

## Chapter 7

# Bridging the Gap between Business Process Models and Service Composition Specifications

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### ABSTRACT

*Fundamental goals of any Service Oriented Architecture (SOA) include the flexible support and adaptability of business processes as well as improved business-IT alignment. Existing approaches, however, have failed to fully meet these goals. One of the major reasons for this deficiency is the gap that exists between business process models on the one hand and workflow specifications and implementations (e.g., service composition schemes) on the other hand. In practice, each of these two perspectives has to be regarded separately. In addition, even simple changes to one perspective (e.g. due to new regulations or organizational change) require error-prone, manual re-editing of the other one. Over time, this leads to degeneration and divergence of the respective models and specifications. This aggravates maintenance and makes expensive refactoring inevitable. This chapter presents a flexible approach for aligning business process models with workflow specifications. In order to maintain the complex dependencies that exist between high-level business process models (as used by domain experts) and technical workflow specifications (i.e., service composition schemas), respectively, (as used in IT departments) we introduce an additional model layer – the so-called system model. Furthermore, we explicitly document the mappings between the different levels (e.g., between business process model and system model). This simplifies model adoptions by orders of magnitudes when compared to existing approaches.*

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## INTRODUCTION

Service Oriented Architecture (SOA) is a much discussed topic in companies (Barry, 2003; Erl, 2005; Erl, 2007; Josuttis, 2007; Mutschler, Reichert, & Bumiller, 2008). SOA was introduced to increase enterprise flexibility. Accordingly SOA is expected to support business requirements more quickly than conventional software technology. In this context, business processes and their IT implementation play a crucial role. In particular, there is a high need for quickly adaptable business process implementations, when considering the fact that process changes often become necessary in companies (Weber, Reichert, & Rinderle-Ma, 2008; Weber et al., 2009; Weber, Sadiq, & Reichert, 2009). We pursue the goal to design a SOA in a way that enables easily adaptable business process implementations when compared to contemporary software architectures.

Additionally, we obtain a traceable documentation of the dependencies that exist between high-level activities (i.e., process steps) of a business process model and the technical elements of its corresponding workflow specification (e.g., human tasks or service calls). Thus automated consistency checking across the different model layers becomes possible as part of the software development process. In particular, the effects late adaptations of a business process model have on its corresponding workflow specification and vice versa can be easily traced by utilizing the known dependencies between business process activities on the one hand and workflow activities on the other hand.

A major advantage of our approach is the straightforward creation of the Business-IT-Mapping Model (BIMM) to avoid an unnecessary definition of complex mapping rules. Instead, we maintain rather simple relationships between business processes and workflow activities. Examples from practical settings illustrate the high

effectiveness of this approach with respect to the maintenance of service-oriented applications.

The chapter is structured as follows: We first provide some background information and introduce a basic method for defining service oriented information systems. Then, we describe how business processes can be transformed into a service composition specification. Following that, we discuss how dependencies can be transparently maintained by using an additional Business-IT Mapping Model. Then, we describe the usage of such model and a proof-of-concept prototype. Finally, we discuss related work and conclude with a summary.

## BACKGROUND

A business process represents the documentation of business requirements of the desired service oriented information system (Weske, 2006). Business requirements are often identified by interviewing end users and process owners. These persons detail their own business processes graphically by modeling activities and control flow. Therefore, the main demand on a *business process model* (short: *business process*) is comprehensibility for end users and process owners (Bobrik, 2005). Moreover, their respective business department is normally responsible for modeling the business processes. Even if the operational implementation of this task is carried out by (external) consultants, the business departments still retain responsibility for the results, because only business users command the necessary expertise. During the design phase of business processes, it is primarily the structure of the process flow (control flow), its activities, and authorized users which are documented.

In the following, we first define a general process (Definition 1). Subsequently we define a business process model (Definition 2) as a derivation of a general process.

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