

 <p>Sponsored through Framework Programme Sixth (Call 5) by</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>		Document Information
		Date : Jan 21, 10 Version: 1.2 Pages : 32
		Owning Partner: CETIC
		Author(s): Jean-Christophe Deprez
		QualOSS Reviewer(s): Nicolas Devos (CETIC), Vincent Auvray (PEPITE)
		To: General Audience of Assessors
		Purpose of Distribution: Ready for public distribution
The QUALOSS Consortium consists of: CETIC (BE), Facultés Universitaires Notre Dame de la Paix à Namur (BE), Universidad Rey Juan Carlos (ES), Fraunhofer IESE (DE), ZEA Partners (BE), MERIT (NL), AdaCore (FR), PEPITe (BE)		Printed on 08/06/08 at 03:17:51 PM
Status: <input type="checkbox"/> Draft <input type="checkbox"/> To be reviewed <input type="checkbox"/> Proposal <input checked="" type="checkbox"/> Final/Released	Confidentiality: <input checked="" type="checkbox"/> Public - Intended for public use <input type="checkbox"/> Restricted - Intended for QUALOSS consortium only <input type="checkbox"/> Confidential - Intended for individual partner only	
Title: Release of the QUALOSS Platform (Standard QualOSS Assessment Method - Version 1.1) (part of deliverable D4.5)		

	Release of the QUALOSS Platform	Page : 2 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Deliverable: D4.5 (part of)

Title: Release of the QUALOSS Platform

Executive Summary:

This document describes the Release of the QUALOSS Platform (Std QAM). It shows that the Std QAM fulfills the requirements of the QualOSS Methodology v1.1. In particular, it describes the assessment process of the Std QAM and how the GQM was applied to create the list of goals and questions. Furthermore, it lists pointers to material and documentation of measurement procedures and indicator computation used to answer the questions. Thus, this document should be used in conjunction with a set of spreadsheets and other documentation material that specify the various measurement procedures and compute risk indicators related to the evolvability and robustness of an F/OSS endeavor.

The intended audience for this document are assessors (or evaluators) who want to learn the details of the Release of the QUALOSS Platform. Hence, only material useful for applying this assessment method is covered. For detailed information related to the QualOSS methodology, refer to the QualOSS Methodology v1.1 that was used to deriving the Release of the QUALOSS Platform.

This document makes no assumption as to the number of assessors who will perform an assessment. Hence, it can be used by a team of people for performing a joint assessment and share the workload.

The first part of the document presents overall assessment process of the Release of the QUALOSS Platform. Second, it presents the hierarchical Standard QualOSS quality model of the current version. Furthermore, this document also mentions the information to create during a Standard QualOSS assessment, that is, the various files to create and the content to provide in these files.

Expertise Required By Assessors

It is expected that the assessor of Release of the QUALOSS Platform is knowledgeable and capable of installing and using traditional code quality assurance tools as well as setting up a database server to collect various data such as community data using CVSAnalys. For the specific expertise expected for each assessment part, a documentation is provided in each subdirectories distributed in the same archived as this document.

	Release of the QUALOSS Platform	Page : 3 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

TABLE OF CONTENTS

1	Introduction	4
1.1	Motivations	4
1.2	Objectives	4
1.3	Structure of the Deliverable	5
2	Terminology	6
2.1	Definitions of F/OSS endeavor, Robustness, Evolvability	6
3	Assessment Process for the Standard QualOSS Assessment Method - Version 1.1	11
3.1	Initiating An Assessment for a Full FIOSS Collaboration	11
3.1.1	Concrete Actions and Warnings	12
3.2	Setting Up and Planing an Assessment for a Full FIOSS Collaboration	12
3.2.1	Workflow of an Assessment	13
3.2.2	Scoping an FIOSS endeavor	24
3.2.3	Rules of the Standard QualOSS Assessment Method	25
3.3	Collecting and Analyzing Data for an Assessment in a Full FIOSS Collaboration	25
3.4	Interpreting the Results of an Assessment in a Full FIOSS Collaboration	26
3.5	Supervising an Assessment for a Full FIOSS Collaboration	26
3.5.1	Concrete Actions and Warnings	27
4	Documents of an Assessment	29
4.1	Documents for Describing an Assessment	29
4.2	Measure/Indicator Spreadsheets and their Log File	29
4.3	Documentation and Other files	30
	References	32

	Release of the QUALOSS Platform	Page : 4 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

1 INTRODUCTION

This document presents the necessary information for executing the Release of the QUALOSS Platform. The information aims to be self contained and sufficiently clear for an assessor to apply the assessment method on any desired F/OSS endeavor (see Section 2 for a complete definition of F/OSS endeavor).

1.1 MOTIVATIONS

Enterprises increasingly acquire Free/Open Source Software (F/OSS) to integrate them in their products, whether software or hardware. As reported by Gartner in (Gartner, 2008), it is anticipated that 80% of all proprietary software application will include F/OSS code by 2012.

It is therefore important to provide a tool for enterprises to select the most appropriate F/OSS development endeavors to collaborate with. As enterprise mature in their use of F/OSS, they will understand the need to fully collaborate with the existing F/OSS community rather than be tempted to fork existing F/OSS code. In such a full collaboration mode, an enterprise will contribute bug corrections and eventual new features but it will benefit from others' contributions. When collaborating with a large F/OSS community, the benefit largely outweighs the effort provided by any single contributor.

To assess the worthiness to enter in a collaboration with a F/OSS endeavor, an enterprise will be interested to verify that the F/OSS code, the community, the software process, the libraries and tools show an acceptable quality and maturity. In other words, a *F/OSS endeavor should be assessed for its robustness and evolvability* where robustness means the capability to solve current issues and evolvability, the capability to continue to solve future issues (see Section 2 for a complete definition of robustness and evolvability).

QSOS (QSOS, 2006) and OpenBRR (OpenBRR, 2005), respectively sponsored by Atos Origin and Intel, both propose assessment method for assessing F/OSS project. However, they do not really assess the quality of code. In general, these two methods tend to be too light to make a fully informed decision. The Std QAM has been built around the problematic of F/OSS acquisition with the purpose of integrating it in a product hence the results likely have a much higher added value for this acquisition context than any other assessment methods.

1.2 OBJECTIVES

The main objective is to develop the Release of the QUALOSS Platform to assess the evolvability and robustness of an F/OSS endeavor. The dimension of the F/OSS acquisition targeted by the Release of the QUALOSS Platform are

- Usage = Integration in a product
- Collaboration = F/OSS full collaboration
- Mode = Product comparison

The context based on the three values above was selected not only because it is viewed as the model to become increasingly used to collaborate and integrate F/OSS code in larger software but also because this context is broad and therefore assessment for other F/OSS acquisition contexts will likely be able to reuse what has been developed on Release of the QUALOSS Platform.

In parallel to developing the Release of the QUALOSS Platform, this document also shows that the assessment method meets all the requirements of the QualOSS Methodology v1.1. This fact guarantees a high rigor in the assessment method thus that assessment results are trustworthy.

	Release of the QUALOSS Platform	Page : 5 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Besides showing the fulfillment of all QualOSS Methodology v1.1 requirements, the following is given:

- A detailed description of the assessment process of Release of the QUALOSS Platform
- A detailed presentation on how the Goal-Question-Metric paradigm was applied to build the Release of the QUALOSS Platform with
 - A complete list of all goals and refinement of sub-goals that add viewpoint and quality focus to the F/OSS acquisition context above (Usage, Collaboration, Mode)
 - A list of questions related to each goal
 - A list of pointers to useful documents that explain how to take the needed measures and compute the risk indicators to answer each question.

1.3 STRUCTURE OF THE DELIVERABLE

Section 2 reviews the definition of F/OSS endeavor. It also defines F/OSS endeavor robustness and evolvability and presents the quality model used to refine the concepts of F/OSS endeavor robustness and evolvability. Furthermore, Section 2 reviews the important aspect of the Goal-Question-Metric paradigm (GQM) that is later applied in Section 3 to derive goals and questions from each leaf characteristic of the quality model tree.

Section 3 presents the various tasks of the assessment process imposed by the QualOSS methodology and develop the fine-gained actions and operations to execute during these tasks. Section 3 also applies the initial steps of the GQM by specifying assessment goals and deriving questions whose answers determine if a goal is reached. The last step of the GQM, that is, the measures are specified along their measurement procedure in the next section.

Section 4 points to spreadsheets that specify the indicators and measures to compute to provide answers to questions of the GQM. Furthermore, Section 4 also refers to other templates useful for collecting scoping and other traceability information during an assessment.

