

EUROPEAN MIDDLEWARE INITIATIVE

DSA1.4.1 - ANNUAL MAINTENANCE AND SUPPORT REPORT

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Abstract:

This report contains a consolidate view of the results of all SA1 tasks with particular focus on the compliance with the established processes and procedures and the implementation of the Service Level Agreements with major customers.

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	Name	Partner / Activity	Date	Signature
From	Francesco Giacomini	INFN/SA1	22/04/2011	
Reviewed by	Florida Estrella, Alberto Aimar, Jedrzej Rybicki	CERN/NA1, CERN/SA2, JUELICH/JRA1	31/05/2011	
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1. INTRODUCTION

1.1. PURPOSE

This document reports on the state of the implementation, at the end of the first year of the project, of the Software Maintenance and User Support plans described in DSA1.1 [R1] and of the Release Management plan described in DSA1.2 [R2]. The Software Quality Assurance Plan (SQAP) [R3], which complements and extends the plans presented in DSA1.1 and DSA1.2, is also taken into consideration when appropriate.

1.2. DOCUMENT ORGANISATION

The document is organized in four main sections, one for each of the operative tasks of the SA1 work package: Software Maintenance, Release Management, User Support and Quality Control. Each section is further divided in four parts: summary of the main prescriptions foreseen in the plan; status of the implementation; quality control checks; issues and suggestions for improvement.

1.3. REFERENCES

R1	DSA1.1 Software Maintenance and Support Plan http://cdsweb.cern.ch/record/1277556
R2	DSA1.2 Software Release Plan http://cdsweb.cern.ch/record/1277545
R3	DSA2.1 Quality Assurance Plan http://cdsweb.cern.ch/record/1277599
R4	EMI Description of Work (Public DoW) https://twiki.cern.ch/twiki/pub/EMI/EmiDocuments/EMI-Part_B_20100624-PUBLIC.pdf
R5	EMI Policy Documents https://twiki.cern.ch/twiki/bin/view/EMI/SA2#EMI_Policy_Documents
R6	EMI 1 Kebnekaise http://www.eu-emi.eu/emi-1-kebnekaise
R7	ARC RfC tracker http://bugzilla.nordugrid.org/
R8	dCache RfC tracker http://www.dcache.org/rt/
R9	gLite RfC tracker https://savannah.cern.ch/projects/jra1mdw/
R10	UNICORE RfC tracker http://unicore.sourceforge.net/
R11	ETICS https://etics.cern.ch/eticsPortal/
R12	DJRA1.1.2 Compute Area Work Plan and Status Report (M12) http://cdsweb.cern.ch/record/1277610
R13	DJRA1.2.2 Data Area Work Plan and Status Report (M12)



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	http://cdsweb.cern.ch/record/1277616
R14	DJRA1.3.2 Security Area Work Plan and Status Report (M12) http://cdsweb.cern.ch/record/1277568
R15	DJRA1.4.2 Infrastructure Area Work Plan and Status Report (M12) http://cdsweb.cern.ch/record/1277583
R16	MSA1.2.2 EMI Reference Releases (EMI 1, M12) http://cdsweb.cern.ch/record/1277547
R17	Extra Packages for Enterprise Linux (EPEL) http://fedoraproject.org/wiki/EPEL
R18	EMI Integration Testbed https://twiki.cern.ch/twiki/bin/view/EMI/TestBed
R19	MSA1.2.1 EMI Reference Release (EMI 0, M6) http://cdsweb.cern.ch/record/1277546
R20	EMI 1 Kebnekaise Acceptance Criteria List https://twiki.cern.ch/twiki/bin/view/EMI/EMI1AcceptanceCriteria
R21	EMI 1 Kebnekaise Software Repository http://emisoft.web.cern.ch/emisoft/index.html
R22	EMI Releases Tracker https://savannah.cern.ch/projects/emi-releases/
R23	EMT https://twiki.cern.ch/twiki/bin/view/EMI/EMT
R24	FAQ for Registering a New Support Unit in GGUS https://gus.fzk.de/pages/ggus-docs/PDF/1210_FAQ_for_New_SU.pdf
R25	DNA1.2.1 Service Level Agreement Template (First Version) http://cdsweb.cern.ch/record/1277517
R26	Security Assessment Plan https://twiki.cern.ch/twiki/bin/view/EMI/SAIQCSAP
R27	DNA1.2.2 Service Level Agreement Template (Second Version) http://cdsweb.cern.ch/record/1277519
R28	DSA1.3.1 Software Maintenance Quality Control Report (M6) http://cdsweb.cern.ch/record/1277561
R29	DSA1.3.2 - Software Maintenance Quality Control Report (M10) http://cdsweb.cern.ch/record/1277562

1.4. DOCUMENT AMENDMENT PROCEDURE

This document can be amended by the authors further to any feedback from other teams or people. Minor changes, such as spelling corrections, content formatting or minor text re-organisation not affecting the content and meaning of the document can be applied by the authors without peer review. Other changes must be submitted to peer review and to the EMI PEB for approval.

