team ensures tickets are followed up in a timely manner. All security incidents get routed to the EGI CSIRT team.

— Strategy towards 2024

In December 2019, the EGI Council adopted the new 5-year strategy for the EGI Federation that considers the new aspects in the ecosystem in which we operate. The EC policy on the European Open Science Cloud, the development of new research infrastructures and the new technical trends are examples of external factors that were considered.

The strategy is rooted in the belief that all researchers should have seamless access to services, resources and expertise to conduct world-class research and innovation. Within this vision, our core mission is to deliver open solutions for advanced computing and data analytics primarily serving research communities and research infrastructures. We also support small international groups, individual researchers and SMEs.

The following six strategic goals will guide the future activities of the EGI Federation:

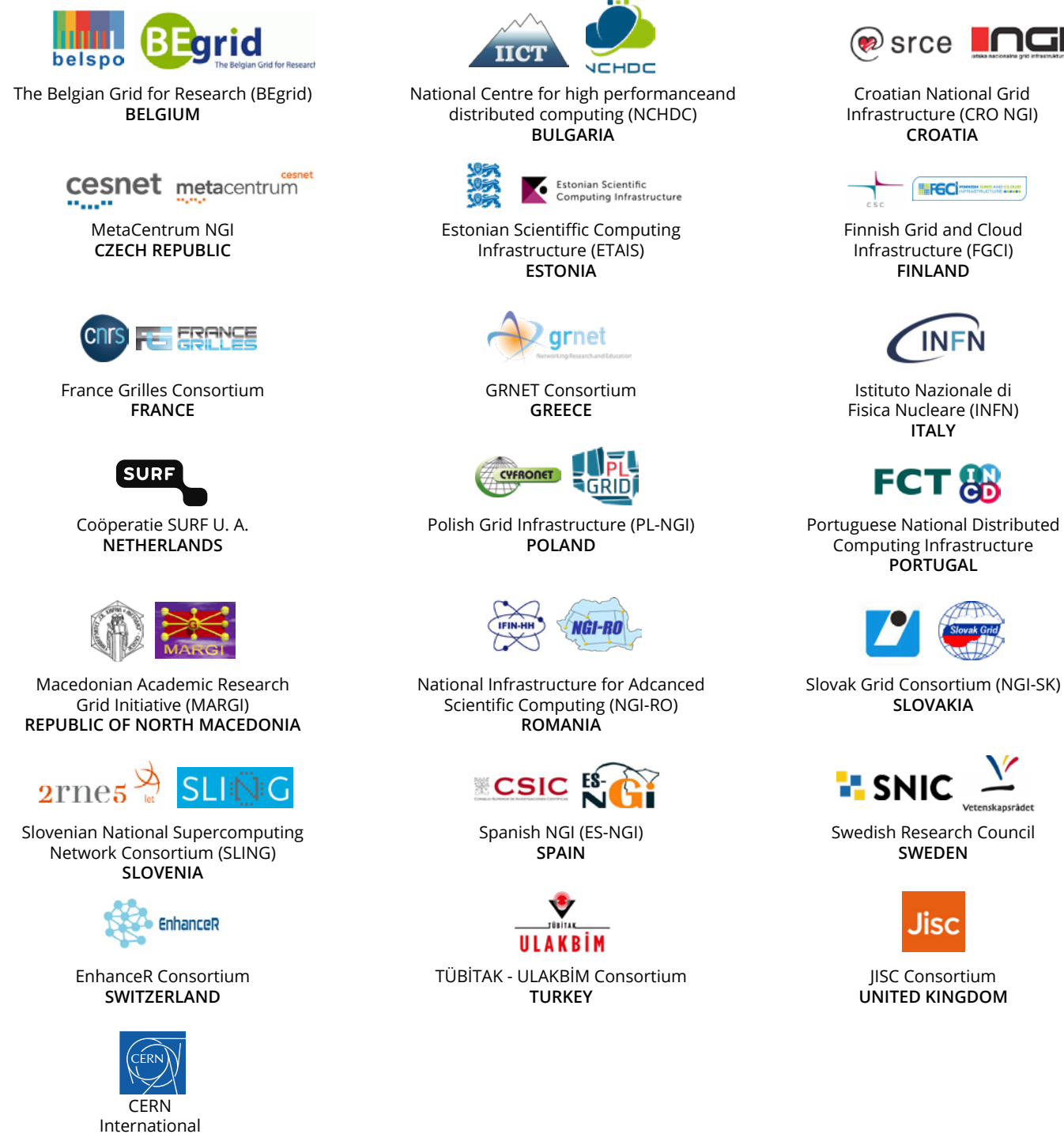
- 1 Be a trusted service & technology partner for research and innovation: improve promotion and engagement with target user groups to further solidify the EGI Federation as trusted long-term partner;
- 2 Evolve the service offering to meet the needs of researchers: work with user communities and with peer e-infrastructure organisations towards reliable research-enabling services;
- 3 Improve skills of users/operators in service providers: deliver training and consultancy to increase their knowledge and quality of work;
- 4 Align business models to better support service provisioning: increase the efficiency in translating the needs of services and support from the target user groups to service providers of the EGI Federation in alignment with the national and community policies and business models;
- 5 Strengthen the governance and broaden European coverage: ensure that the EGI Federation governance remain effective in the changing environment and grow the relationships with current and future EGI participants;
- 6 Be a recognised foundation of the EOSC: position the services and expertise of the EGI Federation as key assets for the EOSC, especially for the Federating Core.