	Release of the QUALOSS Platform	Page : 6 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

2 TERMINOLOGY

2.1 DEFINITIONS OF F/OSS ENDEAVOR, ROBUSTNESS, EVOLVABILITY

As previously noted, F/OSS acquisition decision should not only be influenced by the quality of a F/OSS component but also by its community, and its working method (also referred to as software processes). The term **F/OSS project** is often encountered when one refers to elements other than just the product. However, the term F/OSS project has several limitations. First, there is no accepted definition of a F/OSS project. Although one could try to give it a definition, the use of the term is too popular to control. Second, a F/OSS project is usually associated to a whole component. However, in many cases, an organization is not interested about integrating a whole F/OSS component but only a part of it. An assessment method will therefore attempt to evaluate not the whole F/OSS project but only a segment of it. To avoid possible confusion, QualOSS has decided to propose a new term with a more formal definition.

A **FIOSS endeavor** is the undertaking of community members using tools and following software processes to produce work products related to one or more F/OSS components.

*NOTE 1: In this definition, a **F/OSS component** is defined by a set of source code files.*

*NOTE 2: In this definition, the notion of **tools** is to be taken broadly. Software process support tools (such as version control or bug tracking systems) as well as software libraries used by a F/OSS component which may have been produced by another F/OSS endeavor) are considered as tools.*

Formally, we define a FIOSS endeavor as a tuple of 4 sets, *CM*, *WP*, *SP*, and *TL* where

- *CM* is a set of community members,
- *WP* is a set of work products produced by community members, including the source code of the F/OSS components
- *SP* is a set of software processes followed by community members to produce work products, and
- *TL* is a set of tools such as libraries used to compile or run the F/OSS components or support tools to automate part of the software processes such as version control or bug tracking system

We note that the **scope of a FIOSS endeavor** is purposely left fuzzy. The **scope** can be adjusted to the specific needs of an assessment. This fuzzy definition makes it possible to address more business acquisition scenarios. The scope of an FIOSS endeavor can be adjusted based on the business and measurement goals. In some cases, the goals will justify specifying the scope of a F/OSS endeavor at the level of a whole F/OSS project or if needed, at a finer level such as a specific subset of releases and particular F/OSS sub-components of a F/OSS project. Yet in some cases, the context could be enlarged and an assessment may consider a set of several F/OSS projects as the FIOSS endeavor to assess.

To specify the **scope of the FIOSS endeavor** under assessment, one must give a list of elements in each of the four sets, *CM*, *WP*, *SP*, and *TL*.

In theory, it is possible to precise very specific scopes where one specifically lists all elements in each of the 4 sets. However, in most software acquisition scenarios, the scope of a F/OSS endeavor is determined by a set of source code files of interests (initial elements in *WP*). In turn, other work products related to the source code files will be included. Concerning community members, the scope is rarely restrictive and all community members who have acted or commented on the selected work products are considered as part of the community. The challenge in specifying the scope of *CM* is to align how the various measurement tools are used. Although this may seem trivial, it is a point that can easily jeopardize the validity of an assessment. For

	Release of the QUALOSS Platform	Page : 7 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

example, the tools used to assess WP only execute on the core component of a F/OSS project and not its plugins or optional modules. However, the tools used to assess CM counts members who only contributed to these plugins or optional modules. Given that the two measurement were taken on different scopes, they cannot be combined easily. This may seem insignificant however, many F/OSS component are currently fostered around particular platforms, therefore, the overall community is usually much larger than the one only contributing to the core of the platform. In practice, the problematic in scoping CM in correspondence with WP appears in almost every assessment.

The scoping of TL also follows a pattern similar to the scoping of WP. However, we note that the Release of the QUALOSS Platform does not cover tools and libraries. This may be included in later version of the assessment method.

The scoping of SP is determined by the actual assessment needs. In other words, one will not considered all records showing the evidence of software process execution but rather a sample of these records. Records in SP are for example, bug reports, structure of a version control repository, etc.

It is worth noting that the Release of the QUALOSS Platform does not impose a lengthy recording of the scope of WP, CM, and SP. The only important requirement is that *the scoping an F/OSS endeavor* should be specified accurately enough to guarantee the repeatability of an assessment.

The QualOSS project is concerned about assessing the *robustness and evolvability of an F/OSS endeavor*. These two characteristics of an F/OSS endeavor are important in determining whether it is worth collaborating with an F/OSS endeavor or not. Below are the definitions for these two characteristics.

The ***robustness of an F/OSS endeavor*** is the degree to which an F/OSS endeavor is capable to keep functioning when mishaps occur —a mishap may be internal or external to the F/OSS endeavor in question. For example, a bug being reported or a dispute among community leaders are internal mishaps. A technological shift or the appearance of a new competing F/OSS endeavor are examples of external mishaps.

The ***evolvability of an F/OSS endeavor*** is the degree to which a F/OSS endeavor is capable to remain viable in the long future.

An efficient technique for assessing high-level concepts such as robustness and evolvability is to subdivide them into simpler concepts and repeat the division until the derived concepts become simple enough to be evaluated. This division of concerns creates a tree hierarchy, if the leaf of the tree hierarchy are quality characteristics, then it is referred to as a ***quality model***. Figure 1 illustrates the quality model for defining *robustness and evolvability of an F/OSS endeavor* used by the Release of the QUALOSS Platform.

	Release of the QUALOSS Platform	Page : 8 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

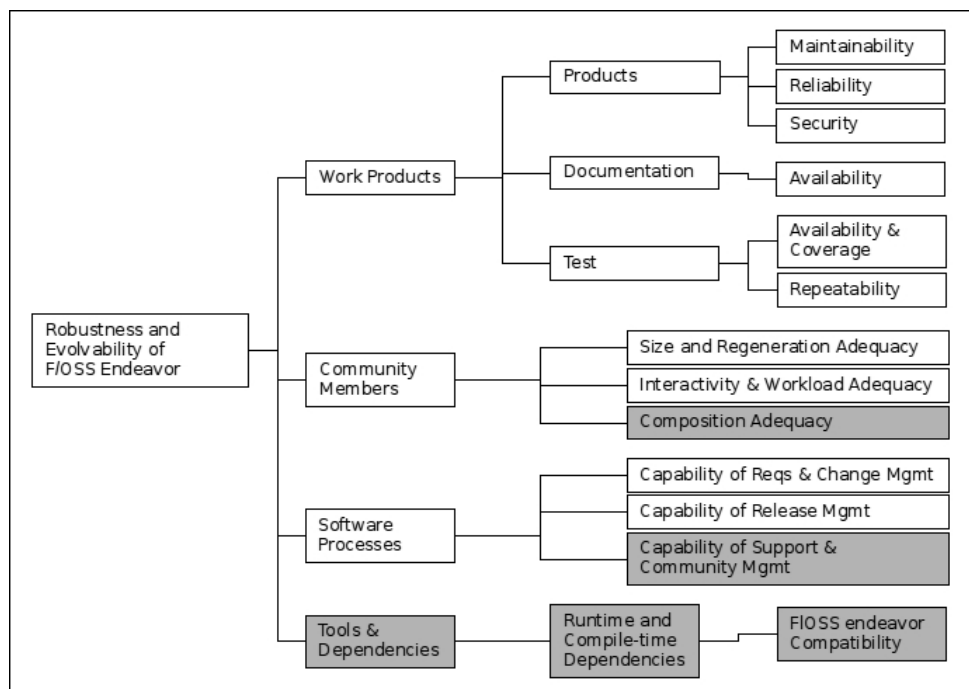


Figure 1: Hierarchical Quality Model of Release of the QUALOSS Platform used to assess risks related to the robustness and evolvability of an FLOSS endeavor.

The grey nodes were originally planned to be covered in Release of the QUALOSS Platform. However, due to time constraints and also to limit the effort needed to perform an assessment, it was decided to put them on hold as they would mostly require manual measurement effort. Eventually, they will be included in a later version of the Standard QualOSS Assessment Method. It is also worth noting that to keep assessment modular, the assessment of the quality model has been split into the following 7 parts: maintainability, reliability, security, documentation, test, community, software processes. Each of these 7 parts has its own spreadsheets that defines measurement procedures and where measure values must be entered.

The QualOSS Methodology v1.1 imposes that its assessment method applies the Goal-Question-Metric paradigm (GQM). Below the important points of the GQM are review and it is also explained how the Release of the QUALOSS Platform instantiated the GQM.

The starting point of the GQM is to formulate a set of assessment goals for each leaf of the quality model above. When applying the GQM (Basili, 1992), a goal is formulated by specifying the issue addressed, the context (of validity), the view point, the quality focus, and the object of the assessment, the purpose of the assessment. For example, if one plans on assessing whether the project JasperReport is worth integrating in a software application, one of the many assessment goals is detailed in the template below.

