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Criteria Based Evaluation for Transforming CIM to PIM

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Abstract. Model transformation is the most interesting part and the main key in Model Driven Architecture (MDA). The transformation from Computation Independent Model (CIM) to Platform Independent Model (PIM) is the first transformation in MDA and it is very important in designing high quality software. Several CIM to PIM transformation approaches have appeared, they have not been objectively analyzed yet. In this paper, we provide a review of several CIM to PIM transformation approaches, and present a criteria-based evaluation. The results can be used for evaluating and comparing CIM to PIM transformation approaches.

1 Introduction

MDE (Model Driven Engineering) [4] is an alternative approach which aims at the development of information systems, based on the creation of source models and transforming them to multiple levels of abstraction until we automatically get a code. Its objective is to automate the process of software development that the specialists follow manually. MDE is a general approach that can be seen as a family of approaches, where MDA (Model Driven Architecture) [1] supported by OMG, is presented as the most interesting and the most common variant. MDA has the same principle as MDE, but it provides its own characteristics defined in three levels of abstraction, defines some requirements to be respected, and also recommends the use of some standards.

The first level of MDA is the CIM (Computation Independent Model) presented as models used by business managers and business analysts to describe the business process. The second level is the PIM (Platform Independent Model) which allows defining the models used by analysts and the software designers to realize an independent analysis and a conception of the developed software. The third level is the PSM (Platform Specific Model) which is considered as models of code used by software developers. These models are believed to contain all the information needed to operating an execution platform and used by software developers. The code is not a model of MDA, but it is the final result of the MDA process.

Transformations between different levels of MDA [1] begin by CIM-to-PIM transformation, which allows building PIM models from CIM models. The goal is to reword information contained in CIM models inside PIM models, which ensures that business information are not disappeared throughout MDE[4] process. Then, transformation from PIM models toward PSM models allows adding in PIM a set of technical information related to a target platform.

In practice, automatic transformation begins from PIM to PSM. However, our ultimate aim is to make the CIM a productive level, and a basis for building PIM through an automatic transformation. The goal is that business models do not remain only simple documents of communication between business experts and software designers.

In this paper, we provide a review of several CIM to PIM transformation approaches, and present a criteria-based evaluation. The results can be used for evaluating and comparing CIM to PIM transformation approaches.

We based on paper [5] to create conceptual framework and deducting valuation criteria from it. Then, a criteria based-evaluation [6], [7], [8] used to compare transformation approaches from CIM to PIM. Our Criteria Based Evaluation is compound of static model who present common concepts of transformation from CIM to PIM, taxonomies of CIM and PIM, and transformation method.

Static model: According OMG [1], the CIM level represented by business process models. Then, the PIM level based on one or more analysis and design models. Finally, transformation rules allow shifting from a business process model towards a model of analysis and design. Taxonomy of CIM: Computation Independent Model (CIM) means that this model does not contain information related to the computer science. This level show real-world in business processes model. We divide the models of PIM level according to the three classical modeling views includes functional, static, and dynamic view. A rules collection transforms the source model towards the target model. However, source model derived from source meta-model, and target model derived from target meta-model. Transformation rules are established by using human language, programming language, algorithm, or model transformation language like ATL and QVT.

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