

EGI-InSPIRE

PERIODIC REPORT – PY4

Document identifier:	EGI-InSPIRE-Periodic Report
Date:	18/06/2014
Activity:	NA1
Lead Partner:	EGI.eu
Document Status:	FINAL
Dissemination Level:	PUBLIC
Document Link:	https://documents.egi.eu/document/2244

Abstract

This is the periodic report for the 4th year of the EGI-InSPIRE project. It summarises the work completed during the year and the resources expanded in undertaking this work.

I. COPYRIGHT NOTICE

Copyright © Members of the EGI-InSPIRE Collaboration, 2010. See www.egi.eu for details of the EGI-InSPIRE project and the collaboration. EGI-InSPIRE (“European Grid Initiative: Integrated Sustainable Pan-European Infrastructure for Researchers in Europe”) is a project co-funded by the European Commission as an Integrated Infrastructure Initiative within the 7th Framework Programme. EGI-InSPIRE began in May 2010 and will run for 4 years. This work is licensed under the Creative Commons Attribution-Noncommercial 3.0 License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/3.0/> or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, and USA. The work must be attributed by attaching the following reference to the copied elements: “Copyright © Members of the EGI-InSPIRE Collaboration, 2010. See www.egi.eu for details of the EGI-InSPIRE project and the collaboration”. Using this document in a way and/or for purposes not foreseen in the license, requires the prior written permission of the copyright holders. The information contained in this document represents the views of the copyright holders as of the date such views are published.

II. DELIVERY SLIP

	Name	Partner/Activity	Date
From	Tiziana Ferrari	EGI.eu/NA1	18/06/2014
Reviewed by	Reviewers:	AMB & PMB	
Approved by	AMB & PMB		10/062014

III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
1	01/06/2014	First draft	Sy Holsinger/EGI.eu
2	10/06/2014	Second Draft – Full Content	Sy Holsinger/EGI.eu
3	15/06/2014	Refinements	Sy Holsinger, Tiziana Ferrari/EGI.eu
4	16/06/2014	AMB Review	Sy Holsinger/EGI.eu, et al.
5	18/08/2014	Integrated feedback and Final Review	Sy Holsinger, Tiziana Ferrari/EGI.eu

IV. 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.

V. 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>

VI. TERMINOLOGY

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



VII. 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.....	6
2	Publishable Summary.....	8
3	Project Progress.....	13
3.1	Project Objectives for the Period	13
3.2	PY4 Performance	13
3.3	PY1-PY4 Performance.....	16
3.4	Work progress and achievements during the period	18
3.4.1	Operations	18
3.4.2	Software Provisioning.....	41
3.4.3	Community Engagement.....	47
3.4.4	Accelerating EGI's H2020 Goals ("mini projects")	64
3.5	Project Issues.....	69
3.5.1	Operations	69
3.5.2	Software Provisioning.....	70
3.5.3	Community Engagement.....	71
3.5.4	Accelerating EGI's H2020 Goals ("Mini-Projects")	71
3.6	Project Management.....	72
3.6.1	Project Management Metrics	74
3.6.2	Coordination Activities	75
3.6.3	Cooperation with Other Projects.....	75
4	Deliverables and Milestones	76
4.1	Deliverables.....	76
4.2	Milestones	77
5	Explanation of the use of Resources	79
5.1	Summary	79
5.1.1	NA1	79
5.1.2	NA2	79
5.1.3	SA1.....	80
5.1.4	SA2.....	80
5.1.5	JRA1.....	80
6	Financial Statements Per Beneficiary	82
6.1	Summary	82
6.1.1	Consumption of Effort	82
6.1.2	Overall Financial Status	91



6.1.3	Issues and mitigation.....	94
6.1.4	Deviations from linear plan.....	94
7	Annex A1: Dissemination and Use	95
7.1	Main Project and Activity Meetings	95
7.2	Conferences/Workshops Organised	95
7.3	Conferences/Workshops Attended.....	98
7.4	Publications	103



1 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 ☒

Period covered: from 1/05/2013 to 30/04/2014

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

Tiziana Ferrari

Tel: +31-20-893 2007

Fax: n/a

E-mail: tiziana.ferrari@egi.eu

Project website1 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 coordinator:

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

¹ 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.

2 PUBLISHABLE SUMMARY

Following on from preparation and successful completion of the 3rd EGI-InSPIRE EC Review, a number of actions took place to align PY4 activities. The main outcomes of the project in PY4 can be summarized in the following list.

- Developed its **vision** of an Open Science Commons² and strengthened cooperation with European and international e-Infrastructures (see D1.16 Annual Report) – NA2.
- Defined a **strategy** to deliver a secure, federated data-analysis capability for the European Research Area (EGI Council, September 2013)³ – all activities.
- Developed the **EGI Platform Architecture**, where the EGI production infrastructure is conceptualised as a collection of Core Infrastructure, Cloud, Collaboration and Community Platforms of services, which in PY4 was extended by preparing the launch of the EGI Federated Cloud (April 2014)⁴ with the support of the output of the mini-project of activity SA4 – SA1, SA2, SA4.
- Developed the **EGI Engagement Strategy**⁵ that proposed an holistic approach to engagement with the coordinated participation of user communities of the User Community Board, NGI international liaisons, the EGI.eu communications team, the EGI.eu user support team and the Executive Board and Council. The strategy is periodically revised tacking into account the changing research community landscape, the national priorities and the performance indicators from the project metrics and the balanced scorecard. The strategy allowed the strengthening of engagement and support actions towards Research Infrastructures and large European research collaborations – NA2.
- Developed the concept of **Distributed Competence Centres**⁶ involving NGI support teams, technology providers and user communities for technology support, opening of calls for use cases, training and providing pan-European coordination of user support activities – NA2.
- Strengthened the **engagement with many Research Infrastructures** of the ESFRI – NA2⁷.
- Developed a **portfolio of four solutions**⁸: Federated Cloud, Federated Operations, High-Throughput Data Analysis, Community-driven Innovation and Support – all activities.
- Started a **business development** function leading activities exploring the provisioning of pay per use services and the opportunities of procurement activities – NA1⁹.
- Developed a **new strategy for the sustainability of the services for transnational access**¹⁰ - NA1 and NA2.
- Strengthened relationships with **SMEs and industry and participation to the Helix Nebula Marketplace** – NA1 and SA2.

² <https://documents.egi.eu/document/2224>

³ <http://go.egi.eu/strategy>

⁴ <https://documents.egi.eu/document/2232>

⁵ <https://documents.egi.eu/document/2079>

⁶ https://wiki.egi.eu/wiki/Distributed_Competence_Centre

⁷ D2.26 Annual Report on EGI and its Community Engagement Activity, <https://documents.egi.eu/document/2126>

⁸ <http://www.egi.eu/solutions/>

⁹ https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC:Home

¹⁰ D2.25 EGI Sustainability and Business Plan, <https://documents.egi.eu/document/2158>



- Developed processes and the service management framework for central application and allocation to resources and applied the FitSM best practices for the service management of EGI.eu services for transactional access – SA1¹¹.
- Organised four **events**: the EGI Technical Forum 2013 and the EGI Community Forum 2014 – hosting a wealth of workshops and training events, as well as two large thematic workshops in December and March – NA2.
- Published **case studies** describing how grid computing is helping European scientists, news items, newsletters, white papers and brochures – NA2.
- Successfully negotiated the third amendment of the project for the **extension of the project until December 2015** to ensure the continuation of a subset of EGI strategic activities including user community engagement, business development, pay-per-use and the porting of communities to the EGI Federated Cloud. The extension of the project is supported by a reclaimed budget of € 816,000 for an equivalent amount of human effort of 313 PMs, at a 50% co-funding rate.
- The EGI Global tasks of EGI-InSPIRE evolved from project activities into a **portfolio of services for transnational access** supported by EGI partners with in-kind contributions and EGI Council membership fees, whose cost amounts to approximately 1.5 MEuro.

OVERVIEW

One of the business changes over the last year from an organisation perspective was the change of both EGI.eu and EGI-InSPIRE Directors. Despite all of the changes both organisationally and technically, with the launch of the EGI Federated Cloud, EGI-InSPIRE has made tremendous progress and has positioned itself well moving sustainability forward.

In order to strengthen community engagement activities, the European EGI.eu coordination was reinforced with the constitution of the Distributed Competence Centre. Since January 2014 engagement activities are directed by the Engagement Strategy, a living document defining the outreach priorities and the tactical actions to achieve these.

The new document has been prepared and published during PY4 by NA2. The Engagement Strategy describes the goals and targets of EGI engagement activity, details the various tasks that Engagement covers and provides information about the human networks and online resources and tools that help us implement engagement activities. Short-term targets and metrics that facilitate strategy execution are also covered in this document. The Engagement Strategy facilitates the integration of the NA2 tasks and the human network coordination activities from the NILs, Champions and UCB area. Driven by the engagement strategy the NA2 teams made significant progress during PY4 in reaching structured communities and the long tail, developing and providing services for them.

The concrete outcome was the flourishing of NGI collaborations with Research Infrastructures of ESFRI, under the EGI.eu coordination. The Technical Outreach to New Communities task made good progress on a number of fronts. Two of the Virtual Team projects finished: Technology study for the Cherenkov Telescope Array (focusing on gateway requirements and Single Sign On) and Collaboration between EGI/NGIs and ESFRI project ELIXIR (aiming at defining a map of collaborations between ELIXIR Head Nodes and NGIs). The final reports of these VTs will be published in PQ15. These support activities are complemented by support actions to the LifeWatch and EISCAT-3D ESFRIs that were run in the framework of the EGI Federated Cloud. A large number of user communities and projects are participating to the definition of Proof of Concepts for the deployment of the EGI Federated Cloud, including: ATLAS, BioVeL, BSIM, CLARIN, DIRAC,

¹¹ <https://e-grant.egi.eu/slaneg/auth>



ENVRI, ESA, GEO, PeachNote, SCI-BUS, VERCE, We-NMR.

The operations activities have increased their user-orientation, by investing effort in the extension of the network of collaborating e-Infrastructures and by establishing collaborations with Open Science Grid (OSG) and XSEDE both in the United States for the support of various international communities including structural biology and Computational Chemistry and Materials Sciences. The integration of e-Infrastructures from the Africa-Arabia region started. This collaboration has been supported by the CHAIN-REDS project.

The integration of the EGI Cloud Infrastructure with the grid production infrastructure has been finalized. By PQ16, all cloud providers have been certified and run as production sites. The integration allows the reuse of all the operations tools already in use for the High Throughput Data Analysis solution based on Grid technology.

In order to facilitate access to distributed resources, a centrally managed compute and storage resource EGI pool was implemented. This resource pool for the first time in EGI introduces a process for resource application and allocation by lowering barriers for researchers and streamlining procedures that rely on the role of EGI.eu as resource broker acting on behalf of NGIs and Resource Centres. EGI and six of its partners have created an open pool of computing resources for both new and existing user communities.

The Operation Level Agreements and Service Level Agreement framework have been reviewed. New EGI.eu OLA has been created as an agreement between each provider of an EGI core service/activity and EGI.eu to cover the provision and support being part of the “Federated Operations Solution”.

During PY4, EGI’s community engagement activities continued across technical and non-technical areas, both within and external to the EGI Community. In addition, the Strategy and Policy Team led the preparation on a Scientific Review Process to support Excellent Science in EGI that was endorsed by the EGI Council as well as the adoption of a new Scientific Discipline classification within EGI’s tools. The Communications Team focussed on improving engagement and dialogue with research user communities and contributed to the creation of the EGI Engagement Strategy and is an active part of the on going implementation of this.

In addition, the team attended 3 research specific events and 5 international events aimed at policy makers and technology providers along with being in editing and creating many new publications for EGI including the EGI Solutions white papers and a number of brochures. The EGI website had 50 News items, 7 Case Studies and 39 Blogs. The Communications Team also worked with the Policy & Strategy Team to update the Services area of the website. This makes it easier for a visitor to determine the services offered to them as a researcher, resource provider or EGI.eu participant and has continued to gain mentions in external media including international Science Grid This Week, The Financial Times, euronews, GÉANT’s CONNECT, Forbes, Pan European networks’ Science and Technology magazine and The Register.

The Strategy and Policy Team (SPT) contributed to a major revision of the Sustainability and Business Plan and has led the Pay-for-Use Proof of Concept. The team also progressed on the work of the service portfolio by adding 6 new services and developed white papers to describe the 4 EGI solutions. The SPT has focused its efforts in solidifying collaboration opportunities with Helix Nebula leading to both technical and business model development. The team continued the collaboration with OpenAIRE to ensure that scientific publications can be linked to EGI. The 2nd edition of the EGI Compendium was finalised and published during the year as well as a variety of EGI and external publications around topics such as service management and achievements in ongoing collaborations. During PY4 a new MoU was also signed with the APARSEN project to bring in competences within the EGI community in the area of data curation and preservation. This MoU is strategic to expand the EGI service portfolio in the area of services needed to manage the full life cycle of data in the medium



term. Other MoUs in the area of resource providers have been signed (USA, China, India) as well as an MoU to formalise the participation in the Helix Nebula Marketplace.

The Security Policy Group chair expanded the scope of the security policy activities to account the cloud services and also continued the work for a common security framework across e-Infrastructures.

The routine maintenance and development of the operation tools proceeded regularly during the year with the introduction of many new features to all the operational tools. Among them we can mention a complete review of the Operations Portal to improve the look and feel, the ergonomics and the efficiency; the new GOCDB v5.X series which is now independent from the underlying RDBMS and offers many new capabilities such as the extensibility mechanism and new scoping extensions; and the integration of the EMI probes in SAM.

The regionalisation activities were successfully completed in the first months of PY4 with the release in production of the regional Accounting Repository and Portal. Currently, each tool has its working regionalisation solution or as independent instance or view inside the central instance.

The developments with respect to the accounting for different resource types, which started in PY3 and continued in PY4, are close to completed. Cloud, Storage and Parallel Jobs resource types can be accounted in the EGI Accounting Repository based on Secure Stomp Messenger protocol v2 and new views were developed in the portal to show this data. The remaining step to complete this activity is the deployment of an automatic system to dispatch this accounting data from the repository to the portal.

Another important result achieved in PY4 is the integration in the Accounting Portal of a module able to get site charging attributes from the GOCDB, and use them, in association to the accounting data, as input parameters of a billing function. The charging attributes can be stored in the GOCDB through the new extensibility mechanism provided by the v5.2. Two provisional billing functions, one for grid resources and the other for cloud, are now available in the Accounting Portal. It is important to note that the modularity of the Accounting Portal functionality allows to easily and quickly introduce any kind of function, requiring as input parameters values associated to the GOCDB entities and data accounting to exploit the above described mechanism.

For what concerns software provisioning, as follow-up action of the end of the EMI and IGE projects, which until April 2013 had been responsible of third level software support in EGI, the new support levels offered in the EGI helpdesk – GGUS – by the EGI Technology Providers was completed and implemented, and is now documented in the GGUS helpdesk portal. In addition, the Unified Middleware Distribution of EGI is now capable of importing software packages that are released through third-party repositories like EPEL (“Extra Packages for Enterprise Linux”).

During the year, SA2 supported the UMD release process, delivering 17 updates of the Unified Middleware Distribution. The support framework has been extended to adapt to the changes introduced by the end of the middleware development projects funded by the European Commissions (EMI and IGE). Now UMD is able to import packages from multiple technology providers, including community repositories such as EPEL or local repositories maintained by the product teams. The extension of the framework slightly reduced the possibility to automate the import process, but this has been compensated by the improvement in the verification process and release building. These improvements allowed verifying and releasing many more products than the previous year with the available resources.

Besides the technical changes needed with the new technology ecosystem, SA2 also coordinated the UMD Release Team, a fortnightly phone call where the representatives of the product teams present their release plans, and where topics relevant for multiple products or product teams are discussed. The URT meetings helped to keep alive the communications channels between product teams and product teams and EGI.



Federated Cloud activities progressed both in integrating Cloud middleware and tools with the EGI core platform and in reaching out for new user communities interested in cloud services. The cloud resource centres have started to be certified and integrated in the production infrastructure to prepare for the official announcement at the end of May 2014.

The main activities of SA2 will continue supported directly by EGI.eu during PY5 and beyond as core services funded by the NGIs fees.

During autumn 2012 EGI reviewed its strategic plan and formulated through this its strategic goals around Community & Coordination, Operational Infrastructure and Virtual Research Environments. To accelerate these strategic goals, the EGI Council approved a plan to set up a coordinated programme of short-lived projects that individually address specific topics around these goals, and to investigate sources of funding for these. In cooperation with the EGI EB, the EGI-InSPIRE Project Office identified a number of partners that were under-spending. The EGI-InSPIRE Project Management Board decided to reallocate some of these unused funds to this support programme. Starting in December 2012 the EGI project office initiated a project internal call for funded mini projects, which eventually led to the funding of 11 proposals out of 29 submissions.

With the approval of the EC project officer, all funded mini projects were organised and set up as tasks within Work Package 8 (SA4) as part of the EGI-InSPIRE project. Regular contributions to the EGI-InSPIRE quarterly reports focus on summarising the progress made and issues faced in the mini projects; MS801 provided a mid-term deliberation of the mini project's progress, status and plans for the future. D8.1 comprises the end-of term report for all mini projects. The work was organised between overall work package administrative activities (delivered by the Work Package activity leader), and a number of technical shepherds who coordinated the day-to-day work and embedding of the assigned mini projects into their target domain.

Throughout PY4, all mini projects generally performed well and within expectations except for the following noteworthy circumstances: (i) When allocating a short lived mini project that includes unfunded contributions, then these must be considered voluntary regardless the partner reputation, avoiding the project to run into problems. (ii) When including SMEs in such mini projects, potential financial hindrances stemming from relationships between project partners need to be properly addressed in risk management, as these can severely impede the success of a mini project.

Nonetheless, with addressing these circumstances, the affected mini projects were able to achieve their goals and finish in time and within budget. In summary, given the successful outcomes of the activity, the mini projects are considered to be a successful instrument for the agile implementation of strategic goals.

3 PROJECT PROGRESS

3.1 Project Objectives for the Period

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 D1.15¹²

3.2 PY4 Performance

Table 1: Achieved Project Year Four Project Metrics (Q13-Q16)

Project Objectives	Objective Summary	Metrics	PQ13	PQ14	PQ15	PQ16	Target PY4
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	337	341	335	361	345 (350) (355)
		Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2 A)	433,878	436,922	404,105	487,577	400,000 (425,000) (450,000)

¹² D1.15 Annual report on quality status <https://documents.egi.eu/document/2251>

		EGI monthly availability and reliability of site middleware services (M.SA1.Operation.5)	95.41%/95.91%	97.24%/97.96%	96.60%/97.04%	95.83%/96.42%	97.0/97.5 % (97.5/98.0 %) (98.0/98.5 %)
		NEW Average monthly availability and reliability of NGI core middleware services (MSA1.Operation.4)	98.33%/98.53%	99.29%/99.75%	98.57%/99.65%	99.00%/99.63%	99.60/99.80 % (99.65/99.85 %) (99.67/99.87 %)
		NEW EGI monthly availability and reliability of critical central operations tools (MSA1.Operation.6a)	99.71%/99.91%	97.39%/97.42%	99.62%/99.63%	98.91%/99.10%	99.60/99.80 % (99.65/99.85 %) (99.67/99.87 %)
		NEW EGI monthly averaged VO availability and reliability (M.SA1.Operation.7)	97.27%/98.34%	98.13%/99.04%	98.18%/98.61%	96.88%/97.89%	98%/99% (98.5/99.0 %) (98.7/99.2 %)
PO2	Support of European researchers and international collaborators through VRCs	Number of papers from EGI Users (M.NA2.5)	9	36	10	27	Achieved/ year: 82 (80) (90)
		Number of grid jobs done a day (Million) (M.SA1.Usage.1)	1.19 M (grid) 1.45 M (grid and local)	1.35 M (grid) 1.61 M (grid and cloud)	1.40 M (grid) 1.61 M (grid and local)	1.52M (grid and local)	1.6 M (1.8 M) (2.0 M)
PO3	Sustainable support for Heavy User Communities	Number of production sites supporting MPI (M.SA1.Integration.2)	80	89	69	74	90 (100) (120)
		Number of users from HUC VOs (M.SA1.VO7)	11,656	11,569	12,085	11,990 + 7,000 users with access to robot	12,500 (13,000) (14,000)

						certificates	
		NEW Total number of High Activity VOs (M.SA1.VO.5) *quarterly value ** yearly value	53*	45*	41*	38* Achieved /year: 67	55** (60) (65)
PO4	Addition of new User Communities	Number of users from non-HUC VOs (M.SA1.VO.6)	10,368 (*)	7,532(*)	8,389	7,015(*) + 5,000 users with access to robot certificates	11,000 (11,500) (12,000)
		Public events organised (attendee days) (M.NA2.6)	210	2137	530	1553 Achieved/year: 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)	5 (**)	9 (***)	10 (***)	11 (****)	5 (7) (9)
		MoUs with resource providers (M.NA2.10)	3	4	5	6	4 (5) (5)
PO6	Integration of new technologies and resources	Number of resource centres offering federated cloud services accessible to authorised users (M.SA2.16)	14	19	14	15	15 (20) (25)

(*) 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/quarterly_report/QR13/
- http://metrics.egi.eu/quarterly_report/QR14/
- http://metrics.egi.eu/quarterly_report/QR15/
- http://metrics.egi.eu/quarterly_report/QR16/

3.3 PY1-PY4 Performance

No	Objective Summary	Metrics	Achieved/Target PY1 (PQ4)	Achieved/Target PY2 (PQ8)	Achieved/Target PY3(PQ12)	Achieved/Target PY4 (PQ16)
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)
		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)
		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%)
		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%)
		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%)
		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%)
PO2	Support of European researchers and international collaborators	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	960,053/500,000	1,264,922/525,000	1.43/1.2M	1.6M/1.6 M

	rs through VRCs	(M.SA1.Usage.1)			(1.4M) (1.5M)	(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)
		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)
		Total number of High Activity VOs (M.SA1.VO.5)	N/A	N/A	N/A	38/ 55 (60) (65)
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
		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)
		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
		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
		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)

3.4 Work progress and achievements during the period

3.4.1 Operations

The production Infrastructure satisfactorily met the PY4 targets of the SA1 project metrics with particular reference to the number of Resource Centres integrated, the compute capacity offered, and number of on-going Research Infrastructures/new communities being integrated, as illustrated by the following summary table¹³.

Project objective	Metric	PY4 performance	PY4 Target Foundation/Ideal/Stretch	Deviation from Foundation (%)
Expansion of a nationally based production infrastructure	Total number of production resource centres that are part of EGI (EGI-InSPIRE and integrated partners) Metric: M.SA1.Size.1	361	345/350/355	+5%
	Total number of job slots available in EGI-InSPIRE and integrated resource providers Metric: M.SA1.Size.2a	487,577	400,000/425,000/450,000	+22%
	EGI monthly reliability of Resource Centre Metric: M.SA1.Operation.5	96.42	97.0-.5%/97.5-98%/98-.5%	-0.6%
	Average monthly reliability of NGI core middleware services Metric: MSA1.Operations.4	99.63	99.6-.8%/99.65-.85%/99.67-.87%	0%
	EGI monthly reliability of critical central operations tools Metric: MSA1.Operations.6a	99.10	99.6-.80%/99.65-.85%/99.67-.87%	-0.5%
Sustainable support for Heavy User Communities	Number of production sites supporting MPI Metric: M.SA1.Integration.2	74	90/100/120	22%
	Number of users from HUC VOs Metric: M.SA1.VO.7	11,990	12,500/13,000/14,000	-4%
Addition of new User Communities	Number of users from non-HUC VOs Metric: M.SA1.vo.6	7,015	15,000/17,000/19,000	-53%
	Number of on-going Research Infrastructures/new communities being integrated (M.SA1.Integration4)	11	5/7/9	+120%

Operations successfully contributed to the accomplishment of the applicable project objectives as detailed in the following.

Objective 1 (O1): The continued operation and expansion of today's production Infrastructure.

- This objective was successfully met by completing the integration of the ArabiaAfrica Operations Centre comprising 11 production RCs. In addition with the end of PY4 production infrastructure has been extended to provide cloud resources. In PY5 the plan is to extend the

amount of cloud resources and sites from integration new resource infrastructures providers: IHEP-China, C-DAC India, IDGF. To provide reliable infrastructure 4 decommission campaigns have been performed removing from the infrastructure unsupported software (EMI 1, EMI 2) and software not supporting DN publishing and SHA-2.

- To assure software support after EMI and IGE projects EGI agreed with 25 product teams level of support based on pre-defined defined 3 categories taking into account response time to tickets. EGI helpdesk system has been modified to automatically monitor and notify about agreement violation.

Objective 2 (O2): The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.

- In PY4 SA1 has started resource allocation activity, which is supposed to simplify reaching an agreement between users and Resource Centres concerning the parameters and conditions of use of resources. The Resource Allocation process is useful for users (VO representatives, individual users) because in a multi-provider EGI environment they have a single point of contact to ask for a share on resources and also beneficial for resource providers as it allows more effectively plan the use of resources and closer communication with users.
- We are also observing constant increase of infrastructure usage. The overall quantity of computing resources used in PY4 amounts to 15.1 Billion HEP-SPEC 06 Hours (the corresponding amount of consumed resources consumed during PY3 amounted to 12.01 Billion HEP-SPEC 06 Hours).
- The overall compute resource utilization during PY4 has been significantly increasing both in terms of the cumulative number of jobs successfully done and the normalized CPU wall time consumed by all disciplines. In the reference period April 2013-March 2014 the rate of jobs successfully executed increased by +10.8%, while the total normalized CPU wall time (HEP-SEPC06) increased by +15.98%.
- While the HEP utilization is still dominating in absolute terms but decrease by -1.46% comparing to PY3 (88.34% of the total EGI consumption in normalized CPU wall time hours), a number of other communities significantly increased their yearly CPU wall time utilization: Fusion (+108.46% yearly increase), Computational Chemistry (+48.31%), Multidisciplinary (+76.13), Infrastructure (+14.75%) and unknown disciplines (+6417.66%).

Objective 4 (O4): Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.

- EGI is actively collaborating with 11 on-going Research Infrastructures/new communities being integrated (EISCAT, CTA, DRIHM, LifeWatch, ENVRI, DCH-RP, EMSO, ICOS, VERCE, WeNMR, ESA) to investigate and demonstrate the reuse of EGI core operational and infrastructural services to meet common ESFRI requirements. Collaboration was established with the EUDAT and PRACE infrastructures and user communities aiming for the integration of data access and processing across the three infrastructures. Use cases are being collected for data access, transfer, replication and processing in various disciplines. Common data access and transfer tools and protocols that can be provided by all three e-infrastructures will be identified.
- During PY4 as part of EGI.eu service catalogue, Federated Operations service has been defined. Federated Operations brings together the operational tools, processes and people necessary to guarantee standard operation of heterogeneous infrastructures from multiple independent providers, with a lightweight central coordination. This includes, for example, the monitoring, accounting, configuration and other services required to federate service provision for access by multiple research communities. A federated environment is the key to uniform

service and enables cost-efficient operations, while allowing resource centres to retain responsibility of local operations. This service is supposed to simplify the day-to-day operations of a federated heterogeneous infrastructure avoiding duplication of costs and providing re-usable tools. In addition, all activities, which are part of the service, were covered by signing an Operations Level Agreement document, which describes expectations towards provisioning of the activity/tools.

- The EGI service registry (GOCDB) and SAM monitoring tool were adopted by EUDAT to support operations, and EGI-InSPIRE supported the implementation of EUDAT requirements through JRA1 development activities.
- A collaboration was also established in PQ09 with XSEDE, a major research infrastructure providing HPC resources in US. A submission of Collaborative Use Examples (CUEs) for collaborating research teams utilizing resources in EGI and XSEDE (which includes resources provided by the Open Science Grid) was opened in PQ10 with the aim of getting a better understanding of the breadth of research activities and of the usage modalities that would benefit from a XSEDE and EGI collaboration. The collaboration refocused in PY4 to understand possible integration of helpdesk/support, resource allocation and security solutions.

Objective 6 (O6): 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 infrastructure as they mature and demonstrate value to the EGI community.

- In PY4 SA1 successfully accomplished integration of cloud resources into production infrastructure. Work has been done in terms of adjustment of Core EGI.eu tools, activities and documentation to support other types of resources than grid.

In the following sections the major achievements in each operations technical area are listed.

3.4.1.1 Security

In PQ13 no security incidents were reported or handled. The IRTF continued to track new security vulnerabilities in operating systems and other non-Grid software. Two "critical" advisories were issued to all site security contacts during the quarter. One of these, a Linux kernel vulnerability CVE-2013-2094¹⁴, resulted in a large amount of work for the CSIRT in monitoring and handling the requirement for sites to install patches or to deploy suitable mitigations within the defined time. For the Incident Response Task Force (IRTF) four security incidents were handled during PQ14. Three of these were related to stolen ssh passwords, while one was as the result of a brute-force ssh scanner.

In PQ15 for the Incident Response Task Force (IRTF), two security incidents were handled during the quarter. EGI-20140113-01 is an open incident involving the unauthorized use of Biomed resources. EGI-20140121-01 involved hosts at a site, which were used for NTP-based ddos attacks on third parties. These hosts were not compromised; they were just improperly configured and this is not a Grid related incident. A couple of smaller incident reports were received but these were closed early since they were not relevant to EGI operations.

