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Chapter XVI

Interchange Formats for Reference Models

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Abstract

This chapter presents interchange formats as an enabler for reference model reuse on a technical level. We use a framework to describe the interplay of modeling tools and interchange formats. Based on an extended framework, we discuss the potential of interchange formats for the reuse aspect of reference models. Furthermore, we distinguish four cases of different technical sophistication that are needed to make interchange work. As it is unrealistic that everybody will use the same tool, the standardization of open interchange formats is the second best solution to leverage reference model reuse across different tools. After briefly sketching XMI, BPEL, XPDL and PNML, we focus on event-driven process chains (EPCs) since they are frequently used as a language for process reference models. The introduction to EPC markup language serves as an example to illustrate the design of an open interchange format for a reference modeling language.

Introduction

Since the advent of XML as a standard for the definition of structured data, considerable effort has been put into the specification and standardization of domain-specific XML schemas. Such an XML schema defines the set of allowed XML elements and attributes and the structure in which they may appear for a certain application domain. An individual XML file is said to be valid if and only if its elements and attributes comply with the structure rules of a related XML schema. By this means, the XML schema specifies the set of XML instances which are valid against it. The names of XML elements and attributes are usually taken from the application domain of the schema. Precise data semantics have to be clarified in additional human-readable documents. The overall goal of specifying a domain-specific XML schema is to facilitate the interchange of structured data between different parties related to that domain, for example, business partners exchanging XML-based business documents over the Internet.

The success of XML soon had an impact on how modeling languages were defined and used in practice. One prominent example from the area of workflow modeling is the business process execution language for Web services (BPEL4WS or BPEL) (see Andrews et al., 2003). This language has been defined as an XML schema accompanied by a specification document. XML instance files that are valid against the BPEL schema represent BPEL process models. The advantage is that BPEL models can be processed by and interchanged between different modeling tools and execution engines. Beyond that, interchange formats have also been defined for existing modeling languages. There are various examples such as the PNML schema for Petri nets, the EPML schema for event-driven process chains, and the XMI interchange concept for the unified modeling language (UML).

Throughout this chapter, we discuss that this recent trend has the potential to leverage the application of reference models in practice. In the following, we define reference models as generic conceptual models that formalize recommendations for a certain application domain in order to be reused as best practice recommendation (see Fettke & Loos, 2003). Interchange formats are of particular importance as an enabler for reference model reuse on a technical level (see Brocke & Buddendick, 2004) because they facilitate model exchange between different tools and applications. In Section 2 we present a framework for discussing the interplay of modeling and interchange formats. This framework includes model user, modeling tool, model and metamodel repository, import/export interfaces, model file and interchange formats and it explains how they are related to each other. In section 3 we extend this framework in such a way that the reuse aspect of reference modelling is depicted appropriately. Based on this extended framework, we distinguish four cases based on the level of technical sophistication that is needed to make interchange work. In this context, we discuss the advantages of open specifications of interchange formats from a reference modeling perspective. Section 4 presents current interchange format support for reference modeling languages. While XMI offers a rather mature interchange mechanism for UML-based reference models, considerable work is needed on interchange formats for business process modeling. As event-driven process chains (EPCs) are frequently used as a language for process reference modeling, we present the design of the EPC markup language. It serves as an example to illustrate the design of an open interchange format for a reference modeling language. Section 5 concludes the chapter and gives an outlook on future research directions.