	Release of the QUALOSS Platform	Page : 9 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Issue	Difficulty in selecting the most appropriate F/OSS endeavor from which to acquire a F/OSS component
Purpose	Evaluate the risk to integrate JasperReport in a software application based on the JasperReport endeavor (object), the context, viewpoint, and quality focus described below.
Context	The context must be defined from the 3 dimensions of a F/OSS acquisition: <ul style="list-style-type: none"> • <i>Usage = integrate in a product</i> • <i>Mode = product comparison</i> • <i>Collaboration = F/OSS full collaboration</i>
Viewpoint	• <i>Product Manager</i> with a long term Management viewpoint (for example)
Object	<i>The JasperReport endeavor (appropriately scoped)</i>
Quality focus	<i>Maintainability (for example)</i>

This is merely one goals related to maintainability. The other assessment goals targeted by the Release of the QUALOSS Platform can be derived as shown for maintainability from the product manager's viewpoint. The purpose of all assessment goals is to evaluate the degree of risk for a leaf characteristic, for particular viewpoint and for the selected context. The general template from which to build all the assessment goal is presented below.

Issue	Difficulty in selecting the most appropriate F/OSS endeavor from which to acquire a F/OSS component
Purpose	Evaluate the risk to integrate a F/OSS component (based on the context, viewpoint, object, and quality focus below described below.)
Context	The context must be defined from the 3 dimensions of a F/OSS acquisition: <ul style="list-style-type: none"> • <i>Usage = integrate in a product</i> • <i>Mode = product comparison</i> • <i>Collaboration = F/OSS full collaboration</i>
Viewpoint	The viewpoint or role encountered in an enterprise project where a F/OSS integration is needed, <ul style="list-style-type: none"> • Product Manager (with a long term Management viewpoint), • Project Manager (with a short term management Viewpoint), • Product Architect (with a technical long term viewpoint), • Developer, Analyst, Tester, Technical Writer (each with a technical short term viewpoint)
Object	<i>A F/OSS endeavor (appropriately scoped)</i>
Quality focus	<i>A leaf quality characteristic of Figure 1</i>

The second step of GQM is to identify a series of questions for each assessment goal. The combined answer to these questions determines the degree to which an assessment goal is satisfied. The spreadsheets mentioned in Section 4 presents the list of questions related to each assessment goal. For the assessment goal given in our example above on maintainability from the product manager's viewpoint, the questions are:

- How is the percentages of enhancements proposal that get accepted?
- How is the rapidity with which accepted enhancements are implemented?
- How is the percentage of changes in the code between major releases?
- How is the percentage of changes to public interfaces in the code (external API) between major releases?
- How is the evolution in code volumetry between various releases of the code over time (in chronological order)?

	Release of the QUALOSS Platform	Page : 10 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Questions for all viewpoints and for each leaf characteristics of the quality model in Figure 1 are available in accompanying spreadsheets (see Section 4 for references to spreadsheets).

The next step of GQM is to determine how to answer each question and how answers can be combined. The GQM also suggests that answer to questions should be done using sound data analysis and sound measurements. Actually, measures are combined into risk indicators. In the QualOSS project, indicators are being developed to quantify the perceived risks associated to an assessment goal, for instance, a predictable behavior in a F/OSS endeavor will be seen as less risky than unpredictable actions, even if such actions may sometimes generate great outcomes. The actual measures, their measurement procedures, the indicators and their procedures of the Release of the QUALOSS Platform are given in spreadsheets (see Section 4 for details).

In particular, enterprises prefer to have risk-based scores that address their particular concerns rather than scores theoretically sound but not directly related to their questions of interest and often hard to interpret. For example, giving a score to product maintainability using the maintainability index formula from the scientific literature is perceived less useful than a score derived from answers to understandable questions such as those listed above.

A **QualOSS indicator** is therefore an instrument that aggregates sound data analysis results i.e. measures (or metrics) to evaluate the risks associated to a quality characteristic of a F/OSS endeavor for the selected F/OSS acquisition scenario.

	Release of the QUALOSS Platform	Page : 11 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

3 ASSESSMENT PROCESS FOR THE RELEASE OF THE QUALOSS PLATFORM

This section describes the assessment process of Release of the QUALOSS Platform. It first reviews the high-level task of the assessment process and then describes the lower-level operations and actions to perform in each tasks.

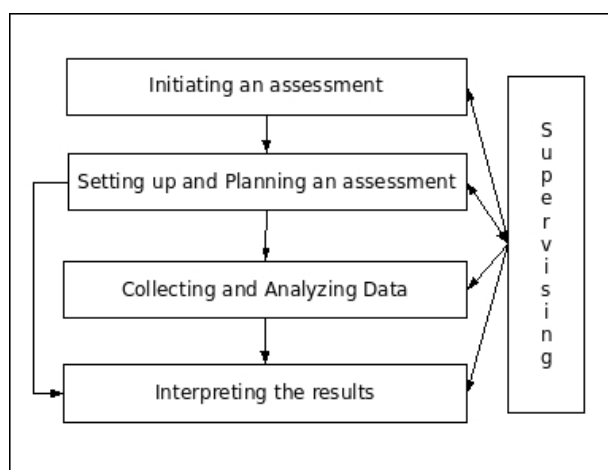


Figure 2: Tasks of the assessment process of the Release of the QUALOSS Platform.

The result of an assessment are collected in a single document. A template for that document is given in file.

StandardAssessmentTemplate.ott

The information below is already included in that assessment report template in that template.

A unique name for the assessment method with its version:

Standard QualOSS Assessment Method v1.1

Effort to apply the assessment method: **Between 0.5–2 person-weeks**

Follows: **QualOSS Methodology v1.1**

Applicable to the FIOSS Acquisition Context:

Usage: **Integration in a Product**

Collaboration: **FIOSS Full Collaboration**

Mode: **Product Comparison**

3.1 INITIATING AN ASSESSMENT FOR A FULL FLOSS COLLABORATION

The 4 objectives when initiating an assessment are

- to describe the broad context of the assessment,
- to justify the need for an assessment,

	Release of the QUALOSS Platform	Page : 12 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

- to explain how the result of an assessment will be used,
- to identify high-level business constraints such as the time-frame in which results must be produced and what maximal effort or cost is acceptable.

A sample text is provided in the template file *StandardAssessmentTemplate.ott* to fulfill the first three objectives however it is preferable to substitute it with a more appropriate description suited to the actual assessment. The only requirement is that the new text describes the three topics above: the broad context of the assessment, the need for the assessment, and how the results will be used.

Finally, the fourth objective of initiating the assessment is concerned with the **identification of high-level business constraints** that must be respected by the assessment. Depending on the resources available in the organization, the importance of the software development project, a middleweight assessment on one F/OSS endeavor should take between 1 person-week and 1 person-month.

If the F/OSS component considered is software library, platform or framework and only small contributions are envisaged then the F/OSS assessment do not need to take more than one person week. On the other hand, if the F/OSS component to integrate already implements a large part of the functionality then the analysis may take a full 1 person-month, just for the assessment of robustness and evolvability. Toying with the F/OSS component to check its functional behavior is not accounted for in that 1 person-month.

3.1.1 CONCRETE ACTIONS AND WARNINGS

Some concrete actions for this task are

Initiate Action 1: Instantiate the assessment description template *StandardAssessmentTemplate.ott* for the current assessment. (Alternatively, if an older evaluation description report is used as starting point, it must be well cleaned up prior to moving to the next task to avoid possible confusion with older data from the previous assessment that would remain in the new document. This action is explicitly made as part of the Supervision task)

Initiate Action2: Fill Section 1 of assessment description report for the current assessment. If the client or assessor has expected results in mind for certain quality characteristic, it is usually important to mention them in Section 1.

Initiate Action3: To speed up an assessment, it is sometimes possible to start with the task of setting up and planning the assessment before completing the initialization of the assessment. In particular, it is usually possible to perform the first 3 operations and a part of operation 4 of the workflow proposed by the task setting up and planning the assessment.

3.2 SETTING UP AND PLANING AN ASSESSMENT FOR A FULL FLOSS COLLABORATION

The objectives of the setting up and planning task are

- To identify accurately the scope of the F/OSS endeavor under assessment,
- To select the evaluators and identify other stakeholders who will be consulted during or might be impacted by the assessment and its results, (including others in the organization and eventually, members of the F/OSS communities),
- To identify workflow to follow during the remaining of the assessment activity and the other rules to obey when performing operations of the workflow,
- To select the appropriate procedures and tools to use to perform each operation of the workflow,

	Release of the QUALOSS Platform	Page : 13 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

- To plan the supervision strategy and inform the person in charge of supervising the assessment of this strategy, and
- To validate the outcomes produced by the first 5 objectives.

