EUROPEAN MIDDLEWARE INITIATIVE

DSA1.4.2 - 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. This is an update of DSA1.4.1 (M12)

I. DELIVERY SLIP

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II. DOCUMENT LOG

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IV. DOCUMENT AMENDMENT PROCEDURE

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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.

V. GLOSSARY

Acronym	Long Name

The complete EMI glossary is available at https://twiki.cern.ch/twiki/bin/view/EMI/EmiGlossary .

VI. COPYRIGHT NOTICE

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1. INTRODUCTION

1.1. EXECUTIVE SUMMARY

This document presents the work done during the second year of the project in terms of

- Releasing EMI 1 Kebnekaise updates providing bug fixes and new features as requested by the EMI users, following the processes defined in DSA1.1, DSA1.2 and SQAP

- Coordinating the preparation of the EMI 2 Matterhorn release

- Maintaining the pre-EMI software developed by ARC, gLite, dCache and UNICORE and installed in production environment

- Supporting the users, either system administrators or members of scientific communities, using software developed in the EMI context

All the above activities followed plans prepared early in the project and described in two deliverables (DSA1.1 Software Maintenance and Support Plan and DSA1.2 Software Release Plan). DSA1.1 has undergone radical changes to better present the maintenance and support processes after the comments and request for resubmission received at the first year EC project review.

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.

During the second year the maintenance task focused on addressing Request for Changes (RfC) submitted against the EMI software, either released through the EMI distribution or with former, pre-EMI releases. 1383 RfCs were opened targeting EMI products in the reporting period.

In the same period, 1305 RfCs were closed by the EMI PTs, fixing defects found in the software or introducing minor features as requested by user communities. The current statistics do not include the large number of RfCs that will be closed as result of the EMI2 release, which are not yet available at the time of this writing.

Significant effort was put in porting the complete EMI software portfolio to Scientific Linux 6. The porting was completed in time for the EMI 2 release.
The Debian 6 porting activity was also started but wasn't completed for all products in time for the EMI 2 Matterhorn release. The main reasons for this are the lack of expertise of most PTs with this platform and the lack of prioritization of this activity when compared to other development, maintenance and support activities. The late integration of Debian 6 support in the ETICS build system, a task that showed to be more complex than anticipated, concurred in delaying the Debian 6 porting activity.

The Release Management task focused on two main parallel activities: the release of EMI 1 Kebnekaise updates and the coordination of the preparation of the EMI 2 Matterhorn release.
15 EMI 1 Kebnekaise updates were released, providing bug fixes for problems found in production and new features as requested. EMI components have been provisioned to the EGI-UMD, to upstream repositories like EPEL and directly to sites. The adoption of the quality process defined by the SA2 WP has led to a constant improvement in the quality of the releases, as acknowledged by EMI and EGI quality control results. Currently all EMI components are part of the EGI-UMD distribution with the exceptions of AMGA and Oracle-based flavors of VOMS, FTS, DPM and LFC.

In parallel with the updates releases, the Release Management task has coordinated the preparation of the second EMI major release, planned for release at the end of the second year of the project. The release, codenamed Matterhorn, was officially announced on 21st May 2012, completed with

repositories of digitally signed packages (binary and source), documentation and release notes.

The release of EMI 2 was the culmination of a year of work started with the Matterhorn release schedule definition at the EMI All Hands Meeting in Lund. Through a process centered around four code freeze and related release candidates it was possible to achieve increasing levels of quality in an iterative fashion and accumulate only a slight delay over the initial foreseen release date while supporting, for the first time, more than one platform.

Support to users was successfully provided during the second year in compliance with the SLA signed with EGI. 626 incidents were opened during this period against EMI Support Units (SUs). In the same period, 586 incidents were closed, with an average solution time of 94 days for less urgent, 70 days for urgent, 63 days for very urgent and 16 days for top priority.

An internal monitoring tool (emi-ggus-mon) was developed to measure the support performance and check compliance with the response times defined in the SLA with EGI. The tool is used to produce a weekly support performance report highlighting SLA compliance and critical tickets. The development of the tool was necessary as GGUS did not provide support for monitoring the SLA, in violation with the agreement signed in the SLA.
A session has been added in the EMT weekly meeting to discuss problematic incidents and coordinate the support activities. This approach has proved to being successful in ensuring compliance with the SLA signed with EGI. As described in the DNA1.2.3 deliverable, no significant violations of the SLA has been observed in year two.

