

BPMN 2.0 HANDBOOK SECOND EDITION

Methods, Concepts, Case Studies and Standards in Business Process Modeling Notation

Authored by members of WfMC, OMG and other key participants in the development of BPMN 2.0, the *BPMN 2.0 Handbook Second Edition* assembles industry thought-leaders and international experts. Following the ground-breaking body of work in the *BPMN 2.0 Handbook First Edition* this book is greatly expanded with substantial new content and chapters updated to the latest advances in this important standard.

The authors examine a variety of aspects that start with an introduction of what's new and updated in BPMN 2.0, and look closely at interchange, best practices, analytics, conformance, optimization, choreography and more from a technical perspective.

The authors also address the business imperative for widespread adoption of the standard by examining best practice guidelines, BPMN business strategy and the human interface including real-life case studies. Other critical chapters tackle the practical aspects of making a BPMN model executable and the basic time-line analysis of a BPMN model.

This book is for *business* people who want to understand the how and why of BPMN 2.0 in simple non-jargon terms and the strategy and motivation for its adoption within the corporation.

It is also for the *technical* practitioner seeking current insights into the BPMN 2.0 standard and how to take advantage of its powerful capabilities.

Guide to BPMN 2.0 Technical Aspects

- Admission Process Optimization with BPMN and OSCO
- Analytics for Performance Optimization of BPMN 2.0 Business Processes
- Bespoke Enterprise Architecture: Tailoring BPMN 2.0 using Conformance Classes
- BPMN 2.0 Interchange
- BPMN Extension for Social BPM
- Collaborative Activities Inside Pools
- Making a BPMN 2.0 Model Executable
- New Capabilities for Interaction Modeling in BPMN 2
- New Capabilities for Process Modeling in BPMN 2
- Refactoring BPMN Models
- Simulation for Business Process Management

Guide to the Business Imperative for BPMN

- Best Practice Guidelines for BPMN 2.0
- BPMN and Business Strategy: One Size Does Not Fit All
- BPMN Used by Business Professionals: An In-depth Reflection on BPM with BPMN by the Swiss FOITT
- Business Process Integration in a Defense Product-focused Company
- Human-Readable BPMN Diagrams
- Making BPMN 2.0 Fit for Full Business Use
- Multi-faceted Business Process Modeling

Appendix includes BPMN Supporters list, XPDL 2.2 Guide, BPMN Glossary, index and more.

MANAGEMENT, COMPUTER SCIENCE

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BPMN 2.0 HANDBOOK SECOND EDITION

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Robert Shapiro, Stephen A. White PhD,
Conrad Bock, Nathaniel Palmer,
Michael zur Muehlen PhD,
Prof. Marco Brambilla, Denis Gagné *et al*

BPMN 2.0 HANDBOOK SECOND EDITION

Methods, Concepts, Case Studies and Standards
in Business Process Modeling Notation (BPMN)

Foreword by Dr. Bruce Silver

EDITED BY
LAYNA FISCHER

Published in collaboration with the
Workflow Management Coalition (WfMC)

BPMN 2.0 Handbook 2nd Edition Introduction

Layna Fischer, Future Strategies Inc. USA

Authored by members of WfMC, OMG and other key participants in the development of BPMN 2.0, the **BPMN 2.0 Handbook Second Edition** assembles industry thought-leaders and international experts. Following the ground-breaking body of work in the **BPMN 2.0 Handbook First Edition** this book is greatly expanded with substantial new content and chapters updated to the latest advances in this important standard.

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FOREWORD

Bruce Silver, Principal, Bruce Silver Associates

The *BPMN 2.0 Handbook* illustrates this diversity of interest in the new standard. In addition to discussion of BPMN 2.0's technical features, we have examples of its application in business and government, its relation to SOA and process execution, and its suitability as a business-readable communication tool. We also have many suggestions for how BPMN could be extended, improved, or enhanced to meet the broader goals of business process management.