A standard workflow to follow during assessments is given in Section 3.2.1. Each operation of the workflow is then described as a list of concrete actions to perform to realize each operation. This workflow is designed to help to fulfill all the objectives of this task listed above. In particular, Operation 4 asks to scope the F/OSS endeavor. Furthermore, guidance on scoping an F/OSS endeavor is presented in Section 3.2.2. With regards to the second objective above, Operations 1, 3 and 7 of the workflow cover the need to identify the necessary people. The standard workflow in Section 3.2.1 fulfills part of the third objective. In addition, Section 3.2.3 specifies a standard set of rules to obey during an assessment. It is worth noting that new rules or refinement of the existing rules is also handled in Operation 5 of the workflow. The forth objective is handled by Operations 6 and 9, where the quality model and tools for computing indicators can respectively be adapted. With regards to the supervision and validation strategy, the rules in Section 3.2.3 explicitly assign this duty to the person responsible for the assessment. Clearly, the responsible person may fail to fulfill the assigned duty. However, in the end an assessment to be considered valid must have maintain a sufficient traceability between the input dataset, intermediate results, processing methods and final results. Hence, if this traceability is inadequate the assessment is not considered valid.

3.2.1 WORKFLOW OF AN ASSESSMENT

Figure 3 presents the workflow of operations to follow during an assessment. This workflow is imposed by the standard QualOSS assessment method.

The entry point of the workflow assumes that the assessment report template used as input of Operation 1 already contains the results from the previous task of initiating an assessment. As part of the Setting up and Planning Task, the operations in the bold box are to be executed.

	Release of the QUALOSS Platform	Page : 14 of 32
		Version: 1.2 Date: Jan 21, 10
		Status : Final Confid : Public

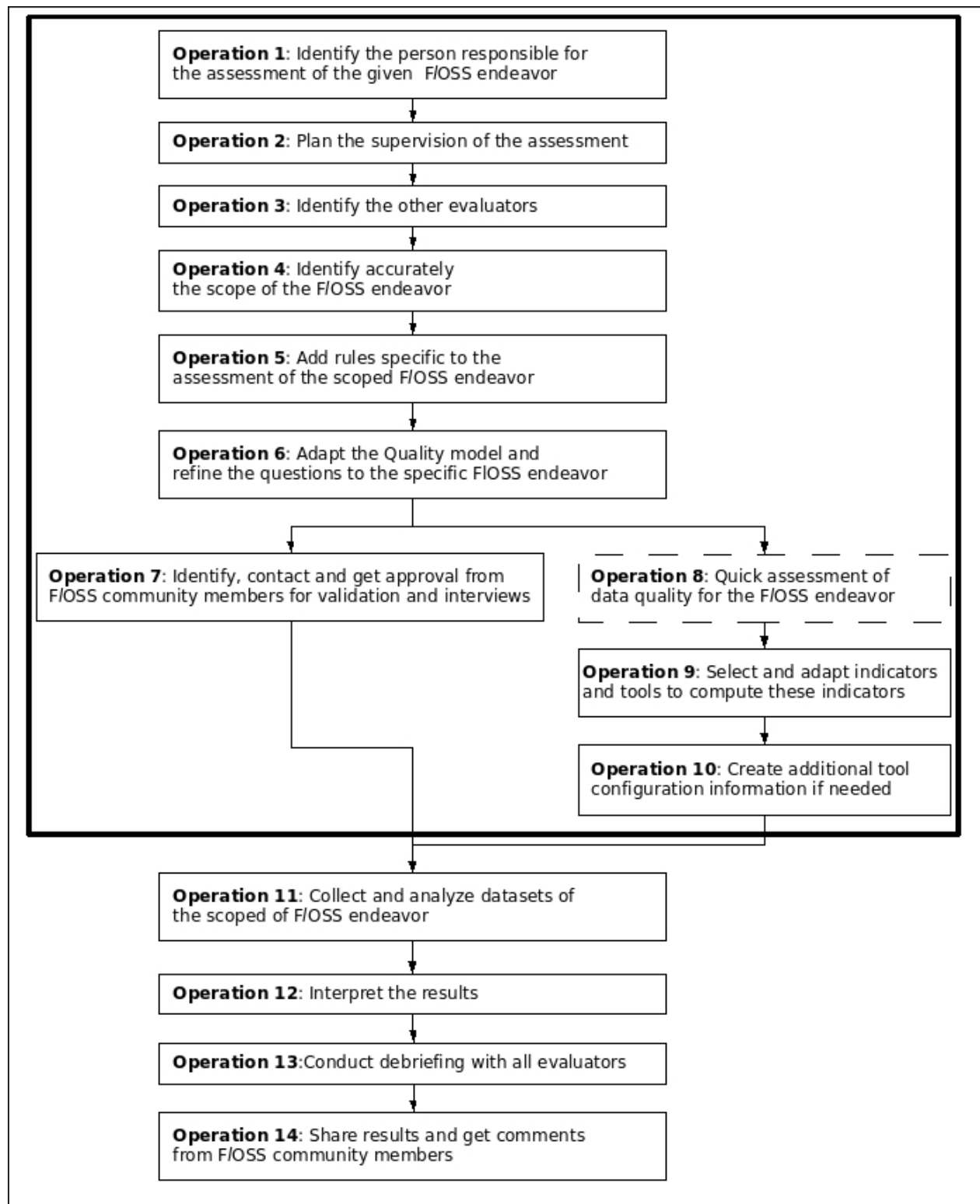


Figure 3: Workflow of operations of the Standard QualOSS Assessment Method v1.1 (same as in v1.0)

Below we explain each operation of the workflow. In particular, the inputs, outputs and processing are described. However, prior, updated information about concrete actions and warnings is given.

	Release of the QUALOSS Platform	Page : 15 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

3.2.1.1.CONCRETE ACTIONS AND WARNINGS ON THE WORKFLOW

Setting up Action 1: An initial scope of the F/OSS endeavor is provided in the fact sheet in Section 1.2 of the assessment description report. The scoping as part of Operation 4 should verify that all data provided are valid and that no additional data source should be considered.

Setting up Action 2: The data sources listed in the fact sheet may not cover the full history or complete scope of the desired F/OSS endeavor. It is therefore important to document the visible data noise and error. These comments can be directly added in the spreadsheet. It is also important to verify that the noise or error in datasets considered is low enough for the assessment results to remain validity.

Setting up Warning 1: Operation 4 of Scoping is usually more challenging than expected. In particular, it is possible to perform source code analysis on tar ball distributions and the perform community analysis on the version control repository (VC rep) where the scope does not match between the tar ball and the VC rep. For example, the source code only analyzes the core code of a project while the community analysis also includes the plugins or vice versa.

Setting up Warning 2: Operation 8 has been dropped from the Standard QualOSS Assessment Method – version 1.1. However, it is left in the general workflow so it can be integrated in a future version.

3.2.1.2.WORKFLOW OPERATION DESCRIPTION

Operation 1: Identification of the person responsible for the assessment of the given FIOSS endeavor.

Implements Tasks:	Setting up and Planning an Assessment
Inputs:	<ul style="list-style-type: none"> Assessment description report with results from the task initiating an assessment (Section 1 written including fact sheet about the FIOSS endeavor to assess)
Outputs:	<ul style="list-style-type: none"> Report instantiated from the template with the responsible person name specified and other eventual information know at the beginning of the assessment
Brief Description of the operations:	<p>The person (initiator) who has a need for the assessment is supposed to have instantiated a copy of the assessment description template and have filled the Section 1 to specify the requirement for the assessment.</p> <p>The initiator will then contact the person or organization capable of taking the responsibility for the assessment. The responsibility may actually be undertaken by the initiator. When a team of people is performing the assessment, a leader assessor must be selected as the responsible person for the assessment.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> The lead assessor (person responsible for the assessment) assigned to the assessment writes her/his name down in the assessment description template. The lead assessor reviews the rules in Annex A of assessment description report to understand all the duty to fulfill. The lead assessor reviews the content of Section 1 from the assessment description to verify that the requirements of the assessment are understood and fit with the context handle by the Release of the QUALOSS Platform. It is particularly useful to already review the validity of data provided in the fact sheet in Section 1.2.

