

# EUROPEAN MIDDLEWARE INITIATIVE

## SOFTWARE MAINTENANCE QUALITY CONTROL REPORT

### EU DELIVERABLE: D3.3.2

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Document identifier:	<b>EMI-D3.3.2- Software_Maintenance_Quality_Control_Report- TOC_v0.1.odt</b>
Date:	<b>28/01/2011</b>
Activity:	<b>SA1.4</b>
Lead Partner:	<b>CINECA</b>
Document status:	<b>TOC</b>
Document link:	

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**Abstract:**

This document describes the status and performance of the quality control task which details with the availability and execution of regression tests for the supported EMI components, test unit availability and coverage and various static and dynamic metrics on released components.

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### Document Log

Issue	Date	Comment	Author / Partner
1	28/01/2011	Table of contents	Giuseppe Fiameni/CINECA

### Document Change Record

Issue	Item	Reason for Change
1		
2		
3		

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## 1. INTRODUCTION

### 1.1. PURPOSE

Quality Control (QC) verifies the application of Quality Assurance (QA) processes and procedures and, through the execution of periodic reviews, reports and measures the status and the performance of the SA1 work. This document report the results of the Quality Control activity performed at PM6. It includes an aggregated view of quality check results and performance measurements, and highlights which changes might be considered to correct anomaly or nonconformity discovered during the control process. The list of change requests is submitted to the QA team that, on the base of project's priorities, determines which of them it is necessary to apply and which not.

### 1.2. DOCUMENT ORGANIZATION

The document is organized as follows:

- Chapter 1 and 2 are the Introduction and the Executive Summary respectively;
- Chapter 3 presents the organization of the Quality Control activity and how it interacts with other entities, such as the Quality Assurance;
- Chapter 4 reports the results of the Quality Review scheduled for PM10;
- Chapter 5 reports the status of the EMI-1 bundle and how PTs are approaching the release deadline (**NEW**);
- Chapter 6 presents the status of the security assessment activity (**NEW**);
- Chapter 7 describes the status of the Regression Tests;
- Chapter 8 is the conclusions of the work.

### 1.3. REFERENCES

<b>R1</b>	<b>Quality Assurance Plan</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA21">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA21</a>
<b>R2</b>	<b>Quality Assurance Metrics</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/TSA23">https://twiki.cern.ch/twiki/bin/view/EMI/TSA23</a>
<b>R3</b>	<b>Quality Assurance Wiki Page</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/SQAP">https://twiki.cern.ch/twiki/bin/view/EMI/SQAP</a>
<b>R4</b>	<b>Software Release Schedule</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/TSA13#EMI_0">https://twiki.cern.ch/twiki/bin/view/EMI/TSA13#EMI_0</a>
<b>R5</b>	<b>Software Release Plan</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA12">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA12</a>
<b>R6</b>	<b>Software Maintenance and Support Plan</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA11">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA11</a>
<b>R7</b>	<b>Technical Development Plan</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA131">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA131</a>
<b>R8</b>	<b>Release Management Wiki Page</b> , <a href="https://twiki.cern.ch/twiki/bin/view/EMI/TSA13">https://twiki.cern.ch/twiki/bin/view/EMI/TSA13</a>

