
Preface: business process modelling and collaboration

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1 Introduction: about this issue

A business process contains a set of activities, which represent both business models and collaborations between different units or organisations. Business processes have played an important role in enabling business application integration and collaboration across multiple organisations nowadays. The integration and collaboration 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).

There are multiple ways to model a business process in declarative ways such as Model-Driven Architecture (MDA), Business Process Execution Language (BPEL) and other formal mathematical methods means such as process algebra. Despite a great interest in the research area of business process modelling and collaboration, complicated technical issues (e.g. security and privacy enforcement) and organisational challenges (e.g. business

process integration and management, negotiation and agreement) remain to be solved.

Today the creation, operation and evolution of business process management systems raise concerns that range from high-level requirements and policy modelling through to the deployment of specific implementation technologies and paradigms and involve a wide (and ever growing) range of methods, tools and technologies. They also cover a broad spectrum of vertical domains and industry segments from electronic and mobile commerce to real-time applications for the extended organisation, for example, business activity monitoring.

All the six papers in this issue will have deep research results to report the advance of business process modelling and collaboration.

Current workflow management systems require fundamental enhancements to their process models and architectures to support dynamic business processes in fast-changing environments. In particular, late-binding mechanisms need to be introduced into the routing and decision steps in the workflow process definitions to optimise high-level objectives based on business metrics. In the first paper 'Self-managed workflow process execution', Shan et al. introduce a choice node to be used in place of route nodes when needed and the required framework for performing dynamic path selection, resource allocation and work queue prioritisation.

Next, many engineering domains involve an intricate interplay of conceptual synthesis of alternative requirements and design configurations, preliminary impact analysis of these alternatives using complex simulations and multimedia visualisations and human decision-making. Design traceability in such settings must be both product- and process-oriented: it must enable an efficient media-based comparison of product alternatives from the current project or related experiences and it must facilitate the reuse of modelling experiences to avoid unnecessary repetition of costly experiences. In the second paper 'Process integration and media-assisted traceability in cross-organisational engineering', Jarke et al. study these problems in a large interdisciplinary project to optimise cross-organisational engineering tasks linking chemical engineering, plastics engineering and related application demands, for example, in the automotive industry. The solution presented in this paper integrates ideas from scenario-based modelling, process integration

and ontology-based management of multimedia artefacts. In the third paper 'Survey of computer-supported collaboration in support of business processes', Chang et al. provide a survey of Computer-Supported Cooperative Work (CSCW) research to examine the current IT-based collaboration techniques capable of supporting business processes. The CSCW field is categorised by the issues tackled by the researchers. Each category is analysed based on past approaches and present achievements; the trends for future research and development are then predicted. In addition, they discuss how CSCW research can facilitate distributed business process integration and management.

As the global marketplace becomes more and more competitive, business organisations often need to team up and operate as a virtual enterprise to utilise the best of their resources for achieving their common business goals. As the business environment of a virtual enterprise is highly dynamic, it is necessary to develop a workflow management technology that is capable of handling dynamic workflows across enterprise boundaries. In the fourth paper 'DynaFlow: a dynamic inter-organisational workflow management system', Meng et al. present a Dynamic Workflow Model (DWM) and a Dynamic Workflow Management System (DynaFlow) for modelling and controlling the execution of inter-organisational business processes. DWM enables the specification of dynamic properties associated with a business process model. In the fifth paper 'Describing and reasoning on web services using process algebra', Salaun et al. describe the essential facets of web services by using process-algebraic notations. In addition, they present a framework based on a mapping between process algebra and web services written in BPEL and illustrate both the modelling of services by process algebra and the use of reasoning tools. Finally, Schuler et al. present a system called Open Service Infrastructure for Reliable and Integrated Process Support (OSIRIS) in a peer-to-peer way. They further present very promising results verifying the advantages over centralised process management in terms of scalability.

As a result, all the six papers further depict various directions with different challenges in business modelling and collaboration for this journal. We sincerely hope that *IJBPM* will continue to grow as a successful journal with author contributions in the challenging research area.