BPMN

Business Process Modeling Notation

BizAgi Process Modeler

Business Process Modeling Notation (BPMN) is a graphical notation that describes the logic of steps in a business process. This notation has been especially designed to coordinate the sequence of processes and messages that flow between participants in different activities.

Why is it important to model with BPMN?

- BPMN is an internationally accepted process modeling standard.
- BPMN is independent of any process modeling methodology.
- BPMN creates a standardized bridge which reduces the gap between business processes and their implementation.
- BPMN enables you to model processes in a unified and standardized way so that everyone in an organization can understand each other.

Introduction to BPMN

The Business Process Modeling Notation - BPMN – provides a common language which allows all the parties involved to communicate processes clearly, completely and efficiently. In this way, BPMN defines the notation and semantics of a Business Process Diagram (BPD).

BPD is a diagram based on the ‘Flowchart’ technique, designed to present a graphical sequence of all the activities that take place during a process. It also includes all relative information for making an analysis.

BPD is a diagram designed for the use of process analysts who design, control and manage processes. In a BPD diagram there are a series of graphical elements that are grouped into categories.

To introduce BPMN, the reader will find throughout this document a series of examples revolving around a Consumer Credit Application process.

A Credit Application process begins with the recording of the application where the client expresses an interest in acquiring credit. This stage includes the presentation of the application, and the required documents to the organization for verification. This is followed by an analysis or study of the credit application and finally we find the activities needed to either disburse the credit or to notify the client in case of rejection.

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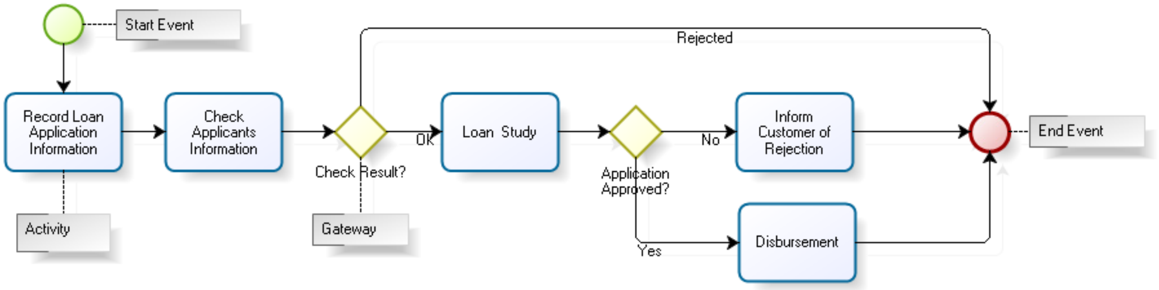


As you can see in the above example, in a Business Process Diagram there are a number of graphical elements with which we represent a business process.

In the above example we can see different types of elements that describe how the process works. Within these elements are the activities that represent the work that was carried out, the beginning and end events, which indicate the starting point and completion of the process, plus the decision elements known in BPMN as Gateways, which indicate alternatives along the way. These elements are connected by means of Sequence Lines that show the process flow.

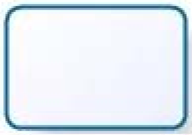
At the beginning of the Credit Application Process there is the figure “Start Event”, which indicates the beginning of the process. Processes can begin in different ways and BPMN provides for different types of Start Events (simple, message, signal, etc.)

At the end of this process we find the figure “End event", indicating termination of the process. As the graph shows, the process ends when the applicant is rejected, the credit application is not approved or the loan is granted and disbursed.

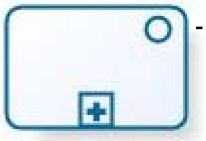
The gateway used in the above example is the Exclusive Gateway. As a decision element, this gateway behaves like an “XOR”, in other words, only one of several given alternatives can be taken. In the Credit Application Process we can see two examples of the use of an exclusive gateway. The first one depends on the result of verifying the applicant’s information: the line may run in one of two directions; if the result was “Applicant Rejected”, the process ends there, and if the applicant was accepted, the process can continue. In the second example, the decision is based on the result of the credit study: if the application is rejected, the client is notified, if it is approved the credit is disbursed.

If we look into the Credit Application Process, we discover activities that can be analyzed in greater detail. One of these activities is checking the Information provided by the applicant. Credit organizations normally carry out several analyses of an applicant, verifying, for instance, if the applicant is already a client of the organization, if they are a target client or, check the applicant’s financial situation.

