**EGI-InSPIRE**

Periodic Report – PY5

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| **Document identifier:** | **EGI-InSPIRE-Periodic Report** |
| **Date:** | 26/01/2015 |
| **Activity:** | **NA1** |
| **Lead Partner:** | **EGI.eu** |
| **Document Status:** | **FINAL** |
| **Dissemination Level:** | **PUBLIC** |
| **Document Link:** | **https://documents.egi.eu/document/2406** |

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| Abstract  This is the periodic report for the 5th year of the EGI-InSPIRE project. It summarises the work completed during the year and the resources expanded in undertaking this work. |

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1. Delivery Slip

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|  | **Name** | **Partner/Activity** | **Date** |
| **From** | Tiziana Ferrari | EGI.eu/NA1 | 23 Jan 2015 |
| **Reviewed by** | **Reviewers:** | AMB & PMB | 26 Jan 2015 |
| **Approved by** | **AMB & PMB** |  | 30 Jan 2015 |

1. Document Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue** | **Date** | **Comment** | **Author/Partner** |
| 1 | 04 Nov 2014 | ToC | Samuel Keuchkerian  Sy Holsinger |
| 2 | 08 Dec 2014 | V1.0 | Activity Managers |
| 3 | 27 Dec 2014 | V2.0 | Samuel Keuchkerian |
| 4 | 14 Jan 2015 | V3.0 | Malgorzata Krakowian, Sergio Andreozzi,  Samuel Keuchkerian |
| 5 | 30 Jan 2015 | Final version | Samuel Keuchkerian |

1. Application area

This document is a formal deliverable for the European Commission, applicable to all members of the EGI-InSPIRE project, beneficiaries and Joint Research Unit members, as well as its collaborating projects.

1. Document amendment procedure

Amendments, comments and suggestions should be sent to the authors. The procedures documented in the EGI-InSPIRE “Document Management Procedure” will be followed:  
<https://wiki.egi.eu/wiki/Procedures>

1. Terminology

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

1. PROJECT SUMMARY

To support science and innovation, a lasting operational model for e-Science is needed − both for coordinating the infrastructure and for delivering integrated services that cross national borders.

The EGI-InSPIRE project will support the transition from a project-based system to a sustainable pan-European e-Infrastructure, by supporting ‘grids’ of high-performance computing (HPC) and high-throughput computing (HTC) resources. EGI-InSPIRE will also be ideally placed to integrate new Distributed Computing Infrastructures (DCIs) such as clouds, supercomputing networks and desktop grids, to benefit user communities within the European Research Area.

EGI-InSPIRE will collect user requirements and provide support for the current and potential new user communities, for example within the ESFRI projects. Additional support will also be given to the current heavy users of the infrastructure, such as high energy physics, computational chemistry and life sciences, as they move their critical services and tools from a centralised support model to one driven by their own individual communities.

The objectives of the project are:

1. The continued operation and expansion of today’s production infrastructure by transitioning to a governance model and operational infrastructure that can be increasingly sustained outside of specific project funding.
2. The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.
3. The support for current heavy users of the infrastructure in earth science, astronomy and astrophysics, fusion, computational chemistry and materials science technology, life sciences and high energy physics as they move to sustainable support models for their own communities.
4. Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.
5. Mechanisms to integrate existing infrastructure providers in Europe and around the world into the production infrastructure, so as to provide transparent access to all authorised users.
6. Establish processes and procedures to allow the integration of new DCI technologies (e.g. clouds, volunteer desktop grids) and heterogeneous resources (e.g. HTC and HPC) into a seamless production infrastructure as they mature and demonstrate value to the EGI community.

The EGI community is a federation of independent national and community resource providers, whose resources support specific research communities and international collaborators both within Europe and worldwide. EGI.eu, coordinator of EGI-InSPIRE, brings together partner institutions established within the community to provide a set of essential human and technical services that enable secure integrated access to distributed resources on behalf of the community.

The production infrastructure supports Virtual Research Communities (VRCs) − structured international user communities − that are grouped into specific research domains. VRCs are formally represented within EGI at both a technical and strategic level.

While the project is terminated as of December 31, 2014, the activities are ongoing through a combination of supporting mechanisms without disruption and will be continued through other projects.

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# Declaration by the Scientific Representative of the project

**PROJECT PERIODIC REPORT**

**Grant Agreement number: 261323**

**Project acronym: EGI-InSPIRE**

**Project title: European Grid Initiative: Integrated Sustainable Pan-European Infrastructure for Researchers in Europe**

**Funding Scheme: CCPCSA**

**Date of latest version of Annex I against which the assessment will be made:**

**Periodic report: 1st □ 2nd □ 3rd □ 4th □ 5th ⌧**

**Period covered: from 1/05/2014 to 31/12/2014**

**Name, title and organisation of the scientific representative of the project's coordinator:**

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I, as scientific representative of the coordinator1 of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

* The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
* The project (tick as appropriate):

■ has fully achieved its objectives and technical goals for the period;

□ has achieved most of its objectives and technical goals for the period with relatively minor deviations;

□ has failed to achieve critical objectives and/or is not at all on schedule.

* The public website is up to date, if applicable.

■ is up to date

□ is not up to date

* To the best of my knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.6) and if applicable with the certificate on financial statement.
* All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

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| --- |
| Name of scientific representative of the Coordinator: Tiziana Ferrari  Date: 20/01/2015  Signature of scientific representative of the coordinator: |

# Publishable Summary

Following on from preparation and successful completion of the 4rd EGI-InSPIRE EC Review, the main outcomes of the project in PY4 can be summarized in the following list.

* A new **EGI vision** for the support of the European Research Area was developed - the Open Science Commons[[1]](#footnote-1). The vision was published and promoted at relevant policy events like e-Infrastructure Reflection Group and policy makers, and is also being promoted through a dedicated website. The realization of the Open Science Commons is a collaborative effort requiring the involvement of both EGI stakeholders and external organizations and will drive the EGI engagement activities towards user groups, service providers, e-Infrastructure providers and technology providers.
* Based on the defined vision, a new **EGI strategy** is being developed following an extensive consultation with EGI stakeholders. This required the definition and adoption of a strategy development methodology that is driving and will structure strategy-making activities. The methodology is based on processes and tools such as the strategy map, the balanced scorecard. The methodology is intended to ensure the quality of strategy conversations.
* A **business engagement programme** was defined under the lead of the related virtual team[[2]](#footnote-2). This is the first business-orientated plan of EGI-InSPIRE that builds on the SME-engagement activities carried out at a national level with the intent of defining a EGI global strategy to promote innovation and to establish a pay per use access to the services. The programme describes how SMEs can interact with EGI and in what roles. The goal is to facilitate and streamline the way EGI partners establish relationships with the private sector and offer a common framework for engagement.
* In the area of **business models and sustainability**, the pay for use proof of concept[[3]](#footnote-3) completed its pilot phase which included: the definition of prices for services from the participating service providers, the definition of agreements and service management processes and procedures, the introduction of a billing function, and the analysis of the changes needed to support services and roll out the new functionalities in the production environment, and the evaluation of legal, policy, and organisational issues around the full implementation of the pay-for-use model.
* The business development activity was complemented by the start of activities on the definition of an **EGI Marketplace** and its business functions. This activity included the revision of the current service delivery channels, the business function of user-facing tools like **e-GRANT** for resource allocation, and the definition of the requirements of a new integrated tool and set of policies that simplify the access, with a particular focus on service delivery to the **long-tail of science**. The processes underpinning the establishment of service level agreements have been defined, and the requirements for the automated support in e-GRANT were defined.
* In PY5 strategic partnerships were established with: the GEANT Association in the area of cloud federation, AAI and procurement; with the EUDAT project for progressing with the technical interoperability of data management services and PRACE in the area of training.
* The EGI Council in PQ19 approved the **new EGI.eu governance** that introduces a new fee scheme, the choice between associate and full membership allowing different degrees of involvement of partners in the strategy making activities, and extends full membership to non European countries, ERIC organizations and EIROs.
* The beginning of PY5 was a critical milestone to verify the **EGI sustainability of the solutions that reached maturity during the project: High Throughput Analysis and Federated Operations**. As of May 2014 the co-funding ensured by the project to the running of NGI operations, EGI.eu core services and EGI.eu software release tools and activities stopped (only the coordination at EGI.eu operations has been supported at a 50% co-funding rate through task NA4.1). This allowed verifying the impact of funding on the daily running of NGI services. While the infrastructure services and the responsiveness of NGIs were not affected in general, with the new governance several small NGIs are facing problems sustaining their membership fee from 2015. With a new governance in place, in 2015 new mechanisms needed to be introduced to facilitate the on boarding of existing or new national e-Infrastructures that haven’t yet developed a sufficiently strong and diverse user community, or who are not yet supported by a national roadmap with ministerial support. This will require various policy and user engagement actions to expand the user base and develop a national value proposition with the support of the local funding agencies.
* The **FitSM** standard for federated service management was adopted to define the whole framework of **Operational Level Agreements and Service Level Agreements** of EGI[[4]](#footnote-4) defining the relationship in service provisioning between the various service providers of EGI: the individual data and computing centres, the National Grid Initiatives and EIROs, the EGI.eu technical partners. The implementation of FitSM[[5]](#footnote-5) requirements and the adoption of the related templates for documentation, agreements and reporting are in progress in all areas of service management of EGI. The standard was adopted to replace project quality assurance procedures with service level management procedures for all activities that from May 2014 are no longer funded in the project.
* A new discipline-orientated approach was introduced to user technical support activities, which were organized by clustering the effort and expertise of NGIs around user communities by grouping them by discipline, according to the national priorities. EGI has developed a **network of competence centres** for Research Infrastructures on the ESFRI roadmap that will be expanded by federating it with competence centres run by external partners. The aim is the achievement of the Knowledge Commons to ensure technical support, training and education and user-driven innovation of EGI and beyond. The Distributed Competence Centre of EGI (DCC) includes user-support personnel and technical assets that can be accessed by research communities to support their research activities with distributed computing services from EGI. The project provided the coordination for the DCC.
* The existing virtual research communities continued their operations, and with the contribution of established and prospective **community building** activities have been growing in various scientific domains, namely **structural biology, computational chemistry and materials sciences, astronomy and astrophysics, nanotechnologies, agriculture and hydrology**.
* A call for support projects was opened in PQ17, which resulted in the definition of a long-term plan of future collaborative user-driven projects and technical service pilots in various research areas (humanities, natural sciences, medical and health sciences) involving research infrastructures on the ESFRI roadmap and international research projects like **BBMRI, EISCAT-3D, ELIXIR, EPOS, INSTRUCT, LifeWatch, KM3Net, and at national level CTA, ELI, DARIAH and CLARIN, ESS, ICOS and LOFAR,** and international organizations like EBI and FAO. These collaborations will allow fostering the exploitation of the existing solutions, provide technical support to new user communities and develop and innovate the technical infrastructure of EGI with the drive of new technical requirements. These developments already started in PY5 to advance the **EGI AAI infrastructure** with the aim of removing barriers in user authentication by integrating multiple federated identity providers. This evolution is particularly important for the commercial exploitation of services and the long tail of science. The second EGI coordinated project was with **ELIXIR** head nodes. The pilot aims at facilitating the discovery of existing reference datasets in EGI and developing and deploying services that allows the replication of life science reference datasets by data providers, resource providers and researchers, and the use of these datasets by life science researchers in analysis applications. Test activities will continue in 2015. In PY5 **15 community and/or e-Infrastructure integration activities** were conducted: IFCA, INERTIA, ELIXIR, DRIHM, DCH-RP, VERCE, Aix Marseille Universite, Charles University in Prague - First Faculty of Medicine, Instituto de Astrofísica de Andalucía, CHAIN-REDS, BILS, HARNESS, ELIXIR, BSIM2, and BioVeL. The impact of user engagement activities is reflected in the following relative increases in infrastructure utilization (CPU wall time) from 2013 to 2014:
  + +215% Engineering and Technology
  + +79% Biological Sciences of which
    - +105% Structural Biology
    - +152% Biodiversity Conservation
    - +146% Genetics and heredity
  + +77% Medical and Health Sciences
  + +27% Social Sciences and Humanities
  + +17% Computational Chemistry
  + +10% Astronomy, Atroparticle Physics, Astrophysics

In 2014 EGI services were used by Natural Sciences (83.90%) and Medical and Health Sciences (15.38%), followed by Social Sciences (0.27%), Engineering and Technology (0.20%) and support activities like training (0.25%).

* As part of its strategic activities EGI developed new collaborations or strengthened on-going ones with a large number of European and international projects and partners (Section 3.6.2), the list of involved parties includes: the European Commission, the European e-Infrastructure Reflection Group, RDA, GEANT Association, EUDAT, PRACE, the Security for Collaborating Infrastructures initiative, Big Data Value Association, FAO, ESA, EMBL, BBMRI, DARIAH, EISCAT-3D, ELIXIR, EPOS, INSTRUCT, LifeWatch, CANFAR, Open Science Grid, GARUDA, and the following projects: FedSM, Helix Nebula, BioMedBridges, iMARINE and CHAIN-REDS.
* Following the successful launch of the **Federated Cloud** the PY5 period was one of consolidation, where we aimed to strengthen the support for both resource providers, with improved tools and technologies to make their joining the federated cloud easier and for user communities where necessary strengthening the process by which we engage with new and emerging communities.In total, the user support team took care of 36 Proofs of Concepts; of these, five went into production: BioVeL Portal, OpenRefine, OpenModeler (all BioVel project) and READemption (Uni Wuerzburg). The current number of active users including those accessing through user portals via robot certificates is estimated to be around **33,300**.
* JRA2 was set as a new activity started in PY5 with the aim to continue the software development for a subset of tools that require further development to support pay per use Proof of Concepts, and the operation of the Federated Cloud. **Service Availability Monitoring***:* this task allowed the evolution of the former SAM framework into a more lightweight and sustainable solution to better address evolving requirements of EGI testing and benchmarking its capabilities for resilience and service continuity. The most relevant enhancements in the EGI **accounting** system have been related to the CPU, MPI and Cloud accounting. Furthermore, an important contribution has been given to the Pay-for-User Proof-of-Concept. Finally, a first support of the new EGI scientific discipline classification is now available in the portal and an analysis to choose the best technologies for the new portal has been done. The evolution of the accounting system will continue in the first months of 2015. **AppDB** has seen further improvements related to Virtual Appliance support, and has been extended with new data entities, which among other interconnect people and software. Other new entities that were introduced v5.4.0 (September) onwards, are related to software and people interconnection, by making use of OpenAIRE's web API. **e-GRANT***:* development of e-GRANT were made to allow using e-GRANT more efficiently as a Resource Allocation tool using EGI Federated Cloud to allow customers to request resources and allow providers to create resource pools. During the last quarter, work on the rest of functionalities for the EGI Federated Cloud was completed.
* The **EGI communications activities** in PY5 targeted policy makers with the definition of a promotion plan of the Open Science Commons, and the user communities through different mechanisms: by promoting the vision through a variety of communication channels, through events and with targeted publications for user communities. The content of the EGI newsletter ***Inspired*** increased its user orientation, two issues were released: n. 16 (July 2014) and n. 17 (October 2014). The ***EGI Use Cases****[[6]](#footnote-6)* were also published. These illustrate how the High Throughput Computing solution of EGI can help scientists in their work. **Six publications** were printed in total: the Federated Cloud White Paper, the Federated Operations White Paper, the High-throughput Data Analysis White Paper, the Community-driven Innovation and Support White Paper, the Open Science Commons Paper and the EGI Case Studies. EGI communication wrote an additional six new case studies during the reporting period in cooperation with the scientists featured in the articles. In addition, two issues of the EGI newsletter were published.
* Two major EGI events were organised with the **EGI Community Forum 2014** in Helsinki (May 2014), the **EGI Conference on Challenges and Solutions for Big Data Processing on Cloud** held in Amsterdam (September 2014). EGI participated in two external events at the European Bioenergetics Conference in Lisbon (July 2014) and at the European Conference on Computational Biology conference held in Strasbourg (September 2014). EGI Champions and EGI council members represented EGI at the 4th gender Summit (Brussels, June 2014), the FEBS-EMBO meeting (Paris, September 2014), the Early Science from Low-frequency telescopes conference (December 2014), and the UCC 2014, the 7th IEEE/ACM conference on Utility and Cloud Computing (London, December 2014) where an EGI workshop was held focusing on the EGI Federated Cloud. The **EGI Community Forum 2014**[[7]](#footnote-7) for the first time showcased how the EGI solutions can support excellence of the ERA in different disciplinary areas, with a focus on the long tail of Science.
* The **fourth project amendment** was finalized in PY5 with the aim of reallocating unspent budget to activities in a few strategic directions taking into account the feedback received after the 4th project review held in July 2014. The following table details the new activities added to the PY5 work plan.

The following table illustrates the actions that were undertaken in PY5 in reply to the recommendations received after the PY4 review. An additional work plan was defined and executed thanks to the reallocation of unspent budget among the consortium members, this was reflected in the 4th project amendment.

Table 1. Changes introduced with the 4th project amendment taking into account the feedback from the PY4 project review.

|  |  |
| --- | --- |
| * + - * 1. REC 1 | **“Develop and promote the Open Science Commons Vision”**  The additional PY5 activity plan proposed in the 4th amendment included the promotion of the vision to funding agencies, the EGI.eu Council and other e-Infrastructures, the publication of a Open Science Common policy, a case studies compendium and other support material for the EGI engagement activities, the organization of the EGI September workshop and a joint EGI-GEANT workshop |
| * + - * 1. REC 2 and 4 | **“Continue to develop the EGI Strategy” and “KPI Metrics should be measured and evaluated in a wider context, in order to determine whether the organisation is heading in the right direction”**  In PY5 the EGI strategy was further developed according to a strategy map involving the Executive Board, the EGI Council. This revision included the review of the Balanced Score Cards and all the definition of continuous strategy development processes. |
| * + - * 1. REC 3 | “**Sustainability planning needs more development, especially in respect of achieving longer-term sustainability”**  An SME engagement strategy development has started and SME case studies involving the EGI Federated Cloud were analyzed. |

# Project Progress

## Project Objectives for Period PY5

EGI-InSPIRE defines the following project objectives (PO) as its goals, these were adapted to the needs of the EGI Collaboration in PY5 as follows.

* **PO1:** The continued operation and expansion of today’s production infrastructure by transitioning to a governance model and operational infrastructure that can be increasingly sustained outside of specific project funding
  + In PY5 in order to ensure the continuity and evolution of the EGI federation services, changes in the governance, funding, procurement and reporting mechanisms were successfully introduced to shift from a project activity delivery mode to a service delivery model.
* **PO2:** The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.
  + The objective of PY5 was to establish a new discipline-orientated approach in user technical support activities, based on the federation of effort and expertise among the NGIs sharing priorities and interest in agreement with their national priorities. EGI has developed a network of competence centres for Research Infrastructures on the ESFRI roadmap.
* **PO3:** The support for current heavy users of the infrastructure in Earth Science, Astronomy & Astrophysics, Fusion, Computational Chemistry and Materials Science Technology, Life Sciences and High Energy Physics as they move to sustainable support models for their own communities.
  + The objective of PY5 was to support the flourishing of user community building to expand the user base in Europe and beyond.
* **PO4:** Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.
  + The objective of PY5 was to engage with international research collaborations to establish technical roadmaps to support Research Infrastructures on the ESFRI roadmap. A call for support projects was opened in the summer, which resulted in the definition of a plan of future collaborative projects and pilot activities with BBMRI, DARIAH, EISCAT-3D, ELIXIR, EPOS, INSTRUCT, LifeWatch, and KM3Net.
* **PO5:** Mechanisms to integrate existing infrastructure providers in Europe and around the world into the production infrastructure so as to provide transparent access to all authorised users.
  + EGI-InSPIRE PY5 supported the development of the tools and open standard interfaces for the consolidation of a European network of private cloud providers.
* **PO6:** Establish processes and procedures to allow the integration of new DCI technologies (e.g. clouds, volunteer desktop grids, etc.) and heterogeneous resources (e.g. HTC and HPC) into a seamless production
  + The objective of PY5 was to extend the existing integration processes, policies and security framework developed for the High Throughput Analysis solution, for application to the Federated Cloud.

The PY5 work plan supported the continuation of a subset of activities established in the period PY1-PY4, nevertheless the metrics framework from PY4 was adopted for quality assurance of funded and as well as unfunded activities in PY5. The PY5 metrics are commented in the Annual Quality Report D1.15[[8]](#footnote-8) from PY4.

## PY5 Performance

Table 1: Achieved PY5 Project Metrics (Q17-Q19)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Objective Summary** | **Metrics** | **PQ17** | **PQ18** | **PQ19** | **Target**  **(as defined in the PY4 quality plan)** |
| PO1 Expansion of a nationally based production infrastructure | Number of resource centres in EGI-InSPIRE and integrated partners (M.SA1.Size.1)  Only includes certified sites | 364 | 358 | 352 | **345** (350)  (355) |
| Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2A) | 517,464 | 652,445 | 657,044 | **400,000**  (425,000)  (450,000) |
| EGI monthly availability and reliability of site middleware services (M.SA1.Operation.5) | 95.20/  95.76 | 86.27/  87.72 | 93.29/  93.44 | **97.0/97.5**%  (97.5/98.0%)  (98.0/98.5%) |
| Average monthly availability and reliability of NGI core middleware services (MSA1.Operation.4) | 99.17/  99.63 | 98.76/  99.27 | 92.02/  92.71 | **99.60/99.80%**  (99.65/99.85%)  (99.67/99.87%) |
| EGI monthly availability and reliability of critical central operations tools (MSA1.Operation.6a) | 98.42/  98.54 | 99.80/  99.80 | 99.85/  99.94 | **99.60/99.80%**  (99.65/99.85%)  (99.67/99.87%) |
| EGI monthly averaged VO availability and reliability (M.SA1.Operation.7) | 90.43/  92.25 | 93.24/  94.59 | 99.45/  99.46 | **98%/99%**  (98.5/99.0%)  (98.7/99.2%) |
| PO2 Support of European researchers and international collaborators through VRCs | Number of papers from EGI Users (M.NA2.5) | 194[[9]](#footnote-9) | | | **82**  (80)  (90) |
| Number of grid jobs done a day (Million) (M.SA1.Usage.1) | 1,431,893 | 1,666,919 | 1,528,000 | **1.6 M**  (1.8 M)  (2.0 M) |
| PO3 Sustainable support for Heavy User Communities | Number of production sites supporting MPI (M.SA1.Integration.2) | 51 | 50 | 52 | **90**  (100)  (120) |
| Number of users from HUC VOs (M.SA1.VO7) | 11,369 | 11,311 | 11,474 | 12,500  (13,000  (14,000) |
| **NEW**  Total number of High Activity VOs  (M.SA1.VO.5)  \*quarterly value  \*\* yearly value | 163 | 160 | 151 | **55**\*\*  (60)  (**65**) |
| PO4 Addition of new User Communities | Number of users from non-HUC VOs (M.SA1.VO.6) | 7,151 + 12,000 users with access to robot certificates | 6,874(\*) + 15,000 users with access to robot certificates | 6,847(\*) + 15,000 users with access to robot certificates | 11,000  (11,500)  (12,000) |
| Public events organised (attendee days) (M.NA2.6) | 2,670  (aggregated value for PY5) | | | **15,000**  (17,000)  (19,000) |
| PO5 Transparent integration of other infrastructures | Number of on-going Research Infrastructures/new communities being integrated (M.SA1.Integration.4) | 11 | 15 | 15 (\*\*) | **5**  (7)  (9) |
| Cumulative number of active MoUs with resource providers (M.NA2.10) | 6 | 7 | 7 | **4**  (5)  (5) |
| PO6 Integration of new technologies and resources | Number of resource centres offering federated cloud services accessible to authorised users  (M.SA2.16) | 14 | 15 | 15 | **15**  (20)  (25) |

(\*) The number of users decreased during PY5 due an on-going campaign aiming at decommissioning inactive VOs. This value needs to be incremented by 15,000 users – 9,000 for the heavy user communities (estimated value) from 40 VOs that are enabled to use robot certificates. The decommissioning of registered users from expired projects affected the non Heavy User Communities more significantly as these are typically structured around short-term projects.

