Chapter 6
4SRS–SoaML Method for Deriving a Service–Oriented Architecture From Use Cases Within a SPEM Approach

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ABSTRACT

The transformation of requirements specification into an architectural design has been a crucial endeavor for the information systems analysis and design community, with ever-new challenges to tackle. Despite the wide and diverse existing proposals, the lack of a common structure and use of different strategies makes it close to impossible to analyze or compare these approaches. Therefore, the use of model-based methods benefits from a detailed specification in order to support their analysis and evolution, also in comparison to other approaches. Following work on the derivation of a logical architecture from business-process use-cases requirements in a service-oriented approach, the authors propose a detailed specification, within a SPEM approach, of a transformation method, which they further analyze and refurbish in order to meet current and future challenges.

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INTRODUCTION

Transition from and consequent alignment between requirements and architectures has consistently been one of the main challenges during information system development, namely within Software Engineering (SE) solutions (Galster, Eberlein, & Moussavi, 2009). This is inherently a modelling activity, in which abstract models of information systems are derived from Requirements Engineering (RE) and then systematically developed from problem to solution space (France & Rumpe, 2007). Nevertheless, this activity counts on scarcely available and disparate techniques to support developers (Salgado, Machado, & Maciel, 2016b), and is confronted with ever-new challenges due to advances in research and practice.

Despite the extensive research in this topic, much is left to do regarding related model-based activities, where comparatively analyzing or evolving any of the numerous existing proposals remains a challenging task (Yue, Briand, & Labiche, 2011). In a previous work, supported in a set of selected proposals focused in model-based transformation approaches, a framework was presented for covering a set of related key issues (Salgado et al., 2016b) to answer these challenges. This framework allows classifying and categorizing the individual details of each approach, further facilitating the assessment and comparison of methods. This work also reinforces the need for any of these methods to be clearly modeled and specified, in order to better support its analysis and evolution.

Consequently, focusing on our 4SRS-SoaML method (Salgado, Teixeira, Santos, Machado, & Maciel, 2015), which is adapted to the derivation of a service-oriented logical architecture from business requirements, we deemed important to perform a detailed specification of its workings and constituents in a model-based approach. As this is one of the most recent approaches surrounding the conventional 4SRS method (R.J. Machado, Fernandes, Monteiro, & Rodrigues, 2005) and due to the growing extension of its associated research topics, we first propose to perform its specification in line with those previous research works.

This proposal intends to prepare the method to overcome doubts and difficulties associated to analysis and evolution according to previous proposals. These include future evolutions as higher control on its execution status, improved monitoring of the tasks, added support to the roles performing those tasks and a detailed view of the transversal use of the work products involved. Following our recent work (Salgado, Machado, & Maciel, 2016a) we will be using the Software and Systems Process Engineering Metamodel (SPEM) (OMG, 2008) for soundness and clarity reasons, thus leaving it open for future adjustments or adaptions to any other similar version.

Accordingly, succeeding this initial proposal for the detailed specification and analysis of the current 4SRS-SoaML method, we propose a new, refurbish version, of the set of steps and respectively associated micro-steps for this method. Supported
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