Depending on the above, the activities may or may not be compound. In BPMN, compound activities are known as Subprocesses, and atomic activities as tasks.

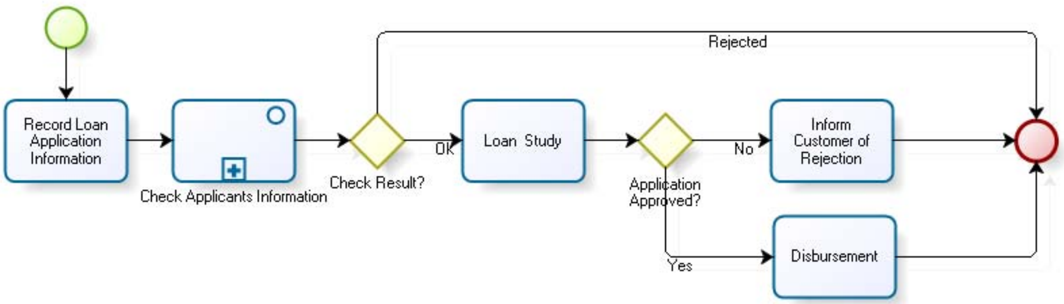


- Task: A task is carried out when the work in the process is not broken down into more detail. It is executed by one person and/or one application.

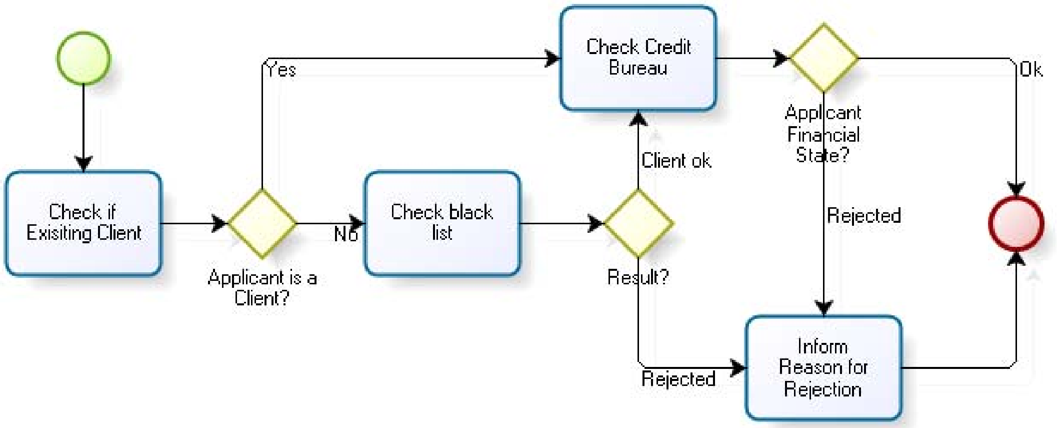


- Subprocess: A Subprocess is a compound activity included in a process. It is compound because it includes a series of activities and a logical sequence (process) indicating that it can be analyzed in more detail. Visually it can be “collapsed” or “expanded”.

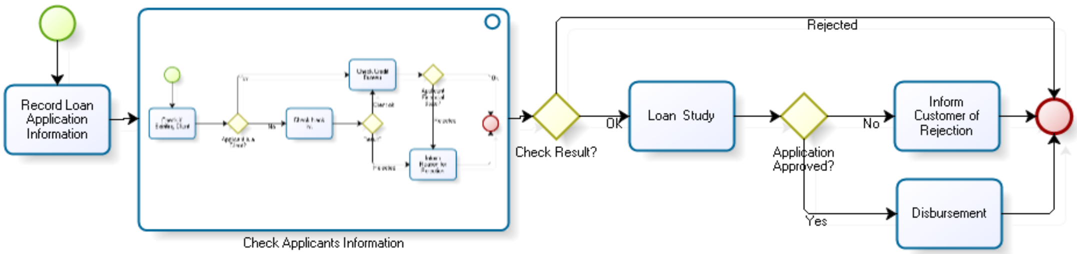
The process flow diagram of a Credit Application would look like this, when the Information Checking activity is included as a subprocess.


