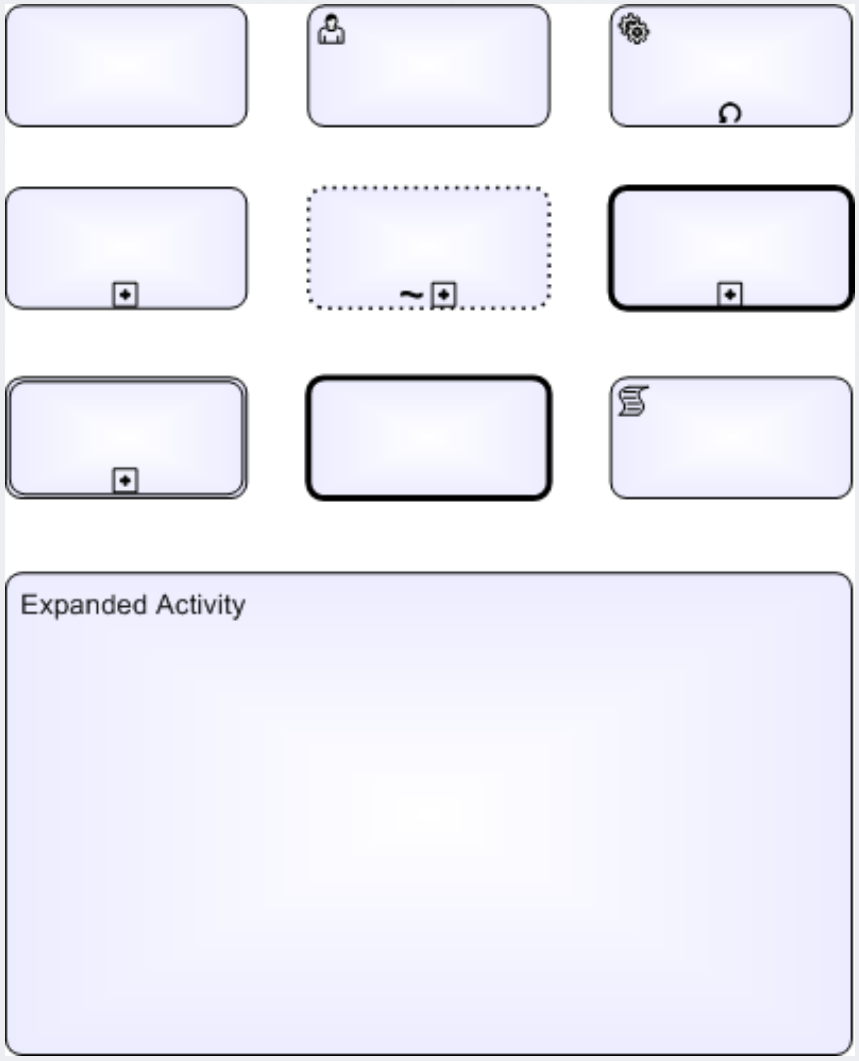
Activities

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**.

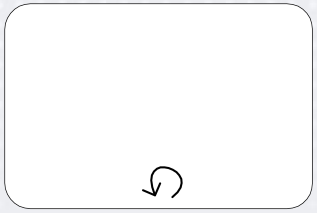
A task can be differentiated by markers that represent its type or associated resource.

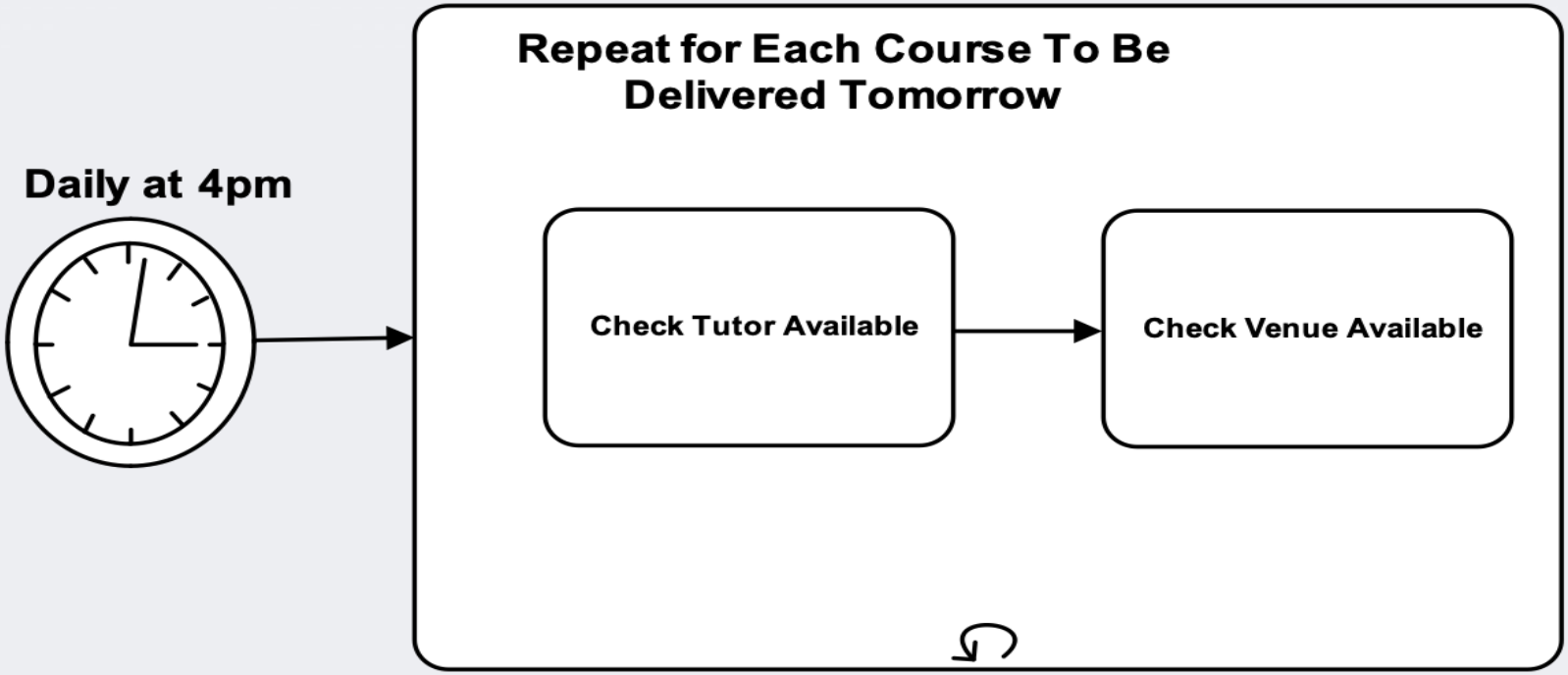
Sub-Process can be Collapsed or Expanded, and can be differentiated by the kind of elements that join in: **Sub-process**, **Transactions**, **Event Sub Process** and **Call Activities**.



