The Road to XPDL 2.0 Case Study

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Background

The road to XPDL 2.0; this inspiring story charts its journey from a proprietary process definition language to an open standard. This is also, by necessity, a very personal perspective because my involvement in XPDL was due to the fact that I worked for the respective organizations that supported the emerging standard from its earliest days. Now as WfMC's Vice Chair of the Steering Committee representing TIBCO within WfMC, I can speak only from my own experience in working on XPDL, using TIBCO as the case study whose narrative echoes the course taken by most WfMC members and vendors in this industry. It's a fascinating story often researched by academics tracking the origins of an industry standard and is, in essence, WfMC's *own* XPDL story. While many chapters in our annual Handbook are about user implementation case studies of our standards, we seldom offer a peek at how they started and evolved.

This chapter thus documents TIBCO's journey to XPDL 2.0 and relates some of the challenges along the way and some of the eventual advantages associated with the move to XPDL 2.0.

Introduction

As a founder and long-term contributing member of the WfMC, TIBCO embraced the original XPDL 1.0 specification and implemented it in TIBCO iProcess™ Modeler, the company's Windows-based modeling tool.

TIBCO iProcess Suite, with its origins in Staffware's BPM and workflow products and consistent with other workflow and BPM products at the time, provided a proprietary solution to persisting and exchanging process definitions. However, with the advent of TIBCO's new Eclipse-based modeling tool TIBCO Business Studio™, with its support for BPMN 1.0, XPDL 2.0 was the natural choice for persisting and exchanging process definitions.

As with other established workflow and BPM products the origins of TIBCO iProcess™ Suite pre-date workflow or BPM standards. Indeed, iProcess Suite's ancestors can be traced back to the second half of the 1980s, well before the Workflow Management Coalition (WfMC) was founded in 1993.

Even in those early days it was evident to us that the ability to exchange process definitions was an important factor. Therefore, in the absence of an open standard, a proprietary solution was created.

In the more than 20 intervening years since the original Staffware workflow product was created, workflow, BPM, and related standards have progressed considerably. The WfMC's XML Process Definition Language (XPDL) has gained popularity with approximately 70 known implementations[1]. At the time of writing the

[1] A list of known XPDL implementers can be found at http://www.wfmc.org/standards/xpdl.htm

WfMC is completing version 2.1 of the specification and is aiming to release it formally during the first half of 2008. Although originally intended as an execution language, some product authors have chosen WS-BPEL[2] (Business Process Execution Language) as a basis for exchanging business process definitions.

What follows is an overview of how process definition persistence and interoperability of the product line that has become TIBCO iProcess Suite has progressed hand-in-hand with the evolution of the WfMC's XPDL right up to the present day.

CHANGING REQUIREMENTS

In the early days of workflow there were fewer reasons to exchange process definitions than there are today. The main reasons included:

- Promoting workflows between environments such as between development and test and between test and production.
- Providing technical support with copies of process definitions to enable diagnosis of problems that had occurred.
- In local government-related installations there were cases of different local government authorities providing workflow definitions they had created for legislative compliance to other authorities to ease their adoption of the legislation in question. At the time I considered this a very entrepreneurial approach for organizations that are normally considered to be fairly staid.

Since these early times the reasons to exchange process definitions have expanded to include:

- Exchanging process definitions between specialized modeling tools and workflow design tools.
- Providing process definitions along with historical workflow and business data to analytics tools to allow the analysis of process and organizational efficiency as well as processing trends. This is an example of both the need for some organizations to use "best of breed" products as part of their overall solution as well as the growing number of product components that sometimes make up a particular vendor's BPM suite.
- Expanding on the example above, there are cases where ready-made or substantially complete processes are sold to end user organizations to accelerate their ability to automate commonly occurring processes typically in vertical markets.
- With the explosion in the number of workflow and BPM product — combined with end user reorganizations, changes in platform and supplier strategy, and takeovers and mergers — there is a growing need to be able to migrate processes from one BPM product to another. A similar situation exists in some organizations where there are multiple enterprise modeling tools used across departments (e.g. Casewise, ARIS, Proforma). In these cases there is a desire to preserve the existing investment in models that have been created. This drives a requirement for the exchange of process definitions even if it is uni-directional.

These reasons can be summarized in the process design ecosystem shown below.