<b>R9</b>	<b>Configuration and Integration guidelines,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2ConfigurationIntegrationGuidelines">https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2ConfigurationIntegrationGuidelines</a></i>
<b>R10</b>	<b>Certification and testing guidelines,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2CertTestGuidelines">https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2CertTestGuidelines</a></i>
<b>R11</b>	<b>Change management guidelines,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2ChangeManagementGuidelines">https://twiki.cern.ch/twiki/bin/view/EMI/EmiSa2ChangeManagementGuidelines</a></i>
<b>R12</b>	<b>DSA2.2.1 - QA Tools Documentation,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA221">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDSA221</a></i>
<b>R13</b>	<b>Software Verification and Validation Template,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SoftwareVerAndValTemplate">https://twiki.cern.ch/twiki/bin/view/EMI/SoftwareVerAndValTemplate</a></i>
<b>R14</b>	<b>Quality Control Report PM6,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SA1QC6">https://twiki.cern.ch/twiki/bin/view/EMI/SA1QC6</a></i>
<b>R15</b>	<b>Software Quality Assurance Plan Documentation,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SQAP#SQAP_Documentation">https://twiki.cern.ch/twiki/bin/view/EMI/SQAP#SQAP_Documentation</a></i>
<b>R16</b>	<b>Firs Principles Vulnerability Assessment,</b> <i><a href="http://www.cs.wisc.edu/mist/VA.pdf">http://www.cs.wisc.edu/mist/VA.pdf</a></i>
<b>R17</b>	<b>Review of the Software Release Plan,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSRP">https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSRP</a></i>
<b>R18</b>	<b>Review of the Software Release Schedule,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSRS">https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSRS</a></i>
<b>R19</b>	<b>Review of the Software Maintenance and Support Plan,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSMSP">https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSMSP</a></i>
<b>R20</b>	<b>Review of the Security Assessments,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSA">https://twiki.cern.ch/twiki/bin/view/EMI/SA1QCRSA</a></i>
<b>R21</b>	<b>Consejo Superior de Investigaciones Cientificas,</b> <i><a href="http://www.csic.es">http://www.csic.es</a></i>
<b>R22</b>	<b>First principles vulnerability assessment,</b> <i>Proceedings of the 2010 ACM workshop on Cloud computing security workshop, James A. Kupsch, Barton P. Miller, Elisa Heymann, Eduardo César</i>
<b>R23</b>	<b>SA1 Quality Control Wiki Page,</b> <i><a href="https://twiki.cern.ch/twiki/bin/view/EMI/TSA14">https://twiki.cern.ch/twiki/bin/view/EMI/TSA14</a></i>

#### 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

<b>ABI</b>	Application Binary Interface
<b>ACR</b>	Approved Change Request
<b>API</b>	Application Programming Interface
<b>CDS</b>	CERN Document Server
<b>CG</b>	Change Request
<b>CSIC</b>	Consejo Superior de Investigaciones Cientificas
<b>DCI</b>	Distributed Computing Infrastructure
<b>DMSU</b>	Deployed Middleware Support Unit
<b>EGI</b>	European Grid Infrastructure
<b>EMT</b>	Engineering Management Team
<b>ETICS</b>	eInfrastructure for Testing, Integration and Configuration of Software
<b>FPVA</b>	First Principles Vulnerability Assessment
<b>GGUS</b>	Global Grid User Support
<b>ITIL</b>	IT Infrastructure Library
<b>KPI</b>	Key Performance Indicator
<b>kSLOC</b>	Kilo Source Lines Of Code
<b>MCB</b>	Middleware Coordination Board
<b>NGI</b>	National Grid Initiative
<b>PEB</b>	Project Executive Board
<b>PTB</b>	Project Technical Board
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>RfC</b>	Request for Change
<b>SLA</b>	Service Level Agreement
<b>SQAP</b>	Software Quality Assurance Plan
<b>SQC</b>	Software Quality Control



EUROPEAN MIDDLEWARE INITIATIVE

## SOFTWARE MAINTENANCE QUALITY CONTROL REPORT

Identifier: EMI-D3.3.2-Software\_Maintenance\_Quality\_Control\_Report-TOC\_v0.1.odt

Date: 28/01/2011

<b>SU</b>	Support Unit
<b>VC</b>	Validated Change



## 2. EXECUTIVE SUMMARY

Performing Quality Control is an activity specifically concerned with the monitoring of work results to see whether they comply with quality standards set out in the SQAP (Software Quality Assurance Plan) defined in SA2 [R1]. Operating throughout the project, its aim is to identify unacceptable or non-conformable results and to inform the QA (Quality Assurance) about their existence so that corrective actions can be undertaken to eliminate, or mitigate, negative impacts on project's outcomes. All EMI components need to satisfy well-defined quality standards before being included in a stable EMI distribution. The adoption of quality standards must be sufficient to guarantee, to a high degree of confidence, that all EMI products (software components, documentation, etcetera) meet the requirements, in term of quality parameters, set by EMI stakeholders.

