Business Process Architect – "It All About the Model"

Abstract: Since the late 1990s Business Process Modeling has permeated the arena of applications management. The only problem was until recently all these models did was represent the process for documentation and training purposes only. With development of the BPEL tool the business processes can now be automated but required significant developer skills. The other problem was there was no tool to connect the business process to the system process. With the partnership between Oracle and Aris the business process architect enables the business side to build these models and then import these to the BPEL for automation. This presentation will demo the Procure to Pay process in the BPA tool and then demonstrate how this process is imported into the BPEL tool for automating the process from start to finish.

Business Process Management

Business process management (BPM), having evolved over the past fifteen years, has finally reached a level of maturity where organizations are now abolishing functional silos to allow the enterprise-wide flow of business processes. It replaces the old, manual system of coordinating activities in a company and improves functionality and effectiveness through modeling, documentation, certification, collaboration, automation, and compliancy to minimize costly errors. Businesses are looking for a new way of using BPM solutions. As they become more dynamic, businesses are demanding faster responses from their business processes. BPM has to integrate existing enterprise applications, web services, and people in such a way that it can also quickly change, destruct, or construct processes. This is far beyond the realm of traditional enterprise application integration (EAI) and Workflow. The need for quick responses to changing business environments has resulted in the growth of BPM.

Why Use BPM?

Business Processes are demanding more attention over the past few years as organizations attempt to increase efficiency, reduce costs and provide timely information in an ever increasing global environment. As businesses consolidate and applications become more integrated there is an increasing need to look at information processing as business processes rather than transaction based. Companies used to coordinate activities through the company manually. This resulted in inefficiency and errors in the operational process and often led to difficulties in improving the process itself. Organizations are increasingly focusing on the implementation of BPM solutions for the purpose of improving functional efficiency and effectiveness in their core business processes. BPM specifically coordinates interactions between systems, business processes, and human interaction. The expected results include:

- **Saving money** by automating the routing of activities and tasks to employees, taking away the non-value-adding activities by providing users with tailored task lists
- **Saving time** by changing business processes and requirements – with today's tight integration of process definitions and underlying applications, the changes in the definition can be deployed and communicated virtually immediately
- **Adding value** by opening up a range of functions that can be leveraged in a truly BPM-minded company – Value can be added through process (quantitative) analysis and optimization, and quality certification (e.g., ISO); another area is compliance management (e.g., SOX) which is imposed on many organizations

BPM is a methodology backed by software used to manage businesses at a higher efficiency. It has emerged from the rising complexity of doing business in a competitive economy, where margins continue to narrow and the pressure to respond is greater than ever. Companies are under increasing regulatory and investor scrutiny and must be run successfully, both in the short and long term. Simply put: businesses must improve their agility and reduce costs and overhead on an ongoing basis. A BPM high-level mission lets business processes become as manageable as data. To that end, BPM has to integrate existing applications, web services, and people in such a way where it can quickly change, destruct, or construct processes, which is a capability that is far beyond the traditional EAI. By implementing BPM, companies are able to orchestrate and leverage cross-functional business processes that are used over multiple systems, divisions, people, and partners. Through the use of tools and services these benefits can accomplished but they have been a long time coming. Let's first take a look at how we got here.

History of BPM

BPM was recognized by the academic world in the fifties and sixties as an important ingredient in the quality management approach. In the eighties BPM advocates drew the attention of business managers to process management, process (re-)engineering, and workflow management. Although BPM has been around for the past twenty years, few companies have applied it to their Oracle Applications. Business Process Re-engineering (BPR) projects were the early attempts to integrate business processes within the applications but there never was a tool to accomplish these integrations. During the late 1990s a lot of tools emerged but they were only for mapping business processes and did little to execute business processes in the applications. At the same time there were also other web messaging services that were passing data back and forth between applications and the early products were known as web services. Also at that time there were other products with workflow type products that orchestrated the flow of data through and between applications. Then roughly five years ago business process integration (BPI) solutions, business process modeling (BPM), business to business (B2B), and industry process solutions were built on top of the enterprise applications integration (EAI) solutions. Until recently, there were no serious attempts to integrate business process management with business applications. Today, BPM is continually gaining ground. Companies have learned from experience that BPM is a strong asset when facing the rapidly changing requirements that are typical of today's dynamic world.

These days, the flexibility of a solution is what is important to businesses. As a result, more BPM products are using Service Oriented Architectures (SOA) for their solutions. Using this type of platform and adding modules, one can create flexible BPM solutions. Today, the market offers BPM solutions that incorporate both the EAI and BPI functionality in addition to workflow, business activity monitoring, web services, rule engines, and portal capability, etc. Integrated solutions that optimize only at a company or department level are no longer sufficient for success in today's highly competitive, integrated supply chain environment. Every department contains mountains of data, but without an integrated and process-oriented solution, all this valuable information is often lost to the company as a whole. What is needed is a real time solution that goes beyond integrating the content and processes. As a result, user organizations are now swimming in improved data, which are still stored in disparate applications, data marts, operational data stores, and data warehouses. Despite these efforts, many companies have still failed to link data to business processes, and only a few companies have changed their business processes to reflect the insights gained from the data side.