In PQ16 for the Incident Response Task Force (IRTF) two security incidents were handled during the quarter. The IRTF also continued to track new security vulnerabilities in operating systems and other non-Grid software, and chase sites that were vulnerable to previously announced problems. The most important was the OpenSSL Heartbleed bug (also known as vulnerability CVE-2014-0160) announced to the world on 7th April 2014. Advisories were quickly distributed to all sites and VOs. Monitoring

¹⁴ https://wiki.egi.eu/wiki/EGI_CSIRT:Alerts/kernel-2013-05-14

was developed and used and encouragement was given to ensure that all service operators performed the necessary remedial actions and updates in a timely manner.

For the Security Service Challenge (SSC) activity¹⁵, the final confidential report from the SSC of 11 sites in the UK NGI was produced. The German NGI will run the next SSC in PQ14. Extensions have been made to the SSC framework for NGI runs in particular to add the functionality needed to do concurrent runs in different NGIs. This has been done in parallel with preparations for the NGI-DE-SSC run. Plans for training other NGIs to run their own SSC will be given at the EGITF13.

The security monitoring sub-group was very busy developing probes to track all SVG and CSIRT alerts and advisories as required, in particular for CVE-2013-2094. A pilot of site-wide monitoring was deployed at KIT, where the Pakiti client was installed on all the worker nodes to report to the EGI Pakiti server. The pilot will be extended to other sites over the next few months. A workflow to handle security issues in GGUS has been drafted and discussed internally in the team. After minor changes it will be passed on to the GGUS team so a joint discussion could be organized at EGITF13. Training has been planned for the EGITF in security logging and auditing.

The Software Vulnerability Group (SVG) continued to handle all reported vulnerabilities. During PQ13, 11 new vulnerabilities were handled, including 4 from the on-going vulnerability assessment of CREAM. One SVG advisory was issued¹⁶. The final report on the security assessment of the gLite WMS is still awaited and the assessment of CREAM continues.

During PQ13 work continued on the EGI CSIRT procedure for compromised certificates and emergency suspension. A nearly final draft has been completed¹⁷. In addition, the CSIRT team identified the need for easy access to VO security contact information and a vo-security-contacts mail list has been established. A brief document was prepared describing the requirements for this. The team has been carrying out a major re-organization of the communications and information access levels in EGI-CSIRT.

Experience in handling vulnerabilities after the end of EMI and IGE shows that the SVG communication and handling procedures are still working well and were not affected by the end of the two projects. No changes to the SVG procedures are needed. The SVG risk assessment team suffers from lack of effort available for performing the risk assessments. During the quarter, 11 new software vulnerabilities were handled, including one critical and 6 high-risk. SVG issued 6 public advisories that went to all EGI sites.

The Emergency Suspension procedures document was finalised and approved by the OMB in its September 2013 meeting. To enforce this decision a campaign to set up Argus instance in each NGIs has started.

The CSIRT has been an accredited member of the TERENA Trusted Introducer scheme since October 2012. EGI is carrying out the necessary steps to achieve full certification. An on-site visit happened in January 2014 with a detailed investigation of EGI's policies and procedures and currently awaiting the report from this visit to see what changes are required for full certification.

SVG members have been involved in producing 2 questionnaires related to EGI Federated Cloud Security. These questionnaires are aimed at ensuring that the emerging Cloud infrastructure is able to comply with EGI Security Policies, and provide a similar level of assurance concerning security as the EGI Infrastructure based on Grid Technology.

¹⁵ https://wiki.egi.eu/wiki/SSC6_NGI_UK

¹⁶ <https://wiki.egi.eu/wiki/SVG:Advisory-SVG-2013-5268>

¹⁷ <https://documents.egi.eu/document/1018>

3.4.1.2 Service Deployment and Integration

The PY4 saw a major release of the UMD (UMD-3) that incorporates all the EMI-3 products. After the major release 15 updates were released for UMD 2 & 3. In total more than 350 products and sub-components were deployed and tested covering not only all of EMI / IGE products but also incorporated a new product team the QCG team¹⁸.

Stage Rollout activities and feedback from testing are now being reported in the context of the new UMD Release Team (URT) activity providing lightweight coordination of software release activities. This activity started in May 2013 and the main purpose is to keep the communication channels open between the product teams, as they existed previously within the middleware projects and open new lines of communications between EGI and the product teams, as these were mediated by the middleware projects technical coordination. Staged Rollout activities collaborated with EGI CSIRT in order to check the readiness of the software towards the SHA-2 implementation¹⁹ and ARGUS interoperability²⁰.

Of relevance during the year there were:

- The collaboration with XSEDE²¹ in the USA that produced an integration analysis to enable the COMPCHEM and WeNMR VOs on both infrastructures. Integration activities with the EUDAT infrastructure were promoted through a study case (conducted within the ENVRI project) aiming at enabling the EISCAT-3D research infrastructure to benefit from both EGI and EUDAT services for compute and big data management²².
- The assessment of the readiness of accounting and information publishing for resource centres adopting ARC, UNICORE, QCG and GLOBUS middleware and the preparation of documentation²³ for NGIs deploying these middlewares.
- The support on network performance troubleshooting, provided by the eduPERT²⁴ team through the EGI helpdesk.
- The integration of the resource centres of the South African National Grid (SAGrid) in EGI, opening the way to seamless collaboration between research communities in South Africa and Europe. From now on, the South African and European infrastructures are 100% interoperable and part of the same federated infrastructure. The integration was achieved as part of a long-term collaboration between EGI.eu and the Meraka institute, formalised in a Memorandum of Understanding.
- The participation in the Middleware Readiness Working Group²⁵. The main goal is to keep the dialog open between EGI and WLCG communities, bridging the processes used in the two communities, i.e. by making available the testing versions for sites, which are both WLCG and participate in the EGI Staged Rollout. With experiments' agreement to participate in such tests, the versions provided by the technology providers can be made available in the UMD production repositories sooner rather than later.

¹⁸ http://www.qoscosgrid.org/qcg-packages/sl5/x86_64/

¹⁹ https://wiki.egi.eu/wiki/Middleware_products_verified_for_the_support_of_SHA-2_proxies_and_certificates

²⁰ https://wiki.egi.eu/wiki/Middleware_argus_interoperability

²¹ <https://wiki.egi.eu/wiki/EGI-XSEDE:Collaboration>

²² https://wiki.egi.eu/wiki/EGI_ENVRI

²³ <https://wiki.egi.eu/wiki/MAN09>

²⁴ <http://geant3.archive.geant.net/Services/NetworkPerformanceServices/Pages/eduPERT.aspx>

²⁵ <https://twiki.cern.ch/twiki/bin/view/LCG/MiddlewareReadiness>



- The operational integration of the EGI Cloud Infrastructure into the Grid production platform. The first cloud resource centres were successfully certified following the existing quality assurance procedures of EGI.

3.4.1.3 Help Desk & Support Activities

3.4.1.3.1 Grid Oversight

Follow-up upgrades of unsupported software

- The COD was responsible of overseeing the process of retirement EMI-1 middleware, upgrade campaign completed in PQ13 and of EMI-2 middleware, campaign to be finished in PY5, by the end of May 2014.
- COD was also involved in the process of retirement of obsolete middleware like SHA-2 non-compliant middleware.

Unknown Probe Result

- Monitoring results produced locally by the SAM system run at an NGI level can be reported as unknown in case of problems with the issuing of tests or the shipping of results. The implementation of a Nagios probe that checks the percentage of UNKNOWN test results and raises an alarm in case this percentage exceeds a given threshold was discussed. In addition, COD team has started developing the specifications of a test that will raise alarms on the operations dashboard when the unknown percentage is higher than a certain threshold. This work is in progress.

Follow-up NGI Core Services availability

- COD regularly issued GGUS tickets to NGIs that do not meet the 99% availability requirement according to the service level targets defined in the Resource Provider OLA. In case of violation, information about the service improvement plans is gathered from the NGIs.

Nagios Probes working group

- Under the coordination of COD, the Nagios Probe working group performed a technical analysis of the EMI-1 probes in preparation to their integration into SAM Update 22, and a proposal – requiring the removal of some of the probes, mainly ARC ones – was submitted to the OMB for approval. The working group will be also in charge of proposing which probes should be OPERATIONS, once SAM Update 22 will be in production. The working group is currently reviewing some requests of new probes and assessing the new MPI probes.

3.4.1.3.2 Help Desk

Many GGUS releases were deployed during the PY4, providing important new features and improvements:

- Due to the end of EMI and IGE as projects ensuring coordination of 3rd level support of the EMI and IGE distributions, the list of 3rd level middleware support units was reviewed and many were decommissioned together with other units that were inactive. Additional support units were renamed and others merged.
- A number of important new workflows were rolled to production:

- An automated workflow for tickets waiting for submitter input²⁶. Purpose of this development is to automate as much as possible the follow-up of tickets with inactive submitters via automated e-mail notifications.
- A new work flow for tickets waiting of input from the support team²⁷ was implemented aiming at reminding supporters whenever feedback is needed and when ETAs (the estimated time of availability of patch) is violated. Purpose of this workflow is to handle 3rd level support tickets in a scenario where different support teams can provide different responsiveness depending on the amount of resources locally available. A new policy was introduced for testing, requiring the addition of ETA information to every software ticket which reaches the 3rd level of escalation requiring the release of a patch.
- Three different quality of service levels were introduced, requiring different responsiveness to tickets depending on the level of criticality of ticket itself.

3.4.1.3.3 Software Support

During the PY4 the activity ran smoothly following the established procedures. The number of tickets handled was lower in every quarter, 125 in PQ13, 99 in PQ14, 122 in PQ15 and 86 in PQ16, with a total of 114 solved tickets over the whole year, between 24% and 34% on every quarter. This is a likely indication that the deployed software is getting stable after the end of the EMI and IGE projects, when the pace of development slowed down.

The organization of 1st and 2nd line software support during the project extension and afterwards was reviewed. Work was performed in order to shift the responsibility of software support to a new consortium of partners, represented by CESNET and Ibergrid, as this service is part of the “EGI core activities” and will not be funded in EGI-InSPIRE from May 2014:

- The procedures were agreed, the 1st level will follow weekly shifts alternating between CESNET and Ibergrid. At the CESNET side the shifts are integrated into the work of its general helpdesk.
- The list of supported software components at the 2nd level was revised and assignments to both CESNET and Ibergrid, and other unfunded contributing partners (in case of the community platform) were done.
- The new work model was deployed in advance in April, no major problems appeared.

3.4.1.3.4 Documentation

Documentation activities were focused on integration procedures and other documentation necessary to prepare the production phase of the EGI Federated Cloud.

The existing Operation Level Agreements²⁸ are being reviewed as part of the service management best practices of EGI, and the Resource Centre OLA²⁹ was already updated and approved by the OMB.

Another documentation area was Resource Allocation where a number of materials were produced to support the implementation of the EGI Resource Pool³⁰, which allows for the application and allocation of resources through a pool of resources physically distributed but made available centrally through the brokering activity of EGI.eu. Resource application and allocation are supported by the e-

²⁶ https://wiki.egi.eu/wiki/FAQ_GGUS-Waiting-For-Submitter-Process

²⁷ https://wiki.egi.eu/wiki/FAQ_GGUS-Waiting-For-PT-Process

²⁸ <https://wiki.egi.eu/wiki/Documentation#OLA>

²⁹ <https://documents.egi.eu/public/ShowDocument?docid=31>

³⁰ https://wiki.egi.eu/wiki/Resource_Allocation

Grant tool (see section 4.1.12). Procedure 06³¹ and 09³² were updated and new temporary procedure 18³³ has been created to support Cloud resources integration to production infrastructure

During quarter 15 and 16, documentation activities were focused on defining a revised OLA framework and related SLAs with help from the FedSM project. Another activity was the creation of manual how to enable accounting and information system publishing for integrated middlewares.

3.4.1.3.5 NGI User Support

NGI_AEGIS. NGI_AEGIS User Support Team continued successful user support throughout this quarter. As a part of our activities, together with Serbian chemistry community, we updated the software packages deployed on AEGIS01-IPB-SCL site to their latest versions: OpenEye's application SZMAP and an electronic structure program package ORCA. In addition to that, NAMD 2.8 compiled with PLUMED plugin was added to the software stack. PLUMED is an open source plugin for free energy calculations in molecular systems. NGI_AEGIS Helpdesk³⁴ and NGI_AEGIS website³⁵ have been regularly maintained and we continued to participate in tests of GGUS and NGI_AEGIS Helpdesk interface (after the new release of GGUS portal). Scientific Computing Laboratory of Institute of Physics Belgrade that hosts AEGIS01-IPB-SCL resource centre (and NGI_AEGIS core services) had a major infrastructure upgrade in which new cooling system was installed and all machines were moved to new water-cooled racks so that functioning of NGI_AEGIS Grid services is now even more reliable with the perspective of their expansion in the near future.

In QR15, successful support to various user communities continued. In addition to day-to-day user support activities, in cooperation with the Grid users coming from Serbian chemistry community MOPAC software package were updated on AEGIS01-IPB-SCL site to its latest version. MOPAC (Molecular Orbital PACKage)³⁶ is a semiempirical quantum chemistry program based on Dewar and Thiel's NDDO approximation. This package was updated to MOPAC2012 version that enables users to use additional methods (PM7 and PM7-TS) compared to previous MOPAC2009 version.

As an outcome of collaboration with the emerging agricultural community number of applications were ported to the Grid and registered in the EGI AppDB:

- agDataHarvester which performs harvesting of any dataset exposed via an OAI-PMH target (<http://appdb.egi.eu/store/software/agdataharvester>),
- agDCtoLOM, a tool for transforming metadata into another schema using XSLT files (<http://appdb.egi.eu/store/software/agdatatransformation>),
- agLOMtoAK which performs conversion of a set of metadata records with XML binding that follow IEEE LOM metadata format into AKIF format (<http://appdb.egi.eu/store/software/aglomtoak>),
- agLOMtoRDF which performs conversion of a set of metadata records with XML binding that follow IEEE LOM metadata format into RDF/XML binding (<http://appdb.egi.eu/store/software/aglomtordf>),
- agRecommender which can be used to estimate recommendations using rating data as input (<http://appdb.egi.eu/store/software/agrecommender>),

³¹ <https://wiki.egi.eu/wiki/PROC06>

³² <https://wiki.egi.eu/wiki/PROC09>

³³ <https://wiki.egi.eu/wiki/PROC18>

³⁴ <https://helpdesk.aegis.rs/>

³⁵ <http://www.aegis.rs/>

³⁶ <http://openmopac.net/>

- agrovocTagger, a tool with the purpose to index documents with the Agrovoc Thesaurus (<http://appdb.egi.eu/store/software/agrovoc>tagger>),
- agTextMining that provides text mining services to datasets (<http://appdb.egi.eu/store/software/agtextmining>),
- agTriplificator that converts a LOM IEEE file into RDF triples and save them to a 4store triplestore (<http://appdb.egi.eu/store/software/agtriplificator>),
- JSONCLI, a command line utility that pipe in JSON data for pretty-printing, validation, filtering, and modification (<http://appdb.egi.eu/store/software/jsoncli>).

Regular maintenance of NGI_AEGIS Helpdesk³⁷ and AEGIS web site³⁸ was performed in this quarter. New IP address was assigned to NGI_AEGIS Helpdesk due to the migration of servers at Karlsruhe Institute of Technology (KIT) that are hosting this service to the new network and DNS hosted at IPB was updated accordingly. We continued to participate in testing of GGUS and NGI_AEGIS Helpdesk interface (after each new release of GGUS portal) and GGUS team was informed about issues in synchronization between GGUS and NGI-AEGIS Helpdesk xGUS instance.

As an extension of our user support activities NGI_AEGIS joined Distributed Competence Centre³⁹ with the expertise in compute services, MPI, core services and application porting and testing in the area of physics, chemistry, engineering and materials science.

During PQ13 the case study of a Serbian physicist Nenad Vukmirovic from the Institute of Physics Belgrade has been published on the EGI web site⁴⁰. His recent work – published in the Physical Review Letters – used NGI_AEGIS Grid computing resource to calculate how electrons interact with phonon waves. Together with the Serbian chemistry community, the SZMAP application⁴¹ was deployed in NGI_AEGIS Resource Centres. This OpenEye's application aims to help researchers to understand the role of water in molecular interactions such as ligand binding. In addition, the previously installed OpenEye's applications EON were updated to the latest versions. The Helpdesk⁴² and the NGI_AEGIS website⁴³ (<http://www.aegis.rs/>) have been regularly maintained and updated. NGI_AEGIS participated to the testing of the new recent GGUS release and of the GGUS-NGI_AEGIS Helpdesk interface functionality. During PQ14, the NGI_AEGIS software stack will be extended with the Rosetta⁴⁴ software suite for modelling of macromolecular structures.

NGI_ARMGRID. NGI is developing a portal for quantum physics applications.

NGI BG. NGI BG user support activities for new communities during the 15th quarter focused on establishing contact with new research community in area of protein folding and gene regulation (Institute of Molecular Biology from Bulgarian Academy of Sciences). VOMS Registry application was developed and deployed⁴⁵. The application is web-based registry of VOMS certificates. It provides a useful tool for searching from available VO-s and VOMS-es and for downloading VOMS certificates.

³⁷ <https://helpdesk.aegis.rs/>

³⁸ <http://www.aegis.rs/>

³⁹ https://wiki.egi.eu/wiki/Distributed_Competence_Centre

⁴⁰ http://www.egi.eu/case-studies/eng_tech/semiconductor.html

⁴¹ <http://www.eyesopen.com/SZMAP>

⁴² <https://helpdesk.aegis.rs>

⁴³ <http://www.aegis.rs>

⁴⁴ <https://www.rosettacommons.org/home>

⁴⁵ <https://portal.grid.uni-sofia.bg:8443/vomscerts/>



The user support established contact with research groups from Bulgarian Academy of Sciences and University of Architecture, Civil Engineering and Geodesy. The testing installation of OpenStack cloud middleware was performed and induction training of researchers from the domain of Financial Mathematics was given.

NGI_CH. NGI_CH user support activities for new communities focused on the following main streams:

- Support to the DEWA/GRID-Geneva group⁴⁶ for enabling the SWAT hydrological model on a federated cloud infrastructure. The plan is to integrate the use case as part of the supported portfolio at the national level first, and then link it to the EGI FedCloud infrastructure.
- Support to the SwissExperiment project⁴⁷ for extending the current supported use-case on the national cloud infrastructure. The requirement for the extended use case will call for a larger number of resources than those available at the national level; the EGI FedCloud infrastructure will be explored.
- Follow up on the activities in Chemistry, Molecular & Materials Science and Technology Virtual Team
- Continued the effort in the national cloud strategy group aimed to establish and academic national cloud infrastructure. The outcome of this strategy should harmonize with the European cloud infrastructure roadmap that is also one of the targets of EGI.
- Continued the implementation of the Community Distributed Support model: contacts and site visits with 2 institutes (EPFL and UZH).

NGI_CY. Training of new users that are going to use grid to run Computational Physics experiments was performed. The application used by new users is AMIAS (Athens Model Independent Analysis Scheme), it is about stochastic procedures for the statistical analysis of Random Transform from CT-scans simulations, and relies on Monte Carlo and other simulation techniques.

NGI_CZ. End of 2013, NGI_CZ (CESNET) became an official member of ELIXIR (Czech Republic Node). The Node is a joint project of seven institutions/projects. In November 2013, ELIXIR CZ Consortium agreement was signed by Czech Minister of Education. In November 2013, we also organized an ELIXIR introduction event for the bioinformatics community in the Czech Republic. ELIXIR's director, Niklas Blomberg participated on the event. NGI_CZ employee (Ludek Matyska) has been elected as the vice-chairman of ELIXIR CZ Node and he is responsible for technical e-Infrastructure solutions. NGI_CZ is also an active partner in the cloud initiative coordinated by EGI.

The local installation of the DIRAC File Catalogue was completed. Purpose of this activity is to compare this service to LFC. This activity was driven by needs of the VO AUGER. Transfers of ATLAS user data to tapes hosted by CESNET Data Storage and the random retrieval of selected files were conducted. NGI_CZ participated to the second Belle MC Challenge started at the end of July, activities will continue in PQ14.

The Belle Montecarlo Challenge finished, results were reported by the Belle representative at the CHEP conference and will be further discussed at the Belle Computing meeting in November. Performance of the DIRAC File Catalogue (DFC) and LFC was compared in the test and the first

⁴⁶ <http://www.grid.unep.ch/>

⁴⁷ <http://www.swiss-experiment.ch/>



results shown at EGI TF 2013. Migration for the VO auger will be suggested with possible realisation in 2014.

NGI FRANCE. France Grilles organised the SUCCES 2013 days⁴⁸ and attended the JRES conference (10-13 December in Montpellier, France)⁴⁹. This event is the main event gathering all IT people around French academic institutes: more than 1500 attendees, 70 booths, more than 150 sessions. France Grilles had the chance to give its talk⁵⁰ presenting operations, services and user communities the first day. This allowed a lot of people to come on the France Grilles booth to ask questions. The VIP and GateLAB talk ("VIP et GateLAB: retour d'expérience"⁵¹) was the occasion to present the work of a French team on the infrastructure and with the help of the services of France Grilles.

The France Grilles 'Services to the end users' catalogue⁵² is online in French and in accessible in English language.

A policy was drafted to propose the DIRAC service to new VO's and a first local VO accepted the service to perform testing activities. France Grilles is currently preparing its yearly scientific French-speaking meeting⁵³. This event is co-organised with the "Groupe Calcul". It will take place in Paris (13-14 November 2013). The call for papers was sent to the France Grilles and regional HPC competence centre user communities.

NGI GE. NGI GE supported users in solving problems by regular meetings and to clarify and identify issues in the users support and inform them about new procedures. User training materials have been developed and regular update of Georgian Grid Initiative website⁵⁴ was performed.

NGI_GR. Problems affecting the functionality of WS-PGRADE portal were fixed with an upgrade of the portal to its latest version. The WRF application for Scientific Gateway (WRF4SG) was installed as an extension of WS-PGRADE portal. Finally, the broken interface between GGUS and HellasGrid RT was restored.

NGI HR. The University Computing centre, SRCE, organized and held the event "e-Infrastructure Day 2013"⁵⁵, an annual gathering of users, developers and operators of e-Infrastructures, as well as representatives of academic institutions, financiers and business representatives. This year's program was dedicated to the topic "Developing science and research infrastructure". As part of the event, six projects that are on an indicative list of Ministry of science, education and sport (MSES) being prepared for EU structural funds was presented. Presenters and representative of the MSES participated in a roundtable discussion on the topic "Developing research infrastructure through the EU Structural Funds".

⁴⁸ <http://succes2013.sciencesconf.org/>

⁴⁹ <https://2013.jres.org>

⁵⁰ https://conf-ng.jres.org/2013/planning.html#article_66

⁵¹ https://conf-ng.jres.org/2013/planning.html#article_23

⁵² <http://www.france-grilles.fr/-Offre-de-service-?lang=en>

⁵³ <http://succes2013.sciencesconf.org/>

⁵⁴ <http://grid.grena.ge>

⁵⁵ <http://www.cro-ngi.hr/dan/2013/>

NGI IBERGRID. NGI IBERGRID user support activities for new communities during the 15th quarter focused on:

- Support IBERGRID users to access IBERCLOUD resources.
- Inclusion of new site CLOUD resources in the IBERCLOUD pool (BIFI).
- Working in close collaboration with EGI Champion in Biophysics and Structural Biology.
- Preparation of a tutorial for ITQB (Technology institute for Chemistry and Biology) researchers.
- Porting of a customized version of Gromacs for the tutorial to be executed from the command line.
- Development of the Py4Grid interface to decrease the grid learning curve. The tool has been registered in AppDB⁵⁶ and in GITHUB⁵⁷.
- Development of a Flyer Available in the main portal of the "Portuguese Centre for Integrated Structural Biology (PCISBIO)"⁵⁸.
- Preparation of a tutorial for the Biophysics community:
 - Focus on running GROMACS application via WeNMR Portal, the DIRAC IBERGRID portal and user client tools.
 - Development of Py4Grid toolkit for the abstraction of command line tool complexity.
- Support to the EGI champions scheme on using the EGI infrastructure and associated portals and gateways.
- Support to the EGI champions scheme on producing dissemination material.
- A user Support survey was sent to regional users in order to better define their activity profile. RT – the national NGI helpdesk – is completely integrated with GGUS. This system is also deployed to provide support to regional user communities. The DIRAC documentation is being revised for IBERGRID, with the objective of spreading its use. Resources were provided to the Distributed Research Infrastructure for Hydro-Meteorology Study (DRIHM) project at some of the Iberian Resource Centres. The Ibergrid support mailing list was made public to allow public consultation from users. Finally, several sites started the decommission procedure; these were supporting regional users. The orphaned user communities were migrated to the IFCA-CSIC infrastructure.

NGI IT. The NGI_IT user support activity in the last quarter focused on:

- A training workshop⁵⁹ addressed to the computational chemistry community was jointly organised by the COMPCHEM VO and the user support team. The workshop was held at the Italian NREN (GARR) in Rome and supported by the National Interuniversity Consortium of Materials Science and Technology that funded the attendance of three participants. The event attracted 22 young researchers coming from 12 different Universities and research institutions including a remote participant from the Spanish National Research Council in Madrid.
- The focus of the workshop was on the porting of specific use cases already known, at least partially, to the participants. The considered use cases were based on three different commonly used computational chemistry applications: VENUS, QUANTUM ESPRESSO and

⁵⁶ <https://appdb.egi.eu/store/software/py4grid>

⁵⁷ <https://github.com/GoncaloBorges/Py4Grid>

⁵⁸ <http://www2.dq.fct.unl.pt/xtal/PCISBIO/Home.html>

http://www2.dq.fct.unl.pt/xtal/PCISBIO/Home_files/EGI_PTNMR_ADuarte_GBorges.pdf

⁵⁹ <https://agenda.italiangrid.it/conferenceProgram.py?confId=867>

CRYSTAL. The training workshop was highly appreciated by the participants which highly rated it (3.5 points out of 4) in a highly participated (70%) final survey;

- The collaboration with the COMPCHEM VO in creating the CMMST VRC and elaborating the related document.
- The creation of high-level web interfaces for already ported applications in collaboration with the developers of the Italian Grid Portal⁶⁰. Applications addressed during the quarter are: FLUKA (HEP), Quantum Espresso (COMPCHEM), CRYSTAL (COMPCHEM and material science community).
- The support to INFN that, as a result of the ELIXIR-ITA activities, is now, together with CINECA, GARR and CRS4, a technological partner for ELIXIR-ITA. Current activities are mainly centred on organizational issues.
- The interaction with the Biocomputing group of the Bologna University to the end of organizing a new production, similar to the run in the past quarters for a BLAST based application. We shall probably apply to the Resource Allocation Call with this application.
- The collaboration with the Institute for the Biomedical Technologies of the National Research Council (CNR-ITB), Milan Dept., in order to collect three use cases: 1) protein surface simulation 2) parameter sweep application for simulation of biochemical system 3) molecular dynamics. The first two were already run on EGI by the community and we are investigating how their computing model can be improved to obtain greater efficiency using a mixed HTC/Cloud approach.
- An attempt to organise an EGI-EMSO meeting.
- Support to the BioComputing Group of the Bologna University, Italy: support was provided to create and run a computing model for a use case based on the BLAST application for sequence alignment, 17 million sequences aligned all-against-all. The production, started in previous PQs, has been completed during PQ14 and the entire output (more than 4 TB) has been retrieved by the community for analysis.
- Establishing contacts and support activities for the DRIHM.eu project (hydro-meteorology): during PQ14 support was provided to run the parallel version of the WRF model to the EGI infrastructure, in particular to some NGI_IT sites supporting MPICH. Porting implied the use of the DRIHM applications software repository. Effort was spent to improve the entire EGI testbed in supporting the community, in particular tests were performed (and GGUS tickets created) in order to fix authentication problems at some testbed sites.
- Support to the COMPCHEM VO: different user support activities have been carried out. In particular application porting and computing model creation for two packages: CRYSTAL (a quantum chemistry ab initio program, designed primarily for calculations on crystals, slabs and polymer sand) and VENUS (it calculates the trajectory for two reactants, atoms or molecules, by integrating the Hamilton equation in Cartesian coordinates).
- Coordination and management activities related to the creation of a virtual research community out of the existing Chemistry, Molecular & Materials Science and Technology oriented EGI VOs - see the section about CMMST Virtual Team.
- Participation to the EGI-XSEDE interoperability project where collaborative use cases activities have been provided in collaboration with the COMPCHEM VO.
- The INFN-SPES experiment at the Legnaro National Laboratories, in Legnaro, Padova - the community requested the porting of the FLUKA MonteCarlo application to the

⁶⁰ <http://portal.italiangrid.it>

NGI_IT resources. Fluka has been ported to the NGI_IT infrastructure and submissions are perfumed through the DIRAC service. A web interface has been created on the IGI portal as frontend for the users.

- Collaboration with the Bologna University, Department of Physics and with the National Research Council, Institute for Microelectronics and Microsystems (CNR-IMM), to create the distributed computing model for two applications: DMRG (self-developed quantum simulation) and QUANTUM_ESPRESSO. The porting for the first application has been completed and a frontend though the IGI-Portal has been created.
- Created a new collaboration with the National Research Council, Institute for Biotechnologies (CNR-ITB) to run an HPC on the CLOUD use case based on the AMBER application (classical dynamics molecular simulator) to be run on parallel virtual machines equipped with high quantity of RAM.
- Another use case provided by the CNR-ITB is based on a mixed cloud/grid computing model based on a molecular surface modelling applications that we are trying to address with the WNODES service.
- KM3NET project: trying to follow the initial contacts that we had during the presentation of the NGI_IT infrastructure during a community collaboration meeting.
- Organization of a Tutorial Workshop on Grid Application Porting for Computational Chemistry and Astronomy and Astrophysics national communities: it will focus on the porting of real life applications and the creation of computing model on the EGI infrastructure. It will be held in Rome, hosted by Consortium GARR for a selected number of research groups
- Participation to CVMFS task force⁶¹ for the setup and testing of the software distribution infrastructure for the following VO: GRIDIT (the Italian national catch all VO), superb and ARGO.

