Wil M.P. van der Aalst
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Francisco Curbera (Eds.)

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3rd International Conference, BPM 2005
Nancy, France, September 2005
Proceedings

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Preface

This volume contains the proceedings of the 3rd International Conference on Business Process Management (BPM 2005), organized by LORIA in Nancy, France, September 5–8, 2005.

This year, BPM included several innovations with respect to previous editions, most notably the addition of an industrial program and of co-located workshops. This was the logical result of the significant (and still growing) industrial interest in the area and of the broadening of the research communities working on BPM topics.

The interest in business process management (and in the BPM conference) was demonstrated by the quantity and quality of the paper submissions. We received over 176 contributions from 31 countries, accepting 25 of them as full papers (20 research papers and 5 industrial papers) while 17 contributions were accepted as short papers. In addition to the regular, industry, and short presentations invited lectures were given by Frank Leymann and Gustavo Alonso. This combination of research papers, industrial papers, keynotes, and workshops, all of very high quality, has shown that BPM has become a mature conference and the main venue for researchers and practitioners in this area.

We would like to thank the members of the Program Committee and the reviewers for their efforts in selecting the papers. They helped us compile an excellent scientific program. For the difficult task of selecting the 25 best papers (14% acceptance rate) and 17 short papers each paper was reviewed by at least three reviewers (except some out-of-scope papers).

We would like to acknowledge the splendid support of the local organization (in particular Claude Godart, Olivier Perrin, and Daniela Grigori). We also thank Chris Bussler as workshop chair. Special thanks (as always!) go to Eric Verbeek: he did a great job in compiling the final versions of the papers into this LNCS volume. Finally, we would like to mention the excellent co-operation with Springer during the preparation of this volume. We hope you will find the papers in this volume interesting and stimulating.

June 2005
Wil van der Aalst, Boualem Benatallah, Fabio Casati, and Francisco Curbera
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Table of Contents

Research Papers

Modeling and Analysis of Mobile Service Processes by Example of the Housing Industry
Volker Gruhn, André Köhler, Robert Klawes 1

An Organisational Perspective on Collaborative Business Processes
Xiaohui Zhao, Chengfei Liu, Yun Yang 17

Mining Hierarchies of Models: From Abstract Views to Concrete Specifications
Gianluigi Greco, Antonella Guzzo, Luigi Pontieri 32

Flexible Business Process Management Using Forward Stepping and Alternative Paths
Mati Golani, Avigdor Gal 48

Semi-automatic Generation of Web Services and BPEL Processes - A Model-Driven Approach
Rainer Anzböck, Schahram Dustdar 64

A Human-Oriented Tuning of Workflow Management Systems
Irene Vanderfeesten, Hajo A. Reijers 80

The Price of Coordination in Resource Management
Kees van Hee, Alexander Serebrenik, Natalia Sidorova, Marc Voorhoeve, Jan van der Wal 96

sPAC (Web Services Performance Analysis Center): Performance Analysis and Estimation Tool of Web Services
Hyung Gi Song, Kangsun Lee 109

Specifying Web Workflow Services for Finding Partners in the Context of Loose Inter-organizational Workflow
Eric Andonoff, Lotfi Bouzguenda, Chihab Hanachi 120

An Intuitive Formal Approach to Dynamic Workflow Modeling and Analysis
Jiacun Wang, Daniela Rosca, William Tepfenhart, Allen Milewski, Michael Stoute 137

Using the π-Calculus for Formalizing Workflow Patterns
Frank Puhlmann, Mathias Weske 153

Mining Workflow Recovery from Event Based Logs
Walid Gaaloul, Claude Godart 169

Behavior Based Integration of Composite Business Processes
Georg Grossmann, Yikai Ren, Michael Schrefl, Markus Stumptner ... 186

Visualization Support for Managing Large Business Process Specifications
Alexander Streit, Binh Pham, Ross Brown 205

Transforming BPEL to Petri Nets
Sebastian Hinz, Karsten Schmidt, Christian Stahl 220

