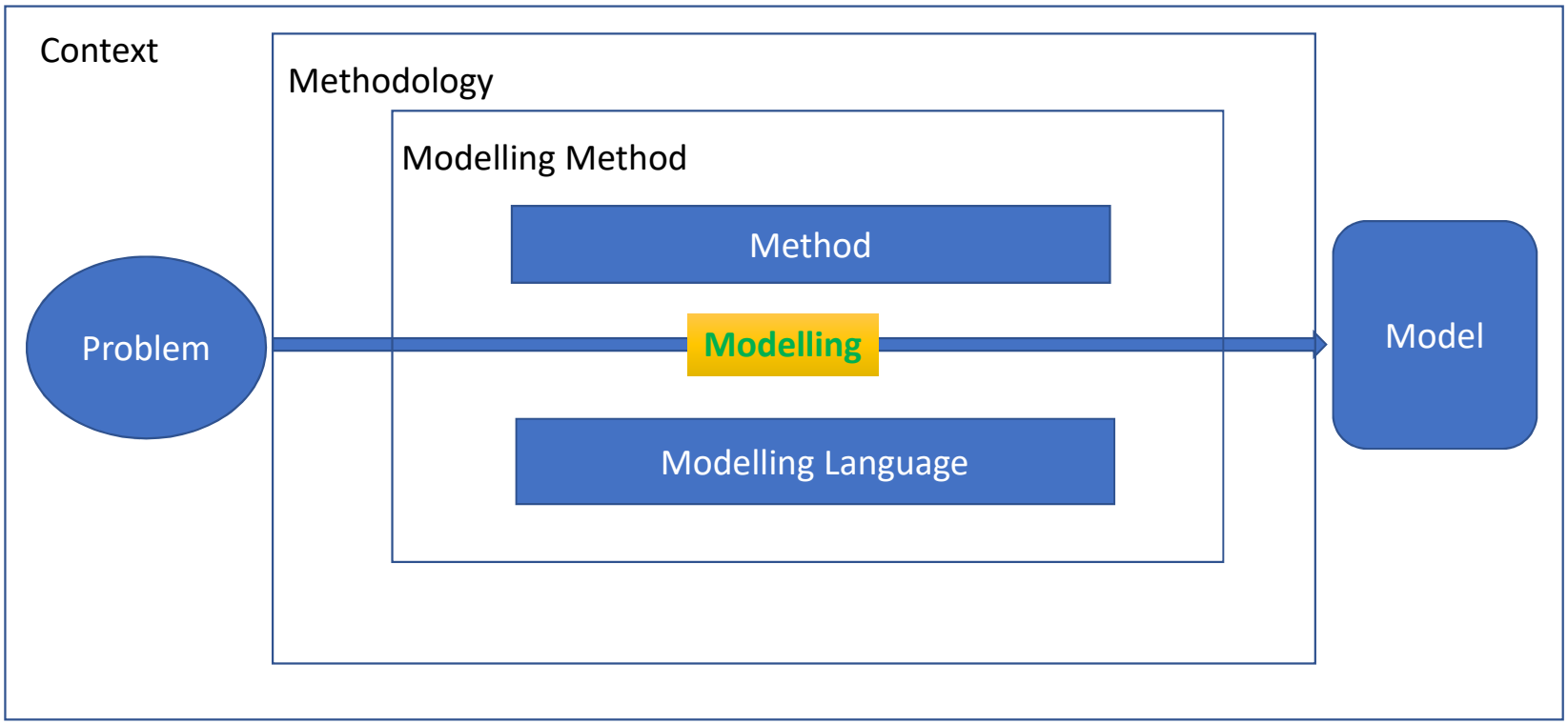
Business Process Modeling
BPMN

Hoan Ng

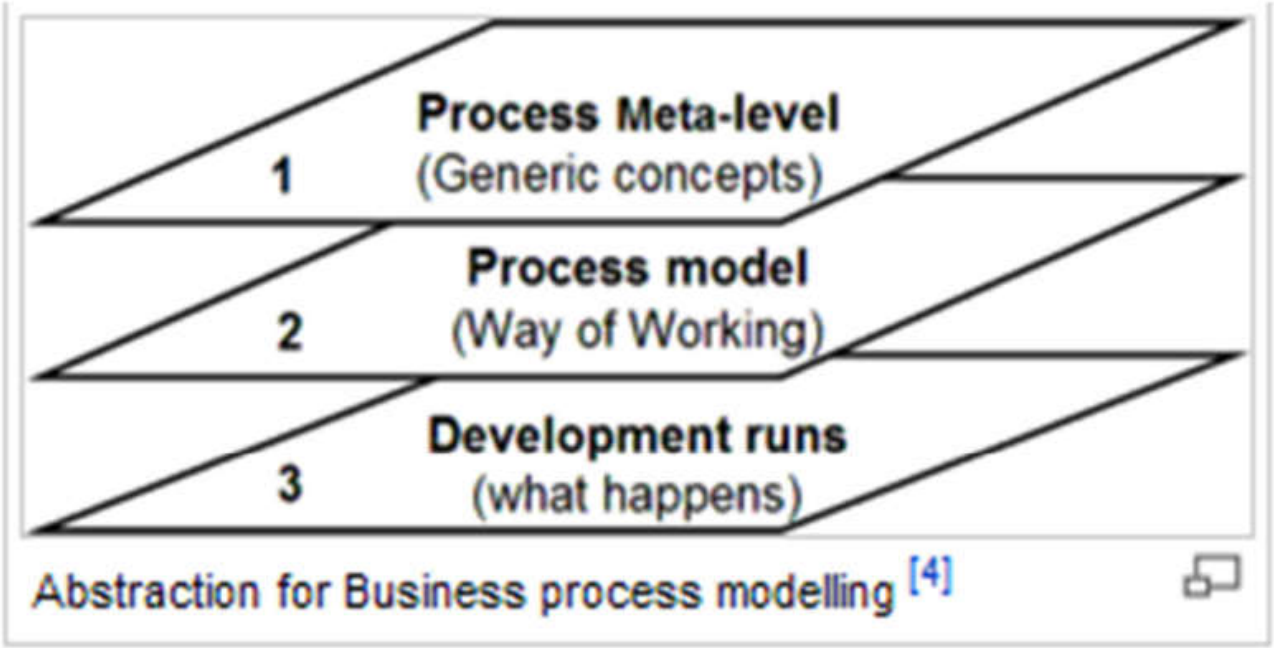
Modelling Methods



Agenda

- 3-Levels Abstraction
- Definition
- **Primary Goal Of BPMN**
- Basic Symbols
- Basic Principles
- Experiences
- Examples

3-Levels Abstraction



Abstraction for Business process modelling [4]

DEF
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ION

DEFINITION

What is BPMN (Business Process Modeling Notation)?

WHAT IS BPMN ?

Business Process Model and Notation

- Business Process - A collection of related, structured activities or tasks that produce a specific service or product for a particular customer.
- Model –a representation of a business process.
  - Visual proces model – process diagram
  - Non-visual proces model (e.g. executable process model)
- Notation – a set of elements (language) + rules used for representing a business process in a business process model (diagram).

