An Evaluation of Inter-Organizational Workflow Modeling Formalisms

Aymeric Dussart, Robichaud Conseil, Canada
Benoit A. Aubert, HEC Montreal, Canada
Michel Patry, HEC Montreal, Canada

ABSTRACT

This paper evaluates the dynamic aspects of the UML in the context of inter-organizational workflows. Two evaluation methodologies are used. The first one is ontological and is based on the BWW (Bunge-Wand-Weber) models. The second validation is based on prototyping and consists of the development of a workflow management system in the aerospace industry. Both convergent and divergent results are found from the two validations. Possible enhancements to the UML formalism are suggested from the convergent results. On the other hand, the divergent results suggest the need for a contextual specification in the BWW models.

Keywords: ontology; conceptual study; prototype validation; UML; IS development methods and tools

INTRODUCTION

Transactions have been traditionally managed either through organizations or through markets. With advances in electronic commerce and in information systems, this distinction is getting blurred. For example, the last years have seen the development of electronic intermediaries, also known as electronic marketplaces (e-marketplaces), which aim at concentrating transactions made within, or across, industrial sectors through a limited number of virtual intermediaries. These virtual markets enhance transactional efficiency through the aggregation of trading partners (Lucking-Reiley and Spulber, 2001) and through a reduction in asymmetrical information. Both means have the potential to substantially reduce transaction costs (Garicano and Kaplan, 2000).

It is clear that electronic business has penetrated business-to-business (B2B) processes and consequently spurred a transformation of the traditional organizational boundaries (Zwass, 1998).
Since technology has made possible the participation of several partners in shared business processes, these have been crossing organizational boundaries to an extent never experienced before (van der Aalst, 2000).

Research on inter-organizational workflow technology is facing an important problem. It has essentially focused on technical issues and has almost ignored language structure (van der Aalst, 2000). This is a classical case of a “technology seducer” problem, very present in the Information Systems (IS) discipline which has been criticized by Weber (1997).

This paper assesses the adequacy of the Unified Modeling Language (UML) for inter-organizational business processes. There is no question that having adequate language structures for representation is a fundamental requirement for adequate development. The evaluation methodology is based on ontology, using Wand and Weber models (1990), and prototyping. Since little empirical validation work has been done on Wand and Weber’s models, this analysis will be combined with a prototypical validation that will consist of comparing the process language used in a workflow management system to the process language used for modeling business processes. By combining the two approaches, convergent results are expected to be found to validate the language.

The paper is organized as follows. First, workflows are defined. Then, a literature review is presented to introduce our ontological evaluation framework and to motivate the choice of the UML as a candidate for thorough ontological and prototypical evaluation. Then, the ontological and the prototypical validation are developed. A discussion of the results follows using the convergent and divergent elements from both validations.

### Definition of Workflows

With leading e-business software vendors such as IBM, BEA systems, Oracle, Vignette.com, and Microsoft (with Biztalk Server) offering workflow solutions, workflow technology can no longer be purely considered as hype. There are over 200 products available today (van der Aalst, 2000). A workflow can be defined as: “The computerized facilitation or automation of a business process, in whole or in part” (WfMC, 1995, p. 6) and a Workflow Management System (WFMS) as: “A system that defines, creates and manages the execution of workflows through the use of software, running on one or more workflow engines, which is able to interpret the process definition, interact with workflow participants and, where required, invoke the use of IT tools and applications” (WfMC, 1995, p. 6).

Originally, workflow appeared from attempts to automate administrative tasks by storing digital copies of bureaucratic documents such as invoices or customer letters (Chaffey, 1998). It has since evolved into a more complex tool for coordinating groups and individuals working in organizations. Recently, workflow technology has been presented as a new way to support inter-organizational business processes (Gartner Group, 1999, [i], [ii]).

The raison-d’être of workflow lies in its ability to automate business processes and consequently to improve operational efficiency. Chaffey (1998) mentions that workflow provides increased process efficiency through automation, process standardization, improved information availability, automated assignation of tasks to staff, and process monitoring through tools capable of measuring individual or team performance.

Three types of workflow are
Concurrency Control for Replicated Data in Distributed Real-Time Systems
www.igi-global.com/article/concurrency-control-replicated-data-distributed/51162?camid=4v1a