(\*\*) IFCA, INERTIA, ELIXIR, DRIHM, DCH-RP, VERCE, Aix Marseille Universite, Charles University in Prague - First Faculty of Medicine, Instituto de Astrofísica de Andalucía, CHAIN-REDS, BILS, HARNESS, ELIXIR, BSIM2, BioVeL.

Activity metrics for each quarter are available from the EGI Metrics Portal:

* <http://metrics.egi.eu/project_metrics/QR17/>
* <http://metrics.egi.eu/project_metrics/QR18/>
* <http://metrics.egi.eu/project_metrics/QR19/>

## PY1-PY5 Performance

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Objective Summary | Metrics | Achieved/  Target  PY1  (PQ4) | Achieved/  Target  PY2  (PQ8) | Achieved/  Target PY3 (PQ12**)** | **Achieved/Target PY4**  **(PQ16)** | **Achieved/Target PY5**  **(PQ19)** |
| PO1  Expansion of a nationally based production infrastructure | Number of resource centres in EGI-InSPIRE and integrated partners (M.SA1.Size.1) | 344/  300 | 347/  330 | 347/  350 (355)  (355) | 361/  345  (350)  (355) | 352  (350)  (355) |
| Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2) | 239,895/  200,000 | 290,300/  250,000 | 361,287/  300,000  (325,000)  (333,000) | 487,577/  400,000 (425,000)  (450,000) | 531,000\*  400,000 (425,000)  (450,000) |
| Reliability of resource centre functional services (M.SA1.Operation.5) | 94.6%/  90% | 94.8%/  91% | 96.9%/  95%  (96%)  (97%) | 96.42%/  97/97.5%  (97.5/98%)  (98/98.5%) | 93.29/93.44 (97.5/98%)  (98/98.5%) |
| Reliability of NGI functional services (MSA1.Operations.4) | N/A | N/A | 99.5%/  97%  (98.5%)  (99%) | 99.63%/  99.6/99.8%  (99.65/99.85%)  (99.67/99.87%) | 99.23/99.26 (99.65/99.85%)  (99.67/99.87%) |
| Reliability of critical operations tools (MSA1.Operations.6a) | N/A | N/A | 99.9%/  97%  (98.5%)  (99%) | 99.10%/  99.6/99.8%  (99.65/99.85%)  (99.67/99.87%) | 99.85/99.94 (99.65/99.85%)  (99.67/99.87%) |
| EGI monthly averaged VO availability and reliability (M.SA1.Operation.7) | N/A | N/A | N/A | 97.89%/  98%/99%  (98.5/99.0%)  (98.7/99.2%) | 99.45/99.46 (98.5/99.0%)  (98.7/99.2%) |
| PO2  Support of European researchers and international collaborators through VRCs | Number of papers from EGI Users (M.NA2.5) | 161/50 | 82/  60 | 72/  70  (80)  (90) | 82/  70  (80)  (90) | 194  (no target established for PY5) |
| Number of jobs done a day (M.SA1.Usage.1) | 960,053/  500,000 | 1,264,922/  525,000 | 1.43/  1.2M  (1.4M)  (1.5M) | 1.6M/  1.6 M  (1.8 M)  (2.0 M) | 1,4M 1.6M (1.8 M)  (2.0 M) |
| PO3  Sustainable support for Heavy User Communities | Number of sites with MPI (M.SA1.Integration.2) | 96/  50 | 108/  100 | 77/  120  (130)  (140) | 74/  90  (100)  (120) | 52/  90 (100) (120) |
| Number of users from HUC VOs (M.SA1.VO.7) | 7,103/  5,000 | 10,856/  5,500 | 11,595/  12,000  (15,000)  (17,000) | 11,990+7,000/  12,500  (13,000  (14,000) | 11,474+7,000/ 12,500  (13,000  (14,000) |
| Total number of High Activity VOs  (M.SA1.VO.5) | N/A | N/A | N/A | 38/  55  (60)  (65) | TBC |
| PO4 Addition of new User Communities | Peak number of cores from desktop grids (M.SA1.Integration.3) | N/A | N/A | 6,450/  1,000  (5,000)  (7,500) | N/A | N/A |
| Number of users from non-HUC VOs (M.SA1.VO 6) | 4,075/  5,000 | 8,518/  1,000 | 10,602/  10,000  (12,000)  (13,000 | 7,015+5,000/  11,000  (11,500)  (12,000) | 6,847/  11,000  (11,500)  (12,000) |
| Public events organised (attendee days) (M.NA2.6) | 10,123/  1,500 | 11,795/  2,000 | 8,877/  15,000  (17,000)  (19,000) | 1,553 in QR16  4,430/  15,000  (17,000)  (19,000) | 2,670  (no target established for PY5) |
| PO5 Transparent integration of other infrastructures | Number of on-going Research Infrastructures/new communities being integrated (M.SA1.Integration.4) | N/A | N/A | N/A | 11/  5  (7)  (9)/  NA | 15/  5  (7)  (9)/  NA |
| MoUs with resource providers (M.NA2.10) | 1/  3 | 3/  5 | 3/  4  (5)  (5) | 6/  4  (5)  (5) | 7/  4  (5)  (5) |
| PO6  Integration of new technologies and resources | Number of HPC resources (M.SA1.Integration.1) | 49/  1 | 39/  3 | 44/  50  (50)  (50) | N/A | N/A |
| Number of resource centres part of the EGI Federated Cloud (M.SA2.16) | 1/  0 | 7/  1 | 14/  10  (15)  (20) | 15/  15  (20)  (25) | 19/ 15 (20)  (25) |

\* Was 652,000, removed half of the CPUs from LRZ-MU (HT on) while investigating.

## Work progress and achievements during the period

### Operations coordination (NA4.1)

During PY5 EGI-InSPIRE supported the central coordination of the infrastructure operations by funding coordination activities at EGI.eu. The core services that enable the EGI federation are supported council fees (40%) and by in-kind contributions of the partners. The operational activities at NGI level, not funded anymore by the project, have been sustained by the NGIs.

The Operations Management Board continues to be regularly held once per month, with a good attendance of the NGI representatives. The on-going actions and other operational issues are tracked and discussed during the Operations fortnightly meetings. The communication channels between the EGI partners implemented at the beginning of the project were seamlessly provided during PY5 ensuring the coordination of the operational activities and the evolution of the procedures and policies framework. Coordination activities include the supervision of the core services[[10]](#footnote-10) now funded by council fees and in-kind contributions. The operational ones are:

* the core operational tools,
* the security activities,
* the software provisioning activities,
* catch-all middleware services,
* operational support to NGIs and helpdesk support.

The provisioning of all these activities is regulated by dedicated Operational Level Agreements (OLAs)[[11]](#footnote-11) between the providers and EGI.eu, and by the EGI.eu Service Level Agreement (SLA)[[12]](#footnote-12) between EGI.eu and the consumers (NGIs) of the services. The first set of reports on the services performances subject of the various agreements, OLAs and SLAs, has been collected, the quality of services is monitored and monthly statistics are generated and distributed. Based on monitoring results availability of the technical services and performances of the human services has been assessed as in good standing. All the activities continued without interruptions during the transition from PY4 to PY5.

The definition of clear and complete OLAs and SLAs framework is one of the activities towards the implementation of the FitSM service management system in the EGI Operations. An external FitSM auditor identifying the areas of improvement audited the Federated Operations service in November 2014. A plan for the full implementation of the service management processes required by FitSM is being defined in order to increase the service quality delivered with repeatable and reliable processes.

With regards to UMD software provisioning, although the UMD-3 upgrade campaign has been mostly completed during PY4, during PY5 the EGI.eu operations team coordinated the upgrade of

* the accounting clients in collaboration with the APEL team,
* dCache to the new long term supported version from UMD-3 (the security support of the previous version was extended until August 2014), and
* the configuration of the new ops VO VOMS servers.

The software provisioning core activity, coordinated by EGI Operations, produced a total of 5 minor updates for UMD-3, there has been no new major release, since there were no technical requirements to justify the overhead of a new major release. All the products in UMD-3 released during PY5 maintained backward compatibility.

5 updates included 87 product updates, 125 including multiple packaging for different platforms, currently UMD supports SL5, SL6 and Debian6. Most of the products have been verified in the verification testbed by the UMD team, the time for an individual verification has further decreased during PY5, from ~3 hours/product of PY4 to ~2.2 hours in PY5.

All the products released in UMD have been tested in production by Early Adopter sites in the staged rollout process. Currently there are ~40 early adopter sites collaborating for the UMD releases, the UMD team started to collaborate directly with the WLCG community to integrate the results of their testing activities in the staged rollout process.

During PY5 the number of resource centres remained constant as at the end of PY4, the Cloud sites increased by 5 (the overall number of resulting sites that support the High Throughput Computing and the constant by compensating the decommission of few grid sites. The total capacity of the infrastructure has further increased in terms of logical CPUs, although the number of sites has been constant, the trend is in line with PY4 increase considered the shorter period considered.

The number of users has slightly decreased, almost remaining constant from PY4, and this can be explained by the increasing use of scientific gateways that often do not require the user to register to a virtual organization by using a catch-all credential (robot certificate), as well as by the on-going decommissioning campaign of terminated VO projects. Robot certificates and portals are increasingly are increasingly used to reduce the barriers to use EGI resources.

### Community engagement (TNA4.1)

PY5 ensured continued support to existing user communities and prospective ones and the coordination of user engagement activities across EGI through the NGI International Liaisons. The EGI Engagement strategy defined the areas of coordinated activity across NGIs. These included: agriculture and food sector, nanotechnologies, art and humanities (the DARIAH and CLARIN research infrastructures), natural sciences (ELI and KM3Net), life science (ELIXIR).

As an example of engagement activity, a common project was defined by EGI and ELIXIR about integrating ELIXIR reference datasets within EGI[[13]](#footnote-13) involving ELIXIR head nodes and EGI experts.

There has been significant work done in the EGI in the past to help the deployment and discovery of services, where “services” can be either computationally oriented (such as batch queues) or application oriented (such as web-services, ready-to-use applications embedded in portal gateways or encapsulated in Virtual Machine Images). However in bioinformatics many services used for analysis purposes rely on public reference datasets. Reference dataset are getting big and users struggle to discover, download and compute with them. There is an increasing demand to compute the data where the reference datasets are located. EGI members already host some biological reference datasets across the infrastructure, however currently EGI neither provides discovery capabilities for available datasets, nor provides guidelines for those who wish to use these datasets or would like to replicate additional datasets onto EGI sites.

The EGI community and the ELIXIR communities started a project in December 2014 facilitate the discovery of existing reference datasets in EGI and to develop and deploy services that allows the replication of life science reference datasets by data providers, resource providers and researchers, and the use of these datasets by life science researchers in analysis applications. The project receives contributions from several NGIs, ELIXIR nodes, and e-infrastructure and life science experts beyond EGI and ELIXIR. The foreseen length of the project is 9 months; the project started at the end of 2014 will continue in 2015. From 2015 Virtual Research Environment projects and the network of competence centres being established in PY5 by EGI will drive the EGI user engagement plan including the development of a EGI training programme customized to the needs of the user communities.

### Communications (TNA4.2)

***EGI events***

* **EGI Community Forum 2014** (CF2014)[[14]](#footnote-14). The Communications Team lead the logistical organisation of the CF2014 held in Helsinki, Finland (19-23 May 2014) and co-hosted with the University of Helsinki and CSC - IT Center for Science Ltd. The team also supported the Programme Committee and was responsible for the updates and maintenance to the event’s website and Indico pages. A Book of Abstracts was produced for the event – see below. 373 participants attended the event.
* **EGI Conference on Challenges and Solutions for Big Data Processing on Cloud** (Big Data Conference)[[15]](#footnote-15). The Communications team lead the logistical organisation of the Big Data Conference held in Amsterdam (24-26 September 2014). The event was co-located with the RDA conference in Amsterdam. The conference hosted the EGI-GÉANT Symposium on Federated Community Cloud Services for e-Science, organised in partnership with the GÉANT Association.
* e-Infrastructures for Earth Science workshop preparation started. The 2 days event took place on 22-23 January 2015 as was co-organized by EGI, EUDAT, GEANT and PRACE.

***External events***

The Communications Team represented EGI at the following events:

* **European Bioenergetics Conference** (EBEC 2014)[[16]](#footnote-16). EGI sponsored the event in Lisbon (12-17 July) and had a stand, where the Communications team engaged with several potential users with the help of Afonso Duarte, EGI Champion for the Life Sciences. EBEC had about 400 attendees. A blog post[[17]](#footnote-17) summarising the event was published.
* **European Conference on Computational Biology** (ECCB 2014)[[18]](#footnote-18). EGI sponsored the event in Strasbourg (7-10 September) and had a stand, where the Communications team engaged with several potential users with the help of Fotis Psomopoulos, EGI Champion for the Life Sciences. EBEC had about 2000 attendees. A blog post[[19]](#footnote-19) summarising the event was published.

Additionally, during PY5:

* Rosette Vandenbroucke, EGI Council member for Belgium, represented EGI at the 4th Gender Summit, held in Brussels (30 June-1 July)
* Afonso Duarte, EGI Champion, attended the FEBS–EMBO 2014 meeting in Paris (30 August- 4 September) and summarised his engagement activities in a blog post
* Joeri van Leeuwen, EGI Champion, will attend the Early Science from Low-frequency Radio Telescopes[[20]](#footnote-20) (8-10 December) to present his EGI-enabled results obtained through the LOFAR telescope.
* Ashiq Anjun, EGI Champion, will attend UCC 2014, the 7th IEEE/ACM Conference on Utility and Cloud Computing[[21]](#footnote-21) in London (8-11 December), where a EGI workshop will be held on the 11th focussing on the EGI Federated Cloud.

During PY5, the Communications Team worked in the following publications.

***Printed Publications***

**EGI CF2014 Book of Abstracts[[22]](#footnote-22).** Compilation of the contributions submitted to the EGI Community Forum 2014 and reviewed by the Programme Committee.

**EGI Solutions.** These four publications were created in collaboration with the Strategy and Policy Team and provide clear, easy to read documents outlining the uses and benefits of the EGI solutions. They are:

* Federated Cloud White paper [[23]](#footnote-23)
* Federated Operations White paper [[24]](#footnote-24)
* High-Throughput Data Analysis White paper [[25]](#footnote-25)
* Community-driven Innovation and Support White paper [[26]](#footnote-26)

**EGI Case Studies[[27]](#footnote-27)**. This publication showcases some of the case studies[[28]](#footnote-28) published online in the EGI website during the EGI-InSPIRE project. The case studies focus on research and scientific results obtained thanks to the use of EGI’s computing services. The case studies are examples of how EGI can contribute to advancements in the long tail of science.

***Online Publications***

**Newsletters.** Two issues of *Inspired* were published:

* Issue 16 (July 2014) [[29]](#footnote-29)
* Issue 17 (October 2014) [[30]](#footnote-30)

**Open Science Commons paper**[[31]](#footnote-31). This publication was created in collaboration with the Strategy & Policy Team. The Open Science Commons paper is an introduction to EGI’s new vision intended for policy makers, national and European funding agencies, Research Infrastructures, e-Infrastructure providers, research communities and the private sector.

**Case studies.** In PY5 (as of November), the Communications team investigated & wrote six new case studies in cooperation with the scientists featured in the articles. They were:

* *Is the Andromeda II galaxy the result of a merger?* How scientists from Poland used grid computing to find an explanation for the origins of a galaxy that fits astronomical observations.[[32]](#footnote-32)
* *A new way to know more about distant stars.* Grid computing is helping astronomers to describe stars, calculate their age and learn more about the planets that surround them.[[33]](#footnote-33)
* *Getting closer to quantum computing with the grid.* How scientists in Serbia are contributing to our understanding of Bose-Einstein Condensates and how they will lead to a new computing paradigm.[[34]](#footnote-34)
* *Improving digital security with natural selection.* How scientists from the Czech Republic are trialling new cryptanalysis methods with inspiration from the theory of evolution and the help of grid computing.[[35]](#footnote-35)
* *Designing a toxic chemical-eating bacteria*. How a team from the Czech Republic used grid computing to design a bacteria capable to ingest toxic compounds.[[36]](#footnote-36)
* *Does combat stress have a long-term effect on attention and memory?* How grid computing is helping to understand the effects of combat on soldiers’ brains.[[37]](#footnote-37)

***Website***

There was no major restructuring or rethinking of the EGI website during PY5. The website was updated and maintained as need arose. The content was expanded with, in addition to the online publications stated above, with:

* 25 new news items[[38]](#footnote-38)
* 12 blog posts[[39]](#footnote-39)
* 2 Director’s Letters[[40]](#footnote-40)

***Launch of the EGI Federated Cloud***

The Communications Team worked in concertation with the Operations & Technology Teams to announce the launch of the EGI Federated Cloud during the EGI Community Forum in Helsinki. The launch was announced with a press release[[41]](#footnote-41) and a news item[[42]](#footnote-42) distributed to all media contacts, which resulted in several media mentions[[43]](#footnote-43).

**Webinars**

Two webinars were/are being organised and scheduled:

* RNA-Seq analysis with READemption: setup and usage in the EGI Federated Cloud[[44]](#footnote-44) (26 November)
* Cloud-Init[[45]](#footnote-45) (15 December)

**Communication team contributions to the EGI Strategy**

The Communications team also contributed to the on-going discussions about the definition of the EGI Strategy and vision for the coming years.

### Distributed Competence Centre (NA4.3)

In PY5 the EGI-InSPIRE project setup a Distributed Competence Centre (DCC) across the NGIs, projects, user communities and technology providers. The DCC includes user-support personnel and technical assets that can be accessed by research communities to support their research activities with distributed computing services from EGI. The project provides coordination for the DCC, and some of the DCC members’ work is partially supported by the project.

The DCC federates user support activities across NGIs. PY5 provided funding for travel so DCC members can visit users and provide face-to-face support in application porting, service development and configuration, pre-production test, system integration and production setups. The achievements of the DCC members are summarised in the below table, showing the support the DCC members provided for certain VOs/communities. Details on the provided support are given in Appendix A.

Table 2. Overview of the Distributed Competence Centre activities.

| **VO or community** | **VRC** | | | | **NGI** | | | | | | | | | **Site** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LSGC** | **CMMST** | **WeNMR** | **Earth Science** | **BG** | **MD** | **RS** | **CZ** | **BY** | **SK** | **PL** | **ES-PT** | **FR** | **LIP** | **INFN** |
| biomed.eu | X |  |  |  |  | X |  |  |  |  |  |  |  |  |  |
| France grilles | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| enmr.eu |  |  | X |  |  | X |  |  |  |  |  |  |  |  | X |
| Compchem |  | X |  |  | X |  |  |  |  |  |  |  |  |  | X |
| Vlemed | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shiwa | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEE |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| SaGrid |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CLARIN / DRHIHM |  |  |  |  | X |  |  | X |  |  |  |  |  |  | X |
| ENV modelling |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| Biomed |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| Atlas |  |  |  |  | X |  | X |  |  |  |  |  |  |  |  |
| Alice |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| LHCb |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| CMS |  |  |  |  | X |  | X |  |  |  |  |  |  |  |  |
| Economy |  |  |  |  |  | X |  |  |  |  |  |  |  |  |  |
| ES |  |  |  | X |  |  |  |  |  |  |  |  | X |  |  |
| semiconductors |  |  |  |  |  | X |  |  |  |  |  |  |  |  |  |
| highthroughputseq.egi.eu |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| physiome.lf1.cuni.cz |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| eiscat.se |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| peachnote.com |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| AUGER |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| LifeWatch |  |  |  |  |  |  |  |  |  |  |  | X | X | X | X |
| BELLE |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| CLARIN |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| ELI |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| ELIXIR |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| CTA |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| EPOS |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| LOFAR |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| ESS |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| BBMRI |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| ICOS |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |
| Nanotech |  |  |  |  |  |  |  |  | X | X |  |  |  |  |  |
| Bioinf |  |  |  |  |  |  |  |  | X |  |  |  |  |  |  |
| Med. Image |  |  |  |  |  |  |  |  | X |  |  |  |  |  |  |
| chem.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| earth.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| eng.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| hpc.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| iber.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| ict.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| life.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| pfound.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| phys.vo.ibergrid.eu |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| Aegis |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| meteo.see-grid-sci.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| seismo.see-grid-sci.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| env.see-grid-sci.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| desktopgrid.vo.edges-grid.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| vo.aginfra.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| cmpc.aegis.rs |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| vo.semagrow.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |
| drihm.eu |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |

Appendix A provides a report of user engagement activities carried out by NGIs at the national level.

### Strategy Policy and business development (NA5)

This section describes the work performed by the Work Package NA5 which is composed of two main tasks: 5.1: “Strategy, policy and business development” and task 5.2 “Business models and proof of concepts”. During the reporting period, the main achievements are:

* The development and promotion of the vision of Open Science Commons.
* The development of a new EGI strategy through a consultation process with the stakeholders.
* The improvement of the strategic planning, definition of an EGI business engagement program, definition of a value proposition document for EGI.eu.
* The development of pay for use proof of concept.
* The business models and tools around the capability to offer EGI services by directly charging customers.

**Develop and promote the Open Science Commons Vision**

Following the 4th Year EGI-InSPIRE project review, the reviewers recommended to develop and promote the Open Science Commons vision, that was initially conceived in April 2014 and presented at the review. During the period under report, EGI.eu developed a dedicated policy paper[[46]](#footnote-46) that was also presented at the e-IRG workshop in Rome[[47]](#footnote-47). For promoting the Open Science Commons vision and the comments and involvement of external partners, a dedicated web site instantiated: www.opensciencecommons.org (.eu and .com).

