Guest Editorial: Dynamic and Declarative Business Processes (DDBP), and Vocabularies, Ontologies and Rules in the Enterprise (VORTE)

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1. INTRODUCTION

Business processes that reflect a constantly changing environment have become a key factor of an organization's agility. Traditionally, businesses process management does not adequately address such a dynamic environment; this calls for the advent of new, *dynamic business processes* which was captured in combination with declarative approaches in the Dynamic and Declarative Business Processes (DDBP) workshop series. Closely related to business processes and business process modeling are *business rules* that define and/or constrain how goals are achieved in an enterprise. Business rules have been a central topic of the Vocabularies, Ontologies, and Rules in the Enterprise (VORTE) workshop series which aimed at enhancing business process management systems by ontologies and formal semantics for rules. Both workshops, DDBP[1] and VORTE[2], were held jointly at with the 13th IEEE International EDOC Conference (EDOC 2009) in Auckland, New Zealand in September 2009. The joint activities of the workshops formed an interesting combination of the related topics and this Special Collection contains extended versions of the best three papers and one keynote contribution from both workshops.

The main topic for the DDBP workshop series 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

1 2nd International Workshop on Declarative and Dynamic Business Processes (DDBP 2009), http://www.leduotang.com/sylvain/ddbp/

2 4th International Workshop on Vocabularies, Ontologies, and Rules for the Enterprise (VORTE 2009), https://oxygen.informatik.tu-cottbus.de/VORTE/

specify or regulate the set of desirable results/states, dynamic business processes become suited for the use of a declarative approach to their modeling and designing.

The VORTE workshop focused on vocabularies, ontologies, and business rules which are key components of a model-driven approach to enterprise computing in a networked economy. Enterprise vocabularies, ontologies, and business rules do not exist in isolation but serve to support business processes. While many have recognized the importance of vocabularies, ontologies, and business rules in business process modeling and management, there are many open research challenges to be addressed. These challenges can be approached from different perspectives. Fundamental research explores theoretical foundations for enterprise and business process modeling by applying techniques developed in disciplines such as formal ontology, cognitive science, linguistics, and logics. It also covers ontological evaluation of enterprise systems and their interoperability, and ontological analysis and (re)design of business process modeling languages and methods. Applied research looks into enhancing business rule engines and business process management systems by ontologies. Business process modeling research aims to define how process modeling and execution languages, such as Business Process Modeling Notation and Business Process Execution Language, relate to business ontologies and rules. Enterprise integration and collaboration research address ontology-based service description technologies for inter-enterprise collaboration.

2. SPECIAL COLLECTION BACKGROUND AND TOPICS

This special collection 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 as well as vocabularies, ontologies and rules in business process management and modeling. This special issue presents a collection papers covering the following topics:

- Dynamic/declarative business process modeling
- Tools for dynamic/declarative processes
- Business rules and policies
- Rule driven business process engines
- Dynamic/declarative model specification
- Formal models of dynamic/declarative business processes
- Monitoring of dynamic/declarative business processes
- Validation and model checking of dynamic/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
- Ontological foundations for enterprise and business process modeling
- Languages and methods for business vocabularies, terminologies, and taxonomies
- Rule modeling and rule markup
- Rule-based approaches to Web service policies and choreographies
- Web service ontologies
- Ontological evaluation of enterprise systems
- Ontology-based enterprise architectures

From the pool of 11 peer-reviewed papers that were presented in both workshops, we invited three best papers for publication in this special issue. The papers were substantially extended, after

which they went through another round of the peer-review process. In addition, we invited one of the two keynote speakers to submit a paper based on the keynote. This paper was then peer-reviewed by following the standard policy of the journal.

3. SELECTED PAPERS

This special issue brings four papers that cover a broad range of topics related to methods and formalism for vocabularies, ontologies, and rules in declarative and dynamic business processes.

"Adaptation of Process Models – A Semantic-based Approach" by Thomas Eisenbarth, Florian Lautenbacher and Bernhard Bauer looks at the problem of adaptation of business processes based on evolving requirements. To address this problem, the authors based their solution on the use of semantically-annotated business process models where each element of a business process is annotated with concepts from ontologies. On top of such models, the authors applied a token-based strategy and planning principles to achieve their goal – adaptation of business process. The overall approach is implemented as a part of the Eclipse JWT toolkit for modeling and development of workflow-based systems. The authors of this also provide a demonstration of the approach on an example from the financial services industry.

Jens Dietrich, in his paper entitled "An Ontological Model for Component Collaboration", discusses the importance of the metadata describing components and artifacts used in compositions of executable business processes. Dietrich reports on the results of an empirical analysis of component-based models (e.g., OSGi) where they investigated how different dynamically composed systems violate the correctness and the fitness criteria.

The papers "Document Logic: Risk Analysis of Business Processes through Document Authenticity" written by Shusaku Iida, Grit Denker and Carolyn Talcott and "Generation and Evaluation of Business Continuity Processes" written by Christoph Brandt, Frank Hermann and Jan Friso Groote are both dealing with risk analysis and the early identification of unexpected failures in business process execution which is an important topic in Business Process Management.

Iida *et al* introduce an interesting approach for risk analysis in business process models. The approach proposes a formal framework called Document Logic, which is based on rewriting logic. It allows for specifying document flows between business entities in a simple way and for assigning trust values to entities and activities. Based on inference rules that consider document authenticity and a simple trust model, Document Logic is able to detect risks such as document forging automatically.

An industry related project is presented in the paper written by Brandt *et al* in which formal techniques are applied to verify business process models for Business Continuity Management. Specifically, the authors suggest the use of graph transformation for checking the compliance of business processes to certain requirements such as security constraints and shows how the approach can be used to modify the business process automatically if failures are identified during execution.

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Christoph Bussler, Sanjay Chaudhary, Robert Colomb, Oscar Corcho, Marlon Dumas, Sergio España, Joerg Evermann, Ricardo Falbo, Xiang Fu, Adrian Giurca, Karthik Gomadam, Guido Governatori, Giancarlo Guizzardi, Sven Hartmann, Reiko Heckel, Heinrich Herre, Mustafa Jarrar, Jana Koehler, Zoran Milosevic, Shin Nakajima, Leo Obrst, Andreas Opdahl, Adrian Paschke, Luís Ferreira Pires, Manfred Reichert, Stefanie Rinderle, Peter Rittgen, Christophe Roche, Michael Rosemann, Florian Rosenberg, Shazia Sadiq, Marcus Spies, Csaba Veres, Gerd Wagner, Kewen Wang, and Andreas Wombacher.

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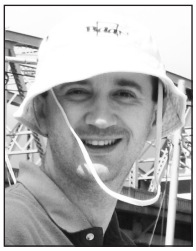
BIOGRAPHICAL NOTES

Dragan Gašević is a Canada Research Chair in Semantic Technologies and an Associate Professor in the School of Computing and Information Systems at Athabasca University. He received a PhD in computer science from the University of Belgrade. His research interests include semantic technologies, software language engineering, technology-enhanced learning, and service-oriented architectures.



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Georg Grossmann is a Research Fellow at the University of South Australia. He works in the area of business process integration and obtained his PhD in 2008 from UniSA. Before coming to Australia, he obtained a MSc in economics and computer science jointly from the University of Vienna and the Vienna University of Technology. Current research interests include behaviour-based integration of Web services, ontology-driven integration and distributed event-based systems.

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