The discussion and collaboration with EGI has been continuous and has lead to agreed improvements in the support procedures. In particular, an agreement was reached at the 10th EGI TCB meeting to comply with an ETA of 45 days for tickets of priority very urgent. The very urgent priority should be used for tickets caused by defects in the software that have significant impact on the production and for which no acceptable workaround is found.

1.2. PURPOSE AND SCOPE

This document reports on the state of implementation, at the end of the second year of the project, of the Software Maintenance and User Support plans as described in DSA1.1 and of the Release Management plan described in DSA1.2.

1.3. DOCUMENT ORGANIZATION

Besides this Introduction, the Executive Summary and the final Conclusions, the document includes the following sections

- Section 2, Software maintenance, which introduces briefly the EMI maintenance process and discuss in detail the work done in year two related to corrective, perfective and adaptive maintenance of EMI software;
- Section 3, Release management, which introduces the EMI release process and describes the main release management activities performed in year two;
- Section 4, User support, which discusses the EMI user support process and the support performance in year two;
- Section 5, Deviation and issues, which analyzes the main problems found in the above activities in year two.

2. 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.

2.1. SOFTWARE MAINTENANCE PLAN

The Software Maintenance Plan is described in detail in 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 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. This information is used to drive the maintenance process and to monitor its performance.

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 assessed 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.

2.2. STATUS OF THE IMPLEMENTATION

After the successful and timely release of EMI 1 Kebnekaise, the maintenance activities were extended to EMI released products and implemented according to the EMI process for handling change management, certification and testing.

The maintenance of pre-EMI-1 software products deployed on the various production infrastructures has also been guaranteed. Several updates have been released by all the middleware stacks involved in the project, both to fix defects and to introduce improvements according to the needs of the users.

Statistics collected from the EMI RfC dashboard provided by SA2 show that the maintenance work in year two increased considerably with respect to year one (1305 problems closed in year two vs. 509 in year one).

Number of solved problems
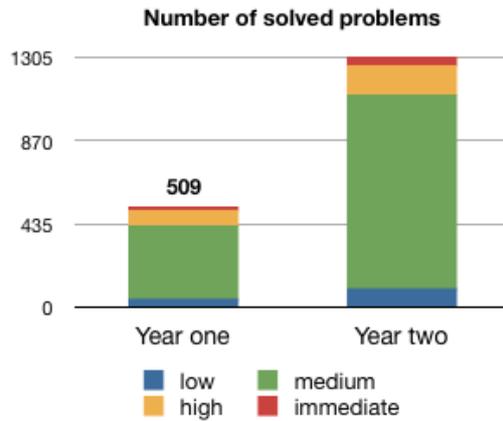
Figure 1 Number of solved problems: Year one vs Year two

In particular, during the second year 1383 RfCs targeted at EMI components have been submitted: 269 low priority, 975 medium priority, 110 high priority and 29 immediate priority. In the same period 1305 RfCs have been closed[1], 88 low priority, 1017 medium priority, 155 high priority and 45 immediate priority. The average time to solution for the tickets in the second year is 140 days for low priority, 120 days for medium priority, 126 days for high priority and 117 days for immediate priority.