**Evolve the EGI Strategy**

In the reporting period, EGI.eu put a considerable amount of effort in redesigning the overall EGI strategy based on the Open Science Commons vision and by ensuring that the different viewpoints and needs of the stakeholders were collected and evaluated. The process that was followed is based on the use of the strategy map and balanced scorecard tools, and supported by an external consultant to better develop the skills of EGI.eu staff and consolidate a process that would increase the maturity of EGI strategic planning. The initial step was to organise a 3-day training for the EGI.eu staff to align the knowledge and understanding of how to define and execute strategies. The training was developed on the concrete case of EGI. Following the training, it was decided to continue the work with the consultant to coach and support the EGI.eu strategy and policy team and the EGI.eu senior managers in defining the new strategy.

The new strategy has been developed according to the following steps:

1. Development an initial high-level view of the **EGI strategy map and analysis of the main strategic shifts**
2. Development of the **strategy tablets** (2-page document analysis strategic topics, problems to be solved)
3. Preparation of an **interview** with the EGI.eu Executive Board to capture their viewpoints on strengths and weaknesses of the current situation, the future challenges, their perceived needs of the various stakeholders and comments on the main shifts that should be captured by the EGI strategy. Individual interviews were conduced with the seven members of the EGI.eu Executive Board.
4. Preparation of a **survey for the EGI Council** to capture individual NGIs viewpoint, collection of answers from the EGI Council and analysis to update the big shifts table
5. Definition of a set of **milestones** for the years 2015-2017 to implement the strategy
6. Preparation of the main **EGI strategy document**
7. Organisation of an **EGI Council workshop** devoted to the evaluation of the defined strategy
8. Final revision of the EGI strategy document and **adoption**

This work is in advanced development stage and the last three steps are on-going at the time of writing, with the EGI Council workshop planned for the 11th February 2015.

**EGI.eu Value Proposition**

We have developed a short document describing the value of EGI.eu for the participants (NGIs/EIROs) that pay a fee and are part of the EGI Council. The goal of the document is to provide a clear statement for current and future EGI.eu participants of the benefits that they can obtain by becoming part of the EGI Council. The document is available in the EGI document repository[[48]](#footnote-48).

**Business Engagement**

The Business Engagement VT was launched as an additional effort of the EGI-InSPIRE project due to the increasing perception of the need for strengthening the collaboration and knowledge transfer between EGI and industry. EGI acknowledges that SMEs play a very important role in the European economy, and are expected to take even a more important role in boosting European competitiveness. EGI also recognises that the collaboration with industry is essential for enhancing its own performance and sustainability.

The Business Engagement Programme Virtual Team (BEP VT) was launched in April the 1st with the objective of defining a suitable Business Engagement Programme for SMEs, and identifying a number of companies with interest to start collaborating with EGI. A wikipage[[49]](#footnote-49) was released to inform about the motivational background and the proposed action plan. In order to enhance the inclusiveness and participation across several channels were used to disseminate this initiative. NGIs, NILs and champions were informed, but the invitation to participate was also made extensive to some SMEs already orbiting in the EGI constellation. As well, several members joined in different stages of the lifetime of the VT invited by other members. The number of participants in the VT was of 24 in the end of November. There have been organised 7 virtual phone conferences with an average participation on 7-8 members. The minutes of the meetings have been stored in the EGI document repository[[50]](#footnote-50). The discussions have also been continued using the e-mail thread specifically created for enhance the communication among members.

The VT recognised the complexity of the EGI environment and diversity of the legal status and strategic objectives of the Resource Providers and NGIs integrating EGI. Much effort and discussion time have gone to identify these issues and in creating a document with a proposal that would avoid potential conflicts.

The main output of the VT work, which has accepted by the members as a very satisfactory accomplishment, is the delivery of a document proposing a suitable framework for engagement, while respecting the strategic, legal, and organisational issues identified[[51]](#footnote-51). It outlines the opportunities and benefits for a wide type of private organisations to work with EGI. A main conclusion was the need of widening the scope to include not only SMEs but also R&D units of large enterprises, and other organisations such as projects with relevant activity after the funding cycle. The document also defines the varying levels of collaboration, proposing a three layer structure. The first one would have a low barrier of entry to facilitate the engagement; the other ones would allow the creation of tailored agreements for collaboration. The document was presented for feedback to the EGI.eu managerial board.

The second output was the creation of a common database for identifying those SMEs that could be participants of the programme. The initial objective of the VT in terms of number of identified SMEs has proven to be overambitious for the time and resource scale of the VT. The contacts for proposing formal engagement have not started yet.

**Business models and proof of concepts**

In early 2013, the EGI Council approved a policy to explore business models for pay-for-use service delivery to couple together with the traditional method of free-at-point-of-use. Therefore, the goal of this task was to support the implementation of this policy in collaboration with NGIs and individual resource providers through the definition and execution of proof of concepts. Activities included: articulation of appropriate business models, definition of prices for services from the participating sites, definition of agreements and service management processes and procedures, introduction of a billing function, analysis of the changes needed to support services and roll out the new functionalities in the production environment, and evaluation of legal, policy, and organisational issues around the full implementation of the pay-for-use model.

The output of this task is documented in a separate report. The approach was taken to split the activity into 2 main phases:

* Phase 1 (Jan-June 2014) – set up and implement the minimum/basic functionality to allow providers to define a price and to account for them and present at the 4th EGI-InSPIRE EC Review.
* Phase 2 (July-Nov 2014) – Develop tools for service discovery and request; Increase automated functionality.

The first version of the report following Phase 1 was published in June[[52]](#footnote-52) with an updated report (in progress at the time of writing), which provides further details regarding overall activities, processes and documentation for providers and users, and serve as a record for continuing activities into 2015.

The Pay-for-Use Proof of Concept group[[53]](#footnote-53) launched in January 2014 on a best effort basis with formal funding activities starting in May 2014 as a dedicated tasks within PY5 NA5 WP. This activity was also closely linked to TNA5.1 Strategy, Policy and Business Development; SA5.2: Federated Cloud and JRA2 Tool development.

In total, 16 regularly scheduled phone conferences were held[[54]](#footnote-54) with formal minutes produced[[55]](#footnote-55) as well as two dedicated sessions at the EGI Community Forum in Helsinki[[56]](#footnote-56) and the EGI Big Data workshop in Amsterdam (Sept)[[57]](#footnote-57).

The following sections provide a high-level view of the main activities, results achieved, and recommendations moving forward, including individual partner contributions.

**Pay-for-Use PoC Summary**

Overall, the group consisted of 43 Members and Observers from EGI.eu (Lead), Resource Centers, NGI NILs, and Commercial Companies. An overview of the participating countries providing pricing information is summarised as follows:

* Publishing Pricing Information
  + 20 Organisations across 13 Countries
  + 20 Grid Sites: Belarus; Bulgaria; Germany; Greece; Italy; Latvia; Poland; Spain; Switzerland; Turkey
  + 10 Cloud Sites: Finland; Greece; Italy; Poland; Slovakia; Spain; Turkey; UK
  + 15 Storage sites: Bulgaria; Greece; Italy; Spain
* 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)
    - Taxation report available at[[58]](#footnote-58)
  + Prices to be valid for one year once in production

**Main Activities/Achievements**

* Complete business processes defined: Providers to publish pricing information; customers to discovery services and prices; request submission; negotiation and SLA; VO set-up; accounting of consumed resources; invoicing.
* Tool adaptation
  + GOCDB extensions added to set pricing: cloud compute and storage, grid compute and storage, VAT
  + Accounting Portal extended for price information accounting
  + e-GRANT developed to offer both a user-facing interface and enable providers to receive requests, negotiate the service and price and allocate resources.
* Business models and pricing schemes defined: selling of physically resources (pay-per-use; packaged), joint development projects, and consultancy.
* National exposure and initiatives underway and already examples of success stories (see individual partner contributions below)
* Legal and Policy solutions emerging for institutions not fully able to engage in commercial activities: e.g. research-only purpose statements; charging for human services with resources offered for free (however, monetary value of those services is now able to be calculated)
* System tested and approved by resource providers
* Business opportunities being explored
  + Helix Nebula Marketplace (HNX) – 4 EGI sites involved
  + Engineering SpA (Large Italian company) - Looking for resource providers to support contract (research data)
  + European Space Agency - Review procurement procedures and tender requirements (financial liability)
  + Pre-commercial procurement (PCP) / Public procurement of innovative solutions (PPI) (dedicated presentation at EGI Big Data Workshop – INFN) e.g. Cloud for Europe; EC projects (e.g. PICSE - Procurement Innovation for Cloud Services in Europe)
  + 100% IT (UK Ltd. company) - Commercial organization involved in EGI Federated Cloud/P4U PoC
  + Charity Engine (Worldwide Computer Company Ltd) - Desktop computing (BOINC) - revenue sharing model (1/3 provider, 1/3 charity, 1/3 company); Broker agreement available for € based on users brought
  + Arctur (Slovenian SME) - Provides cloud and HPC services; Offers Alice ununsed/available resources for free - Interested in joining the EGI "marketplace” as a provider
  + Zenotech (UK) - Runs a marketplace for aerospace, automotive, civil engineering and renewables – contacted EGI to have providers visible in marketplace to serve their customers.

Recommendations moving forward:

1. User-facing graphical interface – all technical development is complete and a design mock-up created – will be ready by end of Jan 2015.
2. Increase automation of varying pricing schemes beyond pay-for-use and packaged services (e-GRANT terminology of “pools”)
3. Integrate an automated billing function
4. Mature EGI.eu's role as a full central broker – contractually and pricing model (e.g. % of transaction)

### Federated Cloud (SA5)

Following the successful launch of the federated cloud the PY5 period was one of consolidation, where we aimed to strengthen the support for both resource providers, with improved tools and technologies to make their joining the federated cloud more easy and for user communities where necessary strengthening the process by which we engage with new and emerging communities. This involved alterations to operational and user support procedures which are detailed within the next sections.

Though we had experienced a rapid growth in the number of resource providers joining the Federated Cloud infrastructure, a key component was now to stabilise those we had, get them all supporting proof of concepts and participating fully in the activities. This included responding to support requests in the manner as normal for EGI resources centres regardless of the solution supported.

#### Operating a reliable federated institutional IaaS Cloud service (SA5.1)

Towards the beginning of PY5 almost all operational activities for the IaaS Cloud services were dedicated to releasing the Cloud infrastructure into production.

In the remainder if PY5 all work undertaken in Task SA5.1 were geared towards continuous improvement and formalisation of the operational activities and processes for the federated Cloud infrastructure, this includes supporting new sites to join the federated cloud.

This also included the support and maintenance of the dedicated connectors and reporters that allow the easy integration of the new cloud service type in to the production infrastructure, alongside continuing external developments of cloud management frameworks, user facing tools and our own central services.

**Site connection procedure improvements:**

* Processing developments and extensions to recommended or under development standards passed back to SDO working groups (UR, OCCI, GLUE)
* Development of standards middleware to support connection of new CMF, including the public clouds Microsoft Azure and Amazon Web Services.
* Development and release of reference implementation for CDMI based on GRNET Synefo.
* Development of monitoring probes to test higher level functionality in CMF to cover full user workflows including contextualisation which has been standardised through cloudinit.
* Development of documentation for new sites and installation of federated cloud specific software components.

**Site certification procedure improvements:**

* **Merging PROC18 in PROC09 –** The temporary Cloud site certification procedure PROC18 was integrated into PROC09, unifying the overall certification process across all offered resource types in EGI (save necessary differentiations, which were kept at a minimum).
* **Manual check instructions –** The manual checks that must be conducted during certification are documented in the EGI Wiki[[59]](#footnote-59)
* **Information security checks –** Security checks were developed together with EGI Security Policy Group (SPG) and the EGI Computer Security Incident Response Team (CSIRT) and documented in the EGI Wiki.[[60]](#footnote-60)

**Service support & improvement activities:**

* **GGUS support units (SU) –** A set of dedicated support unit were set up in GGUS to track operational incidents in the federated Cloud infrastructure
* **Availability & Reliability monitoring –** A/R metrics are generated and collected on a monthly basis with other OLA service level targets.[[61]](#footnote-61)
* **CMF release and deployment management** – Cloud Management Framework (CMF) integration code may be released and deployed using the UMD, and managed by the URT. An initial survey[[62]](#footnote-62) was conducted for scoping further work.
* **Technical service improvements –** Campaigns were run to integrate site bdii instances in GOCDB, supporting dteam VO at Cloud sites, including VO information in accounting records, and to put VM descriptions in GOCDB.
* **Resource provisioning –** Support for cloud sites in Resource Allocation process; Cloud resources can be offered through E-grant
* **CMF production infrastructure integration –** A new procedure has been produced and approved by the OMB regarding the integration of new Cloud Management Frameworks and Grid middleware in the EGI production infrastructure (<https://wiki.egi.eu/wiki/PROC19>)

**User related activities:**

* **VO control –** Updating PROC14 (VO creation) and PROC13 (VO decommission) procedures to include cloud VOs creation and support
* **User SLA –** Working on first EGI User SLA document based on Cloud use case with Biovel community

#### Cloud Proofs of Concept (SA5.2)

During PY5 the EGI.eu UCST continued with broadening the network of NGIs providing support for Proofs of Concept use cases and users. This requires continuous monitoring of site certification (because certified sites typically became active in user support), and knowledge exchange about the services, resources and tools that are available for the NGI support teams to engage with and support the users. The bi-weekly User Support teleconferences have proved an important platform for coordinating the distributed support for existing use cases, discussing new use cases, cross-cutting needs and requirements. The following comprises a summary of the activities during PY5; complete and more detailed information is available in the EGI Wiki[[63]](#footnote-63).

In total, the resource providers contributing support for Proofs of Concepts are affiliated with 11 NGIs (in alphabetical order; Czech Republic, Croatia, France, Greece, Hungary, Italy, Macedonia, Spain, Poland, Portugal and Sweden).

At launch there were a total of 15 use cases/proof of concepts on going. Due to the rapid growth experienced in new communities approaching the federated cloud it became necessary to streamline the support workflow to maximise efficiency of usage for the UCST. This included classifying the use cases such that it was clear at each stage what support or assistance was necessary from the UCST

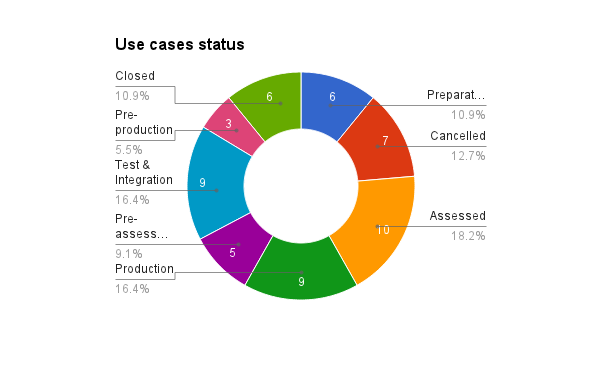
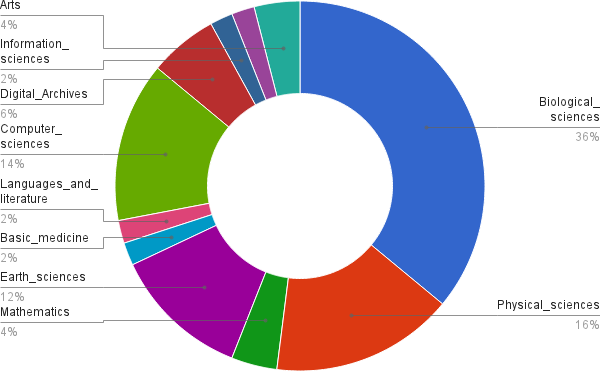
In total, the UCST took care of 36 Proofs of Concepts; of these, five went into production: BioVeL Portal, OpenRefine, OpenModeler (all BioVel project) and READemption (Uni Wuerzburg). Three further Proofs of Concept were closed without turning into a production system: EISCAT-3D data catalog, acces and dissemination, ESA SSEP data processing, and Jena University’s JAMS (Jena Adaptive Modelling System) porting to the Cloud. Figure 1 provides an overview of the status of all supported Proofs of Concept.

Figure 1: Overview of the status of the supported Proofs of Concept

Overall, in terms of classification the Proofs of Concept supported by the UCST on the Federated Cloud infrastructure is by far more diverse than on any other offered resource type. XXXX provides an overview of the first and second level scientific discipline classification of all Proofs of Concept.



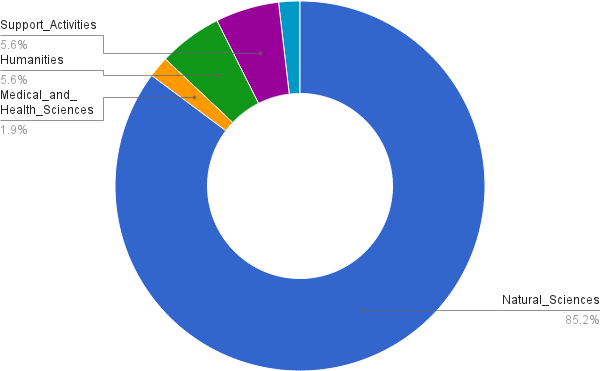


Figure 2: First level and second level classification of all Proofs of Concept

The EGI.eu user support team further promoted the various tools and Proofs of Concept that went into production:

* FedCloud demo session at the EGI CF 2014
* Biovel: http://www.egi.eu/news-and-media/newsfeed/news\_2013\_0038.html
* Biovel newsletter n. 4
* Ecological Niche Modelling running on the EGI Federated Cloud[[64]](#footnote-64)
* Biovel newsletter n. 5[[65]](#footnote-65)
* IFCA launches EGI FedCloud portal for CMS open data[[66]](#footnote-66)
* READemption webinar[[67]](#footnote-67)

Further, through the work with the Proof of Concept user communities, the EGI.eu user support team elicited the following common key requirements for the Federated Cloud activity:

* **Big data distribution**: an official solution should be offered by the EGI Federated Cloud to copy and replicate the big data sets used by the use cases.
* **Automatic scalability to exploit cloud elasticity**: add in the EGI Federated Cloud portfolio services tools allowing users to automatically scale out through both live VM resource allocation (CPU, RAM, etc.) and VM instance management
* **Contextualisation tool(s) for Windows OS**: offer a contextualization solution for Windows OS virtual machines as well.
* **Extend the EGI Federated Cloud OCCI client to get information about the cloud site configuration**: a user should be able to query a EGI Federated Cloud site to know its policy about IP management, ports, etc. The OCCI client should allow users to create new security rules (e.g. open port 22) during for their virtual machines.
* **Offer a Virtual Machine image with the EGI Federated Cloud CLI environment pre-installed**: to speed-up the use case preparatory work.
* **Reliable storage solutions**: offer production quality block and object storage solutions.
* **Custom DNSs**: Users should be able to create custom DNS configurations.
* **Reliable service management**: Well-defined procedures and policies to access the EGI Federated Cloud resources.
* **Java API for OCCI**: useful to easily integrate user applications to the EGI Federated Cloud.

### Tool development (JRA2)

JRA2 is a new activity started in PY5 to ensure continuity to the software development for a subset of tools that require further development to support pay per use Proof of Concepts, and the operation of the Federated Cloud.

As first step, collaboration and reporting tools were chosen and created:

* JRA2 mailing list: inspire-jra2@mailman.egi.eu
* Indico folder for the JRA2 meetings[[68]](#footnote-68)
* JRA2 wiki page for the weekly reporting[[69]](#footnote-69)
* JRA2 RT queue

It was agreed to organise a JRA2 monthly meeting to discuss about the development status and future plans of the tools involved. The other EGI tools, not directly involved in the JRA2 activity but parts of the EGI Federated Operations solution, have been also invited to attend the JRA2 monthly meeting. Indeed, we have taken advantage of these meetings to coordinate the tool development roadmaps and guarantee the tool interoperation as we did in the JRA1 monthly meetings during the first four years of the project.

Furthermore, during the first quarter of the PY5, AppDB and e-GRANT adopted the development processes defined in JRA1 and already used by all the other tools.

The integration testbed[[70]](#footnote-70) was extended to include AppDB and e-GRANT.

#### SAM

The main objective of this task is the evolution of the current Service Availability Monitoring framework towards a more lightweight and sustainable solution that will better address the evolving requirements of EGI for testing and benchmarking its capabilities in terms of resilience and service continuity.

During the first half of PY5 a proposal had been made by the consortium (GRNET, SRCE & CNRS) working on this task for the expansion of the scope of JRA2.1 to include new functionality, which we considered important in order to deliver a functional product that will be able to replace the existing SAM service in the beginning of EGI-Engage. In the first days of October, the discussions with EGI.eu were finalized and the following items were added to the JRA2.1 work plan:

* Standalone version of ARGO (started in October 2014)
* Testing and release of ARGO (started in November 2014)
* Removal of the WN framework (started in November 2014)
* CDMI Cloud Storage Monitoring probe (started in November 2014)

The status and planning for JRA2.1 can be found on the JRA2.1 time-plan[[71]](#footnote-71). Currently all the development tasks are still running but they will be completed by the end of the year or in January 2015.

Web UI

For the WebUI, Lavoisier was migrated to the latest version. The new version of Lavoisier comes with improved functionality with the cost of introducing non-backwards compatible changes. This version benefits from a new language, which eases the developments. A preliminary work has been done to introduce statuses report and some chart libraries have been tested. The final choice is the google chart library. As a result, most of the custom UI functionality was re-implemented for the new version of Lavoisier. Along with the new version of Lavoisier, a new theme was used that provides higher quality UI components. Furthermore, the new version of Lavoisier gave us the ability to implement access control using X.509 certificates and custom roles either defined in the configuration files or using the existing roles from the GOCDB. The tree map view was implemented taking into account the custom factors provided by the API.

Moreover, the EGI Operations team has tested the current Web UI and some bug fixes and ergonomics requirements have been done.

Web API

For the WebAPI we had to implement the relevant changes in order to provide access to the raw data that are now being captured by the Sync Components. The new functionality resulted in updating both the WebAPI service and the mongodb datastore. In addition to this, the test use cases for the core functionality of the WebAPI were extended to cover significant part of the code base. Finally, we introduced support for the custom factors in the WebAPI.

The implementation of delivering status results timelines on various levels required effort on both the datastore and the api service itself.

Regarding the datastore, which is implemented in MongoDB:

* Various schema changes were applied in the collections that hold the status result data. Also additional collections were employed because of the need to hold supplementary meta-information regarding statuses.
* Because the order of magnitude of the status data is tenfold compared to the a/r results, various optimizations were employed in-order to increase speed and efficiency on the queries. The optimizations include implementations of various critical indexing strategies on the above collections and the enrichment (with metadata) and pre-arrangement of data before being delivered to the datastore.

