On the Suitability of BPMN
for Business Process Modelling[*]

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Abstract. In this paper we examine the suitability of the Business Process Modelling Notation (BPMN) for business process modelling, using the Workflow Patterns as an evaluation framework. The Workflow Patterns are a collection of patterns developed for assessing control-flow, data and resource capabilities in the area of Process Aware Information Systems (PAISs). In doing so, we provide a comprehensive evaluation of the capabilities of BPMN, and its strengths and weaknesses when utilised for business process modelling. The analysis provided for BPMN is part of a larger effort aiming at an unbiased and vendor-independent survey of the suitability and the expressive power of some mainstream process modelling languages. It is a sequel to previous work in which languages including BPEL and UML Activity Diagrams were evaluated.

Keywords: BPMN, Business Process Modelling, Workflow Patterns.

1 Introduction

The focus on Process-Aware Information Systems (PAISs) during the last decade has led to a new generation of languages and tools for process modelling. Existing languages for process description have been enhanced, e.g. UML 2.0 Activity Diagrams (AD), while new languages like BPMN and BPEL have been developed and have experienced rapid take-up. The common feature of these three languages is their focus on providing a comprehensive, integrated notation for (business) process modelling. Despite their common aims, these languages operate at different levels: UML AD and BPMN are graphical and informal notations targeted at analysts while BPEL is a textual and executable language targeted at application developers.

This broad characterisation does not, however, provide insights into the suitability of these languages for (business) process modelling, or how they actually relate to each other. To address these issues, a thorough analysis of each of the languages is necessary.

In this paper we focus on BPMN. Through a detailed examination, we aim to expose advantages and shortcomings of BPMN and to critically question its suitability for business process modelling. This analysis is part of a broader survey of mainstream process modelling languages and is a companion to earlier analysis of UML 2.0 AD [17,9] and BPEL [15,1]. The overarching goal of the survey is to provide comparative insights, which is achieved by analysing the languages using a common framework, namely the *Workflow Patterns* (www.workflowpatterns.com).

The Workflow Patterns Framework is a collection of generic, recurring constructs originally devised to evaluate workflow systems, but also suitable to evaluate workflow standards, business process languages and PAISs in general. Following Jablonski and Bussler's classification [3], these patterns span the *Control-flow*, *Data* and *Resource* perspectives of PAISs. Our choice of this evaluation framework is based on the fact that it is: (1) widely used; (2) well accepted; (3) comprehensible to IT practitioners; and (4) sufficiently detailed to provide a comprehensive basis for assessing the capabilities of process modelling languages.

In essence, the contributions of this paper are as follows:

- It is the first multi-perspective evaluation of the expressive capabilities of BPMN;
- It provides an assessment of the overall suitability of BPMN for process modelling;
- It identifies areas for possible improvement of BPMN;
- It provides a basis for comparing BPMN with related languages.

Previous efforts [11,7] have analysed the quality and ontological standard of BPMN. The evaluation in [11] is based on the *Semiotic Quality Framework*. It is positioned by its authors as a more general than and complementary to the evaluation in [7], which relies on the *Bunge Wand and Weber (BWW) Framework*. Based on an ontology for Information Systems, the BWW Framework is at a higher abstraction level and less specialised compared to the Workflow Patterns Framework. Lastly, a review of the capabilities of BPMN from a control flow perspective based on the Workflow Patterns is provided in [14]. However, the evaluation in [14] has a limited focus as well as ambiguities which we have identified in [16].

In the remainder of the paper we evaluate BPMN from the Control-flow, the Data and the Resource perspectives. Then we discuss our findings and compare these with earlier evaluations of UML 2.0 AD and BPEL.

2   The Control-Flow Perspective in BPMN

In this section we examine the control-flow perspective of BPMN and its ability to represent a series of twenty common control-flow modelling requirements that occur when defining process models. These requirements are described in terms of the Workflow Control-flow Patterns [2]. The material in this section summarises the findings reported in a technical report [16]. There has also been a review of this perspective of BPMN by White [14], who is one of BPMN's developers. The results reported here differ from those in [14], however due to space limitations we refer to [16] for a detailed discussion on the differences and the flaws identified in [14].