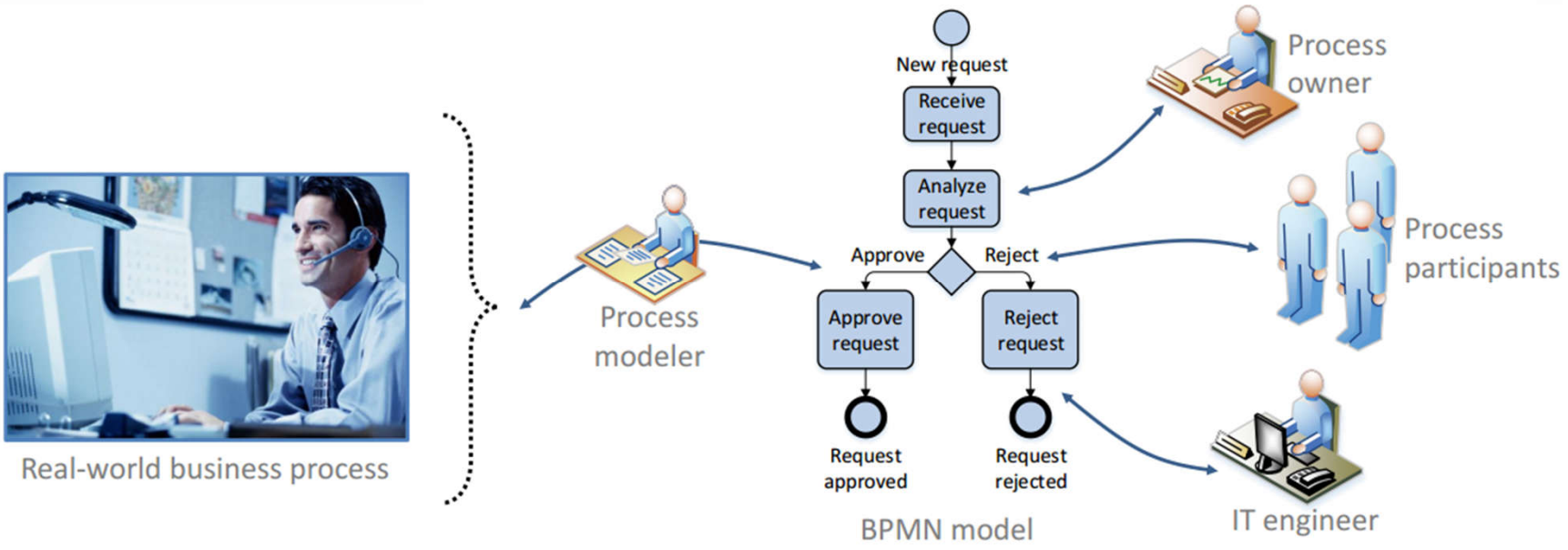
The current BPMN version is 2.0.2, released in January 2014

WHY BPMN ?

- Standardized. The de-facto & ISO/IEC 19510:2013 standard in process modeling.
- Open. Created and controlled in an open and fair process.
- Simple & complete. Can be used in a simple or detailed way.
- Learnable.
- Interchangeable.
- Executable.


PRIMARY GOAL
OF BPMN
Primary goal of BPMN
In Scope of BPMN
Out-of-Scope of BPMN
PURPOSES of BPMN

PRIMARY GOAL of BPMN



"The primary goal of BPMN is to provide a notation that is readily understandable by all business users /…/. Thus, BPMN creates a standardized bridge for the gap between the business process design and process implementation."

IN SCOPE of BPMN

Business process modeling

- Diagrams (e.g. process diagrams, collaboration diagrams).
- Syntax, semantics and visual appearance for process elements (e.g. events, activities and gateways).
- Attributes and properties of the semantic elements represented by the graphical process elements.
- Formats for exchanging diagrams.

Business process execution

OUT-of-SCOPE of BPMN

BPMN is constrained to support only the concepts of modeling that are applicable to business processes.

Out of scope, but related domains are:

- Definition of organizational models and resources.
- Modeling of functional breakdowns.
- Data and information models.
- Modeling of strategy.
- Business rules models.