Iteration

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



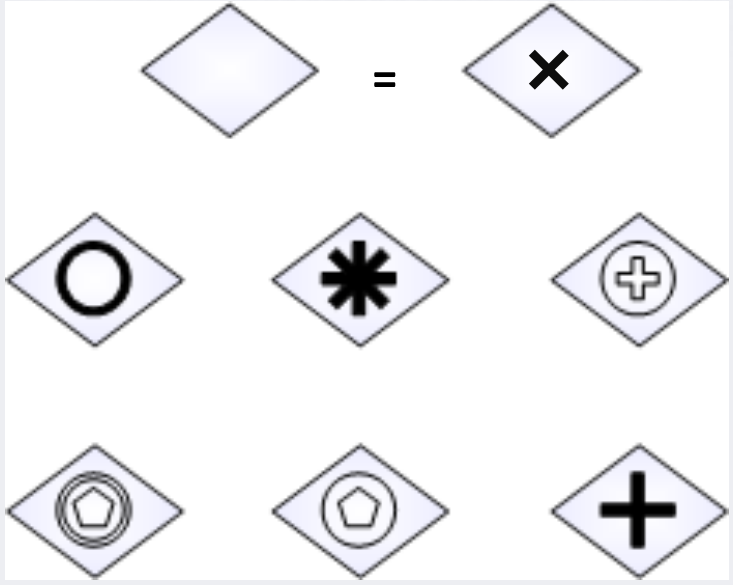


Gateways

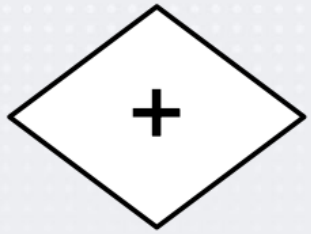
- A **Gateway** is used to control the divergence and convergence of sequence flows in a Process or in a choreography.

Gateway will determine branching, forking, merging or joining.

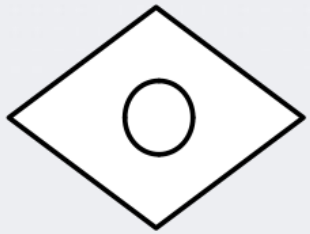
There are 7 kinds of gateways differed by its internal marker: **Exclusive**, **Inclusive**, **Parallel**, **Complex**, **Event-based**, **Parallel Event-based** and **Exclusive Event-based**.



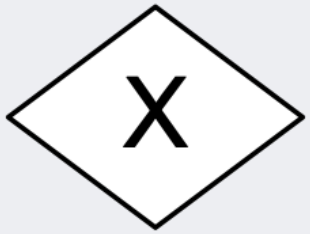
Gateways Types



And - Parallel fork/join

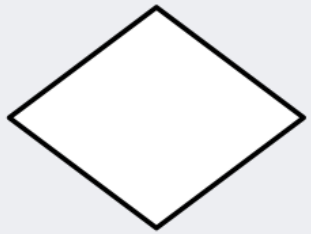


OR - Inclusive Decision/ Merge



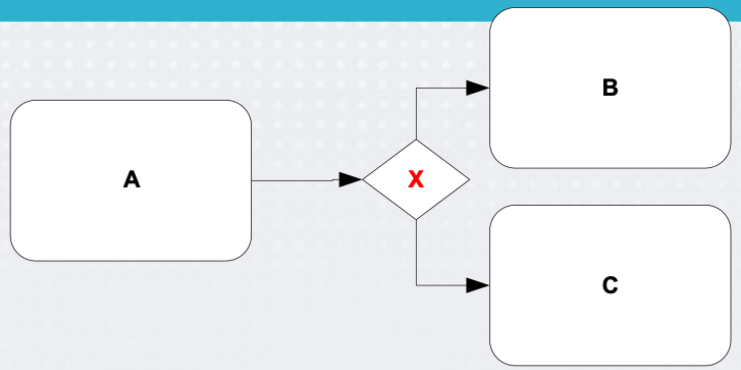
XOR - Exclusive Decision/Merge

means the same as

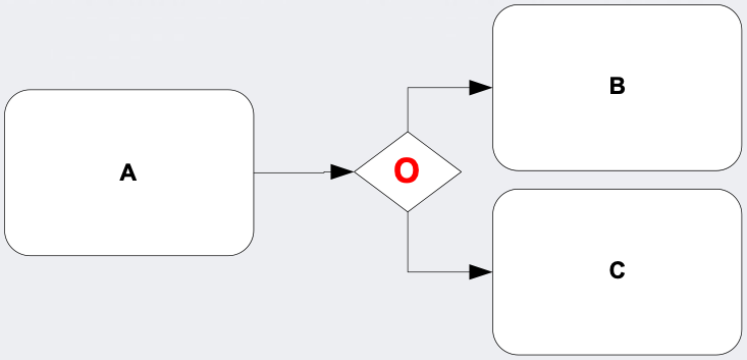


-Gateways control convergence OR divergence of process flows - not equivalent to decision diamonds.
-Decisions are based on the evaluation of a piece of data *within the preceding process*.