...

### 3. THE ORGANIZATION OF THE QUALITY CONTROL

The diagram below (Figure 1) describes how the QC and the QA activities interact and how the information flows across them.

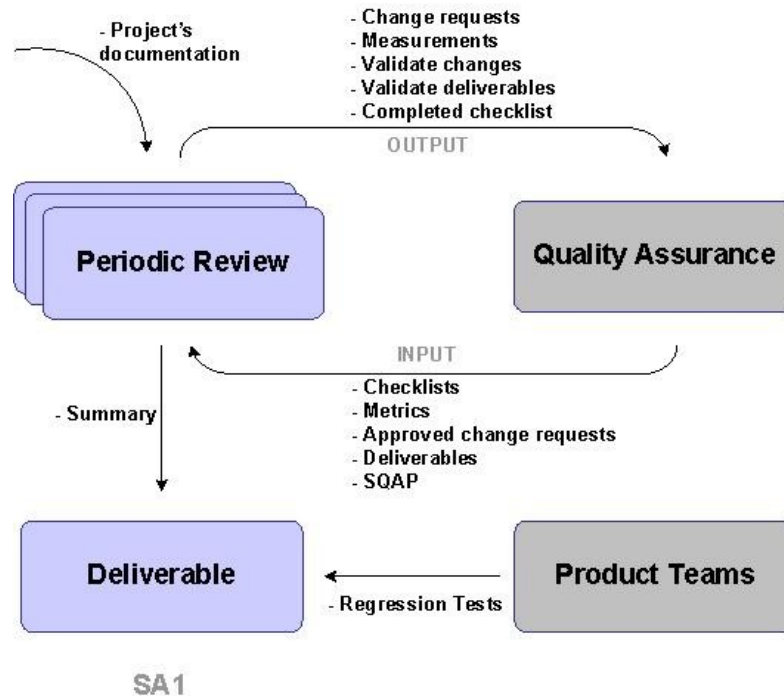


Figure 1: Quality Control Information flow

#### 3.1. INPUTS

This section presents the list of information pieces that the QC receives as input and that are indispensable to perform quality reviews.

##### Quality Assurance Plan

The SQAP specifies the procedures, the metrics and the manner according which the EMI project achieves its quality goals in terms of software development.

##### Quality Checklists

A check-list is a structured tool used to verify whether the required steps in a process have been met. As each step is completed, it is checked off the list. In accordance to the SQAP, the input checklists for the QC in SA1 are:

- Review of the Software Release Plan
- Review the Software Release Schedule
- Review the Software Maintenance and Support Plan

- Security Assessments

## Quality Metrics

A quality metric is an operational definition that describes, in very specific terms, a project or product attribute and how the QC process will measure it.

The metrics defined for the QC in SA1 are:

- Review of the Software Release Plan
  - *No metric defined for this review*
- Review the Software Release Schedule
  - *Delay on the release schedule (ID: DELAYONTHERELEASE)*
- Review the Software Maintenance and Support Plan
  - *Total user incidents per user month (ID: TOTALUSERINCIDENTS)*
  - *Training and support incident per user month. (ID: TRAININGSUPPORTINCIDENTS)*
  - *Average time to deal with an incident at the 3rd level of user support (ID: AVERAGETIMEFORUSERINCIDENTS)*
- Security Assessments
  - *No metric defined for this review*

## Approved Change Requests

An ACR (Approved Change Request) is a change request submitted by the QC during a previous review that, after having positively reviewed by the QA, has been granted to be applied. The list of ACRs is provided as input to the quality review in order to verify that their implementation is correct and satisfies the quality standards. Approved change requests can include modifications to the work methods or to the schedule and come as a result of the change management process led by the QA in collaboration with the PEB.

