Realizing Agile Workflow with DeFleX to Support Adaptive Business Processes

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Abstract

An agile workflow within an organization’s information system allows processes to be defined as they are being performed. It requires general knowledge about the organization to be dynamically combined with specific information about a current workflow. This information, as well as the roles of agents involved, is declared in RuleML so that inferences can drive the workflow. We describe a use case of a bug tracking system where agents need help to decide where to send a document next. DeFleX (Declarative Flexible XML routing) is a prototype implementation of this architecture using standard Web Services technology and an open source inference engine, jDREW. DeFleX uses an often-ignored feature of SOAP, allowing intermediate locations to be dynamically determined, to realize agile workflows.

1 Introduction

Business process modeling and workflow systems are well-suited to handle processes which are repetitive by nature, where the work in question can be modeled a priori, and if information needs and support opportunities are determined once and for all. However, many interesting and valuable work activities do not fit into this static scheme. Static process models might even hinder the development of the intended innovation. Distributed cross-organizational workflows in dynamic and ad hoc cooperations are difficult to model a priori, and complex but unique problems result in complex but unique solutions, which do not justify the effort of complete a priori modeling. The concept of agile workflow is therefore introduced to handle incomplete process models and to intertwine modeling and enactment of workflows.

With its distributed and composable nature, the Web Services architecture is considered to be suitable for realizing agile workflow applications. SOAP, the core protocol that enables Web Services, offers a lightweight approach for exchanging structured information in a distributed environment. In this paper, we utilize the extensibility of the SOAP header to assemble agile workflows, in which SOAP intermediaries are used to model agents or nodes in workflows and the path for message exchange signifies the change of the responsibility among participating agents. To distinguish agile workflows from static ones, the complete message routing path is not specified until run-time.

We proposed a Web Services based architecture enabling just-in-time service composition in accordance with the context and content. A deductive inference engine is employed to perform reasoning services for all the participating agents, or nodes. In this architecture, an organization can define a set of declarative processing rules as general policy and allow insertion of specific processing rules and facts at runtime by each intermediary node. A prototype DeFleX (Declarative Flexible XML routing) is implemented to demonstrate how dynamic message passing is made possible in an agile workflow environment.

We describe a simplified case based on a bug tracking scenario where the initial document is a bug report with incrementally appended information about the attempts to fix the bug, including any test activities that were subsequently performed, a log history of contributing personnel and affected modules, and ad hoc rules and facts inserted by agents to express routing information used for directing this document to appropriate agents, and anything else dy-