

Chapter XIV

Design Principles for Reference Modelling: Reusing Information Models by Means of Aggregation, Specialisation, Instantiation and Analogy

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ABSTRACT

With the design of reference models, an increase in the efficiency of information systems engineering is intended. This is expected to be achieved by reusing information models. Current research focuses mainly on configuration as one principle for reusing artifacts. According to this principle, all variants of a model are incorporated in the reference model facilitating adaptations by choices. In practice, however, situations arise whereby various requirements to a model are unforeseen: Either results are inappropriate or costs of design are exploding. This paper introduces additional design principles that aim toward giving more flexibility to both the design and application of reference models.

INTRODUCTION

Modeling comprises a concentration on special aspects in design processes by means of abstraction. In particular, information (system) models are built in order to describe relevant aspects of information systems. Due to an increasing de-

mand of these models addressing similar design problems to a certain extent, the development of reference (information) models is subject to research.¹ The essential idea is to provide information models as a kind of “reference” in order to increase both efficiency and effectiveness of modeling processes (Becker et al., 2004; Fettke & Loos, 2003; Scheer & Nüttgens, 2000).

Practical applications of reference models are widespread in the domain of ERP-systems (Becker & Schütte, 2004; Huschens & Rumpold-Preining, 2006; Kittlaus & Krah, 2006; Scheer, 1994). In this domain, reference models set the basis for general business solutions that can be adapted to individual customer needs. In order to support this kind of customising process, reference models are built in a configurative way (Becker et al., 2004; Meinhardt & Popp, 2006; Recker et al., 2005); for a review on German literature (see vom Brocke, 2003, pp. 95-158). This work intends to encounter all relevant variants of prospective applications during build-time of the model in order to facilitate adaptability by means of choices (van der Aalst et al., 2005, p. 77). A vital factor for the economic efficiency of reference modeling is in how far a single variant of the model fits the customer's requirements. As this fit indicates the value of the model, it is also essential for the return on investment in building reference models from a supplier's perspective. Considering the variety of requirements to be faced in today's software engineering, the design principle of configuration illuminates specific limitations. In particular, it is increasingly hard to take into account the various requirements that may be relevant and to incorporate them in the reference model. Hence, supplementary design principles that may enlarge the "tool-kit" of reference modeling appear to be useful. Accordingly, the principles aggregation, specialisation, instantiation, and analogy are presented in this chapter.

Initially, as a theoretical background, the concept of reuse in reference modeling is introduced. This allows an analysis of preliminary works leading to a closer specification of this study's research focus and methodology. On that basis, new design principles are introduced and analysed according to their potential for reference modeling. Finally, a conclusion is drawn and perspectives for future research are suggested.

FOUNDATIONS OF DESIGN PRINCIPLES FOR REFERENCE MODELING

The Concept of Reuse in Reference Modeling

In order to learn how to build reference models according to specific needs, a deeper understanding of essential elements of these particular kinds of models is required. This chapter outlines how these essential elements lie in the intention of building information models which can easily be reused in the design of other models. In addition, relevant dimensions of reusing information models are presented, serving as a framework for this work.

A Reuse-Oriented Concept of Reference Models

According to reviews on reference modeling literature (vom Brocke, 2003, p. 31 ff.), which are predominantly written in German, the concept of reference modeling is introduced on the basis of special characteristics of models. In particular, a certain degree of validity and quality are highlighted. Thus, reference models are meant to describe a sort of best (or common) practice of business in a creation application domain. This approach enables a sophisticated understanding of the idea of reference modeling. However, certain limitations are obvious. Considering the problem of measuring characteristics, for instance, there is no objective reason for awarding or rejecting best practice to a model. At the same time, it may even be questionable in how far this discussion helps to learn about principles of building reference models so that they finally prove to be best practice.

For further work, it seems to be reasonable to ground the concept of reference modeling on the intention of reusing information models. To

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