Modeling Business Processes

A Petri Net-Oriented Approach

Wil van der Aalst and Christian Stahl

Modeling Business Processes A Petri Net Oriented Approach Information Systems

Joaquim Filipe,B. Sharp,P. Miranda

Modeling Business Processes A Petri Net Oriented Approach Information Systems:

Modeling Business Processes Wil Van Der Aalst, M.P.,Christian Stahl,2011-05-27 An introduction to the modeling of business information systems with processes formally modeled using Petri nets This comprehensive introduction to modeling business information systems focuses on business processes It describes and demonstrates the formal modeling of processes in terms of Petri nets using a well established theory for capturing and analyzing models with concurrency The precise semantics of this formal method offers a distinct advantage for modeling processes over the industrial modeling languages found in other books on the subject Moreover the simplicity and expressiveness of the Petri nets concept make it an ideal language for explaining foundational concepts and constructing exercises After an overview of business information systems the book introduces the modeling of processes in terms of classical Petri nets This is then extended with data time and hierarchy to model all aspects of a process Finally the book explores analysis of Petri net models to detect design flaws and errors in the design process The text accessible to a broad audience of professionals and students keeps technicalities to a minimum and offers numerous examples to illustrate the concepts covered Exercises at different levels of difficulty make the book ideal for independent study or classroom use **Modeling Business Processes** Wil Van Der Aalst, M.P.,Christian Stahl,2011-05-27 An introduction to the modeling of business information systems with processes formally modeled using Petri nets This comprehensive introduction to modeling business information systems focuses on business processes It describes and demonstrates the formal modeling of processes in terms of Petri nets using a well established theory for capturing and analyzing models with concurrency The precise semantics of this formal method offers a distinct advantage for modeling processes over the industrial modeling languages found in other books on the subject Moreover the simplicity and expressiveness of the Petri nets concept make it an ideal language for explaining foundational concepts and constructing exercises After an overview of business information systems the book introduces the modeling of processes in terms of classical Petri nets This is then extended with data time and hierarchy to model all aspects of a process Finally the book explores analysis of Petri net models to detect design flaws and errors in the design process The text accessible to a broad audience of professionals and students keeps technicalities to a minimum and offers numerous examples to illustrate the concepts covered Exercises at different levels of difficulty make the book ideal for independent study or classroom use

Research Challenges in Information Science João Araújo,Jose Luis de la Vara,Maribel Yasmina Santos,Saïd Assar,2024-05-03 This book constitutes the proceedings of the 18th International Conference on Research Challenges in Information Sciences RCIS 2024 which took place in Guimar es Portugal during May 2024 The scope of RCIS is summarized by the thematic areas of information systems and their engineering user oriented approaches data and information management business process management domain specific information systems engineering data science information infrastructures and reflective research and practice The 25 full papers 12 Forum and 5 Doctoral Consortium papers included

in these proceedings were carefully reviewed and selected from 100 submissions They were organized in topical sections as follows Part I Data and information management conceptual modelling and ontologies requirements and architecture business process management data and process science security sustainability evaluation and experience studies Part II Forum papers doctoral consortium papers **Process Querying Methods** Artem Polyvyanyy,2022-04-25 This book presents a framework for developing as well as a comprehensive collection of state of the art process querying methods Process querying combines concepts from Big Data and Process Modeling and Analysis with Business Process Intelligence and Process Analytics to study techniques for retrieving and manipulating models of real world and envisioned processes to organize and extract process related information for subsequent systematic use The book comprises sixteen contributed chapters distributed over four parts and two auxiliary chapters The auxiliary chapters by the editor provide an introduction to the area of process querying and a summary of the presented methods techniques and applications for process querying The introductory chapter also examines a process querying framework The contributed chapters present various process querying methods including discussions on how they instantiate the framework components thus supporting the comparison of the methods The four parts are due to the distinctive features of the methods they include The first three are devoted to querying event logs generated by IT systems that support business processes at organizations querying process designs captured in process models and methods that address querying both event logs and process models The methods in these three parts usually define a language for specifying process queries The fourth part discusses methods that operate over inputs other than event logs and process models e g streams of process events or do not develop dedicated languages for specifying queries e g methods for assessing process model similarity This book is mainly intended for researchers All the chapters in this book are contributed by active researchers in the research disciplines of business process management process mining and process querying They describe state of the art methods for process querying discuss use cases of process querying and suggest directions for future work for advancing the field Yet also other groups like business or data scientists and other professionals lecturers graduate students and tool vendors will find relevant information for their distinctive needs Chapter Celonis PQL A Query Language for Process Mining is available open access under a Creative Commons Attribution 4 0 International License via link springer com **Research and Development in E-Business through Service-Oriented Solutions** Tarnay, Katalin,Imre, Sandor,Xu, Lai,2013-06-30 As businesses are continuously developing new services procedures and standards electronic business has emerged into an important aspect of the science field by providing various applications through efficiently and rapidly processing information among business partners Research and Development in E Business through Service Oriented Solutions highlights the main concepts of e business as well as the advanced methods technologies and aspects that focus on technical support This book is an essential reference source of professors students researchers developers and other industry experts in order to provide a vast amount of

