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Abstract

Annual project report covering the work of the EGI-InSPIRE consortium during the first project period, May 2010 to April 2011.



I. COPYRIGHT NOTICE

II. DELIVERY SLIP

	Name	Partner/Activity	Date
From	Steven Newhouse and al.	EGI.eu	22/6/2011
Reviewed by	**PMB**	PMB	7/7/2011
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III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
1	22/6/2011	First draft	S. Newhouse and al.
2	7/7/2011	Final version	S. Newhouse and al.

IV. APPLICATION AREA

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

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.

VIII. PUBLISHABLE EXECUTIVE SUMMARY

E-Infrastructures are geographically distributed computing resources provided to support multi-disciplinary research activities. The European Grid Infrastructure (EGI) is a federation of e-Infrastructure providers in Europe and beyond that enables access to high-performance and high-throughput computing resources, and their associated storage capacity, for the benefit of its user communities. EGI's distributed resources are linked through a modern high-performance network.

The continued development and operation of the EGI is supported by the EGI-InSPIRE project (European Grid Infrastructure for an Integrated Sustainable Pan-European Researchers in Europe). The first year of the project's activities was focused on:

- Completing the transition of a working model based on large, regional e-Infrastructures to a national-based model and associated support procedures;
- Establishing structures and services to support multi-disciplinary user communities in their use of the production infrastructure;
- Sourcing advanced technology from external technology providers to meet the developing needs of end-users and the evolving e-Infrastructure;
- Continuing the development of the EGI community, defining key relationships within it.

At the heart of EGI's activities is a virtuous service cycle, designed to improve the quality of the e-Infrastructure, to develop services for new and existing user and operations communities, to liaise with external technology providers to source new software required by user and operations communities, and then to deliver these technologies seamlessly, through a federated European-wide infrastructure.

The virtuous service cycle is coordinated by EGI.eu, an organisation established in Amsterdam as a Dutch foundation, to manage and coordinate the EGI federation on behalf of its participants: National Grid Initiatives (NGIs) and European Intergovernmental Research Organisations (EIROs). EGI.eu coordinates the transition from a short term based funding structure to a sustainable, long-term governance model of the EGI federation, through the EGI-InSPIRE project.

A sustainable e-Infrastructure is essential for the user communities embarking on long-term research activities that will be dependent on these services for decades to come. EGI provides a reliable e-Infrastructure ready to become a building block for Europe's Digital Agenda strategy for 2020 and a foundation for innovation within the European Research Area.

Operations

The European Grid Infrastructure is a federation of Resource Infrastructure Providers providing Resource and Service Infrastructures:

- **Resource Infrastructure.** At the end of the first year of EGI-InSPIRE the resource infrastructure comprised 102 PB of disk space, 89 PB of tape space and 239,840 CPU cores (+24.9% increase since April 2010). This amount increases to 338,895 cores if the integrated infrastructures (e.g. Canada, China, South American and Caribbean countries) and peer grids (OSG) are included. Integrated Resource Infrastructure Providers are non-EGI-InSPIRE partners who contribute resources to EGI users and consume EGI operational services.

  Resources were distributed amongst 338 Resource Centres (345 Resource Centres including those from integrated infrastructures), of which 96 supported MPI. The Resource Centres span across 57 countries: EGI-InSPIRE partners contributing resources are present in 51 countries, while in the remaining six countries resources are contributed by integrated Resource Infrastructure Providers.

- **Services Infrastructure**. The operations services are provided by EGI.eu centrally in collaboration with the EGI-InSPIRE partners (Global Services) and locally by Resource Infrastructure Providers (Local Services) through the respective Operations Centres. EGI now

comprises 32 EGI Operations Centres operating 40 European National Grid Initiatives (NGIs) and CERN (an European Intergovernmental Research Organisation). The NGIs from South East Europe and the Baltic region that were not part of EGEE in April 2010 are now fully integrated into EGI.

EGI already has gLite and ARC middlewares fully integrated into the operational infrastructure. During the first year several task forces[1] contributed to the progress of operational activities in various areas: network support, GLOBUS and UNICORE integration, NGI deployment use cases of local operational tools and the enhancement of EGI Operational Level Agreements.

Operational tools are developed, maintained and operated within the project to support the production infrastructure. These include a message-based system that is used to monitor individual site service and account for their usages, a federated helpdesk to track issues, an operations portal used to track the status of the infrastructure, a central site configuration repository, and a database and portal to account for the usage of individual resources by different user communities.

User Support

User Support is delivered to end-users through the NGI Support Teams and Virtual Research Communities (VRCs). The structuring of the end-user communities into VRCs has started and will enable all end-users to be represented in evolving EGI's services. The interaction between the users and the production infrastructure are supported by:

- **Requirements Gathering**: The EGI Requirements Tracker has been established to enable all members of the EGI community to submit, track and comment on gathered requirements. Requirements can relate to any aspect of the e-Infrastructure from middleware to research applications or support services and can be easily submitted following instructions on the web site by anyone in the community.
- **NGIs Support Services**: The EGI model sees front-line user support coming from the NGIs and from within the user communities through the VRCs..
- **Technical Services**: EGI provides central services to support end-users and the use of the production infrastructure. The *Applications Database* which allows end-users to find applications that have already been prepared to run on the infrastructure, can now also be embedded in as a 'web gadget' within the webpages of EGI and operated by institutions, NGIs or VRCs. The *VO Services* kicked off with a careful investigation to determine which tools were available within the community could be offered to users, and to develop support material for these new users. The development of the *training services* has progressed slowly, but finished the year with the release of the first version of an "EGI Training Marketplace".

EGI-InSPIRE provides additional support to the heavy user communities: High Energy Physics (HEP), Life Sciences (LS), Astronomy and Astrophysics (A&A), Computational Chemistry and Materials Sciences and Technologies (CCMST), Earth Sciences (ES) and Fusion (F). The services and tools produced by these communitis within the project benefit each other and other users of the e-Infrastructure. The activities supported include:

- **Dashboards**: Developed by HEP, dashboards work across different middlewares and are used by different communities to monitor the infrastructure and the work done on it. GANGA was integrated with the message-based monitoring system used within the production infrastructure and a new user interface was deployed with improved functionality and performance. A new

[1] https://www.egi.eu/indico/categoryDisplay.py?categId=29

version of the ATLAS Data Management Dashboard is being developed that will allow users to follow the progress of a data transfer and will facilitate detection of any failures.

- **Applications**: The GANGA and DIANE applications are used in a wide range of fields, both within and outside HEP, for running large-scale computing tasks and are providing well-documented solutions to allow small and medium-sized communities to start exploiting grid technologies with a minimal initial overhead.
- **Services**: GRelC is a grid-database service that currently allows users in ES, HEP and LS to interact with different database management systems, both relational and non-relational. Hydra is a service targeted at the LS community that supports encryption and decryption of data files stored on grid resources by splitting the keys into many parts which can be distributed to improve security and reliability.
- **Workflow & Schedulers:** Support for the integration of the GridWay scheduler with Kepler, and for SOMA2, a versatile web-based environment for computational drug discovery and molecular modeling is provided in the project.
- **Message Passing Interface (MPI):** The MPI programming model is frequently used in scientific applications in the CCMST, A&A and F communities. Improvements continue to be made in the documentation needed for running MPI applications on ARC, gLite or UNICORE middlewares and the deployment of the MPI capability on the production infrastructure where it is now available on over 90 sites.

Domain specific support is provided to the following communities:

- **High Energy Physics**: Support is given for the experiments using the Large Hadron Collider by testing sites, running jobs and managing the data on the distributed resources, alongside development support for their underlying data persistency framework.
- **Life Sciences**: The support given to the establishment of the Life Sciences Grid Community as a VRC has enabled the development of community based management tools, communication channels, and the monitoring of community resources.
- **Astronomy & Astrophysics**: Effort has focused on porting a visualisation tool (VisIVO) to the EGI environment that allows visualisations to be generated directly from parallelised scientific simulations, and on integrating Virtual Observatory archives and catalogues with grid resources.
- **Earth Sciences**: Work has progressed on accessing critical data from community repositories from the grid either directly through collaboration with the GENESI-DEC project and the use of the GReIC software.

Software Provisioning

Software deployed into the production infrastructure is sourced from external technical providers. This allows EGI to deploy different software solutions to various user communities in response to the needs of the EGI community. The requirements are gathered across the project through a common tool and then assessed together with the external technology providers in-order to drive the delivery of innovative solutions for the production infrastructures.

New software releases are required to follow specific quality criteria, developed within the project and made public to the developers. The software components, collected into a Unified Middleware Distribution (UMD), are available to the community through the EGI Software Repository once they have been verified as meeting the specified quality criteria and have experienced production loads during staged rollout. The UMD Roadmap captures the capabilities being sought from the EGI Community and implementations from EGI's technology providers.

External Relations

EGI exists within an ecosystem of resource providers, end-users, technology providers and policy makers. To continue the work of growing and informing this community and raising EGI's profile. EGI-InSPIRE supports extensive external relations activities that include:

- **Dissemination**: Work includes content for the project and event websites, the monthly Director's Letters, the quarterly newsletter *Inspired*, and case studies and success stories for publications such as International Science Grid This Week and Public Service Review, as well as a range of brochures and posters. Supported events include ISC2010 in Germany, ICT 2010 in Brussels, eChallenges in Warsaw, SciTech in Brussels, ISGC in Taipei, and also SC10 in the US, which attracted more than 10,000 delegates. NGIs and project partners have contributed to the dissemination activities through events, websites, materials, publications, papers, translations, press releases and outreach to policy makers.
- **Policy Development**: Policy shapes the activity within EGI and its relationship with organisations outside EGI. The virtuous service cycle is implemented through groups governing activities in operations, security, user community support and technology management and Memoranda of Understanding (MoUs) with technology providers and Virtual Research Communities. The policy team has produced papers relating to EGI.eu's engagement with the ERIC legal framework, sustainability of the EGI ecosystem, collaboration between the DCI projects in general, and EGI's roadmap for clouds and virtualisation in particular. The role of standards in the technology used in the production infrastructure was also analysed as well as the role EGI could play in the EC's Europe 2020 vision.
- **Community Building Events**: The EGI Technical Forum 2010 was held in Amsterdam at the Beurs van Berlage from 14 to 17 September 2010 in partnership with the BiG Grid project (the Dutch NGI) and attracted 570 delegates. It brought together many European distributed computing projects and their collaborators in academia and businesses. The major theme of the meeting was to establish collaborations between the new and the current European Distributed Computing Infrastructure projects to see how to meet the needs and requirements of the research community. The EGI User Forum was organised by EGI.eu, Vilnius University and LITNET in Vilnius, Lithuania, 11-14 April 2011, with the support of the EGI-InSPIRE and European Middleware Initiative (EMI) projects and local secretariat BAIP. The showcased the diversity of the EGI user community through plenaries, oral presentations, poster sessions and co-located workshops. The programme also included numerous networking and opportunities to 'meet the experts'. In total 420 delegates attended.

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1 DECLARATION BY THE SCIENTIFIC REPRESENTATIVE OF THE PROJECT

I, as scientific representative of the coordinator 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) [2]:

  X 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, if applicable

  X is up to date

  ☐ is not up to date

- 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 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: Steven Newhouse

Date: .15/6/2011

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism.

[2] If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

2 PROJECT PROGRESS

2.1 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

Progress towards these objectives is monitored through the project's metrics during the course of the project. Additional metrics are defined to monitor the work of the different activities (work packages) and the national operational infrastructures within the project[3]. These are collected each quarter and reviewed by the activity and project management and are discussed in the individual annual activity reports.

The project's metrics are detailed below and should be read with the following explanatory notes:

- The number of job slots represents the capacity of the infrastructure to accept work, i.e. a crude measurement of capacity. The resources contributed by the EGI-InSPIRE partners (the project value) represent the totals from Europe and Asia Pacific. EGI provides services to other infrastructures around the world (e.g. North and South America) which are integrated into the project alongside other resources for the benefit of our shared user communities.
- As part of PO6, the integration of HPC resources is a reflection of the number of compute clusters with dedicated high performance networking as opposed to commodity networking connections. This metric is a subset of the number of resources supporting Message Passing Interface (MPI) applications in the infrastructure. In PY1 it was expected that the increase in this figure would be driven by integration of UNICORE resources, but the NGIs have reported a significant number of resources integrated through gLite and ARC middleware.
- The integration of virtualised resources (part of PO6) required technical activity during PY1 which meant that full integration would not take place until PY2. However, some resources

[3] D1.1 Quality Plan and Project Metrics, https://documents.egi.eu/document/55

have been reported in PY1 by the partners as part of the infrastructure but these are not yet integrated (accounting, monitoring, etc.) but are used to deploy existing grid resources.

Table 2: Achieved Year One Project Metrics

Project Objectives	Metrics	Target Year 1	PQ1	PQ2	PQ3	PQ4
PO1: Expansion of a nationally based production infrastructure	Number of production resources in EGI (M.SA1.Size.1)	300	341	337	340	347
	Number of job slots available in EGI (M.SA1.Size.2)-Integrated	300 000	277 193	296 588	308 583	338 895
	Number of job slots available in EGI (M.SA1.Size.2)-Project	200 000	184 844	197 777	207 203	239 840
	Reliability of core middleware services (M.SA1.Operation.5)	90%	93.3%	90.7%	92.3%	94.6%
PO2: Support of European researchers and international collaborators through VRCs	MoUs with VRCs (M.NA2.11)	5	0	0	0	1
	Total Number of papers from EGI Users (M.NA2.5)	50	25	25	29	31
	Number of jobs done a day (M.SA1.Usage.1)	500 000	834 746	871 073	819 100	960 053
PO3: Sustainable support for Heavy User Communities	Number of sites with MPI (M.SA1.Integration.2)	50	Not collected	73	90	96
	Number of users from HUC VOs (M.SA1.Size.7)	5000	6429	6743	7880[4]	7103

[4] PQ3 saw a temporary increase in the HEP figures for that quarter that disappeared in PQ4.

PO4: Addition of new user communities	Number of desktop resources (M.SA1.Integration.3)	0	0	0	1562	1562
	Number of users from non-HUC VOs[5] (From M.NA3.12)	500	3542 Computer Science and Mathematics (24); Multi-disciplinary (1682); Other (1836)	3749 Computer Science and Mathematics (28); Multi-disciplinary (1850); Other (1871)	4109 Computer Science and Mathematics (10); Multi-disciplinary (1987); Other (2112)	4075 Computer Science and Mathematics (12); Multi-disciplinary (1974); Other (2089)
	Public events organised (M.NA2.6)	1500	406	2722	872	3115
PO5: Transparent integration of other infrastructures	MoUs with resource providers (M.NA2.10)	3	0	0	0	1
PO6: Integration of new technologies and resources	MoUs with Technology providers (M.NA2.9)	2	0	0	2	4
	Number of HPC resources (M.SA1.Integration.1)	1	Not collected	55	54	55
	Number of virtualised resources HEP SPEC06 (M.SA1.Integration.4)	0	Not collected	16 000	16 109	16 694

2.2 Work progress and achievements during the period

2.2.1 Operations

The operations activities include the operation of the infrastructure (SA1) and the development and maintenance of the operational tools (JRA1) that are needed to support the operational infrastructure. Management of the SA1 activities is undertaken through the Operations Management Board (OMB) – the policy group that leads the technical development of the operational activities – with representatives from all the NGIs and integrated Resource Infrastructure Providers were successfully established.

The Operations Architecture[6] defines the actors of the EGI operations community (Resource Centres, Resource Infrastructure Providers and EGI.eu), the relationships and governance model, the Resource Infrastructure and the Service Infrastructure.

[5] Non-HUC VOs cover the following disciplines: Computer Science and Mathematics, Multidisciplinary, Other. The disciplines are defined in the Operations Portal

[6] D4.1 EGI Operations Architecture, https://documents.egi.eu/document/218

- **Resource Infrastructure.** At the end of the first year of EGI-InSPIRE the resource infrastructure comprised 102 PB of disk space, 89 PB of tape space and 239,840 jobs slots – equating approximately to CPU cores – which is a +24.9% increase since April 2010. This amount increases to 338,895 cores by including integrated infrastructures (e.g. Canada, China, South American and Caribbean countries) and peer grids (OSG). Integrated Resource Infrastructure Providers are non-EGI-InSPIRE partners who contribute resources to EGI users and consume EGI operational services.

  Resources were distributed amongst 338 Resource Centres (345 Resource Centres including those from integrated infrastructures), of which 96 supported MPI. The Resource Centres span across 57 countries: EGI-InSPIRE partners contributing resources are present in 51 countries, while in the remaining 6 countries resources are contributed by integrated Resource Infrastructure Providers.

- **Services Infrastructure**. The operations services are provided by EGI.eu centrally in collaboration with the EGI-InSPIRE partners (EGI Global Services) and locally by Resource Infrastructure Providers (Local Services) through the respective Operations Centres. The EGI Global Services were successfully and gradually handed over from EGEE to EGI. Also the Local Services offered by the Resource Providers were run satisfactory and seamlessly. At a local level, even if NGIs are very heterogeneous in terms of size and maturity, Resource Centres were operated reliability and the overall availability of EGI services was not affected by the start of the operations of the new NGIs.

At the end of the EGEE-III project the Resource Infrastructure was operated by 14 Regional Operational Centres (ROCs): Asia Pacific, Canada, Central Europe, CERN, France, Germany/Switzerland, IGALC (Latin American and Caribbean Grid Initiative), Italy, Latin America, Northern Europe, Russia, South Eastern Europe, South Western Europe, and United Kingdom/Ireland. This scenario has evolved considerably during the first project year of EGI-InSPIRE. The largest ROCs (Central Europe and South East Europe) stopped their operations during PQ2 and PQ3 respectively. The EGEE ROCs have consequently developed into a much larger group of smaller Operations Centres, which typically serve a single country. This transition was successfully completed in January 2011 without affecting the infrastructure availability and reliability.

EGI now comprises 32 Operations Centres operating 40 European National Grid Initiatives and CERN (European Intergovernmental Research Organisation). National Grid Infrastructures from the South East and Baltic regions that were not part of EGEE in April 2010, were subsequently integrated during PQ1 into South East Europe ROC and NGI_NDGF.

During PQ3 for the first time a process for requirements gathering was defined and approved by the OMB, consisting in a phase of requirements gathering and prioritisation involving Resource Centres and coordinated by the respective Resource Infrastructure Provider, followed by discussion and prioritization at the OMB. In the final stage input is eventually presented to the Technology Providers at the TCB level to drive innovation. This process was adopted in January and February 2011 to provide input to the EMI project for the EMI 2.0 release. This is an important milestone as for the first time the Operations Community was collectively involved in a structured requirements gathering process.

During the first year several task forces[7] contributed to the progress of operational activities in various areas: network support, GLOBUS and UNICORE integration, NGI deployment use cases of local operational tools and the enhancement of EGI Operational Level Agreements.

2.2.1.1 Security

All resources used by the teams such as mailing lists, wikis, security monitoring servers etc. were migrated from EGEE to EGI resources under the egi.eu domain. This transition didn't impact the availability of the security monitoring services (Pakiti and Nagios security monitoring) covering the whole EGI infrastructure. The operational security teams EGI CSIRT (Computer Security Incident Response Team) and the EGI SVG (Software Vulnerability Group), were successfully established during PQ1. SVG has 15 members and has established contacts with the software developers of the main deployed middleware stacks. SVG, jointly with EMI representatives, produced a security assessment plan which identifies which software components within EMI are going to be assessed and the related timing. The plan also states which software packages that have been assessed so far[8]. SVG will improve the handling of software vulnerabilities in the EGI RT to improve automation, including automatic reminders. The EGI CSIRT ran the first phase of Security Service Challenge 4 (SSC4) where 13 sites (including all WLCG Tier1 sites) were tested and the site's performance evaluated. As a result of this SSC challenge the workflows will be streamlined in order to extend the activity to a larger set of Resource Centres. A ticketing system for incident response (RTIR) was setup and personnel were trained in its usage.

