COMP2332:
Enterprise Healthcare Business Process Modelling

Business Process Modelling Notation (BPMN 2.0)

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

Location: **Masri110**

Section: **1**

HiCure
Excellence in Health Informatics Integrated Curricula

Prof. Adel Taweel

Birzeit University

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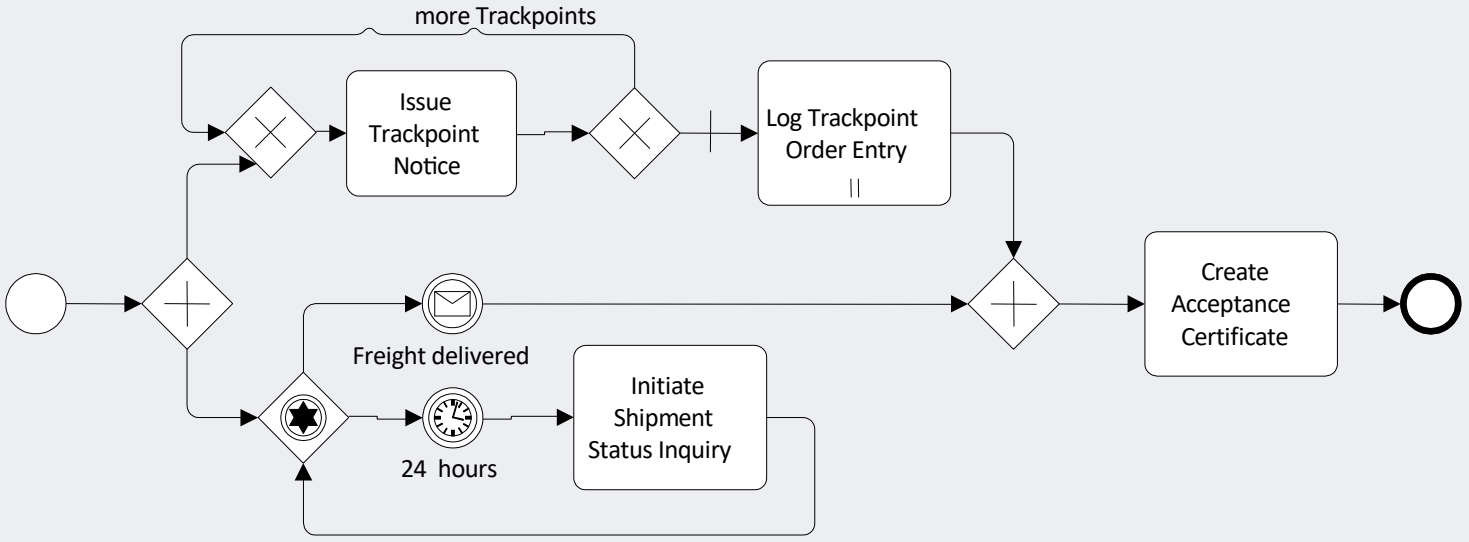
Business Process Modelling Notations

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

BPMN

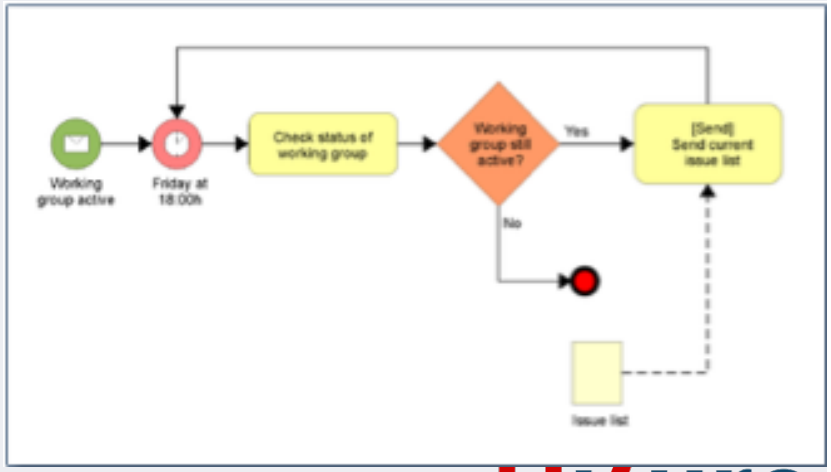
The Business Process Modelling Notation (BPMN)

- 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)



