COMP2332:
Enterprise Healthcare Business Process Modelling

Business Process Modelling Notation (BPMN 2.0)

Time: **Tuesday+ Thursday: 12:50-14:05**

Location: **Masri110**

Section: **1**

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Prof. Adel Taweel

Birzeit University

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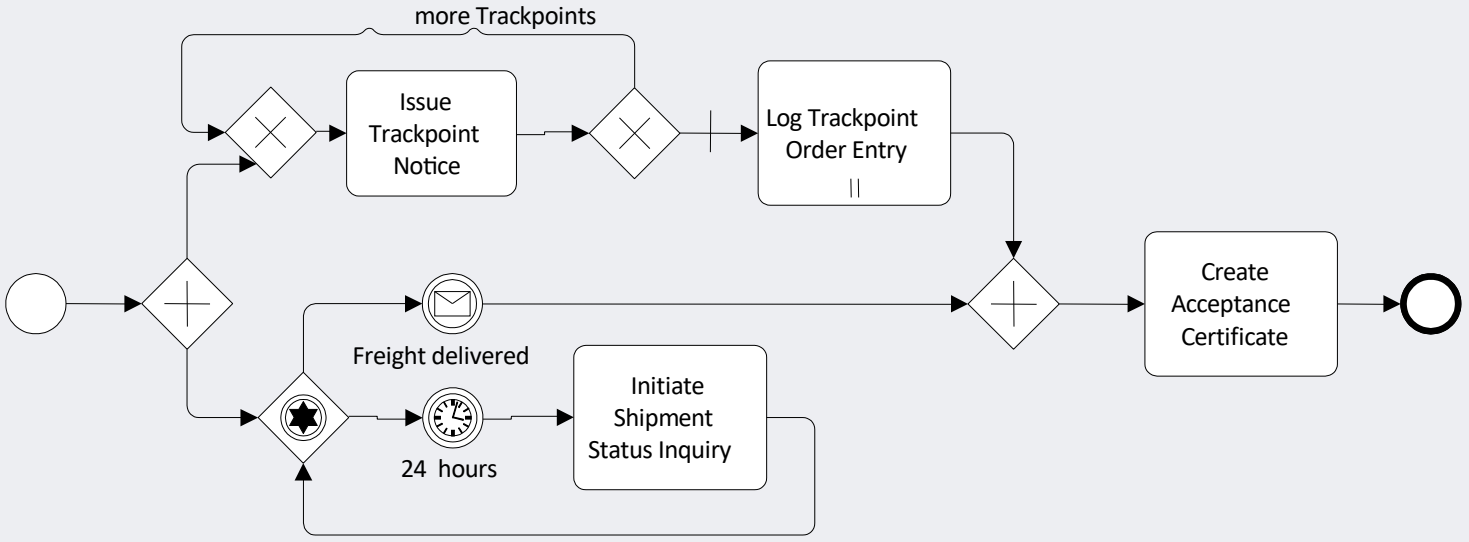
Business Process Modelling Notations

- Introduction and Purpose
- Motivation
- BPMN – basic elements
- BPMN- diagrams
- BPMN vs YAWL
- Modelling in BMPN

BPMN

The Business Process Modelling Notation (BPMN)

- Graphical notation for *conceptual* processes
- Covers control, data, authorization, exception
- An 'industry standard' process modelling technique- Standardized by OMG
- Developed by Business Process Management Initiative (www.BPMN.org)



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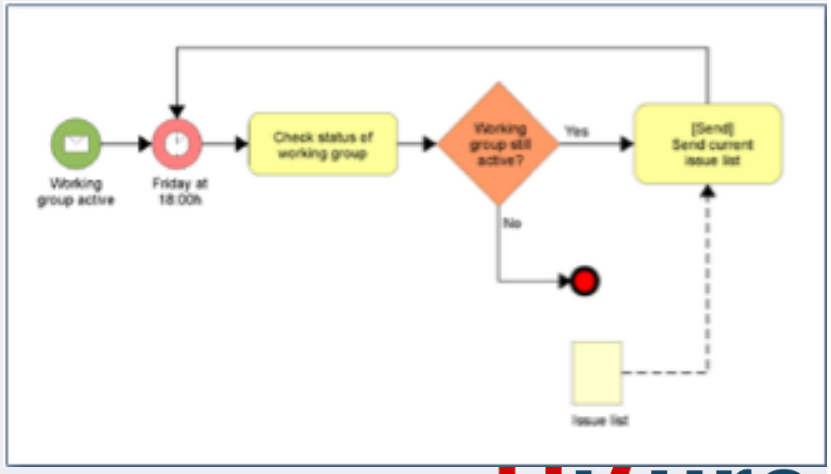
BMPN