When the document is modified for any reason, its version number shall be incremented accordingly. The document version number shall follow the standard EMI conventions for document versioning. The document shall be maintained in the CERN CDS repository and be made accessible through the OpenAIRE portal.

1.5. TERMINOLOGY

APT	Advanced Package Tool
ARC	Advanced Resource Connector
CE	Computing Element
CREAM	Computing Resource Execution And Management
DCI	Distributed Computing Infrastructure
EGEE	Enabling Grid for E-sciencE
EGI	European Grid Infrastructure
EMT	Engineering Management Team
ETICS	eInfrastructure for Testing, Integration and Configuration of Software
FAQ	Frequently Asked Question
GGUS	Global Grid User Support
KPI	Key Performance Indicator
LHC	Large Hadron Collider
PEB	Project Executive Board
PM	Project Month
PRACE	Partnership for Advanced Computing in Europe
PT	Product Team
PTB	Project Technical Board
QA	Quality Assurance
QC	Quality Control
RAT	Risk Assessment Team
RC	Release Candidate
RPM	RPM Package Manager (originally Red Hat Package Manager)
RfC	Request for Change
SL	Scientific Linux
SLA	Service Level Agreement
SQAP	Software Quality Assurance Plan
SU	Support Unit
SVG	Software Vulnerability Group
UMD	Unified Middleware Distribution
UNICORE	Uniform Interface to Computing Resources
VOMS	Virtual Organization Membership Service
WLCG	Worldwide LHC Computing Grid



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WP	Work Package
XML	Extensible Markup Language
YUM	Yellowdog Updater Modified

2. EXECUTIVE SUMMARY

This document summarizes all the work done during the first year of the project in terms of:

- Maintaining the software developed by ARC, gLite, dCache and UNICORE and installed in a production environment. Bugs were fixed and improvements added according to requirements coming from the users.
- Preparing the first release of an EMI distribution, putting together in a coherent way all the middleware components so far developed independently by ARC, dCache, gLite and UNICORE.
- Supporting the users, either system administrators or members of scientific communities, using software developed within EMI.

All the three activities followed plans prepared early in the project and described in two deliverables (DSA1.1 Software Maintenance [R1] and Support Plan and DSA1.2 Software Release Plan [R2]). The many differences in experience and background of the people participating in the project made the preparation of the plans a complex task and it took considerably more time than originally planned in the DoW [R4]. However the contents of the resulting plans were sufficiently clear on how to maintain, support and release EMI products. These were complemented by the Software Quality Assurance Plan (SQAP), prepared by SA2, and by a number of policy documents, also prepared by SA2, covering aspects such as Release Management, Change Management, Configuration and Integration, Packaging, Testing, Documentation, Certification [R5].

The late production of a number of plans and policy documents caused some misunderstandings among the members of the project and hence some delays in the implementation of the plans, but without significant impact on the achievement of the goals stated in the DoW and in the plans. Moreover the compliance with the agreed project policies often imposed important changes in the software, which required a substantial increase of the effort especially by some partners.

The Software Maintenance task is based on the clear mandate to keep the stability of the software deployed in production, introducing only those changes that are necessary to keep the infrastructure running in a way that is adequate for its users. Since no proper EMI release existed during the first project year, the maintenance task concentrated on the existing software developed independently by ARC, dCache, gLite and UNICORE and deployed in production. Updates to those software components were regularly released and no significant discontinuity was perceived by users during the project switch-over.

The Release Management task focused almost exclusively on the preparation of the first EMI major release, planned for the end of the first project year. The release, codenamed Kebnekaise, was officially announced on 12th May 2011 [R6], completed with repositories of digitally signed packages (binary and source), documentation and release notes. The integration work to put together all the existing software components in a coherent framework was an exceptional endeavor, which required several iterations to complete and showed the genuineness of the collaboration of all the Product Teams (PTs) involved.

The user support chain is a collaboration between the infrastructure providers (e.g. EGI) and the software providers (e.g. EMI). The User Support task organized the 3rd level of the user support chain for EMI. The 3rd-level support is offered by experts, typically developers, of the affected software component and intervenes only in cases where the first two levels are not able to resolve the incident or even to simply to understand it. The user support function in EMI is organized in multiple Support Units (SUs), approximately one per software product developed within EMI. An additional, generic SU is available for tickets that are not easily assignable to a specific SU. The User Support activity is constantly monitored, profiting also from the tools made available by the GGUS portal [R24], which is the reference tool supporting this activity. The User Support activity did not see any interruption moving from previous projects to EMI.



