


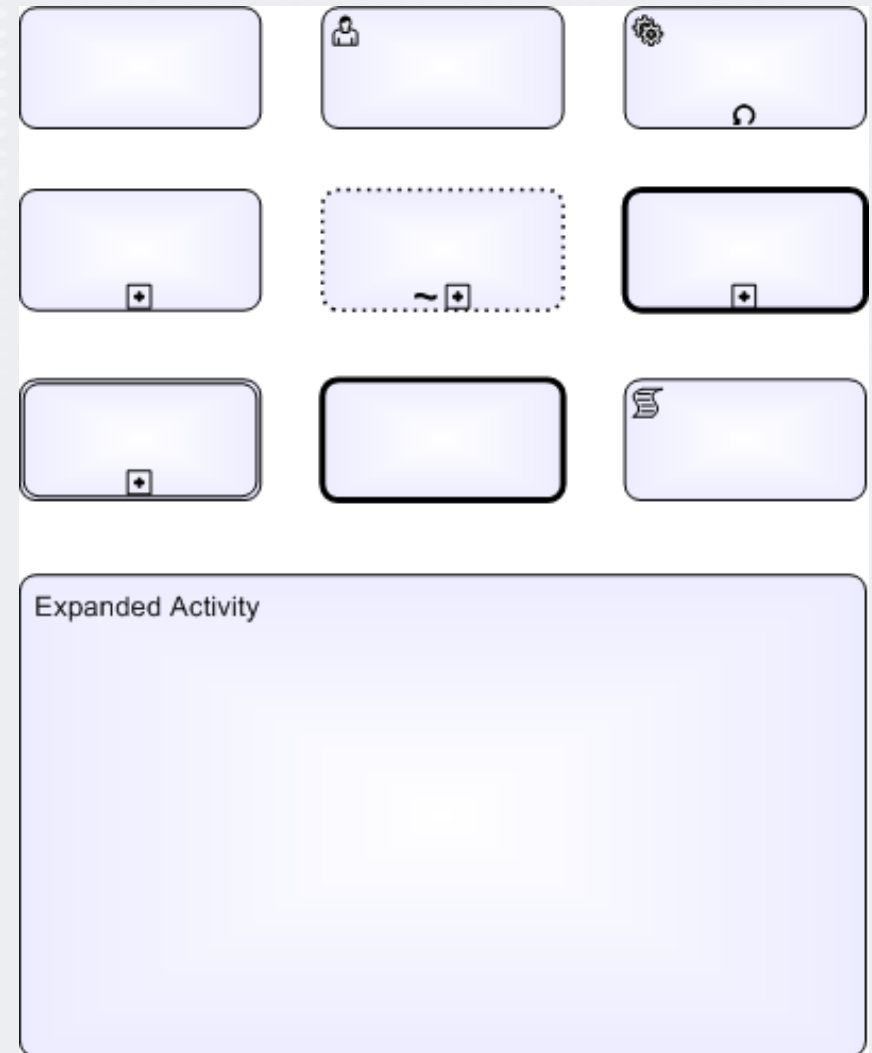
# Activities

 **Activity** is a generic term for work that a company performs in a Process. An Activity can be **atomic** or **non-atomic**.

The type of activities that are part of the process are: **Task** and **Sub-Process**.

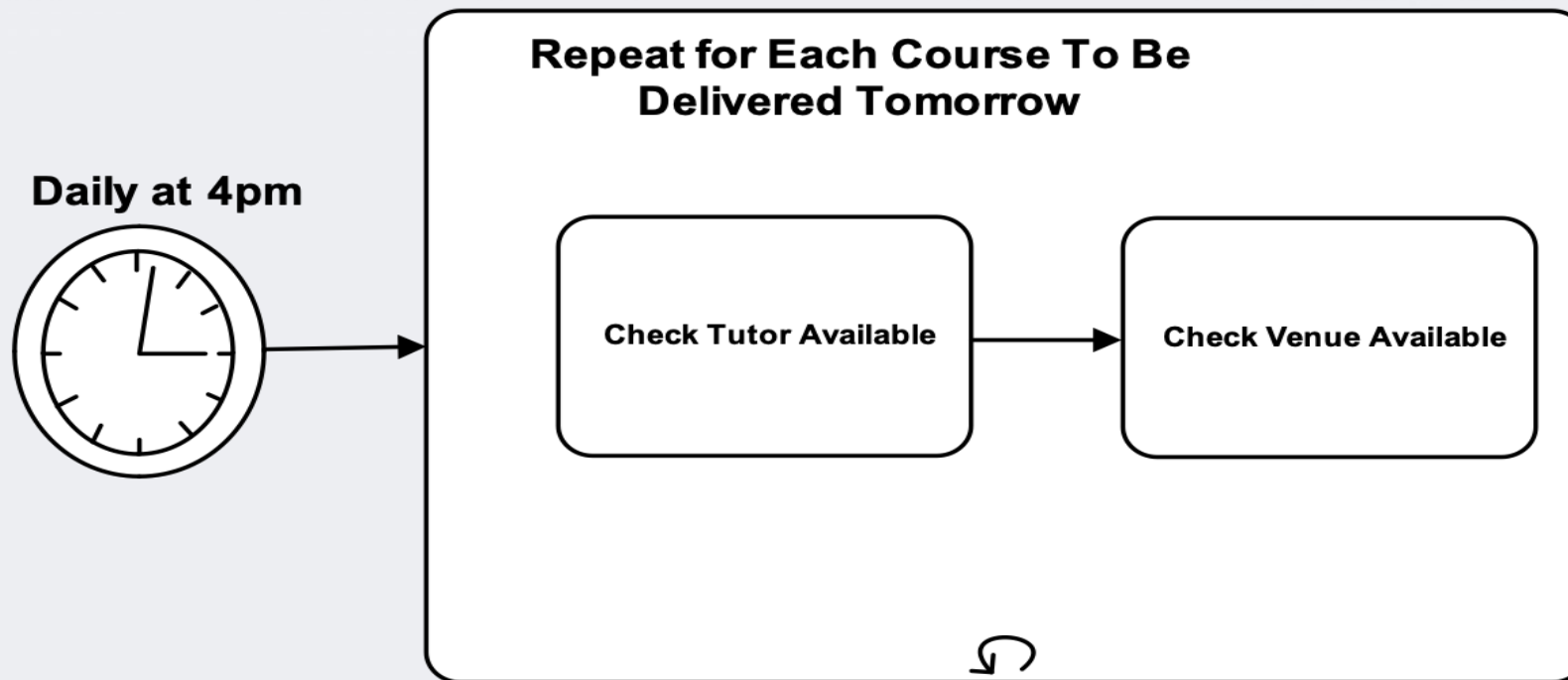
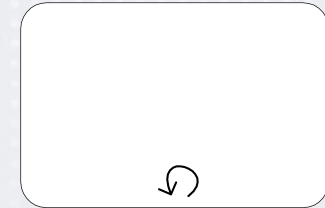
A task can be differentiated by markers that represent its type or associated resource.

Sub-Process can be Collapsed or Expanded, and can be differentiated by the kind of elements that join in: **Sub-process**, **Transactions**, **Event Sub Process** and **Call Activities**.