User support activities for new communities during PQ13 focused on the following main areas:

- BioComputing Group of the Bologna University, Italy: Support was provided to create and run a computing model for a use case based on the BLAST application for sequence alignment, 17 million sequences aligned all-against-all. The production requires about 800,000 core hours and is now almost completed (about 3TB the foreseen output data size) - a complex data management model was needed for the input data.
- Establishing contacts and support activities to the DRIHM.eu project community: DRIHM is a project about meteorology and hydrology to study and forecast flooding events coordinated by the CIMA Foundation – Italy. Technical work was conducted to support part of their computing model. For one computing model a cloud approach based on WNoDeS will be proposed. WNoDeS is a virtualisation system that instantiates virtual machines on grid resources via grid jobs. NGI_IT also contributes resources to the EGI-DRIHM testbed and related activities coordinated by EGI to support other layers of the computing model.
- Support to the EMSO ESFRI project: The project is about data handling for a distributed infrastructure of submarine experimental sites. The coordination is in Italy under the responsibility of INGV. After a period of inactivity, some activities were resumed and new actions were defined. The computing model requirements were analysed, mainly for what concerns the data management and the interoperability between grid resources, different DB and storage systems already in use by the community. Some NGI_IT resources were provided to the community through groups created in a catch all national VO (a VO dedicated to EMSO does not exist yet).

⁶¹ https://wiki.egi.eu/wiki/CVMFS_Task_Force

- Support to the COMPCHEM VO: Various user support activities and application porting for several applications were completed.
- A new INFN community - the SPES experiment at the Legnaro National Laboratories, Padova - requested the porting of the FLUKA monte-carlo application to the NGI_IT resources. This is being supported by porting activity and probably by providing a high-level web interface in the IGI Portal for the community.

During PQ14 the on-going community support activities will be completed. A grid school based on real-life applications is being planned. Purpose of the school is the porting to the distributed infrastructure of applications for a selected number of research groups belonging to the computational chemistry and astrophysical disciplines.

NGI_SK. The NGI SK provided the continued support for current and new users in the process of developing, upgrading and running their applications on the HPC cluster and EGI infrastructure. Particularly, our activities were concentrated on porting and running the newest version (6.0.1) of FDS (Fire Dynamics Simulator) application, where the main focus was imposed on running parallel MPI models. We followed constantly the latest technical developments made in EMI middleware concerning this issue. With the view of comparing the efficiency of the FDS running it was ported also on the supercomputer IBM Power 775.

The NGI_SK provided the expertise and continued support for current and new grid users in the process of developing and running their applications on both national HPC clusters and the Grid infrastructure. Particularly, our activities covered the support in porting and running the next applications: FDS (Fire Dynamics Simulator) model, WRF (Weather Research and Forecasting) model version 3.5 including also pre- and post-processing tools, EPANET model (simulator of hydraulic and water quality behaviour within pressurized pipe networks), software programs for speech recognition, and application of genetic algorithm PAGASOS used in nanostructure simulations. The main focus was imposed on running parallel MPI models; we followed constantly the latest technical developments made in EMI middleware concerning this issue.

NGI_TR. The NGI was in contact with the ELIXIR VT team to get recommendations and MoU templates for setting up national bioinformatics initiative. NGI representatives participated to the VC meeting in between the main institutions and groups of the national bioinformatics community to share the NGIs experience about national initiatives.

3.4.1.4 Infrastructure Services

3.4.1.4.1 Messaging

The APEL SSM client that was released as part of UMD 3 is now using the production ActiveMQ broker network. In order to only receive usage records from authorized end-points, a component was deployed on the production message broker network, which is responsible for authenticating the gLite-APEL nodes. This component retrieves the list of authorized nodes from GOCDB.

Cleaning of unused queues on all brokers was performed. Initial plans were prepared for the removal of CERN brokers from the ActiveMQ network in preparation to the new messaging broker infrastructure that will be in place from May 2014. Migration is critical because it has to be performed before the start of the migration of the SAM central services, which will also be provided by a new consortium of partners as of May 2014.

There were no ActiveMQ upgrades in this quarter. As part of message brokers migration process new packages for ActiveMQ version 5.8 for RHEL 6 platform were prepared in January. New packages will be used for deployment of new message broker instances.

3.4.1.4.2 GOCDB

The deployment of the GOCDB 5 was postponed due to the need of keeping site and service endpoint IDs from GOCDB version 4 for interoperability with SAM. Other operational tools performed tests of new GOCDB 5 features.

The new GOCDB version 5 was deployed to production on October 2nd.

GOCDB version 5.1 was released on November 26th 2013. The major features are: new service endpoints filters, highlighted downtimes, and PI changes.

3.4.1.4.3 Operations Portal

The prototype of a new Availability/Reliability dashboard was deployed in the Operations Portal.

The development of the new Availability and Reliability calculations continued and activities concentrated on the provisioning of the features requested by the new mini-project "A new approach to Computing Availability and Reliability Reports".

Operations portal development of the new A/R calculation continued and the focus was shifted to features requested by the new mini-project "A new approach to Computing Availability and Reliability Reports".

3.4.1.4.4 SAM

The SAM Update-22 release was finalized after a pre-release testing phase to which various NGIs contributed in June. Update 22 contains significant changes compared to the previous release⁶². In order to clear out bugs before the staged rollout it was decided to have a testing phase. During the testing phase NGIs deployed additional local SAM instances. The central Nagios server "midmon" responsible of the central EGI monitoring function was extended with the new set of tests monitoring middleware compliance to SHA-2 certificates and a new test monitoring the publishing of User DN information in the accounting records by Resource Centres.

The list of OPERATIONS tests was extended by adding the following new tests:

- Monitoring tests of the central EGI.eu operational tools and instances;
- user DN publishing tests run by midmon;
- SHA-2 compliance tests for service types CREAM-CE, VOMS and WMS run by midmon.
- As a result of the bidding process for hosting EGI core activities that started in July 2013, Service Availability Monitoring central services – currently operated at CERN – are being migrated to a new consortium of service providers. Planning of the migration started in September 2013. In order to achieve a smooth transition, new instances are being prepared in order to have the infrastructure ready by May 2014. Several meetings were held between new partners and CERN team to plan this.
- SAM Update-22 was deployed on the central SAM-GridMon on October 1st, followed by staged rollout. SAM Update-22 was released for production deployment on October the 28th.

⁶² <https://tomtools.cern.ch/confluence/display/SAMDOC/FAQs#FAQs-WhichmetricshavebeenchangedbetweenSAMUpdate20andSAMUpdate22%3F>

- The central monitoring service “midmon” responsible for the central monitoring of services and various capabilities, was extended with a new set of tests to monitor the compliance of middleware to SHA-2 certificates.
- Upgrade of SAM NGI instances to the version Update-22 continued. It was agreed at the OMB in December⁶³ that the final deadline for upgrade of all NGIs is April 1st 2014. As part of the SAM central service migration process test, the SAM GridMon instance was deployed at CNRS at the end of January and a new alias for the central SAM was added: mon.egi.eu.
- The bidding process for hosting EGI core activities was finalized and the proposal from GRNET, CNRS and SRCE consortium for running central SAM, Nagios monitoring instances and message broker network was accepted. In order to achieve smooth transition, it was agreed to start the deployment of new services and migration at the beginning of 2014. Several meetings were organized between the SAM team and the consortium. In addition, the consortium organizes regular weekly meetings starting from January 2014.

3.4.1.4.5 Accounting

The integration of the accounting infrastructure significantly advanced during PQ13. The new data retention policy requiring the retention of personal data for a maximum duration of 18 months was enforced as of the 1st of July. This affected accounting views displaying information aggregated per User DN. No accounting information was lost in this operation, and aggregated accounting information is still available in summarized form.

The adoption of the new SSM 2.0/EMI 3 APEL Client publishing to the production APEL server through messaging started. ARC/JURA and QCG/MAPPER accounting clients have now successfully tested sending records to the production APEL server using SSM 2.0; EDGI – Desktop Grid Accounting also have successfully sent records to the APEL test server using SSM 2.0.

MPI Accounting using the EMI 3 APEL client has been tested and the summaries of MPI accounting have been verified by the MPI VT.

New versions of the APEL client and server packages have been released in response to RT5615 <https://rt.egi.eu/rt/Ticket/Display.html?id=5615> which highlighted insecure file permissions. The Regional APEL Server is being tested by a number of partners.

Summaries of test cloud accounting records, received from 8 of the 10 EGI FedCloud task resource providers, are now sent twice a day to the EGI Accounting Portal using SSM 2.0.

There was a network problem overnight on the 22nd/23rd July, which caused a break in connectivity to the APEL service. The problems were caused by a router closing down the port linking the network segment containing the APEL service in response to an excess of broadcast traffic.

The leadership of accounting development activities was handed by Alison Packer/STFC to Stuart Pullinger/STFC.

The integration of the accounting infrastructure with middleware was progressing this quarter. Accounting team assisted the developers of the JURA product for ARC middleware. Now it is in production at several sites. In parallel the team was involved in assisting the QCG developers to create APEL compatible accounting software for QCG and test it. QCG accounting is now in production in two Resource Centres and more sites will be upgraded by the Polish NGI.

Publishing of accounting data from Globus was successfully tested; this required changes to the code and database schema, as reported below. The UNICORE developers’ team was also supported with accounting documentation. Accounting of Desktop Grids is now in production.

⁶³ <https://indico.egi.eu/indico/conferenceDisplay.py?confId=1857>

The accounting team is supporting Resource Centres in their migrating from EMI2 APEL to EMI3 APEL. There is also work done in assisting two partners with the testing of the Regional APEL Server.

For parallel job accounting, data has been provided to the developers of the Accounting Portal, so that work can now focus on the visualisation part. The submission of data via the message broker network will be tested in QR15.

Development of Cloud Accounting is in progress. In particular, the semantics of the accounting record fields for various cloud stacks are being defined. New sites are now publishing cloud accounting data in preparation to the start of the production activities.

The Accounting Portal team is working on a dump of storage accounting data from the storage accounting database, for the definition of the visualization part. The development of application usage accounting is in progress, the plan is to have a development version for testing in QR15. Work will be needed to create a message format for this data and to identify sites to test the system.

Several network problems at the site hosting the central accounting databases have affected the availability of the accounting service this quarter. No data has been lost but some processing of accounting records has been delayed. More downtimes/outages are expected in QR15 as the networking infrastructure is moved to a more reliable configuration and new hardware.

For CPU Accounting, a new release of ApeL and SSM software with bug fixes was introduced. The team started to work on backend changes to enable combined MPI and non-MPI accounting. The Accounting portal based on static data is working on visualisation. New sites have been added to receive Cloud Accounting data and Storage Accounting data. Application accounting code has been added to repository. It is planned to migrate test services, which use the test message broker network to the production network. In terms of Pay for Use accounting, a test group of sites are now publishing a cost in EUR per HEPSPEC6 hour.

3.4.1.4.6 Availability reporting

Within quarter 15, availability reporting was performed as usual on a monthly basis. Publication of results and re-computation requests regarding A/R results were handled by the SLM unit via GGUS.

3.4.1.4.7 Availability reporting

Availability and Reliability reporting was conducted on a monthly basis as usual. Publication of results and re-computation requests regarding monitoring results and Availability/Reliability figures were handled by the Service Level Management support unit in GGUS.

Availability reports were generated as usual on a monthly basis. Publication of results and re-computation requests regarding Availability and Reliability results were handled by the SLM unit via GGUS.

3.4.1.4.8 Catch all operations services

A migration of the VOMRS service supporting the DTEAM VO is needed in order to support SHA-2 certificate encryption and decommission VOMRS. The testing of this migration from VOMS to the latest EMI-3 version of VOMS-Admin has begun. This activity will be completed in PQ14 assuming the test results will be satisfactory. A similar migration of the VOMRS supporting the OPS VO is being discussed with CERN. The operation of the EGI Catch All CA took place as normal. The infrastructure for Resource Centre certification was timely operated. The midmon dedicated SAM instance – used for monitoring of running middleware versions on sites and other central monitoring activities – underwent maintenance work. Also, several new probes have been regularly added to assist the campaign for unsupported middleware service instances and to migrate to SHA-2.

The migration of the VO membership service for DTEAM (the testing VO) from VOMRS to the latest EMI-3 VOMS was completed in Sep 2013 according to the technical implementation plan defined in September. One minor bug regarding the notification mechanism of VOMS was identified on the production instance. The VOMS development team was notified and the bug has been accepted for fixing.

The EGI catchall CA tested the issuing of SHA-2 end entity certificates successfully and is thus complying with the EUGridPMA official roadmap concerning the preparation of the migration to SHA-2. The site certification technical services were upgraded. In particular, new core Top-BDII and WMS services were setup while older instances were retired. Also the code running on site-certification.egi.eu has been maintained and updated.

Maintenance operations on “midmon” (the dedicated SAM instance used for monitoring of running middleware versions on sites) were applied. Also several new probes were added to enable and assist the campaign for unsupported middleware service instances. Setting up of a new security Nagios server based on SAM-Update-22 has also begun. Currently this is in testing phase.

A few bugs regarding the notifications mechanism on EMI-3 VOMS have been identified. The VOMS development team was notified, bugs have been accepted and rollout of bug fixes has been taking place. A replication issue that affected availability of VOMS service was found around mid-December and it has been resolved. The EGI catchall CA has switched over. A new CA bundle was accepted via the EUGridPMA and included in the 1.55 release. New CA issues SHA-2 end entity certificates and SHA-2 compliant CRLs from January 1st 2014 and henceforth. Old CAs will continue operations (only CRL issuance). New RAs have been established within QR15 (Nigeria and Tanzania). Code base of site-certification.egi.eu has been refactored. Deployment of the new software release on the production service has taken place within QR15. During quarter 15, maintenance operations on the midmon dedicated SAM instance (used for monitoring of running middleware versions on sites) have been applied. Also, several new probes have been added that enable and assist the campaign for unsupported middleware service instances. A new security Nagios box based on SAM-Update-22 has also been deployed. All checks and probes from the old instance have been moved to the new one and after testing the consistency of the results the new one has replaced the old one.

3.4.1.5 Tool Maintenance and Development

The JRA1 work package provides for the continual evolution of the operational tools used by the production infrastructure and is composed of five tasks:

1. TJRA1.1 is the management task
2. TJRA1.2 for the maintenance and the developments for all the tools
3. TJRA1.3 devoted to the development of regionalized tools
4. TJRA1.4 for the extension of the accounting system to encompass new resource types (other than CPU)
5. TJRA1.5 for the extension of the Operations Portal and its harmonization with other portal frameworks

TJRA1.5 completed its activities at the end of PY3, while TJRA1.3 ended in PY2 after one-year extension.

Overall, JRA1 carried out a series of tool roadmap reviews in order to have a whole and up-to-date picture of the operational tools evolution and to identify possible criticality that could hinder the accomplishment of the JRA1 PY4 objectives. A document, containing this overall picture of the

operational tools roadmap, is now available in the document server⁶⁴. The document is updated monthly to always present an up to date picture of the development roadmap.

In October 2013, a meeting was organized to discuss the tool development roadmap after 2014 in Horizon 2020⁶⁵.

3.4.1.5.1 GOCDB

During PY4 the product team focused on the development of the **GOCDB v5**. This was a major release and the product team achieved a complete re-design of the tool's business logic. The GOCDB v5 supports multiple projects and is used to manage the relationships between different entities (Grid, Cloud, etc.) using a well-constrained relational schema. It includes a comprehensive role-based permissions model and can be easily extended for project specific business rules and roles. After the v5, other two minor releases were released, v5.1 and 5.2.

The main features developed for the GOCDB v5 series during PY4 include:

- **Support for different RDMBS:** GOCDB v5 is now based on a well established/de facto Object Relational Mapping library (Doctrine ORM). Out of the box, this library supports a number of different RDBM systems. Support for Oracle and MySQL is already available and other DBs could be supported with few changes. This development replaces the previous proprietary ORM package (PROM; pseudo object relational model).
- **Extensions to the scoping mechanism:** this feature allows different operational entities (Sites, Services, Service Groups) to be tagged by one or more scope-tags. The scope extensions allow the creation of flexible resource categories akin to a tag-cloud. Scope tags can be created to address any grouping requirement such as different projects and infrastructures. Importantly, this allows resources and their data to be defined only once, which is essential to maintain the integrity of data across different groupings.
- **Admin Interface:** developed to simplify and speed-up daily operational tasks for GOCDB administrators. This feature was developed in the context of the mini project *TS4.11 - GOCDB Scoping Extensions and Management Interface*.
- **Extensibility mechanism:** allows users to associate custom key-value pairs to Sites, Services, and Service Groups. Programmatic interface (PI) support is provided with a newly added 'extensions' parameter. This allows queries to perform fine-grained resource filtering based on custom properties. This new feature is crucial to implement the Pay-for-Use proof of concept [R 14] and can be exploited to satisfy other user requirements. This extension mechanism is based upon the primary GLUE2 extension mechanism.
- **Support for multiple projects:** a single GOCDB instance can now host more projects.
- The **OGF GLUE2 XML rendering specification** was published in May 2013 and was led by the GOCDB team. Following publication, the team has started on the development of new PI methods that are scheduled for release in 2014.
- A general **improvement of the GOCDB failover mechanisms** was achieved.
- The GOCDB team continued to provide **technical and operational support to EUDAT** to manage their GOCDB instance. The EUDAT GOCDB instance has been updated to the latest GOCDB release.
- GOCDB implements **regionalisation** through scoping and the implementation of scoped views of the data.

⁶⁴ <https://documents.egi.eu/document/1997>

⁶⁵ <https://indico.egi.eu/indico/conferenceDisplay.py?confId=1890>

3.4.1.5.2 Operations Portal

The development of the Operations Portal during the entire PY4 focused on the following activities:

- **Refactoring of the whole portal:** this activity has been done to homogenize and enhance the look and feel of the interfaces by exploiting the capabilities of the most recent technologies. Due to these recent developments, an important improvement of the portal efficiency, reactivity and visibility has been achieved. Moreover, different new features have been developed allowing a more transparent and easy access to the information (e.g. filters on the long table, possibility to export information as json/csv files, auto completion on large list), as well as the introduction of new technology supports such as mobile smartphones and tablets. The new version of the dashboard is completely flexible and new sources of information can be easily added. The new Operations Portal v3.0 was deployed in production in April 2014.
- **Migration to Lavoisier 2.0:** in parallel with the refactoring of the portal, the Lavoisier framework has been upgraded to a more flexible and powerful new version.
- **Enhancement of the VO security contact list functionality:** new features to make easier the management of the security contacts.
- **Introduction of the VO users listing functionality:** new features to get the list of all the EGI users.
- **Regional views:** regionalization is supported by providing central customized views for each Operations Centre of the Operations Portal. Different views in the portal were created depending on the role of the users registered into GOC DB and associated to their certificates, so that access to information is restricted to the authorized operators only.

3.4.1.5.3 Service Availability Monitor (SAM)

The main activity streamlines on which the development focused during PY4 are:

- **Integration of Nagios probes developed through the EMI project in SAM** as a part of SAM Update-2: this activity involved several complex coordination tasks, such as the establishment of the EMI/SAM testbed to test newly developed probes, establishment and contribution to the SAM probes WG which aimed at analysing the impact of the changes to EGI operations, as well as SAM testing campaign where several regions volunteered to participate and help validate the final release.
- **Major repackaging of the SAM distribution and implementation of several MyEGI enhancements** as a part of SAM Update-22.
- **Support migration of SAM central services:** as SAM services operated by CERN was discontinued as of 01 May (CERN did not participate to the bidding for providing the services after PY4), the support to migrate the SAM central services to a new consortium of partners (CNRS, SRCE and GRNET) has been a main task in PY4. This involved developing a detailed time plan, writing technical documentation necessary for the migration of SAM central services, providing technical support to the consortium as well as organizing SAM migration meetings and workshops to follow up on the transition process and make sure it is implemented in time and within its scope.
- Participation to the validation of the *TS44.10 - A new approach to Computing A/R reports* mini-project results.
- SAM fully supports the EGI regionalisation plan from the end of PY1 and **all the NGIs are running their local SAM regional instance**. All NGI instances are configured to use ATP as topology source. All DoW SAM regionalisation requirements for TJRA1.3 were already addressed by the end of PY3.

3.4.1.5.4 EGI Helpdesk (GGUS)

There have been several important enhancements during the fourth year:

- The **new GGUS authentication system based on AAI infrastructure and Shibboleth technology** is now completed and was released in April 2014. This new feature simplifies the usage of GGUS, indeed users don't need any more an X.509 certificate to access GGUS. They can login on GGUS with their EGI SSO account.
- **Introduction of a new GGUS Report Generator functionality**: the development of the new report generator has been completed in PY4.
- **Implementation of high availability mechanisms for GGUS components** (switching between stacks): the whole GGUS infrastructure was moved to two independent stacks of virtual machines in different locations and the manual switching mechanisms was implemented.
- **Restructure VOMS GGUS synchronization**: a complete refactoring of the VOMS synchronization for user authentication has been accomplished to improve its reliability.
- **New interfaces to MAPPER**: a dedicated xGUS instance was set up.
- Several **minor achievements** have been completed such as the improvement of the interface to the CERN Service Now ticketing system, the change on the ticket workflow, the introduction of the quality of service levels and the upgrade of the interface towards GOCDB to support the new v5.
- At the end of PY4 6 NGIs are using the xGUS helpdesk (NGI_AEGIS, NGI_AFRICA, NGI_CH, NGI_CHINA, NGI_DE and NGI_SI), the solution for the regionalisation provided by GGUS.

3.4.1.6 Accounting Repository

The most substantial result obtained during the third year of the project has been the adoption of the **new SSM (Secure Stomp Messenger) v2** protocol by the APEL Accounting Repository. Furthermore PY4 the APEL team supported EGI sites to upgrade their APEL client to the new EMI-3 client, completely rewritten, which uses SSM v2.

Moreover, the APEL team has worked with sites and developers running alternative accounting clients to use SSM to send their records to the Accounting Repository. There are now sites in production sending accounting data from ARC, QCG and EDGI Desktop Grid. Globus and Unicore have successfully tested but have not started publishing accounting data in production.

The **Regional Accounting Repository** has been released in May 2013. It was successfully tested by the South-African (NGI-ZA) and Greek NGI (NGI-GRNET).

Regarding the accounting of different type of resources the main activity performed during the fourth year are listed below:

- **Cloud**: During PY4 the SSM 2.0 protocol has been adopted and specific work has been done in collaboration with the EGI Federated Cloud Task Force, to compare and make consistent, in term of format and type of data, the cloud accounting records collected from the resource providers employing different cloud technologies (OpenStack, OpenNebula, Okeanos, etc.).
- **Parallel Jobs**: The parallel jobs data has been added to the CAR (Compute Accounting Record, largely based on the OGF UR [R 68]) and, after the release of EMI-3 that includes the new EMI-APEL client (April 2013), such data can be stored in the Accounting Repository. The most relevant differences regarding the collected data for parallel jobs with respect to

normal sequential jobs are the number of cores and the number of worker nodes used by the applications. APEL EMI-3 parser supports LSF, PBS, SLURM and SGE batch systems.

- **Storage Accounting:** At the end of PY3, the JRA1 team integrated new storage records in the Accounting Repository coming from dCache and DPM storage systems, and sent via SSM. DPM and dCache introduced the StAR support from EMI-3 release. An analysis was done for StoRM to add the support for storage accounting by exploiting its BDII information but the sensors have not been developed yet. In PY4, APEL team tested and refined the solution with data retrieved from over 50 sites. Currently, they started to integrate production sites and real data are now collected in the repository. A specific activity is running to ensure that storage accounting data received from the different storage clients is comparable across sites. Once this is established, work will continue to define the summaries of storage accounting data.
- **Application Accounting:** An evolution of the prototype developed in PY3 was showed during the last EGI Community Forum in Helsinki.

3.4.1.7 Accounting Portal

During PY4 the Accounting Portal team continued **to improve the product with code refactoring and several enhancements and optimizations mostly driven by user requirements**. The most important improvements are the following:

- Improved UserDN country classification patterns
- Support for new RFC 2253 UserDNs
- UserDN NGI attribution
- Support for local jobs. There are three options, selectable on most views:
 - Only Grid jobs (default)
 - Grid and local jobs (In case there is a corresponding global VO, both are aggregated)
 - Only local jobs
- Moved InterNGI views to production: these views show how the users of each NGI use the resources of the other NGIs. They are very useful to highlight the collaborations between NGIs and the benefit that each NGI obtain thanks to his participation to the EGI.eu collaboration.
- New code for UserDN SAM probe that detects if sites have published CPU/UserDN records on the last 7 days and honours some NGI non publishing policy
- Added support to SSM v2
- The **Regional Accounting Portal** has been released in May 2013. It was successfully tested by the Greek NGI.
- **Prototype views for cloud, parallel jobs and storage accounting** were developed.

The Accounting Portal team is participating to the Pay-for-Use pilot group⁶⁶ to identify how the billing task may be implemented for accounting data.

3.4.1.8 Metrics Portal

The main Metrics Portal developments performed during PY4 were:

- Access control improvements

⁶⁶ https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC:Home

- New quarterly views and Excel report
- New NGI entity for the EGI.eu organization for management purposes
- Improved links and navigation in the metrics portal
- GGUS metrics improvement
- Fixes and optimizations

The Metrics Portal has been used for the last three years to gather metrics from the project tasks. It has been updated according to changes in the structure and scope of the project and its tasks and activities. In PY4 the concept of quarter dependent activities was introduced to manage completed activities (e.g. SA3). New metrics were added for NA2, SA1 and SA2 to reflect changes in the activity and project metrics.

3.4.2 Software Provisioning

The main challenge faced by software provisioning during the year has been the end of the European funded middleware projects. In the previous three years EMI and IGE supported most of the products released in the UMD repositories, with Memorandum of Understanding in place to agree on the support levels provided for the software releases targeting UMD. After April 2013, SA2 contacted the individual product teams to assess their support calendar, and their will to continue the active support of their products for the future, e.g. accepting requirements from EGI. After one year, the evaluation of the middleware activities for UMD is positive: there have been no critical issues blocked by lack of support, the communications with the developers continued productively within the UMD Release Team meetings and mailing list. EGI has still in place an MoU for the support of the QCG middleware.

During the reported period SA2 continued to support two major releases of the Unified Middleware Distribution (UMD): UMD-2 and UMD-3. The whole EGI e-infrastructure was updated to UMD-2 and no issues were found regarding the decommissioning of UMD-1.

Starting with 1st of May 2013 we faced the end of EMI and IGE projects that were the main EGI's technology providers. Independent PTs, part of EMI, continued to contribute to the UMD release, providing improved versions of their components, as well as the European Globus Community Forum that supported the IGE products. In this new ecosystem, the release procedures of the product teams are very diverse, including target repositories such as the EMI ones, the operating system community ones and the product teams own repositories. UMD framework was adapted to be as flexible as possible, including the case when a product update is spread across different repositories.

The UMD Release Team meeting continued regularly, twice a month discussing the release schedule of UMD and the product teams plans for new releases.

The Federated Clouds task force expanded the number of use cases and the exploration of the technical solutions to be deployed in the cloud infrastructure including an automatic virtual images distribution and consistent authentication and authorization frameworks. The integration with the EGI core platform is almost completed and several cloud resource centres completed the certification procedure to become production sites of EGI.

3.4.2.1 Quality Assurance: Definition of the UMD Quality Criteria

During PY4 SA2.2 produced two versions of the Quality criteria, the 6th⁶⁷ and the 7th⁶⁸ releases were produced respectively in the 2nd and 4th quarter of PY4. The 6th release of the documents includes a

⁶⁷ Release notes [https://wiki.egi.eu/wiki/EGI_Quality_Criteria_Release_6]

⁶⁸ Release notes [https://wiki.egi.eu/wiki/EGI_Quality_Criteria_Release_7]

complete review of all the criteria focusing on security and interoperability criteria that reduced the verification effort and allowed external teams to take care of verification of products. Update 7 consists on updates of the tests proposed to the verifiers and provisioning of configuration templates for the virtual machines for the use of the verifiers. The acceptance criteria have been reduced to a set of core criteria, including requirements for security, information publishing, accounting monitoring and support. The documents include also a wiki with the list of the test that verifiers are supposed to run to test the products versus different criteria, as well as verification templates and verification guidelines.

With update 7 verifiers can use configuration templates for the virtual machines to be used during the verification process. SA2.2 also developed a tool to allow software managers to easily introduce products from new technology providers. The tool and sample descriptions of the products are available at the EGI quality criteria GitHub project⁶⁹.

