

OMG STANDARDS THAT HELP USE SOA

Introduction

Businesses are constantly looking for ways to reduce costs, and increased computerisation is usually one option. In past decades the availability of ever-more-affordable IT platforms held out the possibility of increased efficiency through automation of manual processes. However, past IT solutions were often monolithic, proprietary enterprise software packages which offered potential savings if your organisation worked in exactly the way the software demanded. Needless to say, many organisations did not, so had to reshape themselves to use the business processes assumed by their new software. Where this wasn't possible, the necessary manual exception handling introduced error and inefficiency, and if separate parts of the organisation used enterprise applications from different vendors, there were often problems getting the applications to communicate with each other as well. These issues have contributed to the huge numbers of completely failed business IT projects, and helped create organisations with impregnable information silos where data flows between separate monolithic applications only with difficulty. The inflexibility of monolithic IT systems has also restricted organisations' ability to respond rapidly to changing markets by adapting their business processes or creating new products.

Service Oriented Architecture (SOA) has gained a strong following as a remedy to this malaise, offering the promise of adaptable systems which can not only be customised to the way an organisation actually works today, but also improve agility in the face of constantly-changing business requirements. The SOA approach emphasises the creation of independent, modular business services, each of which performs a specific and well-defined business function. Sets of services can be used in different combinations to realise the different business processes with an enterprise – and when requirements change or a new process is needed, services can be threaded together in new ways to support this. However, while all this is certainly possible, the question of how service configurations are designed and implemented within

a SOA framework sometimes goes unanswered.

SOA is a set of guiding principles for designing business systems, but does not on its own provide a design for any one system, nor even the tools to create such a design. There is an increasing consensus amongst business IT experts that Business Process Management (BPM) design techniques provide the best route to analysing business needs and designing SOA solutions that meet them. BPM provides a set of tools for discovering, documenting and continuously improving the many individual procedures (or "business processes") an organisation undertakes to deliver products and services. These business processes are sometimes formally laid down, but more often are partly enshrined in organisational "folklore". Organisations can greatly improve their operating efficiency and reduce errors (and the consequent reworking needed to correct them) by first using BPM techniques to discover, document and improve business processes, and then automating significant parts of them using a SOA infrastructure.

As industry guru Ismael Ghalimi succinctly puts it "BPM is SOA's killer application, and SOA is BPM's enabling infrastructure".

Object Management Group (OMG) has almost twenty years' experience with SOA, having begun work on the CORBA® middleware framework, an enterprise SOA infrastructure, around 1990. More recently OMG has also developed a strong portfolio of open BPM standards that are becoming a vital link in the design and deployment of SOA applications in business.

Identifying your processes: Business Process Maturity Model

The first step in using BPM and SOA to deliver improved business processes is to identify the stable, repeatable processes within the business that could benefit from better automation. This isn't always simple. A contributory factor to many failed enterprise IT deployments is the lack of mature, repeatable, documented proce-



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dures for achieving the organisation's goals. Too many businesses are run in inconsistent, sometimes ad-hoc ways, using processes that aren't documented and with results that can be hard to predict. No new technology, no matter how innovative, is going to be able to improve processes that don't properly exist. Unfortunately, managers typically have few standards for appraising the maturity of their business process, or measuring how closely they actually follow any written documentation that does exist, and also have few guidelines to help put processes on a firmer footing.

