Business Process Management – Kolumne

Folge 4

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Liebe Leser,

mit der aktuellen Ausgabe des EMISA Forums erhalten Sie Folge 4 unserer EMISA-Kolumne zum Thema *Business Process Management (BPM)*. Themen zur Modellierung und zum Management von Prozessen nehmen bei Veranstaltungen mit EMISA-Beteiligung traditionell eine wichtige Rolle ein. Mit der BPM-Kolumne tragen wir diesem Umstand Rechnung und berichten über aktuelle Themen, Projekte und Veranstaltungen aus dem BPM-Umfeld.

Schwerpunkt der heutigen Kolumne bildet die Thematik *Process Lifecycle Management.* Prozess-Management-Technologie wird in der Praxis nur dann sinnvoll einsetzbar sein, wenn sie alle Phasen des Prozesslebenszyklus einbezieht. Dies schließt eine integrierte Unterstützung für die Modellierung, Implementierung, Ausführung und Überwachung von Prozessen ebenso ein, wie die Möglichkeit dynamischer Prozessänderungen auf verschiedenen Ebenen.

Barbara Weber von der Universität Innsbruck liefert das aktuelle Schlagwort zum Thema *Process Lifecycle Management*. Des weiteren erhalten Sie eine Zusammenfassung zweier im Rahmen der BPM'06 Konferenz veranstalteten Workshops, deren Schwerpunkte – *Business Process Intelligence* bzw. *Dynamic Process Management* – gut zum aktuellen Thema passen. Am Ende dieser Kolumne findet sich unser BPM-Veranstaltungskalender für 2007.

Liebe Leser, im Besonderen sind wir auch an Ihren Anregungen und Beiträgen zum Thema interessiert. Wir freuen uns u.a. über Kurzbeiträge zu folgenden Rubriken:

- Vorstellung von Projekten und Arbeitsgruppen
- Aktuelle Schlagworte
- Aktuelle Produktangebote
- Aktuelle Dissertationen & Habilitationen
- Veranstaltungen

Ihre Beiträge senden Sie bitte an Manfred Reichert **(**m.u.reichert@cs.utwente.nl**),** Stefanie Rinderle **(**stefanie.rinderle@.uni-ulm.de**)** oder Barbara Weber **(**Barbara.Weber@uibk.ac.at**).**
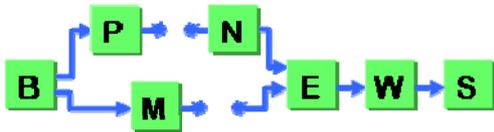
Aktuelles Schlagwort:

Process Life Cycle Management

Barbara Weber, Quality Engineering Research Group, University of Innsbruck

Contemporary information systems (IS) more and more have to be aligned in a process-oriented way. This new generation of information systems is often referred to as Process-Aware IS (PAIS) [DuHA05]. PAIS should capture real-world processes adequately to provide effective process support, i.e., there should be no mismatch between the computerized processes and those in reality. In order to achieve this goal, business processes must be supported in an integrated way.