- BPMN is a graphical representation for specifying business processes in a workflow
- BPMN was developed by Business Process Management Initiative (BPMI)
- BPMN is currently maintained by the Object Management Group (OMG) since 2005
- BPMN 2.0 published 2010
- Tool support: (> 60 tools?)
  - Drawing tools
  - Repository based modelling tools



BPMN: Purpose

- to provide a notation that is easily **understandable** by all business users: business analysts, Business managers, business executive.
- to support the notation with an internal model that has formal **execution semantics**.
- to provide a standard interchange format for **transfer** of process and interaction models.
- to create a standardized bridge between the business process **design** and process **implementation**.

Why BPMN?

- Standard notation
- Model concepts and/or implementation of business process
- Models high-level process concepts
- Notation is not complex

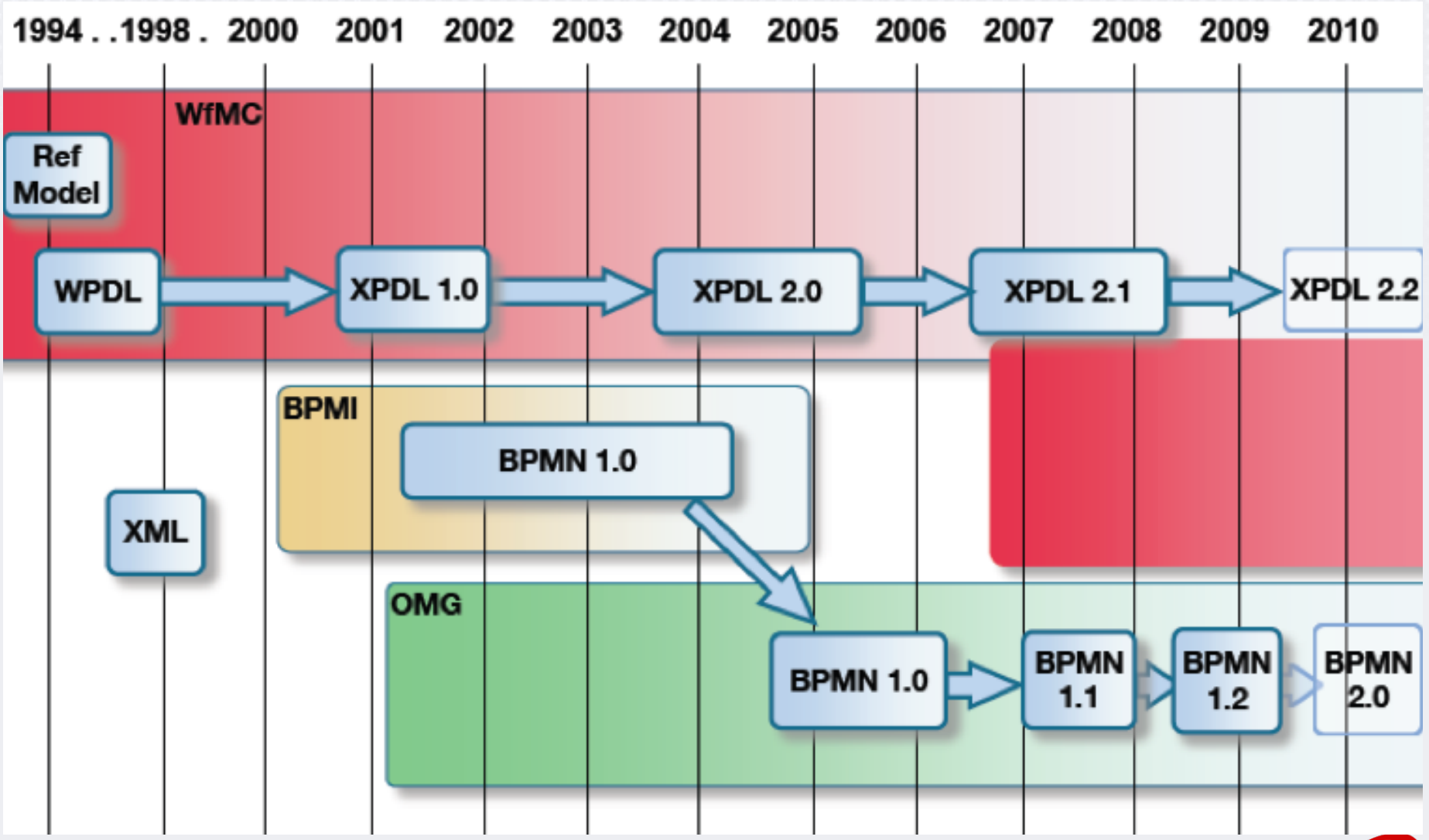
Issues with BPMN

- Limited complexity
- Process/conversation oriented
- Very high level
- Cannot see details of tasks or data

How Can BPMN help in improving processes?

- Modelling the As-Is business processes
- Identifying areas of improvement
- Discovering reusable business services
- Modelling the To-Be business processes
- Discovering web services
- Helping in the implementation of needed web services

BPMN History



BPMN 2.0

- The BPMN 1.0 specification did not formally define the **semantics** of the Business Process Diagram.

- BPMN 2.0 partially solves this, and also contains significant changes, including:
  - New event types: parallel multiple events.
  - Parallel event-based gateway.
  - Event sub-processes only carried out when an event occurs.
  - Updates on collaboration modelling.
  - Two new diagram types:
    - (a) Choreography diagram: modelling data exchange between partners, where each data exchange is modelled as an activity.
    - (b) Conversation diagram: an overview of several partners and their links.

What can BPMN Represent?

Level of Detail?

ENTERPRISE ARCHITECTURE - A FRAMEWORK™

Level 1: Conceptual, Descriptive

Level 2: Logical, Analytical

Level 3: Physical, Executable

	DATA *What*	FUNCTION *How*	NETWORK *Where*	PEOPLE *Who*	TIME *When*	MOTIVATION *Why*	