# Iteration

- Loop – process is performed zero, one or many times (serially one after the other)

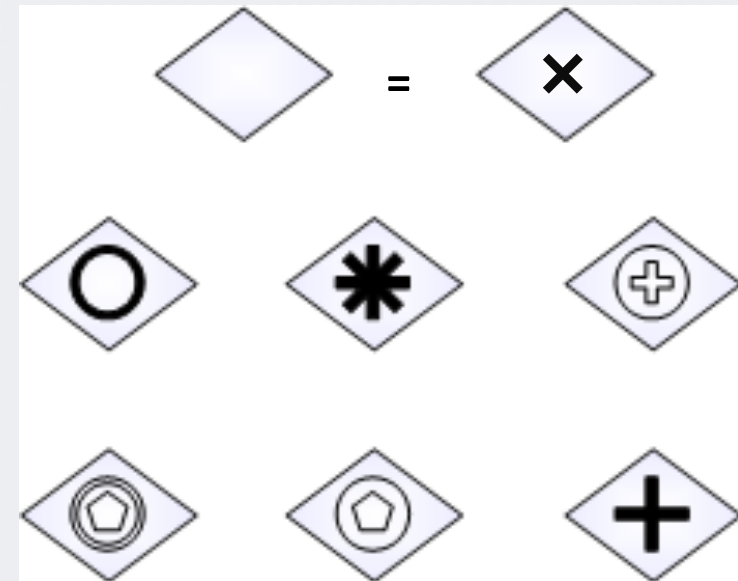


# Gateways

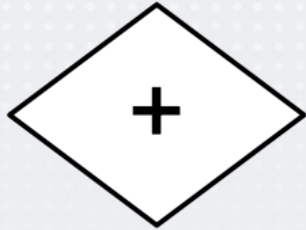
❏ A **Gateway** is used to control the divergence and convergence of sequence flows in a Process or in a choreography.

Gateway will determine branching, forking, merging or joining.

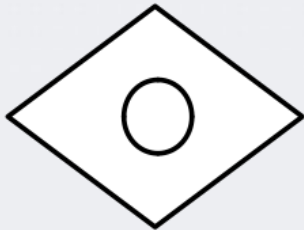
There are 7 kinds of gateways differed by its internal marker: **Exclusive**, **Inclusive**, **Parallel**, **Complex**, **Event-based**, **Parallel Event-based** and **Exclusive Event-based**.



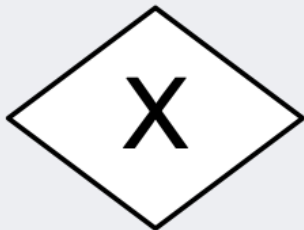
# Gateways Types



**And - Parallel fork/join**

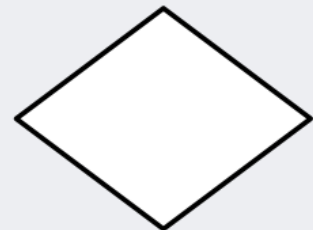


**OR - Inclusive Decision/  
Merge**



**XOR - Exclusive  
Decision/Merge**

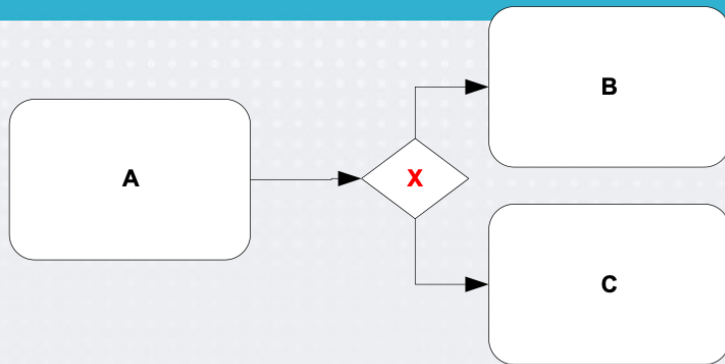
**means the same as**



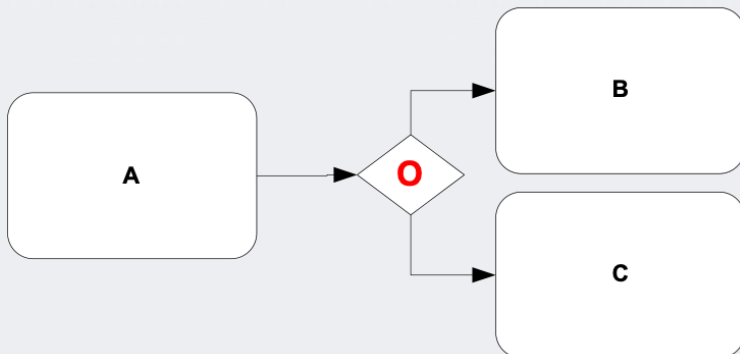
**-Gateways control convergence OR divergence of process flows - not equivalent to decision diamonds.**

