

4 Activities

- ▷ Activity Types
- ▷ Activities Markers
- ▷ Task Types

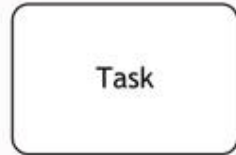


Activities




A Task is a unit of work, the job to be performed. When marked with a  symbol it indicates a Sub-Process, an activity that can be refined.

Activities



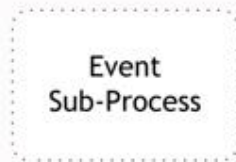
Task

A Task is a unit of work, the job to be performed. When marked with a  symbol it indicates a Sub-Process, an activity that can be refined.



Transaction

A Transaction is a set of activities that logically belong together; it might follow a specified transaction protocol.




Event Sub-Process

An Event Sub-Process is placed into a Process or Sub-Process. It is activated when its start event gets triggered and can interrupt the higher level process context or run in parallel (non-interrupting) depending on the start event.



Call Activity

A Call Activity is a wrapper for a globally defined Task or Process reused in the current Process. A call to a Process is marked with a  symbol.

Conversations



A Conversation defines a set of logically related message exchanges. When marked with a  symbol it indicates a Sub-Conversation, a compound conversation element.

Choreographies




A Choreography Task



A Sub-Choreography contains a refined choreography with several interactions.



A Call Choreography is a wrapper for a globally defined Choreography Task or Sub-Choreography. A call to a Sub-Choreography is marked with a  symbol.

Events

	Start	Intermediate	End
Standard			
Event Sub-Process Interrupting			
Event Sub-Process Non-Interrupting			
Catching			
Boundary Interrupting			
Boundary Non-Interrupting			
Throwing			
Standard			

None: Untyped events, indicate start point, state changes or final states.

Activity Markers

Markers indicate execution behavior of activities:

-  Sub-Process Marker
-  Loop Marker
-  Parallel MI Marker
-  Sequential MI Marker
-  Ad Hoc Marker
-  Compensation Marker

Task Types

Types specify the nature of the action to be performed:

-  Send Task
-  Receive Task
-  User Task
-  Manual Task
-  Business Rule Task
-  Service Task
-  Script Task

Parallel Gateway



When used to split the sequence flow, all outgoing branches are activated simultaneously. When merging parallel branches it waits for all incoming branches to complete before triggering the outgoing flow.



Inclusive Gateway
When splitting, one or more branches are activated. All active incoming branches must complete before merging.



Complex Gateway
Complex merging and branching behavior that is not captured by other gateways.



Exclusive Event-based Gateway (Instantiate)
Each occurrence of a subsequent event starts a new process instance.



Parallel Event-based Gateway (Instantiate)
The occurrence of all subsequent events starts a new process instance.

Swimlanes



Message Flow symbolizes information flow across organizational boundaries. Message flow can be attached to pools, activities, or message events. The Message Flow can be decorated with an envelope depicting the content of the message.



Pools (Participants) and Lanes represent responsibilities for activities in a process. A pool or a lane can be an organization, a role, or a system. Lanes subdivide pools.



The order of message exchanges can be specified by combining message flow and sequence flow.



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



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



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

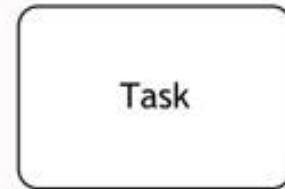



A Data Association is used to associate data elements to Activities, Processes and Global Tasks.



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.

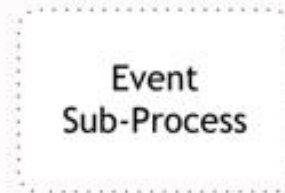
Activity Types



A **Task** is a unit of work, the job to be performed. When marked with a  symbol it indicates a **Sub-Process**, an activity that can be refined.




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1

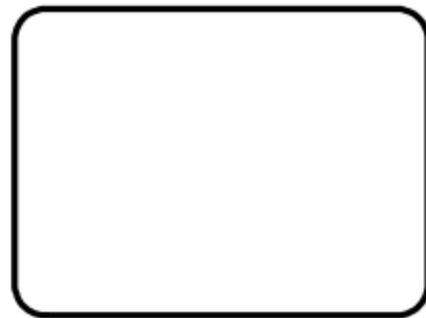
Task / Sub-process

Activity Types : 1. Task / Sub-Process

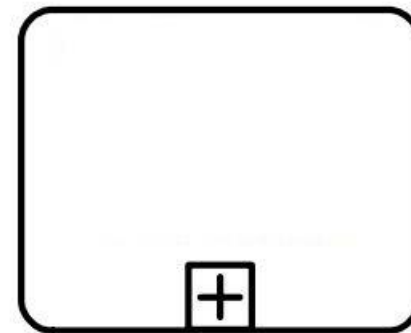
Task : is an atomic activity within a process flow

Sub-Process : is a compound activity that represents a collection of other tasks and sub-processes

Task object shares the same shape as the Sub-Process except + sign



Task Sample



Sub-Process
Sample

2

Call Activity

Activity Types : 2. Call Activity

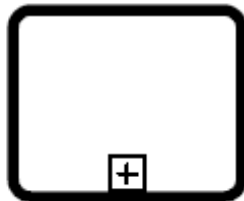
Activity defined in a process that is external to the current process definition.

Call Activity is a Point in the Process where a global Processor or a Global Task is used

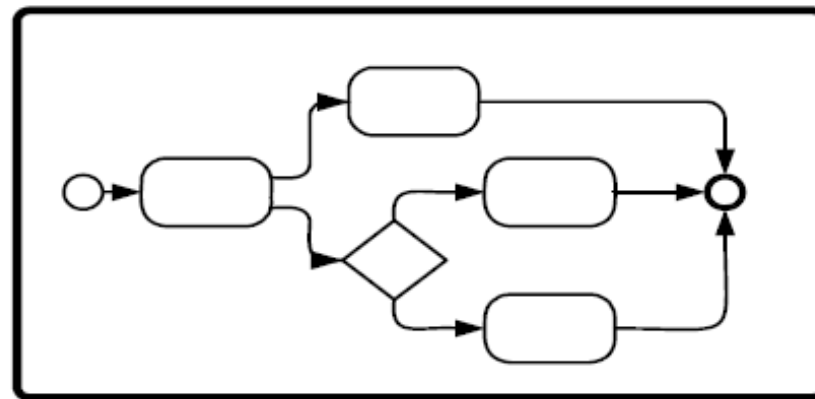
It allows you to create a **reusable** process definition that can be reused in multiple other process definitions.



A Call Activity object calling a Global Task



A Call Activity object calling a Process (Collapsed)



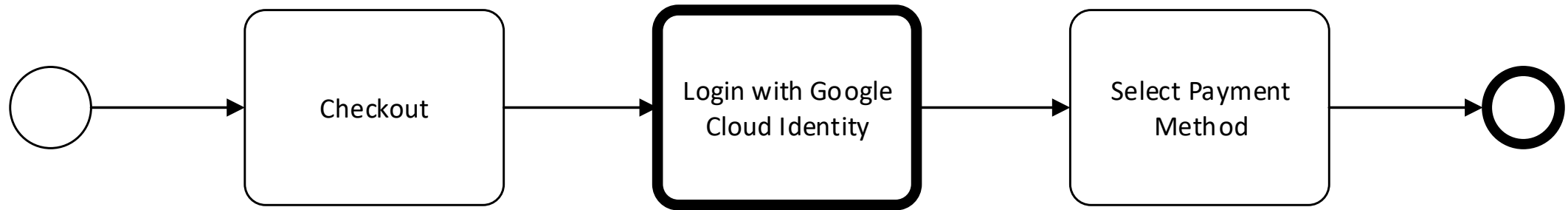
A Call Activity object calling a Process (Expanded)

Activity Types : 2. Call Activity Real World Example



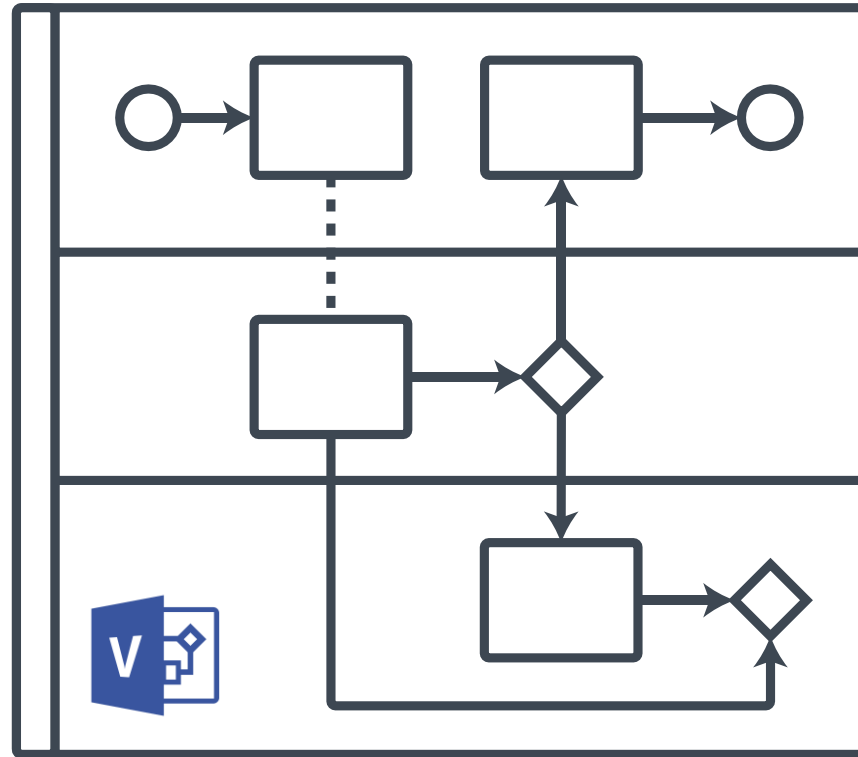
Login with
Google Cloud Identity

Activity Types : 2. Call Activity BPMN Example



Call Activity Sample

Activity Types : 2. Call Activity BPMN Hands-on



BPMN Demo using Microsoft Visio

3

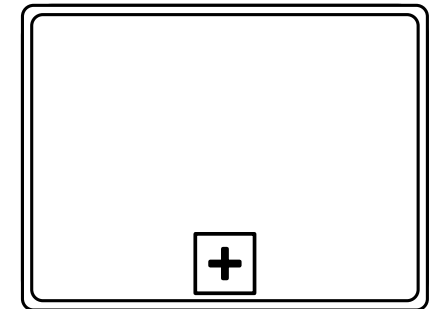
Transaction Activity

Activity Types : 3. Transaction

Specialized type of sub-process that will have a special behavior 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 collectively

Like atomic transaction type (all success or nothing)



