DesCOTS-SL: A Tool for the Selection of COTS Components

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1. Introduction

DesCOTS [1] is a system that has as aim to help clients in the selection of COTS components. This system is based in the use of quality models [2] associated to a software domain for evaluating the products in that domain, and for defining in a formal way the requirements of the clients for finding a suitable product in that domain.

The evaluation and the formal definition of requirements are facilitated by metrics of each quality entity in the quality models. Our ISO/IEC 9126-1-based quality models are a set of quality entities structured in hierarchies of characteristics, sub-characteristics and attributes; with possible intermediate hierarchies of sub-characteristics and attributes.

The selection may be done finding which products, considering the evaluations of the quality entities for the different products, satisfy the restrictions established by the requirements (see figure 1).
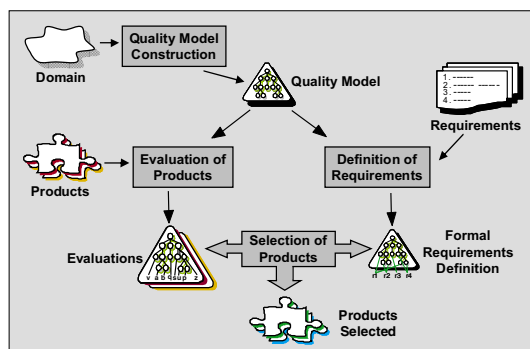

Figure 1. Quality Models-based Selection of COTS

As a basis of the whole system we use a taxonomy of software domains. These domains enclose a significant group of functionality, and may be grouped into categories, that in their turn can be grouped in other categories, until reaching to the most general category of *Software Applications*. The taxonomy is used to facilitate the client the identification of the domain of interest and to manage the different artefacts related with the selection of COTS components:

quality models, evaluations of products, and selection projects.

DesCOTS is constituted by 4 subsystems. Two of them were presented in past RE conferences: QM, which supports the construction of quality models [3] and EV, which supports the evaluation of products [4]. In this conference we present SL that supports the definition of requirements and the selection of products. Finally, the system administration and the taxonomy construction and management provided by the subsystem AD are still under development.

2. SL Functionalities

We are going to illustrate the functionalities of SL by referencing the windows in the screen capture of figure 2, where the main elements related with the *RE06 Project* for the selection of a *Reference Management Tool* (RMT) are shown. It is important to remark, that the quality model of the RMT domain and the evaluations of RMT products need to be introduced previously to the use of SL by means of QM (by users experts in the domain) and EV (by experts in a product, or providers of a product).

Once identified the domain of interest by browsing the taxonomy (*Taxonomy Browser* window) or by using the taxonomy navigator presented in [4], the user needs to create or open a selection project associated to that domain. In the *RE06 Project* window we can see that this project has three requirements organized into two groups.

The requirements, and all their attributes, may be seen in a table format (*View Details* window), and may be sorted by clicking on column names.

To make more effective and automatic the selection, each requirement needs to be formalized by means of a formula. The elements of the formulas are either constants or quality entities belonging to the quality model of the domain. In the *Edit Requirement* window, we can see that the formula for the requirement *RQ2-Capture of References* establishes that the selected product should have *ISI filter* as *Predefined Import Filter* or that the selected product should allow *Adding Import Filters*.
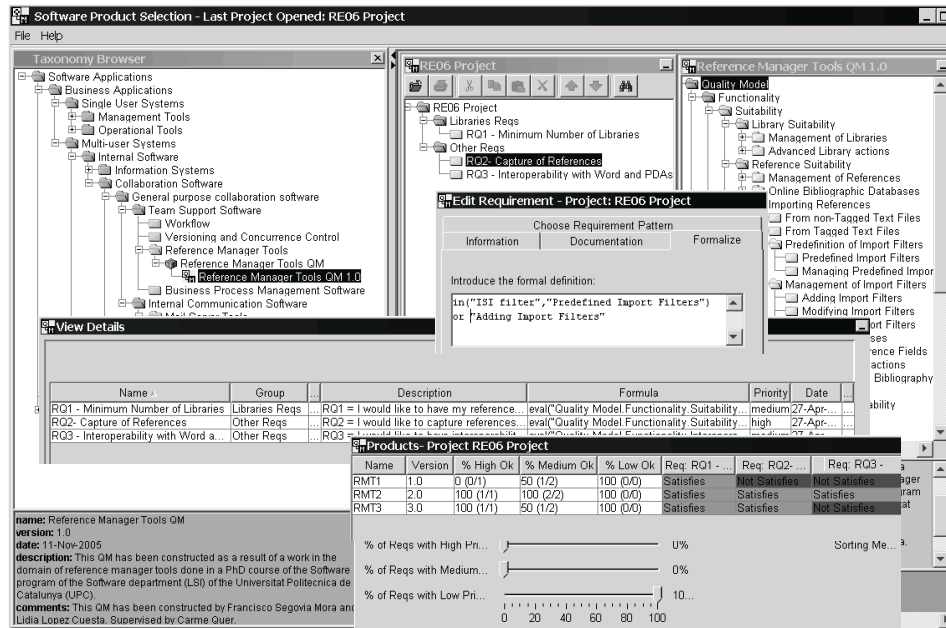
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Figure 2. Selection of a Reference Management Tool

The operands applied to quality entities depend on their metrics. *Predefined Import Filter* is a quality entity of the RMT domain (*Reference Manager Tools QM 1.0* window), that has a metrics of type set with the predefined filters potentially available in a RMT. *Adding Import Filters* is also a quality entity of the domain that has a Boolean metrics.

For one particular project, it is possible to choose among two kinds of priorities for requirements: *ordinal* and *AHP* [5]. The first one establishes three levels of priority (high, medium and low). The results of the selection are those products that satisfy a given percentage of each level of priority. This is the case of requirements of the *RE06 Project*, where *RQ2* has high priority and *RQ1* and *RQ3* have medium priority (*View Details* window). With *AHP* the user has to establish the importance of each requirement of the project with respect to each other. From this characterization it is possible to deduce the importance of each requirement and to determine its priority.

SL shows the result of the selection in a table (see *Products–Project RE06* window). The rows are the products selected (*RMT1*, *RMT2*, *RMT3*), and the columns are the requirements. Every cell in the table has a colour, green or red, depending on whether the requirement is satisfied by the product or not.

In order to expand or reduce the number of products selected, there exists a filter that allows setting the percentage of requirements of each level of priority that each selected product must satisfy. If we require that products selected in the *Products–Project RE06* window satisfy the 100% of high and medium priority requirements (low part of the window), the only product selected would be *RMT2*, which is the only one that satisfies the three requirements.

3. Final remarks

If you are interested in using some of the tools in DesCOTS you may find details about the download process and the use in [6]. You can also find there information about the platform and software used in its development, and about new versions of the tools.

Acknowledgments

References

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