

Chapter 1

E–Business Modeling Languages

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ABSTRACT

This chapter gives an overview of modeling languages used for modeling business environment, abstract workflows, executable business processes, and business data. The languages are either abstract that primarily serve the purposes of business modeling or executable that can be run in a business process engine. The business process modeling languages BPMN (Business Process Modeling Language) and BPEL (Business Process Execution Language) are in the center of the discussion; however, the core concepts and application area of other languages are given as well. An important part of business modeling is the description of business collaboration and the format of business information exchanged. XML based data modeling languages are used for describing such contracts. Throughout the chapter the focus is on the underlying concepts of these languages rather than the syntax.

INTRODUCTION

From the 1990s, the evolution of information infrastructure made it possible for enterprise system vendors, industrial collaborations and researchers to design and standardize widely accepted notations that can be used by strategy consultants,

business analysts, system architects, and software engineers to design and implement the internal life of an enterprise.

Each modeling language has its scope in enterprise modeling. Some are specific to modeling a domain in the enterprise such as organizational or technological infrastructure, workflow and the

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data transferred between subsequent activities. The other difference in the core concepts of these modeling languages is related to the business actor who employs them. The design of corporate workflows requires a higher level of abstraction and is mainly done by people with a business background, strategy consultants at the highest level and business analyst on a lower level. Therefore, abstract workflow and data modeling languages like BPMN or YAWL (Yet Another Workflow Language) can be employed in those roles. Actors with a technological background like system architects and engineers implement these execution rules on the business process management system of the enterprise. They can use a modeling language like BPEL that has direct connection to programming languages and the technological infrastructure. Workflow data and contract information can be modeled with ER-diagrams that can have different representations usually given as XML (eXtensible Markup Language) schema. Finally there are domain specific modeling standards such as HL7 (Health Level Seven) in the health information technology that dominate the description of collaborations in their domain.

Modeling languages are developed within standardization organizations supported by the biggest enterprise system vendors or have their roots in the academic sphere. Therefore their evolution is driven by both the industrial needs and the evolution of modeling and simulation theory. In the chapter, the languages are investigated from both perspectives. From the academic point of view, their mathematical background, expression power and support for modeling software engineering concepts like transactions and fault compensation are highlighted. From the business point of view their ability to describe various aspects of e-business: such as business-to-business interactions, automatic and human tasks, task life cycle, contract modeling, organizational and technological infrastructure of an enterprise are in the center of the discussion.

BACKGROUND OF BUSINESS MODELING LANGUAGES

Service Oriented Architecture

Business people and software engineers have different expectations about a modeling language, which therefore have to meet a lot of diverse requirements. Business analysts expect an easy-to-use graphical environment where they can define the order of business activities with from a low to a high granularity. On the other hand, software engineers expect a fine-grained model, where each task or service has its own deployable and runnable software component with a well-defined software interface.

The meeting point of these two perspectives is the Service Oriented Architecture (SOA). In the SOA each atomic business task such as filling in a form or posting a mail is implemented as a single software component called service. There may exist compound services that perform atomic tasks in a predefined order. All services are published in a catalogue, from which a compound service can look up a service that can perform one of its atomic task.

In business collaboration, services of a business use the services of another business based on a contract. When modeling these interactions, we are talking about service orchestration, if we place ourselves in either business's point of view and observe the internal behavior of that service, and we are talking about service choreography, if we place ourselves outside of the concerned businesses and just observe their interactions.

Each service has its own interface, and therefore, for a successful collaboration of services a uniform language is required in a SOA domain that describes the task performed and gives the format of input data necessary to execute the task and the format of output data produced. E-business modeling languages provide the means to define such contracts.

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