

Integration of BPEL Designer in Specific -Vendor UML Modeling Tool

Witthayawut Srikarsemsira
IT Enterprise Architect,
No Magic Asia, Thailand

Siripong Roongruangsuwan.
Enterprise Solution Manager
No Magic Asia, Thailand

Abstract

Currently, the Business Process Diagram (or BPD) is included in all general UML modeling tools. The BPD diagram allows business users and business analysts to design business processes with business process modeling notations. Some papers review that exporting BPMN to BPEL feature is a significant feature of communication between business and technical users over their requirements. However, as we investigated, there are some limitations on exporting BPMN to BPEL. This implies that exporting BPD diagram to BPEL files is not the end solution for business and technical users.

This paper proposes to establish mapping between BPMN notations in the BPD diagram and BPEL notations in the BPEL diagram to ensure smooth operation between the two groups. It also shows that the BPEL designer diagram is useful for business users with technical skill, who plan to design business process to be integrated as an extension diagram in UML modeling tools. In this paper, No Magic Inc.'s MagicDraw is an example of specific-vendor UML modeling tool for integration with BPEL designer.

In the future, the BPEL designer should be included as an extension in specific-vendor UML modeling tools.

1. Introduction

1.1. Business Process Modeling Notation

BPMN stands for Business Process Modeling Notation. It is the new standard for modeling business processes and web service processes, as put forth by the Business Process Management Initiative (BPMI). The Business Process Diagram (BPD) is introduced to describe the business process and it contains all required elements, which are used for modeling the process. Those elements are called "Business Process Modeling Notation (BPMN)" [1, 2, 3]. The BPD has been designed to be easy for business analysts to use and understand; it also provides the ability to model complex business processes. It has also been designed specifically with web services in mind.

1.2. Business Process Execution Language (BPEL)

The Business Process Execution Language for Web Services (BPEL or BPEL4WS) is a language used for the definition and execution of business processes using Web services. BPEL enables the top-down realization of Service Oriented Architecture (SOA) through composition, orchestration, and coordination of Web services. BPEL provides a relatively easy and straightforward way to compose several

Web services into new composite services called business processes [5, 6, 7, 8, 9, 10, 11, 12, 13, 14].

Theoretically, some articles present how to map notations between BPMN and BPEL and report that it is a significant way for communication between business users and technical staff [15, 16, 17]. Our investigation reveals that there are some limitations on mapping notations between BPMN based on specification version 1.0 and BPEL 1.1 specification in practicality [19, 20]. Meanwhile, it is difficult to execute the converted BPEL from BPMN in the vendor-specific environment.

2. Literature Review

2.1 Related Works

This chapter refers to BPD diagram provided by Microsoft Process Modeler and BPEL Designer given by BEA WLW and Oracle Process Manager. Also, this chapter addresses the mapping between BPMN and BPEL including the remaining problems.

2.2 BPD in Process Modeler V.2.1

The Process Modeler for Microsoft Visio™ has been among the first tools to spread the BPMN news, tightly coupled with the widely accepted Microsoft Office suite. Emerging into its future, Process Modeler delivers new added values for business analysts as well as for IT professionals. The Professional Edition now offers the capability to enrich BPMN models with Web Services instrumentation in order to export valid BPEL definitions. Compliant BPEL infrastructures, like Oracle's BPEL Process Manager, will then be able to import this process definition for final orchestration and deployment [21].

Below is the overall list of component available in Process Modeler V.2.1.

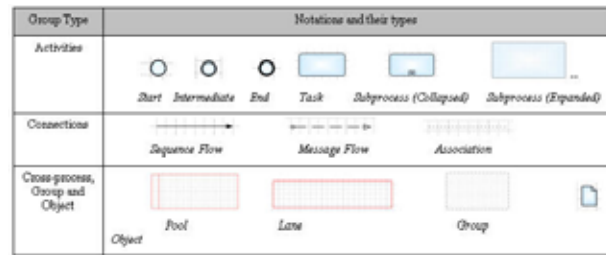


Figure 1 – All notations are provided by Microsoft's BPD Diagram

2.3 BPEL Designer in BEA WLW V.8.1

WebLogic Integration uses BEA WebLogic Workshop as a common development environment for all aspects of an integration solution, including BPM, data transformation, application integration, and custom web user interfaces. It leverages BEA WebLogic Server as the underlying deployment environment, and encourages the use of web services to integrate distributed systems inside and outside the organization [22].

Below is the overview list of component available in BEA WLW V.8.1.

