**EGI-InSPIRE**

Periodic Report – PY5

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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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1. Application area

This document is a formal deliverable for the European Commission, applicable to all members of the GI-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.

**Table of contents**

[1 Declaration by the Scientific Representative of the project 7](#_Toc407454206)

[2 Publishable Summary – Managers/TF 9](#_Toc407454207)

[3 Project Progress 10](#_Toc407454208)

[3.1 Project Objectives for the Period TF 10](#_Toc407454209)

[3.2 PY5 Performance – MK/ALL 10](#_Toc407454210)

[3.3 PY1-PY5 Performance - MK 12](#_Toc407454211)

[3.4 Work progress and achievements during the period 14](#_Toc407454212)

[3.4.1 Operations – PS/MK 14](#_Toc407454213)

[3.4.2 Community engagement - GS 16](#_Toc407454214)

[3.4.3 Strategy Policy and business development - SA 21](#_Toc407454215)

[3.4.4 Federated Cloud – DW 29](#_Toc407454216)

[3.4.5 Mini projects – MD 33](#_Toc407454217)

[3.4.6 Tool development – DS 33](#_Toc407454218)

[TASK JRA2.2 Accounting (Stuart) 36](#_Toc407454219)

[3.5 Project Issues 39](#_Toc407454220)

[3.5.1 Operations related issues- MK 40](#_Toc407454221)

[3.5.2 Community engagement related issues– GS/SC 40](#_Toc407454222)

[3.5.3 Strategy Policy and business development related issues – SA/SH 40](#_Toc407454223)

[3.5.4 Federated Cloud – DW/MK/GS 40](#_Toc407454224)

[3.5.5 Mini projects - MD 40](#_Toc407454225)

[3.5.6 Tool development - DS 40](#_Toc407454226)

[3.6 Project Management – TF 40](#_Toc407454227)

[3.6.1 Project Management Metrics 40](#_Toc407454228)

[3.6.2 Coordination Activities 40](#_Toc407454229)

[3.6.3 Cooperation with Other Projects 40](#_Toc407454230)

[4 Deliverables and Milestones 41](#_Toc407454231)

[4.1 Deliverables 41](#_Toc407454232)

[4.2 Milestones 41](#_Toc407454233)

[5 Explanation of the use of Resources 42](#_Toc407454234)

[5.1 Summary – CB/TF 42](#_Toc407454235)

[5.1.1 NA1 - TF 42](#_Toc407454236)

[5.1.2 NA4 - GS 42](#_Toc407454237)

[5.1.3 NA5 - SA 42](#_Toc407454238)

[5.1.4 SA5 - DW 42](#_Toc407454239)

[5.1.5 SA6 - MD 42](#_Toc407454240)

[5.1.6 JRA2 - DS 42](#_Toc407454241)

[6 Financial Statements Per Beneficiary - CB 43](#_Toc407454242)

[6.1 Summary 43](#_Toc407454243)

[6.1.1 Consumption of Effort 43](#_Toc407454244)

[6.1.2 Overall Financial Status 49](#_Toc407454245)

[6.1.3 Deviations from linear plan 50](#_Toc407454246)

[7 Annex A1: Dissemination and Use 52](#_Toc407454247)

[7.1 Main Project and Activity Meetings - ALL 52](#_Toc407454248)

[7.2 Conferences/Workshops Organised - ALL 52](#_Toc407454249)

[7.3 Conferences/Workshops Attended - ALL 52](#_Toc407454250)

[7.4 Publications – SC/SH 52](#_Toc407454251)

# 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****[[1]](#endnote-1):**

**Tiziana Ferrari**

**Tel: +31-20-893 2007**

**Fax: n/a**

**E-mail: tiziana.ferrari@egi.eu**

**Project website address:** <http://www.egi.eu/about/egi-inspire/>

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

* 1. To my best 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.
* 4 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.

|  |
| --- |
| Name of scientific representative of the Coordinator1: Tiziana Ferrari  Date: 17/06/2014  Signature of scientific representative of the coordinatori: |

**Usually the contact person of the coordinator as specified in Art. 8.1. of the grant agreement**

The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: <http://europa.eu/abc/symbols/emblem/index_en.htm> ; logo of the 7th FP: <http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos>). The area of activity of the project should also be mentioned.

# Publishable Summary – Managers/TF

Each manager to provide a high-level overview according to their activities.

TF to review

Following on from preparation and successful completion of the 4th EGI-InSPIRE EC Review, a number of actions took place to align PY5 activities. Changes were made that impacted the project. These changes follow the recommendations made during the EC review and are reflected in a redistribution of efforts and some changes in work packages and activities. The main outcomes of the project in PY5 can be summarized in the following list.

**OVERVIEW**

# Project Progress

## Project Objectives for the Period TF

EGI-InSPIRE defines the following project objectives (PO) as its goals:

* **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.
* **PO2:** The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.
* **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.
* **PO4:** Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.
* **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.
* **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

Performance of the individual activities against the planned project metrics targets are outlined in the activity reports and the Periodic Report. Metrics are commented in the Annual Quality Report D1.15[[2]](#footnote-1)