[2] OASIS, Web Services Business Process Execution Language Version 2.0, April 2007, http://docs.oasis-open.org/wsbpel/2.0/OS/wsbpel-v2.0-OS.pdf

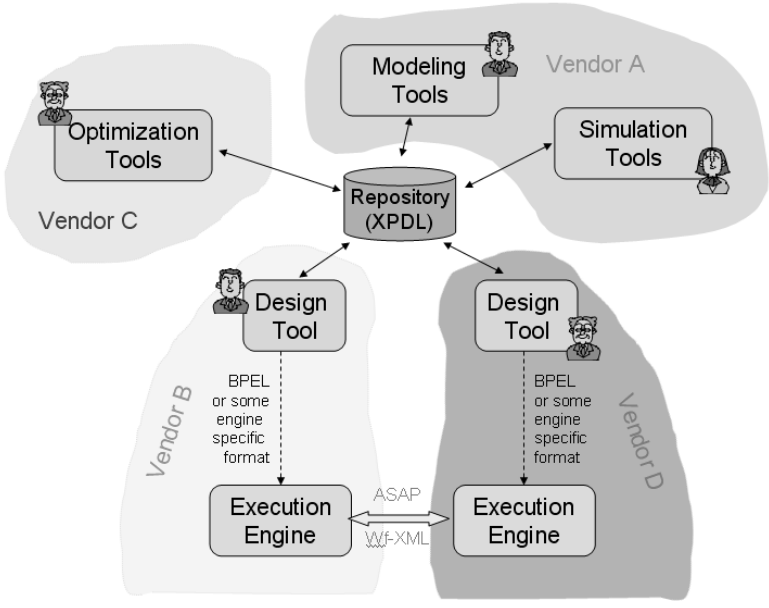

Figure 1—Process Design Ecosystem

As I mentioned earlier, prior to the existence of an open standard for process definition, the ancestors of iProcess Suite and virtually every other workflow or BPM tool on the market adopted a proprietary solution to enable process definitions to be exchanged. The process definition exchange format in iProcess, which predated the emergence of XML, was text-based and we economically named the XFR Format (Transfer Format). The XFR Format was documented and provided on request to customers and partners. Being text-based it was relatively easy to interpret and a number of specialized conversions appeared, typically between modeling tools and the XFR Format. I was always surprised that some conversions were achieved without our documentation. If only they'd asked; they would have found it much easier with the documentation that we'd have readily provided! This marked the start of the requirement for true interoperability between products produced by different vendors.

EVOLUTION HAS BEGUN

In 1998 the WfMC with a working group led by Robert Shapiro published a specification for process definition interchange[3]. You'll often find us WfMC old-timers refer to this as Interface 1 as this corresponds to the first of the five interfaces defined in the WfMC's Workflow Reference Model[4] which was constructed by largely David Hollingsworth and long time chair of WfMC, Jon Pyke. This format was commonly known as Workflow Process Definition Language (WPDL). WPDL was a text-based process definition language. Whilst the specification was still under

[3] Workflow Management Coalition Interface 1: Process Definition Interchange process Model, WfMC TC-1016-P, 1998.

[4] Workflow Management Coalition, The Workflow Reference Model, WFMC-TC-1001, January 1995

development, we engaged a computer science graduate[5] studying for his master's degree to determine on behalf of Staffware the viability of converting processes defined in XFR Format into WPDL. His resulting master's thesis concluded that by and large there was a good match between the constructs offered by both formats. Indeed he even created a utility to prove that an export from XFR Format to WPDL was achievable. However, the timing of WPDL's publication coincided with the emergence of XML as an extensible language to be used for describing documents to be exchanged. XML offered clear advantages for describing process definitions along with the ability for implementers to provide their own extensions to describe process constructs that were unique to their own workflow or BPM products. With this in mind, the WfMC with a working group led by Mike Marin and Robert Shapiro started work on an XML-based process definition interchange language XPDL[6] . XPDL 1.0 was published in 2002[7].

With the advantages XML provided, adoption of XPDL 1.0 by workflow and BPM vendors was much greater than it had been for WPDL. Staffware was one of the early adopters and provided an XPDL 1.0 import/export capability for its process modeling tool. On its own, the existence of this facility didn't provide much of an advantage within iProcess Suite, since the XFR Format could still be used to exchange process definitions within the suite. However, it was the potential for exchanging process definitions with software packages outside iProcess Suite that we firmly believed would generate the most interest and benefit for our users. We weren't alone in our view; my WfMC Technical Committee co-members who were largely our competitors in their day jobs shared this view that the ability to exchange process definitions between tools would help the growth in acceptance of workflow and BPM.