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The Software Maintenance, Release Management and User Support tasks were constantly monitored by the Quality Control (QC) task, according to SQAP specifications. In addition, after each QC review, feedback was given to SA2, who is responsible for the overall Quality Assurance in the project, in order to improve the SQAP itself.

The QC task was also responsible to define and implement the Security Assessment Plan. The plan is ready and its implementation has already started with the assessment of some critical security components.

The activity performed in SA1 is also influenced by the Service Level Agreements that the project signs with its customers. So far one SLA has already been signed, with EGI. The SLA was agreed towards the end of the first year and SA1 is developing experience with its application. All initial signs show that that the current organization of the SA1 tasks is able to comply with the agreed terms of the EMI-EGI SLA.

3. SOFTWARE MAINTENANCE

The Software Maintenance task deals with the analysis and correction of software defects found in released components by users and infrastructure technicians. This task includes the definition of the Software Maintenance, Problem Management and Change Management processes and the continuous execution of the related procedures.

The plan about how the goal of the task is achieved is described in DSA1.1 and is summarized in Section 3.1. The status of its implementation is described in Section 3.2. Section 3.3 summarizes the QC findings on the performance of this task at M6 and M9. Section 3.4 lists the issues that have been identified with the application of the plan and how they will be addressed in the future.

3.1. SOFTWARE MAINTENANCE PLAN

The Software Maintenance Plan is described in Section 4 of DSA1.1. The main items of the plan are:

1. **Stability:** with EMI software running in hundreds of sites, the stability of what is in production use is of paramount importance and must be preferred over the introduction of non-urgent changes. No changes can be introduced in production releases without approval.
2. **Release frequency:** a major release of the EMI distribution is foreseen each year, where non-urgent changes (typically new features) can be introduced.
3. **Backwards-compatibility:** within a major release of the EMI distribution backwards-compatibility must be maintained when introducing changes. Backwards incompatibilities can be introduced only with a new major release.
4. **Supported releases:** two EMI major releases are supported at a time.
5. **Tracking changes:** Requests for Change (RfC) need to be tracked with an appropriate tool. The tool used for a specific product is a choice of the corresponding PT, provided it records some types of information that is common to everybody.
6. **Priority-driven development:** RfCs are eligible of being addressed in a software release already in production (i.e. they are considered corrective or adaptive maintenance) if they score high in terms of priority. Priority is a function of factors such as severity, urgency, impact and cost and can assume four different values, from highest to lowest: immediate, high, medium and low. To each of them is associated a well-defined behaviour. In particular immediate- and high-priority RfCs have to be addressed in the production versions of the affected services, whereas medium- and low-priority RfCs have to be postponed until the next EMI major release comes out.
7. **Priority decisions:** the priority of an RfC is assigned by the PTB.
8. **Maintenance responsibility:** SA1 is responsible to coordinate the corrective and adaptive developments to address defects, potential defects and minor improvements in services in use in production environments.

3.2. STATUS OF IMPLEMENTATION

Since the first EMI release was foreseen only at the end of the first year of the project, the maintenance plan was only applied, by extension and when it made sense, to the software inherited from previous projects and experiences.

For each of the items included in the plan presented in the previous section, the status of the implementation at the time of writing is as follows:



1. **Stability:** the changes to the existing middleware distributions were reduced to the minimum necessary to keep the infrastructure running properly, adopting a conservative approach in a moment when significant organizational changes were happening and, at the same time, user communities like WLCG were heavily using the Grid infrastructure following the excellent data taking from the LHC experiments. The list of releases, together with their most significant changes, in the different middleware stacks were reported in detail in the Quarterly Reports.
2. **Release frequency:** during the maintenance of the existing products, changes which were deemed not urgent enough were postponed for being implemented in the software released with the first EMI distribution.
3. **Backwards-compatibility:** all changes implemented during the first year were backwards compatible. Changes introducing backwards-incompatibilities were postponed to EMI 1 (e.g. the VOMS library, used by many services and clients).
4. **Supported releases:** since a) an EMI major release is foreseen per year and b) two major releases are supported at a time, an EMI major release is supported and maintained for two years. This two-year period is further subdivided in two periods: 18 months of full support and 6 months of security-only support. By extension, the same approach was adopted, where it made sense, for the major distributions of ARC, dCache, gLite and UNICORE already existing when EMI started. They will be fully supported until October 2011. After that date only security vulnerabilities with a target date, as assessed by the EGI Security Vulnerability Group (SVG) Risk Assessment Team (RAT), within April 2012 will be fixed.
5. **Tracking changes:** before the start of EMI multiple trackers were in use to track change requests (e.g. bugs to fix or new features to implement) in the different software products that entered the project. The most popular were Bugzilla for ARC [R7], RT for dCache [R8], Savannah for gLite [R9] and Sourceforge for UNICORE [R10]. Adopting a single tool was judged not worthwhile, but a number of constraints were set in terms of information that has to be recorded with each RfC and in terms of workflow that each RfC has to go through during its lifetime, from submission to inclusion in a release. Moreover SA2 provided a specification and developed tools to export such information from the different trackers into a common XML format. This common format will be used in at least two situations: the periodic assessment of new RfCs and the generation of metrics.
6. **Priority-driven development:** without a proper EMI release, there could not be any RfC concerning EMI products. The assessment of RfCs concerning existing products was left to the existing middleware-specific organizations according to their existing procedures. Nevertheless, when possible, the maintenance procedures thought for EMI were applied to actual situations concerning existing software. Two examples of this happening were an immediate-priority RfC concerning the CREAM CE, that was preventing an important user community from submitting certain types of jobs, for which a fix was available in a couple of days (including testing and staged rollout) and a critical security vulnerability in dCache, which was fixed within the set target date of three days.
7. **Priority decisions:** without a proper EMI release during the first project year, there could not be any RfC concerning EMI products, so this part of the plan could not be implemented yet.
8. **Maintenance responsibility:** without a proper EMI release during the first project year, there could not be any RfC concerning EMI products, so this part of the plan could not be implemented yet.

