Business Process ~~Modelling~~ Model and Notation = BPMN

1

BPMN

- The primary goal of BPMN is to provide a notation that is readily understandable by all business users:
  - the business analysts that create the initial drafts of the process,
  - the technical developers responsible for implementing the technology that will perform those process
  - the business people who will manage and monitor those processes
- Thus, BPMN creates a standardized bridge for the gap between the business process design and process implementation
- We focus on it since it is the de facto standard notation to model BPs in particular within industrial contexts

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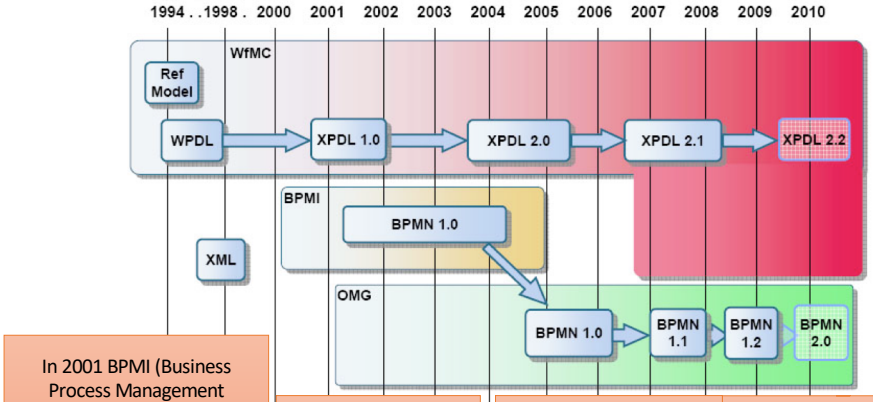
History

The vendors realized immediately there was a need of a graphical representation for the language oriented towards the needs of business users. Not a notation that directly represents the precise execution language under development.



In 2001 BPMI (Business Process Management Initiative) developed BPML as an XML process execution language.

In 2004 **BPMN 1.0** was released to the public and **in 2006 it was adopted as OMG standard.**

In Feb.2008 **BPMN 1.1** was released to the public, **making the meaning of the notation more explicit.**

BPMN 1.2 does not include any significant graphical changes; **modifications were merely editorial.**

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BPMN 1.2 vs BPMN 2.0

- **BPMN 1.2** provides a mapping from a "valid" BPMN diagram to BPEL, such that an engine can execute the process
  - The 1.2 specification provides only **contained verbal descriptions** of the graphic notations elements and modeling rules, this leads to misleading and confusions in the translation process
- **BPMN 2.0 beta 2** was introduced in June 2010
  - It represents the biggest revision of BPMN since its inception
- BPMN 2.0 received a **formal definition** in the form of a **meta-model**, that is a precise definition of the constructs and rules needed for creating specific models

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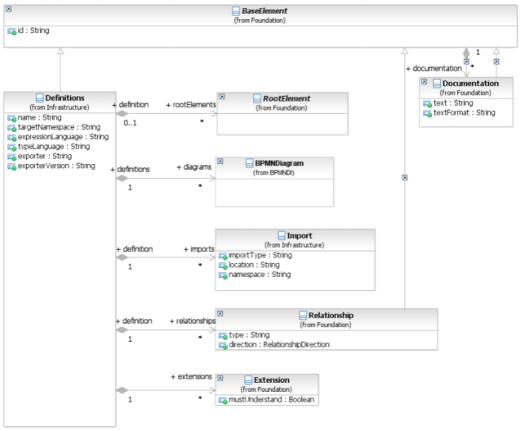
BPMN 2.0 Meta-model

- Metamodelling provides a number of benefits:
  - It formalizes the definition of models and entities
  - It formalizes the relationship between elements
  - It enables interoperability
- The new version's specification document has got **comprehensive UML class diagram** that graphically show the features of the different BPMN constructs and their relationships



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BPMN 1.2 vs BPMN 2.0

- The metamodel also has got additional language constructs that cannot be represented in the graphic models.
  - Such constructs are required by process engines to capture the necessary additional information for process execution.
- Moreover, the metamodel was the basis for the development on an **exchange format for BPMN models**
  - Up to now, it was almost impossible to transfer BPMN models from one tool into another.
  - Some tools have got import and export interfaces for the exchange of BPMN models by means of the XPDL format, but the use of XPDL for this purpose is not widely accepted yet.
  - Moreover, XPDL has not been implemented uniformly by all vendors, so that in practice there are quite often problems with model exchange

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BPMN 2.0 (http://www.bpmn.org/)

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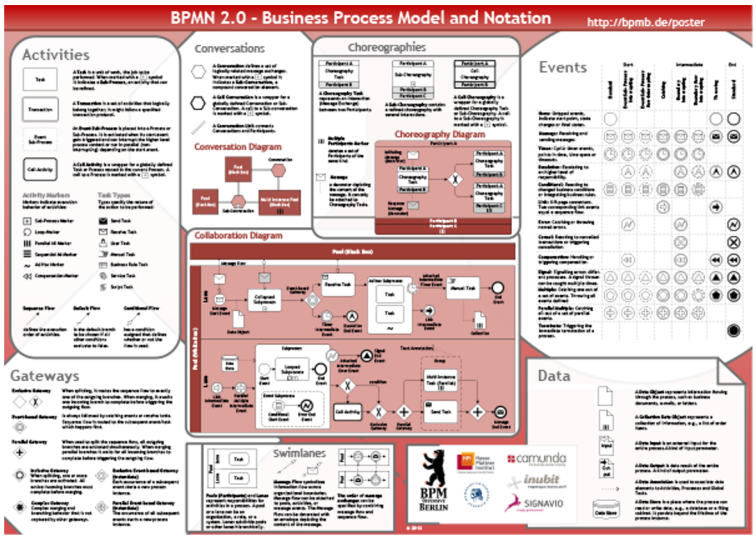
BPMN 2.0 manifesto



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BPMN 2.0 model types

- **Processes**, including Private (internal) **Business Processes and Public Processes**
- **Collaborations**, which can include **Processes**
- **Choreographies**

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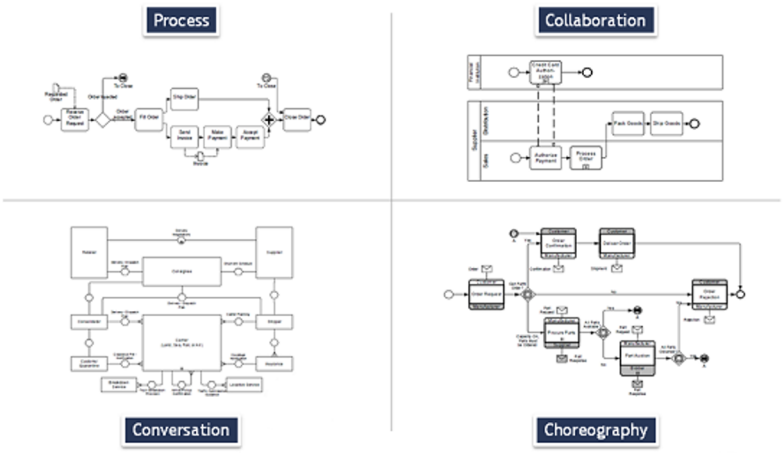
BPMN 2.0 model types



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Process Diagram

Private **Business Processes** are those internal to a specific organization.

- An *executable* **Process** is a **Process** that has been modeled for the purpose of being executed according to the semantics
- A non-executable **Process** is a *private* **Process** that has been modeled for the purpose of documenting **Process** behavior at a modeler-defined level of detail. Thus, information needed for execution, such as formal condition Expressions are typically not included in a *non-executable* **Process**.

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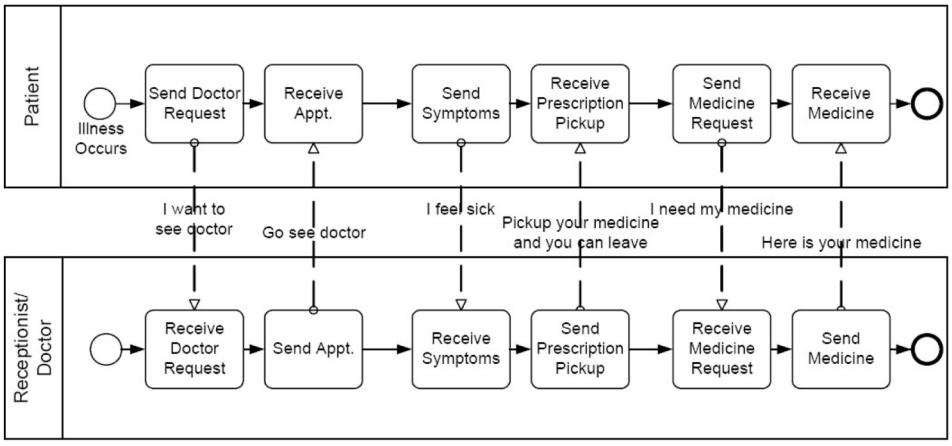
Collaboration Diagram

A **Collaboration** depicts the interactions between two or more business entities



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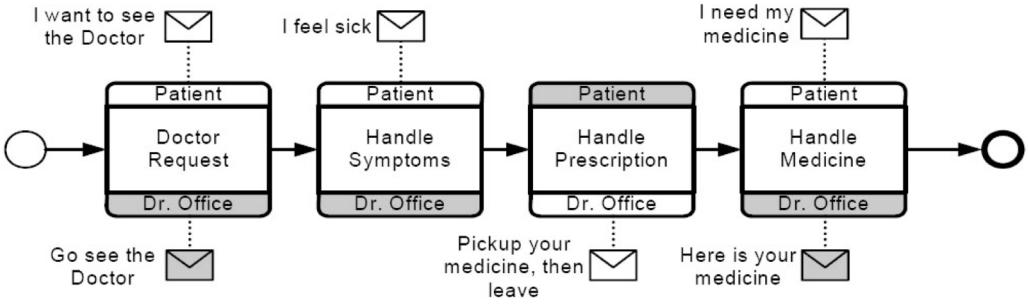
Choreography Diagram

- A self-contained **Choreography** is a definition of the expected behavior, basically a procedural contract, between interacting *Participants*
- While a normal **Process** exists within a **Pool**, a **Choreography** exists between **Pools** (or *Participants*)



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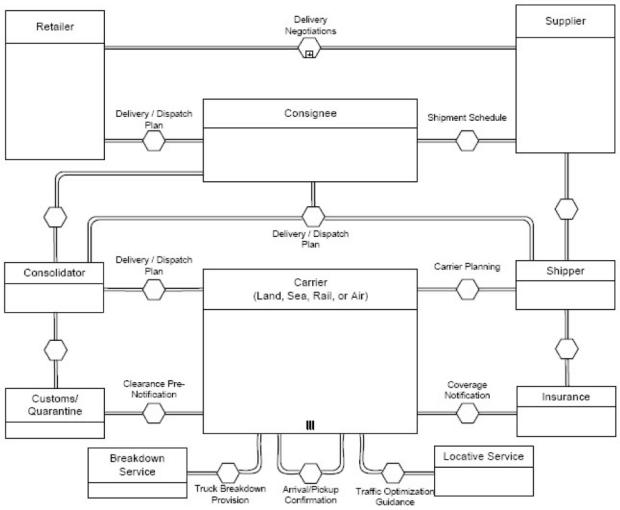
Conversation Diagram

- The **Conversation** diagram is a particular usage of and an informal description of a **Collaboration** diagram
- A **Conversation** is the logical relation of **Message** exchanges



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Let's focus on Processes and Collaboration Diagrams

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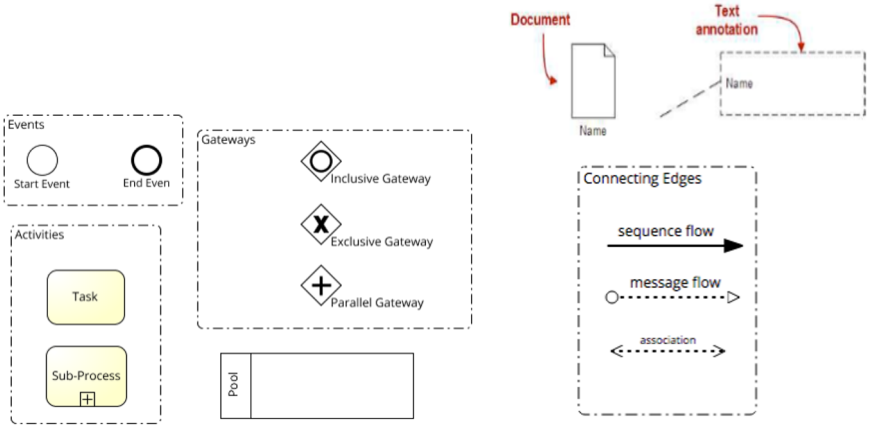
Basic Elements



Used for simple business process modelling, understood by majority of business process related stakeholders

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Token Generation

Token like a virtual marble, which is generated when a process is called

Token **never crosses the message flow** to reach the flow of another pool

- When a process begins, he start event generates a token
- The token migrates to the first activity along with the sequence flow
- When a token touch an activity, it is executed
- After activity execution, the token goes to the next flow

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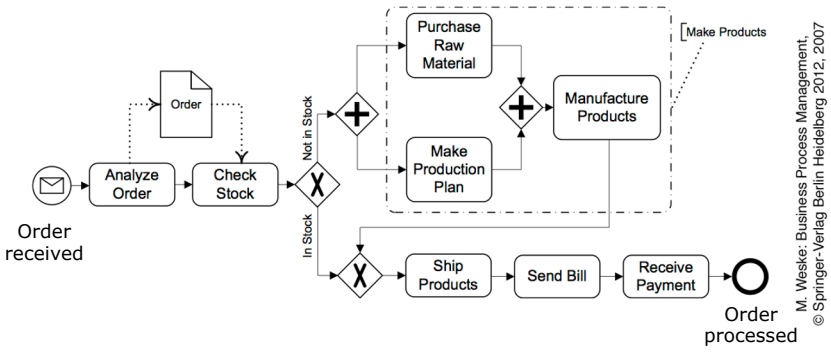
Simple BP model in BPMN



