Automated Measurement and Analysis of Open Source Software

Project Number 318736

D8.3 – Periodic Project Report

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Final

EC Distribution

The Open Group with contributions from all partners

Project Partners: **Centrum Wiskunde & Informatica, SOFTEAM, Tecnalia Research and Innovation, The Open Group, University of L'Aquila, UNINOVA, University of Manchester, University of York, Unparallel Innovation**

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DOCUMENT CONTROL

Version	Status	Date
0.1	Template for collecting partners inputs	29 April 2015
0.8	Initial partner technical progress reporting	12 May 2015
1.0	Partner technical reporting and initial resource reporting	19 May 2015
1.1	Additional partner resource reporting	21 May 2015
1.2	Final version after QA	23 May 2015
1.3	Updated version addressing Project Officer comments	12 June 2015

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EXECUTIVE SUMMARY

This document provides a report on the progress of the OSSMETER project for the final six months of operation. The work completed in each of the workpackages, the issues faced by the project partners and their resolutions, and any deviations from the work plan are described. Administrative information on resource usage and costs incurred are also provided. The report indicates that all deliverables will have been completed in time for the final review and that no major issues have arisen that would prevent the consortium and European Commission from finalising the grant agreement. The report also lists a substantial number of dissemination actions that have been carried out by the project partners in the final six months.

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1. INTRODUCTION

This document provides a status report for the OSSMETER project for the six month period from 1 October 2014 through 31 March 2015, which represents the final reporting period for the project. The report covers the progress in the workpackages, the issues faced by the project partners and their resolutions, and the dissemination actions that were undertaken, along with the associated resources that were utilised by each partner.

This document assumes the reader is familiar with the objectives of the OSSMETER Project and the work programme described in the OSSMETER contract Annex I – Description of Work, which is part of the European Commission (EC) contract. This report is intended to provide a summary of the management aspects and technical challenges of the project and overall progress. The technical results achieved to date are detailed in the deliverables identified in the following section.

2. PROJECT DELIVERABLES AND MILESTONES

The following deliverables by the project partners have been developed during the reporting period:

- D5.7 OSSMETER Platform - Final Version
- D6.2 Multi-sector IT Services Use Case Evaluation
- D6.3 Construction Use Case Evaluation
- D6.4 Eclipse.org Use Case Evaluation
- D6.5 External Industry Evaluation Results
- D7.6 Final Dissemination and Exploitation Plan

The above deliverables have been submitted under separate cover and the work undertaken along with any challenges or deviations in the work plan are described below.

The following milestones within the project work plan have been achieved by the partners:

Milestone	Milestone Name	Description
MS5	Project Completion	Case studies and external industry evaluation performed, any integration issues addressed and feedback integrated in analysis and measurement components, and final platform is available.

With the achievement of the above milestone all milestones in the project have been completed.

3. WORKPACKAGE PROGRESS SUMMARY

Overall the project has completed the development and integration work for the OSSMETER platform and all of the supporting components and also carried out updates to address specific items identified by the industrial partners during the final evaluation phase of the project. Additional optimisation, ease of use, and performance improvements have been implemented development partners.

The industrial partners have required additional time to become familiar with the platform and to carry out local deployments of the platform for specific evaluation tasks. In addition, the processing time to carry out the initial analysis of the set of OSS projects used for evaluations has had an impact on the project schedule for completing and documenting the industrial evaluations carried out in the final months of the project. However, the evaluation results have been positive with the benefits being quantified by each of the three industrial use case partners, as well as being confirmed by a set of external evaluators from several different types of organisations involved in OSS and software development. Based on the evaluation results, the partner have also finalised the exploitation planning for the project addressing both the economic approach and the sustainability challenge.

The following sections detail the activities undertaken for each of the workpackages in which tasks were carried out during the reporting period. The work completed, issues identified and decisions taken are described for each workpackage. Deviations in research and development tasks are noted on the respective workpackages, while any deviations related to costs and effort are noted under Section 5 – Project Resources. Information concerning Workpackage 1 – Requirements and Use Cases, is not included as tasks for this workpackage were completed during the first reporting period of the project.

