

EGI-Engage

EGI Sustainability and

Business Development Plan

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Abstract

This document presents an update on the strategic planning and evaluation activities of EGI. It also includes the results of business development activities that aim at ensuring growth and sustainability of EGI and plans for impact assessment. Any business related communication, dissemination and engagement activities will be reported in D2.8.



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TERMINOLOGY

A complete project glossary is provided at the following page: <u>http://www.egi.eu/about/glossary/</u>





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Executive Summary

The EGI Sustainability and Business Development Plan is intended to present an update on the strategic planning and evaluation activities of EGI. It also includes the results of business development activities that aim at ensuring growth and sustainability of EGI and offers plans for impact assessment. Any business related communication, dissemination and engagement activities will be reported in D2.8.

The main objective of the EGI-Engage project is to support EGI in providing federated access to compute, storage, data, knowledge and expertise complementing community-specific capabilities. The project also supports service innovation and expands the capabilities offered to researchers (e.g. improved cloud or data services) and the spectrum of its user base by engaging with large Research Infrastructures (RIs), the long tail of science and industry/SMEs.

In order to not only achieve these objectives, but to ensure the long-term availability of the infrastructures and the services in which more than 46,000 researchers rely, a multi-facet approach is taken.

The first achievement has been a well-defined strategy looking towards the EGI of 2020, which is built on five strategic themes: 1.) Engage and support user communities; 2.) Design, develop and deploy solutions; 3.) Serve, support and improve live (in production) services, 4.) Influence policies and 5.) Achieve sustainable future.

Over the last several years, thanks to the efforts of the entire EGI community, the organisational model has stabilised through refinement to the governance structure allowing a stronger focus on service development and innovation matched to defined target groups.

Existing high-level services have been organised through a formal service portfolio based on or in line with the EGI 2020 strategy, categorised as Federated IaaS Cloud, High-Throughput Data Analysis, Federated access and Consultancy for user-driven innovation are delivered to different types research disciplines such as high-energy physics, life science, earth science, and groups comprising research infrastructures like CERN and EMBL, research infrastructures like ESFRIs. New target groups have also been added such as the long tail of science with a dedicated portal called "Access" and conceptual design of an EGI Marketplace as well as a dedicated programme for outreach to industry. EGI has also been active with emerging research infrastructures and have formed eight competence centres to better understand requirements and co-develop solutions.

Strategic partnerships have also been established with other e-Infrastructures such as EUDAT, PRACE, GÉANT, and OpenAIRE as well as Infrastructure Agreements with Research infrastructures (e.g. Compute Canada) to expand the infrastructure and Policy and standards bodies (e.g. e-IRG).

Much focus has been on identifying opportunities, expanding the infrastructure and business development. However, an important aspect of sustainability is ensuring that the services offered are consistently maintained, supported and improved upon. This has been covered through a couple different ways, whether the advisory Solutions and Service Board to streamline and guide evolution of the services and solutions portfolio, through the establishment of formal SLAs with





communities, or in how the services are management via the FitSM service management standard implementation.

Diverse business models have moved from proof of concept to implementation such as with EGI pay-for-use and the delivery of commercial FitSM training and certification. Analysis of procurement opportunities has already begun, which will be further explored in the second year of the project.

Innovation has taken shape through a number of channels comprising special interest groups, virtual teams, and funded projects that has led to either additional functionality (e.g. GPGUs) or new technology integrated (e.g. MPI, science gateways) and most notably the launch and expansion of the EGI Federated Cloud.

Moving forward, to ensure sustainability, EGI will need to be assessed as well as monitored. This is done through both impact and risk assessments. The goal will be to define a number of qualitative and quantitative indicators to assess the impact of EGI. Risks have started with the EGI-Engage project with define processes and a risk registry, but will need to be expanded to EGI as a whole. This is something that will be achieved through the ongoing work to achieve ISO9001 (quality management) and ISO20000 (service management) standards.

EGI.eu just celebrated its sixth birthday, which continues to prove it is here to stay. This document highlights how not only has EGI achieved this, but how it will continue to ensure the services offered will evolve and expand over the coming years.





1 Introduction

The main objective of the EGI-Engage project¹ is to support EGI in providing federated access to compute, storage, data, knowledge and expertise complementing community-specific capabilities. The project also supports service innovation and expands the capabilities offered to researchers (e.g. improved cloud or data services) and the spectrum of its user base by engaging with large Research Infrastructures (RIs), the long tail of science and industry/SMEs.

In order to not only achieve these objectives, but to ensure the long-term availability of the infrastructures and the services in which more than 46,000 researchers rely, a multi-facet approach is taken that starts from a well-defined strategy, diversified business models and high-quality services professionally delivered and managed.

This report therefore presents an update on the strategic planning and evaluation activities of EGI. It also includes the results of the business development activities that aim at ensuring growth and sustainability of EGI as well as the approach to assessing impact using the following structure:

- Section 2 starts off with the EGI2020 strategy that lays the foundation of where EGI sees itself over the next 5 years and the steps that need to be taken to get there, which is the basis for activities further described throughout the rest of the document.
- Section 3 provides how the strategy has been implemented over the last year and the activities that support EGI sustainability and business development.
- Section 4 focuses on assessing impact and risk, first outlining the planned approach to impact that will service as a basis for data collection during the next year while extracting some initial risks from the project perspective.
- Section 5 concludes the document summarises key points and outlines future work.

Any business related communication, dissemination and engagement activities will be reported in D2.8².

² EGI-Engage D2.8 Communications, Dissemination and Engagement Report and Updated Strategy – <u>https://documents.egi.eu/document/2668</u>





¹<u>https://www.egi.eu/about/egi-engage/</u>

2 EGI strategy towards 2020

EGI is an international collaboration that federates the digital capabilities, resources and expertise of national and international research communities in Europe and worldwide. The main goal of EGI is to empower researchers from all disciplines to collaborate and to carry out data and compute intensive research and innovation. Over the last decade, EGI has built a federation of long-term distributed compute and storage infrastructures that support research and innovation. This international e-Infrastructure has delivered unprecedented data analysis capabilities to more than 46,000 researchers from an array of disciplines. The federation brings together around 350 data and compute centres worldwide. EGI is governed by the EGI Foundation (abbreviated as EGI.eu) and funded through a combination of membership fees, national and EC funding.

Today, EGI provides both technical and human services, from integrated and secure distributed high-throughput and cloud computing, storage and data resources to consultancy, support and codevelopment. The research supported by EGI is diverse³. Examples include the search for the Higgs boson at the Large Hadron Collider particle accelerator at CERN; finding new tools to diagnose and monitor diseases such as Alzheimer's, or the development of complex simulations to model climate change.

Benefits of EGI

- 1. Ensuring uniform and reliable availability of resources to researchers on a local, national and European scale
- 2. Enabling faster production of scientific results through collaboration across organisational and national boundaries
- 3. Promoting open and collaborative research while ensuring open access to shared resources and expertise
- 4. Allowing researchers to focus on their research rather than managing their e-Infrastructure needs
- 5. Providing effective use of resources in different administrative domains to ensure the most effective return on infrastructure investments
- 6. Facilitating the innovation and sharing of solutions by building a thriving ecosystem through community events and collaborative services.

³ EGI Case Studies: <u>http://www.egi.eu/case-studies/</u>





2.1 Vision and mission

Vision

"Enable all researchers from all disciplines to have easy, integrated and open access to the advanced digital capabilities, resources and expertise needed for collaboration and data/compute intensive science and innovation."

Mission

"Create and deliver open solutions for research by federating digital capabilities, resources and expertise between communities and across national boundaries."

2.2 Organisational model

Over the last decade, EGI has built a federation of long-term distributed compute and storage infrastructures that support research and innovation. This international e-infrastructure has delivered unprecedented data analysis capabilities to more than 46,000 researchers from many disciplines. The federation brings together more than 350 data and compute centres worldwide. Today, EGI provides both technical and human services, from integrated and secure distributed high-throughput and cloud computing, storage and data resources to consultancy, support and co-development.

EGI is coordinated by a not-for-profit foundation established under Dutch law in the Netherlands, EGI.eu, and funded through a combination of participant fees, national and EC funding.