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Resources

- BPMN provides two constructs to model resource aspects:
  - **Pools** are generally used to model resource classes
  - **Lanes** are used to partition a pool into sub-classes or single resources. Lanes can be nested within each other in multiple levels.
- There are no constraints as to what specific resource type a **pool** or a **lane** should model
  - We would typically use:
    - A pool to model a *business party* like a whole organization
    - A lane to model a department, unit, team or software system/equipment within that organization
- **A message flow** represents the flow of information between two separate resource classes (pools)

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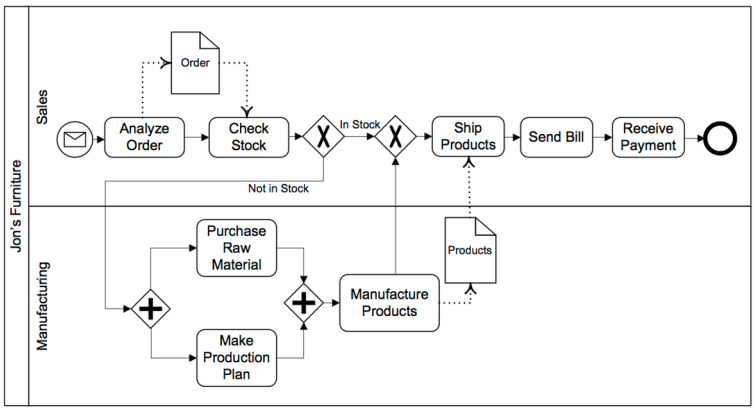
Simple BP model with resources information



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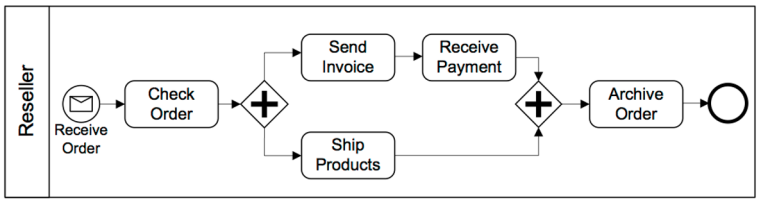
From textual to graphical notation: Reseller



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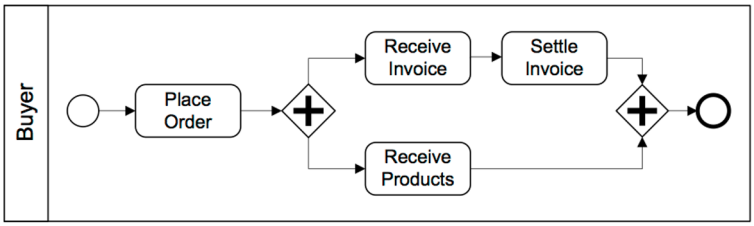
From textual to graphical notation: Buyer



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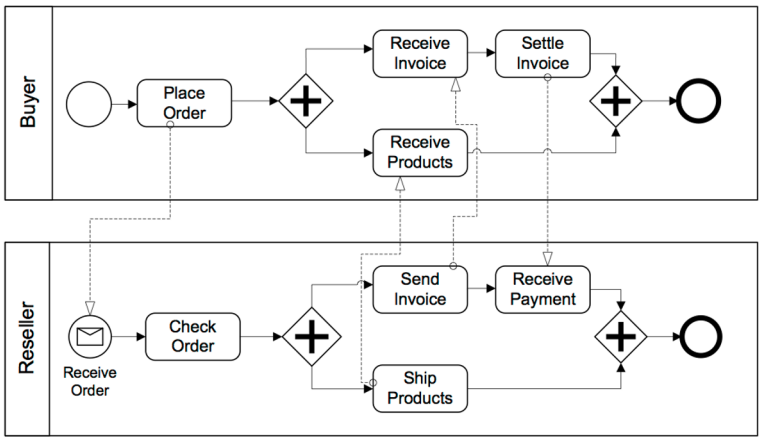
Buyer – Re-seller: Collaboration



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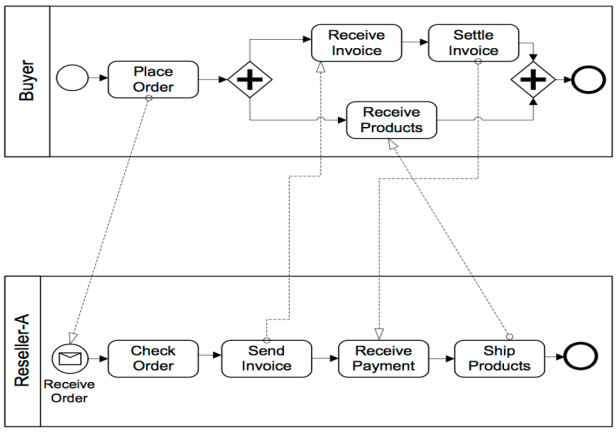
Protecting Reseller from Fraudulent Buyers



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Black box or white box?

- Modeling a pool as a white box or as a black box is a matter of relevance
- When working on a collaboration diagram, an organization may decide whether or not to expose their internal behavior depending on the requirements of the project at hand

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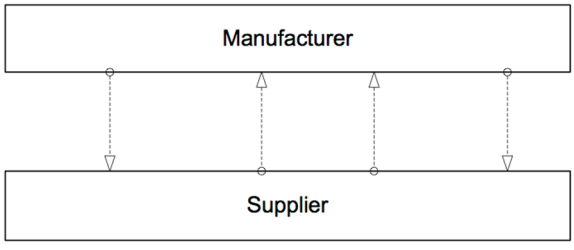
Business Process collaboration – message flow



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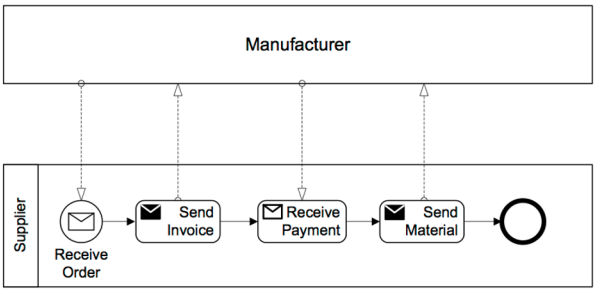
BP collaboration with one public process



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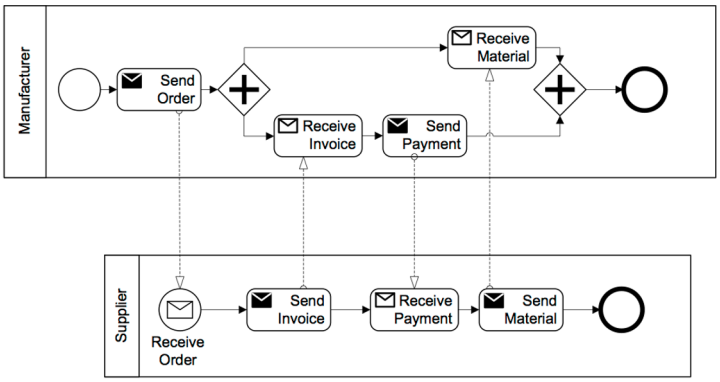
BP collaborating with two public process



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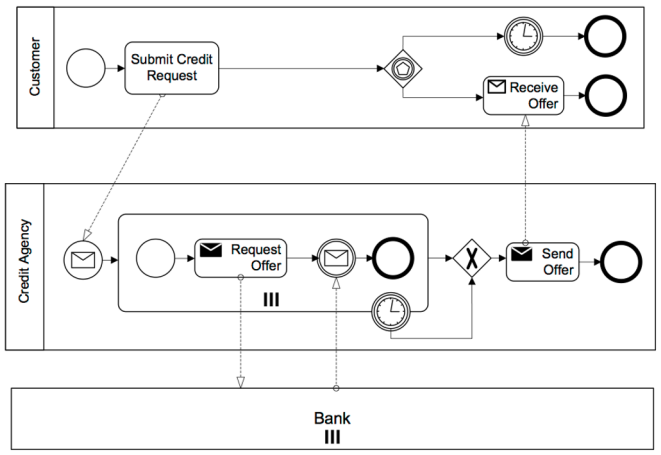
Multiple instance pool



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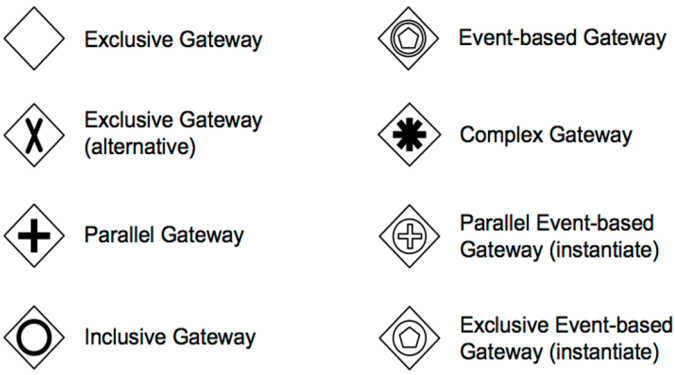
Types of gateways



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Exclusive Gateways

Exclusive Gateway

Exclusive Gateway (alternative)

- Indicates **locations within a business process where the sequence flow can take two or more alternative paths**.
- Only **one of the paths** can be taken.
- Depicted by a **diamond shape** that **may contain** a marker that is shaped like an "X".
- We use a **XOR-join to merge** two or more alternative branches that may have previously been **forked with a XOR-split**.

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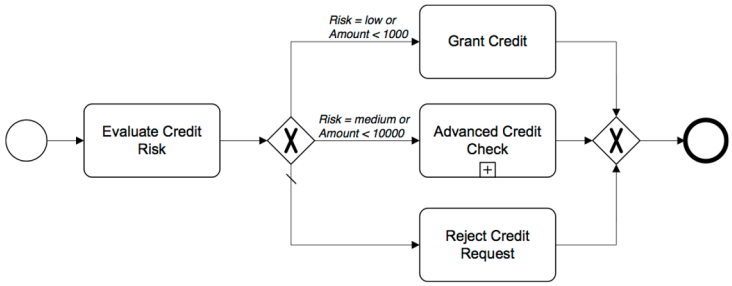
Exclusive gateway with default flow

- Exclusive gateways are locations within a process where there are two or more alternative paths.
- The criteria for the decision, which the exclusive gateway represents, exist as conditions on each of the outgoing sequence flow.
- When a token arrives at an exclusive gateway, there is an immediate evaluation of the conditions that are on the gateway's outgoing sequence flow. One of those conditions must always evaluate to true.



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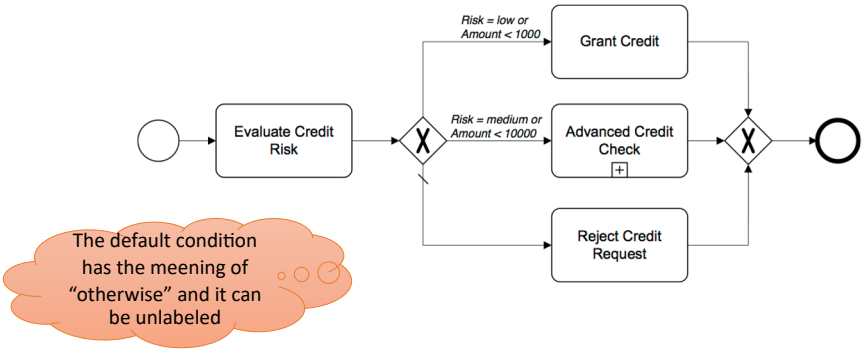
Exclusive gateway with default flow

- One way for the modeler to ensure that the process does not get stuck at an exclusive gateway is to use a default condition for one of the outgoing sequence flow.
- The default condition can complement a set of standard conditions to provide an automatic escape mechanism in case all the standard conditions evaluate to false.
- The default is chosen if all the other sequence flow conditions turn out to be false.



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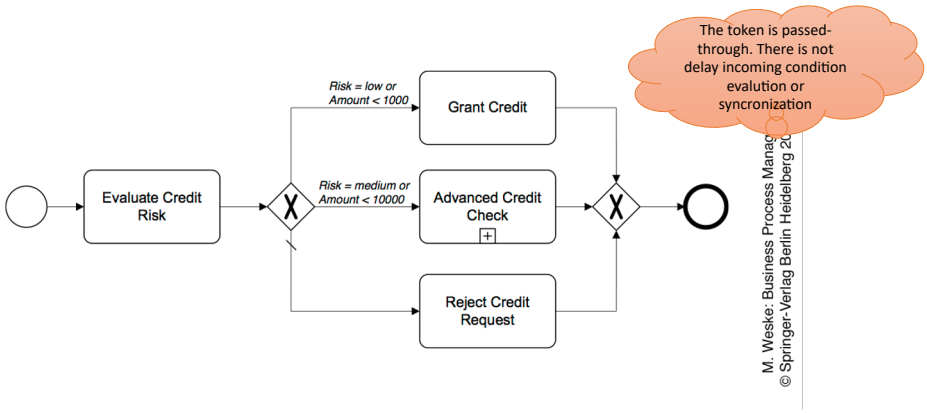
Exclusive gateway with default flow

When a token arrives at the exclusive gateway, there is no evaluation of conditions (on the incoming sequence flow), and immediately moves down the outgoing sequence flow.



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Exercise

As soon as an invoice is received from a customer, it needs to be checked for mismatches.

The check may result in either of these three options:

i) there are no mismatches, in which case the invoice is posted;

ii) there are mismatches but these can be corrected, in which case the invoice is re-sent to the customer; and

iii) there are mismatches but these cannot be corrected, in which case the invoice is blocked

Once one of these three activities is performed the invoice is parked and the process completes.