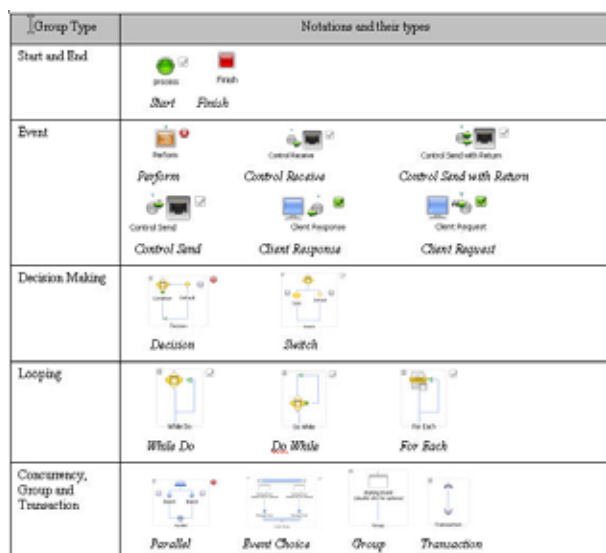


Figure 2 – All notations are provided by BEA's BPEL Designer

2.4 BPEL Designer in Oracle Process Manager V.10.1.2

Oracle BPEL Process Manager provides a user-friendly and reliable solution for designing, deploying, and managing BPEL business processes. Oracle BPEL Process Manager consists of the key components shown below [23]: Oracle BPEL Process Manager includes JDeveloper BPEL Designer, extending the functionality of Oracle JDeveloper 10g to enable you to model, edit, and design business processes using BPEL. What is unique about JDeveloper BPEL Designer is that it uses BPEL as its native format. This means processes built with JDeveloper BPEL Designer are 100% portable.

Below is the overview list of component available in Oracle Process Manager V.10.1.2.


Group Type	Notations and their types			
Activities	 Assign _J	 Compensate _J	 Invoke _J	 Empty _J
	 Java Embedding _J	 Receive _J	 Reply _J	 Terminate _J
	 Throw _J	 Transform _J	 Wait _J	
	 Flow			
	 FlowN			
	 Pick			
	 Scope			
	 Sequence			
	 Switch			
	 While			

Figure 3 – All notations are provided by Oracle’s BPEL Designer

2.5 Mapping BPMN and BPEL

MagicDraw UML application (version 10.0 or later) provides a BPD, enabling the business users to create the business process using UML tools. The BPD is made up of a set of graphical elements, based on BPMN Standards. The BPMN has been developed to

enable business users to develop readily understandable graphical representations of business processes. BPMN also supports appropriate graphical object properties enabling the generation of executable BPEL.

BPEL Export functionality aims to add value to wide range of business users to transform BPD to Business Process Execution Language (BPEL) files. When mapping a BPMN diagram to BPEL (version 1.1) [5, 17, 18], a decision must be made as to the basic structure of the BPEL document. That is, will the BPEL format be based on the BPEL graph structure (the *flow* element) or the BPEL block structure (the *sequence* element)?

2.6 Remaining Problems


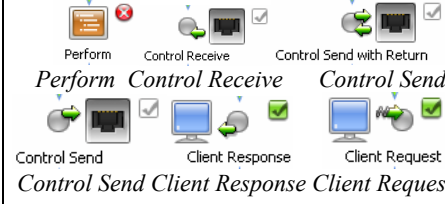



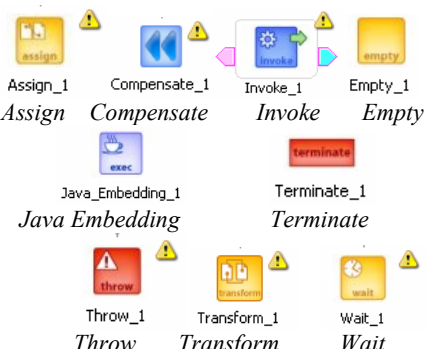
From the related works above, the major problems for modeling and executing the business process are: 1) There are some conflict issues for modeling the business process 2) There are some limitations of mapping notations between BPMN and BPEL And 3) The loss data of BPMN and BPEL conversion might be occurred. This paper provides the solution for integrating BPEL Designer diagram in the general UML Modeling tool in order to ensure that the miscommunication and conflict issues will be reduced. Additionally, the loss data of mapping notations between BPMN and BPEL will be reduced.

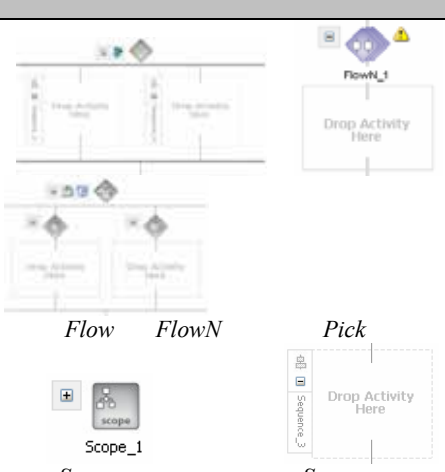
3. Proposed Solution

This paper proposes to combine the notations of BPD diagram and some required attributes & rules in the BPEL into the BPEL Designer diagram. Then, the BPEL Designer diagram will be integrated as an extension diagram in the general UML Modeling tool. In this paper, we would like to propose to integrate the BPEL Designer named “Business Process Execution Language (BPEL) Diagram” as an extension

diagram in the No Magic Inc.'s MagicDraw UML Modeling Tool Version 10.0, because the latest version of MagicDraw have already provided BPD diagram and the next release will provide the functionality for exporting BPMN to BPEL.