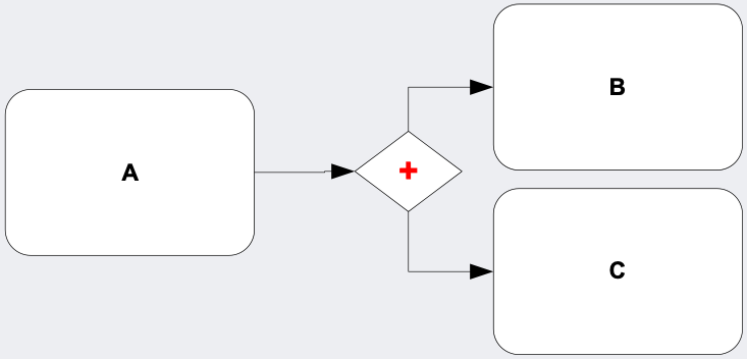
Divergence



Exclusive Or: When A has finished perform B or C

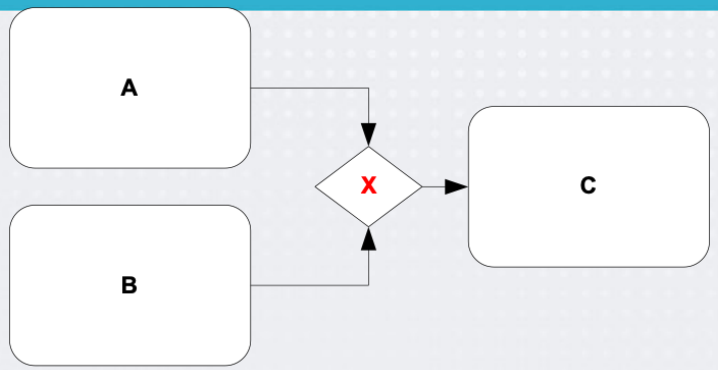


Inclusive Or: When A has finished perform B or C or both

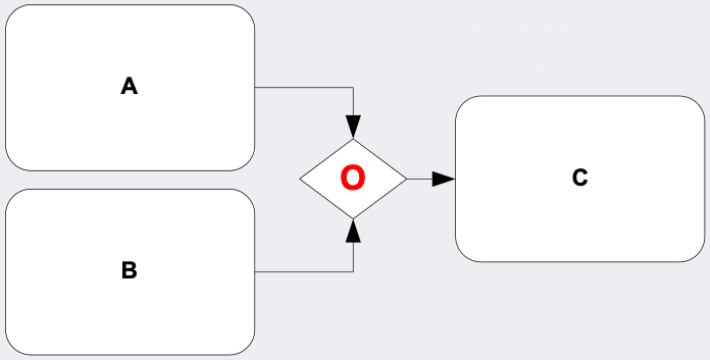


And: When A has finished perform B and C

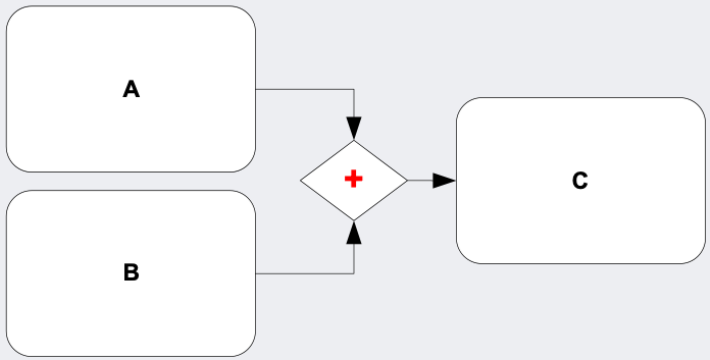
Convergence



Exclusive Or: Perform C when A or B have finished

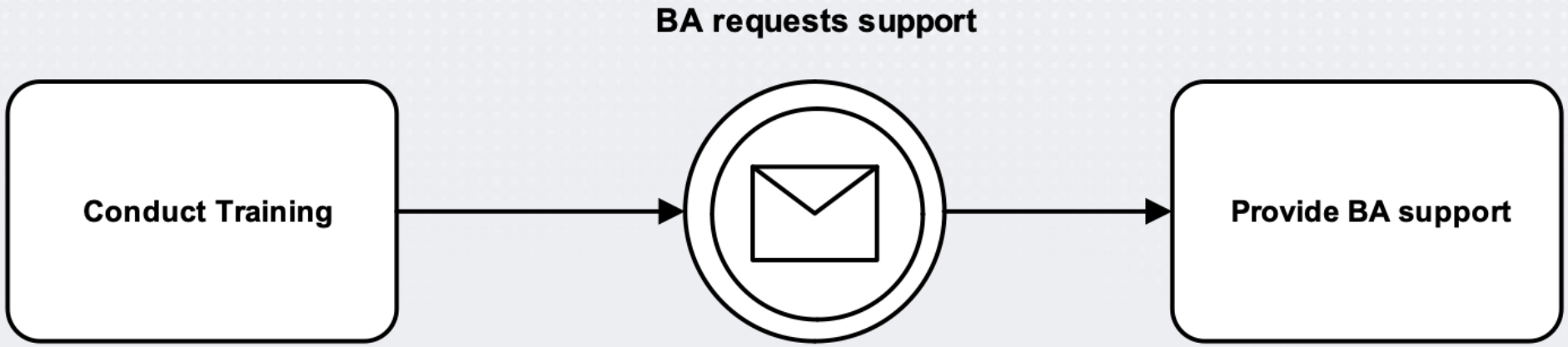


Inclusive Or: Perform C when A or B or Both have finished



And: Perform C when A and B have finished

Process Break

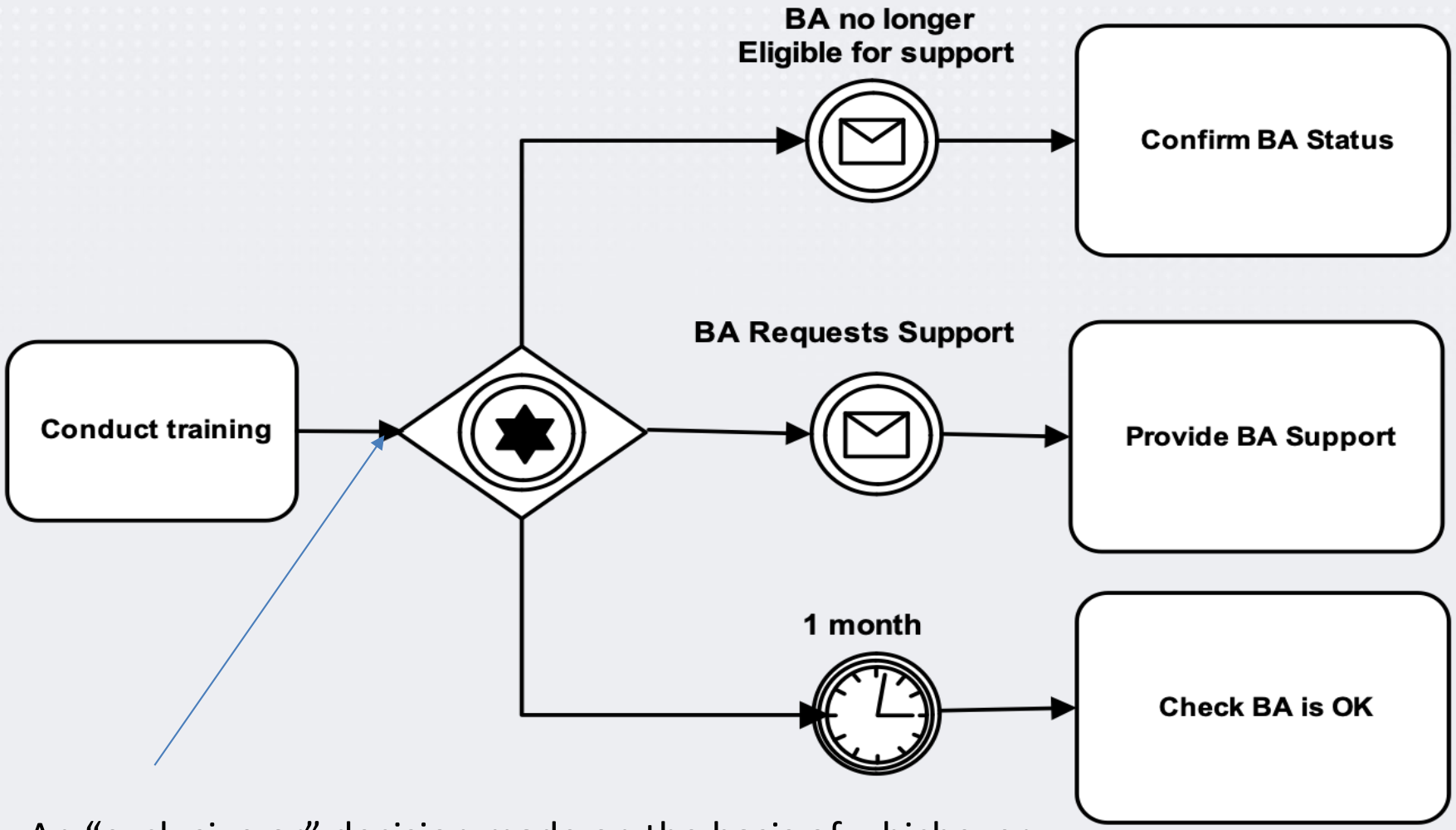


-> An intermediate message can be used to show a process break.

