

# Lecture Notes in Business Information Processing

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# Business Process Management Workshops

BPM 2012 International Workshops  
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Revised Papers



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# Foreword

This volume collects the proceedings of the workshops held on September 3, 2012, in conjunction with the 10th International Conference on Business Process Management (BPM 2012), which took place in Tallinn, Estonia. The proceedings are so-called post-workshop proceedings, in that the authors were allowed to revise and improve their papers after the workshops, so as to take into account the feedback obtained from the audience during their presentations.

The BPM conference is considered the leading research conference in this area, whose practicality appeals to researchers and practitioners alike. As such, BPM is perceived as a premium event to co-locate a workshop with – both by academia and by industry. The 2012 edition of the conference attracted 15 workshop proposals with topics ranging from well-established BPM areas, such as process design and process mining, to recent areas that are gaining growing interest from the research and industry communities, such as adaptive case management, artifact-centric BPM, process model collections, and more. Given the high quality of the submissions, selecting candidate workshops and assembling the best mix of workshops was not an easy task. Eventually, the following 13 workshops were selected for co-location with BPM 2012:

*First International Workshop on Adaptive Case Management and Other Non-workflow Approaches to BPM (ACM 2012)* – organized by Irina Rychkova, Iliia Bider, and Keith Swenson.

The goal of ACM 2012 was to bring together researchers and practitioners to discuss theoretical and practical problems and solutions in the area of non-workflow-based approaches to BPM in general, and adaptive case management (as a leading movement) in particular. This workshop aimed to promote new, non-traditional ways of modeling and controlling business processes, the ones that suit better the dynamic environment in which contemporary enterprises and public organizations function.

*8<sup>th</sup> International Workshop on Business Process Design (BPD 2012)* – organized by Marta Indulska, Michael Rosemann, and Michael zur Muehlen.

The BPD 2012 workshop was dedicated to improving the understanding, reliability, and quality of process design. The event was exclusively focused on the design, innovation, evaluation, and comparison of process improvement methods, tools, and techniques. In particular, the workshop sought papers that propose innovative approaches toward the design of processes and complementary artifacts (e.g., organizational design).

*8<sup>th</sup> International Workshop on Business Process Intelligence (BPI 2012)* – organized by Boudewijn van Dongen, Diogo Ferreira, and Barbara Weber.

BPI 2012 aimed to bring together practitioners and researchers from different communities such as BPM, information systems research, business administration, software engineering, artificial intelligence, process and data mining with

the goal of providing a better understanding of techniques and algorithms to support a company's processes at build-time and the way they are handled at run-time.

*5<sup>th</sup> International Workshop on Business Process Management and Social Software (BPMS2 2012)* – organized by Selmin Nurcan and Rainer Schmidt.

The objective of BPMS2 2012 was to explore (1) how social software interacts with business process management; (2) how business process management has to change to comply with social software and business processes may profit from social software and social media; and (3) how those new opportunities offered by social software impact the design, development, software support, and continuous improvement of business processes.

*First International Workshop on Data- and Artifact-Centric BPM (DAB 2012)* – organized by Lior Limonad, Boudewijn van Dongen, Jianwen Su, and Roman Vaculin.

DAB 2012 was the first workshop aimed at bringing together researchers and practitioners whose common interests are in study and development of data- and artifact-centric approaches to BPM. Recently, various approaches such as case-management and artifact-centric BPM have emerged, emphasizing the integration of data and control as key aspects of flexible and rich business-process specification. Consequently, studying the fundamental relationships and properties of the integrated perspective where data and process are considered together was set as the focal point of DAB.

*6<sup>th</sup> International Workshop on Event-Driven Business Process Management (edBPM 2012)* – organized by Nenad Stojanovic, Opher Etzion, Adrian Paschke, and Christian Janiesch.

edBPM 2012 was focused on applying methods and techniques from the real-time data/stream processing in the BPM domain, enabling more agile, flexible, and responsive business processes. The idea was to enable a smooth integration of the processing of real-time information, sensed in the process as well as from the business environment, in the business logic. The topics covered new concepts for designing, realizing, and managing such systems, including the presentation and analysis of existing solutions. The main goal was to enable of sharing the new ideas and defining of new challenges for this emerging research and application domain.

*Third International Workshop on Empirical Research in Business Process Management (ER-BPM 2012)* – organized by Bela Mutschler, Jan Recker, and Roel Wieringa.

ER-BPM 2012 stimulated empirical research that can contribute to a better understanding of the problems, challenges, and existing solutions in the BPM field. The workshop provided an interdisciplinary forum for both researchers and practitioners to improve the understanding of BPM-specific requirements, methods and theories, as well as tools and techniques.

*Second International Workshop on Process Model Collections (PMC 2012)* – organized by Hajo Reijers, Mathias Weske, and Remco Dijkman.

PMC 2012 aimed to discuss novel research in the area of managing business process model collections. Currently, organizations, reaching higher levels of business process management maturity, tend to collect large numbers of business process models, which may amount to hundreds of models. The workshop discussed challenges related to management and utilization of such model collections.

*Second International Workshop on Process-Aware Logistics Systems (PALS 2011)* – organized by Kamel Barkaoui, Virginia Dignum, Huib Aldewereld, Walid Gaaloul, Cherif Sadfi, and Ichiro Satoh.

PALS 2012 dealt with problems related to the design and optimization of global logistics systems, from a business process management perspective. It was dedicated to exploring and mastering the tools needed for operating, reconfiguring, and in general making decisions within logistics-based systems, in order to provide the customers and system users with the greatest possible value. PALS provided the participants with a perspective on the tools that are now available for modeling and solving logistics-oriented problems on a large-scale, and with an emphasis on the business process and information technology perspectives.

*Joint Workshop on Process-Oriented Information Systems in Healthcare (Pro-Health) and Knowledge Representation for Health Care (KRH4C)* – organized by Richard Lenz, Silvia Miksch, Mor Peleg, Manfred Reichert, David Riaño, and Annette ten Teije.

This workshop brought together researchers from two communities facing similar challenges to improve the understanding of domain-specific requirements, theories, methods, and tools. Both communities have been addressing the unique characteristics of healthcare processes and clinical-guideline-based decision-support systems, including their high degree of flexibility, the integration with electronic medical records and shared semantics of healthcare domain concepts, and the need for tight cooperation and communication among medical care teams.

The papers of this workshop appeared in separate proceedings and are thus not included in this volume.

*Third International Workshop on Reuse in Business Process Management (rBPM 2012)* – organized by Marcelo Fantinato, Maria Beatriz Felgar de Toledo, Itana Maria de Souza Gimenes, Lucineia Heloisa Thom, and Cirano Iochpe.

rBPM 2012 focused on exploring any type of reuse in the BPM domain at its various levels: the basic service-oriented foundation composition level; the management and monitoring upper level; and the quality of service and semantics orthogonal level.

*First Joint International Workshop on Security in Business Processes (SBP 2012)* – organized by Peter Karpatai, Marco Montali, Rafael Accorsi, and Raimundas Matulevicius.

