**EGI-InSPIRE**

**Roadmap for the maintenance and development of the deployed operational tools**

**EU MILESTONE: MS711**

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| --- |
| Abstract  This milestone document records the planned technical changes for the operational tools and the use cases they are designed to support |

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1. Application area

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

1. Document amendment procedure

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1. Terminology

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

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.

1. EXECUTIVE SUMMARY

The development of the deployed operational tools is an on-going activity that concerns the common tools that are currently used to support e-Infrastructure operations. This work ensures:

* The continuing and correct functionality and interoperation of the tools with the deployed middleware;
* The developing of new features in response to the new scenarios that arise in a so dynamic world like e-Infrastructure;
* The developing of new features to satisfy the new requirements coming from its users, primarily the NGI/EIRO Operation Centres and the EGI.eu Operations Team.

The first activity is fundamental to avoid a degradation of tools capabilities that could decrease the quality of the services offered by EGI. The other two activities allow us to provide EGI community with up-to-date tools able to satisfy a growing numbers of end-users requirements and the most recent use-cases increasing the ability of EGI to keep and attract users. User requirements and new scenarios are collected and prioritised by the Operational Tools Advisory Group (OTAG). OTAG provides a forum to discuss the future evolution of the operations tools and to agree tool roadmaps that meet the expressed needs of the EGI community. It has representation from the tool users, and the software product teams located within or external to the project. Additionally a dedicated advisory board has been created to discuss the GGUS requirements. It is composed of representative from user communities, NGIs, EGI, technology providers and the new GGUS requirements will be discussed there before reaching the OTAG

To monitor this work there is a series of milestones labelled “Roadmap for the maintenance and development of the deployed operation tools”. One is planned for the beginning of each project year. The aim of the milestone is to give an overview of the plans for the developments for the operational tools in the following months, describing the general direction of the development and give estimations of the timeframe for these developments.

During PY4 the main driving themes for JRA1 activity have been the support of the operational needs of the EGI federated cloud, the extension of the operational tools to integrate new middleware types, the whole refactoring of the Operations Portal to improve its look and feel and performance, the GOCDB v5 release that remove the dependency from Oracle and the deployment of the last SAM update integrating the EMI probes

The JRA1 activity ends in PY4, after that the software maintenance will be supported as EGI core activity through EGI Council fees and NGI in-kind contributions. Additionally the JRA2 activity, that will start in PY5, will deal with the continuation of software development for a subset of tools that require further improvements. The roadmap presented in this document includes developments that will be carried out during 2014 by all these activities.

This is the last milestone of the series and the plans described here cover the interval between now and the end of the project.

The tools in the scope of the milestone are:

* Operations Portal
* GGUS
* GOCDB
* Accounting Repository
* Accounting Portal
* Service Availability Monitoring (including support for messaging)
* Metrics Portal

For each of these tools the current status, highlighting the features developed in the last year and their dependencies to other tools, are described. The deviations from the roadmap planned in the previous milestones of the series will be listed and motivated. This is meant to provide the background on which the new developments and plans will be realised.

All development teams have detailed plans for the last project year and beyond. Nevertheless it is important that the respective advisory body (OTAG and GGUS advisory board) steers and monitors this activity. The requirements coming from the users of the various tools need to be channelled and prioritised by this group and discussed with the developers, to make sure that changes could be well harmonized in all the tools preserving the integrity of the interplay between them.

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# Introduction

As described in last year’s milestone MS 710 [R 1] this document summarises the current status of implementation and the development plans of critical operational tools till the end of the EGI-InSPIRE project in December 2014. These operational tools are essential to achieve the objective of providing a large scale and resilient pan-European distributed computing infrastructure supporting a diverse range of scientific disciplines.

The JRA1 activity will end at PM48, after that the software maintenance will be supported as EGI core activity [R 2] through EGI Council fees and NGI in-kind contributions. Additionally the JRA2 activity that will start in PY5, will deal with the continuation of software development for a subset of tools that require further improvements. The roadmap presented in this document includes developments that will be carried out during 2014 by all these activities: JRA1 (until April 2014), EGI core activities (May-December 2014) and JRA2 (May-December 2014).

Section 2 sequentially looks at the current status of each of the operational tools highlighting the features developed in PY4 and the contingent deviations from the roadmap planned in MS 710. It also lists the functional dependencies of that tool on other operational tools and on specific data sources and reviews the status of regionalisation.

Section 3 outlines the development plans and each tool development team presents a roadmap summary for 2014.

# EGI OPERATIONAL TOOLS - STATUS AND DEPENDENCIES

## Operations Portal

The Operations Portal [R 3] is providing information to various actors (NGI Operations Centers, VO managers, etc.) along with related facilities, such as the VO administration tool and the VO management module, the different dashboards (Operations dashboard, security dashboard , VO Operations dashboard) and different communication tools : broadcast tool and downtime system announcement .

### Current Status

The Operations Portal is described in detail in the EGI-InSPIRE milestone document MS705 [R 4]. In this section we describe the main developments performed during PY4.

#### Refactoring of the whole portal

To improve the look and feel and the ergonomics of the portal a complete review of the portal has been initiated. Currently the refactoring is almost completed and the new Operations portal release (3.0) will be deployed in pre-production in February 2014 and we will move it to production in March 2014. The benefits of this refactoring will be:

* New portal look and feel with a homogenization of the display
* Improvements on efficiency, on reactivity and visibility
* The replacement of the heterogeneous JavaScript libraries by the use of a standard one: jQuery. [R 5]
* Readiness for mobile phones and tablets
* The use of the last web technologies to improve the efficiency and the usability
* Upgrade of php version

Different improvements have been added to access more easily to the information:

* Filters on the long table
* Possibility to export information (json, csv)
* Auto completion on large list

This work has been done step by step and module per module:

* Refactoring of the VO ID cards - achieved
* Refactoring of the VO Administration Module - achieved
* Refactoring of the Broadcast - achieved
* Refactoring of the ROD Dashboard – achieved
* Refactoring of the VO Dashboard – achieved
* Refactoring of the COD Dashboard – on going
* Decommission of CIC\_HELPDESK and integration of Operations Portal with standard GGUS Helpdesk - on going

#### Migration to Lavoisier 2.0

In parallel with the refactoring of the portal Lavoisier [R 6] has been migrated to a new version.

