This article appeared in the
April 2004 issue of

business integration
JOURNAL
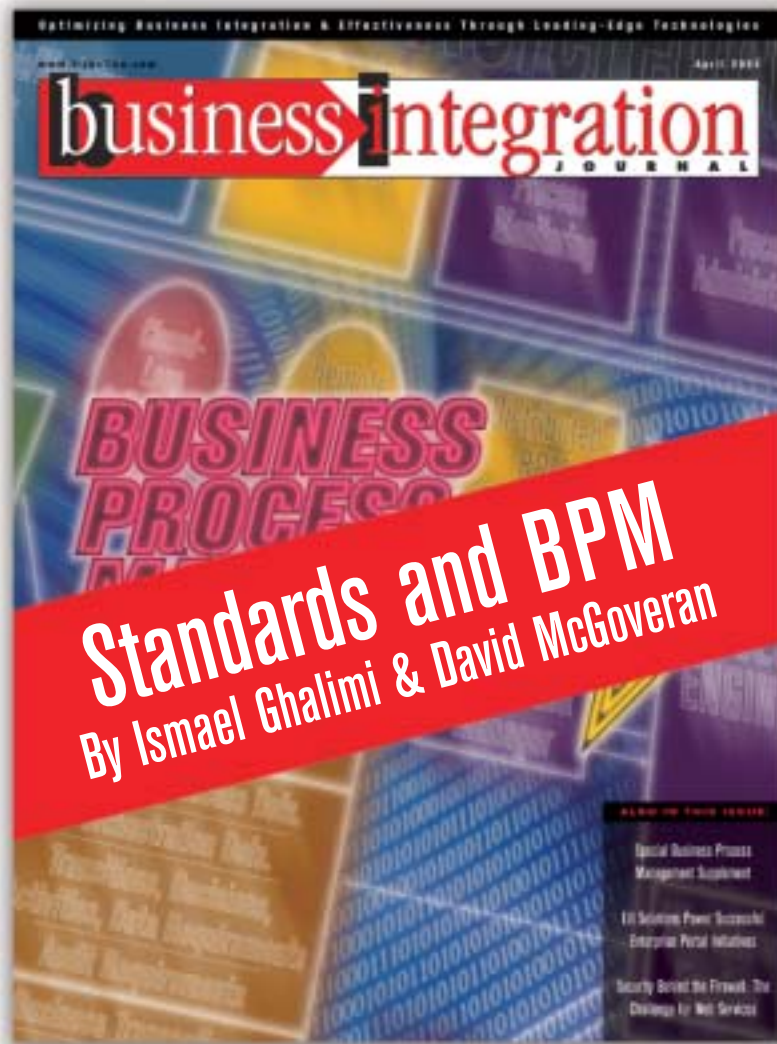
Standards and BPM
By Ismael Ghalimi & David McGoveran

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Almost by definition, every type of enterprise software requires standards to enhance interoperability. Business process management systems (BPMSes) certainly deserve to be classified as enterprise software and there are many opportunities to use standards with them. The two main uses for business process management (BPM) standards are multi-system interoperability and component interoperability. Both preserve software investments. Perhaps more important, however, is preserving business process knowledge in reusable form.

Standards developed for other process-related purposes are often useful for BPM technology and practices. Some standards that relate to BPM, such as Unified Modeling Language (UML), were developed with an entirely different objective. Some standards, such as IDEF0, were in place long before the conception of the first BPMS. BPM's heritage in business process analysis, business process automation, business process re-engineering, and workflow have led to the adoption of existing standards used in those disciplines. In addition, the use of newer technologies, such as Web Services in BPM technologies, has initiated the evolution of older standards and development of new ones.

The standards that are, or would be, useful to BPM can be classified according to their function (see Figure 1).

Much remains to be accomplished when it comes to BPM-related standards. Standards don't yet exist for all these functions and not all standards define an application programming interface (API). Additionally, numerous de jure and de facto standards groups exist with overlapping objectives. These groups sometimes represent disparate perspectives and a common approach to BPM-related standards is far from being established. For example, automated activities might be invoked using an asynchronous messaging protocol, a synchronous API, or Web Services protocol. Each would require a different approach to choreography and orchestration.

Process specification or execution languages that have a workflow heritage generally approach the problem top down, from a process enactment or control perspective. They usually provide support for activities performed by humans, along with resource assignment, functional roles, and organizational units. By contrast, those languages with a service-oriented architecture (SOA) or Web Services heritage generally approach the problem bottom up, with services collaborating or interacting in an orchestrated or choreographed manner to create the business process. These differences can have a profound impact on functionality, business vs. IT value proposition, and ease of use for the business user.

The story has just begun. We can expect extensive development of BPM standards over the next five years as the definition and value of both BPM and BPMS products continue to mature. For now, we can provide only a brief guide to the more relevant standards, most of which are still being developed:

The Business Process Execution Language (BPEL) offers an execution language for distributed and transactional business processes based on the Pi-Calculus mathematical model. It supports the orchestration of multiple independent but communicating processes. It relies on the standards-based Web services stack for process-to-process communication and integration with third-party systems. Version 1.2 of BPEL for Web services (BPEL4WS) will be released soon and will offer support for distributed transactions based on contributions made by Intalio to the Organization for the Advancement of Structured Information Standards (OASIS) WS-BPEL Technical Committee.

The Business Process Modeling Language (BPML) was the first standards-based business process modeling language for executable processes and has been developed by the Business Process Management Initiative (BPMI.org). It provided the first XML-based language for executable processes based on the Pi-Calculus model and the standards-based Web services stack. It laid the foundation for the development of BPEL4WS. Its development was suspended when BPMI.org joined forces with OASIS to develop future versions of BPEL4WS.