Number of solved problems   **Average time to solution**
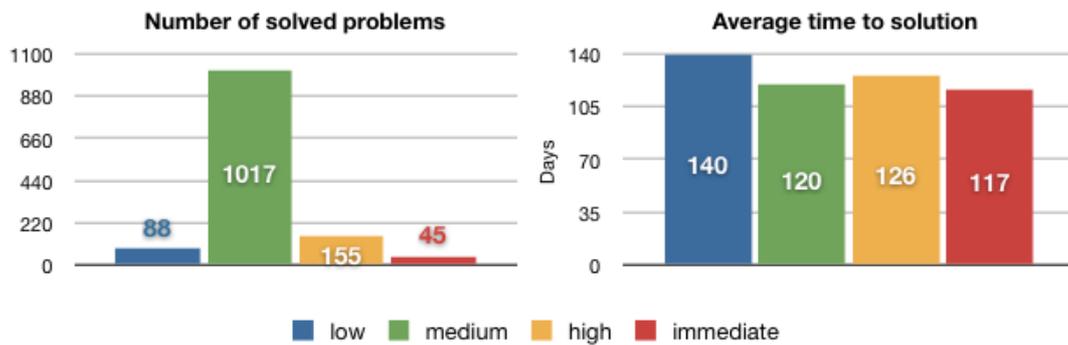
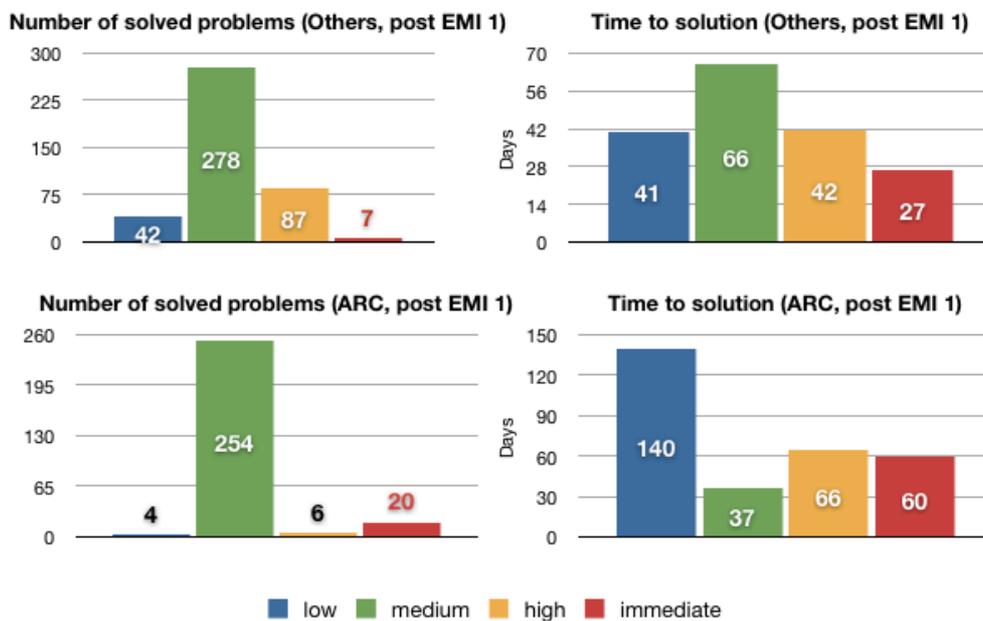Figure 2 Number of solved problems and average time to solution in Year two

Figure 2 shows that priority does not seem to affect the average time to solution. There are two explanations for this: first, 46% of the RfCs closed in in year were submitted before the EMI maintenance process was in place. At that time priority didn't have the same meaning and each middleware followed its own maintenance process. Second, the adoption of the EMI maintenance process and procedures by the PTs is still ongoing. The mapping between the internal PT tracker priority and the EMI priority is not always consistent with the process rules. For example, statistics show that ARC medium priority RfCs are solved, on average, quicker that immediate priority RfCs.