2.2.1.2 Service Deployment

The transition from EGEE to EGI was prepared two months before the start of the project for the handover of coordination activities from CERN to EGI, together with the definition of new procedures for the timely staged rollout of new middleware releases[9]. The EGEE Pre-Production Infrastructure was entirely decommissioned and integrated into the production one where feasible.

The procedures and the tools needed for automation of staged rollout were gradually refined and developed during the course of PY1[10]. Staged rollout is also used to the software components from the operational tools that are deployed throughout the infrastructure. Staged Rollout has progressively expanded in terms of the number of Early Adopters teams[11] and coverage of middleware products. Now ARC, gLite and UNICORE are integrated into the process. A staged rollout manager was appointed in each area. The "New Software Release Workflow" was tested with the dry run of several EMI components (Release Candidate 3).

The integration of ARC into the EGI monitoring infrastructure has been completed. This required the re-writing of probes to migrate from the old SAM framework to Nagios[12], the integration of those into the SAM release, the decommissioning of the old SAM infrastructure operated at NDGF for ARC resources, and the integration of the Nagios probes into the Operations Dashboard. Middleware

[7] https://www.egi.eu/indico/categoryDisplay.py?categId=29

[8] The Security Assessment Plan https://documents.egi.eu/document/563

[9] MS402 Deploying Software into the EGI Production Infrastructure, http://go.egi.eu/53

[10] See https://wiki.egi.eu/wiki/Staged-Rollout and https://wiki.egi.eu/wiki/Staged-rollout-procedures for details on the step by step procedures for EA teams.

[11] https://www.egi.eu/earlyAdopters/table and https://www.egi.eu/earlyAdopters/teams

[12] http://wiki.nordugrid.org/index.php/Nagios_Tests

deployment plans were gathered and according to these two task forces were constituted to address the issue of integration of GLOBUS[13] and UNICORE[14] resources.

Contacts have been established with other DCIs (Desktop Grids, StratusLab, PRACE) and activities have been carried out in the framework of the Infrastructure Policy Group (IPG) and the Production Grid Infrastructure Working Group (PGI-WG) within the Open Grid Forum to promote interoperability and interoperation between different technologies and infrastructures.

2.2.1.3 Help desk & Support Teams

Helpdesk

The support infrastructure has been adapted to the EGI model following the work already started in the last year of the EGEE-III project. NGIs have established their national support tools and processes, and the operations in the former EGEE ROCs have been transferred to these NGIs. New NGI support units were implemented for NGIs that have currently gone through this process. xGUS – the GGUS NGI view – is now deployed in production by several NGIs.

A new *technology support* workflow for middleware-related issues has been established with the Deployed Middleware Support Unit (DMSU) and the Technology Providers. The middleware support chain is a staged process organized into: 1st line support (TPM), 2nd line support through the DMSU and, finally, 3rd line support involving the Technology Providers. The implementation of the support chain was made available with the January 2011 release of GGUS.

In addition, the *software provisioning* workflow was implemented. Through this workflow the Technology Providers can announce releases by submitting a ticket which is then routed to the EGI-SA2 activity through an interface to the EGI-RT system. Feedback concerning the release is also handled through such a ticket, which is assigned back to the Technology Provider with an "accept" or "reject".

Support teams

- **1st line support**. The new Ticket Processing Management (TPM) model with two teams was implemented and now provides 1st line support handling 250 tickets per month on average.
- **Regional Operator on Duty (ROD)**. The first EGI-InSPIRE Regional Operator on Duty (ROD) team workshop was held in June 2010. The transition from EGEE to EGI-InSPIRE required many changes. In the EGI era, ROD teams monitor the status of Resource Centres in their country or region, while the Central Operator on Duty (COD) is responsible for the global oversight over the whole infrastructure. This is to provide a high-quality grid infrastructure to the user communities. A ROD Newsletter is now periodically released since December 2010 to consolidate the Grid oversight teams (central and local ones). The purpose of this newsletter is to inform about recent and upcoming developments related to Grid Oversight and to show the support performance indicators during the month.

[13] https://wiki.egi.eu/wiki/Globus_integration_task_forces

[14] https://wiki.egi.eu/wiki/UNICORE_integration_task_force

- **Central Operator on Duty (COD)**. Since the beginning of the project COD is responsible of overlooking infrastructure quality and support activities across the various Resource Providers. COD is now also responsible of handling Resource Centre suspension in case of low performance and of following up issues with underperforming Resource Centres on a monthly basis. A new procedure was defined for this. Several cases of Resource Provider unresponsiveness or lack of compliance to established procedures were escalated. All of these have been handled and the overall quality of ROD support has been improving, especially in some of the newly established NGIs. Training sessions for ROD teams were organized in co-location with the EGI-InSPIRE project conferences. COD contributed effort to the definition of various new procedures (see section Documentation).
- **Network Support**. A network support questionnaire was distributed at the beginning of the project to gather information about network support contact points for each NGI, and to assess network support problems and the existing relationships with the local Network Research and Education Networks. Following to this, a workshop was organized in January 2011 to gather feedback on network support models and network monitoring and troubleshooting tools that can be used by Resource Centre administrators. The overall strategy for network support was finally defined. The activity is organised into: support to network performance problems where the GARR team provides contact with the NREN PERT service[15] and support to the deployment of tools for troubleshooting on demand and network monitoring (PerfSONAR-Lite-TSS, the Grid Jobs based Network monitoring and DownCollector). A network support unit is now available from the EGI Helpdesk.

2.2.1.4 Grid Management

2.2.1.4.1 TSA1.4 Deployment of operational tools

The existing central instances of operational tools were migrated to the egi.eu domain to phase out the EGEE domain gridops.org, whose decommissioning is currently scheduled in June 2011. Various new software releases affecting the central tools were timely deployed in production (SAM, GOCDB and the Operations Portal), and the prototype of a new EGI-wide monitoring portal.

- **SAM**. In June 2010 the old SAM submission framework was decommissioned as the final step of a migrating from a centralized to a fully distributed monitoring system. At the end of the first year the following SAM/Nagios instances were in production[16]:
  - 24 NGI instances covering 35 EGI partners;
  - 3 ROC instances covering 4 EGI partners;
  - 1 project instance covering 1 EGI partner;
  - 3 external ROC instances covering the following regions: Canada, IGALC and LA.

  The central tool monitoring server now also monitors GOCDB.

  An approach for the monitoring of uncertified Resource Centres requiring the deployment of a dedicated set of services was discussed, and will be finally put in production with the contribution of TSA1.8 effort during the second year of the project.

[15] Performance Enhancement and Response team (http://www.geant2.net/server/show/conWebDoc.1061)

[16] https://wiki.egi.eu/wiki/SAM_Instances

The latest prototype of the central MyEGI instance was deployed in May 2011[17]. Unfortunately, due to bugs spotted in software release its availability was not broadcasted to wide audience.

- **Brokers.** The ActiveMQ broker production network – deployed in failover mode and used for the distribution of monitoring information – consists of three brokers deployed at CERN, in Croatia and Greece. An additional broker is currently deployed for APEL.
- **GOCDB.** GOCDB was migrated from GOCDB3 to GOCDB4 in 2010 and to a new hardware platform in February 2011. After the migration the GOCDB service has been working without outages. GOCDB failover instance deployment started.
- **Operations Portal.** The regionalized operations portal software was released in June 2010 for the first time, and is now deployed at NGI_BY, NGI_CZ, NGI_GRNET and NGI_IBERGRID. The central instance[18] was regularly updated (7 upgrades during the first year).
- **Network monitoring.** The web portal[19] with network tools for troubleshooting and monitoring is now hosted by GARR (Italy), together with the network availability monitoring tool (DownCollector) – developed in the framework of the EGEE-III SA2 activity.

The EGI implementation and policies related to the DTEAM and OPS VOs – necessary for monitoring and troubleshooting – were reviewed: the DTEAM and OPS VOs are "global", and their support is mandatory in all production Resource Centres to ensure site-level troubleshooting (DTEAM) and to have a running Nagios-based monitoring infrastructure (OPS). The deployment of regional monitoring VOs is limited to the monitoring of non-EGI sites. The DTEAM VOMS service – formerly operated at CERN – was migrated to one of EGI's core services. In parallel to this, the VO membership management was handed over by CERN to SRCE and EGI.eu.

Nagios test terminology was disambiguated and a set of related procedures (monitoring of non-production sites, downtime management of central tools, changing of the AVAILABILITY and OPERATIONS probes, changing of an existing probe and/or the integration of new tests) were approved. The following wiki pages relevant for operational tools were created:

- Operational tools information[20] – the page contains a brief description about each tool, main links to the tools interfaces and to documentation.
- Operational tools deployment plans[21] – the page contains NGI plans regarding the deployment of regionalised versions of operations tools.

2.2.1.4.2 TSA1.5 Accounting

The release to production of the APEL ActiveMQ client in early June 2010 meant the APEL central repository was ready to accept records through the new messaging communication bus. After this release the infrastructure progressively migrated from R-GMA to the new APEL client based on ActiveMQ. The R-GMA central infrastructure was decommissioned at the end of February 2011 and at the end of the first year 90% of the production/certified sites (0.3 % of the of the EGI-InSPIRE

[17] https://grid-monitoring.egi.eu/myegi/

[18] http://operations-portal.egi.eu/

[19] https://wiki.egi.eu/wiki/Network

[20] https://wiki.egi.eu/wiki/Tools

[21] https://wiki.egi.eu/wiki/Operations_tools_deployment_plans

logical CPUs) - excluding those not using their own accounting solution - were migrated to ActiveMQ APEL publishing. Of the 10% left, only 4% are sites which were previously using RGMA, the other 6% are sites that have never published accounting information. The APEL documentation from the old GOC wiki was migrated to the EGI wiki[22] (https://wiki.egi.eu/wiki/APEL). The new ActiveMQ STOMP consumer is ready for external testing, and UK and Hungary are contributing to testing activities. CERN will soon start using this interface for publishing of local jobs. Currently several NGIs (Germany, Portugal and Spain) have expressed their interest in deploying a regional accounting portal instance.

2.2.1.4.3 TSA1.8 Core services and availability

Availability and Reliability

The EGEE SLA document was updated to produce an EGI OLA document covering all the agreed and adopted practices. In parallel, a new process was defined and finally approved for the management of monthly availability and reliability statistics. A new procedure involving the Central Operator on Duty (COD) was created for getting explanations from sites for their figures if they fall below the Operational Level Agreement (OLA) requirements. The new procedure – which was prototyped in May 2010 – had been necessary to organise the handover of availability and reliability reporting from CERN to EGI.eu. AUTH is the partner responsible of validating and distributing the monthly performance reports.

During the second half of the year a new suspension policy for underperforming Resource Centres requiring an increase of the current availability threshold from 50% to 70%, was assessed. The impact on the production infrastructure was considered to be minimal, for this reason in April 2011 the OMB finally approved the adoption of the new policy.

A task force was organized to define the medium-term EGI OLA roadmap. The first result of this task force was the proposal of various changes to the existing OLA, which resulted in a new Resource Centre OLA which was approved in May 2011. Implications of OLA extensions on tool development plans were discussed during a set of dedicated meetings. During the second year the task force will focus on the Resource Provider and EGI.eu OLAs.

Core services

A WMS and a MyProxy service – for the EGI Nagios Security Monitoring tool – were installed and entered production. In parallel a new VOMS/VOMRS server was setup in order to host the DTEAM VO. Data from the VOMS server at CERN were migrated to the new VOMS server hosted at AUTH. In PQ1 EUGridPMA[23] accredited the SEE-GRID CA in order to provide catch all Certificate Authority Services to EGI VOs. Such a service is required for individuals that do not have access to a local personal certificate provider (which requires staff, equipment and accreditation) as a certificate I required to access grid resources. The current network of Registration Authorities covers Albania, Azerbaijan, Bosnia – Herzegovina and Georgia. The migration of the DTEAM VOMS service from CERN was finalised. In addition, a procedure has been defined to provide a catch all VOMS services for newly created VOs.

[22] https://wiki.egi.eu/wiki/APEL

[23] http://www.eugridpma.org/

2.2.1.4.4 Documentation

EGEE existing documentation has been progressively migrated to the EGI wiki, and made accessible at https://wiki.egi.eu/wiki/Documentation. This is a particularly challenging task as EGEE documentation is distributed across various document servers (e.g. EDMS and GOC WIKI). Documentation that was migrated, was also updated to the new operational environment of EGI. The migration of documentation is still in progress.

The EGI documentation page includes pointers to approved manuals, best practices, procedures, FAQs and Training Guides. A series of meetings was organized to decide the set of categories and templates to be used to facilitate navigation and document categorisation. During the first year several new documents were produced: 3 manuals, 2 FAQs, and 8 new procedures were drafted and approved:

- COD Escalation Procedure
- Operations Centre Creation
- Operations Centre decommissioning
- Quality verification of monthly availability and reliability statistics
- Validation of an Operations Centre Nagios
- Setting a Nagios test status to OPERATIONS
- Adding new probes to SAM
- Management of the EGI OPS Availability and Reliability Profile

2.2.1.5 Tools

2.2.1.5.1 Overview

Operational tools are developed and maintained (within JRA1) to manage the distributed production infrastructure [https://wiki.egi.eu/wiki/WP7-jra1]. The JRA1 activity is also responsible for providing support to the configuration of the message broker network of the production infrastructure based on the ActiveMQ system [http://activemq.apache.org/].

The inherited Operational Tools Product Teams (OTPTs – the development groups) were geographically distributed across Europe and used different development infrastructures, in terms of bug/task tracking tools, repositories, building tools, documentation pages etc., so during the early stages of the activity one of the main tasks was the evolution of the OTPTs development infrastructure. It was decided not to change the local, independent infrastructures, but to agree on a common release procedures and requirements gathering workflows[24]. The EGI Request Tracker (RT) system [https://rt.egi.eu/rt/] is also used to provide an overview of the future JRA1 releases.

During the early stages of the project it was agreed with the SA2 and SA1 activities to treat JRA1 products that need to be deployed at the regional level as any other software or middleware product that is installed in the production infrastructure and that is generally provided by third parties or by other projects (e.g. EMI). This implies that JRA1 tools that need deployment must successfully

[24] MS702 Establishing the Operational Tools Product Teams http://go.egi.eu/52

undergo the quality criteria verification, repository mirroring and staged rollout steps[25][26]. During the first year of the projects only the SAM tool, being the only one deployed in all NGIs, underwent this release process.

2.2.1.5.2 Requirements Tracking

The common requirement workflow definition for all the tools is now complete. Users of the JRA1 tools can create requirements anytime by filing a ticket in the Requirement queue and addressing it to the "Operational Tools" category. Requirements that arrive through other ways (e.g. emails, phone conferences, documents etc.) are also translated into RT tickets. Periodically (every two months at most) each JRA1 PT reviews the requirements list accepting those that can be addressed immediately because they do not require much effort or do not break any interaction with other tools and labels all the others items as "to be discussed". Discussions and prioritization of those requirements take place during internal JRA1 meetings at first and then within the Operational Tools Advisory Group (OTAG) [https://wiki.egi.eu/wiki/OTAG] which is composed of representatives from the operation and users communities, from the middleware developers and from the JRA1 activity. The OTAG is the main supervisory body for the development progress. The prioritization step is particularly important in order to have a proper schedule of the development work. Together with the "Requirement queue" a so called "Roadmap queue" was created in the RT system. This is the single access point to information about new releases for all the tools. Each new release is associated to an RT ticket and in the ticket the estimate release date, links to release notes, to changelog and to documentation pages are provided. Requirements addressed by the releases are also referenced in the ticket as links to the tickets in the "Requirements queue".

2.2.1.5.3 Operations Portal

The Operations Portal (the former CIC Portal) is a single access point to operational information. This is used by all the project actors and is composed of various modules, the main ones being:

- The Broadcast tool that allows users to send bulk messages to various communities
- The Operational Dashboard that collects information from many sources about site/service status and failures and allows users to semi-automatically open tickets in the EGI Helpdesk system
- A VO Identity Cards repository that stores and provides an interface for inputting Virtual Organisation (VO) static information for wider reference

A detailed development roadmap was developed for the tool which was followed during the year[27]. Significant functionality delivered during the year includes:

- A packaging that allowed regional instances to be deployed that synchronise with the central instance.
- Porting to the Symfony web framework [http://www.symfony-project.org/].
- Integration of the VO ID card system that records the life cycle of a given VO and links the VO managers to the project management for operations.
- Integration of the Lavoisier web service programmatic interface [http://grid.in2p3.fr/lavoisier/, http://grid.in2p3.fr/software/lavoisier2/features.html].

[25] MS503 Software Provisioning Process http://go.egi.eu/68

[26] MS402 Deploying Software into the EGI production Infrastructure http://go.egi.eu/53

[27] MS701 Operations Portal Workplan http://go.egi.eu/39

- Usability improvements to the Operations Dashboard with a new Central Operator on Duty (COD) view, the Broadcast tool (mailing list reorganization), for the VO ID Cards (new registration page, glossary added, new help) and for the Portal homepage.
- Integration of external tools in the Operations Portal such as Bazaar [http://www.plgrid.pl/en/our_offer/tools/user_and_administrator_tools/bazaar] and the YaimVO Configurator (A tool that lets you manage the last part of the YAIM configuration file – YAIM is the gLite configuration utility).

The central instance of the Operation Portal is available at https://operations-portal.egi.eu/.

2.2.1.5.4 EGI Helpdesk (GGUS)

The EGI Helpdesk is the main support access point for the project. Primarily used by Grid end-users and by support teams, but also by site managers who need support to solve middleware issues. It is based on the central Global Grid User Support (GGUS) system interfaced where possible with regional helpdesks. Main achievements of the releases made during the year were:

- Regional view (xGUS) in production for NGI-DE since July 2010. This was a prototype to be evaluated by other NGIs and demonstrated at the EGI Technical Forum in September 2010.
- GGUS redesign: with the end of EGEE and the start of EGI-InSPIRE the GGUS website got a new logo and a new style sheet. Along with the trend of decreasing height/width ratio of modern monitors (less height, more width) the navigation bar was moved from the top to the left of each web page. That way more space for the content is available
- The integration of new NGIs, new VOs and new regional helpdesks into the system
- The renaming and restructuring of various support units (reorganize support units to fit the EGI model, adapt or remove legacy support units from EGEE)
- Introduction of new 3rd level support units
- Introduction of the Deployed Middleware Support Unit (DMSU) workflow with instances of the Initiative for Globus in Europe project (IGE) and EMI support units that are hidden from normal users and for which assignment is possible only by DMSU.
- A redesigned Report Generator (a tool that create GGUS ticket statistics) will allow for:
  - More flexibility with new metrics available (i.e. average and median of Response Time, Solution Time and Assignment Time)
  - Output in further processable formats, e.g. xml

The central instance of the GGUS helpdesk is available at http://helpdesk.egi.eu/.

2.2.1.5.5 Grid Configuration Repository (GOCDB)

The GOCDB contains general and semi-static information about the sites participating in the production Grid (covering data such as site services installed, site manager contact details, security contacts etc.). It is accessed by projects, by other tools and by third party middleware in order to obtain an operational snapshot or a specific bit of information.