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.

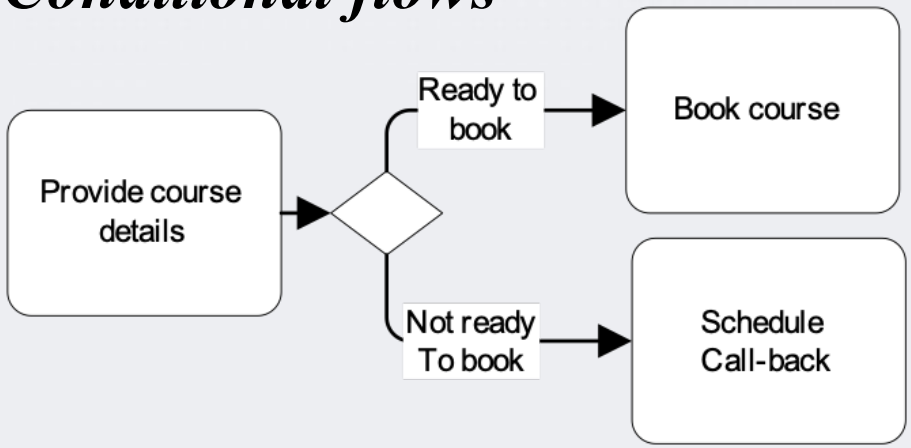
Sequence Flow of Control

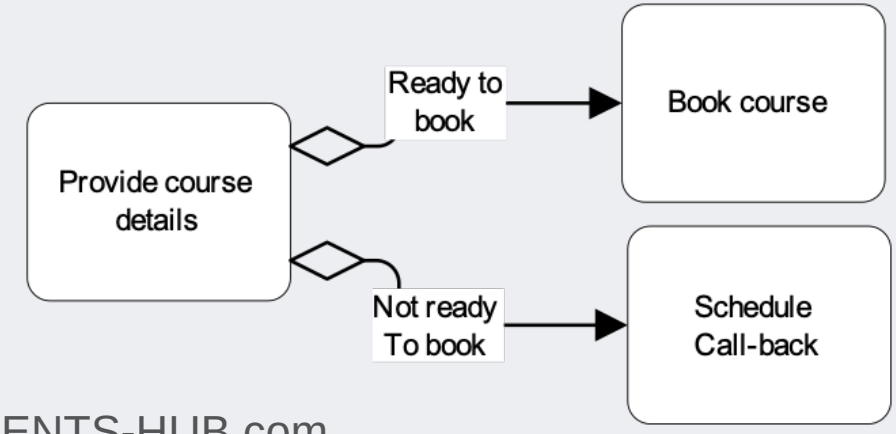
Unconditional flows

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

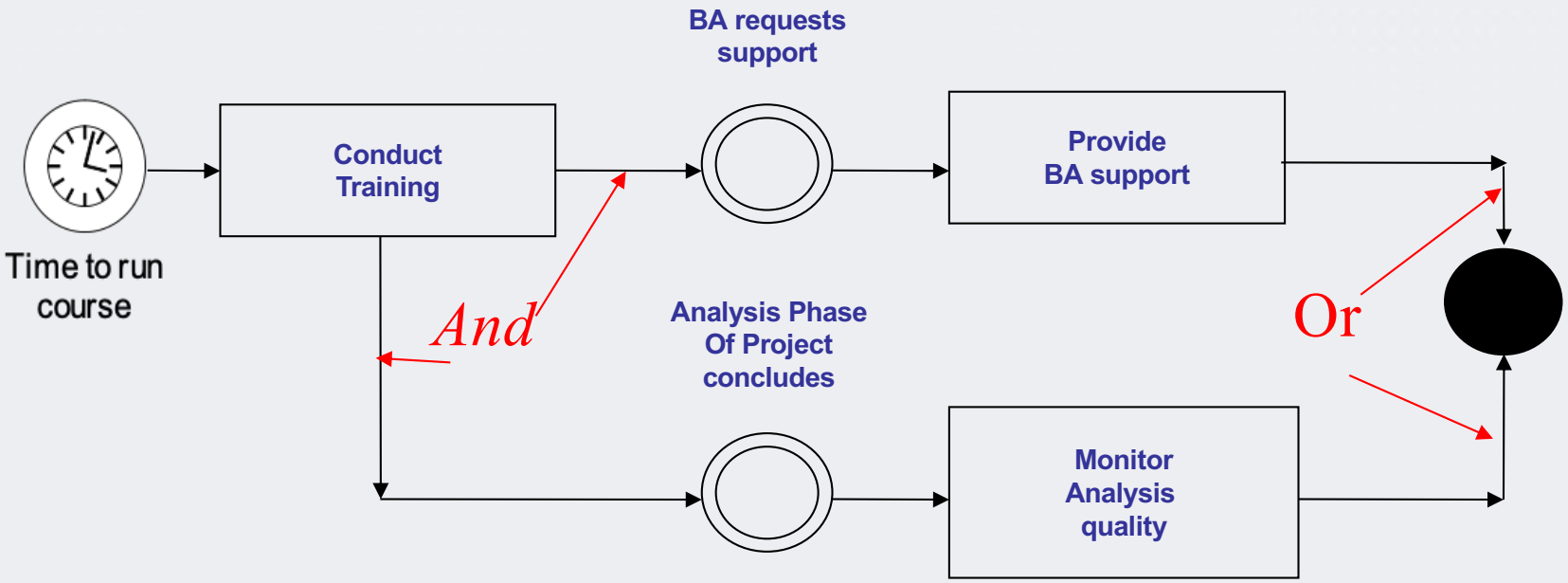




Do these rules reflect business requirements?
Are they workable?

Are these two process flows equivalent?
Which is better?

