Chapter 13
The Business Process Modeling Notation

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13.1 Introduction

Business processes may be analyzed and designed at different levels of abstraction. In this respect, it is common to distinguish between business process models intended for business analysis and improvement, and those intended for automation by means, for example, of a workflow engine such as YAWL. At the business analysis level, stakeholders focus on strategic and tactical issues such as cost, risks, resource utilization, and other nonfunctional aspects of process models. At the automation level, stakeholders are interested in making their models executable, which entails the need to provide detailed specifications of data types, data extraction and conversion steps, application bindings, resource allocation, and distribution policies, among others.

The requirements for process modeling notations at these two levels of abstraction are significantly different. This in turn has resulted in different languages being advocated at the business analysis level and at the execution level. Common languages used at the business analysis level include flowcharts, UML activity diagrams, the Business Process Modeling Notation (BPMN), and Event-driven Process Chains (EPCs). In this chapter, we consider BPMN, and specifically, version 1.0 of the BPMN standard specification.

In general, the main purpose of BPMN models is to facilitate communication between domain analysts and to support decision-making based on techniques such as cost analysis, scenario analysis, and simulation. However, BPMN models are also used as a basis for specifying software system requirements, and in such cases, they are handed over to software developers. This handover raises the following question: How can developers fully exploit BPMN process models produced by domain analysts?

One way to achieve a seamless handover is by transforming, either manually or automatically, business process models obtained from business analysis (e.g.,
BPMN models) into “equivalent” process models defined in an executable language, such as YAWL. Accordingly, this chapter will discuss relationships between BPMN and YAWL, and will show how BPMN models can be transformed to YAWL nets.

The remainder of this chapter is organized as follows. Section 13.2 introduces the Business Process Modeling Notation (BPMN). Section 13.3 explains the transformation from BPMN models to YAWL nets, and Sect. 13.4 presents the tool support that was developed to automate the transformation.

13.2 BPMN

This section explains BPMN by example, distinguishing control-flow, data manipulation, resource management, and exception handling aspects. The presentation of BPMN is meant to be didactical rather than exhaustive.

13.2.1 Control-Flow

In BPMN, a process model is represented as a Business Process Diagram (BPD). With reference to the running example of the book, Fig. 13.1 depicts a BPD corresponding to a Freight In Transit process. This BPD consists of nodes of three types: events (represented as circles), activities (represented as rectangles), and gateways (represented as diamonds). Events denote things that happen at a particular point in time, activities denote work that needs to be performed, and gateways serve to route the flow of control along the branches of the BPD. Nodes are connected by means of directed edges called sequence flows. A sequence flow basically says that the flow of control can pass from the source node to the target node.

![Fig. 13.1 Example of a business process model in BPMN](image)