Event-Based Coordination of Process-Oriented Composite Applications
Marlon Dumas, Tore Fjellheim, Stephen Milliner, Julien Vayssière ... 236

Integrating Process Learning and Process Evolution – A Semantics Based Approach
Stefanie Rinderle, Barbara Weber, Manfred Reichert, Werner Wild ... 252

An Analysis and Taxonomy of Unstructured Workflows
Rong Liu, Akhil Kumar 268

A Framework for Document-Driven Workflow Systems
Jianrui Wang, Akhil Kumar 285

Service Interaction Patterns
Alistair Barros, Marlon Dumas, Arthur H.M. ter Hofstede 302

Industrial Papers

Modeling and Assessment of Production Printing Workflows Using Petri Nets
Raju N. Gottumukkala, Dr. Tong Sun 319

Process Management in Health Care: A System for Preventing Risks and Medical Errors
Massimo Ruffolo, Rosario Curia, Lorenzo Gallucci 334

A Pathway for Process Improvement Activities in a Production Environment: A Case Study in a Rework Department
Onur Özkök, Fatma Pakdil, Fahri Buğra Çamlıca, Tolga Bektaş, İmdat Kara 344

IT Support for Healthcare Processes
Richard Lenz, Manfred Reichert 354

From RosettaNet PIPs to BPEL Processes: A Three Level Approach for Business Protocols
Rania Khalaf 364

Short Papers

Using Software Quality Characteristics to Measure Business Process Quality
A. Selcuk Guceglioglu, Onur Demirors 374

Business Process Modelling and Improvement Using TAD Methodology
Nadja Damij, Talib Damij 380

On the Suitability of Correctness Criteria for Business Process Models
Juliane Dehnert, Armin Zimmermann 386

Service Retrieval Based on Behavioral Specifications and Quality Requirements
Daniela Grigori, Verónika Peralta, Mokrane Bouzeghoub 392

On the Semantics of EPCs: Efficient Calculation and Simulation
Nicolas Cuntz, Ekkart Kindler 398

Towards Integrating Business Policies with Business Processes
Zoran Milosevic 404

A Contract Layered Architecture for Regulating Cross-Organisational Business Processes
Mohsen Rouached, Olivier Perrin, Claude Godart 410

An Effective Content Management Methodology for Business Process Management
Young Gil Kim, Sang Chan Park, Chul Young Kim, Jin Ho Kim 416

Specification and Management of Policies in Service Oriented Business Collaboration
Bart Orriëns, Jian Yang 422

Yet Another Event-Driven Process Chain
Jan Mendling, Gustaf Neumann, Markus Nüttgens 428

Comparing the Control-Flow of EPC and Petri Net from the End-User Perspective
Kamyar Sarshar, Peter Loos 434

Overview of Transactional Patterns: Combining Workflow Flexibility and Transactional Reliability for Composite Web Services
Sami Bhiri, Khaled Gaaloul, Olivier Perrin, Claude Godart 440

Accelerated Enterprise Process Modeling Through a Formalized Functional Typology
Avi Wasser, Maya Lincoln, Reuven Karni 446

Introducing Business Process into Legacy Information Systems
Marcos R.S. Borges, A.F. Vincent, M^a Carmen Penadés, Renata M. Araujo 452

Spheres of Isolation: Adaptation of Isolation Levels to Transactional Workflow
Adnene Guabtni, François Charoy, Claude Godart 458

Verification of SAP Reference Models
B.F. van Dongen, M.H. Jansen-Vullers 464

Author Index 471

Modeling and Analysis of Mobile Service Processes by Example of the Housing Industry

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Abstract. This article describes the method of Mobile Process Landscaping by example of a project in which the service processes of a company from the housing industry were analyzed regarding their mobile potential. This analysis was conducted with the aim to organize these processes more efficiently in order to realize cost savings. Therefore, the method of Mobile Process Landscaping, which is introduced in this article, was used. The method refers to the stage of requirements engineering in the software process. It is shown how the initial situation of the company was analyzed, which alternative process models on the basis of mobility supporting technology were developed and how these alternatives were economically evaluated. Furthermore, it is shown how first restrictions for the software and system design were made on the basis of one process model. Finally, it is shown how the Mobile Process Landscaping method can be used to verify whether the adoption of mobility supporting technology is suitable to obtain a defined goal and which requirements such a solution needs to fulfill.