XPDL provides all of the key constructs that are used by the majority of BPM products. This includes provisions for both human- and system-centric activities (integration, web services, etc.) including associated attributes such as participants. It also includes the ability to define sub-processes to promote both reuse and ease of understanding and maintenance. On the other hand, product authors who choose to use WS-BPEL as their method for persisting process definitions are faced with the challenges of representing other activity types, such as those listed above, given that BPEL is primarily concerned with the orchestration of web services. Of course these limitations are well known and the proposed WS-Human Task[8] and BPEL4People[9] specifications are expected to ultimately fill many of these gaps. The 1.0 versions of these specifications have been drawn up by a number of vendor organizations, but until the specifications are adopted by recognized standards bodies they cannot be regarded as open standards.

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[5] Christian Kjaeldgaard, Master's Thesis in Mechatronics, Department of Machine Design, The Royal Institute of Technology, Stockholm

[6] Major contributors to XPDL 1.0 included Roberta Norin, Mike Gilger and Seth Osher

[7] Workflow Management Coalition: Workflow Process Definition Interface – XML Process Definition Language, version 1.0, WFMC-TC-1025, October 2002.

[8] Web Services Human Task (WS-HumanTask), Version 1.0, June 2007, Active Endpoints Inc., Adobe Systems Inc., BEA Systems Inc., International Business Machines Corporation, Oracle Inc., and SAP AG.
http://www.ibm.com/developerworks/webservices/library/specification/ws-bpel4people/

[9] WS-BPEL Extension for People (BPEL4People), Version 1.0, June 2007, Active Endpoints Inc., Adobe Systems Inc., BEA Systems Inc., International Business Machines Corporation, Oracle Inc., and SAP AG.
http://www.ibm.com/developerworks/webservices/library/specification/ws-bpel4people/

It is inevitable that there will be some process constructs that are unique to a particular product or weren't considered as core requirements for XPDL. For example, XPDL 1.0 doesn't provide support for how a process diagram should be represented graphically, but it does define the relationship between all the process entities. The WfMC envisaged such situations when designing XPDL, so there is provision in the specification for implementers to include their own extensions to describe such additional or different process constructs. After all, every product vendor needs a mechanism to represent their unique selling points. The fact that XPDL is XML-based means that XSLT can be used to transform one XPDL dialect into another (or even a non-XPDL but XML-based process definition language such as IDS Scheer's AML[10]). iProcess Suite's XPDL import/export functionality supports the ability for XSLT[11] (XSL[12] Transforms) files to be "plugged in" to pre- or post-process import and export respectively. Hence users of iProcess Suite now have the ability to exchange process definitions with modeling tools or other process centric software packages as appropriate.

A NEW MODELING NOTATION CHANGES THE PERSPECTIVE

While the WfMC was busy with XPDL 1.0, a new group, Business Process Management Initiative (BPMI.org) which is now merged with the Object Management Group (OMG) had emerged and was also concerned with BPM related standards. One of their initiatives was to develop a common graphical modeling notation to describe business processes: Business Process Modeling Notation (BPMN)[13]. Although BPMN specifies graphical details of how a process definition should be drawn, along with associated attributes, it does not specify a mechanism for storing a process diagram so it could be retrieved for further editing or exchanged with other tools. In order to provide a standardized mechanism to persist a diagram drawn using BPMN, again with the working group led by Robert Shapiro and Mike Marin the WfMC extended XPDL to provide support for BPMN, resulting in XPDL 2.0[14].

BPMN has been adopted by more than 40 products with the number of adopters continuing to grow. As such it has become a widely recognized notation for describing business processes. TIBCO, with its new Eclipse-based process modeling tool TIBCO Business Studio, is one of these adopters.