Regarding the API (which is implemented in golang) and considering the need to serve in different ways the metric data and status results, we decided to implement more unified, concise and feature-rich responses that cater for more, but also stay simpler and easier to understand and use.

In that notion, everything that is related with serving metric results is implemented in one unified request that gives the ability to flexibly define nested types of groupings (per vo, per ngi, per site, per host and per metric). Also the inclusion of default values on most of the usual parameters and the placement of critical input parameters on the URL path gives the ability to have more clean semantic-like and user-friendly URLs. Regarding the responses most of the xml fields are being implemented in a more robust and dynamic way (by using efficient pointer structures of xml objects in golang) giving the ability to change and shift the amount of data presented and how it is grouped on demand.

Availability and Reliability Compute Engine

For the Compute Engine, the main focus has been the optimization of the core engine for the A/R computations, including the full unit test coverage of the core functionality.

During the reporting period the focus with respect to the Compute Engine has been placed upon:

* deserialization framework for input files
* modifications of low level AND and ORing operators within the engine and customization of these selections
* moving access to the status results to the web interface
* code refactoring (removing old and deprecated bits and pieces of code in the code base)

Much progress has been done with respect to code refactoring and deserialization framework. Still work is ongoing in all of the above-mentioned aspects and will be completed by the end of December.

Sync Components

For the Sync Components, the bulk of the work was directed towards the implementation of the required data store changes in order to be able to capture also the raw data for each probe. The raw data are now stored in a separate stream in parallel to the captured metric results.

We looked into AVRO format for storing sync component streams. This will allow the sync components to add data schemas, which will later be used in the A/R Compute Engine.

Monitoring Engine & Gridmon

For the SAM Gridmon we investigated usage of Web API and other internal APIs by SAM Nagios and third parties (ARGO sync components, Operations portal, EGI.eu operations). Based on the investigation it was decided that majority of functions are already implemented by the ARGO REST API and that they can be deprecated.

The only component from SAM Gridmon that will remain is POEM. It was decided to refactor it in order to make it independent from MRS database. Furthermore, POEM will use SQLite instead of MySQL to make the deployment more lightweight. First version of simplified POEM will be deployed in November.

Monitoring engine will be simplified to contain Nagios, POEM and components for configuration and communication over message broker. Instead of modifying ATP provide XML that NCG uses currently, NCG was modified to use GOCDB REST API directly. Similarly, instead of using POEM-Sync component, NCG gets information about profiles directly from POEM deployed on GridMon. In addition, as part of the SAM Update-23 release thorough cleaning of the packages from SAM repository was performed and first RHEL6 packages were tested.

Standalone version

As a part of a conceptual and design procedure, the initial effort was to analyse, identify and list all the integral parts of the compute engine that are monolithic and heavy-targeted on specific use-cases and environments. The components that have been listed are being transitionally refactored in order to be replaced with something more generic and modular. In addition, some refactoring took place regarding eliminating operational points of dependency with the hadoop cluster in order to be able to reduce gracefully when the cluster is absent.

The most promising and fruitful point from which the refactoring effort embarks is the input part of the compute engine where the various consumer logs and sync component files are gathered. There has been an effort for establishing a clear schema mechanism for each type of data file. Avro framework was chosen as a way to serialize data in the consumer & sync components and deliver it to the compute engine. An avro file serializer & deserializer has been implemented both as a proof of concept and also to serve as an utility to handle files during development. Avro Schemas have been implemented for the current form of sync and consumer log files albeit with more expressive and generic header fields.

Regarding the readiness of the compute engine to accept avro-encoded files, new parts have been introduced in the front of the compute pipeline that automatically receive the avro-files, extract the schema and transfer the structured data to the rest of the compute engine.

Another important part is the centralization of some crucial information (topology/operational stuff etc) during computation steps in a single point (eg the datastore) in order to greatly reduce the use of configuration files and parameter bundles that unfortunately get transferred/referenced on each step of the computation pipeline. This will greatly improve the effort to further modularize and decouple the compute engine parts in order to be able to offer more generic features on demand.

Through the developments for the standalone version our plan is to make ARGO as a product more lightweight and well documented.

#### Accounting

In PY5, the most relevant enhancements in the EGI accounting system have been related to the CPU, MPI and Cloud accounting. Furthermore, an important contribution has been given to the Pay-for-User Proof-of-Concept.

For the CPU accounting, the team assisted many sites sites to migrate from EMI2 APEL software to the EMI3 software. Now, around 10 sites remain using EMI2 APEL. INFN, IN2P3 and NorduGrid sites migrated from SSM1.2 to SSM2 messaging software and new versions of the APEL accounting software were released to fix many bugs.

Changes to the central repository have been made to enable it to send MPI data summary to the portal. After some initial issues, now the system has been running reliably and the central repository is regularly sending MPI data summary to the portal.

A new EMI3 view showing the accounting data according to the new EMI3 schema and integrating the MPI accounting data was developed and it is now available in the development version of the accounting portal for evaluations aims. The EMI3 view will become soon the new official view in the EGI accounting production system.

About Cloud accounting, new EGI Federated Cloud sites have been included in the accounting system. In July, the new accounting probes, developed in collaboration with the EGI Federated Cloud providers, were released. These new probes allowed us to add the VO information in the cloud accounting data. Now, we are working with the EGI Federated Cloud provider to improve the conformance with the agreed schema. The next relevant enhancements in the cloud accounting will be (1) adding a unique identifier of the VM image in the cloud accounting record (linked to the AppDB Cloud Marketplace) and (2) improving the accounting of long-term VM instance. Both should be available in the first months of 2015.

The team also supported the Pay-for-User Proof-of-Concept WG helping them to define prices for grid, cloud and storage resources. New views were developed in the portal to allow the estimation of the average monetary cost of the used resources according to the billing functions defined by the Pay-for-Use PoC.

Finally, a first support of the new EGI scientific discipline classification is now available in the portal and an analysis to choose the best technologies for the new portal has been done.

The evolution of the accounting system will continue in the first months of 2015. The backed systems will be updated systems to provide better reliability to EMI3 clients and reducing resources allocated for EMI2 clients. Support for sites to migrate from EMI2/SSM1.2 to EMI3/SSM2 APEL software will continue, MPI view in the portal will be improved according to the users’ feedback and the consistency of the cloud accounting data will be verified in collaboration with the EGI Federated Cloud developers.

#### AppDB

During PY5, AppDB has seen several improvements with respect to extending the service’s reach.

Starting with v5.2.0 (May), its Cloud Marketplace features support for VO-wide image lists of Virtual Appliances; VO administrators can create and manage lists of VA images that are supported by their VO and publish them via VMCaster / VMCatcher integration[[72]](#footnote-72). Moreover, through integration with the Grid Information Service (top/site BDIIs) and the GOCDB, interested users can review these lists and get information on how to instantiate supported VAs on the appropriate sites / resource providers.

Since v5.2.8 (June), the authentication system has been expanded with support for the eduGAIN federated AAI. As part of the greater effort to support the ELIXIR project, we granted AppDB access to the user authenticated through the EBI’s[[73]](#footnote-73) IdP; to this purpose, we also did the integration with Perun, in order to provide information on Cloud VOs.

Another work that took place during the first quarter was the preparation for and participation at the EGI Community Forum, where two presentations were made, and the development of a new probe which monitors the AppDB as a VA distribution mean[[74]](#footnote-74).

From July, AppDB has seen further improvements related to Virtual Appliance support, and has been extended with new data entities, which interconnect people and software. More specifically, starting with v5.3.0 (July), Virtual Appliance images have been introduced to a new mechanism to support contextualization scripts; users registering Virtual Appliances may choose to specify one or more such scripts for each image they add. Any user who runs the Virtual Appliance, then, can select one of the appropriate scripts in order to instantiate the virtual machine with a predefined environment, more suitable to his or her needs.

Moreover, as far as Virtual Appliance support goes, a new entity went public after v5.3.0, namely the Site entity, by making use of GOCDB's web API[[75]](#footnote-75). These entities provide information on whether a site exposes an OCCI endpoint (service) and on which Virtual Appliance images, registered in AppDB, are available there, along with all the necessary data to instantiate a virtual machine on the site. This feature makes it much easier for a user to find and properly deploy the solution he or she needs, from a single point of entry.

Other new entities that were introduced v5.4.0 (September) onwards, are related to software and people interconnection, by making use of OpenAIRE's web API [R2]. These include Organizations and Projects. Organizations have been mapped to people profiles based on existing institute information, which they have superseded. Furthermore, users can also add Project entries on their profiles, and also link Project and Organization entities to software / virtual appliances they have registered, also specifying a verb which indicated the type of relation the software / virtual appliance has to these entries. Furthermore, software and virtual appliances may be linked to each other by owners, in order to specify relations such as “instance-of” and “uses”, meaning e.g. that “Software A” uses “Software B”. The result of this effort is a more coherently connected content for AppDB, which provides end-users with a richer and more versatile experience when trying to locate information.

It should also be mentioned that, currently, the aforementioned contextualization script mechanism is being remodelled, in order to enhance its capabilities. The result, which is expected to be deployed with the forthcoming v5.5.0 release, will feature a new entity in its core, namely the Software Appliance, in an effort to provide Software-as-a-Service (SaaS). Software Appliances will contain and manage contextualization scripts for Virtual Appliances, and will completely replace the existing contextualization script mechanism.

Finally, a pilot project, whose continuation in 2015 will be possibly co-funded by the ELIXIR project, has been initiated having as primary aim of discovering and reuse ELIXIR reference datasets within the EGI. The expected outcome for the AppDB will be to extend the service with new capabilities in order to expose information about biological reference datasets and their replicas across EGI. Key characteristics of these datasets will be made available by AppDB in the form of metadata for life science users. The initial dataset metadata schema should consist of basic attributes such as name, locations, size, and type; when input from tasks 1 & 2 becomes available, the schema should be revisited in order to identify any additional characteristics that may need to be included. The expected delivery date is on the second quarter of 2015 and more information is available at [link](https://docs.google.com/document/d/1xJrnVW7u5Q2N7nF3hPsYBOnzloilaoDx2j607Wo7BcA).

#### e-GRANT

During the first months of PY5 e-GRANT development was focused on two main issues:

* improvements for Resource Allocation (RA) procedure;
* functionalities supporting the EGI Federated Cloud.

Development around RA concerned implementing functionalities, which allow using e-GRANT more efficiently as a Reservation and Allocation Tool, such as:

* implementation of "approximate" pool matching: the broker has a better access to all resource pools available (enabled in the system) when searching for resources for a specific RA request. At the same time, the system assesses for the broker which pools are most appropriate for the request;
* solution for the problem with expiring Pools, enabling / disabling Pools in production: during the searching for the resources (“Find Pools” command) only pools enabled by providers are given as a result of the command;
* implementation of e-mail notifications: every significant action taken in e-GRANT is notified with an e-mail sent to all relevant parties (customer, broker or provider).

Work involved in implementing functionalities designed for the EGI Federated Cloud was performed according to a schedule agreed with the Federated Cloud Task Force members. Tasks planned for and fulfilled during the second quarter of 2014 are:

* allowing customers to request EGI Federated Cloud resources: implemented RA request form for EGI Federated Cloud resources with adequate metrics for the resources,
* allowing EGI Federated Cloud providers to create resource pools: implemented Pool form for EGI Federated Cloud resources with adequate metrics for the resources.

Additionally, cooperation with Pay-for-Use Task Force has been established. As a result an overall contribution of e-GRANT in Pay-for-Use activity was initially determined and e-GRANT will provide support for 6 out of 11 processes involved in the activity.

During the second half of the PY5, e-GRANT development work was focused on evolving Federated Cloud activity in e-GRANT, making it an integral part of EGI resource allocation process and introducing a new activity: the EGI Pay-for-Use. e-GRANT team became a member of Pay-for-Use working group whose aim is to create a pilot system supporting EGI Pay for Use activity.

The team also started to develop a feature to broker Federated Cloud resources in e-GRANT.

At the same time the core component of the tool – general functionalities for RA process, evolved. Cooperation with Resource allocation support team led to introducing improvements to the system, making it more user-friendly. RA support team conducted tests, which concluded in list of features meant to improve RA process in e-GRANT: make it compact, facilitate pool matching, and make it more intuitive for users. Some of the improvements:

* Involving middleware information in resource specification – both Customer and Provider can specify middleware which makes pool matching conducted by Broker more accurate
* Specific description of metrics for Customer and Provider – Customer and Provider gained personalized definition for information they need to specify when creating a RA Request or RA Pool
* New view for Pool List – better organized, Broker and Provider are able to more freely browse Pools available in site(s).

During the last quarter, work on the rest of functionalities for the EGI Federated Cloud was completed. After agreeing final details with the EGI Federated Cloud Task Force and EGI.eu User Community Support Team (UCST) development on brokering Federated Cloud resources was finished and moved to production. Some other details (UCST requirements) were also implemented:

* putting information about RA Documentation in Provider and Customer view
* improving navigation for RA Documentation
* Federated Cloud resources are by default added to new RA Request.

A complete list is available in [this GGUS ticket](https://ggus.eu/?mode=ticket_info&ticket_id=107696).

Regarding the EGI Pay-for-Use WG, a separate testing instance was established where following functionalities were developed:

* integration with EGI GOCDB to import data about resource prices
* possibility for Provider to create a Resource Pool with Pay-for-Use resources
* information about resource price filled automatically (info from GOCDB) when creating a PFU resource Pool
* HTC and Federated Cloud resources integrated with Pay-for-Use activity

As a result, 29 Pay-for-Use resource Pools were created

December activity will be focused on complete the developments related to the Pay-for-Use activity. January 2015, it is planned to have a whole working pilot system with basic functionalities for Pay-for-Use. Functionalities that will be developed by the end of the year are:

* The customer is able to search for all the providers that support pay-for-use services
* The customer decides from which provider to buy services and submits a request

The activities foreseen for the first months of the next year will included the introduction of the SLA definition for EGI HTC and Federated Cloud resources in the resource allocation process.

Further activities to support the Pay-for-Use proof of concept are foreseen too:

* the customer uses the services and receives a monthly usage report. However, users will have access to the accounting portal for their VO (updated once a day);
* the customer receives an invoice and pays directly the service provider(s).

## Project Issues

### Operations related issues

The main issue raised during PY5 for the operational infrastructure is related to few small NGIs who are experiencing difficulties in performing their daily activities. This is caused mainly by staff issue and the impossibility to have more people working on the NGI duties. Since small NGIs with few sites do not have a big pool of people to distribute operational tasks. In PY5 the NGI operations centre was decommissioned because of problems with the sustainability of the operations of the single site federated in EGI.

The issue is currently being assessed, EGI Operations plan to have individual interviews with the smaller NGIs, in order to discuss the status of their operations and identify how EGI can help them to provide the minimum operational activities required to be part of the federation.

### Federated Cloud

Commercial cloud providers can join the Federated Cloud (this is already the case in UK with 100%IT), however the newly approved governance does now allow commercial entities to be full member. An extension of the governance model is needed to facilitate the engagement with the private sector.

## Project Management

The focus at the start of PY5 was the preparation for the fourth EC Project Review that was held in Amsterdam on July 02-03 2013. The project officer, 4 EC reviewers and representatives attended this from the coordinator and the project consortium. Two rehearsals were organised by phone during January and February to prepare and align material in the presentations. Information was collected from the partners to prepare the Form C’s and the project’s work packages to prepare the periodic report.

Following the review and management discussions, corrective actions in the project activities of PY5 were discussed and their implementation started in order to take into account the outcome of the PY4 review. An additional set of activities – benefiting from the redistribution of unspent effort – and the policy for the reallocation of the unspent budget were defined in agreement with the partners, the activity managers and the PMB. These changes were reflected in the preparation of the 4th amendment and were formally communicated for approval to the EC on Oct 22 2014.

The Description of Work was modified as of 1/03/2014 as follows:

* 1. Transfer of budget between Beneficiary 14-CNRS and Beneficiary 1 EGI.eu in order to perform activities related to task TSA4.6 “Dynamic Deployments for OCCI Compliant Clouds” aiming at achieving technical interoperability between the Helix Nebula broker SlipStream and the open standard based interfaces of the EGI Federated Cloud.
  2. Allocation to the central budget of EGI.eu for strengthening of strategy development activities, including training on strategy development processes and balanced score card development.
  3. Redistribution among the consortium beneficiaries of effort (141 Person Months) remaining at the end of Project Year 4. Purpose of the redistribution was to reinforce and increase the EGI-InSPIRE PY5 work plan, taking into account the recommendation of the PY4 EGI-InSPIRE review. The project activities benefitting from additional budget and effort were: NA1 (Project management), NA4 (Community Engagement), NA5 (Strategy, Policy and Business Development), SA5 (Federated Cloud), JRA2 (Tool Development).

The following table provides an overview of the amended budget and related activities.

Table 3. Overview of Amendment N4 and of the additional work plan proposed in reply to the PY4 review.

|  |  |
| --- | --- |
| **Source** | **Changes** |
| * + - * 1. Changes requested by the Beneficiaries CNRS and EGI.eu | * + - * 1. Transfer of activity from CNRS to EGI.eu : mini-project TSA4.6 “Dynamic Deployments for OCCI Compliant Clouds”         2. Task description:         3. Mini-project for adding two key capabilities to the SlipStream open source software to support broker service to deploy virtual machines to the EGI Federated Cloud and basic auto-scaling functionalities.         4. This mini-project is strategic for both EGI and Helix Nebula because SlipStream is also the open source implementation selected for the Helix Nebula Marketplace to federate commercial providers. With the output of this project is possible to demonstrate the hybrid cloud model where users can deploy VMs both on commercial and public-funded resource centers.         5. CNRS is not able to deliver the work within the agreed time frame. As backup plan:         6. 1. CNRS agrees to return the whole budget to EGI.eu allocated for the mini-project, 42KE and contribute the booked effort in the timesheet as unfunded partial performed work         7. 2. SixSq (Swiss SME that develops the SlipStream open source product, www.sixsq.com) agrees to allocate manpower and complete the work with a two-month subcontract for 30 KEuro starting on the 01st of April 2014 and ending on the 31st of May; they agreed to deliver the capability in a timely manner for EGI to demonstrate the integration within the Helix Nebula project timeline.         8. 3 EGI.eu uses 12 KEuro (refundable at 100%) to cover the cost of partial work done by an EGI.eu employee to compensate the delay from CNRS in this mini-project. |
| * + - * 1. Redistribution of unspent budget (PY1-PY4) | * + - * 1. The efforts unspent (141 PMs) in the project periods PY1-PY4 are reallocated across the consortium partners, with the aim of increasing the activity plan for EGI-InSPIRE PY5 following the recommendations from the PY4 review, and for an effective use of the unspent project budget.         2. PMs are distributed across the EGI-InSPIRE PY5 as follows: * NA1 (task NA1.4 Quality Assurance) – 1 PM for support to the preparation of EGI “core activity” 2014 report, review of the EGI-InSPIRE metrics and editing of project reports. * NA4 (task NA4.3 Distributed Competence Centre) – 51 PMs for the definition of customized policies and a platform for the long-tail of Science, support to Molecular Dynamics and modeling, condensed matter physics community and computational chemistry community, nano-technologies, GPGPU application porting, support to Research Infrastructures on the ESFRI roadmap (CLARIN, DARIAH, ELIXIR, ELI, BBMRI, ICOS, LOFAR), porting of applications to the federated cloud (Next Generation Sequencing analysis), implementation of a pilot use case for the discoverability and reuse of biological open datasets. 🡪 Updated section : 1.3.2.4.4 * NA5 (task NA5.1 Strategy and Policy and NA5.2 Business Models and proof of concepts) – 4 PMs for the reinforcement of strategy development activities, SME and industry engagement and participation to pay for use activities. 7000 Euro of equivalent manpower is allocated to EGI.eu to review the compliance of EGI web sites to EU regulations. 🡪 Updated section: 1.3.2.5.1 * SA5 (task SA5.1 Operating a Federated Cloud and SA5.2 Proofs of Concepts) – 71 PMs for the provisioning of core sevices for the cloud (PERUN), the expansion of the EGI federated cloud in Armenia, France, Greece, Latvia, Portugal, Turkey and United Kingdom, and additional cloud development activities for the support of new use cases including a pilot for the EXLIR community, piloting of federated AAI services in the EGI federated cloud, cloud security monitoring and operations and cloud standard-related activities (the development of a OCCI client and its integration into the jCloud toolkit, , cloud service information discovery, extension of the cloud backends supported by rOCCI, CDMI support in open stack). 🡪 Updated section: 1.3.3.6.1 * JRA2 (task JRA2.1 Service Availability and JRA2.3 Application DB) – 14 PMs for developments of the availability reporting system of SAM, the addition of new capabilities to the Application DB for the discovery of open bioinformatics datasets and their exploitation, and the concept development of a service registry and marketplace. 🡪 Updated section: 1.3.4.3.1   The additional partners that become active in PY5 thanks to the proposed used of unspent budget are: BE03 IIAP NAS RA (Armenia) and BE53 UOBL ETF (Bosnia and Herzegovina).   * + - * 1. The partners that will benefit from the redistribution of unspent efforts to contribute to the activity plan presented above, are: * BE01 EGI.eu (NA1, NA5) * BE52 IICT-BAS (Bulgaria) (NA4) * BE17 SRCE (Croatia) (JRA2) * BE16 GRNET (Greece) (NA4, SA5, JRA2) * BE18 MTA KFKI (Hungary) (SA5) * BE21 INFN (Italy) (NA4, SA5) * BE23 RENAM (Moldova) (SA5) * BE26 SARA BV (Netherlands) (NA4) * BE28 CYFRONET (Poland) (NA4) * BE30 IPB (Serbia) (NA4) * BE12 CSIC (Spain) (SA5) * BE32 UI SAV (Slovakia) (NA4) |
| * + - * 1. REC 1 | “**Develop and promote the Open Science Commons Vision**”  The additional PY5 activity plan proposed in this amendment includes the promotion of the vision to funding agencies, the EGI.eu Council and other e-Infrastructures (1 PMs at EGI.eu, NA4), the publication of a Open Science Common policy, a case studies compendium and other support material for the EGI engagement activities, the organization of the EGI September workshop and a joint EGI-GEANT workshop (8,000 Euro, EGI.eu) |
| * + - * 1. REC 2 and 4 | “**Continue to develop the EGI Strategy” and “KPI Metrics should be measured and evaluated in a wider context, in order to determine whether the organisation is heading in the right direction**”  In PY5 the EGI strategy will be further developed according to a strategy map involving the Executive Board, the EGI Council. This revision includes the review of the Balanced Score Cards and all the definition of continuous strategy development processes (1 PMs at EGI.eu, NA4)  This activity is supported by a training activity to be subcontracted to Excitant Ltd for an amount of 41,000 Euro, including   * advise EGI.eu strategy and policy and team and managers on the processes for strategy development * coach EGI.eu during the execution of the processes * advise EGI.eu for the development of a revised balanced score card * review the outcomes of the processes (balanced score card, interviews of the strategy boards - the Executive Board and the Council)  plus a 3-day internal training of EGI.eu staff involved for an amount of 7,500 Euro. Excitant is a company established in UK that contributed to the development of the 4th generation balanced scorecard. The output of the strategy development activity will be included in the final project report and will generate a new strategy paper. |
| * + - * 1. REC 3 | «**Sustainability planning needs more development, especially in respect of achieving longer-term sustainability**”  An SME engagement strategy development has started and SME case studies involving the EGI Federated Cloud were developed. |

### Project Management Metrics

* Collaboration Board: Composed of representatives from the partners, the group met once during the project year in May 2014. Besides discussing the general project status, the third project amendment for the support of PY5 was presented and policies for claiming of unspent budget after PY4 were discussed. Policies for the handling of partners that may not be in a position to pay their council membership fees in 2014 were discussed.
* Project Management Board: Composed of representations of partner groupings within the project it met 4 times in PY5 (both F2F and via telecon) to develop the project amendment N4.
* Activity Management Board: Composed of the work package leaders it met frequently during the year – generally fortnightly – to manage the day-to-day activities of the project.