3.1 WP2: DOMAIN MODELING AND OSS PROJECT LIFECYCLE ANALYSIS

3.1.1 Work completed

- The quality metamodel and the custom quality model presented in D2.4 have been implemented in the OSSMETER platform. In particular, by using the editor developed in WP5 the custom quality model previously proposed in D2.4 has been refined and concretely implemented and made available to the users of the system.
- By considering the comments related to WP2 discussed in the second EC review report, the quality model proposed in D2.4 has been refined in order to include additional quality factors related to project processes. In particular, by relying on existing metric providers and factoids we managed to add the quality sub-attributes “Capability of Issues Processing” and “Capability of Releases Management” in a new quality attribute named “Processes”.
- The metamodels and importers developed and maintained in WP2 have been refined according to requests from use case partners that occurred during the evaluation phase of the project.

- A new manager for importing data from the Zendesk bug tracking system (https://www.zendesk.com/) has been implemented and integrated in the OSSSMETER platform in WP5.

3.1.2 Issues identified

- There were no major issues during the reporting period.

3.1.3 Decisions taken

- There were no major issues that required decisions to be taken.

3.1.4 Deviations from work plan

- There were no major deviations from the work plan.

3.2 WP3: SOURCE CODE QUALITY AND ACTIVITY ANALYSIS

3.2.1 Work completed

- Factoid descriptions and implementations for all source code quality and activity analyses were finalised and integrated with the default quality models. This includes testing and fine-tuning based on initial test data, setting thresholds differently and test driving the factoid descriptions.
- Defined visualizations for all relevant (non-intermediate) metric data. This includes a design choice for the grouping of several metrics in one diagram, and the choice of diagram type per metric which fits the data most "naturally".
- Completed heuristics for classpath estimation for Java analysis. Classpaths are reconstructed from Eclipse project configuration and Maven project metadata. This requires reverse engineering of Eclipse and Maven internal API with positive results for recent project data, but hard to optimize results for older source code. The main issues to deal with are missing metadata for guessing Java versions, external library dependencies and platform evolution.
- Added simple experimental metrics for company affiliation of contributors and license headers identified, at the request of the use case partners. For the first we parse email addresses and added additional optional metadata which is provided by the Git system. For the second we match word bags of a selected number of templates for license headers to the word bags of the file headers of all relevant files in a project. We track and measure the header variety, distribution and evolution over time.
- Improved language of documentation strings for all metric providers based on feedback from project partners and manual review. We collected feedback during project meetings and by test driving the platform on local projects of colleagues within a development partner organisation.
- Streamlined deployment of the platform (deployment metadata). This lead to the version on the HEAD of the dev branch being easy to clone and immediately run without much configuration by a programmer.

- Several bugs were discovered during testing and initial evaluation in the category of divide-by-zero, off-by-one and null pointer exceptions. Also code inspections revealed minor issues in the metric definitions caused by software co-evolution (i.e. of the delta model and the metrics). All issues identified as such have been resolved, including those reported on GitHub by the use case partners.

3.2.2 Issues identified

- Efficiency challenges were encountered when computing metrics for historical data for longer periods of time. This was addressed by significantly optimising several metrics. Effort was also spent parallelizing the Rascal interpreter, which eventually failed to produce a speed-up due to intricate data dependencies. The current speed still leaves room for improvement in the future; for example it's expected for specific metrics that the upcoming release of the Rascal compiler (not a part of the project) may produce a (conservative) factor 20 to 30 speed-up and open the possibility for more asynchronous multi-threading.
- Several race conditions caused by increased parallelization of the platform were identified and fixed using thread local variables. Also, precision of quotients and percentages was reported accidentally with 40 digit precision and was dialled back to 2 decimals for all factoids.

3.2.3 Decisions taken

- Avoided storage of unnecessary historical data to reduce bloat. A few tables of historical metric data were filtered that were not used to contribute to a factoid description or part of the default quality model.
- Turned off heuristic recovery of classpaths for project data older than three years since it was experimentally observed that accuracy was less than useful for those periods (metric accuracy did not improve by running the expensive operation).