Linking data and content to processes falls in the realm of BPM, a technology that coordinates the data and actions of disparate Information Technology (IT) systems and should allow companies to transform potentially damaging customer interactions into revenue opportunities. An ideal enterprise system in an

ideal world would have a single software vendor providing 100 percent of the data, content, business processes, and connectivity to the outside world, and would accommodate changes instantaneously when required. However, this is a utopian ideal. Unfortunately in the real world, communication is impeded because content silos exist everywhere, and users do not talk the "same language" and do not always use the same software.

> "The problem companies' face is how to operate in a state of perpetual change and adaptation. They are no longer wondering how to make a change; they are wondering how to make a change, over and over again. They also know they need to create and test countless variants of countless processes, but have no idea how to make this happen. It's not for want of trying. … Every day, in every company, someone is challenging the status quo that business processes and the various automation systems, on which they depend, are cast in stone, impossible to understand and modify without wholesale reengineering and replacement. Many companies are trying to break out of the situation by implementing a host of point solutions – piecemeal ways of exposing, integrating, transforming and connecting disjoint processes, information and machines. Their intentions are good, but rarely do they achieve long term, meaningful results – a system not just built to last but built to adapt."
> *Business Process Management – The Third Wave*

What Is BPM?

Organizations use BPM systems to improve the effectiveness of their core operations. BPM specifically coordinates interactions between systems, business processes, and human interaction. It automates the routing of activities and tasks to employees, taking away non-value adding activities, such as routine decisions, data, and form transfer etc., and instead, provides users with tailored lists of task. With today's tight integration of process definitions and underlying applications, changes in the definition can be deployed and communicated virtually immediately.

Additionally, BPM can also add value to a company requiring procedures to be created and published because it offers compliance management. Companies can use it to meet the US *Sarbanes Oxley Act* (SOX) and *International Standards Organization* (ISO) requirements. It can opening up a range of functions such as process (quantitative) analysis, and optimization. Thus, by implementing BPM, companies are able to orchestrate and leverage cross-functional business processes that are used over multiple systems, divisions, people, and partners. In particular, the sheer number of provisions contained within the legislation is daunting, and although it is possible to use checklists and spreadsheets to achieve compliance with all of SOX mandates, most companies recognize that specialized software and systems can streamline the process of tracking tasks and managing the overall process. To that end, BPM technology should improve management control by automating processes and enforcing business policies. Management dashboards also assist executives in spotting problems earlier, through greater visibility of critical business information.

The acronym **BPM** has been the cause of some confusion in the past. It can be mistaken for business process modeling, which is a subset of the more "evolved" business process management. It is important to note the distinction between the two. Business process *modeling* is issued solely for the graphical representation of the workflow, which can be either information or an actual document in a business process. Business process management is the definition of the process as a whole, including EAI, business process modeling, workflow, and even B2B transport capabilities. Furthermore, BPM should not

be confused with business *performance* management which belongs to the world of Business Intelligence (BI) and data warehousing.

BPM is a set of tools and services that support human and application interaction with business processes. BPM product suites automate manual processes by routing tasks through departments and applications. These routings are rule- and action-based, and are defined in a set of formulas. Actions can be automatically triggered, without an underlying rule requiring additional information; therefore, the process can be continuous and manual processes can be avoided. BPM encompasses several disciplines intended for use across different divisions and areas within organizations. Some of these disciplines are:

Business Process Modeling. "Defines" the process (usually in graphical format). As explicitly modeled processes are required for all subsequent BPM disciplines, process modeling is often perceived as the starting point of BPM. Defined with the use of a process modeler (not to be confused with graphical editors such as Visio or PowerPoint), the resulting model is composed of objects that are able to be related to by the BPM engines. Composed of different diagrams (to represent different dimensions of the organization), the model is stored in a structured repository.

Business Process Documentation. Responsible for the process-enhanced documentation. It complements the process diagrams by providing, through graphics, the what-to-do description and sequence of steps. It also adds the extended documentation by providing the how-to-do of business tasks to the model "skeleton". Items such as the work instructions, standard operating procedures, master templates, training components, etc. are added to the diagrams to create a documented process.

Business Process Certification. Takes care of the process's ability to comply either with industry documentation standards such as ISO or with an internal "gating process". It confirms that the processes have been approved or certified in a proper manner before their internal deployment.

Business Process Collaboration. Deploys processes (intranet or extranet publication) on the one hand, and provides users with the ability to leverage the process know-how into enhanced productivity via user and task collaboration, on the other hand.

Business Process Compliancy. Establishes the process's readiness to comply with internal and external regulations (such as *Sarbanes-Oxley* [SOX]). The compliant certified processes are then used to achieve governance certification, audits, or both.

Business Process Optimization. Responsible for Continuous Process Improvement (CPI), including tools to assess the performance of the actual process against internal norms or industry benchmarks. The integrated quantitative analysis capability is used to identify bottlenecks and estimate throughput times and cost saving opportunities. This often includes a simulation engine to perform "what-if" analyses to locate process issues in a proactive manner.

