

Jordan University of Science and Technology

Developing Model-Driven Quality-Aware Data Warehouses with a UML Profile

Authors: Omran Al-Badarneh, Asim El Sheikh, Amer Al-Badarneh

Abstract: Nowadays, Model-Driven Architecture (MDA) is playing a major role in today's system's development methodologies. Data Warehouse (DW) researchers try to apply MDA standard on DW development project. After surveying the related literature, we found that the main focus of MDA and DW is not as much on performance aspects of DW as on database issues. With the aim to facilitate building a quality-aware DW, we present an extension of the Unified Modeling Language (UML) to create performance UML2 profile and its corresponding metamodel. The profile is defined by a set of new stereotypes to enable DW team to elegantly represent the DW performance requirements with MultiDimensional (MD) properties at the conceptual level. The proposed approach is MDA compliant and uses Query-View-Transformation (QVT) and Model-to-Text (MTL) languages for automatic generation of Platform Specific Model (PSM) and the implementation code in target platform. One key advantage of the proposed approach is that the conceptual modeling of quality-aware DWs is accomplished independently of the DW target platform, allowing the implementation of the regarded DWs on most of commercial database management systems. Finally, this work has been exemplified and validated by developing a case study in which the proposed profile is used. The outcomes from the validation process give clear evidences that the proposed development framework for DWs outperforms other development methods that do not handle performance requirements at early stages of system development.