### Coordination Activities

The complete list of collaborations is documented on the web[[76]](#footnote-76). The following list details the collaborative actions of PY5.

* **With policy makers**.
  + Members of NA1 contributed input to the consultation meeting held in Brussels on the 17th of June with the organization of the **European Commission**, providing feedback on the H2020 work programme 2016-17, and participated to the Research e-infrastructures and innovation clusters" workshop - Brussels - 3 October 2014 to discuss status and challenges in providing services and knowledge to the private sector. The meeting was instrumental to give momentum and inspire the definition of the EGI business engagement programme. In preparation to the submission of a project proposal to H2020 WP2014-15, EGI hosted a workshop promoted by the EC on the creation of a model curriculum for the Data Scientist profession that resulted in the submission of a action proposal for H2020 work programme 2014-15 topic INFRASUPP-4.
  + EGI launched publicly the Open Science Commons vision promoting the Data Commons, the e-Infrastructure Commons, the Knowledge Commons and the Scientific Instruments Commons at the **e-IRG** workshop held in Rome in November 10-11 2014 under the Italian Presidency.
* **With international initiatives**.
  + EGI participated to the fourth plenary of the **Research Data Alliance** and co-located its September conference with RDA in Amsterdam. EGI became member of RDA in January 2015.
* **With European e-Infrastructures**.
  + From 2015 a technical collaboration plan will start in cooperation with EUDAT, GEANT and PRACE. Collaborative activities will be user-centric aiming at offering a service catalogue that is increasingly integrated technically and organizationally.
  + Collaboration meetings with the **GEANT Association** were held to plan a long-term collaboration in the area of security, cloud, communications, events and policy including service procurement, were organized in PY5. The definition of a joint cloud technology and strategy roadmap was agreed by both organizations. A joint symposium on cloud and big data technologies was co-located with the EGI conference “[EGI Conference on Challenges and Solutions for Big Data Processing on Cloud](https://indico.egi.eu/indico/conferenceDisplay.py?confId=2160)” and boosted the collaboration activities between the two communities.
  + A technical collaboration plan was defined with the **EUDAT** project to harmonize data management services of the EGI High Throughput Computing solution and EUDAT. The plan will be driven by the use cases of 4 research infrastructures: BBMRI, ELIXIR, EPOS and ICOS. Open calls for additional use cases will be also organized to further evolve the plan. In addition, both e-Infrastructures expressed the interest in joining efforts in user community engagement and support. The first user workshop for Environmental Science was held in Amsterdam in January 2015. Similar coordination meetings were organized with **PRACE**. EGI also engaged with a subset of PRACE partners to expand its network of competence centres to offer integrated HPC, HTC and cloud knowledge and service. This resulted in the participation to two Centre of Excellence actions for environmental sciences and for numerical simulations. These were submitted for EC evaluation in January 2015.
  + The security coordination team of EGI coordinates the “**Security for Collaborating Infrastructures**” initiative organized a joint meeting with EUDAT and PRACE to discuss synergies, collaborations and communication channels for a better cooperation of the e-Infrastructures in the area of security operations[[77]](#footnote-77).
  + EGI has been contributing to the discussion of the **Helix Nebula Marketplace** (HNX) sustainability and business models, promoted the participation of pay-per-use EGI cloud provider to HNX, and proposed an organizational framework for the Helix Nebula Initiative long-term sustainability.
  + EGI is evaluating the opportunity of becoming member of the **Big Data Value** association to promote its Open Science Commons vision and boost its engagement with the private sector leveraging on the capability of providing a distributed open standards based cloud infrastructure and on the possibility to provide a scalable access to distributed datasets of public or commercial relevance.
* **With international organizations**.
  + Collaborations were established with **FAO** and **ESA** for the provisioning of open data for the agriculture and food sector and to support the ESA big data challenge activities on space observation. European Space Agency (ESA) will collaborate with EGI to port and run e-Collaboration for Earth Observation (e-CEO), a platform developed by ESA to help researchers to compare and evaluate different problem-solving approaches. The NGIs that participate to the EGI Federated Cloud will provide capacity to the e-CEO platform.
  + Collaboration with **EMBL** was established in the area e-Infrastructures for analysing medical metabolic phenotype data. The aim of the collaboration is to provide distributed access to open metabolomics datasets through a federated cloud infrastructure integrated with the EGI cloud solution.
  + Seven new project collaborations were established in PY5 with Research Infrastructures on the ESFRI roadmap for the implementation of a network of Competence Centres: **BBMRI, DARIAH, EISCAT-3D, ELIXIR, EPOS, INSTRUCT and LifeWatch.**
* **With international e-infrastructures**.
  + The Canadian Astronomy Data Centre will contribute to the technical integration of the Canadian federate cloud (**CANFAR**) with the EGI Federated Cloud and to the development of community-specific services. A new cloud infrastructure for European astronomers will be made available based on the EGI Federated Cloud.
  + EGI is partnering with the **Open Science Grid** infrastructure in the United States of America to join effort and transfer knowledge expertise across the two in the area of life science support.
  + The [Centre for Development of Advanced Computing (C-DAC)](http://cdac.in/" \t "_blank) in Bangalore is one of the leading lights in India working on many national initiatives to provide the country with the advanced IT solutions and services it needs. One of these is the [GARUDA (Global Access to Resources Using Distributed Architecture) grid initiative](http://www.garudaindia.in/" \t "_blank). A MoU was signed in PY5 to strength the relationship between the two and provide a solid framework for greater cooperation in many areas, focusing on sustainable grid and cloud interoperation[[78]](#footnote-78).
  + The CSIR Meraka institute in Pretoria (South Africa) signed an MoU with EGI.eu that replaces the former agreement for South-Africa Grid. The new MoU expands the scope of the resource infrastructure activities to a larger African-Arabian region including institutes from the following countries: South-Africa, Egypt, Morocco, Tanzania, Nigeria, Algeria, Senegal, Ethiopia, Tunisia and Ghana.
  + The CLAF institute from Rio de Janeiro (Brazil) signed an MoU with EGI.eu that replaces the former agreement with UFRJ for the Latin-American region. This updates the collaboration with resource providers of the following countries; Brazil, Mexico, Colombia, Chile and Argentina.

### Cooperation with Other Projects and Initiatives

EGI.eu is continuously working to establish collaborations with external partners within the extended Distributed Computing Infrastructures (DCIs) community. Specifically, the EGI.eu Strategic and Policy Team lead the coordination and establishment of agreements with projects, providers, organisations and communities for joint collaboration.

* The **FedSM** project is contributing to the improvement of the service management practices in EGI, while EGI.eu is providing feedback on the requirements on service management from the perspective of a federated infrastructure.
* Through the **Helix Nebula** project, EGI.eu has engaged in the work for an interoperable and integrated European federated cloud with the commercial cloud providers and also supported the development of a connector to enable to connect EGI cloud providers within the Helix Nebula Marketplace. This is strategic to strengthen activities between providers of the public sector and the private sector towards a single market for services to service the ERA. During the last Helix Nebula General Assembly (Nov 2014), EGI.eu also promoted the Open Science Commons paper.
* Other projects such as **ENVRI, BioVeL, DCH-RP, ER-Flow and BioMedBridges** provided links and collaborations with research communities interested in using EGI. Overall, after four years, EGI has established a rich network of collaborations that are contributing to the growth of the e-Infrastructures ecosystem in Europe and worldwide.
* EGI established a partnership with the **iMARINE** project (<http://www.i-marine.eu/Pages/Home.aspx>) for the delivery of IaaS services to the support of the Maritime and Fresh Water Biology sector, and to offer the possibility of hosting customised virtual research environments for that research sector based on the coupling of open data available from existing open distributed data repositories.
* The collaboration with the **CHAIN-REDS** project resulted in the establishment of the MoU with India and Latin America mentioned above and with the integration of the CHAIN-REDS science gateway with the EGI Federated Cloud IaaS.

# Deliverables and Milestones

No Deliverables were due in PY5.

## Milestones

| **Id** | **Activity No** | **Milestone title** | **Lead Partner** | **Original Delivery date**  **(\*)[[79]](#footnote-79)** | **Revised delivery date**  **(\*)** | **Status**  **(\*\*)** |
| --- | --- | --- | --- | --- | --- | --- |
| MS248 | NA4 | EGI Community Forum 2014 Helsinki <https://documents.egi.eu/document/2242> | EGI.eu | 48 | 51 | PMB Approved |

# Explanation of the use of Resources

## Summary

The financial report of PY5 for the period 1/05/2014 to 31/12/2014 is, at the date of submission of material to the EC reviewers, still under preparation. The deadline for submission into the European Commission portal (NEF) for the cost claims is March 01, 2015. Therefore the collection of financial statements the partners is still in progress.

**Section 1 - Form C and summary financial statement**: The project office is gathering the participants FORM C, from each beneficiary and from each third These are to be submitted into NEF by 01 March 2015. The following analysis of use of resources is based on the provisional figures available at the time of writing.

## Section 1 - Form C and summary financial statement

### NA1 Project Management

The effort reported in NA1 was in line with the estimated effort of PY5 with a total achieved PMs equal to 93% of the committed PMs. This is thanks to the additional unspent budget allocated in the fourth amendment that allowed the strengthening of coordination activities around strategy development, quality assurance and the balanced scorecard. The slight under-spending in task NA1.2 (Project and consortium management) due to the reduced number of active consortium partners in PY5, was compensated by additional effort allocated to task NA1.4 (Quality Management). Furthermore the efforts left will be used during Jan-Feb 2015 for the preparation of the periodic reporting and final report, and financial statements,

### NA4 Community Engagement

Activity NA4 included activities delivered by EGI.eu for human network coordination and communications (TNA4.1 and TNA4.2), and by NGIs for the contribution to the Distributed Competence Centre (TNA4.3) achieved in total 95% of the committed PMs and is well in line with the effort committed. The human network coordination activity at EGI.eu that includes operations coordination, NGI international liaison coordination and the Distributed Competence Centre coordination achieved 99% of the committed PMs.

### NA5 Strategy, Policy and Business Development

TNA5.1 represents the EGI.eu Strategy and Policy Team based at EGI.eu and focused on strategy, policy and business development. During the reporting period, the activities required the involvement of the human network coordinators leading to a total effort of 137% compared to the planned resources. The extra effort was allocated to match the recommendations provided by the reviewers after the 4th EGI-InSPIRE review, mainly related to developing the Open Science Commons vision, the new EGI strategy including the balanced score card.

TNA5.2 was led by EGI.eu and comprised a mix between NGIs and individual resource centres representing resource providers to develop business models and proof of concepts, namely the pay-for-use proof of concept. During PY5 staff at EGI.eu remained stable and consumed 100% of resources. Effort consumption varied across the resource providers, however, cumulatively spent 89% of allocated resources with limited impact on the results achieved, which is also expected to increase as two partners have not yet provided reporting information at the time of writing this report (RENAM; STFC). One partner, UIIP NASB, did not claim any effort through the project, but still contributed to the activities as unfunded effort. Each partner declaring effort over the originally allocated effort (e.g. CSIC) was matched by requested work to be carried out and balanced with other project partners under spending, therefore no major issues occurred in project management and financial resource consumption.

### SA5 Federated Cloud

The overall effort achieved by SA5 amounts to 72% of the committed effort. While the infrastructure integration activities carried out at a national level by the cloud providers achieved 108% of the committed effort and hence are in line with the resources allocated, the effort spent at a national level to integrate new use cases in the infrastructure is only 41% of the committed effort, regardless of the large number of pilots and cloud user communities that reached maturity. While the effort spent by partners nationally varies a lot, the low number of PMs achieved is partly due to the lack of effort reported effort of partners like CSC and LIP, who concentrated their activity on SA5.1 for the operational integration of their local cloud infrastructure into the federation. STFC has not yet provided reporting information at the time of writing this report.

### JRA2 Tool Development

The overall JRA2 effort consumption was the 112% of allocated resources and no major issues occurred in final resource consumption. All partners consumed all the committed resources even exceeded their planned efforts. Some other partners (CNRS, FCTSG, CYFRONET) allocated a quite relevant amount of unfunded effort to properly complete their tasks and satisfy new emerging requirements.

# Financial Statements Per Beneficiary PY5

## Consumption of Effort

|  |
| --- |
| The reported manpower is based on validated timesheets only. |
| The timesheets shall be used exclusively for the purpose of reporting to the European Commission. | |
| Selected period: PM49-PM56 (May 2014 to December 2014) |
| Report extracted on: **3 February 2015** |

Table 4. Overview of PM declared and committed PMs per PY5 work package.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Work Package** | **PM Declared** | **Committed PM** | **Achieved %** |
| MGT | WP1-M | 33 | 35 | 93% |
| COORD | WP9 | 197 | 207 | 95% |
| COORD | WP10 | 38 | 39 | 96% |
| OTHER | WP11 | 83 | 116 | 72% |
| RTD | WP12 | 66 | 59 | 112% |
| **Total:** | | **417** | **456** | **91%** |

The detailed breakdown of effort contributed to each work package by each partner is provided in the following tables. List of PY5 work packages:

* WP1 🡪 NA1 Management
* WP9 🡪 NA4 Community management
* WP10 🡪 NA5 Strategy, Policy and Business Development
* WP11 🡪 SA5 Federated Cloud
* WP12 🡪JRA2 Tool Development

**WP1-M - NA1: Management**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
| TNA1.1 | 1-EGI.EU |  | 7.5 | 6.3 | 119% |
| TNA1.2 | 1-EGI.EU |  | 9.7 | 12.1 | 80% |
| TNA1.3 | 1-EGI.EU |  | 14.6 | 16.0 | 91% |
| TNA1.4 | 1-EGI.EU |  | 1.2 | 1.0 | 119% |
|  | **Total WP1-M** |  | **33.0** | **35.4** | **93%** |

**WP9 (NA4) - Community Engagement**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
| TNA4.1 | 1-EGI.EU |  | 25.1 | 28.1 | 89% |
|  | 6-UIIP NASB |  | 0.0 | 1.0 | 0% |
|  | 7B-UZH |  | 1.6 | 2.5 | 64% |
|  | 9-CESNET |  | 1.9 | 4.0 | 48% |
|  | 12-CSIC |  | 4.7 | 4.0 | 118% |
|  | 13-CSC |  | 0.0 | 4.0 | 0% |
|  | 14-CNRS |  | 2.6 | 4.0 | 65% |
|  | 16-GRNET |  | 2.4 | 4.0 | 60% |
|  | 18A-MTA KFKI |  | 1.4 | 2.0 | 72% |
|  | 20-IUCC |  | 2.8 | 2.0 | 140% |
|  | 21-INFN |  | 19.2 | 20.0 | 96% |
|  | 25-UKIM |  | 3.7 | 2.0 | 186% |
|  | 28-CYFRONET |  | 4.0 | 4.0 | 100% |
|  | 29-LIP |  | 0.9 | 2.0 | 43% |
|  | 31-ARNES |  | 6.3 | 2.0 | 313% |
|  | 32-UI SAV |  | 2.1 | 2.0 | 106% |
|  | 34-STFC |  | 7.7 | 4.0 | 192% |
|  | 36-UCPH |  | 2.4 | 2.0 | 118% |
|  | 55B-SARA |  | 0.8 | 4.0 | 19% |
|  | 57-JINR |  | 0.0 | 2.0 | 0% |
| **TNA4.1** | **Sum:** |  | **89.5** | **99.6** | **90%** |
| **TNA4.2** | **1-EGI.EU** |  | **16.9** | **15.9** | **106%** |
| TNA4.3 | 3-IIAP NAS RA |  | 1.8 | 2.0 | 90% |
|  | 7B-UZH |  | 0.7 | 1.0 | 73% |
|  | 9-CESNET |  | 15.5 | 6.0 | 258% |
|  | 12-CSIC |  | 3.0 | 2.0 | 152% |
|  | 13-CSC |  | 0.0 | 4.0 | 0% |
|  | 14-CNRS |  | 5.3 | 5.0 | 107% |
|  | 16-GRNET |  | 12.2 | 8.0 | 152% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
|  | 18A-MTA KFKI |  | 2.3 | 2.0 | 114% |
|  | 20-IUCC |  | 1.5 | 1.0 | 151% |
|  | 21-INFN |  | 11.0 | 9.0 | 122% |
|  | 23-RENAM |  | 3.0 | 1.0 | 299% |
|  | 25-UKIM |  | 0.0 | 2.0 | 0% |
|  | 27-UIO |  | 3.3 | 2.0 | 166% |
|  | 28-CYFRONET |  | 3.4 | 8.0 | 43% |
|  | 29-LIP |  | 2.8 | 2.0 | 138% |
|  | 30-IPB |  | 1.0 | 3.0 | 35% |
|  | 31-ARNES |  | 5.4 | 5.0 | 109% |
|  | 32-UI SAV |  | 5.7 | 6.0 | 95% |
|  | 33-TUBITAK ULAKBIM | | 3.1 | 3.0 | 102% |
|  | 34-STFC |  | 3.3 | 10.0 | 33% |
|  | 36-UCPH |  | 1.1 | 1.0 | 112% |
|  | 52-IICT-BAS |  | 3.8 | 4.0 | 94% |
|  | 55B-SARA |  | 1.2 | 4.0 | 30% |
| **TNA4.3** | **Sum:** |  | **90.5** | **91.0** | **99%** |
|  | **Total WP9-E:** |  | **196.8** | **206.5** | **95%** |

**WP10 (NA5) Strategy, Policy and Business Development**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
| **TNA5.1** | **1-EGI.EU** |  | **7.3** | **5.3** | **137%** |
| TNA5.2 | 1-EGI.EU |  | 8.0 | 8.0 | 100% |
|  | 6-UIIP NASB |  | 0.0 | 2.0 | 0% |
|  | 12-CSIC |  | 2.4 | 1.0 | 240% |
|  | 13-CSC |  | 1.1 | 1.0 | 114% |
|  | 16-GRNET |  | 3.2 | 3.0 | 105% |
|  | 21-INFN |  | 4.4 | 5.0 | 89% |
|  | 23-RENAM |  |  | 2.0 | 0% |
|  | 28-CYFRONET |  | 2.3 | 2.0 | 117% |
|  | 32-UI SAV |  | 1.3 | 2.0 | 64% |
|  | 33-TUBITAK ULAKBIM | | 3.5 | 2.0 | 175% |
|  | 34-STFC |  |  | 2.0 | 0% |
|  | 39-IMCS-UL |  | 1.8 | 2.0 | 89% |
|  | 52-IICT-BAS |  | 2.3 | 2.0 | 115% |
| **TNA5.2** | **Sum:** |  | **30.4** | **34.0** | **89%** |
|  | **Total WP10:** |  | **37.6** | **39.3** | **96%** |

**WP11 (SA5) - Federated Cloud**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
| TSA5.1 | 1-EGI.EU |  | 3.3 | 6.6 | 50% |
|  | 3-IIAP NAS RA |  | 2.0 | 2.0 | 102% |
|  | 9-CESNET |  | 3.1 | 6.0 | 51% |
|  | 12-CSIC |  | 6.9 | 3.0 | 229% |
|  | 13-CSC |  | 0.0 | 1.0 | 0% |
|  | 14-CNRS |  | 3.2 | 4.0 | 79% |
|  | 16-GRNET |  | 0.5 | 6.0 | 8% |
|  | 17-SRCE |  | 1.0 | 1.0 | 100% |
|  | 20-IUCC |  | 3.4 | 3.0 | 113% |
|  | 21-INFN |  | 1.0 | 1.0 | 100% |
|  | 28-CYFRONET |  | 0.6 | 1.0 | 61% |
|  | 29-LIP |  | 12.6 | 5.0 | 252% |
|  | 31-ARNES |  | 4.7 | 1.0 | 466% |
|  | 32-UI SAV |  | 1.7 | 1.0 | 172% |
|  | 33-TUBITAK ULAKBIM | | 2.6 | 4.0 | 64% |
|  | 34-STFC |  | 0.0 | 1.5 | 0% |
|  | 39-IMCS-UL |  | 1.2 | 1.2 | 96% |
|  | 52-IICT-BAS |  | 1.9 | 1.0 | 186% |
|  | 55B-SARA |  | 0.0 | 1.0 | 0% |
|  | 56A-KTH |  | 8.0 | 3.0 | 265% |
| **TSA5.1** | **Sum:** |  | **57.5** | **53.3** | **108%** |
| TSA5.2 | 9-CESNET |  | 4.3 | 22.0 | 19% |
|  | 12-CSIC |  | 4.4 | 11.5 | 38% |
|  | 13-CSC |  | 0.0 | 0.5 | 0% |
|  | 14-CNRS |  | 1.1 | 1.0 | 110% |
|  | 16-GRNET |  | 3.0 | 10.5 | 28% |
|  | 17-SRCE |  | 0.6 | 0.5 | 119% |
|  | 18A-MTA KFKI |  | 0.0 | 3.0 | 0% |
|  | 20-IUCC |  | 0.5 | 0.5 | 107% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
|  | 21-INFN |  | 2.8 | 2.0 | 139% |
|  | 28-CYFRONET |  | 0.4 | 0.5 | 73% |
|  | 29-LIP |  | 0.0 | 0.5 | 0% |
|  | 31-ARNES |  | 2.7 | 1.5 | 183% |
|  | 32-UI SAV |  | 0.7 | 0.5 | 137% |
|  | 33-TUBITAK ULAKBIM | | 2.5 | 2.5 | 98% |
|  | 34-STFC |  | 2.1 | 3.0 | 71% |
|  | 37-EMBL |  | 0.0 | 2.0 | 0% |
|  | 52-IICT-BAS |  | 0.5 | 0.5 | 103% |
|  | 56A-KTH |  | 0.3 | 0.5 | 59% |
| **TSA5.2** | **Sum:** |  | **25.8** | **63.0** | **41%** |
|  | **Total WP11:** |  | **83.3** | **116.3** | **72%** |

