

Chapter 2

Enhancing E-Service Collaboration with Enforcement and Relationship Management: A Methodology from Requirements to Event Driven Realization

Dickson K.W. Chiu

Dickson Computer Systems, Hong Kong

Shing-Chi Cheung

*Hong Kong University of Science and
Technology, Hong Kong*

Sven Till

*Hong Kong University of Science and
Technology, Hong Kong*

Lalita Narupiyakul

*University of Ontario Institute of Technology,
Canada*

Patrick C. K. Hung

*University of Ontario Institute of Technology,
Canada*

ABSTRACT

In a business-to-business (B2B) e-service environment, cross-organizational collaboration is important for attaining the interoperability of business processes and their proper enactment. The authors find that B2B collaboration can be divided into multiple layers and perspectives, which has not been adequately addressed in the literature. Besides regular e-service process enactment, robust collaboration requires enforcement, while quality collaboration involves relationship management. These problems are challenging, as they require the enactment of business processes and their monitoring in counter parties outside an organization's boundary. This paper presents a framework for B2B process collaboration with three layers, namely, collaboration requirements layer, business rule layer, and system implementation layer. The collaboration requirements layer specifies the cross-organizational requirements of e-service processes. In the business rule layer, detailed knowledge of these three types of process collaboration requirements is defined as business rules in a unified Event-Condition-Action (ECA) form. In the system implementation layer, event collaboration interfaces are supported by contemporary Enterprise JavaBeans and Web Services. Based on this architecture, a methodology is presented for the

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engineering of e-service process collaboration from high-level business requirements down to system implementation details. As a result, B2B process collaboration can be seamlessly defined, enacted, and enforced. Conceptual models of various layers are given in the Unified Modeling Language (UML). We illustrate the applicability of our framework with a running example based on a supply-chain process and evaluate our approach from the perspective of three main stakeholders of e-collaboration, namely users, management, and systems developers.

INTRODUCTION

The Internet has recently become a global common platform on which organizations and individuals communicate among each other to carry out various commercial activities and to provide value-added services. The term *e-service* generally refers to service provided over the Internet. Organizations that offer such services are known as *e-service providers*. The adoption of e-services in business-to-business (B2B) environment, however, arouses the need for a more in depth study on process collaboration across organizations. Most existing research and practice are still focusing on *regular* e-service process enactment, which represents only the basic knowledge (Chiu et al., 2003b). Effective collaboration requires robustness and quality. More robust B2B process collaboration requires the capturing and dissemination to business partners of the knowledge for correct and effective exception detection and handling, i.e., *enforcement*. *Exception detection* in particular has not been adequately addressed in the literature. We distinguish exception detection from *exception handling* (Chiu et al. 1999; 2001). The former concerns the knowledge of “what” has been deviated from an agreed collaboration process while the latter concerns “how” deviations can be controlled or compensated. Besides these mandatory actions, *quality* collaboration involves also optional actions that relate to business relationship management. Yet, most work on relationship management focuses on customer relationship management (Tiwana 2001) in the B2C context, instead of B2B. Thus, the problem of process collaboration is challenging because

a generally accepted infrastructure for controlling or monitoring the business processes of an organization’s counter-parties is not available.

The study in this paper is motivated by our previous work on the feasibility of modeling e-Contracts based on cross-organization workflows with workflow views (Chiu et al., 2002). We have also studied the engineering of e-Contracts for its enactment (Cheung et al. 2002) and enforcement (Chiu et al., 2003b). Based on these foundation studies together with our recent work on collaborative workflow (Chiu et al., 2009; Wong & Chiu, 2007), we identified the difficulties in modeling e-Contracts (Krishna et al., 2004) and the limitations towards quality collaboration. In particular, requirements solely based on e-Contracts are inadequate because of their incompleteness and ambiguities (Chiu et al., 2003b). Although research on e-service has been steadily progressing, requirement engineering for e-service collaboration beyond basic enactment is almost unexplored.

In this paper, we propose a methodology to structure B2B process collaboration in multiple layers, namely, collaboration requirements layer, business rule layer, and system implementation layer, as well as from multiple perspectives of process enactment, enforcement, and relationship management. Based on our experience on event-driven process execution and exception handling from the ADvanced Object Modeling Environment (ADOME) Workflow Management System (WFMS) (Chiu et al., 1999; 2001), we further utilize event-condition-action (ECA) rules from the active database paradigm (Dayal, 1988) as a unified foundation artifact for eliciting various requirements for cross-organizational e-service

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