Keywords: business process modeling and analysis, mobile business processes.

1 Introduction

Since the availability of broadband radio networks and the receded costs for appropriate devices the use of mobility-supporting technology has become an interesting opportunity for companies to optimize selected business processes and to increase their efficiency. Mobile business processes are characterized by a high degree of mobility of the involved persons and by a lack of knowledge about the next location of the person. Often a connection to IT-systems of the company would be desirable. In such processes, media-breaks, long processing times, inefficient routes and lacks of information can be observed. The use of mobility supporting technology offers the opportunity to solve these problems. But therefore a systematic analysis of the professional requirements on the basis of business processes is necessary.

This article deals with the method of Mobile Process Landscaping (MPL) by whose use the described tasks can be handled. Referring to the software process the activities and their results can be assigned to the requirements engineering. The use of

W.M.P. van der Aalst et al. (Eds.): BPM 2005, LNCS 3649, pp. 1 – 16, 2005.

this method is shown by example of the technical service processes taken from a company of the housing industry.

In chapter 2 the MPL method is explained. First, mobile business processes are defined (2.1.). Afterwards, the structure of the method (2.2.) as well as its aim (2.3.) are described. Subsequently, an overview about related work is given (2.4). Chapter 3 shows the usage of the MPL method by example of a company of residential trade and industry. That chapter corresponds to the structure of the MPL method as explained in section 2.3. Chapter 4 draws a conclusion.

2 Mobile Process Landscaping Method

2.1 Mobile Business Processes

The term „business process" was defined by numerous authors ([1], [2], [3], [4], [5], [6]). Below, we follow the commonly used definition of Davenport [2] according to which a business process can be understood as „a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs: a structure for action."

A business process can be decomposed in different levels into sub-processes. If a sub-process is not decomposable it is called "activity." Thus, a business process can be understood as an abstract description of workflows in a company. The actual occurrence of such a business process in reality is called a business process instance.

In the following, only business processes with a specific distribution structure and thus a certain mobility of the process-executing person are considered. We suppose that mobility is given when for at least one activity an "uncertainty of location" exists. This assumption is based on the concept of "location uncertainty" by Valiente and van der Heijden [7], according to which the place of the execution of an activity can be different in different instances of the business process or the place can change during the execution of an activity. Thus, we deal with a mobile activity within a business process. Because multiple mobile activities are conceivable, and a mobile activity often affects the whole business process, the complete business process is called "mobile business process".

Furthermore, it can be noticed that the "uncertainty of location" is externally determined. This assumption implies that the location uncertainty is caused by external factors and that the process-executing person has therefore no freedom of choice regarding the place of the process execution. Beyond, often a cooperation with external resources (from the process-point of view) is needed during the execution of the process. This fact restricts the term "mobile business process" to the necessity of cooperation with external resources within the considered activity, for instance caused by the need for communication or coordination with other persons or interaction with other objects.

Considering this, we propose the following definition: A mobile business process is a business process, in which

a. at least one person is involved, which executes its tasks in different locations,
b. the actual location of the task-execution is known just vague and/or just short before the beginning of the task,

c. this uncertainty (b) is determined externally and can not be fully controlled by the process-executing person.

On the basis of this definition, two conclusions can be drawed. First, the definition implies that the assigned task causes the mobility of the involved person. The mobile worker need to appear physically on the specified location because there exists a resource (damaged device, customer) necessary for the solution of his task. Second, it is not relevant for this definition whether mobile information technology is used or not. In fact, mobile information technology will be the key for the realization of an efficient work flow in the majority of the cases.