Business Process Automation. Responsible for the integration between users, processes, and related applications, resulting in the system automation of the process tasks. Driven by a

workflow management engine, the BPM process information, as modeled, can be used for automated transaction execution and routing, including task execution triggered by previous events, evolved task scheduling and user notification, real time monitoring of task execution, ad hoc execution, etc.

Business Process Management: How to Orchestrate Your Business; Hans Mercx, July 9, 2005

BPM often means different things to different people. One could, in great part, blame this on the slew of budding pure-play software providers that refer to themselves as full-fledged BPM providers, but really only cover a niche or two of the entire BPM realm. One should also distinguish clearly between BPM as a management activity and BPM as a modeling tool, since these definitions are often used interchangeably. Below are the typical high-level tasks that a comprehensive BPM solution should cover (listed sequentially):

1. *Process definition* or *modeling*, which maps and defines business process
2. *Process execution*, which is a critical task that requires a core database and engine that contains process rules, and automatically initiates and manages processes
3. *Process monitoring*, which enables managers to see potential bottlenecks and monitor *work in process* (WIP)
4. *Integration layer*, which, logically, links an organization's diverse business applications
5. *User interface* (UI), which enables people to interact with the process engine

Business Process Management: A Crash Course on What it Entails and Why to Use It, P.J. Jakovljevic, December 8, 2005

Process mapping leads to process execution. Within the processes, organizations can use exception handling integration by defining the rules in the exception processes. All processes can be monitored and generate Key Performance Indicators (KPI) for the organization as focus areas. BPM solutions can also interface with task lists, e-mail, and handheld devices. It can also integrate with the mainframe and other databases, and with ERP, CRM, and legacy systems. To close the BPM life cycle, once reporting is completed, the KPIs can be used for input and to analyze and create evaluations based on the data and identify where the bottlenecks occur in the company.

BPM product suites also use Business Process Integration (BPI) to integrate business processes with other applications, and to enable the flow across their legacy systems. However, BPI doesn't have the business management capabilities that a BPM has in terms of dashboards, analytics, and the ability to define and track metrics across different processes. It also cannot analyze impact and simulations. Yet by working in conjunction with BPM, BPI brings more depth to the BPM systems.

BPM: Why Use It?

Why would anyone want to consider deploying BPM? Some reasons include the potential to dramatically reduced operation costs, reduced lead times, streamlined outsourcing, improved performance visibility, better management of global operations, faster time-to-market, exceeded customer expectations, and so on. The **Business Project Management Institute** reports that an effective BPM strategy can

- reduce product design time by 50 percent, resulting in faster time-to-market, more competitive products, and increased revenue;
- reduce order time by 80 percent, leading to cost savings, improved customer satisfaction, and revenue gains; and
- Help organizations achieve efficiency gains of 60 percent in call centers, resulting in improved asset management, reduced customer service costs, and improved customer satisfaction.

A recent report claims that a BPM-enabled *enterprise resource planning* (ERP) system can cut inquiry response time by 70 to 90 percent, decrease customer order lead time by 50 percent, increase inventory turns by 35 percent, and cut manufacturing cycle time by 40 percent. In the past, tweaking a current ERP system to simplify a job would have customarily involved costly custom programming. Today, BPM can streamline business processes within and between systems, because it is a mix of workflow, EAI, and application development that makes it easier for companies to codify current processes, automate their execution, monitor performance, and make "on-the-fly" adjustments to improve the processes.

Business Process Architect

Due to an increasing standardization the development of information systems have changed considerably. In the past, the industry focused mainly on optimizing system design and system integration. This offers new potential for savings in the organizational environment of business processes. Today, steadily intensifying competition has turned this potential into the hottest topic for every single company. Flexible structures which persistently focus on internal business processes are becoming the decisive competition factor for companies. However, only a holistic view of all business processes enables a company to recognize, streamline, and support interconnected processes through optimized information system infrastructures. Compared with the management of centralized business environments, the management of these new structures is becoming more and more complex. In this context, clearly and uniformly defined responsibilities, maximum transparency of structures, a homogeneous communication basis integrating all company levels, and streamlined project management based on business objectives are vital for success. Company modeling methods offer support in mastering these complex tasks. Business models are a crucial prerequisite for analyzing business processes, bringing projects in line with the overall business objectives, and finding the perfect information system infrastructures in the form of a compound of distributed, integrated systems to support these lean organizational structures.

Modeling the company's actual situation - and, in doing so, increasingly examining holistic business processes - is coming more and more to the foreground of the discussion. The increasing availability of the most varied modeling methods adds impetus to this trend, but the multitude of methods also leads to increasing complexity and confusion. Consequently, efforts are being made to define standardized general concepts (architectures) for development and modeling methods. This architecture concept enables methods to be evaluated and organized by focusing on their key points, and it serves as an orientation framework for complex development projects because due to its structuring elements, it contains an implicit procedural model for the development of integrated information systems. An architecture of this kind naturally leads towards standardization in the use of methods. Therefore, existing and new modeling methods based on the architecture have been combined to form a holistic method for modeling business processes. Further more, this architecture served as a basis for Oracle in developing their Oracle Business Process Analysis Suite (Oracle BPA Suite). Oracle Business Process Architect supports consultants and companies in creating, analyzing and evaluating business processes in terms of business process reengineering.