3.4.2.2 Quality Control: Verification of Conformance Criteria

During the last year a series of improvement were applied to the tools, procedures and testbed used in this activity:

- The SA2.3 team created the VMpublisher (31) script to distribute the new verified VM images through EGI's Federated Cloud taskforce members or external users. This new tool is based on the technology used in the Federated cloud. Verifiers now can generate - after successful verification - a VM image that contains a deployable instance of the new UMD software, ready to be used by EGI sites.
- The network testbed configuration was changed to support IPv6. The new VMs instantiated during verification process have IPv6 public addresses by default. The new configuration allows to EGI verifiers to detect issues related with TP services or if the UMD middleware is not IPv6 compliant.
- ReleaseCandidate-tester, the tool used by SA2.3 team to detect repository dependencies issues before an UMD release, was also modified. The new script was rewritten in python and now is available from GitHub⁷⁰. It is now included into each VM after each instantiation.
- A new set of configuration files for the most important Technology Provider products were provided. These configuration templates are now available from GitHub⁷¹ and can be used by SA2 verifiers to configure TP products in an automated way. These templates are also available on the VM instantiated within SA2 testbed.

From all products verified during this period, more than 257, only two products, the SL6 versions of GridWay 5.14.0 and the SL5 version of GridSafe 1.3.1 for UMD-3 were rejected in QR13. The issues found with GridWay were solved and an updated version, 5.14.1, passed the verification in QR15.

3.4.2.3 Provision of a Software Repository and support tools

During PY4 SA2, and specifically SA2.4, continued to provide a reliable and flexible infrastructure for the support of the software provisioning workflow. The infrastructure, which includes software repositories and other support tools, has been extended to add a new major release UMD-3, released during May 2013.

The process to download the packages from external repositories has been further simplified to be as

⁶⁹ <https://github.com/egi-qc/tools>

⁷⁰ https://github.com/alvarosimon/RC_tester

⁷¹ <https://github.com/egi-qc/configuration-templates>

much generic as possible. Packages can now be downloaded from every source, being it a web server or a yum/apt repository, reducing to a very minimum the pre-requisites for the Product Teams who want to contribute to UMD.

This high flexibility cost part of the automatisms used in the process, which increased the chances of errors in importing a new product release. This has been considered acceptable taking into account that the additional overhead is not substantial and that the number of products releases has been reducing after the end of the European funded middleware projects.

UMD Releases

During PY4, TSA2.4 continued to support SA2 software provisioning activities as usual. The following releases were published:

UMD-2

Release	Date	Type	Content
UMD 2.5.0	24/05/2013	Minor release	EMI products updated: <ul style="list-style-type: none"> • CREAM Torque 2.0.1 • WMS 3.4.1 • Blah 1.18.3 • Torque server config 1.0.1-1 • LB 3.2.10 IGE updates: <ul style="list-style-type: none"> • GridFTP 5.2.3 • Gsisshterm 1.3.4 • GRAM5
UMD 2.6.0	12/06/2013	Minor release	EMI products updated: <ul style="list-style-type: none"> • UNICORE/X6 5.1.0 • UNICORE TSI6 5.1.0 • EMI-WN 2.0.1 • GFAL/lcg_util 1.15.0 • gLExec-WN 1.1.2 • EMI-UI 2.0.2-1

UMD-3

Release	Date	Type	Content
UMD 3.0.0	14/05/2013	Major release	EMI products: <ul style="list-style-type: none"> • Argus • APEL parsers • Bdii-site • Bdii-top • Bdii-core • CANI • Cream • Cream-torque • DPM • EMI-UI • Gfal-lcg_util • Glexec • glite-yaim-core • Gridsite • Gsoap-gss

			<ul style="list-style-type: none"> • LB • Lcg-info-clients • LFC • Torque Server • TORQUE WN • Voms • WMS • WN
UMD 3.1.0	26/06/2013	Minor release	<p>EMI products, first release in UMD-3:</p> <ul style="list-style-type: none"> • ARC InfoSys • ARC core • ARC CE • ARC Client • ARC gridftp server • CREAM LSF • UNICORE Gateway6 • UNICORE XUADB • UNICORE Registry6 • UNICORE Client6 • UNICORE TS16 • gLite MPI • StoRM • GLite Cluster <p>EMI products, updates:</p> <ul style="list-style-type: none"> • WMS • BDII core • DPM • LB
UMD 3.1.1	01/07/2013	Emergency release	<p>EMI products, updates:</p> <ul style="list-style-type: none"> • EMI-UI 3.0.1 • CANL 2.1.1 • GFAL/lcg_util 1.15.0
UMD 3.2.0	11/10/2013	Minor release	<p>The release contains updates for the following components:</p> <ul style="list-style-type: none"> • APEL • Argus • BDII Site • BDII Top • BDII core • BLAH • Cream-GE • Cream • EMI UI • Emir • Glexec • GridFTP • Gridsite • Gridway • LB • Unicore-X6

			<ul style="list-style-type: none"> • Yaim-core • WMS <p>The release contains the following new components:</p> <ul style="list-style-type: none"> • dCacheQCG ntf • QCG comp • QCG accounting • QCG broker client • QCG broker
UMD 3.2.1	12/09/2013	Revision release	<p>The release contains updates for the following components:</p> <ul style="list-style-type: none"> • StoRM
UMD 3.3.0	12 December 2013	Minor update	<p>This release provides updates for the following packages:</p> <ul style="list-style-type: none"> • Arc-ce • Blah • Bdii-core • Bdii-top • CanL • cream-torque • Cream-CE • ProxyRenewal • Dpm • Gridway • uncore-hila • uncore-uvo
UMD 3.4.0	29 January 2014	Minor update	<p>This releases includes updates for the following products:</p> <ul style="list-style-type: none"> • Arc-CE • BDII-Top • Cream-Slurm • Cream-Torque • GridSite • QCG-computing • QCG-notification • WMS

IT support

IT support team operates many EGI.eu services, such as the website, Indico, wiki, document DB, and more. The work during PY4 focused mainly on routine support of the tools and the users. The main reported activities are:

- Maintenance of the EGI web site.
- Updated the look and feel of the EGI web site.
- Monthly updates of inspire-members list from PPT.
- Implemented deletion of user for EGI SSO.
- Ongoing backoffice administration, maintenance and user support.

Repository Front-end

The repository front-end, which is the set of web tools used by the users to retrieve information about

the UMD releases and products, has been stable during the year.

The main reported activities are:

- Admin support for the web front end, this includes upgrades for the WordPress content management system, and minor changes in the content of the web pages.
- Minor bug fixes and enhancements for the RSS feed plugin.
- Added Support for UMD-3 in the web pages and web tools.

Repository Back-end

The repository backend is the business logic layer that handles the release of new software in UMD, from the import of new packages to the build of an UMD release. The process has been further generalised during PY4, this required only small changes in the back-end, since the extensions performed during PY3 sufficed the new requirements. The main activities on the back-end during the year have been the extension for the support of the new major release UMD-3 and regular maintenance and operation of the system.

3.4.2.4 Federated Private Clouds

During PY4 the activities in the federation of cloud resources made big progresses, driven by the task force that continued to meet regularly on a weekly base, including many contributors both within and outside the EGI community. The main achievements of the Federated Cloud during PY4 have been the following:

- New resource providers have approached to join the federated cloud pre-production infrastructure. Between them there is also a commercial SME cloud provider, 100%IT. 100%IT is the first commercial provider ever to start a federation process with the EGI resources. The integration activity is monitored in the group wiki pages⁷², which are used also as communication channel to disseminate the progresses of the task force.
- Testing the operational procedures used for the EGI production services with the cloud middleware, in collaboration with the EGI Operations team. The outcome of this test and evaluation activities has been a further development of the EGI core procedure documents. EGI cloud providers have been extensively testing a modified certification procedure⁷³, slightly modified to include specific steps for cloud resources, and during Q16 several resource centres completed the procedure becoming fully eligible of being part of the EGI production infrastructure. The commercial provider, 100%IT, was the first beta-tester of the certification procedure, and the first cloud provider eligible for the production status.
- Development, in collaboration with EGI AppDB team, of an automated Virtual Machines Images (VMI) distribution mechanism to enable a uniform work environment for the users, who can now register their VMI in AppDB and have them distributed among the FedCloud resource providers.
- Contributed to the evolution of the cloud standards:
 - For the OGF OCCI Standard, produced a request for contextualization extension currently under approval.
 - Another important standards extension has been the Usage Record v2, to store accounting data for cloud services.

⁷² <https://wiki.egi.eu/wiki/Fedcloud-tf:ResourceProviders>

⁷³ <https://wiki.egi.eu/wiki/PROC18>

⁸ <https://wiki.egi.eu/wiki/Fedcloud-tf:Main>

- Started the work towards a consistent AuthN and AuthZ infrastructure, leveraging on the existing EGI AAI, to be used for the different cloud stacks, in order to allow uniform authentication of the users in the federated cloud providers. The target mechanism is the OpenStack Keystone model, and the implementations are already deployed in the FedCloud testbed and successfully tested with the EGI X509 authentication mechanism.
- The support for new user communities continued deploying new Proof of Concepts (PoC) in the testbed. Two new PoC have been deployed during PY4, the e-Science Gateway framework, and a use cases from the European Space Agency.

The Federated Cloud task force activities and progresses were presented in many events during the year, for example in all the main EGI forums and in the Cloudscape conference.

More details on the Federated Cloud activities, the use cases and the proof of concept are available at Federated Cloud Wiki space⁸.

3.4.3 Community Engagement

During PY4, EGI's community engagement activities continued across technical and non-technical areas, both within and external to the EGI Community. In addition, the Strategy and Policy Team led the preparation on a Scientific Review Process to support Excellent Science in EGI that was endorsed by the EGI Council as well as the adoption of a new Scientific Discipline classification within EGI's tools.

The Strategy and Policy team has focus its efforts in solidifying collaboration opportunities with Helix Nebula leading to technical development achieves and with OpenAIRE to ensure EGI publications are promoted. The 2nd edition of the EGI Compendium⁷⁴ was finalised and published during the quarter as well as a variety of EGI and external publications around topics such as service management and achievements in ongoing collaborations.

The Technical Outreach to New Communities task made good progress on a number of fronts. Two of the Virtual Team projects finished: **Technology study for the Cherenkov Telescope Array** (focusing on gateway requirements and Single Sign On)⁷⁵ and Collaboration between EGI/NGIs and ESFRI project **ELIXIR**⁷⁶ (aiming at defining a map of collaborations between ELIXIR Head Nodes and NGIs). The final reports of these VTs will be published in PQ15. These support activities are complemented by support actions to the LifeWatch and EISCAT-3D ESFRIs that were run in the framework of the EGI Federated Cloud. A large number of user communities and projects are participating to the definition of Proof of Concepts for the deployment of the EGI Federated Cloud, including: ATLAS, BioVeL, BSIM, CLARIN, DIRAC, ENVRI, ESA, GEO, Peachnote, SCI-BUS, VERCE, We-NMR⁷⁷.

During PY4 a new MoU was also signed with the APARSEN project to bring in competences within the EGI community in the area of data curation and preservation. This MoU is strategic to expand the EGI service portfolio in the area of services needed to manage the full life cycle of data in the medium term.

⁷⁴ <http://www.egi.eu/news-and-media/publications/#compendium>

⁷⁵ https://wiki.egi.eu/wiki/VT_Technology_study_for_CTA

⁷⁶ https://wiki.egi.eu/wiki/VT_ELIXIR

⁷⁷ <http://go.egi.eu/poc>

3.4.3.1 Champions

The nine EGI Champions remain active attending events in their own communities supported by EGI.eu. The strengthening of the EGI Champions has continued through a series of webinars providing information on EGI and its activities and focused media and presentation training.

The scheme has now been in operation for over a year and the Champions from the initial two cadres are growing in confidence and having an increasing impact throughout the community. They are first and foremost specialists in specific scientific research domains and it is here where they are proactively promoting the benefits of the EGI at various international conferences. With comparatively modest financial support, they are able to spread the EGI message to the very heart of research communities and make contact with scientists that can positively influence others in the use of our infrastructure. The following table summarises their participation at major events and demonstrates the areas where they have broadcast not just their research findings but also the important role that EGI had in their work – though at this stage there is no way of measuring the direct impact of this means of promotion, it is felt that such ‘ambassadorial’ promotions present powerful and compelling cases in support of the EGI cause.

Useful contacts have been established with the XSEDE program in the USA, which has a campus champions programme and is now exploring how to have expand these activities into domain specific outreach.

Champion	Event	Venue	Link	Date	Days	Impact
Ashiq Anjum	Utility and Cloud Computing	Dresden	http://ucc2013.inf.tu-dresden.de/	09/12/13	4	Over 100 attendees, with a session chaired by champion, some contacts made
Ashiq Anjum	5th IEEE International Conference on Cloud Computing and Science	Bristol	http://2013.cloudcom.org/	02/12/13	4	
Silvio Pardi	International Symposium on Computing in Informatics and Mathematics	Tirana	http://iscim2013.epok.a.edu.al/	26/09/13	2	
Stella Arnaouti	35th IAHR World Congress	Chengdu, China	http://www.iahr2013.org/index.htm	09/09/13	4	I wasn't there so I have no conference highlights to say. The only important thing. I can say is that EGI was promoted through my presentation to a great number of

						delegates.
Stella Arnaouti	NERA Summer Academy 2013	Lohninghof, Zell am See, Austria	http://www.nera-eu.org/	01/09/13	3	Essential part of presentation explained that results were EGI dependent. Audience understood and post presentation sought further info. Contact list to be used for follow up.
Afonso Duarte	EBSA2013 European Biophysics Congress	Lisbon	www.ebsa2013.org	13/07/13	5	Audience of 860; Close contact established with 2 Principal Investigators and 15 young researchers. Good exposure to the wider community
Joeri van Leeuwen	Radio Transients with SKA PATHfinders and Precursors	Skukuza, South Africa	https://sites.google.com/site/jointtransients/	08/07/13	4	60 participants; Very good personal contact with research deciders - may reap benefits
Tomáš Kulhánek	EMBC 2013	Osaka, Japan	http://embc2013.embs.org/index.html	03/06/13	5	Audience of 3000 that represents potential for future leads
Eleni Katragkou	European Geosciences Union (EGU) General Assembly 2014	Vienna	http://www.egu2014.eu/	27/04/14	2	Audience was over 11,000 extra value having EGI stand at event, contacts made and in follow up

Additionally, the Champions are playing an increasingly active part at the EGI Forums the EGI Champions will be ran sessions at the Technical and Community Forums within PY4.

Some valuable team building work with the Champions was initiated in June when a training webinar was conducted with the support of professional Media Communications specialists at ‘Matin Ince Communications Ltd’; the aim of the training was to twofold in that it gelled the team of Champions into a group of like-minded ambassadors of EGI and secondly gave them the chance to develop corporate ideas on the purpose of EGI and their role in the organisation. A follow-up training session will be conducted during the EGITF.

While the Champions’ ‘Event Feedback Reports’ provide a clear sense that the scheme has a very positive impact on the community, there is an obvious need to develop metrics that provide a more

quantifiable demonstration of the return on investment. This is need for a measure of success is mirrored in other parallel schemes such in the US's XSEDE programme and the UK's Software Sustainability Institute, both of which recognise the benefits yet have to date not established formal metrics.

3.4.3.2 Marketing & Communication

During PY4 the Communications Team focussed on improving engagement and dialogue with research user communities and contributed to the creation of the EGI Engagement Strategy⁷⁸ and is an active part of the on going implementation of this.

3.4.3.2.1 External Events

The communications team attended these research specific events:

- European Biophysics Congress in Lisbon
- ISMB/ECCB 2013 in Berlin
- European Geological Union's General Assembly in Vienna.

EGI also attended international events aimed at policy makers and technology providers:

- International Supercomputing Conference in Leipzig
- SC'13⁷⁹ in Denver
- ICT2013⁸⁰ in Vilnius
- CloudWATCH⁸¹ kick-off meeting
- The 5th European Innovation Summit⁸²

3.4.3.2.2 Publications

During PY4 the Communications Team has been involved in editing and creating many new publications for EGI including the EGI Compendium and working on the EGI Solutions white papers. The brochure portfolio was also improved and expanded in PY4:

- "Applications for Biophysics" brochure⁸³
- The 2012/2013 Annual Report⁸⁴
- The case for EGI "Why EGI?"⁸⁵
- The Solutions white papers and brochures⁸⁶
- A case studies brochure⁸⁷
- Book of Abstracts for the 2014 Community Forum⁸⁸

⁷⁸ <http://documents.egi.eu/document/2079>

⁷⁹ <http://sc13.supercomputing.org/>

⁸⁰ <http://ec.europa.eu/digital-agenda/en/ict-2013>

⁸¹ <http://www.cloudwatchhub.eu/>

⁸² <http://www.knowledge4innovation.eu/5th-european-innovation-summit-2013>

⁸³ http://www.egi.eu/news-and-media/EGI_Biophysics_web.pdf

⁸⁴ http://www.egi.eu/news-and-media/EGI_AnnualReport2011.pdf

⁸⁵ <http://go.egi.eu/why>

⁸⁶ <http://www.egi.eu/solutions/>

⁸⁷ http://www.egi.eu/export/sites/egi/news-and-media/publications/Case_studies_v2.pdf

- 4 Issues of the Inspired newsletter⁸⁹

These were alongside other “ad-hoc” materials like posters for specific events aimed at particular communities.

3.4.3.2.3 Website, social media and external media

During PY4 the EGI website had:

- 50 News items
- 7 Case Studies
- 39 Blogs

The Communications Team also worked with the Policy & Strategy Team to update the Services area⁹⁰ of the website. This makes it easier for a visitor to determine the services offered to them as a researcher, resource provider or EGI.eu participant.

The Communications team has been working on improving the organisations’ activity of various social media platforms⁹¹. This has included:

- Implementing a posting and interaction schedule
- Moving to using Hootsuite⁹² to help manage this
- Working with the user support technical team to edit and upload the webinar programme to YouTube⁹³
- Adding the EGI Solutions to LinkedIn⁹⁴

Through PY4 EGI has continued to gain mentions in external media including international Science Grid This Week⁹⁵, The Financial Times⁹⁶, euronews⁹⁷, GÉANT’s CONNECT, Forbes⁹⁸, Pan European networks’ Science and Technology magazine and The Register⁹⁹.

3.4.3.2.4 EGI Technical Forum 2013

EGI’s fourth Technical Forum was held in Madrid, Spain between 16 and 20 September 2013. It was organised in conjunction with IBERGRID, a partnership between the Spanish and Portuguese National Grid Initiatives that represents the Iberian Peninsula in EGI. The meeting was well attended with 471 participants and 238 contributions. It was co-located with IBERGRID 2013, Cloud PlugFest and three others. The team worked with two PhD students, funded by EGI to attend the TF 2013, to have them blog from the event¹⁰⁰. A more in-depth report can be found in MS243¹⁰¹.

⁸⁸ http://www.egi.eu/export/sites/egi/news-and-media/publications/CF2014_BoA.pdf

⁸⁹ <http://www.egi.eu/news-and-media/newsletters/>

⁹⁰ <http://www.egi.eu/services/>

⁹¹ <http://go.egi.eu/smc>

⁹² <http://hootsuite.com/>

⁹³ <http://www.youtube.com/playlist?list=PL8MrRo-3u8hsY741TtKylvh-rYUPT9vcp>

⁹⁴ http://www.linkedin.com/company/stichting-european-grid-initiative/products?trk=top_nav_products

⁹⁵ <http://www.isgtw.org/>

⁹⁶ <http://www.ft.com/intl/cms/s/2/5a8ff636-36be-11e3-8ae3-00144feab7de.html>

⁹⁷ <http://www.euronews.com/2013/09/23/visions-from-the-heart/>

⁹⁸ <http://onforb.es/1uADHQM>

⁹⁹ http://www.theregister.co.uk/2014/05/22/egi_launches_federated_cloud/

¹⁰⁰ <http://www.egi.eu/blog/tags/tf13>

¹⁰¹ <https://documents.egi.eu/document/1981>



3.4.3.2.5 EGI Community Forum 2014

The final Community Forum of the EGI-InSPIRE project was held in Helsinki, Finland, between 19-23 May 2014 and was co-organised with University of Helsinki and CSC - IT Center for Science Ltd. The event showcased the services, technologies and tools available to new and existing scientific communities. The meeting attracted 373 attendees and featured 270 contributions, which for the first time, included Networking session, Hackathons and Lightning Talks. The meeting was also co-located with a Research Data Alliance Europe (RDA), EUDAT, OpenAIRE & ATT meeting, the NorduGrid Conference, Nordic e-Infrastructure Collaboration (NeIC), and the European Globus Community Forum. A more in-depth report can be found in MS248¹⁰².

3.4.3.3 Strategic Planning and Policy Support

Theme: Demonstrating Excellent Science

During PY4, the activities focused on continuing the collaboration with OpenAIRE to expand the capability of their open access infrastructure to enable the possibility to associate EGI concepts to publications. In April 2014, the OpenAIRE team released a new beta of their service (beta.openaire.eu) with the features asked by EGI. In this service, it is possible to associate a publication to EGI and add the following concepts: EGI scientific discipline, country, NGI and virtual organisation. The SPT also worked on identifying mining rules so to discover acknowledgment statements referring directly or indirectly to EGI so to create the related associations.

Concerning the scientific review of resource requests, the work on the Term of Reference for the board was completed (<https://documents.egi.eu/document/1472>), but this body was never established because of the lack of incentives from NGIs in contributing significant resources to a shared central pool and due to a planned reduction of effort in the strategy and policy team to support this activity. Nevertheless, the technical part of the central allocation tool was developed and launched.

The Scientific Discipline Classification VT led by the SPT completed the work and during PY4 a number of EGI tools have adopted the new classification, thus harmonising and enriching the way activities can be mapped on a richer set of scientific disciplines (see AppDB, GOCDB, training marketplace, accounting portal and OpenAIRE).

Theme: Service/Solution Portfolio

After the successful rollout of the EGI service portfolio covering the services coordinated by EGI.eu and the EGI solutions portfolio, PY4 focused on expanding the work towards elements of the NGIs and resource centres. Six new services have been modelled and added to the service portfolio (grid compute, grid storage, cloud compute, cloud storage, file transfer, file metadata catalogue). The solutions have been reduced from 5 to 4 (two have been merged) and white papers have been developed for each of them (<http://www.egi.eu/solutions>) describing target customers and needs, proposed solution, value proposition, access mechanisms and success stories.

Theme: Federated IT Service Management

The SPT has developed a top-level service management policy following the requirements of the FitSM standard¹⁰³ that has been approved by EGI.eu.

¹⁰² <https://documents.egi.eu/document/2242>

¹⁰³ <http://www.fitsm.eu>



Theme: Evolving the Governance of EGI (and other e-Infrastructures)

During PY4, SPT supported the EGI Council Governance Task Force in designing a new governance model for EGI. The main contribution has been in providing secretary for the meeting and reviewing the various iterations of the document. The plan for an overarching ERIC-based organisation across e-Infrastructures (DRI ERIC) was not implemented due to the lack of commitment from other stakeholders.

Theme: Improving Strategic Metrics

The work focused on updating the balanced scorecard following the revision of the strategy that has been performed in preparation of H2020. The update aimed at using more pragmatic measures that can be more easily tracked and to connect with various KPIs provided to the EC and related to EU2020 priorities. The BSC will be consolidated during PY5 following the strategy updates that will be approved by the Council.

Theme: EGI Sustainability

The sustainability plan has been further expanded to include a more rich SWOT analysis for both the EGI collaboration and EGI.eu. A number of actions for growth have been formulated to lead to a better sustainability of EGI services.

Theme: Collaborations

During PY4, the SPT supported the development of an MoU with APARSEN to bring in competences within the EGI community in the area of data curation and preservation. EGI.eu also signed an MoU to be part of the Helix Nebula Marketplace (HNX)¹⁰⁴. Through this MoU, EGI resource providers for cloud services will have the opportunity to join this marketplace to enable a hybrid cloud model where user communities can integrate resources from commercial providers and publicly-funded infrastructures. Three more MoUs have been signed to expand the resource infrastructure outside Europe: one MoU with OSG (Open Science Grid in USA), one with the South-African Grid and one with Chinese Academy of Sciences.

Theme: EGI Pay for Use

Exploring the provision of EGI services on a pay for use approach has been a key priority of the second part of PY4. A proof of concept has been designed in collaboration with a large number of participating resource centres and NGIs (https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC). The activity was structured in two main phases to be completed in June 2014 and October 2014 respectively. For both phases, the focus is on a pragmatic approach based on putting in place a real scenario from discovery of service to allocation, accounting and billing so to adapt the currently operational tools and identify gaps in the functionalities, legal and policy aspects. The first phase aims at exploring a non-brokered while the second phase aims at exploring the brokered approach via EGI.eu and has dedicated funding in PY5 through a dedicated task (NA5.2).

Theme: Communications

The following articles have been contributed to the EGI Inspired newsletter: “The EGI Solutions Portfolio”, “Achievements of the EGI-Helix Nebula collaboration”, “A new certification in Service Management”, “What to expect from Horizon 2020 ICT work programmes?”, “can Open Science boost

¹⁰⁴ <http://hnx.helix-nebula.eu/>



EGI's impact?". The SPT also authored an article for the 2nd e-IRG newsletter of 2013 ("Service Management Standards for EGI") and a blog post "How are you managing your services?"¹⁰⁵.

Theme: Security Policy Coordination

In the area of security policy, an updated version of the Service Operations Security Policy document was approved stating the requirement for resource centres to deploy the central security emergency suspension system¹⁰⁶. A new clause in the user AUP to include the requirement for users and communities to acknowledge EGI support in their publications was discussed as well as updates to deal with the new federated cloud service. The SPG Chair also continued to lead the "Security for Collaborating Infrastructures" (SCI) activity building a standard trust framework for security policy between EGI, EUDAT, PRACE, XSEDE and others; he also participated in the Federated Identity Management for Research (FIM4R) activity. Engagement with the EGI Federated Clouds activity has now started with two members of the EGI security team attending a meeting of the working group in Oxford UK (January 2014). Presentations were given on the importance of operational security and a draft security questionnaire for Cloud providers has been produced. New procedures for certification of cloud providers are required and we need to develop a new security test suite to check basic traceability of actions and further developments in security monitoring are likely to be required.

Theme: Liaison with IGTF/EUGridPMA

Over PY4, FOM has been carrying out work with the EUGridPMA and IGTF in a joint effort with the CILogon service and XSEDE to prepare a proposal for an 'identifier-only' assurance level so to achieve a joint assurance level between Europe and the US. Meetings of the TAGPMA held in the US were attended with effective results in furthering the definition of the assurance level. Over the last ten years, the IGTF has collected guidelines and security profiles that represent the consensus and best current practice for identity management and attribute authority operations that reflect the needs of resource providers (distributed IT infrastructures for research), and this is IGTF is now morphing to better express the technology-agnostic aspects of trust (identity levels of assurance) which will henceforth be known as the "Interoperable Global Trust Federation - supporting distributed IT infrastructures for research". The Identifier-Only Trust Assurance (IOTA) profile was developed and endorsed, and the first IOTA authority will be accredited shortly.

Theme: EGI Compendium

A new edition of the EGI Compendium was produced and published covering data from 2012 (<http://go.egi.eu/compendium-2012>). Following the restructuring of activities for the EGI-InSPIRE extension, the compendium activity has been dropped due to lack of effort; therefore there won't be an edition in 2014 covering the year 2013.

Themes: Contributing to events

The SPT participated as member of the program committee of the EGI Technical Forum 2013 and the EGI Community Forum in 2014. The following workshops have been organised by the SPT: EGITF13: "Evaluating the scientific impact of e-Infrastructures", "Business and governance models for technology providers", "Helix Nebula Workshop: Interoperability among e-Infrastructures and Commercial Clouds", "Policies and Business Models for Open Science"; EGICF14: "Helix Nebula Workshop: Interoperability among e-Infrastructures and Commercial Clouds", "Open access to EGI

¹⁰⁵ http://www.egi.eu/blog/2013/12/16/how_are_you_managing_your_services.html

¹⁰⁶ <https://rt.egi.eu/rt/Ticket/Display.html?id=5509>



research outputs”, “Business development and pay per use”.

SPT contributed to the organisation of the “EGI towards H2020” workshop by supporting the development of the agenda, chairing the session on “Business Models and Clouds”, delivering a presentation and also by supporting the note taking. The SPT manager also attended ICT2014, coordinated the networking session “Digital Research Infrastructure – Integrating e-Infrastructures to meet the needs of the ERA” and provided a presentation in another networking session related to OpenAIRE to report on the collaboration with EGI.

3.4.3.4 Technical Outreach to New Communities

Activities and achievements were performed and achieved by the TONC group of the EGI.eu User Community Support Team in PY4 through progress with existing and new Engagement projects¹⁰⁷.

3.4.3.4.1 Virtual Teams

During PY4 the following Virtual Team projects have been active (some were called in other names, not as Virtual Teams, but operated as such).

VT 1. Collaboration between EGI/NGIs and large ESFRI project ELIXIR: The Virtual Team project was closed with two outputs:

- A social network that has been established in and among the NGIs and ELIXIR nodes.
- An agreement between the EGI and ELIXIR management representatives to strengthen collaborations by intensifying knowledge exchange between the NGIs and the ELIXIR nodes. A face-to-face meeting was held during January at EBI and technical pilots have been scoped:
 - Use case 1: evaluate the EGI Federated Cloud tools to support the "enlighten your Research" project.
 - Use case 2: execution of the Ensembl¹⁰⁸ application in the EGI Federated Cloud environment.