The release of GOCDB4 and decommissioning of GOCDB3 was the major goal of the GOCDB PT at the beginning of the project as a continuation of the work performed during EGEE-III. By design GOCDB4 provides:

- A GOCDB module (hereafter called “GOCDB4 Regional Module”) that can be installed by NGIs to store their own topology information (GOCDB regional modules can be operated in full production, but cannot yet synchronize to the central GOCDB)
- A central system (hereafter called “GOCDB4 Central Instance”) to present all data collected from NGI instances

- A central input module (thereafter called "GOCDB4 Input System") to allow NGIs with no Regional GOCDB to insert data into the central instance.
- Functionality to support Early Adopter sites with sites for adapted reliability metric calculations, masking sites from different/entire communities (related to regionalisation), and naming schema able to encompass UNICORE services.

The Central instances (visualization and input systems) of the GOCDB can be accessed starting from https://goc.egi.eu/. The regionalization model of the GOCDB and the possible use cases and implementation options are still being discussed within the regionalisation task force [https://wiki.egi.eu/wiki/Regionalization-1].

2.2.1.5.6 Accounting Repository

The Accounting Repository stores data about VO usage of site resources within the production infrastructure and is primarily accessed by other tools (e.g. the Accounting Portal) in order to create usage reports. It is based on the gLite-APEL system [https://wiki.egi.eu/wiki/APEL]. APEL sensors that provide data to be stored in the Accounting Repository are not developed by JRA1, but within the EMI project.

The APEL accounting system has been integrated with the ActiveMQ message broker network and now accepts and processes production usage records through the glite-APEL client. This is now in production use and the previous RGMA system has been decommissioned. Work on the design of a distributable Regional Accounting Server has been completed, implemented and deployed into production. This has included testing with EMI and clients developed by partners in other grids who used to publish by direct database insertion and will now publish Job Summaries using ActiveMQ.

2.2.1.5.7 Accounting Portal

The Accounting Portal is the graphical frontend for the Accounting Repository. It is accessible to anyone with a recognised grid certificate and displays overviews with details determined by the role associated with the certificate (for example user, site administrator, regional manager and VO manager)**.** Problems with filling vacancies at CESGA due to administrative and national law issues delayed the planned release dates for the Accounting Portal. The hiring process was completed at the end of PQ3 when two people were appointed.

Nonetheless, work was performed during the first two quarters to support the new Programmatic Interface released with GOCDB4. Tier2 report pages were updated and several minor issues solved, the NGI View was added to the central accounting instance and an improved installation support was added to the regional package. The VO views now use data from XML feeds from the Operations Portal. Requirements stored in the EGI RT system were reviewed in order to create a development work plan at the beginning of PY2 in collaboration with the OTAG. The prototype version of the regional accounting portal is already available[28]. Currently several NGIs have expressed their interest in deploying a regional instance of the regional portal.

The central instance of the Accounting Portal is available at [http://accounting.egi.eu/].

2.2.1.5.8 Service Availability Monitoring

[28] MS703 Operational Tools Regionalisation Work Plan http://go.egi.eu/107

The SAM system is a monitoring framework for sites and services. It is used by site mangers to monitor their sites, but also at a project level as a data source to create availability/reliability statistics for the resource centers participating in the production infrastructure. It is one of the main sources of data for the Operations Dashboard described previously. It is composed of various components, the most important being:

- The test submitting framework: based on the NAGIOS system [http://www.nagios.org/] set up and customized by the NAGIOS Configurator (NCG)
- The DataBase components: The Aggregated Topology Provider (ATP) [https://tomtools.cern.ch/confluence/display/SAM/ATP], the Metric Description DataBase (MDDB) and the Metrics Result DataBase (MRDB)
- A message bus to publish the monitoring results
- A visualization tool: MyEGI

The transition from the ROC model (SAM instances deployed in each ROC) to the decentralized NGI model (SAM instances deployed in each NGI) was quickly completed. New releases undergo the staged rollout procedure before full scale deployment. The myEGI portal (and web service interface) has been deployed, probes for the ARC middleware and MPI services have been integrated (UNICORE and Globus are still under development, and various components databases have been merged into a single database. A work programme that defines how to aggregate physical sites and services into virtual sites for monitoring purposes is underway. Additional support was provided to NGIs which started deploying Virtual Organisation SAM instances (IBERGRID and France).

2.2.1.5.9 Metrics Portal

The Metrics Portal collects a set of metrics from different resources to help in measuring project performance and keep track of the project evolution by displaying historical values of the metrics in a single place. It also provides web interfaces to inject the metrics into the database.

Being developed at CESGA, the Metrics Portal suffered the same problems related to the hiring process that affected the Accounting Portal for the first three quarters of the project and no releases were performed during that period. Minor fixes were done to the portal inherited from EGEE-III to accommodate changes in underlying data source tools such as Gstat [http://gstat.egi.eu/].

Once the staff hiring problems were resolved a detailed 3 years development road-map with schedule for the new EGI Metrics Portal was created[29] and development started. The presented roadmap is based on a spiral model: three complete cycles are defined, producing a new release of the metrics portal at the end of each cycle. Inside each cycle there are six steps, one devoted to each data source. After each step a preview release including the additional metrics created will be available in the development version of the metrics portal for internal review. The first preview was released at the beginning of April 2011. Adjustments to this preview release continued during the last month of PY1 in response to the feedback from the project. There are no regionalisation plans for the metrics portal that is available as a central instance only [http://metrics.egi.eu/]

2.2.2 User Support

By the start of 2011 the staffing at EGI.eu had risen to full strength allowing effective coordination of the distributed tasks by the central team. These focused on:

[29] Metrics Portal Work Plan, http://go.egi.eu/516

1. Helping scientific communities establishing EGI VRCs to collect and communicate requirements to EGI (TNA3.2).
2. Establishing communication channels with the NGIs for user support related topics (TNA3.2 and TNA3.3).
3. Providing key technical services with valuable features for NGI User Support Teams (TNA3.4 task) including a training marketplace, application database and VO services.

Together these tasks would provide an integrated and cohesive support structure that would serve the needs of all communities, large and small, both new and established.

The User Community Support activity ran two USAG meetings and two UCB meetings during this period. These meetings provide forums for user tool developers (in the USAG) and user community representatives (in the UCB) to exchange information and views on requirements, roadmaps and priorities. The meetings also provided feedback on the requirement gathering and prioritising processes, the Requirement Tracking system and its dashboard pages. These have been refined and extended based on the UCB and TCB members' feedback.

Following successful discussions with the various known communities and internal partners (Heavy User Communities) a template MoU[30] for establishing and running a VRC was produced. The first VRC to be established was the Worldwide e-Infrastructure for NMR and Structural Biology (WeNMR) community[31]. A number of other communities are making good progress with developing their own MoUs and such an agreement will be signed with the Life Sciences Research Community in May.

Advanced services, tools and support are provided by the Heavy User Communities recognising that much of the innovative services that can help other communities emerge from those that are making the most use of the infrastructure. Dedicated support is provided for the High Energy Physics, Life Sciences, Astronomy & Astrophysics, and Earth Sciences communities.

2.2.2.1 User Community Support Team

The User Support website has evolved in steps over the course of the year. The first iteration was formal, basic, and was structured around the organisational framework of the project rather than the needs of the users. The second iteration was more concise and contained more detailed explanations of everything that the activity offered but the structure of the navigation was not as efficient as it could be. The third major update provided set of pages that addressed the needs of people outside of the project whilst also addressing the needs of project members. Therefore the design approach was first to define the user types (individual researchers, members of national and international scientific collaborations), then define the information that each of these user types would need and finally to structure the site around this collective information. A navigation framework was then designed to enable any of the user types to find the information that they needed. Once this navigational framework was in place the content was updated to reflect the current state of the various services available to users and user communities. The NGI contacts that were known as a result of one-on-one discussions and a recent survey[32], together with the discipline based gateways (including the VRCs

[30] MoU template for VRCs: http://go.egi.eu/205

[31] MoU between EGI.eu and WeNMR: http://go.egi.eu/460

[32] NGI User Support Team survey – February 2011: http://www.zoomerang.com/Survey/WEB22BXJMELKHP

and candidate VRCs) are now clearly presented. The updated pages are available under http://www.egi.eu/user-support.

The Requirements Tracker system mentioned earlier was launched at the start of the year and enables all members of the EGI community to submit, track and comment on gathered requirements. Requirements can relate to any aspect of the e-Infrastructure from middleware to research applications to support services and can be easily submitted following instructions on the web site. User requirements are investigated, analysed and processed by the EGI User Community Support Team (UCST) in conjunction with support team members from the NGIs and other partners. Operations Requirements relating to deployed software are similarly investigated and prioritised according to their own needs. These combined requirements are then processed and discussed with the Technology Providers in the framework of the Technology Coordination Board. Requirements that can be addressed in the end-user and application domain are addressed independently by the UCST. The system, which was implemented using the existing EGI RT system, has proved to be both efficient and easy-to-use. Low-level requirements are grouped under topics which can be presented through wiki pages thus enabling committee members and others to easily track progress at a higher level[33] [34].

The UCST has also reviewed the NGIs' website from the user perspective: Is there enough information about EGI, EGI-InSPIRE, and how to use their national resources presented? NGIs were informed about the areas that were identified for possible improvement and they are currently updating or establishing websites to address these areas, or have completed the work (e.g. UK NGI, AEGIS).

2.2.2.2 User Support Services

Over the course of the first year of the project the disparate technical services that the EGI-InSPIRE TNA3.4 task started have been progressively brought together. While these services, namely the Application Database, the Training Marketplace and the VO Services did not always evolve smoothly, by the end of the first year they coalesced into a cohesive suite of integrated resources that users would want to use. This can be seen from the increase in Web visits for all of the three services[35] and in the increased use of AppDB (more new applications were registered than in the previous period; already seven AppDB gadgets are used within NGI and VRC webpages[36]), in the increased use of VO Services and the increased use of RT for user requirements.

Training Marketplace

Elements of the training services have been inherited from the EGEE-III project. A training events calendar and a Digital Library were considered valuable services to keep, while the Trainers' database has been removed from the portfolio by the UCB in February[37] in order to focus the development effort onto the other two. The vision for a Training Marketplace has been established by the EGI Training Working Group led by the UCST and the goal by the end of the period was to establish the

[33] User requirements presented to TCB: https://wiki.egi.eu/wiki/Track_UMD_Requirements

[34] User requirements presented to the UCB: https://wiki.egi.eu/wiki/Track_User_Support_Requirements

[35] Activity level metrics for NA3:
https://wiki.egi.eu/wiki/WP3:_User_Community_Coordination#Activity_level_metrics

[36] List of NGI and VRC portals that use the AppDB gadget:
https://wiki.egi.eu/wiki/AppDB_Gadget_Editor#Success_Stories

[37] User Community Board Meeting, 16. February 2011 (agenda with minutes):
https://www.egi.eu/indico/conferenceDisplay.py?confId=313

first version of this marketplace through the EGI Website. The marketplace aims to provide a one-stop shop for trainers and trainees from NGIs, VRCs, VOs, projects to offer and consume training services, to integrate these services into customised courses and events. Achieving this goal was extremely difficult because of the withdrawal of UEDIN, provider of training services, from the EGI-InSPIRE project in January 2011. By March the effort has been transferred to STFC (also in the UK JRU) and by the end of March 2011 the EGI Training Marketplace has been established within the EGI Website using Drupal (presentation), Fedora (data) and Solr (search) technologies. Consolidating on this success the STFC team will extend the marketplace with new features collected from NGIs, VRCs and prioritised by the UCB.

Application Database

The activities since the beginning of the project have been primarily focused on migrating valuable existing data from the EGEE era into a new system, able to meet the rise of requirements set forth with the introduction of the EGI era, and expanding the quality of the service. The system was redesigned at the beginning of the project to provide a minimalistic, yet advanced functionality through the user interface. The last major release came out before the EGI User Forum. The most important new features in this release are:

- The release included integration with the EGI SSO system, simplifying the authentication for those who wish to register or correct the profiles of applications and tools.
- Support for all the UMD middleware types as well as for other types of middleware have been added to the application profile template. This allows communities to indicate middleware dependency of their applications with more details.
- Introduction of personal roles, enabling NGI managers to have control over the profiles of applications registered from their countries.
- Integration with the EGI Operations Portal (developed in JRA1, provided by SA1) in order to import and present information about the relationship between VOs and applications.
- A read-only RESTful Web API (in beta version) to expose all the major resources, including applications, people, publications, etc. from the database. NGIs and VOs can provide fully customised and localised views for AppDB content by using this API.
- Gadget editor and AppDB gadget that enables user support teams to generate and integrate custom application lists from AppDB into VRC/NGI/… portals. Since the tool has been released already at least 5 NGI and VRC pages have been extended with this functionality.

VO Services

Through tools and services, documentation and procedural guidelines the VO services activity enables VOs to optimise their usage of the VO resources available to them. Aiming to fulfil those goals, the VO Services activity organised itself around three focus areas:

- Evaluation of VO and VRC support services and tools: A portfolio of services and tools has been reviewed for use by VOs looking for software solutions. Some job monitoring frameworks built on top of GANGA and DIANE job submission tools were examined[38], as well as their integration with mini-dashboard platforms installed at CERN. Other tools were also assessed and appropriate documentation was produced to guide VOs during the installation and testing phases.

[38] Tools reviews and provided services by the EGI VO Services activity: https://wiki.egi.eu/wiki/Services_and_Tools_Portfolio

- Provision of services and tools for VOs and VRCs: The NAGIOS framework that is used by EGI to run probes across the whole infrastructure was analysed and documentation was produced on how to extend that framework to VO needs as for example the implementation of VO-specific monitoring probes. Two instances are now offered as services for Emerging VOs who wish to monitor their resources. During the first year of the project several VOs from IBERGRID community (phys.vo.ibergrid.eu, life.vo.ibergrid.eu and ict.vo.ibergrid.eu) are already being served by project VO-specific NAGIOS services. Furthermore the We-NMR and HealthGrid (Life-Science Grid Community) were also supported during the process of setting up - or enhancing - their own dedicated services.
- Consultancy and Helpdesk for VO Managers: Relevant documentation for VO managers has been prepared and inserted into the VO Services section of the EGI Wiki as Operational guidelines or Frequently Asked Questions for VO managers to address issues that have come up during the first year of the project. Moreover, the VO Services staff has setup, and presently operates the VO Services support unit in the EGI Helpdesk handling tickets addressed to that support unit, and linking / involving the appropriate bodies to reach a prompt solution. This specific activity has already originated some requirements to EMI. Inherited support units with identical mandates have been decommissioned.

2.2.2.3 NGI User Support Teams

NGIs declared at the end of EGEE that they were capable of serving their local users. Therefore the biggest challenge of EGI was bringing the distributed teams of NGI support staff into post EGEE processes that can efficiently serve the e-Infrastructure needs of multi-national collaborations. The project put various communication mechanisms in place to enable structured and freeform communication for NGIs with their customers, with each other and with EGI.eu. The prime goal of the EGI.eu UCST for the first project year (PY1) was to establish these communication channels and to assure the proper flow of information through them for the benefit of both NGIs and scientific user communities.

User support is provided by NGIs from the TNA3.3 task of EGI-InSPIRE. There are 24 European and 7 non-European (Asian) countries involved in this task. The effort is very fragmented, none, but one partner (KIT-G, Germany) has more than 1 FTE in this task. Mainly due to this limited effort within the partners the project and specifically UCST established coordination, monitoring and reporting processes that put minimal overhead on partners. This is achieved by using the technical services (from TNA3.4) and a few additional key tools (such as the Requirements Tracker) as the main facilitators to monitor the NGIs' user support work.

By the end of PY1 managerial user support contacts have been collected and recorded for 37 European countries and five countries/regions outside of Europe. Information about these entry points (Website and/or email list) have been also collected and made available to the community through the EGI Website[39]. Besides providing constancy and training events[40] for users, porting applications for communities[41] other activities carried out by/with the NGI support teams during the period and during the year in general were:

[39] NGI User Support Teams – entry point for users: http://www.egi.eu/user-support/ngi_support

[40] List of EGI training events: http://www.egi.eu/user-support/training_marketplace/

[41] EGI Applications: http://www.egi.eu/user-support/applications_database/

- Supporting VRCs and VOs in the transition from LCG-CE to CREAM. Information collected from or contributed by NGIs about the topic is available in FAQ style in the EGI Wiki: https://wiki.egi.eu/wiki/FAQ:_lcg-ce_to_cream-ce
- Because of the limited human effort in many of the NGIs one of the biggest challenges for NGI User Support Teams was to organise efficient and easily maintainable support structure. While EGI-InSPIRE provides a central Indico, Wiki for NGIs, many of the NGIs setup local services to manage the agendas of NGI events (e.g. Indico) to track and resolve local user needs (e.g. xGUS or RT) or to write manuals/documents collaboratively (Wiki).
- (TUBITAK ULAKBIM, Turkey) The porting of a new scientific application for a user or a team often requires investigation and development which is specific to a given scientific code and output solution that cannot be reused in other cases. Such projects require lot of effort from the grid support team while benefit only a small group of users.
- (GRNET, Greece) Capturing and understanding feedback from user communities is challenging because the users/communities often do not provide feedback, or because of the differences in the understanding of grid/non-grid teams.
- (INFN, Italy) Besides running training courses and porting scientific applications to EGI the following main achievements have been reached:
    - the Java ™ PKCS#11 (ver. 2.0) and CoG kit (1.8.0) BouncyCastle APIs have been combined to enable SMART card based user authentication in EGI
    - Creation of a patch to support DAG jobs on CREAM CEs;
    - Development of Java portlets: i) Application Registry: access to a MySql database to print the results in a Liferay page; ii) Grid Portlet: make use of gLite Java API to submit jobs; iii) EnginFrame portlet: allows to access the gLite services by means of the EnginFrame 2010 framework; iv) gLibrary portlet: integrate the gLibrary features within Liferay; v) Adobe Connect: allows the user to access his/her own reserved area of Adobe Connect Server; vi) Web form registration: allows users to ask for an account on the portal.
    - A P-GRADE portal v2.7 has been installed and made available for the community upon request. Ad-hoc workflows and visualization tools (tested for Computational Chemistry applications) have been developed and made available via the Portal.
- (SWING, Switzerland) Non-HEP communities have little (or no) experience on porting applications to large scale distributed infrastructures. A more direct involvement of the SWING User Support team is necessary to identify power user groups and applications, building up trust, development and training is time and effort consuming.
- (IPP-BAS, Bulgaria) There is substantial interaction between the Grid and HPC communities within the Bulgarian NGI. Some applications are running partly in grid mode and partly in cluster mode depending on which way is most appropriate. The users of such applications are technically proficient and do not require gateways and other facilitating services but instead pose certain difficulties for the administrators of the grid clusters since they have some non-standard requirements to the infrastructure. (Example of such requirements are high wall clock running times – more than one week – high amount of scratch space for jobs or storage space for results, and availability of dedicated resources.) These requirements were solved via frequent interactions between administrators and users, making changes to the configuration of the infrastructure as necessary. With the projected increase of number of users such approach will not scale well, unless significant improvements in the grid middleware are adopted.