specialized knowledge sources for promoting e business **Transactions on Petri Nets and Other Models of Concurrency XII** Maciej Koutny,Jetty Kleijn,Wojciech Penczek,Mingmin Zhang,2017-09-19 The 12th volume of ToPNoC contains revised and extended versions of a selection of the best workshop papers presented at the 37th International Conference on Application and Theory of Petri Nets and Concurrency Petri Nets 2016 and the 16th International Conference on Application of Concurrency to System Design ACSD 2016 It also contains one paper submitted directly to ToPNoC The 9 papers cover a diverse range of topics including model checking and system verification refinement and synthesis foundational work on specific classes of Petri nets and innovative applications of Petri nets and other models of concurrency Application areas covered in this volume are security service composition databases communication protocols business processes and distributed systems Thus this volume gives a good overview of ongoing research on concurrent systems and Petri nets **Business Process Management** Mathias Weske,2019-06-22 Business process management is usually treated from two different perspectives business administration and computer science While business administration professionals tend to consider information technology as a subordinate aspect in business process management for experts to handle by contrast computer science professionals often consider business goals and organizational regulations as terms that do not deserve much thought but require the appropriate level of abstraction Matthias Weske argues that all communities involved need to have a common understanding of the different aspects of business process management To this end he details the complete business process lifecycle from the modeling phase to process enactment and improvement taking into account all different stakeholders involved After starting with a presentation of general foundations and abstraction models he explains concepts like process orchestrations and choreographies as well as process properties and data dependencies Finally he presents both traditional and advanced business process management architectures covering for example workflow management systems service oriented architectures and data driven approaches In addition he shows how standards like WfMC SOAP WSDL and BPEL fit into the picture This textbook is ideally suited for classes on business process management information systems architecture and workflow management This 3rd edition contains a new chapter on business decision modelling covering the Decision Model and Notation DMN standard the chapter on process choreographies has been streamlined and numerous clarifications have been fetched throughout the book The accompanying website www bpm book com contains further information and additional teaching material *Artificial Intelligence Systems and the Internet of Things in the Digital Era* Abdalmuttaleb M.A Musleh Al-Sartawi,Anjum Razzaque,Muhammad Mustafa Kamal,2021-05-28 This book brings together intelligence systems and the Internet of Things with special attention given to the opportunities challenges for education business growth and economic progression of nations which will help societies economists financial managers engineers ICT specialists digital managers data managers policymakers regulators researchers academics and students to better understand use and control AI and IoT to develop future strategies and to achieve sustainability goals