This version is more flexible and provides new features like:

* Complete support of path and xpath
* More rendering formats: csv, json, txt, xml, yml, gzip , html, chart, etc
* The support of java scripts libraries and css framework

The main work was to translate the different views from the old version to the new one but also to increase the efficiency by using as much as possible the xpath queries.

#### VO security contact list

The EGI CSIRT community [R 7] expressed some requirements related to the availability of the VO security contact information. These requirements are described in an EGI document [R 8] and translated by JRA1 in RT requirements (RT 6107 and RT 6108).

To satisfy the CSIRT’s requirements, a new page has been created summarizing the list of VO security contacts and the possibility to export it. Moreover a new branch has been added into the broadcast to contact these different contacts in one click. The remaining task is to provide an API to the EGI mailman system to concatenate all these contacts in one mailing list.

#### VO Users

* It has been added the possibility to export the list of users and robot certificates registered in our user's database extracted from the different VOMS servers. To get the list of users use: <https://operations-portal.egi.eu/vo/downloadVoUsers>
* To get the list of robot certificates: https://operations-portal.egi.eu/vo/downloadVoUsers?robot=true

Moreover, the users accounting has been improved by using the new VOMS API. The results are currently visible only on the Lavoisier Interface at https://cclavoisier02.in2p3.fr:8080/lavoisier/voms\_users?accept=html.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| Refactoring of the different dashboards | Done except for the COD dashboard | Will be delivered with release 3.0 |
| Continuous integration | Done | Will be delivered with release 3.0 |
| Availabilities and reliabilities report system | Done | In production |
| Package | Low priority task | No demand from NGI |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | Comments |
| GGUS | Display, create and update tickets via SOAP calls |
| Indirectly dependent on |  |
| GOCDB | Use of information: user, ngi, site, downtimes, services  Views in cache in Lavoisier |
| SAM PI | Use of information: Availabilities and reliabilities raw data  Views in cache in Lavoisier |
| ActiveMQ broker network  Regional Nagios Services | Use of information: Nagios results  The use of virtual queues ensure the persistence of the information |
| GSTAT | Use of metrics about storage and CPU  Views in cache in Lavoisier |
| BDII | All dynamic information about services  Views in cache in Lavoisier |
| Pakiti | Use of information: security vulnerabilities  Views in cache in Lavoisier |
| The security Nagios Box | Use of information: security vulnerabilities  Import stored into our DB |
| The EGI SSO system | User list - used to refined the authentication mechanism  Views in cache in Lavoisier |
| VOMS servers | Users and vo information  Views in cache in Lavoisier |
| Tools which are dependent on the Operations Portal |  |
| Accounting Portal | List of VO and discipline |
| AppDB | List of VO and the associated information |
| GOCDB | The downtime visualisation tool. |

### Regionalisation

As announced in MS710 regionalization is supported by providing central customized views for each Operations Centre of the Operations Portal facilities. During PY4 different views in the portal were created depending on the role of the users registered into GOC DB and associated to their certificates, so that access to information is restricted to the authorized operators only.

## GGUS

The EGI helpdesk also known as GGUS (Global Grid User Support) is described in detail in MS410 [R 9].

### Current Status

The implementation of the Report Generator and all the other requested features were completed. The high availability solution was brought forward a big step. The whole infrastructure was moved to two independent stacks of virtual machines in different locations. The manual switching mechanisms was implemented. The VOMS synchronization for user authentication was restructured to improve reliability. This is fundamental for the alarm ticket process used to send urgent notifications to the supporters in case of critical errors.

Alternative access to GGUS and xGUS using an AAI infrastructure was prepared and will be completed early 2014. For MAPPER project a dedicated xGUS instance was set up [R 10].

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| Integration of the last remaining NGI (Russia) | Cancelled | Never got any response. Currently we have the Russian helpdesk connected to GGUS via an e-mail interface. |
| New interfaces to MAPPER | Done | New xGUS instance for Mapper |
| Specific work flows for CSIRT/Security | Cancelled |  |
| Restructure VOMS GGUS synchronization | Done |  |
| GGUS Report Generator (final version depends on external requirements) | Done |  |
| Adapt interface to GOC DB/Doctrine | Done |  |
| Implementation of alarm processes for EGI tools | In progress (March 2014) |  |
| High availability for GGUS components (switching between stacks) | Done |  |
| Disaster recovery plan[[1]](#footnote-1) | Rejected | Beyond GGUS responsibility |
| Additional authentication through shibboleth | In progress (April 2014) |  |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | For |
| GOCDB | Site names, email contacts, downtime information |
| OIM (OSG Information Management System) | Site names, email contacts |
| VOMS | Rights for Team/Alarm tickets |
| Two way dependency |  |
| xGUS instances NGI Helpdesks based on xGUS (NGI\_AEGIS, NGI\_CH, NGI\_DE, NGI\_SI, Africa ROC, China ROC) | Same server infrastructure as GGUS |
| Helpdesks interfacing with GGUS | Synchronisation of ticket data |
| Tools which are dependent on GGUS |  |
| Operations Portal | Display, create and update tickets via SOAP calls |
| Accounting Repository | GGUS ticket data |
| Metrics Portal | GGUS ticket data |
| LHCOPN helpdesk | Dedicated view on tickets in GGUS |

### Regionalisation

Already in PY3 all the remaining NGI helpdesk instances could be integrated in GGUS, so the regionalisation task for GGUS can be considered as finalised. The NGI can choose to set up an xGUS instance, to use GGUS directly or to set up an interface to their local helpdesk. Currently we have 6 NGIs using an xGUS instance (ngi\_aegis, ngi\_africa, ngi\_ch, ngi\_china, ngi\_de and ngi\_si) and 7 NGIs/ROCs connected via an interface to GGUS (NGI\_France, NGI\_CZ, NGI\_GRNET, NGI\_IBERGRID, NGI\_PL, ROC\_CERN, ROC\_RUSSIA, OSG). All other NGIs are using GGUS directly.

## GOCDB

GOCDB is an information system for recording Grid topology data such as service endpoints, sites, downtimes and users. GOCDB v5 supports multiple projects and is used to manage the relationships between different entities (Grid, Cloud, etc.) using a well constrained relational schema. It includes a comprehensive role-based permissions model project specific business rules.

A detailed description of GOCDB and its features is provided at the following link:

<https://wiki.egi.eu/w/images/d/d3/GOCDB5_Grid_Topology_Information_System.pdf>

### Current Status

GOCDB v5.1 is the current production release. The GOCDB service is hosted at STFC RAL with a nightly tape backup. The service has a primary failover instance installed offsite at STFC Darsebury Lab. The primary failover is updated with an hourly download of the production data. A secondary failover instance is hosted in Germany.

