Business Process Modeling and Standardization

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Introduction

The emerging interest in the process approach is giving rise to numerous expectations and views. Whether it is Business Process Reengineering (BPR), Business Process Management (BPM), Activity Based Costing (ABC), or Business Activity Monitoring (BAM), process modeling is at the core of each of these approaches. The arrival of modeling standards is now resulting in the rationalization of process analysis methods and the creation of a knowledge base that can be shared by market participants.

Substantial progress has been made in business process standardization. However, it is clear that the wide range of domain covered by business process modeling requires more that a single compacted standard. This article attempts to present the current status and the need to embrace the multiple dimensions of business process approaches. The perspectives given in this report are based on MEGA customer experience and our many years of participation in standardization groups.

Business Process: One Word, Multiple Arenas Of Application

Before creating a list of the modeling standards being developed, we will first address the following question: What business processes are we talking about? The term "business process" is often used in relation to very different types of projects. Of these, we are addressing the following three:

- The creation of a customer-oriented business management method. This means running the company via its business processes or value chains.
- The creation of procedures to oversee the organization's operations.
- The integration of IT resources using a business process approach.

In planning a company's operations, one factor is the relationship between strategy and business processes. For example, a bank can decide to focus on the financial products market over the retail banking market. The business process "Provide financial products" thus becomes the bank's major value added product line. Bank operations must be reorganized according to this business process so that each branch focuses on satisfying customers who buy financial products.

In the second example, a bank is looking to improve its operational organization. For example, this bank would want to ensure, through management procedures, that it had control over its customer debt levels. The goal is to determine what rules to apply and which organizational units are responsible for applying them. Here, task distribution and management of responsibilities for each task are at the forefront.

The third example involves information systems. The issue here is coordination of software services and user tasks. In the case of this bank, for example, a workflow could be implemented to automate the gathering of past customer records for debt control purposes.

It is apparent that the above described areas cover topics as varied as strategic analysis, responsibility analysis, and information system architecture. This review of different instances involving business process modeling reveals that no single standard being proposed today can satisfy all these differing requirements. It is important to realize that for each approach, there must be a specific, adapted type of process modeling. Business analysts using the process approach will need to be informed as to the optimal standard to deploy. The next paragraph provides a classification of the main business process standards.

Criteria For A Business Process Modeling Standard

Aside from covering the different business process modeling requirements, as described above, a standard for analyzing business processes must meet certain criteria that apply to any modeling standard:

- An intuitive notation that is easily adopted for use by those involved with business analysis: a good diagram is worth a thousand words.
- A metamodel and vocabulary—a group of concepts and relationships—that are strictly and consistently defined to provide a solid foundation for the various business process approaches.
- A breakdown of the metamodel and notation for each level of analysis of business processes: value chain, organization, and IT integration. This breakdown must be accompanied by a mechanism for navigating between the different levels of analysis.
- An exchange format for both the process models and their diagrams.

State of the Industry

A double analysis grid, depicting the field of application for the process modeling and the characteristics of a modeling standard, enables us to classify the main standards that already exist and those currently being created.

Fields of Application	• Value Chain Analysis • Organization Analysis • Business Process Automation Analysis • Execution language for automated processes
Characteristics of a modeling standard	• Has a metamodel • Has a notation • Has an exchange format

Figure 1 – Grid analysis for a business process modeling standard.

The following table gives us an overview of existing and proposed standards:

Name	Standard organization	Status	Field of application	Meta model	Notation	Exchange format
XPDL	WFMC	Finalized	Execution language	Yes	No	Yes
BPML	BPMI	Finalized	Execution language	Yes	No	Yes
BPEL	OASIS	Finalized New version in the planning stages	Execution language	Yes	No	Yes
UML 1.0	OMG	Finalized	Business Process Automation Analysis	Yes	Yes	Yes
UML 2.0	OMG	Being finalized	Business Process Automation Analysis	Yes	Yes	Yes
BPMN 1.0	BPMI	Finalized	Business Process Automation Analysis	No	Yes	No
BPMN 2.0	BPMI	Planning stages	Business Process Automation Analysis Organization analysis Value chain analysis	?	Yes	?
ISO 9000x	ISO	Finalized	Organization analysis Value chain analysis	No	No	No
BPDM	OMG	Planning stages	Business Process Automation Analysis Organization analysis Value chain analysis	Yes	Yes	Yes

Figure 2 – Major Business Process Modeling Standards.

XPDL, BPML, BPEL

These process modeling languages are dedicated to process execution. They are generally not used directly in analysis and design phases. Being expressed in XML syntax, they have a native exchange format. None of these languages offers a standardized graphic notation. By definition, they are not designed to cover the levels of value chain and organization analysis.