SCOPE (CONTEXTUAL) *Planner*	List of Things Important to the Business ENTITY = Class of Business Thing	List of Processes the Business Performs Function = Class of Business Process	List of Locations in which the Business Operates Node = Major Business Location	List of Organizations Important to the Business People = Major Organizations	List of Events Significant to the Business Time = Major Business Event	List of Business Goals/Strat End/Means=Major Bus. Goal/ Critical Success Factor	SCOPE (CONTEXTUAL) *Planner*
ENTERPRISE MODEL (CONCEPTUAL) *Owner*	e.g. Semantic Model Ent = Business Entity Reln = Business Relationship	e.g. Business Process Model Proc. = Business Process I/O = Business Resources	e.g. Logistics Network Node = Business Location Link = Business Linkage	e.g. Work Flow Model People = Organization Unit Work = Work Product	e.g. Master Schedule Time = Business Event Cycle = Business Cycle	e.g. Business Plan End = Business Objective Means = Business Strategy	ENTERPRISE MODEL (CONCEPTUAL) *Owner*
SYSTEM MODEL (LOGICAL) *Designer*	e.g. Logical Data Model Ent = Data Entity Reln = Data Relationship	e.g. "Application Architecture" Proc. = Application Function I/O = User Views	e.g. "Distributed System Architecture" Node = I/S Function (Processor, Storage, etc) Link = Line Characteristics	e.g. Human Interface Architecture People = Role Work = Deliverable	e.g. Processing Structure Time = System Event Cycle = Processing Cycle	e.g., Business Rule Model End = Structural Assertion Means = Action Assertion	SYSTEM MODEL (LOGICAL) *Designer*
TECHNOLOGY MODEL (PHYSICAL) *Builder*	e.g. Physical Data Model Ent = Segment/Table/etc. Reln = Pointer/Key/etc.	e.g. "System Design" Proc = Computer Function I/O = Screen/Device Formats	e.g. "System Architecture" Node = Hardware/System Software Link = Line Specifications	e.g. Presentation Architecture People = User Work = Screen Format	e.g. Control Structure Time = Execute Cycle = Component Cycle	e.g. Rule Design End = Condition Means = Action	TECHNOLOGY CONSTRAINED MODEL (PHYSICAL) *Builder*
DETAILED REPRESENTATIONS (OUT-OF-CONTEXT) *Sub-Contractor*	e.g. Data Definition Ent = Field Reln = Address	e.g. "Program" Proc = Language Stmt I/O = Control Block	e.g. "Network Architecture" Node = Addresses Link = Protocols	e.g. Security Architecture People = Identity Work = Job	e.g. Timing Definition Time = Interrupt Cycle = Machine Cycle	e.g. Rule Specification End = Sub-condition Means = Step	DETAILED REPRESENTATIONS (OUT-OF-CONTEXT) *Sub-Contractor*
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORGANIZATION	e.g. SCHEDULE	e.g. STRATEGY	FUNCTIONING ENTERPRISE