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[1] These statistics do not include information about RfCs fixed with the EMI2 release, which are not yet available at the time of this writing.
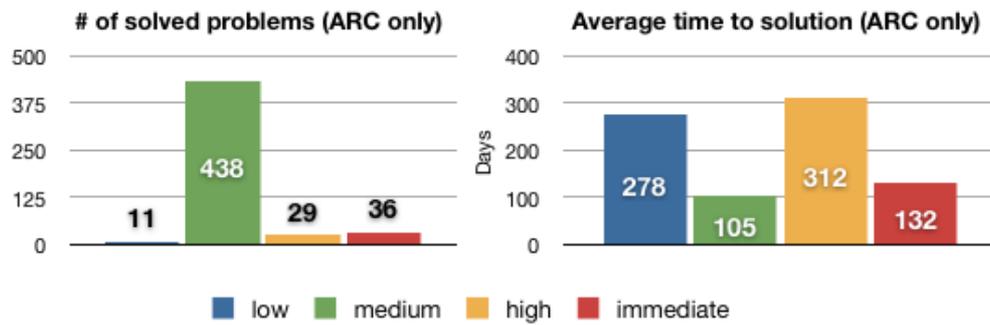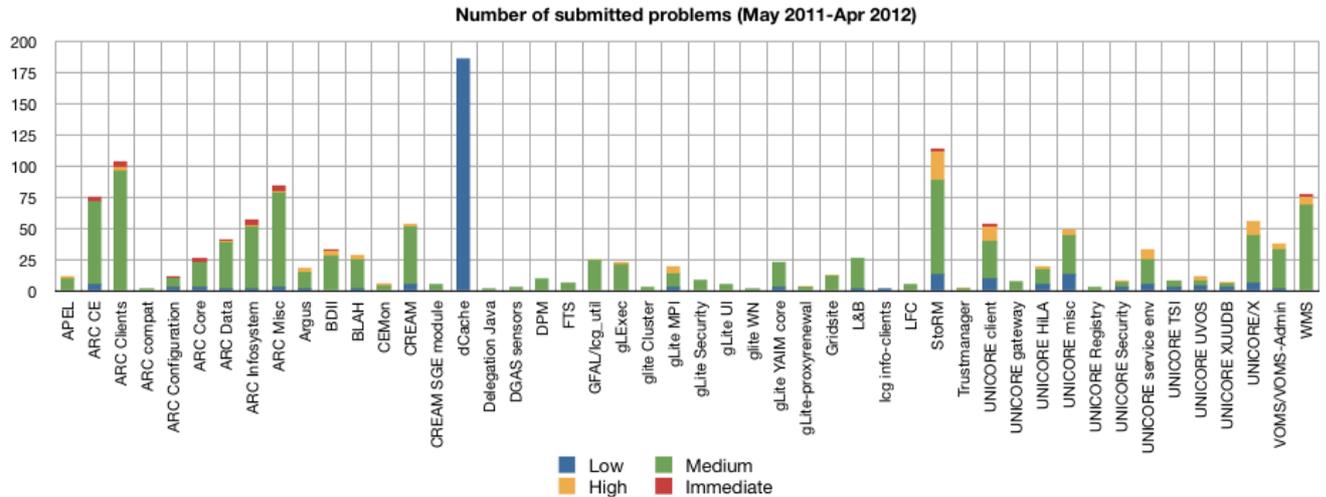
Figure 3 Number of solved problems and average time to solution (ARC only)

The statistics collected for RfCs submitted after the EMI 1 release show that the EMI maintenance process prioritization starts to influence the average solution time, especially for non-ARC products.
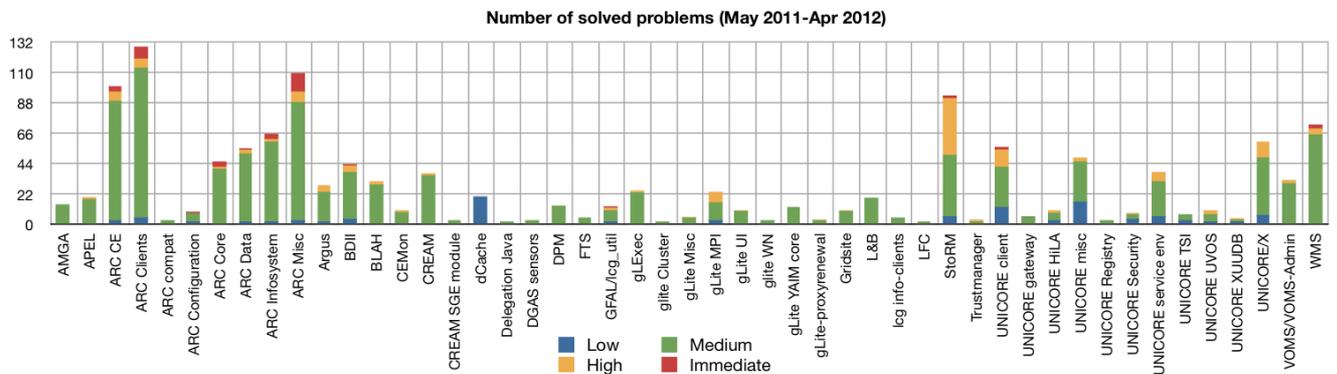

Figure 4 Number of solved problems and average time to solution (Post EMI 1)

Figure 5 and Figure 6 show the distribution of submitted and closed problems in year two against EMI products per priority.