3.2.4 Deviations from work plan

- A number of extra new metrics were introduced along with associated factoids for license headers and company affiliations based on requests by the use case partners. The work provided an opportunity to showcase the ease of extension given an unforeseen new requirement such as a new kind of metric, an adaptation of an existing metric and a necessary extension of the backing metamodel for project deltas. The result was very nice. Most time was spent in testing the output rather than in development.
- More time was spent on optimizing and debugging than planned. The variety of the projects in the demonstrator as well as the evaluation generated unforeseen issues which were not triggered by initial test benchmark of 8 real projects. The unexpected variety of programming styles, age and project metadata setup were the main causes of this extra work.

3.3 WP4: COMMUNICATION CHANNEL AND BUG TRACKING SYSTEM ANALYSIS

3.3.1 Work completed

- The readers of communication channels and bug tracking systems in the OSSMETER platform were tested against a large set of projects. This application revealed many cases where the readers failed to retrieve data due to small differences in the settings of various communication channel instances. All bugs were fixed and readers were modified to generalise as much as possible over communication channel settings.
- The output of factoids summarising communication channel and issue tracking metrics was observed for a large set of projects. In several cases it was not informative enough. All factoids were revisited to address these cases, i.e. improve wording and modified thresholds.
- While use case partners were assessing and validating the platform, several bugs in the code were discovered. These have been addressed making sure that the projects of interest to the use case partners are processed in time.
- While more projects were being processed, testing of the OSSMETER web application was periodically carried out. Several cases were identified where the communication channel and issue tracking system analysis was not showing correctly and were updated.
- Use case partners were supported in addressing all issues related to communication channel and issue tracking system analysis that emerged during the process of installing and evaluating the OSSMETER platform.

3.3.2 Issues identified

- There were no major issues during the reporting period.

3.3.3 Decisions taken

- There were no major issues that required decisions to be taken.

3.3.4 Deviations from work plan

- There were no major deviations from the work plan.

3.4 WP5: OSSMETER PLATFORM

3.4.1 Work completed

- Extended the functionality of the platform and its REST API. The OSSMETER platform can now log information related to its execution, such as execution time of metrics, cluster information, and information related to the analysis of projects. The REST API has been extended in order to expose this information to external clients. The purpose of this functionality is to enable remote administration of the platform.

- Extended the functionality of the web application to support custom quality models. Users can now define their own quality model, and then the presentation of the measurements in the web application is adjusted to this quality model.
- Extended the web application to support remote administration of the application as well as of the platform. This functionality is available only to the administrators of the system. The administration panel can be used to send invitations to new users, monitor the execution of the platform, retrieve execution errors, post news to the users of the application, and modify the default quality model of the platform.
- Conducted a set of experiments to evaluate the computation time and disk storage requirements of the platform. A set of subprojects were selected from the use cases of the industrial partners, gathered and analysed the required data.
- Supported the evaluation undertaken by the industrial partners by fixing bugs, maintaining the deployment of the platform, and writing documentation.

3.4.2 Issues identified

- Remote management and administration of an OSSMETER cluster was time-consuming and tedious.

3.4.3 Decisions taken

- Developed additional administration facilities for easing administration related tasks.

3.4.4 Deviations from work plan

- There were no major deviations from the work plan.

3.5 WP6: ASSESSMENT AND VALIDATION

3.5.1 Work completed

- The evaluation methodology and reporting templates were agreed amongst the three use case partners (Tecnalia, Softeam, UI) and each carried out their evaluations of the OSSMETER platform from their own respective industrial perspectives and requirements.
- Each of the use case partners have prepared the evaluation reports (deliverables D6.2, D6.3 and D6.4) addressing evaluation of all the measures related with each of their respective domains (Construction, Eclipse and Multi-sector IT services), along with the research and development metrics, and technology adaptation readiness measures.
- Specific tasks in support of the evaluations were carried out by the use case partners. For example, UI undertook development of metric and corresponding visualisation for evaluation of the Event Detection Assessment, for the Usage Assessment and the License identification for the construction Use Case. Also, questionnaires were delivered to evaluators and feedback collected and reported on more subjective measures.