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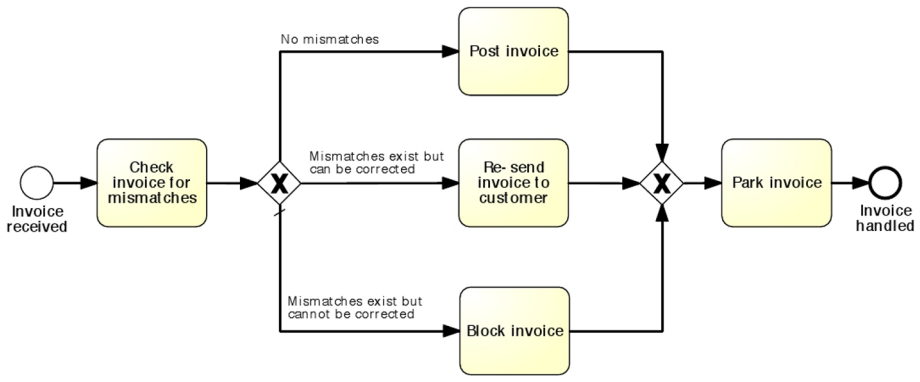
Solution



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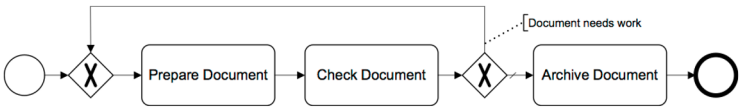
Exclusive gateways realizing a loop



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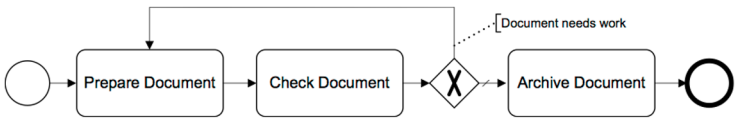
BP with uncontrolled flow



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Parallel Gateways

- Provide a mechanism to synchronize parallel flows (AND-join) and to create parallel flows (AND-split), with activities that can be executed concurrently
- Depicted by a diamond shape that must contain a marker that is shaped like a plus sign

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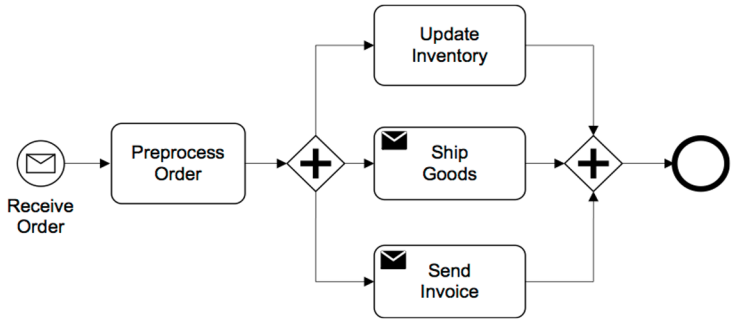
Parallel gateway (Splitting Behaviour)



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- When a token arrives at a parallel gateway, there is no evaluation of any conditions on the outgoing sequence flow.
- The parallel gateway will create parallel paths.
- This means that the gateway will create a number of tokens that are equal to the number of outgoing sequence flow. One token moves down each of those outgoing sequence flow.

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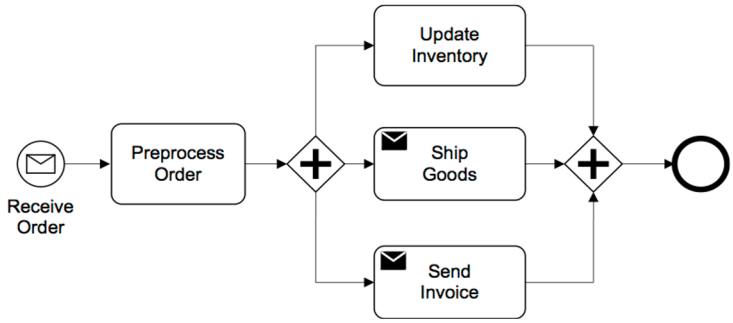
Parallel gateway (Merging Behaviour)



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- To synchronize the flow, the parallel gateway will wait for a token to arrive from each incoming sequence flow.
- When the first token arrives, there is no evaluation of a condition for the incoming sequence flow, but the token is "held" at the gateway and does not continue.
- When all the tokens are arrived, then they are merged and one token moves down the outgoing sequence flow.

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Exercise

Once the boarding pass has been received, passengers proceed to the security check. Here they need to pass the personal security screening and the luggage screening. Afterwards, they can proceed to the departure level.

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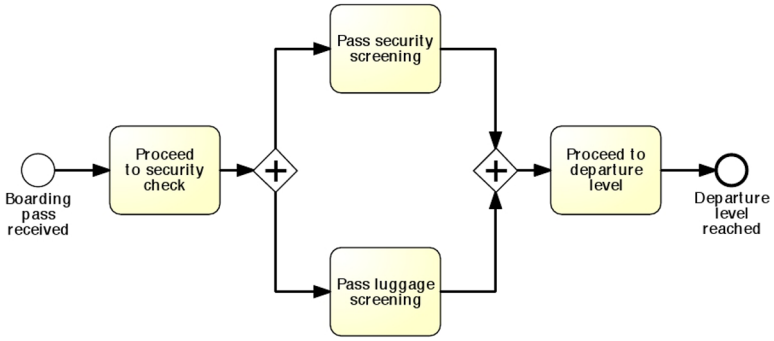
Exercise



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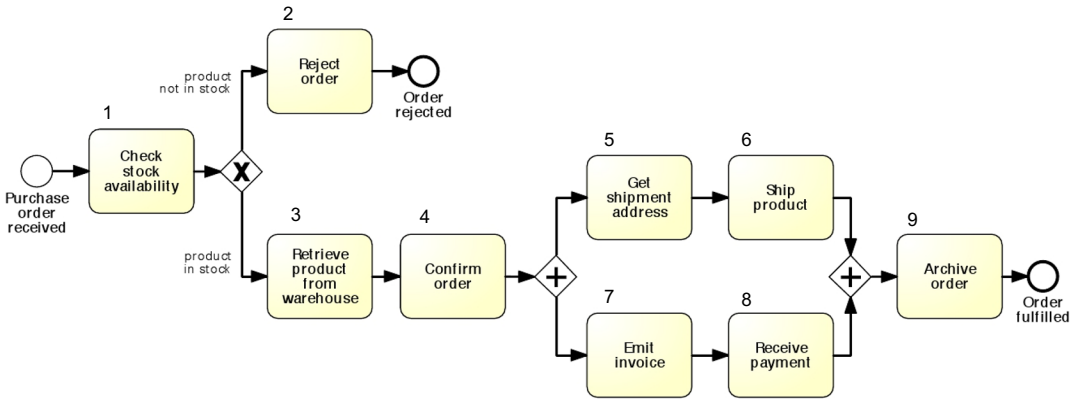
Gateways Combination



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Inclusive Gateways

- Sometimes we may need to take one or more branches after a decision activity.
- To model situations where a decision may lead to one or more options being taken at the same time, we need to use an inclusive (OR) split gateway.
- An OR-split is similar to the XOR-split, but the conditions on its outgoing branches do not need to be mutually exclusive, i.e. more than one of them can be true at the same time.
- When we encounter an OR-split, we thus take one or more branches depending on which conditions are true.


Inclusive Gateway

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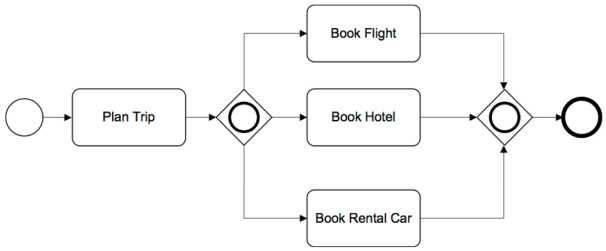
Inclusive or gateway (Splitting Behaviour)



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- Inclusive gateways support decisions where more than one outcome is possible at the decision point.
- Inclusive gateway with multiple outgoing sequence flows creates one or more paths based on the conditions on those sequence flow.
- In terms of token semantics, this means that the OR-split takes the input token and generates a number of tokens equivalent to the number of output conditions that are true.
- Every condition that evaluates to true will result in a token moving down that sequence flow.
- At least one of those conditions must evaluate to true.

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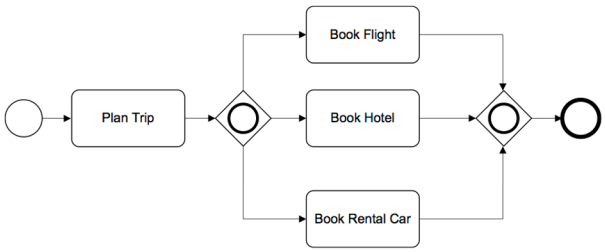
Inclusive or gateway (Merging Behaviour)



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- When the first token arrives at the gateway, the gateway will "look" upstream for each of the other incoming sequence flow to see if there is a token that might arrive at a later time.

- Thus, the gateway will hold the first token that arrived in the upper path until the other token from the lower path arrives.

- When all the expected tokens have arrived at the gateway, the process flow is synchronized (the incoming tokens are merged) and then a token moves down the gateway's outgoing sequence flow.

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From BPMN 2.0 Specification to Process Execution

The Inclusive Gateway is activated if:

- At least one incoming Sequence Flow has at least one token and
  - For every directed path formed by Sequence Flow that:
    - starts with a Sequence Flow *f* of the diagram that has a token,
    - ends with an incoming Sequence Flow of the inclusive gateway that has no token,
    - does not visit the Inclusive Gateway.
  - There is also a directed path formed by Sequence Flow that:
    - starts with *f*,
    - ends with an incoming Sequence Flow of the inclusive gateway that has a token,
    - does not visit the Inclusive Gateway.

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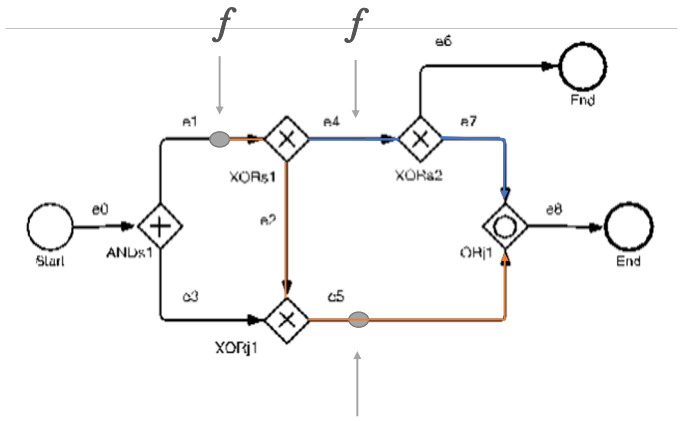
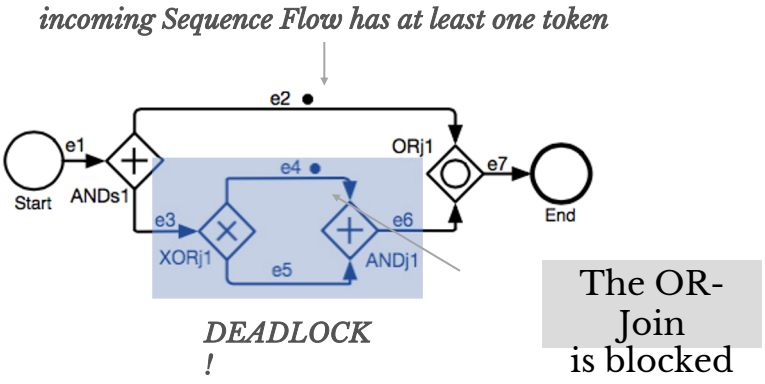
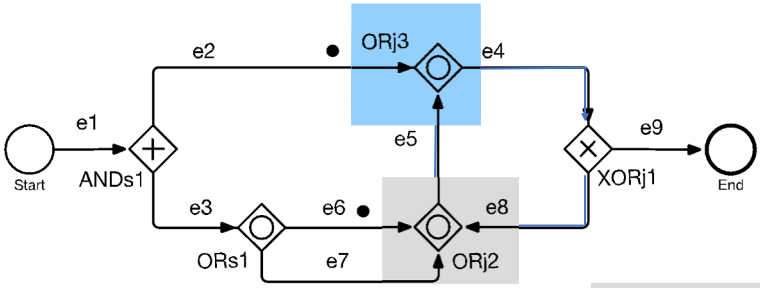
EXAMPLE



An Example of Deadlock Upstream an OR-Join



An Example of Vicious Circle

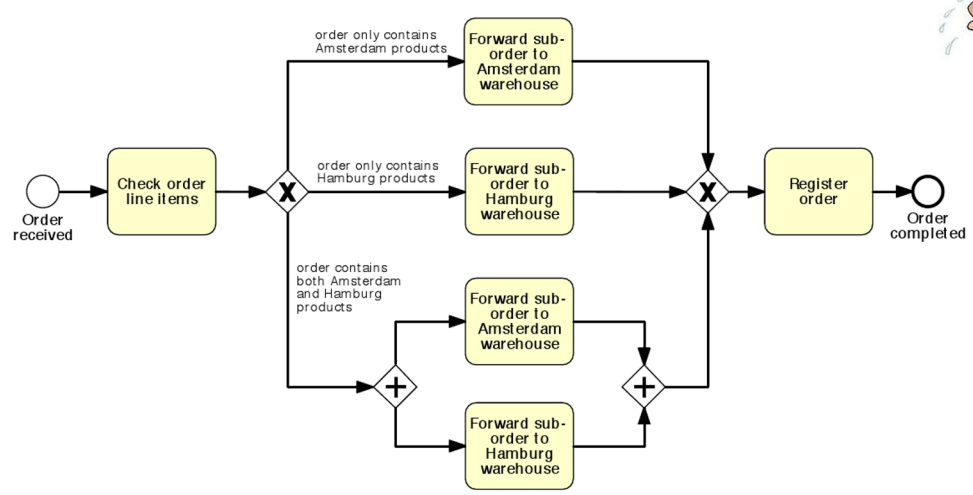


The OR-Join is blocked

Exercise

- A company has two warehouses that store different products, one in Amsterdam and another one in Hamburg.
- When an order is received, it is distributed across these warehouses: if some of the relevant products are maintained in Amsterdam, a sub-order is sent there; likewise, if some relevant products are maintained in Hamburg, a sub-order is sent there.
- Afterwards, the order is registered and the process completes.