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The design of architecture of is based on an integration concept derived from a holistic analysis of business processes. The first step in creating the architecture is the development of a model for business processes which contains all basic features for describing business processes. The result is a highly complex model, which is divided into individual views in order to reduce its complexity. This division enables the content of the individual views to be described by special methods suitable for this view without the user having to pay attention to the numerous relationships and interrelationships with the other views. The relationships between the views are incorporated later and combined to form an overall analysis of process chains without any redundancies. A second approach that also reduces complexity is the analysis of different descriptive levels. Following the concept of a lifecycle model, the various description methods for information systems are differentiated according to their proximity to information technology. This ensures a consistent description from business management-related problems all the way to technical implementation. Thus, the concept represents the framework for the development and optimization of integrated information systems and a description of their implementation. In this context, emphasizing the subject-related descriptive level results in the concept being used as a model for creating, analyzing, and evaluating business management-related process chains.

The components necessary to provide a full description of a business process are thus procedures, events, products/services (statuses), processors, organizational units and information technology resources. Considering all effects on all elements of the procedure for every event would complicate the model extremely and lead to redundancies in the description. As mentioned earlier, the resource view is replaced by a lifecycle concept of an information system's descriptive levels. Lifecycle models in the form of level or phase concepts describe the lifecycle of an information system. The lifecycle model, however, does not have the significance of a procedure model for developing an information system. It rather defines the various descriptive levels that differ in their proximity to information technology.

The starting point of the analysis is the business management-related problem. The description encompasses rough facts that are geared very closely toward technical objectives and technical language. This also incorporates the information technology options for the support of business management processes and decisions. Therefore, only semi-formal descriptive methods are used for representation. Because of their lack of detail and their highly technical vocabulary, they cannot serve as a starting point for a formalized translation into the implementation stage. Therefore, the requirements definition describes the business management approach to be supported in a formalized description language, so that the definition can be used as the starting point for a consistent implementation into information technology. This process is also referred to as (semantic) modeling. The requirements definition is closely associated with the business management-related problem. The design specification level is reached when the conceptual content of the requirements definition is transferred to the design specification categories. Instead of the technical functions, the modules or transactions that execute the functions are defined here. This level can also be thought of as an adaptation of the requirements definition to the general description constructs of information technology. The requirements definition and the design specification are only loosely linked. This means that a design specification can be changed without affecting the requirements definition. However, this does not imply that requirements definition and design specification can be developed separately. In fact, after completion of the requirements definition, its contents in terms of business management should be constituted in such a way that purely IT-related considerations (e.g., information system performance) do not influence its technical contents.

At the implementation level, the design specification is transferred to concrete hardware and software components. This establishes the link to information technology. The descriptive levels are marked by different update cycles. The updating frequency is lowest at the requirements definition level and highest

at the implementation level. The implementation level is closely linked to the development of information technology and subject to continuous revision as a result of the rapid innovation cycles in information technology. The requirements definition level is particularly significant because it is both the basis of the long-term business management application concept and the starting point for further steps toward technical implementation. The requirements definitions have the longest lifecycle and - through their strong affinity to the business management problem - document the technical benefits of the information system. For this reason, the view of the development of requirements definitions or semantic models has the highest priority. The semantic models form the link between users and the initial implementation of their problem description into an IT-related language. Before the individual areas of analysis within the ARIS architecture (views and levels) can be modeled, the initial semantic business process (i.e., the business management-related problem) must already exist. The weak points of the information systems currently used are described in terms of support relating to business processes and the key content of the target concept of the system to be developed. The weak points also mirror objectives that new information systems pursue. Therefore, the model expressing this problem needs to cover as many facts as possible from the data, function, and organizational views including their interrelationships. Moreover, the model must guarantee that the target concept be specified to such an extent that it can serve as a starting point for the rest of the modeling process. Only the development process of the requirements definitions triggers the division into views corresponding to the architecture. Due to the requirements that the initial business situation has to be described coherently and that the weak points of the existing information systems have to be displayed concisely, the use of common modeling methods is limited. Because of their various representation foci, the common modeling methods can only be used when it comes to modeling individual views.

Business Process Modeling

The interactions and transactions between companies and their partners, suppliers, and customers are becoming ever more complex, mostly due to new information and communication technologies. It is becoming ever more evident that further development and performance of business processes depend on close cooperation between the various business partners. On the one hand, a company wishes to be able to better understand its own actions and those of its business partners; on the other hand, organizations should be given the ability to adapt faster to internal and market-driven changes. A standardized process modeling language can help companies to describe their internal and external business processes clearly and flexibly. Companies should also be able to communicate the modeled processes to their business partners in an appropriate, concrete, and comprehendible manner. All parties involved should speak the same "process language".

To reach these goals, the Business Process Management Initiative (BPMI.org) offers a standardized modeling language: Business Process Modeling Notation (BPMN). BPMN is a graphical notation system for describing business processes in a business process diagram (BPD). The notation is intended to be easily understood by all users. This makes it suitable not only for business process analysts and those who monitor and manage processes, but also for developers who implement the process execution technologies. XML-based languages need to be visualized with this notation for business process automation (e.g., Business Process Execution Language for Web Services (BPEL4WS).