The proposed BPEL Designer diagram consists of the following activities:

Group Type	Notations and their types
Start and End	
Event	
Decision Making	
Looping	
Concurrency, Group and Transaction	
Activities	

Group Type	Notations and their types
Structured Activities	

4. Conclusion

In conclusion, this paper introduces two new standards in order to design the business process. Those standards are Business Process Modeling Notations (BPMN) and Business Process Execution Language (BPEL). Also, the mapping between BPMN elements and BPEL is addressed in this paper. Our researches reveal that there are some limitations on mapping issues. Therefore, this paper proposes to integrate a BPEL Designer diagram as an extension diagram in the vendor-specific UML Modeling Tool. To achieve this, there are two alternatives. First, the BPD diagram is required to be enhanced by adding/modifying additional attributes related to Web Services. Second, the new BPEL Designer diagram, which combines the capability of BPD diagram and all required field to Web Services in BPEL, are added into the UML Modeling tool.

5. Reference

- [1] Stephen A. White, IBM Corporation. "Introduction to BPMN".
- [2] Business Process Management Initiative (BPMI) BPMI.org, "Business Process Modeling Notation (BPMN)" version 1.0, May 2004.

- [3] Cover Pages, “*BPML.org Releases Business Process Modeling Notation (BPMN) Version 1.0*” <<http://xml.coverpages.org/ni2003-08-29-a.html>>, August 2003.
- [4] Dr. Bala Ramesh, “*Business Process Management: Process - Oriented Paradigm*”, 2004
- [5] Tony Andrews, Microsoft, Francisco Curbera, IBM, Hitesh Dholokia, Siebel Systems, Yaron Goland, BEA, Johannes Klein, Microsoft, Frank Leymann, IBM, Kevin Liu, SAP, Dieter Roller, IBM, Doug Smith, Siebel Systems, Satish Thatte, Microsoft, Ivana Trickovic, SAP, and Sanjiva Weerawarana, IBM, “*Business Process Execution Language for Web Services*” Version 1.1, May 2003.
- [6] Ao. Univ. Prof. Dr. Schahram Dustdar, “*Business Process Execution Language for Web Services – Composition and Orchestration*”.
- [7] Matjaz B. Juric, “*A Hands-on Introduction to BPEL*”. http://www.oracle.com/technology/pub/articles/mataz_bpel1.html.
- [8] Matjaz B. Juric, “*A Hands-on Introduction to BPEL, Part2: Advanced BPEL*”. http://www.oracle.com/technology/pub/articles/mataz_bpel2.html.
- [9] Matjaz B. Juric, “*BPEL and Java*”, April 2005. <http://www.theserverside.com/articles/article.tss?1=BPELJava>
- [10] BPEL Source, “*Business Process Execution Language (BPEL) Resource Guide*, <http://www.bpelsource.com/>
- [11] Sanjiva Weerawarana and Francisco Curbera, IBM TJ Watson Research Center, “*Business Process with BPEL4WS: Understanding BPEL4WS, Part1*”, August 2002 <http://www-128.ibm.com/developerworks/webservices/library/ws-bpelcol1/>
- [12] Rania Khalaf and William Nagy, IBM TJ Watson Research Center, “*Business Process with BPEL4WS: Learning BPEL4WS, Part 6*” <http://www-128.ibm.com/developerworks/webservices/library/ws-bpelcol6/>
- [13] Rania Khalaf and Nirmal Mukhi, IBM TJ Watson Research Center, “*Business Process with BPEL4WS: Learning BPEL4WS, Part 8*” <http://www-128.ibm.com/developerworks/webservices/library/ws-bpelcol8/>
- [14] Michael Cobban, Director of Business Analysis, SoftCare EC, Inc©, “*What is BPEL and why is it so important to my business?*” http://www.softcare.com/whitepapers/wp_what_is_bpel.php, 2004.
- [15] Stephen A. White, IBM Corporation, “*United States Using BPMN to Model a BPEL Process*” <www.bpmn.org>, February 2005.
- [16] Tracy Gartner, IBM UK Laboratories Hursley Park, “*UML Modelling of Automated Business Processes with a Mapping to BPEL4WS*”.
- [17] Stephen A. White, IBM Corporation. “*Process Modeling Notations and Workflow Patterns*”.
- [18] No Magic Asia Co., Ltd., “*NM_MD-BPEL_Phase1_All Validation Rules and Limitations_2005-09-30.doc*”, September 2005.
- [19] No Magic Asia co, Ltd., “*Software Requirement Specification for MD-BPEL_Phase1 project*” Version 1.1, September 2005.
- [20] No Magic Asia co, Ltd., “*Software Design Description for MD-BPEL_Phase1 project*” Version 1.1, September 2005.
- [21] Microsoft, “*Using BPEL with Process Modeler*”.
- [22] BEA, “*BEA BPEL Import Tool’s User Guide*”, April 2005.
- [23] Oracle, “*Oracle Process Manager Developer’s Guide*”, 2005.