SECTION 1—Guide to BPMN 2.0 Technical Aspects

NEW CAPABILITIES FOR PROCESS MODELING IN BPMN 2.0

Stephen A. White PhD, International Business Machines, and Conrad Bock, National Institute of Standards and Technology, USA

This paper introduces new features in processes diagrams in the Business Process Model and Notation (BPMN) Version 2.0. A companion paper introduces new features in interaction diagrams for BPMN 2. BPMN provides a view of processes (how things get done) with flow charts tailored for business processes and interactions. BPMN 2 expands the capabilities of BPMN 1.x Process and Collaboration diagrams, and adds Choreography diagrams for business interaction modeling. The paper focuses on the new process modeling capabilities of BPMN 2 and assumes familiarity with earlier versions of BPMN.

NEW CAPABILITIES FOR INTERACTION MODELING IN BPMN 2.0

Conrad Bock, National Institute of Standards and Technology, USA, and Stephen A. White PhD, International Business Machines

Interaction models capture how businesses interact with customers and each other to provide products and services. Models are needed to reach agreements about what will be provided to whom and when, and to gather requirements and expertise in one place for a successful business. The trend towards combinations of products and services increases the complexity of interactions beyond the capacity of conventional business process modeling languages. Conventional process modeling typically focuses on business internals. Interaction models hide the proprietary aspects of business processes, while exposing those aspects needed for interaction. They scale to complex interactions between many parties, as in supply chains.

ANALYTICS FOR PERFORMANCE OPTIMIZATION OF BPMN2.0 BUSINESS PROCESSES

Robert M. Shapiro, OpenText, USA and Hartmann Genrich, GMD (retired), Germany

We describe a new approach to process improvement based on the combined use of statistics and simulation to study the structural aspects of process models. Past efforts to use simulation focused on resource optimization have led to some significant successes when coupled with Workforce Management scheduling technology, but that approach has not been particularly successful in making structural improvements in the actual processes. The difficulty of preparing satisfactorily detailed schedules, combined with the structural complexities introduced in particular by the event and looping structures in BPMN, requires a fresh look at the problem.

MAKING A BPMN 2.0 MODEL EXECUTABLE

Lloyd Dugan, BPMN4SCA, USA, and Nathaniel Palmer, SRA International, Inc., USA

The very notion of an executable BPMN model can generate very different reactions. On one hand, BPMS vendors and implementers may agree, since the majority of BPMS platforms run models represented by BPMN. Yet their agreement belies the significant use of embedded business logic and proprietary extensions to make models executable. Process modelers, however, may question whether making a BPMN model executable is even worth pursuing. They might argue that the proper use of BPMN surrounds other purposes than simply creating BPMS applications. Yet this position often stems from a lack of appreciation for what makes models executable, which involves technical concepts perhaps of little interest to modeling purists. What is often missed in the “pure model” versus “executable model” argument, however, is that the same techniques that make BPMN models executable can in fact make models better.

BPMN EXTENSION FOR SOCIAL BPM

Piero Fraternali, Marco Brambilla and Carmen Vaca, Politecnico di Milano, Italy

The success of Social Networks has demonstrated the centrality of online interactions among people and the importance of communities of practice, whereby users can interact with the service providers and among themselves, for being informed, share experience, and express their opinion on the quality of a service. Several studies and analyses have demonstrated the advantages that this “socialization” of the users’ online experience, for customers, citizens, or employees, will carry over to the enterprise environment. This trend is already in place in several business scenarios under the broad definition of “Social Enterprise” or “Enterprise 2.0”. One specific example of this lays in the changes in the paradigm of Business Process Management, from “closed” to “open and social”. This is known as *Social BPM* and encompasses the ability of integrating the advantages of social interactions with the well known value of enterprise process definition and improvement.