BPMN defaults for Process Flows

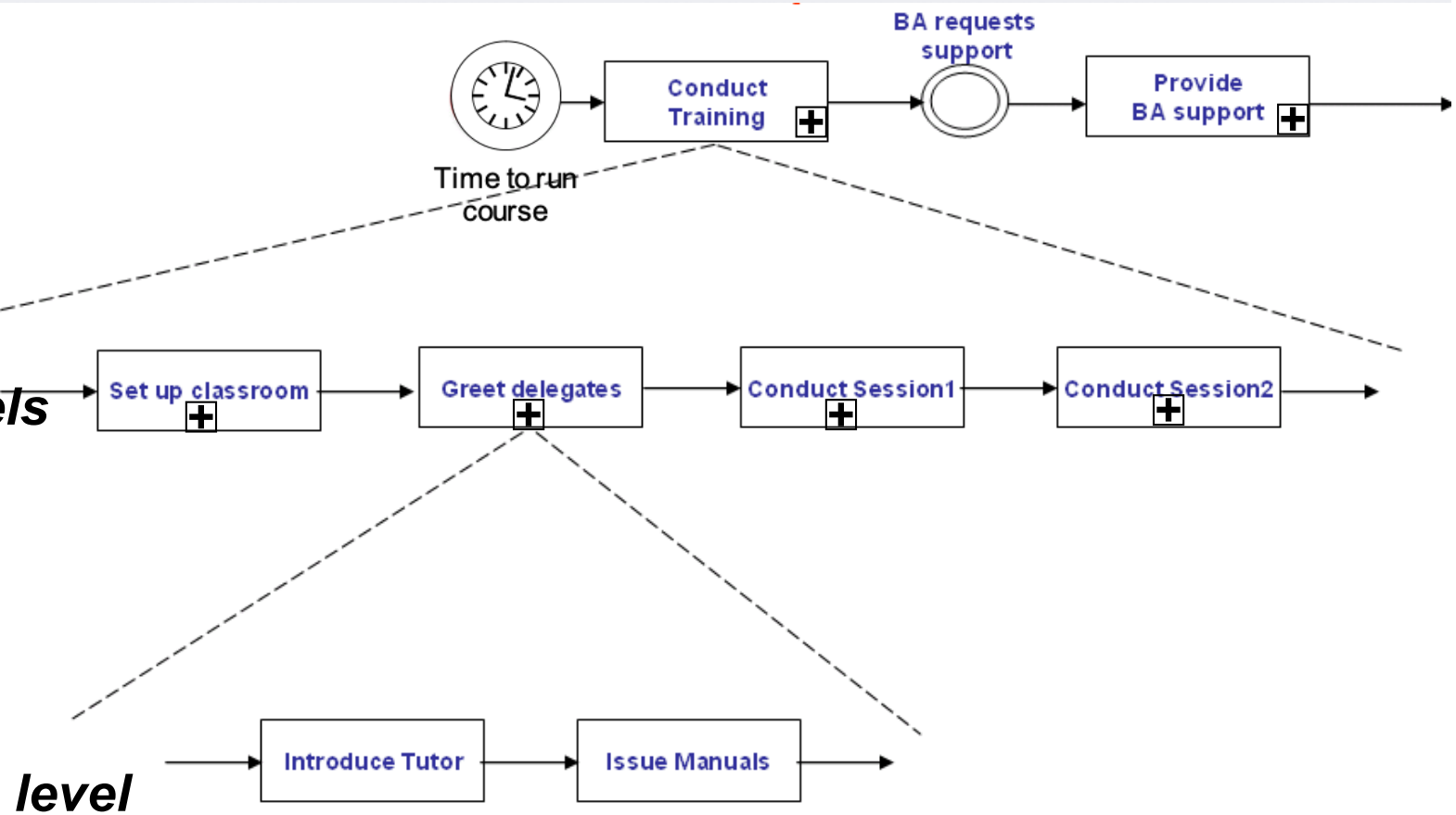


Process Decomposition

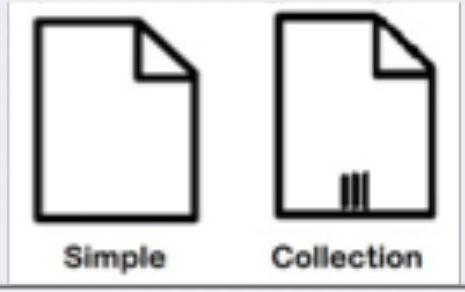
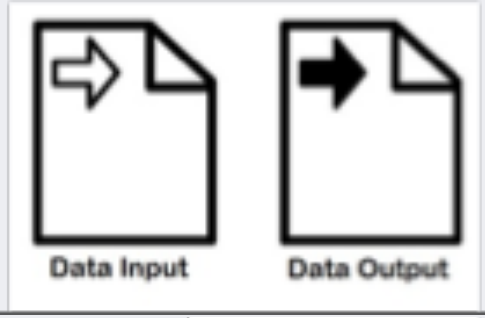
Activities
Top level

Sub-Process
Intermediate levels

Task
Bottom or atomic level



Data Objects

Element	Description	Icon
Data Objects	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.	
Data Inputs, Outputs	Represent the necessary data (input) to adequately perform the activities and processes and the produced data (output).	
Data Store	Provide activities with a mechanism to retrieve or to store data will persist beyond the scope of the process.	

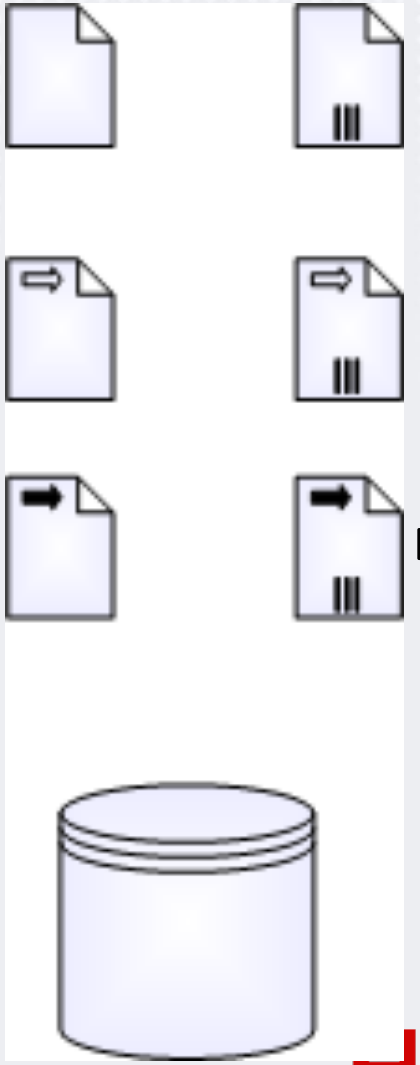
Data Objects

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.



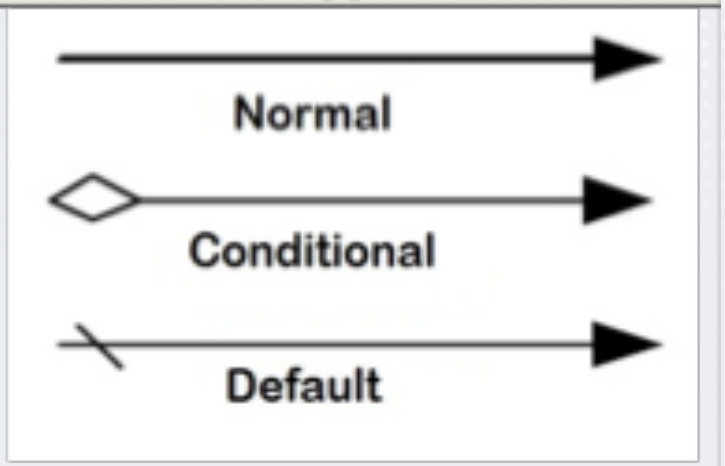
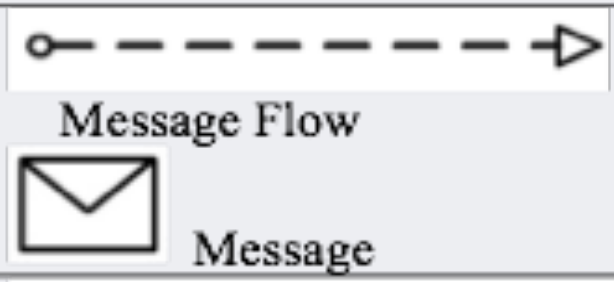
BPMN – Basic Elements

- 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.