Rejected
Record Loan Application Information
Check Applicants Information
Check Result?
OK
Loan Study
Application Approved?
No
Inform Customer of Rejection
Yes
Disbursement

The subprocess of verifying the applicant’s Information would be as follows:

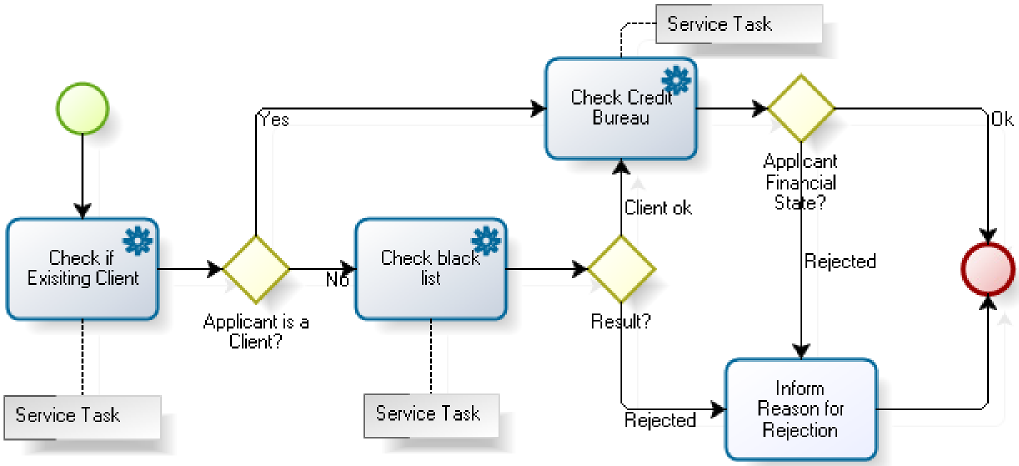


It is also possible to show the Credit Application process with the expanded Client Information Checking Subprocess, as follows:

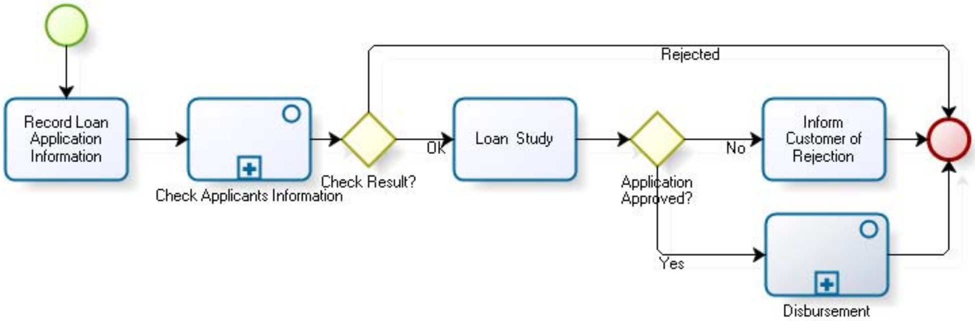

Record Loan Application Information
Check Applicants Information
Rejected
OK
Check Result?
Loan Study
No
Application Approved?
Inform Customer of Rejection
Yes
Disbursement

Additionally, within the Client Information Checking Subprocess, we find that the activities of Verifying for Existing Client, Checking the Client Black List and Credit Bureau Consultation are automatic tasks, that is to say, they are carried out by a system with no human intervention. This can be either an automatic device or a Web service. For diagramming these elements, BPMN provides a type of task called Automatic Task (Service).

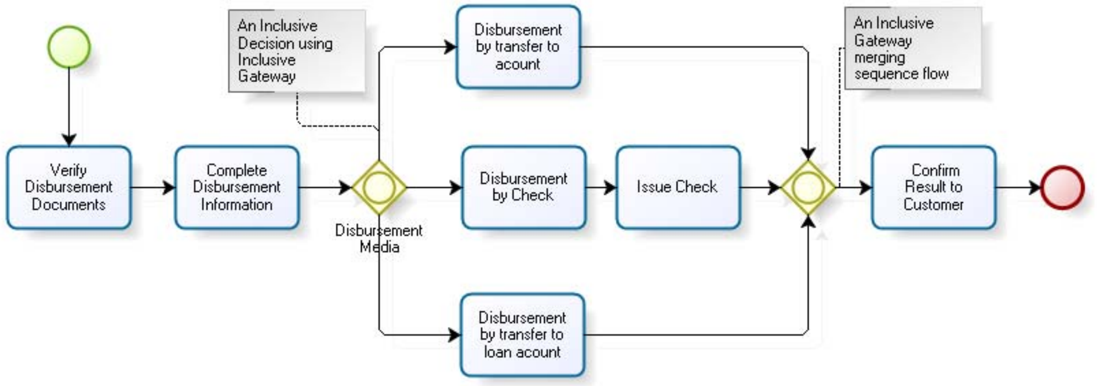
The subprocess of Verifying Applicants' Information is shown in the following way, with the Automatic activities:



Another activity in the Credit Application process that can be carried out on a more detailed level is disbursement.


