DesCOTS-EV: A Tool for the Evaluation of COTS Components

Carme Quer, Xavier Franch, Xavier Lopez-Pelegrín

Universitat Politècnica de Catalunya (UPC), Barcelona (Catalunya, Spain)

{cquer, franch, cotsdali}@lsi.upc.edu

1. Introduction

In the last years, some methods have been proposed for dealing with COTS component selection. In all of them, a key point is the comparison of the user requirements, which drive the selection process, with the capabilities of the evaluated COTS. Quality models are a means to obtain structured descriptions of COTS domains. Once built, COTS in a domain may be evaluated with respect to the quality entities included therein, quality requirements may be stated with respect to the quality model, and the classical factor-requirement negotiation process may be used for the selection of the most appropriate COTS.

Our goal is to have completely implemented in a near future a new version of the system DesCOTS [1] that will support all the above processes (see figure 1). This system is constituted by 4 subsystems: QM, that helps in the construction and management of quality models [2]; EV, that helps in the evaluation of COTS components and that is the one presented in this paper; SL, that helps in the definition of requirements in a project and in the selection of COTS components that hold these requirements; and AD, that allows the administration of the whole system.
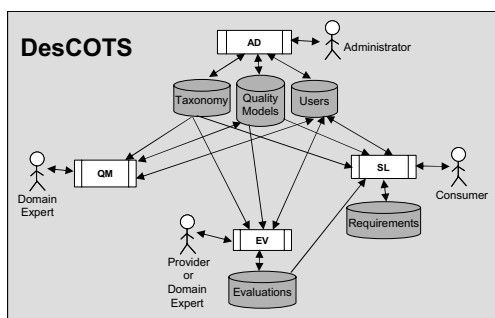

Fig 1. The DesCOTS system

Once the quality model for a domain is registered by means of the QM tool, the EV tool facilitates the evaluation of COTS components belonging to the domain. The tool also supports the identification of the domain to which the COTS belongs by browsing a taxonomy of domains, and thus finding the more suitable quality model in order to evaluate this COTS.

There exist some other systems in the market that could be used for our purposes. They can be grouped in four types of tools represented by: miniSQUID as a tool for defining metrics and quality entities; OPAL as a tool for supporting a COTS selection process; eCOTS as a platform for sharing massive information about COTS domains and components; and IRqA as a typical requirements management tool. All except IRqA have evaluation support. However, none of them is adequate enough for supporting the specificities of our IQMC method [3] for the construction of quality models and the taxonomy management.

2. The quality framework

The quality framework of the DesCOTS system is based on the ISO/IEC 9126-1 standard which, in its current form, embraces both quality models and metrics. Thus, our quality models are a set of quality entities structured in hierarchies of characteristics, sub-characteristics and attributes; intermediate hierarchies of sucharacteristics and attributes are possible.

Quality entities that are evaluated by means of EV have subjective or objective metrics, depending on whether it is possible or not to establish a precise measurement procedure for them: characteristics and subcharacteristics have subjective metrics (if they have metrics at all); derived attributes have derived objective metrics, with a formula associated which establishes how the value of the attribute is calculated from the values of its subattributes; and basic attributes have basic objective metrics, that may be simple (boolean, integer, ...) or structured (set, tuple, domain, function). Taking into account that we accept that attributes may be related with more than one quality entity in the upper levels of the quality model, we allow having a different metrics in every case.

3. EV description

The main functionality of EV is to allow the evaluation of a COTS, once identified the domain to which the COTS belongs. The identification is made by browsing the taxonomy of categories and domains in which the repository of quality models is structured. This taxonomy is shown as a hierarchy when users

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start the tool. The browsing may be done in two modes: the expert mode, for expert users of the taxonomy, that consists on opening and closing the categories of the taxonomy, looking for the domain; and the basic mode, for users that do not know the taxonomy, that consists in browsing the taxonomy with the help of a wizard that drives the identification of the domain by asking questions and proposing different answers that yield to the suitable domain.

EV allows managing evaluations of multiple COTS components, and thus these COTS must be registered in the tool. In figure 2 we can see at the left hand side the taxonomy of *Business Applications* [4] where we can identify the mail server domain, and embedded in the taxonomy the mail server products that are being evaluated. The window to add a new mail server that the user wants to evaluate is also shown.

Once selected a product, the quality model of the domain appears in a new window and the evaluation of each quality entity may begin. In figure 3, we can see that the window of the taxonomy has been hidden and the user is evaluating the quality entity *Default Folders* that has a set metrics.
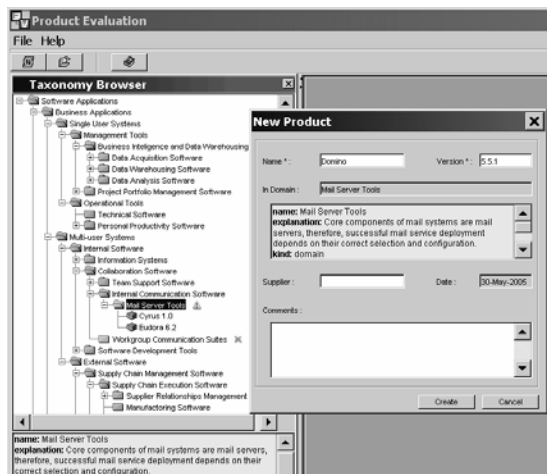

Fig 2. Adding a new mail server COTS component

4. Applicability to requirements engineering

We want to point out that:
- ▪ The existence of quality models for COTS domains facilitates the definition of requirements for COTS components in these domains.
- ▪ Managing evaluations of COTS components respect to a quality model facilitates the selection of components that follow a set of requirements.
- ▪ The questions and answers used in browsing the taxonomy can be viewed as the high-level goals of the COTS component to be selected.
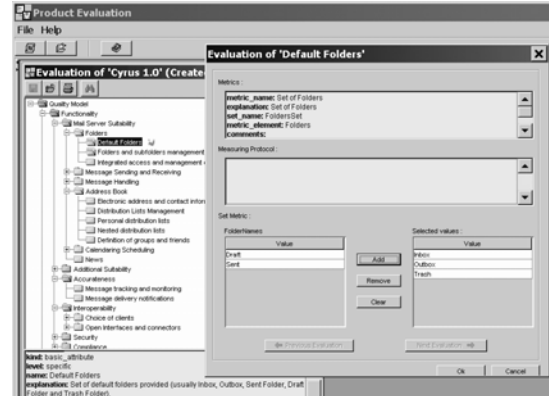

Fig 3. Evaluating the Default Folders attribute

5. Final remarks

The tool follows a client/server architectural pattern, with JAVA^{TM}, HTTP/XML and MySQL. All the libraries used are open source, following the aim of getting openness and flexibility.

Users interested in EV may download the client program of the tool [5], and use it, communicating with a server program that access and stores the evaluations in a database located in our host. However, we think in EV as a tool that would be local at the host of the user who makes the evaluation (see fig 1), and that would access to a central host where the taxonomy and quality model definitions would be maintained. In order to make the selection, the SL tool would access to the databases with the evaluations of the providers.

We are currently working in new versions of the SL and AD subsystems, to give support to the selection of COTS components and to improve the management and construction of the taxonomy.

Acknowledgments

References

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