## PY5 Performance – MK/ALL

**Table 1: Achieved Project Year Five Project Metrics (Q17-Q19)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project  Objectives | Objective Summary | Metrics | PQ17 | PQ18 | PQ19 | Target  PY5 |
| 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 |  |  |  |  |
| Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2A) |  |  |  |  |
| EGI monthly availability and reliability of site middleware services (M.SA1.Operation.5) |  |  |  |  |
| **NEW**  Average monthly availability and reliability of NGI core middleware services (MSA1.Operation.4) |  |  |  |  |
| **NEW**  EGI monthly availability and reliability of critical central operations tools (MSA1.Operation.6a) |  |  |  |  |
| **NEW**  EGI monthly averaged VO availability and reliability (M.SA1.Operation.7) |  |  |  |  |
| PO2 | Support of European researchers and international collaborators through VRCs | Number of papers from EGI Users (M.NA2.5) |  |  |  |  |
| Number of grid jobs done a day (Million) (M.SA1.Usage.1) |  |  |  |  |
| PO3 | Sustainable support for Heavy User Communities | Number of production sites supporting MPI (M.SA1.Integration.2) |  |  |  |  |
| Number of users from HUC VOs (M.SA1.VO7) |  |  |  |  |
| **NEW**  Total number of High Activity VOs  (M.SA1.VO.5)  \*quarterly value  \*\* yearly value |  |  |  |  |
| PO4 | Addition of new User Communities | Number of users from non-HUC VOs (M.SA1.VO.6) |  |  |  |  |
| Public events organised (attendee days) (M.NA2.6) |  |  |  |  |
| PO5 | Transparent integration of other infrastructures | Number of on-going Research Infrastructures/new communities being integrated (M.SA1.Integration.4) |  |  |  |  |
| MoUs with resource providers (M.NA2.10) |  |  |  |  |
| PO6 | Integration of new technologies and resources | Number of resource centres offering federated cloud services accessible to authorised users  (M.SA2.16) |  |  |  |  |

(\*) The value decreased in PQ13, PQ14, PQ15 and Q16 due an on-going campaign aiming at decommissioning inactive VOs. This value needs to be incremented by 12,000 users (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.

(\*\*) DRIHM, EISCAT 3D, MAPPER, VERCE, VPH

(\*\*\*) EISCAT, CTA, DRIHM, VPH, Mapper, LifeWatch, GAIA, ENVRI, DCHRP, ELIXIR

(\*\*\*\*) EISCAT, CTA, DRIHM, LifeWatch, ENVRI, DCH-RP, EMSO, ICOS, VERCE, WeNMR, ESA

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 - MK

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No | 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) | 358  (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%) | 86.27%/87.72%  (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%) | 98.76%/99.27%  (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%) | 99.80%/99.80%  (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%) | 93.2%4/94.59%  (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) |  |
| 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) | 1,7M 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) | 50/  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) | 11,311/ 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) | 6,874/  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) |  |
| 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) |  |
| 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) |

## Work progress and achievements during the period

### Operations – PS/MK

**Contribution from operations**

During PY5 EGI-InSPIRE supported the central coordination of the infrastructure operations by funding the operations activities carried out by EGI.eu. The core services that enable the EGI federation are supported part by the fees of the EGI council members and part by the partners delivering the services. The operational activities at NGI level, not funded anymore by the project, have been sustained by the NGIs.

The Operations Management Board meeting 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 meetings held every two weeks. The communication channels between the EGI partners implemented at the beginning of the project continued to be provided seamlessly during PY5 ensuring the coordination of the operational activities and the evolution of the procedures and policies framework.

During 2013 the EGI Council identified the activities funded by the EGI-InSPIRE project that are needed to enable the EGI services federation to be supported after the end of the project by the fees paid by the EGI council members. The service providers have been identified through a bid among all the EGI partners, and they started to provide the required services in May 2014. The core activities[[3]](#footnote-2) supported 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) between the providers and EGI.eu, and by the EGI.eu Service Level Agreement (SLA) between EGI.eu and the consumers (NGIs) of the services. The first set of performance reports on the services 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. The Federated Operations service has been audited during November 2014 by an external FitSM auditor identifying the areas of improvement. 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.

Regarding (or With regard to) the UMD software provisioning activities although the UMD-3 upgrade campaign has been mostly completed during PY4, during PY5 (EGI-)Operations coordinated the upgrade of the accounting clients, in collaboration with the APEL team, the upgrade to the new long term supported version of dCache made available in UMD-3, since the security support of the previous version was extended until August 2014, and the configuration of the new ops VO VOMS servers.

During PY5 the number of resource centres remained almost the same as at the end of PY4, the Cloud sites (+5) contributed to keep the number of sites 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 increase 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). New users are increasingly using these technologies to reduce the barriers to use EGI resources.

### Community engagement - GS

Management summary

#### Human networks Coordination - GS

#### Communication – SC

Contributions from Sara Coelho

##### **Events**

***EGI events***

**EGI Community Forum 2014** (CF2014)[[4]](#footnote-3). 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)[[5]](#footnote-4). 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.

***External events***

The Communications Team represented EGI at the following events:

**European Bioenergetics Conference** (EBEC 2014)[[6]](#footnote-5). 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[[7]](#footnote-6) summarising the event was published.

**European Conference on Computational Biology** (ECCB 2014)[[8]](#footnote-7). 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[[9]](#footnote-8) 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[[10]](#footnote-9) (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[[11]](#footnote-10) in London (8-11 December), where a EGI workshop will be held on the 11th focussing on the EGI Federated Cloud.

##### Publications

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

***Printed***

**EGI CF2014 Book of Abstracts[[12]](#footnote-11).** 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 [[13]](#footnote-12)
* Federated Operations White paper [[14]](#footnote-13)
* High-Throughput Data Analysis White paper [[15]](#footnote-14)
* Community-driven Innovation and Support White paper [[16]](#footnote-15)

**EGI Case Studies[[17]](#footnote-16)**. This publication showcases some of the case studies[[18]](#footnote-17) 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***

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

* Issue 16 (July 2014) [[19]](#footnote-18)
* Issue 17 (October 2014) [[20]](#footnote-19)

**Open Science Commons paper**[[21]](#footnote-20). 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.[[22]](#footnote-21)
* *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.[[23]](#footnote-22)
* *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.[[24]](#footnote-23)
* *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.[[25]](#footnote-24)
* *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.[[26]](#footnote-25)
* *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.[[27]](#footnote-26)

##### Additional work

***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[[28]](#footnote-27)
* 12 blog posts[[29]](#footnote-28)
* 2 Director’s Letters[[30]](#footnote-29)

***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[[31]](#footnote-30) and a news item[[32]](#footnote-31) distributed to all media contacts, which resulted in several media mentions[[33]](#footnote-32).