Rejected
Record Loan Application Information
Check Applicants Information
OK
Check Result?
Loan Study
No
Application Approved?
Inform Customer of Rejection
Yes
Disbursement

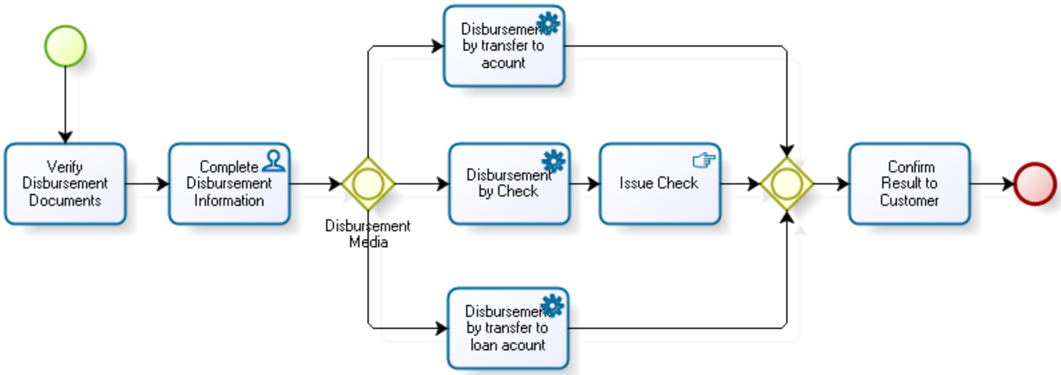
If we look at the Disbursement subprocess (following diagram), we can see that there are several ways of disbursing the credit; deposit into an account, deposit into another loan account or by issuing a check. These forms are not necessarily mutually exclusive, in other words, a credit can be disbursed using just one of the available forms or using different combinations, such as one part by deposit into an account and another part by check. This business situation is diagrammed by using the Inclusive Gateway as an element of decision; this gateway allows one or several of the routes to be activated, depending on the facts of the process.


An Inclusive Decision using Inclusive Gateway
Disbursement by transfer to acount
An Inclusive Gateway merging sequence flow
Verify Disbursement Documents
Complete Disbursement Information
Disbursement Media
Disbursement by Check
Issue Check
Confirm Result to Customer
Disbursement by transfer to loan acount

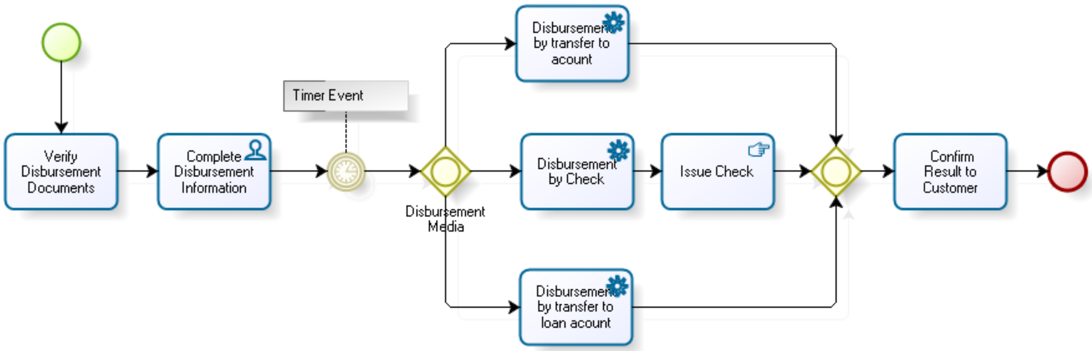
Once the credit has been disbursed, the client has to be notified of the result, but all the branches that have been activated should be finalized in order to carry out the activity of informing the client. This is done by using the Inclusive Gateway as an element of convergence (synchronizer), which means that it will wait for all the activated branches before continuing the flow.
In the previous example we saw some notes in the process diagram. BPMN provides various devices to include additional information about the diagram, thus providing the reader with more details about the process.