ADMISSION PROCESS OPTIMIZATION WITH BPMN AND OSCO (CASE STUDY)

Jack Xue, Butler University and Conseco Service LLC, USA

The Business Process Modeling Notation (BPMN) is an increasingly important standard for business process design and optimization and has enjoyed high levels of attention in academic research and business practice. In this paper, experiences are shared from a project that using BPMN to design and optimize an online admission process. This process is optimized with a framework of the Online Stochastic Combinatory Optimization (OSCO) which chooses a subset of incoming requests such that the revenue of the service provider is maximized. The admission decision is based on an estimation of requests’ service times, and the rewards associated with serving these requests within their Quality of Service (QoS) bounds with respect to limited system resources. Historic distributions are utilized to help in decision-making. Experiments demonstrated the effectiveness of the admission process.

ADDRESSING SOME BPMN 2.0 MISCONCEPTIONS, FALLACIES, ERRORS, OR SIMPLY BAD PRACTICES

Denis Gagné, Trisotech, Canada

Business process modeling using BPMN requires at least two corpus of knowledge: Modeling knowledge and BPMN knowledge. BPMN knowledge, without an understating of basic modeling concepts and principles, will likely lead to less than useful business process models, while improper knowledge of BPMN rules and best practices, will not lead to any more useful process models.

This chapter addresses the question: what are models? Broadly speaking, we use the term model to refer to any structured knowledge that accurately reflects and/or helps us to make sense of our surrounding context (the term “world” rather than “context” is more often used in formal discussions). Models exist both internally as mental models and externally as artifacts. These artifacts can take many forms: written texts, spreadsheets, equations, diagrams, etc. While these different kinds of models vary greatly in their form and function, they all share certain desirable properties.

REFACTORING BPMN MODELS: FROM ‘BAD SMELLS’ TO BEST PRACTICES AND PATTERNS

Darius Silingas and Edita Mileviciene, No Magic, Lithuania

BPMN is already acknowledged as a *de facto* standard for business process modeling. However, it still takes a long journey to raise the maturity of business process modeling practice. The language elements and notation are described in BPMN specification, illustrative BPMN examples are given in a supplementary document. The language and basic style guidelines are already covered in BPMN books. Despite of it, in practice most business process modelers do a lot of mistakes that make their BPMN models over complex, difficult to understand and maintain. According to the old saying, “it is stupid to not learn from your own mistakes, it is wise to learn from mistakes by others”. Therefore, it is important to understand the common mistakes and their indicators that can be detected automatically or manually in BPMN model.

SIMULATION FOR BUSINESS PROCESS MANAGEMENT

John Januszczak, Vice President, Meta Software Corporation, USA

This paper provides an overview of business process simulation, the types of information required to define a business process scenario for the purpose of simulation, and a proposed standard for defining simulation scenarios that is compatible with the Business Process Modeling Notation (BPMN and XML Process Definition Language (XPDL). The article also describes how a RESTful web services API can be developed to support the standard. By providing a standard interchange format and/or a standard API, various artifacts currently available in the event logs of BPM systems could be used to generate baseline simulation scenarios useful in operational decision making and addressing near term processing issues, as well as long term process design.

COLLABORATIVE ACTIVITIES INSIDE POOLS

Michele Chinosi, European Commission Joint Research Centre, Italy

Choreographies and Conversations, introduced with BPMN 2.0, will make modelers able to describe interactions among different Participants as well as messages exchange. Often enough different Participants have to accomplish the same task. This can be now easily and clearly represented using BPMN 2.0. BPMN 2.0 does not specify the usage of Lanes neither their meaning. However, Lanes are sometimes used to specify internal roles or departments.

In this context it could happen that modelers want to represent an Activity performed by different roles or offices together (e.g., attending the same meeting, collaborative writing of a document). Such situation has been modeled so far by using merging Gateways placed before the activities, but this patch does not solve a related problem. BPMN forces to draw elements within Lanes boundaries. This means that, at least conceptually, one Activity is lead by the subject which the containing Lane is linked to, which is not necessarily true. Some experiments revealed how much the means to model such inner collaboration is a desirable feature.