Table 1: Production and failovers GOCDB instances.

|  |  |
| --- | --- |
| GOCDB instances | URL |
| Production instance | <https://goc.egi.eu/portal/> |
| Primary failover instance | <https://goc.dl.ac.uk/portal/> |
| Secondary failover instance | <https://goc.itwm.fraunhofer.de/portal/> |

The main developments of PY4 focused on development of GOCDB v5. This version replaces the now deprecated v4.x series, which was based on a proprietary PROM database that was strongly tied to Oracle. In contrast, v5 is based on de-facto Object Relational Mapping libraries (Doctrine ORM) [R 11] that can support different RDBMS, and is a major re-write from v4. V5 was necessary in order to simplify the code base, improve performance and to develop new features that were not possible with v4.

The main features developed during PY4 include:

* Support for different RDMBS with out-of-box support for Oracle and MySQL. Other DBs such as Postgres could be supported with few changes.
* Extensions to the scoping mechanism to allow different operational entities (Sites, Services, ServiceGroups) to be tagged by one or more scope-tags. The scope extensions allow the creation of flexible resource categories akin to a tag-cloud. Fine-grained resource selection and filtering is supported in the programmatic interface (PI) with the ‘scope’ and ‘scope\_match’ parameters.
* An admin Interface was developed to simplify and speed-up daily operational tasks for GOCDB administrators.
* A powerful extensibility mechanism was developed based on the GLUE2 extensibility mechanism. This allows users to associate custom key-value pairs to Sites, Services, and ServiceGroups so that this information is published following the Open Grid Forum standard. Support in the Programmatic Interface (PI) is provided with newly the added ‘extension’ parameter, which allows queries to perform fine-grained resource filtering based on custom properties. This feature has been released on the GOCDB test instance and is currently undergoing acceptance testing prior to a production release.
* Support for multiple projects hosted within a single GOCDB instance. A new ‘Project’ entity was added with supporting project-level user roles and business rules.
* The GLUE2 XML rendering was completed and published by OGF [R 12]. The GOCDB development team contributed to the accomplishment of this milestone.

The work completed during PY4 largely followed the MS710 planned tasks. Three of the four core tasks were delivered and some deviation occurred:

* The GLUE2 XML rendering task is being carried over as it was important to finalize the OGF specification before focussing on a GOCDB implementation with new PI methods.

Additional developments were also undertaken that were not recorded in MS710, including prototyping multiple service endpoints and providing operational assistance to EUDAT.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| GOCDB v5 | Completed | Released Oct 2013 |
| Extending Scoping | Completed | Released as part of v5 |
| Extensibility Mechanism | Completed, released to gocdb-test for acceptance testing | Planned release ~end Jan 2014 |
| Glue2 XML Rendering and add Glue2 Downtime | Carried over. | Specification published by OGF Dec 2013. |

### Dependencies

As a primary source of information GOCDB doesn’t depend on any other tool.

|  |
| --- |
| Tools which are dependent on GOCDB and corresponding Technology Provider |
| Operations Portal and Operations Dashboard (IN2P3) |
| ATP (CERN) |
| Top-BDII config generator (CERN) |
| MyEGI |
| NCG (SRCE) |
| Regional Nagios (CERN) |
| GGUS (KIT) |
| GSTAT (ASGC) |
| APEL (STFC) |
| Accounting Portal (CESGA) |
| Metrics Portal (CESGA) |
| e-GRANT (Cyfronet) |

The list is not exhaustive. Some VO specific tools are using the GOCDB programmatic interface (e.g. to feed downtime calendars), and the information may also be used by regional tools (local monitoring, local helpdesks etc.).

### Regionalisation

Since the start of PY3 regionalisation of GOCDB is implemented through scoping and the implementation of scoped views of the entities registered. See MS710 [R 1] for details.

## Accounting Repository

The EGI accounting repository (APEL) [R 13] stores information relating to the usage of resources within the EGI production infrastructure. It receives data on individual jobs and summaries of collections of jobs records from information providers, sites and other infrastructures, and exports accounting information to consumers of usage records.

### Current Status

#### CPU Accounting

A new EMI-APEL client was released as part of EMI 3 [R 14]. It includes support for local jobs and MPI accounting [R 15]. The EMI 2 and EMI 3 APEL Accounting systems have successfully run in parallel with one set of daily summaries retrieved by the Accounting Portal. The APEL team has worked with APEL client sites to migrate them to running EMI APEL 3. There are now 50 sites sending data to the new repository.

A regional version of the APEL Accounting Repository has been released for testing. It is in testing by the South African NGI (NGI-ZA).

Moreover, the APEL team have worked with sites and developers running alternative accounting clients to use Secure Stomp Messenger (SSM) [R 16] to send their records to the Accounting Repository. There are now sites in production sending accounting data from ARC [R 17], QCG [R 18] and EDGI Desktop Grid [R 19]. Globus [R 20] and Unicore [R 21] have successfully tested but have not started publishing in production.

#### Other Types of Accounting

* Cloud Accounting – a new version using SSM 2.0 has been implemented and is currently in use. Summary data is sent to Accounting Portal daily using SSM via the EGI Message Broker network. 17 sites have sent data, 9 are sending regularly.
* Storage Accounting – a new test database, Implemented using SSM 2.0, is in place. Now contains data from over 50 sites. Accounting portal have a dump of this data and have produced a prototype view.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| EMI-APEL 3 Client released | Complete | In use at 50 sites |
| Regional APEL Server released | Complete | In use by NGI-ZA |
| Cloud Accounting Summaries to Accounting Portal | Complete | Prototype portal view in use |
| Application Accounting usage record defined | Running | Prototype parser and database in development. A demonstration will be showed during the next EGI CF 2014. |
| Storage Accounting Summaries to Accounting Portal | In progress (April 2014) | Prototype portal view in use from database dump |
| Publishing summaries from Accounting Repository to other sites (OSG/DGAS) | Running | DGAS: In testing by December 2013. OSG: issue with US laws. The current legal advice is that we cannot transfer UserDN data to the USA. |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | For |
| EGI Message Broker Network | Transport of data from client to server |
| Operations Dashboard & Operations Broadcast | Shows APEL client Publication/Synchronisation Status.  Service availability/maintenance broadcasts |
| GGUS | Managing support workflow |
| BDII | Benchmark data for normalisation used in accounting |
| GOCDB | Used to identify production APEL sites, for permission to publish and for APEL client Nagios tests. |
| SAM | Monitors APEL availability |
| Functional dependency on |  |
| Accounting Portal | Repository provides the accounting summaries which the portal manipulates and visualises |

### Regionalisation

The regional APEL server software has been released. It is currently in testing by the South African (NGI-ZA) and Greek (NGI-GRNET) NGIs.