Business Process Modeling Notation (BPMN) uses the Business process diagram (BPD) model type for describing processes. This model maps three classes of business processes and the relationships between them:

- Private business processes are business processes that are performed exclusively within an organization. They are generally known as workflow or BPM processes. Various internal business processes are modeled as a sequence flow within individual pools whose interactions are represented using message flows.
- Abstract business processes describe interactions between private processes of different pools, between objects of different pools, or combinations of both. Along with the sequence flow within the private process, the message flow between the individual processes is particularly important. Interactions are modeled using message flows. Abstract business processes are integrated in individual pools and can be modeled separately or as part of an entire BPMN diagram. If an abstract business process appears in the same model as a corresponding private business process, they can be associated with each other.
- Collaboration processes describe only the interactions between two or more business entities (business partners). A sequence of activities is modeled to reflect the pattern of message exchanges between the various partners. The sequence flow has no part in this. The mapping specification is planned for later versions of the BPMN specification. Collaboration processes can be integrated in pools. The interactions of the partners involved are described in individual lanes. This allows the processes to be modeled separately or as part of a comprehensive BPMN diagram. If a collaboration appears in the same diagram as one of its internal processes, activities common in both can be associated with each other.

Both detail processes comprise a start event, activities, sequence flow connections, and an end event. Message flow connections are modeled between the activities of the two detail processes. Since processes of several business partners can be shown in one BPD and each business partner has a different view of the same process, it is useful to specify a "point of view". The BPMN does not dictate how the point of view is to be emphasized in a BPD. The easiest way is to maintain the names of the assigned business entities (business partners) in the Description/Definition attribute.

Implementing BPMN in Oracle BPA Suite

Although BPMN supplies only the Business process diagram (BPD) model type, two model types can be used in Oracle BPA Suite: the EPC and the new Business process diagram (BPMN) model type. In this way, processes existing in Oracle BPA Suite can be reused as private processes. The EPC has all model attributes that BPMN needs for the business process diagram. By using the Business Process Diagram (BPMN) model type, you keep existing models of the EPC type free of B2B-context aspects. As a result, your EPC models are not rendered more complex by additional relationship types. The new business process diagram inherits all BPMN-relevant model attributes from the EPC and all sequence flow-relevant objects, connections, and symbols. The new Business Process Diagram (BPMN) model type allows sequence flow-relevant EPC concepts to be reused. However, you can also represent pools, lanes, and message flows.

Elements of the Business Process Diagram

Pools and Lanes

A business process diagram through pools is clearly structured. A pool is a graphical container in which a set of activities of a business entity are combined. A business entity can be a function, application

system, organizational element, or data element. In BPMN, two pools represent two different business entities. The technique of structuring a model in pools is typically used in a B2B context. A pool combines a process partner's various activities that are structured and organized using lanes. In this way, a boundary is defined with the activities of other process partners. In a BPD, pools need not necessarily contain process elements. You can also insert an empty pool ("black box") in a model, for example if you want to integrate into an overall process the interrelationships of a subprocess (e.g., of a business partner) that is involved but whose details are not known. You might also not want to model the details of a subprocess because you want to avoid overcomplexity. Pools include at least one lane. A lane can in turn contain additional lanes that are nested or defined as a matrix. If a pool has only one lane, the pool assumes the same name as the lane. If a pool includes more than one lane, the various names for the lanes and a special pool name must be specified. According to BPMN

In Oracle BPA Suite, pools and lanes are individual object types that are initially placed in the model. Within the pool, the process can be modeled in a way similar to an EPC. All functions, events, and rules of the process are placed on the pool object. Use the belongs to connection to describe the association of these objects with a pool. We recommend that you create it as an implicit relationship. A connection of the depicts type links the pool object to an organizational element, application system type object, data element, or function. Please note that each pool can have only one connection of this type throughout the given database. These relationships should also be implicit. According to BPMN specifications, a pool does not need to be represented in the model by a symbol. The borders of a pool can also be hidden, especially if the diagram contains only one pool. These options should not be used in a model with several pools, otherwise it will become overly cluttered.

Sequence Flow

A process in the form of a sequence flow describes the sequence in which the activities of a process are carried out. The sequence flow combines the Event, Activity, and Gateway object types. Sequence flows are permitted only within pools and may not cross their borders. Sequence Flow Connection Appropriate connection types, such as activates, is evaluated by, creates, links, or leads to are maintained depending on the connection's source and target object type.

Message Flow

A message flow describes the exchange of information between two pools. The message flow can either be placed directly between the two pool objects or between objects in the sequence flow of the processes in the corresponding pool. Only message flows are allowed to cross pool borders, and a message flow connection must not be placed between two objects of the same pool. The connection is represented by a dashed line. The beginning of the line is marked by a circle and the end is a white arrow head. Each message flow comprises a sender object, a connection of the sends type, a connection of the is received from type, and the recipient. No message flow connections can begin at a start event or intermediate event. However, an end event does not receive message flows, but can be a sender itself. Lanes, gateways, data objects, and text annotations do not have message flows.