**WP12 (JRA2) - Tool Development**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task** | **Partner** |  | **PM Declared** | **Committed PM** | **Achieved PM** |
| JRA2.1 | 14-CNRS |  | 5.6 | 3.5 | 161% |
|  | 16-GRNET |  | 6.3 | 7.0 | 90% |
|  | 17-SRCE |  | 6.5 | 6.5 | 101% |
|  | 34-STFC |  | 0.0 | 6.0 | 0% |
| **JRA2.1** | **Sum:** |  | **18.5** | **23.0** | **80%** |
| JRA2.2 | 12-CSIC |  | 16.5 | 9.6 | 172% |
|  | 34-STFC |  | 14.3 | 12.0 | 119% |
| **JRA2.2** | **Sum:** |  | **30.9** | **21.6** | **143%** |
| **JRA2.3** | **16-GRNET** |  | **10.5** | **10.0** | **105%** |
| **JRA2.4** | **28-CYFRONET** |  | **6.0** | **4.0** | **150%** |
|  | **Total WP12:** |  | **65.8** | **58.6** | **112%** |

## Overall Financial Status

### *Selected period: PM49 to P568 (May 2014 to December 2014)*

### *Report extracted on 3 February 2015*

### *This financial overview is an estimate cost based on the reported man-power in the timesheet system tool, PPT. Partners will be asked to provide responses to financial consumption that is significantly above or below plans.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Partner** | **PM Declared** | **Committed PM** | **Achieved PM** | **Eligible Cost Estimate** | **Estimated Funding** |
| 1-EGI.EU | 93.6 | 99.3 | 94.3% | 831,267.8 | 562,153.9 |
| 3-IIAP NAS RA | 3.9 | 4.0 | 96.3% | 11,475.9 | 5,738.0 |
| 6-UIIP NASB | 0.0 | 3.0 | 0.0% | 0.0 | 0.0 |
| 7B-UZH | 2.3 | 3.5 | 66.4% | 15,100.1 | 7,550.0 |
| 9-CESNET | 24.8 | 38.0 | 65.2% | 150,581.3 | 75,290.7 |
| 12-CSIC | 37.9 | 31.1 | 122.0% | 277,688.3 | 138,844.2 |
| 13-CSC | 1.1 | 10.5 | 10.9% | 11,219.4 | 5,609.7 |
| 14-CNRS | 17.8 | 17.5 | 101.9% | 145,098.4 | 72,549.2 |
| 16-GRNET | 38.0 | 48.5 | 78.3% | 274,926.9 | 137,463.5 |
| 17-SRCE | 8.1 | 8.0 | 101.6% | 36,255.5 | 18,127.7 |
| 18A-MTA KFKI | 3.7 | 7.0 | 53.0% | 20,678.7 | 10,339.3 |
| 20-IUCC | 8.2 | 6.5 | 126.9% | 102,316.4 | 51,158.2 |
| 21-INFN | 38.4 | 37.0 | 103.7% | 263,606.5 | 131,803.2 |
| 23-RENAM | 3.0 | 3.0 | 99.5% | 8,957.1 | 4,478.6 |
| 25-UKIM | 3.7 | 4.0 | 92.9% | 13,000.0 | 6,500.0 |
| 27-UIO | 3.3 | 2.0 | 166.4% | 31,349.8 | 15,674.9 |
| 28-CYFRONET | 16.7 | 19.5 | 85.7% | 134,766.3 | 67,383.1 |
| 29-LIP | 16.2 | 9.5 | 170.7% | 80,767.3 | 40,383.7 |
| 30-IPB | 1.0 | 3.0 | 34.6% | 5,143.5 | 2,571.8 |
| 31-ARNES | 19.1 | 9.5 | 200.8% | 104,817.7 | 52,408.8 |
| 32-UI SAV | 11.5 | 11.5 | 100.2% | 86,394.2 | 43,197.1 |
| 33-TUBITAK ULAKBIM | 11.6 | 11.5 | 100.4% | 75,537.0 | 37,768.5 |
| **Partner** | **PM Declared** | **Committed PM** | **Achieved PM** | **Eligible Cost Estimate** | **Estimated Funding** |
| 34-STFC | 27.4 | 38.5 | 71.3% | 268,074.6 | 134,037.3 |
| 36-UCPH | 3.5 | 3.0 | 116.1% | 36,699.3 | 18,349.6 |
| 37-EMBL |  | 2.0 |  |  |  |
| 39-IMCS-UL | 2.9 | 3.2 | 92.0% | 21,600.6 | 10,800.3 |
| 52-IICT-BAS | 8.4 | 7.5 | 112.6% | 47,322.2 | 23,661.1 |
| 55B-SARA | 2.0 | 9.0 | 22.0% | 19,248.9 | 9,624.5 |
| 56A-KTH | 8.3 | 3.5 | 236.0% | 90,356.3 | 45,178.1 |
| 57-JINR |  | 2.0 |  |  |  |
| **Total** | **417** | **456** | **91.3%** | **3,164,250** | **1,728,645** |

## Deviations from linear plan

The project office is currently collecting the participants’ financial statements (Form C). Whenever there is deviation to the efforts plan the partners who have already submitted their costs have provided a justification:

* EGI.eu: the remaining efforts have been consumed in the preparation of the periodic and final reports, and the financial statements during Jan-Feb 2015;
* CESNET: the partner has carried out its tasks consuming less efforts than planned;
* CSC: the partner has submitted its form c and the PO could verify that the efforts have been spent according to the plan (~1 FTE); only they have not all been declared into the management tool system PPT;
* MTA SZTAKI: 2 additional PMs have been declared and justified in their costs;
* LIP, only 9.6 PMs as planned have been charged in their costs, the other are not reclaimed. Their budget is consumed as forecast;
* IBP 3 additional PMs have been declared and justified in their costs.

Partners GRNET, ARNES, STFC and SARA have not yet provided their costs. For EMBL and JINR, no effort have been reported despite several reminders and no Form C is expected from these two partners; there is however no advance payment to reclaim since the payments have only been released up to the actual costs validated by the EC at the end of Y3.

A further analysis of the submitted Form Cs will be provided during the review and if funding is left, a redistribution plan will be defined by the PMB to redistribute among the participants who exceeded their budget. The financial session will be closed within the 60-day period. This last reporting period has engaged fewer partners and we are confident that the costs acceptance, the EC final payment and the redistribution of the grant to the partners will be finalised within 6 months after the end date of the project.

1. A1 Dissemination and Use

## Main Project and Activity Meetings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Indico URL)** |
| 19-23 May 2014 | Helsinki, Finland | EGI Community Forum 2014 | 420 | [http://cf2014.egi.eu](http://cf2014.egi.eu/) |

Project and Activity Meetings; details in <https://indico.egi.eu/indico/categoryDisplay.py?categId=3>

## Conferences/Workshops Organised

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Indico URL)** |
| 19-23 May 2014 | Helsinki, Finland | EGI Community Forum 2014 | 420 | [http://cf2014.egi.eu](http://cf2014.egi.eu/) |
| 4-6 Mar 2014 | Amsterdam, NL | [APARSEN-EGI Community Workshop on Managing, Computing and Preserving Big Data for Research](http://indico.egi.eu/indico/conferenceDisplay.py?confId=2052) | 32 | http://indico.egi.eu/indico/conferenceDisplay.py?confId=2052 |
| 24-26 Sept 2014 | Amsterdam, NL | [EGI Conference on Challenges and Solutions for Big Data Processing on Cloud](http://indico.egi.eu/indico/conferenceDisplay.py?confId=2160) | 158 | http://indico.egi.eu/indico/conferenceDisplay.py?confId=2160 |

## Conferences/Workshops Attended

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Indico URL)** |
| 31 Mar 2014 | ITQB, Oeiras, PT | Exploit the power of the European computer grid infrastructure for Structural Biology | 15 |  |
| 2-4 April 2014 | Athens, Greece | 2nd International Conference on Research Infrastructures | 700 |  |
| 31-Aug-14 | Paris, France | FEBS–EMBO 2014 | 700 |  |
| 12-17 July 2014 | Lisbon, Portugal | EBEC 2014 | 300 |  |
| 8-10 Decemnber 2014 | Tempe, USA | Early Science from Low-frequency Radio Telescopes | 300 |  |

## Publications

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Publication title** | **Journal / Proceedings title** | **DOI code** | **Journal references (volume, pages)** | | **Authors** |
| Probing the radio emission from air showers with polarization measurements | Physical Review D | 10.1103/PhysRevD.89.052002 | 89 | 52002 | Aab A. et al |
| Measurement of the parity-violating asymmetry parameter alpha\_b and the helicity amplitudes for the decay Lambda\_b->J/psi+Lambda with the ATLAS detector | Physical Review D | 10.1103/PhysRevD.89.092009 | 89 | 92009 | Aad G. et al |
| Search for dark matter in events with a Z boson and missing transverse momentum in pp collisions at $\sqrt{s}$=8 TeV with the ATLAS detector | Physical Review D | 10.1103/PhysRevD.90.012004 | 90 | 12004 | Aad G. et al |
| Search for top quark decays $t\rightarrow qH$ with $H\to\gamma\gamma$ using the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP06(2014)008 | 6 | 8 | Aad G. et al |
| Search for direct production of charginos neutralinos and sleptons in final states with two leptons and missing transverse momentum in pp collisions at sqrt(s) = 8 TeV with the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP05(2014)071 | 5 | 71 | Aad G. et al |
| Search for direct top squark pair production in events with a Z boson b-jets and missing transverse momentum in sqrt(s)=8 TeV pp collisions with the ATLAS detector | European Physical Journal C: Particles and Fields | 10.1140/epjc/s10052-014-2883-6 | 74 | 2883 | Aad G. et al |
| Search for direct production of charginos and neutralinos in events with three leptons and missing transverse momentum in sqrt(s) = 8TeV pp collisions with the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP04(2014)169 | 4 | UNSP 169 | Aad G. et al |
| Measurement of the production of a W boson in association with a charm quark in pp collisions at sqrt(s)=7 TeV with the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP05(2014)068 | 5 | 68 | Aad G. et al |
| Search for Higgs boson decays to a photon and a Z boson in pp collisions at sqrt(s)=7 and 8 TeV with the ATLAS detector | Physics Letters B | 10.1016/j.physletb.2014.03.015 | 732 | 8-27 | Aad G. et al |
| Search for Invisible Decays of a Higgs Boson Produced in Association with a Z Boson in ATLAS | Physical Review Letters | 10.1103/PhysRevLett.112.201802 | 112 | 201802 | Aad G. et al |
| Measurement of the electroweak production of dijets in association with a Z-boson and distributions sensitive to vector boson fusion in proton-proton collisions at sqrt(s) = 8 TeV using the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP04(2014)031 | 4 | 31 | Aad G. et al |
| Measurement of the production cross section of prompt J/psi mesons in association with a W boson in pp collisions at sqrt{s}=7 TeV with the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP04(2014)172 | 4 | 172 | Aad G. et al |
| Measurement of dijet cross sections in pp collisions at 7 TeV centre-of-mass energy using the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP05(2014)059 | 5 | 59 | Aad G. et al |
| Search for a multi-Higgs-boson cascade in WWbb events with the ATLAS detector in pp collisions at sqrt(s) = 8 TeV | Physical Review D | 10.1103/PhysRevD.89.032002 | 89 | 32002 | Aad G. et al |
| Standalone vertex finding in the ATLAS muon spectrometer | Journal of Instrumentation | 10.1088/1748-0221/9/02/P02001 | 9 | P02001 | Aad G. et al |
| Measurement of the top quark pair production charge asymmetry in proton-proton collisions at 7 TeV using the ATLAS detector | Journal of High Energy Physics | 10.1007/JHEP02(2014)107 | 2 | 107 | Aad G. et al |
| Search for Quantum Black Hole Production in High-Invariant-Mass Lepton+Jet Final States Using Proton-Proton Collisions at sqrt(s) = 8 TeV and the ATLAS Detector | Physical Review Letters | 10.1103/PhysRevLett.112.091804 | 112 | 91804 | Aad G. et al |
| Measurement of the mass difference between top and anti-top quarks in pp collisions at sqrt(s) = 7 TeV using the ATLAS detector | Physics Letters B | 10.1016/j.physletb.2013.12.010 | 728 | 363-379 | Aad G. et al |
| Search for new phenomena in photon+jet events collected in proton--proton collisions at sqrt(s) = 8 TeV with the ATLAS detector | Physics Letters B | 10.1016/j.physletb.2013.12.029 | 728 | 562-578 | Aad G. et al |
| Search for dark matter in events with a hadronically decaying W or Z boson and missing transverse momentum in pp collisions at sqrt(s)=8 TeV with the ATLAS detector | Physical Review Letters | 10.1103/PhysRevLett.112.041802 | 112 | 41802 | Aad G. et al |
| A study of heavy flavor quarks produced in association with top quark pairs at sqrt(s) = 7 TeV using the ATLAS detector | Physical Review D | 10.1103/PhysRevD.89.072012 | 89 | 72012 | Aad G. et al |
| Measurement of the resonant and CP components in $\overline{B}^0\rightarrow J/\psi \pi^+\pi^-$ decays | Physical Review D | 10.1103/PhysRevD.90.012003 | 90 | 12003 | Aaij R. et al |
| Observation of the resonant character of the $Z(4430)^-$ state | Physical Review Letters | 10.1103/PhysRevLett.112.222002 | 112 | 222002 | Aaij R. et al |
| Evidence for the decay $B\_c^+ \rightarrow J/\psi 3\pi^+ 2\pi^-$ | Journal of High Energy Physics | 10.1007/JHEP05(2014)148 | 5 | 148 | Aaij R. et al |
| Angular analysis of charged and neutral $B \to K \mu^+\mu^-$ decays | Journal of High Energy Physics | 10.1007/JHEP05(2014)082 | 5 | 82 | Aaij R. et al |
| Study of beauty hadron decays into pairs of charm hadrons | Physical Review Letters | 10.1103/PhysRevLett.112.202001 | 112 | 202001 | Aaij R. et al |
| Measurement of $\psi(2S)$ polarisation in $pp$ collisions at $\sqrt{s}=7$ TeV | European Physical Journal C: Particles and Fields | 10.1140/epjc/s10052-014-2872-9 | 74 | 2872 | Aaij R. et al |
| Observation of photon polarization in the $b \to s\gamma$ transition | Physical Review Letters | 10.1103/PhysRevLett.112.161801 | 112 | 161801 | Aaij R. et al |
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1. Distributed Competence Centre REPORT

Life Science VRC

*Amsterdam Medisch Centrum (AMC)*

The AMC e-Science group (part of LSGC) has continued to support biomedical researchers mainly from the AMC (academic hospital in NL) - around 50 researchers who use facilities from time to time. Activities/Achievements include:

* Support and management of the VLEMED VO
* Further development, maintenance and operation of a science gateway for neuroimaging data analysis on grid ([https://neuro.ebioscience.amc.nl/](https://neuro.ebioscience.amc.nl/" \t "_blank))
* Development of a science gateway for molecular docking simulation on grid ([https://docking.ebioscience.amc.nl/](https://docking.ebioscience.amc.nl/" \t "_blank))
* Proposal to develop a new gateway to manage genomics data for immunology research
* Basic training of biomedical science students on usage of the neuroscience gateway
* Basic training of WS-PGRADE for medical informatics students
* Basic training of WS-PGRADE for bioinformaticians during the 2014 european conference on computational biology (ECCB, Strasbourg, 7 Sept 2014)
* Various invited presentations in which the science gateway activities were disseminated

Plans:

* Continue to support VLEMED, extending to cloud resources
* Continue and extend support to existing science gateways (neuroscience, docking)
* Development of new data management gateway for immunogenomics (will use EUDAT resources)
* New science gateways for other (biomedical) applications

*Centre national de la recherche scientifique (CNRS)*

CNRS contributed to the Life Science community support. CNRS is leading the LSGC (Life Science Grid Community) group where community-wide policies are discussed. During this period, CNRS has particularly bee involved in:

1. **VAPOR maintenance.** The VAPOR portal (Vo Administration PORtal[[80]](#footnote-80)) is now mature and only bug fixes where implemented during the last months. The VAPOR portal has been deployed for the biomed VO and used by the LSGC technical team for infrastructure monitoring and community support. Due to high demand, other VOs have been integrated. In addition to biomed, it currently monitors the France Grille, WeNMR, CompChem, VLEMED, SHIWA workflows, SEE and SAGRID VOs.
2. **DIRAC workload management.** To deal with various recurrent issues, DIRAC has been identified as the reference workload manager for the LSGC. Although its use could not be technically enforced for all users, it received higher priority support. A DIRAC instance is maintain by the French NGI for various user communities.
3. **CVMFS.** CVMFS applications deployment tool has been successfully tested by the LSGC technical team. A Life Sciences CVMFS instance installation campaign has been conducted by contacting every sites supporting the biomed VO. Currently, 44 sites deliver this service for the biomed VO.
4. The **biomed technical team** provided continuous support to the life science users, monitored the resources available through the VAPOR portal and liaised with the sites when needed to solve technical problems and improve users experience.

CMMST VRC

The activities of UNIPG in the period May-December 2014 can be divided into two parts. The first part was devoted to the collection and approval of the work done by the chemistry Molecular, Materials Science and Technologies (CMMST) Virtual Research Community formalized  
at the EGI Community forum held in Helsinki. Such work was followed in the period going from May to July by the preparation of the documentation for proposing the Homonimus Competence   
Centre (presented at the International Conference of Computational Science and its Applications  
and at XSEDE 2014). The proposal was not approved by EGI and from there on contacts with ECTN   
and EUCHEMS (Istanbul and Krakow September 2014) were made in order to enlarge the community  
and prepare with the sponsorship of INSTM the documentation for a Virtual research environment that will be discussed in December at the EGI premise. Several Laboratories of the COST actions as well as EUCHEMS; ECTN, MOSGRID and SCALALIFE have expressed their willing of taking part to the initiative. If successful, the activity will continue in 2015.

WeNMR VRC

The WeNMR VRC and its associated DCC have been operating on a regular basis over the last period. In preparation for H2020, WeNMR, in collaboration with NeuGRID, has submitted a proposal for a competence center in EGI Engage: “MoBrain: A Competence Center to Serve Translational Research from Molecule to Brain”. MoBrain has been selected for inclusion in EGI-Engage.

The WeNMR community has shown a constant growth over that period (Figure 1), reaching over 1500 registered users from all over the world (Figure 2).

Figure 3: Growth of the WeNMR VRC user community

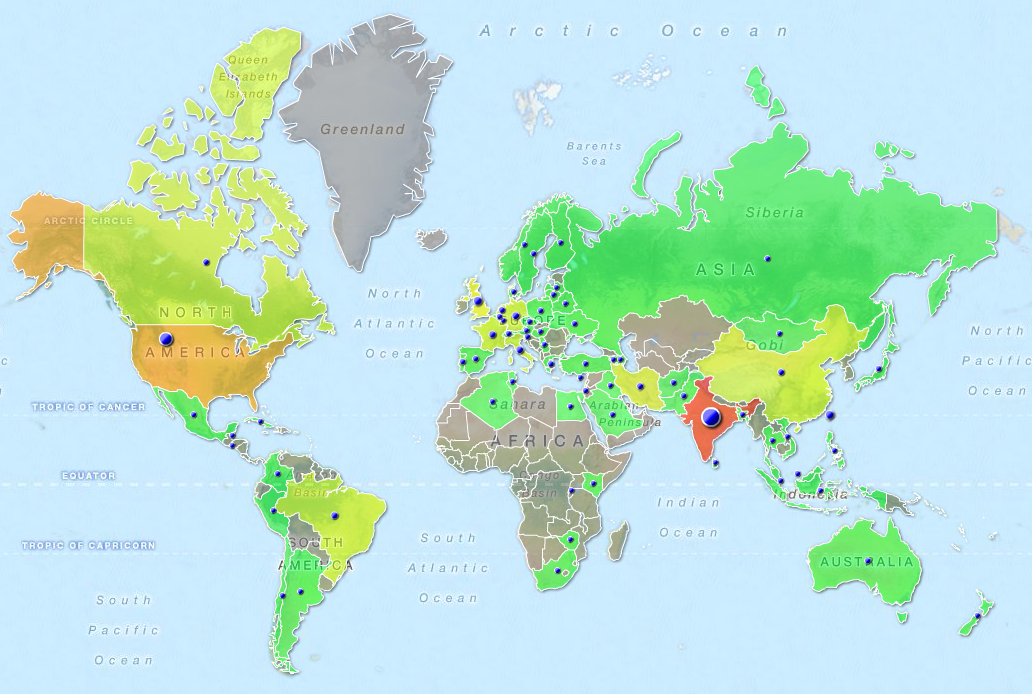


Figure 4: Geographic WeNMR VRC user distribution (November 2014)

Its help center[[81]](#footnote-81) has handled 12 requests, but many more were received by the respective software developers/experts directly by email.

On the infrastructure side, all sites have kept their infrastructure updated. INFN keeps updating and operating the two VOMS servers ([voms2.cnaf.infn.it](http://voms2.cnaf.infn.it/) and [voms-02.pd.infn.it](http://voms-02.pd.infn.it/)) serving the [enmr.eu](http://enmr.eu/) VO, and the VO-specific Nagios monitoring service hosted by the server [grid-monitor03.pd.infn.it](http://grid-monitor03.pd.infn.it/). INFN provided technical support for solving grid related issues at sites (11 GGUS ticket since May 2014), configuring CVMFS on the majority of the grid sites supporting the [enmr.eu](http://enmr.eu/) VO, and helping users to obtain grid certificates.

In terms of outreach to the user community, the following meetings were attended where WeNMR and its activities were shortly highlighted in presentations:

* *“A worldwide e-Infrastructure for NMR and structural biology”*. Keynote lecture at the 6th International Workshop on Science Gateways, Dublin, Ireland, June 3-6, 2014.
* *“Information-driven modelling of biomolecular complexes”*. EMBO practical course on the structural characterization of macromolecular complexes, Grenoble, June 6-8, 2014.
* *“Integrative modelling of biomolecular complexes”*. BioNMR workshop on “using NMR spectroscopy and other biophysical methods to study protein-ligand interactions”, Oxford, UK, July 7-9, 2014.
* *“Integrative modelling of biomolecular complexes”*. 24th International Conference on Magnetic Resonance in Biological Systems (ICMRBS), Dallas TX, USA, August 24-29, 2014.
* *“Modelling structure, affinity and specificity of protein-protein complexes”*. Protein-Protein Interactions on the Genome Scale meeting, Paris, October 8-10, 2014.
* *“Modelling structure, affinity and specificity of protein-protein complexes”*. Protein-Protein Interactions on the Genome Scale meeting, Paris, October 8-10, 2014.
* *“Integrative modelling of biomolecular complexes”*. Modeling of Protein Interaction meeting, Lawrence KS, USA, October 23-25, 2014.