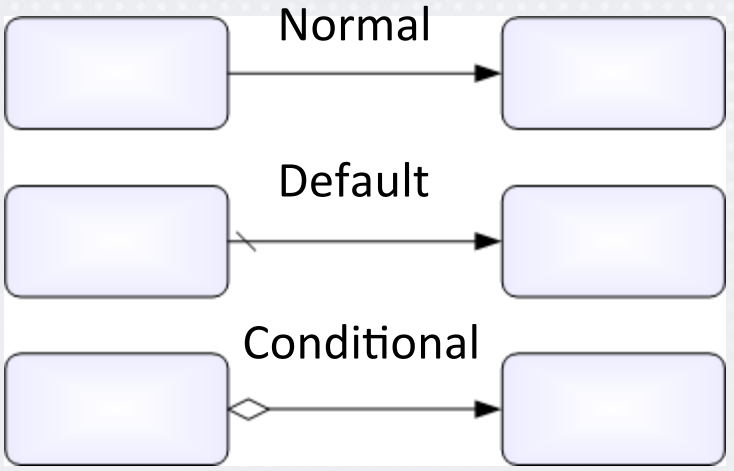
Connecting Objects

Element	Description	Icon
Sequence Flow	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).	
Message Flow	Messages are used to show the communication flow between two participants (represented as two separated pools). They can include *messages* which represent the content of the participant's communication.	
Association	Associations are used to link Artifacts and Text Annotations with other graphical BPMN elements. An arrow can be used to denote the association direction.	

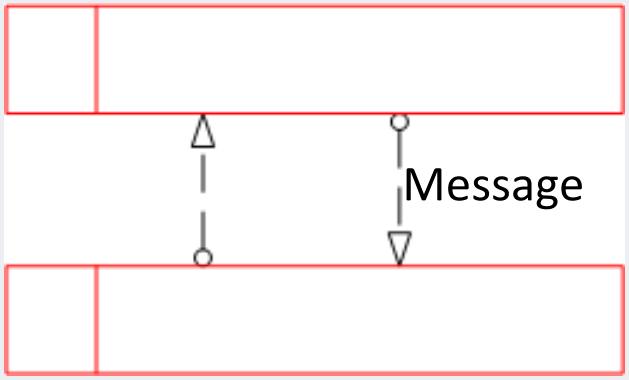
Connection Objects

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

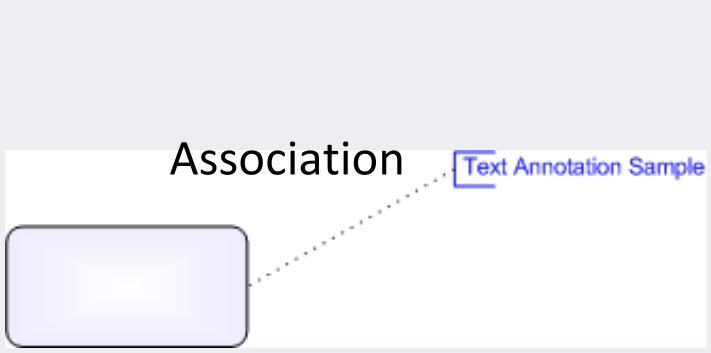
Sequence Flows can be **Normal**, **Default** and **Conditional**, and always have direction, source and target.