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[10] ARIS Platform, White Paper – April 2006, Overview of interfaces to ARIS 6.1x/6.2x/7.0x

[11] XSLT, XSL Transformations Version 1.0, W3C November 1999, http://www.w3.org/TR/xslt

[12] XSL, Extensible Stylesheet Language Family, http://www.w3.org/Style/XSL/

[13] Business Process Management Initiative (BPMI), Business Process Modeling Notation (BPMN), Version 1.0, May 2004. The OMG subsequently released a formally adopted version of this specification: Business Process Modeling Notation (BPMN) Specification, Final Adopted Specification, dtc/06-02-01, February 2006.

[14] Workflow Management Coalition Workflow Standard, Process Definition Interface – XML Process Definition Language, WFMC-TC-1025, Version 2.0, October 2005. Contributors included Tim Stephenson, Wojciech Zurek, Sasa Bojanic, Gangadhar Gouri, Keith Swenson and Justin Brunt.

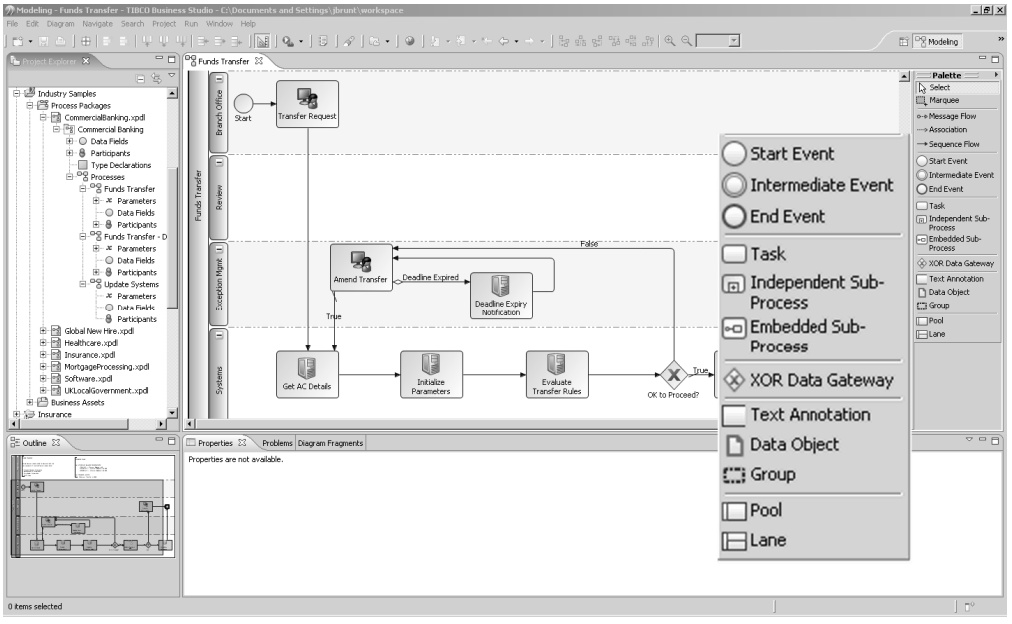

Figure 2—Example: TIBCO Business Studio

Since TIBCO, in common with other implementers, adopted BPMN before XPDL 2.0 was available a choice had to be made about how to persist the process models described with BPMN. Because TIBCO was already a supporter of XPDL, the choice was made to map the BPMN to XPDL 1.0 with appropriate extensions to support the graphical notation. A similar mapping had already been achieved with TIBCO's existing modeling tool; therefore this exercise was reasonably straightforward. I share the sentiments that are outlined in the introductory sections of the BPMN specification that the advantage to users, is that they can capture business processes using a notation that was not proprietary and can be readily communicated among the stakeholders (e.g. process owner, business analyst, process implementer). Because the diagrams were persisted in the same dialect (same extensions) of XPDL 1.0, they could be readily imported by TIBCO's existing process design tool.

Once XPDL 2.0 was available, we were happy that Business Studio was able immediately to adopt it as its primary format for persisting process models defined with BPMN. We liked that a key feature of XPDL 2.0 is that it provides standardized support for persisting BPMN diagrams. BPEL does not provide this capability, so other mechanisms need to be employed if BPEL-based process definitions are to preserve the layout information of BPMN diagrams. Not only does XPDL 2.0 provide the support for BPMN diagrams but also incorporates solutions to feedback from implementers about additional constructs they had independently implemented.