- The installation and configuration of OSSMETER platform was performed on a local server at both UI and Softeam for developing custom metrics for their respective use cases. Several steps were needed for the deployment of the platform, such as the installation and the configuration of the machine to run the platform. The installation and the metrics creation guidelines provided by technical partners were evaluated and feedback provided for improvement to the technical team.
- Continuous feedback was provided to WP5 team through the GitHub interface, including both technical issues and future improvement requests. The various evaluation teams amongst the use case partners reported questions, bugs, enhancements to the technical team for the release of successive updates of the platform in support of the evaluations.
- A set of 12 experts external to the project were selected to carry out evaluations of the OSSMETER platform to complement the more detailed use case evaluations of the industrial partners. The experts came from a range of organisations and provided a rating of the platform across 5 key measures along with comments and recommendations. The external evaluation results have been documents in D6.5.

3.5.2 Issues identified

- The execution of custom made metrics for the Construction Domain for testing and debugging in the centralised deployment for WP5 was not practical. The central platform was committed to analysing OSS projects for each use case and had a tight scheduling, which would result in a long development time of the custom Construction metrics.

3.5.3 Decisions taken

- Deployment of a local OSSMETER instance for the Construction use case to run the developed custom metrics in order to test them, debug them and obtain the metric analyses results for the evaluation in time.

3.5.4 Deviations from work plan

- The gathering of results from the custom made metrics for the Construction Domain were time consuming, because of need to deploy a local installation and the low processing power available from the platform. However, a successful evaluation was achieved, with all the needed information.
- Overall the evaluation process has taken longer than expected due to the learning curve of being able to deploy and configure a local installation in some cases. In other cases the time to carry out the initial analysis of several OSS projects needed for each use case required more time than planned. This has resulted in the use case evaluations deliverables (D6.2, D6.3 and D6.4) being completed later than scheduled.
- In order to not disrupt and further delay the internal industrial evaluations of the use case partners, the external evaluations were rescheduled until the use case partners had sufficient projects analysed. This resulted in the external evaluations deliverable (D6.5) being completed later than scheduled.

3.6 WP7: DISSEMINATION AND EXPLOITATION

3.6.1 Work completed

- During the six month reporting period the project partners have successfully submitted and presented 3 technical papers at various European and international conferences with 2 papers at International Conference on Model Driven Engineering Languages and Systems (MODELS) and a paper at the International Conference on Software Maintenance and Evolution (ICSME).
- An article has been prepared by the partners concerning the project technologies and has been accepted for publication in Journal of Software: Evolution and Process.
- Presentations of the project have been given the Net Futures concertation meeting organised by the European Commission, at the Platform 3.0 Forum standards grouping, Open World Forum for open source software, the Paris ICT Cluster, and as part of presentations in Korea at the Big Data and Smart Computing conference and workshop on Mining Big Text. Results from the project have also been used in university curricula and seminars.
- The partners have updated the final version of the exploitation plan (D7.6) with additional details concerning licensing related to third party technologies used in results, a plan for sustainability of open source results after project completion, a viable economic model based on the industrial evaluations, updated positioning of the project results towards target communities and further collaboration with other related projects.
- Tecnalia has applied to organise the Eclipse DemoCamp, which will address OSS metrics and provide a showcase for the OSSMETER platform. The event will be organised in Spain in Spring 2016.
- A further 4 technical papers on OSSMETER project results have been developed and submitted by the development partners to key conferences that will be conducted after the project is completed including: MODELS 2015, SEMANTiCS 2015, and American Medical Informatics Association (AMIA) 2015 Annual Symposium
- UNINOVA has worked with the National Construction stakeholders in Portugal to promote the use of the OSSMETER solution in future projects that might exploit OSS. They have also had discussions with the buildingSMART executive committee to push OSSMETER as an official tool/service to present in the initiative website for those that want to take advantage of Open Source solutions in IFC-based Construction projects.
- Softeam has continued to participate on the RISCOSS Project Advisory Board providing visibility of OSSMETER and identifying opportunities for collaboration.

3.6.2 Issues identified

- There were no major issues during the reporting period.

3.6.3 Decisions taken

- There were no major issues that required decisions to be taken.

3.6.4 Deviations from work plan

- There were no major deviations from the work plan.