## Accounting Portal

The EGI accounting infrastructure is a complex system that involves various sensors in different regions, all publishing data to a central repository [R 13]. The data is processed, summarized and displayed in the Accounting Portal, which acts as a common interface to the different accounting record providers and presents a homogeneous view of the data gathered and a user-friendly access to understanding resource utilisation.

### Current Status

The activity in PY4 included an integral core rewrite, inclusion of several types of new accounting (Storage, Cloud, etc.), local job support, great improvements on InterNGI accounting, work on improving the UserDN publishing, the first instance of a regionalized version of the Portal.

Below a list of the main activities achieved during PY4:

* Improved UserDN country classiﬁcation patterns
* Improvements on usage by country
* GET interface for CSV
* Support for new RFC 2253 UserDNs
* Better support for custom VOs
* UserDN NGI attribution
* Support for local jobs, there are three options, selectable on most views:
  + Only Grid jobs (default)
  + Grid and local jobs (In case there is a corresponding global VO, both are aggregated)
  + Only local jobs
* Moved InterNGI views to production
* New Active Users View
* New query publication percentage views
* Shortened web service URLS
* New XML endpoint for VO activity
* Solved change on myOSG endpoint
* Fixed US OSG views
* Fixed reptier2 for Brazil federation.
* New endpoint for UserDN publication SAM probe
* Updated links section
* Heavy Core refactoring
* OOP migration
* New view aggregating all region charts for InterNGI reports (NGI/COUNTRY)
* Security improvements
* New code for UserDN SAM probe that detects if sites have published CPU/UserDN records on the last 7 days and honors some NGI non publishing policy
* Cloud accounting base code
* Updating of VO Metrics processing
* Base VM to deploy a regional accounting portal instance
* Changes for other types of accounting
* Fist Regionalized instance operative on NGI GR
* Monetary cost computation for cloud view
* Cloud accounting implementation
* Work on summary view
* Installation of new SSM software
* Fix for Unknown Discipline counting on VO Discipline CVS report
* Server work and moving, database maintenance
* Many ﬁxes and optimizations.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| Contributed CPUs by site | Under analysis | Technical issues under investigation |
| Preliminary support for parallel (MPI) jobs | Done |  |
| Provisioning of Storage accounting | Done |  |
| Provisioning of MPI accounting | In progress (February 2014) | Still needs some view coding |
| Provisioning of Application accounting | In progress (October 2014) |  |
| EGI User usage accounting | Done |  |
| Provisioning of Cloud Accounting | Done |  |
| Regional portal codebase improvements | Done |  |
| XML endpoints generalization and  improvement | In progress (June 2014) |  |
| SSM implementation for normal Accounting | In progress (June 2014) |  |
| EGI Usage VT Report Improvements | Done |  |
| EGI Usage VT Publishing Improvements | Done |  |
| Scientific Disciplines VT Interface Support | Blocked | Depends Ops Portal |
| Scientific Disciplines VT final Implementation | Blocked | Depends Ops Portal |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | Comments |
| GOCDB: | List of sites and NGIs in production, list of available services in production. |
| Operations Portal: | VOMS endpoints and VO list. |
| Accounting Repository: | Accounting records and summarized accounting data. |

### Regionalisation

A regionalised version of the portal was developed and deployed during PY4, it is currently in testing in the Greek NGI (NGI\_GR). The developer team planned to discuss with the South African NGI (NGI\_ZA) to gauge their interest in a regional instance of the Portal.

## Service Availability Monitoring Framework

The Service Availability Monitor (SAM) [R 22] is the system that is used to monitor EGI resources within the production infrastructure. It consists of the following components:

* Probes: implementing the metrics to test the infrastructure. A wide range of existing middleware components and protocols can be tested, e.g. FTS, LFC, CREAM, SRMv2, BDII, etc.
* Submission framework: a test execution framework based on the Nagios open source monitoring tool and Nagios Configuration Generator (NCG)
* Transport layer: a message broker network to distribute monitoring results
* Storage layer: Aggregated Topology Provider (ATP), Profile Management Database (POEM) and Metric Result Store (MRS)
* Visualization layer: MyEGI

### Current Status

SAM v. 22 is the current production release [R 23]. This version has introduced EMI probes in SAM framework that was a major milestone necessary to support testing of the EMI middleware. This release was also focused on major repackaging of the SAM distribution and implementation of several MyEGI enhancements. Deployment of the SAM v. 22 also involved several complex coordination tasks, such establishment of the EMI/SAM testbed [R 24] to test newly developed probes, establishment and contribution to the SAM probes WG [R 25] which aimed at analysing the impact of the changes to EGI operations as well as SAM testing campaign where several regions volunteered to participate and help validate the final release.

During the PY4 the SAM team has also contributed to the testing and validation of the GOCDB v5 release and participated in the validation of the *A new approach to Computing A/R reports* mini-project [R 26].

Integration of the EMI probes was a major task in MS710 roadmap and was achieved in full scope by successfully releasing and deploying SAM v. 22 to production in October 2013 [R 23]. A small delay compared to the planned release in September was mostly due to the need of extensive testing and validation.

With respect to the messaging activity progress has been made in the development of failover capabilities for the msg2handler component. In general, the message brokers network is resilient to failure as long as the clients support such a feature and the developments done target towards that direction. However, this task has not yet concluded and the foreseen date for the delivery of the necessary components is February 2014.

One more achievement to be mentioned is the support of APEL clients, which has already been implemented on the production message brokers. APEL clients publish data through the message brokers to which they connect via ssl (x509). Authentication data are updated regularly on the message broker endpoints (source of information is GOCDB) and so far the interoperation with APEL can be considered successful overall.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| Integration of some EMI probes | Done (October 2013) |  |
| Messaging: Implementation of SAM probes failover capabilities | In progress (February 2014) | Slow start in development process |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | Comments |
| GOCDB | Provides infrastructure topology information for sites, services and downtimes. |
| BDII | Provides infrastructure topology information to define mapping between services and VOs supported. |
| GStat | Provides GRID topology information to define mapping between sites and Tiers. |
| Tools which are dependent on SAM |  |
| Operations portal | Via messaging. |
| Metrics portal |  |

### Regionalisation

SAM was conceived from the beginning as a fully distributed monitoring system and was one of the first tools to support regionalization. Significant improvements were implemented in SAM v.17 [R 27] enabling distributed profile management and configuration of the service. Right now, almost every NGI is running a regional SAM instance and contributes to the aggregated availability reports published every month.