For this purpose PAIS should allow authorized users to flexibly deviate from the predefined processes as required (e.g., to deal with exceptions) and to evolve PAIS implementations over time (e.g., due to process optimizations or legal changes). In addition, a framework is needed which enables the reuse of process knowledge when introducing new ad-hoc changes by learning from previous process instance changes. Moreover, the PAIS should support deriving optimized process models from them.
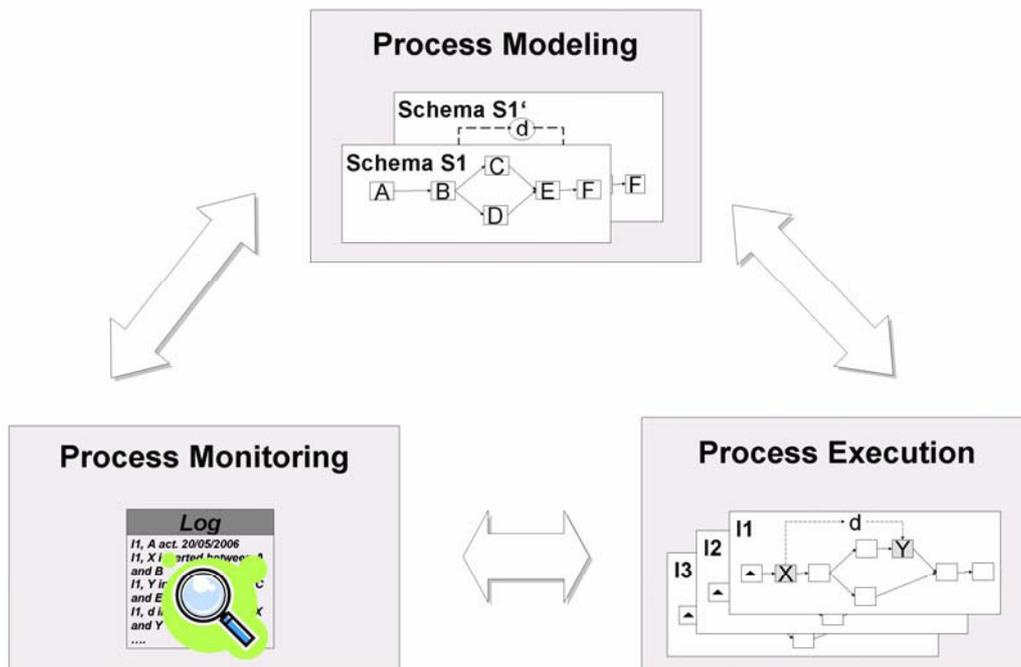
Figure 1: PAIS allow for the modelling, execution and monitoring of business processes
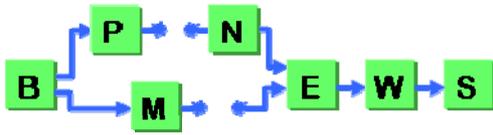
Process Modeling

PAIS enable users to model, execute, and monitor a company's business processes (cf. Fig. 1). In general, the orchestration of a business process is based on a predefined process model, called a *process schema*, consisting of the tasks to be executed (i.e., activities), their dependencies (e.g., control and data flow), organizational entities performing these tasks (i.e., actors), and business objects which provide or store data for the activities.

For each business process (e.g., booking a business trip or handling an order) a *process type* has to be defined for which different *process schema versions* may exist, reflecting the evolution of this process type. In Fig. 1, for example, process schemes *S1* and *S1'* correspond to two different versions of the same process type.
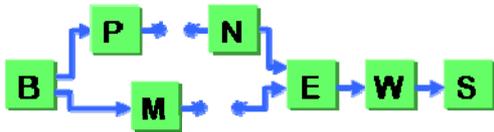
Process Execution