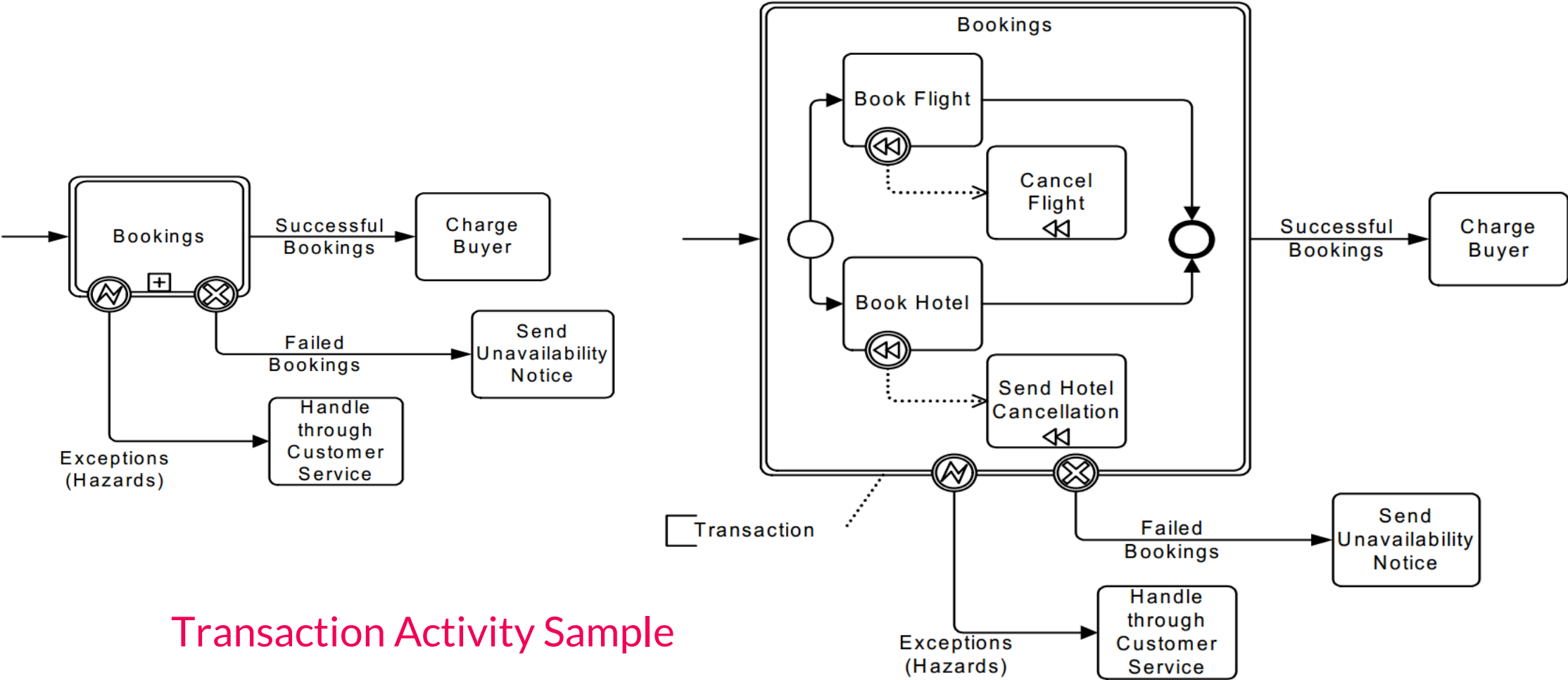
Transaction
Sample

Activity Types : 3. Transaction Real World Example



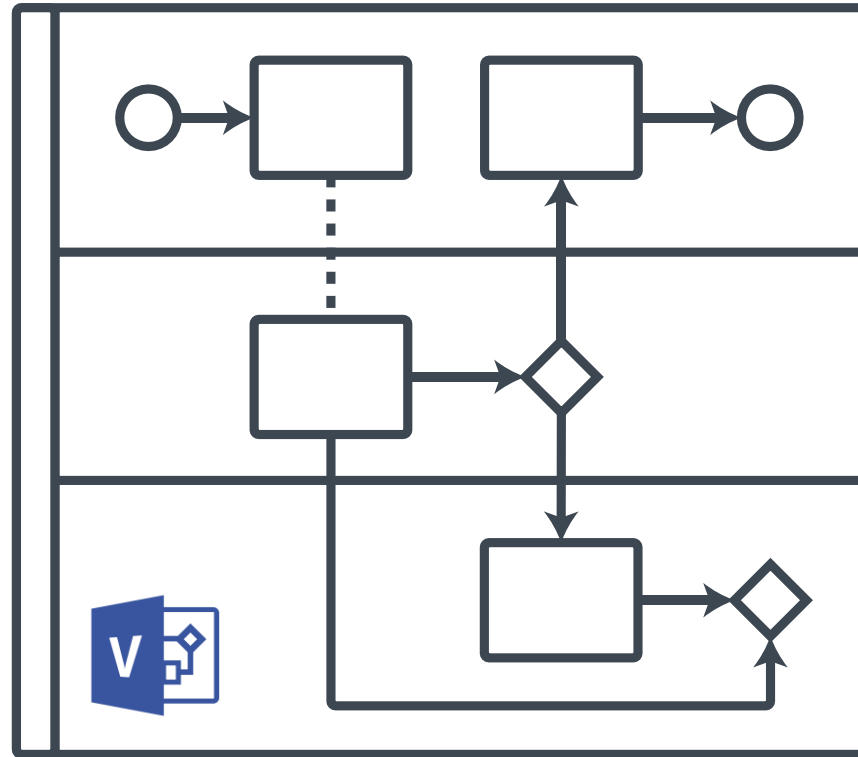
Online Payment
Transactions

Activity Types : 3. Transaction BPMN Example



Transaction Activity Sample

Activity Types : 3. Transaction BPMN Hands-on



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Activity markers Types

-  Sub-Process Marker
-  Loop Marker
-  Parallel MI Marker
-  Sequential MI Marker
-  Ad Hoc Marker
-  Compensation Marker

1

Sub Process Activity

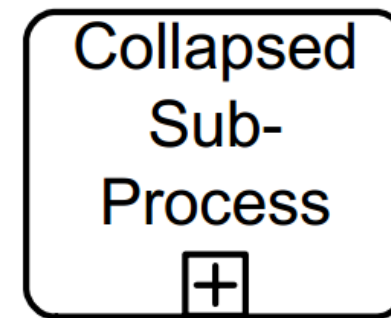
Activity markers Types – 1. Sub-Process

Subprocesses represent a collection of activities (and gateways and flows) being represented collectively as a single activity

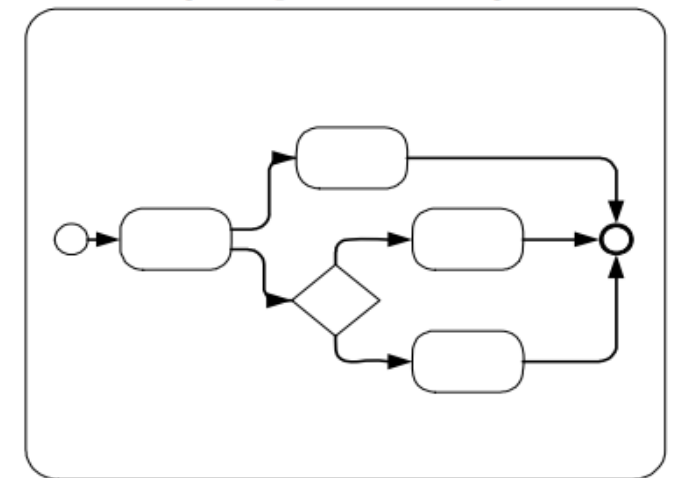
Sub-Process can have an expanded or collapsed representation

Reduce the complexity of the entire flow so it becomes much easier to understand the logic of the process!

Sub-process Activity Notation



**Sub-Process
(Expanded)**

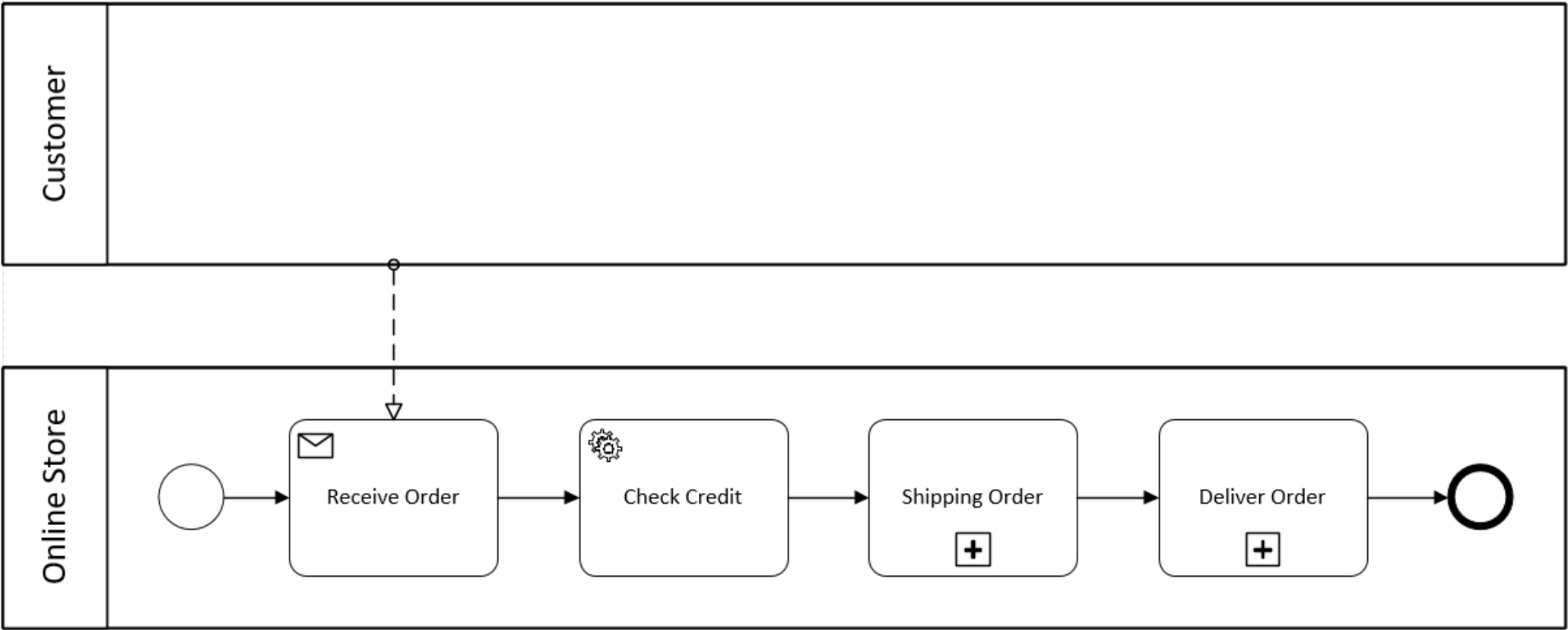


Activity markers Types – 1. Sub-Process Real World Example



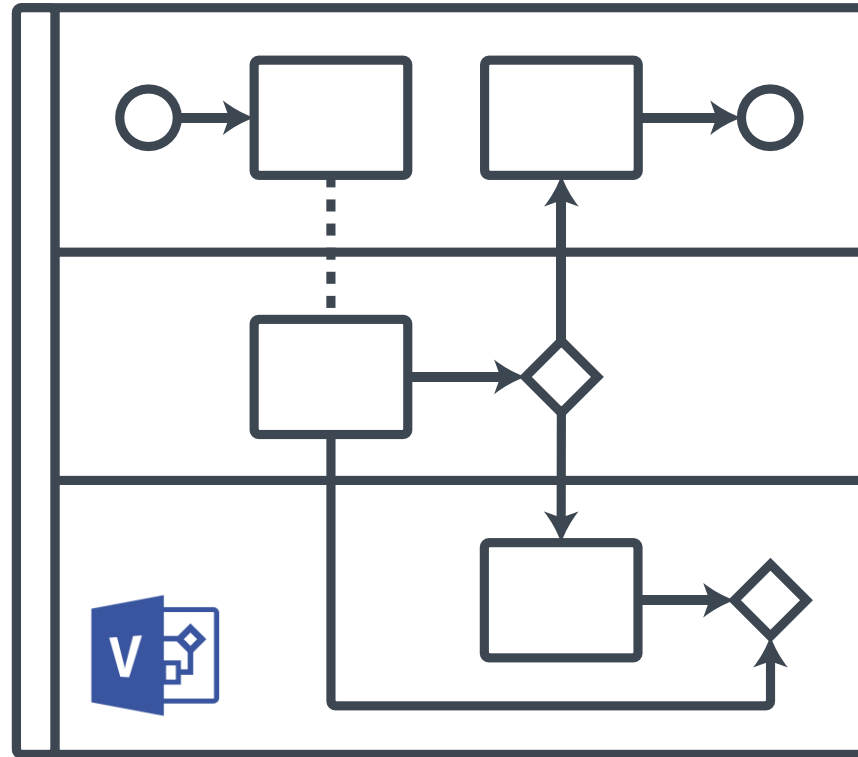
Shipping process in
Online Purchase Orders

Activity markers Types – 1. Sub-Process BPMN Example



Sub-process Task Sample

Activity markers Types – 1. Sub-Process BPMN Hands-on



BPMN Demo using Microsoft Visio

2

Loop Activity

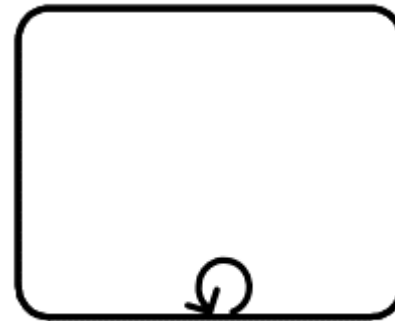
Activity markers Types – 2. Loop Activity

Loop Activity is repeated until the loop condition is met (While loop)

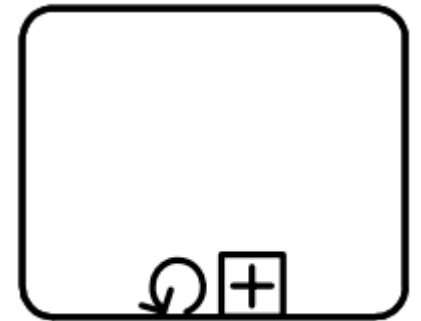
Loop condition is defined in the activity properties