Number of submitted problems (May 2011-Apr 2012)

Figure 5 Number of submitted problems in year two per product

Number of solved problems (May 2011-Apr 2012)

Figure 6 Number of solved problems in year two per product

The results of the maintenance activity was reflected in 15 EMI 1 updates and several pre-EMI update releases. In particular, SA1 coordinated the maintenance and release of security updates for all EMI components in close collaboration with the EGI Software Vulnerability Group.

For more details on each individual update contents, please refer to EMI quarterly reports, to the EMI 1 updates page, or to individual pre-EMI middleware release pages (ARC, dCache, gLite, UNICORE)

Besides corrective maintenance, significant effort was put in porting the complete EMI software portfolio to Scientific Linux 6. The porting was completed in time for the EMI 2 release, with a few exceptions (gLite WMS, Hydra). The porting for these components is going to be released via EMI 2 updates.

The Debian 6 porting activity was also started but was completed only for a limited number of products in time for the EMI 2 Matterhorn release (ARC, UNICORE, CANL, Gridsite). The main reasons for this are the lack of expertise of most PTs with this platform and the lack of prioritization of this activity when compared to other development, maintenance and support activities. The late integration of Debian 6 support in the ETICS build system, a task that showed to be more complex than anticipated, concurred in delaying the Debian 6 porting activity.

3. RELEASE MANAGEMENT

The Release management task is responsible for:

- Coordination of product updates preparation, certification and release through the EMI release tracker

- Maintenance of the EMI testing, deployment and production repositories

- Preparation of the EMI 1 updates public pages (in collaboration with NA2)

- Provisioning of EMI updates to EGI/UMD, contributing to several UMD updates according to the EGI software provisioning procedure

- Coordination of the EMI Beta and Acceptance Testing activities, to provide early access to EMI software to interested parties.

- Management of the ETICS continuous build infrastructure for EMI 1 and EMI 2 releases, focusing on configuration management, troubleshooting and support to Product Teams

3.1. 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.

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 (e.g., EGI).

3.2. STATUS OF THE IMPLEMENTATION

During year two, the Release Management task focused on two main parallel activities: the release of EMI 1 Kebnekaise updates and the coordination of the preparation of the EMI 2 Matterhorn release.

15 EMI 1 Kebnekaise updates were released, providing bug fixes for problems found in production and new features as requested. EMI components have been provisioned to the EGI-UMD, to upstream repositories like EPEL and directly to sites. The adoption of the quality process defined by the SA2 WP has led to a constant improvement in the quality of the releases, as acknowledged by EMI and EGI quality control results. Currently all EMI components are part of the EGI-UMD distribution with the exceptions of AMGA and Oracle-based flavors of VOMS, FTS, DPM and LFC.

In parallel with the updates releases, the Release Management task has coordinated the preparation of the second EMI major release, planned for release at the end of the second year of the project. The release, codenamed Matterhorn, was officially announced on 21st May 2012, completed with repositories of digitally signed packages (binary and source), documentation and release notes.

The release of EMI 2 was the culmination of a year of work started with the Matterhorn release schedule definition at the EMI All Hands Meeting in Lund. Through a process centered around four code freeze and related release candidates it was possible to achieve increasing levels of quality in an iterative fashion and accumulate only a slight delay over the initial foreseen release date while supporting, for the first time, more than one platform.

The table below highlights release candidate deadlines and shows that only slight delays were accumulated on the schedule defined in Lund.