	Release of the QUALOSS Platform	Page : 16 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 2: Plan the assessment and the supervision

Implements Tasks:	Setting up and Planning an Assessment
Inputs:	
	<ul style="list-style-type: none"> • None
Outputs:	
	<ul style="list-style-type: none"> • Updated assessment description report • Master copy of the spreadsheets and log files
Brief Description of the operations:	
<p>The supervision is handled by the lead assessor of an assessment, as specified by the Rules of the Release of the QUALOSS Platform (listed in Section 3.2.3 of this document and also duplicated in Annex A of the assessment description template v1.0).</p> <p>The planning of the assessment can be introduced in Section 1.4 of the assessment description report. An instance of the assessment spreadsheets and their log file must be created. Section 4 lists pointer to these spreadsheets.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • The lead assessor specifies begin and end dates for each task of the assessment in the table of Section 1.4 of the assessment description report. • The lead assessor creates the master copy of the various assessment files, in addition to this assessment description, a copy of the seven spreadsheets and their log file must be created. It is advised to keep each spreadsheet and its log file in their own directory. In this way, additional material created during the measurement effort can be added in the corresponding directory. 	

Operation 3: Identify the other evaluators

Implements Tasks:	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	
	<ul style="list-style-type: none"> • Assessment Report (from operation 1) • Master copy of the spreadsheets and log files
Outputs:	
	<ul style="list-style-type: none"> • Assessment report where where all operations of the workflow have been assigned to specific evaluators
Brief Description of the operations:	
<p>Identify the various assessors who will contribute to the assessment and make sure they can commit to the assessment and its planning. It is also important to give them access to the files they must contribute to (corresponding spreadsheet and log files).</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • The lead assessor fills the assignment table in Section 2 of the assessment description report with the name of additional assessors • The lead assessor asks for the commitment from the other assessors and then gives them access to the copy of the spreadsheet(s) and log file(s) they will need to contribute to • The lead assessor insists with the other assessors on the collection of all assessment actions in the 	

	Release of the QUALOSS Platform	Page : 17 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

appropriate log file and in the appropriate column of the measurement spreadsheets.

Operation 4: Identify accurately the scope of the FIOSS endeavor

Implements Tasks:	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	<ul style="list-style-type: none"> • Fact sheet of the F/OSS endeavor in the assessment description report
Outputs:	<ul style="list-style-type: none"> • Augmented fact sheet of the F/OSS endeavor with more precise information about the scope. • Specify scoping information in the appropriate log file
Brief Description of the operations:	
<p>The scope of work product related to the product must be clearly identified since the product, test and documentation are crucial in the full F/OSS collaboration scenario.</p> <p>Although it is important to be as accurate as possible when scoping the datasets (URL) related to community members, software processes and tools, it is also possible to keep a wider scope than truly needed and it will be the duty of the person who actually needs to assess characteristics of the community, processes or tools to record the data accessed in order to analyze and evaluate each of the characteristics. Refer to Section 3.2.2 for detailed information on scoping and how it can be refined during an assessment.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • The lead assessor in agreement with the other assessor defines the F/OSS endeavor scope more accurately in the Fact sheet, for example, annotate the fact sheet with additional information on how to treat the data found at a given data source. It is especially important to verify that the scope between version control repository, bug tracker database and distribution packages can be defined in equivalent ways so measures taken on each can be aggregated in a coherent way. 	

Operation 5: Add rules specific to this assessment

Implements Tasks:	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	<ul style="list-style-type: none"> • List of rules to follow during the assessment from Annex A of the assessment description report
Outputs:	<ul style="list-style-type: none"> • Augmented list of rules in Annex A of the assessment description report
Brief Description of the operations:	
<p>New rules can be defined in addition to the existing ones in Annex A. In particular, due to the specifics of an assessment, new rules may need to be defined. Some of these rules could for example specify how the evaluators will communicate their results during an assessment.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • The lead assessor in agreement with other assessor adapts existing or specifies new rules to follow during the assessment. 	

	Release of the QUALOSS Platform	Page : 18 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 6: Adapt the quality model and refine the questions of this specific assessment

Implements Tasks:	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	<ul style="list-style-type: none"> • Assessment report with the scoped F/OSS endeavor and added rules
Outputs:	<ul style="list-style-type: none"> • Assessment report with the specific quality model to use for summarizing the results of the assessment of the F/OSS endeavor.
Brief description of the operations:	<p>The Release of the QUALOSS Platform uses the quality model in Section 2. The Figure of the standard quality model is already inserted in the assessment description template hence all assessment description reports automatically inherit this model but they may adapted it if needed as well as the list of goals and questions. However any adaptation must be well documented in the assessment description report and the spreadsheet must be adapted accordingly.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • The lead assessor adapts in agreement with the other stakeholders (other people in the organization) review the quality model, goals and questions to identify the uninteresting ones. Comment for the elimination of elements of the quality model, goals and questions must be commented in the assessment description report • The lead assessor adapts the measurement spreadsheet, in particular, all non-interesting measures (directly or because their goals, questions or characteristics were eliminated from the assessment) should have their measure status set to “-3 – Not Needed” (see Operation 11 for more details on measure status) • The lead assessor notifies the assessors whose spreadsheets were adapted with measure status so they do not take the unneeded measures

	Release of the QUALOSS Platform	Page : 19 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 7: Identify, contact, and get approval from FIOSS community members for validation and interviews

Implements Tasks	<ul style="list-style-type: none"> Setting up and Planning an Assessment Supervising an Assessment
Inputs:	<ul style="list-style-type: none"> Assessment report (from operation 6)
Outputs:	<ul style="list-style-type: none"> Assessment report where list of FIOSS community member who will help with data validation and other interview needs
Brief Description of the operations:	<p>Based on the accurate scope of the FIOSS endeavor, it will then be possible to identify a few relevant FIOSS community members who could help with data source validation as well as comment on assessment results in the last operation of the workflow. However, not all FIOSS community members will have the time or interest to look over assessment results. In turn, during this step, they will be contacted and they will be explained the assessment taking place. If they agree they will then be added to the list of participant to the assessment.</p> <p>Eventually, the organization may decide to share the complete selection context and how the assessment will influence the selection decision. Alternatively, if sharing the complete selection situation did not yield any results, an assessor may wait until Operation 14 to cover dataset validation by presenting measurement results.</p> <p>Importantly, this initial contact serves as first check to verify if the community members are open to entering in a FIOSS full collaboration with an external organization. Hence, this operation should not be overlooked.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> The assessor assigned to Operation 7 (during Operation 3) searches the data source for important community member, that is, ones who likely have a broad knowledge on the FIOSS endeavor. A new community member will likely lack the historical knowledge to answer certain questions about data completeness and representativity. The assessor assigned to Operation 7 contact the identified community members. Add the FIOSS community members who answered positively to the list of assessment participants in the table of Section 2 of the assessment description.

Operation 8: Quick assessment of the data quality for the given FIOSS endeavor

this operation has not been implemented in version 1.1

Implements Tasks	Setting up and Planning an Assessment
Inputs:	<ul style="list-style-type: none"> Assessment report with accurate FIOSS endeavor scope (from operation 6)
Outputs:	<ul style="list-style-type: none"> Evaluation of data quality for Work products, Community Members, Software Processes, Tools and Dependencies
Brief Description of the operations:	<p>This operation consists of performing a quick and light analysis of the various data source based on the specific URL in the fact sheet and the existing tooling in order to predetermine the level of confidence to give to measures on each data source.</p> <p>Concrete Actions: skip this operation</p>

	Release of the QUALOSS Platform	Page : 20 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 9: Select and adapt indicators and tools for computing these indicators

Implements Tasks	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	
<ul style="list-style-type: none"> • Assessment description report with scoped F/OSS endeavor and data quality evaluation 	
Outputs:	
<ul style="list-style-type: none"> • Assessment description report with specific selection of the indicators and of tools for computing these indicators 	
Brief Description of the operations:	
<p>Based on the data available, their format and their content quality, it is possible to determine what indicators can or cannot be computed. In the case where an indicator cannot be computed automatically, it may be possible to propose an alternate manual procedures. Although maybe less reliable, it will at least propose a result rather than none.</p> <p>During Operation 9, assessors also select the indicator to use and the tools to compute them. In the Release of the QUALOSS Platform, the indicators and measures are those found in the spreadsheets distributed with this document. If certain quality characteristics, goals or questions have been eliminated during Operation 6, their corresponding indicators (and measures can be ignored).</p> <p>If indicator tailoring is needed for any reason, it must be recorded and justified in the assessment description report. In other words, a concrete reasoning must be provided to explain why the adjustments to the standard QualOSS indicators had to be performed in the given assessment.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • An assessor who performs indicator tailoring must report it in the appropriate log file. • An assessor sets the measure statuses to “-3 – Not Needed” to eliminate an indicator or a measure from the assessment. (see Operation 11 for more information on measure status) • <i>NOTE: unfortunately, the need for indicator and tool tailoring is often discovered during Operation 11 or 12 of the workflow. In such cases, it is important to back track the assessment so the proper validation is performed and results on non-validated tools are not directly accepted as-is.</i> 	