Loop can applied into task or subprocess

Like while(condition) in programming

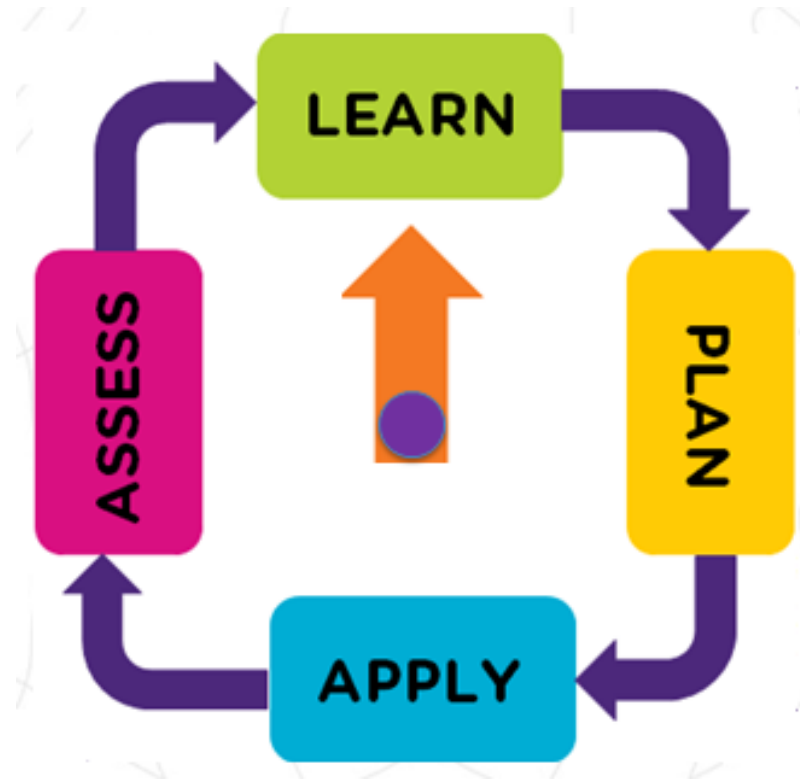


Loop Task
Activity



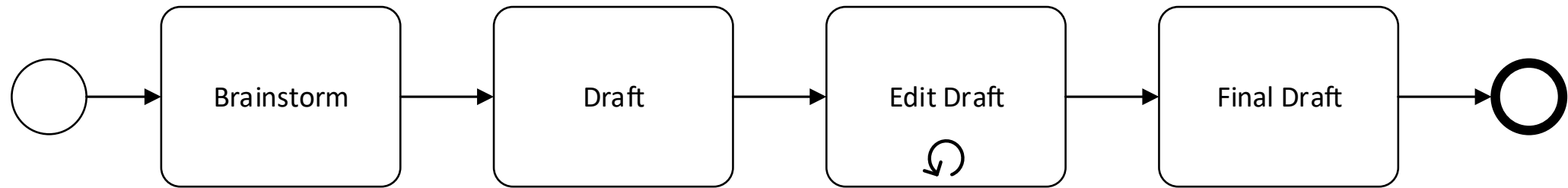
Loop Subprocess
Activity

Activity markers Types – 2. Loop Activity Real World Example



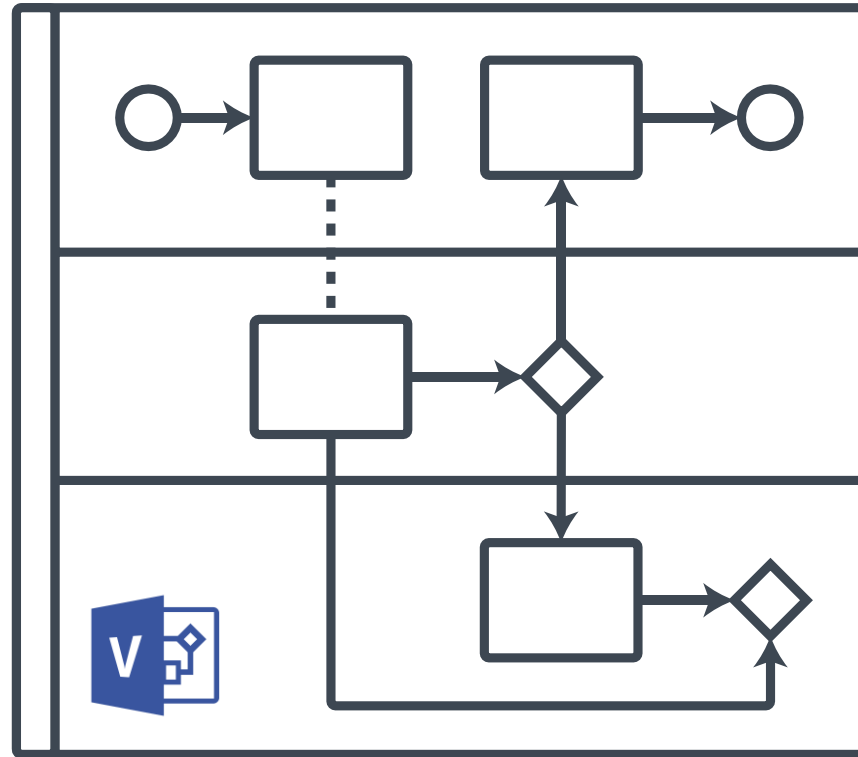
Continuous Learning Loop

Activity markers Types – 2. Loop Activity BPMN Example



Loop Task Sample

Activity markers Types – 2. Loop Activity BPMN Hands-on



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3

Multi Instance Activity

Activity markers Types – 3. Multi Instance Activity

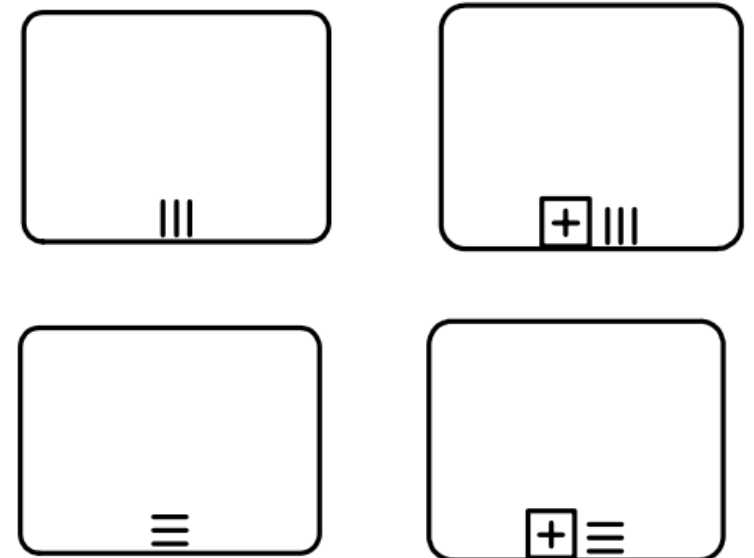
Multi-instance activity can run with other identical activities simultaneously.

Multi-instance marker will cause the activity to be executed multiple times at runtime.

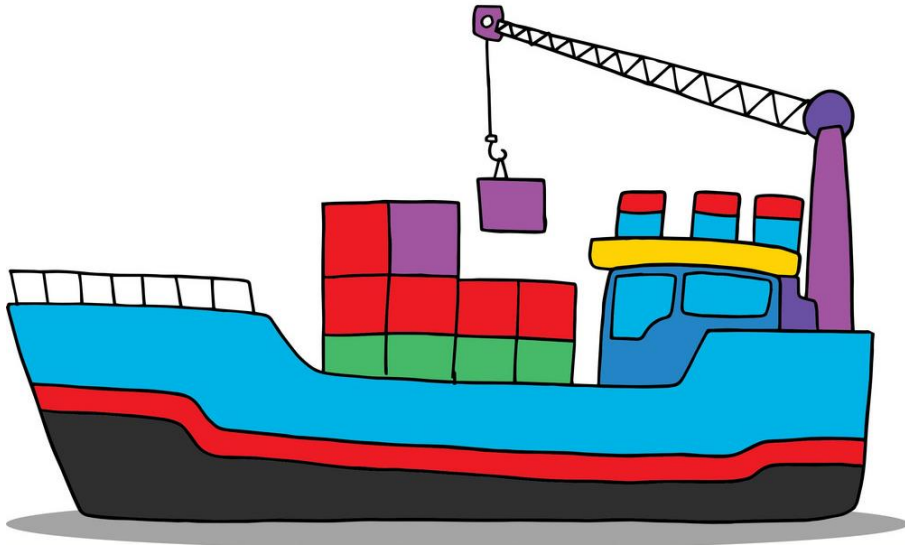
The instances may be executed in parallel or sequential

Like foreach in programming

Multi-instance Activity
Notation



Activity markers Types – 3. Multi Instance Activity Real World Example



Transport containers
from ship



Review Employees
Reports

Activity markers Types – 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)

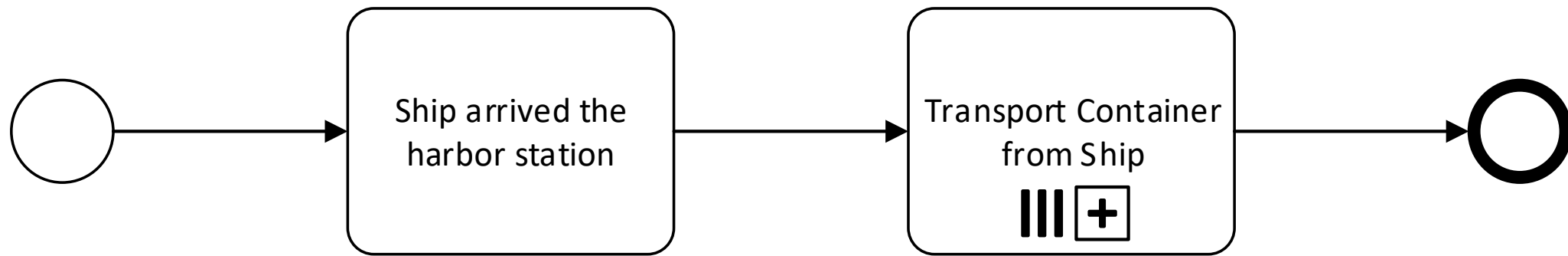
Use multi-instance when :

Activity is performed many 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

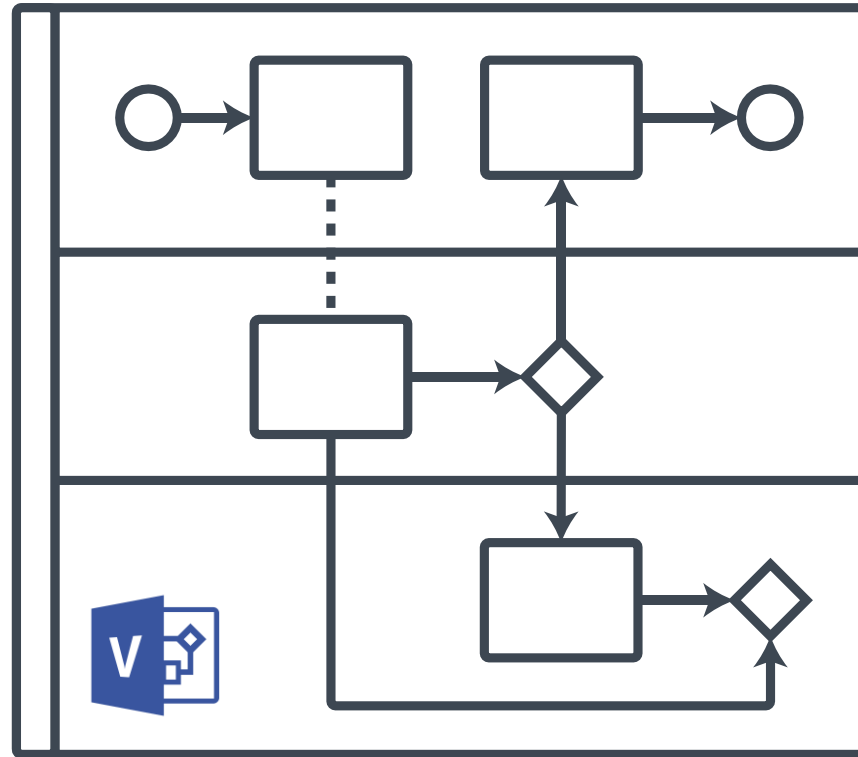
> Foreach (x in array of instants)

Activity markers Types – 3. Multi Instance Activity BPMN Example



Multi Instance Sample

Activity markers Types – 3. Multi Instance Activity BPMN Hands-on



BPMN Demo using Microsoft Visio

4

Ad Hoc Activity

Activity markers Types – 4. Ad Hoc Activity

Ad hoc subprocess is one in which the specified steps are defined, but the order of operations is not

This type of representation is common for documenting of manual processes that do not have defined sequences.

