Chapter 19
Methodology for ISO/IEC 29110 Profile Implementation in EPF Composer

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ABSTRACT

The article presents the ISO/IEC 29110 Profile Implementation Methodology that was developed to manage consistent implementation of individual ISO/IEC 29110 Profiles in the open-source content management tool Eclipse Process Framework Composer. Such an implementation enables effective managing of the standard and its publishing in the form of a web application that can be easily and efficiently used. This methodology represents an example of the usable outputs of the ISO/IEC 29110 standard being utilized in education and research in the Czech Republic. Its main elements described in this article can be also used for implementation purposes in other countries. First, the methodology structure is presented, followed by its individual elements, i.e. General Principles, Profile Structure, Profile Element Mapping, Implementation Conventions, EPF Composer Usage Guidelines, and Implementation Process. The evaluation of this methodology was performed during the implementation of the Entry Profile.

INTRODUCTION

Although software systems play a key role in today's society, software projects do not achieve that kind of success their role predicts. According to several surveys (Johnson, 2006; Ambler, 2013), the ratio of successful software projects ranges to 60%, while the rest is categorized as challenged or failed. Software Process Improvement (SPI) represents a way of improving a status of software development. International standards like ISO/IEC 12207 (ISO/IEC 12207, 2008) ISO/IEC 15289 (ISO/IEC 15289, 2006), ISO/IEC 15504 (ISO/IEC 15504. 2004), and ISO 9001 (ISO 9001, 2008) play an important role in SPI initiatives as companies are willing to show compliance with common business rules. However, according to several surveys (Analecto et al, 2004; Laporte et al, 2008), small companies consider implementation of international standards quite difficult as they lack sufficient resources in terms of

number of employees, budget and time (Coleman & O'Connor, 2008). This fact is also confirmed in research studies (O'Connor & Coleman, 2009; Sánchez-Gordón & O'Connor, 2015). To overcome difficulties small companies face when implementing heavyweight standards and to enable these companies to be recognized as entities that produce quality software, the ISO/IEC 29110 Systems and Software Engineering - Lifecycle Profiles for Very Small Entities (VSEs) standard is being developed by the ISO community. According to the recent systematic literature review focused on the ISO/IEC 29110 standard (Moreno-Campos et al., 2014), an increasing interest in the standard was confirmed as well as a need of further research. To support standard usage in the Czech Republic, such issues like standard localisation, accessibility, and implementation support are of high importance. That is why a number of initiatives promoting the use of the ISO/IEC 29110 standard in the Czech Republic have been carried out by the author of this article. Besides localizing the standard as well as all Deployment Packages, the standard was also implemented in an open source content management tool, the Eclipse Process Framework (EPF) Composer. This allows to effectively manage the standard even when changed and above all to publish it online as a web application that can be easily and efficiently used. Implementation of individual Profiles of the ISO/IEC 29110 standard in the EPF Composer poses a challenge itself due to the complexity of this particular tool. Also, it is necessary to assure a consistent implementation of all Profiles to reach a valid overall usage of the standard. So far, two Profiles in the area of software engineering have been published, i.e. Entry and Basic Profile, and the remaining are under development. To manage further profile implementation and assure its high quality and coherence, the ISO/IEC 29110 Profile Implementation Methodology presented in this article was developed. This methodology represents an example of the usable outputs of the ISO/IEC 29110 standard being utilized in education and research in the Czech Republic. Moreover, it does contribute to a further diffusion of the standard. This article is structured as follows. Following the Introduction, the ISO/IEC 29110 standard is introduced and its application in the Czech Republic is discussed. Further, the EPF Composer is described as the tool utilized for the implementation of the standard. The ISO/IEC 29110 Profile Implementation Methodology is presented including its basic principles, conventions, guidelines and implementation process and then evaluated. Lastly, the concluding remarks are outlined.

ISO/IEC 29110 Standard

In order to help small companies to improve their software processes and be recognized as entities that produce quality software, the ISO/IEC 29110 standard is being developed. The term "very small entity" (VSE) was defined by the ISO/IEC JTC1/SC7 Working Group 24 and consequently adopted in the emerging ISO/IEC 29110 standard meaning "an entity (enterprise, organization, department or project) that has up to 25 people". At first, the Working Group 24 focused on developing a standard in the field of software engineering, while it successively expanded its focus also on the area of systems engineering and services. The standard being developed in the area of systems engineering is further described in (Laporte & O'Connor, 2014). The entire history of the ISO/IEC 29110 standard development is then outlined in (O'Connor & Laporte, 2014).

The ISO/IEC 29110 standard's structure is as follows. Part 1 Overview (ISO/IEC 29110-1, 2010) explains main concepts, terms and structure of the standard. Part 2 Framework and Taxonomy (ISO/IEC 29110-2, 2010) then presents the principles and mechanism of building the VSE Profiles that represent a key concept of the ISO/IEC 29110 standard. As a starting point, the "Generic" Profile Group was defined being applicable to a vast majority of VSEs that do not develop critical software. Within the

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