EGI in Numbers*				
EGI: 32 countries + CERN & EMBL				
EGI Federation: 51 countries + CERN & EMBL				
Virtual Organisations: 290				
Users: ~46,000				
Resource centres: 335				
Federated CPU cores: 650,000+				
Federated storage (disk): ~310PB				
Computational Jobs (grid): ~1,6M/day				
Virtual Machines (cloud): ~1,3K/day				
(*Feb 2016)				

The Foundation has participants and associated participants drawn from NGIs⁴, EIROs⁵, ERICs⁶, and other such legal entities. These entities participate in the foundation independantly or as the representative of a national e-infrastrcuture consortium. EGI.eu participants form the governing body (EGI Council). Participants and associated participants also provide the physical and human resources and shared services that enable EGI to deliver, improve and innovate services for research communities. EGI.eu coordinates areas such as overseeing infrastructure operations, user community support, contact with technology providers, strategy and policy development, flagship events and dissemination of news and achievements. Figure 1 clarifies the relationship between EGI.eu, EGI, the EGI Federation and the EGI Community.

⁶ ERIC: European Research Infrastructure Consortium





⁴ NGI: Organisation representing a national e-infrastructure which provides long-term distributed compute and storage resources for research and innovation

⁵ EIRO: European Intergovernmental Research Organisation



Figure 1 Defining EGI, EGI Federation and EGI Community

The support model can be summarised as:

- Coordination provided by the EGI Foundation through participant fees paid by the EGI Participants (e.g., NGIs and EIROs). This is the main source of revenue that binds the national infrastructures making a true European wide infrastructure.
- Physical resources and additional human support through national funding while also ensuring regular maintenance and operation.
- Innovation and development via targeted R&D projects (e.g. European Commission).
- Strategic partnerships for in-kind effort around areas of mutual benefit (e.g. software).
- Professional consultancy services (e.g. FitSM Service management training and certification).
- Pay-for-use models (currently in pre-production).

2.3 Strategic themes

Figure 2 below shows the "Strategy Map" that depicts our high-level goals, our target groups, service offerings and major themes. Emphasis is placed on supporting existing EGI research communities and attracting new ones linked to emerging research infrastructures and outreach to SMEs/industry. To serve these communities better, EGI consolidates existing IaaS capabilities while expanding into PaaS and SaaS domains with pre-configured and customisable platforms that can be easily deployed and managed. This makes it easier to share, discover and process distributed data (either with open or controlled access).







Figure 2 – EGI Strategy Map

EGI has a long tradition of federating distributed capabilities - from the technical to the human and is well positioned to support the integration and efficient operation of the services and resources needed to increase the impact on digital and open science, research and innovation. Priorities that aim to improve processes and capabilities within the EGI federation are grouped in five strategic themes:

- i. **Engage and support user communities** consolidate outreach networks and create a network of dedicated competence centres for long-term engagement with research communities.
- ii. **Design, develop and deploy solutions -** promote open innovation processes and source the best ideas from the community for advancing current EGI services; strengthen skills in managing distributed teams and reinforce adoption of and compliance to open standards.
- iii. **Serve, support and improve live services** continuously improve the maturity of service management throughout the federation; regularly review user satisfaction and collect suggestions to implement through innovation projects.
- iv. **Influence policies** continue to develop competences in digital infrastructure and open science policy while improving the engagement with the European Commission and the Member States; continue to develop and promote the vision for an Open Science Commons.
- v. Achieve sustainable future continue to develop the EGI strategy collaboratively to improve cohesion; work towards long-term, sustainable funding for operating EGI core services while at the same time focusing on raising funds for innovation; continue to explore different business models, while improving discoverability and reuse of services and solutions.

For further details see full EGI Strategy 2020⁷.

⁷ EGI Strategy - 2015-2020 - <u>https://documents.egi.eu/document/2417</u>





2.4 Target groups

EGI targets a wide range of researchers across a large geographical space, within an array of domains and at different levels within an organisation. It is essential to know the specific characteristics of each target group in order to be able to choose suitable and effective engagement approaches and priorities. Over the years, EGI has recognised the typical 'target groups' for engagement and optimised the outreach, support and development activities for the unique characteristics of these groups. The following sections provide further details for each.

2.4.1 Existing EGI research communities

EGI currently serves different types research disciplines such as high-energy physics, life science, earth science, and groups comprising research infrastructures like CERN and EMBL, research collaborations like WeNMR. These research communities are organised and enabled in EGI via Virtual Organisations (VOs) based on research area or collaboration, which currently stands at 290 VOs. One of the top priorities of EGI's strategy is to continue to support and enhance existing services, propose innovations, and ensure that EGI is seen as a reliable and trustworthy service provider.

2.4.2 Emerging research infrastructures

EGI engages a broad range of research infrastructures within the ERA in order to support them in better serving their research communities. In the next two years, a growing number of Research Infrastructures (RIs) from the ESFRI roadmap and from national roadmaps are expected to reach implementation or operational stage. These RIs as well as the Future and Emerging Technologies (FET) Flagship Initiatives are already exploring needs of their user communities and thus they are key instruments in bringing together a wide diversity of stakeholders to look for solutions to many of the problems science is facing today. Given their international nature and awareness of the benefits of e-Infrastructures, the European RIs and Flagships, their preparatory projects, and other similarly large, multinational and structured scientific collaborations are considered as the primary long-term beneficiaries of EGI services and therefore the prime targets for EGI to engage.

A second target group for EGI is the large number of highly dynamic, small/medium size research collaborations, software developer communities, and research networks. These are often represented by FP7 or H2020 projects at the European scale, and by similar-size national projects at the national scale. Unlike RIs and Flagships, these groups may scarcely, or not be aware of e-Infrastructures and their benefits to science, so discussions have to start at a more basic level.

2.4.3 Long tail of science (LToS)

The long tail of science refers to the large number of individual researchers and small laboratories who are scattered across Europe and do not have access to computational resources and online services to manage and analyse large amount of data. The Long tail is almost invisible and most of its members lack the technical know-how and expertise in using e-Infrastructures.





2.4.4 SMEs and Industry

There are more than 20 million SMEs in the EU representing 99% of businesses. SMEs are considered one of the key drivers for economic growth, innovation, and employment. The European Commission has made them one of the focuses in the Horizon 2020 with the aim of putting SMEs in the lead for the delivery of innovation to the market. EGI aims at supporting this policy objective by exploring opportunities for synergies with SMEs (e.g. offering the EGI innovative services for big data analytics).

2.5 Offering

EGI supports research and innovation by consolidating and innovating services through a federation of compute, storage, data, knowledge and expertise of national and international research communities in Europe and worldwide. EGI works with research infrastructures to co-create new services they need and lower barriers for entry to the long tail researchers and SMEs.

Existing high-level services:

- Federated IaaS Cloud: Run compute- or data-intensive tasks and host online services in virtual machines or docker containers on IT resources accessible via a uniform interface. Store/retrieve research data at multiple distributed storage service providers. Share applications, tools and software for data processing and analysis.
- **High-Throughput Data Analysis:** Run compute-intensive tasks for producing and analysing large datasets and store/retrieve research data efficiently across multiple service providers.
- **Federated access to computing and data:** Manage service access and operations from heterogeneous distributed infrastructures and integrate resources from multiple independent providers with technologies, processes and expertise offered by EGI.
- **Consultancy for user-driven innovation:** Expertise to assess research computing needs and provide tailored solutions for advanced computing.

High-level services under development:

- **Open Data Platform:** Store and discover research data, publish with open or controlled access, access and reuse data with the EGI computing services
- Accelerated computing: Run computational tasks on specialised processors (accelerators) with traditional CPUs from multiple providers allowing for faster real-world execution times.
- **Community-specific tools:** To provide access to specialised tools for data analysis contributed by the community

2.6 Strategic partnerships

As the EGI vision is ambitious, it is recognised that it cannot be achieved in isolation. For that EGI needs to establish key partnerships with organisations and/or projects that complement and expand existing capabilities and skills.





2.6.1 With other European e-Infrastructures

EGI fully supports collaboration with other e-Infrastructures in order to leverage services for the benefit of European researchers while striving to reduce duplication of effort. EGI's position in respect to other similar initiatives can be summarised as:

- EUDAT⁸: EGI enables the reuse of research data available from their services
- PRACE⁹: EGI complements their HPC services with cloud and HTC capabilities, altogether addressing the different computing needs of the research community
- GÉANT¹⁰: EGI relies on their connectivity for distributed access to data and computing
- OpenAIRE¹¹: EGI uses the dissemination/discovery services to track the research outputs

EGI positioning with respect to similar initiatives to national and regional e-Infrastructures: "EGI federates regional and national e-Infrastructures in the area of cloud and HTC". Over the last several months, EGI has been working with several e-Infrastructures on a joint service catalogue being led by the European Commission.