Tabella 1 EMI 2 Release Candidates

RC	RC content	ETA	Real Time of Arrival	Build status
RC1	All EMI2 developments done Successfull builds (all platforms)	Dec, 14th 2011	Jan, 14th, 2012	SL5/x86_64 - 80% SL6/X86_64 - 60%
RC2	In-house deployment reports	Feb, 1st 2012	Feb, 10th, 2012	SL5/x86_64 - 90% SL6/X86_64 - 62%
RC3	Testbed deployment reports Initial testing reports	Feb, 29th 2012	March, 11th, 2012	SL5/x86_64 - 97% SL6/X86_64 - 93%
RC4	Full test reports Full deployment on EMI testbed Locked configurations	March, 28th 2012	April, 15th, 2012	SL5/x86_64 - 98% SL6/X86_64 - 95%
Final	Signed packages in the EMI repository Release announcement	April, 26th 2012	May, 21st, 2012	

Summarizing, during the second year, 181 component releases have been released in production by SA1. The release classification is presented in Figure 7.

Number of component releases (May 2011-Apr 2012)
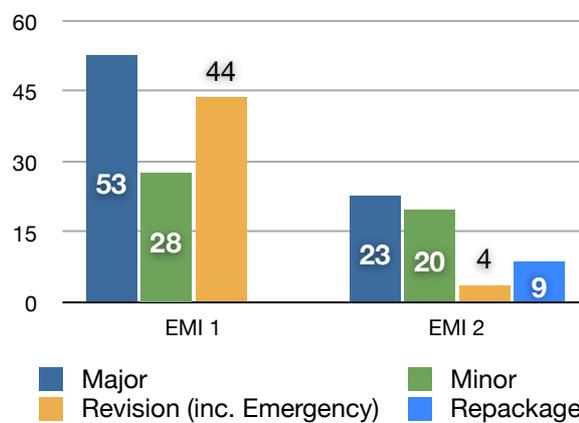
Figure 7 Number of component releases in year two

4. USER SUPPORT

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 are currently provided in compliance with the SLA signed with EGI.

4.1. USER SUPPORT PLAN

The User Support Plan is described in detail in 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. Third-level expert support is provided 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.

4.2. STATUS OF THE IMPLEMENTATION

Support to users was successfully provided during the second year in compliance with the SLA signed with EGI.

626 incidents were opened during this period against EMI Support Units (SUs), 419 less urgent, 143 urgent, 48 very urgent and 16 top priority. In the same period, 586 incidents were closed, with an average solution time of 94 days for less urgent, 70 days for urgent, 63 days for very urgent and 16 days for top priority.

An internal monitoring tool (emi-ggus-mon) was developed to measure the support performance and check compliance with the response times defined in the SLA with EGI. The tool is used to produce a weekly support performance report highlighting SLA compliance and critical tickets. The development of the tool was necessary as GGUS did not provide support for monitoring the SLA. A session has been added in the EMT weekly meeting to discuss problematic incidents and coordinate the support activities. This approach has proved to being successful in ensuring compliance with the SLA signed with EGI. As described in DNA1.2.3 very few violations of the SLA has been observed in year two. The analysis covers the period May, 1st 2011- Apr, 1st 2012. During such period 531 support requests were escalated to the third level, and 13 violations of the SLA have been reported by EGI, covering less than 3% of the escalated support requests and with limited accumulated delays. The violations are described in Table 1. A more detailed analysis is given in DNA1.2.3.

	# Violations	Average deviation	Service Level
Top priority	2	22h 43m	4h
Very urgent	0	0h 0m	2d
Urgent	4	1d 9h 21m	5d
Less Urgent	7	8d 21h 21m	15d

Table 1 SLA violations reported by EGI in year two

SLA violation warnings were introduced in GGUS in February 2012. Email notifications are sent to EMI SUs when a ticket belonging to them is about to enter the SLA violation period. It's still not possible to produce detailed reports of EMI SUs performance. The GGUS team is working on a new report generator that takes into account SLA monitoring, which should be available by the end of 2012.

The discussion and collaboration with EGI has been continuous and has lead to agreed improvements in the support procedures. In particular, an agreement was reached at the 10th EGI TCB meeting to comply with an ETA of 45 days for tickets of priority very urgent. The very urgent priority should be used for tickets caused by defects in the software that have significant impact on the production and for which no acceptable workaround is found.

