How to Do Business Process Modeling Notation

BPMN, Business Process Modeling Notation, is a way of graphically describing a business process in a standardized way that can be interpreted easily by many groups of people within the organization, e.g.:

- Process Owners
- Business Analysts
- IT
- Management/Leadership

It provides an organization a common representation with which to examine their processes, to make improvements and even to simulate and gauge the effects of those improvements.

**Step 1: Get to Know BPMN**

As well as just describing the process, one of the key strengths of BPMN is the ability to use the same process diagrams to automate the process using a compliant BPM or workflow engine. This removes a common disconnect between the business owners and the automation/development teams as they are working on the same understanding of the process.

Using BPMN will enable you to create a diagram similar to a flowchart to map the individual processes your organization uses. Specifically, BPMN uses graphical elements to:

- represent the process
- better understand the process
- understand who is involved in the process.

The elements can be broken down into 4 core components being: Flow Objects, Connecting Objects, Artifacts, and Swimlanes. Specifically, BPMN uses elements to represent the process, to better understand the process and identify who is involved in the process. Mapping out each process makes it simpler for an organization to examine their processes and identify those areas where they could make improvements.

**AIIM Tip**

*If the aim of using BPMN is process automation, ensure that the process being reviewed is mature, stable and unlikely to change. The cost savings/value you achieve from process automation may be negated by the rework required during the automation of a process in flux. The process should be first optimized, checked for inefficiencies and then automated later. An automated inefficient process is still an inefficient process!*
First identify a business process you want to review and run a workshop with those involved in the process to find out what actually happens, remember that this might be different from what is supposed to happen. Once you have captured the high level processes you can begin to break down the process.

Flow objects can be further broken down into three core elements; these are Events, Activities and Gateways.

**Step 2: Identify Events**

An event is something that happens during the course of a business process and is represented on a diagram by circles. The most basic and common events are Start and End events, which control the initiation and completion of the process. During this step, you need to identify all of the areas in your process where something happens that will impact the timing or sequence of activities in the process. Events can be broken down into:

- **General**:
  - A single lined circular shape represents the start of a process.
  - A double lined circular shape represents an intermediate process e.g., interrupt a process.
  - A dark ringed circular shape represents the end of a process.

- **Message**
  - A single lined circular shape with an envelop in the middle represents the arrival of a message.
  - A double lined circular shape with an envelope in the middle represents an intermediate process e.g., waiting for a response.
  - A dark ringed circular shape with an envelope in the middle represents the end of a process e.g., the message has been sent.

- **Timer – shows the specific time for a process or places a process on hold.**
  - A double lined circular shape with a clock in the middle represents that a specific time or cycle can be set in order to trigger the start and/or continue a process.
  - A triple lined circular shape with a clock in the middle can be used to put a process on hold for a set time period.
Identify all the points at which your process can start and can end (either normally or abnormally) and also look for any external factors which could trigger change within the process while it is running (e.g. messages received/sent, time limit expiry, cancellation requests). With the events identified in your process, begin to document them using the basic symbol of a single line circle and by adding an envelope symbol for messages or a clock to the circle for messages and timers. At this point, do not worry about connecting anything. Make sure you have the events in the proper order. In most cases, processes will have at least a start event and an end event, although they may have more or may have intermediary events as well.

**AIIM Tip**

*It is usually best to document the events by observing the process in action several times noting your observations and getting these confirmed by those carrying out the process. Think detail! The more detail you gather and document, the better your analysis of the process will be.*

For more information

- [Mapping vs Modeling](#)
- [What is Business Process Management (BPM)?](#)
- [Business Process Modeling Techniques](#)
- [Business Process Mapping](#)
- [BPMN Events](#)
- [BPMN Overview](#)

**Step 3: Identify Activities**

Activities represent a piece of work that needs to be performed as a part of the business process. This work may be done manually or may be automated activities done by systems on behalf of people. Activities are represented with a rounded-corner rectangle. They fall into two groups:

- Task – A single rounded-corner rectangle shaper. It can represent a task or a sub-task process.
- Collapse sub-process - A single rounded-corner rectangle shape with a ‘plus’ sign in the lower center of the shape. It is used for additional detail about the process.

Tasks can also be represented by a task type symbol, which is positioned in the top left hand corner of the task box. These task type symbols add more information to your diagram. There are seven task type symbols, these are:

- Send Task
Sub-processes can be used to group sets of related process components together for ease of use and readability or to allow a previously defined process to be reused. Sub-processes could be reused in other larger processes or to be used in multiple processes without having to be written multiple times in multiple places.