Use it if there is no execution dependency between activities inside ad hoc process .



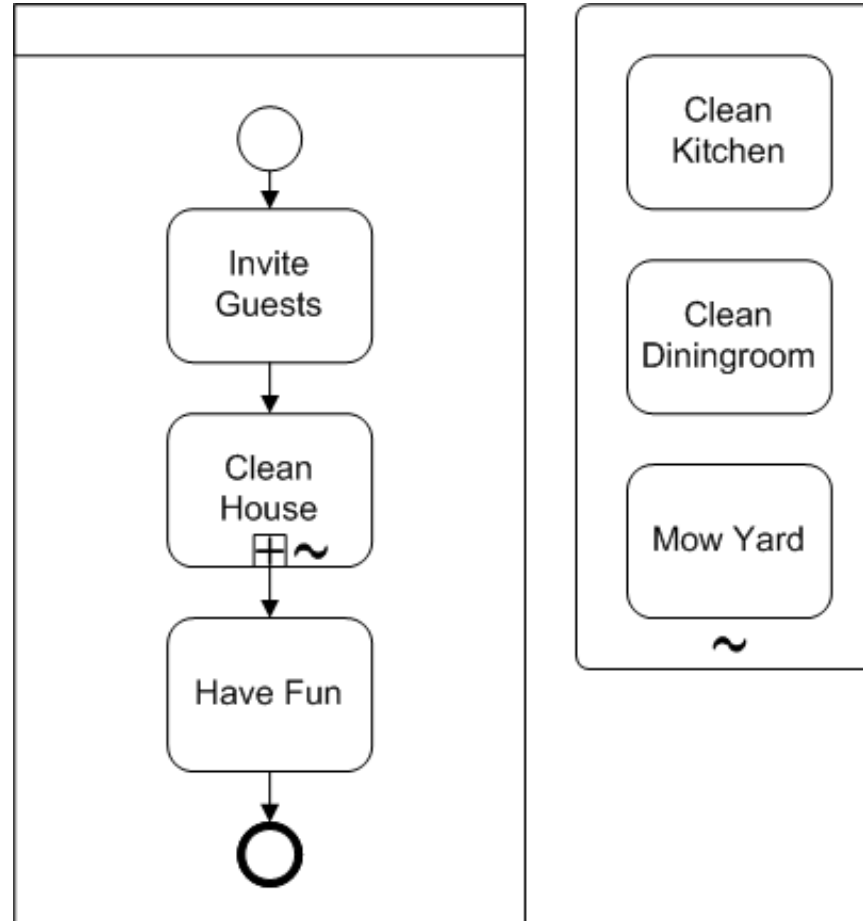
Ad hoc activity
Notation

Activity markers Types – 4. Ad Hoc Activity Real World Example



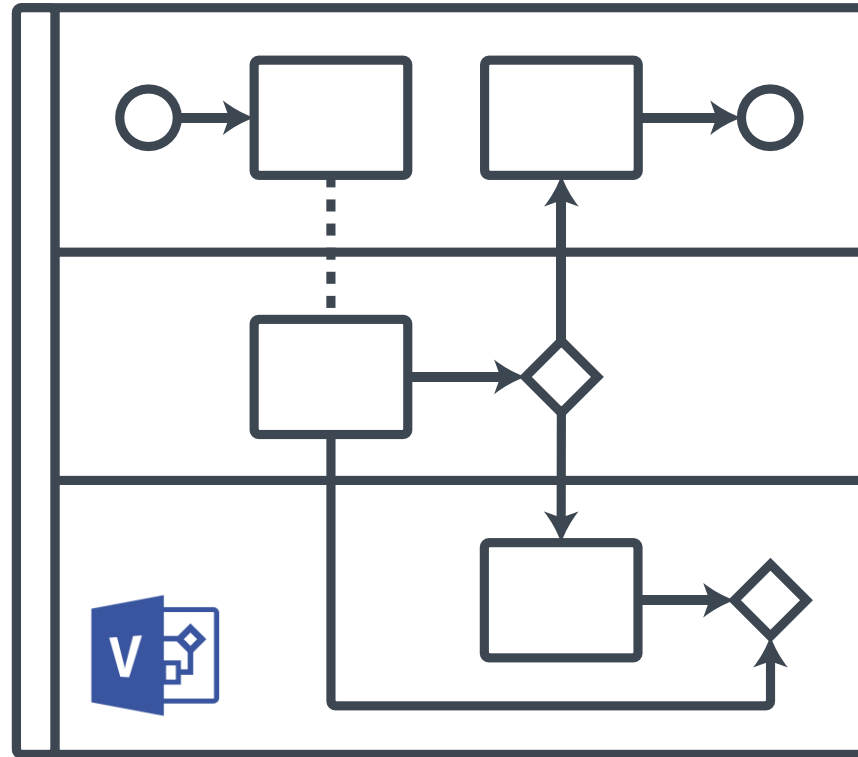
Ad hoc technical support
channels

Activity markers Types – 1 4. Ad Hoc Activity BPMN Example



Ad hoc activity Sample

Activity markers Types – 4. Ad Hoc Activity BPMN Hands-on



BPMN Demo using Microsoft Visio

5

Compensation Activity

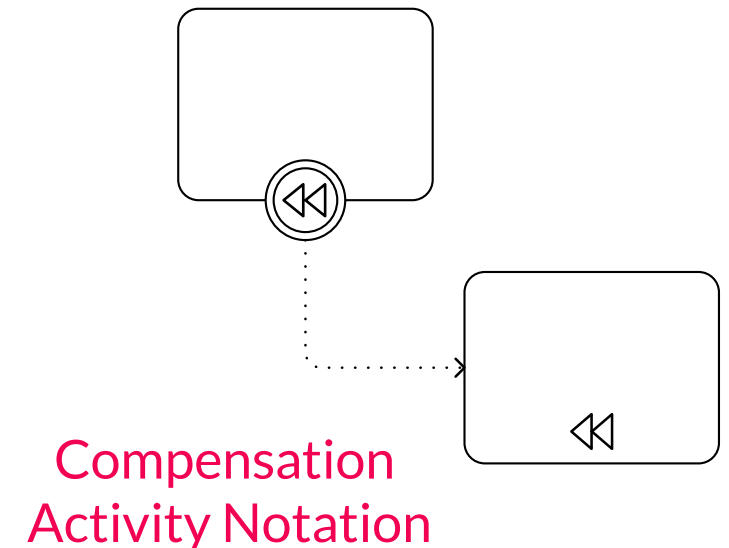
Activity markers Types – 5. Compensation Activity

Compensation is concerned with **undoing** steps that were already successfully completed, because their results and possibly **side effects** are no longer desired and need to be reversed.

If an Activity is still active, it cannot be compensated, but rather needs to be canceled.

Compensation is performed by a compensation handler.

A compensation handler performs the steps necessary to reverse the effects of an Activity



Activity markers Types – 5. Compensation Activity Real World Example



Flight Cancellation
Compensation plan

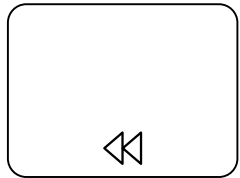
Activity markers Types – 5. Compensation Activity BPMN Example



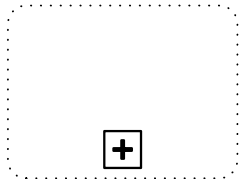
Compensation throw Event ,
which trigger compensation process



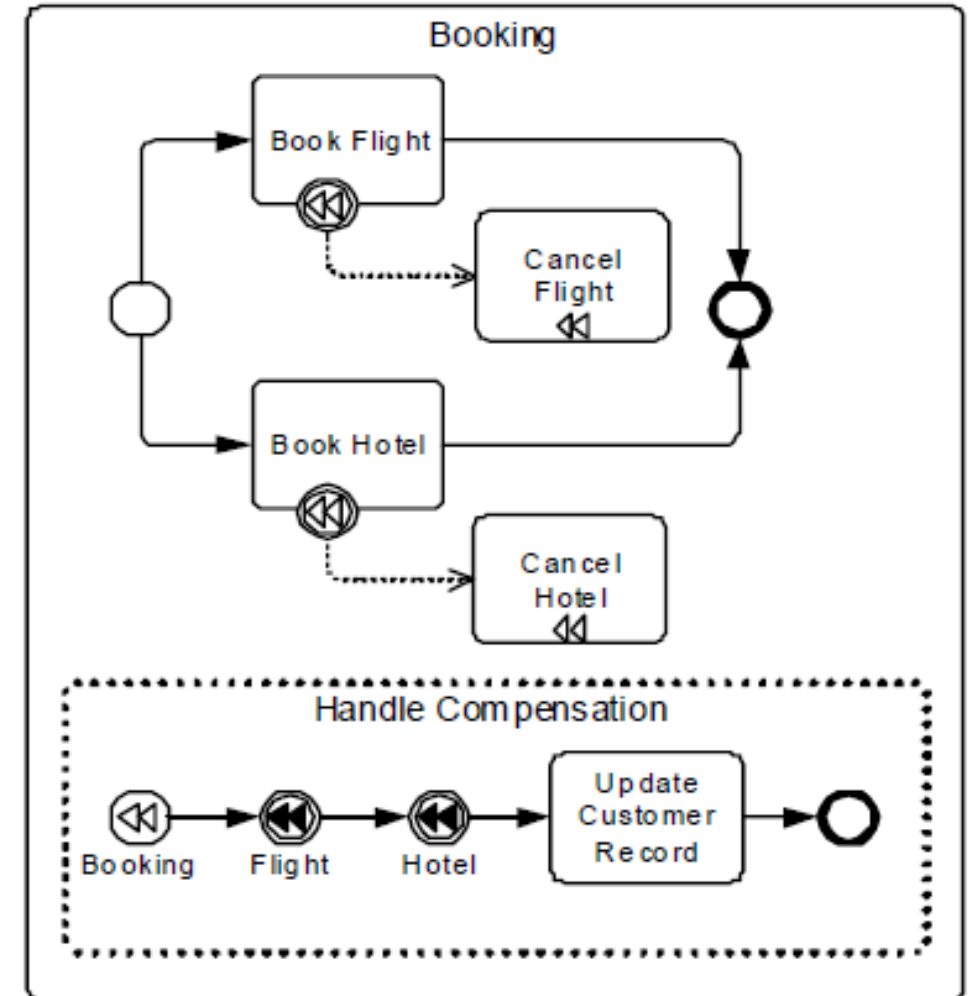
handling catch Compensation Event ,
Which connected to compensation undo task



Compensation marker task that will
Perform undo action

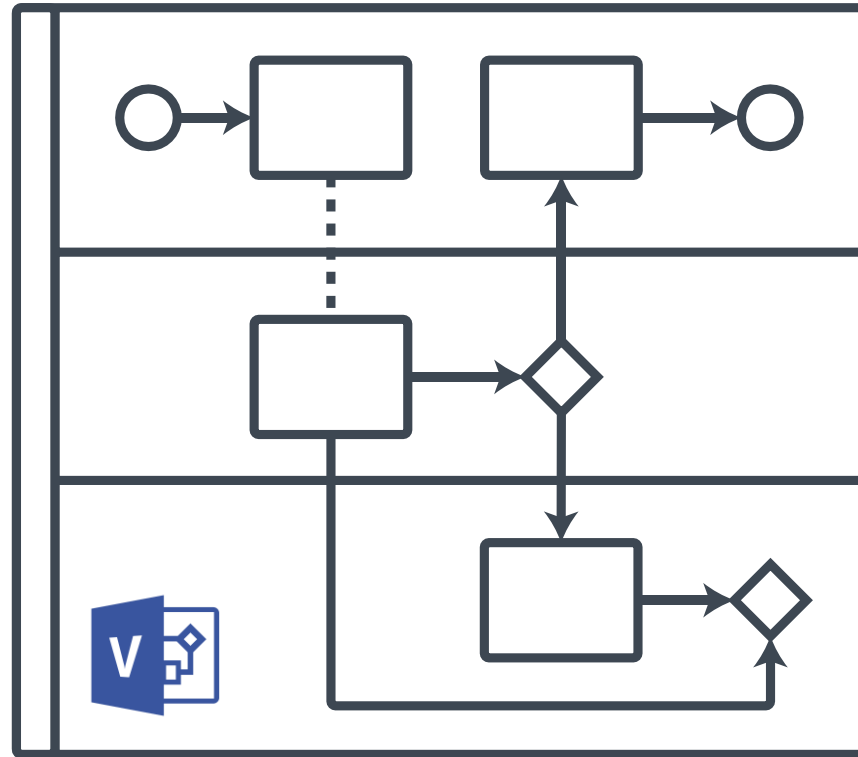


Event sub-process that will handle
the compensation process , in case of failure



Compensation Activity Sample

Activity markers Types – 5. Compensation Activity BPMN Hands-on



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Task Behavior Types



Send Task



Receive Task



User Task



Manual Task



Business Rule Task



Service Task



Script Task

1

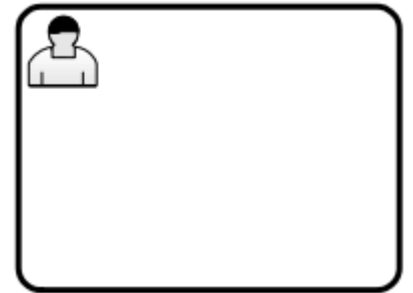
User Task

Task Behavior Types – 1. User Task

Task where a human performer performs the Task with the assistance of a software application (process-aware app)