**-Decisions are based on the evaluation of a piece of data within the preceding process.**

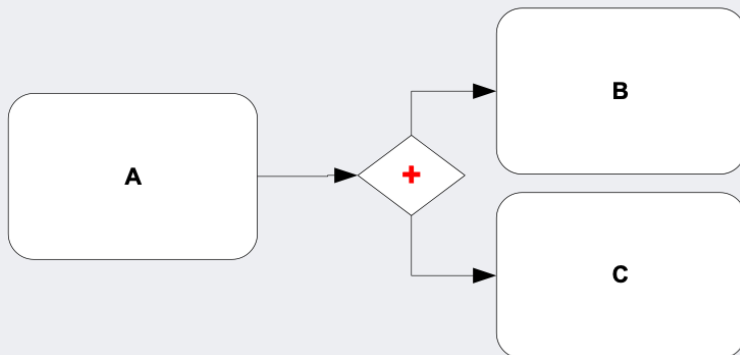
# Divergence



**Exclusive Or: When A has finished perform B or C**

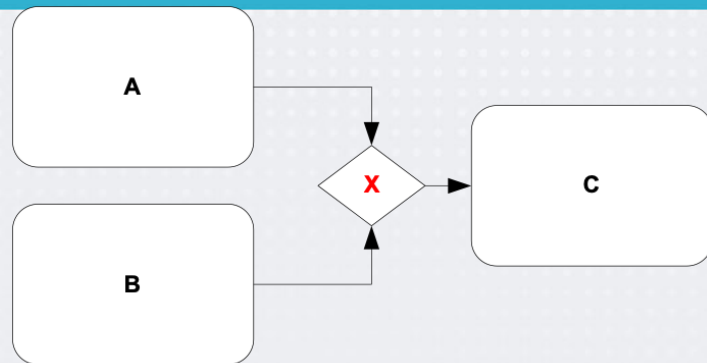


**Inclusive Or: When A has finished perform B or C or both**

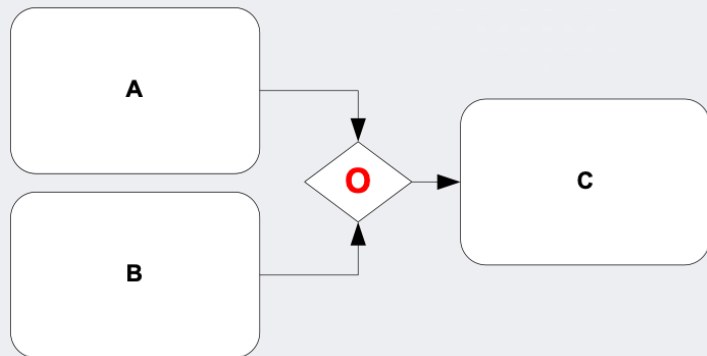


**And: When A has finished perform B and C**

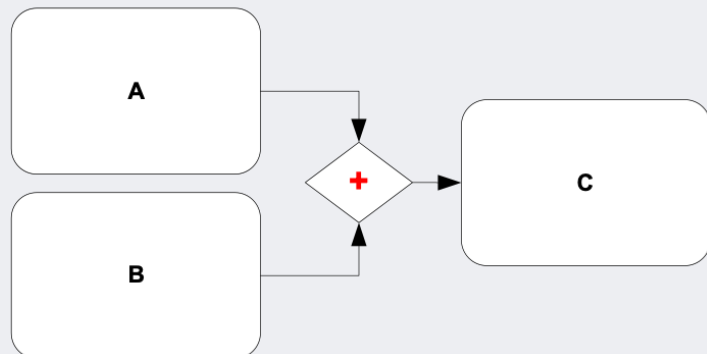
# Convergence



**Exclusive Or: Perform C  
when A or B have finished**

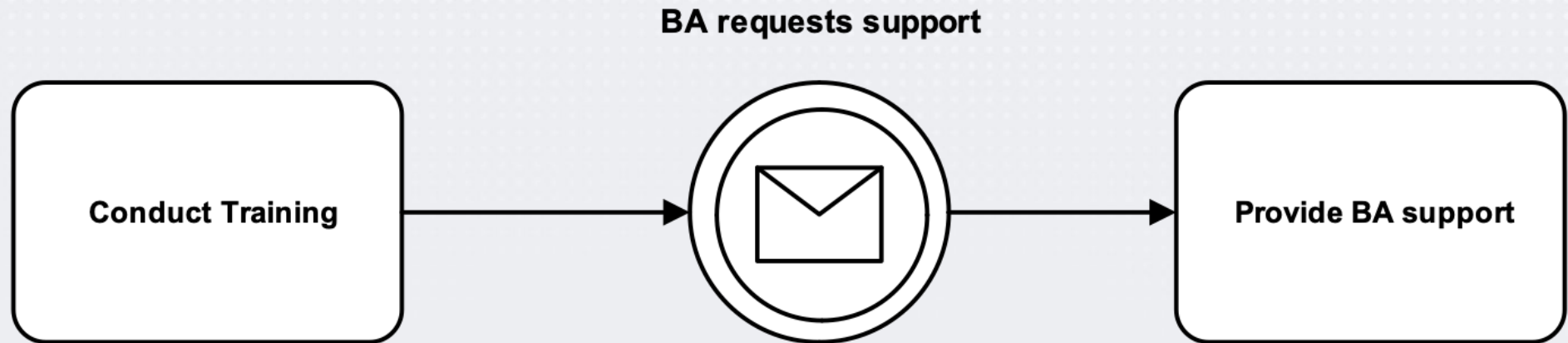


**Inclusive Or: Perform C  
when A or B or Both have finished**



**And: Perform C  
when A and B have finished**

# Process Break

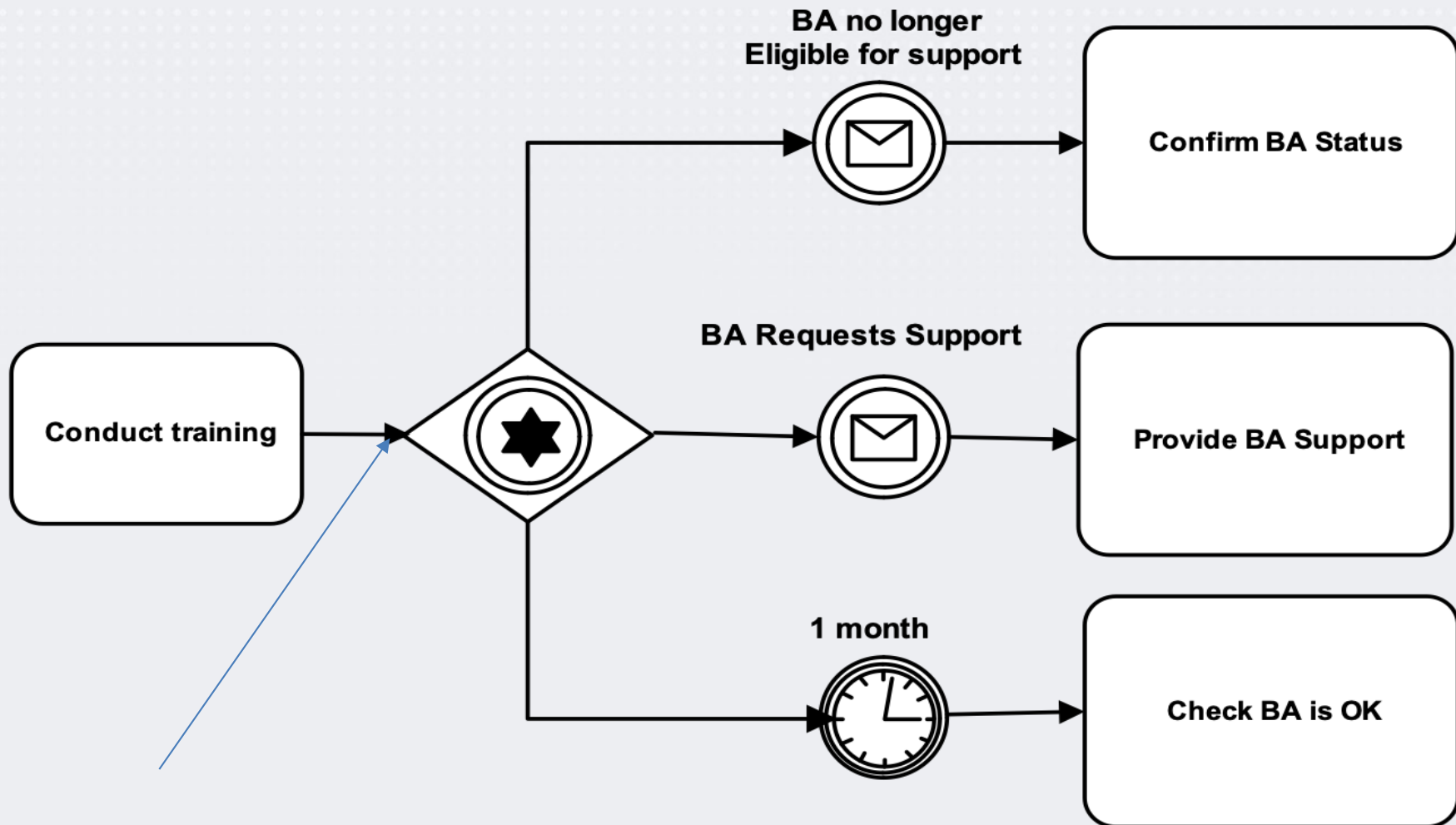


-> An intermediate message can be used to show a process break.

e.g. Having conducted training, the process waits until a BA (Business Administrator) requests support.

**Assumption:** The next step is *always* BA requests support...?

# Event Based Gateway



An “exclusive or” decision made on the basis of whichever associated intermediate event occurs first.



# Sequence Flow of Control

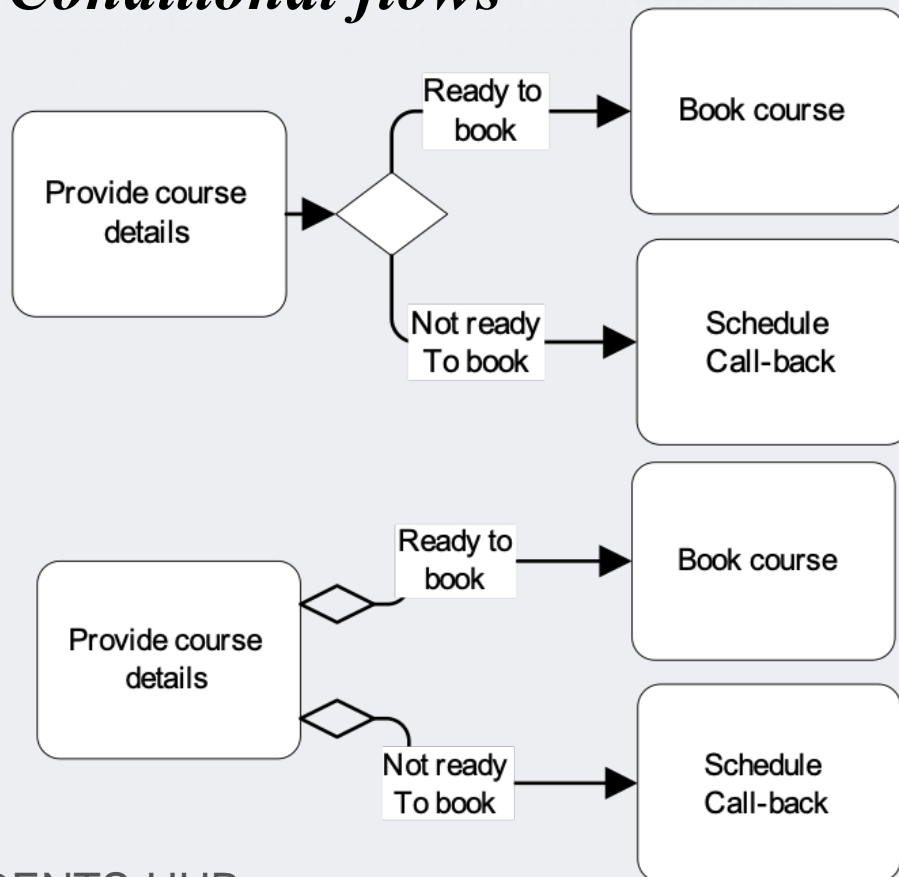
## *Unconditional flows*



Business rules enforced:

1. when a course enquiry is made, course details are ALWAYS provided.
2. The only time that course details will be provided is when an enquiry is made.