SBP 2012 aimed to bring together researchers and practitioners working toward the reliable security management of business process models in process-aware information systems. SBP 2012 encouraged innovative methods for business process security audit and control along the entire business process life

cycle, welcoming contributions beyond the strictly technical character, considering economic, legal, and standardization issues.

*First International Workshop on Theory and Applications of Process Visualization (TAProViz 2012)* – organized by Ross Brown, Simone Kriglstein, and Stefanie Rinderle-Ma.

TAProViz 2012 intended to promote and nurture the development of process visualization topics as continuing research areas. To date, many process model representations have not developed beyond minimally interactive 2D representations of directed graphs. In the workshop, research in computer–human interaction, games, and interactive entertainment was extended toward BPM to engage, provide insight, and to promote collaboration.

With these 13 workshops, the BPM 2012 workshop program was rich and stimulating with a variety of topics, and formed an extraordinary and balanced program of high-quality events. BPM 2012 had more than 250 participants including both researchers and practitioners. In total, 141 papers were submitted to the various workshops, from which 80 were selected for presentation. The papers that were presented in the workshops report innovative and state-of-the-art advancements in the BPM area, spanning from formal to conceptual and empirical research. We are confident the reader will enjoy this volume as much as we enjoyed organizing this outstanding program and assembling its proceedings.

Finally, we did not organize everything on our own. Many people of the BPM 2012 Organizing Committee contributed to the success of the workshop program. We would particularly like to thank the General Chair, Marlon Dumas, for involving us in this unique event, the Local Organization Chairs, Raimundas Matulevicius, Laura Kalda, and Georg Singer, for the smooth management of all on-site issues, and the workshop organizers for managing their workshops and diligently answering the wealth of emails we sent around. Last but not least, we would like to thank the authors of the various workshop papers for making all this possible.

September 2012

Marcello La Rosa  
Pnina Soffer

# Preface

The following preface is a collection of the prefaces of the post-workshop proceedings of the individual workshops. The workshop papers, grouped by event, form the body of the volume.

## **First International Workshop on Adaptive Case Management and Other Non-Workflow Approaches to BPM (ACM 2012)**

**Organizers:** Irina Rychkova, Ilia Bider, Keith D. Swenson

### **Introduction**

The sign of our times is the amazing speed with which changes in the business world happen. This requires from the enterprises of today, and even more of the future, to become agile, i.e., capable of adjusting themselves to changes in the surrounding world. At the same time, current process thinking is mostly preoccupied with the issue of optimizing performance through standardization, specialization, and automation. A focus on optimization has resulted in the workflow view (in which a process is considered as a flow of operations) emerging as predominant in the field of business process management (BPM). An optimized workflow constitutes a completely prescriptive definition of the process execution rules. Besides requiring a long time to develop, such execution rules can reduce the creativity of people participating in the process and thereby result in poor performance.

A focus on agility requires a paradigm shift in BPM that promotes process execution rules being less prescriptive to give people the opportunity to creatively use their knowledge and experience in volatile environments. Here, we need to move from workflow-based process management to constraint-based process management. The constraint-based process management should focus on more declarative definition of execution rules, i.e., a combination of guidelines and restrictions.

The needs for the paradigm shift have already been identified by practitioners. This shift can also be seen in a strong practical movement appearing called adaptive case management (ACM), which "[...] is information technology that exposes structured and unstructured business information (business data and content) and allows structured (business) and unstructured (social) organizations to execute work (routine and emergent processes) in a secure but transparent manner" (<http://www.xpdl.org/nugen/p/adaptive-case-management/public.htm>).



## Goal

While practitioners are trying to overcome the restrictions of workflow thinking, the research on the topic is somewhat lagging. The goal of this workshop is to bring together researchers and practitioners to discuss theoretical and practical problems and solutions in the area of unpredictable processes. This workshop aims to promote new, non-traditional ways of supporting volatile work that better suit the dynamic environment in which contemporary enterprises and public organizations function.

## Submissions, Organization, and Attendees

For this first edition of the workshop we received 13 submissions. After the reviewing process, six full papers and three short papers were accepted. The workshop was attended by 22 participants, including eight speakers. Exactly half of the participants were from universities, while the other half represented industry or industrial research. The papers were presented in three sections:

- 1st section: Idea papers reporting on university research
- 2st section: Experience reports on case management solutions
- 3rd section: Critics on the conventional BPM approaches.

Iliia Bider opened the workshop with a keynote talk and Keith Swenson and Sandy Kemsley closed the event driving a wrap-up panel discussion. The objective of this discussion was to outline the roadmap of the future research in the area of ACM. The following sections present a summary of the workshop presentations.

## Idea Papers Reporting on University Research

Iliia Bider started with a keynote talk “Towards a Non-workflow Theory of Business Processes.” He models enterprises as complex multilevel adaptable systems using systems theory. According to this theory, process instances are represented as moving through state space, and the process model is represented as a set of formal rules describing the valid paths of the possible trajectories.

Lars Taxén presented his idea paper “Adaptive Case Management from the Activity Modality Perspective.” He proposes to use six activity modalities in order to model any situation where people are accomplishing goals. These modalities are: objectivation, contextualization, spatialization, temporalization, stabilization, and transition. Defined by neural science, these modalities represent a – natural to a human brain – framework for capturing and understanding the activities. Traditional workflow style BPM has focused primarily on the temporalization modality; but highly volatile unpredictable work requires other modalities to be considered.

Nicolas Mundbrod presented “Toward a System Support of Collaborative Knowledge Work.” Much of the ACM literature has focused on knowledge workers coordinating work. The paper discusses collaboration on knowledge work

tasks and aspects of uncertainty, goal orientation, emergence of work, and growing knowledge base. The authors measure collaborative knowledge work using nine dimensions: knowledge action types, methodology, interdisciplinary, organizational frame, spatial proximity, involved knowledge workers, temporary constraints, information interdependency, and number of repetitions.

Irina Rychkova presented “Toward Automated Support for Case Management Processes with Declarative Configurable Specifications” covering her attempt to model a mortgage application process with BPMN and finding a number of challenges. Among her findings is that the problem is not with the BPMN language itself, but with the imperative modeling style – traditionally associated with BPMN – that consists of putting tasks in a specific order. Instead we need a declarative style where tasks can be defined without explicit ordering, but with rules that allow tasks to be dynamically enabled and disabled based on conditions.

### **Experience Reports on Case Management Solutions**

Helle Frisak Sem presented “On Two Approaches to ACM” that details the system — in production at the Norwegian Food Safety Authority (NFSA) — for food safety inspections, information and investigations. There are two approaches built into this system: one for controlling and scheduling more regular tasks, and another for handling emergencies in a much more flexible manner.

Rüdiger Pryss presented “Mobile Task Management for Medical Ward Rounds — The MEDo Approach.” He describes a mobile task management system for medical ward rounds that is currently adopted by several medical hospitals in Germany. After finding that a traditional workflow approach did not match the needs of the doctors, they switched to more flexible tasklist-oriented approach. Collaborative design with medical personnel and subsequent work on improving usability of the system represented the major issues.

“Data Centric BPM and the Emerging Case Management Standard: A Short Survey” covers the current state of the evolving case management model and notation effort at the OMG.