It represents a typical “workflow” Task

User Tasks are assumed to be performed via an application’s user interface



User Task
Notation

Task Behavior Types – 1. User Task Real World Example



Registration Form

Email:

First Name:

Last Name:

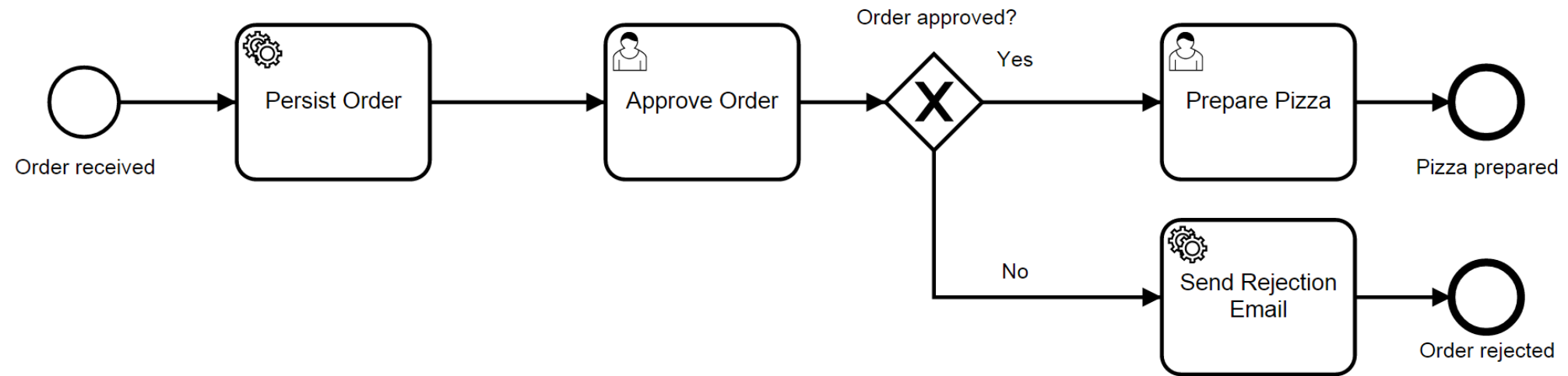
SUBSCRIBE

A customer fulfils an online registration form



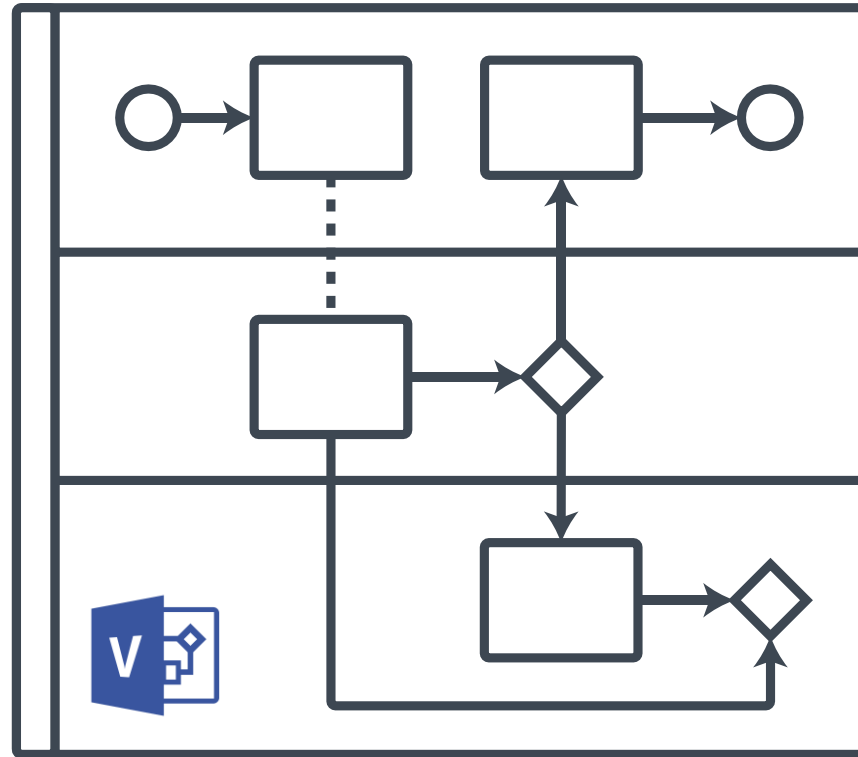
An editor approves an article for publishing

Task Behavior Types – 1. User Task BPMN Example



User Task Sample

Task Behavior Types – 1. User Task BPMN Hands-on



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2

Manual Task

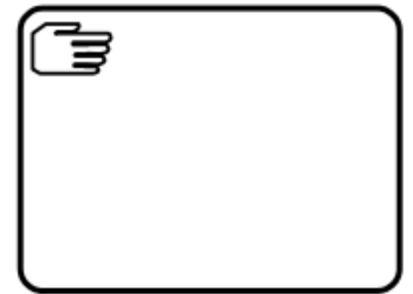
Task Behavior Types – 2. Manual Task

Task that is expected to be performed without the aid of

- Any business process execution engine
- Or any application

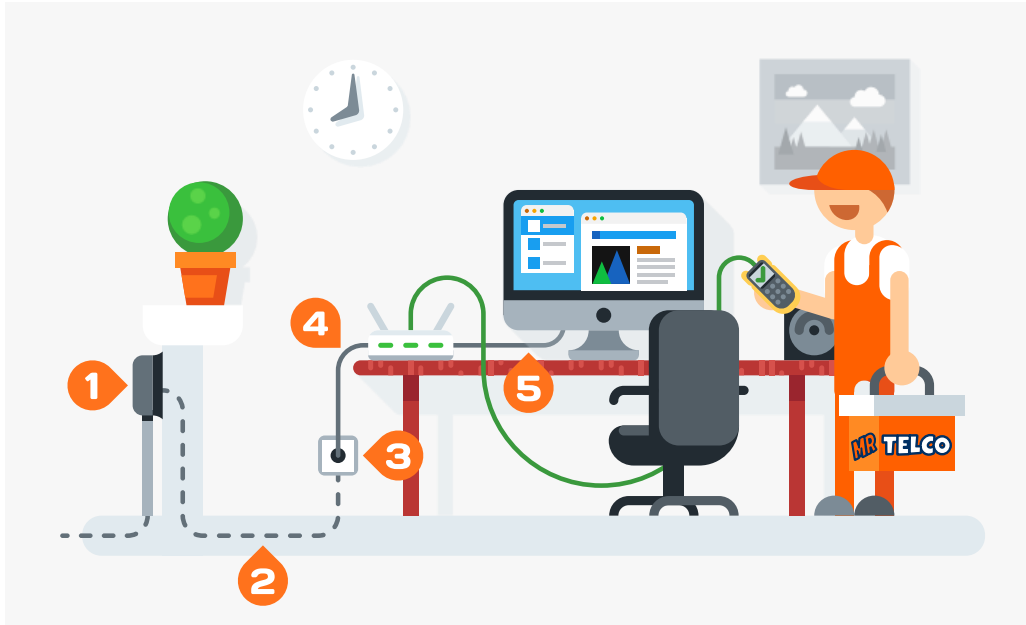
Type of BPMN Task which requires human involvement to complete.

A Manual Task provides no system interface to the performer, so it is inherently not executable in a BPMS.



Manual Task
Notation

Task Behavior Types – 2. Manual Task Real World Example

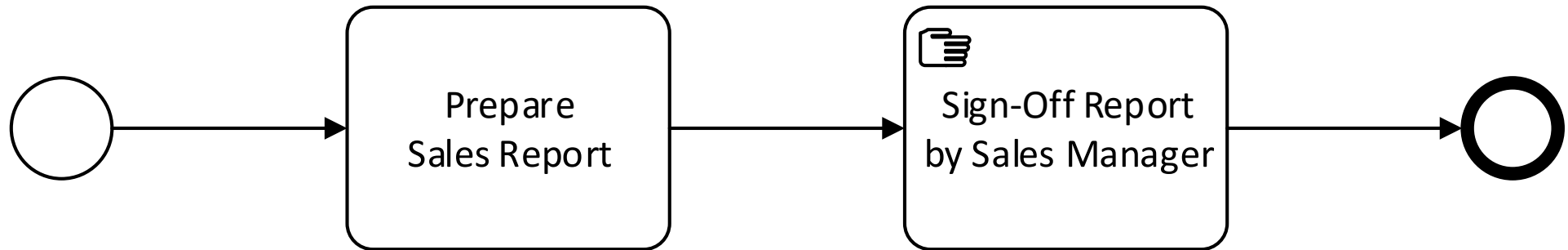


A telephone technician installs a telephone at a customer location



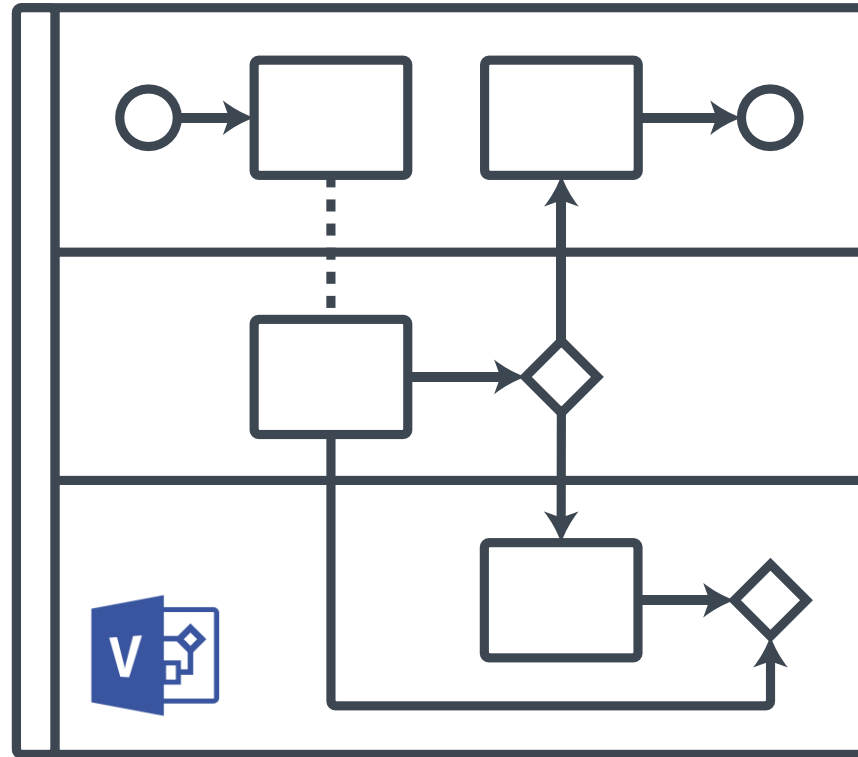
Loading a truck with product

Task Behavior Types – 2. Manual Task BPMN Example



Manual Task Sample

Task Behavior Types – 2. Manual Task BPMN Example



BPMN Demo using Microsoft Visio

3

Send Task

Task Behavior Types – 3. Send Task

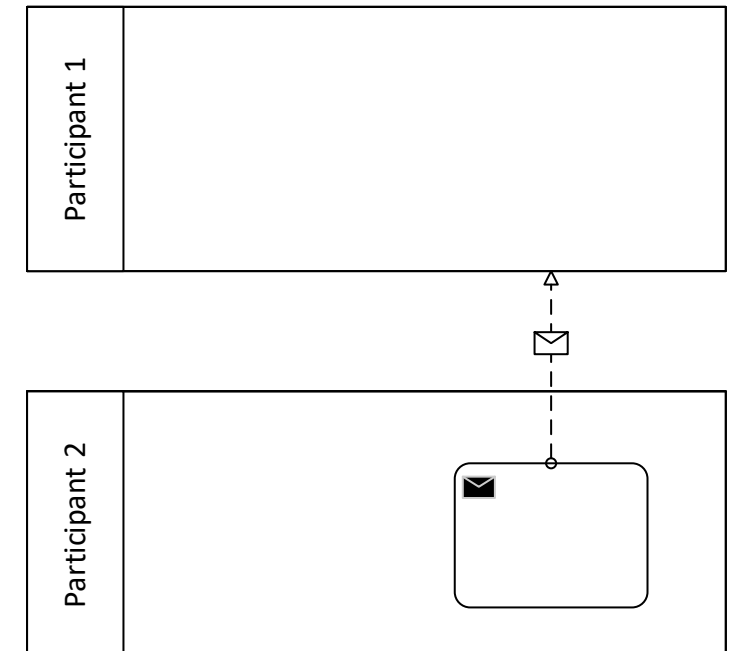
Simple Task that is designed to send a Message to an external Participant