Based on a process schema new *process instances* are created and executed at run-time as specified in the underlying process schema. However, to deal with exceptions or unanticipated situations process participants must be able to deviate from the predefined execution path if required (cf. Fig. 2) [ReDa98]. The effects of such instance-specific changes should be kept local to the respective process instance, i.e., they must not affect other process instances of the same type. In Fig. 2, instance I_2 has been individually modified by dynamically inserting two activities *X* and *Y* as well a data dependency between them. Thus the respective execution schema of I_2 deviates from the original process schema *S1* this instance was derived from.
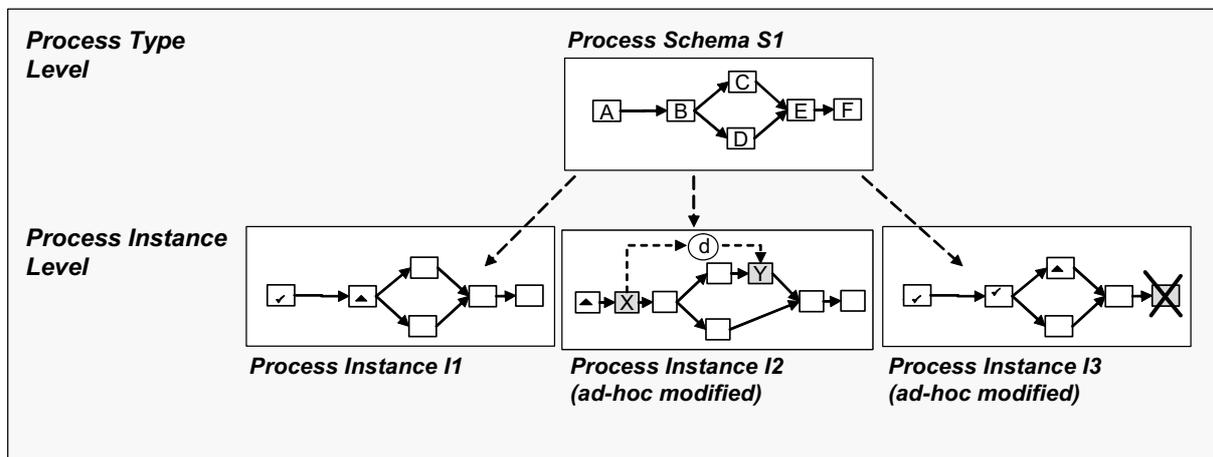
Figure 2: Individual Process Instances have to be modified due to Exceptions

Similar deviations can occur more than once. As it requires significant user experience to define changes from scratch, change reuse should be supported. In order to reuse changes they must be annotated with contextual information (e.g., about the reasons for the deviation) and be memorized by the PAIS. This contextual information can then be used for retrieving similar problem situations and therefore ensures that only changes relevant for the current situation are presented to the user [WWB04, RWRW05].

Process Monitoring

To ensure traceability the execution histories of process instances as well as changes are logged by the PAIS. This information can then be used to derive suggestions for process improvements [WRRW06, GRRA06]. To incorporate the respective process improvements into the process model, the PAIS must support process type changes.
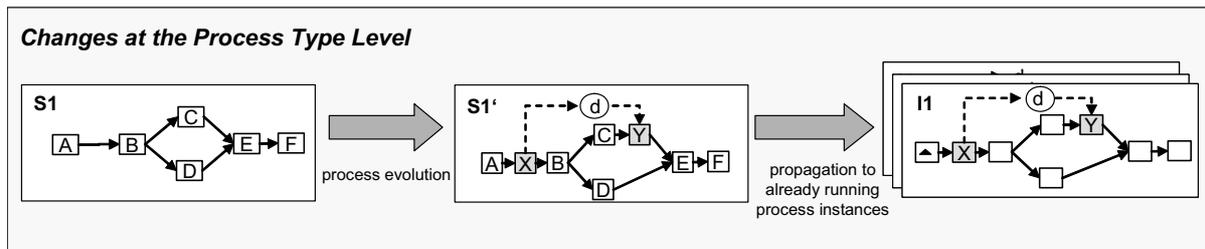

Figure 3: Business Processes Evolve over Time

These changes cover the evolution of real-world business processes and are performed by the process engineer [RRD04, CCPP98, Wesk00]. As a result a new schema version of the same type is obtained (cf. Fig. 3). Usually, the execution of future process instances is then based on the new schema version. Regarding long running process instances, it might be required to additionally migrate them to the new process schema version [RRD04].

Integrated Process Lifecycle Support by Combining Business Process Management and Case-Based Reasoning