- (LIP, Portugal) An important achievement was the restructuring of the Iberian regional infrastructure use: Instead of having regional VOs per application, a macro-VO with country groups and applications subgroups has been implemented. This makes the support of VOs in the infrastructure more scalable. The ultimate challenge was on migrating the users (mainly from the Spanish application VOs to this IBERGRID macro VO).
- (UCY, Cyprus) Some users were interested in running Matlab on grid, but the code is not available on any EGI VO. There used to be an agreement between the EGEE project and MathWorks on the usage of Matlab on a few sites, however this agreement expired and has not been extended. The group currently looks for workaround solutions that could satisfy these users.
- (TCD, Ireland) Grid-Ireland has continued its consultancy work with existing grid users particularly in mathematics and astronomy/astrophysics. This has included improvements to grid job submission toolkits. Grid-Ireland is involved in the Training Working Group and (with SA3) coordinated training for Heavy User Communities at the EGI User Forum 2011. In the next period, Grid-Ireland will begin central deployment of web portals (general purpose and application specific, e.g. for solar physics users) to replace a number of under-used command-line user interface services.
- (CESNET, Czech Republic) The support team provided assistance for the following communities (1) Local WeNMR team has been connected to the WeNMR VRC through the VO. (2) Supporting the AUGER VO to run their VO and to become an EGI VRC. (3) Development of job optimisation methods for non-IT users (4) Producing new NGI Website and CESNET Yearbook. Meetings have been held with representatives of various ESFRI projects and other large scientific collaborations: (1) ELI – CESNET provides document repository, Wiki and Web services for ELI. (2) CEITEC and CERIT-SC – discussed possibilities for joint research and development. (3) Global Change Research Centre AS CR, v.v.i. (large infrastructure project CzechGlobe, involved in the ESFRI project CzeCOS / ICOS – discussed scientific cooperation, searching for common research topics. (4) CLARIN - exchange of information about the e-Infrastructure in the Czech Republic, discussing potential of cooperation in data storage and processing. (5) BIOCEV (large infrastructure project, involved in ESFRI projects INFRAFRONTIER and EuroBioImaging), Academy of Sciences, v.v.i., Prague – Discussing potential of scientific cooperation in biobank infrastructure building. (6) Moravian Library, Brno – Discussing possibilities of cooperation in long-term cultural heritage preservation. (7) EuroBioImaging (ESFRI project) – Exchanging information on the purposes and IT support for EuroBioImaging infrastructures. (8) CTA (Cerenkov Telescope Array) – discussions about support needed by the user community.

2.2.2.4 Shared Services and Tools

2.2.2.4.1 Dashboards

Monitoring of the distributed infrastructure and the activities of the user communities on this infrastructure is a vital condition for ensuring its quality and performance. Monitoring is of particular importance for Heavy User Communities (including HEP) due to the scale of their activities and the quantity of resources that they are using. There are two main tasks that have to be addressed by the monitoring systems used by HEP VOs: monitoring of the distributed sites and services, and monitoring of the VO activities, namely job processing and data transfer. The Experiment Dashboard was developed in order to address the monitoring needs of the LHC community, but in contrast to other monitoring systems it provides common solutions that work transparently across various middleware platforms and are not coupled with VO-specific frameworks, offering instead a common way to instrument those frameworks for publishing monitoring data.

Experiment Dashboards

The system proves to be an essential component of LHC computing operations and is widely used by the LHC VOs. For example, the Dashboard server of a single LHC VO, like CMS, is accessed by up to 5000 unique visitors (unique IP addresses) per month and more than 100k pages are accessed daily. The system covers monitoring of job processing, data transfers, and distributed sites and services, measuring their usability from the VO perspective.

During the reference period the performance, scalability and functionality of the system were steadily improving following the growing scale of the LHC computing activities and the requirements of the LHC community. The role of the system is becoming more important with time and this trend is expected to continue for the coming years.

Job monitoring: ATLAS job submission framework - GANGA was instrumented with the generic library which enables reporting of the job monitoring information to the Messaging System for the Grid (MSG). Dashboard collectors to consume data from MSG were developed. Since most of ATLAS jobs are submitted through the PanDA workload management system, another Dashboard collector was developed in order to import job monitoring information from PanDA into the Dashboard job monitoring repository. New versions of the job monitoring user interfaces with improved functionality and performance were implemented. All these components were deployed in production during the second half of 2010 and the beginning of 2011 and were successfully validated by the ATLAS computing community.

Data Management Monitoring: A new version of the ATLAS Data Management Dashboard is being developed. It will allow users to follow transfer progress selecting either transfer source or destination and will facilitate detection of transfer failures. The first prototype with limited functionality was deployed for validation by the end of 2010. Starting from 2011, it is being used by the ATLAS community. A new version with complete functionality will be deployed in production by the end of 2011.

Site Usability: The LHC VOs rely on the Service Availability Monitor (SAM) for remote testing of the distributed sites and services. During the reference period, the original SAM system was redesigned using the Nagios open-source framework for monitoring network hosts and services. In order to realign with the very important changes in the SAM architecture, the new Dashboard Site Usability Portal is being developed. A first prototype is deployed for validation and is being evaluated by the LHC VOs.

Distributed computing shifts: The Experiment Dashboard provides several applications which are used by the LHC VOs for the distributed computing shifts. Among them is Site Status Board (SSB). A lot of improvements were performed on the SSB application. For example, on the request of the CMS community, a new algorithm for handling site downtime information was developed and deployed. The new algorithm takes into account topology information describing the sites and services used by a VO, retrieves information for scheduled and unscheduled downtimes from the OIM and GOCDB systems, and properly handles changes of scheduled downtime periods. The SSB collectors were partially redesigned in order to improve their performance and robustness. A new user interface with extended functionality and improved performance was deployed into production for ATLAS and CMS.

Further development of the Experiment Dashboard system is being aligned with the LHC computing needs and will follow the requests of the LHC virtual organisations.

Generic Dashboard

Though the target user community for the Experiment Dashboard system is the LHC, most of the Dashboard applications are generic and can be used outside the scope of LHC. Among those applications are Site Status Board, site usability interface and generic job monitoring. These are very relevant for heavy user communities who use a lot of distributed resources and have special requirements for the distributed sites and services.

The data repository of the Dashboard job monitoring application is implemented in Oracle. This can create a limitation for using Dashboard job monitoring by smaller user communities. In order to satisfy the needs of smaller communities, the "mini-Dashboard" monitoring application was prototyped. It allows users to follow processing of user jobs submitted through the GANGA or Diane job submission frameworks and relies on MySQL for persistency implementation. The generic "mini-Dashboard" prototype is available at CERN (http://gangamon.cern.ch/ganga). The system can be extended and customised for the needs of a particular VO. It can grow together with the new user communities, by integrating their customisations and contributions if they are of general interest.

2.2.2.4.2 Applications

Ganga and DIANE are used in a wide range of fields, both within and outside HEP, for running large-scale computing tasks; to date communities from more than 10 scientific fields and disciplines have reported their use of the tools. The tools described here have been grouped together under the banner of The EGI Introductory Package. The intention is to provide a well-documented solution that allows small and medium-sized communities to start exploiting grid technologies with a minimal initial overhead.

These tools facilitate more efficient use of the EGI resources by improving task-processing throughput, and on tuning the user experience in order to decrease the load on support teams. Recent experience with Ganga-based Error Reporting tools will be taken as a starting point to achieve better integration of the job submission tools with the user support systems. Another important on-going work area is the improvement of the monitoring of analysis jobs so that grid faults are more quickly identified, with the intention of reducing the failure rate of user jobs. In addition, support for intelligent fault detection may be required as an improvement for currently used distributed analysis tools.

Ganga

Ganga is an easy-to-use frontend for job definition and management tool that provides a uniform interface across multiple distributed computing systems. It is the main end-user distributed analysis tool for the ATLAS and LHCb experiments, and also provides the foundation layer for services managing large numbers of jobs such as HammerCloud. During the reference period, Ganga was deployed across 138 sites and used by 1440 unique users (40% ATLAS, 40% LHCb, 20% others) submitting more than 250,000 jobs per week. During this period there were 37 public releases of Ganga, covering versions 5.5.5 to 5.6.0.

Development of the Ganga Core focused on improving job merging and resubmission features. The framework now supports configurable auto-resubmission of failed sub-jobs and the possibility of overriding backend parameters when job resubmission is performed manually. The automatic merging

code ensures consistent location of merged outputs (which was not the case for Athena-based applications).

One of the major development themes has been to provide features that improve usability and user support functionality. Notable highlights include a new web-based monitoring interface (WebGUI) that allows users to conveniently view the status of their submitted Ganga jobs and browse the local job repository. The Ganga WebGUI builds on a common web application framework developed for the ATLAS and CMS experiments' Task Monitoring Dashboards. This allows users to easily navigate between the job repository view and central dashboard services, via interfaces which share the same look-and-feel.

User job task-monitoring has been improved to gather information about all submitted jobs, irrespective of their submission backend; this provides the developers with an understanding of the usage patterns outside of the known grid use-cases. Furthermore, improvements were made to the Ganga usage monitoring service to give a more detailed breakdown of the use of Ganga across different VOs.

Finally, an Error Reporting Tool was integrated into Ganga, providing the ability to upload detailed job data and log files to a remote server, from where they can be accessed by user-support teams. This solution greatly streamlines the flow of information to support teams, at the same time providing them with all available diagnostic information. This tool was the basis for a CMS-specific error reporting tool which, since its deployment in October 2010, has handled over 350 user-submitted error reports.

DIANE

DIANE is a lightweight task processing framework which allows for more efficient and robust execution of large numbers of computational tasks on unreliable and heterogeneous computing infrastructures. During the reference period DIANE was deployed at 23 sites and used to process more than 600,000 tasks. Some minor bug fixes and improvements to DIANE's mini-Dashboard task monitoring were implemented and released. The project code repositories were migrated to SVN and 2 public releases of DIANE (v2.2 and 2.3) were released during the reference period. DIANE was reported as being used for Geant4 software regression testing on the EGI and OSG grids.

2.2.2.4.3 Services

GRelC

The GRelC Project provides a grid-database service allowing users to interact with different database management systems, both relational (PostgreSQL, MySQL, Oracle, DB2, SQLite, etc) and non-relational (eXist, XIndice, XML flat files). It provides a uniform access interface to heterogeneous data sources in a grid environment across Earth Science, High Energy Physics and Bioinformatics.

During the first year of the project several tasks have been carried out.

- The *system database* (a relational database related to the management and monitoring framework of the GRelC services network) has been designed and implemented to represent and manage GReIC service instances, databases and virtual organisations.
- The clients responsible for the data ingestion into the system database have been implemented and tested.

- New metrics have been added to the system (RTT, availability/service down, network errors, host unreachable), and a configuration file has been added to make the client easily configurable.
- Training and documentation materials have been updated and reviewed.
- Design and implementation of a monitoring web application (including project view, host view, service view and GRelC registry) and associated DashboardDB will give users the proper understanding about the underlying grid-database service infrastructure.
- A questionnaire has been circulated to SA3 relating to database resources, related needs and future plan and will be acted upon in PY2.

Hydra encryption service

Work just started during PQ4 on the Hydra encryption service provision for the life sciences community. Provided that the service can be deployed under gLite 3.2 without changes (it was designed for gLite 1.5), after PQ4 a distributed, more secure service will be delivered. A functionality check of the Data Management System is then planned every quarter.

2.2.2.4.4 Workflow & Schedulers

Kepler

The activity has been also focused on establishing collaboration with other user groups interested on the actions being carried out by the activity. Presentations on the subject during the EGI Technical Forum held in Amsterdam triggered interest from the community in the capabilities of workflow scheduling technologies. Questions and topics arose in an informal manner. It was felt that the Forum represents a great opportunity to bring together all the collaborators interested in grid technology and looking for different options to solve the challenges they have to face. Moreover, during the EGI User Forum held in Vilnius, a tutorial on how to use Kepler to build scientific workflows was provided to the community present at the forum.

The activity has been also focused on starting the work to support GridWay in Kepler. The first steps towards the support of GridWay in Kepler have been taken.

SOMA2

SOMA2 is a versatile modeling environment for computational drug discovery and molecular modeling (http://www.csc.fi/soma). SOMA2 is operated through a WWW-browser and it offers an easy access to third-party scientific applications. The SOMA2 environment offers a full scale modeling environment from inputting molecular data to visualization and analysis of the results, and including a possibility to combine different applications into automatically processed application workflows.

The existing SOMA2 gateway has been extended for job submission to grid infrastructures by adding support for processing user's personal X509 certificates. For the end user, it is now possible to include both local and grid resources in their application workflow. All grid related features were implemented as optional setting and functionality is based on use of personal X509 certificates. This has been demonstrated by submitting jobs via SOMA2 to Nordugrid Arc middleware. The scientific application Autodock 4 was integrated into SOMA2 for execution on grid resources. The SOMA2 system was also presented to the EGI communities at the EGI User Forum 2011 in April.

2.2.2.4.5 MPI

The MPI group works on issues of high impact on the Computational Chemistry, Fusion and Astronomy and Astrophysics (A&A) communities, but are also intended to have an impact on other

user communities. It ensures that the user communities and site administrators are able to adopt MPI through:

- Improved end-user documentation, addressing MPI application development and job submission in ARC, gLite and UNICORE;
- Quality controlled MPI site deployment documentation;
- Outreach and dissemination at major EGI events and workshops;
- User community, NGI and site engagement, gathering direct input;
- Participation in selected standardisation bodies.

To date, over 90 resource centres are reporting use of MPI through the use of gLite and ARC. UNICORE sites have not yet been integrated into the monitoring infrastructure which is underway for PY2. Specific activity over the year has included:

- The MPI Working Group Recommendations document (initially commissioned under EGEE-III) was finalized and published.
- The gLite middleware changes which support "WholeNodes" has been widely tested by the Italian NGI.
- A new MPI wiki created by IFCA reflecting changes and updates to MPI-START and general MPI site installation and administration. A centralised EGI MPI wiki was also created, updating existing material.
- MPI technical session at the EGI Technical forum 2010 and an MPI "Hands-On" training event at EGI User Forum 2011.
- TCD has engaged with site administrators regarding the handling of GPGPUs. UNIPG implemented a virtualised GPGPU cluster, the results were presented at the EGI User Forum 2011.

2.2.2.5 Domain Specific Support

2.2.2.5.1 High Energy Physics

During the first year of the project, work has focused mainly on needs of the LHC experiments (ALICE, ATLAS, CMS and LHCb) and the WLCG project, but has also included support for detector studies for the International Linear Collider project (ILC) – a candidate for the next world-class machine in this domain – as well as for the former LEP experiments to enable them to use grid tools for re-analysis. Thus, three generations of HEP experiments (i.e. LEP, LHC and ILC) are being supported, each of which has project lifetimes measured in decades.

In all cases there has been a strong focus on the use of common tools and there have been several concrete cases – described in more detail below – which would not have been possible without the support provided by this project. In addition, the effort provided as well as the project goals have helped re-focus on task-oriented, timely delivery and has enabled us to convince the user community of the clear advantages of such an approach, not only in the short-term but also as part of an overall strategy for long-term sustainability. Thus, even in cases where the experiments have made different choices, based on their computing models and other constraints, we have been able to deploy common solutions at the architectural level and in some cases at the implementation or even deployment level. To do so in the first year of LHC data taking is a formidable achievement that bodes well for future steps in this vein.

The success of the first LHC run (from late March until December 2010) and the value of grid computing in performing the data processing and analysis has been widely acknowledged, including a significant reduction in the time taken to produce results presented at international conferences. This is

due at least in part to the support provided by this work package, as well as the previous EGEE project series.

Analysis Tools and Support

The CMS Remote Analysis Builder (CRAB) is the official analysis tool in CMS to aid users in configuring CMS applications for distributed use, by discovering the location of remote datasets and submitting jobs to the grid infrastructure. During the past year five releases of the CRAB 2 Client and three for the CRABServer have been produced. The data discovery, the stage out and error messages have been improved as well as all the known problems with growing data sets have been addressed and improvements in the management of the data masks have been applied. A new functionality has been added in order to improve the user support. This has been done by integrating the Error Reporting Tool (in common to both ATLAS and CMS) which is designed to upload job state and logging information to a remote server. Additional functionality prototyped during the year includes the Credential API, which role is to allow the support for multiple users, restructuring of the BossAir framework in order to reduce the load at scale, improved strategy for the CMS user output data stage out has been implemented, and a web-services REST based interface needed to enable the CRAB3 Client-Server interactions.

HammerCloud (HC) is a distributed analysis testing service that is actively used for two main use cases:

- to continually validate the availability and performance of EGI and global grid sites;
- to deliver on-demand stress tests to the sites to aid in the commissioning of new sites or evaluate changes to site configurations.

During the reported period HC was used by the ATLAS experiment actively while the core software was generalized for other VOs; a major milestone achievement in this work was the release of HC version 4. HCv4 introduces a system of experiment applications that allow VOs to implement VO-specific functionality during the test submission, execution and presentation phases. The motivation for the generalization of HC came primarily from an expressed interest in the service by the CMS and LHCb VOs.

Data Management Tools and Support

The ATLAS Distributed Data Management (DDM) is the project built on top of the WLCG middleware and is responsible for the replication, access and bookkeeping of the multi-Petabyte ATLAS data across more than 100 distributed grid sites. The work during this year has been focused on the improvement of the service monitoring, the automation of services and the optimization of network and storage resources:

- The DDM Accounting system for storage occupancy on ATLAS grid sites was improved by adding new views to its web frontend in order to visualize for instance the metadata about the data custodian. As well, a new agent was put in place to obtain storage information from the BDII and compare this information with the one retrieved using the SRM.
- The DDM Centralized Site Exclusion is a central system to temporarily exclude sites from DDM activity during downtimes or when heavy problems are observed. Two collectors were deployed that are capable of setting sites offline automatically: The first collector gets the GOCDB and OIM site downtime information from the ATLAS Grid Information System. The second collector allows ATLAS DDM to temporarily stop replicating data to full sites.
- The DDM Site Services are responsible for the data placement by throttling the underlying WLCG middleware. The main progress of this software component was focused on making a more

efficient usage of the network resources and to reduce the cloud boundaries in order to allow the evolution of the ATLAS Computing Model.

The DDM Site Services were instrumented to measure the durations of gLite File Transfer Service (FTS) transfers between sites and store them in an Oracle database. The transfer statistics are used as feedback to optimize the source and path selection for cross-cloud transfers, but are also visualized in a dynamic web page in order to monitor the throughput performance of the network links. In parallel, an ad-hoc load generator triggers transfers on the complete mesh of ATLAS sites and will provide the information needed for a first attempt of link commissioning.

- The service monitoring infrastructure, which is based on the CERN IT Service Level Status (SLS) framework, has been improved by using message queues that allow the different service instances to communicate with a central server that publishes the health report to SLS. The service monitoring clients have been improved as well for different DDM components. The implementation is completely generic and has been presented to the CMS experiment to encourage immediate reuse.

The DIRAC system was developed in order to provide a complete solution for using the distributed computing resources of the LHCb experiment. DIRAC provides a complete framework for data production and analysis, including workload management, data management, monitoring and accounting. One of its most important components is the Data Management System (DMS), whose support in EGI-InSPIRE project started in October 2010, therefore this annual report will include only the work done starting from PQ2. Significant progress has been done in improving and developing the system by:

- Documentation for new developers has been produced;
- Enhancement of the functionality of the on-line database monitoring to visualize the status of the data while they are being transferred from the on-line storage system to the mass storage system at CERN;
- Development of a new DIRAC agent to allow automatic consistency checks between the content of grid storage elements (SEs) and the information registered in the central file catalogue. Since the grid SEs and the file catalogue are completely decoupled, inconsistencies often arise, which have to be periodically fixed.
- A system to keep accounting of the historical storage resources usage, grouping by different parameters (software version for the reprocessing, detector conditions, file type). This tool displays how much space a reprocessing or a Monte Carlo production occupies and is urgently needed by LHCb collaboration to manage storage resources around the grid sites in a more efficient way. The development phase has been concluded and it is currently under validation.