	Release of the QUALOSS Platform	Page : 21 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 10: Create specific tool configuration information (if needed)

Implements Tasks	<ul style="list-style-type: none"> • Setting up and Planning an Assessment • Supervising an Assessment
Inputs:	
<ul style="list-style-type: none"> • Assessment report with indicators (from operation 9) • Spreadsheets with documentation on tools and log files to collect assessment information 	
Outputs:	
<ul style="list-style-type: none"> • Configuration information needed by tools and procedures for indicator computation 	
Brief Description of the operations:	
<p>In certain cases, analysis tools or even manual procedures must be configured properly to provide reliable, accurate results. For example, to perform an analysis correctly, a code analysis tool may need references to libraries used by a F/OSS component or for code evolution analysis, the source of various versions may need to be packaged in a particular way to prepare for measurement.</p> <p>Rather than attach raw configuration information to the assessment description report, it is preferable to package the configuration and store it in a particular, retrievable URI (Unit Resource Identifier) and only mention that URI in the assessment description report for example, in the appropriate log file of the assessment. Information regarding the command to launch the tools and any error output should also be recorded in that log file.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • Each assessor captures the needed configuration information and packages it properly so the measurement can take place. (For example, a data scoping document, or a zipped file with the data to measure) • Each assessor mentions in the appropriate log file information about the configuration of data. This can either be specified globally in the scoping section of the log file or for a particular measurement. • <i>NOTE: unfortunately, the need for indicator and tool tailoring is often discovered during Operation 11 or 12 of the workflow. In such cases, it is important to back track the assessment so the proper validation is performed and results on non-validated tools are not directly accepted as valid.</i> 	

	Release of the QUALOSS Platform	Page : 22 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 11: Collect and Analyze scoped datasets of the FIOSS endeavor

Implements Tasks	<ul style="list-style-type: none"> Collecting and Analyzing Data Supervising an Assessment
Inputs:	
<ul style="list-style-type: none"> Assessment report with relevant quality model Spreadsheets with relevant goals and questions Log files with appropriate scoping Data configuration packaged appropriately (and commented in the log file) Documentation for each assessment part on how to use the tools and the manual procedures. 	
Outputs:	
<ul style="list-style-type: none"> Analyzed data stored in the spreadsheets <ul style="list-style-type: none"> Measure values Measure status (for each measure value) 	
Brief Description of the operations:	
<p>This step consists of launching the needed tools and manual procedures to obtain the necessary measure values and assign a measure status to each measure. Naturally, assessors must record all their assumptions and decisions in the appropriate log file.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> Assessors launch tools or manual procedures (as documented for each assessment part – See Section 4 for pointer to documentation on each assessment part) Assessors enter the measure values and status in the appropriate spreadsheets. (value domains depends on measure. Measure Status are fixed for Release of the QUALOSS Platform. Zero or positive status means that the measure may be considered. On the other hand, negative status means that the measurement could not be appropriately taken and should not be considered. The measure status and their meaning are as follows (note: below, measurement tools = automated or manual measurement procedures): <ul style="list-style-type: none"> 0 means measure value was taken on complete or nearly complete datasets and measurement tools work as expected on the datasets 1 means that datasets for the measure did not exist. 2 means that datasets were incomplete or noisy or that measurement tools did not work correctly on all datasets. However, the resulting measure value are reliable enough to be used in for indicators. -1 means that a measure is not applicable in the context of the given assessment -2 means that measurement tools did not work properly enough to provide reliable measure values -3 means that a measure is not yet fully defined (in the current Std QAM version) or is of no interest to the assessment (based on stakeholder feedback) Assessors log measurement information in the appropriate log files, specifically, when a deviation happened during the measurement process (for example, an unexpected error) 	

	Release of the QUALOSS Platform	Page : 23 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 12: Interpret the results

Implements Tasks	<ul style="list-style-type: none"> • Interpreting the results • Supervising an Assessment
Inputs:	
<ul style="list-style-type: none"> • Assessment report with quality model • Spreadsheets with measure values and status 	
Outputs:	
<ul style="list-style-type: none"> • Spreadsheets with indicator values, coverages and confidences 	
Brief Description of the operations:	
<p>In the Release of the QUALOSS Platform, the computation of Indicators is mostly automated in the spreadsheet mentioned in Section 4. However, to obtain aggregated information of indicator of indicators, one can submit to the QualOSS team at CETIC (qualoss@cetic.be) all the spreadsheets along with their log files and the assessment description report. If the assessment data responds to all traceability requirements, the results will be loaded in the visualization tool. It is also possible to compute the aggregation manually however, centralizing results on the QualOSS platform will enable opening the debate on the assessment results. This debate will serve as validation.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • Assessors verify that values of indicators are computed correctly. If not then an assessor may attempt to debug the spreadsheet. In any case, the information must be captured in the appropriate log files. 	

Operation 13: Conduct debriefing with all evaluators

Implements Tasks	<ul style="list-style-type: none"> • Interpreting the results • Supervising an Assessment
Inputs:	
<ul style="list-style-type: none"> • Assessment description report • Log files with all needed information for debriefing 	
Outputs:	
<ul style="list-style-type: none"> • Assessment description report with debriefing information and recommendations for future assessments 	
Brief Description of the operations:	
<p>Based on the action previously recorded in the log files, the lead assessor determines whether the assessment data are valid or not. If many unanticipated, corrective actions took place, the validity of assessment results may be jeopardized. The lead assessor must clearly indicate the information on assessment validity in the executive summary of the assessment description report as well as in the Section 5 on supervision.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> • Lead assessor summarizes important measurement information from the log files in Section 3 of the assessment description report • The lead assessor summarizes important indicator computation information from the log files in Section 4 of the assessment description report • The lead assessor summarizes important supervision information from the log files in Section 5 of the assessment description report. In particular, the lead assessor must also enter conclusion on the assessment validity of each assessment part as well as the overall assessment data in Section 5. • Lead assessor submits the assessment description report, spreadsheets and log files to qualoss@cetic.be. 	

	Release of the QUALOSS Platform	Page : 24 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

Operation 14: Share the results and get comments from the FLOSS community members

Implements Tasks:	<ul style="list-style-type: none"> Interpreting the results Supervising an Assessment
Inputs:	<ul style="list-style-type: none"> Final assessment report with debriefing information
Outputs:	<ul style="list-style-type: none"> Relevant comments from FLOSS community members
Brief Description of the operations:	<p>FLOSS community will be given the opportunities to comment on the results of the assessment. In some cases, they will agree with the risk level assigned to the various characteristics of the quality model while in other cases, they may find a justification for their weakness. Yet, they may also show a complete disagreement with the score obtained. When appropriate, these comments will be used to determine the validity of the assessment.</p> <p>It may also be possible that in the light of the assessment results, the FLOSS community member consulted mentions that the datasets used were incomplete. If additional data sources are available, then this may be ground for dismissal of the assessment results. However, it should be determined why these data sources were not mentioned during Operation 7.</p> <p>Concrete Actions:</p> <ul style="list-style-type: none"> The lead assessor informs the FLOSS community members (identified during Operation 7) about results availability via the QualOSS visualization tool hosted at CETIC FLOSS community members will be free to comment on the results via email to the lead assessor (or via a web forum if needed)

3.2.2 SCOPING AN FLOSS ENDEAVOR

This section summarizes the action to perform as part of operation 4 of the workflow that consists in scoping appropriately the F/OSS endeavor to assess. It consists of specifying the work products, the community members, the software processes, and the tools and dependencies to study during an assessment.

Release of the QUALOSS Platform is built for the FLOSS full collaboration. In this context, a FLOSS component is the starting point of the scoping operation. Naturally, the scoping will start from the source code without neglecting other work products related to the source code such as binaries, documentation, and test files. For example, to specify the scope related to the *Eclipse BIRT reporting engine*, one may list a subset of the source code files found in a packaged distribution for the entire Eclipse BIRT plug-in. Subsequently, it is then possible to scope documentation work products by identifying the relevant API in HTML files and tutorial files related to the *Eclipse BIRT reporting engine* only. Finally, unit test files found next to the relevant source files may then be selected in the scope.

Second, it will be possible to identify the software processes and the community members associated to *Eclipse BIRT reporting engine* (and not necessarily related to other part of the Eclipse BIRT plug-in project).