Fig. 4 shows how integrated process life cycle support can be achieved by combining process management technology and case-based reasoning [WRW06].
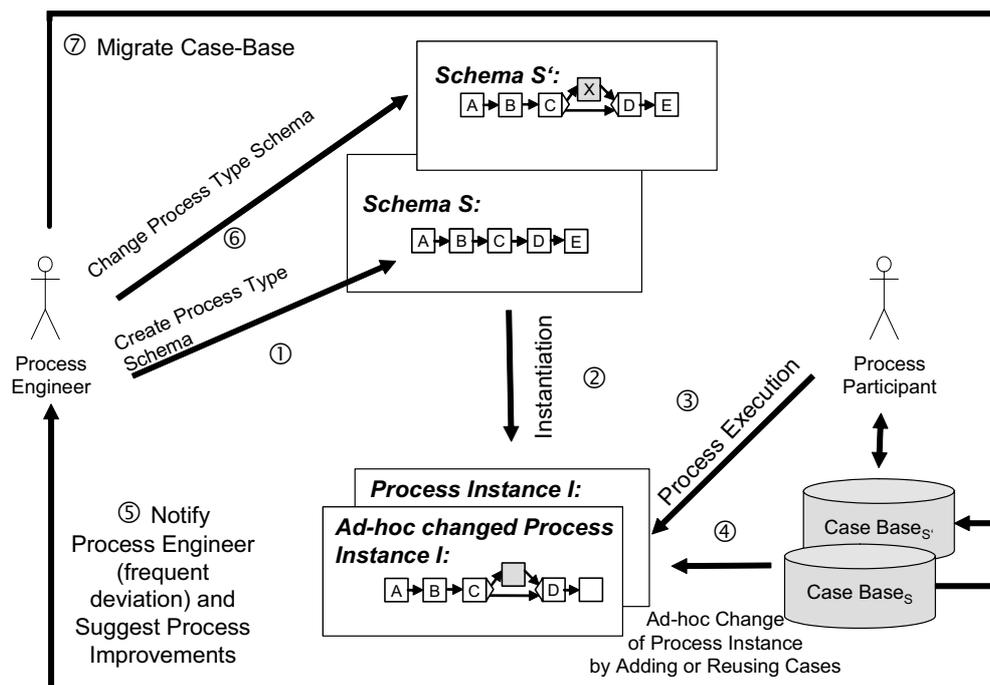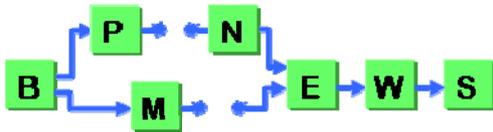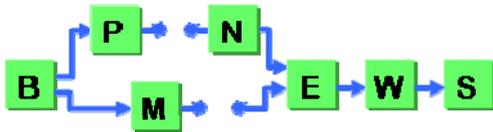

Figure 4: Integrated Process Lifecycle Support

At build time an initial representation of a business process is created either by process analysis or by process mining (i.e., by observing process and task executions) (1). At run time new process instances can then be created from the predefined process schema (2). In general, process instances are executed according to the process schema they were derived from, and activities are assigned to process participants to perform the respective tasks (3). However, when exceptional situations occur at the process instance level, process participants must be able to deviate from the predefined schema. Users can either define an ad-hoc deviation from scratch and document the reasons for the changes in the case base (CB), or they can reuse a previously specified ad-hoc modification from exactly this CB (4). The PAIS monitors how often a particular schema is instantiated and how often deviations occur. When a particular ad-hoc modification is frequently reused, the process engineer is notified that a process type change may have to be performed (5). The process engineer can then evolve the process schema (6). In addition, existing cases which are still relevant for the new process schema version are migrated to a new version of the CB (7).

References

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[CCPP98]   Casati, F., Ceri, S., Pernici, B., Pozzi, G.: Workflow evolution. Data and Knowledge Engineering 24 (1998) 211–238.

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[RRD04]   Rinderle, S., Reichert, M., Dadam, P.: Correctness Criteria for Dynamic Changes in Workflow Systems - A Survey. Data & Knowledge Engineering 50 (2004) 9-34.

[RWRW05]   Rinderle, S., Weber, B., Reichert, M., Wild, W.: Integrating Process Learning and Process Evolution - A Semantics Based Approach. In: BPM 2005. (2005) 252–267.

[Wesk00]   Weske, M.: Workflow management systems: Formal Foundation, Conceptual Design, Implementation Aspects. University of Münster (2000) Habil Thesis.

[WWB04]   Weber, B., Wild, W., Breu, R.: CBRFlow: Enabling Adaptive Workflow Management through Conversational CBR. In: ECCBR'04, Madrid (2004) 434–448.