A first solution



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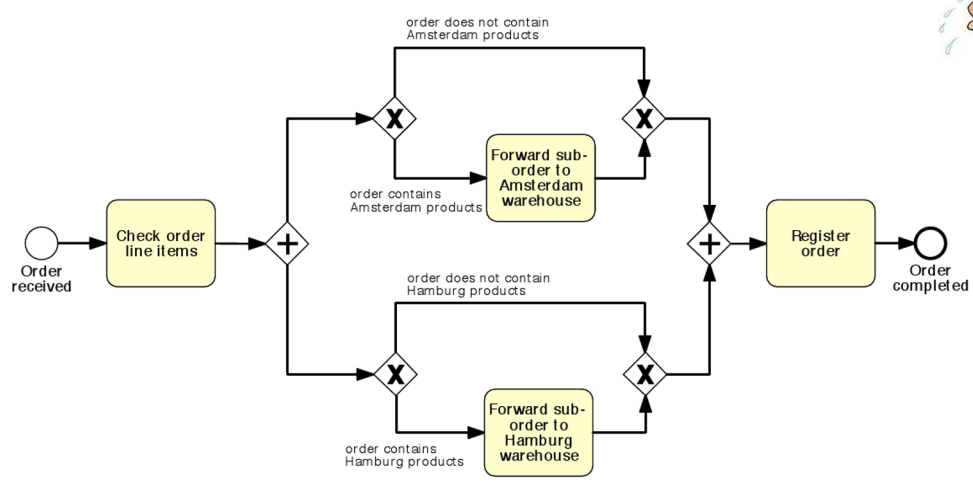
A second solution



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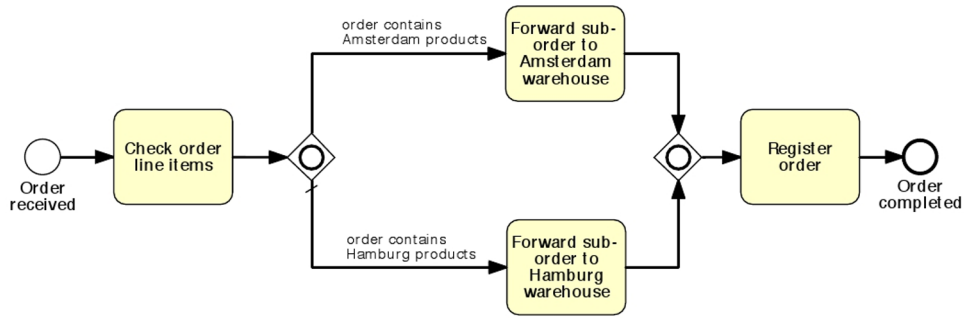
A third solution with OR gateways



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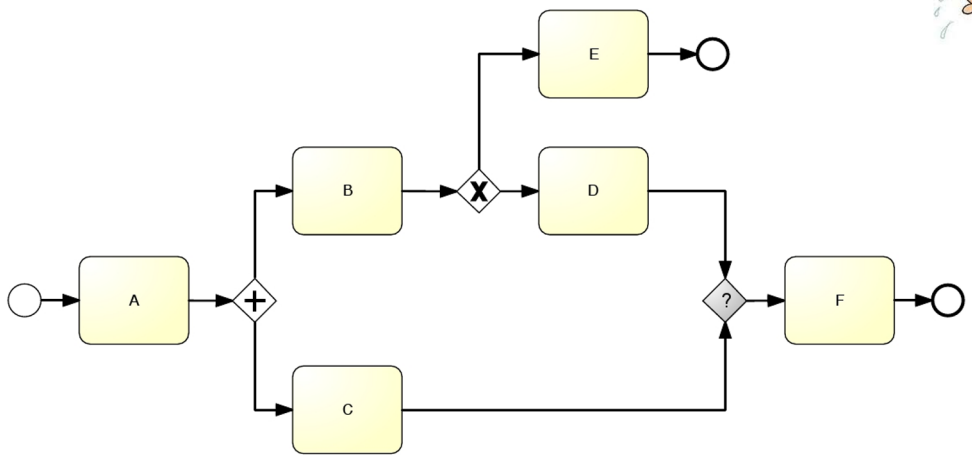
What kind of join should we use?



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Solution

- Since the OR-join semantics is not simple, the presence of this element in a model may confuse the reader.
- Thus, we suggest to use it only when it is strictly required.
- Clearly, it is easy to see that an OR-join must be used whenever we need to synchronize control from a preceding OR-split. Similarly, we should use an AND-join to synchronize control from a preceding AND-split and an XOR-join to merge a set of branches that are mutually exclusive.

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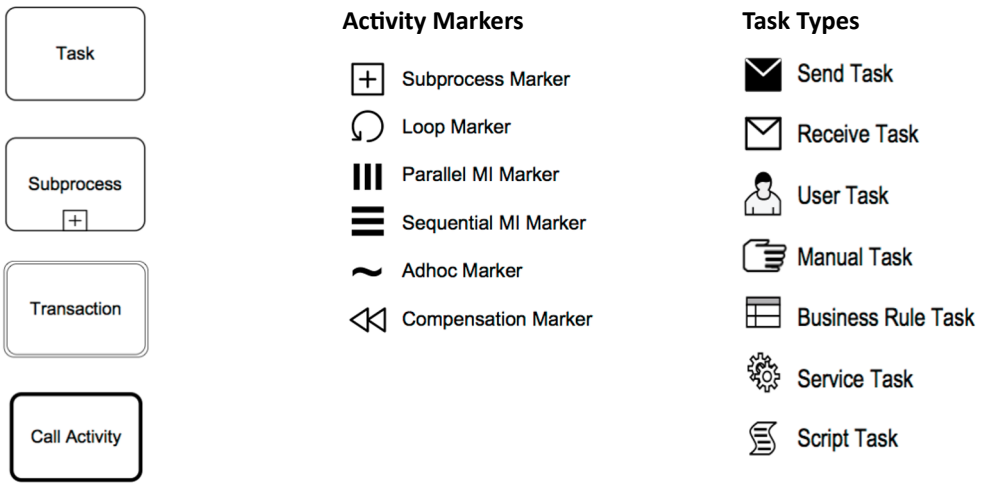
Activity in BPMN



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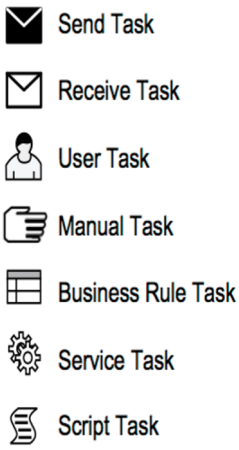
Task types



- A send task is a task that send a message. Once the message is sent, the task is completes
- A receive task is a task that waits to receive a message. Once the message arrives, the task completes
- User tasks represent traditional workflow tasks that involve user interaction
- Manual activities are performed without the support of software systems.
- A Business Rule task is used to synchronously execute one or more rules.
- A service task is a task that is implemented by a piece of software, either using a Web services interface or an application programming interface to a software system.
- A script task is a task that uses some scripting language expression in order to be performed. Script tasks are used to represent simple functionality, for which no dedicated software system is required.

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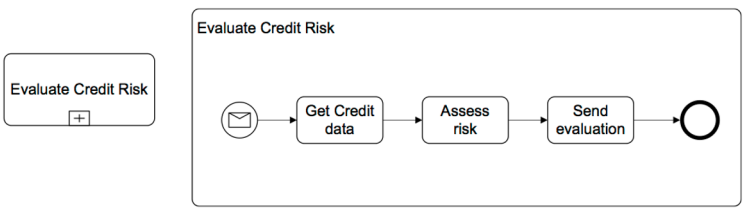
Collapsed and expanded sub-process

- A **Task** is an atomic activity within a process flow
- A **Sub-Process** is a compound activity that represents a collection of other task and sub-processes



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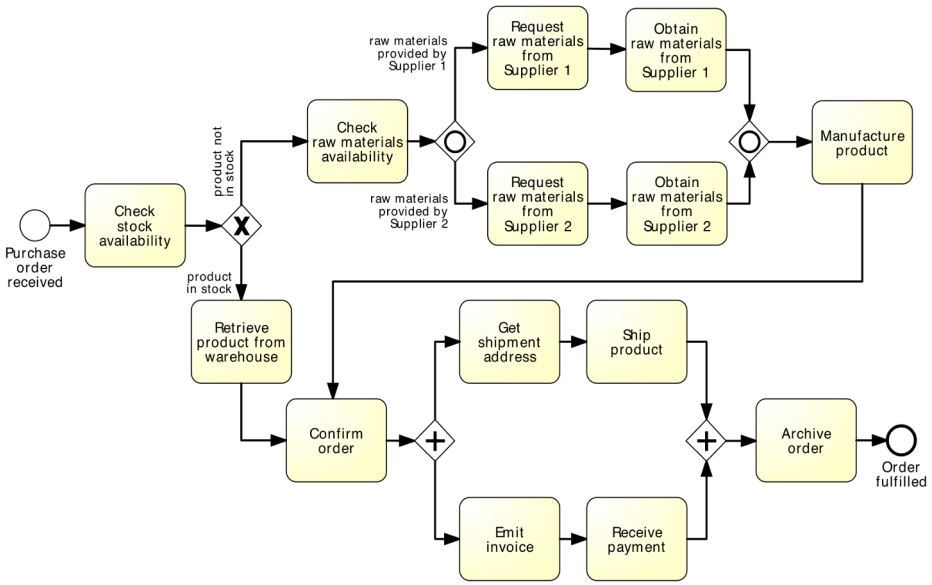
Anything wrong with this model?



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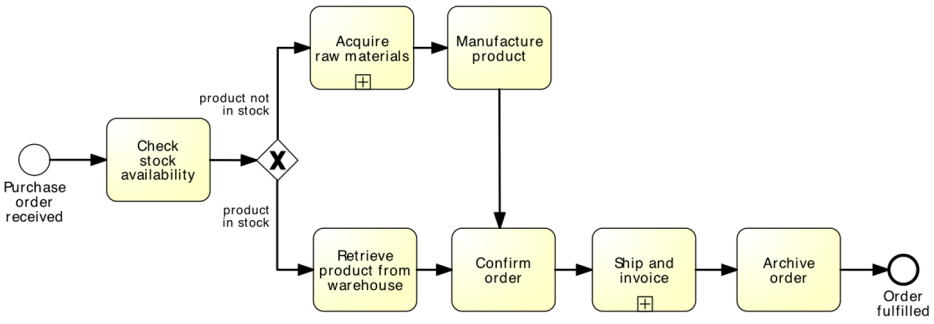
Is this better?



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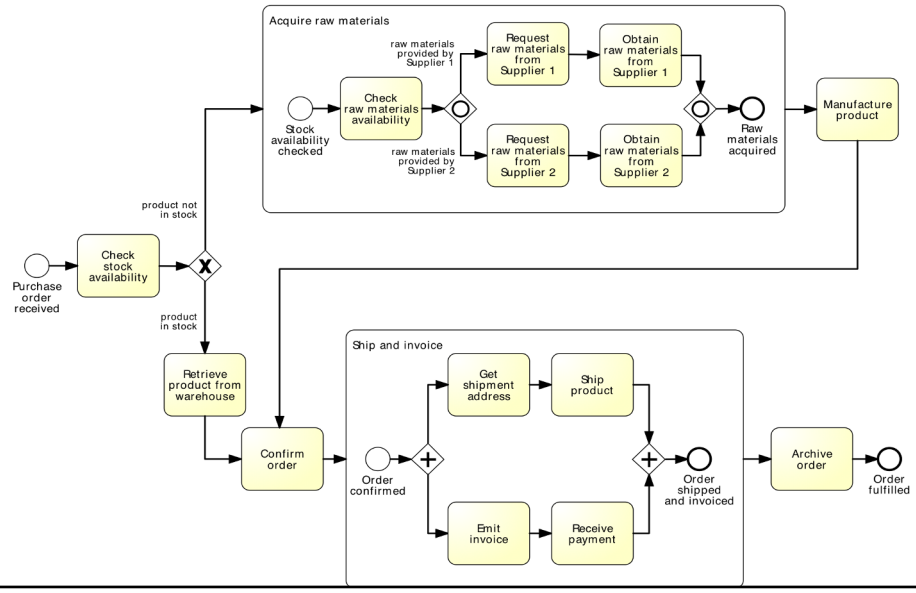
Expanded…



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Use of Sub-processes

1. Break down large models into smaller ones, making them easier to understand and maintain

1. Share common fragments across multiple processes

1. Identify parts of a process that should be repeated

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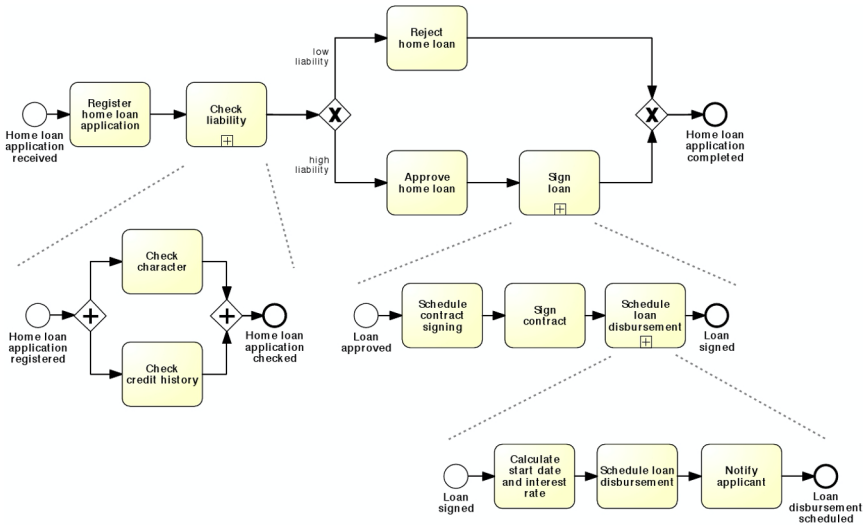
Process hierarchies



Process hierarchies: we can nest sub-processes in multiple levels, so as to decompose a process model hierarchically

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Call Activity

Activity defined in a process that is external to the current process definition

Call Activity is a point in the process where a global processor

It allows you to create a reusable process definition that can be reused in multiple other process definitions

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Call Activity: reusability and maintenance

- Our default choice should be to define sub-processes as global process models so as to **maximize their reusability** within our process model collection
  - Supporting processes such as payment, invoicing, HR, printing, are good candidates for being defined as global process models, since they are typically shared by various business processes within an organization
- Besides reusability, another advantage of using global process models is that **any change made to these models will be automatically propagated to all process models** that invoke them