2.2 Structure of the Method

Subsequently, the structure of the method is explained. Figure 1 shows the essential steps of the method. First, the company needs to define the objective which is to be achieved by use of this method. Usually, the goal is to optimize the process parameter (personnel) costs, the duration of the process or the quality of the produced goods and services.

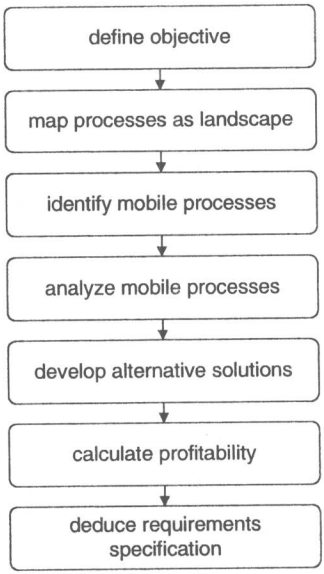

Fig. 1. Steps of the MPL-Method

As soon as the objective is defined one can start with acquiring the processes and depicting them as process landscape. The process landscape shows relations between the main business processes and allows its user to recognize dependencies between processes very early. During the next step, those sub-processes characterized by a high degree of mobility of the process-executing person need to be identified. Therefore, the method provides an assessment scheme which is explained in chapter 3.3. If mobile processes are identified, an analysis is necessary.

During this step, shortcomings in the process flow resulting from the mobility of the process-executing person can be discovered. On the basis of these insights new process versions can be developed in order to avoid the recognized shortcomings. This can be conducted by constraining or supporting the mobility within the process. Subsequently, the different alternatives need to be evaluated by an economically point of view. If a positive decision for the realization of one alternative has been reached, first requirements specifications and restrictions for the software architecture can be deduced. Further information about the Mobile Process Landscaping method can be found in ([8], [9], [10], [11]).

2.3 Aim of the MPL Method

By the use of the MPL method within the business process model of a company the following can be achieved:

- the discovery of mobile processes in the business process model,
- the analysis of potential for optimization by the support or elimination of the mobile processes,
- the development of alternative solutions based on the use of mobility-supporting technology,
- the economic evaluation of those alternatives and
- the deduction of general conditions and requirements for the software and system design for the selected alternative.

On the basis of these results alternative solutions can be evaluated according to the companies strategic goals. The architecture of the resulting system can be developed on the foundation of clear professional guidelines.

2.4 Related Work

A number of recent publications show that efficiency and effectiveness of certain activities can be improved through the use of mobile technologies ([7], [12], [13]). The mentioned examples are case studies describing successfully released solutions in different companies. However, how these companies choose the described business processes and activities for the use of mobile technologies remain open questions.

Frequently, a technology-driven approach can be observed for realising potential benefits, which adjusts processes corresponding to the available features of certain mobile devices. But often, a large number of complex processes with many involved people prevails, e.g. in large companies and corporate groups. Such an approach may then lead to wrong decisions, especially in the long term. In our opinion, the process of decision-making about use and design of a mobile information system needs to be systematic and comprehensible.

Beyond, the question for the quality of mobility is an important one in this context. As stated in [14] user mobility is often distinguished into personal and terminal mobility. Particularly, the movement of the terminal and therewith the terminal mobility has come to the fore in the recent years. In contrast, the personal mobility has received less attention. In our opinion, it is necessary to focus research on this topic

because of the constraints for software development resulting from certain requirements of the specific kind of mobility.

Kakihara and Sorensen [19] discuss the notion of mobility in distinguishing spatial, temporal and contextual mobility. This is an important contribution to the definition of mobility in this article.

Dustdar and Gall [16] as well as Sairamesch et al. [17], [18] describe frameworks for distributed and mobile collaboration which can be used to develop software architectures for mobile systems. These frameworks are of particular interest for the MPL method because it is the methods aim to provide a systematic deduction of constraints for the software architecture on the basis of the process model.

Gupta and Moitra [20] introduce an highly interesting technology integration approach for pervasive IT Infrastructure. The aim of this approach is partly the same as of the MPL method (focusing on the protection of investments and maximizing the returns) but has a more generic character.