2.6.2 With other Resource Providers

It is important for EGI to be open to the world. That is why consolidating and expanding peer agreements with infrastructures similar to EGI outside Europe to support European researchers to collaborate with their international peer is a priority. International organisations that contribute resources and have a collaboration agreement with EGI through MoUs:

- Asia Pacific Region (including resources from Australia, China, India, Iran, Japan, Malaysia, New Zealand, Pakistan, Philippines, South Korea, Taiwan, Thailand, Vietnam)
- Africa-Arabia (including resources from South Africa, Egypt, Morocco, Tanzania, Kenya, Nigeria, Algeria, Senegal, Ethiopia, Tunisia, Ghana)
- Ukrainian National Grid (UNG)
- Latin America (including resources from Brazil, Chile, Mexico)
- China: IHEP
- Open Science Grid (USA)
- Canada: ComputeCanada
- India: C-DAC

2.6.3 With Research infrastructures

Research communities help to steer the development of the services and tools EGI needs to provide the best services for science. In addition to the research infrastructures engaged through the competence centres, the following are engaged through MoUs: CLARIN/DARIAH, DRIHM, LSGC, WeNMR, WLCG. Other on-going activities to engage new communities are recorded in D2.8¹².

¹² EGI-Engage D2.8: <u>https://documents.egi.eu/document/2668</u>





⁸ <u>www.eudat.eu</u>

⁹ <u>www.prace-ri.eu</u>

¹⁰ www.geant.org

¹¹ www.openaire.eu

2.6.4 With Technology Providers

In order to continuously maintain a professional service delivery and innovate, EGI needs to establish long-term relationships with technology providers that provide current technology or can bring future innovation. For this reason, EGI is pursuing the strategy of entering into project consortiums that are expected to deliver innovation beneficial for EGI. A recent list of projects in which EGI is linked to is provided in Table 2.

2.6.5 With Policy and Standards Bodies

International policy bodies and standards organisations contribute to define strategic and technical policies.

• e-IRG

International Grid Trust Federation (IGTF)

• EUGridPMA

• Open Grid Forum (OGF)

2.6.6 With Commercial Cloud Providers

The main relationships with the private sector come through the membership in the Helix Nebula Initiative (HNI) and the Big Data Value Association (BDVA).





3 Implementing the strategy

The following sections provide details on how the strategy has been implemented over the last year and the activities that supports EGI sustainability and business development to expand or evolve the infrastructure.

3.1 Strategic theme: engage research communities

This theme focuses on improving our understanding of researchers' needs, and translating these needs into sound projects or services that deliver effective solutions, is a critical part of our strategy.

3.1.1 Effective Outreach Network

Ensuring an effective outreach network builds on the Engagement Strategy and continues through to selecting the right people such as organising open calls to select the best candidates, preparing the right information and creating promotional material for EGI services available. With awareness that human resources are not infinite appropriate funding needs to be matched with activities.

Explore new research sectors

To prepare EGI for any future engagement with new communities that could lead to the creation of future business projects EGI has introduced market analysis activities. Initially, target markets will focus on agriculture and fishery and marine sciences through new partners established within EGI-Engage, which was the result of the open calls for competence centres, however was not yet mature enough to establish a formal group. Therefore, the objectives of this activity are to investigate the data analysis sector in Europe and worldwide and identify stakeholders and related interests, value chains and revenue streams, and competing players. The analysis will include an assessment of the market size and potential of the sector, main actors identification and description (customers, providers, competitors, others), market structure, opportunities and threats, identification of value chains, and recommendations of how to address the opportunities. In addition data policies and legal aspects will also be covered. EGI-Engage deliverables 2.6 "Report on data sharing policies and legal framework in fishery and marine sciences data sector"¹³ and 2.7 "Market Report on the Fishery and Marine Sciences Data Analysis Sector"¹⁴ provide all related detail that will help facilitate the connection of EGI with the stakeholders by providing a clear introduction to its domains and peculiarities. Additionally, the market analysis allows EGI to learn the data requirements and obstacles expressed by the stakeholders themselves.

From research to business

In 2014, a dedicated team was setup to establish a Business Engagement Programme [R1] for developing relationships with SMEs and bringing them into the EGI ecosystem to create mutual value. The result of the virtual team¹⁵ was the basis for future, broader actions by identifying SMEs

¹⁵ <u>https://wiki.egi.eu/wiki/VT_Business_Engagement</u>





¹³ <u>https://documents.egi.eu/document/2699</u>

¹⁴ https://documents.egi.eu/document/2700

potentially willing to collaborate with EGI in these activities and establishing active strategic partnerships. Several SMEs were members of the virtual team and were fundamental in shaping the Business Engagement Programme outlined in this document. EGI-Engage offers the opportunity to put into action the work carried out and focus on key objectives that comprise:

- 1. Facilitating the connection of EGI with SMEs at a European and National level.
- 2. Understanding the requirements from SMEs in all sectors but with special focus on the agriculture and food and the fishery and marine sciences sectors, which will provide use cases for the creation of enhanced services unifying computing and data approaches.
- 3. Creating a model (similar to a master franchise) for SME engagement that will be put in practice but can also later be adopted and adapted for a wider number of NGIs/Resource Centres.
- 4. Attracting SMEs to explore and detect opportunities and threats around the Open Data and co-develop business models for their exploitation.

Therefore, a formal EGI Business Engagement Programme has been put in place defining how private organisations, with a focus on SMEs, can engage with EGI for joint collaborations. The programme outlines the opportunities and benefits for organisations to work with EGI, and defines varying levels of collaboration. An implementation plan to develop all the needed mechanisms for the engagement to happen was documented in the EGI-Engage deliverable D2.2 "EGI-Engage D2.2 - Master Model for SME engagement"¹⁶, which is supported by a dedicated task in EGI-Engage (NA2.3) with the following objectives: understand the data and computation requirements of SMEs and define models for engagement, and increase the skills of the participating NGIs (and EGI in general) to approach SMEs and figure out possible ways of collaboration, also leading to the creation of future business projects. Currently, there are almost 50 companies in a dedicated contact database at various levels of discussion whether through EGI.eu or locally via the NGIs. As previously referenced, further details on specific collaborations and ongoing initiatives can be found in D2.8 "Communications, Dissemination and Engagement Report and Updated Strategy"¹⁷.

3.1.2 Co-create with research infrastructures through competence centres

To engage a broad range of research infrastructures within the ERA supporting them to better serve their research communities, activities focus on the larger RIs and establish dedicated competence centres for co-creating solutions and long-term relationships. This enables the promotion of software products developed by the EGI community to research infrastructures that want to develop services on top of in-house infrastructures and to offer products, services and expertise for federating and operating infrastructures. This also leads to organised pilots to evaluate requirements and subsequently add capabilities for research infrastructure that want to adopt infrastructure or platform as a service.

¹⁷ https://documents.egi.eu/document/2668





¹⁶ <u>https://documents.egi.eu/document/2548</u>

The Competency Centres comprise¹⁸:

- ELIXIR (Life Science)
- BBMRI (Biobanking and Biomolecular Resources)
- MoBrain (Translational Research from Molecule to Brain)
- DARIAH (Digital Arts, Humanities, and Social Sciences)
- LifeWATCH (Biodiversity and Ecosystems)
- EISCAT_3D (Next-Generation Radar for Atmospheric and Geospace Science)
- EPOS (European Plate Observing System)
- Disaster Mitigation

3.1.3 Research communities understand the value of EGI

In addition to being able to understand the needs of the research communities, EGI needs to be able to clearly articulate how the EGI offering can fulfil them. Over the last years, EGI has developed services and solutions portfolios to clarify what options are available, their benefits and success stories. Strengthening the processes around the management and evolution of the service and solution portfolios are a key priority. Once described, the outreach network is trained in the communication of these technical capabilities and the added value of EGI services.

Service and Solutions Board

The Services and Solutions Board (SSB)¹⁹ is a newly established board (Jul 2015) to oversee and manage the creation and maintenance of the EGI.eu and EGI community service and solution portfolios. This includes all services and solutions that are planned, active or to be retired. To support this goal, the SSB carries out activities such as:

- Advising EGI management on the priorities for evolving the services and solutions portfolio
- Conducting regularly scheduled management reviews of both services and solutions portfolios and related service management processes (see below)
- Supporting the activities of EGI ITSM processes upon request from the process managers
- Implementing the recommendations from the EGI Council and eventual SIB
- Interfacing through other boards (i.e. UCB, TCB, OMB)
- Steering the creation, review and approval of service/solution design packages including descriptions and specifications alongside any information to be added to the service portfolio
- Planning the design and transition of new or changed services considering timescales, responsibilities, new or changed technology and communication

From the IT service management perspective, the SSB mainly interfaces with the following processes: Service Portfolio Management (SPM); Service Level Management (SLM); Customer Relationship Management (CRM); Supplier Relationship Management (SUPPM).