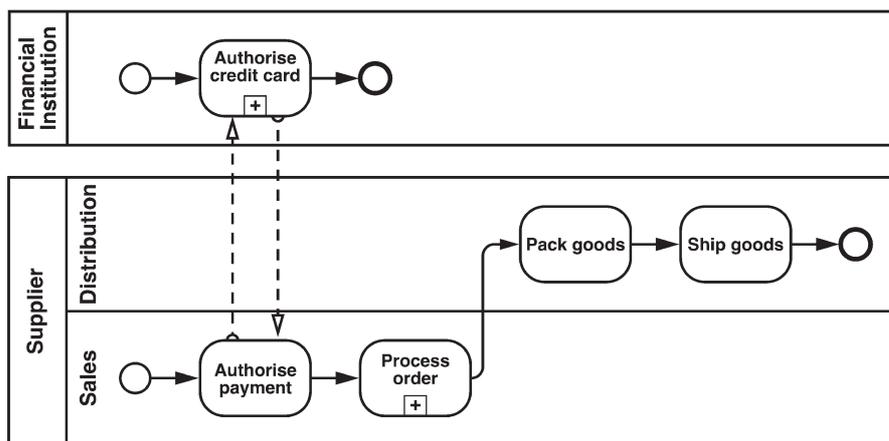
OMG's Business Process Maturity Model (BPMM) is designed to help with this. It provides a reference model for appraising processes within the enterprise and prioritising improvements to them. It also describes an evolutionary improvement path that guides organisations moving from immature, inconsistent processes to mature, disciplined ones. BPMM is based on Watts Humphrey's original Process Maturity Framework, which is also the foundation of the widely-respected Capability Maturity Model for Integration (CMMI) used to help organisations institute repeatable software engineering processes. Following CMMI's success, as many as 200 different maturity models have appeared. However, most are simply descriptions of how an organisation might look at different stages of evolution, giving little guidance on the specific steps necessary to move between maturity levels. By contrast, BPMM is designed to help organisations identify process deficiencies and guide them along the route to improving them. As with CMMI, BPMM orders these

improvements so that each stage provides a foundation on which to build improvements undertaken at the next stage.

Like all maturity models based on the Process Maturity Framework, BPMM defines five maturity levels through which an organisation progresses as it identifies and improves the definition of its processes. They are:

- Level 1: Initial – where business processes are performed in inconsistent, sometimes ad-hoc ways, with results that are difficult to predict.
- Level 2: Managed – where management stabilizes the work within local workgroups to ensure that it can be performed in a repeatable way that satisfies the workgroup's primary goals (even though separate workgroups performing similar tasks may use different procedures).
- Level 3: Standardized – where common, standard processes are synthesized from best practices identified in all the organisation's workgroups and tailoring guidelines are provided for supporting different business needs. Standard processes across the organisation provide an economy of scale and a foundation for learning from common measures and experience.
- Level 4: Predictable – where the capabilities enabled by standard processes are exploited and provided back into the workgroups. Process performance is measured throughout the process to understand and control variation, so that process outcomes can be predicted from intermediate states.
- Level 5: Innovating – where organisations recognise the opportunity for improvements that close gaps between their current capability and that required to achieve business objectives, and implement them.

While most organisations' process maturity is somewhere around level one, the chances of successful implementation of any process automation strategy (SOA-based



A simple example of a Business Process Diagram

or otherwise) is greatly improved if the organisation can achieve at least maturity level two or three.

Defining Service Orchestration: BPMN

OMG's Business Process Modelling Notation™ (BPMN™) complements BPMM by providing a standard, simple-to-read visual notation for documenting business processes. It's intended to be used directly by the stakeholders who design, manage and realise business processes, but at the same time be precise enough to allow Business Process Diagrams (BPDs) written in BPMN syntax to be translated into orchestration software that controls the execution of individual SOA services to realise a particular business process. BPMN applies sound modelling principles to representing any business processes, even those that are completely human-driven and involve no software at all.

Business people are typically very comfortable with visualising business processes using a flow-chart syntax, and thousands of business analysts already study the way companies work and define business processes with simple flow charts that link individual business primitives into processes. BPMN standardises an easy-to-use formalisation of these familiar flowcharts, providing a syntax which is precise yet independent of any particular software environment. It is becoming the most widely-used standard in the field and its widespread use is itself enabling rapid growth in business process standards expressed in the new notation. More than 50 tools now

support BPMN and three books devoted exclusively to the language were published between April and August 2008 alone. OMG has also instigated a certification scheme to allow practitioners to demonstrate their knowledge of the BPM in general and BPMN in particular – the "OMG Certified Expert in Business Process Management" programme .

