Chapter 5

Business Semantics Alignment for Business Process Model Integration

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ABSTRACT

Business process modeling has become an accepted means for designing and describing business operations. However, due to dissimilar utilization of modeling languages and, even more importantly, the natural language for labeling model elements, models can differ. As a result, comparisons are a non-trivial task that is presently to be performed manually. Thereby, one of the major challenges is the alignment of the business semantics contained, which is an indispensable pre-requisite for structural comparisons. For easing this workload, the authors present a novel approach for aligning business process models semantically in an automated manner. Semantic matching is enabled through a combination of ontology matching and information linguistics processing techniques. This provides for a heuristic to support domain experts in identifying similarities or discrepancies.

INTRODUCTION

Businesses all over the world are faced with the challenge of having to flexibly react to change and to dynamically work with varying business partners. Business conduct in a globalized world needs to be agile and pro-active. Therefore, continuous shaping and reshaping of business processes and the supporting or even enabling IT is a critical success factor for a business's competitiveness (Frank, 2004; Scheer & Nüttgens, 2000). Management core tasks include sensible business engineering and adequate adaption to current requirements for reasonable allocation of

all required resources. For establishing electronic business, the underlying processes, required information, and subsequent IT-support need to be described precisely (Weske, 2007). Over the past decades, describing business operations by way of business process models has become an accepted means of description and communication in enterprises within and across company boundaries. Such models depict interrelated business activities and business objects in a particular sequence, expressed in a certain modeling language with elements labeled in natural language for designating the domain facts (Schmelzer & Sesselmann, 2008).

The description includes the business processes together with the information and resources used. Often, models are also visually represented in form of diagrams for supporting communication for documentation and quality management purposes, or serving as input for developing IT-support of business operations. Thereby, the process of conceptual modeling of business processes needs to focus on technical and business-related issues alike.

With the help of business process models, organizations can obtain a transparent overview of relevant aspects and perform risk, compliance, security, or general performance analysis (Hammer, 2010). The goals of such analysis are in most cases the identification of potential quality and performance improvements (Hammer, 2010). The wish for efficient business management and work simplification as well as the possibility for business process reengineering as the basis for automating routine operations mostly drives the decision for introducing business process management (Harmon, 2010). Deciding for adopting business process management offers the possibility to manage business performance by means of well-defined processes. The design of business processes is their most fundamental aspect and includes "the specification of what tasks are to be performed, by whom, when, in what locations, under what circumstances, to what degree of precision, with what information, and the like" (Hammer, 2010, p. 8). Models represent processes, often graphically,

and are the foundation of process management, even though there is as yet no standard notation or architecture for process representation (Hammer, 2010).

In general, through modeling a representation of a system is created which offers a simplified abstraction of reality by reducing its complexity through abstraction. Models are helpful for analysis purposes and enable decision support for the management, especially in case of questions concerning business process optimization for increasing business value or for describing relevant aspects of business information systems supporting business operations. Plainly put, these models describe the "what," whereas technical models describe the "how" of a business. In this, business process models take effect in two dimensions. They provide input for the technical realization of automating business process execution as well as in turn may also be influenced by the possibilities the employment of information technologies is offering. At the same time a holistic view of an enterprise's business process model collection allows for all-encompassing description, analysis, and optimization. In this, conceptual models of business processes facilitate business analysis and reengineering as well as the development of software that supports the processes.

Over the past decades, a number of methodologies, modeling techniques, and modeling languages have been developed together with supporting modeling tools (Aguilar-Savén, 2004). Nowadays, various different modeling techniques and languages are in use (Thomas & Fellmann, 2009).

Creating a business process model combines meaning from two different language spaces, as illustrated in Figure 1. A construct from a modeling language needs to be applied correctly and labeled according to the conventions of the natural language depending on the modelers' choice.

Therefore, major tasks in working with existing or legacy business process models are the analysis of these descriptions for the purpose of comparison and detecting commonalities with

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