The Business Process Modeling Notation (BPMN) is the first standards-based graphical notation for business processes and is being developed by BPMI.org. It lets business analysts, process designers, and software engineers graphically design end-to-end business processes that can be automatically translated into fully executable processes using the BPEL4WS language. When completed in second or third quarter this year, it will support XML-based serialization into XML Metadata Interchange (XMI) using UML profiles, therefore allowing exchange of business process designs between business process modeling tools, as well as interoperability with UML 2.0.

Analysis and Design	Execution	Monitoring and Analysis
• Process knowledge discovery and analysis • Graphical process modeling notation • Business process specification • Technical process specification • Metrics specification • Resource specification • Business transaction definition • Technical transaction definition.	• Resource assignment • Scheduling • Executable process languages • Service/activity centric orchestration • Process-to-process interoperation • Federated/distributed process invocation and coordination • Transaction execution.	• Process query languages • Event/metrics query languages • Analytical languages • Activity monitoring • Process monitoring • Event monitoring • Process audit trail schemas • Process audit trail query.

Figure 1: Categories of Standards Functionality

The Business Process Query Language (BPQL), currently being developed by BPMI.org, will be the first standards-based query language for business processes. BPQL will support the deployment of business process definitions onto a process server and the real-time querying of process instances. BPQL is expected to be released in the fourth quarter of 2004.

The Business Activity Monitoring Language (BAML) will support the definition of process metrics, monitoring instruments, monitoring filters, key performance indicators (KPI), and process dashboards. BAML is expected to be released in fourth quarter.

The Business Process Audit Trail Schema (BPATS) will provide a standard XML Schema for the serialization of process instances based on BPEL4WS process definitions. Both BPQL and BAML will rely on BPATS. BPATS is expected to be released in the fourth quarter.

The Web Service Choreography Interface (WSCI) was the first standards-based language for defining the public interface of business processes. It was developed by BPMI.org, BEA, Intalio, SAP, and Sun Microsystems, then donated to the World Wide Web Consortium's (W3C's) Web Services Choreography Working Group. It supports the mapping of alternative public interface process models such as RosettaNet Partner Interface Process (PIP) onto the BPEL4WS and BPML execution models. WSCI public interfaces are functionally equivalent to BPEL4WS abstract processes, which are considered the standard mechanism for defining the public interface of business processes. WSCI supports message choreography, transaction boundaries and compensation, exception handling, thread management, and dynamic participation of Web Services.

WS-Transactions support the propagation of a transaction context across multiple parties over the Internet using Web services interfaces. It brings to the Web services stack the transactional services originally offered by CORBA through Internet Inter-Orb Protocol (IIOP) and XA/Open interfaces. It extends such services with additional transaction semantics that take advantage of asynchronous and XML-based messaging protocols.

The Business Transaction Protocol BTP from OASIS enables the coordination of requests, responses and outcomes for distributed applications involving multiple business entities. It supports atomic transactions, as well as permitting outcomes that are more flexible than all-or-nothing, but which are nonetheless agreed upon by the participating entities. BTP is potentially important as a BPM-related standard since a BPMS is often required to support complex business transactions. WS-Transactions supercedes the work done for the Business Transaction Protocol (BTP), but is only a vendor proposal at the time this article is being written.

The ebXML Business Process Specification Schema (ebXML BPSS) from OASIS provides a schema for partially executable business processes defined through business-level constructs. BPSS defines collaborative business-to-business (B2B) processes in terms of a sequence of typed message exchanges (BPSS business transactions) and defined message contents. It provides a slightly higher-level modeling abstraction for business processes compared to block-structured process languages, such as BPEL4WS and BPML, and can be mapped onto those to offer a seamless path to execution.

The XML Process Description Language (XPDL) is an XML-based description language for workflow processes based on the Petri-Net mathematical model. It addresses both human and, to a lesser degree, automated activities, providing a transition model of the control flow based on an abstract document known as a case. Only activities modify the case. It supports the concept of resources, organizations, and both nested and chained processes, but does not support collaborative process, transaction, or exception semantics. Developed by the Workflow Management Coalition (WfMC) primarily for process definition interchange, it's a strict functional subset of more general block-structured process languages such as BPEL4WS and BPML, and so can be mapped onto those languages.

The Process Specification Language (PSL) from the National Institute of Standards and Technology (NIST) defines a neutral representation for manufacturing processes; it's an industry-specific process specification language that can be mapped onto block-structured process languages such as BPEL4WS and BPML to offer a seamless path to execution.

Integration Definition (IDEF) standards are Federal Information-Processing Standards originally derived from the U.S. Air Force Integrated Computer-Aided Manufacturing Architecture. IDEF0 Function Modeling Method (a.k.a. FIPS 183) is a process-mapping standard consisting of a high-level map of the major business processes a company uses, and a second level that provides functional decomposition of these processes into ever-finer sequences of activities by describing decisions, actions, and activities. It has found considerable use in BPR activity models.

The IDEF3 Process Description Capture Method provides a methodology for discovering, collecting, and documenting high-level, non-executable business processes. It has found considerable use in BPR process models. Called "swimlanes," rows (or alternatively, columns) are often used to assign responsibility roles. As part of the overall IDEF framework, it provides a vendor-neutral alternative to enterprise frameworks such as ARIS, Catalyst, and Zachmann.

UML is managed by the Object Management Group (OMG) and provides two primary diagramming standards for process description. Use-case diagrams describe the relationships and interactions between functions and environmental actors. UML activity diagrams are sometimes used to model process flows as state transitions. Activities are assigned responsibility roles, and designated graphically as swimlanes. Additional UML diagramming standards for process description are being considered. **bij**

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