

# **Business Process Modeling Notation**

A 35,000 Foot View of BPMN

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April 26, 2007

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## 1. Introduction

Business Process Modeling Notation (BPMN) is a standard set of symbols and practices designed to provide a business with the ability to graphically define their internal business processes in a way that can be easily understood by all and shared just as easily with other organizational units or business partners. BPMN is being developed by the Object Management Group (OMG), which is an international, open membership, not-for-profit computer industry consortium. BPMN 1.0 was released in May 2004.

BPMN has also been accepted as the graphing technique for the most widely accepted workflow languages (i.e. BPEL, XPDL and jPDL). These are all industry standard, XML based, languages for implementing workflows within a Service Oriented Architecture (SOA). Today there are dozens of vendors and Open Source projects that have created workflow engines to interpret these languages, which can individually or working together, allow workflow integration between disparate systems.

The following pages will take the several hundred page BPMN 1.0 specifications document and attempt to put it into a nutshell. The basic concepts along with the core objects being used within BPMN will be touched upon to give a high level understanding that will help anyone decipher a Business Process Diagram (BPD) created with BPMN.

## 2. Flow Objects

The core Flow Objects in a BPD consists of Events, Activities and Gateways. Each one of these objects has a set of types and properties but this paper will simply describe the overall nature of each object and touch on a few of the common types and their properties. A basic concept of BPMN diagramming is that a Start Event typically creates a token that is sent through the sequence flow and ends up entering the End Event, which ends the process. Throughout the sequence flow, the token can be branched into two or more tokens but all tokens must eventually enter an End Event.

### Event

An Event is represented by a circle and is something that “happens” during the course of a business process. These Events affect the flow of the process and usually have a cause (trigger) or an impact (result). Events are circles with open centers to allow internal markers to differentiate different triggers or results. The three types of Events, based on when they affect the flow, are Start, Intermediate, and End (Figure 2.1).



**Figure 2.1 Event Objects**

## Activity

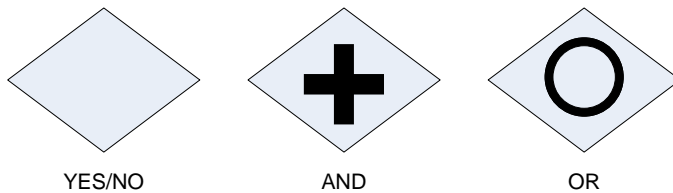
An Activity is represented by a rounded-corner rectangle (Figure 2.2) and is a generic term for work that is performed within a process. An Activity can be atomic or non-atomic. The non-atomic, also referred to as compound, are typically a Sub-Process and are depicted by a small plus sign in the bottom center of the shape. The atomic Activity is typically a Task and is a simple rounded-corner rectangle.



**Figure 2.2 Activity Objects**

## Gateway

A Gateway is represented by the familiar diamond shape (Figure 2.3) and is used to control the divergence and convergence of the token(s) throughout the sequence flow. Internal Markers indicate the type of action the token(s) will take when entering and/or leaving the Gateway. The typical Gateways used in a BPD are the basic YES/NO decision Gateway, the AND Gateway and the OR Gateway (Figure 2.3). The YES/NO Gateway is, of course, one or the other and only one token can come or go. This does not necessarily need to be a yes no question; it can be one choice or the other. The AND allows for Joins and Forks where two or more tokens all converge and/or diverge at that point in the sequence flow. Finally, the OR Gateway allows two or more tokens, but not necessarily all, to converge or diverge at that point in the sequence flow, based on a set of circumstances.



**Figure 2.3 Gateway Objects**

### 3. Connection Objects

The Flow Objects above are connected together in a diagram to create the basic skeletal structure of a business process. There are three core Connecting Objects that provide this functionality; the Sequence Flow, the Message Flow and the Association.

#### Sequence Flow

A Sequence Flow is represented by a solid line with a solid arrowhead (Figure 3.1) and is used to show the sequence in which activities are performed throughout a process. This is the connection object that allows the token(s) to traverse the process.



**Figure 3.1 a Sequence Flow Object**

#### Message Flow

A Message Flow is represented by a dashed line with an open arrowhead (Figure 3.2) and is used to show the flow of messages between two participants (Actors) between separate but related processes. In BPMN, two separate Pools (see Section 4) represent the two participants.



**Figure 3.2 a Message Flow Object**

#### Association

An Association is represented by a dotted line with a line arrowhead (Figure 3.3) and is used to associate data, text, and other Artifacts with flow objects. Associations are used to show the inputs and outputs of activities.



**Figure 3.3 an Association Flow Object**

### 4. Pools and Swimlanes

The concept of Swimlane diagramming has been around for many years to show the functional tasks and hand-offs relative to the Actors within a process. BPMN uses this same concept with two constructs, a Pool and a Lane.