Since this document refers to the first quality review performed within the SA1, there are no previous approved change requests that require to be verified.

## Deliverables

This is the list of deliverables (i.e. documents, products) that the QC verifies

## 3.2. OUTPUTS

This section presents the list of the information pieces that the QC returns to the QA for further elaboration.

## Change Requests

Change requests are recommended corrective or preventive actions for preventing future defects in procedures or products.

## Measurements

Measurements are the documented results of the elaboration of associated quality metrics.

## Validated Changes

Validated changes refer to approved change requests that have been validated with success because their implementation satisfies quality standards. Any changed or repaired procedures or products are once again verified and could be either accepted or rejected before being considered definitive.

## Validated Deliverable

Validated deliverables are deliverables, among those received in input from the QA, that have successfully passed the Quality Control review. By the term deliverable is meant any verifiable product or service that is produced within the project.

## Completed Checklists

Completed checklists are output of the QC activity and become part of the project's documentation.

## 4. QUALITY CONTROL REVIEW – PM10

### 4.1. REVIEW OF THE SOFTWARE RELEASE PLAN

#### 4.1.1 Input

##### Checklists

- *Checklist for the Review of the Software Release Plan [R17].*

##### Metrics

- *No metrics defined for this review.*

##### Approved Change Requests

- *No previous approved changes defined for this review.*

##### Deliverables

- *Software Release Plan [R5].*

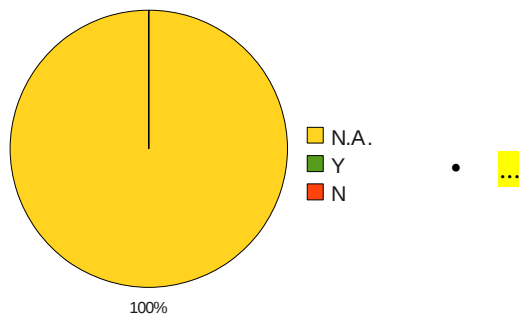
#### 4.1.2 Output

##### Completed Checklist

Check Number	Question	Response
1	Does the list of supported platforms correspond to the actual set of platforms on which software components are released?	
	<i>see Software Release Plan [R5]</i>	
2	Is the installation of external dependencies well documented?	
	<i>see Software Release Plan [R5]</i>	
3	Are instructions to build the software up to date?	
	<i>see Software Release Plan [R5]</i>	
4	Is the list of supported delivery software formats up to date (source and binary packages, tarball, package lists, etc)?	
	<i>see Software Release Plan [R5]</i>	
5	Is the description of the process on how to handle changes up to date?	
	<i>see Software Release Plan [R5]</i>	
6	Are the communication channels published with updated information?	
	<i>see Software Release Plan [R5]</i>	

7	Is the process on how to deliver software to the Production Infrastructures up to date and it's aligned to what the Production Infrastructures are expecting?	
	<i>see Software Release Plan [R5]</i>	

**Table 1: Review of the Software Release Plan (N.A. = Not Available)**



### Measurements

There are no measurements defined for this review.

### Comments

The table below (Table 2) reports specific comments for the checks that have returned a non-satisfactory response (i.e. N.A. or N). It strongly recommended to take all the comments in account and to take corrective actions in response to the change requests defined for this review.

Check Number	Comments
1	Does the list of supported platforms correspond to the actual set of platforms on which software components are released?
2	Is the installation of external dependencies well documented?
3	Are instructions to build the software up to date?
4	Is the list of supported delivery software formats up to date (source and binary packages, tarball, package lists, etc)?
5	Is the description of the process on how to handle changes up to date?