3.3. QUALITY CONTROL CHECKS

The SQAP includes prescriptions for review of the Software Maintenance and Support Plans. The SA1 QC task performed the foreseen checks at M6 and M9 and reported the findings in two corresponding deliverables DSA1.3.1 and DSA1.3.2 Software Maintenance Quality Control Report (M6, M10) [R28,29].

The review of the Software Maintenance and Support Plan foresees only one check for the Software Maintenance part. In both reviews the check was successfully passed (see Section 4.3 in both DSA1.3.1 and DSA1.3.2).

The DoW lists three Key Performance Indicators (KPI) for the Software Maintenance task: Number of Problems (KSA1.3), Number of Urgent Changes (KSA1.4) and Change Application Time (KSA1.5). Since no public EMI release was foreseen during the first year of the project, these KPIs were not applicable so far to the EMI change management procedures and were not computed. Moreover they were not even applicable to the change management procedures followed for the separate middleware distributions existing before the project started, due to their high heterogeneity. Additionally, it was difficult, and in some cases impossible, to get these KPIs for the separate distributions in production during the first year. All necessary tools to report the SA1 KPIs are however already available from SA2, though some refinement will inevitably be necessary following their first usage.

3.4. ISSUES AND SUGGESTED IMPROVEMENTS

Since the maintenance task for software released with an EMI distribution will start only after the EMI 1 release, there is no significant experience nor feedback concerning the procedures. But as the procedures were defined from the experience gained by four established and successful projects no significant changes to the plan are foreseen at this time. SA1 will continue to work closely with SA2 in the monitoring, review and revision, if required, of the Software Maintenance Plan.

4. RELEASE MANAGEMENT TASK

The main scope of the Release Management covers:

- Release management and coordination
- Maintenance of the package repositories
- Definition of policies and release cycle

This task also covers the smooth transition from many middleware distributions to one, so that the production infrastructures stay functional without noticeable discontinuity.

The Software Release Plan is described in DSA1.2 and is summarized in Section 4.1. The status of its implementation is described in Section 4.2. Section 4.3 summarizes the QC findings on the performance of this task at M6 and M9. Section 4.4 lists the issues that have been identified with the application of the plan and how they will be addressed in the future.

4.1. RELEASE MANAGEMENT PLAN

The Release Management plan is described in DSA1.2. The main items of the plan are:

1. Initial situation: the initial situation sees four different release management policies in the contributing middleware stacks (ARC, dCache, gLite and UNICORE). There is some overlapping in the policies, but also many differences. For this reason the corresponding processes and procedures are maintained as they are and managed, within EMI, by the existing release teams. This approach offers the best guarantee against the risk of causing problems in the support of the software already in production during a significant discontinuity in the organization of how the Grid infrastructure is managed.
2. One-year release cycle: the release process has a one year period, with five well-scheduled phases: requirements analysis; definition of the development and test plans; development, testing and certification; release certification and validation; release and maintenance. Each EMI Work Package (WP) is differently involved in each phase, with SA1 mainly concerned with the last two phases.
3. Major releases: approximately at the end of each project year the delivery of an EMI major release is foreseen, containing all the significant changes, notably new features, planned and developed during the previous year. An EMI major release offers also the opportunity to include non backwards-compatible changes in the distribution.
4. Internal release: a special EMI major release is foreseen at M6, named EMI 0, an internal integration exercise of all the software components under a unique management process.
5. Updates to major releases: within an EMI major release, updates to component releases are possible, but cannot break their interface. The changes are managed according to the Change Management Policy, which is described in the DSA1.1.
6. Release criteria: only software that satisfies well-defined release criteria can be included in the distribution. They cover integration and configuration, packaging, testing and certification, the availability of metrics, and release.
7. Build and test environment: one common integration, build and test infrastructure is used for all the software components, under the control of the Release Manager. Authoritative Quality Assurance checks are integrated into this infrastructure. The chosen infrastructure is based on the ETICS system [R11].