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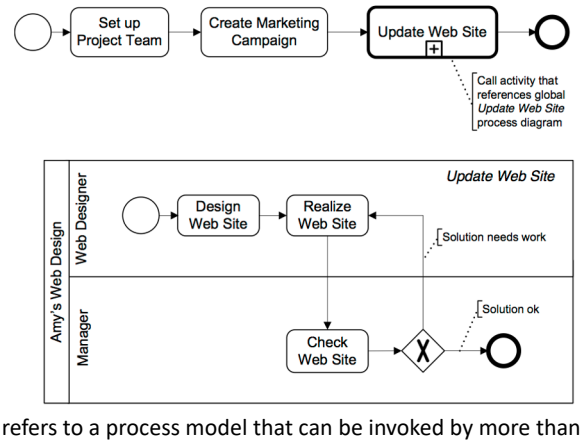
Share common fragments across multiple processes: **Call Activity**



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The call activity refers to a process model that can be invoked by more than one process
In the same process model collection

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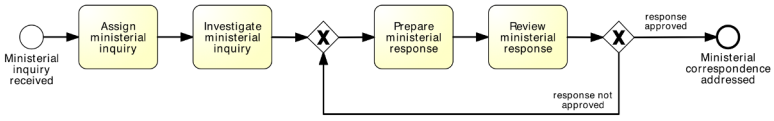
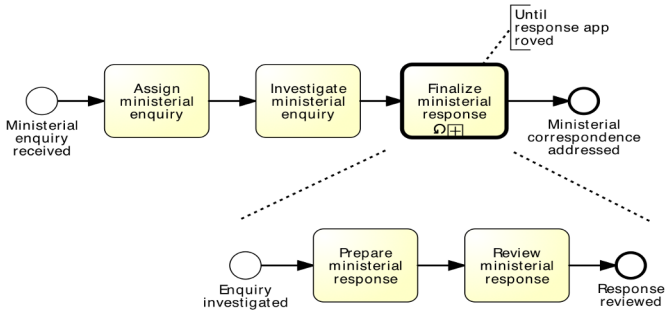
Identify parts of a process that should be repeated



equivalent to:



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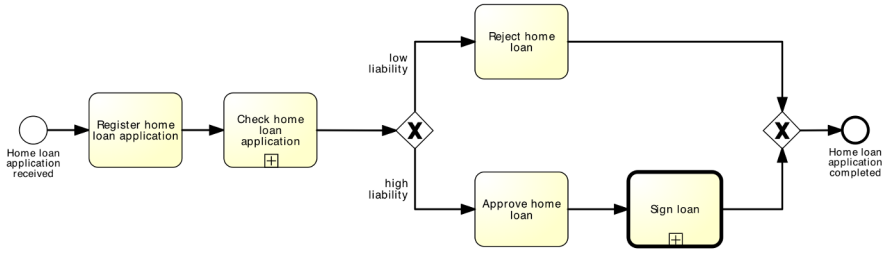
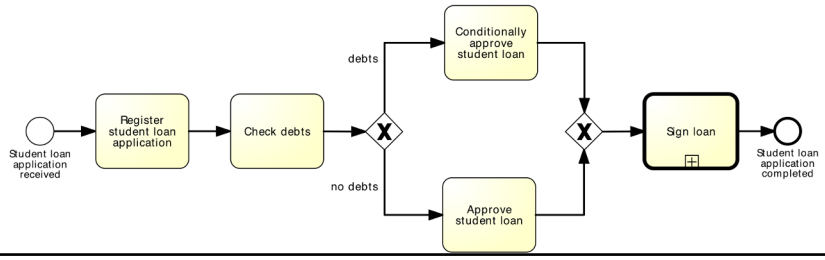
Share common fragments across multiple processes: example





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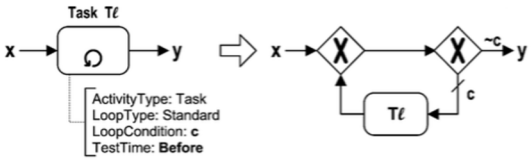
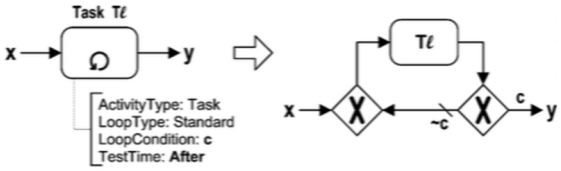
More On the Loop



(a) "while-do" loop



(b) "do-until" loop

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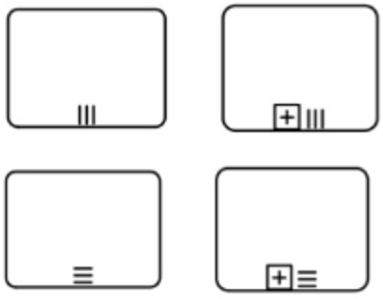
Multi-Instance Activity

Multi-instance activity can run with other identical activities simultaneously

Multi-instance marker will cause the activity to be executed multiple times at run-time

The instance may executed in parallel or sequential



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Multi Instance Vs. Loop Activity

Use Loop when:

- Loops for as long as the underlying looping condition is true
- Condition must be evaluated for every loop iteration (in beginning or end of iteration)
- → While (condition)

Use multi-instance when:

- Activity is performed may times with different data sets
- For example: when a company's manager receives reports from his employees he or she will need to evaluate them many times, each time with different data
- → Foreach (x in array of instants)

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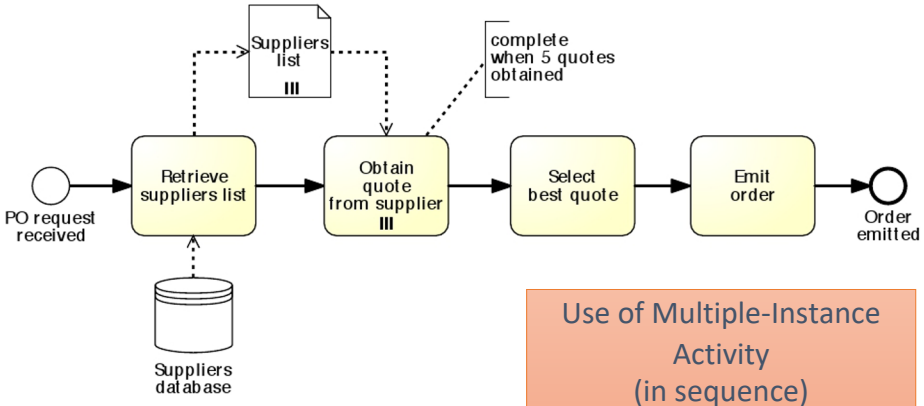
Use of Multiple-Instance Activity (in parallel)



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Exercise - Model the following process fragment

After a car accident, a statement is sought from two witnesses out of the five that were present, in order to lodge the insurance claim.

As soon as the first two statements are received, the claim can be lodged with the insurance company without waiting for the other statements.

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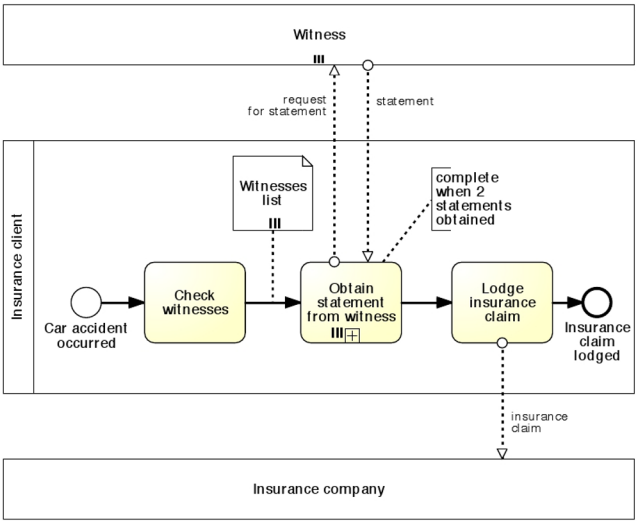
Solution



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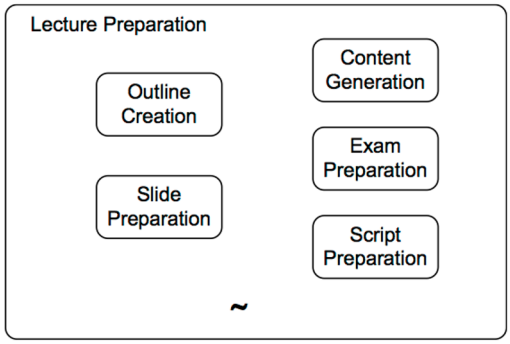
Uncontrolled Repetition: Sample ad-hoc process

Sometimes we may need to model that one or more activities can be repeated a number of times, without a specific order, until a condition is met.

These activities are **uncontrolled**, in the sense that they may be repeated multiple times with no specific order, or not occur at all, until a condition is met—in our case the order being fulfilled.



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A **partial order may be established** among the activities of an ad-hoc sub-process via the sequence flow. However, **we cannot represent start and end events** in an ad- hoc sub-process.

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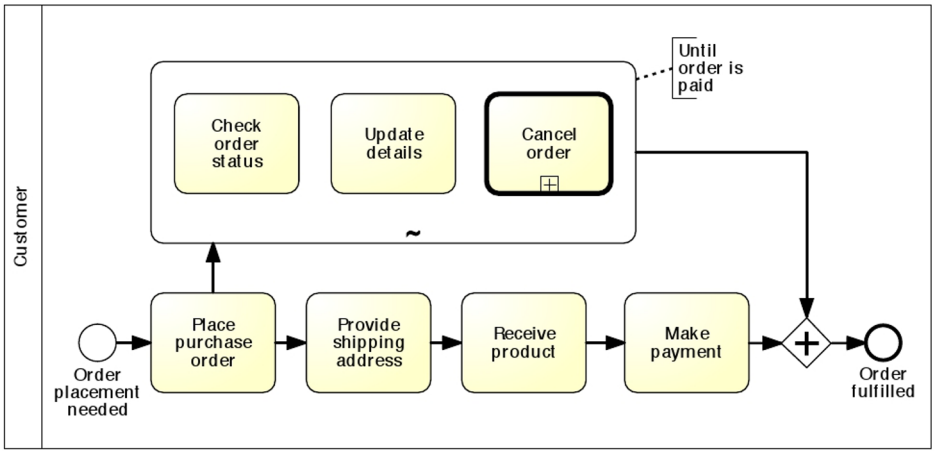
Using an ad-hoc sub-process to model uncontrolled repetition: example



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Exercise - Model the following process snippet

Un tipico processo di reclutamento dell'esercito inizia selezionando un elenco tutte le candidature dei candidati. Quelli selezionati vengono quindi chiamat sostenere i seguenti test:
droga e alcool, occhi, visione dei colori, udito, sangue, urine, peso, impronte digitali ed esame medico. La visione dei colori può essere eseguita solo dopo l'esame degli occhi, mentre l'esame medico può essere effettuato solo dopo aver esaminato la visione dei colori, l'udito, il sangue, l'urina e il peso. Inoltre, potrebbe essere necessario che alcuni candidati ripetano più volte alcuni di questi test per ottenere una valutazione corretta, ad es. potrebbe essere necessario ripetere l'esame del sangue se il candidato ha assunto troppo zucchero nelle precedenti 24 ore. Ai candidati che superano tutti i test viene chiesto di sostenere un esame mentale e un esame fisico, seguito da un colloquio. Solo quelli che superano questi due esami e si comportano bene nell'intervista possono essere reclutati nell'esercito.

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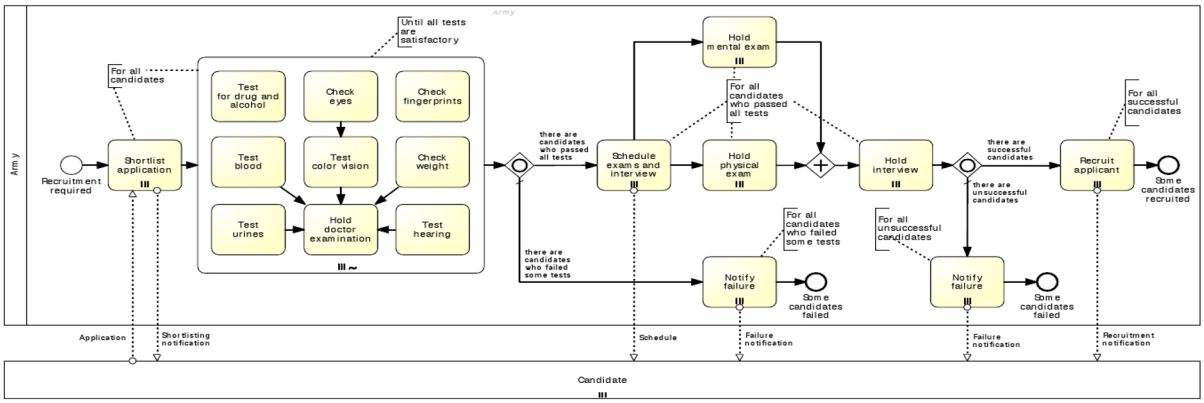
A Possible Solution



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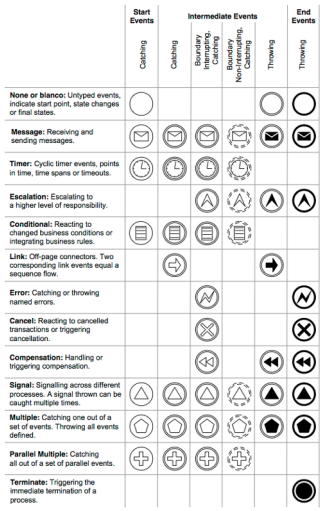
Handling BPMN Events



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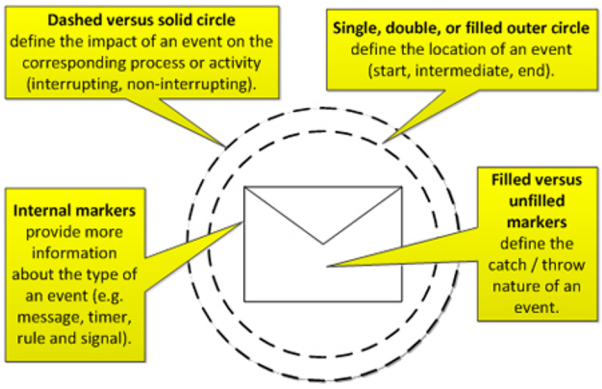
- While it comes natural to give a name (also called *label*) to each activity, we should not forget to give labels to events as well.
  - For example, giving a name to each start event allows us to communicate what triggers an instance of the process, meaning, when should a new instance of the process be started.
  - Similarly, giving a label to each end event allows us to communicate what conditions hold when an instance of the process completes, i.e. what the outcome of the process is.