Through your observation of your business processes, you observed the tasks carried out as part of the process as a result of an event being triggered. This includes not only human tasks but also automatic tasks that are set up as business rules completed by a system. Often, when you are at this step, you may need to go back to observe more to ensure you have captured all the steps including exceptional cases that might not happen every time.

Now, that you have identified the activities, it is time to add them to your model. There are a host of symbols that you can use such as a hand for manual processes, gears for service (system) tasks, etc. Begin to plug in the activities to your model.

**AIIM Tip**

*Keep an eye out for groups of steps that are common, either within the process or that may be the same in other processes and define them as common sub-processes that can be reused.*

*Do not rush this step. If you feel you need to observe the process again, go back and observe it. It is important that you get the process documented correctly. Accuracy is more important than speed.*

**For more information**

- Of Content and Process
- Common BPMN Modeling Mistakes – Activities
- BPMN 2.0 Activities
- Introduction to BPMN Part III – Flow and Connecting Objects
- BPMN Process Diagram
- BPMN Diagrams – How to Use Subprocesses
- Introduction to BPMN – Advanced Concepts
Step 4: Identify Gateways

Gateways are decision points within a business process where the ‘sequence flow’ can take two or more alternative paths and are represented by diamond shapes. The gateway determines what pathway the process flow will take, chooses whether to split into multiple branches or to merge from multiple branches back into one branch. Gateways can also be used to merge ‘sequence flows’. Different gateways are marked with Internal Markers which indicate the type of behaviour. There are three main gateway types:

- **Exclusive Gateway** – this is a basic choice where the process will go one way or another. The gateway can have any number of outcomes but the process will only ever take one – the first outcome that is evaluated as being true is taken, even if others are also true, so the order of the outcomes is important. A default outcome can be specified to ensure that there is always a path that can be taken out of the gateway (represented as either an empty diamond or a diamond containing an X).

- **Inclusive Gateway** – this is the opposite of the Exclusive Gateway above, where all of the outcomes that evaluate to true are taken, not just the first one. This gateway can lead to the process flow splitting into separate parallel branches (represented as a diamond containing an empty circle).

- **Parallel Gateway** – similar to Inclusive Gateway, but without any conditions to be evaluated. Every path out of the parallel gateway will be taken and the process will branch down all these paths at the same time. The parallel gateway is also used to merge existing parallel branches back into a single sequential process flow. Where the parallel gateway has multiple paths leading into it, the process will not continue further until all incoming branches have reached it (represented by a diamond containing a plus + symbol).

In addition to the main gateways there are also Event-based gateways and Complex gateways which provide more advanced control over decision or allow events to trigger certain decisions within the process, but these are far less common than the three above.

In your observation, you probably noted several times in the business process where an individual had to make a decision or was at a point in the process where someone else was entered into the process. This should be documented in the BPMN process you are diagramming by using the appropriate diamond shape and associated gateway type.

**AIIM Tip**

Throughout the process of diagramming and documenting the business process, we are trying to find the most concise and simple representation as possible as it makes it improve the process that way. The scope of the BPMN notation is designed for all eventualities but just because it’s all provided doesn’t mean it all has to be used! Attempt to keep your processes as basic and simple as is possible, using the most common elements unless you have a reason to.
For more information

- Gateway Types
- BPMN Diagrams – How to Use Gateways
- The Use of BPMN Gateways
- Beyond Tasks and Gateways
- Introduction to BPMN 2.0

Step 5: Determine Connections

Flow objects are connected with each other by the connecting objects represented by lines. Connecting objects show the order in which activities will be performed, what messages are delivered and any association to other data, text and/or objects.

No part of the process is able to function alone. Each part of the process connects with other parts. Before you map out the connections, review the activities, events, etc. that have already been documented and determine the flow of information as part of the business process.

Connections between steps in the process are represented by Sequence Flows, which are used as the inputs and outputs of the Events Activities and Gateways. These control the movement or “flow” through the process and are fundamental in determining the sequence for the activities as well as the paths and branches to follow for gateways.

You will need to map connections as:

- Sequence flow – represented by a solid line with a solid arrowhead. This is used to show the order of activities in the process.
- Message flow – represented by a dashed line with an open arrowhead. This is used to show the flow of messages between participants.
- Association – represented by a dotted line with a line arrowhead. Used to associate the exchange of data, text and other objects.

AIIM Tip

Remember to place emphasis on the order activities will be performed, messages delivered and any other associated information. It is important to get the order correct so you can analyze the processes.
Step 6: Adding Information to the Model

Artifacts allow additional information to be incorporated into the graphical model making it more informative and understandable to readers.