### **Critics on the Conventional BPM Approaches**

Keith Swenson asked whether “BPMN Is Incompatible with ACM.” According to Keith, not BPMN per se, but any two-dimensional graphical language is questioned on the basis of usability and practicality for a knowledge worker. He outlines three key design requirements that must be met: the knowledge worker must be able to design quickly, must not require training that detracts from focusing on their profession, and the resulting notation must not have hidden dependencies. These criteria were never considered in the design of traditional BPM graphical languages.

Ilia Bider asked “Do Workflow-Based Systems Satisfy the Demands of the Agile Enterprise of the Future?” According to Ilia, business agility will become one

of the most important properties of the next-generation enterprises. He shows that designing and putting into operation workflowable processes may neither be possible nor desirable in the enterprise of the future. This conclusion should have an impact on the software tools, systems, and services aimed at supporting business processes.

### Conclusion

This workshop paves the way for a line of reasoning and research into the areas of unpredictable (knowledge-driven) work that is hard to support with traditional workflow-oriented BPM approaches. As a conclusion of the event, we outlined the roadmap for future research asking the following questions: What really constitutes knowledge work? How much technical training should be necessary to draw a workflow diagram? Is modeling in the traditional sense needed at all? How many different ACM approaches exist today, and how are they compared? What is the proper level of detail? How much data modeling is required? What are the adoption rates for case management solutions and what affects this rate? What role does usability play in adoption of ACM? And ultimately, what is the return on investment of supporting knowledge work in a case management environment? It is the sincere desire of the Program Committee and all attendees that this work can continue to answer some of these open questions.

September 2012

Irina Rychkova  
 Ilia Bider  
 Keith D. Swenson

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## 8th International Workshop on Business Process Design (BPD 2012)

**Organizers:** Marta Indulska, Michael zur Muehlen, Michael Rosemann

This year marked the 8th consecutive year of the International Workshop on Business Process Design (BPD), which was organized in conjunction with the 10th International Conference on Business Process Management, in Tallinn, Estonia. The workshop was initiated on the recognition that the act of designing processes is a challenging task and requires an understanding of organizational strategies, goals, constraints, and IT capabilities, to name just a few. This task is the most value-adding, and likely the most exciting step in the process life cycle, yet it has attracted limited academic contributions. Accordingly, the BPD workshop continues to provide a forum for researchers interested in all aspects of design, innovation, evaluation, and comparison of process improvement techniques and tools.

The opening of BPD2012 was a keynote presentation on the topic of “Design Is How We Change the World.” In this talk, Michael zur Muehlen distinguished process design as a creative activity from process engineering as a goal-seeking activity. He highlighted the need to separate the concept of a design space, which encompasses possible process solutions, from the concept of an evaluation space, which ranks these solutions along multiple evaluation dimensions.

This year, five research papers were accepted for publication at BPD2012. The paper selection was based on a rigorous review process, which resulted in a 50% acceptance rate. The five papers included in this volume cover the quality of process models; improving the assignment of resources to activities; representing knowledge-intensive processes; managing business process management systems; and the organizational adoption of business process management. As Organizing Chairs of the BPD workshop, we would like to sincerely thank the members of the Program Committee for their thorough reviews of the submissions. We would like to extend our thanks to the authors for their presentations, and to all participants of the workshop for their comments on the presented papers.

September 2012

Marta Indulska  
Michael zur Muehlen  
Michael Rosemann

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## 8th International Workshop on Business Process Intelligence (BPI 2012)

**Organizers:** Boudewijn van Dongen, Diogo R. Ferreira, Barbara Weber

Business process intelligence (BPI) is an area that is quickly gaining interest and importance in industry and research. BPI refers to the application of various measurement and analysis techniques in the area of business process management. In practice, BPI is embodied in tools for managing process execution quality by offering several features such as analysis, prediction, monitoring, control, and optimization.

The goal of this workshop is to promote a better understanding of the techniques and algorithms to support business processes at design-time and the way they are handled at runtime. We aim to bring together practitioners and researchers from different communities, e.g., business process management, information systems, database systems, business administration, software engineering, artificial intelligence, and data mining, who share an interest in the analysis and optimization of business processes and process-aware information systems. The workshop aims at discussing the current state of ongoing research and sharing practical experiences, exchanging ideas, and setting up future research directions that better respond to real needs. In a nutshell, it serves as a forum for shaping the BPI area.

The 8th edition of this workshop attracted 17 international submissions. Each paper was reviewed by at least three members of the Program Committee. From these submissions, the top five were accepted as full papers and, in addition, another three interesting submissions were accepted as short papers for presentation at the workshop.

The papers presented at the workshop provide a mix of novel research ideas, evaluations of existing process mining techniques, as well as new tool support. The paper by Adriansyah, Munoz-Gama, Carmona, and van Dongen is motivated by the need to measure the conformance of an event log with respect to a predefined process model and presents a method for measuring precision based on the alignment between the event log and the process model. Ferreira, Szimanski, and Ralha propose a method for discovering the relationships between micro-level events recorded in an event log and the macro-level activities in a business process. Goel, Bhat, and Weber describe a non-intrusive technique to discover end-to-end processes from process-unaware systems. Suriadi, Ouyang, van der Aalst, and ter Hofstede address the use of event logs for root cause analysis and propose a systematic technique for enriching and transforming event logs with attributes required for such analysis. Claes and Poels present the results of an exploratory survey on the adoption of process mining tools and the usage of the process mining framework ProM. Esposito, Vaz, Rodrigues, and Souza present the MANA tool for mining unstructured business processes. Verbeek and van der Aalst provide an experimental evaluation of a process mining technique based on integer linear programming enhanced with passage-based discovery. Finally, Pika, van der Aalst, Fidge, ter Hofstede, and Wynn introduce

an approach to predict the risk of deadline transgressions in business processes based on indicators that can be obtained from event logs.

For the second time, the workshop was accompanied by the BPI challenge, a process mining contest based on a real-world event log. In this year's challenge, an event log from a Dutch financial institute was made available and participants were asked to extract as much information as possible from this log. We invited the jury to comment on the submissions and our sponsors – Perceptive Software and Fluxicon – provided prizes for the best submission and for all other participants.

In total, six submissions were received, all of which were of very high quality. The jury selected the submission by A.D. Bautista, L. Wangikar, and S.M. Kumail Akbar from CKM Advisors, New York. According to the jury, “their submission shows a very results-driven method of analyzing, where every analysis seemed to be driven by the motivation to prove/disprove a specific hypothesis, related to a concrete and actionable improvement potential in the client company. This results in a successful conversion of analysis to digestible business-level results and recommendations.”

The winner received a new iPad, combined with a license for Disco Enterprise, a process mining tool from Fluxicon, and all other participants received licenses for Disco Professional. A two-page abstract of five of the submissions is included in these proceedings.

As with previous editions of the workshop, we hope that the reader will find this selection of papers useful to keep track of the latest advances in the area of business process intelligence, and we look forward to keep bringing new advances in future editions of the BPI workshop.