3.7 WP8: PROJECT MANAGEMENT

3.7.1 Work completed

- Quarterly meetings were conducted at the steering level where the detailed work plans were reviewed and updated. In addition, technical meetings were organised by the technical manager and workpackage leaders to address specific items arising from integrations topics and the industrial user evaluations.
- The technology transfer for the Use Case evaluation of the project results by industrial user partners was lead by the Technical Manager and coordinated amongst all partners, including follow-ups to address technical items and questions from users. Coordination of updated technology components was carried out to provide industrial partners additional features requested for carrying out evaluations during the reporting period.
- Planning of workpackage tasks, allocation of resources and roles and establishment of intermediate milestones and checkpoints to achieve the final results have been regularly undertaken. Partner progress has been monitored in completion of technical deliverables due at the end of the project.
- Preparations for the final project review and project reporting were carried out along with review of project deliverables to ensure expected quality levels were achieved and comments from previous reviews were addressed.

3.7.2 Issues identified

- There were no major issues during the reporting period.

3.7.3 Decisions taken

- There were no major issues that required decisions to be taken.

3.7.4 Deviations from work plan

- The project has experienced delays in completing tasks in WP6 for reasons described above under WP6 reporting above, which has had a knock-on effect in completing tasks in WP7 and the final reporting for the project.

4. DISSEMINATION ACTIONS

The project partners undertook the following dissemination actions during the reporting period 1 October 2014 through 31 March 2015.

Item	Activity	Date	Partners Involved	Audience or Event
1.	Paper and presentation: "Mining Metrics for Understanding Metamodel Characteristics"	October 2014	UDA	ACM/IEEE 17th International Conference on Model Driven Engineering Languages and Systems (MODELS), Valencia, Spain
2.	Paper and presentation: "Empirical analysis of the relationship between CC and SLOC in a large corpus of Java methods"	October 2014	CWI	International Conference on Software Maintenance and Evolution (ICSME), Victoria, Canada.
3.	Paper and presentation: "Software Analytics for MDE Communities"	October 2014	YORK	ACM/IEEE 17th International Conference on Model Driven Engineering Languages and Systems (MODELS), OSS4MDE workshop, Valencia, Spain
4.	Presentation: "OSSMETER FP7 Project: Open Source Software Analysis"	October 2014	SOFT	Open World Forum, Paris, France
5.	Journal paper: "Empirical analysis of the relationship between CC and SLOC in a large corpus of Java methods and C functions"	January 2015	CWI	Journal of Software: Evolution and Process. Accepted May 2015.
6.	"Sales Pitch" for EU Concertation Meeting	January 2015	CWI	"Net Futures" EU Concertation Meeting, Brussels, Belgium
7.	Software Release: Rascal 0.7.3, including Java and PHP meta models developed for OSSMETER	January 2015	CWI	Supporting the evaluation release of OSSMETER, as well as the bigger audience of Rascal users.
8.	Presentation: "OSSMETER Overview"	January 2015	SOFT	Meeting of Paris Region Systems and ICT Cluster (GTLL)
9.	Invited talk: "Software Engineering: The War Against Complexity"	February 2015	CWI	Demonstrations Day Cha-Q project; Change-centric Software Engineering, Antwerp University, Antwerp, Belgium
10.	Invited talk: a part of the talk was devoted to present OSSMETER	February 2015	UNIMAN	International Conference on Big Data and Smart Computing (BigComp 2015), Jeju Island, Korea
11.	Invited talk: a part of the talk was devoted to present OSSMETER	February 2015	UNIMAN	Workshop: Mining Big Text 2015, Yonsei University, Seoul, Korea
12.	Invited talk: a part of the talk was devoted to present OSSMETER	February 2015	UNIMAN	Seminar at Kyunghee University, Seoul, Korea
13.	Presentation: "OSSMETER tools for evaluating quality of open reference	February 2015	TOG	Platform 3.0 Forum, San Diego, USA

Item	Activity	Date	Partners Involved	Audience or Event
	technologies"			
14.	Lectures and tutorials in the context of the Model-Driven Engineering master course	March 2015	UDA	Undergraduate students – University of L'Aquila

5. PROJECT RESOURCES

5.1 PARTNER COSTS

The following summarises the costs incurred by each partner for the OSSMETER Project up through 31 March 2015, which corresponds to the full duration of the project.