VT 2. Technology study for the Cherenkov Telescope Array ESFRI: The Virtual Team project was closed during Project Quarter 15¹⁰⁹ (PQ15). The output was a technical recommendation for CTA about the integration of the WS-PGRADE and InSilicoLab technologies. The technological integration is estimated to require about 2PM effort and then the members would setup a central CTA gateway based on the integrated package. Once setup, the central CTA gateway would be promoted for the CTA community to gather applications and scientific workflows that can serve the broader community, and would generate more specific requirements for the ‘CTA Very High Energy gamma-ray Science Gateway’. The integration and development of the gateway started in April 2014 outside of the Virtual Team project, but based on the technological recommendations of the VT.

VT 3. Towards a Chemistry, Molecular & Materials Science and Technology (CMMST) Virtual Research Community (VRC): During the reporting period the project refined the draft of the document that provides details on the structure and scope of the VRC that should be setup in CMMST domain. The document defines also new forms of collaboration between technology providers and experts, tries to define parameters for evaluating the quality of services and users, outlines a tentative Credit System aimed at developing a Grid Economy based on the synergistic

¹⁰⁷ See up to date information about these projects at <https://wiki.egi.eu> → Projects

¹⁰⁸ www.ensembl.org

¹⁰⁹ The 15th project quarter of EGI-InSPIRE run between 1st of February – 30th of April 2014.

collaborative model proposed by the community. The recently joint groups (MosGrid, ScalaLife, SCI-BUS) provided input into the report. The report was finalised and published and the VT was closed in PQ16, and the setup of the VRC has started (outside of the Virtual Team project).

- VT 4. ENVRI Study Case with EISCAT_3D:** During the reporting period the project worked with the ENVRI project to define and implement a proof of concept system for the EISCAT_3D ESFRI to help them define a big data system. The proof of concept system made ~2TB historical data set from earlier observations sharable, searchable and downloadable for the community through metadata. The proof of concept is based on the EGI Federated Cloud (as storage) and the Open Source Geospatial Catalogue as a catalogue and web frontend. The setup was successfully demonstrated to EISCAT_3D and ENVRI representatives in February 2014, and discussions about the scale-up and extension of this system for the start of the EISCAT_3D production state are currently ongoing.
- VT 5. Scientific Publication Repository Implementation:** During PY4 collaboration with OpenAIRE progressed. Various mining rules have been extracted to discover relationships among existing scientific publications that are in OpenAIRE and EGI related entities such as NGIs, VOs and EC-funded projects. The publications under analysis were mainly from ArXiv providing access to the full documents. Mining on metadata coming from Web of Science was also executed. The OpenAIRE collaboration confirmed the release of the new functionalities for the end of 2013. Future plans for the VT: To support rollout of new OpenAIRE functionalities for the EGI community and to test them among the NGIs that are part of the VT. A beta-version of OpenAIRE with the EGI-specific features has been made available for EGI.eu in April. The version is currently under testing by various community members and scenarios. Based on the EGI feedback the beta release is expected to be finalised by the end of 2014.
- VT 6. Promoting Desktop Grids:** Desktop Grids (as a middleware technology for e-Infrastructures) is available as a result of multi-year long joint work between the EGEE-III/EGI-InSPIRE and the EDGeS/EDGI projects. However, the uptake of desktop grids within the NGIs and scientific communities isn't significant until now. The VT has been established in November 2013 to
- Promote and train the Desktop Grid related technologies in the EGI communities.
 - Utilize the available bridged Desktop Grid resources (such as EDGeS@home) by more VOs.
 - Increase the number of heavily used EGI applications on the integrated (Desktop Grid) infrastructure with focus on widespread tools/solutions/approaches.
 - Improve documentation including Road maps, Training materials, and Manuals.
 - Complete the final remaining steps for full integration concerning e.g. support tools
 - Find joint EGI champion(s) - IDGF ambassador(s).
- The progress with the VT is slower than expected, because several infrastructure-related integration work (incl. the setup of a multi-national Desktop Grid Operation Centre) must complete before promotion materials could be prepared and distributed.
- VT 7. Business Engagement Programme for SMEs:** This virtual team started its activity on the 1 April 2014 with the objective of defining a framework for building healthy relationships between EGI and SMEs by answering questions such as: What can a federated EGI collaboration offer? What is the value for both sides? What would be the forms of engagement? What cannot be done? Another aim is to identify SMEs potentially interested in collaborating and, ideally a few pilot cases and KPIs. So far there have been two phone meetings organised. The first one introduced the goal to the participants. In the second, there were some of the

previous questions addressed, with the result of some topics for further discussion, mainly: the characteristics of such a Programme, the limitations, the possible demands from the private sector, and possible offering from the EGI side.

VT 8. EGI-DRIHM collaboration: The collaboration was established with the DRIHM project to setup a web based science gateway for the hydrometeorology community and enable them to run simulation workflows using resources from the European Grid Infrastructure as well as from other sources, particularly PRACE and ‘local sites’. The collaboration made good progress during the year, and had successful demonstration at the DRIHM annual EC meeting, as well as at other events. The collaboration continues until the end of the DRIHM project, and will focus on:

- Integration of Windows based simulations with the EGI Federated Cloud.
- Development of new workflow applications.
- Development of community-specific GUIs for the workflow.
- Assessing the portability of currently PRACE-based models to EGI given that the PRACE allocation that DRIHM currently receives will expire at the end of 2014.

3.4.3.4.2 EGI Federated Cloud

During PY4 support was provided for at least 20 use cases on the EGI Federated Cloud. 5 of these are already in production and have been demonstrated at the EGI Community Forum in Helsinki in May 2014. Below the full list of use cases with a short description:

Cloud 1. **WeNMR**¹¹⁰: The objective of WeNMR is to optimize and extend the use of the NMR and SAXS research infrastructures through the implementation of an e-infrastructure in order to provide the user community with a platform integrating and streamlining the computational approaches necessary for NMR and SAXS data analysis and structural modelling.

- Use case 1: using VMs prepared with Gromacs and some other software to run MD simulations for educational purpose, possibly on multi-core VMs.
- Use case 2: validating and improving biomolecular NMR structures using VirtualCing, a VM equipped with a complex suite of ~25 programs. The cloud usage framework is based on a pilot job mechanism making use of the ToPoS¹¹¹ tool. Therefore, such a framework would naturally allow for execution of VirtualCing¹¹² tasks across multiple cloud providers. Do notice that the framework is independent on the cloud access interface: it would work also with simple grid jobs, as far as the user-defined (or VO manager defined) VirtualCing VM is available at the grid site e.g. in a SE (or in the VO software area mounted by the WNs) and the grid job is allowed to start the VM^{113 114}.

Cloud 2. **Peachnote.com**¹¹⁵: a music score search engine and analysis platform. The system is the first of its kind and can be thought as an analogue of Google Books Ngram Viewer and Google

¹¹⁰ <https://www.wenmr.eu/>

¹¹¹ https://grid.sara.nl/wiki/index.php/Using_the_Grid/ToPoS

¹¹² <http://code.google.com/p/cing/wiki/VirtualCing>

¹¹³ Technical details about its current implementation are available at <http://code.google.com/p/cing/w/list>

¹¹⁴ A live demonstration about the deployment and use of VirtualCing on the WNoDeS testbed of the INFN-CNAF computing centre has been shown at the EGI TF 2012 held in September: <http://prezi.com/hrzwekguwx/virtualcing-cloud-demo-on-wnodes/>

¹¹⁵ <http://www.peachnote.com/>

Books search for music scores. Peachnote provides visitors and researchers access to a massive amount of symbolic music data.

- Use case 1: the ability to upload and start a prepared VMware VM. The VM has only to be able to make outbound connections: to Amazon's SQS for job information, to HBase cluster to retrieve and store data, and to the Peachnote server to regularly update the workflow code. No inbound connections are needed, which hopefully means less administrative and security concerns.
- Use case 2: the ability to run a small Hadoop and HBase cluster in the cloud.

Cloud 3. **WS-PGRADE**¹¹⁶: a portal environment for the development, execution and monitoring of workflows and workflow based parameter studies on different Distributed Computing Infrastructures (DCI).

- Use case 1: biologists, chemists simulating molecular docking by the autodock software tool are potential users of this use case. This use case gives the ability to run a small BOINC based desktop grid infrastructure as a DCI and to submit a pre-defined application (called autodock) to this DCI through the WS-PGRADE/gUSE portal as a (predefined) workflow.
- Use case 2: any scientists requiring an on-demand, scalable computing infrastructure are potential users of this use case. This use case gives the ability to run a small BOINC based desktop grid infrastructure providing virtualisation support (GBAC) on the computational resource (BOINC client). The job submission interface in this scenario is the WS-PGRADE/gUSE system where compound applications (i.e. workflows) can be easily built and executed on the BOINC based desktop grid DCI. The submitted jobs of the workflow are executed on minimal Linux OS used as the virtualised environment. Scalability can be improved by attaching external (non-cloud) resources to the desktop grid server.

Cloud 4. **DIRAC interware for eScience communities**¹¹⁷: The DIRAC interware project provides a framework for building ready to use distributed computing systems. It has been proven to be a useful tool for large international scientific collaborations integrating in a single system, their computing activities and distributed computing resources: Grids, Clouds and HTC clusters. In the case of Cloud resources, DIRAC is currently integrated with Amazon EC2, OpenNebula, OpenStack and CloudStack. The work integrates the resources provided by the multiple private clouds of the EGI Federated Cloud and additional WLCG resources, providing high-level scientific services on top of them by using the DIRAC framework.

- Use Case 1: running LHCb simulations of Monte Carlo jobs using IaaS federated manner, for integration and scaling tests.
- Use Case 2: VMDIRAC as portal for VM scheduler, with third party job broker.

Cloud 5. **Catania Science Gateway Framework**¹¹⁸: The Catania Science Gateway Framework (CSGF) has been developed by INFN, Division of Catania (Italy), to provide application developers with a tool to create Science Gateways in short time and in a very easy way. CSGF is made of a set of libraries to manage Authentication & Authorization mechanisms and to interact with several different kinds of DCIs (grid, cloud, HPC, local, etc.). The CSGT would like to use the EGI Federated Cloud to develop a new CSGF plugin implementing the service model SaaS exploiting OCCl.

¹¹⁶ <https://guse.sztaki.hu/liferay-portal-6.0.5/>

¹¹⁷ <http://diracgrid.org/>

¹¹⁸ <http://www.catania-science-gateways.it/>

- Use Case 1: the use case is an interoperability test, implemented as a new Liferay portlet in CSGF, to make the portal capable of submitting applications to the EGI Federated Cloud, grids and HPC resources in a user-transparent way. The portlet includes a set of VMs, each pre-configured with some test applications and providing an application specific SaaS environment built on grids and IaaS clouds. Users will see that cloud sites are resources that are available to execute applications without worrying about technical matters. The CSGF will select and start a VM to execute an application on behalf of the user, according to application characteristics. The VM management issues will be completely managed by CSGF and will be hidden from end users.
- Use Case 2: the second use case aims to show how the cloud-tenant of a real or virtual organisation can sign in on a Science Gateway using his/her federated credentials, select VMs from a geographically shared repository and deploy/move/copy it/them across the “personal virtual-cloud” he/she is entitled to use. The VMs should belong to the same domain name independently of the site where it/they are instantiated and of the underlying cloud middleware stack. This service is named MyCloud and uses the CCloud-Enabled Virtual EnviRonment¹¹⁹ (CLEVER) to orchestrate the cloud services through their OCCI-compliant and rOCCI-enabled interfaces.

Cloud 6. **The ENVRI¹²⁰ target:** is on developing common capabilities including software and services of the environmental and e-infrastructure communities. While the ENVRI infrastructures are very diverse, they face common challenges including data capture from distributed sensors, metadata standardization, management of high volume data, workflow execution and data visualization. The common standards, deployable services and tools developed will be adopted by each infrastructure as it progresses through its construction phase. In the context of the ENVRI project, the EGI Federated Cloud will host data access and dissemination service on the Federated Cloud Storage as a Service and provide computing resources to ENVRI processing services via the EGI Federated Cloud IaaS service. The objective is to offer to the ENVRI partners a reliable, flexible and easy to use system to perform data discovery and dissemination and to support computing services.

- Use case 1: data access, catalogue and dissemination (EISCAT 3D).
- Use case 2: data processing (CNR-Pisa).

Cloud 7. **Next Generation Sequencing Applications and Computational workflow:** RNA-sequencing analysis of data has performed to understand different biological features and behaviour. The research team generated a workflow based on a pipeline built to satisfy many experiments using Python 3.4, third party-libraries (numpy, pysam, matplotlib) and some external tools as segemehl and R. The running time heavily depends on the size and type of data, and usually takes from several hours to several days. The workflow will be published as open source tool soon. Indeed, it's a very common approach.

- Use case: the use case consists of running this workflow on the EGI Federated Cloud.

Cloud 8. **DCH-RP¹²¹:** The DCH-RP project is willing to run data preservation services on the EGI Federated Cloud.

- Use case: running the following data preservation services on the EGI Federated Cloud. (1) Preservation Aware Data Management: Dropbox equivalent online storage

¹¹⁹ <http://clever.unime.it/>

¹²⁰ <http://envri.eu/>

¹²¹ <http://www.dch-rp.eu/>

for direct and dynamic data handling during information creation time, (2) OAIS Complaint Archive, (3) collaborative Task-based Search & Access: ElasticSearch Server for searching metadata, provenance, full-text, pictures and video and, (4) User Interface.

Cloud 9. **BSIM2**¹²²: BSIM2's mission is to boost the discovery and optimisation of new drug candidates, led by efficient computational methodologies and workflows.

- Use case: this start-up company is exploring a set of Proof's of Concept on the EGI Federated Cloud.

Cloud 10. **European Space Agency**¹²³: in the context of the Helix Nebula¹²⁴ initiative, the European Space Agency organized a Proof of Concept using EGI Federated Cloud resources. The objective is to prove the interoperability between commercial (Helix Nebula) and academic (EGI Federated Cloud) cloud providers and to prove the possibility to provide processing services to scientists using the Federated Cloud IaaS system. ESA target is volcano and earthquake monitoring in the context of the SuperSites Exploitation Platform project¹²⁵.

- Use case: the proof of concept deploys and test performances of a computing cluster, by running a set of processing jobs on it. The cluster will use the Globus Grid middleware and will be connected to the ESA Grid-Processing On Demand¹²⁶ system for job submission.

Cloud 11. **BioVeL**¹²⁷: provides workflows for the processing of data in major areas of biodiversity research: ecological niche modelling, ecosystem functioning, and taxonomy.

- Use case 1: OpenModeller web-service in Europe (niche modelling).
- Use case 2: Sustain BioSTIF web-service (data visualization).
- Use case 3: Portal to access/visualize Catalogue of Life taxonomy data (EDIT).
- Use case 4: OpenRefine

Cloud 12. **VERCE**¹²⁸: Earthquake and seismology research addresses fundamental problems in understanding the Earth's internal wave sources and properties, thereby aiding society in the management of natural hazards, energy resources, environmental changes, and national security. VERCE is supporting this effort by developing a data-intensive e-science environment to enable innovative data analysis and data modelling methods that fully exploit the increasing wealth of open data generated by the observational and monitoring systems of the global seismology community.

- Use case: evaluate EGI Federated Cloud capabilities for data analysis and post-processing.

3.4.3.4.3 New Engagement Projects

As part of the EGI Engagement Strategy the role and responsibilities around building engagement projects with prospective communities is reinforced and formalised during PY4.

Because prospective engagement projects require strong links between EGI and the scientific

¹²² <http://www.bsimsquare.com/>

¹²³ <http://www.esa.int/ESA>

¹²⁴ <http://www.helix-nebula.eu/>

¹²⁵ <https://wiki.services.eoportal.org/tiki-index.php?page=SSEP>

¹²⁶ <http://gpod.eo.esa.int/>

¹²⁷ <http://www.biovel.eu/>

¹²⁸ <http://verce.eu/>

community at both the national level (inside one/more NGIs) and at the European level (with EGI.eu), the process of building new engagement projects is built on two pillars:

1. Bottom-up approach: assessing the NGIs' collaborations with national nodes/institutes of scientific projects/communities and collecting the national requirements into European Virtual Team projects.
2. Top-down approach: building human bridges between EGI and scientific projects through management-level meetings arranged between EGI.eu and the representative institutes/bodies of scientific projects/communities.

The bottom-up approach has been run extensively in PY3 and in the first half of PY4 to define new Virtual Team projects attract interest in multiple NGIs. This process built on those NGIs who recognised common interest in some certain scientific areas, and are willing to proceed into defining a multi-national user support project around this. Most of these proposals gained momentum in PY4, and one of them reached a Virtual Team status:

- **Genome Analysis and Protein Folding:** the Virtual Team objectives, tasks and allocation of effort is concluded and described in the GAPF VT Project Initiation Document by the end of PY4. The VT itself started in May 2014. The expected Outcomes/Deliverables from the GAPF VT are:
 - Table including applications for the protein Structural Biology and Sequencing (Protein/DNA/RNA) communities. The running state of the applications will be assessed and EGI AppDB data sanitization performed.
 - Establish a contact-network with persons of financed European Projects focused in the areas of this VT.
 - Setup and “put in motion” tutorial and webinar sessions for specific tools and applications for the user communities.
 - Produce dissemination material on production level applications relevant for the community.
 - Make the porting of new tools easier via EGI (e.g. by the use of high level platforms)

At the time of writing this report several other VT proposals are still under discussion with the interested NGIs:

- Agricultural sciences
- Environmental Sciences
- Astronomy and astrophysics
- CLARIN ESFRI project

Additional bottom-up initiatives could not get sufficient interest from multiple NGIs to become Virtual Team project. For example, the proposal from the Slovakian NGI about a new Virtual Team to develop and offer domain-specific services for nanotechnology research teams.

Following the top-down approach the representatives of EGI.eu hold meetings with the representatives of various scientific project/collaboration during PY4 with the goal to define collaborative projects that can be run in the form of Virtual Team projects. The projects that have been defined with the top-down approach during PY4, and are already active are described in the next section. Those projects that have been defined, but are yet to start are:

- **LifeWatch ESFRI:** EGI.eu participated in a LifeWatch ESFRI RI Operational meeting in Feb. 2014. EGI solutions were presented and a set of objectives to be implemented inside the Virtual Team framework was delineated. It is currently under consideration of LifeWatch.
- **EMSO ESFRI:** EGI.eu invited EMSO ESFRI RI managerial team for a meeting, where current ESFRI status was discussed and willingness to explore EGI services portfolio assessed. A set of pertinent requirements by the ESFRI was captured and is under discussion.



- **ICOS ESFRI:** During a face-to-face meeting between the ICOS Director General and the representatives of EGI.eu and a few NGIs (CZ, FR, PL, FI) initial topics for collaboration have been discussed, and it was agreed that these will be documented in a short document that will serve as a basis of scoping joint work between ICOS and EGI.

3.4.3.4.4 Applications Database (AppDB)

The EGI Applications Database¹²⁹ is a central service that stores and provides to the public, information about software solutions in the form of native software products and virtual appliances, the programmers and the scientists who are involved, and publications derived from the registered solutions. Reusing software products, registered in the AppDB, means that scientists and developers may find a solution that can be directly utilized on the European Grid Infrastructures without reinventing the wheel. This way, scientists can spend less or even no time developing or porting a software solution to the Distributed Computing Infrastructures (DCIs). AppDB, thus, aims to avoid duplication of effort across the DCI communities, and to inspire scientists less familiar with DCI programming and usage. The EGI Applications Database is open to every scientist, interested in publishing and therefore sharing, their software solutions.

Progress and assessment

Development and other activities during PY4 include many additions and enhancements, the most significant of which has been the introduction of a 'Cloud/Virtual Appliances Marketplace'¹³⁰ section, to support the uptake of EGI's new production infrastructure, the Federated Cloud. The new marketplace section enables the sharing of Virtual Appliances — sets of Virtual Machine images that belong to a single scientific application setup. The shared appliances are deployed on the sites of the Federated Cloud through Virtual Organizations, and can then be instantiated on-demand by VO members, using the provided command line tools of the Federated Cloud, or one of the high level, graphical environments contributed by the NGIs.

Besides metadata registration about Virtual Appliances, the Marketplace offers the ability to manage each appliance's images by defining and publishing versioned sets thereof, categorized by operating system, platform architecture, virtualization technology, etc. This image information may be easily distributed to any infrastructure (including the Federated Cloud one) by creating vmcatcher compatible image lists, or VO-wide image lists directly from within the AppDB portal; the image lists specify which site or VO, respectively, offers the specific version of the VA, so that users make use of them.

Another important feature has been the introduction of a SAML-compliant Authentication & Authorization platform, linked to a dedicated Identity Provider service. This solution offers the ability to manage user permissions across all services such as the portal itself, the RESTful API, the software repository, wiki sites, etc.; hence, AppDB users may now view and specify explicit permissions for other users or even user groups upon their solutions, in addition to the built-in system policies. Moreover, Virtual Appliances may be marked as private, in order to protect sensitive information from non-authorized users.

Last but not least, AppDB now features a dedicated wiki site¹³¹, where all documentation about the offered services and portal functionality and usage in general have been migrated. Registered users with appropriate permissions may modify its global contents, while it is planned for all registered

¹²⁹ <https://appdb.egi.eu>

¹³⁰ <https://appdb.egi.eu/browse/cloud>

¹³¹ <https://wiki.appdb.egi.eu>

users to be offered with personal space for documentation about their solutions, in the near future.

Needless to say, the front-end of the Applications Database has been totally revamped in order to better incorporate as well as highlight the new Marketplace features, foremost, as well as the rest of the aforementioned added improvements.

3.4.3.4.5 Client Relationship Management System (CRM)

During project quarters 13 and 14, the work of the EGI CRM team was focused on further development, customization and usability of the EGI CRM User Interface, following requirements from EGI and NGI coordination bodies, as well as on the dissemination of the tool to the NGI International Liaisons. Project quarters 15 and 16 were focused on the operation and maintenance of the tool. Regarding the development work, the following milestones were achieved:

- A new “BrowseNGIData” module was designed and implemented to provide views per NGI of the different CRM records. It introduces expandable list trees of Projects per Type, Research Institutes per Project Type and Person Contacts per Research Institute.
- The repository for CRM Monthly Activity Reports and the CRM Metrics Portal were integrated in the CRM layout. Both are now available through the “Home” module.
- The Home module was further enhanced, and through a transparent interoperation with CRM pre-build AJAX procedures and CRM forms, it allows CRM users to easily identify, access and correct incomplete information on CRM records associated to them.

In the dissemination area, an EGI webinar was prepared, presented and recorded during June 2013, and a CRM demo has been submitted, approved and delivered at the EGI TF 2013.

The use of the CRM has slowly, but gradually increased in the first 12 months after its start. However the use decreased later, and by the end of 2013 the system received no new entries from EGI. The outreach work that the CRM system aimed to support continued, but used different tools/forums for information exchange. Particularly (1) the monthly NIL teleconferences, (2) the NIL and UCST email lists, (3) the Virtual Team framework where focused requirement-capturing exercises was supported.

Because of this change in working practices the community concluded that EGI does not need a dedicated and custom-made CRM system. Acceptable level of information sharing and coordination can be achieved in the EGI outreach activity within the already available mechanisms.

The CRM system will be discontinued after the end of April by EGI-InSPIRE. The database content will be archived for possible use, the software will be archived in a virtual machine image, so if needed, restart will be possible in the future.

3.4.3.4.6 Training Marketplace (TMP)

The Training Marketplace is an online registry to advertise and to view (browse and search) training events, online training materials, training resources and university courses that relate to EGI. The service supports cooperation between trainers and trainees in different localities and projects by connecting the groups through the stored items that are advertised in the Training Marketplace. The Training Marketplace is typically used together with the EGI Document Database to index and highlight materials files from the Document Database that relate to training. The Training Marketplace provides rating and commenting facilities for the registered items, and web gadgets for integration with third party websites, such as NGI sites and research community sites.

After the intensive further development of the Training Marketplace in its first year of existence, the service reached its current form in 2013. Unpopular item categories have been removed as part of this

process. The remaining categories have been extended with features that increase system usability, for example permalinks to some of the item categories, larger variety of gadgets.

The service improved according to plans. Statistics indicate that the event registration part of the Marketplace is the most popular section (13 entries between May 2013 April 2014), while other parts are used moderately. These statistics did not change despite the further development of the gadget engine during the same period. During the 4th project year the team worked on engaging with projects that would become direct customers of the marketplace and build a sustainable future on multiple, independent customers, of which EGI would be one. The system will become unfunded in EGI-InSPIRE after April 2014, but STFC, the provider from the UK NGI continues providing TMP for EGI at least until the end of 2014.

3.4.4 Accelerating EGI's H2020 Goals ("mini projects")

During autumn 2012 EGI reviewed its strategic plan and formulated through this its strategic goals around Community & Coordination, Operational Infrastructure and Virtual Research Environments. To accelerate these strategic goals, the EGI Council approved a plan to set up a coordinated programme of short-lived projects that individually address specific topics around these goals, and to investigate sources of funding for these. In cooperation with the EGI EB, the EGI-InSPIRE Project Office identified a number of partners that were under-spending. The EGI-InSPIRE Project Management Board decided to reallocate some of these unused funds to this support programme. Starting in December 2012 the EGI project office initiated a project internal call for funded mini projects, which eventually led to the funding of 11 proposals out of 29 submissions.

With the approval of the EC project officer, all funded mini projects were organised and set up as tasks within Work Package 8 (SA4) as part of the EGI-InSPIRE project. Regular contributions to the EGI-InSPIRE quarterly reports focus on summarising the progress made and issues faced in the mini projects; MS801 provided a mid-term deliberation of the mini project's progress, status and plans for the future. D8.1 comprises the end-of term report for all mini projects. The work was organised between overall work package administrative activities (delivered by the Work Package activity leader), and a number of technical shepherds who coordinated the day-to-day work and embedding of the assigned mini projects into their target domain.

Throughout PY4, all mini projects generally performed well and within expectations except for the following noteworthy circumstances: (i) When allocating a short lived mini project that includes unfunded contributions, then these must be considered voluntary regardless the partner reputation, avoiding the project to run into problems. (ii) When including SMEs in such mini projects, potential financial hindrances stemming from relationships between project partners need to be properly addressed in risk management, as these can severely impede the success of a mini project.

Nonetheless, with addressing these circumstances, the affected mini projects were able to achieve their goals and finish in time and within budget. In summary:

- All funded mini-projects were organised by re-using as much project administration infrastructure as possible. However, they were not constrained to use these tools.
- No particular management or administration structure was required; every mini project managed itself with one identified person acting as the main contact point for coordination with Work Package administration and shepherd.
- Mini-projects were *empowered* to achieve their goals with as much freedom and responsibility as required and affordable to ensure a consistent progression.
- All mini projects delivered their technical achievements, with small exceptions (c.f. D8.1)

- The results of TSA4.3 (Evaluation of Liferay modules) will be considered for future EGI backoffice evolution.
- All other mini project successfully delivered results that are already deployed in the EGI production infrastructure.

Given the successful outcomes of the activity, the mini projects are considered to be a successful instrument for the agile implementation of strategic goals.

3.4.4.1 Massive Open Online Course (MOOC) Development

- After some research into the field of available tools and services, the platform provided by the University of Amsterdam was chosen (<http://mooc.uva.nl>).
- The course utilises animations, slides, personal presentations, and covers the following topics: Job distribution, local clusters, Grids and pilot job frameworks.
- The course infrastructure includes portal technologies that are deployed entirely on a Cloud infrastructure.
- All course material was successfully recorded prior to the MOOC launch itself
- The MOOC was put online in November 2013, with about 300 subscriptions at launch date.
- After the formal end of the MOOC, submitted assignment answers were assessed, graded, and achievement certificates issued where appropriate.

3.4.4.2 Evaluation of Liferay Modules

- A basic instance of Liferay 6 including a number of agreed modules and extensions was set up and shared access and administration configured for all team members.
- Liferay Office and related portlets were integrated with the IGI portal for evaluation
- User authorisation was integrated with the EGI SSO service
- Liferay was also evaluated for being provided as a service for the long tail of science in EGI, including alternative and more lightweight AAI integrations other than certificates and EGI SSO.
- An evaluation of Liferay as an alternative solution to EGI's AppDB has been conducted, and will be integrated into the final project report.
- Liferay was evaluated as a potential replacement for the current EGI blog system.
- CESNET conducted a deeper analysis of Liferay 6.2 and some of its advanced features as a potential replacement for EGI back-office services such as DocDB and Wiki.
- The final outcome of this mini project is Liferay being indeed suitable for being offered as a managed service to user communities on the long tail of science, whereas it is probably not worth the effort to replace some of EGI back-office services for Liferay.

3.4.4.3 Providing OCCI support for arbitrary Cloud Management Frameworks

- The existing OCCI framework was thoroughly assessed, and a new architecture for the framework was developed. Existing code was re-used as much as possible. The result is a highly modular framework featuring easy extension and maintenance.
- The framework includes full support for (legacy) VOMS proxy certificates as well as RFC3820¹³²-compliant certificates.

¹³² <http://tools.ietf.org/html/rfc3820>

- rOCCI-server implements full support for the HTTP Digest Authentication¹³³-based protocol that is specified and implemented in OpenStack. It implements Token Based Access Control (TBAC), which is necessary for true federated AAI.
- Refactoring was undertaken throughout the entire project year, however numerous releases of both existing production versions as well as early adopter versions of the refactored framework have been released throughout.
- The framework refactoring has been completed, and all externally usable elements (i.e. rOCCI server and rOCCI client) were gradually transitioned to the new framework.
- The rOCCI solution consists of four clearly separable components, of which rOCCI-core and rOCCI-API address custom integrations, and rOCCI-cli and rOCCI-server are concrete instantiations of the framework itself.
- rOCCI components have been released into production, while providing support for additional backend integrations.