***Webinars***

Two webinars were/are being organised and scheduled:

* RNA-Seq analysis with READemption: setup and usage in the EGI Federated Cloud[[34]](#footnote-33) (26 November)
* Cloud-Init[[35]](#footnote-34) (15 December)

***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 - GS

**Contribution from Gergely Sipos**

**Distributed Competence Centre**

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. This support provides 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.

| 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 |  |  |  |  |  |  |  | X |
| Vlemed | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shiwa | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SaGrid |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CLARIN / DRHIHM |  |  |  |  | X |  |  | X |  |  |  |  |  |  | X |
| ENV modelling |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| Biomed |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| Atlas |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| Alice |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| LHCb |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |
| CMS |  |  |  |  | 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 |  |

### Strategy Policy and business development - SA

#### Strategy, policy and business development – SA

Contribution NA5 strategy, policy and business development

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](https://wiki.egi.eu/wiki/VT_Business_Engagement) 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 DocDB](https://documents.egi.eu/document/2169). 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. This document can be found in the [EGI DocDB](https://documents.egi.eu/document/2339). It and 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 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 has not started yet.

**Business models and proofs of concept**

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 was to be documented in this final periodic report. However, 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. So, a more detailed document was first produced following Phase 1 in June[[36]](#footnote-35) 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[[37]](#footnote-36) 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[[38]](#footnote-37) with formal minutes produced[[39]](#footnote-38) as well as two dedicated sessions at the EGI Community Forum in Helsinki[[40]](#footnote-39) and the EGI Big Data workshop in Amsterdam (Sept)[[41]](#footnote-40).

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[[42]](#footnote-41)
  + 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:

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

**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 centred 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 disscusions
* “Engineering SpA” requirements' feedback
* GOCDB Cloud site entry and extensions created
* Participation in e-Grant tool testing consequently providing feedback

Main achievements:

* Internal reflexion 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 HG\* 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)[[43]](#footnote-42)

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

#### Business models and proof of concepts - SH

### Federated Cloud – DW

#### Operating a reliable federated institutional IaaS Cloud service – MK

**Contribution from DW and MD** 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:

**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 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[[44]](#footnote-43)
* **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.[[45]](#footnote-44)

**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.[[46]](#footnote-45)
* **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[[47]](#footnote-46) 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

#### Participation in Proofs of Concept elicited by EGI - GS

**Contribution from DW and MD**

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[[48]](#footnote-47).

In total, 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).

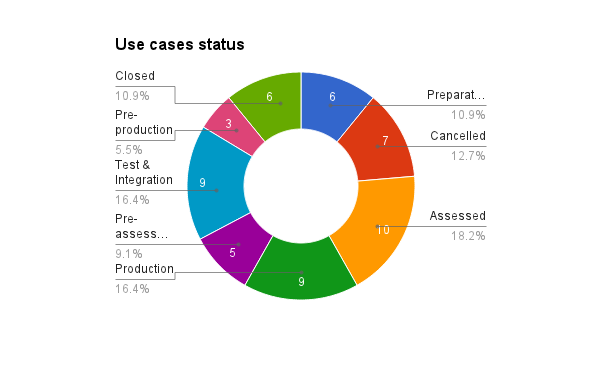
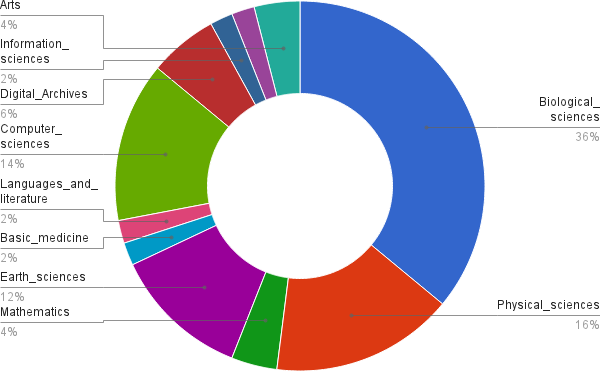
In total, the UCST took care of 36 Proofs of Concepts; of these, five went into production: BioVeL Portal, OpenRefine, OpenModeler (all BioVel project) and READemption (Uni Wuerzburg). Three further Proofs of Concept were closed without turning into a production system: EISCAT-3D data catalog, acces 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.