Partner	Euros	
	Actual Costs To Date	Planned Costs To Date
TOG	449,481	397,553
YORK	519,843	548,974
CWI	566,655	529,901
UDA	461,412	453,740
UNIMAN	546,509	556,109
TECNALIA	302,259	300,719
Softeam	536,071	449,647
UNINOVA	115,321	146,516
UI	238,319	206,138

Overall the project has incurred total costs of €146,573 or 4.1% more than the original budget planned for the project. However, the overrun in costs has not impacted the project and all tasks and deliverables have been completed.

TOG costs were higher due to the mix of personnel contributing to the project tasks included more senior engineers than the mix of junior and senior engineers originally assumed when preparing the budget.

CWI costs were higher due to higher personnel rates associated with the persons actually assigned to carry out project tasks compared to the original rates assumed in the budget.

Softeam costs were higher due to additional effort being needed to carry out industrial evaluations for two separate use cases. The original assumption when preparing the budget was there would be a greater degree of commonality between the two use case evaluation tasks and the personnel involved.

UI costs were higher due to industrial evaluation tasks originally planned for UNINOVA being shifted to UI to carry out as UI were more representative and had greater industrial expertise. This resulted in higher effort and associated costs for UI, while UNINOVA had lower effort and costs.

More details concerning the breakdown of the figures by cost categories are provided by each partner as part of the formal cost claim for the reporting period, which will be submitted via the European Commission's online system (NEF).

5.2 PARTNER EFFORT

The following table summarises the contributions in person months made by each partner to the individual workpackages during the final six months of the project.

Person-Month Status Table										
CONTRACT N°: 318736		TOG	York	CWI	UDA	UNIMAN	TEC	Softeam	Uninova	UI
ACRONYM: OSSMETER										
PERIOD: 01/10/2014 to 31/03/2015										
Workpackage 1:	**Actual WP total:**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Requirements and Use Cases	**Planned WP total:**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Workpackage 2:	**Actual WP total:**	0.0	0.1	0.4	4.0	0.0	4.7	0.0	0.0	0.0
Domain Modeling and OSS Project Lifecycle Analysis	**Planned WP total:**	0.0	4.8	0.4	4.0	0.0	2.5	0.0	0.4	0.0
Workpackage 3:	**Actual WP total:**	0.2	0.0	7.2	0.0	0.0	0.0	0.0	0	0.0
Source Code Quality and Activity Analysis	**Planned WP total:**	0.9	1.5	5.9	0.0	0.0	0.0	0.0	0.4	0.0
Workpackage 4:	**Actual WP total:**	0.0	0.1	2.0	0.5	5.4	0.0	0.0	0.6	0.0
Communication Channel & Bug Tracking System Analysis	**Planned WP total:**	0.0	1.4	2.6	0.5	3.0	0.0	0.0	0.4	0.0
Workpackage 5:	**Actual WP total:**	0.2	16.9	0.0	0.5	4.7	0.0	0.0	0.0	0.0
OSSMETER Platform	**Planned WP total:**	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.0
Workpackage 6:	**Actual WP total:**	1.6	0.0	2.0	1.5	0.8	8.1	10.3	2.7	10.4
Assessment and Validation	**Planned WP total:**	1.8	4.5	3.0	1.4	2.1	5.9	6.4	2.8	7.1
Workpackage 7:	**Actual WP total:**	1.7	0.2	1.0	0.8	1.4	0.7	0.4	1.0	0.5
Dissemination and Exploitation	**Planned WP total:**	1.3	3.0	1.6	0.8	1.0	1.3	0.0	0.9	0.8
Workpackage 8:	**Actual WP total:**	1.1	0.1	0.6	0.5	0.5	0.9	0.5	0.2	0.6
Project Management	**Planned WP total:**	1.2	0.9	0.5	0.0	0.9	0.6	0.5	0.2	0.3
	Actual total:	4.8	17.4	13.2	7.8	12.7	14.4	11.2	4.6	11.4
Total Project Person-months	**Planned total:**	5.6	16.0	13.9	7.2	7.0	10.3	6.9	5.5	8.2

The following table summarises the contributions in person months made by each partner to the individual workpackages during the full duration of the project.