6	Are the communication channels published with updated information?
7	Is the process on how to deliver software to the Production Infrastructures up to date and it's aligned to what the Production Infrastructures are expecting?

**Table 2: Review of the Software Release Plan – Comments**

**Validated Changes**

...

**Validated Deliverables**

Name of the deliverable under evaluation	Validated	
	YES	NO
Software Release Plan		

The Software Release Plan cannot be validated since the document is not available.

**Variations from previous report**

...

**Change Requests**

**4.2. REVIEW THE SOFTWARE RELEASE SCHEDULE**

The *Review of the Software Release Schedule* [R18] checks that the priorities of the project are taken into account and reflected in the scheduled releases.

The *Software Release Schedule* [R14] is a document requested by the SQAP. At the time of writing, it has not been released yet. Due to its unavailability all the checks have failed causing the rise of a nonconformity problem.

**4.2.1 Input**

**Checklists**

- *Checklist for the Review of the Software Release Schedule [R18].*

**Metrics**

- *Delay on the release schedule (ID: DELAYONTHERELEASE).*

### Approved Change Requests

- *No previous approved changes defined for this review.*

### Deliverables

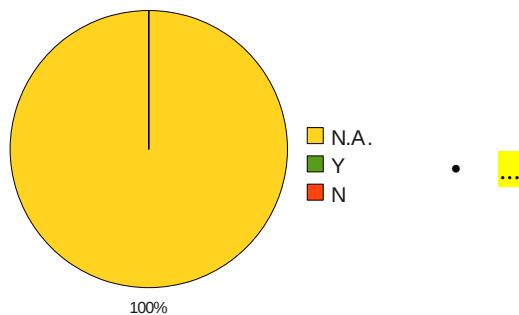
- *Software Release Schedule [R14].*

## 4.2.2 Output

### Completed Checklist

Check Number	Question	Response
1	<i>Has the previous schedule been kept?</i>	
	<i>see Software Release Schedule [R1]</i>	
2	<i>Does the new schedule take into account what wasn't accomplished in the previous schedule?</i>	
	<i>see Software Release Schedule [R1]</i>	
3	<i>Is the new schedule aligned to the Software Development Plan and the priorities of the project?</i>	
	<i>see Software Release Schedule [R1]</i>	

**Table 3: Review the Software Release Schedule**



### Measurements

In the following, the metrics list defined for this review is reported.

<b>ID</b>	DELAYONTHERELEASE
<b>Name</b>	Delay on the release schedule
<b>Description</b>	This metric could be provided as a histogram showing the delay time (in days) for each release, weighted using the release time
<b>Unit</b>	(release delay)/(release time) * 100



<b>Measurement</b>	...
<b>Thresholds/target value</b>	Ideally the release deadlines should be always met, leading to 0 delays for each release. Proper thresholds have to be defined. The trend of the delays over time could provide useful hints for process optimization.
<b>Comment</b>	...

**Table 4: Delay on the release schedule – Metric**

### Comments

The table below reports specific comments on the check results.

Check Number	Comments
1	<i>Has the previous schedule been kept?</i>
2	<i>Does the new schedule take into account what wasn't accomplished in the previous schedule?</i>
3	<i>Is the new schedule aligned to the Software Development Plan and the priorities of the project?</i>

**Table 5: Review the Software Release Schedule - Comment**

### Validated Changes

...

### Validated Deliverables

Name of the deliverable under evaluation	Validated	
	YES	NO
Software Release Schedule		

The Software Release Schedule cannot be validated since the document is not available.

### Variations from previous review

There are no variations to report from the previous review.

### Change Requests

...

### 4.3. REVIEW THE SOFTWARE MAINTENANCE AND SUPPORT PLAN

The Review of the Software Maintenance and Support Plan [R18] checks that the plan is up to date and describes the actual maintenance and support processes and that the SLAs are respected.

The Software Maintenance and Support Plan has been released and is accessible at [R5].