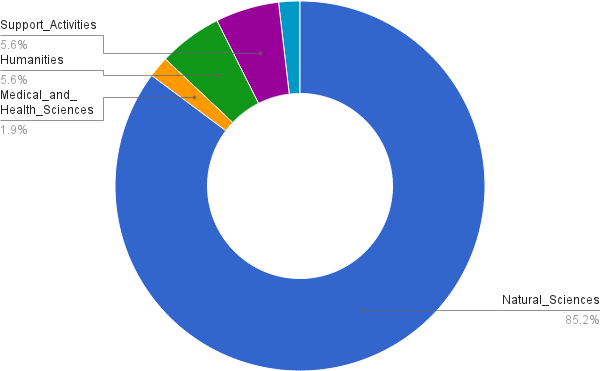


Figure 2: First level and second level classification of all Proofs of Concept

The UCST further promoted the various tools and Proofs of Concept that went into production:

* FedCloud demo session at the EGI CF 2014: https://www.egi.eu/news-and-media/newsletters/Inspired\_Issue\_16/CF2014wrapup.html
* Biovel: http://www.egi.eu/news-and-media/newsfeed/news\_2013\_0038.html
* Biovel newsletter n. 4: http://www.biovel.eu/images/publications/BioVeLNewsNo4-Autumn2013.pdf
* Ecological Niche Modelling running on the EGI Federated Cloud: http://www.egi.eu/news-and-media/newsletters/Inspired\_Issue\_13/ENM.html
* Biovel newsletter n. 5: http://www.biovel.eu/images/publications/BioVeLNewsNo5-Spring2014-final.pdf
* IFCA launches EGI FedCloud portal for CMS open data: https://www.egi.eu/news-and-media/newsfeed/news\_2014\_041.html
* READemption webinar: http://www.egi.eu/blog/2014/11/04/egi\_webinar\_rna\_seq\_analysis\_with\_reademption\_setup\_and\_go.html

Further, through the work with the Proof of Concept user communities, UCST 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.

### Mini projects – MD

No mini projects in PY5 - MD

### Tool development – DS

JRA2 is 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.

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: https://indico.egi.eu/indico/categoryDisplay.py?categId=130
* JRA2 wiki page for the weekly reporting: https://wiki.egi.eu/wiki/Inspire\_JRA1\_weekly\_reports
* 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[[49]](#footnote-48) is still operative and now includes AppDB and e-GRANT too.

#### SAM – Christos

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. Details about foreseen activities are available in the DoW.

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

The status and planning for JRA2.1 can be found on the JRA2.1 time-plan[[50]](#footnote-49). 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, 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 & 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 senseful 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.

A/R 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 within the engine and customization of these selections
* transiting of status results towards 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 in 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.

## TASK JRA2.2 Accounting (Stuart)

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 TF, 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 TF 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 by the end of the year.

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.

#### Accounting – Stuart

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#### AppDB – Marios

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[[51]](#footnote-50). 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[[52]](#footnote-51) 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[[53]](#footnote-52).

From July, 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. 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[[54]](#footnote-53). 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. Estimated delivery date, end of November - begin of December.

Finally, a pilot-project, co-funded by the EGI-InSpire and the ELIXIR project, has been initiated having as primary aim to identify, integrate and expose ELIXIR reference datasets within the European Grid Infrastructure. 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 are available at this [link](https://docs.google.com/document/d/1xJrnVW7u5Q2N7nF3hPsYBOnzloilaoDx2j607Wo7BcA).

#### e-GRANT - Tomasz

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 RA 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.

The e-GRANT team developed also a new feature for the EGI Federated Cloud:

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, was developed. 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. At the end of the year 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

## Project Issues

### Operations related issues- MK

**Contribution from Operations (PS/MK)**

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.

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.

### Community engagement related issues– GS/SC

### Strategy Policy and business development related issues – SA/SH

### Federated Cloud – DW/MK/GS

### Mini projects - MD

### Tool development - DS

## Project Management – TF

(NA1 stuff)

### Project Management Metrics

The project was managed through regular meetings defined by the Consortium Agreement: Change dates and update contents

* Collaboration Board: Composed of representatives from the partners, the group met twice during the project year in September 2013 and 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 6 times during the year (both F2F and via telecon) to develop the project amendment and to discuss the handling of Breach of obligations under Consortium Agreement caused by the withdrawing of Germany from the EGI Council in 2014.
* 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

### Cooperation with Other Projects

# Deliverables and Milestones

## Deliverables

| **Id** | **Activity No** | **Deliverable title** | **Lead partner** | **Original Delivery date(\*)[[55]](#footnote-54)** | **Revised delivery date(\*)** | **Status**  **(\*\*)** |
| --- | --- | --- | --- | --- | --- | --- |
| D#.## |  |  |  |  |  |  |

## Milestones

| **Id** | **Activity No** | **Milestone title** | **Lead partner** | **Original Delivery date(\*)[[56]](#footnote-55)** | **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 – CB/TF

**Section 1 - Form C and summary financial statement**:

### NA1 - TF

### NA4 - GS

### NA5 - SA

### SA5 - DW

### SA6 - MD

### JRA2 - DS

# Financial Statements Per Beneficiary - CB

## Summary

### Consumption of Effort

***Selected period: PM37 to PM48 (May 2013 to April 2014)***

***Report extracted on 10 June 2014 (updates the previously provided one). The updated report was necessary because of problems encountered with the effort reporting system, in particular with the reported “committed PMs”, which are now accurate.***

**Project Period 5 to be updated**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | **Work Package** | **Worked PM Funded** | **Committed PM** | **Achieved PY4 PM %** | **Achieved PY3 PM %** | **Achieved PY2 PM %** | **Achieved PY1 PM %** |
| **MGT** | **WP1** | 60 | 82 | 73% | 92% | 99% | 75% |
| **COORD** | **WP2** | 266 | 353 | 75% | 80% | 91% | 107% |
| **COORD**  **End 30/10/11** | **WP3** | n/a | n/a | n/a | n/a | 128% | 106% |
| **SUPPORT** | **WP4** | 1,218 | 1,123 | 108% | 107% | 108% | 100% |
| **SUPPORT** | **WP5** | 142 | 134 | 106% | 88% | 99% | 87% |
| **SUPPORT**  **End 30/04/13** | **WP6** | n/a | n/a | n/a | 91% | 104% | 83% |
| **RTD** | **WP7** | 77 | 70 | 110% | 92% | 87% | 93% |
| **SUPPORT** | **WP8** | 111 | 103 | 108% | 46% | n/a | n/a |
|  | **Total** | 1,874 | 1,865 | 100.5% | 97% | 104% | 97% |

The detailed breakdown of effort contributed to each work package by each partner is provided in the following tables for PY4. Each work package (for reporting purposes) is split into the different types of effort used within EGI-InSPIRE (which has different reimbursement rates) and is therefore reported separately.