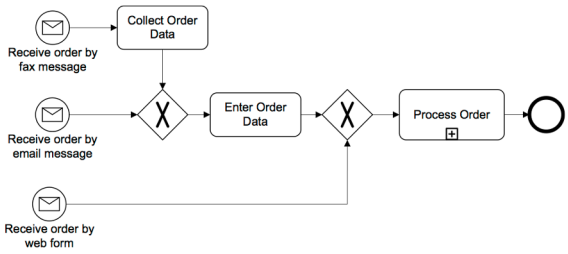
More on Events



BPMN Events

Start Intermediate End

Untyped Event – Indicates that an instance of the process is created (start) or completed (end), without specifying the cause for creation/completion



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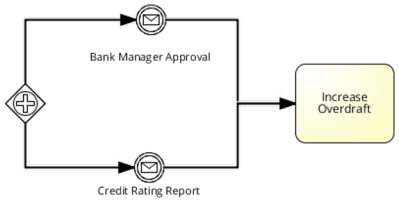
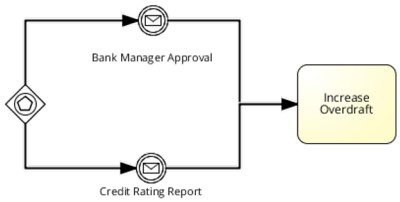
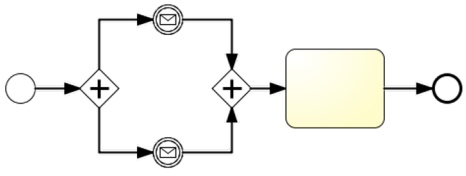
Start Event Gateways







Parallel Event-based Gateway (instantiate)

Exclusive Event-based Gateway (instantiate)

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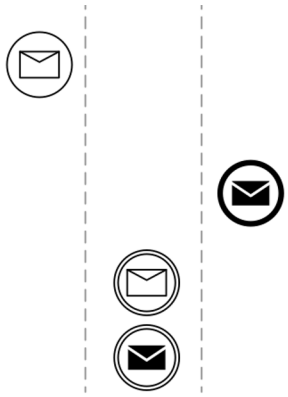
Message Events

Start Intermediate End



Start Message Event – Indicates that an instance of the process is created when a message is **received**

End Message Event – Indicates that an instance of the process is completed when a message is **sent**

Intermediate Message Event – Indicates that an event is expected to occur during the process. The event is triggered when a message is **received** or **sent**

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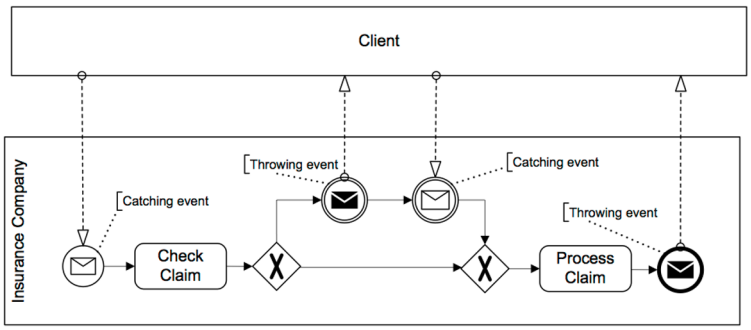
Message Events: Throwing and Catching Events



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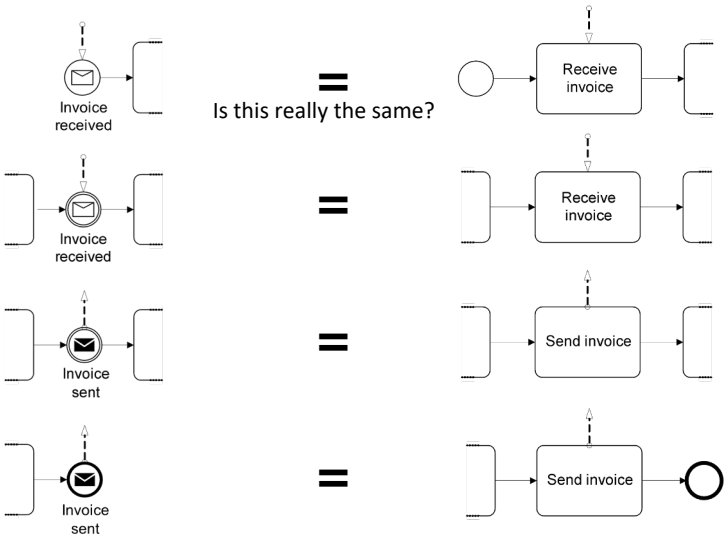
Comparison with sending/receiving tasks



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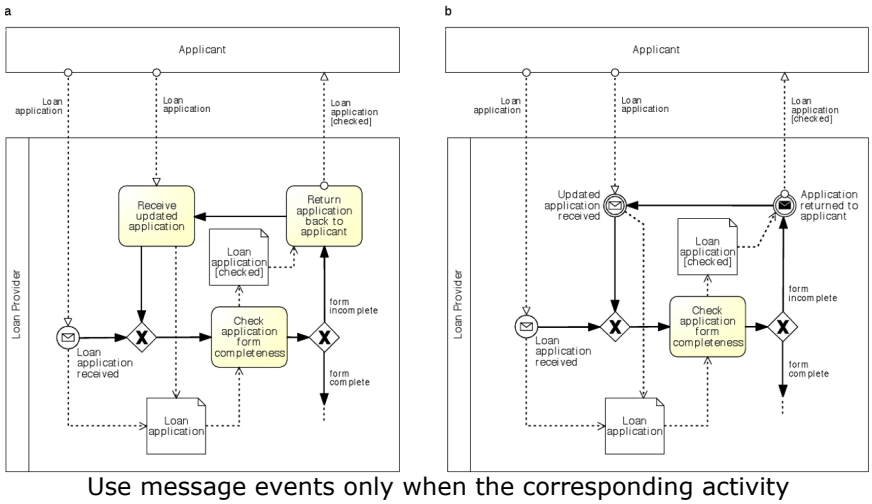
When to use what?



Use message events only when the corresponding activity would simply send or receive a message and do nothing else

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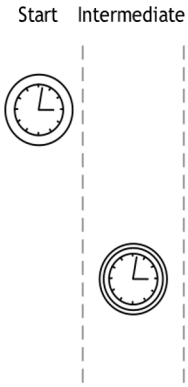
BPMN Events



Start Timer Event – Indicates that an instance of the process is created at certain date(s)/time(s), e.g. start process at 6pm every Friday

Intermediate Timer Event – Triggered at certain date(s)/ time(s), or after a time interval has elapsed since the moment the event is "enabled" (delay)

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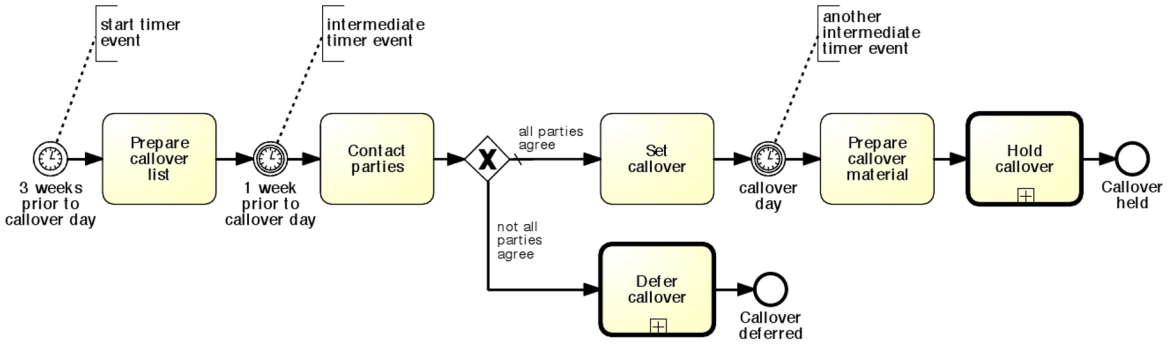
Temporal Event and Example



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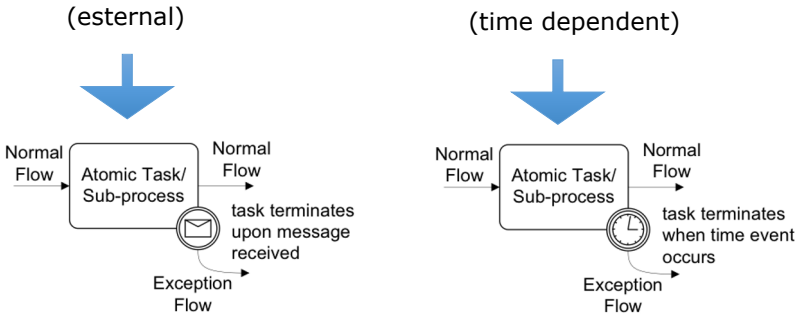
Modelling Exceptional Behaviours



Both of them can be interrupting or not interrupting

??? (internal) ???

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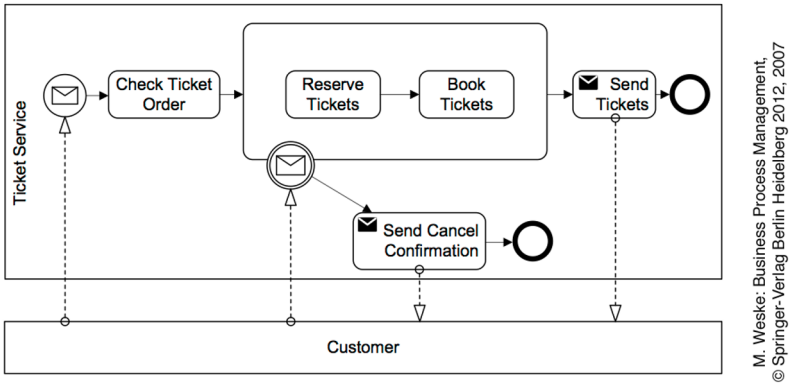
BP with interrupting boundary event



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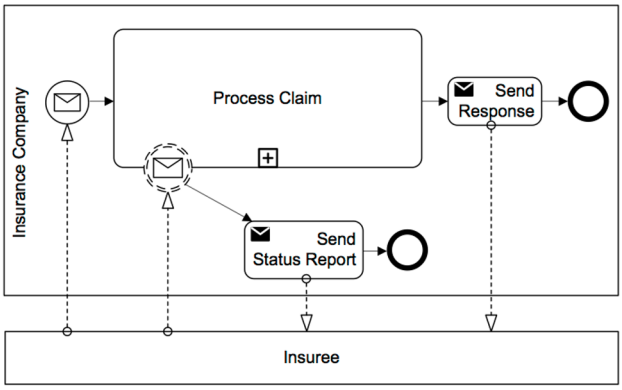
BP with non-interrupting boundary event



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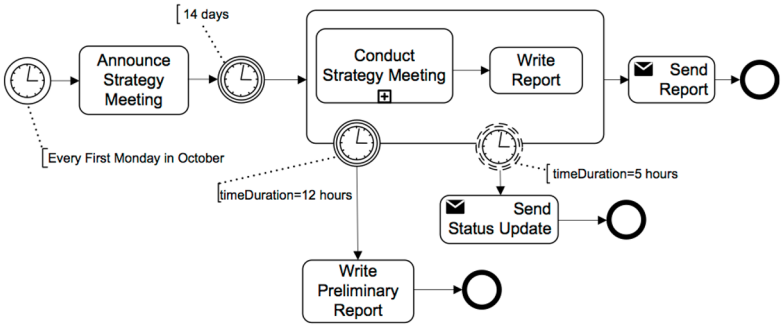
Interrupting and non interrupting boundary time



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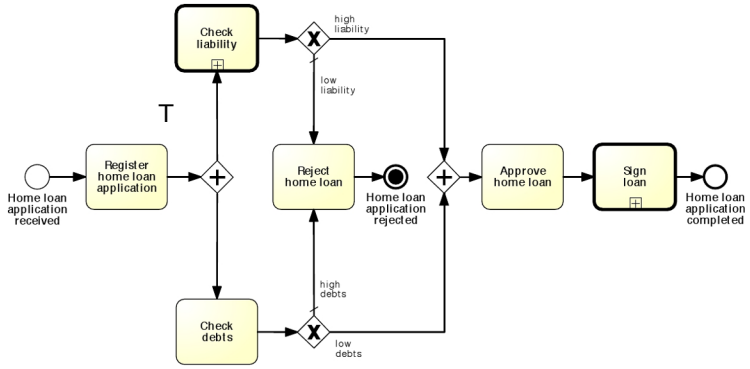
Process Abortion

- The simplest way of handling an exception is to abort the running process and signal an improper process termination.
- Observe that if a terminate event is triggered from within a sub-process, it will not cause the abortion of the parent process but only that of the sub-process, i.e. the terminate event is only propagated downwards in a process hierarchy.