3.4.4.4 CDMI Support in Cloud Management Frameworks

- A code repository¹³⁴ and a local Continuous Integration system were set up, and a skeleton implementation was implemented. The OpenNode¹³⁵ external project sponsor also supports this activity.
- An initial version of the CDMI proxy service, named “Stoxy”, was published in the code repository.
- Stoxy now supports EGI’s AAI via X509-enabled Keystone tokens.
- Stoxy now supports – next to a native file system based backend – OpenStack Swift for object storage.
- Production deployments are available at JUELICH and KTH.

3.4.4.5 Dynamic Deployments for OCCI Compliant Clouds

- The Autoscale feature design and roadmap was harmonised between EGI and the FP7-funded CELAR project¹³⁶.
- A complex multi-layer demonstration application was also developed (called LAMP++), which we will use to validate the system as well as the OCCI connector, prior to deploying real Helix Nebula scientific applications.
- An Open Source OCCI connector has been developed as a demonstrator for Slipstream 1.x, and was used to conduct a Proof of Concept deployment of the Helix Nebula project’s flagship use case supplied by ESA.
- A stable and production-ready OCCI connector has been developed for Slipstream v2 that incorporates the rOCCI-cli component provided by another mini project (see section 3.2.4.3).

3.4.4.6 Automatic Deployments and Execution of Applications using Cloud Services

- Collaborations with two other mini projects were established (c.f. sections 3.2.4.3 and 3.2.4.7).

¹³³ <http://tools.ietf.org/html/rfc2617>

¹³⁴ <https://github.com/stoxy/stoxy>

¹³⁵ <http://www.opennodecloud.com/>

¹³⁶ <http://www.celarcloud.eu/>

- First prototypes using CloudInit¹³⁷ successfully demonstrated the approach this mini project is heading.
- Two extensions to the OCCI specification family were developed and submitted to the OGF OCCI Working Group¹³⁸.
- A dynamic application deployment server was developed and deployed in a near-production environment.
- CloudInit was selected as the definitive contextualisation solution. OpenStack supports it out of the box, and a fork including OpenNebula integration is maintained in EGI's AppDB.
- Implementations of the OCCI extensions are used together with CloudInit.
- Major use cases for the mini project are Spanish astrophysicists, chemists, and the EGI Software Provisioning service.

3.4.4.7 Transforming Scientific Research Platforms to Exploit Cloud Capacity

- The mini project established contact with all user communities that were already affiliated with the EGI Federated Cloud at the time of its start.
- A report on assessed Cloud Use Cases is publically available¹³⁹ in EGI's DocDB.
- Support was given to WeNMR and BioVeL projects to support their transition to Cloud infrastructures, particularly to EGI.eu.
- Support to and conversations with User Communities now include: BioVeL, BNCweb (Clarin), WeNMR and Desktop Grids, WS-PGRADE, Peachnote and CHAIN-REDS. These led to the definition of a common CloudInit profile for contextualisation.
- A stable base image for the BioVeL community has been developed and in use by that project to generate appliances for a number of their services (e.g. BioSTIFF).
- One blog post¹⁴⁰ describes how to shrink an existing VM image to a size that current CMF can absorb well and instantiate in a very short time, and a second blog post¹⁴¹ describes good practices on keeping a VM image small from within a virtual server instantiated from it.
- A design pattern and reference implementation for providing and managing a generic MySQL VM image that is capable of serving databases stored in mounted block storage is now available. The BNCweb project is using this pattern, which could easily lead to a DBaaS provided by EGI in the future.

3.4.4.8 VO Administration and operations PORTal (VAPOR)

- The functional specification¹⁴² is available, and liaisons with CompChem, eNMR, and France Grille VO have been established.
- A number of conferences with the EGI Operations Portal team and other VOs to synchronise the developments, synergies and tools that were agreed for integration¹⁴³.

¹³⁷ <http://cloudinit.readthedocs.org/>

¹³⁸ <http://www.ogf.org/pipermail/occi-wg/2013-July/003334.html>

¹³⁹ <https://documents.egi.eu/document/1824>

¹⁴⁰ http://www.egi.eu/blog/2013/11/14/shrinking_vm_images.html

¹⁴¹ http://www.egi.eu/blog/2014/02/10/how_to_keep_your_vm_images_small.html

¹⁴² https://wiki.egi.eu/wiki/VT_VAPOR:VAPOR_features_description

¹⁴³ <https://indico.egi.eu/indico/categoryDisplay.py?categId=100>

- VO Operations management pages were developed covering reporting on aspects of resource availability and performance, such as number of successfully finished jobs, number of timed out jobs, etc. The VAPOR development and testing environment is also hosted on a dedicated virtual machine, in addition to a SVN software repository and Redmine server for project reporting.
- The feature set for the VO operations reports and status is complete (JobMonitor, CE white list, all resources supporting VO, resources failing production status, reports for known issues with storage and computing resources).
- VAPOR's data collecting services are deployed in a Cloud environment while the web application was integrated with the EGI Operations Portal. This went along with significant improvements of the Deployment and Configuration documentation and code refactoring.
- VAPOR has been successfully deployed in production, and a number of VOs are using it already in their regular production infrastructure.

3.4.4.9 A new approach to Computing Availability and Reliability Reports

- The team decided to make use of Apache Hadoop, Apache Pig, and to integrate with the EGI Messaging infrastructure for the new calculating engine.
- The component is integrated with EGI's Service Registry (implemented using GOCDB), and the POEM component of EGI's Monitoring infrastructure. These are used to collect the calculation profiles on an hourly and daily basis and GOCDB's downtime information for reliability calculation.
- Two new modules were added: A service downtime calculator (ingesting GOCDB downtime information) and a data pre-filtering module (used for data validation and integrity checks).
- An API for programmatic access to the A/R calculation service has been added.
- NGI profiles including NGI-specific A/R reports and an updated charting module are now available. The web interface now supports the selection of profiles, NGIs, sites and periods and can export the results to json, xml and csv formats.
- Installation guides for 3rd party components are written and integrated into the general installation and configuration guides.
- Management of calculation profiles is now completed, and available via WebAPI.
- The component is now deployed in production mode, until it will be integrated into a re-written EGI Service Monitoring subsystem in April 2015.

3.4.4.10 GOCDB Scoping Extensions and Management Interface

- The team decided to design the scoping extension so that GOCDB can be offered in a Software-as-a-Service Cloud model.
- A number of changes in GOCDB allow scoping and scoped relationships between projects, NGIs and Services.
- A GOCDB admin interface has also be developed for v5 to simplify daily operational tasks.
- GOCDB v5 is deployed in production for EGI since October 2013.

3.4.4.11 Tools for automating applying for and allocating federated resources

- The team has developed the initial design for the e-Grant tool, and documented it in the Resource Allocation Task Force wiki¹⁴⁴.

¹⁴⁴ https://wiki.egi.eu/wiki/Resource_Allocation_Task_Force

- Integration with EGI's current AAI (including the EGI SSO service) has been completed.
- E-Grant v1 has been deployed in production, featuring basic resource requests and a base set of SLA metrics.
- In November, e-Grant v1 has been used to process the first call for applications of research communities.
- The functionality of e-Grant v2 has been agreed upon with the Resource Allocation Task Force.
- e-Grant v2 supports EGI SSO authorisation for user communities, and X.509 certificate based authorisation for resource centre managers registered in GOCDB.
- e-Grant v2 supports pooled resources that e-Grant can automatically broker to user communities.
- e-Grant v2 is deployed in production since January 2014 and is under maintenance since then.

3.5 Project Issues

3.5.1 Operations

Grid Software Maintenance and Support

Continued grid software maintenance and third level support of software in EGI is paramount. Both will be challenged by the end of the two main projects that currently ensure provisioning of deployed software (EMI and IGE). The risks that are being faced are the discontinuation of maintenance and support of a subset of products, lower quality of the support that is currently subject to SLAs, phasing out of the external repositories, and a change in the software distribution processes that will require have to be reflected with changes in the EGI software provisioning processes.

Solved. In PQ11 the Operations Management Board assessed the risk and the related affecting operations assets¹⁴⁵. The min risks identified were: the availability of specialized support and the commitment to a timely delivering of fixes in case of high or critical vulnerabilities affecting the production infrastructure. In PY13 the UMD Release Team was successfully constituted to facilitate communication among software providers, and between them and the UMD release team. Various urgent fixes were successfully release to meet the need of the production infrastructure. Different Quality of Service levels were enabled in GGUS and the majority of the Technology Providers ensured continuity of their specialized software support activities through GGUS.

NGI operations sustainability

A survey conducted in September 2012 indicated that a small percentage of NGIs improved its funding structure, as requested to compensate for the end of EC financial support to national operational activities in April 2014.

Mitigation: The impact of the current funding position of NGI operational activities was assessed in a new survey¹⁴⁶ having the objective of defining which services in the operations service portfolio are of interest to NGIs either as consumers and providers and the conditions to be met to rely on externally provided services, with the ultimate aim of facilitating the federation of NGI services where needed. The outcome of the survey has been processed in PQ14¹⁴⁷. As the outcome information about NGIs

¹⁴⁵ <https://indico.egi.eu/indico/getFile.py/access?contribId=2&resId=0&materialId=2&confId=1096>

¹⁴⁶ https://wiki.egi.eu/wiki/EGI_Operations_Surveys#NGI_services_provisioning_and_usage

¹⁴⁷ https://wiki.egi.eu/wiki/Federation_of_NGI_services



that are willing to establish collaboration has been distributed to all NGIs. Services which can be provided by other NGIs have been identified and gathered to facilitate federating services between NGIs and reduce cost and leverage other NGIs' expertise.

Migration of the SAM central services

As CERN didn't participate to the bidding for providing the SAM services after PY4, SAM services operated by CERN will be discontinued as of 01 May 2014. The SAM central services have to be migrated to a new consortium of partners (CNRS, SRCE and GRNET).

Mitigation: The main task for the SAM product team during the second half of the PY4 has been the support needed to migrate the SAM central services to the new consortium of partners (CNRS, SRCE and GRNET). This has involved developing a detailed time plan, writing technical documentation necessary for the migration of SAM central services, providing technical support to the consortium as well as organizing SAM migration meetings and workshops to follow up on the transition process and make sure it is implemented in time and within its scope.

EGI operational tools interoperation after the end of the JRA1 activity

As described in MS711 many interdependencies between the EGI operational tools exist and, until now the JRA1 activity has coordinated the development to assure the tool interoperability. With the conclusion of the JRA1 activity at the end of PY4, this coordination will end.

Mitigation: A new EGI.eu board will be created including delegates for each product team to discuss the feature development roadmaps regardless the type of activity (Core EGI Activities, EGI-InSPIRE JRA2 in PY5, other funded projects, etc.) that will support these new developments. The new board will be settled at the start of PY5 and its meeting frequency will be once per month as for the JRA1 meeting.

Integration of the probes developed through the EMI project in SAM:

The development of the probes is out of scope of SAM and JRA1 activities. Several probes have been developed in the context of the EMI project and the JRA1 team should integrate them into the SAM framework. Some problems have been encountered concerning dependencies, environments and configurations in the definition of the packages that EMI should provide to JRA1. Moreover, the roles of EMI and the JRA1 teams in the integration process were not well defined. This caused some delay in the probe integration.

Mitigation: A working group, the EGI SAM probes WG [R 80], composed of experts from NGIs, EMI and EGI, was created to revise the probes developed by the EMI project before they are integrated into SAM framework, and to evaluate probe and monitoring-related improvements. The activity of this WG continued after the end of the EMI project.

3.5.2 Software Provisioning

End of the European Middleware projects and scattered software repositories

In response to the end of EGI's main technology providers, namely European projects EMI and IGE, SA2 is now running a lightweight coordination activity, the UMD Release Team, that is maintaining the communications with the product teams, and collecting information about their activities. The URT meetings proved to be an effective communication channel between EGI and the product teams, and also among product teams. The lack of coordination after the end of the European middleware

projects (EMI, IGE) has been effectively compensated. An indirect consequence of the end of the EMI project and changes in the release workflow of the product teams were applied: now UMD has to deal with several repositories. The UMD tools have been generalized to deal with the new scenario.

3.5.3 Community Engagement

No issues reported

3.5.4 Accelerating EGI's H2020 Goals ("Mini-Projects")

3.5.4.1 Weekly reporting misunderstanding

In the early phase of the mini-projects and the work package setup, mini-projects were grouped in one single work package (SA4) with direct technology contact and peers (the shepherds). This split of responsibilities (i.e. project management and technical management) may be compared to matrix management and was not expected by some of the mini-project leaders. This has led to some mini-projects not reporting weekly as required for some time.

Further explanation of the concept and sharing of responsibilities has resolved this situation, and reporting commences satisfactory.

3.5.4.2 Reporting of delays and issues

Early in the mini-projects setup phase the reporting of a delay or change in development priorities has slipped the attention of the affected mini-projects and the management (both technical and project). This has caused some knock-on effects on related projects where EGI.eu is also involved in an unsatisfactory manner.

This issue was more of a social issue, in that mini-project leaders expected that reporting delays would be understood as some sort of failure on their side. After reassuring and explanations of the necessity of reporting delays and issues mini-project leaders now explicitly state whether there are issues and delays that need further attention or not – with the latter being the case in almost all reports.

3.5.4.3 Mini-project team member over-commitment

The activities around resolving issue I4.3 has led to an efficient management of the situation of a mini-project leader's over-commitment in two EC-funded projects. By early reporting of this situation, the management of both affected EC projects were able to proactively resolve this to the satisfaction of all three involved parties without further knock-on effects.

3.5.4.4 Mini-project dissemination and public progress reporting

At the EGICF13, the public dissemination and networking of mini-projects was conducted through two sessions dedicated only to the mini-projects. However, the split in technical and project management between shepherds and SA4 management reflects the strategic goal of the mini-projects of focused funding to accelerate existing activities. The concrete result of this is the alternative dissemination strategy for the EGITF13: Instead of conducting separate dedicated sessions for mini-project dissemination, the individual reports will be embedded where they fit with their target technology and strategic goals.

3.5.4.5 Managing voluntary contributions into mini projects

The initial planning for the TSA4.4 task included contributions from unfunded partners, and in fact depended on these. However, these contributions did not take place despite initial planning and communication. This has led to some delay in the mini project.

Mitigation: The overall goals of the mini projects have been adjusted to an acceptable and realistic

level. The planned catching up in terms of delay will emerge towards the end of the mini project.

3.6 Project Management

The focus at the start of PY4 was the preparation for the third EC Project Review that was held in Amsterdam on 25-26 June 2013. This was attended by the project officer, 4 EC reviewers and representatives from the coordinator and the project consortium. Two rehearsals were organised (one by phone and another F2F) during June to prepare and align material in the presentations. Information was collected from the partners to prepare the Form C's and the project's work packages to prepare the periodic report.

The project through the first PMB meeting of the project year, discussed the possibility of extending the project for an additional 6 months. The project office undertook to survey the consortium to understand any financial, legal or logistical restrictions to an extension, and if there was to be an extension where the effort should be focused. The extension was approved to be 8 months in PQ15. Unspent budget for each partner was estimated and negotiated in PQ15 to define a work programme for the project extension (May – December 2014). Preparatory work for the implementation of extension of the project started. The work programme for PY5 was defined to ensure the continuation of strategic activities including: pan-European coordination, development of operational tools, user engagement and the Distributed Competence Centre, consolidation of the Federated Cloud, business development and sustainability.

Following the review and management discussions, corrective actions in the project activities of PY4 were discussed and their implementation started in order to take into account the outcome of the PY3 review. In particular, the revision of the process and structure of the user engagement activities was reviewed and the Distributed Competence Centre was created to implement the direction of the User Engagement Strategy, a living document defining the outreach priorities and the tactical actions to achieve these. A business development position was opened to lead the development of the EGI solutions and a new activity investigating the policy and legal issues related to the introduction of pay-per-use services in EGI were initiated.

Due to the need of sustaining an 8-month project extension, a plan was defined to reduce the human effort available in the project at EGI.eu by not extending various temporary contracts in the following areas:

- Project office and quality management (NA1): - 2 FTE/year
- Strategy and policy development team (NA2): - 1.5 FTE/year
- Communications team (NA2): - 2 FTE/year (graphics designer, event manager)
- User community technical support: - 0.5 FTE/year

The reduced manpower was partially compensated by hiring of new temporary contracts for user support, communications and design, and business development.

On October 15, the project direction was formally handed over by Dr. Steven Newhouse who left EGI.eu, to Dr. Tiziana Ferrari – formerly EGI Chief Operations Officer – and the management of NA2 and SA1 was respectively handed over to Sergio Andreozzi (Strategy and Policy Manager at EGI.eu) and Malgorzata Krakowian (Senior Operations Officer at EGI.eu).

The technical profile and costs of the EGI-InSPIRE operations and technical Global Tasks were reviewed in preparation to a change in funding structure from May 2014 after the end of PY4. These tasks (currently delivered through SA1 and SA2) will evolve into support services – the so-called “EGI Core Activities” – that will still be delivered by partners of the EGI collaboration, but will no longer rely on EC project funding according to the EGI services sustainability plan. A new set of partners responsible of providing these activities and services from May 2014 was appointed and the

preparation of handover of activities started.

Project management activities then concentrated on the revision of the PY4 work plan to take corrective actions taking into account PY3 recommendations, and on the definition of the PY5 work plan, the related budget covering an extension of 8-months (until December 2014) and the preparation of the 3rd DoW amendment.

Recommendation 1 and 5: Maintenance of strategic planning activities and introduction of business development. Firstly, the PY4 revision aimed at maintaining the strategic planning activities in PY4 while ensuring not only the continuation but also the strengthening of the critical ones in PY5. Strategy and policy activities carried out at EGI.eu were prioritized accordingly in order to cope for a yearly reduction of human effort of -1.5 FTE. As of Jan 2014 various activities were put on hold including: secretarial support to EGI boards, and other support activities to NA1 like the editing of the EGI Compendium, proactive monitoring of MoUs actions and editing of NGI international task and global task milestones (PM46), and the implementation of scientific review board for central access to distributed resources. In order to cope with the manpower reduction part of the tasks were redistributed among the activity managers where possible.

Priority was given to the introduction of a new function on business development activities, by hiring of a business development expert at EGI.eu, who has been responsible from Jan 2014 for developing the EGI service and solutions portfolio development, coordinating with the communication team for promotion of the EGI solutions, investigating new business opportunities on public procurement of innovation, and pre-commercial procurement in H2020. In addition activities on pay per use continued, and participating NGIs will get funding during PY5.

Recommendation 6: Maintenance and extension of the targeted outreach, new technological requirements. In order to strengthen outreach to new user communities and stimulate the gathering of new technological requirements, an EGI Engagement Strategy¹⁴⁸ was defined. The strategy is a collaborative document that receives input from:

- The strategy and policy team, the user community support team and the communication team of EGI.eu,
- The NGI international liaisons, which bring the input of the National Grid Initiatives and the engagement priorities at a national level,
- The User Community Board and the EGI champions to reflect engagement opportunities that are pursued directly by the existing user communities of EGI within their research domain.

The document is periodically updated and reviewed in collaboration with the Executive Board of EGI.eu.

The Distributed Competence Centre (DCC)¹⁴⁹ was implemented as of January 2013 as technical arm for the implementation of the engagement strategy to user communities. The DCC is not only responsible of engagement and exploration of requirements of new use cases, but also of development, testing and insertion of new technology. In the past years of the project user engagement was mainly delivered by NGI user support teams; as of January 2014, the DCC is also participated by external experts from research communities and technology providers, who are supported with human effort and/or travel budget centrally distributed by EGI.eu according to the support and training needs. During PY5 user engagement activities in the DCC will receive larger budget. In addition, as of Jan 2014 NGI user support teams will be allowed to book additional effort from task SA1.7 Support.

¹⁴⁸ <https://documents.egi.eu/document/2079>

¹⁴⁹ https://wiki.egi.eu/wiki/Distributed_Competence_Centre



Project extension PY5: Unspent budget after PY5 was estimated and reclaimed for distribution across a subset of the consortium, allowing the continuation and strengthening of user engagement through the DCC, the continuation of business development and pay per use policy activities, the development of use cases for the EGI Federated Cloud, starting its production phase in May 2014, and the continuation of the development of strategic tools. Part of the reclaimed budget will be managed centrally by EGI.eu to support the travel of partners to attend user-orientated events. The reclaimed budget will be totally redistributed across NGIs. EGI.eu activities during PY5 will be completely supported by EGI.eu unspent budget for the project period PY1-PY4.

EGI Core Activities: The selection of the partners who participated with bids to the call for EGI core activities¹⁵⁰ was completed, and the EGI.eu co-funding rate negotiation completed. The core activities only include a subset of the global tasks supported by EGI-InSPIRE (the remaining ones will be funded in PY5).

The running of the EGI core activities will no longer be supported by EGI-InSPIRE as of May 2014. The total cost is 1.5 MEuro, and the EGI.eu contribution for 2014 amounts to approximately 620 KEuro. The final EGI.eu co-funding rate for the coming two years starting in May 2014 is 40% and relies on the availability of EGI participants' fees. The remaining 60% will be contributed in-kind by the responsible partners. The planning of the technical transition to a new consortium of partners – where applicable – started already in PQ14.

Breach of obligations under Consortium Agreement: One case of Consortium Agreement breach was managed with reference to Germany JRU breaching article 9.2 “The EGI Global Tasks are co-funded by the EC and the NGIs /EIRO’s (as part of Annex 1 of this Agreement) and EGI.eu. Failure to pay any charge levied by the EGI Council for the use of the services provided through the EGI Global Tasks from EGI.eu will be considered a breach of this Agreement and dealt with under article 14”. A proposal was defined by the PMB and discussed with Germany to keep the JRU in the project requiring sanctions to be applied. In the December PMB meeting the following was approved:

- Germany participates until the end of PY4 without getting the 25% of the Global tasks funding from EGI.eu, as well as the 25% funding from the EC. Germany will provide as unfunded in-kind contribution the full set of global tasks for 2014 in full, amounting to 174,750 €.
- Germany participates to the PY5 extension as unfunded partner.

Consultation will be extended to the CB in PQ16.

3.6.1 Project Management Metrics

The project was managed through regular meetings defined by the Consortium Agreement:

- **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.

¹⁵⁰ https://wiki.eui.eu/wiki/Core_EGI_Activities



- 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.

3.6.2 Coordination Activities

Members of NA1 and NA2 have attended the consultation meeting in Brussels, e-IRG meetings, ICT 2013, the Third Plenary meeting of the Research Data Alliance as well as a number of workshops held by the EC discussing proposed activities within Horizon 2020 and coordination meetings with other European e-Infrastructures. EGI.eu organized a face-to-face meeting in January 2014 involving the board of directors of PRACE, and the Executive Board of EUDAT. Collaboration meetings with TERENA/DANTE in the area of security, cloud, communications, events and policy were organized. Additional coordination activities took place through some of the EC funded projects with which EGI-InSPIRE has collaborations – as described in the following section.

3.6.3 Cooperation with Other Projects

EGI.eu is continuously working to establish collaborations with external partners within the extended Distributed Computing Infrastructures (DCIs) community. Specifically, the EGI.eu Strategic and Policy Team lead the coordination and establishment of agreements with projects, providers, organisations and communities for joint collaboration. External collaborations continued to be established during PY4 with 4 new signed MoUs in the following categories:

- 1 Technology Provider: APARSEN
- 3 Resource Providers: Open Science Grid (USA), SAGrid (South Africa), Chinese Academy of Sciences
- 1 Other organisation: Helix Nebula Marketplace

Since the beginning of the EGI-InSPIRE project, a total of 27 MoUs were signed, of which 7 have been completed including all agreed milestones. The centralised tracking activity from the SPT has been suspended during PY4 due to the reduction of effort in the team. MoUs are now monitored by the parties involved. One more MoU is close to signature: Centre for Development of Advanced Computing (C-DAC).

Other active collaborations exist with PRACE and EUDAT for the integration of the infrastructure but these have not yet been formalised through an MoU. The collaboration with OpenAIRE is also very active and of a mutual interest demonstrated by the support of EGI needs with the release of new functionalities. EGI.eu is also partner in a number of EC-funded projects, thus representing the gateway between other communities or working contexts with the EGI community.

Through this membership, the FedSM project is contributing to the improvement of the service management practices in EGI, while EGI.eu is providing feedback on the requirements on service management from the perspective of a federated infrastructure.

Through the Helix Nebula project, EGI.eu has engaged in the work for an interoperable and integrated European federated cloud with the commercial cloud providers and also supported the development of a connector to enable to connect EGI cloud providers within the Helix Nebula Marketplace. Other projects such as ENVRI, BioVeL, DCH-RP, ER-Flow and BioMedBridges provide links and collaborations with research communities interested in using EGI. Overall, after four years, EGI has established a rich network of collaborations that are contributing to the growth of the e-Infrastructures ecosystem in Europe and worldwide.

4 DELIVERABLES AND MILESTONES

4.1 Deliverables

Id	Activity No	Deliverable / Milestone title	Lead partner	Original Delivery date(*) ¹⁵¹	Revised delivery date(*)	Status (**)
D2.23	NA2	EGI-InSPIRE Presentation https://documents.egi.eu/document/1850	EGI.eu	37	39	PMB Approved
D4.9	SA1	EGI Federated Operations Solution https://documents.egi.eu/document/1967	EGI.eu	41	41	PMB Approved
D2.26	NA2	Annual Report on EGI and its Community Engagement Activity https://documents.egi.eu/document/2126	EGI.eu	47	50	PMB Approved
D4.10	SA1	Annual Report on the EGI Production Infrastructure https://documents.egi.eu/document/2240	EGI.eu	47	50	PMB Approved
D5.12	SA2	Annual Report on the Status of Software Provisioning Activity https://documents.egi.eu/document/2219	EGI.eu	47	50	PMB Approved
D7.4	JRA1	Annual Report on Operational Tool Maintenance and Development Activity https://documents.egi.eu/document/2121	INFN	47	49	PMB Approved
D8.1	SA4	Final Report on Additional Funded Activities to Advance EGI's Strategic Goals (Mini-Projects) https://documents.egi.eu/document/2147	EGI.eu	47	48	PMB Approved
D1.16	NA1	Annual Project Report https://documents.egi.eu/document/2224	EGI.eu	48	50	PMB Approved
D2.25	NA2	EGI Sustainability Plan and Business Plan https://documents.egi.eu/document/2158	EGI.eu	48	50	PMB Approved
D1.15	NA1	Annual Report on Quality Status https://documents.egi.eu/document/2247	EGI.eu	48	50	PMB Approved
D2.35	SA2	EGI Technical Roadmap https://documents.egi.eu/document/2207	EGI.eu	48	50	PMB Approved

¹⁵¹(*) 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

4.2 Milestones

Id	Activity No	Deliverable / Milestone title	Lead partner	Original Delivery date(*) ¹⁵²	Revised delivery date(*)	Status (**)
MS238	NA2	Marketing and Communication Handbook https://documents.egi.eu/document/1967	EGI.eu	38	40	PMB Approved
MS431	SA2	Deployed Middleware Support Unit Operations Procedures https://documents.egi.eu/document/1775	CESNET	38	39	PMB Approved
MS516	SA2	Software Provisioning Process https://documents.egi.eu/document/1860	EGI.eu	38	40	PMB Approved
MS127	NA1	Quarterly Report 13 https://documents.egi.eu/document/1928	EGI.eu	40	40	PMB Approved
MS242	NA2	Review of Website Content https://documents.egi.eu/document/1904	EGI.eu	40	40	PMB Approved
MS427	SA1	Integrating Resources into the EGI Production Infrastructure https://documents.egi.eu/document/1894	EGI.eu	40	40	PMB Approved
MS243	NA2	EGI Technical Forum 2013 https://documents.egi.eu/document/1981	EGI.eu	42	42	PMB Approved
MS801	SA4	Interim Report on Additional Funded Activities to Advance EGI's Strategic Goals (Mini-Projects) https://documents.egi.eu/document/1965	EGI.eu	42	42	PMB Approved
MS128	NA1	Quarterly Report 14 https://documents.egi.eu/document/2183	EGI.eu	43	49	PMB Approved
MS518	SA2	EGI Platforms Roadmap https://documents.egi.eu/document/2232	EGI.eu	46	50	PMB Approved
MS711	JRA1	Roadmap for the Maintenance and Development of the Deployed Operational Tools https://documents.egi.eu/document/2069	KIT	46	47	PMB Approved
MS129	NA1	Quarterly Report 15 https://documents.egi.eu/document/2111	EGI.eu	46	50	PMB Approved
MS246	NA2	Security Activity within EGI https://documents.egi.eu/document/2066	STFC	46	47	PMB Approved

¹⁵²(*) 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

Id	Activity No	Deliverable / Milestone title	Lead partner	Original Delivery date(*) 152	Revised delivery date(*)	Status (**)
MS132	NA1	Work of the Asia Pacific Region https://documents.egi.eu/document/2181	ASGC	47	49	PMB Approved
MS521	SA2	EGI Federated Cloud Blueprint V2 https://documents.egi.eu/document/2109	EGI.eu	48	50	PMB Approved
MS429	SA1	EGI Service Level Agreements and Operations Level Agreements Framework https://documents.egi.eu/document/2239	EGI.eu	48	50	PMB Approved

5 EXPLANATION OF THE USE OF RESOURCES

5.1 Summary

The financial report of PY4 for the period 1/05/2013 to 30/04/2014 is, at the date of submission of material to the EC reviewers, still under preparation. The deadline for submission into the European Commission portal (NEF) for the cost claims is June 30, 2014. Therefore the collection of financial statements the partners is still ongoing. The project office will provide a draft version of the project costs by June 24 2013, as follows:

Section 1 - Form C and summary financial statement: The project office is gathering the participants FORM C, from each beneficiary and from each third party. These are to be submitted into NEF by 30 June 2013.