The different types are:

* M: Project Management as defined by the EC.
* E: EGI Global Task related effort.
* G: General tasks within the project.
* N: NGI International Task related effort.

**Project PERIOD 4**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **EGI-InSPIRE Effort report Per Work Package and Task** | | | | | |  |  |
|  |  |  |  |  |  |  |  |
| *The reported man-power is based on validated timesheets only.* | | | | | | |  |
| *The timesheets shall be used exclusively for the purpose of reporting to the European Commission.* | | | | | | | |
|  |  |  |  |  |  |  |  |
| *Selected period: PM37 to PM48 (May 2013 to April 2014)* | | | | | | |  |
| *Report extracted on 10 June 2014* | | | | | | |  |
|  |  |  |  |  |  |  |  |
| **WP1-E - NA1 Management (EGI)** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TNA1.2E | 17.7 | 37.3 | 47.3% | |  |  |  |
| Total: | 17.7 | 37.3 | 47.3% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP1-M - NA1 Management** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TNA1.1 | 8.0 | 6.0 | 133.3% | |  |  |  |
| TNA1.2M | 25.5 | 23.8 | 107.3% | |  |  |  |
| TNA1.3 | 7.7 | 9.0 | 85.8% | |  |  |  |
| TNA1.4 | 1.0 | 6.0 | 16.7% | |  |  |  |
| Total: | 42.2 | 44.8 | 94.3% | |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| **WP2-E - NA2 Community Engagement (EGI)** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TNA2.1 |  | 0.0 |  | |  |  |  |
| TNA2.2E |  | 0.0 |  | |  |  |  |
| TNA2.3E |  | 0.0 |  | |  |  |  |
| TNA2.4E |  | 0.0 |  | |  |  |  |
| TNA2U.1E | 0.7 | 3.6 | 20.1% | |  |  |  |
| TNA2U.2E | 27.4 | 29.3 | 93.5% | |  |  |  |
| TNA2U.3E | 27.6 | 46.3 | 59.7% | |  |  |  |
| TNA2U.4E | 7.9 | 13.3 | 59.2% | |  |  |  |
| TNA2U.5E | 31.4 | 69.2 | 45.4% | |  |  |  |
| Total: | 95.0 | 161.7 | 58.8% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP2-N - NA2 Community Engagement** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TNA2.1N | 122.4 | 191.3 | 63.6% | |  |  |  |
| TNA2.2N |  | 0.0 |  | |  |  |  |
| TNA2.3N |  | 0.0 |  | |  |  |  |
| TNA2.4N |  | 0.0 |  | |  |  |  |
| TNA2.6N | 48.6 |  |  | |  |  |  |
| Total: | 171.0 | 191.3 | 89.4% | |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| **WP4-E - SA1 Operations (EGI)** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TSA1.1 | 12.8 | 13.8 | 92.7% | |  |  |  |
| TSA1.2E | 9.8 | 10.8 | 91.3% | |  |  |  |
| TSA1.3.1E | 3.5 | 7.2 | 49.0% | |  |  |  |
| TSA1.3E | 33.1 | 21.3 | 155.7% | |  |  |  |
| TSA1.4E | 33.7 | 35.3 | 95.5% | |  |  |  |
| TSA1.5E | 5.0 | 6.0 | 83.3% | |  |  |  |
| TSA1.6E | 13.0 | 11.8 | 110.8% | |  |  |  |
| TSA1.7.1E | 0.0 | 6.1 | 0.0% | |  |  |  |
| TSA1.7.2E | 12.7 | 6.0 | 212.4% | |  |  |  |
| TSA1.7.3E | 45.8 | 43.5 | 105.2% | |  |  |  |
| TSA1.7.4E | 3.6 | 1.0 | 360.7% | |  |  |  |
| TSA1.7E | 8.9 | 13.1 | 68.0% | |  |  |  |
| TSA1.8.1E | 3.3 | 7.2 | 45.9% | |  |  |  |
| TSA1.8E | 23.7 | 19.5 | 121.4% | |  |  |  |
| Total: | 209.0 | 202.4 | 103.2% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP4-N - SA1 Operations** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TSA1.1N | 22.9 | 29.8 | 77.1% | |  |  |  |
| TSA1.2N | 100.0 | 79.3 | 126.1% | |  |  |  |
| TSA1.3N | 130.5 | 93.7 | 139.3% | |  |  |  |
| TSA1.4N | 179.5 | 188.7 | 95.1% | |  |  |  |
| TSA1.5N | 44.4 | 51.7 | 85.9% | |  |  |  |
| TSA1.6N | 72.1 | 80.0 | 90.0% | |  |  |  |
| TSA1.7N | 282.8 | 268.2 | 105.4% | |  |  |  |
| TSA1.8N | 176.3 | 128.7 | 136.9% | |  |  |  |
| Total: | 1,008.5 | 920.1 | 109.6% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP5-E - SA2 Provisioning Soft. Infrastr. (EGI)** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TSA2.1 | 7.9 | 9.0 | 87.7% | |  |  |  |
| TSA2.2 | 19.6 | 17.5 | 111.8% | |  |  |  |
| TSA2.3 | 21.1 | 17.5 | 120.3% | |  |  |  |
| TSA2.4 | 34.4 | 38.8 | 88.9% | |  |  |  |
| TSA2.5 |  | 0.0 |  | |  |  |  |
| Total: | 83.0 | 82.8 | 100.2% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP5-N - SA2 Provisioning Soft. Infrastr.** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TSA2.6 | 58.6 | 51.0 | 115.0% | |  |  |  |
| Total: | 58.6 | 51.0 | 115.0% | |  |  |  |
| **WP7-E - JRA1 Operational Tools (EGI)** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TJRA1.1 | 6.2 | 6.0 | 104.1% | |  |  |  |
| TJRA1.2 | 35.6 | 32.8 | 108.7% | |  |  |  |
| Total: | 41.9 | 38.8 | 108.0% | |  |  |  |
|  |  |  |  |  |  |  |  |
| **WP7-G - JRA1 Operational Tools** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TJRA1.3 |  | 0.0 |  | |  |  |  |
| TJRA1.4 | 35.4 | 29.7 | 119.2% | |  |  |  |
| TJRA1.5 |  | 1.5 |  | |  |  |  |
| Total: | 35.4 | 31.1 | 113.5% | |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| **WP8-S - SA4 Advancing EGIs Strategic Goals** | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Task** | **PM Declared** | **Committed PM** | **Achieved PM** | |  |  |  |
| TSA4.1 | 0.0 | 0.4 | 0.0% | |  |  |  |
| TSA4.10 | 12.4 | 13.3 | 93.2% | |  |  |  |
| TSA4.11 | 5.2 | 4.3 | 120.6% | |  |  |  |
| TSA4.12 | 15.0 | 13.3 | 113.1% | |  |  |  |
| TSA4.2 | 14.5 | 12.0 | 120.6% | |  |  |  |
| TSA4.3 | 6.9 | 9.0 | 76.5% | |  |  |  |
| TSA4.4 | 7.9 | 6.9 | 115.0% | |  |  |  |
| TSA4.5 | 3.2 | 5.1 | 63.1% | |  |  |  |
| TSA4.6 | 4.3 | 6.0 | 71.3% | |  |  |  |
| TSA4.7 | 21.1 | 15.4 | 137.0% | |  |  |  |
| TSA4.8 | 8.8 | 6.9 | 128.1% | |  |  |  |
| TSA4.9 | 11.7 | 10.3 | 113.8% | |  |  |  |
| Total: | 111.0 | 102.9 | 107.9% | |  |  |  |