Person-Month Status Table										
CONTRACT N°: 318736										
ACRONYM: OSSMETER										
PERIOD: 01/10/2012 to 31/03/2015		TOG	York	CWI	UDA	UNIMAN	TEC	Softeam	Uninova	UI
Workpackage 1:	**Actual WP total:**	5.8	6.0	4.6	2.0	2.0	4.0	7.8	2.9	2.9
Requirements and Use Cases	**Planned WP total:**	6.0	6.0	5.0	2.0	2.0	4.0	6.0	4.5	3.0
Workpackage 2:	**Actual WP total:**	0.0	3.3	5.0	40.0	2.0	14.2	1.2	0.6	0.0
Domain Modeling and OSS Project Lifecycle Analysis	**Planned WP total:**	0.0	8.0	5.0	40.0	1.0	12.0	1.0	1.0	0.0
Workpackage 3:	**Actual WP total:**	2.4	1.5	41.6	2.0	0.0	0.0	1.2	0.6	0.0
Source Code Quality and Activity Analysis	**Planned WP total:**	4.0	3.0	40.3	2.0	0.0	0.0	1.0	1.0	0.0
Workpackage 4:	**Actual WP total:**	0.0	0.8	3.4	3.0	41.4	1.0	1.2	1.2	0.0
Communication Channel & Bug Tracking System Analysis	**Planned WP total:**	0.0	2.0	4.0	3.0	39.0	0.0	1.0	1.0	0.0
Workpackage 5:	**Actual WP total:**	1.5	55.9	7.4	5.0	7.7	3.2	2.7	0.6	2.3
OSSMETER Platform	**Planned WP total:**	2.0	37.0	4.0	5.0	3.0	3.0	2.5	1.0	1.0
Workpackage 6:	**Actual WP total:**	7.4	0.0	2.0	2.1	0.8	10.7	24.9	3.4	16.9
Assessment and Validation	**Planned WP total:**	8.0	4.5	3.0	2.0	2.1	8.5	18.0	3.5	13.5
Workpackage 7:	**Actual WP total:**	5.4	1.2	1.4	3.0	4.4	2.4	2.4	1.1	0.7
Dissemination and Exploitation	**Planned WP total:**	5.0	4.0	2.0	3.0	4.0	3.0	2.0	1.0	1.0
Workpackage 8:	**Actual WP total:**	10.7	0.2	1.6	2.0	1.6	1.9	1.0	0.6	0.8
Project Management	**Planned WP total:**	11.0	1.0	1.5	1.5	2.0	1.5	1.0	0.5	0.5
	Actual total:	33.1	68.8	67.0	59.1	59.9	37.4	42.4	10.9	23.5
Total Project Person-months	**Planned total:**	36.0	65.5	64.8	58.5	53.1	32.0	32.5	13.5	19.0

Overall, the project expended approximately 27.2 or 7.2% more person months than was originally budgeted. The overrun in effort has not impacted the project and all tasks and deliverables have been completed.

TOG effort was lower due to the mix of personnel contributing to the project tasks included more senior engineers than originally assumed when preparing the budget and the more experienced senior engineers required less effort to carry out the planned project tasks.

Both CWI and UNIMAN required additional effort to address challenges faced in developing the metrics for the OSS project analysis.

Tecnalia required additional effort for the industrial evaluations for the measures associated with extensibility of the platform to support alternative front-ends and an additional forge.

Softeam needed additional effort to carry out industrial evaluations for two separate use cases where there was less commonality between the two evaluations and the development personnel involved than was assumed when preparing the budget.

UI effort was higher and UNINOVA was lower because industrial evaluation tasks originally planned for UNINOVA were shifted to UI to carry out as UI were more representative and had greater industrial expertise.

6. PROJECT MEETINGS

During the six month reporting period the OSSMETER project held meetings on the following dates and locations involving all partners:

Meeting	Date	Location
EC Project Review	26-27 November 2014	Brussels, Belgium
Project Steering Committee	28 November 2014	Brussels, Belgium
Project Steering Committee	5-6 March 2015	Amsterdam, Netherlands

In addition, monthly conference calls were organised to coordinate the industrial evaluations tasks amongst all the project partners.