In BPMN it is also possible to specify which activities are automatic (**automatic tasks**), which activities are carried out with the help of a system (**user tasks**) or which activities are carried out manually (**manual tasks**), etc.

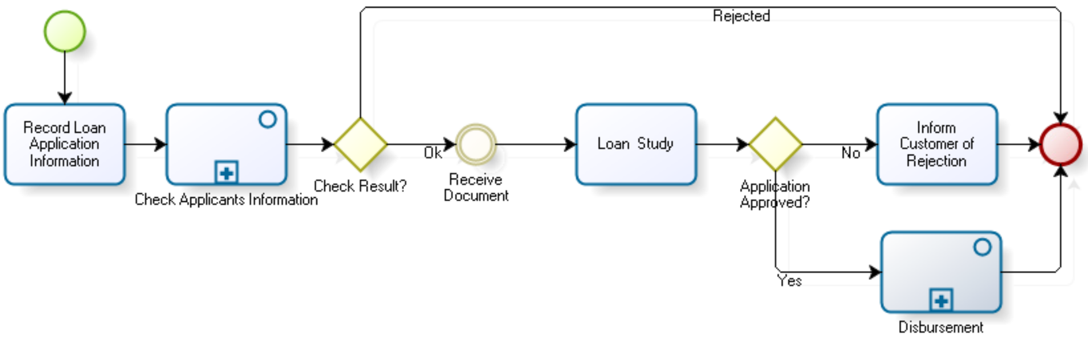
In the Disbursement subprocess, tasks relating to deposit into an account, by check or deposit into another loan account are **automatic tasks**, since they are carried out by the system without human intervention; we can also specify that the activity of “Issue of Check” is a completely **manual task** and that the activity of completing disbursement information is made with the aid of a device, which makes it a **user task**.


Verify Disbursement Documents
Complete Disbursement Information
Disbursement Media
Disbursement by transfer to acount
Disbursement by Check
Issue Check
Disbursement by transfer to loan acount
Confirm Result to Customer

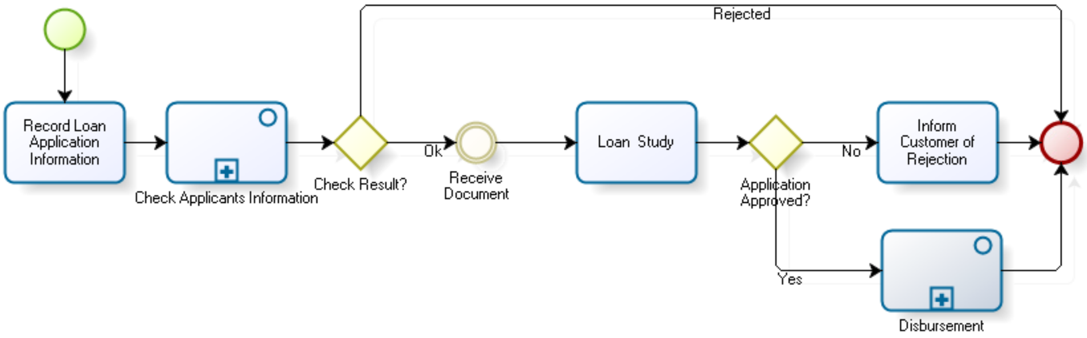
Let us suppose that, once the credit is approved, it is necessary to coordinate a date of disbursement with the client, meaning that the disbursement will only be made on the agreed day. It is, therefore, necessary to wait before carrying out the disbursement task. In these cases, BPMN offers the **Timer Intermediate** Event, a type of intermediate event that represents a period of waiting in the flow.


Timer Event
Verify Disbursement Documents
Complete Disbursement Information
Disbursement Media
Disbursement by transfer to acount
Disbursement by Check
Issue Check
Disbursement by transfer to loan acount
Confirm Result to Customer

Going back to the Credit Application process, it is possible that, at the moment the application is made, the client does not present all the required documents and the process cannot continue unless the documents are complete. It is therefore necessary to include a document receiving activity, but fulfillment of this activity depends on the client, not the organization's employee. In this case a **Simple Intermediate Event** can be used.