Association

An association is used to provide the sequence or message flow components with information. This information can be of a textual or graphical nature. If multiple different processes appear in the same diagram, their individual process elements can be associated with each other via connections. The

association is represented by a dotted line with open arrow heads, if required. This applies in particular when assignments of artifacts of the Data object type are involved.

Association Connections

Appropriate connection types, such as has output of, is input for, provides input for, or creates output to are maintained depending on the connection's source and target object type. Particularly important in BPMN is the assignment of Data object type artifacts to activities. This assignment is directed and describes how information is used and changed within a process. It is implemented in the BPD (BPMN) using the following relationships:
- • Function – creates output to – data elements (especially information carriers)
- • Data element (especially information carrier) – provides input for – function

An event is a state that arises in the course of the business process. Events influence the course of the process. Normally, they represent triggers or effects within the processes. Depending on when an event occurs, it is either a start event, intermediate event, or an end event. The three event categories are represented by their own symbols in BPMN:

Activities

An activity is performed as part of a process. It can be atomic or non-atomic (compound). BPMN permits three categories of activities: Process, Subprocess, and Task. In Oracle BPA Suite, activities are modeled as functions by default. The function receives all attributes specified by BPMN for processes, subprocesses and tasks. As with events, the BPMN attribute type group is used. It contains additional subgroups for the activity types. In terms of BPMN, a process describes an activity that is carried out within a company or organization. A process is described by a graph with flow objects that represent a set of different activities and control objects. Processes are hierarchically structured and can be defined at all levels of detail. In contrast to a process, a business process in BPMN describes a set of activities that are carried out across company/organizational boundaries. In terms of BPMN, a subprocess is a combined activity with a detailed description. A subprocess appears as an object within a process flow. Usually, a subprocess is assigned a detailed process. Unlike in BPMN, Oracle BPA Suite does not identify an assigned activity by a plus sign, but by the assignment icon. Besides identifying an assigned function, BPMN also provides the ability to show the detailed process at the next higher process level. This is done by clicking on the plus sign. This functionality is currently not supported by Oracle BPA Suite.
Gateways describe how sequence flows merge or branch within a process. They determine the behavior of incoming and outgoing connections. In Oracle BPA Suite, they are represented as objects of the Rule type. Similar to events, various types of gateways can be specified. Depending on the type, further symbols are shown in the center of the Gateway symbol. The BPMN specification stipulates that a number of gates must be defined for each gateway. In Oracle BPA Suite, the number of gates is determined by the number of incoming and outgoing connections. Therefore, gate-dependent attributes are maintained at the incoming and outgoing sequence flow connections of the rule. A special case is the complex gateway in which the Incoming condition and Outgoing condition special attributes are specified. These attributes must be maintained if there are several incoming or outgoing sequence flow connections for the gateway concerned. The attribute content of the incoming condition can contain sequence flow names and process properties (data). The outgoing condition contains references to sequence flow IDs and process properties (data).

Artifact

Artifacts provide information about the process. This information does not belong to the sequence flow or message flow. A total of three artifact types are differentiated:

- Data objects are comparable to information carriers or data elements in Oracle BPA Suite. However, in the broadest sense they could encompass all assignments. Data objects influence neither the sequence flow nor the message flow, instead they supply information about what happens during the process. They show how documents, data, and other objects change during the process.
- A Group is a graphical emphasis of associated process elements. In Oracle BPA Suite, graphic objects are ideally suited for this. Alternatively, groupings could be used. However, this is only advisable if the grouping includes a graphic.
- Annotations are remarks about objects or connections. In Oracle BPA Suite, they are realized with the help of the Remark/Example attribute. Important is that the attribute is placed in the model.

BPEL for Web Services in Oracle BPA Suite

The Business Process Execution Language for Web Services (BPEL4WS or BPEL) is a formal, XML-based description language for business processes that interact via Web services. BPEL is based on the Web Service Flow Language (WSFL) from IBM and Web Services for Business Process Design (XLang) from Microsoft, and uses the specifications WSDL 1.1, XML Schema 1.0, XPath 1.0 and WS addressing.

In addition to IBM and Microsoft, BEA, SAP, and Siebel Systems helped to devise the specification. The BPEL process and BPEL allocation diagram model types available in Oracle BPA Suite support the current version of BPEL. BPEL supports two process types:
- Executable business process (executable process)
- Business protocol (abstract process)

An executable process describes the actual behavior of a business partner during an interaction. Different services are grouped into a process. The executable process can then be used as a service. An executable process implements the orchestration and cooperation of different Web services from the perspective of a business partner. An abstract process describes the mutually visible message exchange procedure of the business partners, i.e., it implements the choreography. Each business partner describes its parts in the interaction. An abstract process implements the choreography. By differentiating these two process types, it is possible to separate generally accessible aspects of a business process from the internal or personal aspects. The decision-making behavior and data management of a business partner can be protected. Changes in the "private" aspects do not necessarily have to lead to changes in the generally accessible areas. Both process types are represented in Oracle BPA Suite in a model of the BPEL process type. The special features of a BPEL process are explained below using a simplified example of order processing based on the example of the BPEL specification. Order processing can be triggered on receipt of an order from a customer or receipt of an "internal" order, e.g., from another department in the same company. To describe this process in BPEL, a model of the BPEL process type is created. In general, it is advisable to use object names without blank spaces or special characters in BPEL models and use the same name in all languages. Object names must be unique. If objects with the same name are used, they must be allocated to the namespace they belong to. If an object is allocated to a namespace, the object is linked to the namespace by a connection of the is nested type with the corresponding namespace symbol. Each process description contains four sections in line with BPEL4WS:

