

International
Journal of
**Business Process
Integration and
Management**

Volume 3, No. 2, 2008

Publisher's website: www.inderscience.com

E-mail: editorial@inderscience.com

ISSN (Print) 1741-8763

ISSN (Online) 1741-8771

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Business processes have played an important role in enabling business application integration and collaboration across multiple organisations. The integration can be categorised into two types: internal integration and external integration. Internal integration includes all the integration aspects within one enterprise. Enterprise application integration (EAI) is a typical example of internal integration. External integration covers all the possible integration patterns across multiple enterprises. The typical business process based external application integration includes business process to application integration (BP2Ai) and business process to business process integration (BP2BPi).

To stay competitive, companies must be agile in adapting their business processes to the ever-changing market dynamics. The adaptive business process based enterprises should look beyond the traditional enterprises and marketplaces through collaborative interactions and dynamic e-business solution bindings. The enterprise infrastructure has to provide the capability for dynamic discovery of trading partners and service providers as well as enabling federated security mechanisms, solution monitoring and management.

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- Extended business collaboration architecture and solutions
- Business process based business transformation
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- Enabling technologies for business process integration
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MODEL-DRIVEN DEVELOPMENT OF EXECUTABLE BUSINESS PROCESSES

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Preface

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Keywords: BPM; business process management; transformation of business process models; model-driven development of process-aware information systems; Web Services; WS-BPEL; EPCs; WS-CDL.

Reference to this paper should be made as follows: Mendling, J. and Nüttgens, M. (2008) 'Preface', *Int. J. Business Process Integration and Management*, Vol. 3, No. 2, pp.83–84.

Biographical notes: Jan Mendling is a post-doctoral research fellow at Queensland University of Technology in Brisbane. He holds a PhD degree from Vienna University of Economics and Business Administration, Austria. His research interests include business process management, enterprise modelling, and workflow standardisation. He is co-author of the EPC Markup Language (EPML) and co-organiser of the XML4BPM workshop series. He has published in several international journals and conferences and served in several programme committees. He also holds a Diploma both in Business Computer Science and in Business Administration from the University of Trier, Germany.

Markus Nüttgens is Full Professor of Information Systems at University Hamburg, Germany. Prior to joining University Hamburg, he was a Teaching Assistant at the CIM-Technology Transfer Center (CIM-TTZ), Assistant Professor in the Department of Law and Business Administration and the Deputy Director of Institute of Information Systems, University of Saarland, Germany. He has conducted various research projects with focus on information systems architecture and business process management in the industrial, service, and public sector. His research interests include methods and tools for business process modelling, analysis, and optimisation. He was initially involved in the development of the modelling technique 'Event-driven Process Chain (EPC)' and is the Head of the BPM-Laboratory at University Hamburg, Germany. He is a Member of the steering committee of the German special interest group on information systems (German Society of Informatics e.V.). He received a PhD and a Masters in Business Administration from the University of Saarland, Germany.

1 Introduction

XML technologies and applications have attracted increasing attention in the Business Process Management (BPM) community in recent years, since integration aspects have become more and more important in this context. Firstly, there are several interchange formats available to facilitate the exchange of business process models between tools and applications of different focus, for an overview see for example, Mendling et al. (2004). These interchange formats are well suited to serve as input to

model-driven development approaches for process-aware information systems. XML transformations of process models are required to support these approaches in practice. Secondly, web service technology and semantic web applications have a huge potential for run-time integration of process-aware information systems and enterprise applications. In particular, the standardisation of web services and domain-specific, XML-based message formats is a key enabler for business-to-business integration. For more on standardisation in the area of BPM refer to Mendling et al. (2005).

The XML4BPM workshop series provides a forum for researchers and practitioners to discuss latest trends and research directions in BPM and related XML technology. This Special Issue contains best papers from the XML4BPM 2006 workshop (Mendling and Nüttgens, 2006) that have been reworked and extended. All of these papers deal with the transformation of process models in order to derive executable processes. They cover several languages including the Web Services Business Process Execution Language (WS-BPEL) by Andrews et al. (2003), the Web Services Choreography Description Language (WSDL) by Kavantzias et al. (2005), and Event-driven Process Chains (EPCs) by Keller et al. (1992). Furthermore, there are two additional papers dealing with service composition and enactment, security aspects and BPEL unit testing.

The paper by Weber, Haller and Mülle covers the derivation of executable WS-BPEL processes and their respective WSDL interface specifications from WS-CDL choreographies for virtual organisations. In this context, the differences between WS-CDL and WS-BPEL as well as the information gap between a choreography and an executable orchestration are a major challenge. This information gap stems from the requirement to establish a process-based collaboration for a virtual organisation in a top-down fashion. High-level choreography descriptions are utilised to derive executable process definitions. The authors address these challenges, firstly, by specification of a detailed translation table and, secondly, by introducing a specific knowledge base in the transformation process. This knowledge base delivers process fragments that cover internal activities while avoiding their exposure to collaborating roles. The combined solution has been implemented as a transformation program called CDL2BPEL.

The paper by Mendling, Lassen and Zdun addresses transformation strategies between graph-based and block-oriented process modelling languages. Several transformations have been proposed between such process modelling languages, but the general reusability of the applied transformation concepts is rather limited. In contrast to that, transformation strategies abstract from concrete transformations. Therefore, they are applicable for several block-oriented languages such as BPEL and BPML on the one hand and graph-based languages such as BPMN, EPCs, and YAWL on the other hand. The authors identify several generic strategies for transforming from block-oriented process modelling languages to graph-based languages, and vice versa.

The paper by Lübke, Lücke, Schneider and Marx Gómez presents a light-weighted approach to generate executable code from EPC business process models. A major motivation for this work is the time consuming design of process related user interaction which is a serious burden for small and medium sized enterprises. The proposed model-driven generation of process-aware applications involving web service interaction and user interaction only requires the EPC business process model to be annotated with predefined attributes. A respective transformation yields executable code of complete applications. Therefore, even companies that cannot invest heavily into information technology can benefit from web service technology.

The paper by Johnson and Johansson presents a method for assessing the level of business process information security as a score ranging from 0 to 1. The authors collect an extensive set of assessment questions from four international security management standards and cluster them along the three dimensions purpose, time and scope. Weights are assigned to each category based on a citation metric and the original standard documents. Furthermore, the authors use Bayesian network theory for estimating the credibility of the collected data and a survey method for assessing the cost of evidence. The method was tested in a case study with a large European utility company providing information security scores with associated credibility and cost information.

The paper by Li, Sun and Du addresses the problem that BPEL processes are hardly tested systematically and that tool support is scarce. Still, testing is of paramount importance since BPEL processes are meant to support the business operations of companies. The authors define a test framework that covers the simulation of partner processes, their coordination, lifecycle management of the test and test process definition. The test framework has been implemented as an extension to JUnit called BPELUnit. Currently, automatic test case generation is not covered by the implementation, but considered as an additional feature.

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