BESPOKE ENTERPRISE ARCHITECTURE: TAILORING BPMN 2.0 USING CONFORMANCE CLASSES **Dennis E. Wisnosky, Office of the Deputy Chief Management Officer, Department of Defense, and Michael zur Muehlen Ph.D., Center for Business Process Innovation, Stevens Institute of Technology, USA**

Government agencies have to fulfill their mission while being fiscally responsible and maintaining customer focus. Understanding the agencies' end-to-end processes and mission threads is essential to ensure that both performance and compliance objectives are met. Increasingly, Enterprise Architectures are used to document end-to-end business operations and to prove compliance to rules and regulations. Enterprise Architecture covers the creation of analytical or prescriptive models of organizations to understand, manage, or change the enterprise. The models that describe different architecture facets are typically organized according to the views they describe, such as process, data, rules and organization models, among others. For organizations that engage in multiple architecture projects, a systematic organization of these views is essential; only if the views and their representations are consistent across different projects can an organization efficiently identify organizational and technical interfaces, streamline cross-functional operations, and assert compliance to rules and regulations.

A number of obstacles to consistent architecture efforts exist to date: Divergent viewpoints, different frameworks, multiple modeling methods, and inconsistent interpretations of individual methods. This paper reports on the development of a methodology for the creation of architecture models that is centered around BPMN and is based on the notion of a common vocabulary.

SECTION 2—Guide to the Business Imperative for BPMN

BPMN AND BUSINESS STRATEGY: ONE SIZE DOES NOT FIT ALL

Lionel Loiseau, BNP Paribas Personal Finance Process & Performance Analyst and Michael Ferrari, Analyst, France

In BPM, we would like to conciliate the management-oriented abstraction necessary to fully grasp the essence of a process with the exhaustiveness and realism that are essential to an automated solution. But one size does not fit all!

This led us to develop a classification of the various business process modeling plans and a gradual approach aimed at defining how to move smoothly from one plan to another.

Our classification takes into account the required levels of abstraction, the legacy notations, and the important number of existing process models as well as the contribution of the BPMN notation. While traditional BPMN approaches present three levels of process modeling, respectively descriptive, analytic and exhaustive, our classification connects BPMN to strategy, indicators, business rules and risks, and breaks down further the separation between general process models and organized process models.

In this chapter, we intend to detail and justify our approach and our classification, as well as explain how they are used in our company. We also intend to shed a new light on the role of the BPM analyst, an emerging position blending several skills, notations, and collaborative tools.

BPMN FOR BUSINESS PROFESSIONALS: MAKING BPMN 2.0 FIT FOR FULL BUSINESS USE

**Tobias Rausch, Harald Kuehn, BOC AG, Marion Murzek, BOC GmbH,
Austria and Thomas Brennan, BOC Ltd, Ireland**

Addressing users throughout the business is one of the key goals of BPMN 2.0. At the same time "BPMN is constrained to support only the concepts of modeling that are applicable to business processes. This means that other types of modeling done by organizations for business purpose is out of scope for BPMN." While this is understandable when defining a standard, it is essential for organizations to have support for BPM scenarios such as work instructions, organizational analysis, process costing, ICS/ERM etc.

This paper shows how BPMN 2.0 could be extended with business relevant concepts to support business-analysis (e.g. creating risk reports by assigning risks/controls to tasks). This will be demonstrated by looking at different real-life scenarios and how BPMN process-

es are linked with organizational data, resources, information, risks and controls and thereby allowing rich business analysis, reporting and simulation. There has been much discussion about BPMN's first letter and this paper illustrates how users are offered both a standard for describing process models and support of their key business application scenarios.