Usually, a wider scope is provided during Operation 4 of the workflow and later operation, in particular, Operation 11 will specify the exact set of input data to use during the measurement procedures. For example, the initial scope for the software process of Evolution may simply specify the root URL of the project website in the fact sheet in Section 1.2 of the assessment description report. Then, it will be the task

	Release of the QUALOSS Platform	Page : 25 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

of the assessor of software processes to record clearly the actual URL where data considered during measurement are found.

This alternative way of scoping where a super-scope is defined initially and then the accurate scope is specified later is more pragmatic but it requires a constant vigilance on keeping traces of URL visited when an assessor performs a manual procedures for evaluating a particular characteristic. As described in Section 4, each assessment part requires creating a log file, this is an appropriate place to record the accurate scope used for measurement. If only a small list, it is also possible to list URL in the spreadsheet for the assessment part.

3.2.3 RULES OF THE STANDARD QUALOSS ASSESSMENT METHOD

Operation 5 of the workflow specifically asks to state the rules to follow during an assessment. Thus, a generic set of rules to respect are presented below.

Rule 1. Every assessment performed must have a single responsible person assigned (referred to as the *lead assessor*).

Rule 2. The responsible person is in charge to verify that the assessment respects the standard.

Rule 3. The responsible person is in charge to verify that each task reaches its objectives,

Rule 4. The responsible person is in charge to verify that the traceability requirement is satisfied throughout the assessment activity.

Rule 5. The responsible person is in charge to verify that the outcomes of each task are validated before handing them to the other tasks of the assessment.

Rule 6. Every assessment must be based on the quality model presented in Section 2 (or a light version where certain quality characteristics are ignored) and the questions listed in the spreadsheets mentioned in Section 4. Justification for ignoring part of the quality model or question must be documented.

Rule 7. The person responsible for the assessment must conduct a debriefing with all evaluators; the result of this debriefing must collect the tension points and unanticipated actions that happened during the assessment. Furthermore, the debriefing results must also records suggestions for improvement for future assessments.

3.3 COLLECTING AND ANALYZING DATA FOR AN ASSESSMENT IN A FULL FLOSS COLLABORATION

The task of collecting and analyzing data corresponds to the Operation 11 of the workflow. Thus the operational description is already provided in Operation 11 in Section 3.2. The description below is provided to show that all the objectives of this task described in the assessment process of the QualOSS Methodology v1.1 are met. In particular, this task has the 4 main objectives:

First, to collect the data whose sources were identified when setting up the assessment, in particular, the accurate scope dataset related to the FLOSS endeavor. This objective should already be achieved based on Operation 10 (last one of the Setting up and Planning).

Second, to analyze and measure the data based on information provided in the spreadsheets mentioned in Section 4. The description of task is specified in the Operation 11 in the previous section.

Third, to maintain a link between the raw data, the methods and tools used to collect and analyze that data, the results of data analysis. This traceability is kept in the log files of an assessment (or alternatively, in the comments in the sheet Measures of the spreadsheets.)

	Release of the QUALOSS Platform	Page : 26 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

The fourth objective is to validate the collected and analyzed data. In the Release of the QUALOSS Platform, this validation is twofold. First, it should be performed as part of the supervision task in parallel to the measurement. It is expected that each assessor comments on the validity of the measurement in the appropriate log files. Subsequently, this information will be captured during the debriefing. The second type of measurement validation is transitive during Operation 14 of the workflow where F/OSS community members can comment assessment results.

Achieving all the objectives of this task is crucial for the validity of the whole assessment. As a consequence when an assessment is performed by a team, the lead assessor for the assessment must pay a careful attention to the logging effort by other assessors in the appropriate log files.

3.4 INTERPRETING THE RESULTS OF AN ASSESSMENT IN A FULL FLOSS COLLABORATION

The task of interpreting the results of an assessment corresponds to the Operations 12 and 14 (although 14 is also considered as a supervision operation). Thus the operational description is already provided in Operation 11 in Section 3.2. The description below is provided to show that all the objectives of this task described in the assessment process of the QualOSS Methodology v1.1 are met. In particular, this task has three main objectives:

First, to interpret the analyzed data resulting from the task *collect and analyze data* (or operation 11) using the interpretation methods selected during the task of *setting up and planning an assessment*,

As commented in the description of Operation 12, this initial part of the interpretation is performed by computing the indicators (from the measure results). In many instances, this is done automatically by the spreadsheet.

The second objective consists in maintaining a link between the analyzed data, the interpretation methods, and the resulting interpretation. In practice, this information is also presented in the spreadsheet. For each indicator, one may find information about the measures and their values in the appropriate assessment spreadsheet.

The third objective, which corresponds to Operation 14 of the workflow, consists in publishing and presenting the assessment results to the F/OSS community members and others. This will be useful to gather feedback. However, to keep this exercise useful, it is important that F/OSS community members understand the context of the assessment. In other words, they must clearly understand that QualOSS indicators do not indicate a theoretical good or bad but rather that indicators are just an instrument to determine risky situation from industry's viewpoint.

Finally, this task must also record problems encountered during data interpretation. Although the spreadsheets automate the aggregation of measures into indicator values, problems may arise. In such cases, one must record them in the log file or add comment to the indicator.

3.5 SUPERVISING AN ASSESSMENT FOR A FULL FLOSS COLLABORATION

The task of supervising an assessment runs during the whole assessment in parallel with the other tasks. Its objectives are:

First, to monitor that the tasks are executed as planned, including that each task performs the validation of its outcome. Instead of having additional workflow operations to reach this objective, the standard QualOSS assessment method distributed the supervision actions in every workflow operations and also emphasized it through assessment rules.

Furthermore, supervision is important when an assessment is performed by several assessors. In particular, assessment parts for evaluating different parts of the quality model may be performed by different assessors.

	Release of the QUALOSS Platform	Page : 27 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

During the task of setting up and planning, the lead assessor potential assigns the various assessment part to different people. The lead assessor therefore knows that supervision effort will need to be heightened in such situations. As described in Section 3.2, the lead assessor performs two supervision actions first at the end of the initiation of an assessment and second through a debriefing session at the end of the assessment (Operation 13 of the workflow). These two actions are sufficient to maintain a light and efficient supervision mechanism.

The second objective of this supervision task is of an overarching nature. It aims to identify tensions between the activity elements that occurred during an assessment. In particular, activity elements are:

- (subjects) The evaluators,
- (object) The data of the F/OSS endeavor,
- (tools) The procedures and tools including the quality model, indicators used in the standard QualOSS Assessment Method and even potential ticketing and wiki system to use during an assessment,
- (community) The other evaluators and F/OSS community members who are involved in the assessment,
- (rules) The rules imposed by the standard QualOSS assessment method
- (division of labor) The workflow imposed by the standard QualOSS assessment method

In the Release of the QUALOSS Platform, achieving this second objective is also achieved during the debriefing. During the debriefing conference call, every elements and its interactions with the other elements will be discussed with all the assessors and then gather in a debriefing summary, which as described in Operation 13 of the workflow is added to Section 5 of the assessment description report.

3.5.1 CONCRETE ACTIONS AND WARNINGS

This section is used to centralize the supervision actions taken in parallel to the other assessment tasks. Some of these task have already been described in the previous tasks above.

Rather than performing supervising actions constantly throughout the assessment process, the idea is to place supervision actions at crucial points of the assessment, first, at the end of the task *Initiate an assessment* to guarantee that the assessment starts is sound and well understood basis, and at the end of the task *Interpreting the results*, to verify that all necessary data was recorded and that validation actions took place to guarantee the quality of results.

Some concrete actions for this task are

Supervision actions of the task *Initiate the Assessment*:

Supervise Action 1: At the end of the task *Initiate the assessment*, the supervisor of the assessment must verify that the instance of the assessment description report is cleaned of any irrelevant data (that could remain in the document from past assessment).

Supervise Action 2: At the end of the task *Initiate the assessment*, the supervisor of the assessment must verify that the assessment description report provides a well documented Section 1.

Supervise Action 3: At the end of the task *Initiate the assessment*, the supervisor of the assessment must verify that the assessment context matches with those expected by the Release of the QUALOSS Platform:

- Usage = Integration in a Product
- Collaboration = F/OSS full collaboration

	Release of the QUALOSS Platform	Page : 28 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

- Mode = product comparison

If the context does not match it should be clearly stated that the assessment applies the Release of the QUALOSS Platform outside its intended scope. Thus the results should be used with caution.

Supervision actions of the task *Interpretation of Results*:

Supervision Action 4: The responsible person verifies all logs to insure the traceability between results, processing, and the input and intermediate data.

