Chapter XII

Collaborative Requirements Definition Processes in Open Source Software Development

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Abstract

This chapter discusses typical collaborative requirements definition processes as they are performed in open source software development (OSSD) projects. In the beginning, some important aspects of the entire OSSD approach are introduced in order to enable an understanding of the subsequent description of the feedback-based requirements definition processes. Since the OSSD model seems to represent a successful way of dealing with the significant distribution and heterogeneity of its actors, some opportunities to adapt this approach also in other (software) industries are discussed. Nevertheless the entire OSSD model still exhibits several improvement opportunities that also are addressed in this chapter. In order to overcome possible weaknesses, several approaches to improve the described requirements definition approach are introduced. These improvements help to assure a higher level of efficiency and quality assurance for both processes and the developed artifacts, and furthermore also enable the consideration and acceptance of this approach in other domains and industries.
Introduction

Open Source Software (OSS) has reached a remarkably high popularity in many different application domains throughout the last years. The success of famous OSS products like the Linux Kernel or the Apache HTTPD Web Server leads to the suggestion that the development processes in general and especially the requirements definition processes are well suited to the demands of the users and the developers of OSS. Since the heterogeneous communities of established OSS projects typically consist of a large number of globally distributed actors who collaborate almost exclusively through the Internet, OSS projects should be perceived as complex sociotechnical systems. Whereas typical requirements engineering (RE) processes often are not designed to deal with an increasing level of complexity, heterogeneity and distribution of their organizational structures (Herlea, 1998), the collaborative OSS development methodologies seem to have overcome these issues. This suggests the hypothesis that the underlying OSS development model, which obviously has the ability to produce successful software products, should be considered as a reliable and viable approach in the areas of software engineering (SE) and of cooperative work in general.

Despite the growing popularity of OSS, this new paradigm of software development has not been researched much yet in contrast to proprietary SE processes. Therefore these practices, including the deployed software support of the identified RE processes, should be analyzed in detail in order to determine whether the advantages of these methods can contribute to non-SW-related industries as well.

This chapter outlines and interprets some results of a comparative case study of OSS development processes within the Apache HTTPD\(^1\), the Linux Kernel\(^2\), and the Mozilla project\(^3\). These research activities were aimed at the identification and formalized specification of a descriptive process model for OSS development based on case studies that were performed by participating in the projects, analyzing the projects’ information sources, doing interviews, and literature review. The research was focused on the processes, roles, artifacts, and the deployed software infrastructure, which is used to support the whole development approach and especially the requirements engineering practices presented in this chapter. The identification and formal presentation of a descriptive process model enable the further improvement of the identified processes and its software infrastructure, and furthermore open the opportunity to consider the integration of these practices into traditional software development approaches.

The following describes the results of this approach and focuses on the requirements definition processes in typical OSS environments. Section two provides background information about collaborative RE, and typical characteristics of OSS and OSS development (OSSD) processes, whereas the third section introduces some important aspects of the identified OSSD process model. Section four focuses especially on the requirements definition approach in OSS projects and section five discusses its adaptability to other industries, which is the basis for the description of possible improvement opportunities in section six. Finally the core results of the chapter are summarized in section seven.
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