The membership of the Group consists of the SSB Chair and Deputy, EGI Process Owners and Process Managers, EGI SMS Owner and Manager, appointed representative per board from the

¹⁹ https://wiki.egi.eu/wiki/SSB





¹⁸ <u>https://wiki.egi.eu/wiki/EGI-Engage:Competence_centres</u>

User Community Board (UCB), Technical Collaboration Board (TCB) and Operations Management Board (OMB), chair of virtual teams initiated by the Group. The Group is open to invitees as specific subject matter dictates (e.g. Service Owners), which is to be agreed by the Group prior to confirming participation. The SSB has held 18 meetings during PY1 and has been responsible for the revision of the EGI Service Portfolio.

Review of EGI service portfolio

The first edition of the EGI service portfolio was developed during 2013 to improve service orientation and clarify the unique offering that current and potential beneficiaries can request. This first version focused mainly on services internal to EGI as essential to enable the federation to work together and serve international research communities. This work was initiated in the context of improving the maturity in managing services by developing and implementing best practices for ensuring clarity of service offering and warranties and meeting the expectations of beneficiaries.

Following the improved maturity in designing and delivering services, EGI has recently updated the EGI service portfolio to cover both services that are internal to the EGI and services that EGI collectively delivers to the beneficiaries (researchers and SMEs/Industries). Following the creation of the SSB, the group worked extensively to implement the service portfolio management process (SPM) from FitSM to define the templates and to update the EGI service portfolio (Table 1). According to the established practice, each service is described in a Service Design and Transition Package (SDTP)²⁰ document composed of the following sections:

- 1. Value Proposition
- 2. Business case
- 3. Service design
- 4. Service transition plan

For new services, an SDTP is first created by filling only section 1 (value proposition) and section 2 (business case). After an initial round of discussions within the SSB and value agreed, the EGI Council is requested to review and approve the new service. Upon approval, section 3 (service design) and 4 (transition plan) is completed forming an internal project until successful deployment of the service. An SDTP has been created for all existing services so to align all services to the updated service portfolio. Overall impact has been:

- Improved service orientation
- Improved capabilities to promote EGI services and their value
- Improved management of services
- Clarified alignment with the EGI strategy
- Facilitated management interoperability in federated environments
- Provided a better understanding of all the components, dependencies and processes behind service delivery.

²⁰ <u>https://documents.egi.eu/public/ShowDocument?docid=2550</u>





Table 1 EGI service portfolio

Service	Purpose	Service name	Status
Category			
Compute	For individual researchers, or	Cloud Compute	Active
	national and international	Cloud Container Compute	Active
	research collaborations that	High-Throughput Compute	Active
	want to run their data- and		
	experiments		
Storage	Targeted at researchers and	Archive Storage	Activo
Storage	research communities that	File Storage	Active
	need to access digital resources	Object Storage	Testing
	on a flexible environment.	exject etc. «Be	resting
Data	Helps individual researchers,	File Transfer	Active
Management	and research communities that	Content Distribution	Planned
	have large-scale data	Federated Data Manager	Planned
	management and		
	computational capacity		
Software and	Primarily Research	Configuration Database	Active
Service	Infrastructures and Resource	Accounting	Active
Platform	Centres already within the EGI	Service Monitoring	Active
	community or wishing to	Helpdesk	Active
	become part of it.	Attribute Management	Active
		Identity Provider Proxy	Planned
	It can also help other IT service providers that are geographically and/or structurally dispersed, and wish to organize themselves for federated service provision.	Marketplace	Planned
		Training Infrastructure	Active
		Training Marketplace	Planned
		Validated Software and Repository	Active
		Operations Tools	Active
		Virtual Research Environments	Planned
		Collaboration and Community	Active
		Management Tools	
.		Configuration Database	Active
Coordination	Primarily for Research	Project Management and Planning	Active
and Support	Centres already within the EGI community or wishing to become part of it.	Support	Active
		Technical Coordination	Active
		Security Coordination	Active
		Community Coordination and	Active
		Development	
		Strategy and Policy Development	Active
		ITSM Coordination	Active
		Communications and Promotion	Active
Training and Certification	Targets any organization providing or supporting the delivery of IT services.	FitSM (IT Service Management)	Active





3.2 Strategic theme: design, build and deploy new services & solutions

It is important for EGI to develop professional project and virtual team management skills across the federation and stimulate innovation within and outside our community while providing certified and tested technologies. In order to optimise resources and ensure needs are met, these mechanisms allow research communities contribute to the technical development of new features. As a core principle, EGI promotes modular and open solutions based on standards.

3.2.1 Develop professional project and virtual team management skills across the federation

Establishing lightweight project management system

Many activities within EGI are organised as projects and involve people spanning organisations, cultures and geographical borders. In order to ensure efficiency, it is important to organise the processes and roles around project management to reach a minimum standard. EGI.eu has improved the maturity of the EGI-Engage project office by adopting best practices from the PMBOK[®] Guide²¹, continuing with a lightweight approach for running projects within the EGI community with a useful goal to achieve.

Improve teamwork over distributed and virtual human networks

Virtual interactions and culture diversity can affect the efficiency and effectiveness of teams. Given the high degree of distribution and cultural diversity within the EGI community, it is essential also to develop a common understanding on how to overcome them. Also in this area, the GEANT community has developed a training program and are in discussion to understand how to re-use it within the EGI community.

3.2.2 Stimulate innovation within and outside our community

Several examples were already mentioned on how EGI stimulates innovation within and outside the community, whether through the framework and establishment of the Competence Centres, through open bidding process of outsourced services or through the Business Engagement Programme. One new area that will be developed over the next year is the organisation of thematic open innovation campaigns in order to stimulate the implementation of the best ideas. Plans for the launch of the first open innovation campaign is scheduled for Sept 2016.

In general, EGI plans to map all the innovation management processes that are in place within the EGI community and review them according to reference best practices and technical specifications (e.g. CEN Innovation Management²² or Open Innovation 2.0 paradigm²³). In the medium-term, plans are to define an innovation management system where processes and roles are organised to more efficiently capture innovation opportunities emerging from people that interact with the EGI ecosystem.

²³ https://ec.europa.eu/digital-agenda/en/news/open-innovation-publications





²¹ http://www.pmi.org/PMBOK-Guide-and-Standards.aspx

²² http://shop.standards.ie/nsai/Details.aspx?ProductID=1794228#

3.2.3 Research communities contribute to the technical development of new features

EGI offers as part of its solution community-driven innovation and support solution for potential and existing users to:

- Facilitate access to EGI technical resources by informing them of the administrative and technical requirements.
- Enable data- and computation-intensive research, by providing consulting support to structure research datasets, enabling a user-friendly interface or application.
- Increase the efficiency and effectiveness of the research process.
- Innovate the research approach and methodology, by providing expertise about the digital research procedures from computation experts and like-minded researchers already aware of the new high performance computation research paradigm.
- The ultimate purpose is to create an environment where scientists, regardless of their discipline, can make the most of the EGI for their research without having to become experts in the infrastructure itself.

This is another activity that will evolve over the next year towards the formal organisation of pilots to evaluate innovative services on real use cases. Current results can be summarised as:

Special Interest Groups and Virtual Teams

Special Interest groups²⁴ are communities with a shared interest in advancing a specific area of knowledge, learning or technology where members cooperate to affect or to produce solutions within their particular field. Each group can have medium-term goals that are not immediately achievable.

- SAM Probes refactoring
- GPGPU
- CVMFS
- Advisory Boards (GGUS, Operations Tools, Operations Portal, Accounting Portal, e-GRANT, Operations Tools, AppDB)
- Procurement (under discussion)

Virtual Teams²⁵ are formed when the skills needed for EGI to successfully engage as a community with new users exist in many different organisations in the EGI ecosystem. It is foreseen that different members of EGI want to participate in different types of targeted activities that directly or indirectly relate to engagement with new users. The individuals needed to carry out such a targeted activity can be brought together by a Virtual Team in EGI. Virtual Teams provide a flexible and dynamic means to rapidly bring together certain members of the community for a well-defined series of tasks to meet a specific goal that needs to be achieved in a relatively short period of time (up to 18 months) before being disbanded. The focus of these Virtual Teams will be to either directly increase the number of EGI users (e.g. through integrating a new application) or indirectly (e.g. by raising the profile of EGI through a hosted event; Performing a study/analysis of

²⁵ https://wiki.egi.eu/wiki/EGI_Virtual_teams





²⁴ <u>https://wiki.egi.eu/wiki/EGI_Special_Interest_groups</u>

a specific area). Virtual Teams have members from multiple NGIs and carry out a targeted action within the following activity domains:

- Marketing & Communication
- Strategic Planning and Policy Support
- Community outreach and events for new users
- Technical outreach and support to new communities (incl. studies, specifications, developments)

Virtual Teams can be established and used to enable the development of a strategy for the longterm evolution of EGI, or to significantly increase both the diversity and quantity of users and communities exploiting the infrastructure for world-class research. The application of the framework is limited only by the scope and imagination of the NGIs to commit resources to any particular goal.