## Metrics Portal

The Metrics Portal [R 28] displays a set of metrics that will be used to monitor the performance of the infrastructure and the project, and to track their changes over time. The portal automatically collects all the required data and calculates these metrics before displaying them in the portal. The portal aggregates information from different sources such as GOCDB, GGUS, etc.

### Current Status

The Metrics Portal has been used for the last year to gather metrics from the project tasks. Depending on changes of the structure and scope of the projects and its tasks and activities, the portal will be updated while keeping the old metrics in their validity periods.

Below a list of the main activities achieved during PY4:

* Access control improvements
* Quarter-dependent activities (for decommission of SA3).
* Quarter-dependent metrics (for decommissioned, replaced and semantic-changing metrics).
* NGI summed metrics for NA2.
* New quarterly views and Excel report.
* New scrolling report layout.
* Internal changes in the authentication system.
* Manual metrics expansion.
* New NGI entity for the EGI.eu organization for management purposes.
* New custom Excel reports.
* Cosmetic fixes for Chrome browsers
* Project Metrics View
* Improved links and navigation in the metrics portal
* GGUS metrics improvement
* Addition of new SA1, SA2 metrics and update of the portal to reflect changes in the activity and project metrics
* Software support metrics moved from SA2 to SA1
* Fixed problem with history view
* Restored SA2 metrics
* Server work.
* Fixes and optimizations.

#### Tasks described in MS710

|  |  |  |
| --- | --- | --- |
| Task | Status | Comments |
| GGUS metrics improvement and new A/R metrics | Done |  |
| Access Control improvements | Done |  |
| Manual metrics expansion and refinement | Done |  |
| New customized reports with Excel support | Done |  |
| Views enhancement and optimization | Done |  |
| GGUS metrics improvement and new A/R metrics | Done |  |

### Dependencies

|  |  |
| --- | --- |
| Directly dependent on | Comments |
| Accounting Portal | To display accounting metrics, most active VOs, Number of submitted jobs, etc. |
| BDII | Number of CPUs and Cores in production, online and nearline storage, mpi sites. |
| GGUS | Number of tickets created/closed. Tickets response times, Number of tickets created by priority, etc. |
| GOCDB | Sites in production, number of countries and NGIs in EGI. |
| ACE | Availability and reliability metrics. |

# Operational Tools Roadmaps

## Operations Portal

### Operations Portal Plan

#### Operations Portal 3.0

As described previously the Operations Portal team has focused its developments on the refactoring of the application and the web service.

All these improvements will be delivered with the release 3.0 into 2 phases:

* In February for the pre-production part. This phase it is necessary to check with the users that everything is working well.
* The critical bugs identified during the pre-production phase will be fixed before to deploy the new release into production (March 2014).

Then, the Operations Portal team will collect feedback from people from March to May to implement some improvements and bug fixes according to this feedback.

#### A new classification of the VO disciplines

A new classification of the VO disciplines has been recommended by the Scientific Discipline Classification virtual team [R 29] [R 30]. Basically the Operations Portal will move from one level of disciplines to 2 levels and a VO could be present in multiple discipline. The main development tasks and an assessment of the whole activity are showed in .

Table 2: New classification of the VO disciplines - Tasks and assessment of the activity

|  |  |
| --- | --- |
| Thematics | Tasks |
| Database | Database refactoring |
| Database | Modification of the classes |
| Database | Update of the current VO |
| VO ID Cards | Integration of multi levels selection |
| VO ID Cards | Modification of the search tool |
| VO ID Cards | Modification of the workflows |
| VO ID Cards | Modification of the interfaces |
| Metrics and Charts | Integration of multi levels selection |
| Metrics and Charts | Modification of the metrics per discipline |
| Metrics and Charts | Modification of the interfaces |
| Metrics and Charts | Modification of the charts |
| **Evaluation** | **2 PM** |

#### Support and maintenance

Operations Portal support and maintenance will be guaranteed through the EGI core activities [R 31].

The support is provided through the EGI helpdesk to EGI.eu, VO Managers, EGI CSIRT, Resource Centre, NGI operators for the usage of the various functional modules provided by the tool and to the operators of other depending systems.

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or remote systems deployed by integrated and peer infrastructures that interoperate with the Operations Portal.
* Maintenance of probes to test the functionality of the service
* Requirements gathering
* Documentation

### Operations Portal Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Refactoring of the portal | February : pre-production  March : production |
| Package | September – If this task is still pertinent |
| New Tasks | Planned completion time |
| New disciplines classification | April |
| Collection of the feedback | March - May |
| Implementation of the feedback | May - June |

## GGUS

### GGUS plan

Alternative access to GGUS and xGUS using an AAI infrastructure will be completed.

Interfaces to PRACE and XSEDE infrastructures are foreseen. The implementation will start once the partner infrastructures are ready to go with their ticketing systems.

The VO CMS intends to switch from Savannah to the GGUS ticketing system. Therefore some dedicated modifications of GGUS will be implemented to meet the CMS requests.

For the EGI central operations tools an alarm process will be developed and integrated.

The operations portal is currently implemented as a separate application interfacing with GGUS. It will be integrated into GGUS for simplifying processes and workflows.

#### Support and maintenance

GGUS support and maintenance will be guaranteed through the EGI core activities [R 32].