[WRRW06]   Weber, B., Reichert, M., Rinderle, S., Wild, W.: Towards a Framework for the Agile Mining of Business Processes. In: Proceedings Business Process Management Workshops, BPM 2005 International Workshops, BPI, BPD, ENEI, BPRM, WSCOBPM, BPS (Revised Selected Papers) (2006) 191-202.

[WRW06]   Weber, B., Reichert, M., Wild W.: Case-Base Maintenance for CCBR-based Process Evolution. In: ECCBR'06, Fethiye, Turkey (2006) 106-120.

Veranstaltungsberichte

1st Int'l Workshop on Dynamic Process Management (DPM'06)	Workshop-Bericht von
Wien, 04.09.2006	*Manfred Reichert* University of Twente, NL
Workshop im Rahmen der BPM'06-Konferenz	*Andreas Wombacher* EPFL Lausanne

Background. The agility of enterprises increasingly depends on their ability to dynamically set up new business processes or to modify existing ones, and to quickly adapt their information systems to these process changes. Companies are therefore developing a growing interest in concepts, technologies and systems that help them to flexibly align their business processes to meet changing needs and to optimize their interactions with customers and business partners. In this context dynamic process support has become an extensive research topic in areas like business process management, web service technology, and engineering workflows with several specialized aspects. Besides business requirements there are many technological challenges like the correct and efficient support of dynamic workflows (e.g., evolution of workflow specifications and dynamic change propagation, data-driven workflows), the support of autonomic or self-organizing processes, the dynamic selection of best service providers, the dynamic evolution of local processes as well as their involvement in cross-organizational collaborations, or the handling of security and trust issues in dynamic processes. While there has been major progress in some of these areas, dynamic process support is still a vision when looking at more complex scenarios.

Objectives. The aim of the DPM 2006 workshop was to provide a forum wherein challenges and paradigms for dynamic process management could be debated.

Programme. The DPM 2006 workshop comprised a keynote talk on adaptive process management ("ADEPT2 - Towards a New Dimension for Adaptive and Robust Process-Aware Information Systems") and five full papers that were selected by the program committee for being presented at the workshop.

In his keynote talk Peter Dadam gave insights into the work done within the research projects ADEPT and AristaFlow. The target of the ADEPT project is to develop the fundamentals for a process management technology, which makes process-aware applications easy to implement and which is much more flexible than current workflow management systems. Very challenging in this context is to achieve this in an efficient manner and without violating consistency and robustness. The AristaFlow project complements these activities by designing and implementing an integrated development environment which will allow to compose new processes in a plug & play like fashion. Peter Dadam illustrated the "technological vision" the ADEPT team is trying to make reality, discussed emerging scientific challenges, and explained the technological approaches taken in ADEPT and AristaFlow to meet these goals. Among other things, the developed framework for dynamic process changes, which enables both the quick and correct propagation of process type changes to in-progress process instances and the ad-hoc adaptation of single process instances, was presented. This presentation was complemented by a demonstration of the experimental ADEPT process management system.

The five accepted workshop papers have covered different paradigms for flexible and dynamic process management including declarative, data-driven, rule-based, agent-based, and goal-driven approaches. The paper entitled "A Declarative Approach for Flexible Business Processes Management " by M. Pesic and W.M.P. van der Aalst has introduced an approach for realizing flexible business processes based on declarative process specifications. In the paper "Flexibility of Data-driven Process Structures" by D. Müller,
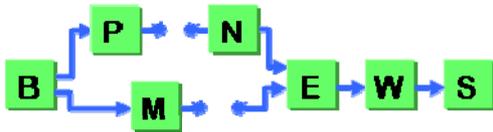
M. Reichert, and J. Herbst different issues related to the design, enactment and change of data-driven process structures have been discussed. A rule-based approach for dynamic process management has been provided by S. Cetin, N. Ilker Altintas, and R. Solmaz in their paper "Business Rules Segregation for Dynamic Process Management with an Aspect-Oriented Framework". Quite a different perspective on dynamic processes has been taken by F. Charoy, A. Guabtni, and M. Valdes Faura in their paper "A Dynamic Workflow Management System for Coordination of Cooperative Activities". Finally, a goal-driven approach for flexible and dynamic process management, which is based on agent technology, has been introduced in the paper "Agile Processes through Goal- and Context-oriented Business Process Modeling" by B. Burmeister, H.-P. Steiert, T. Bauer, and H. Baumgärtel.