- Integrating life science reference datasets in EGI
- Scalable Access to Federated Data
- Promoting Desktop Grids
- Business Engagement Programme for SMEs
- Support for genome analysis and protein folding
- Collaboration between EGI/NGIs and the ELIXIR ESFRI project
- Technology study for CTA (Cherenkov Telescope Array)
- Scientific Discipline Classification

- SPEEch on the griD (SPEED)
- Inter NGI Usage Report
- Science gateway primer
- Scientific Publications Repository
- Fire and Smoke Simulation
- EGI Champions
- DCH-EGI Integration
- MPI within EGI Technology
- Assessing the adoption of Federated Identity Providers within the EGI Community
- Intelligence Collection & Analysis
 Process

Distributed Competence Centres

For the last 5 years, EGI was focused on setting up all organisational aspects of what has now become a sustainable infrastructure while simultaneously putting into place all of the processes and procedures for delivering services to its customers (mainly large research communities). However, one fundamental difference to the predecessor projects (EGEE), which had early adopter communities part of the project, this was not the case within EGI-InSPIRE²⁶.

So one of the business operation changes within EGI-Engage, was the return of bringing current and potential customers closer to EGI in order to offer services that can be more easily adopted through the form of Competence Centres.

A dedicated work package in EGI-Engage coordinates the provisioning of services for scientific communities and supports the co-design, co-development and dissemination of new community-specific e-Infrastructure services. These services support novice and semi-experienced user communities as well as members of the long tail of sciences to become active and self-sufficient users of e-Infrastructure solutions. In addition, some of the services support mature e-

²⁶ <u>https://www.egi.eu/about/egi-inspire/</u>





Infrastructure communities in taking their production experiments on distributed computing and data infrastructures to the next level. The work package includes dedicated tasks for eight Competence Centres (CCs) to support high-impact Research Infrastructures/communities by joint development of customised services for these based on core EGI capabilities, by user engagement and training. Two of the CCs (BBMRI and EISCAT_3D) are supported by both EGI and EUDAT within the Horizon2020 programme. The work package also contributes to fostering open science, and nurturing smaller or less structured research groups by providing training and direct technical support to them. Specific objectives are:

- Identify and support communities and users from EGI and its partners
- Facilitate the integration of scientific applications with EGI's e-Infrastructure services
- Co-design and co-develop services for sustainable, structured scientific communities
- Promote and support the uptake of new services within scientific communities
- Provide a training framework, foundational training services and domain specific training events for scientific communities, EGI members and partners

3.3 Strategic theme: support, serve and improve live services & solutions

Much focus has been on identifying opportunities, expanding the infrastructure and business development, however, an important aspect of sustainability is ensuring that the services offered are consistently maintained, supported and improved upon. This has been covered through a couple different ways, whether the SSB advisory board Solutions and Service Board to streamline and guide evolution of the services and solutions portfolio, through the establishment of formal SLAs with communities, or in how the services are managed via the FitSM service management standard implementation. Each of these aspects is covered in the following sections.

3.3.1 Continuously improve service management across the federation

SLA-based allocation of services

One of the greatest challenges faced by EGI is to offer an easier way for researchers to discover the services they need and agree on terms of use. Currently, EGI is working with seven pilot communities to make this process easier and integrate the procedure within the IT Service Management framework based on the FitSM standard.

An important first step is to create a reliable, trust-based communication channel between the researchers and the providers to agree on the services, their levels and the types of support. The outcome of this process is a Service Level Agreement (SLA) document. SLAs are not legal contracts but, as agreements, they outline the clear intentions to collaborate and support research. The SLA provides many benefits such as better communication and clarity on expectations, increased confidence that services will be delivered, and easier future planning of research activities.





For the resource providers, this allows for direct communication with user communities and clarity on expectations, clear responsibilities and rules/policies concerning usage of the resources, recognition and greater visibility to role of the provider by requiring an explicit acknowledgment.

While for EGI, they help promote the EGI service value with funding agencies and policy makers at national and European level, increases EGI being seen as mature partner, and ensure a foundation of a control process to what is being delivered in the EGI Federation.

In practice, the EGI Foundation User Community Support team (UCST) is proactively looking for providers that can fulfil needs of research communities and help in the negotiation of the appropriate terms of use. Once an SLA is agreed, the UCST helps in coordinating the effort between the resource providers to enable the research community on the promised resources.

For example, Research Community X is looking for cloud compute, HTC compute and File Storage services and contacts the USCT team at the EGI Foundation. The UCST collects the requirements regarding capacity and availability and contacts the NGIs that have expressed interest to support Community X's field of research.

Following a call for resources, the UCST team collected expressions of interest from the NGI from Country Z (two resource centres) and the NGI from Country Y (three resource centres). An SLA is then written to cover the delivery of the services provided by NGI Y and NGI Z to Community X, for a given period with possible extension. The Operations team at the EGI Foundation will monitor the resource providers' performance to see if they fulfil the promised availability of resources. In return, each resource centres will be mentioned in acknowledgments added to all papers published about the research performed on the resources in the SLA.

The following figure shows the SLA/OLA framework. EGI centrally agrees the SLA with the research communities, liaising with the NGIs/EIROs and the resources centres. The outputs of this internal negotiation are the VO-specific OLAs who are extending the RC OLA and RP OLA, these documents support the VO SLA, ensuring that the targets of this last agreement are fulfilled by the service providers.







Figure 3 – EGI OLA and SLA scheme

EGI is working with a number of communities (DRIHM, BILS²⁷, Terradue, MoBrain, Pan-Cancer, Life Science Grid Community, iMarine, EXTRAS project, Human Brain Project and Nanotechnology) to establish a Service Level Agreement (SLA) with resource providers. SLAs are not legal contracts but, as agreements, they outline the clear intentions to collaborate and support research. To support this work a process of SLA negotiation has been defined and followed to ensure effectiveness and repetitiveness of this activity.

Service Management

One of the biggest achievements from the EGI-InSPIRE project was the positioning of EGI as a "service provider", which was a culture shift across the academia and research community that operating a sustainable infrastructure was turning organisations into service providers, thus requiring certain organisational changes. On top of that, the highly distributed nature of many different providers coming together required EGI to put in place standard processes, procedures and agreements for managing the infrastructure efficiently and effectively. Formal IT Service Management was viewed as a potential means for increasing professional service delivery to support long-term sustainability.

EGI.eu had a unique opportunity to participate in the EC funded project called FedSM, which was aimed at helping e-Infrastructures adopt service management best practices. The lightweight approach of this new ITSM standard called FitSM is spreading throughout the community into the national based infrastructures and into the research communities working with EGI.

The biggest impact was with the re-formulation of the EGI service portfolio and publication of the service catalogue. This was a result of getting a better understanding of how services are defined. What this led to was a separation between what EGI.eu offers the participant organisations, and what EGI offers collectively as a federation to the individual researchers and research

²⁷ EGI BILS VO SLA and OLAs <u>https://documents.egi.eu/public/ShowDocument?docid=2701</u>





communities. A solutions portfolio was then created offering a powerful marketing tool for EGI to communicate the value being delivered.

From there, an entire agreement framework comprising clear and complementary SLAs and OLAs EGI was able to put in place. This process was made much smoother thanks to the FitSM templates made available.

The training and certification scheme is really helping to support this. So far, all non-admin staff at EGI.eu has received at the foundation training, half with the advanced, and another handful received the expert level in July 2015. In addition, more than 120 members across the EGI community have received training as well.

EGI.eu has now added FitSM to its service catalogue to continue to support training and certification courses for the community and serve as a consultant for increasing FitSM adoption not just within our participant's organisations, but with research communities in which it is working. This is the first commercially offered service by EGI (see section 5.1.2).

The goal by the end of 2016 will be to obtain a certification for EGI.eu in ISO20000 (service management) and ISO9001 (quality management).

FitSM Training and Certification

As mentioned, the result of the FedSM project was a lightweight service management standard called FitSM. The sustainability and exploitation plan put in place was through a non-profit organization established in Munich, Germany called ITEMO (IT Education Management Organisation)²⁸ to which the project transferred the FitSM licence to maintain the standard. Within ITEMO, a dedicated Working Group was established comprising several FedSM consortium members, including EGI, with the addition of a few service management experts to ensure the long-term sustainability of the standard. The training and certification scheme is backed by certification authority TÜV SÜD²⁹, where EGI.eu is a registered training organisation.