#### 4.3.1 Input

##### Checklists

- *Checklist for the Review the Software Maintenance and Support Plan [R18].*

##### Metrics

- *Total user incidents per user month (ID: TOTALUSERINCIDENTS)*
- *Training and support incident per user month. (ID: TRAININGSUPPORTINCIDENTS)*
- *Average time to deal with an incident at the 3rd level of user support (ID: AVERAGETIMEFORUSERINCIDENTS)*

##### Approved Change Requests

- *No previous approved changes defined for this review.*

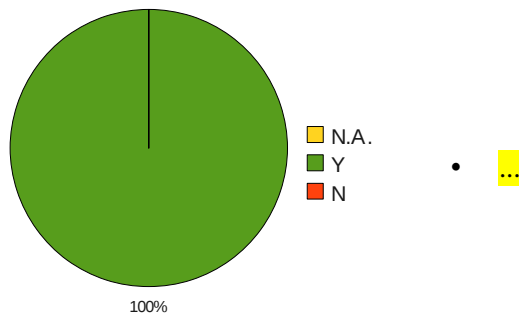
##### Deliverables

- *Software Maintenance and Support Plan [R5]*

##### Completed Checklist

Check Number	Question	Re-sponse
1	<i>Is the process on how to handle incidents reported by EMI users using GGUS up to date?</i>	
	<i>see Software Maintenance and Support Plan [R5]</i>	
2	<i>Is the process on how to handle requests coming from EMI users or other PTs up to date?</i>	
	<i>see Software Maintenance and Support Plan [R5]</i>	
3	<i>Is the process on how to handle problems up to date?</i>	
	<i>see Software Maintenance and Support Plan [R5]</i>	

**Table 6: Review the Software Maintenance and Support Plan**



## Measurements

<b>ID</b>	TOTALUSERINCIDENTS
<b>Name</b>	Total user incidents per user month
<b>Description</b>	This metric covers defects not only in the software but also in the documentation, training and user support processes, per user month. User month means the number of users (in our case, deployed services?) per month.
<b>Unit</b>	GGUS tickets per user per month
<b>Measurement</b>	...
<b>Thresholds/target value</b>	It is difficult to state a threshold valid for all the product teams, in general a decreasing trend would show positive results.
<b>Comment</b>	...

**Table 7: Total user incidents per user month**

<b>ID</b>	TRAININGSUPPORTINCIDENTS
<b>Name</b>	Training and support incident per user month.
<b>Description</b>	This metric covers defects in the training and user support processes, per user month. User month means the number of users (deployed services?) per month. The training and support defects can be derived by subtracting the tickets in status unsolved (ticket that generated a bug) from the total number of opened tickets. It relies on proper bug opening from GGUS tickets, especially for what concerns ambiguous or missing documentation.
<b>Unit</b>	Incident per user month
<b>Measurement</b>	...

<b>Thresholds/target value</b>	Decreasing trend.
<b>Comment</b>	...

**Table 8: Training and support incident per user month – Metric**

<b>ID</b>	AVERAGETIMEFORUSERINCIDENTS
<b>Name</b>	Average time to deal with an incident at the 3rd level of user support
<b>Description</b>	This metric wants to measure the effectiveness of a product team to provide 3rd level user support. The time is measured from the time the ticket reaches a PT's 3rd level support and the time the ticket is moved to the status solved or unsolved
<b>Unit</b>	Days
<b>Measurement</b>	...
<b>Thresholds/target value</b>	Need project wide agreement.
<b>Comment</b>	...

**Table 9: Average time to deal with an incident at the 3rd level of user support - Metric**

### Comments

### Validated Changes

There are no previous change requests that require to be verified for this review.

### Validated Deliverables

Name of the deliverable under evaluation	Validated	
	YES	NO
Software Maintenance and Support Plan		

### Variations from the previous review

There are no variations to report from the previous review.

## Change Requests

...