### Overall Financial Status

EGI-InSPIRE Effort report Per Work Package and Task.

Selected period: PM37 to PM48 (May 2013 to April 2014)

Report extracted on 10 June 2014

The reported man-power is based on validated timesheets only. The timesheets shall be used exclusively for the purpose of reporting to the European Commission. Partners will be asked to provide responses to financial consumption that is significantly above or below plans. This financial overview below includes the repayment of Global tasks by EGI.eu.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Partner** | **PM Declared** | **Committed PM** | **Achieved PM** | **Eligible Cost Estimate** | **Estimated Funding** |
| 1-EGI.EU | 164.6 | 252.5 | 65.2% | 1,461,393.4 | 911,540.4 |
| 2-UPT | 0.0 | 1.6 | 0.0% | 0.0 | 0.0 |
| 3-IIAP NAS RA | 20.7 | 6.6 | 315.8% | 61,624.7 | 20,336.1 |
| 5A-IICT-BAS | 12.6 | 20.2 | 62.4% | 76,879.4 | 25,370.2 |
| 6-UIIP NASB | 2.9 | 7.6 | 37.5% | 10,971.4 | 3,620.6 |
| 7A-ETH ZURICH | 11.8 | 28.1 | 42.1% | 119,130.0 | 39,312.9 |
| 8-UCY | 4.9 | 16.1 | 30.6% | 42,483.5 | 14,019.6 |
| 9-CESNET | 81.0 | 84.7 | 95.6% | 532,690.5 | 255,582.6 |
| 10B-KIT-G | 127.6 | 137.7 | 92.7% | 1,135,143.2 | 443,345.4 |
| 11-UNI BL | 12.8 | 9.5 | 134.3% | 52,224.0 | 17,233.9 |
| 12A-CSIC | 245.6 | 162.8 | 150.9% | 1,920,526.2 | 751,482.8 |
| 13-CSC | 25.8 | 30.8 | 83.8% | 266,096.1 | 87,811.7 |
| 14A-CNRS | 124.1 | 128.6 | 96.5% | 1,072,358.5 | 456,183.6 |
| 15-GRENA | 6.6 | 6.4 | 103.6% | 16,282.9 | 5,373.3 |
| 16A-GRNET | 100.9 | 106.8 | 94.4% | 780,593.0 | 341,118.0 |
| 17-SRCE | 40.9 | 35.0 | 116.8% | 203,005.7 | 91,900.8 |
| 18A-MTA KFKI | 29.9 | 38.9 | 76.9% | 143,311.8 | 47,292.9 |
| 20-IUCC | 30.4 | 6.3 | 485.6% | 391,727.5 | 129,270.1 |
| 21A-INFN | 131.4 | 162.1 | 81.1% | 858,937.6 | 335,725.3 |
| 22-VU | 12.3 | 4.4 | 279.9% | 102,453.1 | 33,809.5 |
| 23-RENAM | 7.0 | 5.7 | 121.8% | 20,892.9 | 6,894.6 |
| 24-UOM | 13.3 | 11.3 | 117.3% | 31,803.8 | 10,495.2 |
| 25-UKIM | 22.4 | 17.8 | 126.4% | 89,771.4 | 29,624.6 |
| **Partner** | **PM Declared** | **Committed PM** | **Achieved PM** | **Eligible Cost Estimate** | **Estimated Funding** |
| 26-NCF | 59.5 | 67.5 | 88.1% | 608,874.6 | 281,403.9 |
| 27A-SIGMA | 13.1 | 22.1 | 59.3% | 129,845.2 | 42,848.9 |
| 28A-CYFRONET | 75.6 | 63.9 | 118.3% | 647,367.2 | 257,113.8 |
| 29-LIP | 78.1 | 50.9 | 153.6% | 428,107.9 | 176,245.6 |
| 30-IPB | 36.6 | 36.9 | 99.0% | 199,601.1 | 65,868.4 |
| 31-ARNES | 52.3 | 27.3 | 191.4% | 313,255.0 | 103,374.2 |
| 32-UI SAV | 40.8 | 37.2 | 109.6% | 326,375.4 | 107,703.9 |
| 33-TUBITAK ULAKBIM | 41.9 | 46.0 | 90.9% | 294,624.0 | 97,225.9 |
| 34A-STFC | 152.9 | 136.4 | 112.1% | 1,570,142.2 | 623,559.2 |
| 35-CERN | 17.0 | 18.9 | 90.0% | 4,037.4 | 1,332.3 |
| 36-UCPH | 11.2 | 11.5 | 97.8% | 124,110.6 | 40,956.5 |
| 38-UU | 32.4 | 34.1 | 94.8% | 370,486.5 | 144,260.1 |
| 39-IMCS-UL | 7.2 | 8.6 | 83.7% | 56,728.0 | 18,720.2 |
| 40A-E-ARENA | 15.9 | 15.1 | 105.1% | 62,988.3 | 20,786.1 |
| 51A-ICI | 9.3 | 6.1 | 152.1% | 56,564.0 | 18,666.1 |
| **Total** | **1,874** | **1,864** | **100.5%** | **14,583,452** | **6,057,409** |