3 The Use of MPL in an Industry Case

In the following, the application of the MPL method is shown by example of a municipal company called LWB, located in Leipzig, Germany. Its main task is to assure a socially acceptable apartment supply for a great number of citizens. For this purpose, LWB builds and maintains apartments particular in the low price segment. These apartments are mainly located in multi-storey houses which are affected by vacancy more than averagely.

The economic situation in the concerned real estate market is characterized by a considerable oversupply of apartments. Because of the large share of vacant apartments (approx. 17%) as well as the continuous migration of prosperous inhabitants into the suburbs, landlords compete for the lowest rents on the market. In this situation the company LWB is confronted with high losses of revenue and high costs for maintenance. In order to overcome this situation the company induced a variety of steps, basically to lower the costs. In this context, an examination and analysis of the internal workflow was planned in order to discover potential for optimization.

The company started quite fast to focus on its maintenance processes because of the very large number of apartments (approx. 12,000) and therefore the very large number of process recurrences. Beyond, these processes are characterized by a high degree of mobility of the process-executing person. These facts promised a high potential for optimization. Therefore, the company LWB asked the University of Leipzig to conduct an analysis by the use of the MPL method. The precise proceeding during this project and the achieved results are introduced in the following. The explanations are aligned on the structure of the method as described in Figure 1.

3.1 Defining Objective

The company aimed at preferably high cost-savings by an optimization of the business processes with a high degree of mobility of the process-executing person. The use of mobile technology therefore was favored. The analysis should be conducted for the business process "Technical Service." As a result, a couple of alternative technical

and process solutions as well as an economical evaluation and first requirement specifications of them was expected.

3.2 Mapping Processes as Landscape

3.2.1 Depiction of Processes

The business process "Technical Service" consists of the sub-processes "Maintenance," "Administration," "Allocation of Costs," "Billing" and "Recording of Consumption Values." These business processes are depicted as a process landscape (PL) to recognize their essential relations to each other (Figure 2). The sub-processes are evaluated by the level of value added and the assumed degree of mobility.

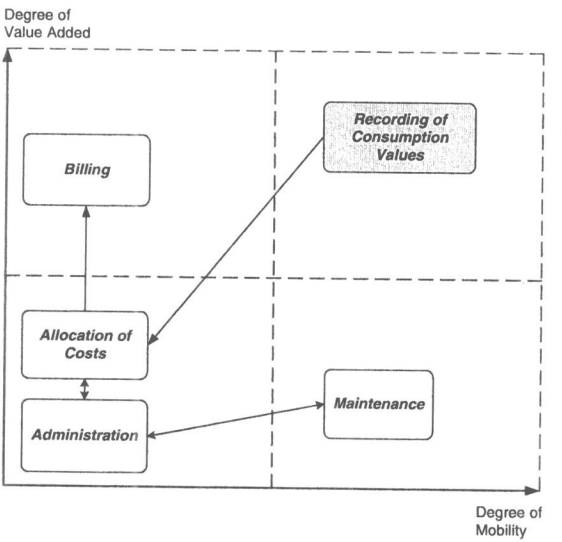

Fig. 2. Figure 1. PL "Technical Service"

The sub-processes "Allocation of Costs" and "Administration" were classified as slightly value adding and not mobile. The sub-process "Billing" was classified as value adding but not mobile. The sub-process "Maintenance" is extremely mobile but just slightly value adding due to the fact that necessary repairs need to be achieved but no revenue can be associated to them. The sub-process "Recording of Consumption Values" is extremely mobile and value adding. Because of this classification the sub-process "Recording of Consumption Values" was examined. Figure 3 shows the detailed sub-process. The notation in this figure as well as in the following ones is used according to the Business Process Modeling Notation [15]. The sub-process „Recording of Consumption Values" contains the recording, the transportation and the processing of the consumption values for water and heating. They are measured by appropriate meters for each apartment.

The recording of the consumption values is executed by a subsidiary company of the LWB called WSL. The process starts when the LWB assigns the WSL to record