Referenzen

Proc. Business Process Management Workshops (BPM'06 Workshops),1st Int'l Workshop on Dynamic Process Management (DPM'06), LNCS 4103, Wien, September 2005,

2nd Int'l Workshop on Business Process Intelligence (BPI'2006)

Wien, 04.09.2006

Workshop im Rahmen der BPM'06-Konferenz

Workshop-Bericht von

Malu Castellanos
Domenico Sacca
Ton Weijters

Background. Surviving in today's competitive market demands that enterprises improve the efficiency of their business processes not only by their automation, as they have done for years, but also by gaining intelligence about processes that reduce costs and improve performance. Business Process Intelligence (BPI) is an emerging, interdisciplinary area that aims at developing models, techniques and tools to improve different aspects of how business processes are modeled and conducted. BPI is not only the application of Business Intelligence techniques to business processes but it also integrates contributions from other research areas like BAM (Business Activity Monitoring), BOM (Business OperationsManagement), BPM (Business Performance Management), and others.

Objectives. Following the success of the first BPI workshop, held in Nancy in 2005, this second workshop intended to bridge across the various research areas that are related to BPI. At the same time the workshop was an opportunity to continue consolidating this area and building a multidisciplinary community.

Programme. The workshop BPI 2006 consisted of a keynote talk on "Process Mining: Practical Experiences and a Reality Check", seven contributed papers that were selected by the program committee for presentation at the workshop, and a panel on "Business Process Intelligence and Business Intelligence: Differences and Convergences".

In his keynote talk, Wil van der Aalst gave an overview of the various process mining techniques that have been developed in the last 10 years, and discussed the many perspectives of viewing process mining: from the reverse engineering of code and the monitoring of embedded systems to cross-organizational workflows and healthcare processes. The goal was to promote a discussion on the challenges that need to be addressed to improve the applicability of process mining.
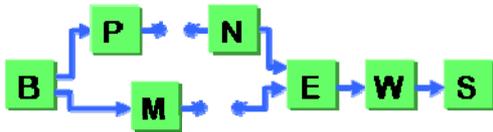
The seven papers cover some of the main topics addressed by BPI. In particular, the paper "Process Mining and Petri Net Synthesis" by E. Kindler, V.Rubin and W. Schäfer, deals with the topic of *process discovery*, which refers to the analysis of enterprise operations in order to derive the process models that these operations obey. A contribution to this topic is also given by the industrial paper "A Generic Import Framework for Process Event Logs" by C.W. Günther and W.M.P. van der Aalst, which illustrates a framework for acquiring log data from a Process-Aware Information System. The topic of *intelligent process analysis* (analysis of business process execution to discover interesting correlations) is addressed by the paper "Process Mining by Measuring Process Block Similarity" by J. Bae, J. Caverlee, L. Liu, B. Rouse, and H. Yan, which presents an approach for measuring the similarity between two process models. Another topic relevant to BPI, *exception handling*, is dealt with by the paper "Improving Exception Handling by Discovering Change Dependencies in Adaptive Process Management Systems" by B. Weber, W. Wild, M. Lauer and M. Reichert. A novel topic of process modeling and reasoning is covered by the paper "Process Representation and Reasoning Using a Logic Formalism with Object-Oriented Features" by A. Gualtieri, T. Dell'Armi and N. Leone. The topic of *business process measurement* is analyzed by the survey paper "A Discourse on Complexity of Process Models" by J. Cardoso, J. Mendling, G. Neumann and H.A. Reijers, which focuses on the problem of defining complexity metrics for business processes. Finally, the position paper "Measuring Performance in the Retail Industry" by G. Marketos and Y. Theodoridis deals with the application of BPI in the context of the retail industry by suitably exploiting the RFID technology.
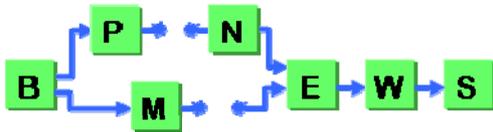
The panel discussed convergences between Business Intelligence (BI) and Business Process Intelligence: how techniques of BI can be effectively applied to add intelligence to the analysis of processes? The panel also intended to evidence differences between the two areas, as BPI is not just an application of BI, but it is a multidisciplinary area.