Zachman Institute for Framework Advancement - (810) 231-0531

http://apps.adcom.uci.edu/EnterpriseArch/Zachman/zachman.jpg

Business Process Redesign

- Effectiveness
  - To do the right things
- Efficiency
  - To do things right

BPMN Diagrams

- **Process** – Flow of activity, decisions, data and events
- **Collaboration** – Conversations and interactions (also process)
- **Choreography** – Tasks performed by participants and how participants coordinate interactions via messages.

BPMN – Basic Elements

- Flow Objects.
  - Events
  - Activities
  - Gateways
- Data Objects.
  - Data objects
  - Data inputs
  - Data outputs
  - Data stores

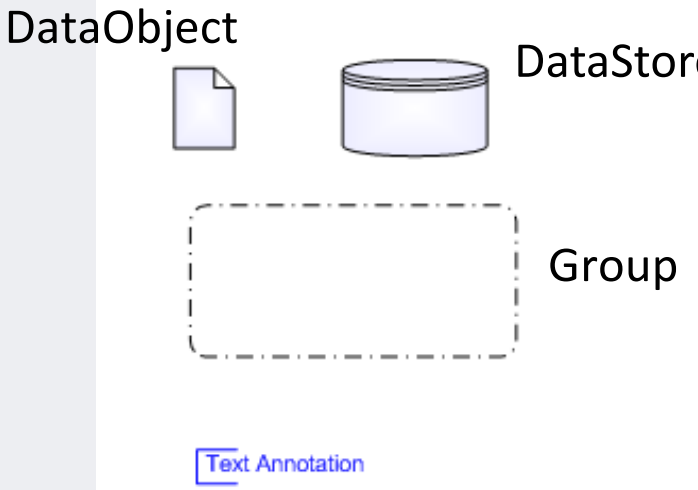
Basic BPMN Design Elements

Flow Objects

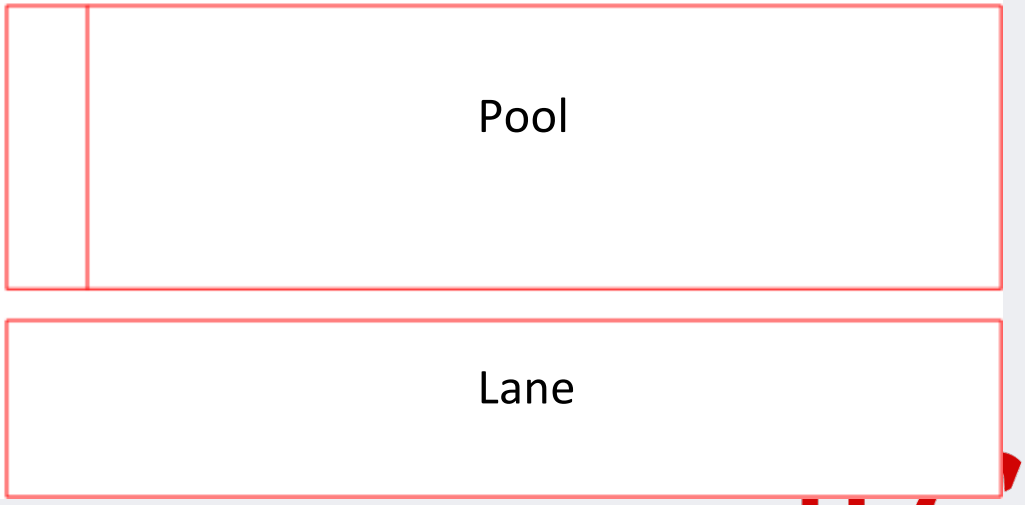
Event Activity Gateway

Connecting Objects

Data Objects & Artifacts



Swimlanes



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Flow Objects: Events

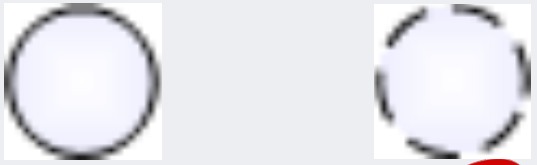
Element	Description	Icon