5.1.1 NA1

NA1, which is solely based at EGI.eu, under reported due to one member of staff who left the organisation in November 2012 and another member of staff who was on sick leave for 5 months. Project duties were reassigned to cover these absences and additional effort provided in PY4.

NA1, which is solely based at EGI.eu, under reported due to need to support the extension of PY5. The amount of effort reported is 72% of the envisaged budget. This was a necessary measure to ensure the continuation of project management activities during the project extension. One member of staff who left the organisation in November 2013 and additional member of staff dedicated to quality management left in September 2013.

5.1.2 NA2

TNA2.2 represents the Communications Team effort based at EGI.eu. During PY4 a full time member of staff left reducing the available effort for a number of months. This was made up by hiring a part time designer for the final few months of PY4 alongside a full time intern to cover some of the effort lost due to the Communications Team taking over responsibly of organising the Community Forum.

TNA2.3 a member of the SPT left in Aug 2013 while another member moved to part-time in December 2013, thus significantly reducing the effort of the Strategy and Policy Team. In Jan 2014, a new member was hired with the role of Business Development Expert to mitigate the reduced effort and to address the recommendation of the reviewers with regards to the need to strengthen the business development function. EGI.eu underspent for 50% in this task due to the mentioned changes. Consequently, some of the activities have been reduced (e.g., removed secretarial support to policy groups, dropped the EGI Compendium), while some other activities have been postponed to PY5 (e.g., the balanced scorecard needs further revision).

TNA2.1N represents the NGI International Liaison role (NIL). With the introduction of the role in Jan 2012 (but created in Nov 2011), NGIs were advised that up to 2 members of staff working as NGI International Liaisons could report under NA2.1N to represent the effort by their NILs. 108 person registered work under TNA2.1N during PY4, from which 53 worked as unfunded contributors. The remaining 55 recorded effort between 0.1 PM to 9.0 PM over the course of 1 calendar year. The data unfortunately still indicates discrepancies that need to and will be followed up with the people individually.

TNA2.6 represents the Virtual Team role. The Virtual Team concept was set in place in Jan 2012 and sought to motivate groups of EGI users who shared common needs on the grid to volunteer their efforts in developing solutions for the community. The resulting work would thus be unfunded (i.e. 0% Committed). NGI staff other than NILs could report under NA2.6N if they were working as part of recognised Virtual Team. As for TNA 2.1 above, scrutiny of the data once available for trending analysis revealed inconsistencies. Nevertheless, the error in reporting is likely to range from effort not being reported up to effort being correctly reported.

The AppDB developer team (IASA and GRNET, NGI Greece) already used its funded effort during PY1-3, and in PY4 worked as unfunded. Their contribution to the project is very significant (VM Marketplace in AppDB).

The Training Marketplace developer team (STFC, NGI UK) used slightly more effort that was planned for PY4 (10.3PM from 7.3PM, 141%).

The CRM developer team (CSIC and LIP, NGI Ibergrid) used slightly more effort that was planned for PY4 (4.3PM from 3.2PM, 137%).

5.1.3 SA1

The PY4 overall usage of WP4 resources is in-line with the project plan both for EGI Global Tasks (100.1% achieved of the Person Months committed) and NGI International Tasks (96.8% achieved of the Person Months committed). The aggregated Person Months achieved in WP4 are 103% of the committed effort.

5.1.4 SA2

During PY4 the overall consumption of the allocated effort has been 86%.

All the tasks but TSA2.1 (87%) and TSA2.4 (64%) were slightly overspending. But the total result of under spending has been affected by the heavy under spending in TSA2.4, which has been affected by CESNET consuming only 68% of the allocated effort. CESNET provides IT support for the collaboration tools and the services have not been affected by this under spending. While the overall involvement in the EGI InSPIRE remained stable over the reporting period, the focus of the involved persons shifted to other tasks that were considered more important. Namely, extensively involvement in TSA1.7 and in the Liferay related mini-project (TSA4.3). If the overprovisioning in just TSA4.3 is taken into account (0.8 FTE), the declared effort in TSA2.4 would have been 74%. (In PY4, we tried to reduce the declared effort -- while not endangering the actual extent of work -- in order to prepare CESNET for the extension, leaving with sufficient funding for PY5).

TSA2.2 and TSA2.3 had a slight and more consistent overspending, respectively 105% and 114%, mainly due to the high number of products verified (~257), the verification of various UMD Release Candidates (~27) and to the improvements of the verification process mentioned in the previous section.

TSA2.6, the task supporting the federated cloud, consumed overall the 110% of the allocated resources, this is motivated by the increasing effort to roll into production the cloud services, and compensates the under spending of PY3. Considering the small amount of allocated resources, the rolling to production of the EGI Federated Cloud mostly relied on unfunded contributions from partners.

5.1.5 JRA1



The total TJRA1.2 effort consumption is in line with the committed effort. The GRNET under-reporting has been reduced again in PY4 and it is now only a minor issue. FCTSG/CSIC over-reporting has been mitigated since the partner focused its effort in TJRA1.4 activities as planned in the roadmap defined in MS710 [R 77] at the end of PY3.

As foreseen at the end of PY3, TJRA1.4 under-reporting has been considerably reduced in PY4. A slight overall under-reporting is still present at the end of PQ15 but it will again reduce in PQ16 taking into accounting the partners reporting trend during the first three quarters of the PY4. The TJRA1.4 report evolution during the project lifetime has been fairly natural considered the type of activities planned for this task, activities that require a deep study and a careful requirements collection before starting the development phases. FCTSG/CSIC under-reporting has been rather reduced in PY4 and now can be considered acceptable. The INFN under-reporting is yet not negligible, however INFN effort consumption has been strongly increased in PY4 thanks to the activity roadmap defined at the end of PY3 (see D7.3) and it will reach acceptable values at the end of PY4.

TJRA1.3 and TJRA1.5 ended, respectively, in PY2 and PY3 with no major deviations.

6 FINANCIAL STATEMENTS PER BENEFICIARY

6.1 Summary

The following tables have been prepared using the efforts achieved over the period May 2013 to April 2014 and declared by the partners through the Project Tracking Tools (PPT). The estimated eligible costs are calculated using an average cost per person month. The percentage rate applicable within the task grouping activity (as defined in the Annex I) applies then on these eligible costs in order to determine the amount of the funding.

An overview of the actual project costs and use of resource will be provided separately as explained in section 5.1 of this document.

6.1.1 Consumption of Effort

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

Report extracted on 13 May 2014

Project Period 4

Type	Work Package	Worked Hours Funded	Worked PM Funded	Committed PM	Achieved PY4 PM %	Achieved PY3 PM %	Achieved PY2 PM %	Achieved PY1 PM %
MGT	WP1	8,620	60	82	73%	92%	99%	75%
COORD	WP2	36,309	263	419	63%	80%	91%	107%
COORD End 30/10/11	WP3	n/a	n/a	n/a	n/a	n/a	128%	106%
SUPPORT	WP4	160,989	1,167	1,199	97%	107%	108%	100%
SUPPORT	WP5	17,421	129	135	95%	88%	99%	87%
SUPPORT	WP6	n/a	n/a	n/a	n/a	91%	104%	83%
RTD	WP7	10,324	77	70	110%	92%	87%	93%
SUPPORT	WP8	15,256	109	103	106%	46%	n/a	n/a
	Total	289,274	2,121	2,179	97%	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

WP1-E - WP1 (NA1) - NA1 Management (EGI)

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	17,7	37,3	47,3%
Total:	17,7	37,3	47,3%

WP1-M - WP1 (NA1) - NA1 Management

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	43,0	44,8	96,1%
35-CERN		2,1	
Total:	43,0	46,9	91,7%

WP2-E - WP2 (NA2) - NA2 Community Engagement (EGI)

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	72,9	130,2	56,0%
12A-CSIC		2,5	
16A-GRNET	0,8	8,9	9,3%
16E-IASA	0,0	2,6	0,0%
21A-INFN	0,8	0,8	100,2%
26A-FOM	1,8	1,2	146,9%
29-LIP	4,5	3,2	142,5%
34A-STFC	15,5	12,4	125,6%
Total:	96,3	161,7	59,6%

WP2-N - WP2 (NA2) - NA2 Community Engagement

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
2-UPT		1,6	
3-IIAP NAS RA	3,0	1,8	166,7%
5A-IICT-BAS	1,1	5,7	18,9%
7A-ETH ZURICH	0,0	1,5	0,0%
7B-UZH	2,3	2,3	98,9%
7C-SWITCH	0,0	2,7	0,0%
8-UCY		4,1	
9-CESNET	9,0	5,9	152,8%
10B-KIT-G	15,2	18,5	82,5%
10E-BADW	0,0		
12A-CSIC	15,3	5,6	274,8%
12D-UPVLC	13,5	10,8	124,3%
13-CSC	6,8	11,9	57,2%
14A-CNRS	7,7	11,7	66,3%
14B-CEA	0,0	4,4	0,0%
14C-HealthGrid		0,0	
15-GRENA	1,7	1,6	102,4%
18A-MTA KFKI	0,0	2,2	0,0%
18B-BME	0,6	2,0	28,1%
18C-MTA SZTAKI	2,6	2,3	115,0%
19-TCD		1,2	
20-IUCC	6,9	0,0	--
21A-INFN	18,4	13,2	139,1%
22-VU	3,5	2,4	145,9%
23-RENAM	0,8	0,6	127,4%
26A-FOM	2,4	2,1	113,9%
26B-SARA	1,1	2,1	52,3%
27A-SIGMA		1,3	
27B-UIO		2,4	
27C-URA		4,4	
28A-CYFRONET	3,2	1,3	243,4%
28B-UWAR	4,1	5,5	73,4%
28C-ICBP		3,9	

29-LIP	2,6	0,0	
30-IPB	7,3	7,3	100,0%
31-ARNES	1,8	0,0	
31B-JSI	0,3	4,6	6,2%
32-UI SAV	13,6	7,1	190,3%
33-TUBITAK ULAKBIM	12,6	13,4	94,0%
34A-STFC	8,2	8,2	100,2%
34C-UG	1,9	1,3	147,6%
34D-IMPERIAL	0,0	1,6	0,0%
34E-MANCHESTER	0,0	1,6	0,0%
36-UCPH	2,4	3,4	68,7%
38-VR-SNIC		0,7	
38A-KTH	0,0	0,6	0,0%
39-IMCS-UL	0,3	2,6	12,6%
40A-E-ARENA	1,0	3,0	33,6%
Total:	171,0	192,5	88,9%

WP4-E - WP4 (SA1) - SA1 Operations (EGI)

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	20,9	28,2	74,0%
9-CESNET	15,3	20,8	73,9%
10B-KIT-G	16,8	20,5	81,8%
10D-JUELICH	3,3	3,0	110,8%
12A-CSIC	7,2	4,3	169,4%
12B-FCTSG	5,2	3,0	174,5%
13-CSC		2,0	
14A-CNRS	3,3	3,0	110,9%
16A-GRNET	27,7	17,5	158,5%
17-SRCE	14,8	9,8	151,8%
21A-INFN	34,3	25,4	135,2%
21B-GARR		3,0	
26A-FOM	5,1	3,0	169,5%
26B-SARA	3,6	5,8	63,3%
28A-CYFRONET	5,2	5,8	91,1%
29-LIP	12,8	7,3	176,2%
34A-STFC	18,3	19,8	92,5%

35-CERN		14,8	
38A-KTH		2,8	
38B-LIU	3,3	3,0	109,9%
Total:	197,3	202,4	97,5%

WP4-N - WP4 (SA1) - SA1 Operations

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
2-UPT	0,0	0,0	0%
3-IIAP NAS RA	17,7	4,8	372,3%
5A-IICT-BAS	9,4	6,5	145,3%
5B-IOCCP-BAS	0,0	2,0	0,0%
5C-NIGGG-BAS	2,1	6,0	34,6%
6-UIIP NASB	2,9	7,6	37,5%
7A-ETH ZURICH	4,7	8,5	54,8%
7B-UZH	0,7	4,5	15,1%
7C-SWITCH	4,2	8,6	48,9%
8-UCY	4,9	12,0	41,0%
9-CESNET	24,2	26,7	90,5%
10B-KIT-G	16,6	25,2	65,8%
10C-DESY	4,0	7,8	51,7%
10D-JUELICH	5,9	5,8	103,3%
10E-BADW	21,6	11,8	184,0%
10G-FRAUNHOFER	4,2	7,7	55,2%
10H-LUH	6,0	5,5	109,6%
11-UNI BL	12,8	9,5	134,3%
12A-CSIC	23,4	11,1	210,2%
12B-FCTSG	39,3	16,6	236,7%
12C-CIEMAT	11,5	9,5	121,4%
12D-UPVLC	12,5	7,0	178,2%
12E-IFAE	13,7	11,5	119,1%
12F-REDE.S	19,5	13,0	150,3%
12G-UNIZAR-I3A	11,5	13,0	88,2%
12H-UAB	20,2	10,0	201,7%
13-CSC	19,0	16,9	112,5%
14A-CNRS	53,0	60,6	87,4%

14B-CEA	27,0	16,0	168,7%
15-GRENA	4,9	4,8	104,0%
16A-GRNET	30,8	30,9	99,9%
16B-AUTH		3,3	
16C-CTI	7,4	3,3	226,7%
16D-FORTH	0,9	3,3	28,1%
16F-ICCS	0,0		
16G-UI	2,5	2,0	125,7%
16H-UP	3,5	2,5	141,1%
17-SRCE	18,1	18,0	100,5%
18A-MTA KFKI	15,7	16,4	96,2%
18B-BME	7,3	7,4	99,3%
18C-MTA SZTAKI	3,7	6,1	59,8%
19-TCO		13,4	
20-IUCC	23,5	6,3	375,3%
21A-INFN	46,7	89,1	52,4%
21B-GARR		3,0	
22-VU	8,8	2,0	440,6%
23-RENAM	6,2	5,1	121,2%
24-UOM	13,3	11,3	117,3%
25-UKIM	22,4	17,8	126,4%
26A-FOM	7,5	8,0	93,3%
26B-SARA	23,6	30,4	77,6%
27A-SIGMA		5,7	
27B-UIO	7,6	5,5	138,5%
27C-URA	5,5	2,8	198,9%
28A-CYFRONET	34,2	29,0	117,8%
28B-UWAR	6,5	1,7	386,2%
28C-ICBP	6,3	4,5	139,5%
28D-POLITECHNIKA WROCLAWSKA	7,1	3,1	227,5%
29-LIP	38,0	22,9	165,7%
30-IPB	29,3	29,6	98,8%
31-ARNES	21,4	10,0	214,9%
31B-JSI	28,8	12,8	226,2%
32-UI SAV	21,1	24,1	87,6%
34C-UG	16,6	14,5	114,2%
34D-IMPERIAL	18,9	14,5	130,0%
34E-MANCHESTER	19,0	14,5	131,2%

35-CERN	0,3	1,1	25,1%
36-UCPH	8,9	8,1	110,3%
38A-KTH	0,0	0,0	0%
38B-LIU	7,6	4,8	159,0%
38C-UMEA	11,3	12,1	93,5%
39-IMCS-UL	6,9	6,0	114,5%
40A-E-ARENA	0,9		
40B-SINP MSU	9,7	2,9	334,7%
40C-JINR	3,8	3,0	126,0%
40D-RRCKI	3,8	3,3	117,3%
40F-ITEP	3,5	3,0	115,9%
40G-PNPI		0,0	
51A-ICI	6,3	1,1	564,1%
51C-UPB		0,0	
51D-UVDT	1,5	2,3	65,9%
51E-UTC	0,0	2,3	0,0%
51H-INCAS		0,0	
51J-UB	1,5	0,5	304,6%
Total:	1.019,9	933,5	109,3%

WP5-E - WP5 (SA2) - SA2 Provisioning Soft. Infrastr. (EGI)

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	7,9	9,0	87,7%
9-CESNET	11,3	15,0	75,3%
10D-JUELICH		0,0	
12A-CSIC	13,1	13,3	99,0%
12B-FCTSG	7,2	4,3	170,2%
16A-GRNET	18,8	14,0	134,5%
16B-AUTH		3,3	
16E-IASA	1,3	3,3	39,0%
16F-ICCS	3,1	3,3	94,0%
21A-INFN		0,0	
29-LIP	20,3	17,5	115,8%
38B-LIU		0,0	
Total:	83,0	82,8	100,2%

WP5-N - WP5 (SA2) - SA2 Provisioning Soft. Infrastr.

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGIEU	4,3	2,5	172,2%
9-CESNET	3,0	1,5	200,0%
10B-KIT-G	6,0	6,0	100,7%
10D-JUELICH	3,7	3,0	121,9%
10H-LUH	2,2	2,0	110,3%
12B-FCTSG	3,6	3,0	118,6%
14A-CNRS	3,9	5,0	78,8%
21A-INFN	16,1	11,0	146,5%
26B-SARA	0,0	3,0	0,0%
32-UI SAV	6,1	6,0	101,8%
34F-OXFORD	2,8	3,0	92,7%
38A-KTH	6,9	5,0	138,4%
Total:	58,6	51,0	115,0%

WP6-G - WP6 (SA3) - SA3 Sces for Heavy User Comm.

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
10G-FRAUNHOFER		0,8	
12A-CSIC		0,8	
12C-CIEMAT		0,5	
13-CSC		0,5	
14A-CNRS		1,9	
14B-CEA		0,2	
14C-HealthGrid		0,2	
19-TCD		0,5	
21A-INFN		0,7	
21C-INAF		0,8	
21D-UNIPG		0,3	
21E-SPACI		0,4	
28C-ICBP		0,2	
31B-JSI		0,1	
32-UI SAV		0,2	
35-CERN		11,5	

37-EMBL		0,0	
Total:		19,4	

WP7-E - WP7 (JRA1) - JRA1 Operational Tools (EGI)

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
10B-KIT-G	12,1	11,8	103,1%
12B-FCTSG	0,6	3,0	19,5%
14A-CNRS	3,9	3,0	129,5%
16A-GRNET	2,9	3,0	96,0%
17-SRCE	3,5	3,0	115,7%
21A-INFN	6,2	6,0	104,1%
34A-STFC	7,7	6,0	128,1%
35-CERN		3,0	
Total:	36,9	38,8	95,1%

WP7-G - WP7 (JRA1) - JRA1 Operational Tools

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
10H-LUH	5,4	6,0	90,3%
12B-FCTSG	7,2	6,0	120,4%
14A-CNRS		1,5	
17-SRCE		0,0	
21A-INFN	7,8	8,7	90,1%
34A-STFC	14,9	9,0	165,6%
35-CERN		0,0	
Total:	35,4	31,1	113,5%

WP8-S - WP8 (SA4) - SA4 Advancing EGI's Strategic Goals

Partner	PY4		
	Worked PM Funded	Committed PM	Achieved PM %
1-EGLEU	0,0	0,4	0,0%
9-CESNET	18,1	14,8	122,4%

10D-JUELICH	4,5	3,4	130,0%
12A-CSIC	10,3	7,7	133,8%
12B-FCTSG	10,8	7,7	140,1%
14A-CNRS	25,3	23,4	108,0%
16A-GRNET	3,6	6,0	59,9%
17-SRCE	4,6	4,3	106,5%
18C-MTA SZTAKI	0,0	2,6	0,0%
21A-INFN	1,0	1,9	52,3%
26B-SARA	14,5	12,0	120,6%
28A-CYFRONET	10,0	9,2	108,8%
34A-STFC	5,2	4,3	120,6%
38A-KTH	3,2	5,1	63,1%
Total:	111,0	102,9	107,9%

6.1.2 Overall Financial Status

Provided by the PO from the partner cost claims. Partners will be asked to provide responses to financial consumption that is significantly above or below plans.

Note that the financial overview below includes the repayment of Global tasks by EGI.eu.

Partner	PY4				
	Worked PM Funded	Committed PM	Achieved PM	Eligible Cost Estimate	Estimated Funding
1-EGLEU	166,7	252,5	66,0%	1.480.179,1	924.509,9
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	10,5	12,2	86,3%	64.189,7	21.182,6
5B-IOCCP-BAS	0,0	2,0	0,0%	0,0	0,0
5C-NIGGG-BAS	2,1	6,0	34,6%	12.689,7	4.187,6
6-UIIP NASB	2,9	7,6	37,5%	10.971,4	3.620,6
7A-ETH ZURICH	4,7	10,0	46,7%	39.959,4	13.186,6
7B-UZH	3,0	6,8	43,6%	20.798,4	6.863,5
7C-SWITCH	4,2	11,3	37,2%	58.372,2	19.262,8
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	66,7	81,9	81,5%	593.453,7	239.530,6
10C-DESY	4,0	7,8	51,7%	35.623,2	11.755,6
10D-JUELICH	17,4	15,2	114,5%	154.602,9	72.703,0
10E-BADW	21,6	11,8	184,0%	192.344,4	63.473,7

10G-FRAUNHOFER	4,2	8,4	50,3%	37.676,4	12.433,2
10H-LUH	13,7	13,5	101,1%	121.442,7	43.449,3
11-UNI BL	12,8	9,5	134,3%	52.224,0	17.233,9
12A-CSIC	69,3	45,1	153,6%	541.762,9	239.682,4
12B-FCTSG	74,0	43,6	169,8%	578.461,4	247.700,9
12C-CIEMAT	11,5	10,0	115,4%	90.200,0	29.766,0
12D-UPVLC	26,0	17,8	145,5%	202.918,7	66.963,2
12E-IFAE	13,7	11,5	119,1%	107.089,0	35.339,4
12F-RED.ES	19,5	13,0	150,3%	152.780,3	50.417,5
12G-UNIZAR-I3A	11,5	13,0	88,2%	89.637,0	29.580,2
12H-UAB	20,2	10,0	201,7%	157.676,8	52.033,3
13-CSC	25,8	31,3	82,4%	266.096,1	87.811,7
14A-CNRS	97,1	110,1	88,2%	839.152,8	379.225,8
14B-CEA	27,0	20,6	130,9%	233.205,7	76.957,9
14C-HealthGrid		0,2			
15-GRENA	6,6	6,4	103,6%	16.282,9	5.373,3
16A-GRNET	84,7	80,2	105,6%	655.721,0	294.221,0
16B-AUTH		6,5			
16C-CTI	7,4	3,3	226,7%	57.025,4	18.818,4
16D-FORTH	0,9	3,3	28,1%	7.076,6	2.335,3
16E-IASA	1,3	5,9	21,7%	9.818,7	4.909,4
16F-ICCS	3,1	3,3	94,0%	23.647,5	11.823,8
16G-UI	2,5	2,0	125,7%	19.460,6	6.422,0
16H-UP	3,5	2,5	141,1%	27.303,8	9.010,2
17-SRCE	40,9	35,0	116,8%	203.005,7	91.900,8
18A-MTA KFKI	15,7	18,6	84,8%	61.777,4	20.386,5
18B-BME	7,9	9,3	84,3%	43.410,9	14.325,6
18C-MTA SZTAKI	6,3	11,0	57,2%	38.123,5	12.580,8
19-TCD		15,1			
20-IUCC	30,4	6,3	485,6%	391.727,5	129.270,1
21A-INFN	131,4	156,8	83,8%	858.937,6	335.725,3
21B-GARR		6,0			
21C-INAf		0,8			
21D-UNIPG		0,3			
21E-SPACI		0,4			
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
26A-FOM	16,7	14,3	116,8%	170.803,2	68.285,2

26B-SARA	42,8	53,2	80,4%	438.071,4	213.118,8
27A-SIGMA		7,0			
27B-UIO	7,6	7,9	96,5%	75.590,4	24.944,8
27C-URA	5,5	7,2	76,5%	54.254,8	17.904,1
28A-CYFRONET	52,6	45,2	116,3%	450.081,6	192.009,5
28B-UWAR	10,5	7,2	146,2%	90.062,6	29.720,6
28C-ICBP	6,3	8,6	73,1%	53.733,3	17.732,0
28D-POLITECHNIKA WROCLAWSKA	7,1	3,1	227,5%	60.366,3	19.920,9
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	23,1	10,0	232,5%	138.684,0	45.765,7
31B-JSI	29,1	17,4	167,1%	174.571,0	57.608,4
32-UI SAV	40,8	37,5	108,9%	326.375,4	107.703,9
33-TUBITAK ULAKBIM	41,9	46,0	90,9%	294.624,0	97.225,9
34A-STFC	94,9	85,4	111,1%	974.880,3	427.122,8
34B-UE		0,0			
34C-UG	18,5	15,8	117,0%	190.021,7	62.707,2
34D-IMPERIAL	18,9	16,1	117,1%	193.640,9	63.901,5
34E-MANCHESTER	19,0	16,1	118,1%	195.354,1	64.466,8
34F-OXFORD	2,8	3,0	92,7%	28.569,3	9.427,9
35-CERN	0,3	32,5	0,9%	4.037,4	1.332,3
36-UCPH	11,2	11,5	97,8%	124.110,6	40.956,5
37-EMBL		0,0			
38-VR-SNIC		0,7			
38A-KTH	10,2	13,5	75,1%	116.264,3	53.956,1
38B-LIU	10,9	7,8	140,1%	124.568,9	47.518,4
38C-UMEA	11,3	12,1	93,5%	129.653,3	42.785,6
39-IMCS-UL	7,2	8,6	83,7%	56.728,0	18.720,2
40A-E-ARENA	1,9	3,0	65,5%	7.673,3	2.532,2
40B-SINP MSU	9,7	2,9	334,7%	38.432,1	12.682,6
40C-JINR	3,8	3,0	126,0%	15.094,4	4.981,1
40D-RRCKI	3,8	3,3	117,3%	15.094,1	4.981,1
40F-ITEP	3,5	3,0	115,9%	13.763,8	4.542,1
40G-PNPI		0,0			
51A-ICI	6,3	1,1	564,1%	38.284,0	12.633,7
51C-UPB		0,0			
51D-UVDT	1,5	2,3	65,9%	9.019,8	2.976,5
51E-UTC	0,0	2,3	0,0%	0,0	0,0
51H-INCAS		0,0			



51J-UB	1,5	0,5	304,6%	9.260,3	3.055,9
Totals:	1.869,9	1.900,2	101,6%	14.667.924,0	6.092.069,9

6.1.3 Issues and mitigation

To be provided following analysis of the submitted Form Cs.

6.1.4 Deviations from linear plan

To be provided following analysis of the submitted Form Cs.