What I find rewarding is that because so many people had implemented these constructs as extensions, there was sufficient evidence to indicate that they should be supported as part of the core specification rather than leaving it to implementers to provide their own solutions such as how value is assigned to data elements (Workflow Relevant Data). By enabling process diagrams to be described using a common format across a number of different tools, the resultant XPDL

2.0 files contain less vendor-specific extensions thus increasing the opportunity for successfully exchanging business processes between different tools. Here at TIBCO we acknowledge that there will continue to be unique constructs within our own and other tools' implementations of XPDL, so we ensured Business Studio also includes the ability to tweak the process models it imports and exports using XSLT.

The thing that now makes everything worthwhile — from my perspective — is the ability to exchange process definitions with as little effort as possible between different tools that will provide users with the greatest benefits from XPDL. Without this ability, XPDL might as well be another proprietary process definition format. The WfMC and a number of interested modeling tool providers have conducted some preliminary interoperability tests using six simple process definitions defined in BPMN 1.0.

In this scenario, modeling tool providers are asked to define the six processes using their own modeling tool and then submit the resulting XPDL files so that other tool providers can see whether they can import XPDL generated by other tools. Although these process samples are simple they have helped to highlight differences in interpretations of the XPDL specification and errors in implementations. Any ambiguities that have been highlighted have been fed back to form input to the XPDL 2.1 specification and implementers have been able to correct problems in their implementations.

There has been reasonable success with this exercise as process definitions have been successfully exchanged between a number of modeling tools. Sometimes one direction has been more successful than another, but progress has been made.

The next stage is to define more complex processes that are more representative of real life business processes. These will use a higher proportion of the BPMN vocabulary and will thus use more of the constructs in XPDL.

We have seen that there is interest in achieving conformance from tool providers, end users as well as the analyst community. In particular, Bruce Silver has provided considerable input to the WfMC XPDL team during the creation of XPDL 2.1 in an effort to get closer to achieving the conformance goal. It is hoped that partnerships like this that are enhancing the efforts of the BPM standards producers will continue.

END OF THE ROAD?

As the field of BPM progresses so do the BPM standards. Implementers of XPDL 2.0 have provided feedback based on their experiences in implementing the standard. The OMG has been busy producing BPMN 1.1, which consists largely of clarifications of version 1.0 but also includes a new variation on a process construct (Signal Event) and some other changes that need to be reflected in XPDL. The WfMC has updated XPDL to incorporate implementer feedback and the relevant parts of BPMN 1.1[15]. The result of these endeavors will be XPDL 2.1, which should be published in the first half of 2008.

Of course, new versions of tools like Business Studio will be released to reflect the changes in both BPMN 1.1 and XPDL 2.1. By actively keeping up with develop-

[15] Business Process Modeling Notation, Specification, dtc/07-06-03 BPMN FTF 2 Convenience Document, June 2007, http://www.omg.org/docs/dtc/07-06-03.pdf. This document is a pre-release version of the BPMN 1.1 specification that is publicly available.

ments in XPDL and BPMN, vendors like TIBCO are ensuring that their tools are as up to date as possible and are in line with other tools such that users of multiple tools can use the same visual process vocabulary across different tools and have the greatest chance of successfully exchanging business processes between them.

At present, only XPDL 2.x provides a standardized way to persist a process diagram defined using BPMN. However, over time, alternatives solutions will likely appear, notably in the form of the OMG's BPDM[16] and BPMN 2.0[17]. BPMN 2.0 is also likely to introduce further modeling constructs that will then need to be supported by XPDL so this specification will continue to evolve to keep up with both the modeling notation and other advances in BPM.

Being instrumental in growing a major industry standard like XPDL gives me great personal satisfaction, knowing that we're achieving great things here at WfMC. More importantly TIBCO benefits as a result.

As BPM progresses, I'm certain that the associated standards will evolve providing enhanced interoperability capabilities and benefits for organizations choosing to implement BPM projects.

[16] Business Process Definition Metamodel (BPDM), Object Management Group. This specification is not yet released but a beta version is available at http://www.omg.org/technology/documents/br_pm_spec_catalog.htm.

[17] Business Process Modeling and Notation (BPMN) 2.0, Request for Proposal, OMG Document/BMI2007-06-05, http://www.omg.org/docs/bmi/07-06-05.pdf. One of the aims of BPMN 2.0 is to merge BPDM and BPMN to give a single specification for the definition of process models and how they can be persisted and interchanged.