Figure 1 shows a very simple, illustrative example of a Business Process Diagram showing how an organisation processes orders; although real BPDs are much more complex than this, this diagram does serve to explain some major features of the notation. Even without any training at all, most business stakeholders can grasp the gist of this diagram's meaning. It contains two "pools" representing the organisations involved in the process – the "Supplier" and a "Financial institution". The Supplier pool is further sub-divided into "lanes" representing the supplier's Sales and Distribution departments. The process begins with the "start event" (represented by a circle) in the Sales department lane, which leads to the first task within the process – authorising payment. As far as the client organisation is concerned, this is an indivisible ("atomic") task, represented as a box with rounded corners. However, this task relies on an external credit card authorisation service provided by a separate financial institution; the dotted lines crossing the pools represent the message flow carrying the service request to the Financial Institution, and the service response back to the Supplier. Within the Financial Institution, the "Authorise Credit Card" service is made up of a single sub-



process; the "+" symbol indicates that there are greater levels of detail documented in other Business Process Diagrams elsewhere.

Once payment authorisation is completed, the solid sequence flow arrow takes us to the next sub-process – "Process Order". Once again, the "+" symbol indicates that this sub-process is documented in more detail elsewhere. The sequence flow now crosses the lane boundary, carrying execution of the process into the Distribution department, where two successive atomic tasks take care of packing and shipping the goods.

SOA services must be orchestrated into processes in order to achieve the outcomes that the organisation desires, such as shipping goods to customers, so it's clear that business process diagrams created using BPMN can be a useful part of successfully implementing SOA within an organisation. However, a vital step is identifying the set of reusable services within an organisation which are at exactly the right level of abstraction to be successfully re-used – neither at too fine nor too coarse a level of granularity. This in turn can be achieved as a by-product of modelling all the relevant processes, allowing the commonly-used SOA services to be factored out of the BPDs.

In practice, successful SOA-based application deployments spend much more time identifying and documenting the target business processes than is spent on implementing the SOA technology that drives them. Metrics from a recent SOA deployment at Delaware Electric Cooperative in the USA show that 55% of the project effort was spent identifying and modelling the business processes involved, while only 20% was spent coding and 25% on testing and deployment.

Turning process diagrams into choreography code: BPDM and MDA

At some point in a SOA deployment, Business Process Diagrams have to be turned into code that orchestrates the SOA services. While this is traditionally done by hand-coding from the design diagrams, an increasing number of development organisations are turning to model-driven development techniques to automatically produce large parts of their application code directly from design diagrams. Recent studies show that around 20% of development organisations now use Model-Driven Development techniques such as OMG's Model Driven Architecture® (MDA®) to derive some or all of their application code directly from precise design models. OMG's Business Process Definition Metamodel (BPDM) has been designed as a standardised machine-readable way to store and exchange Business Process Diagrams created using BPMN or other process notations, allowing them to be used with MDA tools in this way.

BPDM is built on OMG's Meta-Object Facility (MOF™), the common framework that underpins all OMG modelling specifications. MOF-based tools support reasoning about and transforming models, so that process definitions captured using BPMN/BPDM or the other modelling specifications can be maintained in common, standards-based model repositories and translated into the service orchestration code, database definitions, software components, test scripts and other IT artefacts necessary to automate aspects of the business. Using MDA-based tools to help transform models into code has been shown to reduce the number of man-hours spent coding by 35-40% on typical business IT project.

Summary

Business Process Management (BPM) techniques are becoming widely recognised as the natural complement to Service-Oriented Architecture in the drive to reduce costs and increase agility in the world of business IT. Use of tools and techniques based on OMG's suite of BPM standards, including the Business process Maturity Model (BPMM), Business Process Modelling Notation (BPMN), Business Process Definition Metamodel (BPDM), and coding tools based on Model Driven Architecture (MDA) can assist organisations to maximise the benefits of their move to SOA.

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more information

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