September 2012

Boudewijn van Dongen  
Diogo R. Ferreira  
Barbara Weber

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## 5th International Workshop on Business Process Management and Social Software (BPMS2 2012)

**Organizers:** Selmin Nurcan, Rainer Schmidt

Social software<sup>1</sup> is a new paradigm that is spreading quickly in society, organizations, and economics. Social software has created a multitude of success stories such as wikipedia.org. Therefore, more and more enterprises regard social software as a means for further improvement of their business processes and business models. For example, they integrate their customers into product development by using blogs to capture ideas for new products and features. Thus, business processes have to be adapted to new communication patterns between customers and the enterprise: for example, the communication with the customer is increasingly a bi-directional communication with the customer and among the customers. Social software also offers new possibilities to enhance business processes by improving the exchange of knowledge and information, to speed up decisions, etc.

Social software is based on four principles: weak ties, social production, egalitarianism, and mutual service provisioning.

**Weak Ties**<sup>2</sup>: Weak-ties are spontaneously established contacts between individuals that create new views and allow combining of competencies. Social software supports the creation of weak ties by helping to create contacts in impulse between non-predetermined individuals

**Social Production**<sup>3,4</sup>: Social Production is the creation of artifacts, by combining the input from independent contributors without predetermining the way to do this. By this means it is possible to integrate new and innovative contributions not identified or planned in advance. Social mechanisms such as reputation assure quality in social production in an a posteriori approach by enabling a collective evaluation by all participants.

**Egalitarianism**: Egalitarianism is the notion of handling individuals equally. Social software highly relies on egalitarianism and therefore strives to give all participants the same rights to contribute. This is done with the intention of encouraging a maximum of contributors and getting the best solution fusing a high number of contributions, thus enabling the wisdom of the crowds. Social software realizes egalitarianism by abolishing hierarchical structures, merging the roles of contributors and consumers and introducing a culture of trust.

**Mutual Service Provisioning**: Social software abolishes the separation of service provider and consumer by introducing the idea that service provisioning

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<sup>1</sup> R. Schmidt and S. Nurcan, "BPM and Social Software," Business Process Management Workshops, 2009, pp. 649-658.

<sup>2</sup> M.S. Granovetter, "The Strength of Weak Ties," American Journal of Sociology, vol. 78, 1973, S. 1360.

<sup>3</sup> Y. Benkler, The Wealth of Networks: How Social Production Transforms Markets and Freedom, Yale University Press, 2006.

<sup>4</sup> J. Surowiecki, The Wisdom of Crowds, Anchor, 2005.

is a mutual process of service exchange. Thus both service provider and consumer (or better prosumer) provide services to one another in order co-create value. This mutual service provisioning contrasts the idea of industrial service provisioning, where services are produced in separation from the customer to achieve scaling effects.

To date, the interaction of social software and its underlying paradigms with business processes have not been investigated in depth. Therefore, the objective of the workshop is to explore how social software interacts with business process management, how business process management has to change to comply with weak ties, social production, egalitarianism, and mutual service, and how business processes may profit from these principles.

The workshop discussed three topics:

1. New opportunities provided by social software for BPM
2. Engineering next generation of business processes: BPM 2.0?
3. Business process implementation support by social software

Based on the successful BPMS2 2008, BPMS2 2009, BPMS2 2010, BPMS2 2011 workshops, the goal of the workshop is to promote the integration of business process management with social software and to enlarge the community pursuing the theme.

Six papers were accepted for presentation. In his paper “Application and Simplification of BPM Techniques for Personal Process Management,” Marco Brambilla identified the socialization of task management as an important issue. Therefore, his paper gives a vision toward the application of BPM techniques and tools to personal task management. By this means, the interactions, dependencies, and constraints between tasks can be handled in a structured way.

Rainer Schmidt shows in his paper how data created within social software, called social data, can be used to support product innovation, marketing, and customer relations. Social data are created by the core mechanisms of social software: social production, weak ties, and collective decisions. They allow for the innovation of products more thoroughly and rapidly than before. Customer requirements can be identified better than before when using social data. Also, relevant events in the relationship between customer and enterprise can be detected earlier and more reliably.

In the paper “A Conceptual Approach to Characterize Dynamic Communities in Social Networks: Application to Business Process Management” from Cassio Melo, Bénédicte Le Grand, and Marie-Aude Aufaure, measures based on formal concept analysis are used to determine the conceptual proximity between people. Significant insights into trends and market behavior can be obtained from analyzing the evolution of this proximity measure. A case study on Twitter exemplifies the research.

There are still many tasks that require human intelligence instead of digital-based computation. The paper from Pavel Kucherbaev, Stefano Tranquillini,

Florian Daniel, Fabio Casati, Maurizio Marchese, Marco Brambilla, and Piero Fraternali, “Business Processes for the Crowd Computer,” introduces the idea of a crowd computer. The authors describe both the architecture and a crowd programming interface. Furthermore, they show how such a crowd computer can be programmed and identify patterns for crowdsourcing.

Seyed Alireza Hajimirsadeghi, Hye-Young Paik, and John Andrew Shepherd introduce processbooks as means for social network-based personal process management. They start from the observation that many individual processes are codified via websites. Users have to discover and integrate these processes in order to accomplish their personal goals. The authors introduce so-called processbooks to extract personal process models from online sources. The extracted processes can be customized, maintained, and shared with other users. Process books also support the execution of personal processes.

Ralf Laue and Michael Becker introduce a new approach for comparing business process models in their paper “Evaluating Social Tagging for Business Process Models.” Social tagging enriches models with words or short phrases describing the content of the models. Social tagging creates a new way for comparing and searching for business process models. Furthermore, the authors compare social tagging with established approaches that use named elements and model structure.

We wish to thank all authors for having shared their work with us, as well as the members of the BPMS2 2012 Program Committee and the workshop organizers of BPM 2012 for their help with the organization of the workshop.

September 2012

Selmin Nurcan  
Rainer Schmidt

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## First International Workshop on Data- and Artifact-Centric BPM (DAB 2012)

**Organizers:** Lior Limonad, Boudewijn van Dongen, Jianwen Su,  
and Roman Vaculin

Traditionally the management of business operations caters around two key issues: control flow and data. As a result, each of the two has attracted over the past years people both in academia and industry, manifesting itself into a plethora of methods and tools that have been designed to assist with the management of these two concerns. However, the natural and yet independent evolution in both areas has led to a reality in which in many cases the handling of one concern is treated as an afterthought with respect to the other.

Recently, however, we have seen the emergence of paradigms that aim to blend the two concerns, seeking for new approaches that may naturally and seamlessly unify the two in order to better streamline the overall complexity in BPM. Contemporary examples include artifact-centric BPM, Petri nets, and case management. Therefore, the DAB workshop is aimed at bringing together researchers and practitioners whose common interest and experience is the study and development of new foundations, models, methods, and technologies that are intended to uniformly and holistically align data and control flow.

The first DAB 2012 workshop took place in Tallinn, Estonia, coinciding with the BPM 2012 conference. A total of 12 papers were submitted, out of which six were accepted for presentation. It was also our great pleasure to include two invited talks in the DAB 2012 program: “On the Convergence of Data and Process Engineering,” by Marlon Dumas (University of Tartu), and “Verification of Artifact-Centric Business Processes” by Alin Deutsch (University of California). We would like to thank all the authors for submitting their papers, the Program Committee members, and the reviewers. We hope this DAB workshop was the first in an ongoing series.