EAMMIS 2021 was organized by the Bridges Foundation in cooperation with the Istanbul Medeniyet University Istanbul Turkey on March 19 20 2021 EAMMIS 2021 theme was Artificial Intelligence Systems and the Internet of Things in the digital era The papers presented at the conference provide a holistic view of AI education MIS cybersecurity blockchain Internet of Ideas IoI and knowledge management *Application and Theory of Petri Nets and Concurrency* Lars Michael Kristensen,Jan Martijn van der Werf,2024-06-12 This book constitutes the proceedings of the 45th International Conference on Application and Theory of Petri Nets and Concurrency PETRI NETS 2024 held in Geneva Switzerland during June 26 28 2024 The 19 full papers and 2 invited papers included in this book were carefully reviewed and selected from 42 submissions They were organized in topical sections as follows Business Process Modelling and Mining Semantics and Complexity Reachability Verification and Model Checking Applications and Tools *Fundamentals of Information Systems Interoperability* Stefanie Rinderle-Ma,Jürgen Mangler,Daniel Ritter,2024-04-18 This book presents fundamental concepts and technologies to tackle interoperability between information systems It details interoperability at the data service and process level and combines theoretical foundations with hands on presentation of technologies to enable the development of sound and practical integration Chapter 1 details general interoperability challenges and describes the structure of the book To start with Chapter 2 presents technologies for the exchange of data between two selected and highly relevant data formats i e relational databases and XML Next Chapter 3 explains concepts for schema matching and mapping and data integration as well as the technological basis for implementing them based on query and transformation languages like XPath and XSLT Chapter 4 then turns to service interoperability and explains two related technologies REST and GraphQL in detail In Chapter 5 fundamentals for designing process orchestrations at the conceptual level are presented focusing on how to model process orchestrations and how to verify their correctness and soundness and showing BPMN as the de facto modeling standard Chapter 6 then details the concepts and languages for the implementation of process orchestrations including the presentation of execution languages for process orchestrations that are equipped with a formal semantics e g Workflow Nets the Refined Process Structure Tree and CPEE Trees Subsequently Chapter 7 focuses on the growing number of distributed loosely coupled and often non interoperable applications through the concepts of enterprise application integration and explains these by an implementation in CPN Tools and by two case studies Eventually Chapter 8 is lifting the orchestration and integration concepts and technologies to the choreography level by dealing with the interoperability between different process orchestrations Chapter 9 concludes the book by featuring success factors for interoperability projects It also provides a range of open research directions for interoperability such as compliance sensor fusion and blockchain technologies The book is mainly intended as a textbook to be used for developing and teaching courses on interoperability and integration To this end it is accompanied by a Web site with additional teaching materials It also spans a bridge from researchers to graduate students and practitioners by providing a deep understanding on practical interoperability

challenges and solutions The focus here is put on de facto standards and open source systems and tools to enable interoperability solutions at low cost *A Mosaic of Computational Topics: from Classical to Novel* Grzegorz Rozenberg,2020-11-15 This book A Mosaic of Computational Topics from Classical to Novel is a collection of papers published to honor Professor Jetty Kleijn on the occasion of her 65th birthday The scope and reach of her research is truly broad She has made significant and lasting contributions in several research areas both through the solving of challenging problems and in her pioneering of new research directions She has published influential papers contributing to the foundations of computer science in particular in the area of formal languages and automata theory to concurrency theory in particular Petri nets and to natural computing in particular bio inspired computing and the computational modeling of bio processes A significant part of Professor Kleijn s research portfolio is interdisciplinary including her work on the Petri net modeling of biological processes and the development of novel models of information processing in bio systems such as reaction systems She is also passionately engaged in promoting the involvement of women in computer science Jetty and her work are well recognized by the scientific community a fact demonstrated by the enthusiastic response to the invitation to contribute to this book and the 14 carefully refereed papers collected together here explore a number of research topics that are either directly or indirectly related to research directions pursued by Jetty Kleijn in the course of her career

Application and Theory of Petri Nets and Concurrency Susanna Donatelli,Stefan Haar,2019-06-11 This book constitutes the proceedings of the 40th International Conference on Application and Theory of Petri Nets and Concurrency PETRI NETS 2019 held in Aachen Germany in June 2018 Petri Nets 2019 is co located with the 19th International Conference on Application of Concurrency to System Design ACSD 2019 The 23 regular and 3 invited papers presented together in this volume were carefully reviewed and selected from 41 submissions The focus of the conference is on following topics Models Tools Synthesis Semantics Concurrent Processes Algorithmic Aspects Parametrics and Combinatorics and Models with Extensions *Transactions on Petri Nets and Other Models of Concurrency XVI* Maciej Koutny,Fabrice Kordon,Daniel Moldt,2022-04-19 The 16th volume of ToPNoC contains revised and extended versions of a selection of the best workshop and tutorial papers presented at the 41st International Conference on Application and Theory of Petri Nets and Concurrency Petri Nets 2020 and the 20th International Conference on Application of Concurrency to System Design ACSD 2020 The papers cover a diverse range of topics including model checking and system verification refinement and synthesis foundational work on specific classes of Petri nets and innovative applications of Petri nets and other models of concurrency Application areas covered in this volume are process mining verification formal semantics distributed simulations business processes distributed systems and net synthesis Thus this volume gives a good overview of ongoing research on concurrent systems and Petri nets ITNG 2024: 21st International Conference on Information Technology-New Generations Shahram Latifi,2024-07-08 This volume represents the 21st International Conference on Information Technology New Generations