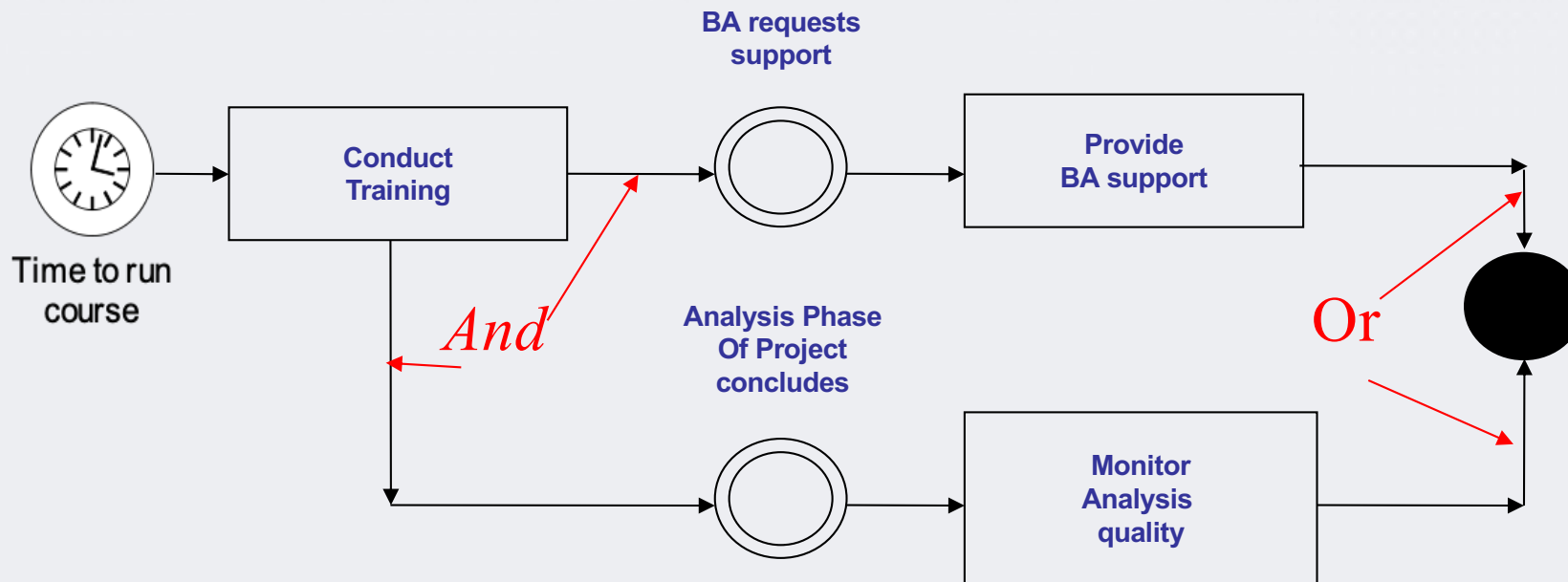
## *Conditional flows*



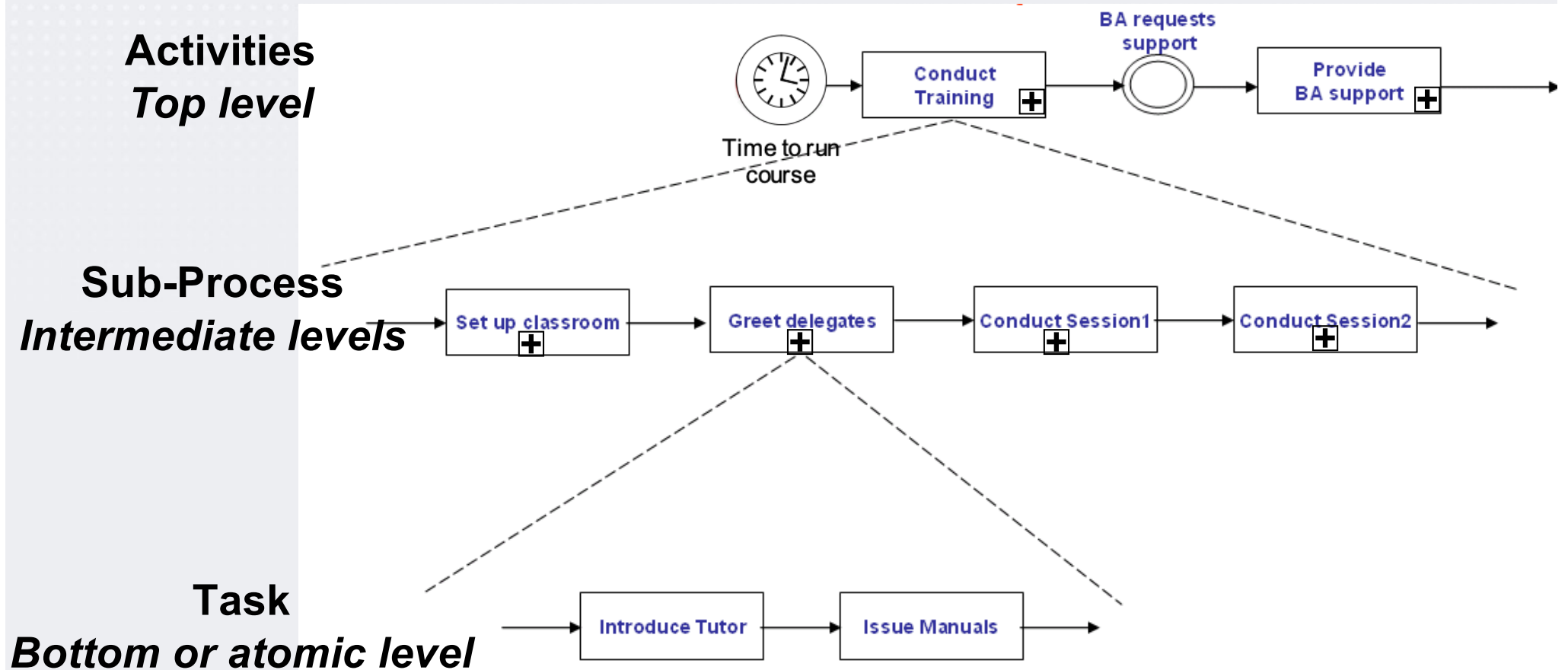
**Do these rules reflect business requirements?**  
**Are they workable?**

**Are these two process flows equivalent?**  
**Which is better?**






# BPMN defaults for Process Flows



# Process Decomposition



# Data Objects

Element	Description	Icon
<i>Data Objects</i>	Data Objects provide information about what Activities require to be performed and/or what they produce. They can represent a singular object or a collection of objects.	 Simple  Collection
<i>Data Inputs, Outputs</i>	Represent the necessary data (input) to adequately perform the activities and processes and the produced data (output).	 Data Input  Data Output
<i>Data Store</i>	Provide activities with a mechanism to retrieve or to store data will persist beyond the scope of the process.	