An updated list of publications citing or acknowledging WeNMR is available on thc community web site[[82]](#footnote-82). Finally, concerning the future plans to support the activity in 2015, part of it will be run via the MoBrain CC, but much will also depend on the results of current and future H2020 calls, including EINFRA-9.

Earth Science community

The community still operates the ES VO on the Infrastructure. New work is done at IPSL, Paris French NGI . They started to use iRODS at EUDAT and will combine it with EGI. The related activities/Achievements include:

* start using iRODS to replicate valuable data (original) on EUDAT (CINES site)
* studies has been undertaken to define the granularity of data archival
* exchange knowledge and information with French NGI so as to share expertise on iRODS
* a workflow is currently in place to replicate IPSL data on EUDAT using iRODS

NGI Bulgaria, Bulgaria

During this period the Bulgarian government updated the National Roadmap on Research Infrastructures, where first of all the Grid and HPC activities are merged under the umbrella of a National center for HPC and distributed computing, which will be responsible to support all the scientific communities with regards to their e-infrastructure needs. Specifically, the BG CLARIN-DARIAH community is also merged in the roadmap.

The second active Grid user community comes from the Environmental modelling and environmental protection area, where two institutes from BAS – National Institute for Geophysics, Geography and Geodesics (NIGGG-BAS) and National Institute of Meteorology and Hydrology (NIMH-BAS).

New users were added to the chemistry VO and further steps were taken to expand the usage from people involved in the area of molecular design and new materials.

Continued support for the activities of LHC and biomed users from Bulgaria.

Expanding the community interested in the use of GPGPU and Xeon PHI resources.

NGI Bulgaria Provided support for specific needs of a research group that is leading the BG CLARIN-DARIAH effort, porting to grid resources, organization of use cases for future fed cloud usage. We also provided support to the key research groups from NIGGG-BAS and NIMH-BAS to port applications that model the transport of air pollutants with higher space resolution than before. Provided resources for LHC and biomed activities.

Provided resources for access to GPGPU through grid.

Work on use of Xeon PHI-based resources, study feasibility of porting certain MPI applications from the above user groups.

The research group from BG CLARIN was able to achieve through using our grid resources much faster processing of their data so that they obtain results in days instead of months. These results are in preparation for publication.

Results from the work of environmental modelling and environmental protection groups were reported in the Community Forum in Helsinki as well as in relevant scientific conferences in the field.

Results were achieved in the use of GPGPU devices to speed-up the modelling of supersonic gas flows and the results are accepted for publication.

Some achievements in the area of Grid middleware and scalability of Grid applications were also published.

We expect before end of 2014 to start the deployment of the new facility at IICT-BAS, which will achieve more than 400 TFlops of peak performance in double precision, thus fulfilling the goals of the roadmap for research infrastructure and integrating all the support of HPC and Grid/cloud communities in a centralized and focused way.

During the last few months there was a national call for projects in several thematic areas, including ICT, new materials, energy and life sciences, and many of these projects specify use of advanced computing models and distributed processing methods and we plan to work actively with these research groups to achieve the best results from use of the new advanced equipment, which will be operational in the first.

NGI\_MD, Moldavia

In the reporting period NGI\_MD activities in the area of users community enlargement was focused on two directions. One is attracting new users from the State University of Moldova where new Grid site was deployed in the beginning of 2014. This site run-time environment, as well as other NGI clusters’ execution environment and open-source applications’ support libraries was adopted for two main applications areas – for modelling of decision-making processes for economical systems analysis and applications for semiconductor devices simulation. The second users’ community is actively using as a framework the idea of the finite volume method, created the efficient algorithms and implement corresponding software to solve practical problems of semiconductor devices modeling.

The other users’ community is representing by local Life Science VRC. The resources of the NGI\_MD were allocated for operation of the distributed information system "DICOM Network”, an innovative informational system for providing modern e-health services in cooperation with other informational systems existing in the national medical institutions. The system is focused on accumulation, processing, systematization and authorized access to distributed database of medical images producing in DICOM format. The distributed system helps supporting of decision-making services for providing information necessary to develop diagnoses, finding solutions of various problems faced by professionals in medicine. The implementing system is a complex of structured elements, which are interdependent and interconnected and forming a complex operating unit in a given environment in order to achieve specific objectives in the area of medical images processing.

For these two users communities are available resources of all three Grid sites operating at national level. For Grid infrastructure users from the State University on 21 May 2014 was organized dedicated training workshop. Serious of specialized trainings for Grid sites admins took place in May – September 2014.

To attract new users’ communities several meetings were attended by NGI-MD staff with presentations that highlighted resources, services and users’ support activities at national level and supporting activities provided by EGI-Inspire project at European level:

* International Scientific Conference “Mathematical Modeling, Optimization and Information Technologies”, IV edition, Chisinau, ATIC, March 25–28, 2014.
* Third Conference of Mathematical Society of the Republic of Moldova (IMCS-50). Chisinau, IMI ASM, August 19-23, 2014.
* “Networking in Education and Research”, Joint Event 13th RoEduNet & 8th RENAM Conference, Chisinau, September 11-13, 2014.

Plans to continue user community support and deployment of new services in 2015 are:

* Extending testing cloud infrastructure to provide resources for existing users and porting new applications;
* Allocation of the cloud infrastructure resources for integration of the distributed medical images collection and processing information system (currently deployed using Grid middleware);
* Implementation of the federated AAI infrastructure at national level, including for providing access to computing resources.

NGI\_AEGIS, Serbia

During the past period NGI\_AEGIS continued to provide support to its key scientific communities: condensed matter physics, chemistry and agricultural community. That included day-to-day operational and user support tasks such as resolving issues related to efficient running of software ported to Grid, VOs membership and certificates handling and renewal but also updating ported software packages to their latest versions (e.g. update of the OpenEye software stack for computational chemistry researchers) and enhancing workflows deployed for users from agricultural community. As one of the outcomes of the successful NGI\_AEGIS user support activities, IPB’s researcher Milovan Suvakov participated in Lighting talks session

(<https://indico.egi.eu/indico/getFile.py/access?contribId=192&sessionId=64&resId=0&materialId=slides&confId=1994>) at EGI Community Forum 2014 that was held in Helsinki, Finland on 19-23 May 2014 (http://cf2014.egi.eu/). As an invited lecturer at the RO-LCG 2014 conference that was held on 3-5 November 2014 in Bucharest, Romania (http://rolcg2014.ifin.ro/) IPB's Vladimir Slavnic gave a talk where he presented ongoing Grid and High Performance (HPC) activities in Serbia, supported scientific communities and various tools and portals developed for their researchers. NGI\_AEGIS support activities will be continued in 2015 and that will include hosting and maintenance of deployed VO services, porting of new applications to Grid, support in gUSE/WS-PGRADE workflow and application dedicated RESTful interface development, as well as providing day-to-day support to all supported research communities.

NGI\_CZ, Czech Republic

FedCloud adoption:

Although this partially belongs to SA5.2 results are interesting for DCCs/support too, especially to Elixir DCC.

Operation and Support for VOs & user communities. Creating new cloud and support of VOs, e.g. [highthroughputseq.egi.eu](http://highthroughputseq.egi.eu/" \t "_blank), [physiome.lf1.cuni.cz](http://physiome.lf1.cuni.cz/" \t "_blank), [eiscat.se](http://eiscat.se/" \t "_blank), [fedcloud.egi.eu](http://fedcloud.egi.eu/" \t "_blank), [peachnote.com](http://peachnote.com/" \t "_blank). Porting existing user images, creating new generic appliances, porting existing applications to the cloud.

Support for EBI and Elixir with Perun (preparation of VO, support in Perun, integration with AppDB), support for use-cases with users without certificates.

Plan for 2015 include continuing support for user communities which use/plan to use EGI federated cloud infrastructure, with emphasis on cloud adoption by new groups and support for life-science user groups.

Particle physics:

We continuously support the managed VOs.

* Auger VO is preparing the change of the production system and catalog. A new test instance of DIRAC was installed in Prague. One week workshop will be held in December in Prague with A. Tsaregorodstsev to discuss details of the migration. Another planning workshop (for 2 or 3 days) is planned in January with the current production team.
* Belle VO. NGI\_CZ supported Belle-II in the 4th MC Campaign. About 2 TB of data were produced at CESNET (2% of the total production) and stored on predefined SEs. A new disk space was made available for the VO belle and it will be used during the next campaign planned for February 2015. Report about CESNET participation was presented at Belle II meeting in KEK (on behalf of CESNET, we did not participate in person).
* ELI VO. We helped ELI simulation group with a cluster selection procedure. Documentation for [eli-beams.eu](http://eli-beams.eu/" \t "_blank) was prepared. NGI\_CZ provided ELI computing and storage capacity for testing purposes. Meetings with ELI are held to share our experience with cluster management and possibility how to connect their HW to NGI\_CZ infrastructure. The HW will be delivered in January and after an initial evaluation period we will discuss sharing with other users.

ESFRI project support:

Being an e-infrastructure, the NGI-CZ is a facility that supports research activities in practically all scientific disciplines, resulting in very large and diverse set of users. We support the following large ESFRI communities, with representation in the Czech Republic.

* ELIXIR – CESNET and CERIT-SC are full members of the national node ELIXIR CZ RI proposal. Prof. Ludek Matyska is currently the deputy head of the node and he co-chairs the Technical Services workstream of the whole ELIXIR (together with Tommi Nyronen from CSC, FI). NGI staff is involved in several ELIXIR task forces, with leading positions in some of them. The NGI is further expected to take care of the basic ELIXIR-CZ e-infrastructure and to provide sufficient computing/storage resources required for operation of the national ELIXIR-CZ node.
* BBMRI – very close collaboration with the Czech BBMRI CZ node leader. It is expected, NGI\_CZ will take care of their basic e-infrastructure needs, coordinating the information systems among the Czech bio-banks.
* ICOS – very close collaboration with CzechGlobe (leader of CzeCOS - local part of ICOS ESFRI project). A collaboration agreement on the deployment of Aladin, the weather forecast system to be used for climate simulations, was signed. The NGI\_CZ will provide the community computing and storage facilities and support the CzeCOS/ICOS RI with expert knowledge in the area of high-performance computing.
* CLARIN – the first contact was done in October with aim to help the community to integrate to NGI.
* ELI – see above ELI VO

Plan for 2015 - to continue with dissemination and support of existing users communities, searching new communities.

Belarus NGI

In the reporting period UIIP NASB has managed to engage new user communities, and further support the main ones:

1. Nanotechnology – The usage of grid technologies has been promoted to Nanotechnology Association, and some projects on solving specific tasks have started.
2. Bioinformatics – A mini course on bionformatics was organized ([http://uiip.bas](http://uiip.bas/" \t "_blank)- [net.by/event/mini\_cours.php](http://net.by/event/mini_cours.php" \t "_blank) ).
3. Tire Industry – New results has been achieved in modelling tires for big trucks. Plans to develop some educational services.
4. Medical image processing – A portal of experimental web-based services for medical image processing has been deployed ([http://imlab.grid.by/](http://imlab.grid.by/" \t "_blank)). The work was being done within a project on tuberculosis portal ([http://tuberculosis.by/about](http://tuberculosis.by/about" \t "_blank)).
5. Grid middleware development – The formal agreement on cooperation in further develoopment of QCG middleware has been discussed with Poznan Supercomputing and Networking Center. Plans for 2015 are to formalize cooperation.
6. Cloud – Experimental grid site of virtualized resources (cloud) has been deployed on the basis of Ganeti software. Plans are to deploy Synnefo in our infrastructure.

NGI Slovakia

The Slovakia DCC-member provided the continued support for all users in the process of developing, upgrading and running their applications on the HPC cluster and EGI infrastructure.ch4.opt.wfout Particularly, our activities were focused on the support of the scientific community from the field of nanotechnology.

Our works realised include:

* Providing the talks and consultancy for members of the nanoscience community with the view of making them familiar with the structure and components of the HPC cluster and EGI infrastructure and how these can be accessed and efficiently utilized.
* Porting three software packages used in the nano-research to the HPC cluster integrated in EGI: “OOMMF” (Object Oriented MicroMagnetic Framework) – for performing micromagnetic simulations; “Magpar” (Parallel Finite Element Micromagnetics) – for solving a variety of static and dynamic micromagnetic problems; “QWalk” – for performing Quantum Monte Carlo calculations of electronic structures in molecules and solids.
* Creating software support tools to reduce the technical difficulties of accessing remote computing resources, and to facilitate the execution process of simulations on the HPC cluster and EGI infrastructure. For running various models offered by the simulation packages mentioned above we have developed flexible and easily manageable command-line scripts which enable the job submission based only on several input parameters. For running the OOMMF simulations we have developed a scientific gateway which provides a unified access to both the HPC cluster and Grid environment. Employing the gateway interface users do not recognise whether their application is submitted to the local cluster or EGI infrastructure. The OOMMF framework is applied to simulation of dynamical processes in magnetic devices.

Our plans:

We will go on with the assistance of existing and new users in the development and improvement their applications and with the development of suitable user-friendly tools for job submission. The architecture and implementation of the scientific gateway is generic, we intend to adopt this approach for other applications likewise; moreover we plan to extend the gateway to Cloud computing resources. Our focus will be imposed also on the porting GPGPU applications to the HPC cluster and EGI infrastructure.

Publications:

1. Viet Tran, Robert Andok, Ladislav Hluchý, Giang Nguyen, Miroslav Dobrucký: “High Performance Computing for Nanoscale Simulations”. EGI Community Forum 2014, Contribution ID: 98, session: Porting new applications to EGI, track: Porting applications to the grid and cloud platform. Helsinki 2014.
2. Giang Nguyen, Ladislav Hluchý, Jaroslav Tóbik, Viera Šipková, Miroslav Dobrucký, Ján Astaloš, Viet Tran, Robert Andok: “Unified nanoscale gateway to HPC and Grid environments”. The 5th Symposium on Information and Communication Technology 2014, ACM 978-1-4503-2930-9/14/12, DOI 10.1145/2676585.2676591 (accepted paper)

LifeWatch DCC:

Lifewatch and its associated Distributed Competence Center have been working in different services during the last months. Lifewatch Spain with a couple of National Grid Initiatives (Spain, Portugal, France and Italy), Flanders Marine Institute (VLIZ, Belgium) and CIBIO (Portugal) has submitted a proposal for a Competence Center in EGI-ENGAGE called “EGI-Lifewatch Competence Center”. In this proposal many different certain actions are defined to do whithin EGI infrastructure. During the las months different EGI resources have been used in three of the use cases included in the proposal:

1. **Data processing and modelling for Ecological Observatories**: During the last months a number of modelling simulations have been run using EGI FedCloud infrastructure. The software used was Delf3D, a suite developed by Deltares, which is composed of a set of modules, including hydrodinamics and water quality. A couple of virtual machines have been launched (at CESNET and IFCA) and set up installing and configuring the software and then a number of hydrodinamics simulations have been executed. For 2015 we plan to continue our simulations and use other kind of resources like storage.
2. **Big data:** Flanders Marine Institute (VLIZ) has started the installation of a number of biosensors on board of the Research Vessel Simon Stevin, as part of the Flanders Marine LifeWatch Observatory. This project has a series of needs that require the use of a powerful e-infrastructure able to handle a Big Data problem: about 50 TB of data per year. During the last months VLIZ have been uploading these files to our Grid site at IFCA and getting ready for the processing (defining needed tools and resources). We have arranged a technical meeting for the very beginning of 2015 in order to establish the concrete needs and train users.
3. **Biodiversity pipeline:** TRUFA (Transcriptomes User-Friendly Analysis) is a free webserver designed to help performing RNA-seq analysis. This web tool have been designed for working over a HPC architecture but in the last months we have been working on migrating it to cloud. TRUFA is currently in alpha phase with around 20 users but we expect to increase the number in the following months so we need to have an scalable solution. In the last months we have defined the new cloud-based architecture and start to work in it under FedCloud infrastructure.

Polish NGI, Poland

* CLARIN: We have tightened links with local CLARIN community. Necessarily storage space & computing power has been booked for them. They are building right now a bunch of services accessed by a web interface. Current work include managing and tagging data, morforlogical analysis, significance estimation via web services. More is planned for next few months: semantical and statistical analysis of the text „core”, speech recognition algorithms and other text analysis related actions. We have also started porting of their software to EGI platform.
* EPOS: A prototype of the SG has been deployed. Current work includes vast amount of induced seismicity software porting, integration of this software with SG and development of so-called non-stationary hazard use case within the portal. The use case is focussing on coal mining processes only. Further extensions are planned towards reservoir IS hazard analysis. The SG has been presented on several conferences and together with InSilicoLab technology will be used to build so called Thematic Core Services for EPOS WG10. We have also met with VERCE project people (they use gUSE for their SG) in order to work towards interoperability between these two SG. Same work is in progress in CTA.
* CTA: InSilicoLab Team works on a solution for the CTA Science Gateway, a central web portal for the whole community including external observers and internal CTA members. The Science Gateway will integrate many different tools, such as wiki pages, helpdesk etc. and more CTA specific applications provided by other project groups like e.g. proposal handling, observation scheduler. One of such application is meant to enable an easy access to the computing infrastructure. A solution for that is also developed by our team based on the InSilicoLab Framework.
* LOFAR — a few LOFAR software packages have been ported to EGEE grid, however aside simple tests no other job runs have been performed.
* ESS – the cooperation just stared. Seems that our InsilicoLab for Chemistry will be a perfect starting point. This will develop during next few months.

LIP, PT

* Support and managemment of several VOs:
  + [chem.vo.ibergrid.eu](http://chem.vo.ibergrid.eu/" \t "_blank)
  + [earth.vo.ibergrid.eu](http://earth.vo.ibergrid.eu/" \t "_blank)
  + [eng.vo.ibergrid.eu](http://eng.vo.ibergrid.eu/" \t "_blank)
  + [hpc.vo.ibergrid.eu](http://hpc.vo.ibergrid.eu/" \t "_blank)
  + [iber.vo.ibergrid.eu](http://iber.vo.ibergrid.eu/" \t "_blank)
  + [ict.vo.ibergrid.eu](http://ict.vo.ibergrid.eu/" \t "_blank)
  + [life.vo.ibergrid.eu](http://life.vo.ibergrid.eu/" \t "_blank)
  + [pfound.vo.ibergrid.eu](http://pfound.vo.ibergrid.eu/" \t "_blank)
  + [phys.vo.ibergrid.eu](http://phys.vo.ibergrid.eu/" \t "_blank)
* Regular participation in the Virtual Team[[83]](#footnote-83) with the goal to increase the awareness of EGI services and applications to the Protein Structural Biology and Sequencing (Protein/DNA/RNA) communities. The major contributions from our part to the VT was the identification of tools available in the EGI e-infrastructure which could be off interested to the VT targeted community. In this framework we continue to pursue the national research teams, namely the ELIXIR, in order to increase our knowledge networks with the goal of increasing the number of users. This is being done in cooperation with the EGI Champion Afonso Duarte.
* Support and dissemination of the Py4Grid tool developed at LIP[[84]](#footnote-84).

Short/medium plans:

* Continue to provide support for the current VOs
* Porting of new applications to the grid namely R[[85]](#footnote-85) and BATMAN[[86]](#footnote-86)
* Extending support of some of grid users to cloud resources

INFN, Italy

Regular user support and onboarding for new users is currently provided for some communities:

* WeNMR;
* DRIMHM;
* INFN internal projects (SPES);
* Computational Chemistry (CMMST);

The activity carried out was focused on providing technical support on the application porting and the resolution of common problems related to application running on grid and cloud sites.

Some of the applications have been made available making use of the IGI Grid Portal and developing for them proper portlets and workflows.

As a result, the activity carried out by INFN contributed to the constant growth over time of the supported national, European and worldwide communities[[87]](#footnote-87) (WeNMR +10%; DRIHM +80%; INFN +30%;CMMST +31%).

Moreover INFN contributed to the following EGI activities:

* Participation to the ELIXIR pilot in EGI.

In particular INFN was leading Task 4 - Tools for data replication.

The scope of the Task was to identify and propose suitable software tools, software configurations, operational practices and documentations expressly devoted to biological reference datasets to run over the EGI FedCloud. The outcomes can be summarized as following:

* Selection of recommended services to replicate reference biological datasets to EGI;
* Deploy a distributed testbed with the recommended services;
* Collect evaluation of such services from resource providers and users.
* Participation to the EGI Long Tail Of Science (LTOS) working group (WG).

The scope of the activity was to merge efforts from different expertise (among the EGI partners) and develop a LTOS platform where single users (who do not belong to structured communities) can relay on a simplified access to the Infrastructure. Discussions and exchanges between the WG members promoted the delivery of the first pilot service by the end of PY5.

In line with this, some activities devoted to helping communities in structure and define EU funded call for proposals have been started. In particular support is given to the following communities:

* CMMST-VRE (EINFRA-9): promoted by INSTM and other public and private working on the field of Computational Chemistry.
  + The first internal meeting for the CMMST community will held in Amsterdam Dec the 1st (<https://indico.egi.eu/indico/conferenceDisplay.py?confId=2342>)
* Structural Biology (EINFRA-9): promoted by the major institutes of ESFRI INSTRUCT and RDA Interest Group).
  + Activities for the Structural biology are ongoing
* LinkD (EINFRA-9): Promoted by LifeWatch community, INFN is involved in order to support bioinformatics application over EGI grid and cloud computational resources. INFN is also involved in the development of web services frontend that allow the end-user to seamless exploit diverse computing resources.
* Biology (EGI-Engage): contribution to the proposal for a Competence Center in EGI-Engage called “MoBrain: A Competence Center to Serve Translational Research from Molecule to Brain”.
* Lifewatch (EGI-Engage): contribution to the proposal for a Competence Center in EGI-Engage “EGI-LifeWatch CC”, in order to support the Lifewatch use-cases over EGI Infrastructure.

The activities led by INFN are aimed at providing and/or developing proper DCI related services to support the above mentioned communities on achieving their outcomes raised from the related projects. However, such activities have to be revised depending on the final evaluation of the related proposals.

French NGI (France Grilles)

During the reporting period France Grilles financed attendance and travel to the EGI Community forum for 8 users of different French communities. The France Grilles team attended. The NIL attended the Biodiversa forum in Paris in October on demand of EGI.eu team to study potential needs of the projects presented. France Grilles team attended the EGI Amsterdam workshop in September.

EGI and France Grilles services were presented in workshop (biodiversity group in Marseille, ECCB'14 in Strasbourg with the EGI.eu team). The NIL took part in the business VT. Several groups of users were supported such as an INRA distributed group of users interested in the iRODS service, a user isolated in Tahiti located at the opposite side of the world but relevant as France Grilles user. Visioconferences involving EGI.eu, France Grilles and the user were organised. A certificate has been issued, the situation is currently on hold.