ITNG 2024 ITNG is an annual event focusing on state of the art technologies pertaining to digital information and communications The applications of advanced information technology to such domains as astronomy biology education geosciences security and health care are the among topics of relevance to ITNG Visionary ideas theoretical and experimental results as well as prototypes designs and tools that help the information readily flow to the user are of special interest Machine Learning Robotics High Performance Computing and Innovative Methods of Computing are examples of related topics The conference features keynote speakers a best student award poster award service award a technical open panel and workshops exhibits from industry government and academia This publication is unique as it captures modern trends in IT with a balance of theoretical and experimental work Most other work focus either on theoretical or experimental but not both Accordingly we do not know of any competitive literature *Enterprise Information Systems III* Joaquim Filipe,B. Sharp,P. Miranda,2002-03-31 The purpose of the 3rd International Conference on Enterprise Information Systems ICEIS was to bring together researchers engineers and practitioners interested in the advances and business applications of information systems The research papers published here have been carefully selected from those presented at the conference and focus on real world applications covering four main themes database and information systems integration artificial intelligence and decision support systems information systems analysis and specification and internet computing and electronic commerce Audience This book will be of interest to information technology professionals especially those working on systems integration databases decision support systems or electronic commerce It will also be of use to middle managers who need to work with information systems and require knowledge of current trends in development methods and applications

Transactions on Petri Nets and Other Models of Concurrency VII Kurt Jensen,Wil M. P. van der Aalst,Gianfranco Balbo,Maciej Koutny,Karsten Wolf,2013-04-22 These Transactions publish archival papers in the broad area of Petri nets and other models of concurrency ranging from theoretical work to tool support and industrial applications ToPNoC issues are published as LNCS volumes and hence are widely distributed and indexed This Journal has its own Editorial Board which selects papers based on a rigorous two stage refereeing process ToPNoC contains Revised versions of a selection of the best papers from workshops and tutorials at the annual Petri net conferences Special sections issues within particular subareas similar to those published in the Advances in Petri Nets series Other papers invited for publication in ToPNoC Papers submitted directly to ToPNoC by their authors The 7th volume of ToPNoC contains revised material from the 5th International Summer School Advanced Course on Petri Nets held in September 2010 in Rostock Germany The nine papers cover a diverse range of topics including modeling verification partial order semantics and synthesis of Petri nets In compliance with their origin as course material the papers are written in survey or tutorial style and give a comprehensive overview of the state of the art in their respective areas *Logic Programming and Nonmonotonic Reasoning* Carmine Dodaro,Gopal Gupta,Maria Vanina Martinez,2024-10-11 This book constitutes the refereed proceedings of the 17th

International Conference on Logic Programming and Nonmonotonic Reasoning LPNMR 2024 held in Dallas TX USA during October 11 14 2024 The 27 full papers and 3 short papers included in this book were carefully reviewed and selected from 48 submissions They deal with declarative logic programming non monotonic reasoning and knowledge representation focusing on the design and implementation of logic based programming languages and database systems **Advanced Information Systems Engineering Workshops** Marko Bajec,Johann Eder,2012-07-04 This book constitutes the thoroughly refereed proceedings of eight international workshops held in Gda sk Poland in conjunction with the 24th International Conference on Advanced Information Systems Engineering CAiSE 2012 in June 2012 The 35 full and 17 short revised papers were carefully selected from 104 submissions The eight workshops were Agility of Enterprise Systems AgilES Business IT Alignment and Interoperability BUSITAL Enterprise and Organizational Modeling and Simulation EOMAS Governance Risk and Compliance GRCIS Human Centric Process Aware Information Systems HC PAIS System and Software Architectures IWSSA Ontology Models Conceptualization and Epistemology in Social Artificial and Natural Systems ONTOSE and Information Systems Security Engineering WISSE **Business Process Management** Umeshwar Dayal,Johann Eder,Jana Koehler,Hajo A. Reijers,2009-08-27 The BPM Business Process Management Conference series has the ambition to be the premier forum for researchersin the area of process awareinformation systems It has a recordfor attracting contributions in innovative researchofthe highest quality related to all aspects of business process management including theory frameworks methods techniques architectures and empirical ndings BPM 2009 was the 7th instantiation of this series It took place in Ulm G many September 8 10 2009 organized by the Institute of Databases and Inf mation Systems of the University of Ulm This volume contains 17 contributed research papers and two contributed industrial papers selected from 116 s missions from 31 countries The thorough reviewing process each paper was reviewed by three to ve Program Committee members was extremely c petitive as the acceptance rate of 16% indicates In addition to the contributed papers these proceedings contain two papers and an outline documenting the invited keynote talks Furthermore a report is included on the collaboration structure in BPM research derived from an analysis of papers accepted for all past BPM conferences In conjunction with the main conference nine international workshops took place the day before the conference These workshops fostered the exchange of fresh ideas and experiences between active BPM researchers and stimulated discussions on new and emerging issues in line with the conference topics The proceedings with the papers of all workshops will be published in a separate volume of Springer s Lecture Notes in Business Information Processing series **Design and Control of Workflow Processes** Hajo Reijers,2003-04-07 The motivation behind the conception of this monograph was to advance scientific knowledge about the design and control of workflow processes A workflow pr ess or workflow for short is a specific type of business process a way of or nizing work and resources Workflows are commonly found within large admin trative organizations such as banks insurance companies and governmental agencies Carrying out the tasks of a workflow in a