### 4.4. SECURITY ASSESSMENTS

The Review of the Security Assessment should check that the different stages described in the First Principles Vulnerability Assessment (FPVA) approach are being followed. FPVA is a primarily analyst-centric (manual) approach to assessment whose aim is to focus the analyst's attention on the parts of the software system and its resources that are mostly likely to contain vulnerabilities. FPVA is designed to find new threats to a system. It's not dependent on a list of known threats.

At the time of this quality control, the Security Assessment Plan has not been completed and released yet. Its unavailability has caused all quality checks to fail culminating in the rise of a nonconformity problem. Nevertheless the assessment of some EMI components (i.e. Argus and gLExec) has already started and the first outcomes are expected to be released soon.

#### 4.4.1 Input

##### Quality Checklists

- *Checklist for the Review of the Security Assessment [R19].*

##### Quality Metrics

- *No metrics defined for this review.*

##### Approved Change Requests

- *No previous approved changes defined for this review.*

##### Deliverables

- *Security Assessment Plan [R14].*

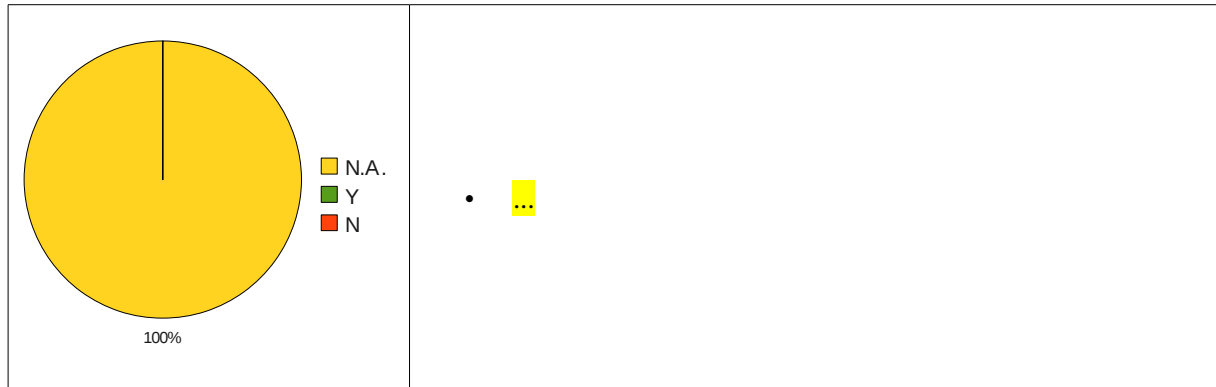
#### 4.4.2 Output

##### Completed Checklist

Check Number	Question	Response
1	The Architectural Analysis has been carried out and the output contains a diagram describing the interactions among components and end users.	
2	The Resource Identification has been carried out and the output contains the resource descriptions.	
3	The Trust and Privilege Analysis has been carried out and the output contains the trust levels and the delegation information for all the components and their interactions.	

4	The Component Evaluation has been carried out and the output contains identified vulnerabilities and their suggested fixes.	
5	The Dissemination of Results has been carried out.	

**Table 10: Review of the Security Assessment Plan (N.A. = Not Available)**



### Measurements

There are no measurements for this review.

### Validated Changes

There are no previous change requests that require to be verified for this review.

### Validated Deliverables

Name of the deliverable under evaluation	Validated	
	YES	NO
Security Assessment Plan		

The Security Assessment Plan cannot be validated since the related document is not available.

### Variations from previous report

There are no variations from the previous review to report.

### Change Requests

...

## 5. STATUS OF THE EMI-1 RELEASE

*What's the status of the EMI-1, how much of the work has been completed, forecast of the release data, open issues.*

## 6. STATUS OF THE SECURITY ASSESSMENT ACTIVITY

*Contribution from Elysa Heymann*



## 7. STATUS OF THE REGRESSION TEST

Regression test reports

## 8. CONCLUSIONS