

Chapter 3

Business Process Modeling

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ABSTRACT

This chapter presents a variety of business process modeling notations that range from programming logic flowcharts to the new standard, BPMN (Business Process Modeling Notation), as put forth by the Business Process Management Initiative (BPMI) (<http://www.bpmi.org>). Specifically, it discusses (1) the use of unstructured programming flowcharts in modeling business processes and their adaptation in process flow diagramming notation, (2) the UML activity diagram, and (3) BPMN, a comprehensive notation for documenting and modeling complex business processes. Using simple examples, this chapter brings out the inherent complexity of modeling business processes and the need for modeling tools that synchronize and align the mental models of business users, process analyst and information technology (IT) systems developers in order to correctly represent the intended process.

INTRODUCTION

Increasingly organizations are being viewed as a web of interrelated business processes that are designed to achieve certain organizational goals. This has generated a need to capture, represent, analyze, improve and manage business processes. Business Process Management (BPM), an evolving new discipline, is management approach of executing firm's strategy through

managed business processes. The management of business processes involves documenting, analyzing, redesigning, evaluating, implementing and monitoring processes (Antonucci et al. 2009). Although, within BPM, process modeling approaches that graphically document business processes are loosely called business process modeling, in the information technology (IT) world business process modeling is associated with graphic representation of business processes with sufficient precision so that the resulting process model can be executed by business process

DOI: 10.4018/978-1-4666-0249-6.ch003

management software (BPMS). Embedded within BPMS is often a simulation module that allows process implementers to simulate and evaluate the performance of the new process. Because business process modeling is rooted in IT systems modeling notations that evolved with advances in business process improvements approaches, this chapter presents a variety of modeling notations that process improvement practitioners use for modeling business processes. Specifically, this chapter discusses (1) the use of unstructured programming flowcharts in modeling business processes and their adaptation in process flow diagramming notation, (2) the UML activity diagram, and (3) BPMN, a comprehensive notation for documenting and modeling complex business processes. Our reasons for selecting these notations are briefly discussed next.

Because the early process modeling practitioners viewed processes as a network of activities, they borrowed the activity, decision and directed arrow symbols, or primitives, from programming flowcharts (Chapin, 1970) to model and document business processes. This is the reason we have included a discussion of flowchart as a business process modeling tool. These programming flowchart symbols were later refined when process investigation and improvement became an integral part of manufacturing processes in supply chain management. As a result recurring manufacturing activities such as inspection, storage and delay were assigned unique graphical symbols (Laguna & Marklund, 2004). These process practitioners also observed that one could enhance both process design and process understandability by structuring the process model into swim lanes that depicted where and by who the activities are being performed (Rummler & Brache, 1995). From our perspective process flow notation and the invention of swim lanes is the foundation on which modern process modeling notations are based on.

In studying process models for software engineering, Curtis et al. (1992) observed that

software process models have often presented software processes from functional, behavioral, organizational and informational perspective. The functional perspective depicts a process in terms of what activities are being performed and which data flows are needed to link these activities. Data Flow Diagrams (DFDs), first introduced in Tom DeMarco's book (1978), transformed the systems analysis and design methods by providing a systems level (as opposed to programming level) tool for capturing the sequence of steps traversed by data. Each step in a DFD documents an action taken to transform or distribute data. Because DFDs are easy to read and they make it possible for users to validate the diagrams, IT practitioners often use DFDs to represent business processes. However, DFDs do not provide the capability to describe process sequencing or process control mechanisms. Probably the most common functional modeling tool is Integration Definition for Function Modeling (IDEF). There are many types of IDEF models, with the most familiar among them being IDEF0 (a Federal Information Processing Standard (NIST, 1993) currently withdrawn but widely adopted as an industry standard), which is used to create activity models. That is, IDEF0 is used to model the tasks performed by an organization in terms of the inputs, outputs, and controls of each task. The modeling process starts with a high-level specification of the task, which is successively decomposed into sub-tasks ensuring that the inputs, outputs and controls are properly accounted and aligned with those at the next higher level. While IDEF0 models can appear to show the sequence of activities, this is only a perception. No temporal relationship is implied by the arrangement activities in the diagram. Although IT practitioners like to use DFDs and IDEF diagrams for business process modeling, we felt that since business process activities are triggered by temporal and business events, these old functional data flow notations are not well-suited for modeling business processes.

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