Persistency Framework Tools and Support

The Persistency Framework consists of three software packages (CORAL, POOL and COOL) which address the requirements of the heavy user communities in HEP for storing and accessing several different types of scientific data produced by the LHC experiments (ATLAS, CMS, LHCb). CORAL is an abstraction layer with an SQL-free API for accessing relational databases. POOL is a hybrid technology store for C++ objects, using a mixture of streaming and relational technologies. COOL handles the time variation and versioning of the conditions data of the HEP experiments. Two new personnel on EGI-InSPIRE funding, a PhD student and a fellow, joined the Persistency Framework team in June and July respectively. Their activities focused on R&D for data access optimization in CORAL and COOL for the former, and on the maintenance and consolidation of POOL and CORAL for the latter. Initially, both newcomers had to gain a better understanding of these software components by studying and extending the documentation that describes their goals and

implementation details and by analysing and executing subsets of their test suites.

In the area of POOL maintenance and consolidation, the main task consisted in the analysis and debugging of some problems observed during the automatic nightly builds and tests of the POOL software. Several bugs have been identified and fixed and this task has been successfully completed.

In the area of CORAL maintenance and consolidation, the main task has consisted in the analysis and improvement of the CORAL handling of network and database glitches. This is a high priority issue for all experiments, which have reported several problems of this kind accompanied by specific Oracle errors such as ORA-03113 or ORA-24327. This task is still ongoing: while a first workaround for the most important bug has been implemented (and included in the releases recently prepared for ATLAS and LHCb) and great progress has been achieved in understanding the detailed chain of events which characterise these errors, a definitive solution to the problem still needs to be released to production users of the code.

2.2.2.5.2 Life Science

Life Sciences Grid Community (LSGC): Ensuring sustainability in supporting Life Science (LS) grid users' communities is essential to maximize the adherence of the communities to the newly developed infrastructures and allow a more coordinated approach worldwide. The LSGC VRC has been established as a self-organised, project-independent structure. To facilitate the user support activity of the LSGC, a set of user management tools is being developed with high priority during the first part of the EGI-InsPIRE project. These tools include communications channels to animate the community, monitoring and user support tools, and tooling for managing the population of users registered in the community.

Communication channels. A mailing list of all LSGC partner representatives is used for internal communication. The LSGC has set up a wiki to collect and publish practical and technical information related to the community. A monthly phone conference is organized to address the managerial and technical issues. The HealthGrid association maintains these communication channels that are essential in maximising the impact of the tools and services developed, as well as negotiating and managing resources with the NGIs.

Monitoring and user support tools. The LSGC receives support from the NGIs involved and the HealthGrid association in term of manpower and grid resources. Part of this manpower is used to operate a Technical Team of members from the biomed VO to assist the LS user communities. The function of the team is to address problems reported by the community, usually through the GGUS front-line support system. The support is performed using duty shifts. The technical team also anticipates problems by actively probing the most critical services for the proper VO operation through a dedicated Nagios server.

Users management database. The LSGC is also currently designing a user management database, which will facilitate liaising with hundreds of users registered in the affiliated Virtual Organizations. The database schema was specified, and the tooling will be developed in the coming months. This user management database will interface to Virtual Organization Membership Service (VOMS) servers as well as the EGI application database, to avoid replicating existing information. It will complement the VOMS and application database with extra-information on the users and their affiliations. It will be used to manage the user community and to produce sub-themes mailing lists (per-NGI, per-project, per-scientific domain) to liaise with the end users. Users will register to the "biomed" VO through a single portal collecting all information needed to fill-in the user database, register to the VOMS server and fill-in the application database. The user database will be interfaced to and monitored from the LSGC community dashboard.

2.2.2.5.3 Astronomy and Astrophysics

The A & A activity in EGI-InSPIRE (TSA3.5) includes the following topics: visualization tools with particular reference to VisIVO; parallel processing on the Grid: MPI and CUDA; Grid-HPC interactivity; access to databases and integration with the Virtual Observatory.

An internal work-plan was prepared to identify in detail such sub-tasks and the involved resources.

Visualization Tools: VisIVO. Following a preliminary design study, VisIVO was ported to the gLite platform during PY1 in order to allow movies and images to be directly generated and stored on the Grid without the need of producing intermediate files; in this way the overall time requested for the production of movies is also reduced. Thereafter, some use-cases have been prepared and the first gridified implementation of VisIVO server was produced and tested against them[42].

Parallel processing on the Grid: MPI and CUDA. A &A provided requirements to the EGI MPI working group. The option to use CUDA for some A&A applications was evaluated as well as the current support for CUDA in Grid. This activity was later temporarily frozen to speed-up the work on VisIVO and also because the coordination of the A&A community was re-launched only recently.

Access to databases and interaction with the Virtual Observatory. During the first two quarters, an evaluation plan was defined to verify the state of the art for what concerns the support of databases in Grid and a possible integration with astronomical archives and catalogues (stored in databases) and with the Virtual Observatory. Starting from the third quarter the evaluation process began. However, to be significant and to produce reliable results the evaluation process has to be extended to the whole community in the framework of the A&A VRC. Due to the lack of resources and with some NGIs not yet consolidated, the A&A VRC coordination activity was frozen and only recently the coordination of the A&A community was resumed; it is expected therefore a speed-up of this process during the second year. The tools and services currently under evaluation include AMGA, GRelC, Spitfire and OGSA-DAI.

Grid-HPC interaction. For what concerns Grid and HPC, the second half of 2010 has been spent trying to identify significant A&A use-cases and test-beds as they are of utmost importance to clearly understand which tools and services are requested by A&A applications and complex workflows to combine Grid and HPC.

We started by cosmological simulations as they represent an important class of A&A applications that typically require HPC resources; we identified some of them: FLY (INAF-OACT Cosmological code) and Gadget + Flash, the most popular cosmological codes in Astrophysics. This process of requirements gathering from simulation applications continues according to the following schema: a) preparation of the initial dataset; its size is typically of several hundreds of Gigabytes; b) data production phase, generally performed through parallel code whose execution involves hundreds of CPU/cores. As for Grid and databases, also in this case it is important to extend the provision of use-cases and test-beds to the whole A&A community in the context of a revitalized A&A VRC.

2.2.2.5.4 Earth Sciences

Earth Science (ES) applications cover various disciplines like seismology, atmospheric modelling, meteorological forecasting, flood forecasting, climate change and many others. The Services for Earth Science task covers the implementation of data access scenarios, to permit the utilization of Earth Science data resources in Grid jobs.

To support the communication among the participating institutions, a mailing list is used. The portal euearthsciencegrid.org acts as a presentation and contact point for interested users, and hosts

[42] MS608 Integration of the VisIVO server with the production infrastructure, http://go.egi.eu/328

additional collaboration tools through an instance of the OpenAtrium collaboration software, which is well suited to support work in groups and offers among others the functionality of a weblog, Wiki, ticketing software and calendars. A general Earth Science Research (ESR) Virtual Organisation is operated and supported for researchers that are not yet member of a specific subject VO.

During the first year of the project, contact and a basis for further collaboration with the GENESI-DEC project, the successor / evolution of the GENESI-DR project for an open Earth Science repository infrastructure was established. One of GENESI-DEC's major goals is to enhance the previously established platform by federating and interoperating existing infrastructures of Digital Earth and Earth Science initiatives. The major goal of the collaboration is to allow and ease access to the data infrastructure for users of EGI. Different possibilities to realise the access have been evaluated. Additionally, integration with existing tools commonly used in the Grid by Earth Scientists will be investigated.

A closer collaboration with the ES Community in the French NGI was established. Together with the Institute Pierre Simon Laplace (IPSL), involved in Climate activity, the interfacing of the EGI infrastructure with the Earth System Grid (ESG) is analysed and possible solutions evaluated. The ESG consists of a federation of Data Nodes, using among others OPeNDAP and THREDDS technology. The first task was to port a MPI climate application on EGI that uses ESG data in order to test any new features. Besides this specific data management, the authentication and authorisation inter-federation (ESG and EGI) is a challenge in this activity. The activity members are in direct contact with ESGF members via IPSL and are discussing possible solutions for the future.

GRelC has been used extensively in the Climate-G testbed. The Climate-G testbed provides an experimental large-scale data environment for climate change addressing challenging data and metadata management issues. The main scope is to allow scientists to carry out geographical and cross-institutional climate data discovery, access, visualization and sharing. During PY1, new versions of the Climate-G portal have been deployed (http://grelc.unile.it:8080/ClimateG-DDC-v2.0/) and tested. To ease the management of the software provided by SPACI in the context of the Climate-G testbed a Virtual-Machine based environment has been also set up. A face-to-face meeting among the EGI-InSPIRE partners involved into the Climate-G testbed has been held in Vienna during the EGU2011 conference (03 – 08 April 2011) to collect new requirements and define new scenarios to be implemented during the second and third year of the project.

2.2.3 Software Provisioning

The Software Provisioning activity is responsible for definition and maintenance of necessary processes and artefacts that ensure an auditable supply of new and updated software for deployment in the EGI. In order to provide a lightweight and flexible Software Quality verification and provisioning processes, much of the activity over PY1 has been in assembling tools, and defining document templates and processes. These processes are to integrate software delivered by external Technology Providers to form an interoperable, yet independent and replaceable components deployed in a multi-provider, multi-software architecture in a pan-European production infrastructure. The requirements coming from the EGI community that are sourced from technology providers within the EGI community are captured in the UMD Roadmap[43]. This is part of a broader EGI Technology roadmap

[43] D5.1 & D5.2 UMD Roadmap, https://go.egi.eu/100 & http://go.egi.eu/272

that captures the general technology environment (drawn from software coming from within the EGI community, the broader open-source community and even industry) within which EGI operates.

The major challenge of PY1 has therefore been in establishing communication and interaction with other parts of the SA2 and the external technology providers. A workflow has been established that accommodates the multiple technology providers delivering components to meet defined capabilities that need to be assessed against defined criteria by community based criteria certification engineers, before being assessed as part of a staged rollout to production by sites administrators of these early adopting sites. Managing these software dependencies in order to reduce the risk of inadvertent side effects of updates on other components is very important.

Both EGI-InSPIRE and EMI (currently the main technology provider to EGI) have had to undertake significant restructuring in PY1 to the workflows around software provisioning. As these are now spread across two projects establishing effective and timely communication channels has been challenging during PY1 and remains a focus of both management teams.

EGI needs to ultimately provide a 'pick and mix' approach to the software it provides to its user and operations communities. This is expressed within the UMD Roadmap as the 'capability' which the technology providers deliver components to upon a common base. The definition of these capabilities through clearly defined functional interfaces – ideally based on open standards– is part of the collaborative multi-year workplan being defined through EGI's technology providers. EMI's planned release of software meets these expectations. It is expected that the software delivered to meet these capabilities will have tight dependencies; however the trend for these dependencies to be delivered form community repositories is encouraging. This model has driven the support structures and planning across all areas of SA2. These processes were verified through a number of dry runs in order to both test the latest implementation but also to train members of the activity. Early pre-releases of some EMI components have passed through this workflow, but no EMI releases were made during PY1.

MoUs and SLAs have been established with three technology providers: EMI, IGE and the SAGA project for the delivery of components into UMD, and a MoU has been established with StratusLab.

2.2.3.1 Quality Criteria

During PY1, the Quality Criteria have evolved and improved significantly with increased coverage of the UMD capabilities and the detail of the Quality Criteria for each UMD Capability. With rising levels of interconnection and interaction within EGI-InSPIRE (e.g. collaborating with JRA1 as an internal Technology provider), and to external projects such as EMI and IGE, accountability, predictability and reliability of the Quality Criteria became increasingly important. The process of Quality Criteria generation, maintenance and dissemination was reviewed, and a Change Management process was put into place that includes clear versions of Quality Criteria, applicability to a certain UMD Roadmap version, and which version of the Quality Criteria documents is in force at which period of time, allowing the Criteria Verification team and the Technology Providers to proactively accommodate for the upcoming version of the Quality Criteria.

The Quality Criteria documents are public and cover 70% of the identified UMD Capabilities. A complete revision of the document lifecycle was conducted, firstly by identifying the possible source of changes for any given criterion, and secondly by defining the review process of the documents. All the existing criteria were updated to clearly state the sources and related references that were used for

the definition. These criteria are released every 6 months in conjunction with new versions of the UMD Roadmap. A lightweight review process of the draft documents is performed every two months by the Quality Assurance and Quality Control teams from SA2, the EGI user (NA3 & SA3) and operations (SA1) communities and the main Technology Providers (EMI & IGE) to verify the coverage and criteria definitions.

All the information regarding the status of the current documents, the definition process and the lifecycle of the Quality Criteria is available in the EGI.eu wiki under the Software Provisioning pages accessible at https://wiki.egi.eu/wiki/EGI_Software_Provisioning.

2.2.3.2 Criteria Verification

With the start of the project an initial version of the Software Verification Process was defined, and further iterated on. Embedded in the general Software Provisioning process is the Criteria Verification task, and StagedRollout (managed by SA1). With increasing refinement of processes, and the interconnections and interactions with other EGI-InSPIRE tasks and external Technology Providers, a general review of artefacts produced by the Criteria Verification task and Staged Rollout was conducted to improve visibility, accountability, auditability and reliability across all Software Products verified, and across all Technology Providers.

After the publication of the first Quality Criteria documents, the Verification team has released a complete set of verification templates for each UMD capability. These verification templates are now public[44]. Verification and Quality Criteria teams also have developed a Quality Criteria service mapping to help new Verifiers[45] and Technologies Providers to identify which QC must be assessed for the products developed to meet a particular UMD capability[46].

A verification test bed that provides a secure platform where verifiers may install, configure and verify the new incoming middleware has been established. This test bed is based on OpenNebula toolkit and was configured and installed using FCTSG cloud computing resources. New verifiers only have to request a new virtual machine instance, in a few minutes a new virtual machine is created and it is ready to be used for the verification process[47]. The VMs authentication model is based on SSH keys. The verification test bed was first used successfully in a dry run of the complete EGI Software Provisioning Workflow. Two handpicked EMI pre-release products were verified (one other picked product failed the provisioning of the packages from the EMI-1 RC3 repository).

2.2.3.3 Deployed Middleware Support Unit

The DMSU was promptly established in PY1 but suffered from a low number of tickets assigned to DMSU during its first 6 months. This allowed effort to be devoted to setting up and defining the necessary processes, roles and responsibilities of a 2nd line support unit in an ITIL based Service Desk model. At the same time, the low numbers of tickets assigned to the DMSU is in line with the ramp-up of new service such as the DMSU. It takes time, education, advertisement, and uptake of the target user group of this service. This was supported with mitigating actions, such as channelling all service requests to software providers through TPM (for operational issues) and DMSU (for middleware

[44] Quality Criteria Verification Template, http://go.egi.eu/417

[45] https://wiki.egi.eu/wiki/EGI_Quality_Criteria_Verification

[46] UMD Quality Criteria EMI service mapping, http://go.egi.eu/418

[47] https://wiki.egi.eu/wiki/EGI_Verifier_Guideline

issues), and have 3rd line support (provided by the Technology Providers) only available to TPM and DMSU.

By the end of the period the DMSU work follows its established procedures. In PQ4, 198 tickets were assigned to DMSU which is a steady increase witnessing that the existence and purpose of DMSU is getting known by the users and sites, and middleware issues are reported via GGUS as they should. Vast majority of the tickets are gLite related, reflecting the wide spread of gLite at EGI sites. However, it also indicates that there are probably still support channels bypassing the EGI Helpdesk for the other middlewares. Out of 198 assigned tickets, 142 tickets were pushed to 3rd line support while 21 were resolved directly in DMSU. 23 tickets were bounced back to TPM as being wrongly assigned which will be resolved through further documentation and education of the processes. Considering the number of tickets TPM must handle, we find this number acceptable.

2.2.3.4 Support Infrastructure

With the setup of the EGI-InSPIRE project the initial architecture of the EGI Software Repository was put into place, and populated with contents from the ARC, UNICORE and gLite Middleware stacks. The EGI Software Provisioning process was designed and implemented, reusing RT as the major tracking, accounting and management instance for the verification and provisioning of new and updated software sourced from Technology Providers. With EMI's decision to publish their software in a distribution-like form and manner, the Software Provisioning process had to be significantly adapted to accommodate and dissect integrated releases of software while all the while analysing and respecting software dependencies between the integrated components of EMI releases. This fundamental change of requirements hence re-design of the Software Provisioning process took place during the second half of the period.

There were three iterations of the New Software Release Workflow (NSRW) during the period as the processes were established with the technology providers. The NSRW now handles individual product releases from a technology provider and merges them into UMD Releases in the EGI Software Repository and Repository (http://repository.egi.eu). The workflow is tightly integrated with the EGI Helpdesk and is used to receive release bundles from external technology providers. A new module was implemented in the EGI Request Tracker (called "Bouncer") is used to extract the included Products, per Platform and architecture (PPAs) and create their corresponding tickets in order to be passed through verification, stage rollout and eventually published in a UMD update[48].

In parallel TSA2.4 continued its operations and support of the IT infrastructure used to support the EGI Community.

- Maintenance of EGI web space www.egi.eu and related content management system
- Maintenance of EGI Single Sign On (SSO) system
- Maintenance of EGI wiki wiki.egi.eu
- Maintenance of the EGI Document server doc.egi.eu
- Maintenance and customisation of EGI Request Tracker rt.egi.eu
- Maintenance of EGI Integrated Digital Conference system (Indico)

2.2.4 External Relations

[48] MS504 EGI Software Repository – Architecture and Plans http://go.egi.eu/89

2.2.4.1 Dissemination

The aim of TNA2.2 is to disseminate EGI's activity within the project and worldwide through dissemination contacts located within the NGIs and related projects. During the first period, it has maintained and developed content for the website, produce the monthly Director's Letters, the quarterly newsletter and developed case studies and success stories for external publications. The Global task within TNA2.2 has coordinated the contributions of the network of dissemination contacts within the partners, and ensured a flow of information between the different stakeholders. An overview of these plans is included in D2.1 Dissemination Plan.

During the opening months of the project, the dissemination team set up the basic communication channels for EGI, including the inspire-na2-dissemination mailing list and the NA2.2 pages on the EGI Wiki site. Social media channels were also set up, including a Twitter micro-blogging feed, a Flickr photostream and a YouTube channel. Contact was established with the dissemination contacts in the partners and well-attended face-to-face meetings were held at the EGI Technical and User Forums.

A new version of the website was launched in September 2010, and the improved design, layout and content were reflected in the web statistics. As a result, in PQ2, the website received more than 3600 unique visitors, an increase of 85% on the first quarter. The bulk of these visited during the EGITF2010 event, generating over 8000 visits, 35% of which were new visits and a total of nearly 35,000 page views. During PQ3, there were around 7700 visits, corresponding to around 32,000 page views per month. In the final quarter, the site received 54,000 visits, consisting of around 240,000 page views and 22,300 visitors, of which 40% were new visits. The highest peak in visits was seen during the week of the EGI User Forum in Vilnius. Websites were also set up for both the EGI Technical Forum 2010 (http://www.egi.eu/EGITF2010) and the User Forum 2011(http://uf2011.egi.eu). The dissemination team has also worked with CESNET to create an EGI blog, which members of the project team can use to publicise events, share news with the community and to blog from events they attend.

TNA2.2 also established the branding for EGI and EGI-InSPIRE, including logos and usage guide[49]. A project presentation template was developed and a standard project presentation was added to the website for download by partners, as well as poster templates. The dissemination team produced 12 Director's Letters, issued in each month of the project[50]. Four issues of the project newsletter, EGI Inspired were also published in Summer 2010, Autumn 2010, Winter 2011 and Spring 2011[51].