Once the Message has been sent, the Task is completed

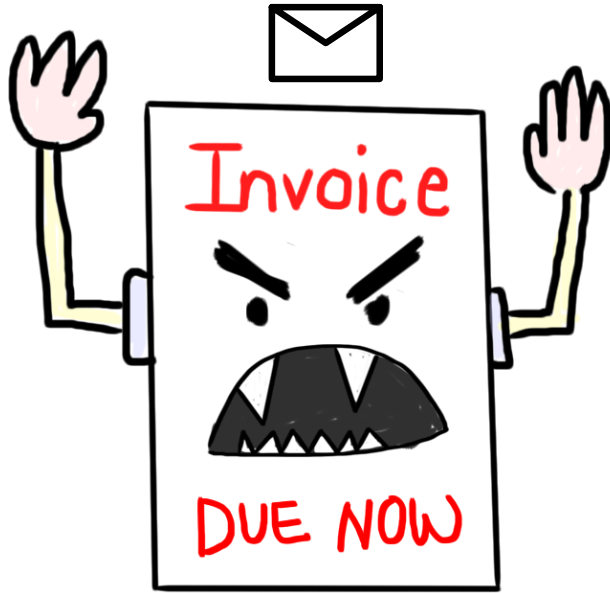
The actual Participant who sends the Message can be identified by connecting the Send Task to a Participant by using a Message Flow.



Send Task
Notation



Task Behavior Types – 3. Send Task Real World Example

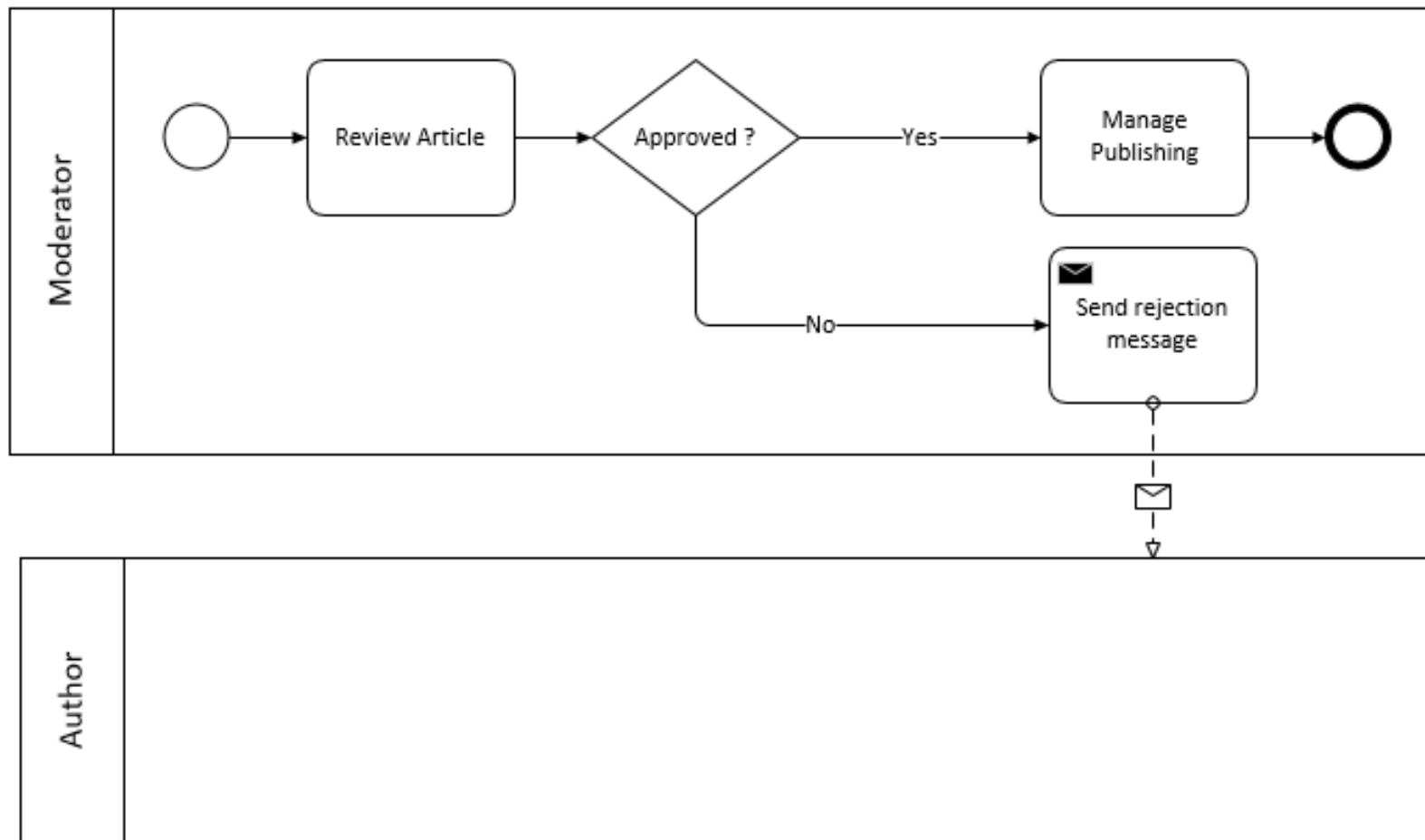


When the purchase is complete, send the invoice to the customer,



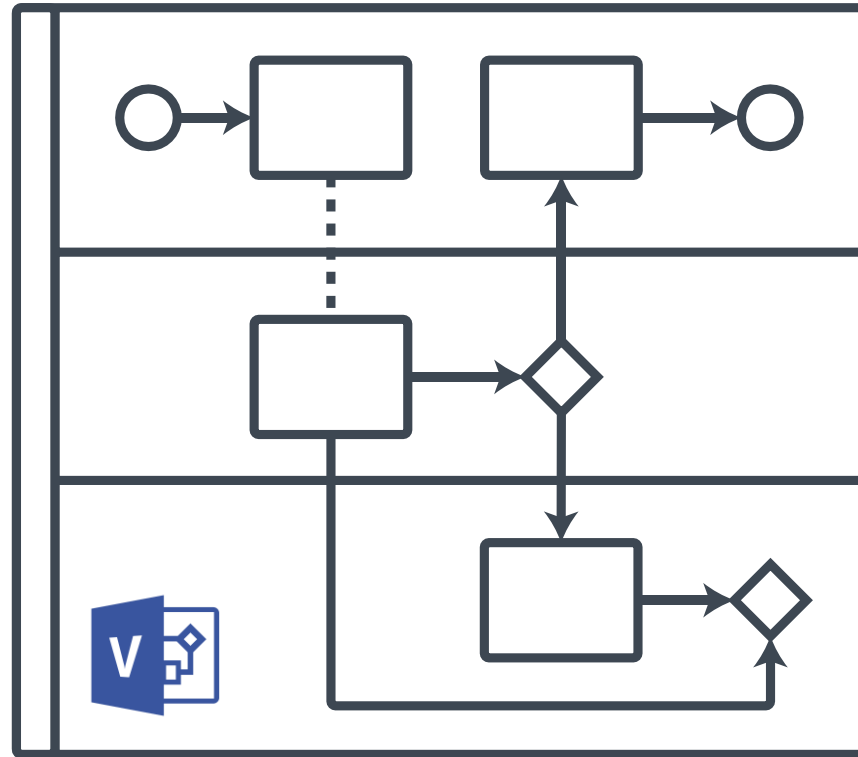
When the article is published, inform the author

Task Behavior Types – 3. Send Task BPMN Example



Send Task Sample

Task Behavior Types – 3. Send Task BPMN Example



BPMN Demo using Microsoft Visio

4

Receive Task

Task Behavior Types – 4. Receive Task

A Receive Task indicates that the process has to wait for a message to arrive from external participant in order to continue ,

Task is completed once message has received

Receive Task is often used to start a Process.

Receive task is the opposite of the Send Task.