As of May 2, 2012 there are in total 226 open tickets assigned to EMI support units. 171 of those tickets are of priority less urgent, 47 urgent, 7 very urgent, and 1 of top priority. 3 tickets are still in status "assigned", 77 in "in progress", 130 in "on hold", 5 in "reopened", and 11 "waiting for reply". We expect that a large fraction of the 130 tickets "on hold" will be closed after EMI 2 Matterhorn release, leaving a small backlog of problems pending on EMI SUs.

5. DEVIATION AND ISSUES

The major deviation from the foreseen schedule was observed on the Debian porting. The main reasons for delays in this task are the lack of expertise of most PTs with this platform and the lack of prioritization of this activity when compared to other development, maintenance and support activities. The late integration of Debian 6 support in the ETICS build system, a task that showed to be more complex than anticipated, concurred in delaying the Debian 6 porting activity.

All the other WP activities are under control and proceeding as expected.

6. PLANS FOR YEAR THREE

In year 3, SA1 will focus on maintaining the middleware components deployed in the production infrastructure.

In particular, SA1 will provide the continuous delivery of EMI 1 and EMI 2 updates to address problems found in EMI components in production or during the internal development and certification cycles. As described in the EMI support calendar, standard updates for EMI 1 Kebnekaise will be provided until the end of October 2012, while security updates will be provided until the end of the project in parallel with EMI 2 Matterhorn updates.

SA1 will work actively towards the full compliance of the software stack with the EMI packaging policy, so that that all EMI software can build from source without relying on the ETICS packager and that compliance with the Debian and Fedora packaging guidelines is achieved where possible[2] in time for EMI 3 Monte Bianco.

The Debian 6 porting activity will be pursued, aiming at porting all the EMI clients to Debian 6 by October 2012. The ported components will be released as EMI 2 updates.

SA1 will also work to increase the presence of EMI Java APIs in the Maven central repository. Guidelines for publishing packages on Maven central have been defined and PTs have been advised to work towards this objective. The progress on this activity will be closely monitored during weekly EMT meetings.

Besides maintenance-related activities, SA1 will coordinate the preparation of the final EMI release, Monte Bianco. A draft roadmap for the EMI 3 has been defined and presented at the EMI all hands meeting in Hamburg. The experience with EMI Kebnekaise and Matterhorn releases suggested that some changes are introduced in the release schedule. For Monte Bianco components will be split in two groups: low level (e.g., APIs that many other components depend upon) and high-level components (e.g., services), with different code-freeze dates. This approach will allow higher-level services to better adapt to changes introduced in lower-level components and will make integration testing and deployment of EMI software components on the testbed more manageable.

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[2] Full compliance for Java services like Argus, VOMS-Admin and UNICORE will be impossible to achieve, as Fedora and Debian packaging guidelines prevent the possibility of packaging dependencies as JAR archives inside the packages at build time, even if such dependencies are not available in upstream repositories (Fedora, Debian or EPEL).

7. CONCLUSIONS

During the second year of the project, SA1 focused on the following tasks:

- Releasing EMI 1 Kebnekaise updates providing bug fixes and new features as requested by the EMI users and following the processes defined in DSA1.1, DSA1.2 and SQAP

- Coordinating the preparation of the EMI 2 Matterhorn release

- Maintaining the pre-EMI software developed by ARC, gLite, dCache and UNICORE and installed in production environment

- Supporting the users, either system administrators or members of scientific communities, using software developed in the EMI context

The maintenance activities performed as expected throughout the year, providing bug fixes for more than 1300 request for changes targeting problems in the software.

The release task has successfully coordinated the release of 15 EMI 1 updates and the preparation of the EMI 2 Matterhorn announced on May 21st with only a slight delay over the initial plans.

Support has been efficiently provided to users in compliance with the SLA signed with EGI.

In year 3, SA1 will continue focusing on adaptive and corrective maintenance for the middleware components deployed in the production infrastructure. EMI 1 and EMI 2 updates will be released as the need arise in compliance with the EMI support calendar.

The Debian 6 porting activity, already completed for some components with the EMI 2 release, will be pursued so that all clients are ported by October 2012.

SA1 will also coordinate the preparation of the last EMI release, Monte Bianco, scheduled for release on February, 28th 2013, for which a draft roadmap has already been defined and presented at the EMI all hands meeting in Hamburg.