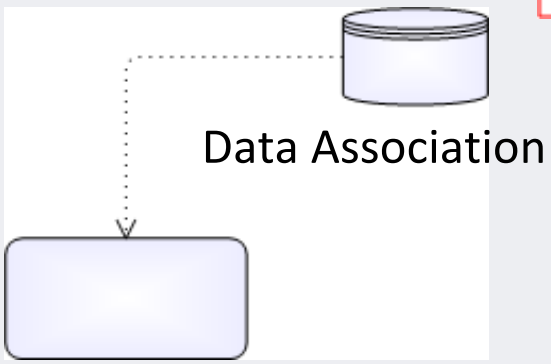


Message Flows **used to represent collaboration between two processes.**

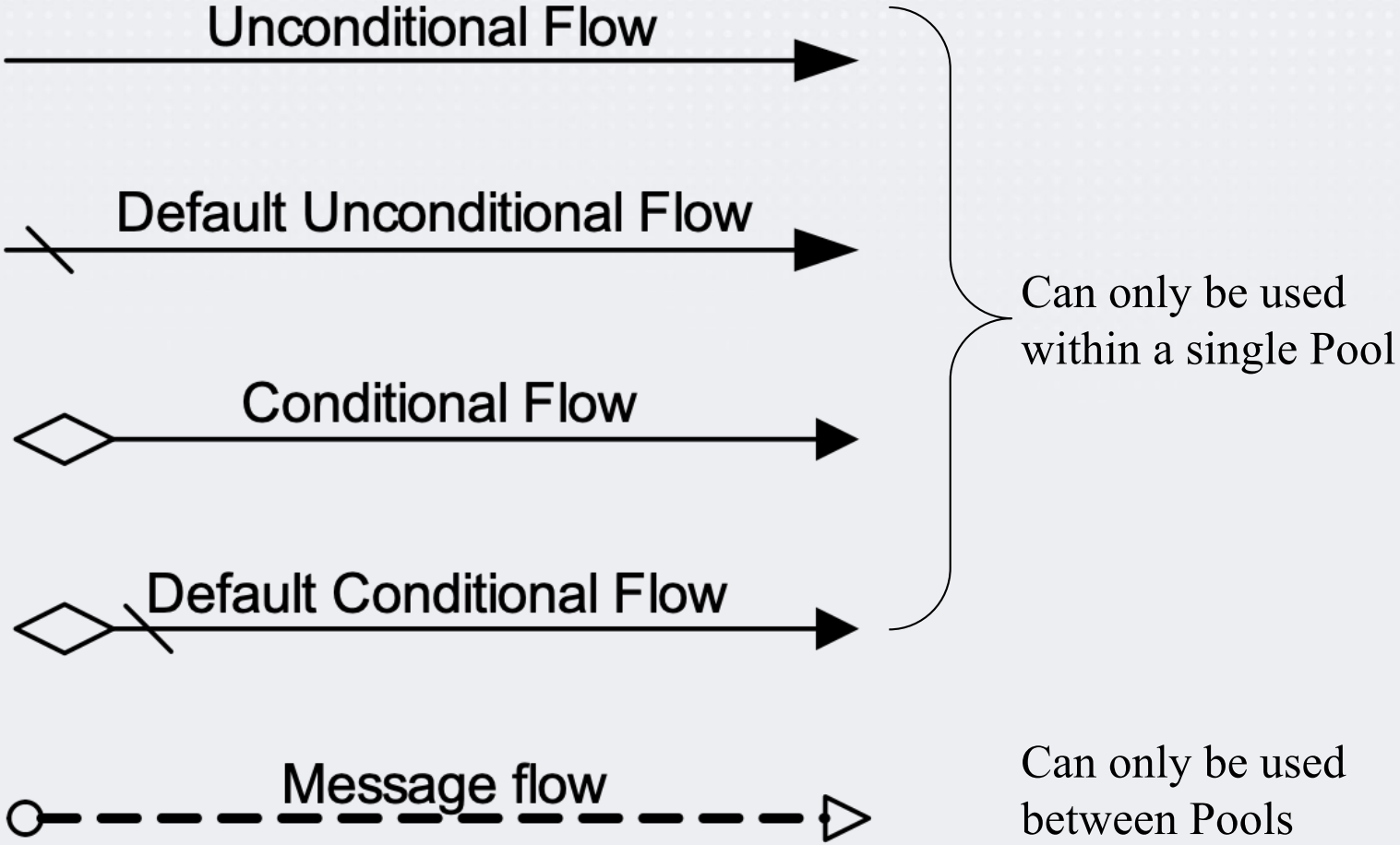


Data Association is a line between a **Data Object** and **an element.**

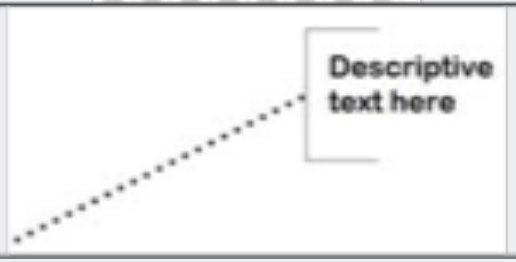




Process flow connectors

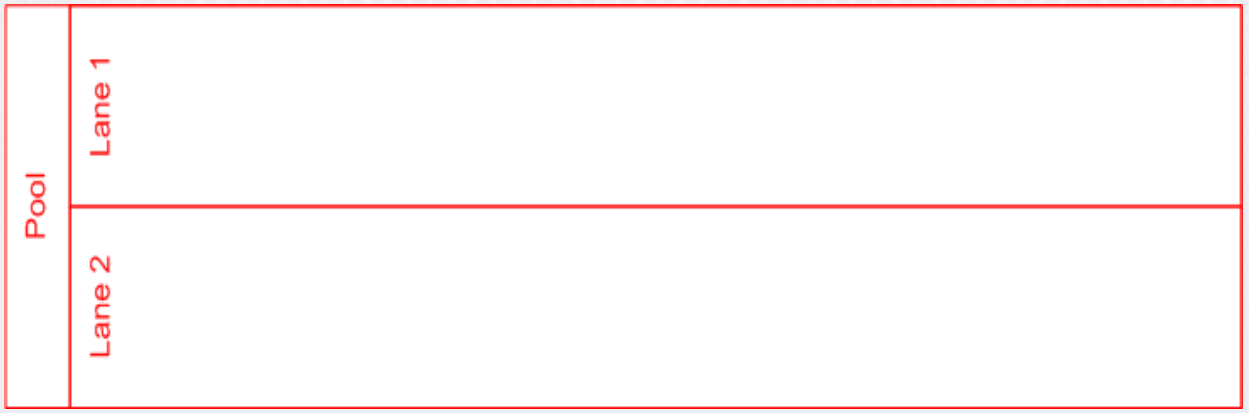


Swimlanes

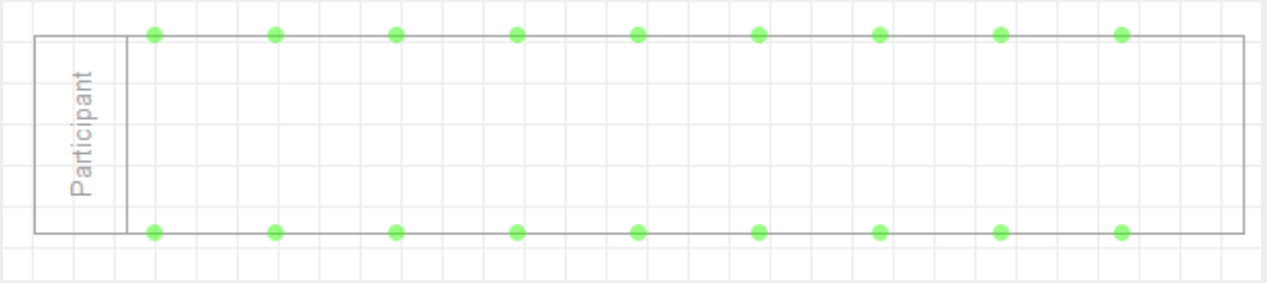
Element	Description	Icon
Pool	Represents a Participant in a Collaboration and acts as a graphical container ("swim lane") for partitioning a set of Activities from other Pools, usually in the context of Business to Business situations. It can include internal details (process) or act as a "black box".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

Swimlanes

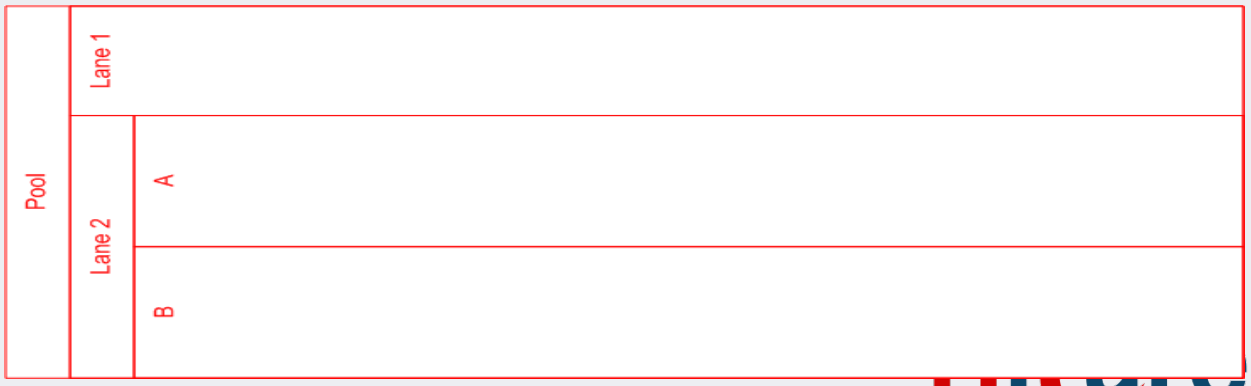
Pool or Laneset is an element representing a process into an organization or company.