September 2012

Lior Limonad  
Boudewijn van Dongen  
Jianwen Su  
Roman Vaculin

### **Invited Talk: On the Convergence of Data and Process Engineering**

Marlon Dumas, Institute of Computer Science, University of Tartu, Estonia

Data engineering is a well-trodden field with established methods and tools that allow engineers to capture complex data requirements and to refine these requirements down to the level of database schemas in a seamless and largely

standardized manner. Concomitantly, database systems and associated middleware enable the development of robust and scalable data-driven applications to support a wide spectrum of business functions. Eventually though, individual business functions supported by database applications need to be integrated in order to automate end-to-end business processes. This facet of information systems engineering falls under the realm of business process engineering.

Business process engineering on the other hand is also an established discipline, with its own methods and tools. Process analysis and design methods typically start with process models that capture how tasks, events, and decision points are inter-connected, and what data objects are consumed and produced throughout a process. These models are first captured at a high level of abstraction and then refined down to executable process models that can be deployed in business process management systems. The division between data and process engineering is driven by various factors, including the fact that data are shared across multiple processes, that data and processes evolve at different rates and according to different requirements. Notwithstanding these reasons, the divide between data and processes leads to redundancies in large-scale information systems that, in the long run, hinder on their coherence and maintainability. This talk gives an overview of emerging approaches that aim at bridging the traditional divide between data and processes. In particular, the talk discusses the emerging "artifact-centric" process management paradigm, and how this paradigm in conjunction with service-oriented architectures and platforms, enable higher levels of integration and responsiveness to process change.

**Marlon Dumas** is the Swedbank Professor of Software Engineering at the University of Tartu, Estonia. He is also Strategic Area Leader at the Software Technology and Applications Competence Centre — a collaborative research center that gathers ten IT companies and two universities with the goal of conducting industry-driven research in software service engineering and data mining. From 2000 to 2007, he worked in the Business Process Management Research Group at Queensland University of Technology (Australia), where he held a Queensland State Fellowship between 2004 and 2007. He has also been visiting professor at the University of Grenoble (France), the University of Nancy (France), the University of Macau, and Visiting Researcher at SAP Research. Professor Dumas has been the recipient of best paper awards at ETAPS 2006 and BPM 2010 and the recipient of the 10-year most influential paper award at MODELS 2011. He is coinventor of three granted patents in the field of business process technologies and co-editor of a textbook on *Process-Aware Information Systems*.

## Invited Talk: Verification of Artifact-Centric Business Processes

Alin Deutsch, Department of Computer Science and Engineering, University of California, San Diego, USA

Business process specification frameworks have recently evolved from the traditional process-centric approach toward data-awareness. Process-centric formalisms focus on control flow while under-specifying the underlying data and their manipulations by the process tasks, often abstracting them away completely. In contrast, data-aware formalisms treat data as first-class citizens.

The holistic view of data and processes together promises to avoid the notorious discrepancy between data modeling and process modeling of more traditional approaches that consider these two aspects separately. In particular, this separation precludes the development of data-aware automatic tools for formal verification, i.e., static analysis and run-time monitoring. Such tools are needed to tackle the complexity of modern business processes, much of which is due to subtle interactions between business process tasks and data.

Data-aware processes deeply challenge formal verification by requiring simultaneous attention to both data and process: indeed, on the one hand they deal with full-edged processes and require analysis in terms of sophisticated temporal properties; on the other hand, the presence of possibly unbounded data makes the usual analysis based on model checking of finite-state systems impossible in general, since, when data evolution is taken into account, the whole system becomes infinite-state. A notable exponent of the data-aware class of specification frameworks is the artifact-centric model, recently deployed by IBM in commercial products and consulting services, and studied in an increasing line of research papers. Business artifacts (or simply "artifacts") model key business-relevant entities, which are updated by a set of business process tasks. In this talk we survey results on data-aware static verification, selecting the artifact-centric model as a natural vehicle for our investigation owing to its practical relevance.

**Alin Deutsch** is a professor of computer science at the University of California, San Diego, USA. His research is motivated by the data management challenges raised by applications that are powered by underlying databases (viewed in a broad sense that includes traditional database management systems but also collections of semi- and un-structured data providing a query interface, however rudimentary). Prominent examples he focuses on are the World-Wide Web and business processes. Alin's education includes a PhD degree from the University of Pennsylvania, an MSc degree from the Technical University of Darmstadt (Germany), and a BSc degree from the Polytechnic University Bucharest (Romania).



He is the recipient of a Sloan fellowship and an NSF CAREER award, and has served as PC Chair of the ICDT-2012 International Conference on Database Theory, the PLANX-2009 Workshop on Programming Language Techniques for XML, and the WebDB-2006 International Workshop on the Web and Databases.

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## 6th International Workshop on Event-Driven Business Process Management (edBPM 2012)

**Organizers:** Opher Etzion, Adrian Paschke, Christian Janiesch,  
Nenad Stojanovic

Event-driven computing is gaining ever increasing attention by the industry and research communities and this workshop shows its importance in the business process management domain. We had seven submissions from industry and academia. Topics ranged from modeling data-intensive processes, to various types of monitoring business processes. Events have become first-class citizens in BPM, enabling novel real-time applications on top of business process execution. However, there still is a lot to be done, especially in the context of a unified terminology and conceptualization (e.g., what is an event in the BPM).

We selected five papers for presentation, although almost every submission contained very interesting material for this kind of workshop and we would like to thank to all authors for their great job.

We also thank the members of the Program Committee for very constructive reviews, which will hopefully help authors in improving their work.

September 2012

Opher Etzion  
Adrian Paschke  
Christian Janiesch  
Nenad Stojanovic

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## Third International Workshop on Empirical Research in Business Process Management (ER-BPM 2012)

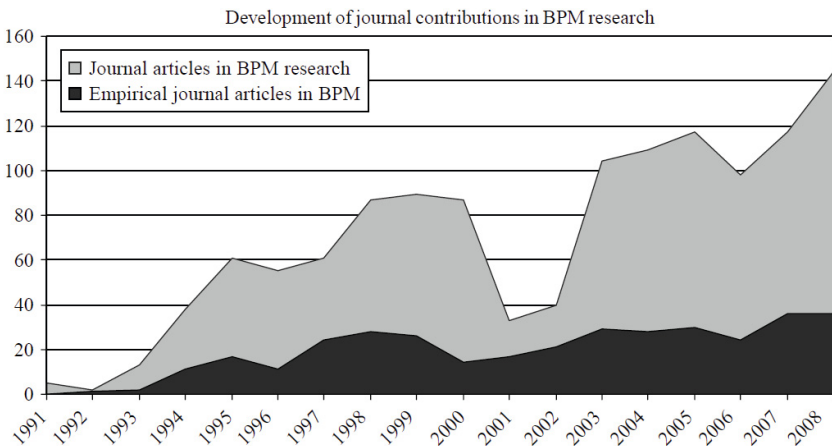
**Organizers:** Bela Mutschler, Jan Recker, Roel Wieringa

### Introduction

Empirical research in business process management(BPM) is coming of age. In 2009, when the inaugural ER-BPM workshop was held, the field of BPM research was characterized by a strong emphasis on solution development, but also by an increasing demand for insights or evaluations of BPM technology based on dedicated empirical research strategies. The ER-BPM workshop series was created to provide an international forum for researchers to discuss and present such research.