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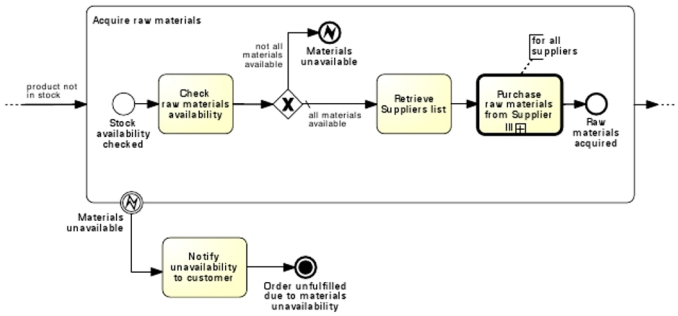
Exception (internal)

Instead of aborting the whole process, we can handle an exception by interrupting the specific activity that has caused the exception

- An end error event is used to interrupt the enclosing sub-process and throw an exception
- This exception is then caught by an intermediate catching error event which is attached to the boundary of the same sub-process
- In turn, this *boundary event* triggers the recovery procedure through an outgoing branch which is called *exception flow*



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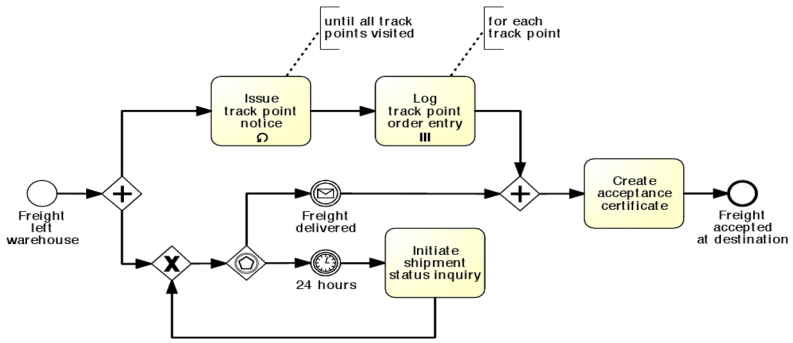
Racing Events

- A typical scenario encountered when modeling processes with events is the one where two external events *race* against one another
- The first of the two events that occurs determines the continuation of the process.



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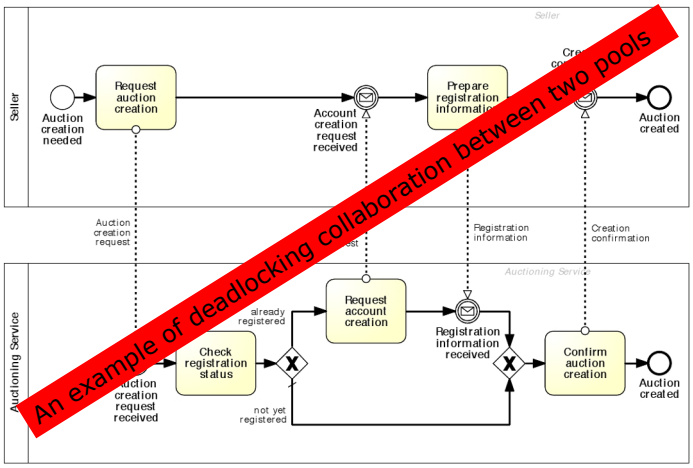
Racing Event: Event Based Gateway

- Event-based gateways can be used to avoid behavioral anomalies in the communication between pools.



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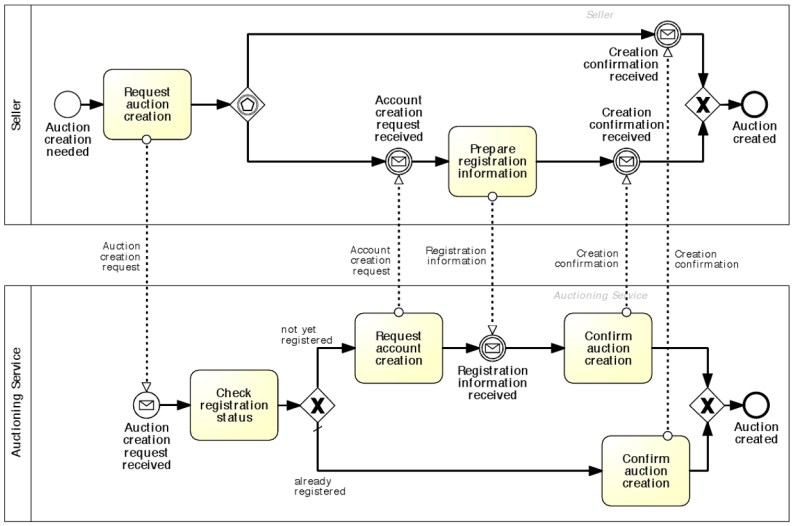
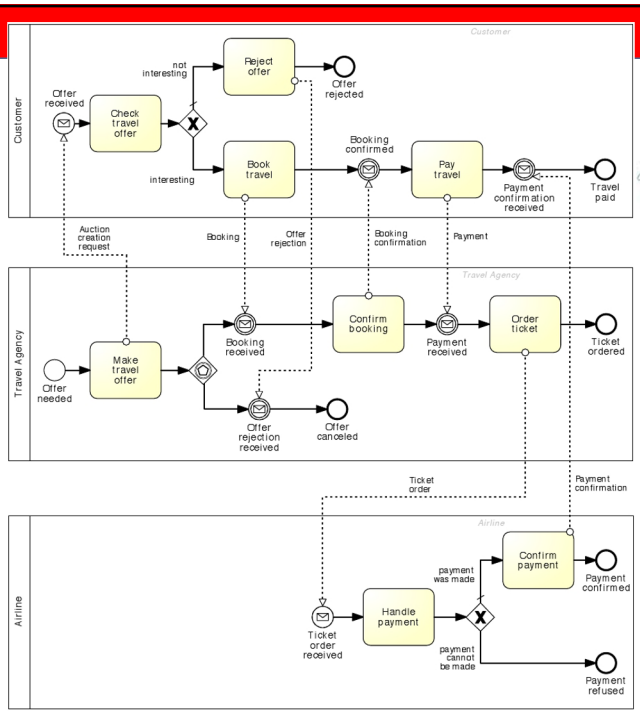
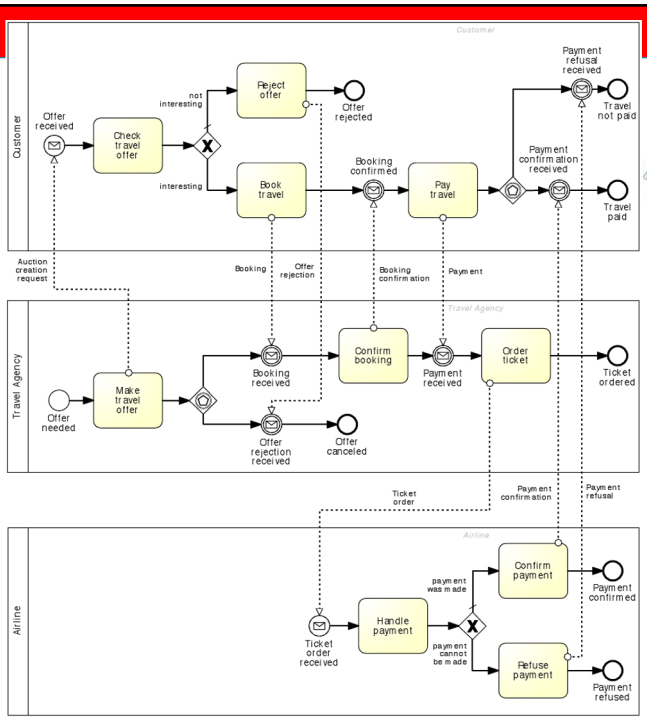
Solution



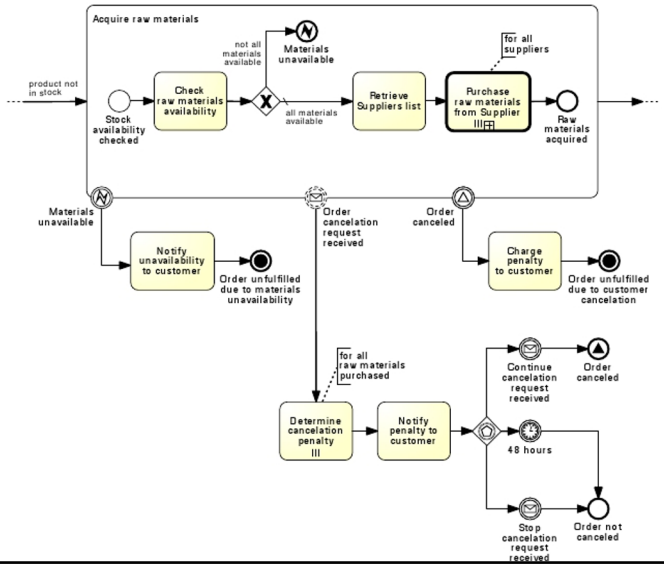
Exercise: Fix the collaboration diagram



Solution



Events Combination



Transaction

Specialized type of sub-process that will have a special behaviour that is controlled through a transaction protocol (such as WS-Transaction)

Logical unit of work which allows grouping of a set of individual activities, so that they either succeed or fail collectivelly

Like atomic transaction type (all success or nothing)

Transaction Real World Example: on-line Payment Transactions

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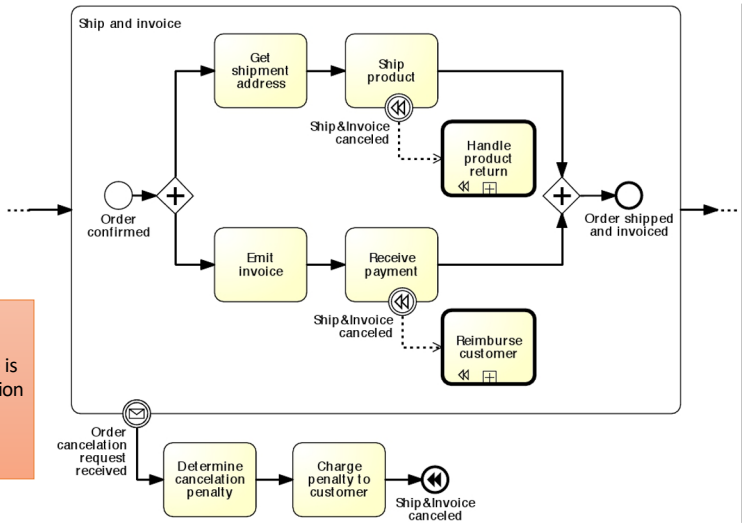
Activity Compensation



As soon as the message is received the compensation is activated.

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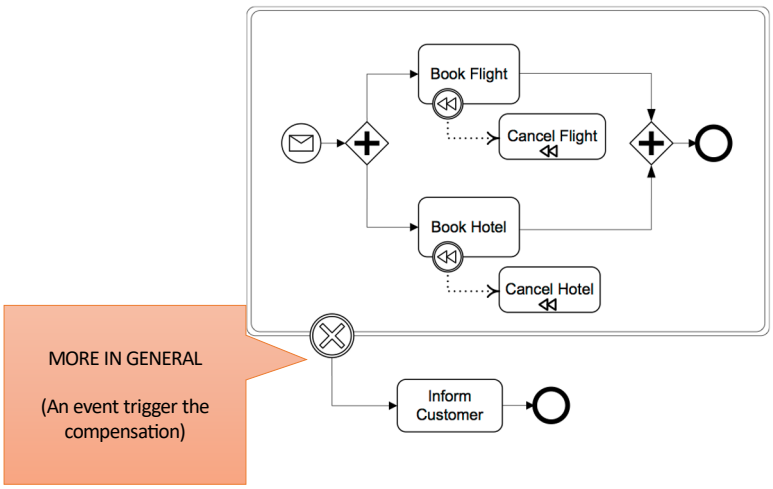
Transaction and compensation



M. Weske: Business Process Management, © Springer-Verlag Berlin Heidelberg 2012, 2007

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Recommendations

- Before adding exceptions it is important to understand the sunny-day scenario well
- Start by modeling the sunny day scenario.
- Then think of all possible situations that can go wrong.
  - For each of these exceptions, identify what type of exception handling mechanism needs to be used
    - First, determine the cause of the exception: internal or external
    - Next, decide if aborting the process is enough, or if a recovery procedure needs to be triggered
    - Finally, evaluate whether the interrupted activity needs to be compensated as part of the recovery procedure.

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Exercise - Model the following routine for logging into an Internet bank account

The routine for logging into an Internet bank account starts once the credentials entered from the user have been retrieved. First, the username is validated. If the username is not valid, the routine is interrupted and the invalid username is logged If the username is valid, the number of password trials is set to zero. Then the password is validated. If this is not valid, the counter for the number of trials is incremented and if lower than three, the user is asked to enter the password again, this time together with a CAPTCHA test to increase the security level. If the number of failed attempts reaches three times, the routine is interrupted and the account is frozen. Moreover, the username and password validation may be interrupted should the validation server not be available. Similarly, the server to test the CAPTCHA may not be available at the time of login. In these cases, the procedure is interrupted after notifying the user to try again later. At any time during the log in routine, the customer may close the web-page, resulting in the interruption of the routine.

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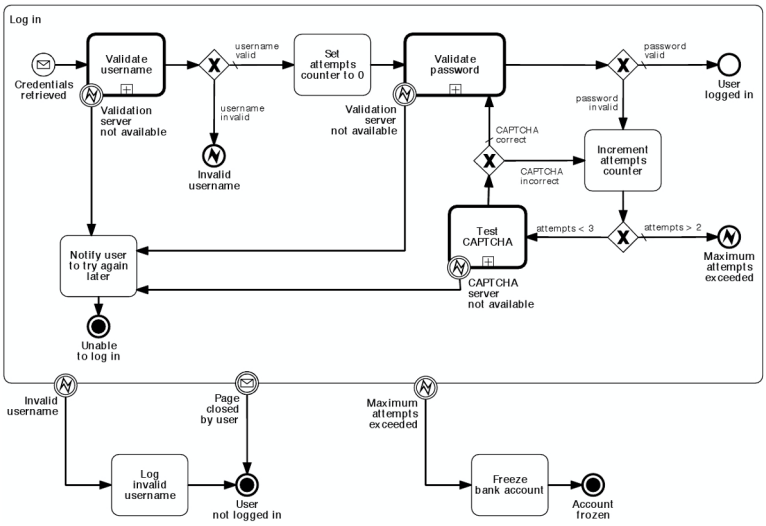
Solution



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Exercise - Model the following process fragment

Once a wholesale order has been confirmed, the supplier transmits this order to the carrier for the preparation of the transportation quote. In order to prepare the quote, the carrier needs to compute the route plan (including all track points that need to be traversed during the travel) and estimate the trailer usage (e.g. whether it is a full track-load, half track-load or a single package). By contract, wholesale orders have to be dispatched within four days from the receipt of the order. This implies that transportation quotes have to be prepared within 48 hours from the receipt of the order to remain within the terms of the contract.

