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A reference model for team-enabled workflow management systems

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Abstract

Today's workflow systems assume that each work item is executed by a *single* worker. From the viewpoint of the system, a worker with the proper qualifications selects a work item, executes the associated work, and reports the result. There is usually no support for teams, i.e., groups of people collaborating by jointly executing work items (e.g., the program committee of a conference, the management team of a company, a working group, and the board of directors). In this paper, we propose the addition of a team concept to today's workflow management systems. Clearly, this involves a marriage of workflow and groupware technology. To shed light on the introduction of teams, we extend the traditional organizational meta model with teams and propose a *team-enabled workflow reference model*. For this reference model and to express constraints with respect to the distribution of work to teams, we use object constraint language (OCL).

Keywords: Workflow management systems; Team-enabled workflow reference model; Computer supported cooperative work; Groupware; Organizational models

1. Introduction

Most publications on workflow management focus on the process (or control-flow) perspective, neglecting the representation of organizational structures and the distribution of work [26], as they relate to a workflow management system. Thus, there is a lack of consensus on the type of organizational structures to be supported. For example, consider how the Staffware system supports the concept of a so-called work queue. Both workers and work items are assigned to work queues. A worker may be linked to multiple work queues and a work queue may be visible to multiple workers, in which case it is called a group queue. Each worker also has a personal queue. Personal work queues can be used to support a *push* mechanism, i.e., work items are

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assigned to specific workers. On the other hand, group queues can be used to support a *pull* mechanism, i.e., multiple workers can view a shared pile of work items and select specific work items. Other workflow systems use other paradigms: IBM's MQ Series Workflow [20] supports both organizations and roles instead of one queue mechanism. Another example is the workflow management system COSA [8], which supports arbitrary organizational dimensions (e.g., groups, roles, authorization, etc.) and merges all relevant work items into one personalized list. The fact that the available systems are quite different with respect to their handling of organizational issues is demonstrated by the varying support for delegation: Systems either have no support for delegation or offer rather specific functionality. Another aspect in which systems are quite different is the distinction between authorization and work distribution. In many systems authorization (the ability to execute a work item) and distribution (assigning tasks to workers) coincide. (Recall the work queue paradigm in Staffware.) Other systems such as FLOWer by Pallas Athena allow for a clear separation of authorization and work distribution. This lack of consensus is also illustrated by the absence of any proposals from the Workflow Management Coalition (WfMC, [24]) concerning the representation of organizational structures and the distribution of work. Although there is a working group on resource modeling (WfMC/WG9), no standards have been proposed. The absence of consensus is an important problem and has been addressed recently by some authors [26,27].

The scope of this paper is limited to the representation of organizational structures and the distribution of work *in the context of team support*. To the best of our knowledge, all commercial workflow products assume a functional relation (in the mathematical sense) between (executed) work items and workers, i.e., from the *viewpoint* of the workflow management system each work item is executed by a single worker. A worker selects a work item, executes the corresponding actions, and reports the result. It is not possible to model or to support the fact that a group of people, i.e., a *team*, executes a work item. Note that current workflow technology does not prevent the use of teams: Each step in the process can be executed by a team. However, only one team member can interact with the workflow management system with respect to the selection and completion of the work item. Thus, current workflow technology is not cognizant of teams. This is a major problem since *teams are very relevant when executing workflow processes*. Consider for example the selection committee of a contest, the management team of a subdivision, the steering committee of an IT project, and the board of directors of a car manufacturer. In addition to providing explicit support for modeling teams, it is also important to recognize that individuals typically perform different roles within different teams. For example, a full professor can be the secretary of the selection committee for a new dean, and the head of the selection committee for tenure track positions. These examples show that modeling of teams should be supported by the future generation of workflow products. In this paper, we explore concepts and technologies for making workflow management systems team enabled.

Groupware technology ranging from message-based systems such as Lotus Notes to group decision support systems such as GroupSystems offer support for people working in teams. However, these systems are not equipped to design and enact workflow processes. Based on this observation a marriage between groupware technology and workflow technology seems to be an obvious choice for developing team-enabled workflow solutions. Systems such as Lotus Domino Workflow [28] provide such a marriage between groupware and workflow technologies. Unfortunately, these systems only partially support a team working on a work item. For example, in