Support will be provided through the EGI helpdesk itself:

* to users and operators of helpdesk systems integrated with GGUS about bugs and incidents affecting the GGUS system itself
* to the operators of integrated (or to be integrated) helpdesks about GGUS interfaces and testing activities
* to users of GGUS about the functionality provided by GGUS

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or remote systems deployed by integrated and peer infrastructures that interoperate with the central EGI components of the system.
* requirements gathering
* documentation

### GGUS Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Implementation of alarm processes for EGI tools | March 2014 |
| Additional authentication through shibboleth | March 2014 |
| New interfaces to PRACE and XSEDE | Depend on PRACE and XSEDE |
| New Tasks | Planned completion time |
| CMS specific adaptations | March 2014 |
| Merge GGUS and xGUS webfrontends to a common platform | March 2014 |
| Implement a bulk submit feature to enable the notification of many sites at the same time | March 2014 |

## GOCDB

### GOCDB plan

During PY5 new features for GOCDB will be developed outside of EGI as an open source project. Future developments are therefore largely undetermined and are likely to evolve. Nevertheless, continued involvement within the EGI Global Task will help ensure future developments are strategic and interoperable. Support will also be provided in PY5 to provide continued EGI operational support, service hosting and bug-fixing. The major developments for GOCDB are likely to include multiple service endpoints and further GLUE2 support:

* Multiple endpoints: A requirement has emerged during PY4 to cater for multiple endpoints per service. This would allow different service-interfaces to be registered and published for a single service. In addition, selected endpoints of a service could be put into downtime rather than the service as a whole. Prototyping for this work has been carried out in PY4 and is a likely development for PY5. Interoperability and future support from dependent tools would be needed to consume the multiple endpoints, e.g. with downtime notifications for selected service endpoints and monitoring of selected service endpoints.
* GLUE2 support: It is envisaged that a range of new GLUE2 attributes will be added to the GOCDB data model including support for the recently evolving GLUE2 cloud extensions. New PI methods will be added to render the GOCDB data in the GLUE2 XSD standard.

#### Support and maintenance

GOCDB support and maintenance will be guaranteed through the EGI core activities [R 33].

The support will be done through the EGI helpdesk to users of GOCDB and to the operators of other depending systems.

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or remote systems deployed by integrated and peer infrastructures that interoperate with the central EGI components of the system.
* requirements gathering
* documentation

### GOCDB Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| GLUE2 XML rendering of GOCDB data | Aug/Sept 2014 |
| Writable PI method to submit downtimes | ~June 2014 |
| New Tasks | Planned completion time |
| Multiple Service Endpoints | ~May 2014 |
| Extend data model and add more GLUE2 attributes (e.g. GLUE2 cloud extensions) | ~July 2014 |
| Web portal interface enhancements | To be defined[[2]](#footnote-2) |

## Accounting Repository

### Accounting Repository Plan

The APEL team will work with sites in testing and the message broker team to move our test infrastructure to use the production message broker network

After discussion with other sites, publishing summaries from Accounting Repository to other sites (OSG, DGAS) will be implemented. Work will continue with sites to migrate their CPU accounting systems from EMI2 to EMI3 and with sites running SSM 1.2 to migrate them to SSM 2.0. The MPI data will be sent from the new repository to the accounting portal. This requires extensive work to re-route the data flow of the existing repository backend. Further work will be to set up database replication to improve the reliability and availability of the service.

Work will start to move the Federated Cloud sites to production. The APEL team will work with developers and sites to finalise the cloud data schema. Then, the necessary systems for the cloud accounting in production will be installed, configured and monitored.

A specific activity will be performed to ensure that storage accounting data received from the different storage clients is comparable across sites. Once this is established, work will continue to define the summaries of storage accounting data. The APEL team will collaborate with the accounting portal team to visualise the summaries after which we can begin receiving storage accounting data in production.

A prototype application accounting system will be developed to be presented at the EGI Community Forum 2014 [R 34]. Collaborating sites will be selected to install an application accounting repository for testing.

Accounting repository activities will continue during PY5 in the context of the JRA2 activity. The PY5 plan foresees the following tasks:

* support of new resource types as the GPGPU
* evolution of the cloud accounting towards a production system
* improvement of CPU, parallel jobs and storage accounting
* improvement of the cloud accounting to cover storage accounting for transient cloud storage and data usage accounting by the virtual machines
* adoption the OGF Usage Record v2
* support to implement Pay-for-Use proof of concept

#### Support and maintenance

Accounting repository support and maintenance will be guaranteed through the EGI core activities [R 35].

The support will be done through the EGI helpdesk about the accounting records publishing process in the production infrastructure and is provided:

* to the operators of those infrastructures that publish or need to publish usage records into the EGI central accounting databases (Resource Centres, NGIs and other integrated and peer infrastructures)
* to the operators of other depending systems

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or the accounting systems deployed by integrated and peer infrastructures
* Maintenance of probes to test the functionality of the service
* requirements gathering
* Documentation

### Accounting Repository Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Application Accounting usage record finalised | September 2014 |
| Storage Accounting Summaries to Accounting Portal | April 2014 |
| Publishing summaries from Accounting Repository to other sites (OSG/DGAS) | September 2014 |
| New Tasks | Planned completion time |
| Application accounting prototype | June 2014 |
| Cloud Accounting to production | April 2014 |
| Migrate sites from SSM1.2 to SSM2 | December 2014 |
| Confirm Storage Accounting schema | March 2014 |
| Storage Accounting in production | December 2014 |
| Send MPI data to portal | April 2014 |
| Send all accounting data (including MPI data) to portal in production using the new schema | September 2014 |
| GPGPU accounting prototype | December 2014 |
| Improvement of the cloud accounting to cover storage accounting for transient cloud storage and data usage accounting by the virtual machines | December 2014 |
| Adoption the OGF Usage Record v2 | December 2014 |
| Support to implement Pay-for-Use proof of concept | December 2014 |

## Accounting Portal

### Accounting Portal Plan

The general direction of the Accounting Portal development is to improve the current code and implement the new features requested by the NGIs, VOs, PMB and OMB. The refactoring in the last period has improved the extendibility of the code and will be phased in production gradually. The regional portal in production in NGI\_GR will be updated and deployed on other NGIs if requested. The views concerning storage, MPI and application accounting views are partly implemented in different degrees and will be completed during the next months.

The scientific disciplines development is dependent on the Operations Portal implementation.

Accounting Portal activities will continue during PY5 in the context of the JRA2 activity. The PY5 plan foresees the following tasks:

* portal extension to include GPGPU usage information
* evolutions on the visualization of cloud accounting information to include the new features introduced in the accounting repository
* evolutions on the visualization of storage accounting information
* evolutions on the visualization of parallel jobs information
* adoption the OGF Usage Record v2
* support to implement Pay-for-Use proof of concept

#### Support and maintenance

Accounting Portal support and maintenance will be guaranteed through the EGI core activities [R 36].

The support, done through the EGI helpdesk, will be provided:

* to users of the portal about the data displayed and the views provided.
* to the operators of other depending systems.