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

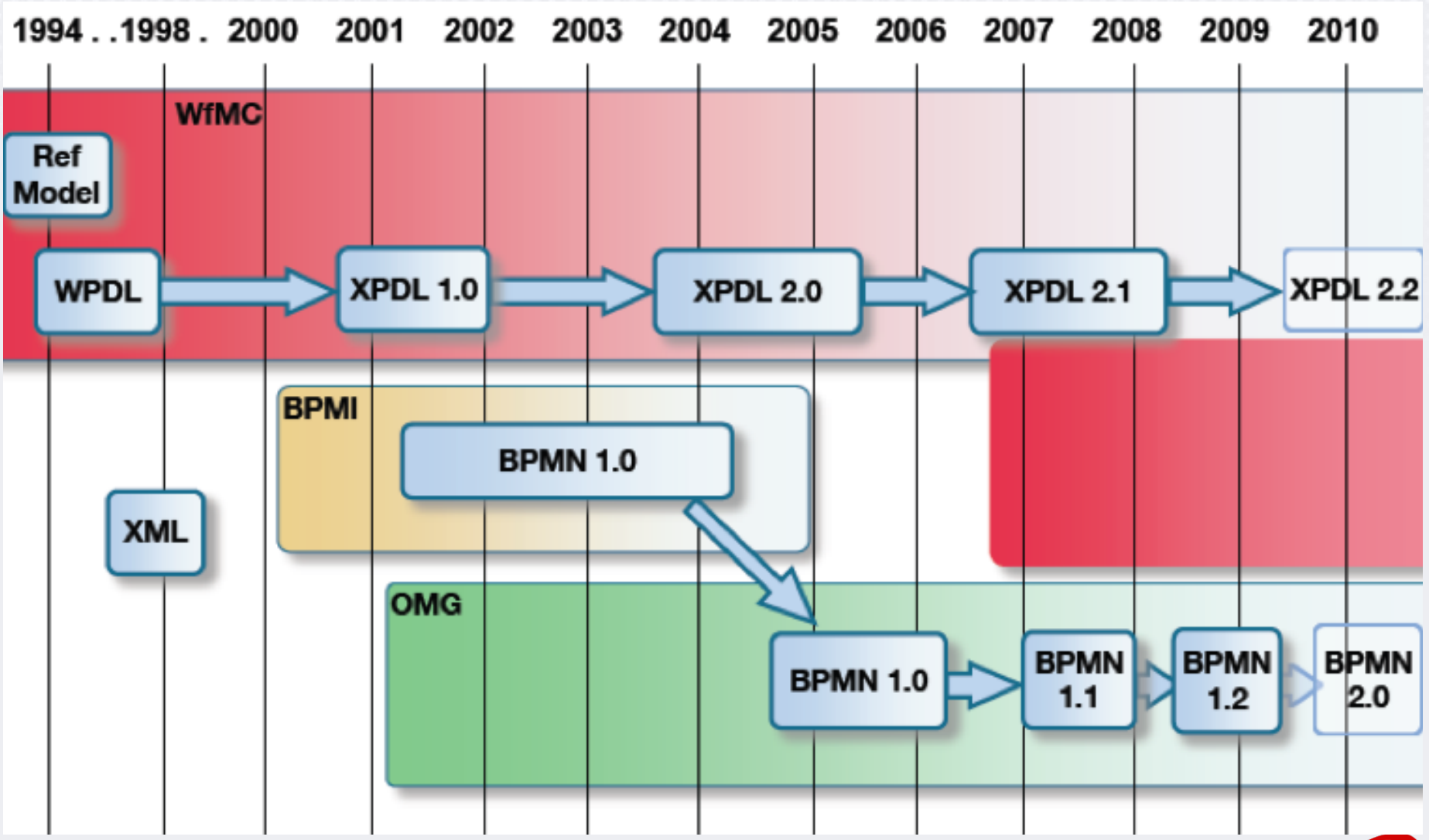
Issues with BPMN

- 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

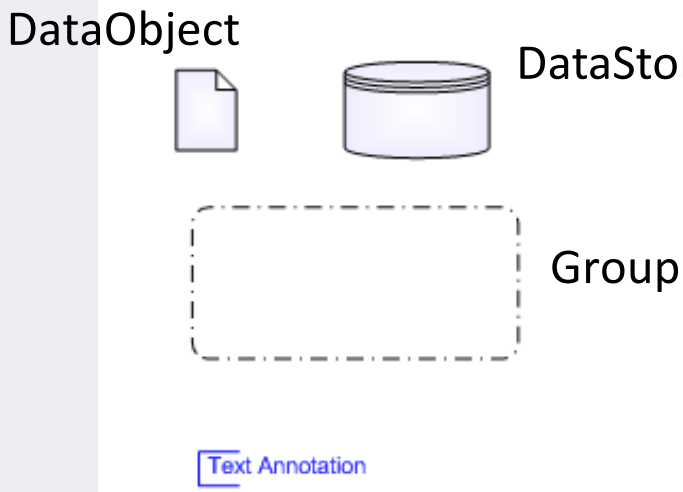
Basic BPMN Design Elements

Flow Objects

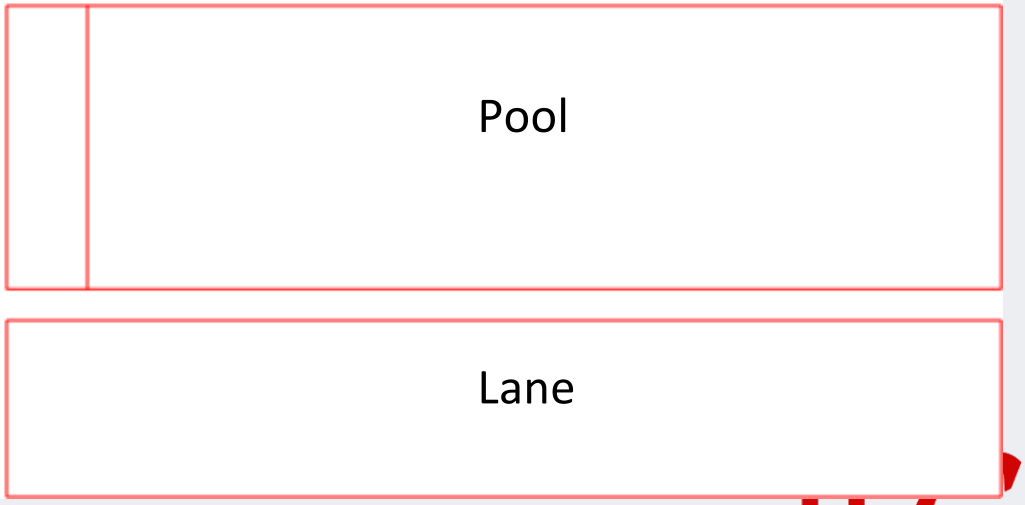
Event Activity Gateway

Connecting Objects

Data Objects & Artifacts



Swimlanes



Flow Objects: Events

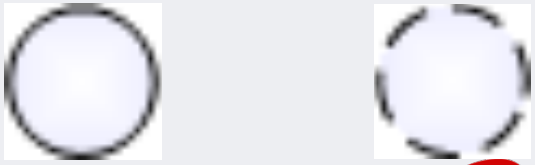
Element	Description	Icon
Event	An event is something that happens during the course of a process or choreography. Events usually have a cause (trigger) and/or an impact. There are three main types of events: Start, Intermediate and Final. The Start and some Intermediate Events have "triggers" that define 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.