BEST PRACTICE GUIDELINES FOR BPMN 2.0

Jakob Freund and Matthias Schrepfer, camunda services GmbH, Germany

In practice modeling projects often tend to be quite large. Adopting BPMN 2.0 eases the creation of process models for business and technical projects. However, the creation of models in large modeling projects is still not a trivial task. The introduction of modeling guidelines guides and supports modeling projects. This article introduces an approach to establish such modeling guidelines for individual modeling projects using BPMN 2.0 as modeling notation. The article discusses the concept of modeling guidelines and shows why their application can help to apply BPMN 2.0 in practice. A framework for the creation of guidelines is described in detail. Real-world examples illustrate the use of modeling guidelines and constitute the effectiveness of best practice guidelines.

HUMAN-READABLE BPMN DIAGRAMS

Thomas Allweyer, Professor, University of Applied Sciences Kaiserslautern, Germany

The Object Management Group has published a useful non-normative document for BPMN modelers: "BPMN 2.0 by Example". While the specification of the BPMN standard describes the BPMN diagrams, elements, and their meanings, the examples document provides suggestions of how to use BPMN for modeling real processes. The reader can get valuable insights and hints for his own modeling practice. This paper discusses one of the models, the E-Mail Voting Example. The E-Mail Voting Example describes how a distributed working group discusses issues and votes on them by e-mail. This process was used during the development of BPMN. The authors claim that "This process is small, but fairly complex [...], and it will help illustrate that BPMN can handle simple and unusual business processes and still be easily understandable for readers of the Diagram".

BUSINESS PROCESS INTEGRATION IN A DEFENSE PRODUCT-FOCUSED COMPANY (CASE STUDY)

Kerry M. Finn, Enterprise SOA Lead and J. Bryan Lail, Chief Architect, Raytheon Company, USA

A common language for integrating processes across silos is a significant enabler in ways both obvious and subtle. Once the business organizations that touch a product or execution life cycle can agree on the first priorities where tighter integration is very clearly going to yield measurable benefits, then the common process language immediately leads to communicating one shared model across leadership and stakeholders. From there, modern methods and tools lead to validated processes, key performance indicators that can be tracked during execution, behavior and cultural changes, and executable processes that automate and parallelize legacy practices. This paper describes how BPMN 2.0 can promote a balance of business agility and enterprise efficiency. The approach takes two tiers to execute for a product-focused company, which the authors call horizontal and vertical integration. The methods and common language around BPMN apply to internal business operations for any sizeable company; however, the approach for applying the methods to the actual products of a defense company is different. The dual benefits come from focusing on the information management for those products in either the battle-space or the business space; this paper will study both areas and deliver a common theme for BPI.

BPMN USED BY BUSINESS PROFESSIONALS: AN IN-DEPTH REFLECTION ON BPM WITH BPMN BY THE SWISS FOITT

**BOC: Christian Lichka, Diana Boudinova;
FOITT: Jochen Sommer, Frank Wittwer**

Standardisation is one of the major advantages of using a common BPM notation. The need for a common notation is recognised by the eCH – a widely-known e-government focused

association requiring the use of the Business Process Management Notation (BPMN) in the public administration sector in Switzerland. However, due to the complexity of BPMN, an in-depth ex-ante reflection of its application focus is crucial. This article describes the experiences and challenges of a BPMN 2.0-based introduction of Business Process Management at the Swiss Federal Office of Information Technology, Systems and Telecommunication (FOITT) in Bern. The FOITT business-oriented case required a narrowing down of the notational complexity by reducing the used set of objects and attributes and thus making business process models business-usable and -understandable while allowing for further application scenarios. The article describes the modelling results obtained with the BPMN IT-solution in use at FOITT – ADONIS by BOC Group [BOC, 2011] - and gives further insights into planned application scenarios such as release workflow management, quality and audit management and internal control system (ICS /risk management). The challenges of a successful introduction of BPM in terms of organisational set-up, guidelines and best practices, training, etc. are further discussed.