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or remote systems deployed by integrated and peer infrastructures that interoperate with the central EGI components of the system.
* maintenance of probes to test the functionality of the service
* requirements gathering
* Documentation

### Accounting Portal Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Provisioning of Application accounting (DB  implementation) | Oct 2014 |
| Provisioning of Application accounting (View  implementation) | Oct 2014 |
| Provisioning of MPI accounting (View  Implementation) | Feb 2014 |
| XML endpoints generalization and  improvement | Jun 2014 |
| SSM implementation for CPU Accounting | Jun 2014 |
| Scientific Disciplines VT Interface Support | Oct 2014 |
| Scientific Disciplines VT final Implementation | Oct 2014 |
| New Tasks | Planned completion time |
| Regional Portal Implantation in other NGIs | Dec 2014 |
| Improvements Storage View | Dec 2014 |
| Improvements Cloud View | Dec 2014 |
| Improvements MPI View | Dec 2014 |
| General Improvements | Dec 2014 |
| Portal extensions to include GPGPU usage information | Dec 2014 |
| Adoption the OGF Usage Record v2 | Oct 2014 |
| Support to implement Pay-for-Use proof of concept | Nov 2014 |

## Service Availability Monitoring Framework

### Service Availability Monitoring Framework plan

A general direction of the development will focus on the maintenance and bug fixing of the existing components. Work started on SAM v. 22.1 with primary aim to fix various issues identified during the deployment of SAM v. 22 and during the extended validation phase.

As SAM services operated by CERN will be discontinued as of 01 May (CERN did not participate to the bidding for providing the services after PY4), the main task for the forthcoming period is to support migration of SAM central services to a new consortium of partners (CNRS, SRCE and GRNET). This will involve developing a detailed time plan, writing technical documentation necessary for the migration of SAM central services, providing technical support to the consortium as well as organizing SAM migration meetings and workshops to follow up on the transition process and make sure it is implemented in time and within its scope. In addition, documentation will be written in order to finalize monitoring of the local NGI services.

With respect to the message brokers the plan is to have a transparent migration (one that will not affect the clients, i.e. SAM and APEL) in the upcoming months. As the new set of brokers will be built upon a newer version of the ActiveMQ software (5.8) tests are already underway to evaluate and assess whether the newer version can interoperate with the current one used in production (5.5). As long as the results of these tests are successful the new broker endpoints (two (2) that will be hosted by GRNET and SRCE respectively) will be added to the current production network by mid March 2014 so that the removal of the current 4 endpoints can proceed until the end of April 2014. If the tests are unsuccessful then GRNET and SRCE will proceed with the provisioning of a new set of brokers that will rely upon the 5.5 version of ActiveMQ, so that the transparent removal of the currently four (4) broker endpoints in production can proceed.

Development of the SAM product will continue during PY5 in the context of the JRA2 activity. The consortium composed by CNRS, GRNET and SRCE will lead the developments. The main objective of SAM developments in PY5 is the evolution of the framework towards a more lightweight and open source project that will better address the evolving requirements of EGI for testing and benchmarking its capabilities in terms of resilience and service continuity and potentially of other interested Research Infrastructures. The work will rely on the outcome of the mini project  *A new approach to Computing A/R reports* [R 26] executed during project year 4.

The PY5 plan foresees the following tasks:

* development of a new web user interface, replacing MyEGI, based on the Lavosier service
* the extension of the WebAPI delivered by [R 26] in order to support also status and metric results as well the aggregation factors
* the extension of the Sync Components in order to store also the raw data of the metric results
* the creation of a lean monitoring instance that will be supported in a easier way
* the removal of the Oracle database dependency for large scale central installations

#### Support and maintenance

SAM and the Message Broker network support and maintenance will be guaranteed by the CNRS, GRNET and SRCE consortium through the EGI core activities [R 37] [R 38].

Second and third level of support will be provided through the EGI helpdesk

* to SAM users and operators about SAM functionality , SAM installation, upgrade and configuration issues, MyEGI views and support to other SAM components, re-computations of monitoring results and of availability/reliability reports
* to the operators of other depending systems
* to the operators of systems that rely of the EGI Message Broker Network capability

The maintenance activity will include:

* core refactoring, bug fixing, proactive maintenance, improvement of the system
* maintenance of probes to test the functionality of the service
* integration (configuration and packaging) of new probes into SAM
* coordination of software maintenance activities with other technology providers that provide software for the EGI Core Infrastructure or remote systems deployed by integrated and peer infrastructures that interoperate with the central EGI components of the system.
* maintenance of probes to test the functionality of the service
* requirements gathering
* documentation.

### SAM Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Messaging: Implementation of SAM probes failover capabilities | February 2014 |
| New Tasks | Planned completion time |
| SAM to monitor services and sites not in GOCDB (RT2791) | April 2014 |
| Support for migration of central services | April 2014 |
| Addition of new (2) broker endpoints | February 2014 |
| Removal of current (4) broker endpoints | April 2014 |
| Development of a new web user interface replacing MyEGI[[3]](#footnote-3) | December 2014 |
| Extension of the WebAPI delivered by [R 26] | December 2014 |
| Ehe extension of the Sync Components | December 2014 |
| Creation of a lean monitoring instance[[4]](#footnote-4) | December 2014 |
| Removal of the Oracle database dependency | December 2014 |

## Metrics Portal

### Metrics Portal plan

Currently the portal is in a stable state, further changes on metrics are dependent on any remaining evolution of the EGI project itself.

#### Support and maintenance

Support and maintenance will be guaranteed in best effort way.

### Metrics Portal Roadmap Summary

|  |  |
| --- | --- |
| Tasks inherited from MS710 | Planned completion time |
| Manual metrics expansion and refinement  Manual metrics are metrics that are introduced manually by the users, as opposed to automatic metrics, which are estimated and then validated or corrected by the users. | April 2014 |
| Views enhancement and optimization  The enhancement refers to the improvement and refinement of the presentation of the editing, reporting and charting views, their presentation on multiple devices, including several browsers and mobile versions. This includes changes to the HTML and CSS coding and templates, tabulation, layout, new fields, colour scheme, search engine ranking and corporate identity. | April 2014 |
| New Tasks | Planned completion time |
| N.A. |  |

# SuMMARY

This document presents the current status of the operation tools and describes how the PY4 roadmap showed in MS710 [R 1] has been implemented.