Supervision Action 5: The responsible person conducts a debriefing with all the assessors to identify problems encountered and also suggest improvements for future assessment and also improvements for future version of the Standard QualOSS Assessment Method. All debriefing comments are added to the assessment description report.

Supervision Action 6: The responsible person gathers the assessment description report, all the spreadsheets and their corresponding log files and sends them to qualoss@cetic.be for external validation and to share the results via a visualization tool.

	Release of the QUALOSS Platform	Page : 29 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

4 DOCUMENTS OF AN ASSESSMENT

This section mentions the various documents generated during an assessment. In most cases, these documents are templates to fill either text documents or spreadsheets for entering measurement related data. In addition, spreadsheets also document the measurement procedures as well as contain information to help to interpret the results.

Three types of documents are described in their own subsection below, namely, the assessment description template, the measure and indicator spreadsheets and the log files, and finally the documentation files.

4.1 DOCUMENTS FOR DESCRIBING AN ASSESSMENT

Every assessment creates an assessment description report. Instead of starting this report from scratch, a template is provided. When following the workflow described in Section 3, it is highly recommended to use the assessment description template because certain workflow operations specifically refer to sections of the assessment description report. Thus, if that report was generated from the template, the sections mentioned are guaranteed to match.

The template is distributed in the package of Release of the QUALOSS Platform. The name and location are

- */StandardAssessmentTemplate_v1_0.ott* (where / indicates the root directory of the package)

Note: Each instance of the template created for an assessment is used not only to present a summary of the results of that assessment in the executive summary section but it is also used to provide a trace of the various assessment actions that took place.

4.2 MEASURE/INDICATOR SPREADSHEETS AND THEIR LOG FILE

The quality model covered by the Release of the QUALOSS Platform is quite broad. Consequently, the assessment has been divided in seven parts, in particular, maintainability, reliability, security, documentation, test, community, and software processes. Some of these 7 parts are not leaves in the quality model tree, in those cases, parts assess the entire sub-tree. For example, the community assessment part assesses community size and regeneration adequacy, interactivity and workload adequacy.

The breakdown of the assessment in part was performed to make it as modular as possible. An assessment of product quality do not need to always cover all quality attributes hence they were split. However, for the other part (test, documentation, community or software process), an assessment will usually be interested in covering all or none of the characteristics hence they were grouped under the same assessment.

Each assessment part can be conducted without a need to perform the other parts. In consequence, the material to perform each assessment part has been stored in its own subdirectory (listed hereafter). Importantly, when several assessment parts are performed together, it is important to synchronize the scope of the datasets to measure (see workflow procedure Operation 4).

Each spreadsheet contains at least two sheets respectively named 'Measures' and 'Indicators_completeInfo'. The former sheet documents the measurement procedure for each measure and also allows entering a measure value and status resulting from each measurement exercise (on each row of the sheet). The latter sheet 'Indicators_completeInfo' lists goals, questions, and describes the indicators used to answer the questions. Furthermore, the indicator value, confidence, and measure coverage are computed automatically from the measure data entered in the 'Measures' sheet.

The sheet names and locations in the package are:

	Release of the QUALOSS Platform	Page : 30 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

- /01-Product-Maintainability/01-Maintainability-StdQualOSSAssessment-1.1.ods
- /02-Product-Reliability/02-StdQualOSSAssessment-1.1.ods
- /03-Product-Security/03-Security-StdQualOSSAssessment-1.1.ods
- /04-Product-Documentation/04-Documentation-StdQualOSSAssessment-1.1.ods
- /05-Product-Test/05-Test-StdQualOSSAssessment-1.1.ods
- /06-Community/06-Community-StdQualOSSAssessment-1.1.ods
- /07-Software-Processes/07-Processes-StdQualOSSAssessment-1.1.ods

The last number in the spreadsheet name refers to the version of the Standard QualOSS Assessment Method.

During an actual assessment, the assessor must keep track of actions and decisions in log files. At the end of an assessment, a log file should be found for each spreadsheet filled. Instead of starting log files from scratch, log file templates are provided. A Master log file template is also provided. This master template can be instantiated for any of the assessment part. However, in some cases, more refined version of the log file template have been created for certain assessment part.

The Master Log file template name and location are:

- /Generic_Log_Template_v1.log

Refinement of this template is proposed for assessment parts below:

- /03-Product-Security/Security_Reporting_Log_v2.log
- /05-Product-Test/Test_Reporting_Log_v2.log

4.3 DOCUMENTATION AND OTHER FILES

Every assessment part comes with a brief standard documentation. This documentation provides the basic information to get started on an selected assessment part. Eventually, it includes pointers to more complete documentation located within the directory of the selected assessment part. The various documentation files and their locations are:

- /01-Product-Maintainability/MainDocumentation-Maintainability.odt
- /02-Product-Reliability/MainDocumentation-Reliability.odt
- /03-Product-Security/MainDocumentation-Security.odt
- /04-Product-Documentation/MainDocumentation-Documentation.odt
- /05-Product-Test/MainDocumentation-Test.odt
- /06-Community/MainDocumentation-Community.odt
- /07-Software-Processes/MainDocumentation-Processes.odt

Beside the standard documentation above, each assessment part is free to present additional material needs to perform the assessment. Additional material is listed in a section of the standard documentation for the assessment part above.

	Release of the QUALOSS Platform	Page : 31 of 32 <hr/> Version: 1.2 Date: Jan 21, 10 <hr/> Status : Final Confid : Public
--	---------------------------------	--

	Release of the QUALOSS Platform	Page : 32 of 32
		Version: 1.2
		Date: Jan 21, 10
		Status : Final Confid : Public

REFERENCES

- (Basili, 1992) Basili, Victor R., "Software Modeling and Measurement. The Goal/Question/Metric Paradigm", Computer Science Technical Report Series NR: CS-TR-2956 / NR: UMIACS-TR-92-96, 1992.
- (Deprez *et al.*, 2007) Jean-Christophe Deprez, Frédéric Fleurial Monfils, Marcus Ciolkowski and Martin Soto. "Defining Software Evolvability from a Free/Open-Source Software Perspective" in proceedings of the Third International IEEE Workshop on Software Evolvability 2007, Oct. 1st, 2007, Paris, France, pp. 29-35.
- (Deprez, 2008) Jean-Christophe Deprez and Simon Alexandre, "Comparing Assessment Methodologies for Free/Open Source Software: OpenBRR & QSOS" in the proceedings of the 9th International Conference on Product Focused Software Process Improvement (PROFESS 2008), Eds. Andreas Jedlitschka and Outi Salo, Monte Porzio Catone, Italy, June 23-25, 2008, pp 189-203.
- (Henderson-Sellers, 2002) Brian Henderson-Sellers "Process Metamodelling and Process Construction: Examples Using the OPEN Process Framework (OPF)" Ann. Software Eng, Vol. 14, Number 1-4, pp. 341-362, 2002.
- (Henderson-Sellers, 2005) Brian Henderson-Sellers and Cesar Gonzalez-Perez and M. K. Serour and Donald G. Firesmith, "Method engineering and COTS evaluation" ACM SIGSOFT Software Engineering Notes, 30(4), pp. 1-4, 2005.
- (Bjorke, 2005) Bjørke, S.Å. (2005) 'The Concepts of Communities of Practice, Activity Theory and Implications for Distributed Learning' in Lager, R. (ed) *Artikler om høyskolepedagogikk, Skriftserien nr 118*, Agder University College, Kristiansand 2005, ISBN: 82-7117-558-0
- (de Souza, 2003) de Souza, C. R. B., Redmiles, D. F., Opportunities for Extending Activity Theory for Studying Collaborative Software Development, Workshop in Applying Activity Theory to CSCW research and practice, European Conference in CSCW (ECSCW 2003), Helsinki, Finland, September 14-18, 2003.
- (QSOS, 2006) Method for Qualification and Selection of Open Source software (QSOS) version 1.6 © Atos Origin, April 2006 (<http://qsos.org/>).
- (OpenBRR, 2005) Business Readiness Rating for Open Source © OpenBRR.org, BRR 2005 – Request for Comment 1, 2005, (<http://www.openbrr.org>).
- (FLOSSMETRICS) <http://www.flossmetrics.org> (Accessed in May 2008)
- (FLOSSMole) <http://ossmole.sourceforge.net/> (Accessed in May 2008)
- (Ohloh) <http://www.ohloh.net/> (Accessed in May 2008)
- (Gartner, 2008) Gartner, Inc., "Gartner Highlights Key Predictions for IT Organisations and Users in 2008 and Beyond", Egham, UK, January 31, 2008. URL: <http://www.gartner.com/it/page.jsp?id=593207>