8. Supported platforms: the EMI distribution is made available on multiple platforms, some of them mandatory for all the software, whereas others can be optional or addressed only for some selected components. The distribution mechanism of choice, in particular for what concerns packaging and hence deployment, is the one used natively on the specific platform (e.g. YUM and RPM for RedHat-derived systems, APT and Deb for Debian-derived systems).
9. Tracking releases: releases are tracked with an appropriate tool. The choice is to use Savannah. Component releases are scheduled as much as possible, but emergency releases are possible.
10. Release Manager role: the Release Manager is responsible for governing the whole process and is assisted by the Engineering Management Team (EMT). The EMT is composed by the PT leaders, a QA representative, a Security representative, representatives of the operations teams of the major infrastructures (like EGI and PRACE).

4.2. STATUS OF IMPLEMENTATION

For each of the items included in the plan presented in the previous section, the status of the implementation at the time of writing is as follows:

1. Initial situation: each of the four middleware providers has continued releasing according to their own procedures in place before the start of EMI, as regularly reported in the Quarterly Reports.
2. One-year release cycle: the five stages of the first release cycle were only approximately followed, due to the difficulties that appeared at the start of a project, mainly deriving from the very different experiences and backgrounds of the project members. As soon as this became apparent, the plan for the first year was adjusted in order to focus on some selected developments (see the Technical Area Work Plan and Status Reports for Compute [R12], Data [R13], Security [R14] and Infrastructure [R15]) and on the production of one unique distribution of all the EMI software components, complying with the project policies.
3. Major releases: **on 12th May 2011, the first major release of the EMI distribution, codenamed Kebnekaise, was officially announced** for the SL5/x86_64 platform [R16]. The Kebnekaise release is the first fundamental milestone along the sustainability roadmap identified by the project. The distribution repository contains 333 digitally-signed binary packages that allow the installation of 53¹ products from ARC, dCache, gLite and UNICORE, all coming from a fully integrated build. Almost 90% of the binary packages also come with the corresponding source package, which has been an outstanding request from middleware users for a long time. Most of the about 190 external dependencies are taken either from the basic OS distribution or from the EPEL repository [R17]. Only when absolutely necessary, in about the 15% of the cases, external dependencies were taken from other sources and are now re-distributed by the project for convenience. The distribution comes with proper documentation and release notes, according to the EMI Documentation Policy.

The release of EMI 1 was the final step of a year-long process, that started with software components developed in very different contexts. Many iterations were needed to achieve this very ambitious goal and the plans needed hard work, patience, collaboration and many adjustments to address the problems as they appeared. Five internal milestones, in the form of Release Candidates (RC), were set with increasing requirements in terms of compliance to the project policies. The outcome of each RC was tested and certified on the integration testbed provided by SA2 [R18].

¹ At the time of this writing



4. Internal release: the EMI 0 milestone was formally achieved in February 2011 (M10) [R19], although most of the work was practically completed in M8. The delay in achieving the milestone, foreseen for M6, was mainly due to unanticipated problems caused by the new way of managing external dependencies and by the aim to conform to the Fedora and Debian policies adopted by the project. Some lessons were learnt also about non-technical issues such as weak communication with PTs, their less than optimal involvement in the decision-making process, misunderstandings related to the numerous policies to be applied and to the targets to achieve.
5. Updates to major releases: change management to EMI releases will be applied only in the second year on software components included in EMI 1 release.
6. Release criteria: the release criteria described in the plan represent a long-term objective that will be reached during the course of the project. For EMI 1 only some of them were considered mandatory [R20]. For EMI 1, the acceptance criteria were categorized as "exclusive" or "inclusive". Failing an exclusive criterion causes exclusion from the release, failing an inclusive criterion doesn't cause exclusion from the release, but the product is marked as not fully compliant with the release criteria.
7. Build and test environment: the ETICS tool was chosen to manage integrated builds, the generation of reports out of the builds and the collection of software-related metrics. The stability of the tool and of the underlying infrastructure was not fully adequate at the beginning of the project, but has improved considerably since then and has represented an indispensable tool for the management of the EMI 1 release, keeping together all the EMI components and all their external dependencies under a unique configuration management system. The ETICS infrastructure made possible multiple builds of the whole project running every day, providing immediate feedback about the continuously applied changes.
8. Supported platforms: for EMI 1 only one mandatory platform was foreseen from the beginning, i.e. Scientific Linux (a recompilation of RedHat Enterprise Linux) v. 5 on the x86_64 architecture. The choice was mostly obliged, being SL5 the reference platform of the WLCG community, which uses by far the largest share of Grid resources. No other mandatory platform was feasible for the first release of EMI 1, although SL6 and some Debian platform are likely targets in the next months.