A number of articles about EGI appeared in International Science Grid This Week, a weekly grid publication produced by collaborating project, e-ScienceTalk. The articles profiled Tiziana Ferrar as COO and Steve Brewer as CCO and also profiled the PLGrid NGI. An article about EGI was also published in Public Service Review: European Science and Technology (Issue 10).

The EGI dissemination team attended a range of international events during the first year of the project, including shared booths at ICT 2010 in Brussels, attended by 600 delegates, and eChallenges

[49] MS203 Dissemination Handbook, http://go.egi.eu/145

[50] http://www.egi.eu/results/Directors_letters/

[51] http://www.egi.eu/results/newsletters/

in Warsaw in October. EGI booths were also hosted at ISC2010 in Germany, SciTech in Brussels on 23 November, and also at SC10, 15-19 November in New Orleans, an event attracting more than 10,000 delegates. EGI attended the 8th e-Infrastructure Concertation event at CERN in November, Women in Science, Innovation and Technology in the Digital Age in Budapest in March and ISGC in Taipei in March. EGI also hosted booths at the EGI Technical and User Forums.

A number of new publications were produced in preparation for attendance at events, including posters on EGI-InSPIRE and User Community Support, posters and postcards advertising the EGI Technical and User Forums, a general brochure on EGI, on User Community Support and pop up banners.

IMCS UL has worked on translation of materials, and issuing local articles. IPB have produced dissemination material for the website, conferences, events and press and has organised two national dissemination and training events. IUCC have been preparing materials on the web and targeting academia and hi-tech companies. MTA SZTAKI are contributing to case studies and organising events. UNIMELB has continued dissemination activities within the Australian HPC community, working toward further building the grid user base and influencing national policy around grid middleware and implementation. E-Arena in Russia participated in organising a seminar dedicated to M.G.Mescheryakov's 100th anniversary in Dubna and prepared the Proceedings of the 4th International Conference "Distributed computing and Grid-technologies in science and education- GRID2010" including 67 scientific articles. TCD has also been updating its websites at http://grid.ie/ and GridIreland was credited in two scientific talks at the Royal Irish Academy conference "The Transient Universe: from exoplanets to hypernovae" (http://url.ie/81a3). LIP has set up a website at http://www.lip.pt/computing/projects/EGI and a technical website at INGRID http://wiki.ncg.ingrid.pt. Similarly, ILSAS created a website at http://www.slovakgrid.sk, and organised the 6th International Workshop on Grid Computing for Complex Problems GCCP2010 in November, including a press conference and materials for the Ministry of Education. ASGC produced an EGI project factsheet in Chinese version for distribution and also organised an Application Training event. LIP has participated in the organisation of the IBERGRID conference. INFN has prepared materials such as posters, brochures and banners, and these were exhibited at the INFN booth at SC10. STFC announced the start of new nationally funded project to encourage networking and dissemination activities around national e-infrastructures, SeIUCCR.

NA2.2 has also contributed to the PM11 deliverable D2.8 Annual Report on EGI and its External Relations activity.

2.2.4.2 Policy

During the first year, the policy development focused on creating the foundation for the policy activities and the related processes, both within EGI and externally with other organisations[52]. From the internal viewpoint, EGI.eu supported the creation and operation of 10 policy groups[53] by defining their Terms of References (ToRs), a Policy Development Process[54] (PDP) and by providing these groups with secretarial support. In order to limit the proliferation of inconsistent glossaries, the EGI

[52] D2.8 Annual Report on EGI and its External Relations Activity, http://go.egi.eu/377

[53] http://www.egi.eu/policy/groups

[54] EGI Policy Development Process http://go.egi.eu/169

Glossary Coordination Group[55] was also created to enable a consistent usage of terminology with a well defined scope and stable meaning in EGI policies and procedures[56]. EGI became a member of EUGridPMA and consequently in IGTF[57]. The representation and participation in these bodies is performed by FOM as part of their funded EGI Global Task. The Security Policy Group (SPG) is chaired and led by STFC through a funded EGI Global Task within NA2.3 with contribution from STFC, LIP, ARNES, INFN, SWITCH and TCD[58].

A framework for Memorandum of Understandings (MoU) was defined and seven MoUs were signed while many others are in advanced state of negotiation[59].

In terms of the activity towards EGI sustainability, EGI.eu produced the first iteration of the sustainability plan[60] and, in collaboration with CNRS, made an analysis of advantaged and disadvantages in adopting the ERIC legal framework[61]. In the area of innovation, EGI.eu produced a number of reports to support the development of a vision for the future of the e-Infrastructure. A collaborative roadmap amongst DCI projects was the first step[62] followed by an analysis of benefits and potentials in adopting virtualisation and cloud technologies[63]. A standards roadmap was also produced as an important tool to promote interoperability and it will be updated annually[64]. Concerning the strategic policy analysis, EGI.eu contributed a report to analyse the role of EGI in the Europe 2020 strategy[65] and it is participating in the relevant strategic policy bodies (e.g., e-IRG, e-Infrastructure Concertation meetings).

In order to reinforce the EGI/NGI engagement in policy development, the EGI.eu Policy Development Team organised a policy workshop at the EGI User Forum 2011. This represented the starting point of a series of workshops to discuss policy matters with NGI representatives. The workshop was prepared by running a survey within the NGIs, collecting data and analysis data and writing a short report. This approach showed to be satisfying and will be adopted for future workshop preparations [http://go.egi.eu/policy-session-egiuf2011].

With regards to the NGI activities performed as funded national tasks, the following outcomes are reported. LIP participated in the EGI Council activities, WLCG Grid Deployment Board (GDB) and Resource Review Board (RRB). TUBITAK ULAKBIM worked on establishing the Turkish NGI. INFN worked on establishing the Italian NGI, created the IGI-CSIRT, collaborate with the Italian NREN on security matters, and disseminated security policies within NGI members. CSIC contributed

[55] https://wiki.egi.eu/wiki/GCG

[56] List of EGI Policies and Procedures http://go.egi.eu/policies_and_procedures

[57] EGI-EUGridPMA Collaboration http://www.egi.eu/collaboration/EUGridPMA.html

[58] MS214 Security Activity in EGI http://go.egi.eu/307

[59] List of agreements under discussion https://wiki.egi.eu/wiki/PDT:Agreements

[60] D2.7 EGI Sustainability Plan http://go.egi.eu/313

[61] MS208 Alignment of EGI.eu with the ERIC organisational model http://go.egi.eu/244

[62] D2.4 DCI Collaborative Roadmap http://go.egi.eu/207

[63] D2.6 Integration of Clouds and Virtualisation into the European production infrastructure http://go.egi.eu/258

[64] D2.5 Standards Roadmap http://go.egi.eu/206

[65] EGI Role towards Europe 2020 http://go.egi.eu/317

to the EGI Council activity (financial task force, reaching out user communities), organised an EGI Council meeting, participated in the EGI.eu Executive Board (EB), and contributed to the ESFRI Lifewatch requirements analysis. CYFRONET focused on aligning NGI policies with EGI ones and worked on preparing best practices for other NGIs (e.g., on scientific software porting/deployment/installation procedures). STFC regularly participated in the EGI Council, EGI.eu Executive Board, e-IRG meetings; it has been also active in revising and redeveloping the MoU and SLD of the UK's two constituent grids, GridPP and NGS respectively. ARNES invested most of its efforts into integrating EGI practices into the Slovenian grid network (SiGNET) and establishing the SLING (Slovenian Initiative for National Grid) members' technology board as the central policy-making body in the country. E-ARENA worked on the creation, development and maintenance of effective functioning national information-communication infrastructure in the research and scientifically-educational sphere; policies need to be further assessed to meet national requirements. SWITCH provided policy input throughout the year - in particular to the question of ERIC and the EGI sustainability documents. TCD actively contributed to the Top-Level Security Policy, Site Operations Policy, Virtual Machine Endorsement policy, and data protection policies. CNRS has been mostly involved in structuring the French NGI (France Grilles) which was officially launched on Sep 24th 2010 in Paris. Within the French NGI, working groups have been set up as a result of the workshop which will contribute to the EGI-InSPIRE tasks. CNRS participated also in the EGI Council (financial task force, user communities). UI SAV participated in e-IRG activities in May (Blue Paper) and in EGI Council meeting in June 2010, in the e-IRG workshop. It also organised a press conference in the first day of GCCP2010 workshop in Bratislava (8 Nov 2010).

2.2.4.3 Events

EGI Technical Forum 2010

The EGI Technical Forum 2010 was held in Amsterdam at the Beurs van Berlage from 14 to 17 September 2010 in partnership with the BiG Grid project, the Dutch NGI. The EGI Technical Forum 2010 was the first major event within the EGI community and brought together European distributed computing projects and their collaborators in academia and businesses, from around Europe and around the world. The major theme of the meeting, achieved through technical sessions, a demonstration and exhibition area, networking space and events, was to establish collaborations between the new and the current European Distributed Computing Infrastructure projects to meet the needs and requirements of the research community.

More than 570 delegates registered for the EGI Technical Forum, of which 17% were female. The event included 290 contributions in the form of presentations, demos, posters and workshops. A survey requesting feedback on the EGI Technical Forum was also sent to delegates through the Zoomerang survey tool. Around 110 responses were received. The conference website was reported to be very or quite useful by 87% of respondents. Around 70% found the EGI organising team helpful (22% did not interact with the team). During the event, 86% found the onsite conference staff helpful. Around 90% used the online programme, and 71% the short version of the printed programme. Around 22% reported using the iPhone application, with 28% using Twitter, 10% Flickr, 25% YouTube, 8% the GLOBAL webcast of the plenaries and 28% read the GridCast blog.

Two dissemination sessions were run during the event, one targeted specifically at NGIs and a general session on reaching out to the media, which included a presentation from Martin Ince of the *Times Higher Educational Supplement*. Two press releases were issued - a media invitation to a press conference sent a week before the event, and a press release issued on Wednesday 15. “EGI Inspire

brings together European e-Infrastructure community"[66] was issued to 3,870 journalists through the AlphaGalileo press service and was also published on the Cordis news wire, the EGI website and sent to the media contacts list and the dissemination mailing list. A press release announcing the funding for EGI-InSPIRE was also issued by the EC Press Office[67] on 15th and together this led to 27 press cuttings during the quarter, including articles in *HPCwire*, *iSGTW*, *ZDNet*, *Yahoo News*, *ITnews* in Australia, *Science Business* and *Environment & Energy Management*. TNA2.2 worked with the GridCast team from e-ScienceTalk to run an event blog, and contributed bloggers from the dissemination team, leading to 26 posts on the blog and 6 videos on YouTube.

EGI User Forum 2011

The EGI User Forum was organised by EGI.eu, Vilnius University and LITNET in Vilnius, Lithuania, 11-14 April 2011, with the support of the EGI-InSPIRE and European Middleware Initiative (EMI) projects and local secretariat BAIP. The conference took place at the Radisson Blu Lietuva in Vilnius, Lithuania and showcased the diversity of the user community within the European Grid Infrastructure through plenaries, oral presentations, poster sessions and co-located workshops. The programme also included numerous networking and opportunities to 'meet the experts'.

In total, 427 delegates registered for the event, of whom 18% were female. The event featured 196 contributions, 173 speakers and 34 session conveners. Over 250 images were uploaded to the Flickr photostream[68] and more than 30 posts were added to the GridCast blog about the event from 8 bloggers, including 14 videos and slide shows. Over 2,600 unique visitors visited the main event website, representing 20,000 page views.

NA2.2 issued a media invitation in advance of the event on Alphagalileo, which was sent to 2,600 journalists. Press articles appeared in *HPCWire*, the SSI blog, the GEANT newsletter and *iSGTW*. The team produced a Book of Abstracts as well as creating promotional materials to advertise the EGI Technical Forum in Lyon in September 2011. NA2.2 ran two sessions in Vilnius, a "Birds of a Feather" event focusing on shared dissemination experiences and a face-to-face NA2.2 meeting.

The conference survey issued after the event received 106 responses. Of these 88% found the conference website useful and 83% found the registration process quite or very easy. Virtually everyone who dealt with the EGI organising team or the venue staff found them very or quite helpful. Usage of the social media channels was good among respondents, with 15-20% for Twitter, Flickr, YouTube and iSGTW. Nearly 50% used the GridCast blog.

2.3 Project Issues

2.3.1 Operations

2.3.1.1 Issue 1: Sustainability of nascent NGIs

In Albania and Moldova the NGIs haven't consolidated their operations and no operational production sites are operated in these countries to date. Several of these smaller and newer NGIs are reporting that they do not have the funding (in particular travel) to engage in the project activities needed to develop the skills to integrate their NGI resources into EGIs.

[66] http://www.egi.eu/export/sites/egi/about/press/EGI2010_PressRelease_15September_final.pdf

[67] http://go.egi.eu/ECPRSept2010

[68] http://www.flickr.com/search/?q=egiuf11&f=hp

2.3.1.2 Issue 2: Supporting Deployed Operational Tools

Some of the regionalised operational tools are now being deployed in NGIs in a similar way to middleware. However, there is no equivalent the Deployed Middleware Support Unit (DMSU) for operational tools. A 2nd level support unit has been created for the SAM tool and volunteers assigned from within the operations community. It is hoped this will take some of the direct load off the operational tool product teams and allow them to focus more on development rather than support. The load on the volunteers and the product teams will continue to be monitored.

2.3.1.3 Issue 3: Operational Tools Regionalisation

TJRA1.3 (the regionalisation of the operational tools) ended in PY1 but the regionalisation activity is not completed and regionalisation use cases are still under discussion at the Regionalisation Task Force. The JRA1 partners are willing to continue committing effort to this task in PY2 with no detriment to the other activity scheduled within the programme of work reusing the underspent effort (only 63% in PY1) to complete the work.

2.3.2 User Support

2.3.2.1 Issue 1: Utilisation of technical services

The UCST has run a survey among the NGIs (through the NGI User Support Team managerial contacts) to understand who and why are using the provided technical services. The survey revealed that many of the NGIs were not aware about the existence and/or the exact features of these services. The UCST sent out customised information to these NGIs, and organised a workshop at the EGI User Forum to raise awareness and to capture feedback and requirements. These requirements are taken into consideration during the next development cycle of the tools. Additional dissemination activity will be undertaken in relation to these services in PY2.

2.3.2.2 Issue 2: UEDIN withdrawal from the UK JRU

UEDDIN withdrew from the UK JRU in January 2011. UEDIN's work has been reallocation to STFC (member of UK JRU) in March 2011 and the new partner has released the first version of an "EGI Training Marketplace" in April 2011. The services continued to be run during this transition period, however development activity halted while the new team familiarised themselves with the work.

2.3.2.3 Issue 3: Use of commercial software for the Experiment Dashboard

The CERN Experiment Dashboard depends on the commercial Oracle database and therefore the tool cannot be given and hosted by communities outside of CERN. The VO services team defined and implemented an alternative, NAGIOS based system to support VO-specific site tests. The service is already used by the WeNMR and life sciences communities. The possibilities of extending this service to meet more complex community requirements will be investigated in PY2. In the meantime, the Experiment Dashboard remains as an alternative solution which is provided by CERN to new communities through agreements made on a case by case basis.

2.3.2.4 Issue 4: Reporting within SA3

For all communities involved in the SA3 work-package the reporting overhead is deemed to be too high with respect to the available effort and in terms of direct benefit to the supported communities. Many of the reports requested have significant overlap in content and delivery schedule, producing peaks of workload that are hard to accommodate, particularly as the review timelines are unpredictable and can be very long.

2.3.3 Software Provisioning

2.3.3.1 Issue 1: Interaction and pro-activeness of EMI

During PY1 the interaction and integration with the EMI project has been a management concern. In PQ1 and PQ2 while EGI was defining an automated and integrated software provisioning system across all technology providers, the low interaction and feedback of the EMI project was a concern. This was due to two linked issues: the delayed appointment of staff at EGI.eu to drive this interaction and internal focus of the EMI project management necessary to drive through their own organisational changes. In PQ3 a Task Force was set up to address and mitigate these concerns and progress was made in terms of automating the transition of software to EGI. In PQ4, this collaborative engagement slowed – it is felt due to EMI's increasing internal focus on their upcoming release. Long-term, EGI needs to increase the number of technology providers that can deliver interchangeably towards its defined capabilities to give greater customer choice.

2.3.3.2 Issue 2: Requirements reported as support request

The DMSU has started to notice tickets, which are effectively requirements on changed or additional functionality of the middleware. Channels to propagate this information further, including assignment of appropriate weight to such requirements, are not clearly defined and they have to be elaborated. This issue will be addressed in the annual update of the DMSU operating procedures underway at the start of PY2.

2.3.3.3 Issue 3: Low ratio of ticket resolution in DMSU

The ratio of tickets solved in DMSU with respect to the number of tickets passed to 3rd line support is still suspiciously low. Further analysis of how many of those are really triggered by appearance of new software bugs is required to make this statistics more meaningful. The DMSU staff are still working to improve and expand their experience based on the issues being reported by the technology being used in production.

2.3.4 External Relations

2.3.4.1 Issue 1: Unresponsive partners

A number of partners in both the dissemination and policy based have still not yet nominated contacts during PY1. These include funded partners UPT, SIGMA and UCPH, plus unfunded partners NUS and UPM. Work will continue with the EGI-InSPIRE Collaboration Board and the EGI Council through NA1 to identify suitable contact points in these partners. Similar issues have also been reported with NGI User Support contacts.

2.4 Project Management

The project management activities are centred at EGI.eu, the coordinator of the EGI-InSPIRE project. Daily project management is implemented by the activity managers for each work package. The Activity Management Board (AMB) containing all the activity managers generally meets weekly by telephone (5 out of the 7 activity managers are based at EGI.eu) and F2F informally at frequent intervals and formally twice in PY1. The Project Management Board which has representatives from the groups within the project (a group represents a number of individual partners clustered to achieve a threshold level of effort) meets at least quarterly and has met 6 times during PY1 – generally F2F. The Collaboration Board has met twice during PY1.

2.4.1 Project Management Metrics

Metric ID	Metric	Public / Internal	Task	Comments/Explanation
M.NA1.1	Number of NGIs actively contributing	P	TNA1.2	39 [38 EGI-InSPIRE

	resources into the production infra-structure			NGIs minus Albania and Moldova who are not currently providing resources, plus Belgium, Estonia and CERN.]
MNA1.2	Time to review deliverables & mile-stones (from entering External Review to exiting PMB Review)	I	TNA1.4	53 days deliverables 38 days milestones

The startup of any project can be difficult. As EGI-InSPIRE was not a continuation of EGEE-III there were significant structural and operational changes that had to be agreed, implemented and document-ed (as formal milestones and deliverables) within the community, while the coordinating partner was still recruiting its core management, technical and administrative staff. As a result resources were not available at the coordinating partner (lead partner on many of the deliverables and milestones) to un-dertake the tasks, and more generally to monitor the activities, as they were dealing with contractual issues around the grant agreement, project matters around the consortium agreement, recruitment, etc.

As a result many of the milestones and deliverables were delivered late, but all have been delivered. For many of the milestones, these were achieved in a timely manner however the documentation of these conclusions to a level of detail to satisfy all stakeholders took additional time.

The importance of timely delivery is recognised by the project management team and as staff have been recruited and trained more time has been devoted to monitoring this aspect. As a result, by the end of the project year deliverables and milestones are now being submitted to the EC in the order of 4-6 weeks late. The review process has been reviewed and revised to streamline the external and AMB review phases. Activity managers are briefed to recognise if the deliverable or milestone will require is a significant amount of new work, or an update (frequently for PY2 and beyond) and to plan their work accordingly.