7 ANNEX A1: DISSEMINATION AND USE

7.1 Main Project and Activity Meetings

Date	Location	Title	Participants	Outcome (Short report & Indico URL)
19-21 Jun 2013	CERN	SAM Workshop		
25-26 Jun 2013	Amsterdam, NL	3rd EGI-InSPIRE Review		Q&A Notes: https://documents.egi.eu/document/1838
8 Oct 2013	CERN	Tracking Tools Evolution TF meeting on savannah, jira and a new ggus dev. item	8	https://indico.cern.ch/conferenceDisplay.py?confId=272822
8 Oct 2013	CERN	3rd savannah-ggus-cms meeting for the WLCG tracktools TF	5	https://indico.cern.ch/conferenceDisplay.py?confId=272817
9 Oct 2013	CERN	2nd meeting on savannah-to-jira migration of the GGUS dev. tracker for the WLCG tracktools TF	4	http://indico.cern.ch/conferenceDisplay.py?confId=272814
4-6 Dec 2013	Amsterdam, NL	EGI towards Horizon 2020 workshop	135	https://indico.egi.eu/indico/conferenceDisplay.py?confId=1893
16-20 Sep 2013	Madrid, ES	EGI Technical Forum 2013	471	http://tf2013.egi.eu/
19-23 May 2014	Helsinki, FI	EGI Community Forum 2013	373	http://cf2013.egi.eu/

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

7.2 Conferences/Workshops Organised

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.
28-30 May 2013	LLR Polytechnique, Palaiseau, FR	LCG France and France Grilles operations meeting	50	https://indico.in2p3.fr/conferenceDisplay.py?confId=8140
18-19 Jun 2013	LPC Clermont Ferrand, FR	NGI Security meeting	18	https://indico.in2p3.fr/conferenceDisplay.py?confId=8454

26-30 Aug 2013	Karlsruhe, DE	GridKa School 2013 "Big Data, Clouds and Grids"	World-wide Grid experts and students	http://gridka-school.scc.kit.edu/2013/index.php
26-30 Aug 2013	Karlsruhe, DE	EGI CSIRT - Security training at GridKa School 2013	Security staff	https://wiki.egi.eu/wiki/EGI_CSIRT:Main_Page
5 Sep 2013	Amsterdam	EGI Webinar on CVMFS infrastructure for EGI VOs	45	https://indico.egi.eu/indico/conferenceModification.py?confId=1809
16 Sep 2013	Madrid, ES	EGI TF13	350	https://indico.egi.eu/indico/conferenceDisplay.py?confId=1417
16 Sep 2013	Madrid, ES	Training Workshop at EGI Tech Forum	2	
17 Sep 2013	Madrid, ES	New developments in WLCG for Run2	M. Salichos, G. Donvito, P. Saiz, J. Flix and J. Pina	A workshop within the EGI Technical Forum celebrated in Madrid from 16-20 September 2013. The link to the session, chaired by J. Flix and M. Delfino, is available in: https://indico.egi.eu/indico/sessionDisplay.py?sessionId=53&confId=1417#20130917
19-20 Sep 2013	Madrid, ES	IBERGRID 2013, 7th Iberian Grid Infrastructure Conference	(~50)	The 2013 IBERGRID conference was organized by IBERGRID (ES-NGI and PT-NGI), in Madrid and co-located with the EGI Technical Forum 2013. The main topics of IBERGRID 2013 Conference were:
27 Sep 2013	Evagoras Lanitis Centre Limassol, CY	European Researcher's Night, 27 September 2013	150	LINC participated in the annual European Researcher's Night "Exploring science through fun learning", introducing to the public the research activities of the laboratory. The Cyprus 2013 event with theme "Science Rocks" took place in Limassol. http://grid.uce.ac.cy/index.php/news/103-researchers-night-2013
30 Sep - 1 Oct 2013	CSCS, Lugano, CH	GridKa Cloud T1-T2 yearly face to face	25	ATLAS German cloud sites' technical solutions discussed. Direct contact between CSCS admins and ATLAS operation experts, https://indico.cern.ch/conferenceDisplay.py?confId=261676

17 Oct 2013	Online	Meeting	Institute for Informatics and Automation Problems (Armenia, National academy of sciences) + United Institute of Informatics Problems (Belarus, National academy of sciences)	A work program on establishing a joint grid-infrastructure for hydrometeorology research
23 Oct 2013	Amsterdam Chaired webinar	EGI Webinar on GSI-SSHTerm	40	https://indico.egi.eu/indico/conferenceDisplay.py?confId=1786
13-15 Jan 2014	Abingdon, UK	EUGridPMA Plenary Meeting	25	https://www.eugridpma.org/meetings/2014-01/ https://www.eugridpma.org/meetings/2014-01/summary-eugridpma-2014-01-abingdon.txt
15-16 Jan 2014	Abingdon, UK	SCI meeting	25	Hosted and chaired this meeting of the Security for Collaborating Infrastructures activity. Produced a new version of the document and planned future activities: http://agenda.nikhef.nl/conferenceDisplay.py?confId=2586
6 Feb 2014	Pilsen, CZ	Hands-on workshop in the West Bohemian University	20	
8 Feb 2014	Prague, CZ	Hands-on workshop how to start with Grid for ELI ESFRI project		
28 Feb 2014	Tbilisi, GE	GRID infrastructure and services	15	
18 Mar 2013	Jan Evangelista Purkyně University in Ústí nad Labem, CZ	CESNET Days		

31 Mar 2014	ITQB, Oeiras, PT	Exploit the power of the European computer grid infrastructure for Structural Biology	15	http://www.lip.pt/events/2014/grid_tutorial/
28 Apr 2014	Universidade de Lisboa, PT	Tutorial for ITQB users	15	

7.3 Conferences/Workshops Attended

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.
7-8 May 2013	Boulder, Colorado, USA	Security for Collaborating Infrastructures	Rep from STFC	http://indico.cern.ch/conferenceDisplay.py?confId=246253 Organised and chaired meeting to work on building trust and standards in security policies and procedures
13 May 2013	Barcelona, ES	LHCP Conference	2	The LHC Tier1 at PIC: experience from first LHC run (http://lhcp2013.ifae.es/)
13-15 May 2013	Kyiv, UA	EUGridPMA 28th meeting	2	Presented CALG self-audit, https://www.eugridpma.org/meeting/2013 http://agenda.nikhef.nl/conferenceDisplay.py?confId=2493 .
13-17 May 2013	Leinsweiler Hof, DE	8th Belle II Computing Workshop	1	presentation of CESNET, http://kds.kek.jp/conferenceTimeTable.py?confId=11545#20130515
21-23 May 2013	CERN	LHCb Computing Workshop	1	
22-23 May 2013	Dublin, IE	e-IRG Workshop	Rep from EGI.eu	http://www.e-irg.eu/e-irg-events/events-archive/2013/workshop-22-23-may.html
27 May 2013	Berlin, DE	7th dCache WS	1	Martinelli presented a local solution for establishing advisory quotas for users and groups (q.v. progress summary)
2-4 Jun 2013	Siauliai, LT	Nordugrid 2013	~40	http://indico.hep.lu.se//conferenceDisplay.py?confId=1273
2-6 Jun 2013	Maastricht, NL	TERENA Networking Conference 2013	1 Rep from STFC and EGI.eu	https://tnc2013.terena.org/ Participated in all Federated Identity Management tracks including REFEDs meeting to represent FIM4R Activity
3-4 Jun 2013	CSCS Lugano, CH	Infiniband Foundation Course	1	
4-6 Jun 2013	Siauliai, LT	NorduGRID 2013 conference	1	Meeting with ARC middleware developers, http://www.nordugrid.org/NorduGrid2013/

5 Jun 2013	Chisinau, Academy of Sciences of Moldova, MD	Information Day on the NATO Science for Peace and Security Programme	Representatives from research institutions of the Academy of Sciences and universities of Moldova	Presentation of Dr. Peter Bogatencov: "NATO support to networking infrastructure and services development for research and education in Moldova. Research and Educational e-Infrastructures in Moldova"
6 Jun 2013	RAL, UK	UK HEP System Managers Workshop	1	
10 Jun 2013	CERN	Atlas Software and Computing Week	1	
24 Jun 2013	UCL, UK	JANET High Throughput Networking workshop		
26 Jun 2013	Lisbon, PT	FET- Flagship HBP: Workshop on Human Brain Project: A roadmap for Portugal	1	http://www.gppq.fct.pt/_7pq/eventos.php?id=987
27 Jun 2013	Imperial College, London, UK	GridPP workshop	1	Future of Big Data Management
22-28 Jun 2013	Albena, BG	5th International Conference AmiTaNS'13 – "Fifth Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences"	R&D representatives from European countries	Dr. Peter Bogatencov presented joint report: Boris RYBAKIN, Peter BOGATENCOV, Grigore SECRIERU, Nicolai ILIUHA - "Mathematical modelling of impulsive loading of explosive charge"

1-6 Jul 2013	SZTAKI, Budapest, HU	Summer School on Grid and Cloud Workflows and Gateways	30	Summer School on Grid and Cloud Workflows and Gateways has been organized from 1st to 6th June 2013 at SZTAKI, Budapest, Hungary. The summer school was organized by the SCI-BUS, ER-flow, and SZTAKI Cloud project, but its subject was not restricted to the technologies developed by these projects. Participants got detailed view on how the various Grid, Cloud middleware technologies can be combined and utilized via high level user-oriented tools and environments like science gateways and workflow systems. Nikola Grkic from the Institute of Physics Belgrade participated in the school, and as the outcome a first NGI_AEGIS gUSE/WS-PGRADE portal has been deployed at AEGIS01-IPB-SCL Grid site.
12-22 Jul 2013	National House of Mihajlo Idvorski Pupin, Idvor, RS	Java in physics simulation	30	In Idvor, home village of the scientist and inventor Mihajlo Pupin, best known for his numerous patents related to long-distance telephone communication, an educational and research summer camp for high school students has been organized. It featured lectures on Java programming for simulations in physics. As a part of this 10-day camp, Dusan Vudragovic from the Institute of Physics Belgrade presented overview of the Grid technologies, usage of the Java programming language in Grid environment, and demonstrated one Grid-related tool developed in Java.
20-23 Aug 2013	Chisinau, IMI ASM, MD	International Workshop on Intelligent Information Systems	Representatives from research institutions of the Academy of Sciences and universities of Moldova, R&D representatives from European countries	Inga Titchiev presented joint report: Inga Titchiev, Nicolai Iliuha, Mircea Petic. "Workflow Petri nets used in modeling of Parallel architectures" Elena Gutuleac presented joint report: Boris Rybakin, Grigore Secieru, Elena Gutuleac. "Numerical analysis of reaction of buried charge to explosive or seismic loading", "Deployment of a Federated Cloud Infrastructure in the Black Sea Region")
9-11 Sep 2013	Bucharest, RO	EUGridPMA Plenary Meeting	17	URL event: https://www.eugridpma.org/meetings/2013-09/ URL report: https://www.eugridpma.org/meetings/2013-09/summary-eugridpma-2013-09-bucharest.txt

06-14 Sep 2013	Varna, BG	XXIV International Symposium on Nuclear Electronics and Computing	Computer Science and High Energy Physics experts	http://nec2013.jinr.ru , H. Oganezov made presentation on TIER3 facilities in Armenia"
11-13 Sep 2013	Salamanca, ES	HAIS	1	Conference Programe URL: http://hais13.usal.es/
16-20 Sep 2013	Madrid, ES	EGI Technical Forum		http://tf2013.egi.eu/
16-20 Sep 2013	Madrid, ES	LIFEWATCH workshop at EGI TF 2013	1	
17-20 Sep 2013	Madrid, ES	CAEPIA	1	Conference Programe URL: http://cae pia13.aepia.org/
19 Sep 2013	Madrid, ES	GlobusEurope	LRZ	http://www.egcf.eu/events/globuseurope-2013/
19-20 Sep 2013	Madrid, ES	IBERGRID 2013, 7th Iberian Grid Infrastructure Conference	(~50)	Conference Programe URL: http://www.ibergrid.eu/2013/programme.html
19-20 Sep 2013	Barcelona, ES	European Conference on Complex Systems 2013	1	Conference Programe URL: http://www.eecs13.eu/
22-27 Sep 2013	Oxford, UK	EFTC2013	1	Conference Programe URL: http://www.eftc2013.org.uk/
24-25 Sep 2013	London, UK	GridPP 31 – UK Grid for LHC Collaboration Meeting	60	http://www.gridpp.ac.uk/gridpp31/
24-25 Sep 2012	London, UK	GridPP31	3	Presentation on Accounting: http://www.gridpp.ac.uk/gridpp31/
23-27 Sep 2013	Yerevan, AM	The 9th International Conference on Computer Science and Information Technologies	Computer Science and Information Technologies experts	http://www.csit.am/ , H. Astsatryan made presentation "Deployment of a Federated Cloud Infrastructure in the Black Sea Region"
23-27 Sep 2013	Yerevan, AM	The 9th International Conference on Computer Science and Information Technologies	Computer Science and Information Technologies experts	http://www.csit.am/ , A. Mirzoyan made presentation "Environment for Access to the Inventory of Stationary Point Sources of Emissions of Air Pollutants in Armenia"

23-27 Sep 2013	Erevan, AM	Conference: Computer Science and Information Technologies. CSIT	R&D representatives from European countries	Tree articles were published: 1. “e-Infrastructures for Research and Education in Eastern Europe Partnership Countries”; 2. “Deployment of a Federated Cloud Infrastructure in the Black Sea Region”. walhers?) 3. “Rising Skill of Young Researches of Moldova in Using High Performance Technologies”
26-28 Sep 2013	Constanta, RO	Network Architecture for the Development of Scientific Computing Infrastructure in Moldova	R&D representatives from European countries	Dr. Peter Bogatencov presented joint report: Dr. Peter Bogatencov, Dr. Grigore Secieru and Nicolai Iliuha. “Network Architecture for the Development of Scientific Computing Infrastructure in Moldova”
30 Sep - 1 Oct 2013	Lugano, CH	ATLAS gridka Cloud F2F meeting	Wuppertal	http://www.lhep.unibe.ch/gsciacca/GridKa-f2f-2013.html
30 Sep - 3 Oct 2013	Helsinki, FI	VAMP/REFED S/FIM4R Identity Management Meetings	2	http://www.terena.org/activities/vamp/ws2/Progress plan for federated IdM in eResearch
1-4 Oct 2013	Visegrad, HU	Nordugrid workshop	Christian Soettrup	Helping Super Computer clusters connect to the EGI infrastructure. http://indico.hep.lu.se/conferenceDisplay.py?confId=1362
7-9 Oct 2013	Linköping, SE	EGI/PRACE/UDAT Security training and workshop	1	https://www.nsc.liu.se/joint-sec-training/Planning future collaboration on security operations
13 Oct 2013	Linköping, SE	EGI/PRACE/UDAT joint security event	Luis Alves	
14-18 Oct 2013	Amsterdam, NL	CHEP 2013	16	http://indico.cern.ch/conferenceTimeTable.py?confId=214784#20131014 - http://www.chep2013.org/
14-18 Oct 2013	Amsterdam, NL	CHEP 2013	DESY-HH	Poster: Job Scheduling in Grid Farms
16-18 Oct 2013	Amsterdam, NL	CHEP 2013	2	http://www.chep2013.org spoke on SCI work in a parallel session on Infrastructures
22 Oct 2013	Amsterdam, NL	TCB and H2020		https://indico.egi.eu/indico/conferenceDisplay.py?confId=1906
23 Oct 2013	Lausanne, CH	HPC-CH Forum	Michael Rolli, Nico Faerber	
27 Oct – 01 Nov 2013	Ann Arbor, Michigan, USA	HEPiX Fall2013	5	http://indico.cern.ch/conferenceDisplay.py?vw=True&confId=247864

6-8 Nov 2013	La Plata, AR	TAGPMA and IGTF All Hands meeting		Attended this IGTF meeting representing WLCG and EGI and gave several presentations: http://indico.rnp.br/conferenceDisplay.py?confId=173
6 - 8 Nov 2013	Vilnius, LT	ICT2013	5,000	EGI booth with partners in the ICT village http://ec.europa.eu/digital-agenda/events/cf/ict2013/item-display.cfm?id=11225
12-18 Nov 2013	Denver, Colorado, USA	SuperComputing'13	10,000	EGI booth with partners in the exhibition hall http://iebms.heiexpo.com/iebms/oep/oep_p2_details.aspx?sessionId=faf1fa4fhkfaoei5fg1fe4&OrderNbr=6395
10 Dec 2013	Geneva, CH	Identity Mgmt. in WLCG Workshop		Attended to help lead directions to be consistent with IdM activities in EGI: http://indico.cern.ch/conferenceDisplay.py?confId=272770
16-17 Jan 2014	Oxford, UK	OGF40		Attended and contributed to working groups in the Security Area: http://www.ogf.org/dokuwiki/doku.php/events/ogf-40
22 Jan 2014	Hamburg, DE	LSDA AAI Workshop		Gave presentations on AAI/IdM in EGI and related legal aspects: https://indico.desy.de/conferenceDisplay.py?confId=909

7.4 Publications

Publication title	Journal / Proceedings title	DOI code	Journal references <i>Volume number</i> <i>Issue</i> <i>Pages from - to</i>	Authors <i>Initials</i>	Authors <i>Surname</i>
OIGI 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	M. D. A. A. E. G. R. P.	Bencivenni Michelotto Ceccanti Cristofori Fattibene Misurelli Brunetti Veronesi
Grandi infrastrutture di storage per il calcolo ad elevato throughput e Cloud	Workshop GARR CSD Selected paper		ISBN 978-88-905077-4-8, pag.50-56	M. A. L. M. D. M. A. P.P. E. V. V. V. G.	Di Benedetto Cavalli Dell'Agnello Favaro Gregori Pezzi Prosperini Ricci Ronchieri Sapunenko Vagnoni Venturi Zizzi

Distributed Open Cloud Computing, Storage e Network con WNoDeS: Esperienza ed Evoluzione	Workshop GARR CSD Selected paper		ISBN 978-88-905077-4-8, pag.63-67	D. M. V. G. A. E. D.	Andreotti Caberletti Ciaschini Dalla Torre Italiano Ronchieri Salomoni
Sull'interoperabilita' tra le risorse locali, Grid e Cloud per la realizzazione di un'infrastruttura di calcolo distribuito in Italia	Workshop GARR CSD Selected paper		ISBN 978-88-905077-4-8, pag.69-75	D. G. R., R. M. A. G. S. R. R. D.	Scardaci Andronico Barbera Bruno Fargetta Fornaia La Rocca Monforte Ricceri Rotondo Saitta
Realizzazione di un'infrastruttura Cloud pilota basata su OpenStack	Workshop GARR CSD Selected paper		ISBN 978-88-905077-4-8, pag.76-82	L. E. M. H. D. A. P. V.	Fano' Illic Fattibene Manzali Riahi Salomoni Valentini Veronesi Venturi
Implementation of PKI IDP Management Systems for Access to Resources of European R&E E-Infrastructures	Proceedings of ITSEC-2012, International Conference on Information Technologies and Security, Chisinau, 15-16 October 2012		NCAA, 2013, pp. 227-237. ISBN 978-9975-4172-3-5	P. V.	Bogatencov Pocotilenco
Dipolar Bose-Einstein Condensates in Weak Anisotropic Disorder	Phys. Rev. A		88 (2013) 013624 DOI: 10.1103/PhysRevA.88.013624	B. A. A.	Nikolic Balaz Pelster
Scaling Exponents and Phase Separation in a Nonlinear Network Model Inspired by the Gravitational Accretion	Physica D		255 (2013) 52 DOI: 10.1016/j.physd.2013.04.004	A. A. A.	Bogojevic Balaz Belic

Nonadiabatic Molecular Dynamics Simulation for Carrier Transport in a Pentathiophene Butyric Acid Monolayer	Phys. Rev. B		87 (2013) 205117 DOI: 10.1103/PhysRevB.87.205117	J. N. L.	Ren Vukmirovic W. Wang
Poster: Handling Worldwide LHC Computing Grid Critical Service Incidents	CHEP2013				HD, GG
More computing resources at no cost: Desktop Grids	Inspired newsletter		Issue 13	R.	Lovas
Cloud resources at BIFI	EGI Technical Forum 2013 Conference Abstract		https://indico.egi.eu/indico/contributionDisplay.py?sessionId=11&contribId=115&confId=1417	J.	Ibar et al
Running Hadoop in the cloud	EGI Technical Forum 2013 Conference Abstract		https://indico.egi.eu/indico/contributionDisplay.py?sessionId=11&contribId=115&confId=1417	A.	Simon et al
Managing and using interoperable DCIs through a standard-based Science Gateway	EGI Technical Forum 2013 Conference Abstract		https://indico.egi.eu/indico/contributionDisplay.py?sessionId=1&contribId=11&confId=1662	M.	Díaz et al
Standard-based Interoperability amongst HPC, Grid and Cloud Resources Distributed Worldwide with Catania Science Gateways	EGI Technical Forum 2013 Conference Abstract		https://indico.egi.eu/indico/contributionDisplay.py?contribId=189&confId=1417	M.	Rodríguez-Pascual et al
Towards an Agile Infrastructure: IFCA experience	EGI Technical Forum 2013 Conference Proceedings		https://indico.egi.eu/indico/contributionDisplay.py?sessionId=27&contribId=256&confId=1417	P. A.	Orviz Lopez
SPARKS, a dynamic power-aware approach for managing computing cluster resources	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 3-15	G.	Borges et al

Towards Federated Cloud Image Management	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 33-44	A.	Simon et al
Graph Database for Structured Radiology Reporting	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 61-74	I.	Blanquer et al
Big data and urban mobility	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 75-88	A.	Tugores et al
Analyzing File Access Patterns in Distributed File-systems	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 89-101	J.	Gomes et al
Studying the improving of data locality on distributed Grid applications in bioinformatics	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 103-115	I.	Blanquer et al
Platform to Ease the Deployment and Improve the Availability of TRENCADIS Infrastructure	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 133-145	M.	Caballer et al
Analysis of Scientific Cloud Computing requirements	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 147-158	A.	Lopez et al
Easing the Structural Analysis Migration to the cloud	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 159-171	M.	Caballer et al
Leveraging Hybrid Data Infrastructure for Ecological Niche Modeling: The EUBrazilOpenBio Experience	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 175-187	I.	Blanquer et al

An unattended and fault-tolerant approach for the execution of distributed applications	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 189-202	M.	Rodríguez-Pascual et al
Calculation of Two-Point Angular Correlation Function: Implementations on Many-Cores and Multicores Processors	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 203-214	M.	Cárdenas et al
Performance Assessment of a Chaos-based Image Cipher on Multi-GPU	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 215-226	J.	Rodríguez et al
The LHC Tier1 at PIC: experience from first LHC run and getting prepared for the next	7th Iberian Grid Infrastructure Conference Proceedings		Ed.: Editorial Universitat Politècnica de València, ISBN: 978-84-9048-110-3, Pages: 241-253	J.	Flix et al
Utilization of the Computational Resources Provided by HP-SEE Project	International Workshop on Intelligent Information Systems. 20-23 August, Chisinau, IMI ASM, 2013		Proceedings IIS2013, pp. 60-64, ISBN 978-9975-4237-1-7	P.	Bogatencov
Numerical analysis of reaction of buried charge to explosive or seismic loading	International Workshop on Intelligent Information Systems. 20-23 August, Chisinau, IMI ASM, 2013		Proceedings IIS2013, pp. 148-151, ISBN 978-9975-4237-1-7	B.	Rybakin
Workflow Petri nets used in modeling of Parallel architectures	International Workshop on Intelligent Information Systems. 20-23 August, Chisinau, IMI ASM, 2013		Proceedings IIS2013, pp. 163-167, ISBN 978-9975-4237-1-7	I.	Titchiev

Using Adaptive Mesh Refinement Strategy for Numerical Solving of Gas Dynamics Problems on Multicore Computers	High-Performance Computing Infrastructure for South East Europe's Research Communities . Results of the HP-SEE User Forum 2012		Modeling and Optimization in Science and Technologies, Volume 2 2014, Springer, 2013, pp. 123-130, ISBN: 978-3-319-01519-4 (Print) 978-3-319-01520-0 (Online)	B	Rybakin
e-Infrastructures for Research and Education in Eastern Europe Partnership Countries	Computer Science and Information Technologies . Proceedings of the CSIT Conference, September 23-27, 2013, Erevan, Armenia		pp.231-235. ISBN 978-5-8080-0797-0	P.	Bogatencov
Rising Skill of Young Researches of Moldova in Using High Performance Technologies	Computer Science and Information Technologies . Proceedings of the CSIT Conference, September 23-27, 2013, Erevan, Armenia		pp.423-425. ISBN 978-5-8080-0797-0	I.	Titchiev
Deployment of a Federated Cloud Infrastructure in the Black Sea Region	Computer Science and Information Technologies . Proceedings of the CSIT Conference, September 23-27, 2013, Erevan, Armenia		pp.283-285. ISBN 978-5-8080-0797-0	H.	Astsatryan

Network Architecture for the Development of Scientific Computing Infrastructure in Moldova	“Networking in Education and Research”, Proceedings of the 12th RoEduNet IEEE International Conference, Constanta, Romania, 26-28 September, 2013		pp. 7-12. ISSN-L 2068-1038	P.	Bogatencov
Electronic States at Low-Angle Grain Boundaries in Polycrystalline Naphthalene	J. Phys. Chem. C		117 (2013) 15741; DOI: 10.1021/jp404825h	M.	Mladenovic
Finite-temperature Crossover and the Quantum Widom Line Near the Mott Transition	Phys. Rev. B		88 (2013) 075143; DOI: 10.1103/PhysRevB.88.075143	J.	Vucicevic
Modelling of Disaster Spreading Dynamics	Springer Book Series on Modeling and Optimization in Science and Technologies		2013, Vol. 2, p. 31-42; DOI: 10.1007/978-3-319-01520-0_4	E.	Stankovic
Implementation and Benchmarking of New FFT Libraries in Quantum ESPRESSO	Springer Book Series on Modeling and Optimization in Science and Technologies		2013, Vol. 2, p. 155-162; DOI: 10.1007/978-3-319-01520-0_19	D.	Stankovic
An Analysis of FFTW and FFTE Performance	Springer Book Series on Modeling and Optimization in Science and Technologies		2013, Vol. 2, p. 163-170; DOI: 10.1007/978-3-319-01520-0_20	M.	Nikolic

Vibrational Spectroscopy of Picolinamide and Water: From Dimers to Condensed Phase	J. Phys. Chem. A		117 (2013) 6474; DOI: 10.1021/jp402033c	V.	Jovanovic
Grid Site Testing for ATLAS with HammerCloud	CHEP2013 Proceedings			J.	Elmsheuser,
Atomic and Electronic Structure of Grain Boundaries in Crystalline Organic Semiconductors		10.1088/0031-8949/2013/T157/014061	Phys. Scr. T 157 (2013) 014061	M. N. I.	Mladenovic Vukmirovic Stankovic
Phonon and Magnetic Dimer Excitations in Fe-based S=2 Spin-ladder Compound BaFe ₂ Se ₂ O		10.1103/PhysRevB.89.014301	Phys. Rev. B 89 (2014) 014301	Z. M. N.	Popovic Scepanovic Lazarevic
Self-assembly of Magnetic Balls: From Chains to Tubes		10.1103/PhysRevE.89.011202	Phys. Rev. E 89 (2014) 011202(R)	R. L. I.	Messina Abou Khalil Stankovic
The molecular properties of nitrobenzanthrone isomers and their mutagenic activities	Chemosphere	10.1016/j.chemosphere.2013.11.057		B. B. D.	Ostojić Stanković Đorđević
Monte-Carlo Simulation on Heterogeneous Distributed Systems: a Computing Framework with Parallel Merging and Checkpointing Strategies	Future Generation Computer Systems		Future Generation Computer Systems 29, 3 (2013) 728--738	S. T. R. P. D. H.	Camarasu-Pop Glatard Ferreira Da Silva Gueth Sarrut Benoit-Cattin

Simulating Application Workflows and Services Deployed on the European Grid Infrastructure	13th IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing	13th IEEE /AC M Inter national Sym posiu m on Clust er, Clou d, and Grid Com putin g, Pays-Bas (2013)		S. T. H.	Camarasu-Pop Glatard Benoit-Cattin
Enabling 3D-Liver Perfusion Mapping from MR-DCE Imaging Using Distributed Computing	Journal of Medical Engineering (2013) 471682			B. S. E. F. O.	Leporq Camarasu-Pop E. Davila-Serrano Pilleul Beuf
Distributions of secondary particles in proton and carbon-ion therapy: a comparison between GATE/Geant4 and FLUKA Monte Carlo codes	Physics in Medicine and Biology	Physi es in Medi cine and Biolo gy 58 (2013) 2879 58 (2013) 2879		C. G. I. P. L. G. Y. D. E.	Robert Dedes Buvat Gueth Lestand Montarou Prezado Sarrut Testa

Validation of Grid Middleware for the European Grid Infrastructure	Journal of Grid Computing			M. David G. Borges J. Gomes J. Pina I. Campos E. Fernandez-del-Castillo I. Diaz C. Fernandez E. Freire A. Simon K. Koumantaros M. Drescher T. Ferrari P. Solagna
A Multy-Domain Operational Chemical Weather Forecast System		LSS C 2013, LNC S 8353, Springer		D. Syrakov, M. Prodanova I. Etropolska K. Slavov K. Ganev
Automatic detection of low-frequency earthquakes (LFEs) based on a beamformed network response	Geophysical Journal International	10.1093/gji/ggu058		W.B. Frank N.M. Shapiro
A stateful storage availability and entropy model to control storage distribution on grids	Journal of Concurrency and Computation: Practice and Experience (2014)	In press		J. Ma W. Liu T. Glatar
Data Stream Clustering with Affinity Propagation	IEEE Transactions on Knowledge and Data Engineering (2014)	In press		X. Zhang C. Furtlehner C. Germain-Renaud M. Sebag

Evaluating mixed HTC/cloud approaches for parameter sweep applications in systems biology	Proceedings of the 2nd International Work-Conference on Bioinformatics and Biomedical Engineering (IWBBIO) Granada, Spain, 2014			I. E. D. E. L.	Merelli Mosca Cesini Ronchieri Milanesi
On the implementation of three popular computational chemistry applications using the EGI distributed computing infrastructure	Proceedings of the 2014 International Conference on Computational Science and Its Applications, University of Minho, Guimaraes, Portugal			A. D. D. M. V. E. A.	Costantini Cesini Michelotto, Bencivenni, Boccia, Giorgio Laganà
The WNoDeS cloud virtualization framework: a macromolecular surface analysis application case study	22nd Euromicro International Conference on Parallel, Distributed and network-based Processing (PDP)	10.1109/PDP.2014.54		E D D V G P D A L I	Ronchieri Cesini D'Agostino Ciaschini Dalla Torre Cozzi Salomoni Clematis Milanesi Merelli
User Interaction and Data Management for Large Scale Grid Applications	J. of Grid Computing, accepted for publication			A O F L	Costantini Gervasi Zollo Caprini

Accessing Grid and Cloud Services through a Scientific Web portal	J. of Grid Computing, submitted 2014			M. D. R. R. A. D. A. E. L. G. E. D. P. V. M.C.	Bencivenni Michelotto Alfieri Brunetti Ceccanti Cesini Costantini Fattibene Gaido Misurelli Ronchieri Salomoni Veronesi Venturi Vistoli
Grid Computing in Computational Chemistry	Chemistry, Molecular Sciences and Chemical Engineering, submitted (2014)			A. C. A.	Laganà Manuali Costantini
MATLAB-based Program for Optimization of Quantum Cascade Laser Active Region Parameters and Calculation of Output Characteristics in Magnetic Field	Comput. Phys. Commun.	10.1016/j.pc.2013.10.025		J. M. J.	Smiljanic Zezelj Radovanovic
Faraday Waves in Collisionally Inhomogeneous Bose-Einstein Condensates	Phys. Rev. A	10.1103/PhysRevA.89.023609		A. R. A.I.	Balaz Paun Nicolin
Theoretical study of the molecular properties of dimethylantracenes as properties for the prediction of their biodegradation and mutagenicity	Chemosphere	10.1016/j.chemosphere.2014.03.067		B.D. B. D.S.	Ostojić Stanković Đorđević

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