As a general consideration the operational tools is continuing the transformation process, started with the EGI-InSPIRE project, that is modifying the old Grid operations used during the EGEE projects in a more general solution, independent from the underlying technologies, applicable to the grid platform as well as to the EGI federated cloud platform, and able to serve different projects and Research Infrastructures. This is proved by the adoption of some of our tools in EUDAT [R 40] and Mapper project [R 41]. Interest in join development of these tools evolving them into open source projects is being discussed with e-Infrastructure and research infrastructure representatives.

Moreover, advanced fail over mechanisms have been introduced to make sure that the availability and reliability of the tools can be maximised.

The JRA1 activity ends in PY4, however, the operational tools development will carry on in different manners. Support and maintenance will be guaranteed by the core EGI activities funded with the EGI Council fees and NGI in-kind contributions. New developments and evolutions will be delivered by the JRA2 activity and open source projects.

The coordination of software maintenance and development activities and requirement analysis will be driven by EGI.eu also in the future in the context of the core EGI activities. This is fundamental to safeguard the EGI infrastructure operation considering the strong interconnections between the EGI.eu operational tools, described in Section 2, and the dependency of other infrastructure components on the operational tools.

# References

|  |  |
| --- | --- |
| R 1 | MS 710 Roadmap for the maintenance and development of the deployed operational tools  https://documents.egi.eu/document/1501 |
| R 2 | EGI Core Activities  https://wiki.egi.eu/wiki/Core\_EGI\_Activities |
| R 3 | Homepage of the Operations Portal  http://operations-portal.egi.eu/ |
| R 4 | MS705 – Operations Portal Roadmap  https://documents.egi.eu/document/525 |
| R 5 | jQuery  http://jquery.com/ |
| R 6 | Lavoisier  http://software.in2p3.fr/lavoisier/index.html |
| R 7 | EGI CSIRT  https://wiki.egi.eu/wiki/EGI\_CSIRT:Main\_Page |
| R 8 | EGI VO Security Contact Information  https://documents.egi.eu/document/1920 |
| R 9 | MS 410 EGI Helpdesk and the NGI Support Units  https://documents.egi.eu/document/522 |
| R 10 | Mapper XGUS instance  https://xgus.ggus.eu/mapper/ |
| R 11 | Object-relational mapping  http://en.wikipedia.org/wiki/Object-relational\_mapping |
| R 12 | OGF GLUE2 XML Rendering  http://www.ogf.org/documents/GFD.209.pdf |
| R 13 | EGI Accounting Portal  https://accounting.egi.eu |
| R 14 | EMI 3 Monte Bianco  http://www.eu-emi.eu/emi-3-montebianco |
| R 15 | MPI within EGI – Virtual Team project report  https://documents.egi.eu/document/1260 |
| R 16 | APEL/SSM  https://wiki.egi.eu/wiki/APEL/SSM |
| R 17 | ARC  http://www.nordugrid.org/arc/ |
| R 18 | QosCosGrid  http://www.qoscosgrid.org/trac/qcg |
| R 19 | European Desktop Grid Initiative (EDGI)  http://edgi-project.eu/ |
| R 20 | Globus  https://www.globus.org/ |
| R 21 | UNICORE  http://www.unicore.eu/ |
| R 22 | Central SAM Documentation  https://wiki.egi.eu/wiki/SAM |
| R 23 | SAM Update-22 Release Note  https://tomtools.cern.ch/confluence/display/SAMDOC/Update-22 |
| R 24 | EGI SAM-NAGIOS Server integrating EMI probes TESTBED  https://twiki.cern.ch/twiki/bin/view/EMI/NagiosServerEMITestbed0022012#EGI\_SAM\_NAGIOS\_Server\_integratin |
| R 25 | Nagios probes working group  https://wiki.egi.eu/wiki/Nagios\_probes\_Working\_Group |
| R 26 | EGI-InSPIRE mini project: A new approach to Computing A/R reports  https://wiki.egi.eu/wiki/VT\_Comp\_Reports |
| R 27 | SAM Update-17 Release Note  https://tomtools.cern.ch/confluence/display/SAMDOC/Update-17.1 |
| R 28 | EGI Metrics Portal  https://metrics.egi.eu |
| R 29 | EGI Scientific Classification Virtual Team  https://wiki.egi.eu/wiki/VT\_Scientific\_Discipline\_Classification\_Classification |
| R 30 | EGI Scientific Classification Virtual Team – Final Report  https://documents.egi.eu/document/1514 |
| R 31 | EGI Core Activities – Operations Portal  https://wiki.egi.eu/wiki/2013-bidding/Operations\_Portal |
| R 32 | EGI Core Activities – GGUS  https://wiki.egi.eu/wiki/2013-bidding/Incident\_management\_helpdesk |
| R 33 | EGI Core Activities – GOCDB  https://wiki.egi.eu/wiki/2013-bidding/GOCDB |
| R 34 | EGI Community Forum 2014-01-24  http://cf2014.egi.eu/ |
| R 35 | EGI Core Activities – Accounting Repository  https://wiki.egi.eu/wiki/2013-bidding/Accounting\_Repository |
| R 36 | EGI Core Activities – Accounting Portal  https://wiki.egi.eu/wiki/2013-bidding/Accounting\_Portal |
| R 37 | EGI Core Activities – SAM  https://wiki.egi.eu/wiki/2013-bidding/SAM\_central\_services |
| R 38 | EGI Core Activities – Message Broker Network  https://wiki.egi.eu/wiki/2013-bidding/Message\_Broker\_Network |
| R 39 | EGI Core Activities – Second leve of support (core platform)  https://wiki.egi.eu/wiki/2013-bidding/2nd\_level\_support\_%28core\_platform%29 |
| R 40 | EUDAT – European Data Infrastructure  http://eudat.eu/ |
| R 41 | Mapper project  http://www.mapper-project.eu/ |

1. The disaster recovery plan is the set of processes, policies and procedures related to preparing for recovery or continuation of GGUS after a natural or human-induced disaster. The responsibility of such a plan is on KIT facilities like medical unit or fire brigade and, then, is beyond the product team responsibility. The lack of this plan has a minimal impact on GGUS availability considered that the whole infrastructure was moved to two independent st acks of virtual machines in different locations. [↑](#footnote-ref-1)
2. This task will be executed outside EGI-InSPIRE project and EGI.eu Core Activities. The timeline is not yet available. [↑](#footnote-ref-2)
3. Needed to remove the Oracle database dependency and reduce the maintenance cost. [↑](#footnote-ref-3)
4. A lean monitoring instance could be supported in an easier way reducing the maintenance cost. [↑](#footnote-ref-4)