# Data Objects

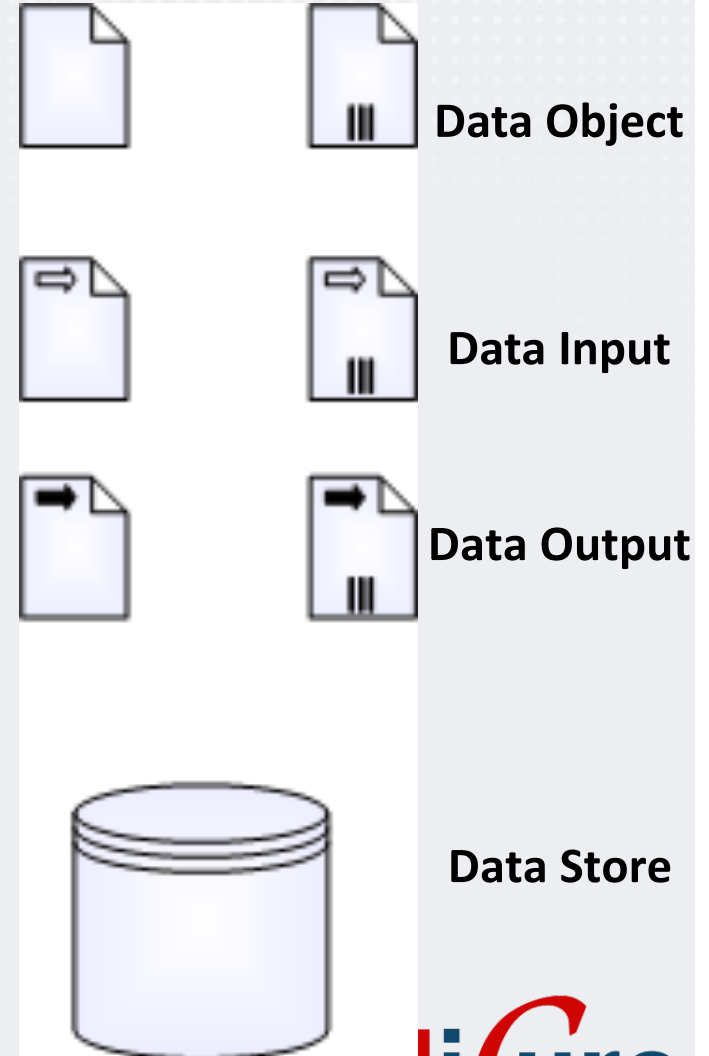


BPMN 2.0 can represent Data in two ways: **Data Stores** and **Data Objects**.

A **Data Store** provides a mechanism for Activities to retrieve or update stored information that will persist beyond the scope of the Process. The same Data Store can be visualised, through a Data Store Reference, in one or more places in the Process.

**Data Objects** provide information about what Activities require to be performed and/or what they produce, Data Objects can represent a singular object or a collection of objects.

Data Objects can be separated in **Data Input** and **Data Output** only considering direction of the information.



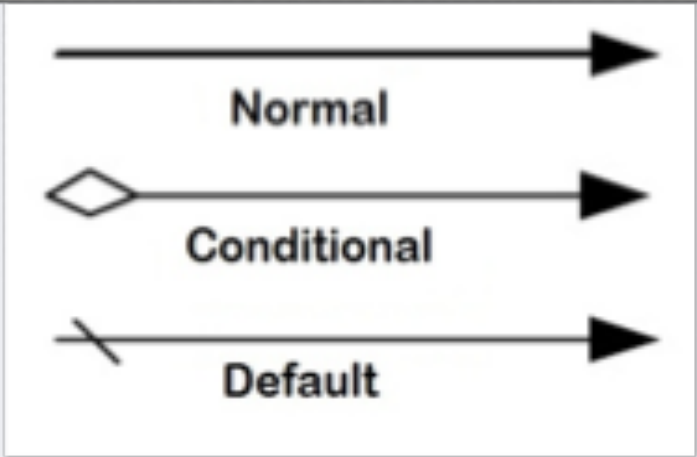


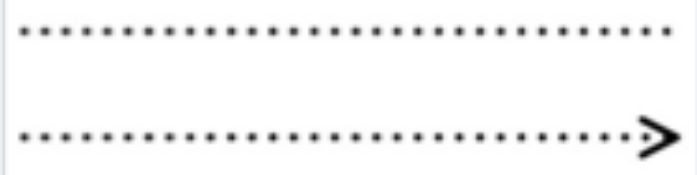
# BPMN – Basic Elements

- **Connecting Objects:**
  - Sequence Flows;
  - Message Flows;
  - Associations;
  - Data Associations.
- **Swimlanes:**

Used to group the primary modelling elements. Can be of two forms: Pools and Lanes.
- **Artifacts:**

Used to provide additional information about the process. Include Group, and Text Annotation.

# Connecting Objects

Element	Description	Icon
<i>Sequence Flow</i>	Sequence flows are used to show the order in which the activities are performed in a process and choreography. They can be normal, conditional (includes a condition which is evaluated in runtime to determine if the control flow is followed or not) and default (it only can be associated to a data exclusive gateway and represents the default outgoing flow which is activated if none of the others is activated).	 <p>Normal</p> <p>Conditional</p> <p>Default</p>
<i>Message Flow</i>	Messages are used to show the communication flow between two participants (represented as two separated pools). They can include <del>messages</del> which represent the content of the participant's communication.	 <p>Message Flow</p>  <p>Message</p>
<i>Association</i>	Associations are used to link Artifacts and Text Annotations with other graphical BPMN elements. An arrow can be used to denote the association direction.	



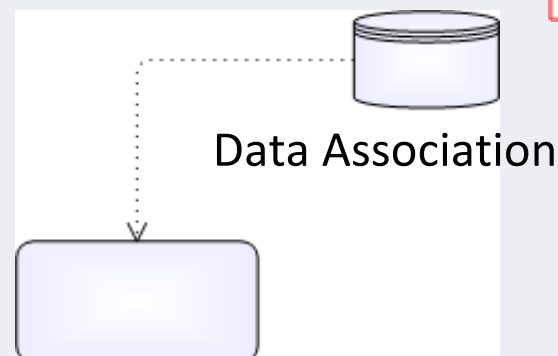
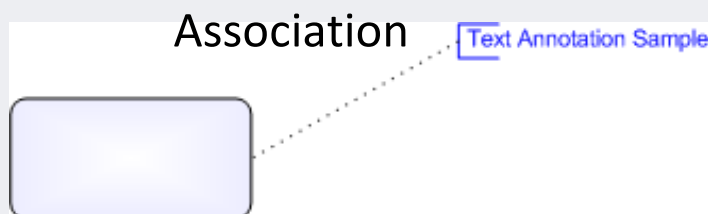
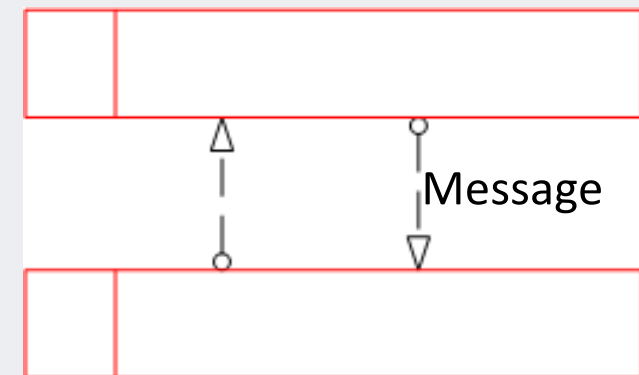
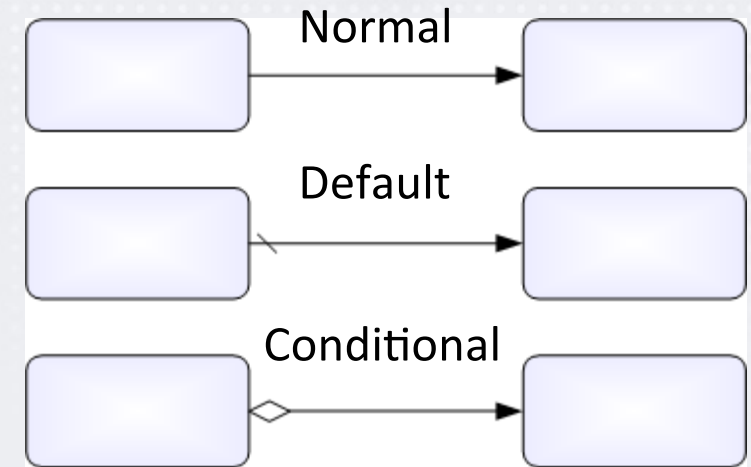
# Connection Objects

There are **6 types** of connection objects. All are represented for a **line**.