Event	An event is something that happens during the course of a process or choreography. Events usually have a cause (trigger) and/or an impact. There are three main types of events: Start, Intermediate and Final. The Start and some Intermediate Events have "triggers" that define the cause of the Event. Each of of these can be decomposed in different types: Message, Timer, Error, Escalation, Cancel, Compensation, Conditional, Link, Signal, Terminate, Multiple, Parallel Multiple. Intermediate events can be attached to activities (*boundary event*).	

Start Event — Something happens that triggers the start of a process.

Intermediate Event — Happens During a process, the next step must wait for something to happen.

End Event — A point when the process may stop.

Start Events and Intermediate Events can be **Interrupting** and **Non-interrupting**.



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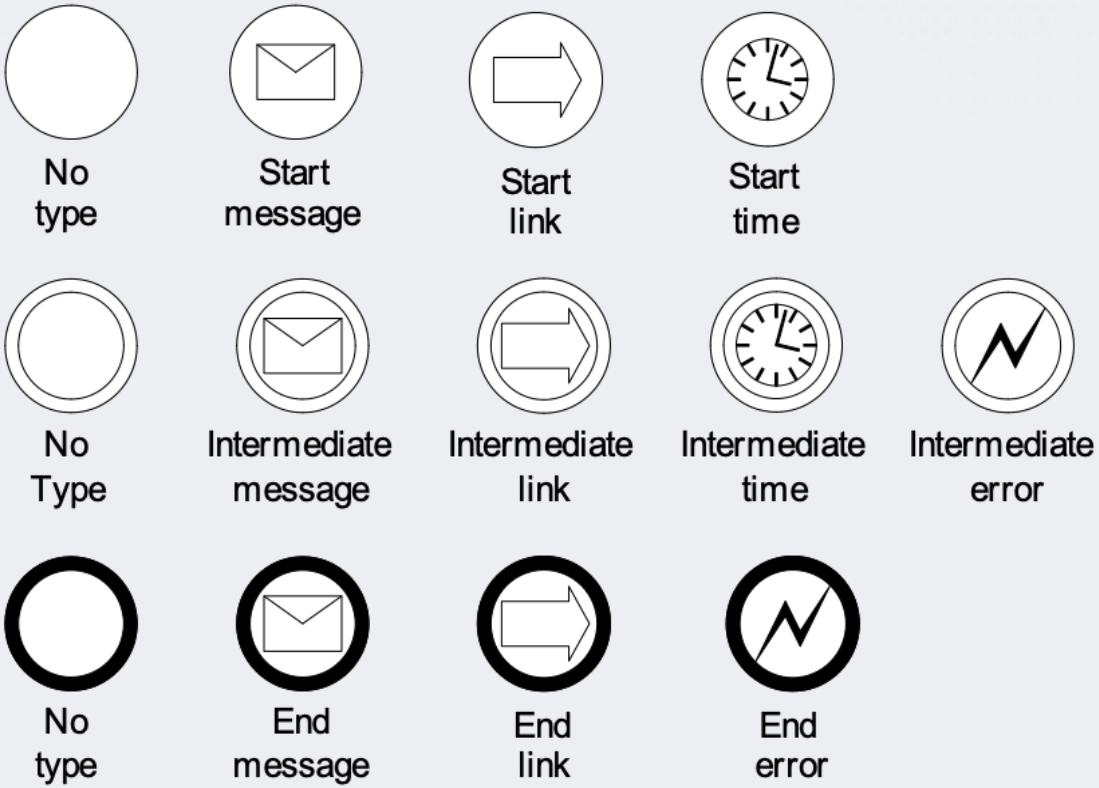
Types of Events: Examples