Through the use of Artifacts, we can incorporate additional explanatory information into the model to describe events and activities or other facets of the process. There are three pre-defined Artifact types:

- Data objects – represented by a document shape type. Used to display what data is required by the activity and what data is produced by the activity.
- Group – represented by a rounded corner rectangle drawn with a dashed line. This includes various objects but does not influence the diagram flow.
- Text Annotations – represented by a dotted arrow to a textbox. It increases or decreases as you add text. It is used to increase the information value of the diagram.

**AIIM Tip**

*It is always a good idea to document or add artifacts so that you can incorporate additional information into your model. This allows anyone in the organization that looks at the BPMN model to be able to better understand it and they will have a frame of reference for reviewing the model.*

For more information

- What’s Your Process?
- BPMN Tutorial
- Representing Business Processes
- Introduction to BPMN Part III – Flow and Connecting Objects
- BPMN Connections
- BPMN Connections (Tutorial)

- Adding Preciseness to BPMN Models
- Introduction to BPMN Part IV – Data and Artifacts
- BPMN Artifact Types
- BPMN Artifacts (Tutorial)
- Highlights from BPMN 2.0: Artifact Shapes
- BPMN 2.0 Fundamentals
Step 7: Analyze the Process

Swimlanes provide the mechanism to organise activities into groups to illustrate different tasks, functions and/or responsibilities. Swimlanes also act as graphical containers for partitioning and sub-partitioning activities from other pools. They can be used to organise and categories activities either vertically or horizontally. There are two Swimlane types, these are:

- Lanes – used to denote divisions of responsibility within a single process. Lanes can also be used to subdivide Pools
- Pools – used to denote collaborations between participants in across multiple processes, usually where the participants are quite separate, e.g. in business-to-business collaboration, rather than two teams from the same division in a company. Pools use a type of connection called Message Flows to denote the messages and communication that happens between the processes in two Pools which correlate with Message Sent & Message Received events within the processes inside those pools.

Look through your sets of connected events, activities and gateways to determine the roles or users/groups who should be responsible for taking actions at those points. Define Lanes within your process to represent each role or user/group and move the related events, activities and gateways into their appropriate Lane, being careful to ensure that the Sequence Flows remain undisturbed. This gives a clear visual interpretation of the work required by each set of participants in the process.

Pools can be used to represent more complex collaborations between separate entities or where there is a more formal or asynchronous messaging required between sets of participants. You cannot link activities in different Pools together directly using Sequence Flows. You must use Messaging Flows between the pools themselves.

Now, that you have your process represented graphically using BPMN, it is time to review it to identify those areas that could be improved.

**AIIM Tip**

*The clear representation of responsibilities gained by using swimlanes gives many advantages for gaining more insight into the processes being modeled. Use swimlanes to understand the handover points between different groups of participants and to understand where delays and inefficiencies in the process may still be lurking because of these handovers and determine if the sequencing of steps can be modified to ensure the most efficient possible path through the process.*

*It is often useful to use swimlanes to represent computer systems in partially automated processes as it gives a clear indication into how much of the process is carried out without user intervention versus how much remains manual or requires users to make decisions.*
Step 8: Review the Process

Using BPMN we can graphically represent the ordered sequence of business activities, events and decision points and make it easy to understand the flow and breakdown of steps involved in the process. BPMN provides a core set of standardized symbols called ‘elements’ to represent the core components which can be used to share the process representation with a wide ranging set of stakeholders including business analysts, key process participants, IT and management.

Now, that you have your process represented graphically using BPMN, it is time to ensure that the process is reviewed and understood by all key stakeholders to make sure that no parts have been incorrectly understood.

Remember, process modeling is usually an iterative process so plan to make adjustments, revisit and improve the process as a key part of the review.

AIIM Tip
As you are organizing the activities, you may find some activities that are similar or that may overlap. Now is a good time to review those activities and make process changes.

For more information

- How to Analyze a Business Process
- Business Process Analysis
- How to Analyze a Business Process
- How to Analyze a Business Process (YouTube)

- BPMN Drawing Examples (Under the Examples tab)
- Business Process Management Training
- How to do Business Process Modeling Notation
- Object Management Group – Business Process Model and Notation (Contains a wealth of resources)
- BPMN Tools (Free and Commercial)
- BPMN Blog
- Modeling Community Blog
- No Longer a Luxury, BPM is Imperative to Business Operations: 5 Steps to Learn How it Can Work for You
- Process Improvement and Automation 2016 – A Look at BPM
- BPM – User Perceptions and Expectations
- A Holistic Approach to Digital Transformation