In 2012, empirical research in BPM is now firmly established as an important strand of research around the use of BPM. Several of the key journals in the information systems discipline have run and published special issues or special sections on BPM research, either with a dedicated emphasis on empirical issues and empirical findings .[3] or with a focus on research that mixes both design and empirical work ..[1, 5]. Further special issues are in the pipeline .[4].

Aside from empirical BPM research finding a dedicated space in the academic journals, an increasing number of empirical research papers are also being published as identified by Houy et al. .[2] and Shown in Fig. 1.



**Fig. 1:** Published BPM research articles over time .[2].

The benefits of empirical research include improved understanding of the problems that can be solved by BPM and improved insight into the performance of techniques in practice. While these benefits are now increasingly being demonstrated in the field of BPM, the field is still growing and maturing. The

ER-BPM workshop thus continues to be an important forum in which to discuss ongoing work, challenges, and outcomes.

### **The ER-BPM 2012 Workshop**

Our ER-BPM 2012 workshop continued to address the demand for empirical research in BPM, and set out to stimulate empirical research that can contribute to a better understanding of the problems, challenges, and existing solutions in the BPM field.

In particular, we envisage the workshop to provide an *interdisciplinary* forum for researchers as well as interested practitioners to improve the understanding of BPM-specific requirements, methods and theories, tools and techniques. Accordingly, we defined the following (not exhaustive) list of topics as relevant to the current state of empirical research in BPM:

- Empirical research on BPM methods, BPM technologies, BPM tools
- Empirical research on process-aware information systems
- BPM-related (software) experiments
- BPM-related action research
- BPM-related surveys
- BPM-related case studies
- BPM-related modeling and simulation studies
- BPM-related experience reports
- Critical success factor analyses of BPM methods, technologies, tools
- Evaluations and comparisons of BPM tools, platforms, and standards
- Frameworks for quantitatively analyzing BPM methods, technologies, tools
- Frameworks for qualitatively evaluating BPM methods, technologies, tools
- Requirements on empirical and experimental BPM research
- Usability and ease-of-use of BPM technologies and BPM tools
- User acceptance of BPM projects
- BPM success, failure, and contingency models
- Studies on the role of standards in practical BPM projects
- Comparative studies of BPM technology
- Empirical studies of cross-organizational BPM coordination and settings
- Costs, benefits, and risks of applying BPM methods, technologies, and tools
- Evaluation approaches for BPM methods, BPM technologies, and BPM tools
- Practice-driven challenges for future BPM research
- Reflections on the use of empirical methods in the BPM field
- Advances in empirical methods for BPM research

We invited papers that outline research in progress as well as completed research papers. Submitted papers were reviewed by at least three members of the Program Committee, and were evaluated on the basis of significance, originality, technical quality, and exposition.

## The Workshop Papers

In 2012, we accepted three papers for presentation in a dedicated ER-BPM session. These articles provide a snapshot of current examples of how empirical research in BPM can be conducted, and what insights such research can uncover.

The paper “Exploring Workaround Situations in Business Processes” by Nesi Outmazgin reports on a multiple case study on types and reasons of workarounds in business process. This is a relevant topic that has not yet been extensively researched, which in turn makes it a perfect fit to the workshop.

The paper “Investigating the Process of Process Modeling with Eye Movement Analysis” by Jakob Pinggera, Marco Furtner, Markus Martini, Pierre Sachse, Katharina Reiter, Stefan Zugal, and Barbara Weber examines a new data collection and analysis technique – eye movement analysis – and its application to a study of the process of process modeling. The paper was selected because it addresses an important topic with a refreshingly new approach to research.

The third paper, “Business Process Orientation: An Empirical Study of Its Impact on Employees’ Innovativeness,” by Jing Tang, L.G. Pee, and Junichi Iijima, explores the role of process orientation as an organizational mindset in an effort toward organizational innovation. Interestingly, this paper considers data from a survey of Japanese organizations, thereby adding insights into cultural and national BPM practices that have been under-represented.

We hope you find these papers stimulating and interesting. We would like to thank the authors for their efforts, and also the Program Committee for dedicating their time to evaluating and selecting these papers.

September 2012

Bela Mutschler  
Jan Recker  
Roel Wieringa

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## Second International Workshop on Process Model Collections (PMC 2012)

**Organizers:** Hajo Reijers, Mathias Weske, Remco Dijkman

Nowadays, as organizations reach higher levels of business process management maturity, they tend to possess and actively use large numbers of business process models. It is quite common that such collections of industry-strength business process models include thousands of activities and related business objects such as data, applications, risks, etc. These models are used to solve a variety of modeling challenges, and they are increasingly published to a large number of stakeholders with varying skills and responsibilities. In that sense, it may not come as a surprise that many organizations struggle to manage such high volumes of complex process models. The problem is exacerbated by overlapping content across models, poor version management, process models that are used simultaneously for different purposes, the use of various modeling notations such as EPCs, BPMN, etc.

Against this backdrop, the aim of the workshop is to discuss novel research in the area of business process model collections. To this end, four papers were selected for presentation, from a total of eight submissions. In addition a keynote speaker was invited.

September 2012

Hajo Reijers  
Mathias Weske  
Remco Dijkman

### **Invited Talk: Managing Large Process Model Collections: Challenges and Expectations from Practice**

Marcello La Rosa, Queensland University of Technology, Australia

The last decade has experienced a growing interest of researchers in the problem of managing large process model collections. A plethora of approaches, techniques, and tools have been proposed that investigate this problem and provide solutions to it from different perspectives and degrees of depth. For example, work has been done to query a repository of process models for similarities or exact matches; to consolidate a set of similar process models into a merged model or via shared sub-processes; to simplify a repository based on various refactoring opportunities; and to visualize relations between process models or variants thereof.

There are at least two independent reasons behind this increased research focus in managing large process model collections. On the one hand, as research in business process management matures, it becomes natural to explore relationships between process models rather than looking at a single process model at a time. For instance, new challenges arise when an existing technique has to scale up to a whole collection of process models. On the other hand, process model collections from practice are emerging with the broad application

of process modeling initiatives within various industries, offering ideal testbeds to evaluate the research outcomes. For example, Suncorp—one of the largest Australian insurers—offers more than 30 products for personal, motor vehicle, and commercial insurance by controlling over 15 insurance brands, which are the result of a series of mergers and acquisitions the company has recently gone through. This has led to more than 3,000 process models that are managed on a daily basis by various teams of process analysts.

Clearly, managing these large process model collections comes with various “concrete issues” that practitioners must face (the so-called modeling in the large challenge). For example, the high variability in Suncorp’s process models repository yields high costs for the development and maintenance of the IT infrastructure implementing such processes, which the company is no longer willing to tolerate (the sole process modeling initiative is estimated to have cost the company more than \$4 million).