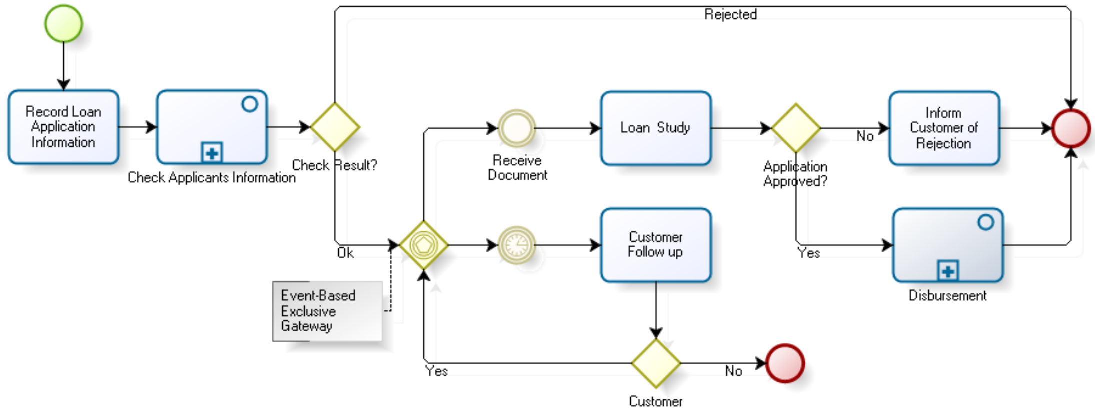

Rejected
Record Loan Application Information
Check Applicants Information
Check Result?
Ok
Receive Document
Loan Study
Application Approved?
No
Yes
Inform Customer of Rejection
Disbursement

In the above example, the **Simple Intermediate Event** “Receive Documents” represents something that can happen during the process flow, that does not depend on the user but on an external factor.

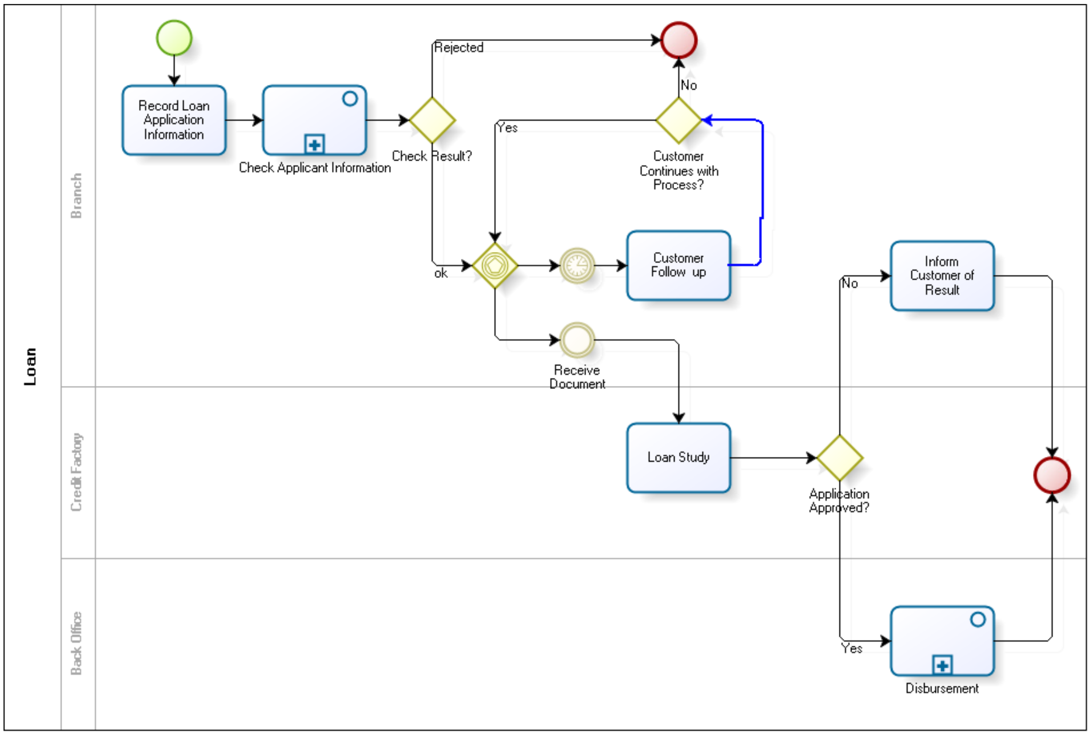

Record Loan Application Information
Check Applicants Information
Check Result?
Rejected
Ok
Receive Document
Loan Study
Application Approved?
No
Inform Customer of Rejection
Yes
Disbursement

