Chapter VI
Modelling Constructs

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ABSTRACT

There are many different notations and formalisms for modelling business processes and workflows. These notations and formalisms have been introduced with different purposes and objectives. Later, influenced by other notations, comparisons with other tools, or by standardization efforts, these notations have been extended in order to increase expressiveness and to be more competitive. This resulted in an increasing number of notations and formalisms for modelling business processes and in an increase of the different modelling constructs provided by modelling notations, which makes it difficult to compare modelling notations and to make transformations between them. One of the reasons is that, in each notation, the new concepts are introduced in a different way by extending the already existing constructs. In this chapter, the authors go the opposite direction: showing that it is possible to add most of the typical extensions on top of any existing notation or formalism—without changing the formalism itself. Basically, they introduce blocks with some additional attributes defining their initiation and termination behaviour. This serves two purposes: First, it gives a clearer understanding of the basic constructs and how they can be combined with more advanced constructs. Second, it will help combining different modelling notations with each other. Note that, though they introduce a notation for blocks in this chapter, they are not so much interested in promoting this notation here. The notation should just prove that it is possible to separate different issues of a modelling notation, and this way making its concepts clearer and the interchange of models easier. A fully-fledged block notation with a clear and simple interface to existing formalisms is yet to be developed.

1. INTRODUCTION

Today, there are many different notations for modelling *business processes* and their different aspects. These *modelling notations* have evolved over time in a more or less systematic way. Though these notations sometimes are very different syntactically, the underlying ideas and the concepts share some common understanding and have many similarities. Due to the syntactic differences, however, it is often difficult to compare the concepts and the expressive power of modelling notations for business processes.

One approach to compare and evaluate modelling notations and workflow management tools is the definition of *workflow patterns*, which distil situations that were found in existing workflow models or as constructs in existing notations and tools. Up to now, over hundred workflow patterns have been identified by the *Workflow Patterns initiative*[1], which is a joint effort of Eindhoven University of Technology and Queensland University of Technology. And many others have contributed or identified their own patterns. These patterns are used for the evaluation of existing tools and business process modelling notations.

The workflow patterns, however, should not be interpreted as a list of *workflow constructs* that a modelling notation should have. Rather, they show what needs to be expressible by a construct or by a combination of constructs. In this chapter, we will discuss modelling constructs with a new focus: minimality and orthogonality. Minimality, in contrast to many existing approaches, tries to minimize the number of constructs that are needed for expressing all the necessary patterns. Orthogonality means that the constructs are as independent from each other as possible. In particular, we show how to add some of the more advanced constructs on top of, basically, any existing formalism. The main idea is to add blocks with some specific features for initiating and terminating them, where each block can have a model of, basically, any formalism.

Before discussing the actual patterns and the modelling constructs in Sect. 4, we will give some more background on the concepts of business process modelling in Sect. 2. And we will discuss some basic principles that underlie different modelling notations in Sect. 3.

2. BACKGROUND AND MOTIVATION

In this section, we give a more detailed motivation for our fresh look at modelling constructs and the research direction we are heading at. Actually, the general idea behind this work is summarized in a motto coming from the bible:

For the letter kills, but the Spirit gives life.
2. Corinthians 3:6b (NIV)

Our endeavour is to understand the spirit of business processes and what is needed to model them—unspoilt by the letter of a particular modelling notation. Only in the end, we try to capture this spirit in letters, i. e. in concrete modelling constructs—in order to prove that the proposed concepts can be made work.

2.1 Business Processes Modelling

Before going into a detailed motivation, we introduce the most important concepts of business processes and their aspects, and introduce our terminology, which follows the lines of AMFIBIA [Axenath, Kindler, and Rubin, 2007], which in turn was inspired by terminology from [Hollingsworth, 1995; van der Aalst and van Hee, 2002; Leymann and Roller, 1999] and is roughly compatible with it.

A *business process* involves a set of *tasks* that are executed in some enterprise or administration according to some rules in order to achieve certain *goals*. Though the *goals* and objectives are very

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