Receive Task
Notation

Task Behavior Types – 4. Receive Task Real World Example

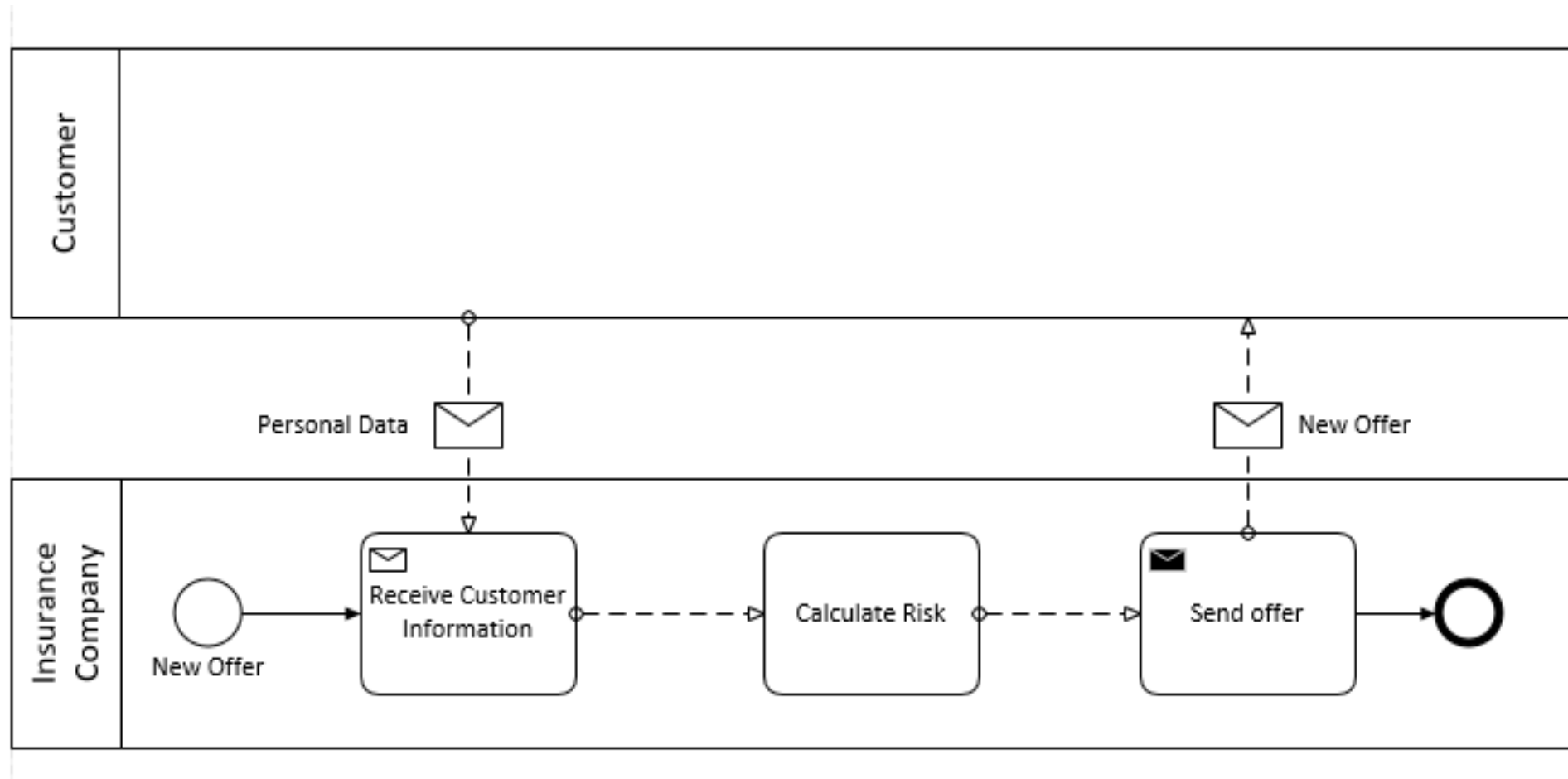


Teacher receive test
answer to start evaluating
students grades



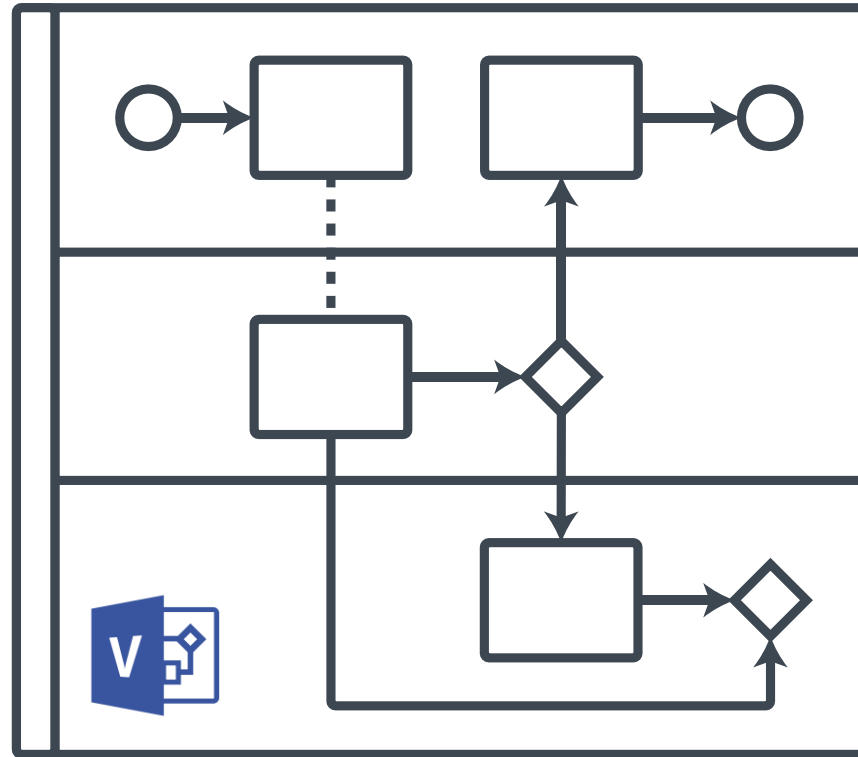
Begin with the delivery
process as soon the shipping
address is approved

Task Behavior Types – 4. Receive Task BPMN Example



Receive Task Sample

Task Behavior Types – 4. Receive Task BPMN Example

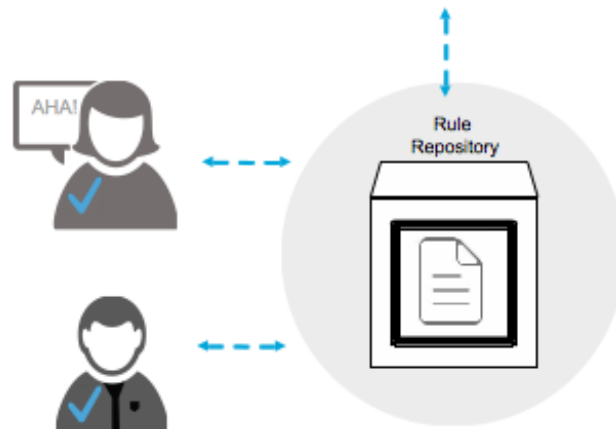


BPMN Demo using Microsoft Visio

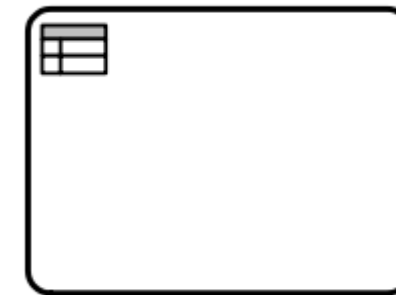
5 Business Rule Task

Task Behavior Types – 5. Business Rule Task

- Provides a mechanism for the Process to provide input to a Business Rules Engine and to get the output of calculations that the Business Rules Engine might provide
- **InputOutputSpecification** property of Task :
allow process to send data to and receive data from the Business Rules Engine



1. Separate the business rules from the applications
2. Express rules in terms that the business can readily understand - **visibility**
3. Empower business and IT experts to collaborate - **agility**



**Business Rule
Task Notation**

Task Behavior Types – 5. Business Rule Task – (BRE – BRMS)

Software component that allows non-programmers to add or change business logic in a business process management system (BPMS)

Business rules engine will include the following:



Business Rule Repository

Database to store Business rules defined by Business Users



Business Rule Editor

User interface to manipulate business rules



Reporting Component

User interface to query , report current rules



Rules Engine Execution Core

Actual programming code that enforces the rules

Task Behavior Types – 5. Business Rule Task Real World Example

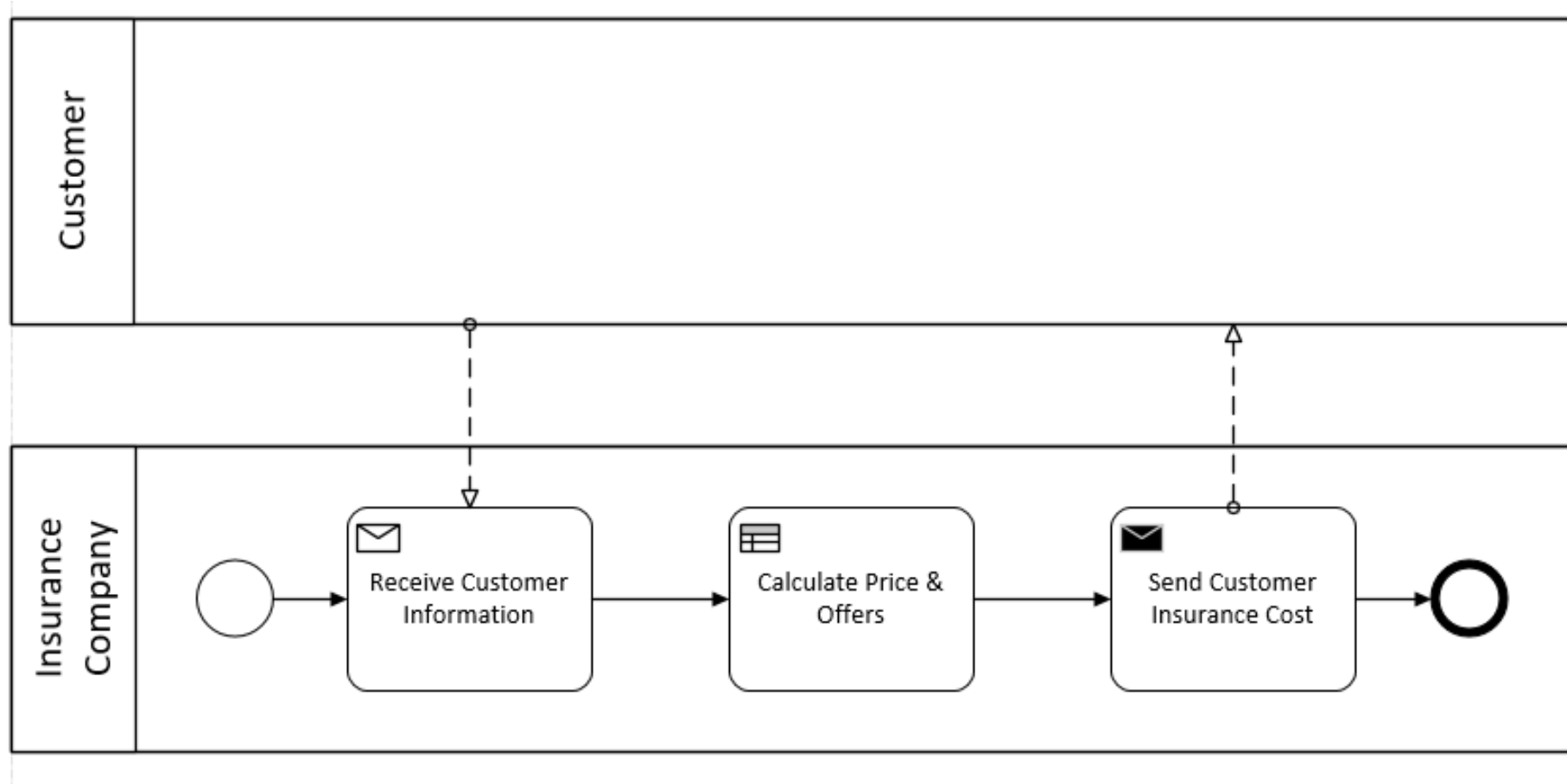


Calculate the insurance cost according to the user's profile



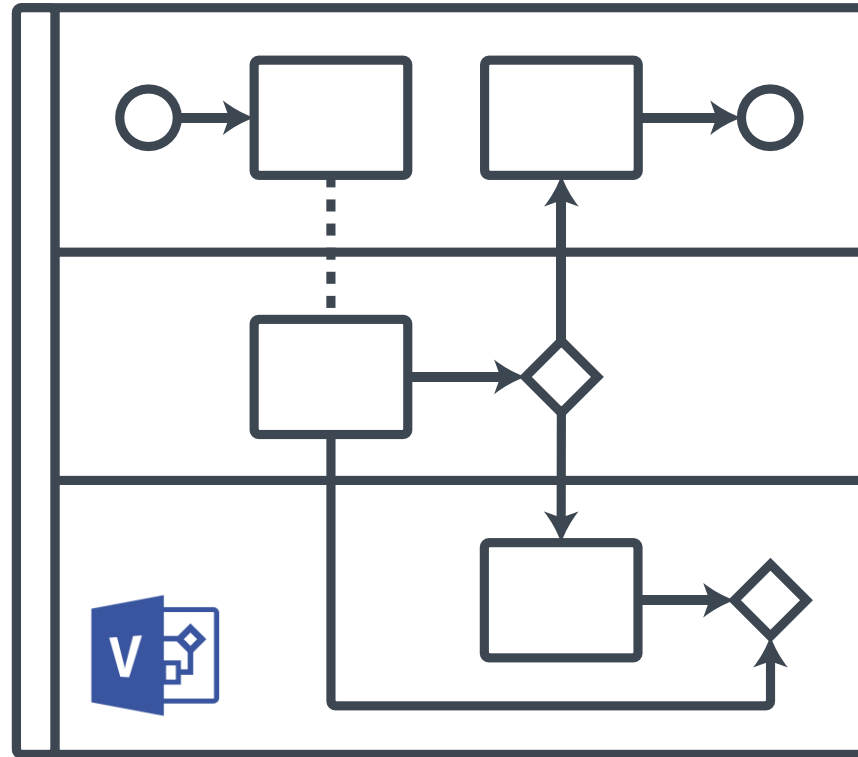
Send the appropriate product offer according to the user's behavior.

Task Behavior Types – 5. Business Rule Task BPMN Example



Business Rule Task Sample

Task Behavior Types – 5. Business Rule Task BPMN Example



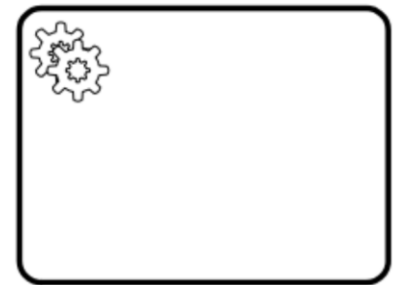
BPMN Demo using Microsoft Visio

6

Service Task

Task Behavior Types – 6. Service Task

- ▷ Service Tasks is a Task that uses some sort of service, which could be a Web service or an automated application
- ▷ As opposed to the User Task and Manual Task, a Service Task does not require any human interaction
- ▷ It is completed automatically, by using some sort of an external service (outside the corresponding “process execution environment”)