Referenzen

Proc. Business Process Management Workshops (BPM'06 Workshops),2nd Int'l Workshop on Business Process Intelligence (BPI'06), LNCS 4103, Wien, September 2005,

Abgeschlossene Dissertationen

- Lucineia Heloisa Thom: *A Pattern-based Approach for Business Process Modeling*. PhD thesis. Universidade Federal Do Rio Grande Do Sul, Brasilien, November 2006

BPM Veranstaltungskalender (2007)
März 2007
07.03 – 09.03   BTW 2007, 12. GI-Fachtagung für Datenbanksysteme in Business, Technologie und Web, RWTH Aachen [http://www.btw2007.de/]
21.03 – 23.03   Modellierung 2007, Workshop des GI-Querschnittsfachausschusses Modellierung, Herrsching [http://www.modellierung2007.de/]
29.03. – 30.03.   Service-orientierte Implementierung von Prozessen: Paradigmen, Konzepte, Technologien Seminar, Deutsche Informatik Akademie (DIA), Heidelberg [http://www.dia-bonn.de]
April 2007
16.04 – 20.04   ICDE'07 – 23rd IEEE Int'l Conference on Data Engineering, Istanbul, Türkei [http://www.icde2007.org/icde/]
Juni 2007
11.06 – 15.06   CAiSE'07 – 19th Int'l Conf. on Advanced Information Systems Engin., Trondheim, Norwegen [http://caise07.idi.ntnu.no/]
11.06 – 14.06   SIGMOD'07 – ACM Int'l Conf. on Management of Data, Peking [http://sigmod07.riit.tsinghua.edu.cn/officer.shtml]
12.06 – 16.06   ICEIS'07 – 9th Int'l Conf. on Enterprise Information Systems, Funchal, Madeira, Portugal [http://www.iceis.org/] Begleitender Workshop: 2nd Int'l Workshop on Technologies for Collaborative Business Processes (TCoB-2007)
18.06 – 20.06   WETICE'07 – 16th IEEE International Workshops on Enabling Technologies: Infrastructures for Collaborative Enterprises, Paris [http://www-inf.int-evry.fr/WETICE/html/new_workshops.html] Workshop mit BPM-Bezug: ProGility 2007 – 2nd IEEE Workshop on Agile Cooperative Process-aware Information Systems [http://is.tm.tue.nl/staff/heshuis/progility]
25.06 – 29.06   ATPN'07 – 28th Int'l Conf. on the Application and Theory of Petri Nets And Other Models of Concurrency, Siedlce, Polen [http://atpn2007.ap.siedlce.pl/] Begleitender Workshop: Int'l Workshop on Formal Approaches to Business Processes and Web Services
Ausblick 2. Jahreshälfte 2007
24.09. – 27.09.   BPM'06 – 5th Int'l Conference on Business Process Management, Brisbane, Australia [http://bpm07.fit.qut.edu.au/]
08. – 09.10.   EMISA'07 – 2nd Int'l Workshop on Enterprise Modelling and Information Systems Architectures, St. Goar [www.icb.uni-due.de./emisa07]
25.10. – 26.10.   Geschäftsprozesse explorieren, modellieren und optimieren Seminar, Deutsche Informatik Akademie (DIA), [http://www.dia-bonn.de]