The EGI Foundation will continue to act as a key engine enabling its members to support international research and innovation together by operating and evolving a federation and management platform. This platform, on one side, enables service providers to harmonise interfaces and connect to a common hub, on the other side, aggregates demand and simplifies the access.

Research is a global endeavor, therefore we will seek to consolidate and broaden key strategic partnerships to better achieve our mission and strategic goals. Together, we can advance research in Europe and beyond for the benefits of the society, the economy and the environment.

Participants of the EGI Council

Participants



Associated Participants

- Gauß-Allianz representing the National Grid Initiative (NGI-DE) (Germany)
- BITP representing the Ukrainian National Grid (UNG) (Ukraine)

New organogram of the EGI Foundation



Implemented in 2020

— EGI Foundation financial information



INCOME	
Contributions from council participants	1,181,500
Other income (conference fees, Pay4Use, and FitSM trainings)	45,660
Projects income	2,309,116
TOTAL	3,536,276

EXPENDITURE	
Personnel	2,301,550
Staff Development	8,031
<i>Operating costs</i>	
Core activities grant to Council and Strategic Innovation	237,440
Fund ICT (inc depreciation costs)	56,172
Facilities	159,269
Non Project Travels	46,150
Project Travels	148,154
General expenditure	90,866
Project central budget	73,635
VAT	37,568
TOTAL	3,158,835

Reserve 2,199,154

COUNCIL PARTICIPANTS CONTRIBUTIONS

UK - Jisc Italy - INFN France - CNRS	3x 90,000
Turkey - Tubitak Ulakbim Spain - CSIC Netherlands - Surf Sara BV	4x 75,000
EIRO - CERN	
Switzerland - Swiss National Grid Ass Sweden - SNIC Poland - Akademia Górnictwo-Hutnicza w Krakowie Belgium - BELSPO	4x 55,000
Romania - IFIN-HH Portugal - FCT Department of information Society Greece - GRNET Finland - CSC-IT center for science Ltd Czech Republic - CESNET	5x 40,000
Slovenia - ArNES Slovakia - Ustav informatiky SAV Croatia - SRCE Bulgaria - IICT-BAS	4x 25,000
Montenegro - MARGI Estonia - Hariduse infotehnoloogia Sihtasutus (HITSA)	2x 10,000
Germany - Gauß-Allianz e.V. (associated participant)	1x 45,000
Ukraine - Bogolyubov Institute for Theoretical Physics (affiliated participant)	1x 1,500
Bulgaria - ICCT-BAS (debtor 2018)	1x 25,000

TOTAL 1,181,500

INCOME PER PROJECT

AARC2	77,774
AENEAS	136,520
AGINFRA+	77,999
eInfraCentral	19,125
ENVRI+	86,538
EOSC-hub	1,629,096
EOSCPilot	49,860
NextGEOSS	31,686
RISCAPE	36,942
XDC	63,801
PaNOSC	47,081
ExPANDS	4,745
EOSC-synergy	31,514
OPERAS-P	11,660
TRIPLE	3,677
correction income HNSciCloud 2018	1,098

TOTAL 2,309,116

PROJECT	EGI AND 3RD PARTIES	TOTAL PROJECT GRANT
AARC2	247,175	2,999,893
AENEAS	215,750	2,999,995
AGINFRA+	201,250	2,837,375
eInfraCentral	81,373	1,499,037
ENVRI+	402,750	14,998,034
EOSC-hub (EGI and 3rd parties)	5,069,692	30,000,000
EOSCPilot (EGI and 3rd parties)	570,824	9,953,067
NextGEOSS	230,913	9,999,999
RISCAPE	103,750	1,999,867
XDC	147,000	3,396,875
PaNOSC (EGI and 3rd parties)	639,372	11,953,517
ExPANDS	381,563	5,998,104
EOSC-synergy	372,500	5,584,006
OPERAS-P	98,144	2,010,539
TRIPLE	258,750	5,630,055

Credits

This publication was prepared by the EGI Foundation team.

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www.studio-bureau.com

The content of this publication is correct as of November 2020.

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