As EGI.eu is a non-profit organisation with no VAT number, offering commercial services raised issues. EGI.eu therefore requested and successfully completed an audit by a Dutch central registrar (CrKBO³⁰) to be VAT exempt through a programme offered to organisation providing "vocational training".

Once all formal channels where established, EGI added FitSM to its service catalogue that defines the importance of IT service management, an overview of FitSM and a full pricing scheme for 2 types of training courses that includes a discount for EGI.eu participants (NGIs/EIROs): 1.) open registration courses for individual participants to attend a fixed date and location; and 2.) in-house training for organisations to request. The training scheme offers a range of course levels from Foundation, two Advanced (Service Planning and Delivery; Service Operation and Control) to Expert.

³⁰ https://www.crkbo.nl/Register/Instellingen





²⁸ www.itemo.org

²⁹ www.tuev-sued.de/home_en

To date, EGI has already run 2 paid training courses, 1 of each type. The first was an in-house Foundation request by EGI business associate Terradue with 7 participants (Nov'15) and the other was an open registration held in Amsterdam (Dec'15) with 14 participants, 5 of which were new EGI.eu staff. Both courses were delivered by 2 EGI.eu trainers recognised by TUV SUD. The training schedule for 2016 is available online³¹.

3.3.2 Develop a services and solutions portfolio in collaboration with the user communities

EGI services cannot be developed top-down. Customer input is essential if EGI wants to continue to deliver value added services for the long-term. Therefore, mechanisms need to be put in place to ensure the user communities have a communication channel to not only provide requirements, but user satisfaction as well. Procedures for regular review of customer satisfaction are included in an established process within FitSM Customer Relationship Management (CRM). In addition, SLAs also include service reviews with the customer, which is part of Service Level Management.

For each community, there are agreed indicators that relate to their relationship with EGI and have established mechanisms for monitoring and reporting in the coming months. By the end of 2016, an annual review of customer satisfaction will be carried out.

3.4 Strategic theme: influence policy

3.4.1 EGI as a trusted source of policy input for the EC

European Open Science Cloud

In support of the new policy initiative of the European Open Science Cloud launched with the Communications "A Digital Single Market Strategy for Europe"³² on May 2015, EGI has collaborated with other leading e-Infrastructures to develop a common position paper³³ and organised three high-level workshops co-located with: EGI conference in Bari (November 2015), EUDAT User Forum in Rome (February 2016), EGI conference in Amsterdam (April 2016). EGI.eu also contributed to the work of the High Level Expert Group on the Open Science Cloud with a dedicated position paper and participation to the stakeholder meeting.

3.4.2 Raising the awareness of the value of EGI services

Impact assessment of EGI

EGI has started to develop a new impact assessment report that captures the impact of EGI across different dimensions. This report will also contain qualitative and quantitative KPIs and it will be updated annually.

³³ http://www.egi.eu/news-and-media/newsfeed/news 2015 034.html





³¹ https://www.egi.eu/services/catalogue/fitsm/fitsm-training-calendar.html

³² http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015DC0192

Concerning the scientific dimension, following a plan started in 2012³⁴, EGI has continued the implementation of the necessary tools and processes to ensure a better collection of scientific publications possible thanks to EGI: 1) the new Acceptable Use Policy was approved with the new article empowering resource providers to request an acknowledgement of support; 2) the VO ID Card has been extended to enable all VOs to publish what is the acknowledgement statement they recommend to their users; 3) the OpenAIRE feature enabling to tag publications by community is now in production and is adopted by EGI³⁵; 4) communication to raise awareness of the importance of citing and reporting is being organised in a more consistent way.

3.4.3 Promoting the Open Science Commons

During the first half of the project, EGI has heavily promoted the Open Science Commons with a dedicated workshop at the EGI conference in Lisbon and with presentations in high-level policy groups including e-IRG and the Digital ERA forum. This work brought the desired results as the Open Science Commons vision was mentioned in the conclusions of the Council on the "Data-intensive and networked research - Open science³⁶. The work also continued with the organisation of a data commons related workshop in the context of the RDA plenary³⁷ in Paris (September 2015) and with the presentation of a policy paper³⁸.

3.5 Strategic theme: achieve a sustainable future

3.5.1 Collaboratively develop the EGI strategy

Monitoring and updating the strategy

The EGI strategy for 2020 has been adopted in May 2015 after several months of development through a collaborative process that involved the EGI.eu staff, the EGI.eu senior management and the EGI participants at large. The implementation will be reviewed on a yearly basis while the strategy will be reviewed every two years.

Strategy and Innovation Board

The Strategy and Innovation Board (SIB) is a new external advisory board that will provide advice and guidance to the EGI council and to EGI.eu leadership regarding strategies for developing relationships and service provision to user communities, other e-Infrastructures, industry, technology and innovation and e-Infrastructure organisation and management. The board will be composed by 9 members that serve as high-level representatives from public research (3), computing/data (2), large industry (1), SMEs (1) and policy makers/advisors (2).

³⁸ http://www.egi.eu/blog/2015/08/20/summer_reflections_on_the_open_science_cloud.html





³⁴ https://documents.egi.eu/document/1369

³⁵ https://www.openaire.eu/egi-stats

³⁶ http://www.consilium.europa.eu/en/meetings/compet/2015/05/28-29/

³⁷ http://www.egi.eu/news-and-media/newsfeed/news_2015_029.html

The SIB will have ownership of strategy and innovation recommendations that will be recorded in a living document maintained and updated by regular virtual meetings. The recommendations document will be reviewed as a standing item at EGI Council Meetings, and on a regular basis by the Executive Board, to provide timely feedback to the SIB, and to incorporate SIB considerations in the future direction and strategy of EGI.

3.5.2 Attract funding for innovation

EC Projects

EGI is a key player in the European e-Infrastructure landscape, contributing directly to a number of EC-funded projects and initiatives. Part of EGI's sustainability is due to the longstanding partnership with the European Commission that supports development and innovation across EGI. EGI.eu manages this relationship and offers coordination on behalf of the European e-Infrastructure community. EGI.eu can participate in European projects as coordinating institution, or as a partner. An added advantage to EGI participants is the ability to join projects as Linked Third Parties through EGI.eu, which gives the image of a united infrastructure as a single beneficiary in a consortium. The following table summarises a non-exhaustive list of several key projects either running or recently completed that support innovation and business development opportunities for EGI augment its maintenance and operation business model.





Table 2 Innovation projects with direct EGI involvement

Project Acronym	Objective	Status	Role of EGI
The Helix Nebula Science Cloud	European Pre-Commercial Procurement (PCP) and competitive marketplace of cloud services serving scientific users.	Running (Jan 2016)	Leading interface with public e- Infrastructures and SDOs
INDIGO- DataCloud	Develop an open source data and computing platform targeted at scientific communities, deployable on multiple hardware and provisioned over hybrid, private or public e-Infrastructures.	Running (May 2015)	Technology development to evolve EGI FedCloud; coordinate exploitation activities targeting service providers
AARC	Federated AAI	Running (May 2015)	Better integration with other e- Infrastructures.
EDISON	Building the Data Science Profession	Running (Aug 2015)	Business Model dev.; Creation of professional training and certification scheme.
BioMedBridges	Develop an e- Infrastructure to allow interoperability between data and services in the biological, medical, translational and clinical domains to strengthen biomedical resources in Europe.	Completed (Dec 2015)	Provide advice on how BioMedBridges can interact with other e-Infrastructures, and on how current developments relevant to the BMS infrastructures can be adopted to catalyse the project's progresses.
Civic Epistemologies	Roadmap for Citizen Science in Digital Culture Heritage.	Completed (Nov 2015)	Business Model dev.; Access to potential new community.
CloudWATCH	Cloud standards	Completed (Sept 2015)	Support the adoption of cloud standards; EGI FedCloud standards testing.
FedSM	IT Service Management	Completed (Sept 2015)	Client partner to implement ITSM; Now EGI.eu is a training organisation.
BioVeL	A virtual e-laboratory that supports biodiversity research using large amounts of data from cross-disciplinary sources.	Completed (Aug 2015)	Contribute to the sustainability plans and provide technical support and consultancy from porting their existing applications exposed through a web service on a single host, to running their applications on the e-Infrastructure.