2.4.2 Coordination Activities

Significant coordination activities have taken place within the project and within the wider EGI community. Project staff have spoken regularly at meetings outside of the project – both public and private – and significant community leadership has taken place through the DCI projects collaboration and the EGI Technical and User Forums. The composition of these meetings has been deliberately targeted beyond the EGI-InSPIRE project. The Technical Forum in September 2010 had a number of sessions involving all the DCI projects (building on the joint DCI collaborative roadmap) and the User Forum in April 2011 was host to the first EMI Technical Conference.

2.4.3 Cooperation with other Projects

Collaboration with other projects and activities can take many forms – formal and informal. The formal relationships are captured by Memorandum of Understanding (MoUs) and are categorised below by the type of activity and the entity with which the collaboration is established.

MoU (Type)	Signing Body
Virtual Research Community (VRC)	EGI.eu
Resource Infrastructure Provider (RP)	EGI.eu
Technology Provider (TP)	EGI.eu
Project Collaboration (PRJ)	EGI-InSPIRE

During PY1 the following MoU were pursued – either to completion or to an advanced stage of negotiation. – to establish formal relationships:

Partner	Type	Status	Date	Link
WLCG	VRC	draft for approval		
IGE	TP	signed	20/01/2011	here
EMI	TP	signed	27/01/2011	here
SAGA	TP	signed	11/04/2011	here
StratusLab	TP	signed	11/04/2011	here
WeNMR	VRC	signed	11/04/2011	here
LSGC	VRC	signed	27/05/2011	here
GISELA	PRJ	signed	11/04/2011	here
UFRJ	RIP	signed	11/04/2011	here
e-ScienceTalk	PRJ	final negotiation		here
DECIDE	PRJ	final negotiation		here
gSLM	PRJ	final negotiation		here
HMRC	VRC	final negotiation		
CHAIN	PRJ	final negotiation		

In addition informal interactions took place through:

- SIENA project: participation in CloudScape III and the Roadmap Editorial Board.
- ERINA+: participation in discussion around impact assessments for e-Infrastructures

3 DELIVERABLE AND MILESTONES

3.1 Deliverables

Id	Activity No	Deliverable / Milestone title	Nature (***)	Lead partner	Original Delivery date(*)[69]	Revised delivery date(*)	Status (**)
D1.1	WP1	Quality Plan and Project Metrics https://documents.egi.eu/document/55	R	1	2	6	PMB approved
D 2.1	WP2	EGI-InSPIRE Presentation https://documents.egi.eu/document/43	R	1	1	3	PMB approved
D 2.2	WP2	Dissemination Plan https://documents.egi.eu/document/56	R	1	3	6	PMB approved
D3.1	WP3	User Community Support Process https://documents.egi.eu/document/106	R	14	3	6	PMB approved
D5.1	WP5	UMD Roadmap https://documents.egi.eu/document/100	R	1	3	5	PMB approved
D1.2	WP1	Gender Action Plan https://documents.egi.eu/document/171	R	1	4	7	PMB approved
D2.3	WP2	EGI-InSPIRE Paper https://documents.egi.eu/document/201	R	1	4	10	PMB approved
D2.4	WP2	Roadmap for Interactions with Other DCI Projects https://documents.egi.eu/document/207	R	1	5	5	PMB approved
D2.5	WP2	Standards Roadmap https://documents.egi.eu/document/206	R	1	5	7	PMB approved
D4.1	WP4	EGI Operations Architecture https://documents.egi.eu/document/218	R	1	5	10	PMB approved
D6.1	WP6	Capabilities Offered by the HUCs to Other Communities https://documents.egi.eu/document/154	R	35	4	7	PMB approved
D2.6	2	Integration of Clouds and Virtualisation into the European production infrastructure https://documents.egi.eu/document/258	R	1	8	10	PMB approved
D5.2	5	UMD Roadmap https://documents.egi.eu/document/272	R	1	9	10	PMB approved

[69] *(*) 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*

D6.2	6	Sustainability plans for the HUC activities https://documents.egi.eu/document/309	R	35	9	10	PMB approved
D2.7	2	EGI Sustainability Plan https://documents.egi.eu/document/313	R	1	10	11	PMB approved
D1.3	1	Annual Report on Quality Status https://documents.egi.eu/document/360	R	1	11	13	PMB approved
D2.8	2	Annual report on EGI and its External Relations Activity https://documents.egi.eu/document/377	R	1	11	13	PMB approved
D3.2	3	Annual report on EGI's User Community Services https://documents.egi.eu/document/386	R	1	11	13	PMB approved
D4.2	4	Annual Report on the EGI Production Infrastructure https://documents.egi.eu/document/413	R	1	11	13	PMB approved
D5.3	5	Annual report on the status of Software Provisioning activity and the work of DMSU https://documents.egi.eu/document/375	R	1	11	13	PMB approved
D6.3	6	Annual Report on the HUC Tools and Services https://documents.egi.eu/document/312	R	35	11		
D7.1	7	Annual Report on Operational Tool Maintenance and Development Activity https://documents.egi.eu/document/372	R	1	11	13	PMB approved
D1.4	1	Annual Project Report https://documents.egi.eu/document/580	R	1	12		

3.2 Milestones

Id	Activity No	Deliverable / Milestone title	Nature (***)	Lead partner	Original Delivery date(*)[70]	Revised delivery date(*)	Status (**)
MS101	WP1	Quality Assurance website with document templates and processes https://documents.egi.eu/document/144	R	1	1	4	PMB approved

[70] *(*) 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	Nature (***)	Lead partner	Original Delivery date(*)[70]	Revised delivery date(*)	Status (**)
MS102	WP1	Execution Plan https://documents.egi.eu/document/358	R	1	2	10	PMB approved
MS103	WP1	Quarterly Report Template https://documents.egi.eu/document/45	R	1	2	3	PMB approved
MS104	WP1	External Advisory Board https://documents.egi.eu/document/170		1	3	5	PMB approved
MS105	WP1	Quarterly Report https://documents.egi.eu/document/156	R	1	3	5	PMB approved
MS201	WP2	Basic website with key collaborative tools https://documents.egi.eu/document/126	R	1	1	5	PMB approved
MS202	WP2	Project Presentation Template https://documents.egi.eu/document/44	R	1	1	4	PMB approved
MS203	WP2	Dissemination Handbook https://documents.egi.eu/document/145	R	12	2	6	PMB approved
MS204	WP2	EGI Newsletter https://documents.egi.eu/document/146	R	1	3	4	PMB approved
MS205	WP2	Establishing the policy area of the website covering the policy bodies and collaborating projects https://documents.egi.eu/document/93	R	1	3	6	PMB approved
MS206	WP2	Terms of reference and initial composition of the policy related groups within EGI.eu https://documents.egi.eu/document/125	R	1	3	6	PMB approved
MS301	WP3	User Support Contacts https://documents.egi.eu/document/60	R	21	1	4	PMB approved
MS302	WP3	Training Website https://documents.egi.eu/document/104	R	34	2	4	PMB approved
MS303	WP3	Ported Applications Website https://documents.egi.eu/document/92	R	16	2	4	PMB approved
MS304	WP3	User Support Metrics https://documents.egi.eu/document/94	R	18	3	6	PMB approved
MS401	WP4	Operational Tools regionalisation status https://documents.egi.eu/document/48	R	21	1	4	PMB approved
MS402	WP4	Deploying Software into the EGI production infrastructure https://documents.egi.eu/document/53	R	12	2	4	PMB approved
MS403	WP4	EGI Helpdesk and NGI Support Units https://documents.egi.eu/document/49	R	10	2	6	PMB approved

Id	Activity No	Deliverable / Milestone title	Nature (***)	Lead partner	Original Delivery date(*)[70]	Revised delivery date(*)	Status (**)
MS404	WP4	Operational Level Agreements (OLAs) within the EGI production infrastructure https://documents.egi.eu/document/65	R	16	2	4	PMB approved
MS405	WP4	Operational Security Procedures https://documents.egi.eu/document/47	R	14	3	4	PMB approved
MS501	WP5	Establishment of the EGI Software Repository and associated support tools https://documents.egi.eu/document/46	R	9	1	4	PMB approved
MS502	WP5	Deployed Middleware Support Unit Operations Procedures https://documents.egi.eu/document/69	R	41	2	5	PMB approved
MS503	WP5	Software Provisioning Process https://documents.egi.eu/document/68	R	12	2	5	PMB approved
MS504	WP5	EGI Software Repository –Architecture and Plans https://documents.egi.eu/document/89	R	16	3	6	PMB approved
MS601	WP6	HUC Contact points and the support model https://documents.egi.eu/document/91	R	13	1	6	PMB approved
MS701	WP7	CIC Operations Portal work plan https://documents.egi.eu/document/39	R	14	1	5	PMB approved
MS702	WP7	Establishing the Operational Tool product teams https://documents.egi.eu/document/52	R	21	1	4	PMB approved
MS703	WP7	Operational Tools regionalisation work plan https://documents.egi.eu/document/107	R	35	2	7	PMB approved
MS704	WP7	Roadmap for the maintenance and development of the deployed operational tools https://documents.egi.eu/document/50	R	10	3	7	PMB approved
MS106	WP1	Quarterly Report 2 https://documents.egi.eu/document/248	R	EGI	6	8	PMB approved
MS207	WP2	Review of the Website Content https://documents.egi.eu/document/179	R	EGI	4	7	PMB approved
MS208	WP2	The EGI becomes a member of EUGridPMA https://documents.egi.eu/document/38	R	26	4	4	PMB approved
MS209	WP2	Security Policies within EGI https://documents.egi.eu/document/210	R	34	5	7	PMB approved
MS210	WP2	EGI Technical Forum		1	6	6	PMB approved

Id	Activity No	Deliverable / Milestone title	Nature (***)	Lead partner	Original Delivery date(*)[70]	Revised delivery date(*)	Status (**)
MS211	WP2	EGI Newsletter https://documents.egi.eu/document/271	R	1	6	6	PMB approved
MS305	WP3	User Feedback and Recommendations https://documents.egi.eu/document/211	R	1	6	8	PMB approved
MS406	WP4	Deployment Plan for the Distribution of Operational Tools to the NGIs/EIROs https://documents.egi.eu/document/128	R	12	4	7	PMB approved
MS407	WP4	Integrating Resources into the EGI Production Infrastructure https://documents.egi.eu/document/111	R	38	4	8	PMB approved
MS408	WP4	EGI Operational Procedures https://documents.egi.eu/document/209	R	26	6	8	PMB approved
MS505	WP5	Service Level Agreement with a Software Provider https://documents.egi.eu/document/212	R	29	4	7	PMB approved
MS602	WP6	HUC Software Roadmap https://documents.egi.eu/document/230	R	21	4	8	PMB approved
MS603	WP6	Services for High Energy Physics https://documents.egi.eu/document/147	R	35	4	7	PMB approved
MS604	WP6	Services for the Life Science Community https://documents.egi.eu/document/236	R	14	4	8	PMB approved
MS605	6	Training and dissemination event for all shared services and other tasks within the activity https://documents.egi.eu/document/326	R	19	8	11	PMB approved
MS212	2	Alignment of EGI.eu with the ERIC organisational model https://documents.egi.eu/document/244	R	14	8	9	PMB approved
MS213	2	EGI Newsletter https://documents.egi.eu/document/365	R	1	9	9	PMB approved
MS107	1	Quarterly Report 3 https://documents.egi.eu/document/361	R	1	9	11	PMB approved
MS108	1	EGI Global Task Review https://documents.egi.eu/document/314	R	1	10	13	PMB approved
MS109	1	NGI International Task Review https://documents.egi.eu/document/315	R	1	10	13	PMB approved
MS110	1	Work of the Asia Pacific Region https://documents.egi.eu/document/316	R		10	13	PMB approved

Id	Activity No	Deliverable / Milestone title	Nature (***)	Lead partner	Original Delivery date(*)[70]	Revised delivery date(*)	Status (**)
MS214	2	Security Activity within EGI https://documents.egi.eu/document/307	R	1	10	11	PMB approved
MS606	6	HUC Software Roadmap https://documents.egi.eu/document/310	R		10	13	PMB approved
MS215	2	EGI Newsletter https://documents.egi.eu/document/520	R	1	12	12	PMB approved
MS216	2	EGI User Forum uf2011.egi.eu	R	1	12	12	PMB approved
MS607	6	Hydra service deployment on a multi-servers configuration https://documents.egi.eu/document/327	R		12		
MS608	6	Integration of the VisIVO server with the production infrastructure https://documents.egi.eu/document/328	R		12		

4 EXPLANATION OF THE USE OF RESOURCES

4.1 Summary

The resources consumed within the project during PY1 are examined from the perspective of each activity and from the perspective of each beneficiary. Effort within the project is split into two broad forms of activity: work that takes place by partner(s) on behalf of the whole community (e.g. EGI Global Tasks), and activity that all partners undertake to engage with centrally (e.g. NGI International Tasks). Overall effort is at 23% where the linear mean would be 25% for the 4 year project while the eligible costs are projected at €6.3M compared to a linear average spend of €6.25.

Two partners have yet to commit any effort UPT and EMBL.

4.2 Resources consumed per activity

Type	Work Package	Worked PM Funded	Committed PM	Achieved PM% (Over 4 yrs)
MGT	WP1	63.0	329.0	19%
COORD	WP2	141.8	705.0	20%
COORD	WP3	205.4	959.9	21%
SUPPORT	WP4	1,154.2	4,721.1	24%
SUPPORT	WP5	101.9	503.0	20%
SUPPORT	WP6	186.3	732.0	25%
RTD	WP7	59.9	315.0	19%
	Total	1,912.5	8,265.0	23%

The detailed breakdown of effort contributed to each work package by each partner is provided in the following tables for the period. 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.

In all of the following activities EGI.eu has committed less effort that was foreseen. EGI.eu was established in February 2010, two months before the start of the project, and while some staff were in place from the 1st May 2011, the organisation only came up to full strength in January 2011. Reduced effort during the early phases of the project had an impact on some deliverables and milestones as detailed elsewhere in this report.

4.2.1 NA1

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

Partner	Worked PM Fund-ed	Committed PM	Achieved PM %
1-EGI.EU	25.8	35.5	73%
Total:	25.8	35.5	73%

WP1-M - WP1 (NA1) - NA1 Management

Partner	Worked PM Funded	Committed PM	Achieved PM %
1-EGI.EU	35.9	44.8	80%
35-CERN	1.3	1.6	81%
Total:	37.2	46.4	80%

In WP1 (and many of the work packages that follow) EGI.eu has committed less effort that was foreseen. EGI.eu was established in February 2010, two months before the start of the project, and while some staff were in place from the 1st May 2011, the organisation only came up to full strength in January 2011. Reduced effort during the early phases of the project had an impact on some deliverables and milestones as detailed elsewhere in this report.

4.2.2 NA2

WP2-E - WP2 (NA2) - NA2 External Relations (EGI)

Partner	Worked PM Funded	Committed PM	Achieved PM %
1-EGI.EU	58.8	77.0	76%
26A-FOM	1.1	1.3	85%
34A-STFC	4.8	4.8	102%
Total:	64.7	83.0	78%

The worked PM figures for TNA2.2E from EGI.eu are at 80% of the committed PMs. This is consistent with two members of staff joining the dissemination team some months after the start of the project. Similarly for TNA2.3E, only 70% of the allocated effort was used due to the search for qualified candidates and their final appointment taking several months at the start of the project.

WP2-N - WP2 (NA2) - NA2 External Relations

Partner	Worked PM Funded	Committed PM	Achieved PM %
2-UPT	0	3.0	0%
5A-IICT-BAS	0.6	2.0	29%
7C-SWITCH	0.3	1.8	19%
8-UCY	1.5	2.0	74%
9-CESNET	1.4	2.0	70%
10B-KIT-G	4.0	3.5	113%
10E-BADW	0	0.8	0%
12A-CSIC	7.6	5.8	132%
12D-UPVLC	2.0	3.0	67%
13-CSC	2.5	4.3	59%
14A-CNRS	4.8	3.5	136%
14C-HealthGrid	2.0	1.8	115%
18B-BME	1.5	0.5	299%
18C-MTA SZTAKI	0	0.5	0%

19-TCD	1.5	1.5	100%
20-IUCC	0.6	1.0	61%
21A-INFN	4.4	5.0	87%
22-VU	5.8	5.3	111%
26A-FOM	1.0	0.8	138%
26B-SARA	0.2	1.0	22%
27A-SIGMA	0.1	1.5	5%
28A-CYFRONET	5.5	4.0	138%
29-LIP	3.2	3.0	105%
30-IPB	3.1	3.0	104%
31-ARNES	3.3	4.5	74%
31B-JSI	2.2	2.5	89%
32-UI SAV	1.4	2.0	71%
33-TUBITAK ULAK-BIM	4.1	4.0	103%
34A-STFC	6.0	6.0	101%
36-UCPH	0.4	3.0	12%
38-VR-SNIC	0.5	0.5	90%
38A-KTH	0.2	1.5	13%
39-IMCS-UL	1.1	5.5	20%
40A-E-ARENA	4.4	3.5	125%
Total:	77.1	93.3	83%

In TNA2.2N effort has been reported by 26 out of the expected 29 funded partners. No effort was reported in the first period by SIGMA, MTA SZTAKI and UPT. Committed PMs per partner are low, varying from 0.3PM to 5.5PM for the first year. As a result, there are some large variations in effort reported from 0% to nearly 300% for BME. However, as no one partner has committed large numbers of PMs to dissemination, these variations have not caused an impact on the work delivered compared to the work plan.

In TN2.3N, effort has been reported by 21 out of the expected 27 funded partners. No effort was reported by UPT, UCY, CESNET, E-BADW, HealthGrid and KTH. Committed PMs per partners are very low, varying from 0.3PM to 3PM for the first year. There are some large variations in effort reported from 0% to 224%. Given the low committed effort, these variations have not caused an impact on the work delivered compared to the work plan.

4.2.3 NA3

WP3-E - WP3 (NA3) - NA3 User Community (EGI)

Partner	Worked PM Fund-ed	Committed PM	Achieved PM %
1-EGI.EU	39.8	50.3	79%
12A-CSIC	4.6	3.0	152%
16A-GRNET	8.1	8.5	96%
16E-IASA	6.5	3.3	200%
29-LIP	3.0	3.0	99%

34A-STFC	0.8	4.6	17%
34B-UE	4.8	1.2	399%
Total:	67.5	73.8	92%

Both CISC and LIP took time to put staff in place but recovered effort by the end of the period. Effort from IASA has been frontloaded within the project (and will average out over the 4 years) and the actual effort contributed will be consistent with the tasks and objectives. It should be noted that GRNET has not claimed all the costs IASA has incurred.

Edinburgh was a partner within the UK JRU and until they formally withdrew in early 2011. The commitment to NA3 has now been taken over by STFC and they are fast catching up with delivering the functionality that the task requires to meet the objectives. The total figures for the UK JRU are in line for PY1.

