QUALOSS

Scope

Many businesses have started to integrate Free libre Open-Source Software (FlOSS) in their products and infrastructures. In consequence, the FlOSS acquisition process is of increasing concern. In proprietary as well as in free software, a first step of acquisition consists of selecting a software component that meets requirements but as importantly, of assessing the reputability of the producer. Such a reputability check usually verifies that the organization producing the software component is serious, in part, that it is robust (able to solve problems and crisis in the short term) and able to evolve to last in the future. While traditional organizations have developed means to convince potential clients of their robustness and evolvability, e.g., display financial strength, these means are not available to the FlOSS world. However, unlike their traditional counterpart, FlOSS endeavours usually share large amount of data publicly. It is therefore possible to analyze those large datasets to gauge the robustness and evolvability of FlOSS endeavours.

Currently, most companies select FlOSS in an ad-hoc manner and often neglect to consider important factors. In response, the Qualoss project proposes to build a methodology for assessing the robustness and evolvability of FlOSS endeavours. This includes the assessment of software code but also of the other elements that constitute an FlOSS endeavour, i.e., work products, community members, software processes, and tools and libraries. The results of an assessment on all FlOSS endeavour elements will provide a comprehensive picture and will therefore improve the decision makers' confidence in making an informed decision about an FlOSS endeavour.

It is important to note that people may not always be interested in assessing FlOSS endeavors that correspond to FlOSS projects. In some cases, they want to assess only part of an FlOSS project or in other cases, a set of FlOSS projects. In turn, the notion of FlOSS endeavour is flexible, i.e., not limited to the single scope of FlOSS project. The scope may be adjusted to the desired grain. The ultimate goal of Qualoss is to build a methodology that adjusts an assessment to the context specified by an evaluator.

Advances

The final Qualoss methodology will propose a set of methods for assessing an FlOSS endeavour. Some methods will help setting up and preparing for an assessment while others will assist in conducting an assessment and interpreting the results. Furthermore, the methodology will also include guidelines for customizing the ready-made assessment method. This ready-made assessment method will evaluate an FlOSS endeavour based on the Qualoss quality model. The Qualoss quality model will be composed of a hierarchy of quality characteristics and of methods for evaluating each of these characteristics.
In its first year and a half, the Qualoss project dedicated all its effort to prototyping an initial assessment methodology.

The prototyping phase consisted of:

- Studying existing work on software quality assessment to identify the relevant quality characteristics, i.e., those related to evolvability and robustness of FlOSS endeavours;
- Creating an initial metrics system to help evaluate these quality characteristics;
- Searching for analysis and measurement tools that could automate the measurements prescribed by the Qualoss metrics system;
- Evaluating five F/OSS endeavours;
- Validating the various outcomes of the prototype phase of Qualoss.

Prototyping helped identify additional important requirements needed in the final assessment methodology so it is capable of addressing a wide range of assessment situations. Initially, it was only plan to assess entire FlOSS projects however analyzing real world FlOSS integration scenarios revealed that in many cases, assessments were needed at other levels of granularity (or scopes), in some cases, assessments are needed only on parts of an FlOSS project (e.g. sub-project or sub-component), in other cases, assessment must be done on a set of FlOSS projects (e.g. when several components from various projects need to be integrated in a final solution).

Although an improvement over existing solutions, there are still problems with the Qualoss prototype. First, the initial quality model was not cohesive enough. It did not clearly identify the object being assessed; it dissociated the assessment of community and of product. Based on that lesson, the object of interest for an assessment was clearly defined : a F/OSS endeavor.

A second shortcoming of the Qualoss prototype is the lack of clarity on how to scope FlOSS datasets to properly assess the desired context. In fact, it is not simple to scope various datasets to the same level. This is due to the various possible configurations of support tools used by a FlOSS endeavour. For example, the bug tracking system may be shared among several FlOSS projects hence containing extra data. The version control system may only contained partial data of a FlOSS project, and mailing lists may be split according to roles, developer, user, etc. For an assessment to propose meaningful results, it is paramount to specify the scope of each dataset to reflect properly the desired scope of interest so the results of analysis and measurements on these various datasets can be aggregated in a meaningful way.
The validation of the prototype also pointed out that the current list of quality characteristics was mostly related to product and it neglected the other elements of a FlOSS endeavour. In particular, it did not include characteristics related to other work products such as tests or roadmap. It only had few characteristics truly related to community and none about community members. It did not clearly specify the important FlOSS software processes to assess. Finally, it ignored the influence of tools and libraries used by FlOSS endeavours. In response, a new quality model is being redeveloped. This quality model will include quality characteristics for all four elements of an FlOSS endeavour, i.e., work products, community and its members, software processes and tools.

Examples of use

Two case studies are conducted in the remaining of the Qualoss project. The first case study involves AdaCore, a Qualoss partner, and their migration strategy to a new GCC version for the GNAT Pro Ada Compiler, AdaCore's main product. The second case study is led by CETIC and it involves other parties not part of the Qualoss consortium. It is related to a software development project on the top of the Plone and Zope technologies.

Achievements

Like OpenBRR and QSOS – two FlOSS assessment methods similar to Qualoss – a shortcoming of the initial prototype is that it only produces a broad, but fairly shallow assessment. However, the final version of the Qualoss methodology is going to deliver assessments at several levels of granularity.

- The flyweight assessment, which only consists in accessing already assessed FlOSS endeavours, that is, FlOSS endeavours whose assessment results will already be present in the Qualoss database. The only assistance needed for understanding results will be a well documented interpretation guide.
- The middleweight assessment, which consists in applying the ready-made Qualoss assessment method on a FlOSS endeavour not yet present in the Qualoss database. It requires a sophisticated understanding of how to scope the raw F/OSS datasets by creating appropriate heuristics and filters. It is expected that the elaboration of heuristics and filters as well we the configuration of analysis and measurement tools require the advice of experts. In turn, companies will usually want to contract out such work.
- The heavyweight assessment, which only applies to specific cases where a customer has very specific requests not yet addressed by the Qualoss ready-made assessment method. In such cases, customization to an assessment method is needed. It is the aim of the Qualoss methodology to also guide experts during their customization exercises. This will be done by providing guidelines and rules on how to tailor the ready-made assessment methods of Qualoss. This dimension is also explored in the Qualoss case studies.

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