Valid combinations of Event Category & Type



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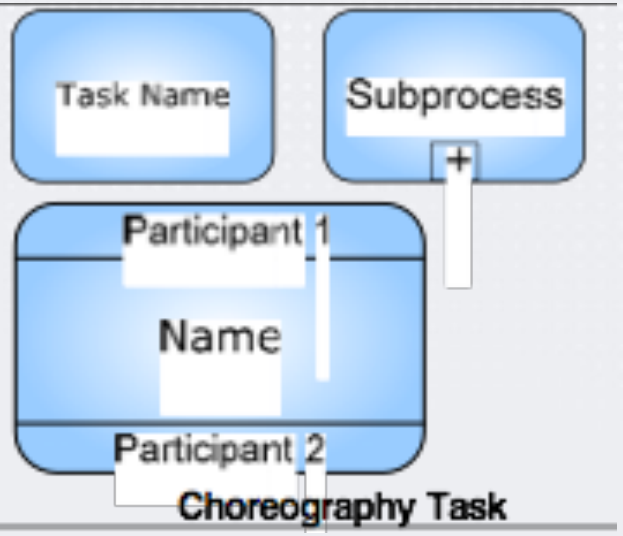
Flow Objects: Activity

Activity	An Activity represents the work to be performed in a Process. It can be atomic (task) or compound (subprocess). The tasks can be simple or choreography ones which represent a set of one or more message exchanges and which involves two participants.	

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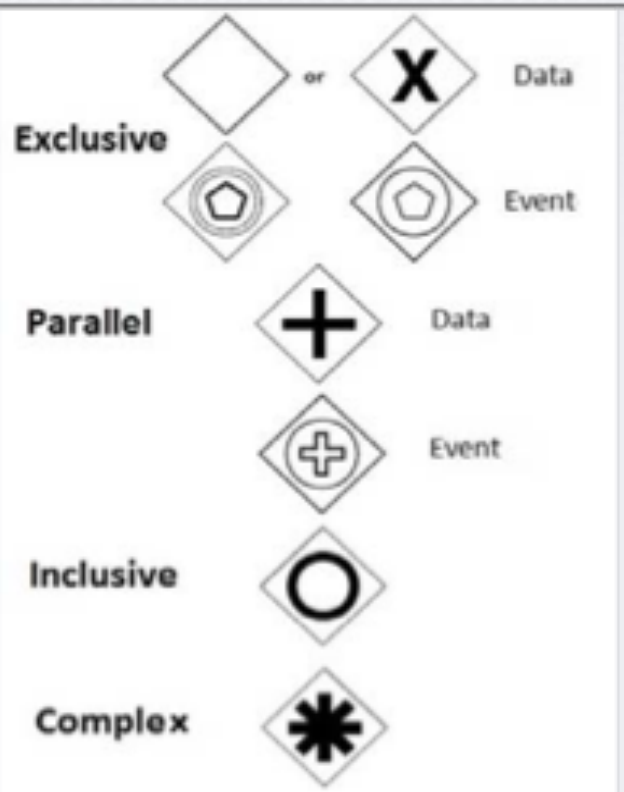
Flow Objects: Gateway

Gateways	A Gateway is used to control the divergence and convergence of Sequence Flows in a Process and in a Choreography. In their convergence version they have one ingoing sequence flow and several outgoing flows whereas in their divergence version they have several ingoing flows and one outgoing flow.	
	Exclusive (XOR), which represents an exclusive decision, i.e. only one outgoing flow is activated. The decision can be evaluated depending on data or events. **Parallel (AND)**, in which all outgoing flows are activated in parallel. **Inclusive (OR)**, in which each outgoing flow is activated depending on the evaluation of its associated condition. It implies that as a result one or several outgoing flows can be activated. **Complex**, which can be used to model the behavior of more complex synchronizations for which an activation condition is used.	

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**.