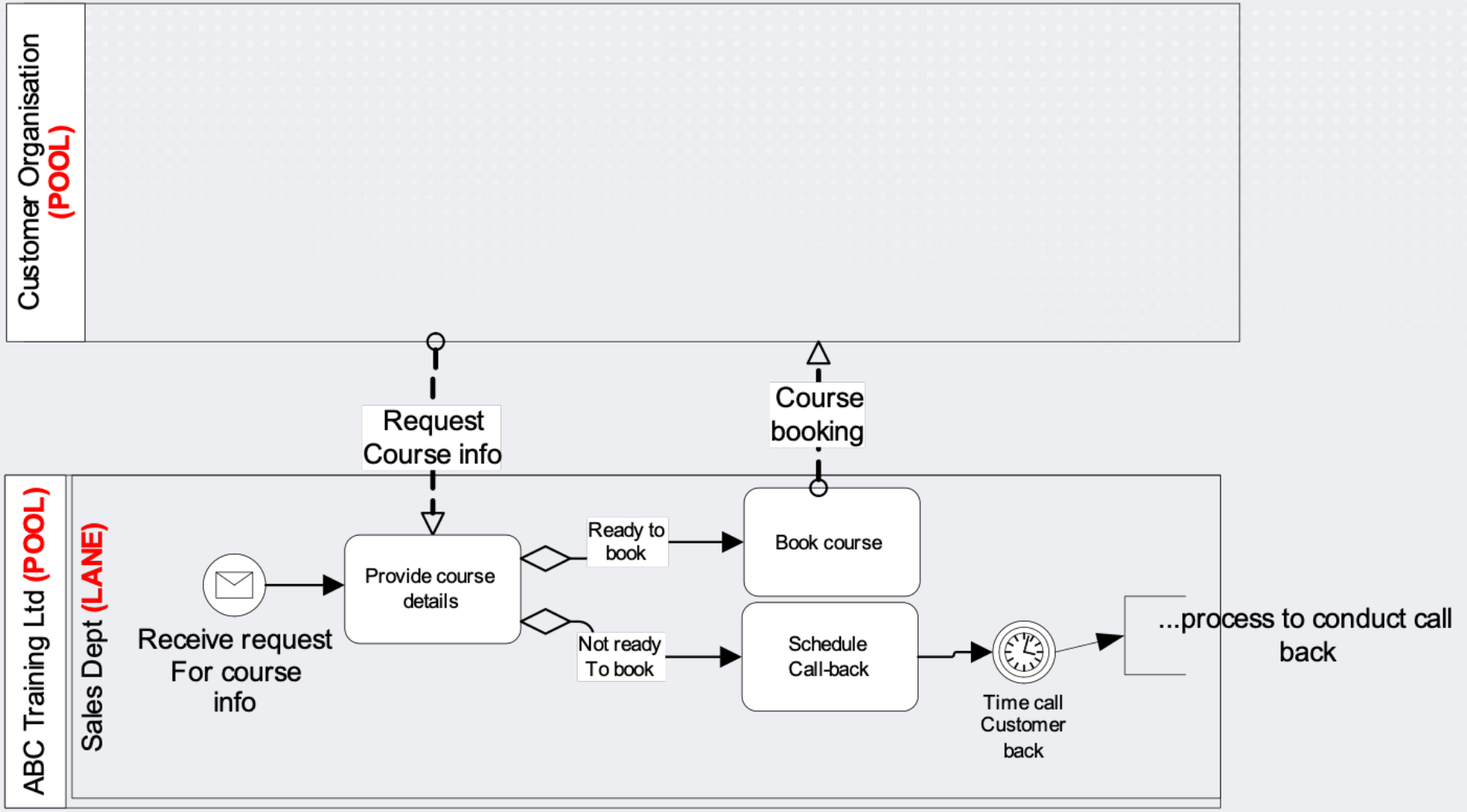
Lane is a representation of an area or department of the company. Some times, a lane can represent a role (of a **participant**) into a process scope.



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

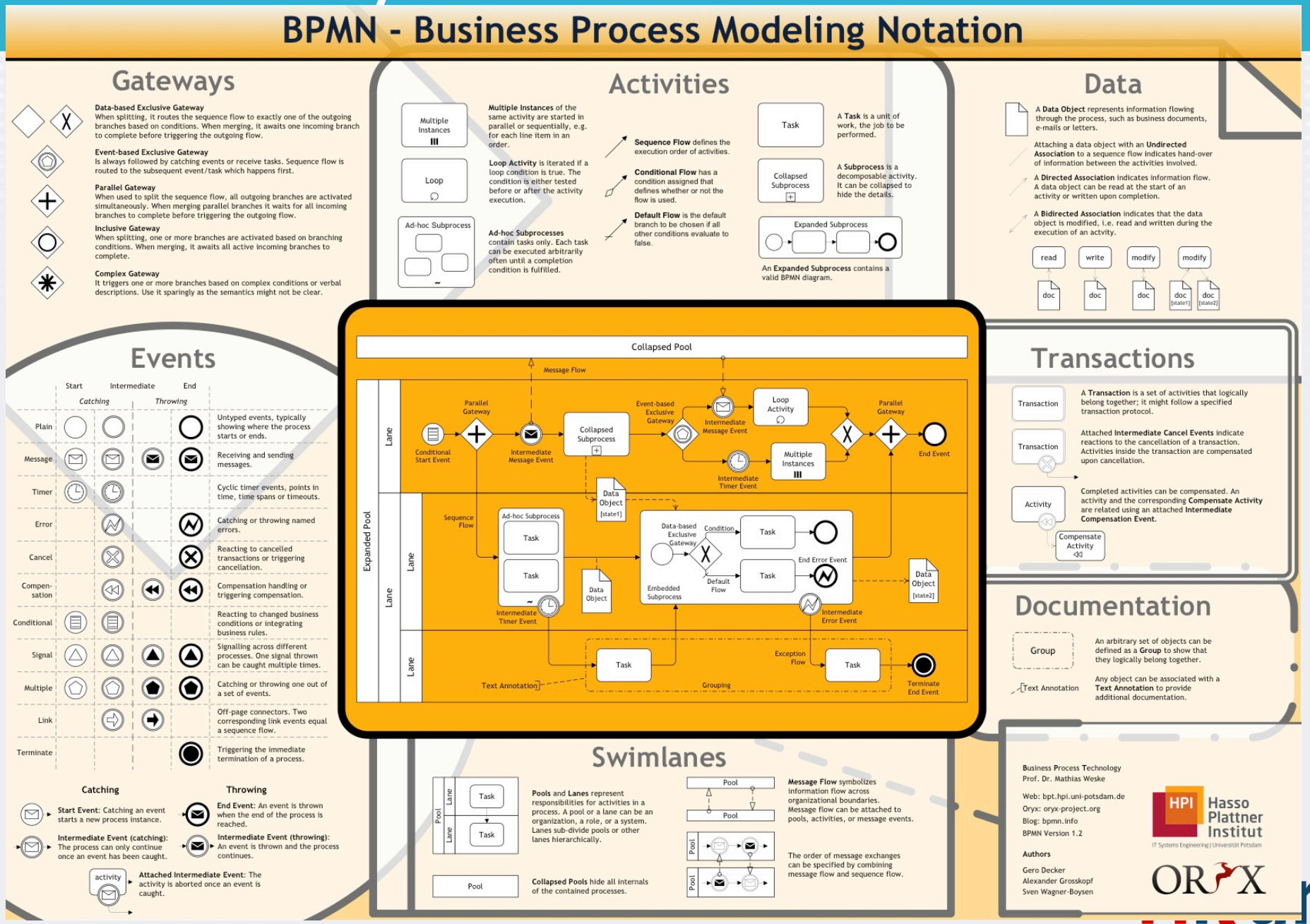
Artifacts

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



Summary of BPMN 2.0 Notations