There are several areas that EGI are currently investing in for the upcoming Horizon 2020 Work Programme, specifically the calls with the March/April 2016 deadlines. There are a number of opportunities that have resulted in the relationships that have been established/developed over the last years with both research communities and industry outreach. Below is a non-exhaustive list of these innovations areas:

- EINFRA-22 User-driven e-infrastructure innovation focusing on research areas such as NeuroLink, Geo-hazards, and Satellite Data; as well as 'open calls with SMEs' alongside other e-Infrastructures and innovation clusters.
- EINFRA-22 User-driven innovation AAI (AARC2)
- ICT-06 Cloud Computing that focusing on supporting SMEs with application porting and benchmarking testing
- INFRASUPP-03-2016 Support to policies and international cooperation for e-infrastructures specifically e-Infrastructure Roadmapping.
- SC1-PM-18–2016 Big Data supporting Public Health policies for patient-generated interoperable data systems (PGIDS) for supporting Big Data in eHealth

3.5.3 Develop complementary business models

Pay-for-Use

EGI operates within a publicly funded research and academic environment providing services free at point of delivery with resources bought from grants dedicated to certain groups or disciplines either by direct allocation or by peer review. With the advent of cloud computing, business models and user expectations are shifting towards on-demand and pay-for-use service provision increasing flexibility and agility. This new paradigm provides motivation for EGI to explore new service definitions by enabling the possibility to provide ICT services that can be paid for the use, along with the more traditional procurement of resources to be managed and offered for free to the owners.

The last year focused on moving the proof of concept that based on a policy paper from prototype to production. The strategy has not been about replicating commercial offerings, but on providing additional mechanisms for researchers with funds to access resources, increase sustainability (e.g. cost recovery, new sources of revenue) and create new opportunities to support research and innovation (academia/ industry partnerships). Therefore the focus is solely on research and innovation activities; pre-commercial applications, offering dedicated high-level consultancy and support (e.g. application porting) while at competitive pricing (not undermining market)

EGI.eu is leading the activity and is comprised of several EGI Resource Centres, NGIs, and a commercial company.

So far, sites publishing pricing information consist of:

- 30 Providers across 12 Countries
- 20 Grid: Belarus; Bulgaria; Germany; Greece; Italy; Latvia; Poland; Spain; Switzerland; Turkey





- 10 Cloud: Finland, Greece; Italy; Poland; Slovakia; Spain; Turkey; UK
- 15 Storage sites: Bulgaria; Greece; Italy; Spain
- ~10 able/willing to provide service on a payment basis
- ~the same number with having had or plan on participating to public tenders

Price Ranges (incl. support):

- Grid (HEPSPEC/hr.): €0.01 €0.15 (Avg. €0.05; Median €0.05)
- Cloud (wallclock/hr.): €0.03 €0.11 (Avg. €0.05; Median €0.05)
- Storage (€/GB/month): €0.01 €0.14 (Avg. €0.04; Median €0.04)
- +/- VAT 8%-24% (where applicable)

The current result is a beta production version of the e-GRANT pay-for-use instance that is planned to go into production in April 2016^{39} .

Activities have also led to several business cases being explored with Helix Nebula, European Space Agency, Engineering, Terradue, UberCloud and CloudSME in addition to two external requests for resources to be offered on a paid basis.

Future activities will look at introducing billing mechanisms and more automated contracts and SLAs. As demand grows, EGI.eu will monitor opportunities for establishing a formal broker role (see Sections 4.2 – Risks).

Potential Legal Entities

Add to new legal entity options to be covered in D2.5 "EGI Governance: Analysis and Recommendations"⁴⁰. a.) non-profit innovation/R&D organisation for small non-NGI groups to collaborate on new services, technologies, innovation that could collectively have a seat within the EGI Council b.) Commercial arm of EGI for selling services and entering formal business relationships.

3.5.4 Increase internal competences in collective bidding

Cross-Border Procurement

With e-Infrastructures evolving towards service-oriented provision with on-demand allocation and pay-for-use capabilities, there is an opportunity for analysing and revising the procurement process for e-Infrastructure services. Currently publicly funded resource providers and their users lack the knowledge and mechanisms to collectively bid within a public procurement process. The goal of this activity is to analyse opportunities and barriers for cross-border procurement of e-Infrastructure services and to identify best practices that could enable RIs or large research collaborations to acquire services to support their research agenda collectively. A number of RIs and infrastructure providers will contribute to the analysis and documentation of use cases. A final report will be produced identifying opportunities, barriers, use cases and best practices. The report will be disseminated to relevant authorities at national and international level, including

⁴⁰ https://documents.egi.eu/document/2655





³⁹ <u>https://e-grant.egi.eu/v2/</u>

those involved in structural funding, and feedback will be collected. The activity will be led by CERN with the contribution of INGV (representing EPOS), CSIC (representing LifeWATCH), BBMRI-ERIC, RBI (representing DARIAH) and EGI.eu (representing EGI and liaising with the NGIs).

Why procurement?

e-Infrastructures evolving towards service-oriented provision with on-demand allocation and payfor-use capabilities while funding mechanisms may change giving power to researchers/research groups to purchase IT services (e.g. compute, storage). There are opportunities to foster the reuse of services, capacity building, the creation of partnerships and allow the various initiatives to build on each other's strengths. In addition, procurement could enable research infrastructures or large research collaborations to acquire the needed services to support their research agenda from public-funded resource providers collectively and couple procurement with pay-for-use capabilities.

Future opportunities

The HNSciCloud Pre-Commercial Procurement (PCP) project⁴¹ started in January 2016 and has defined a set of use-cases supporting the needs of user groups from multiple disciplines including physics, astronomy, life sciences and the long tail of science. An open market consultation will be held at CERN on 17 March 2016⁴².

EGI Procurement Special Interest Group could provide a support mechanism to improve procurement opportunities.

3.5.5 Enable service providers and consumers to easily find the best match

Access Platform for Individual Researchers

Enable the EGI Federation to serve LToS users locally through a common platform and engagement framework

- Develop a platform for easy authentication and management of users from the LToS (e.g. • federated authentication)
- Define a general engagement and support framework that EGI members can adopt locally
- Support EGI Federation members to develop capacity to serve LToS users

EGI now offers an easy-to-use platform for researchers to access compute, storage and application services. This platform allows individual researchers and small research teams to perform compute and data-intensive simulations on large, distributed networks of computers.

This portal, called Access⁴³, is the entry point of the EGI platform that offers grid, cloud and application services from across the EGI community for individual researchers and small research teams. The platform offers the following type of resources:

High-throughput computing sites for running compute/data-intensive jobs

https://access.egi.eu





 ⁴¹ <u>http://www.helix-nebula.eu/about-hnscicloud</u>
 ⁴² <u>http://www.helix-nebula.eu/events/hnscicloud-pre-commercial-procurement-open-market-consultation-omc</u>

- Cloud sites suited for both compute/data intensive jobs and hosting of scientific services
- Storage resources for storing job input and output data, and for setting up data catalogues
- Science gateways that provide graphical web environments for building and executing applications in the platform.
- Applications that are made available 'as services' through the science gateways.

The platform is open for any researcher who needs a simple and user-friendly access to compute, storage and applications services in order to carry out data/compute intensive science and innovation. You need to be affiliated with, or at least have a partner (for example a referee), at a European research institution to qualify for access. The platform is designed to meet the needs of individual researchers and small research groups who have limited or no experience with distributed and cloud computing.

- 1. Login to the Portal with an EGI SSO, Google or Facebook account.
- 2. Provide information on your profile page about your affiliation to a research institute or team
- 3. Request resources from the platform: Indicate what you would like to achieve with the resources so EGI can help you find the most suitable ones.
- 4. After your request is approved, login to any of the science gateways and build or execute compute/data intensive applications.

Access is the critical and innovative component of a LTOS platform composed by many other components and services. Access.egi.eu portal allows users to register and be authorized to access all the other services part of the LTOS platform, and allows EGI to track their activities in order to provide the users to the best service possible.

EGI Marketplace

The EGI Marketplace is a new concept added into the EGI-Engage project has a means to improve the way current and potential users discovery EGI services. The initial concept was outlined in D2.3 "Concept of EGI Marketplace"⁴⁴ with the technical design described in D3.2 "Design of the EGI Service Registry and Marketplace⁴⁵.

The EGI Marketplace offers an excellent opportunity to improve EGI sustainability and business development. Mainly through making it easier for new users to discovery services increasing usage and opening up the Marketplace to wider community contributions e.g. research community specific services, local services, etc. where a number of business models could be introduced once critical mass is achieved.

This activity also involves the analysis and development of a legal, policy and business framework for a marketplace capability that would allow the request, provision, accounting, billing of e-Infrastructure services. The activity is developing scenarios for allocating capacity to research communities in collaborations with pilot user communities (user-driven scenario development), identify incentive mechanisms for resource centres to provide capacity, analyse revenue streams

⁴⁵ <u>https://documents.egi.eu/document/2658</u>





⁴⁴ <u>https://documents.egi.eu/document/2535</u>

(e.g., PCP, PPI, direct charging to users, free service at point of delivery), and analyse integration with other marketplaces (e.g., Helix Nebula). Outputs of the pay-for-use activity and the procurement study will be fed into this work.