MULTI-FACETED BUSINESS PROCESS MODELING

Marco Brambilla, Politecnico di Milano, and Stefano Butti, Web Models Srl, Italy

Turning a business process model into the specification, design and implementation of a software solution for process enactment is a non trivial task: the specified processes can be a mix on new functionality to be developed and interactions with pre-existing systems and the user's activities must be supported through effective and usable interfaces, possibly compliant with the visual identity and interaction style of other corporate applications. Furthermore, the business requirements embodied in the process models, as well as the technical context in which the underlying applications are deployed, are subject to evolution. This may cause severe alignment problems when trying to keep the business process and the application in sync. We claim that business process models *per se* are not enough for representing the complexity of real world software applications that implements them; therefore other design dimensions must be taken into account in the analysis, design, and implementation of applications.

SECTION 3—Reference and Appendices

REFERENCE GUIDE—XPDL 2.2: INCORPORATING BPMN 2.0 PROCESS MODELING EXTENSIONS

Robert M. Shapiro, WfMC Chair XPDL Technical Committee, USA

XPDL2.2 is intended as a preliminary release which supports the graphical extensions to process modeling contained in BPMN2.0. In fact, the BPMN specification addresses four different areas of modeling, referred to as Process Modeling, Process Execution, BPEL Process Execution, and Choreography Modeling. In this reference guide, we focus only on Process Modeling. Within that we define several sub-classes to support process interchange between tools. This is discussed in a later section of this paper. Here we discuss significant additions in XPDL 2.2.

BPMN 2.0 HANDBOOK COMPANION WEBSITE

Additional Material

A Companion website is available at www.bpmnhandbook.org which contains, in addition to the Digital Edition of the BPMN 2.0 Handbook, substantial material on BPMN 2.0 helpful to readers. This includes free BPMN and XPDL Verification/Validation files, webinars, videos, product specs, tools, free/trial modelers etc. Several Handbook authors have contributed additional files and explanatory diagrams to the CD. This additional material gives readers exposure to a larger resource on BPMN 2.0 and XPDL than a book alone can offer.

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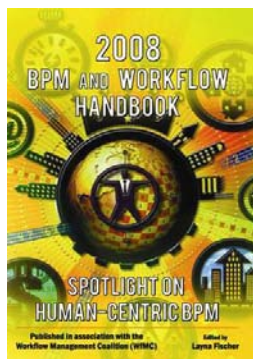
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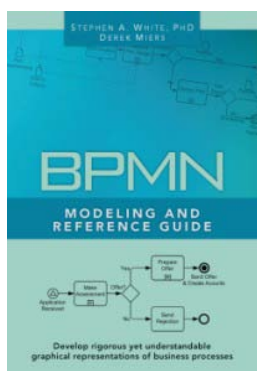
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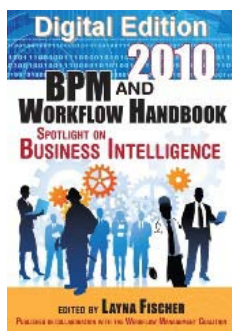
Stephen A. White, PhD, Derek Miers

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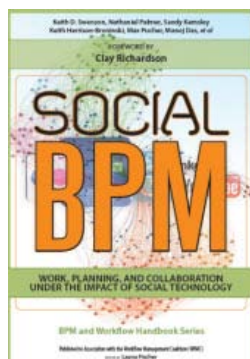


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Keith D. Swenson, Nathaniel Palmer, Sandy Kemsley
Keith Harrison-Broninski, Max Pucher, Manoj Das, *et al*

Today we see the transformation of both the look and feel of BPM technologies along the lines of social media, as well as the increasing adoption of social tools and techniques democratizing process development and design. It is along these two trend lines; the evolution of system interfaces and the increased engagement of stakeholders in process improvement, that Social BPM has taken shape.

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