During this time the collection of publications gathered by France Grilles has grown and this work was presented at a regional academic business group meeting. A DIRAC and iRODS tutorial is currently prepared and will be held in January. A "cloud challenge" call is just closed and one or two projects will be supported on the France Grilles federated cloud.

1. Report on NGIs plans and activities in the Pay-per-Use Pilot

**UIIP-NASB (Belarus)**

Activities carried out during reporting period:

* UIIP NASB has been communicating with business associations and government bodies to promote ideas of creating business oriented grid infrastructures in several domains (i.e. gas and oil industry, nano industry);
* UIIP NASB was also solving organisational issues around the full implementation of the pay-for-use model in the grid infrastructure of the National Academy of Sciences.

Main achievements:

* Two large Grid/Cloud infrastructure state projects have been initiated during the reporting period.

Related activities performed/planned at a national level:

* Pay-for-Use concept and models during next two years will be integrated into national system of funding of the projects using supercomputing technologies as well as into national grid infrastructure information systems.

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* UIIP NASB is welcoming further development of this activity beyond EGI-InSPIRE project and will be participating in such activity implementing the results on the national level.

**Ibergrid- IFCA CSIC (Spain)**

The work from IFCA has been centered on contributing to establish a pay-for-use scheme under FedCloud. IFCA team has reported the experience they have working with different companies in Spain, in particular supporting execution of applications related to engineering modelling. The different ways to interact and the agreements established have been discussed and reported at EGI CF and at the different meetings of this activity within NA2.5

As IFCA has already approved public rates for computing, it has been easy to translate them to the new scheme, although the definition of the different flavour instances for VM will require further tuning. IFCA team has provided input to participate in different opportunities, although these possibilities have not been concluded yet. Also we have reported on the difficulties to support applications running on MS, although got it ready (with substantial effort).

At national level as indicated we have provided support to several companies to test and try FedCloud use at IFCA. Launching for example very large memory (128-256 GB RAM), or requiring licenses (ANSYS, COMSOL, MATLAB).

IFCA will go ahead with pay-for-use activities beyond the end of EGI-INSPIRE. We are right now estimating the best way to provide HPC pay-for-use instances re-using our supercomputing resources. We have two applications, one on genetics, and another one on hydro-engineering, both using MPI and up to 128 cores, that are being ported to FedCloud.

The experience with these applications has been reported at internal meetings, and presented at EGI CF and at EGI meeting on FedCloud in September in Amsterdam.

**CESGA (Spain)**

Activities carried out during reporting period:

* Participation as a hybrid grid-cloud infrastructure in the pilot.
* Attending EGI Pay-for-Use PoC regular and F2F meetings.
* Contributing in defining the model for the EGI Pay-for-Use PoC
* Review of the “Helix Nebula Infrastructure as a Service Agreement”
* Review of the “Engineering SpA” requirements
* Development of cost calculation capabilities in the Accounting Portal:
  + Extraction of the published CPU costs and VAT from GOCDB.
  + Calculation of CPU cost + VAT for:
    - Sites
    - NGIs
    - Countries
    - Grid, based on Normalised hours
    - Cloud, based on wall time hours (normalised not currently available for cloud)
    - Grouped by date, region, VO, SubmitHost, Number of processors, Nodes
    - Filtered by Date, group of VOs.
    - Graphing of all the above
  + Estimation of CPU cost for all the infrastructure (not only PoC participants). This is done with an average CPU cost and VAT value. All the above points are supported

**CSC (Finland)**

Activities carried out during reporting period

* Attending EGI Pay-for-Use PoC regular meetings and discussions
* “Engineering SpA” requirements' feedback
* GOCDB Cloud site entry and extensions created
* Participation in e-Grant tool testing consequently providing feedback

Main achievements:

* Internal reflection on CSC's cloud service readyness to integrate federated Pay-for-Use business models
* Related activities performed/planned at a national level
* Internal evaluation of cPouta's (CSC-Cloud) compliance to EGI Pay-for-Use PoC

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE

* CSC is looking forward to support EGI's PfU follow up activities

**GRNET (Greece)**

Activities carried out during reporting period:

* Attending EGI Pay-for-Use PoC regular meetings and action items produced.
* Contributing in defining the model for the EGI Pay-for-Use PoC
* Contribution to work progress and deliverables presented @ EGI-CF 2014 (Helsinki, May 2014)
* Contribution to PoC deliverable preparation for the EGI Conference (Amsterdam, 24-26 September).
* Held a number of internal meetings in order to define GRNET pay-per-use business plans and try to find ways to avoid legal barriers.
* Advertising the agreed values on all HellasGrid sites (both Grid and Cloud) through GOCDB according to the newly devised pricing scheme.

Planned Activities:

* Participate in the regular PoC meetings and follow-up any pending actions that may arise.

**INFN+CNAF+UNIPG (Italy)**

Activities carried out during reporting period:

* Attending EGI Pay-for-Use PoC regular meetings
* Contributing in defining the model for the EGI Pay-for-Use PoC
* Participation to the established Business Engagement Programme VT
* Contribution to Work progress and deliverables presented @ EGI-CF 2014 (Helsinki, May 2014)
* Contribution to PoC deliverable preparation for the EGI Conference (Amsterdam, 24-26 September).
* Definition and review of the EGI Business Engagement Programme presented at EGI.eu Executive Board (Nov 2014).

Main achievements:

* Deliverables and information used to define proper engagement strategies with public and private.

Related activities performed/planned at a national level:

* Preliminary contact with SMEs and public for the participation in national or European projects - activity on going
* Assisting and supporting communities in the definition of pilot architectures and services aimed at the preparation of new EC funded proposals (e.g. computational chemistry, structural biology).

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* Intention to support the ongoing activities

**INFN-Bari (Italy)**

Activities carried out during reporting period:

* Contributing in defining the model for the EGI Pay-for-Use PoC
* Configuring INFN-BARI and PRISMA-INFN-BARI for the EGI Pay-for-Use PoC
* Attending EGI Pay-for-Use PoC regular meetings
* Review Cloud for Europe PCP tender info and provide initial feedback
* Talk on PCP and PPI (Pre-commercial Procurement and public procurement of innovative solutions) at the EGI Conference on Challenges and Solutions for Big Data Processing on Cloud (24-26 September 2014 CWI Conference Centre, Amsterdam)[[88]](#footnote-88)

Main achievements:

* Evaluation of the compliance of proposed possible customer use cases with respect to NGI\_IT regulations and local Resource Center policies (Requirements from Engineering SpA used as starting material for quality assurance - Report in preparation)

Related activities performed/planned at a national level:

* Review of the “Helix Nebula Infrastructure as a Service Agreement”
* Review of the “Engineering SpA” requirements

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* Intention to support the ongoing activities

**CYFRONET (PL-GRID)**

Activities carried out during reporting period:

* Attending EGI Pay-for-Use PoC regular meetings
* Contributing in defining the model for the EGI Pay-for-Use PoC
* Contribution to Work progress and deliverables presented @ EGI-CF 2014 (Helsinki, May 2014)
* Contribution to PoC deliverable preparation for the EGI Conference (Amsterdam, 24-26 September)
* Preparation of a pilot system in e-GRANT (EGI RA Tool) carrying out PFU activity

Main achievements:

* According to P4U PoC process consists of 9 activities. 6 of them will be implemented and coordinated in e-GRANT tool. Pilot system conducts first 3 of them:
  + Each provider is able to specify the price for each of the services on a central tool
  + The customer is able to search for all the providers that support pay-for-use services
  + The customer decides from which provider to buy services and submits a request, which creates the core of the environment enabling basic functionalities but fulfilling the most important assumptions of the process.

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* Developing functionalities for remaining activities in e-GRANT Tool
  + The customer agrees and signs an SLA
  + The consumer uses the services and receives a monthly usage report. However, users will have access to the accounting portal for their VO (updated once a day).
  + The customer receives an invoice and pays directly the service provider(s)

**UI SAV (Slovakia)**

Activities carried out during reporting period:

* Attending EGI Pay-for-Use Proof of Concept regular meeting
* Solving actions conducted by the meeting
* Reviewing requirements of use cases provided by Engineering SpA and provide offers/feedbacks
* Configuration, operation and maintaining of IISAS-FedCloud sites for EGI Pay-for-use PoC
* Analysing business models and legal solutions for EGI Pay-for-use PoC activity
* Participating on reports and presentations of EGI Pay-for-use PoC activity

Main achievements:

* Full operation of IISAS-FedCloud in EGI Pay-for-use PoC activity
* Report on detailed technological compliances for Engineering SpA use cases
* Legal and technological readiness for EGI Pay-for-use PoC activity

Related activities:

* Prototype of SaaS solution for water supplying application for Bratislava Water Supplying company (Bratislavská vodárenská spoločnosť, a. s.)
* Two scientific papers about porting commercial applications to grid and cloud

Planned activities:

* Following actions of EGI Pay-for-use PoC, configuring and operating IISAS-FedCloud site for EGI Pay-for-use PoC

**TUBITAK (Turkey)**

Activities carried out during reporting period:

* Contributing in defining the model for the EGI Pay-for-Use PoC
* Contribution to Work progress and deliverables presented at EGI-CF 2014
* Analysing business models and legal solutions for EGI Pay-for-use PoC activity
* Internal meetings are organised to define the Pay-for-use model of cloud and grid sites.
* Cloud compute and grid compute prices are defined and set in GOCDB

Main achievements:

* The know-how which are developed in the project period and documented as deliverables and information is used to define engagement strategies.

Related activities performed/planned at a national level:

* Pay-for-use model is already used in funding projects which are used high performance computing infrastructure of TUBITAK ULAKBIM since at the beginning of 2011.

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* Following actions of EGI Pay-for-use PoC, configuring and operating grid and cloud sites for EGI Pay-for-use PoC

**IMCS-UL (Latvian Grid)**

* Activities carried out during reporting period:
  + Attending EGI Pay-for-Use PoC regular meetings
  + Participation in discussions on EGI Pay-for-Use mailing list
  + Contributing to Pay-for-Use PoC report
  + Continuing support for GRID cluster users
* Main achievements:
  + Our scientists published two papers: “Corrections to finite–size scaling in the φ4 model on square lattice” (<http://arxiv.org/pdf/1406.7491.pdf>) and “Corrections to finite–size scaling in the 3D Ising model based on non–perturbative approaches and Monte Carlo simulations” (<http://arxiv.org/pdf/1407.3095v1.pdf>). Computation part was done using Latvian Grid Infrastructure (part of EGI) cluster (mentioned in Acknowledgements).
* Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:
  + While preparing answers for P4U PoC report in June '14 we discussed with management the viability of such solution for us in near future. We strive to provide computing resources for our scientists free of charge. Currently there might not be much interest in paid computing resources (that might change one day, though). On top of that, currently all of our cluster frequent users are from the same institution as we are (IMCS UL). So that would be another challenge - how do we charge different departments inside one organization.

**IICT-BAS (Bulgaria)**

Activities carried out during reporting period:

* Attending in the regular meetings of EGI Pay-for-Use PoC
* Contributing in defining the model for the EGI Pay-for-Use PoC
* Contribution to Work progress and participation with presentation at EGI-CF 2014 (Helsinki, May 2014)
* Participation at EGI Conference on Challenges and Solutions for Big Data Processing on Cloud (24-26 September 2014 CWI Conference Centre, Amsterdam)
* Contribution in the EGI Business Engagement Programme presented at EGI.eu Executive Board (Nov 2014)
* A number of internal meetings with Bulgarian business.

Main achievements:

* A tender was open to enlarge IICT-BAS computing infrastructure
* Establish collaboration with VMware-Bulgaria EOOD, Bulgarian CLARIN community and other National RI recognized into National Roadmap.
* Related activities performed/planned at a national level
* Series of meetings with policy–makers from Ministry of Education and Scientists, as a result, new updated version of National Roadmap for RI was accepted (Decision #569 from 31 July 2014 by Council of Ministers of Bulgaria). IICT-BAS is a coordinator of National Research Infrastructure, named, “National Center for HPC and Distributed computing”.
* Planned to enlarge Grid infrastructure in Bulgaria with new computer facility.
* Planned additional meetings with Bulgarian businesses interested in Cloud / Grid computing.

Individual position and/or plans regarding pay-for-use activities beyond EGI-InSPIRE:

* Intention to support the ongoing pay-for-use activities beyond EGI-InSPIRE

1. <http://go.egi.eu/osc> [↑](#footnote-ref-1)
2. <https://wiki.egi.eu/wiki/VT_Business_Engagement> [↑](#footnote-ref-2)
3. <https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC:Home> [↑](#footnote-ref-3)
4. <https://wiki.egi.eu/wiki/EGI_OLA_SLA_framework> [↑](#footnote-ref-4)
5. <https://wiki.egi.eu/wiki/EGI_ITSM> [↑](#footnote-ref-5)
6. <http://www.egi.eu/export/sites/egi/news-and-media/publications/EGI_Case_studies.pdf> [↑](#footnote-ref-6)
7. <http://cf2014.egi.eu/> [↑](#footnote-ref-7)
8. D1.15 Annual report on quality status <https://documents.egi.eu/document/2251> [↑](#footnote-ref-8)
9. The way this information was collected changed in PY5. The NGIs were asked to provide a list with the total list of publications published during the lifespan of EGI-InSPIRE (PY1-PY5), in preparation for the Master List of papers which will be part of the Final Report as table A1. From this list, 194 represents the total number of publications published during 2014. [↑](#footnote-ref-9)
10. Wiki page with the description of the core activities: <https://wiki.egi.eu/wiki/Core_EGI_Activities> [↑](#footnote-ref-10)
11. <https://documents.egi.eu/secure/ShowDocument?docid=2170> [↑](#footnote-ref-11)
12. <https://documents.egi.eu/public/ShowDocument?docid=2166> [↑](#footnote-ref-12)
13. <https://wiki.egi.eu/wiki/EGI_ELIXIR_Pilot> [↑](#footnote-ref-13)
14. Event’s website: <http://cf2014.egi.eu>; Event’s report: <https://documents.egi.eu/document/2242> [↑](#footnote-ref-14)
15. <https://indico.egi.eu/indico/conferenceDisplay.py?confId=2160> [↑](#footnote-ref-15)
16. <http://www.ebec2014.org/> [↑](#footnote-ref-16)
17. <http://www.egi.eu/blog/2014/07/17/egi_at_european_bioenergetics_conference.html> [↑](#footnote-ref-17)
18. <http://www.eccb14.org> [↑](#footnote-ref-18)
19. <http://www.egi.eu/blog/2014/09/09/egi_at_the_european_conference_on_computational_biology.html> [↑](#footnote-ref-19)
20. <http://mwatelescope.org/tempe2014> [↑](#footnote-ref-20)
21. <http://computing.derby.ac.uk/ucc2014/> [↑](#footnote-ref-21)
22. <http://www.egi.eu/news-and-media/publications/CF2014_BoA.pdf> [↑](#footnote-ref-22)
23. <http://go.egi.eu/2197> [↑](#footnote-ref-23)
24. <http://go.egi.eu/2196> [↑](#footnote-ref-24)
25. <http://go.egi.eu/2198> [↑](#footnote-ref-25)
26. <http://go.egi.eu/2199> [↑](#footnote-ref-26)
27. At the time of writing this report, the EGI Case Studies publication is in layout phase and there is no final PDF to be linked to. An earlier draft of the publication, which provides an idea of the concept, can be found here: <http://www.egi.eu/news-and-media/publications/Case_studies_v2.pdf> [↑](#footnote-ref-27)
28. <http://www.egi.eu/case-studies/> [↑](#footnote-ref-28)
29. <http://go.egi.eu/Issue16PDF> [↑](#footnote-ref-29)
30. <http://go.egi.eu/Issue17PDF> [↑](#footnote-ref-30)
31. <http://go.egi.eu/osc> [↑](#footnote-ref-31)
32. <http://www.egi.eu/case-studies/physical-sciences/andromeda_ii.html> [↑](#footnote-ref-32)
33. <http://www.egi.eu/case-studies/physical-sciences/stars.html> [↑](#footnote-ref-33)
34. <http://www.egi.eu/case-studies/physical-sciences/becs.html> [↑](#footnote-ref-34)
35. <http://www.egi.eu/case-studies/natural-sciences/digital_security.html> [↑](#footnote-ref-35)
36. <http://www.egi.eu/news-and-media/newsletters/Inspired_Issue_15/bacteria.html> [↑](#footnote-ref-36)
37. <http://www.egi.eu/case-studies/medical/combat_stress.html> [↑](#footnote-ref-37)
38. <http://www.egi.eu/news-and-media/newsfeed/> [↑](#footnote-ref-38)
39. <http://www.egi.eu/blog/> [↑](#footnote-ref-39)
40. <http://www.egi.eu/news-and-media/directors_letters/> [↑](#footnote-ref-40)
41. <https://www.egi.eu/news-and-media/press/Press_Release_Federated_Cloud_Launch.pdf> [↑](#footnote-ref-41)
42. <http://www.egi.eu/news-and-media/newsfeed/news_2014_023.html> [↑](#footnote-ref-42)
43. E.g *The Register* <http://www.theregister.co.uk/2014/05/22/egi_launches_federated_cloud/> [↑](#footnote-ref-43)
44. <http://indico.egi.eu/indico/conferenceDisplay.py?confId=2345> [↑](#footnote-ref-44)
45. Indico page to be announced. [↑](#footnote-ref-45)
46. http://go.egi.eu/osc [↑](#footnote-ref-46)
47. http://e-irg.eu/workshop-2014-11-programme [↑](#footnote-ref-47)
48. <https://documents.egi.eu/document/2387> [↑](#footnote-ref-48)
49. <https://wiki.egi.eu/wiki/VT_Business_Engagement> [↑](#footnote-ref-49)
50. <https://documents.egi.eu/document/2169> [↑](#footnote-ref-50)
51. <https://documents.egi.eu/document/2339> [↑](#footnote-ref-51)
52. <https://documents.egi.eu/document/2256> [↑](#footnote-ref-52)
53. <https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC> [↑](#footnote-ref-53)
54. <https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC:Meetings> [↑](#footnote-ref-54)
55. <https://documents.egi.eu/document/2088> [↑](#footnote-ref-55)
56. <https://indico.egi.eu/indico/sessionDisplay.py?sessionId=29&confId=1994#20140521> [↑](#footnote-ref-56)
57. <https://indico.egi.eu/indico/sessionDisplay.py?sessionId=2&confId=2160#20140925> [↑](#footnote-ref-57)
58. <https://documents.egi.eu/document/1391> [↑](#footnote-ref-58)
59. [https://wiki.egi.eu/wiki/HOWTO04\_Site\_Certification\_Manual\_tests](https://wiki.egi.eu/wiki/HOWTO04_Site_Certification_Manual_tests#Check_the_functionality_of_the_cloud_elements) [↑](#footnote-ref-59)
60. [https://wiki.egi.eu/wiki/EGI\_CSIRT:Security\_Resource\_Centre\_Certification\_Procedure](https://wiki.egi.eu/wiki/EGI_CSIRT:Security_Resource_Centre_Certification_Procedure#Cloud_Resource_Center) [↑](#footnote-ref-60)
61. <https://wiki.egi.eu/wiki/Resource_Centres_OLA_and_Resource_infrastructure_Provider_OLA_reports> [↑](#footnote-ref-61)
62. <https://www.surveymonkey.com/r/FedCloud_UMD> [↑](#footnote-ref-62)
63. <https://wiki.egi.eu/wiki/Federated_Cloud_Communities> [↑](#footnote-ref-63)
64. <http://www.egi.eu/news-and-media/newsletters/Inspired_Issue_13/ENM.html> [↑](#footnote-ref-64)
65. <http://www.biovel.eu/images/publications/BioVeLNewsNo5-Spring2014-final.pdf> [↑](#footnote-ref-65)
66. <https://www.egi.eu/news-and-media/newsfeed/news_2014_041.html> [↑](#footnote-ref-66)
67. <http://www.egi.eu/blog/2014/11/04/egi_webinar_rna_seq_analysis_with_reademption_setup_and_go.html> [↑](#footnote-ref-67)
68. <https://indico.egi.eu/indico/categoryDisplay.py?categId=130> [↑](#footnote-ref-68)
69. <https://wiki.egi.eu/wiki/Inspire_JRA1_weekly_reports> [↑](#footnote-ref-69)
70. <https://wiki.egi.eu/wiki/Operational_tools_testbed> [↑](#footnote-ref-70)
71. <http://goo.gl/1NmYs6> [↑](#footnote-ref-71)
72. <https://vmcaster.appdb.egi.eu/> [↑](#footnote-ref-72)
73. <http://www.ebi.ac.uk/> [↑](#footnote-ref-73)
74. <https://cloudmon.egi.eu/nagios/cgi-bin/extinfo.cgi?type=2&host=vmcaster.appdb.egi.eu&service=eu.egi.cloud.AppDB-Update> [↑](#footnote-ref-74)
75. <http://goc.egi.eu/> [↑](#footnote-ref-75)
76. <http://www.egi.eu/community/collaborations/> [↑](#footnote-ref-76)
77. <https://indico.egi.eu/indico/conferenceDisplay.py?confId=2163> [↑](#footnote-ref-77)
78. <http://www.egi.eu/news-and-media/newsfeed/news_2014_025.html> [↑](#footnote-ref-78)
79. *(\*) Dates are expressed in project month (1 to 48).*

    *(\*\*) Status = Not started – In preparation – Pending internal review – PMB approved*

    *(\*\*\*) Nature =* ***R*** *= Report* ***P*** *= Prototype* ***D*** *= Demonstrator* ***O*** *= Other, Deliverable id: for Milestone attached to a deliverable* [↑](#footnote-ref-79)
80. <https://operations-portal.egi.eu/vapor/> [↑](#footnote-ref-80)
81. <https://www.wenmr.eu/wenmr/support/help-center/all-issues> [↑](#footnote-ref-81)
82. <https://www.wenmr.eu/wenmr/publications-acknowledging-wenmr> [↑](#footnote-ref-82)
83. [https://wiki.egi.eu/wiki/VT\_GAPF](https://wiki.egi.eu/wiki/VT_GAPF" \t "_blank) [↑](#footnote-ref-83)
84. [https://github.com/GoncaloBorges/Py4Grid](https://github.com/GoncaloBorges/Py4Grid" \t "_blank) [↑](#footnote-ref-84)
85. [www.r-project.org/](http://www.r-project.org/" \t "_blank) [↑](#footnote-ref-85)
86. [http://batman.r-forge.r-project.org/](http://batman.r-forge.r-project.org/" \t "_blank) [↑](#footnote-ref-86)
87. From 1st Jan 2014, source http://operations-portal.egi.eu [↑](#footnote-ref-87)
88. <https://indico.egi.eu/indico/contributionDisplay.py?sessionId=2&contribId=34&confId=2160> [↑](#footnote-ref-88)