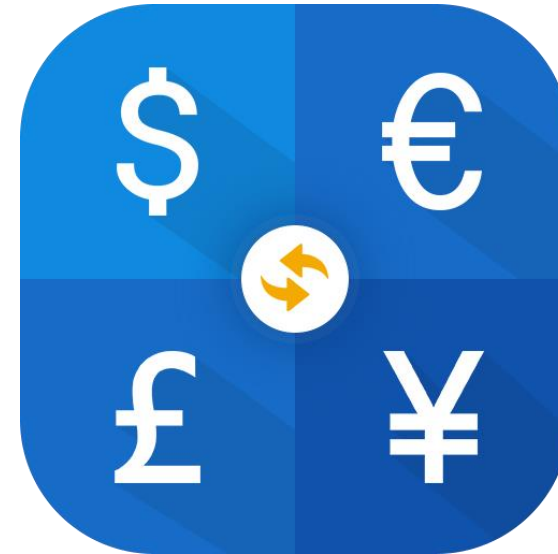


Service Task
Notation

Task Behavior Types – 6. Service Task Real World Example

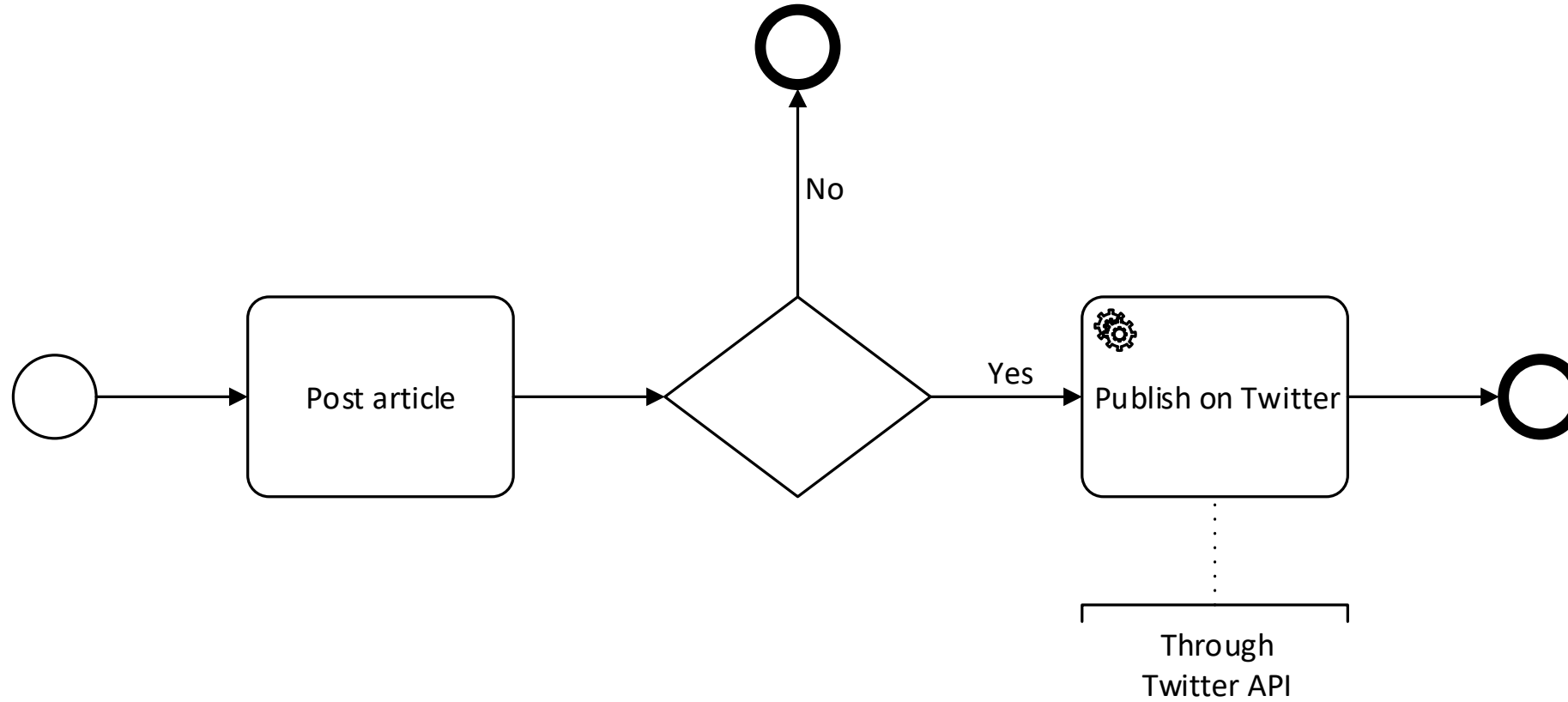


A payment processed by
PayPal services



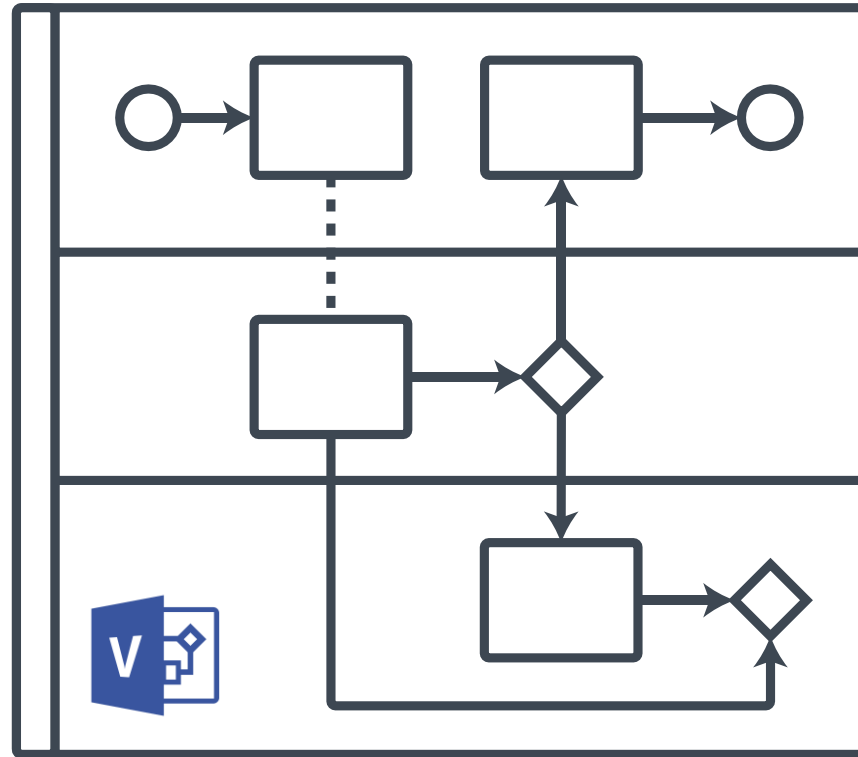
Converting a price into a specific
currency using an online currency
converter

Task Behavior Types – 6. Service Task BPMN Example



service Task Sample

Task Behavior Types – 6. Service Task BPMN Example



BPMN Demo using Microsoft Visio

7

Script Task

Task Behavior Types – 7. Script Task

- ▷ The modeler or implementer defines a script in a language that the engine can interpret
- ▷ In contrast to service task , script task is executed by a business process engine.
- ▷ When the task is ready to start , the engine will execute the script



Script Task
Notation

Task Behavior Types – 7. Script Task Real World Example

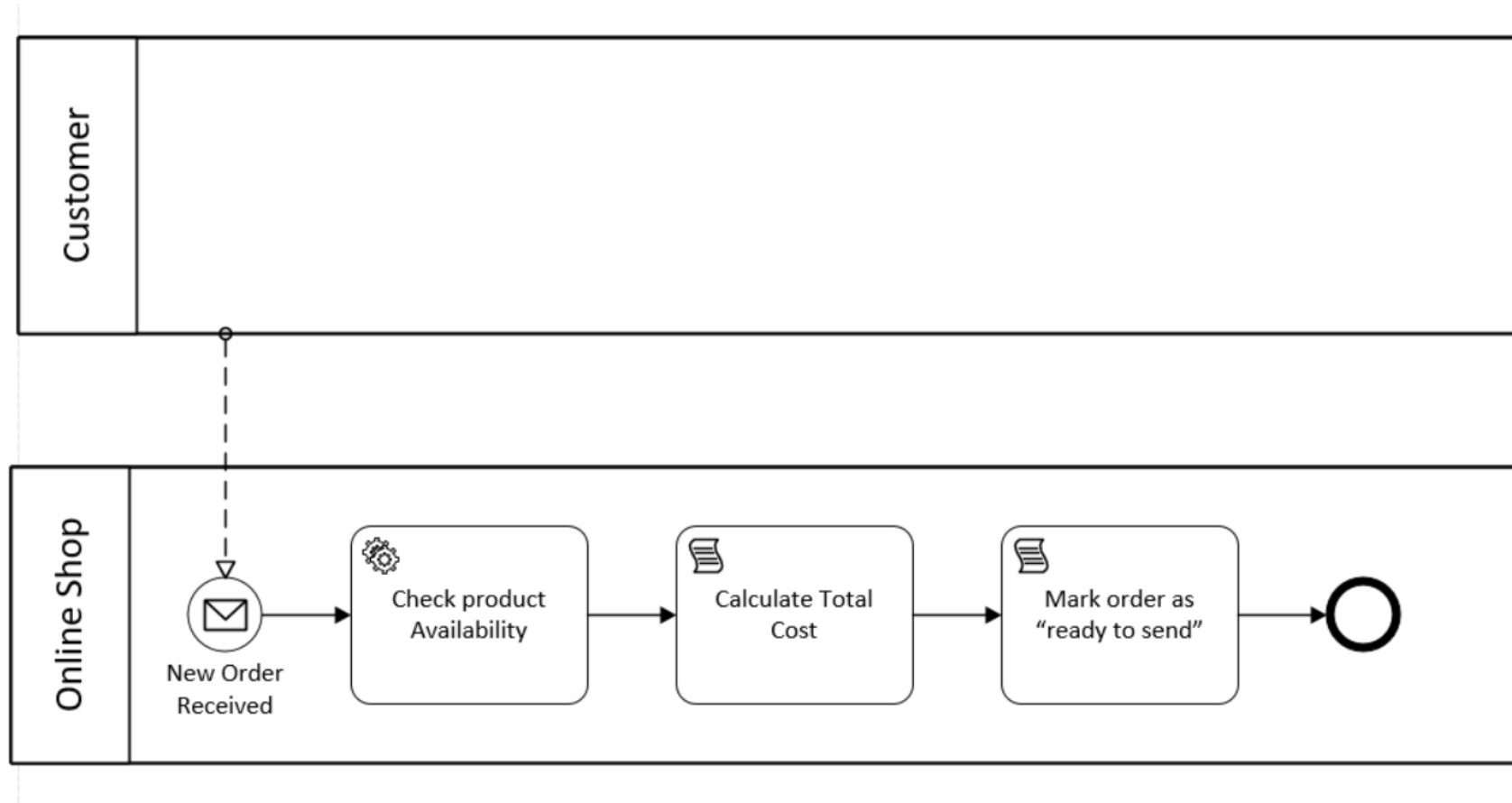


Calculate the total cost by summing product cost and shipping cost



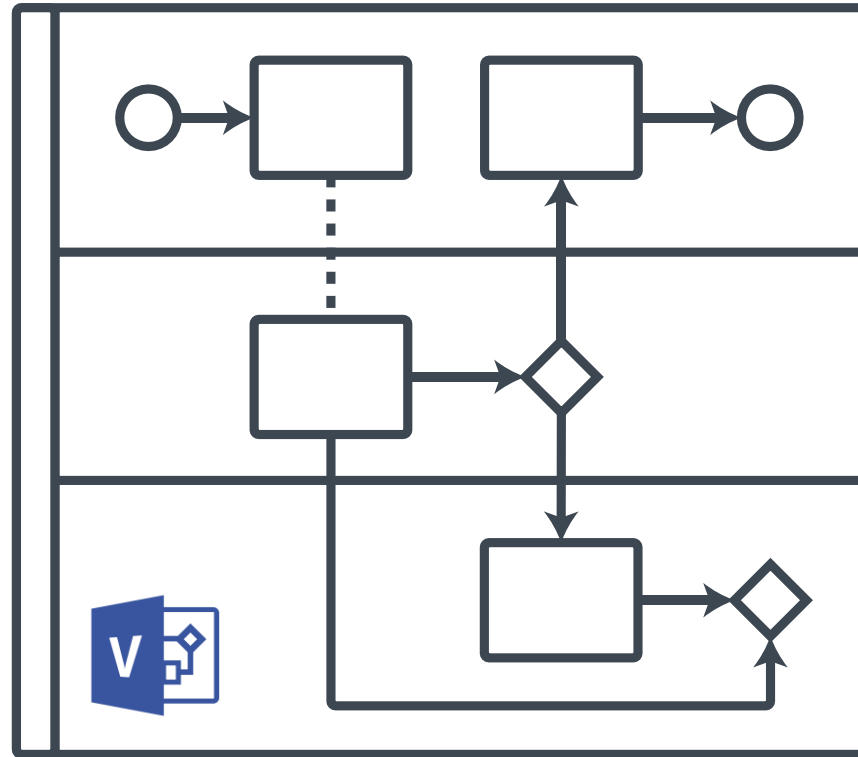
Add a unique ID to a help-desk ticket.

Task Behavior Types – 7. Script Task BPMN Example



Script Task Sample

Task Behavior Types – 7. Script Task BPMN Example



BPMN Demo using Microsoft Visio



To Be continue .. 😊

Thanks!

Any questions?

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