particular order is required to handle one type of case Examples of cases are mortgage applications customer complaints and claims for unemployment benefits A workflow used in handling mortgage applications may contain tasks for recording the application specifying a mortgage proposal and approving the final policy The monograph concentrates on four workflow related issues within the area of Business Process Management the field of designing and controlling business processes The first issue is how workflows can be adequately modeled Workflow mod ing is an indispensable activity to support any reasoning about workflows Diff ent purposes of workflow modeling can be distinguished such as system ena ment by Workflow Management Systems knowledge management costing and budgeting The focus of workflow modeling in this monograph is a to support simulation and analysis of workflows and b to specify a new workflow design The main formalism used for the modeling of workflows is the Petri net Many isting notions to define several relevant properties have been adopted such as the workflow net and the soundness notion

This book delves into Modeling Business Processes A Petri Net Oriented Approach Information Systems. Modeling Business Processes A Petri Net Oriented Approach Information Systems is an essential topic that needs to be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Modeling Business Processes A Petri Net Oriented Approach Information Systems, encompassing both the fundamentals and more intricate discussions.

1. The book is structured into several chapters, namely:

    - Chapter 1: Introduction to Modeling Business Processes A Petri Net Oriented Approach Information Systems
    - Chapter 2: Essential Elements of Modeling Business Processes A Petri Net Oriented Approach Information Systems
    - Chapter 3: Modeling Business Processes A Petri Net Oriented Approach Information Systems in Everyday Life
    - Chapter 4: Modeling Business Processes A Petri Net Oriented Approach Information Systems in Specific Contexts
    - Chapter 5: Conclusion

2. In chapter 1, the author will provide an overview of Modeling Business Processes A Petri Net Oriented Approach Information Systems. The first chapter will explore what Modeling Business Processes A Petri Net Oriented Approach Information Systems is, why Modeling Business Processes A Petri Net Oriented Approach Information Systems is vital, and how to effectively learn about Modeling Business Processes A Petri Net Oriented Approach Information Systems.
3. In chapter 2, the author will delve into the foundational concepts of Modeling Business Processes A Petri Net Oriented Approach Information Systems. The second chapter will elucidate the essential principles that must be understood to grasp Modeling Business Processes A Petri Net Oriented Approach Information Systems in its entirety.
4. In chapter 3, the author will examine the practical applications of Modeling Business Processes A Petri Net Oriented Approach Information Systems in daily life. The third chapter will showcase real-world examples of how Modeling Business Processes A Petri Net Oriented Approach Information Systems can be effectively utilized in everyday scenarios.
5. In chapter 4, the author will scrutinize the relevance of Modeling Business Processes A Petri Net Oriented Approach Information Systems in specific contexts. The fourth chapter will explore how Modeling Business Processes A Petri Net Oriented Approach Information Systems is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, this book will draw a conclusion about Modeling Business Processes A Petri Net Oriented Approach Information Systems. The final chapter will summarize the key points that have been discussed throughout the book.
   This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Modeling Business Processes A Petri Net Oriented Approach Information Systems.

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