The EMI 1 software is available as a set of RPM packages (both binary and, for most components, source), kept in a YUM repository [R21]. The availability of source packages is a significant achievement compared to the past (for example the gLite distribution never included source packages).
9. Tracking releases: all the component releases that compose the overall EMI 1 major release are tracked in a Savannah task tracker [R22]. Each item followed a well-defined workflow that expresses the procedure for scheduled releases, which includes of course a validation step by the Quality Control team.
10. Release Manager role: the EMT, chaired by the Release Manager, has met regularly, typically on Monday afternoon, since early in the project. Meetings were complemented by a heavy use of the dedicated mailing list. The activity of the EMT (meetings, corresponding minutes, open tasks, attendance, etc.) is fully tracked at [R23].

4.3. QUALITY CONTROL CHECKS

The SQAP includes prescriptions for the review of the Software Release Plan and the Software Release Schedule. The SA1 QC task performed the foreseen checks at M6 and M9 and reported the findings in two corresponding deliverables DSA1.3.1 and DSA1.3.2.

The results of the QC activity at PM6 were not encouraging for the Release Management task: both the Software Release Plan and the Software Release Schedule were still unavailable at that time, so the prescribed checks could not even be performed (Sections 4.1 and 4.2 of DSA1.3.1). All deliverables describing activities to be deployed across the four participating middleware providers suffered delays due to the long process of converging to general agreements. The Software Release Plan could only be completed in October and took an additional two months of internal review due to an iterative process of discussion, policy update, and revision between SA1 and SA2.

The results obtained at PM6 were shown and discussed at the first EMI All-Hands Meeting in November 2010. The main conclusion of this first check was the lack of documentation about project plans and policies, which was at the same time cause and consequence of the communication difficulties encountered during the first months of the project. The situation improved considerably in the following months as soon as those documents were prepared by SA1 and SA2.

On the contrary the results at M9 review were positive:

- Seven out of seven checks on the Software Release Plan were successful.
- Two out of three checks on the Software Release Schedule were successful. The failed check concerned the delay of the EMI 0 release, whose reasons were analysed and understood, as explained above.

The QC checkpoint at M9 included an assessment of the progress of EMI 1 (Section 5 of DSA1.3.2): some tasks were late with respect to the schedule but the conclusion was that EMI 1 release milestone at the end of year one is achievable and PTs should concentrate all their efforts on components packaging, testing and certification.

The DoW lists two Key Performance Indicators for the Release Management task: Number of Releases (KSA1.6) and Number of Release Rollbacks (KSA1.7). Since no public EMI release was foreseen during the first year of the project, these KPIs were not applicable so far and were not computed.

4.4. ISSUES AND SUGGESTED IMPROVEMENTS

As expected, all phases planned in the first year could not be followed very diligently. This was understandable at the beginning of the project, due to its complexity, and will be avoided for the next release cycles, from requirements collection to the final release, through a better monitoring of the cycle phases, in close collaboration with JRA1 and SA2. This will allow to better plan the use of resources, especially human effort, in a project where often the same person has to cover different roles (developer, tester, product integrator, task leader, etc.).

SA1 will continue to work closely with SA2 in the monitoring, review and revision, if required, of the Release Management Plan.

5. USER SUPPORT TASK

The User Support task consists in the provision of expert support for incidents and requests escalated from the user support channels of the customer infrastructures and user communities. The support services may be based on SLA detailing the services and their expected quality attributes like the response times.

The plan about how the goal of the task is achieved is described in DSA1.1 and is summarized in Section 5.1. The status of its implementation is described in Section 5.2. Section 5.3 summarizes the Quality Control findings on the performance of this task at M6 and M9. Section 5.4 lists the issues that have been identified with the application of the plan and how they will be addressed in the future.

5.1. USER SUPPORT PLAN

The User Support Plan is described in Section 4 of DSA1.1. The main items of the plan are:

1. Three levels of support: the user support activity is organized in three levels. The first two levels are covered by the infrastructure provider (e.g. EGI) or by the community the user belongs to. Only the third level is covered by EMI.
2. Support Units: for each software product provided by EMI a Support Unit (SU) is created. An additional generic SU for the whole project is also created to intercept requests that could not be properly triaged by previous support levels.
3. Tools: the tool of choice to provide user support is the Global Grid User Support (GGUS) portal, being the tool of choice of EGI.
4. Ticket management: a GGUS ticket can be closed when a satisfactory solution is found for the corresponding incident experienced by the user.
5. Support monitoring: the support activity needs to be properly monitored so that tickets are not left behind.