Against this backdrop, it is opportune to reflect on which practical questions have been answered by the research community so far, and what still remains open. This talk first profiles, the emerging research area of “managing large process model collections” through an overview and classification of its state of the art. Based on this, and taking the case of Suncorp as an example, it illustrates some typical challenges practitioners are facing in this context, and to what extent these challenges have indeed been solved by research. The talk concludes by exploring some ideas for bringing research supply in this area closer to industry demand.

**Marcello La Rosa** is an associate professor and the IS School Academic Director for Corporate Engagements at Queensland University of Technology (QUT) in Brisbane, Australia. He is also a researcher at the National ICT Australia. Marcello obtained his MSc in Computer Engineering from Politecnico di Torino in 2005, and his PhD in Computer Science from QUT in 2009. His research interests focus on process consolidation, configuration, and automation. Marcello has published more than 60 refereed papers on these topics including papers in journals like *ACM TOSEM*, *Formal Aspects of Computing*, and *Information Systems*. He leads the Apromore initiative ([www.apromore.org](http://www.apromore.org)) – a strategic collaboration between various universities for the development of an advanced process model repository. Marcello has taught process management to students and practitioners in Australia for over five years. Based on this experience, he recently co-authored *Fundamentals of Business Process Management* (Springer 2013) – the first, comprehensive textbook on business process management for graduate students. More information on him can be found at [www.marcellolarosa.com](http://www.marcellolarosa.com).



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## Second International Workshop on Process-Aware Logistics Systems (PALS 2012)

**Organizers:** Kamel Barkaoui, Virginia Dignum, Huib Aldewereld, Walid Gaaloul, Cherif Sadfi, Ichiro Satoh

The PALS workshop deals with problems related to the design and optimization of global logistics systems, from a business process management perspective. It is dedicated to exploring and mastering the tools needed for operating, reconfiguring and, in general, making decisions within logistics-based systems, in order to provide the customers and system users with the greatest possible value.

Our vision is that the business process models, which are used on a daily basis for making the decisions needed for operate and reconfigure the logistics systems, can naturally serve as the starting point for the problem formulations needed to optimize these logistics systems.

### Topics and Papers

The workshop attracted nine paper submissions. Each of these submissions was reviewed by at least three Program Committee members. After receiving the reviews, from these submissions, the top four were accepted as full papers and, in addition, another interesting submission was accepted as a short paper. A keynote speaker was also invited.

The first long paper proposes a high-level logistic process modeling environment supporting logistic services according to the business document choreography defined for these services. This approach allows an end-user to orchestrate a business process based on commercial decisions for service delivery by hiding details of the choreography, especially cancellation rules.

The second long paper is interested in modeling and managing capabilities as standalone entities, presented via an action verb and a set of domain-related attributes/features. In order to illustrate their conceptual model benefits, the authors apply it in describing logistics capabilities.

In the third long paper the authors argue that the mobility of an agent is a basic issue to express interactions of flow actions, consequently modeling migration process is a crucial issue. Therefore they propose to integrate Ferber and Müller's influence/reaction model in agent Petri nets to model migration mobile agents. This model clarifies the migration process of an agent from one environment to another and enhances its capacity for formal verification.

The fourth long paper presents a novel approach to carbon credit trading with pervasive computing technologies, particularly RFID (or barcode) technology. It introduces RFID tags as certificates for the rights to claim carbon credits in carbon offsetting and trading. The approach was constructed and evaluated with real customers and real carbon credits in a real supply chain. It can also be used to encourage industries and homes to reduce greenhouse gas emissions.

Finally, the short paper shows the necessity of the formal the verification of Web services properties to ensure a dynamic service composition. A logistics-based process was used as a use case in order to validate their approach.

September 2012

Kamel Barkaoui  
Virginia Dignum  
Huib Aldewereld  
Walid Gaaloul  
Cherif Sadfi  
Ichiro Satoh

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## Third International Workshop on Reuse in Business Process Management (rBPM 2012)

**Organizers:** Marcelo Fantinato, Maria Beatriz Felgar de Toledo, Itana Maria de Souza Gimenes, Lucin'eia Heloisa Thom, Cirano Iochpe

### **Aims and Scope: Academia and Industry**

The current complexity of the corporative world demands dynamic and flexible IT infrastructure to provide technical solutions for conducting business. Business process management (BPM) has been providing important technological support to improve organization competitiveness. In order to increase dynamism and competitiveness, BPM can benefit from reuse techniques and tools at several stages of the business process life cycle.

The Third International Workshop on Reuse in Business Process Management was dedicated to exploring any type of reuse in the BPM domain, taking into account both the results of research in academia and the results of applications in industry. It was a forum in which to discuss systematic reuse applied to BPM at its various levels and different life cycle stages, including:

1. Basic service-oriented foundation level: including service development, description, publication, discovery, selection, negotiation, and aggregation
2. Management and monitoring upper level: including business process modeling, execution, monitoring, administration, and optimization

Moreover, the impact of reuse on business- and service-oriented engineering as well as analyzing how it can help in the design of higher-quality process models were very important topics for discussion. Different existing reuse approaches and techniques can be extended to be applied to this fairly new domain, including: software product line or software product families; variability descriptors; design patterns such as feature modeling; aspect-orientation; and component-based development. In addition, completely novel approaches and techniques can be proposed. Their application should also be discussed, preferably under experimentation as well as analysis of the results.

September 2012

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Maria Beatriz Felgar de Toledo  
Itana Maria de Souza Gimenes  
Lucin'eia Heloisa Thom  
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## Invited Talk: Overcoming Challenges of Reuse in Large Collections of Process Models

Barbara Weber, University of Innsbruck, Austria

The increasing adoption of process-aware information systems (PAIS), together with the reuse of process knowledge, has resulted in process model repositories with large collections of process models. Understandability and maintainability of the process models in the repository are preconditions for their successful reuse. However, industrial process models display a wide range of quality problems impeding their comprehensibility and consequently hampering their maintainability and reuse. The literature reports, for example, error rates between 10% and 20% in industrial process model collections. Moreover, non-intention-revealing or inconsistent naming, redundant process fragments, and overly large and unnecessarily complex process models are typical quality problems that can be observed in existing process model collections.

These problems have resulted in abundant research with the goal of obtaining a better understanding of factors influencing the quality of process models as well as techniques fostering their understandability and maintainability. For obtaining high-quality models it is essential to understand the factors that are influencing the quality of process models, but also the way process models are created. This challenge can be approached by taking a cognitive perspective and by analyzing the process of creating and maintaining process models (in addition to the modeling artifacts created). In part I of the talk I report on some of the findings obtained so far, discuss their implications for the reuse of process models, and outline future research directions. Part II of this keynote covers different techniques for fostering understandability as well as maintainability of process models that were developed in our group such as test-driven modeling, literate process modeling, but also techniques for the refactoring of large collections of process models. Again, implications for the reuse of process models are discussed.

**Barbara Weber** obtained her PhD in Economics at the Institute of Information Systems. Since 2004, she has been a researcher at the Department of Computer Science at the University of Innsbruck where she holds an Associate Professor position. She is a member of the quality engineering (QE) research group and head of the research cluster on business processes and workflows at QE. Her research areas include business process management, process flexibility, process modeling, integrated process lifecycle support and process mining. She has published more than 80 papers and articles in, among others, *Data & Knowledge Engineering*, *Computers in Industry*, *Science of Computer Programming*,

*Software Evolution and Maintenance, Requirements Engineering, and Enterprise Systems.* Together with Manfred Reichert she has co-authored the book *Enabling Flexibility in Process-aware Information Systems*. She has been Co-chair of the successful BPI (business process intelligence) workshop series since 2007, is a member of the IEEE Task Force on Process Mining, and will be PC Chair of next year's BPM conference.