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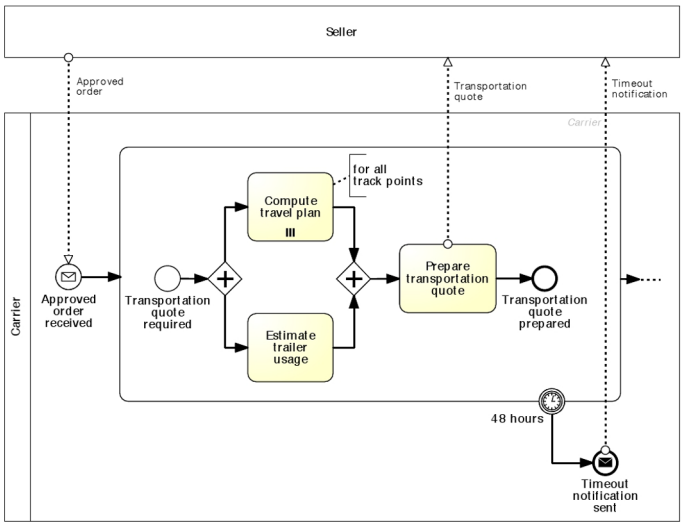
Solution



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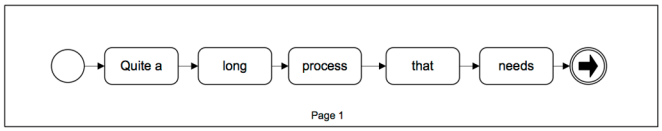
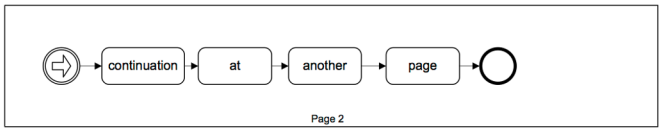
Link Events

Start Intermediate End

Intermediate Link Event – Indicates that the process flow is resumed from a previous diagram (represented elsewhere), or that it continues in a subsequent diagram (represented elsewhere). Often used as an off-page connector.





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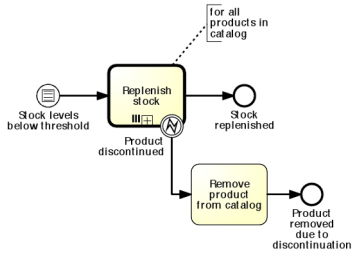
Processes and Business Rules

- A business rule implements an organizational policy or practice.
  - For example, in an online shop, platinum customers have a 20 % discount for each purchase above €250.
- Business rules can appear in different forms in a process model.
  - They can be modeled
    - in a decision activity
    - in the condition of a flow coming out of an (X)OR-split
    - **A third option is to use a dedicated BPMN event called *conditional event***



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Exercise - Model the following business process snippet

In a stock exchange, stock price variations are continuously monitored during the day. A day starts when the opening bell rings and concludes when the closing bell rings. Between the two bells, every time the stock price changes by more than 10 %, the entity of the change is first determined. Next, if the change is high, a “high stock price” alert is sent, otherwise a “low stock price” alert is sent.

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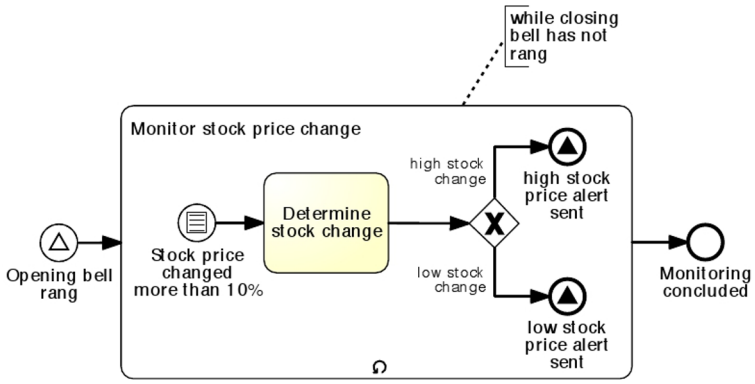
Solution



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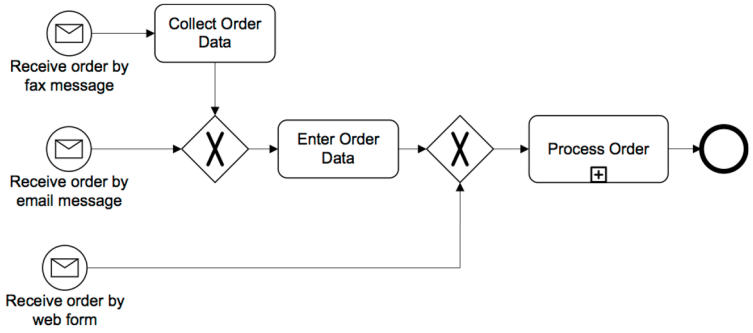
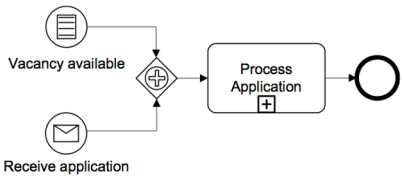
Multiple alternative start events



Multiple Start Events



Both need to occur to instantiate the process

Information Artifacts


Data Object

- **Data Objects** are a mechanism to show how data is required or produced by activities. Represent input and output of a process activity


Data Object Collection

- **A Collection Data Object** represents a collection of information, e.g., a list of order items


Data Input

- **A Data Input** is an external input for the entire process. A kind of input parameter


Data Output

- **A Data Output** is data result of the entire process. A kind of output parameter

Data Object in state s

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Do data objects affect the token flow?

- Input data objects are required for an activity to be executed.
- Even if a token is available on the incoming arc of that activity, the latter cannot be executed until all input data objects are also available.
- A data object is available if it has been created as a result of completing a preceding activity (whose output was the data object itself), or because it is an input to the whole process (like Purchase order).
- Output data objects only affect the token flow indirectly, i.e. when they are used by subsequent activities.

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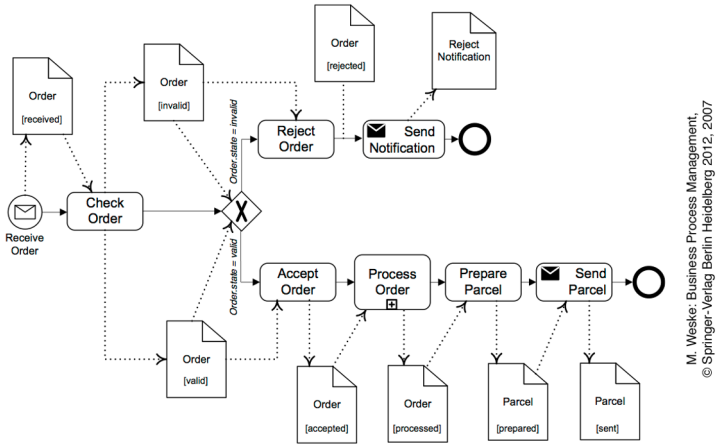
Process diagram involving data-object



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Data Store

- **A Data Store** is a place where the process can read or write data, e.g., a database or a filing cabinet. It persists beyond the lifetime of the process instance

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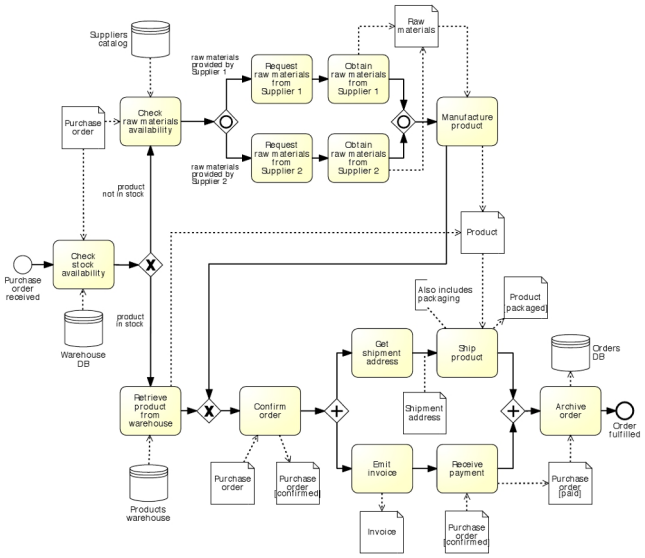
Process Diagram Involving Information Artifact



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Do we always need to model data objects?

- Data objects help the reader understand the flow of business data from one activity to the other
- **However**, the price to pay is an increased complexity of the diagram
- **Use them only when they are needed for a specific purpose**, e.g. to highlight potential issues in the process under analysis or for automation

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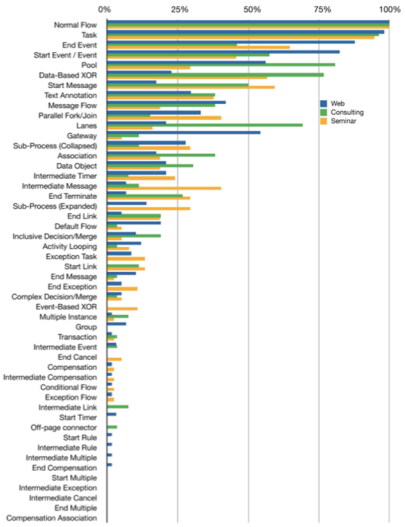
Use of BPMN elements into practice



The BPMN 2.0 [15] defines 50 constructs and their attributes. However, less than 20% of its vocabulary is used regularly in designing BP models [14].

zur Muehlen, Michael and Recker, Jan C. (2008) How Much Language is Enough? Theoretical and Practical Use of the Business Process Modeling Notation . In Proceedings 20th International Conference on Advanced Information Systems Engineering, Montpellier, France.

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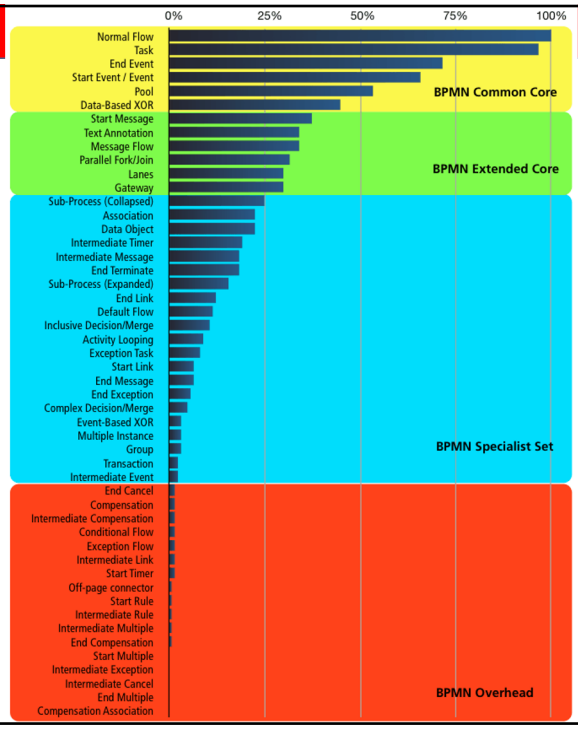
How much language do you need?



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BPMN 2.0 free editors

- ADOxx - http://www.adoxx.org/live/home
- Oryx online editor: http://bpt.hpi.uni-potsdam.de/Oryx
- BizAgi editor (Windows): http://www.bizagi.com/
- Sketchpad Java editor (still in development): http://sourceforge.net/projects/sketchpadbpmn/develop
- Intalio|BPM community edition: http://www.intalio.com/products/bpm/community-edition/
- Eclipse BPMN modeler: http://www.eclipse.org/bpmn/
- Visio stencils: http://bpt.hpi.uni-potsdam.de/Public/BPMNCorner#Tooling
- Other tools & info: http://bpmn.org/BPMN_Supporters.htm
- https://camunda.com/

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Business Process (Modelling Activities)

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Exercises

Using a BPMN 2.0 notation model the following process

- Cooking an Apple Pie
- Enrollment at a university
- Buy a fly ticket
- Buy a book on-line
- Moving from one city to another

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Let's Model: Insurance Claim

1. recording the receipt of the claim
2. establishing the type of the claim
3. checking covering of client's policy
4. checking the premium (payments up to date?)
5. rejection, if 3 or 4 has negative result
6. producing a rejection letter
7. roughly estimate the amount to be paid, if 3 & 4 have positive results 8. appointment of an assessor, if needed
9. revision of the amount offered to the client
10. recording client's reaction
11. assessment of objection: decision to revise 9 or take legal action 12 12. legal proceedings
13. payment of claim
14. filing and closure of claim

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Modelling Travel agency

Travel agency: define a series of task for booking a flight, a hotel and optionally a car, with the possibility to change dates, to cancel the booking, to confirm the booking. Then, draw a process diagram relating the tasks.

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Modelling Coffee break

Coffee break: draw the process diagram for a vending machine that accepts a coin, then gives the possibility (1) to get a coffee or (2) to insert another coin and get either a cappuccino or a tea. Draw the process diagrams for a compatible and a "problematic" butler robot.

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Modelling Bike Sharing and Bike Travel

Bike Sharing and Bike Travel: define a series of task for bike traveling, with the possibility to register, to track, and to maintain the bike. Then, draw a process diagram relating the tasks.

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BPMN by example

Object Management Group
Business Process Model and Notation

Home | Documents | Quick Guide | Examples | Implementers | Resources | Cloud Apps

Charter

A standard Business Process Model and Notation (BPMN) will provide businesses with the capability of understanding their internal business procedures in a graphical notation and will give organizations the ability to communicate these procedures in a standard manner. Furthermore, the graphical notation will facilitate the understanding of the performance collaborations and business transactions between the organizations. This will ensure that businesses will understand themselves and participants in their business and will enable organizations to adjust to new internal and B2B business circumstances quickly.

BPM GLOSSARY
Search for a BPM term:
Submit

Current BPMN Specification

- BPMN v2.0
- BPMN 2.0 by Example: non-normative OMG document with BPMN 2.0 examples
- BPMN Quick Guide

BPM Certification

The OCEB program consists of five examinations, granting five Certifications. Above the single Fundamental level, the program splits into two tracks - one Business-oriented , the other Technically oriented.

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