### Deviations from linear plan

Under reporting partners:

* EGI.eu: 65% efforts used. EGI.eu team in Amsterdam has been reduced and efforts unused in PY4 are allocated to PY5
* UPT (Albania): no activity recorded during whole project duration and budget has been reclaimed in full in Amendment N3.
* IICT-BAS (Bulgaria): 62%. All or part of efforts will be allocated to the PY5 activities
* UIIP NASB (Belarus): 37.5%. All or part of efforts will be allocated to the PY5 activities
* Swiss NGI: 42%. All or part of efforts will be allocated to the PY5 activities
* UCY (Cyprus): 31%. No deviation. The PMs recorded in PPT are those funded 100% in EGI-InSPIRE, the unfunded PMs have been justified in the justification of resource/deviation to the plan
* MTA KFKI (Hungarian NGI): 77%. All or part of efforts will be allocated to the PY5 activities
* Italian NGI: 81%. Members GARR, SPACI and INAF have not reported activities, efforts and budget are shift to INFN.
* Norwegian NGI: 59%. Partner SIGMA coordinates the NGI and has not delivered project activity. Activities will be stopped after PY4 and the unspent budget will be reallocated to the active partners in PY5.
* EMBL: not active in PY4. Effort was reclaimed in PY4. EMBL becomes active partner in PY5.

The above partners are participants in PY5, except SIGMA and UCY. For the others the unspent budget will be reallocated in full or partly to PY5 activities after validation of the PMB and the Project Director.

Over reporting partners:

The efforts exceeded in PY4 plan will not be repaid by the project unless it can be cleared with the underspending of other members of the same NGI.

# Annex A1: Dissemination and Use

## Main Project and Activity Meetings - ALL

| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Indico URL)** |
| --- | --- | --- | --- | --- |
| 19-21 Jun 2013 | CERN | SAM Workshop |  |  |

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

## Conferences/Workshops Organised - ALL

| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Indico URL)** |
| --- | --- | --- | --- | --- |
| 7-8 May 2013 | Boulder, Colorado, USA | Security for Collaborating Infrastructures | 1 | [http://indico.cern.ch/conferenceDisplay.py?confId=246253. Organised and chaired to work on building trust and standards in security policies and procedures.](http://indico.cern.ch/conferenceDisplay.py?confId=246253) |

## Conferences/Workshops Attended - ALL

| **Date** | **Location** | **Title** | **Participants** | **Outcome (Short report & Document Server URL to presentations made)** |
| --- | --- | --- | --- | --- |
| 6-7 May 2013 | Boulder, Colorado, USA | TAGPMA Meeting | 1 | [http://indico.rnp.br/conferenceDisplay.py?confId=161. Representing WLCG and EGI.](http://indico.rnp.br/conferenceDisplay.py?confId=161) |

## Publications – SC/SH

| **Publication title** | **Journal / Proceedings title** | **DOI code** | **Journal references**  *Volume number*  *Issue*  *Pages from - to* | **Authors**  *Initials* | **Authors**  *Surname* |
| --- | --- | --- | --- | --- | --- |
| 0IGI Portal: portale web di accesso a risorse Grid e Cloud per le comunita' scientifiche | Workshop GARR CSD Selected paper |  | [ISBN 978-88-905077-4-8, pag.14-19](https://wiki.egi.eu/wiki/Special:BookSources/9788890507748) | M.  D.  A.  A.  E.  G.  R.  P. | Bencivenni  Michelotto  Ceccanti  Cristofori  Fattibene  Misurelli  Brunetti  Veronesi |