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## Joint Workshop on Security in Business Processes (SBP 2012)

**Organizers:** Rafael Accorsi, Raimundas Matulevicius

### Workshop Goal

The automation of business processes by means of business process management systems enables the flexible adjustment of enterprise systems to the current demand. This is highly appreciated at managerial level. Automation also provides for a systematic separation of processes and IT architectures, allowing, for example the seamless outsourcing of process fragments to a cloud or the selection of different services for process execution.

Despite these immediate advantages, enterprises are still reluctant in fully relying on automated business processes. On the one hand, there are various concerns regarding the deployment of architectures and the correct modeling, enactment, monitoring, and audit of processes with regard to security, privacy, and compliance demands. On the other hand, there is the imminent danger of insider threats and attacks, which are facilitated by a flexible service architecture.

While research, methodologies, and corresponding tool-support lying at the intersection of business process management, security and privacy, and (formal) analysis could provide an appropriate basis for tackling these issues, the current state of the art fails to be carried over to practitioners. Certification to provably attest and control business process adherence to compliance requirements and auditing so as to detect violations are essential instruments for achieving reliably secure process-aware information systems. The SBP workshop series on Security in Business Processes brings together researchers and practitioners investigating and applying preventive and detective analyses to check security and compliance requirements for business process models and the corresponding management systems.

### Scientific Program

The program of SBP included two invited speakers, five long papers, and four short papers. The balance of academia and industry authors and the high attendance indicate that the topics addressed by the SBP workshop are of relevance to both communities, suggesting a high potential to transfer research techniques into commercial tools.

The workshop was divided into four sessions. The first session was dedicated to the perspectives of secure business processes. The keynote speech by Opdahl gave the audience a coherent view on identification and visualization of dependability concerns, especially focusing on the application to business process management. The second session paper by Goldstein and Frank introduced objectives and requirements of the language for multi-perspective modeling of IT security.

In the second workshop session the emphasis was placed on security and compliance. Knuplesch et al. provided insight into compliance of cross-organizational processes and their changes. The discussion was continued by Brucker and Hang, who were analyzed how to implement secure and compliant business-driven systems. The session was completed by Depaire et al., who reported on the process deviation analysis framework.

The third workshop session dedicated to security and Internet services was started by the second keynote speech. Heiberg presented the industrial experience on the new technologies for democratic elections. This talk was followed by a presentation on storage and execution of business processes in the cloud. Martinho and Ferreira argued that these activities should be carried out securely. In the last session talk, Fonda et al. presented an advanced protection technique called SEWebSessions to secure workflow sessions.

The fourth session of the workshop was dedicated to engineering of secure business processes. Lehmann and Lohmann presented a modeling wizard for confidential business processes. In another talk, Soomro and Ahmed introduced extensions to the misuse case diagrams to deal with security risk management. The final workshop presentation given by Leitner et al. introduced a method to produce the current-state RBAC model. The authors reported on the case study where process mining suitability is considered.

We wish to thank all those who contributed to making SBP a success: the authors who submitted papers, members of the Program Committee who carefully reviewed and discussed the submissions, and the speakers who presented their work at the workshop. In particular, we thank the keynote speakers for their enthusiastic and insightful keynotes. We also express our gratitude to the BPM 2012 Workshop Chairs for their support in preparing the workshop. Finally, we thank our colleagues from the Steering Committee – Wil van der Aalst and Guttorm Sindre – and from the Organizing Committee – Peter Karpati and Marco Montali – for their support and contribution to the SBP 2012 workshop.

September 2012

Rafael Accorsi  
Raimundas Matulevicius

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# First International Workshop on Theory and Applications of Process Visualization (TAProViz 2012)

**Organizers:** Ross Brown, Simone Kriglstein, Stefanie Rinderle-Ma

## Introduction

The representation of business process models has been a continuing research topic for many years now. However, many process model representations have not developed beyond minimally interactive 2D icon-based representations of directed graphs and networks, with little or no annotation for information overlays. With the rise of desktop computers and commodity mobile devices capable of supporting rich interactive 3D environments, we believe that much of the research performed in computer-human interaction, virtual reality, games, and interactive entertainment has much potential in areas of BPM; to engage, provide insight, and to promote collaboration among analysts and stakeholders alike. This initial visualization workshop sought to initiate the development of a high-quality international forum to present and discuss research in this field. Via this workshop, we intend to create a community to unify and nurture the development of process visualization topics as a continuing research area.

## Topics and Papers

The workshop attracted 11 paper submissions. Each of these submissions was reviewed by at least three Program Committee members. After receiving the reviews, three full papers and one tool report paper were accepted for presentation at the workshop. In addition, we invited a keynote speaker, Manfred Reichert, from the University of Ulm.

The papers address a number of topics in the area of process model visualization, in particular:

- 3D process model representations
- Visualizing the process of process modeling
- Visual analysis of large-scale activity data
- Visualization of process hierarchies in large collections

The keynote on “Visualizing Large Business Process Models — Challenges, Techniques, Applications” by Manfred Reichert, presented examples of large process models to discuss the challenges to be tackled when visualizing and abstracting such models. The keynote also includes the presentation of a comprehensive framework that allows for personalized process model visualizations, which can be tailored to the specific needs of different user groups.

Philip Effinger presented his tool report, “A 3D Navigator for Business Process Models” describing Flight Navigator, an approach to inspecting and presenting business process models in 3D. Flight Navigator supports numerous interaction paradigms that enable the user to easily present, inspect, and analyze a process model in a 3D environment.

Jan Claes, Irene Vanderfeesten, Jakob Pinggera, Hajo Reijers, Barbara Weber, and Geert Poels presented their full paper, “Visualizing the Process of Process Modeling with PPMCharts.” This paper reports on efforts to visualize the process modeling process, in such a way that relevant characteristics of the modeling process can be observed graphically. The graphical representation that this process mining tool plug-in generates allows for the discovery of different patterns of process modeling.

Kazuo Misue and Seiya Yazaki presented their full paper, “Panoramic View for Visual Analysis of Large-scale Activity Data,” which describes a representation technique to provide a panoramic view of activities in large-scale organizations. The representation embeds charts expressing activities into cells of a treemap. By using this representation, both quantitative and temporal aspects of activities can be seen simultaneously.

Finally, Andreas Seyfang, Katharina Kaiser, Theresia Gschwandtner, and Silvia Miksch, presented their full paper “Visualizing Complex Process Hierarchies During the Modeling Process” detailing a novel visualization, Plan Strips, which represents the hierarchy of plans, i.e., processes, as a set of nested strips. It represents the synchronization of the plans by color coding and ordering these strips, thus saving considerable display space compared to typical graph representations.

September 2012

Ross Brown  
Simone Kriglstein  
Stefanie Rinderle-Ma

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