

Chapter 49

User-Centered Business Process Modeling and Pattern-Based Development for Large Systems

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ABSTRACT

In agile software development, it is imperative for stakeholders such as the users and developers of an information system to collaborate in designing and developing the information system, by sharing their knowledge. Especially in development of a large-scale information system, such collaboration among stakeholders is important, but difficult to achieve. This chapter introduces a modeling method of business processes for requirements analysis and a development framework based on Web-process architectures. The modeling method makes it easier for stakeholders to agree upon requirements. It also employs a formal method to allow business process models to satisfy both understandability and accuracy. On the other hand, the development framework above enables rapid spiral development of short-term cycles through the collaboration of developers and users. This chapter also introduces an example that compares the workloads of two requirement analyses of large-scale system developments for a government service and a financial accounting service, in order to evaluate the advantages of the proposed modeling method.

INTRODUCTION

In agile software development, it is imperative for stakeholders in the development of an information system to collaborate in designing and developing the information system. “Stakeholders” includes

business modelers, software developers, users, and system administrators who must agree on specifications, features, and many other items (Highsmith, 2001; Cohn, 2005). However, such collaboration is particularly difficult in the development of a large-scale information system, because such development has many stakeholders and the process, and outcomes of the development

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tend to be so complex that many agile approaches are hard to apply (Boehm, 2004; Erdogmus, 2003; Stephens, 2003).

In order to address the problem of collaboration among all the stakeholders in large-scale system development, this chapter introduces a modeling method of business processes for requirements analysis, and a development framework based on Web-process architectures. The modeling method makes it easier for stakeholders to agree upon requirements. Moreover, it employs a formal method to verify consistency properties of business processes. On the other hand, the development framework enables rapid spiral development through short-term cycles based on patterns of routine tasks in services.

The modeling method employs a diagram to represent a business process, business forms used in the business process and the lifecycles of business forms. The diagram is a workflow with business form lifecycles (BFLs). In order to collaborate in requirements analysis among users and developers of an information system, it is important to use a modeling language that is easily understandable to both users and developers. For example, office workers who use information systems for their services tend to grasp the details of the services based on the process of how they offer the service to their customers. Therefore, it is easier for such office workers to represent the details of their services with business process models, which must be accurate. By verifying a correctness property of BFLs in a workflow, the model is assured to be correct from the perspective of not only the control flow but also the outputs of the business process that are represented by the workflow. Thus, workflows with BFLs have the advantages of both readability and accuracy.

We also introduce a development framework based on Web-process architectures, which helps in dealing with the conceptual diversity of service operations on the Web (e.g., business activities, business processes, workflow applications, software components, and service primitives) as well

as the extensive variety of component repositories available (e.g., UDDI registry, WSDL specification, enterprise data stocks, and software library resources). This framework eventually reduces the cost of information system development. We describe the framework based on Web-process architectures, in which customer processes, front-office processes, and back-office tasks interoperate in a business process model based on workflows with BFLs.

The proposed method and the framework have been applied to the real development of a large-scale information system for local (province) government services. We explain the advantages of the modeling method based on workflows with BFLs of a requirements analysis for large-scale developments from the perspective of agile software development.

Overview of this Chapter

The main body of this chapter consists of a modeling method of business processes and a development framework. Prior to explanation of them, we briefly explain the relationship between the modeling method and the development framework.

The method and the framework above are used to realize a type of SOA development. First, users and developers of an information system that will be developed collaborate in performing requirements analysis with the modeling method. They here develop workflows with BFLs that are explained in Section 2, through iteration of composition and verification of the workflows. In the iteration, users check and/or compose workflows, while developers compose, check and/or support users to compose workflows. Next, they develop the information system from the workflows, by using the developing framework that is explained in Section 3. Developers here develop the information system based on software components that have been developed in a series of development projects by AIST (2006), while users check the information system regularly (Figure 1).

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