Chapter VIII

Towards Flexible Specification, Composition, and Coordination of Workflow Activities

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ABSTRACT

We introduce the ActivityFlow specification language for flexible specification, composition, and coordination of workflow activities. The most interesting features of the ActivityFlow specification language include (1) a collection of specification mechanisms allowing workflow designers to use a uniform workflow specification interface to describe different types (i.e., ad-hoc, administrative, or production) of workflows involved in their organizational processes (an objective of this feature is to help increase the flexibility of workflow processes in accommodating changes); (2) a set of activity modeling facilities, enabling workflow designers to describe the flow of work declaratively and incrementally, allowing reasoning about correctness and security of complex workflow activities independently from their underlying implementation mechanisms; (3) an open architecture that supports user interaction as well as collaboration of workflow systems of different organizations.
INTRODUCTION

The focus of office computing today has shifted from automating individual work activities to supporting the automation of organizational business processes. Examples of such business processes include handling bank loan applications, processing insurance claims, and providing telephone services. Such requirement shift, pushed by the technology trends, has promoted the emergence of a new computing infrastructure, workflow management systems (WFMSs), which provides a model of business processes and a foundation on which to build solutions supporting the coordination, execution, and management of business processes (Hsu & Kleissner, 1996). One of the main challenges in today’s WFMSs is to provide tools to support organizations to coordinate and automate the flow of work activities between people and groups within an organization, and to streamline and manage business processes that depend on both information systems and human resources.

Over the past few years, many workflow management systems have become available on the market, or developed in research labs worldwide (Mohan, 1994; Sheth et al., 1996; Georgakopoulos et al., 1995b). Although there are more and more successes in the workflow research and development, it is widely recognized (Mohan, 1994; Sheth et al., 1996) that there are still technical problems, ranging from inflexible and rigid process specification and execution mechanisms, and insufficient possibilities to handle exceptions, to the need for uniform interface support for various types of workflows (i.e., ad-hoc, administrative, or production workflows)\(^1\), for dynamic restructuring of business processes, process status monitoring, automatic enforcement of consistency and concurrency control, and recovery from failure, and for improved interoperability between different workflow servers.

In this Chapter we concentrate our discussion on the problem of flexibility and extensibility of process specification and execution mechanisms. We introduce the ActivityFlow specification language for structured specification and flexible coordination of workflow activities. The most interesting features of the ActivityFlow specification language include:

- a collection of specification mechanisms which allows the workflow designer to use a uniform workflow specification interface to describe different types (i.e., ad-hoc, administrative, or production) of workflows involved in their organizational processes, and helps to increase the flexibility of workflow processes in accommodating changes;
- a set of activity modeling facilities which enables the workflow designer to describe the flow of work declaratively and incrementally, allowing
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