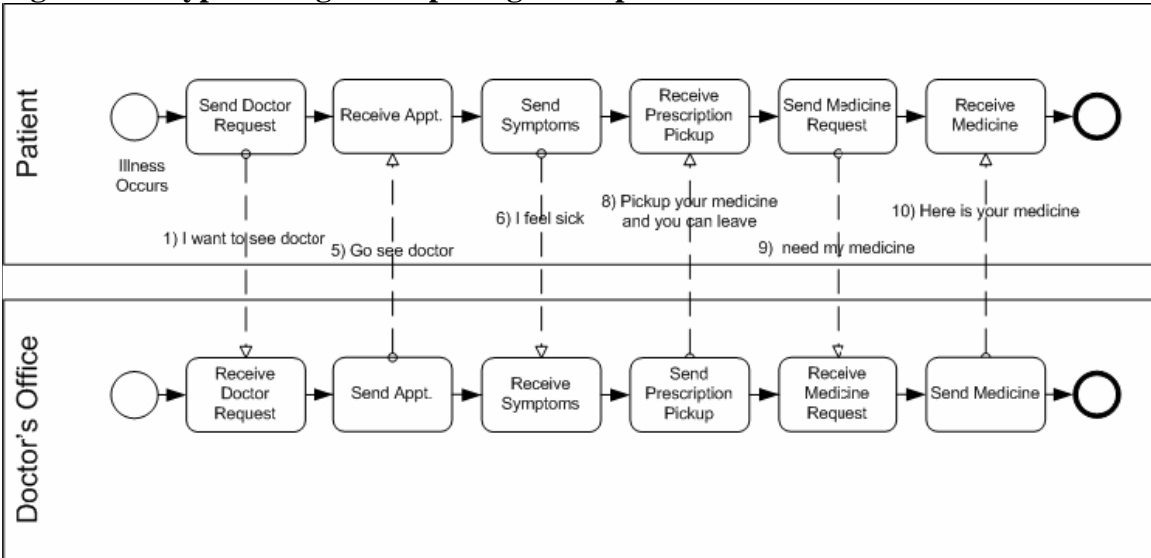
#### Pool

A Pool separates two different participants or business entities that are associated with the overall process but have their own individual process. In other words, a Sequence Flow Object would never cross from one Pool to another because each Pool represents a separate process. A Message Flow Object is used to show the communication between the two Pools (Figure 4.1).

#### Lane

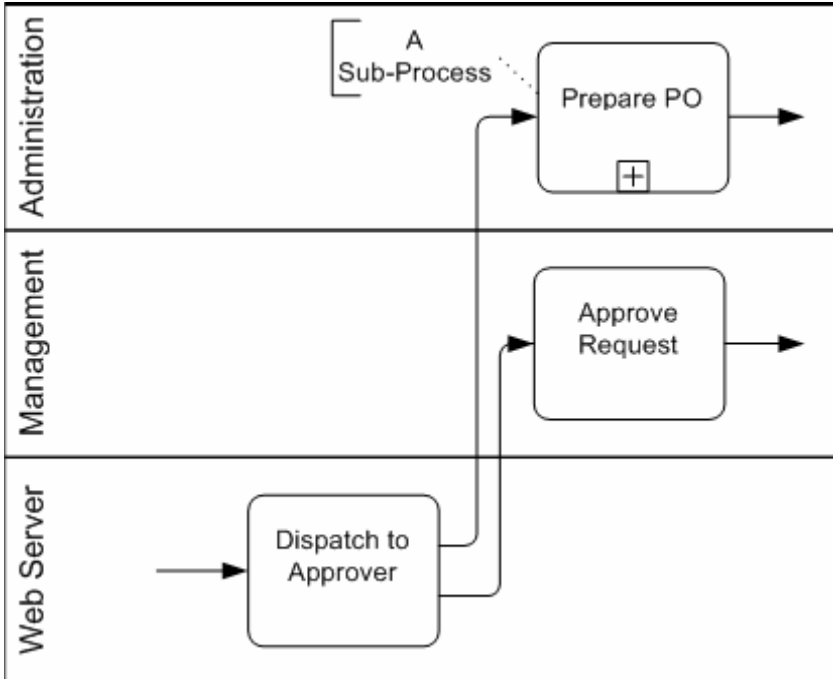
Lanes are similar to the traditional swimlane process modeling methodologies. Lanes are typically used to separate the activities associated with a specific company function or role (see Figure 4.2). In BPMN, Lanes are placed within a Pool to show the Lanes that are all part of the process for that particular company, function or role. Sequence Flow Objects may cross the boundaries of Lanes within a Pool because they stay within the same basic process. Message Flow Objects, on the other hand, may not be used between Flow Objects in Lanes of the same Pool.

Figure 4.1 a typical diagram depicting two separate Pools.



Courtesy of *OMG.org*

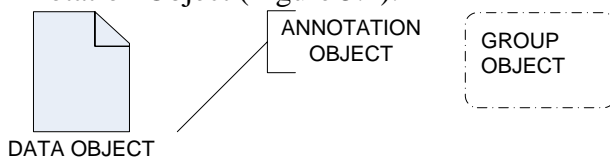
**Figure 4.2** a segment of a diagram depicting Lanes



*Courtesy of OMG.org*

## 5. Artifacts

Artifacts are used throughout a diagram to clarify certain aspects to where normal Human Beings can understand. They do not alter the sequence flow or messaging within the diagram. They are shown using Association Flow Objects. The three Artifacts described within the BPMN 1.0 specifications are the Data Object, the Group Object and the Annotation Object (Figure 5.1).



**Figure 5.1** Artifact Objects

## 6. Summary

Flowcharting has become the standard for describing business processes to both technical and non-technical stakeholders. Unfortunately, there are as many ways to create a flowchart as there are people creating them and in many cases, the person who created the flowchart must be present to explain what they were thinking when they did it. Using a standard notation for defining business processes can eliminate this problem; however, if the standard is a custom made standard, then trying to share documents with external businesses brings the same problem back.

BPMN can resolve these issues by using an industry standard that once learned, is self-describing but the real win is that BPMN can be mapped into BPEL, XPD, or jPDL, using any one of the many BPMN/XML editors around today. This reduces the efforts of the Business Systems Analyst, who traditionally has been required to translate the stakeholder's requirements into technical documents for the developers. This is a new and exciting industry standard that when implemented, will put the proactive company ahead of the pack and reduce the pain of future SOA or workflow related implementations.

For the complete and latest BPMN Specifications see <http://www.omg.org/bpmn/>