5.2. STATUS OF IMPLEMENTATION

For each of the items included in the plan presented in the previous section, the status of the implementation at the time of writing is as follows:

1. Three levels of support: the first two levels of the support chain were organized by EGI, whereas the organization of the third level was implemented by EMI. The purpose of the two first levels is to address most of the incidents experienced by users and escalate to the third level, composed by experts, often developers of the involved software, only those situations that are hard to understand or to solve, requiring deeper knowledge of the software. The support chain has worked well so far and, to the best of our knowledge, no discontinuity was perceived by users, despite the changes to the situation existing before the EMI and EGI projects started.
2. Support Units: the organization of the third-level support within EMI took some time, more than initially expected and planned in the DoW. Several models were discussed; at the end we settled on the following organization:
 - For each software product there is an SU, formed by people expert on that product, typically its developers. The creation of an SU has to satisfy criteria agreed with EGI, such as the availability of an e-mail address and a FAQ [R24].

- A generic SU exists to intercept tickets that are not easily assignable to the specific SUs mentioned at the previous item.
- When a ticket arrives at the generic SU, it gets forwarded to all the specific SUs so that the right one can pick it up. Moreover the tickets assigned to the generic SU are monitored by the User Support task leader and by the SA1 leader. The EMT is involved if a controversy occurs.

The separation of the previous second level support into second and third levels needed GGUS development work which had not been calculated in the setting of the MSA1.1 EMI Support Units integrated in GGUS achievement date. Moreover, common understanding and agreement on strategy took longer than initially planned. This delay had no impact on the provision of user support as there was no disruption in the during the hand-over in Oct 2010. Many SUs, at least those for gLite and dCache, were already in place and working as before.

2. Ticket management: a ticket can be closed when a solution is found. The definition of “solution” given in the plan was vague and for almost all the first year common sense was used to determine if a ticket could be closed. Admittedly it worked quite well; yet a more formal definition was needed in order to avoid as much as possible conflicts during the enforcement of the SLAs established with the customers of EMI software. Indeed a more precise definition was included in the SLA template contained in DNA1.2.1 [R25]: a problem resolution “means the use of reasonable efforts to resolve the reported problem. These methods may include (but are not limited to): configuration changes, patches that fix an issue, reinstalling the software, etc.”.
3. Support monitoring: the User Support task leader and, to some extent, the SA1 leader monitor the user support activity, especially through the reports generated from the GGUS portal. SUs are notified via e-mail about new tickets or updates to existing tickets; moreover they receive reminders about old tickets which do not receive proper attention.

5.3. QUALITY CONTROL CHECKS

The SQAP includes prescriptions for the Software Maintenance and Support Plan. The SA1 QC task performed the foreseen checks at M6 and M9 and reported the findings in two corresponding deliverables, DSA1.3.1 and DSA1.3.2.

The Review of the Maintenance and Support Plan foresees two checks for the User Support part. In both reviews, both the checks passed successfully (see Section 4.3 in both DSA1.3.1 and DSA1.3.2).

The DoW lists two Key Performance Indicators for the User Support task: Number of Incidents (KSA1.1) and Incident Resolution Time (KSA1.2). The GGUS portal technically allowed to compute these since the very beginning of the project, but they were not very meaningful until all the SUs were correctly in place, which happened later than planned as explained above. However these KPIs were reported in the Quarterly Reports already starting from the second quarter. The reported numbers, especially for what concerns the Incident Resolution Time, are still affected by the inheritance from previous projects, notably EGEE, where the 3rd-level support was not well structured as it is in EMI.

5.4. ISSUES AND SUGGESTED IMPROVEMENTS

At the end of the first year there are no outstanding issues in the User Support organization. One aspect that will need special attention though is the interface between the 2nd level and the 3rd level of support, because it is where the boundary between two organizations is crossed. The good relationship with EGI, recently formalized in an SLA, gives confidence that possible problems are promptly addressed.



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DSA1.4.1 - ANNUAL MAINTENANCE AND SUPPORT REPORT

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The recent experience with the deployment of the release candidates of the first EMI distribution showed that a new SU is needed for the Release Management task itself, to provide support concerning package repositories, documentation, release notes, etc. This new SU will be implemented with the May 2011's release of the GGUS portal, ready for the support of the EMI 1 release.

At the moment EGI is, in practice, the only DCI having a support relationship with the EMI project. The establishment of an Operations Level Agreement with EDGI, for the provisioning of support for EDGI plugins deployed with the EMI release, is being discussed. The relationship with other DCIs, notably PRACE, and related scientific communities potentially interested in using the EMI software needs to be investigated.