The Workflow Management Coalition (WFMC) developed the first execution standard. A new XML version of the WFMC language was released in 2002 under the name XPDL.

The Business Process Management Initiative group (BPMI) released a competing language in 2001 called the Business Process Modeling Language (BPML). This initiative restarted the work on process execution languages and made many contributions to its successor, BPEL.

BPEL (Business Process Execution Language) was initiated by Microsoft and IBM in response to the BPMI initiative. Since that time, this language has received the support of most market players, including BPMI. BPEL has become the de facto standard for business process execution. It lies on top of the web service specification stack. Since 2003, the standardization organization OASIS has been in charge of the evolution of the BPEL language.

UML 1.x

Proposed by OMG for object-oriented design, UML 1.X (1.1, 1.2, 1.3, 1.4) provides an activity model that offers limited functionalities for business process modeling. It also offers a metamodel, a notation and an exchange format for models with XMI 1.x. However, its scope remains limited to object design and its metamodel has some semantic errors (activity = state) that reduce its operational effectiveness. These weaknesses have been recognized by the OMG, which has reviewed this model in depth in UML version 2.

UML 2.0

The OMG's UML 2.0 specification should be completed at the end of 2004, and is the product of a lengthy development period. UML 2.0 has a very large scope, so this report will address only a few aspects of the new "activity model." Activity models in UML 2.0 have been completely reworked from the 1.X versions. The main errors in the 1.X specifications have been corrected, and the new model offers a robust base for process analysis. However, its technical nature makes it still primarily suited for business process automation. In its current state, UML 2.0 activity models cannot provide a comprehensive support for dedicated business process analysis. OMG is aware of these limitations and has launched a

complementary initiative, BPDM, specifically to handle business processes. (See paragraph below on BPDM.)

BPMN – Business Process Modeling Notation

After the BPML execution language, BPMI launched a new initiative on graphic process notation. In this way, the BPMN 1.0 specification was released last May. (See http://www.bpmn.org/.) BPMN is an undeniable step forward for a graphical representation of business processes. It specifically introduces the notions of messages and information flows that were lacking in most traditional process representations (IDEF, SAP EPC). Some articles have recently promoted this new specification. In this report, we are offering an inside perspective from the work group that directly participated in creating the specification.

BPMN 1.0's primary scope is business process automation, excluding organization analysis and value chain analysis. To this effect, the following is the work group's position that was voted upon and approved at its last meeting in London in June 2004:

"BPMN 1.0 was created with 'path to execution' as its primary focus and, as such, is a lower level representation of process models than the full spectrum of BPMN as expressed by future versions of BPMN."

"Path to execution" clearly indicates that one of BPMN's primary goals in its version 1.0 was the possibility of representing executable processes. The rules for correlation with the BPEL execution language complete the schema.

Another important point regarding BPMN is that the specification addresses only the issue of notation. BPMN includes neither a metamodel nor an exchange format. It would thus be difficult to discuss exchanging BPMN models.

BPMI recognizes that BPMN 1.0 is just a first step. A new version is being developed, BPMN 2.0, to meet the need for organization and value chain analysis. Definitions must also be developed for a metamodel and exchange format. Relations were fostered with the OMG to coordinate the work of the two organizations.
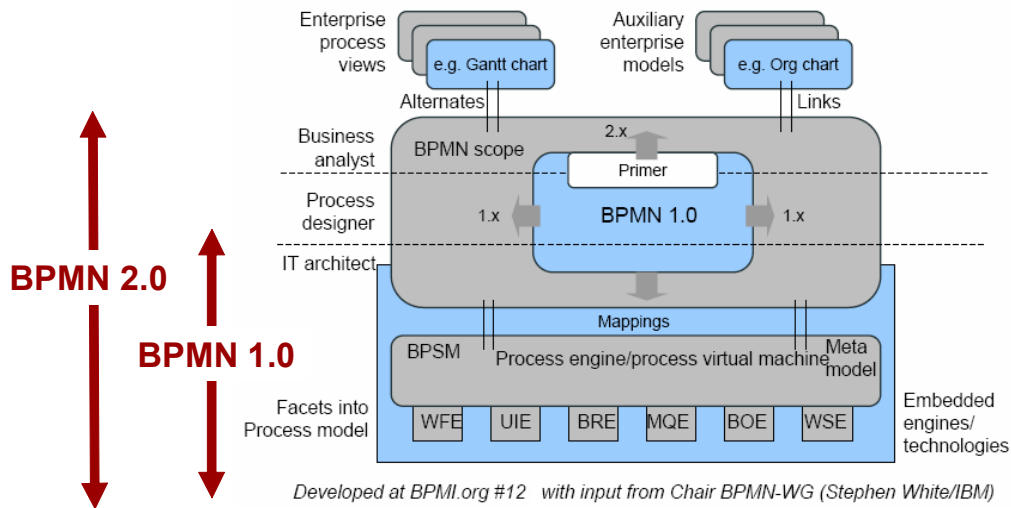

Figure 3 – Functional scope of BPMN according to BPMI.