- Variable definition
- PartnerLink definition
- Fault handling
- Process flow

All data/message items used in the process are listed in the variable definition. Name and message type are specified for each variable. The message type can be a WSDL MessageType, an XML Schema Simple Type, or an XML Schema Element. Variables are allocated to the process start or scope start in the BPEL process. Each variable must have exactly one such type allocation, and the names of the variables of a process or a scope must be unique. Each message type must be described using one or more message parts. For each message part, exactly one type must be specified.

Fusion and BPEL

The key elements of Fusion are the Oracle Business Flows and The BPEL tools that is an integral part of Fusion Middleware and appears will either replace or integrate with Workflow in future releases. Business Process Execution Language (BPEL)-based products work by encapsulating the orchestration facilities necessary to coordinate, manage, and monitor service-oriented business processes. In a somewhat simplified language, while web services allow applications to easily exchange and reuse information, it is only when they are orchestrated (coordinated) into long-running business flows or processes that enterprises can realize their true value.

That is where BPEL comes into picture, which, also known as BPEL4WS, is an XML-based language for standardizing business processes in a distributed or grid computing environment that enables separate businesses to interconnect their applications and share data. The language provides a standard programming language that businesses can use to define how to combine web services to accomplish tasks. Being a standards-based format for transferring processes between platforms while remaining platform-independent, BPEL is now looking like an important element in the taxonomy of web services and BPM, given BEA and SAP are also supporters. For example, customers could now supposedly use recently released or re-branded Oracle BPEL Process Manager to orchestrate processes. Oracle might rightfully assert that its product is the only native BPEL server on the market. However, several nominally non-native BPEL products from Oracle application server competitors, including BEA and webMethods, enable import and export between BPEL and their own proprietary formats.

Although having mighty backers, BPEL still remains one of a number of emergent standards in the general area of BPM. Others would be *Web service choreography interface* (WSCI), and a number of other specifications like *business process modeling language* (BPML) or *XML processing description language* (XPDL). There are also some aspects that BPEL currently does not address, such as complex transformations, data translation, trading partner agreements, manual (human) processes, and connectors to specific back-office systems. For that reason, large enterprises will still tend to look to other more complete solutions or even to the above mentioned BPM, SOA, and Web services specialist vendors to create, manage, and orchestrate complex, high-volume processes that include people, structured data, unstructured content, and exceptions handling.

BPEL is not workflow or the next version of workflow but actually the next *generation* of workflow where the limitations of workflow are overcome and applications can be integrated and function truly as business process, as opposed to software that simply passes information between disparate packages. It

brings together the various applications into an integrated business process that appears seamless to users and management.

BPM Cautions and Caveats

We do not necessarily see BPM as a significant enabler for reinventing mature, "cut-and-dried" ERP processes, particularly not in a single-site environment (although it remains important to automate and keep these routine processes in check). It is important to be able to model the application exactly to how an organization does business with its trading partners, and not be constrained by software. The need for SOA, Web services, and BPM has been boosted by these external processes, which are most often automated workflows that involve multiple companies and a diverse, existing enterprise system. The still emerging BPM market has resulted in a number of point solutions that excel in only a few of the aforementioned components of BPM. Therefore, following the same route as ERP players in the older ERP market, niche BPM vendors will have to partner to deliver a more comprehensive BPM solution.

In addition, though BPM vendors come from different backgrounds, and they can basically fall into three groups, each having typical strengths and weaknesses. These groups include traditional ERP vendors; Enterprise Content Management (ECM) or infrastructure/EAI vendors and BPM pure-play specialist vendors. The first group appears in every software category related to process and consists of traditional ERP vendors, such **as** Oracle**,** SAP**, or** Microsoft. Owing to their expertise in enterprise-wide business processes, these vendors have typical strengths, such as astute offerings for initial software releases and tight integration with (their own) ERP systems; good control and risk documentation; and good reporting and monitoring tools. A typical weakness of these vendors' solutions is that they have entered the market late, and consequently have had less time to mature, and offer poorer integration.

Although the widespread acceptance of Web services inter-enterprise implementations will not happen any time soon, the major players' involvement in leveraging these should prompt large global enterprises to start learning the new protocols, standards and technologies in order to grasp the potential underlying business advantage of abating the traditional problems of integration, while focusing more on the processes underlying IT systems than the actual technology. They should try to grasp how developers will leverage Web services, SOA, and BPM, what their ongoing needs are, and what intricacies may arise from their utilization, such as cultural and standards issues, in addition to many essential features such as reliability, security, scalability, performance, and manageability.