Governance

The governance model of EGI.eu was structured to deal with the complexity of EGI and the aim of including the voice and will of all the members, yet be flexible enough.

A Governance Task Force was formed in March 2014 to address the governance problems and propose a new structure. Over the last year, it has been investigating the degree of satisfaction with the governance model through a series of informal interviews. The main objectives were to:

- Present and reinforce the value of EGI and EGI.eu to their members; identify different types of stakeholders;
- Define a membership system and fee scheme; explore different options of legal structures e.g. public, private, and full commercial; revise the legal entity of EGI.eu and the VAT position.

The aim was to revisit the current mission statement looking forward to H2020 and comply with the ERIC model, taking into account all the changes that current members have gone through over the last years. The multi-annual financial framework, the fee scheme and the value proposition should be clear, egalitarian and attractive for NGIs to sign up for continuation.

After some iteration, it was understood that minor changes were needed to address the current concerns in the short term. The proposed changes should enable EGI to continue forward for the next one/two years as they would clean a number of exceptions in the fee payments that have become recurring, thus removing the sense of urgency and pressure for changes in the short term. The Council addressed also the re-framing of a long-term vision for the role of EGI in the e-Infrastructure e-Commons and the related suitable governance (e.g. ERIC).

Full details will be covered within D2.5 "EGI Governance: Analysis and Recommendations"⁴⁶.

⁴⁶ <u>https://documents.egi.eu/document/2655</u>





4 Impact and risk assessment

4.1 Impact assessment plans

Indicators are instrumental to support the communication of the EGI value and impact to key stakeholders through the various communication channels. The goal of this activity is to define a number of qualitative and quantitative indicators to assess the impact of EGI. During the coming year they will be organised in a lightweight compendium with EGI.eu leading efforts with represented NGIs to collaborate on the definition of the indicators, which will require information from all NGIs part of EGI and from the researchers. This will come in the form of:

- **Outputs:** measure the direct results of the projects in the different dimensions and serve as an important basis for measuring the outcomes.
- **Outcomes:** are understood as the direct benefits from the program, resulting from the outputs of the projects achieved in relation to the goals and objectives set out in the program.
- **Impacts:** describe the wider effects on society and economy of a program and could be interpreted as results of the outcomes. In general, each impact relies on more than one outcome and might also be influenced by other factors.

In order to determine the impacts of e-Infrastructures, it is necessary to identify the relevant social and economic impacts. For this purpose, the list of factors used by the Commission in its Impact Assessment Guidelines (EC SEC 2009/92) will be reviewed in detail. From this list all relevant criteria can be identified and derived, capturing them as well as some others in the criteria suggested below for assessing e-Infrastructures⁴⁷. Initial impact areas along different dimensions to be considered are:

- 1. Research excellence and innovation
- 2. Human capital
- 3. Economy
- 4. Public authorities
- 5. Third countries and international relations

From the Impact of Research Infrastructures Final Report⁴⁸, e-Infrastructures are defined as networked tools, data, instruments and resources that support virtual and heterogeneous communities of researchers and their cooperating partners, covering the entire R&D value chain. Characteristics of e-infrastructures that can support impact assessments include Accessibility,

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⁴⁷ <u>http://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/iag_2009_en.pdf</u>

http://ec.europa.eu/smart-regulation/guidelines/ug_chap3_en.htm

http://ec.europa.eu/smart-regulation/impact/index_en.htm

Efficiency, Innovativeness, Sustainability (availability of scientific data, knowledge and capacities) and Transformative character: push the boundaries of how science is made. Other impact areas to assess EGI's contribution include Innovation, Collaboration and Skills (human capital).

4.2 Risk assessment

Risk management processes include conducting risk management planning, identification, analysis, response planning and control. The objective is to detect threats and decrease their likelihood and impact by proper treatment as well as to collect lessons learned from risks occurrence to facilitate continuous learning of project management team. A dedicated report (D1.2) outlining the risk management process and update on risks foreseen and unforeseen [R4]. However, this is only currently covering the EGI-Engage project and not EGI as a whole. Risk management is specifically covered by ISO9001 and ongoing efforts towards achieving certification will expand risk assessment activities beyond the project.

Regarding EGI.eu, an important risk to note that needs to be managed carefully moving forward is around VAT and the very complex fiscal exposure that EGI.eu, as the coordinating body of a publicly funded pan-European e-Infrastructure, is facing when providing services, partly operated or delivered by its Participants. A lot of work has been done and consultation with the Dutch Tax Authorities is on-going, with an answer about EGI.eu situation expected by the end of March 2016. This has a great dependency on EGI.eu moving into a full broker role (e.g. pay-for-use) and around discussions at the governance level regarding legal entities.

However, from the Risk registry⁴⁹, some risks regarding sustainability and business development can be extracted.

Risk	Risk Level	Consequences	Mitigation
The EGI production infrastructure and service offered to EGI- Engage does not meet the needs of the research communities	High	The user communities move to some other infrastructure provider or will set up own infrastructure without the use of EGI services	Through the CCs, EGI will collect requirements from the users that are part of the project and committed and fed into the innovation processes to expand the capabilities of EGI. EGI will also liaise with external technology providers to ensure that the evolution of the technology will follow the needs of the new user communities and service providers, and that it can be successfully exploited. Engage partners and EGI Council must ensure sufficient level of resources are available for the CCs. SLAs should be in place to clarify expectations and measure fulfilment.

Table 3 Main risks

⁴⁹ https://wiki.egi.eu/wiki/EGI-Engage:Risk_Plan





Risk	Risk Level	Consequences	Mitigation
Research infrastructures are not able to efficiently purchase capacity from the EGI providers	Medium	EGI is not able to capitalise on the investment made on developing the research communities; research infrastructure cannot benefit from pan- European e- infrastructure	EGI-Engage will evolve the business models (WP2) and technology (WP5) to support cross- border procurement and enable research infrastructures to acquire capacity from EGI affiliated service providers. If this fails then EGI needs to be repositioned from a capacity provider to other type of provider - e.g. technology and user support provider.
A security incident could spread within the production infrastructure	Medium	A security incident could lead to service attacks on high profile websites that could bring bad press to European DCIs	The infrastructure as a whole, each NGI, and each resource provider must provide a security officer and backup. They will liaise the EGI Security Officer to act on security issues for promptly implement any mandated changes. This protocol will be tested with regular security challenges. The Software Vulnerability Group will proactively assess the impact of reported issues on the infrastructure, and the Software Security Group will work to improve the quality and coherence of security related grid specific code. A new risk assessment will be run during Engage, including also the new technologies.
Communities develop and adopt different services that have similar functionality	Low	In the worst case scenario the production infrastructure has to deploy different services with the same functionality, thereby multiplying the cost of supporting different user communities	The coordination of SA2 will record duplication of functionalities, trying to minimize at least for common functionalities, the implementations adopted. Even if multiple services exist with the same functionality, the maintenance and operation of community services is outside of EGI-Engage therefore have little impact on the project.





5 Conclusions and future work

This document demonstrates the strategic planning and evaluation activities of EGI. It also outlined a variety of business development activities that not only is sustaining EGI, but also continuing to ensure growth of EGI that ultimately provides federated access to compute, storage, data, knowledge and expertise complementing community-specific capabilities to the more than 46,000 researchers who rely on the services to conduct their everyday research.

EGI has also shown its service innovation and expanded capabilities offered to researchers (e.g. improved cloud or data services) and the spectrum of its user base by engaging with large Research Infrastructures (RIs), the long tail of science and industry/SMEs.

The multi-facet approach started from a well-defined strategy, includes diversified business models and high-quality services professionally delivered and managed through formal service management.

Future work will need to focus on monitoring the implementation of the EGI 2020 Strategy and updating as required. One area will be to continue governance structure discussions to ensure participants are receiving the value they expect while increasing flexibility for additional partners.

The Competence Centres will play a crucial role in transitioning requirements to service delivery, while achieving ISO9001 and ISO20000 certificates to help to better manage services and increase confidence to both new and current customers.

New business opportunities are also coming online such as the business engagement activities (Terradue, UberCloud, CloudSME), the move pay-for-use into production and implement new features, the launch of the EGI Marketplace, and the formal kick off cross-border procurement activities and the submission of several innovation projects for EC funding. Initial dates for 2016 paid FitSM Training and Certification course are online with more to be added over the year. The Market Analysis for serving new sectors (fishery and marine) will also need to be further studied to extract concrete actions in order for EGI to serve these new communities.

EGI.eu recently turned six years old, and matures with each passing year. This document highlights how EGI has achieved this while outlining how it will continue to ensure the services offered will evolve and expand over the coming years.