**Sequence Flows** can be **Normal**, **Default** and **Conditional**, and always have direction, source and target.

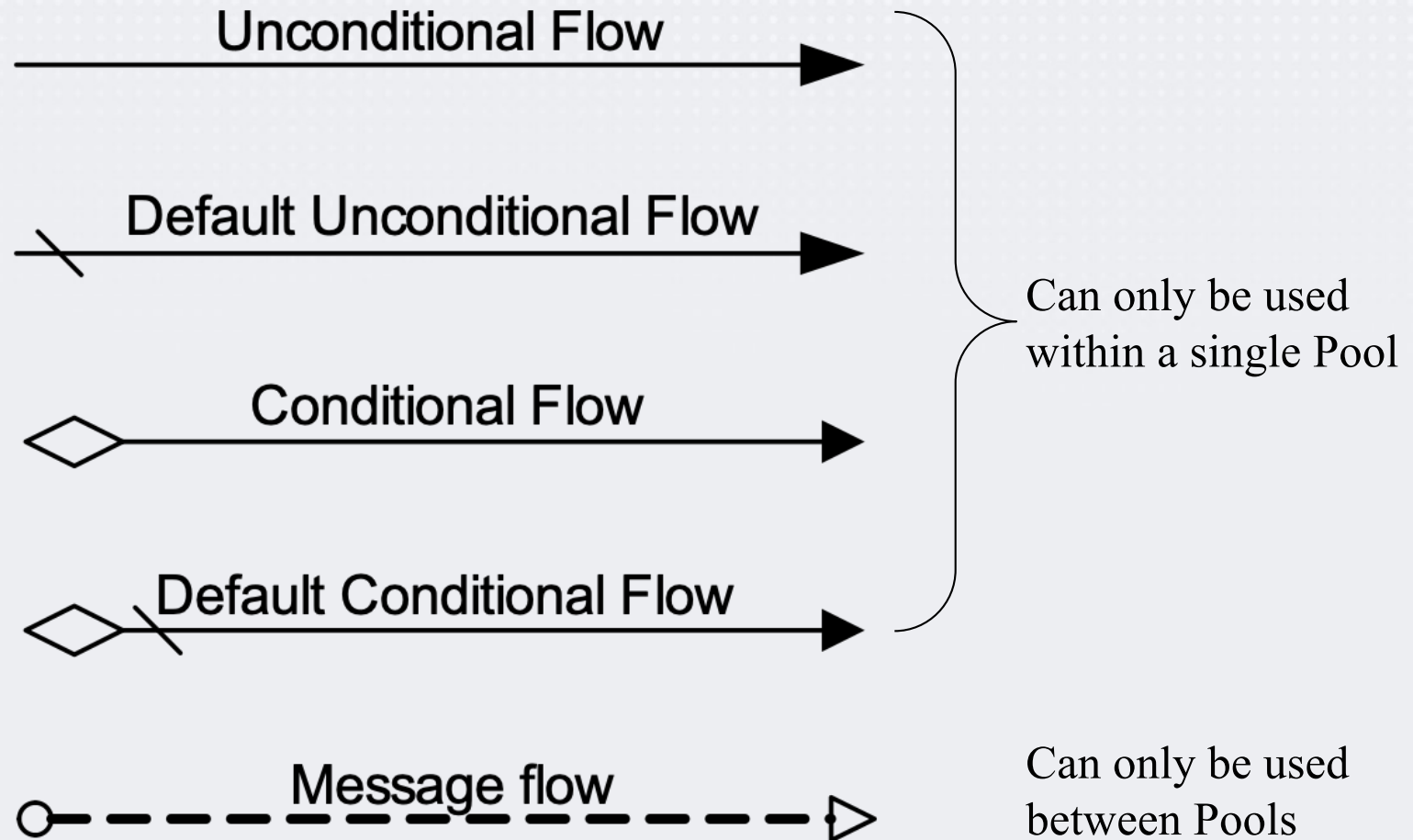
**Message Flows** used to represent collaboration between two processes.

**Data Association** is a line between a **Data Object** and an **element**.









# Process flow connectors



# Swimlanes

Element	Description	Icon
<i>Pool</i>	Represents a Participant in a Collaboration and acts as a graphical container ("swim lane") for partitioning a set of Activities from other Pools, usually in the context of Business to Business situations. It can include internal details (process) or act as a "black box".	
<i>Lane</i>	A Lane is a sub-partition (horizontal or vertical) within a Pool and it is used to organize and categorize activities.	
<i>Group</i>	Groups represent a grouping of graphical elements that are within the same category. They are used for documentation or analysis purposes.	
<i>Text Annotation</i>	Text Annotations are used by modelers to provide additional text information for the reader of a BPMN Diagram.	

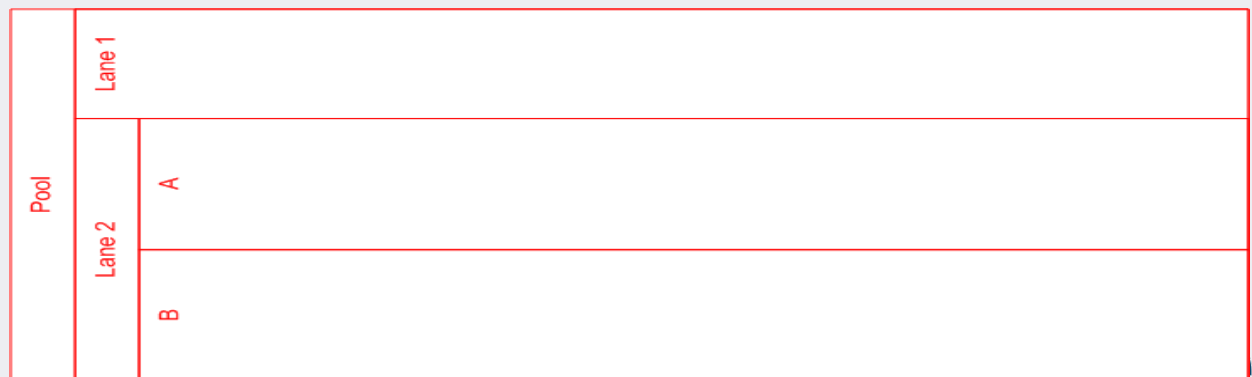
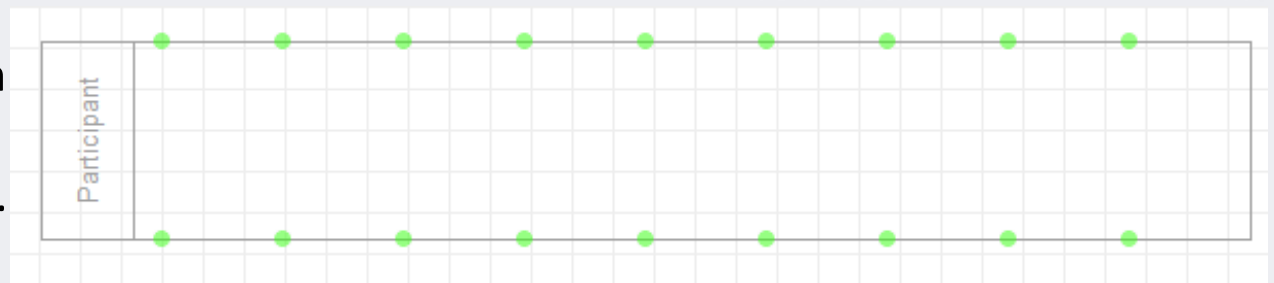
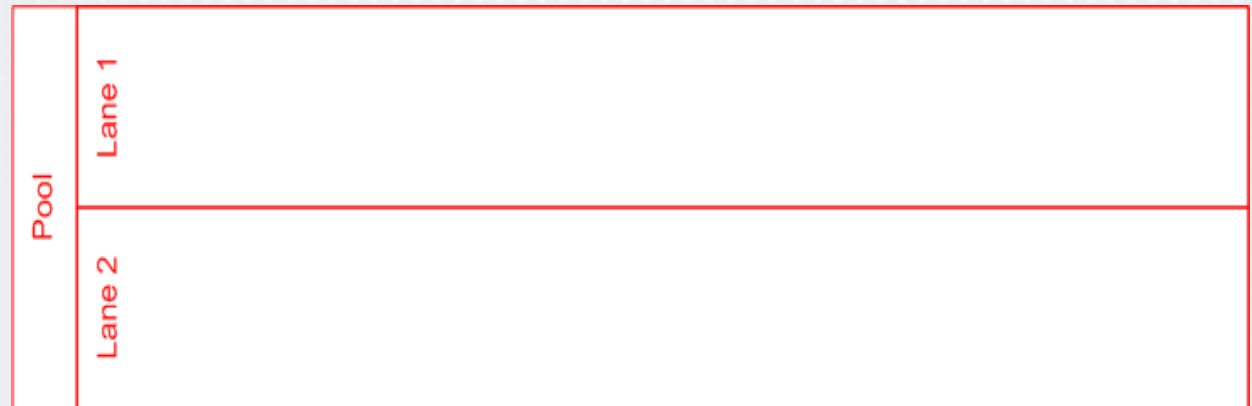
# Swimlanes



