
Guest editorial

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1 Introduction

Expectations from business processes to reflect on a constantly changing environment have become a key factor of an organisation's agility. Traditionally, businesses process management does not adequately address such a dynamic environment; this calls for the advent of new, *dynamic business processes*. General business policies or specific technical constraints make dynamic business process particularly suited to a declarative approach to their modelling and design.

The main topic for dynamic business processes is the notion of requirement. In fact, all the influences of an environment, which might affect the change of a business process, are reflected at least indirectly by modifying results or behaviour expected from the business process. However, not all changes of a business process are equally desirable, and all changes need to satisfy some 'correctness' criteria. Such criteria might be derived from a set of broader business policies or narrower constraints of technical nature. With the use of business policies and constraints that specify or regulate the set of desirable results/states, dynamic business processes become suited for the use of a declarative approach to their modelling and designing.

Generally speaking, in declarative business processes, results or allowed states of a business process are specified (i.e., described) by using a software language. At the same time, an imperative sequence of activities or tasks is not described here explicitly, but it might be inferred by interpreting the declarative specification of a business process. Therefore, the main task for business process modelling is to describe as precisely as possible the results or states a business process needs to produce/reach. With such a declarative nature, the focus of business process management becomes to capture requirements comprehensively for a business process and to validate whether a given implementation of the business process accurately satisfy such requirements.

While the declarative approach appears to be a promising direction for the development and management of future business processes, it also raises a number of research challenges that need to be addressed before the declarative approach becomes widely used. Some of these challenges include: methods for extraction of declarative specifications from domain experts; specifying these declarative specifications in suitable languages or formalisms; and designing, monitoring, checking compliance or dynamically adapting business processes to a set of requirements. Trying to address these and other similar open challenges related to dynamic and declarative business processes, the research community needs both to develop new concepts and to build on existing research in related fields such as formal methods, artificial intelligence, or software engineering. At the same time, it is important to carefully investigate different areas of application and validate the conditions under which the new research results will produce significant benefits. This intersection of factors creates dynamic and declarative business processes an exciting and potentially fruitful research field.

2 Special issue background and topics

This special issue is related to the efforts to establish an international research forum, which will bring together practitioners and researchers in the domain of declarative and dynamic business processes. These efforts resulted in a series of workshops launched in 2008 and entitled – Declarative and dynamic business processes (DDBP). The workshop has so far been collocated with the EDOC conference and its third edition is scheduled for October 2010. This special issue is a follow-up of the first edition of the DDBP workshop. The papers for the special issue were solicited through an open call for papers, which was published after the DDBP workshop, held at the EDOC 2008 Conference in Munich (Germany) in September 2008.

This special issue is organised with the main goal of further promoting research on dynamic and declarative approaches to business process management and service-oriented architectures. In particular, it aims to facilitate bridging theoretical research and practical outcomes. The special issue solicited contributions addressing the open problems, case studies, applications and evaluations of well-established formalisms in new contexts, or any other work assessing the practical significance of dynamic and declarative business processes by means of concrete examples and situations. Some research topics that were explicitly mentioned (but not limited to) in the call for papers included:

- dynamic/declarative business process modelling
- implementation issues for dynamic/declarative processes
- tools for dynamic/declarative processes
- real-world use cases of dynamic/declarative business processes
- business rules and policies
- rule driven business process engines
- business and technical requirements for dynamic/declarative processes
- dynamic/declarative model specification
- mathematical foundations of dynamic/declarative business processes
- formal models of dynamic/declarative business processes
- monitoring of dynamic/declarative business processes
- validation and model checking of dynamic/declarative business processes
- software engineering methods, languages, and standards for dynamic and declarative business processes
- service-oriented architectures and dynamic/declarative business processes
- interoperability for dynamic/declarative business processes

- semantic web and ontologies and declarative and dynamic business processes
- collaboration and declarative/dynamic business processes.

3 Selected papers

After an encouraging response to the open call for papers, followed by a rigorous peer-review process, this special issue brings four papers. The paper entitled ‘Enterprise process modelling complemented with business rules’ by Joseph Barjis tackles the challenges of complexity, dynamicity and flexibility of today’s business processes. Considering the integration of business rules into enterprise models as a possible solution, the paper builds upon the use of ontological models.

The paper ‘A rule-based approach to model and verify flexible business processes’ by Mohamed Boukhebouze, Youssef Amghar, Aïcha-Nabila Benharkat and Zakaria Maamar investigates organisational needs for changing their business process models and assuring that those changes are verified. In their investigation, the authors consider the case when business rules are used to represent business processes to allow for effective updating of the business logic. The proposed verification approach is based on the use of coloured Petri nets.

The paper entitled ‘Policy-based customisation and corrective adaptation of composite web services’ by Abdelkarim Erradi looks at the challenges of the contemporary business process engines, which experience difficulties in satisfying both functional and non-functional requirements emerging from their dynamic environments. The paper proposes a policy-based framework for customisation and corrective adaptation of business

processes implemented with web services and composed using the BPEL language.

The paper ‘DYPROTO – tools for dynamic business processes’ by René Wörzberger and Thomas Heer presents a set of tools developed for dynamic business processes. The toolset is developed in collaboration with an IT service provider for insurance companies. It extends an existing framework for static business processes, and leverages the principles of model-driven engineering (e.g., meta-modelling and OCL-constraints) to facilitate the modification and verification of business processes.

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