6. QUALITY CONTROL TASK

The Quality Control task is a specialized task dedicated to monitoring the compliance of other SA1 tasks to the QA processes and procedures. All the releases of EMI components need to satisfy well-defined certification and validation criteria before being included in a stable EMI distribution, sufficient to guarantee to a high degree of confidence that all EMI products meet or exceed the requirements set by EGI and that no regression is introduced.

This task also deals with security assessments of selected EMI components.

How the goals of the task are achieved is described in DSA2.1 and is summarized in Section 6.1. The status of its implementation is described in Section 6.2. Section 6.3 lists the issues that have been identified with the application of the plan and the feedback sent to SA2 for the inclusion in the SQAP.

6.1. QUALITY CONTROL PLAN

The main prescriptions of the SQAP on the SA1 QC task are:

1. Periodic reviews: the periodic review of the Software Release Plan, of the Software Release Schedule and of the Software Maintenance and Support Plan.
2. Quality metrics: the computation of some metrics, about delays in the releases and user incidents managed by the 3rd-level support, for each of the plans.
3. Security assessments: the definition, execution and review of the Security Assessments Plan. The Security Assessment Plan should include the description of the security criteria to use during the assessments and the list of components that should be assessed in order of priority.

6.2. STATUS OF IMPLEMENTATION

For each of the items included in the plan presented in the previous section, the status of the implementation at the time of writing is as follows:

1. Periodic reviews: the reviews of the Software Release Plan, of the Software Release Schedule and of the Software Maintenance and Support Plan have been performed according to the plan at PM6 and PM9. The results were included in DSA1.3.1 and DSA1.3.2 and have been summarized in the Quality Control Checks sections (3.3, 4.3 and 5.3) in this document.
2. Quality metrics: the same DSA1.3.1 and DSA1.3.2 include the computation of the metrics defined in the SQAP.
3. Security assessments: the Security Assessment Plan [R26] was prepared following the prescriptions of the SQAP. The plan was prepared in collaboration with the EGI SVG and the University of Wisconsin, Madison, and is already being implemented with the assessments of Argus, VOMS-Admin and gLExec.

Additionally, under the coordination of the SA1 QC leader, a task force was created to perform all the steps required for the validation of the releases of all the components to be included in the EMI 1 distribution.

6.3. ISSUES AND SUGGESTED IMPROVEMENTS

As output of its review activity, the QC task generates Change Requests for the SQAP, which then SA2 considers during the SQAP review, foreseen by the SQAP itself once per month. The details of the procedure from the SA1 QC point of view are well explained in DSA1.3.1 and DSA1.3.2.



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During the past reviews, QC generated a few change requests for the SQAP about:

- The definition of tolerance ranges of positive checks to consider the various plans accepted.
- The definition of metrics thresholds to consider a deliverable accepted.
- The reconciliation of the definition of metrics with the definition of KPIs when the two cover the same aspect.
- The clarification on which tools have to be used to measure metrics or KPIs.

All the change requests have been accepted and were incorporated or will be incorporated in a next revision of the SQAP.

7. SERVICE LEVEL AGREEMENT

Service Level Agreements between EMI and its customers are based on the template defined in DNA1.2.1 [R25] and updated in DNA1.2.2 [R27].

The only SLA established so far is with the European Grid Infrastructure (EGI). It covers the provisioning of Software Development and Support services required to support and sustain the EGI UMD software distribution and the grid infrastructure operations. The covered services are Software releases, Requirements analysis, Requirements and software testing reports, Web-based support.

The Agreement

- Defines more precisely concepts that were introduced in the Software Maintenance and Support Plan and in the Software Release Plan.
- Outlines the parameters of all covered services.
- Defines roles and responsibilities.

Notably, the Agreement includes the time frames within which EMI should acknowledge a support requests via GGUS, depending on the priority (as defined by GGUS):

- 4 working hours for Top Priority,
- 2 working days for Very Urgent,
- 5 working days for Urgent,
- 15 working days for Less Urgent.

The agreement was signed on 14th April 2011, during the EGI User Forum and EMI Technical Forum in Vilnius. Coming rather late in the first project year, not much experience was collected from its application. However, the application of the SLA certainly requires some modifications to the GGUS portal concerning the report generation and monitoring functionality, since at the moment there is no easy way to extract the information concerning the time a ticket is passed to 3rd-level support and the time a request is acknowledged, which are needed to compute the response time to a ticket by EMI. The high-priority requirement has already been passed to the GGUS development team.

8. CONCLUSIONS

The first year of the project finished with the availability of the first major release of the EMI distribution, whose announcement was published on 12th May 2011, practically with no delay with respect to the original plan contained in the DoW. This event concluded a whole year of hard work to integrate hundreds of software components that until the start of the project were developed in four very different contexts. At this point all the procedures defined in terms of Release Management, Change Management and User Support have been instrumental in achieving this milestone. The established QC procedures will continue to detect any deviation from the plans, so that those deviations could be promptly addressed.