

Interactive Graphical Maps for Infocenter via Model to Model Transformation

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Abstract. In this work we discuss an Eclipse based Model to Model (M2M) transformation to generate interactive graphical maps related to Darwin Information Typing Architecture (DITA) and delivered by the Eclipse *Infocenter*. The maps are shown and manage with a extension of `Prefuse` run-time interpreter that accepts in input instance of `GraphXML` model. The obtained system is called **GIMI** (Graphical Interactive Map into Infocenter). M2M transformation is realized by mapping rules among the DITA Schema and `GraphXML` expressed in `Xtend`, a model transformation language provided by the *openArchitectureWare* (oAW) framework. The M2M approach allows us to reach a clear separation between structures and interpreters and a more maintainable generation of code. Orthogonally, the realization of functionalities specific to domain-related user actions is leaved to extensible run-time interpreters.

1 GIMI Overview

The goal of our project is exploit the Darwin Information Typing Architecture (DITA) [1] to design an build interactive graphical map to be delivered by the Eclipse Help System *Infocenter* - the Internet-based scenario used by IBM to support its online Manual Management System (MMS). The resulting navigation system is called **GIMI** (Graphical Interactive Map into Infocenter).

Graphical maps are used to give visual supports for understanding and representing knowledge. In fact, different map styles can be exploited to emphasize different aspects of the information given by the *eContents* and to allow users to perceive concepts in different ways. In our project, the maps are show and managed by a run-time interpreter which is an extension of the `Prefuse` toolkit [2], that accepts in input models instances of `GraphXML` and provides interactive functionalities such as zooming, filtering and detailing-on-demand.

To provide the input of the graphical maps we realize a model to model transformation [3] that statically links domain parts (DITA) to presentation parts (maps in `GraphXML`) by running mapping rules defined among both meta models. The rules are expressed in `xTend` a model transformation language provided by the *openArchitectureWare* (oAW) framework.

The logical architecture of the generation system is shown in the picture 1. The content model (written with the help of a DITA editor) is given as input to the transformation process together with the transformer specification `M2MSpec` expressed in `Xtend`. The model (instance of the `NavMap` model) obtained as result of the transformation becomes the input of the runtime rendering library (`Prefuse`).

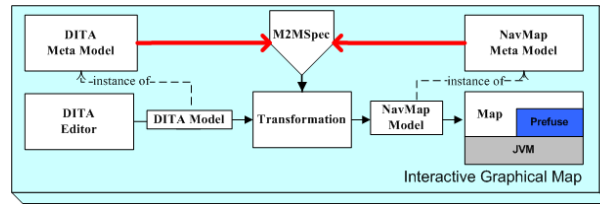


Fig. 1. Model to model transformation process.

Our final intent is to extend the Infocenter visual interface in order to allow learners to use a map as a new form of navigation inside the contents as manual. To this end we introduce in the Infocenter the graphical map provided by a Java Applet included in a new frame (NavmapFrame) to be shown at the client site. The task of the new frame is to load the applet with the right configuration file generated from the model transformation. The result is depicted in figure 2.

In order to improve the use of the map also as the input device to add annotation and to organize navigation into customizable *reading paths*. We have defined a Domain Specific Language (DSL) [4] by introducing a new formal model for content organization [5] from which to start the map generation process.

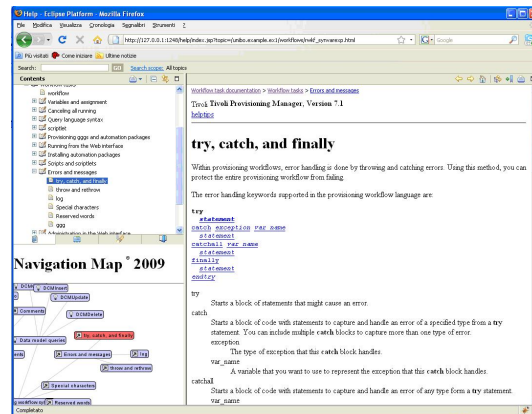


Fig. 2. GIMI resulting user interface.

1.1 Model to Model Transformation

The use of model to model transformation has several architectural and development advantages. First of all it introduces a clear separation point in the overall architecture between structures and interpreters with the advantage of system modularization. Moreover, in case of refactoring, this transformation is more maintainable being directly

connected with both meta model (source and target). This type of solution promotes a strong reuse of code, by inserting maintainable transformation.

The transformation system is based on a set of Eclipse plugins, by exploiting the openArchitectureWare (oAW) framework [6], which is a modular MDA/MDD generator suite implemented in Java. oAW has strong support for EMF-based models [7] but can work with other models, too (e.g. UML2, XML, XSD or simple JavaBeans) through the specific mapping with the Ecore independent model.

Mapping rules are expressed in oAW Xtend, which a general purpose transformation language that enables to build functions over meta model elements, by means of a compact syntax and powerful supports for model management. Xtend has special operators to work on collection; the major drawback is that it is not compliant with the standard QVT and has no support for debugging.

1.2 Conclusions

The M2M approach was successful because it was available the Eclipse and oAW framework that provide the right abstraction to easily implement Model Driven Software Development techniques as the use of static-mapping. The final attended result was reached, the GIMI system improves Infocenter navigability by showing interactive graphical map. A working example of the map is available on the web at the link: lia.deis.unibo.it/Staff/Enrico.oliva/WebMap/Map_wrapper.htm.

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