PABRE-Man: Management of a Requirement Patterns Catalogue[§]

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Abstract— Software requirement patterns have been proposed as an artifact for fostering requirements reuse. In this paper we present PABRE-Man, a software subsystem aimed at managing a catalogue of patterns ready to be applied in requirements engineering projects.

Keywords—software requirement patterns, requirements reuse, call-for-tender processes.

I. INTRODUCTION

The reuse of software requirements may help requirement engineers to elicit, validate and document software requirements and as a consequence, obtain *Software Requirement Specifications* (SRS) of better quality both in contents and syntax. There are many approaches to reuse. Among them, patterns hold a prominent position. A *Software Requirement Pattern* (SRP), following the typical *context-problem-solution* scenario of patterns, basically consists of: a template that may generate one or more requirements by tailoring the template (solution) to a certain project, and some information (context-problem) to identify its need to be applied in that particular project.

In this paper we present PABRE-Man, which is one of the tools that compose the PABRE system (Fig.1): PABRE-Man facilitates the definition of SRPs, as well as the maintenance and evolution of an SRP catalogue; PABRE-Proj provides the use of the SRP catalogue during the elicitation stage and the generation of SRS or call-for-tenders documents.

Figure 1. The PABRE system

Using SRPs in a certain software project implies applying them to elicit the requirements of the project. In the case of requirements that are not covered by any SRP, it is possible to create new requirements related to an SRP (but not as direct application) or even with no relationship to any SRP. The new requirements of different projects can be considered during the catalogue evolution to generate new SRPs or change existent ones.

Both tools have been developed to be the technological support to the assets that we are obtaining in our collaboration with the SSI group of the Centre de Recherche Publique Henri Tudor (CRPHT) of Luxembourg. Specifically, these assets are: one SRP catalogue [1], that is currently composed of 29 non-functional SRPs, and that is continuously evolving; and the PABRE method [2], that provides a guide of use of the SRP catalogue.

II. SOFTWARE REQUIREMENT PATTERNS

For space reasons, we do not include in this paper the metamodel that describes SRPs [3], and on which has been based the development of the tools. Thus, in order to facilitate the understanding of the tool we present SRPs by means of an example. An SRP is a pattern that, when applied, produces requirements related to the objective (goal) of that pattern. For instance, the SRP *Failure Alerts* (Fig.2) application would produce requirements related to the goal of having a system that *alerts users about system failures* (which types of failures shall be monitored, what types of alerts shall be launched, etc.). Goals correspond to *problems* to be solved by applying the SRP.

An SRP consists of several *Forms*, which represent different *solutions* for achieving the goal. For example, the *Failure Alerts* pattern has two different *Forms* depending on whether there is the need of having specific types of alerts depending on the types of failures or not. In each *Form* we always find a *Fixed Part* and some *Extended Parts* (both being templates). The *Fixed Part* always becomes a requirement when using the *Form*. *Extended Parts* are only used if more precise information is required. *Fixed* and *Extended Parts* are both composed by the text to be used as a requirement and optionally some parameters (in italics in the example) to be instantiated during the pattern application in a given software project. The domain of possible values of these parameters is constrained by stating their metrics, which in our example correspond to the set of possible alert types and the set of possible failure types.

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Figure 2. The Failure Alerts SRP

The *Schemas* are hierarchies of classifiers that facilitate the identification and organization of the SRPs relevant for one project. For usability purposes, each requirement analyst may define his/her own schemas. These classification schemas give the *context* where each SRP make sense.

III. PABRE-MAN DESCRIPTION

The functionalities provided by PABRE-Man are mainly: edition and classification of SRPs; exportation of the catalogue (to pdf and rtf); importation of data of the SRPs use in software projects. This importation is relevant for catalogue evolution, and takes to the tool information about: 1) how many times an SRP has been applied; 2) new requirements related with an SRP but not as a direct SRP application; 3) new requirements not related to any existent SRP.

The interface of the tool (Fig. 3) shows permanently a tree with the SRPs of the catalogue classified taking into account one schema. For example, in the figure the catalogue is shown classified following the characteristics and subcharacteristics of the ISO 9126-1 standard. The screenshot corresponds to the edition of SRP *Failure Alerts*. Specifically, it is possible to see one Extended Part of this SRP with its text and the parameters *alerts* and *failures* associated to it, and the type of the metrics of each one. In the main window the metrics manager presents metrics already defined and available for the parameters definition.

IV. FINAL REMARKS

More details about how the current SRP catalogue has been constructed, the PABRE method and the SRP metamodel can be found in [1,2,3].

Different scenarios of use are presented in [1]. Currently both tools are beginning to be used in certain software procurement projects conducted by the CRPHT, by means of the integration of PABRE tools with OPAL [4], the requirements management tool (RMT) used by the CRPHT.

As future work, a new release of PABRE-Man is being developed that provides having versions of SRPs, and exporting requirements to several marketplace RMTs.

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Figure 3. PABRE-Man screenshot