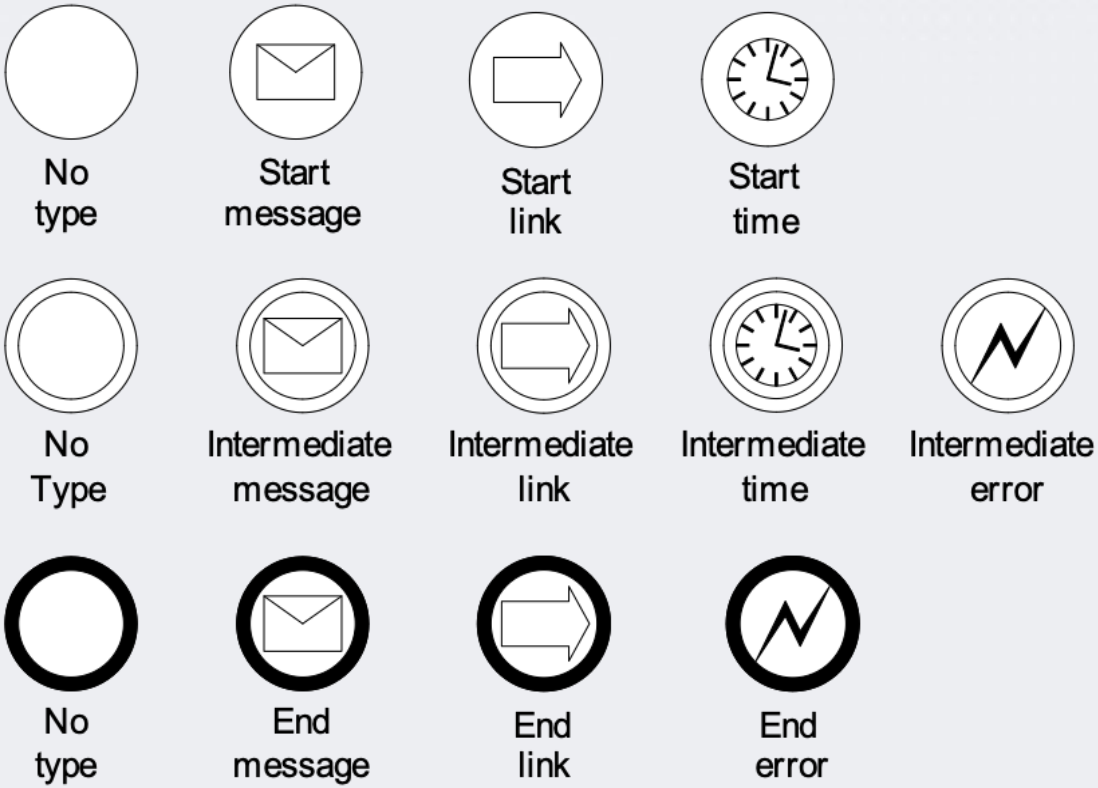
End Event — A point when the process may stop.

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

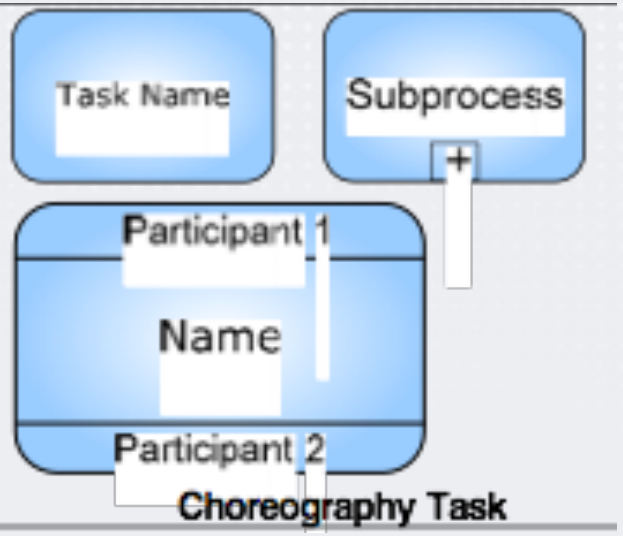


Types of Events: Examples

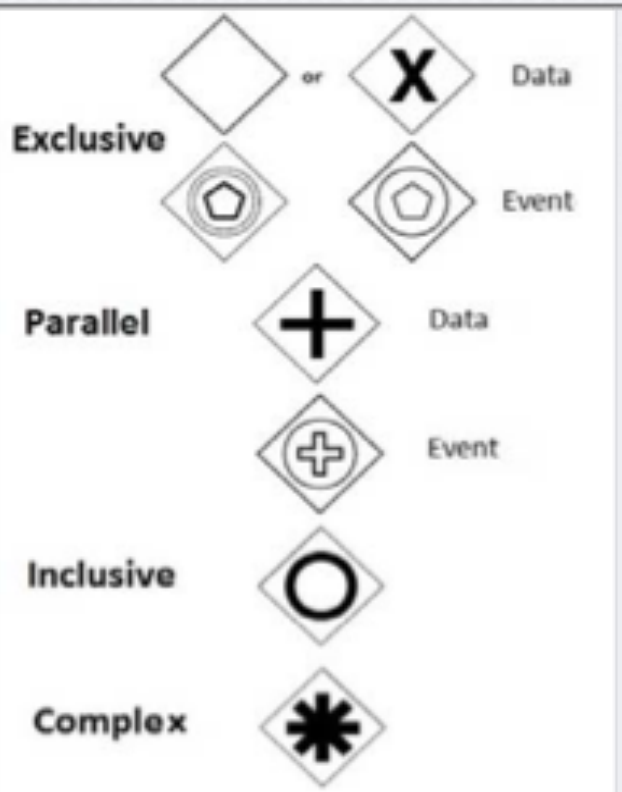
Valid combinations of Event Category & Type



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.	

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**.