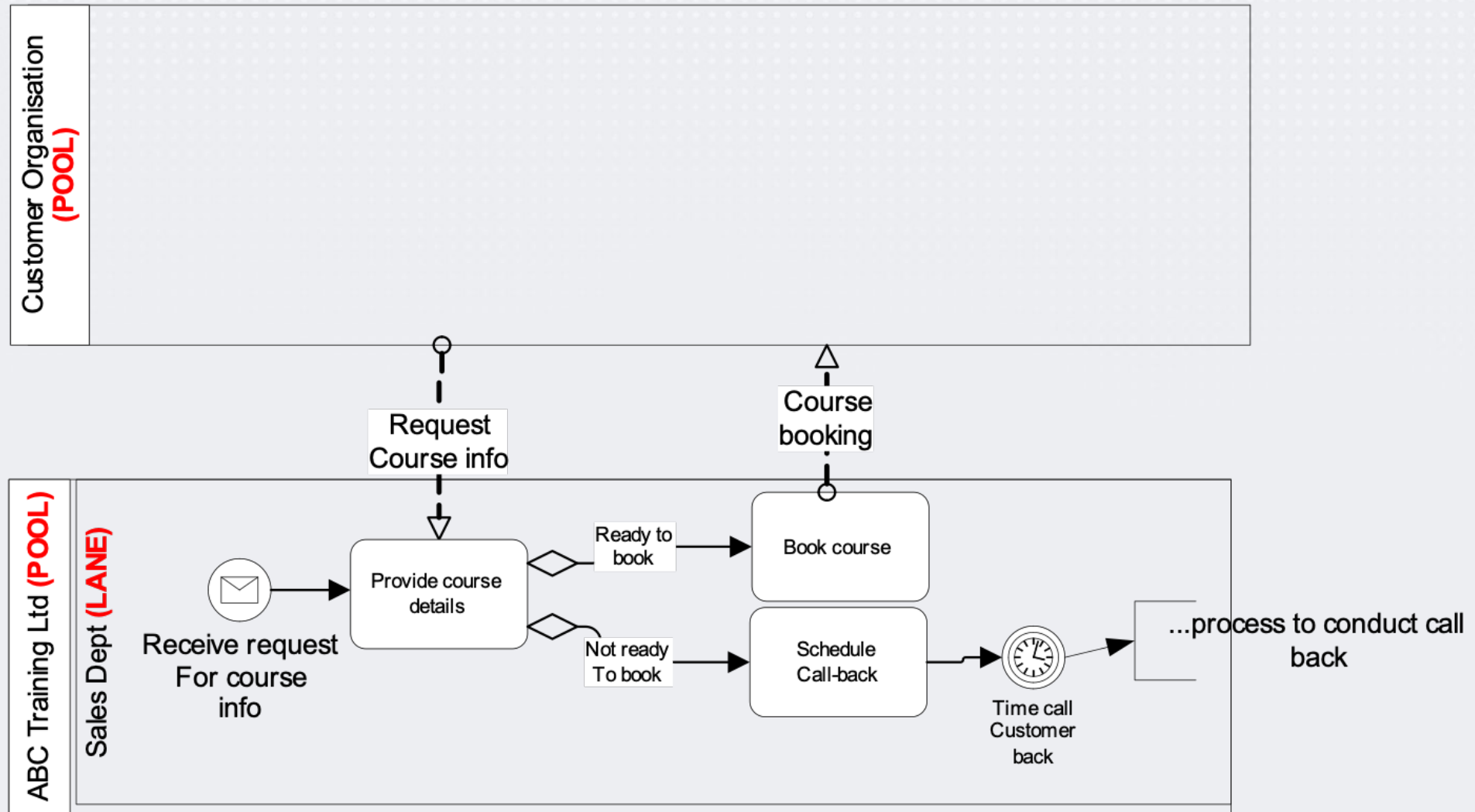
**Pool** or Laneset is an element representing a process into an organization or company.

**Lane** is a representation of an area or department of the company. Some times, a lane can represent a role (of a **participant**) into a process scope.

**Participant** or Empty Pool is a representation of a process or entity that does not have any action within the process.



# Pools, Lanes & Message Flows



A message cannot flow between two objects in the same Pool

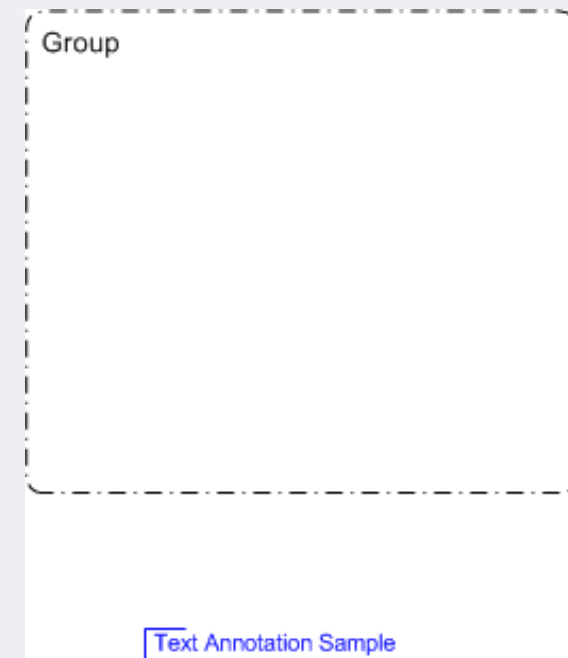
# Artifacts

BPMN 2.0 considers 2 types of artifacts: **Groups** and **Text Annotations**.



A **Group** is a grouping of graphical elements that are within the same Category. This type of grouping does not affect the Sequence Flows within the Group. The Category name appears on the diagram as the group label. Categories can be used for documentation or analysis purposes. Groups are one way in which Categories of objects can be visually displayed on the diagram.

**Text Annotations** are a mechanism for a modeler to provide additional text information for the reader of a BPMN Diagram.