WP3-N - WP3 (NA3) - NA3 User Community

Partner	Worked PM Fund-ed	Committed PM	Achieved PM %
2-UPT	0	7.8	0%
3-IIAP NAS RA	0	1.5	0%
5A-IICT-BAS	1.0	2.0	49%
7A-ETH ZURICH	0.3	1.0	33%
7B-UZH	2.0	2.0	102%
8-UCY	2.8	2.0	140%
9-CESNET	8.2	7.0	117%
10B-KIT-G	10.5	10.5	100%
10C-DESY	2.7	2.3	119%
10D-JUELICH	0	0.8	0%
10G-FRAUNHOFER	0.1	3.0	5%
12A-CSIC	1.5	0.8	197%
12D-UPVLC	5.1	6.0	85%
13-CSC	4.3	6.0	72%
14A-CNRS	7.3	7.3	101%
14B-CEA	0	2.8	0%
14C-HealthGrid	10.4	3.5	297%
15-GRENA	1.3	1.5	83%
18A-MTA KFKI	2.5	2.3	112%
18B-BME	3.9	2.3	174%
18C-MTA SZTAKI	7.5	3.5	213%
19-TCD	3.4	3.5	97%
20-IUCC	7.4	3.3	229%
21A-INFN	8.9	10.0	89%
22-VU	0	3.8	0%
23-RENAM	4.8	2.3	215%

26A-FOM	0.4	1.0	41%
26B-SARA	0.2	1.3	13%
27A-SIGMA	0.1	1.0	7%
27B-UIO	0	1.8	0%
27C-URA	0.3	4.0	7%
28A-CYFRONET	1.6	1.7	97%
28B-UWAR	0.3	3.5	8%
28C-ICBP	2.4	3.5	69%
29-LIP	7.6	7.0	109%
30-IPB	4.2	4.0	105%
31-ARNES	2.0	2.8	73%
31B-JSI	2.2	2.0	109%
32-UI SAV	8.0	9.5	85%
33-TUBITAK ULAK-BIM	9.2	9.0	102%
34A-STFC	1.6	4.0	39%
34C-UG	0	1.0	0%
34D-IMPERIAL	0	1.0	0%
34E-MANCHESTER	0	1.0	0%
36-UCPH	0.9	5.0	17%
38A-KTH	0	2.3	0%
40A-E-ARENA	1.0	1.8	60%
Total:	137.9	166.2	83%

The figures for the NGI Global tasks reflect a mixed picture. For much of the period the NGI support teams have been independently supporting the needs of their users as appropriate for their particular situations and according to their own local knowledge. As the needs of existing and new user communities become better understood these can be passed on to the NGI resources within NA3. Therefore, any unallocated resources from this first periodic reporting period should be carried forward until the second period of the project as the partners should have plenty of opportunity and support for extending the range of support activities that they can offer based around the User Community Support services and activities that are now in place.

4.2.4 SA1

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

Partner	Worked PM Funded	Committed PM	Achieved PM %
1-EGI.EU	8.3	9.0	92%
10B-KIT-G	16.1	17.5	92%
12A-CSIC	3.6	4.3	84%
12B-FCTSG	7.2	3.0	239%
13-CSC	6.0	5.8	104%
14A-CNRS	3.1	3.0	103%
16A-GRNET	1.9	17.5	11%

17-SRCE	3.4	2.8	122%
21A-INFN	8.0	9.0	89%
21B-GARR	6.0	3.0	200%
26A-FOM	4.9	3.0	163%
26B-SARA	10.2	5.8	178%
28A-CYFRONET	5.9	5.8	103%
29-LIP	4.3	4.3	102%
34A-STFC	20.7	17.8	117%
35-CERN	17.6	14.8	119%
38A-KTH	7.2	5.8	126%
Total:	134.4	131.8	102%

Over spending with GARR is caused by confusion between the global coordination activity TSA1.4 and the national activity TSA1.7N which will be corrected. The Greek JRU are working in close partnership with GRNET and AUTH for tasks TSA1.4 and TSA1.8, with AUTH undertaking much of the work in PY1 which will be rebalanced in PY2. Grid oversight activities from SARA required considerable more effort in PY1 due to the support that needed to be given (i.e. training and validation) for the new NGIs and to followup underperforming sites. Over spending with FCTSG is due to the startup costs associated with the transition from EGEE to EGI and it is expected that the effort needed will be less in future years.

WP4-N - WP4 (SA1) - SA1 Operations

Partner	Worked PM Funded	Committed PM	Achieved PM %
2-UPT	0	7.7	0%
3-IIAP NAS RA	1.7	4.8	35%
5A-IICT-BAS	7.0	23.0	30%
5B-IOCCP-BAS	0.7	2.0	36%
5C-NIGGG-BAS	1.4	2.0	72%
6-UIIP NASB	10.8	7.2	150%
7A-ETH ZURICH	4.5	8.5	53%
7B-UZH	2.0	4.5	44%
7C-SWITCH	8.1	8.2	99%
8-UCY	7.0	12.0	59%
9-CESNET	29.6	31.7	93%
10B-KIT-G	35.8	33.4	107%
10C-DESY	8.2	6.5	127%
10D-JUELICH	6.2	6.5	96%
10E-BADW	10.0	11.3	89%
10G-FRAUNHOFER	5.5	5.0	110%
10H-LUH	2.0	6.5	30%
11-UOBL ETF	9.0	18.4	49%

12A-CSIC	10.9	10.7	102%
12B-FCTSG	22.0	17.7	125%
12C-CIEMAT	6.0	9.5	64%
12D-UPVLC	6.0	7.0	85%
12E-IFAE	13.1	11.5	114%
12F-RED.ES	17.8	13.0	137%
12G-UNIZAR-I3A	12.9	13.0	99%
12H-UAB	11.2	10.0	112%
13-CSC	22.1	16.4	135%
14A-CNRS	105.5	62.7	168%
14B-CEA	21.4	16.0	134%
15-GRENA	4.1	4.8	86%
16A-GRNET	26.2	30.4	86%
16B-AUTH	2.9	3.3	88%
16C-CTI	0.5	3.3	17%
16D-FORTH	2.9	3.3	88%
16G-UI	0.8	2.0	38%
16H-UP	2.1	2.5	84%
17-SRCE	19.7	18.0	109%
18A-MTA KFKI	16.7	15.9	105%
18B-BME	6.4	6.9	93%
18C-MTA SZTAKI	16.0	5.7	283%
19-TCD	23.0	23.2	99%
20-IUCC	3.5	6.3	56%
21A-INFN	100.0	91.2	110%
21B-GARR	0	3.0	0%
22-VU	4.0	5.5	72%
23-RENAM	6.8	4.7	147%
24-UOM	12.3	17.8	70%
25-UKIM	22.0	17.8	124%
26A-FOM	19.2	8.0	240%
26B-SARA	8.2	31.4	26%
27A-SIGMA	3.7	9.7	38%
27B-UIO	4.3	7.0	61%
27C-URA	0.7	3.5	19%
28A-CYFRONET	42.2	28.5	148%
28B-UWAR	0	1.7	0%
28C-ICBP	5.7	4.5	126%
28D-POLITECHNIKA WROCLAW-SKA	1.2	4.0	30%
29-LIP	25.5	26.4	96%

30-IPB	29.3	29.2	101%
31-ARNES	9.7	10.8	90%
31B-JSI	11.3	12.8	89%
32-UI SAV	17.4	23.7	74%
33-TUBITAK ULAKBIM	30.7	32.2	96%
34A-STFC	25.3	25.4	99%
34C-UG	23.5	14.5	162%
34D-IMPERIAL	20.4	14.5	141%
34E-MANCHESTER	12.5	14.5	86%
36-UCPH	10.9	20.3	54%
38A-KTH	0.8	1.5	52%
38B-LIU	6.4	7.5	86%
38C-UMEA	10.3	11.7	88%
39-IMCS-UL	5.4	12.7	43%
40B-SINP MSU	4.9	5.0	99%
40C-JINR	2.0	3.3	60%
40D-RRCKI	2.0	3.3	60%
40F-ITEP	1.8	3.0	60%
40G-PNPI	0	3.3	0%
51A-ICI	10.5	5.2	203%
51C-UPB	0	3.3	0%
51D-UVDT	2.0	2.3	88%
51E-UTC	1.4	2.3	62%
51H-INCAS	0	0.8	0%
51J-UB	2.5	0.5	495%
Total:	1,019.7	1,038.8	98%

UBOL-ETF hole did not start work until PQ2 and had to recruit staff which are now in place. IICT BAS could not report all of the work done in PY1 due to issues in obtaining national support which have now been resolved. Overspending in the French JRU is due to reporting errors and the need for additional effort in the EGEE to EGI-InSPIRE transition period which will be balanced out in future years. While FOM within the Dutch NGI has overspent on TSA1.2, 1.3 1.4 and 1.8, SARA has underspent balancing out the activities within the JRU. Additional effort was needed by the Dutch NGI to integrate the national accounting tool into EGI's. Within the UK JRU, overlapping contracts during PY1 have resulted in higher effort being reported that will be recovered in future years. IMCS-UL has been unable to obtain matching national funding and is therefore limited in the effort it can put into its SA1 tasks. MTA-SZTAKI needed extra effort due to the transition from EGEE-III to EGI-InSPIRE. Hungary formerly was part of the Central Europe region and constituted an independent Operations Centre in July 2010.

4.2.5 SA2

WP5-E - WP5 (SA2) - SA2 Provisioning Soft. Infra-structure. (EGI)

Partner	Worked PM Fund-ed	Committed PM	Achieved PM %
1-EGI.EU	8.1	9.0	90%
9-CESNET	25.3	26.8	95%
10D-JUELICH	5.0	6.0	83%
12A-CSIC	13.3	13.3	101%
12B-FCTSG	3.9	4.3	92%
16A-GRNET	6.5	14.0	47%
16B-AUTH	1.4	3.3	42%
16E-IASA	6.5	3.3	201%
16F-ICCS	1.1	3.3	33%
21A-INFN	11.7	11.8	99%
29-LIP	14.2	17.5	81%
36-UCPH	0	6.0	0%
38B-LIU	4.3	6.0	72%
41-NORDUNET	0.5	1.5	33%
Total:	101.9	125.8	81%

Effort with SA2 took time to ramp up at the start of the project as processes were defined and appropriate staff put in place and registered in PPT to permanently work on these tasks. This was a particular issue for EGI.eu (due to recruitment until PQ2) and with LIP and FCTSG (where changes in local labour laws delayed recruitment until PQ3). Reported resource usage reflects this accordingly, showing over-commitment in subsequent project quarters to help reducing any delays in the project plan.

The effort TSA2.4 (Software Repository) for the GRNET JRU (BE16) members varies between the predicted and committed, when the JRU as a whole is considered 15.5PM have been delivered against 23.9PM committed (65%). Effort planning for the bulk of the implementation and provisioning of the Software Provisioning infrastructure and the EGI Software Repository are provided by IASA, scheduled for the early phase of the project. Therefore IASA is expected to use more effort than average in the early phase of the project, and lower effort than average in the later phases of the project. Likewise, AUTH and ICCS are scheduled to provide the maintenance of the infrastructure in the later phases of the project, thus conserving effort in the beginning, and using it up until the end of the project.

4.2.6 SA3

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

Partner	Worked PM Fund-ed	Committed PM	Achieved PM %
10G-FRAUNHOFER	2.1	9.0	23%
12A-CSIC	5.6	9.0	62%
12C-CIEMAT	6.9	6.0	115%
13-CSC	5.5	6.0	91%
14A-CNRS	14.6	15.3	95%

14B-CEA	0	2.7	0%
14C-HealthGrid	3.2	9.7	33%
19-TCD	7.0	7.0	100%
21A-INFN	0	20.0	0%
21C-INAF	8.3	10.0	83%
21D-UNIPG	11.5	3.0	385%
21E-SPACI	4.0	9.0	44%
28C-ICBP	0.7	2.0	33%
31B-JSI	0.5	1.0	47%
32-UI SAV	2.6	6.0	43%
35-CERN	113.9	113.7	100%
37-EMBL	0	14.7	0%
Total:	186.3	244.0	76%

The INFN effort is to be provided by CERN fellows which are appointed by a defined formal process which has taken 12 months to complete. Staff have now been appointed and will start in July 2011. For partners reporting low effort levels (FRAUNHOFER, CEA, HealthGrid & ICBP) there are common issues around hiring delays (triggered by a late GA signing), reporting problems that are being resolved on a case by case basis, and there is an expectation that effort levels will be caught up in PY2. UNIPG as a 3rd party within the Italian JRU (INFN) have over committed but this balanced out with SPACI's under commitment as part of the same JRU.

4.2.7 JRA1

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

Partner	Worked PM Funded	Committed PM	Achieved PM %
10B-KIT-G	9.6	11.8	82%
12B-FCTSG	5.6	3.0	187%
14A-CNRS	3.1	3.0	102%
16A-GRNET	0.9	3.0	30%
17-SRCE	3.3	3.0	110%
21A-INFN	6.9	6.0	114%
34A-STFC	5.3	6.0	88%
35-CERN	0.5	3.0	18%
Total:	35.1	38.8	91%

Effort deviation in GRNET was due to delays in the GA being issued at the beginning of the project and the establishment of subsequent agreements within the JRU. CERN effort has been low additional effort can be provided in future years.

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

Partner	Worked PM Funded	Committed PM	Achieved PM %
12B-FCTSG	0.6	3.0	21%
14A-CNRS	14.8	20.7	71%

17-SRCE	3.6	3.0	119%
34A-STFC	1.4	3.0	48%
35-CERN	4.3	6.0	72%
Total:	24.8	35.7	69%

The difference between the E and G software engineering tasks within JRA1 is as follows – the E effort is related to maintenance and the G effort to development. FCTSG has under reported effort in one area (the regional accounting repository needs to be available to build a regional accounting portal) and over reported in another (due to increased effort in PQ3 & PQ4 once staff were in place on the metrics portal) – when considered together the effort is on track. CNRS effort has been driven by developments taking place in other tools to support regionalisation and has been lower than expected in PY1. At STFC the developer left and committed effort was reduced while a replacement was recruited and delayed some of the regionalisation design work.

4.3 Resources consumed per beneficiary

	Project Period 1				
Partner	Worked PM Fund-ed	Committed PM	Achieved PM	Eligible Cost Estimate	Estimated Funding
1-EGI.EU	176.8	225.5	78%	1,569,787	944,394
2-UPT	0	18.4	0%	0	0
3-IIAP NAS RA	1.7	6.3	27%	5,017	1,656
5-IICT-BAS	10.7	31.0	35%	65,344.0	21,563.5
6-UIIP NASB	10.8	7.2	150%	41,307	13,631
7-SWITCH	17.2	25.9	67%	186,423.0	61,519.6
8-UCY	11.3	16.0	71%	97,611	32,212
9-CESNET	64.5	67.4	96%	424,410	168,408
10-KIT-G	117.8	134.2	88%	1,048,034.7	393,615.2
11-UOBL ETF	9.0	18.4	49%	36,650	12,095
12-CSIC	167.4	156.6	107%	1,308,523.5	489,687.7
13-CSC	40.4	38.4	105%	416,382	151,833
14-CNRS	190.1	151.7	125%	1,642,186.7	570,666.1
15-GRENA	5.4	6.3	86%	13,179	4,349
16-GRNET	68.3	100.7	68%	528,440.6	217,680.5
17-SRCE	29.9	26.8	112%	148,389	55,814
18-MTA KFKI	54.5	37.5	146%	283,251.5	93,473.0
19-TCD	34.9	35.2	99%	339,054	116,632
20-IUCC	11.6	10.5	110%	149,316	49,274
21-INFN	169.7	180.9	94%	1,250,496.0	465,768.8
22-VU	9.8	14.5	67%	81,351	26,846
23-RENAM	11.7	6.9	169%	35,057	11,569
24-UOM	12.3	17.8	70%	29,540	9,748
25-UKIM	22.0	17.8	124%	87,943	29,021
26-NCF	45.4	53.4	85%	464,812.0	181,537.7

27-SIGMA	9.1	28.4	32%	90,098.4	29,732.5
28-CYFRONET	65.5	59.2	111%	560,709.6	194,017.6
29-LIP	57.8	61.2	94%	316,633	124,540
30-IPB	36.6	36.2	101%	199,884	65,962
31-ARNES	31.2	36.3	86%	186,833.0	61,850.9
32-UI SAV	29.5	41.2	72%	235,951	79,318
33-TUBITAK ULAK-BIM	44.0	45.2	97%	309,861	102,254
34-STFC	127.1	119.2	107%	1,305,390.5	470,759.5
35-CERN	136.4	137.4	99%	1,964,389	811,898
36-UCPH	12.1	34.3	35%	133,742	44,135
37-EMBL	0	14.7	0%	0	0
38-KTH	29.2	36.2	81%	334,359.8	132,826.4
39-IMCS-UL	6.5	18.2	36%	50,736	16,743
40-E-ARENA	16.1	23.0	70%	63,646.5	21,003.4
41-NORDUNET	0.5	1.5	33%	7,140	3,570
51-ICI	16.3	14.2	115%	99,137.4	32,715.3
Total:	1,911.3	2,111.1	91%	16,116,182.7	6,316,024.1

No effort has been recorded from partners: EMBL & UPT.

5 FINANCIAL STATEMENTS PER BENEFICIARY

See separate file in directory.

6 CERTIFICATES

Not available as NEF session still not open.

7 ANNEX A: DISSEMINATION AND USE

7.1 Main project and activity meetings

These are all recorded in Indico in the EGI-InSPIRE category:
https://www.egi.eu/indico/categoryDisplay.py?categId=3

7.2 Conferences & Workshops Organised

See EGITF 2010 and EGI UF in section 2.2.4.3.

7.3 Other Conferences/workshops attended

Date	Location	Title	Participants	Outcome (Short report & Indico URL)
29/09/2010	Zurich, Switzer-land	Swiss EGI/eu InSPIRE meeting		Clarification of questions concerning the start of NGI_CH
25-27/10/2010	Brussels (Belgium)	OGF30		SA3: Remote instrumentation and workflows standardization activities http://www.ogf.org/gf/event_schedule/index.php?id=2126
26/10/2010	CPPM-Marseille (France)	Geospatial components on gLite (G-OWS)		SA3: Tutorial to use OGC components Presentation of the CYCLOPS applications; fire(Italy), flash flood (France) Decision to implement the geospatial service for one application to start
27/10/2010	CPPM-Marseille (France)	DIRAC		SA3: Tutorial to use DIRAC in ES Decision to organize a technical meeting in December or January to discuss the potentiality of DIRAC and how to add new services
08/09/2010	FNAL, USA	OSG/WLCG/EGI Security meeting		David Kelsey, STFC: A meeting between the OSG security team, WLCG and EGI to discuss the plans of EGI SPG and possibilities for future policy standardisation work. It was agreed that we would work jointly on defining security policy standards and coordinate these under the auspices of IPG. (A private meeting with no web page)

7.4 Publications

Publication title	Journal/ Proceedings title	Journal references	Authors

Publication title	Journal/ Proceedings title	Journal references	Authors
Ultra-Fast Carrier Transport Simulation on the Grid. Quasi-Random Approach	in: Scalable Computing: Practice and Experience (SCPE), Scientific International Journal for Parallel and Distibuted Computing,	Vol. 11, no.2, June, 2010, pp.137-147, ISSN 1895-1767.	E. Atanassov T. Gurov A. Karaivanova
The DESY Grid Infrastructure	Particle Physics 2009. Highlights and Annual Report, DESY.	ISBN 978-3-935702-45-4. pp. 48-49	A. Gellrich
Multicores in Cloud Computing: Research Challenges for Applications	Journal of Computer	Vol.5, No. 6, June 2010. pp. 958-964	L. Wang, J. Tao, G. von Laszewski, and H. Marten
A Toolkit for Application Deployment on the Grid	Proceedings of the second International Conference on Networked Digital Technologies	July 2010. ISBN 978-3-642-14291-8. pp. 503-508	J. Tao and H. Marten
Ibergrid Transition to EGI	Proceedings of the 4th Iberian Grid Infrastructure Conference	Ed.: Netbiblo ISBN 978-84-9745-549-7, pp. 19-23	J. López Cacheiro, G. Borges et al
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