1. Usually the contact person of the coordinator as specified in Art. 8.1. of the grant agreement [↑](#endnote-ref-1)
2. D1.15 Annual report on quality status <https://documents.egi.eu/document/2251> [↑](#footnote-ref-1)
3. Wiki page with the description of the core activities: https://wiki.egi.eu/wiki/Core\_EGI\_Activities [↑](#footnote-ref-2)
4. Event’s website: <http://cf2014.egi.eu>; Event’s report: <https://documents.egi.eu/document/2242> [↑](#footnote-ref-3)
5. https://indico.egi.eu/indico/conferenceDisplay.py?confId=2160 [↑](#footnote-ref-4)
6. http://www.ebec2014.org/ [↑](#footnote-ref-5)
7. http://www.egi.eu/blog/2014/07/17/egi\_at\_european\_bioenergetics\_conference.html [↑](#footnote-ref-6)
8. http://www.eccb14.org [↑](#footnote-ref-7)
9. http://www.egi.eu/blog/2014/09/09/egi\_at\_the\_european\_conference\_on\_computational\_biology.html [↑](#footnote-ref-8)
10. http://mwatelescope.org/tempe2014 [↑](#footnote-ref-9)
11. http://computing.derby.ac.uk/ucc2014/ [↑](#footnote-ref-10)
12. <http://www.egi.eu/news-and-media/publications/CF2014_BoA.pdf> [↑](#footnote-ref-11)
13. <http://go.egi.eu/2197> [↑](#footnote-ref-12)
14. <http://go.egi.eu/2196> [↑](#footnote-ref-13)
15. <http://go.egi.eu/2198> [↑](#footnote-ref-14)
16. <http://go.egi.eu/2199> [↑](#footnote-ref-15)
17. 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-16)
18. <http://www.egi.eu/case-studies/> [↑](#footnote-ref-17)
19. <http://go.egi.eu/Issue16PDF> [↑](#footnote-ref-18)
20. <http://go.egi.eu/Issue17PDF> [↑](#footnote-ref-19)
21. <http://go.egi.eu/osc> [↑](#footnote-ref-20)
22. <http://www.egi.eu/case-studies/physical-sciences/andromeda_ii.html> [↑](#footnote-ref-21)
23. <http://www.egi.eu/case-studies/physical-sciences/stars.html> [↑](#footnote-ref-22)
24. <http://www.egi.eu/case-studies/physical-sciences/becs.html> [↑](#footnote-ref-23)
25. <http://www.egi.eu/case-studies/natural-sciences/digital_security.html> [↑](#footnote-ref-24)
26. <http://www.egi.eu/news-and-media/newsletters/Inspired_Issue_15/bacteria.html> [↑](#footnote-ref-25)
27. <http://www.egi.eu/case-studies/medical/combat_stress.html> [↑](#footnote-ref-26)
28. <http://www.egi.eu/news-and-media/newsfeed/> [↑](#footnote-ref-27)
29. <http://www.egi.eu/blog/> [↑](#footnote-ref-28)
30. <http://www.egi.eu/news-and-media/directors_letters/> [↑](#footnote-ref-29)
31. <https://www.egi.eu/news-and-media/press/Press_Release_Federated_Cloud_Launch.pdf> [↑](#footnote-ref-30)
32. <http://www.egi.eu/news-and-media/newsfeed/news_2014_023.html> [↑](#footnote-ref-31)
33. E.g *The Register* <http://www.theregister.co.uk/2014/05/22/egi_launches_federated_cloud/> [↑](#footnote-ref-32)
34. <http://indico.egi.eu/indico/conferenceDisplay.py?confId=2345> [↑](#footnote-ref-33)
35. Indico page to be announced. [↑](#footnote-ref-34)
36. https://documents.egi.eu/document/2256 [↑](#footnote-ref-35)
37. https://wiki.egi.eu/wiki/EGI\_Pay-for-Use\_PoC [↑](#footnote-ref-36)
38. https://wiki.egi.eu/wiki/EGI\_Pay-for-Use\_PoC:Meetings [↑](#footnote-ref-37)
39. https://documents.egi.eu/document/2088 [↑](#footnote-ref-38)
40. https://indico.egi.eu/indico/sessionDisplay.py?sessionId=29&confId=1994#20140521 [↑](#footnote-ref-39)
41. https://indico.egi.eu/indico/sessionDisplay.py?sessionId=2&confId=2160#20140925 [↑](#footnote-ref-40)
42. https://documents.egi.eu/document/1391 [↑](#footnote-ref-41)
43. <https://indico.egi.eu/indico/contributionDisplay.py?sessionId=2&contribId=34&confId=2160> [↑](#footnote-ref-42)
44. [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-43)
45. [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-44)
46. https://wiki.egi.eu/wiki/Resource\_Centres\_OLA\_and\_Resource\_infrastructure\_Provider\_OLA\_reports [↑](#footnote-ref-45)
47. https://www.surveymonkey.com/r/FedCloud\_UMD [↑](#footnote-ref-46)
48. https://wiki.egi.eu/wiki/Federated\_Cloud\_Communities [↑](#footnote-ref-47)
49. https://wiki.egi.eu/wiki/Operational\_tools\_testbed [↑](#footnote-ref-48)
50. http://goo.gl/1NmYs6 [↑](#footnote-ref-49)
51. https://vmcaster.appdb.egi.eu/ [↑](#footnote-ref-50)
52. http://www.ebi.ac.uk/ [↑](#footnote-ref-51)
53. https://cloudmon.egi.eu/nagios/cgi-bin/extinfo.cgi?type=2&host=vmcaster.appdb.egi.eu&service=eu.egi.cloud.AppDB-Update [↑](#footnote-ref-52)
54. <http://goc.egi.eu/> [↑](#footnote-ref-53)
55. *(\*) 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-54)
56. *(\*) 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-55)