ISO 9000/2000

The ISO was one of the first organizations to be interested in business processes with the ISO 9000 standards. The ISO provided many relevant definitions for levels of analysis related to organization and value chains. Unfortunately, ISO never provided a formal expression of

the quality processes or an accompanying graphical notation. As a result, ISO 9000 standards never led to a process modeling standard. They remain a reference source for analysis of quality processes.

BPDM – Business Process Definition Metamodel
The OMG has its own development plan to cover business process modeling. This plan is included in the general modeling architecture promoted by the OMG under the name MDA: Model Driven Architecture. MDA is a framework for defining metamodels, transforming them, defining the accompanying notations, and exchanging the models and their diagrams in a standardized exchange format (XMI). The MDA framework also automatically provides the essential elements for any modeling standard. To accommodate business modeling, the OMG created two joint specifications: BSBR, business semantic for business rules, and BPDM, business process document management. This latter specification is based on the activity models in UML 2.0, but simplifies its usage and defines the connections with process automation, organization, and strategy. The following diagram shows the scope of BPDM.
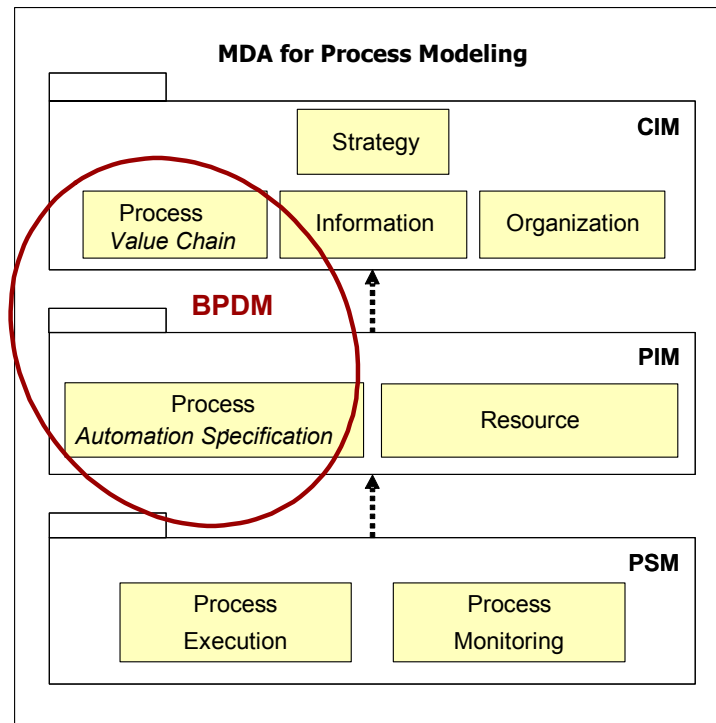

Figure 4 – Functional scope of BPDM.

The OMG and BPMI have started to join forces to coordinate their efforts. The BPDM work plan at the OMG incorporates the BPMN notation. However, the two organizations have both left themselves room to maneuver.

Microsoft: The Unknown Factor
There is still one unknown factor in the arena of business process modeling: Microsoft's stance on the issue. It may seem strange to associate the Redmond company with this topic. However, Microsoft has taken the role of modeling in software development very seriously. With its "Whitehorse" project, Microsoft aims to integrate modeling into the core of its development platform. From component modeling to web services modeling to integration process modeling, the approach taken from the code to specification is more and more business oriented. In fact, Microsoft seeks to oppose the OMG's MDA initiative that is strongly supported by IBM and other players in the modeling industry. Shared elements of the two approaches have not yet been clearly identified.

Summary

Standardization for business processes is currently in full swing, and significant progress has been made. The execution part, developed by OASIS with BPEL continues its merger with web services; the analysis and design part is shifting its emphasis from execution to business centric analysis. Multiple standardization organizations are participating in this movement, including BPMI and the OMG. It will take some time for all of the puzzle pieces to fall into place to produce a complete and unified standard.

MEGA's Approach
Standards are a major factor for the adoption of a common vocabulary and common descriptions for business processes. MEGA was one of the first companies to join forces with BPMI, and has actively participated in the development of BPMN. At the same time, MEGA realized that the OMG had a robust and open modeling architecture to serve as a basis for the rigorous, flexible approaches that we support. The latest developments underway at the OMG support this perception. We are participating in BSBR (business rules) and BPDM (business process) initiatives. These are now integrating players from the business world into the OMG rather than just IT experts. Standardization of business processes is reaching a state of maturity.

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About MEGA

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