Also, although these new concepts may provide new business opportunities and create some dynamism and efficiency , they are not going to transform businesses on their own, given that they are only a piece of new technology. Even if large organizations are the first to dabble with deploying Web services, their impact will ultimately be also felt by companies that supply products and services to consumers, regardless of their size. Enterprises should scrutinize the applications they already have and then define what services it is that they really need. Even many latest applications that are already SOA-enabled might still be at a low level of business abstraction, while ironically, some legacy applications might be easier to encapsulate and integrate. Yet, to fully benefit from web services and SOA, companies should carefully and painstakingly reexamine their business processes and best practices and look for the efficiencies a revamped infrastructure could bring.

Hence, in addition to the question whether BPEL will be the prevailing standard, there is the question whether the enterprises will be willing to share their business process models with one another. They

should thus question vendors closely on which approach they are (or will be) taking in their current and future releases, and why. Once the choice is made, it will be difficult, although not quite impossible, to switch or abridge. Since application integration efforts are costly, complex and time-consuming, the decision may come back to haunt you if you do not choose wisely. Users must recognize that making a choice for an application server should encompass the entire stack (portal, personalization, directory, etc.). The niche specialist Web services and BPM vendors should be considered, although within a tactical mindset and with a reasonably quick and justifiable feedback. In general, the market should stay very close to the commonly accepted standards, and beware of any vendor that is inclined to create much dependence on its proprietary technology, as it leads to unjustifiable price increases, and a declining openness in the future.

Future of BPM

BPM is becoming more important to organizations and companies are slowly becoming aware of the role of BPM suites. Organizations still see their business partners as important ways to fuel businesses. As result, process driven BPM is shifting towards execution driven BPM, which integrates with different applications. Organizations will also start looking for ways to orchestrate their processes to meet the demands of their dynamic business models. Finally, because *business intelligence* (BI) is also becoming more important, vendors will have to focus on their execution driven modules and BI integrations to meet market demand. The importance between BI and BPM is a key reason for BPM vendors to incorporate a reporting element and the ability to measure performance of the business processes into their solutions. Most BPM vendors already integrate with BI solutions, but now BPM vendors are either creating their own modules, or are buying other vendors to merge their products into one solution.

With businesses changing into dynamic environments, organizations need to be able to adapt their processes rapidly and effectively. They need to be able to analyze problems and execute solutions accordingly. This is why organizations will need the full integration capabilities of BPM solutions. Integrating legacy systems with BPI, built-in report and monitoring functionality and BI capabilities are especially important.

The market is changing as time goes by. Not only are the pure-play vendors working on increasing their market share, application platform vendors and ERP vendors will most likely get a good piece of the BPM "pie" in the future. Though the pie will not be shared equally with all vendors in this area, this is truly a scenario where it is possible for smaller providers and vendors to grow into this booming market. As small vendors expand their capabilities in this area, they can share the market with the big players. They will be able to use the strength of their solutions, specifically in the area of meeting the business needs of organizations and their vertical industry requirements, to compete in this booming market. So when an organization looks at the market for a BPM solution, they must have their requirements well defined and, especially when looking for specific functionality, take the small vendors into consideration. *The Future of Business Process Management*, Hans Merck October 20, 2005.

Conclusion

The market seems to have reached a level of maturity where vendors are now abolishing functional silos that prevent a smooth end-to-end, enterprise-wide flow of business processes. Vendors are connecting both transactional and informational systems and document management as organizations try to orchestrate their entire business process more efficiently to save time and money, and to add overall

value. It is important that organizations carefully assess their current functional requirements and future needs in detail, and compare these against existing solutions. The customer's challenge however, is to navigate through a growing pool of product offerings and make sure they will make the right decision in what kind of BPM vendors fits their needs best. With businesses changing into dynamic environments, organizations need to be able to adapt their processes rapidly and effectively. They need to be able to analyze problems and execute solutions accordingly. This is why organizations will need the full integration capabilities of BPM solutions. Integrating legacy systems with BPI, built-in report and monitoring functionality and BI capabilities are especially important.

The reality is that most organizations not only have the need to truly integrate their business processes into their applications but also have the business process drive the integrations between all their applications. This is the vision for Fusion and in order for companies to take full advantage of these opportunities they will have to be prepared for it. Any organization large or small should develop a BPM strategy and then take all the SOX documentation that was generated and build that into their applications. The organizations that take this approach over the next few years can embrace Fusion fully and take advantage of its opportunities for efficiency and cost reduction. For those that don't take the time to develop their BPM strategy, they will incur a large effort in preparation to take on the functionality of Fusion.

About the Author

Paul Cyphers of Solution Beacon has a robust background of over twenty years of extensive applications implementation experience with numerous ERP packages and methodology development. He has over five years of methodology development experience of international solutions content for five major software packages; J.D. Edwards, Oracle, PeopleSoft, Siebel and SAP. He has also led the development of the methodologies for other solution initiatives such as Program\Project\Change Management, Quality Management, Enterprise Performance Measurement and Business Process methodologies. He also led cross-functional international teams developing new, and upgrading existing content for applications to be deployed on global implementations. Paul works with our sales and marketing departments developing presentations and collateral regarding our solutions while preparing and delivering presentations to our clients. He also has responsibility for content and solution development to deliver rapid implementation of applications to clients. Prior to joining Solution Beacon, he has been a methodology director, senior consultant, project manager, systems manager, production supervisor and several materials management related positions. He can be reached by email at pcyphers@solutionbeacon.com.