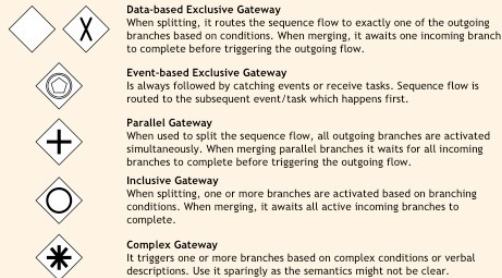




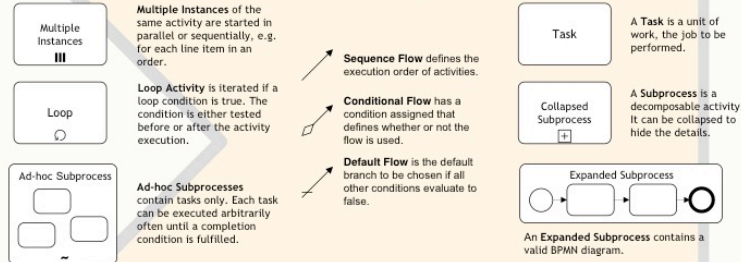
# Summary of BPMN 2.0 Notations

## BPMN - Business Process Modeling Notation

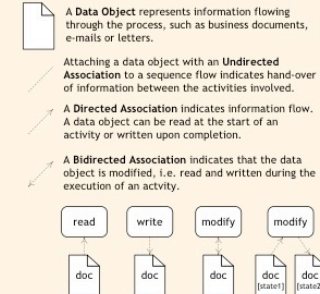
### Gateways



### Activities



### Data

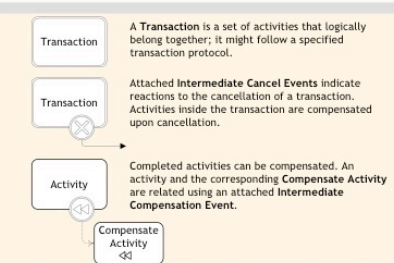


### Events

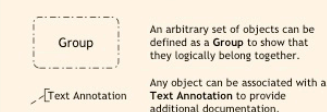
	Start	Intermediate	End	
	Catching	Throwing		
Plain				Untyped events, typically showing where the process starts or ends.
Message				Receiving and sending messages.
Timer				Cyclic timer events, points in time, time spans or timeouts.
Error				Catching or throwing named errors.
Cancel				Reacting to cancelled transactions or triggering cancellation.
Compensation				Compensation handling or triggering compensation.
Conditional				Reacting to changed business conditions or integrating business rules.
Signal				Signalling across different processes. One signal thrown can be caught multiple times.
Multiple				Catching or throwing one out of a set of events.
Link				Off-page connectors. Two corresponding link events equal a sequence flow.
Terminate				Triggering the immediate termination of a process.



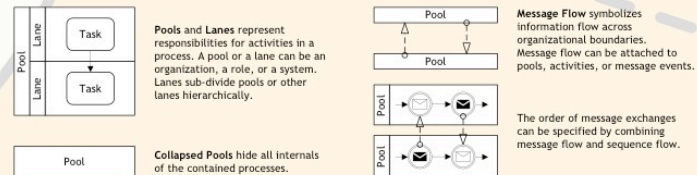
### Transactions



### Documentation



### Swimlanes



Business Process Technology  
Prof. Dr. Mathias Weske  
Web: bpt.hpi.uni-potsdam.de  
Oryx: oryx-project.org  
Blog: bpmn.info  
BPMN Version 1.2



**Authors**  
Gero Decker  
Alexander Grosskopf  
Sven Wagner-Boysen

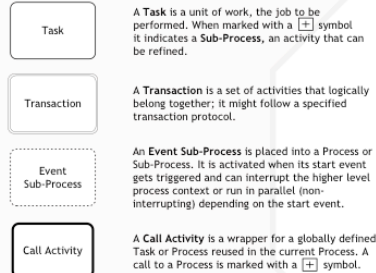


# Summary of BPMN 2.0 Notations

## BPMN 2.0 - Business Process Model and Notation

<http://bpmb.de/poster>

### Activities



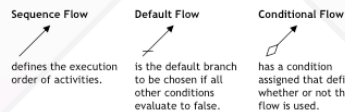
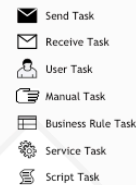
#### Activity Markers

Markers indicate execution behavior of activities:

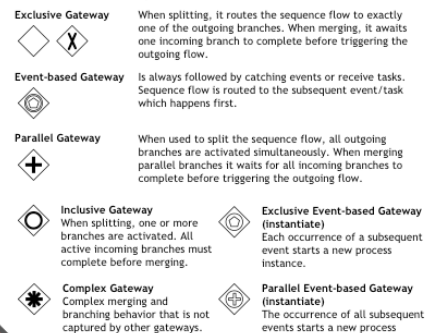


#### Task Types

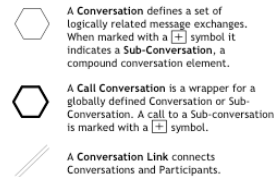
Types specify the nature of the action to be performed:



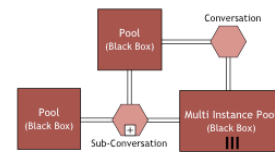
### Gateways



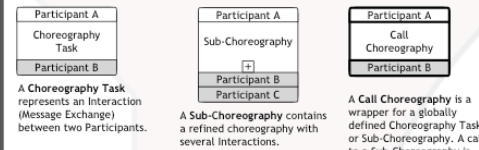
### Conversations



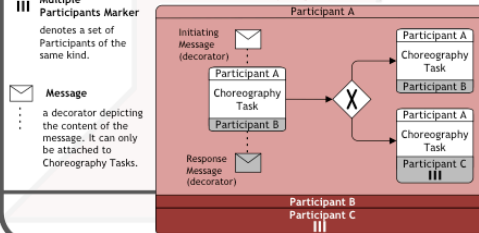
#### Conversation Diagram



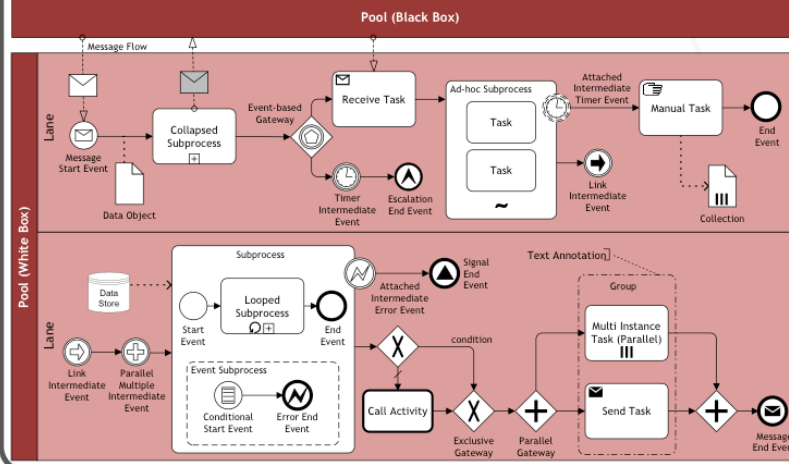
### Choreographies



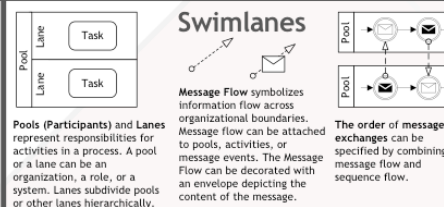
#### Choreography Diagram



### Collaboration Diagram



### Swimlanes



### 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.

**Message:** Receiving and sending messages.

**Timer:** Cyclic timer events, points in time, time spans or timeouts.

**Escalation:** Escalating to an higher level of responsibility.

**Conditional:** Reacting to changed business conditions or integrating business rules.

**Link:** Off-page connectors. Two corresponding link events equal a sequence flow.

**Error:** Catching or throwing named errors.

**Cancel:** Reacting to cancelled transactions or triggering cancellation.

**Compensation:** Handling or triggering compensation.

**Signal:** Signalling across different processes. A signal thrown can be caught multiple times.

**Multiple:** Catching one out of a set of events. Throwing all events defined.

**Parallel Multiple:** Catching all out of a set of parallel events.

**Terminate:** Triggering the immediate termination of a process.

### Data