Nevertheless, the providing of documents is something that may or may not occur within the process, in other words, the client may not present the documents or take too long to do so. This makes it necessary to control the client’s time for presenting the documents and by this means we can follow-up pending applications. For this reason we need to diagram the following situation in the credit application: The client has a given period of time to provide the documents; if this is not done within that period of time, the **Simple Intermediate Event** for receiving documents is deactivated and contact is made with the client to follow-up the process. Nevertheless, if the documents are presented by the client within the established time, they are checked, and the time that controls their delivery has to stop running, in other words, the **Timer Intermediate Event** is deactivated. To diagram this situation, we are going to use the **Exclusive Gateway based on events.** This gateway permits activation of various alternative routes but only one of them will be used, “the first one wins”, since it deactivates all the others so that they will no longer be available.

The process will be shown in the following way.


Record Loan Application Information
Check Applicants Information
Check Result?
Rejected
Ok
Event-Based Exclusive Gateway
Receive Document
Loan Study
Customer Follow up
Customer
Yes
No
Application Approved?
No
Inform Customer of Rejection
Yes
Disbursement

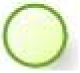
Finally, business process diagrams normally use visual separators to indicate the roles or specify who assumes different responsibilities in the activities of a process. BPMN allows diagramming of the different areas or participants that intervene in the process; for this purpose we use swimlanes, and the process is expressed as follows:



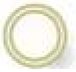
We have seen in the previous examples how some BPMN graphical elements have been used. These BPMN elements are classified into four categories:

Flow Objects:

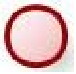
- these are the chief graphical elements that define the behavior of the processes. Among the Flow Objects, we find:
  - Events: They consist of something that happens in the course of a business process; they affect the flow of the process and usually have a cause and a result.
    In the above examples we use start, end and timer; these elements are events and are classified in 3 types.



Start Events



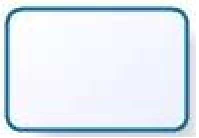
Intermediate Events



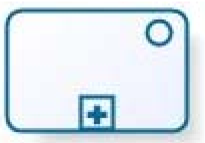
End Events

BPMN includes many ways of starting or ending a process, and there are also many things that can happen in the course of the process, for this reason there are different types of starting events, end events and intermediate events.

- Activities: These represent the work that is carried out as part of a business process. The activities may be compound or not, which is why we use examples of two existing types of activity:



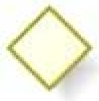
Task



Subprocesses

As we saw in the previous examples, there are different kinds of tasks (Simple, automatic, manual, user, and others) as well as of subprocesses (embedded, reusable, etc.) which allow us to diagram the processes in greater depth, thereby providing more information and clarity for the reader.

Gateways: These are modeling elements used to control the divergence and convergence of the flow.
There are 5 types of gateways. In the examples given in this document we were able to see the use of the Exclusive Gateway (XOR) and the Inclusive Gateway.



The 5 types of gateways are:

  - Exclusive Gateway
  - Gateway Based on events
  - Parallel Gateway
  - Inclusive Gateway
  - Complex Gateway

Conection Objects:

These are the elements used to connect two objects in the process flow .

Among the examples used were the Sequence Lines, which connect flow objects and Associations, which are the dotted lines to help us associate notations in some flows.

There are 3 types of connection objects:

  - Sequence Lines
  - Associations
  - Message Lines

SwimLanes:

- These are elements used to organize flow activities in different visual categories which represent functional areas, roles or responsibilities.
  - Pools
  - Lanes

Artifacts:

Artifacts are used to provide additional information about the process.

In the examples some notations were used in the flow.

There are tree types:

  - Data Objects
  - Groups
  - Annotations

If you wish to practice what you have learned, download BizAgi Process Modeler totally free at http://www.bizagi.com/eng/products/ba-modeler/modeler.html

For more information you may consult:

- Introduction to BPMN by Stephen A. White http://www.bpmn.org/Documents/Introduction%20to%20BPMN.pdf
- BPMN Specifications at http://www.bpmn.org/ http://www.bpmn.org/Documents/OMG%20Final%20Adopted%20BPMN%201-0%20Spec%2006-02-01.pdf