PURPOSES of BPMN

Conformance type	Diagram types	Diagram elements	Execution
Process modeling	Process, collaboration, conversation.	Full process modeling conformance	Not available.
Process execution with BPMN	Not available.	Not available.	Process diagrams.
Process execution with BPEL	Not available.	Not available.	Process diagrams.
Choreography	Choreography and collaboration (partially).	Choreography diagram elements and some basic process elements	Choreography

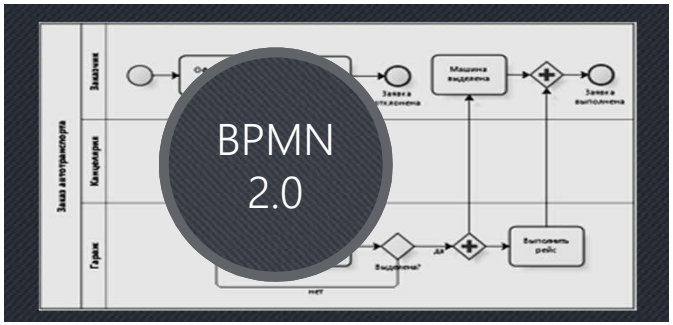
BPMN Conformance types define formal purposes of the use of BPMN and the corresponding software implementations

BPMN DIAGRAM

What is a BPMN diagram?
BPMN diagram types
BPMN Process Diagrams
BPMN Collaboration Diagrams
BPMN Conversation Diagrams
BPMN Choreography Diagrams

WHAT IS A BPMN DIAGRAM?

A visual sentence expressed in BPMN notation.



Set of BPMN (visual) elements (i.e.symbols)

Set of BPMN rules for combining BPMN elements

Set of BPMN rules for combining BPMN elements

BPMN notation

=

BPMN vocabulary

+

BPMN syntax

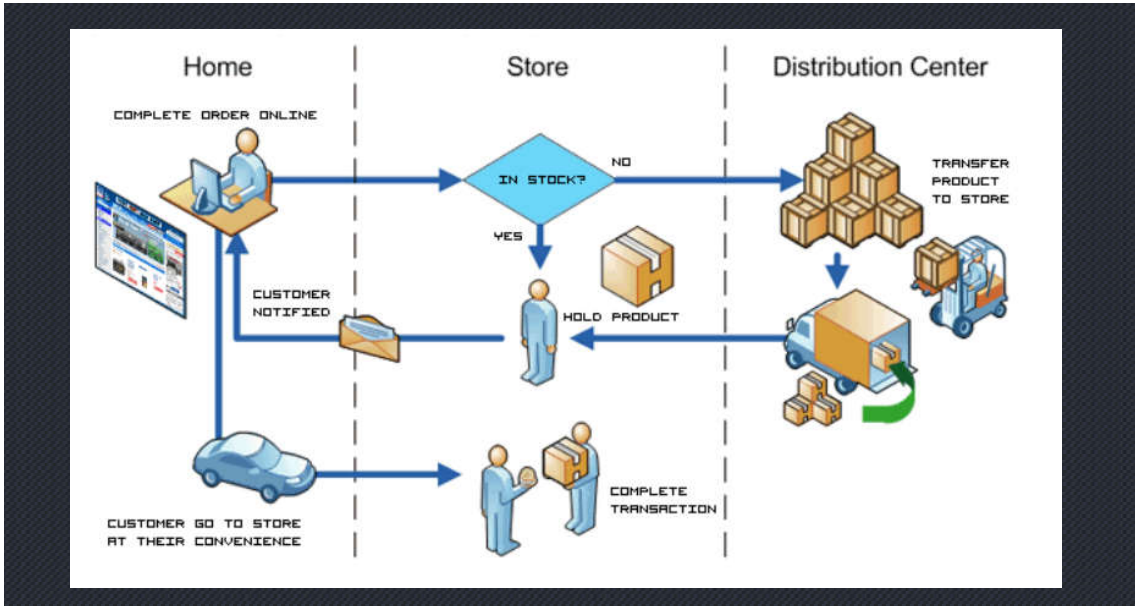
+

BPMN semantics

BPMN DIAGRAM TYPPES

- Cover many types of modeling
- Allows the creation of ‘end-to-end‘ business processes.
- Three basic types of sub-models ‚end-to-end‘ BPMN model:
  - Processes
  - Choreographies
  - Collaborations

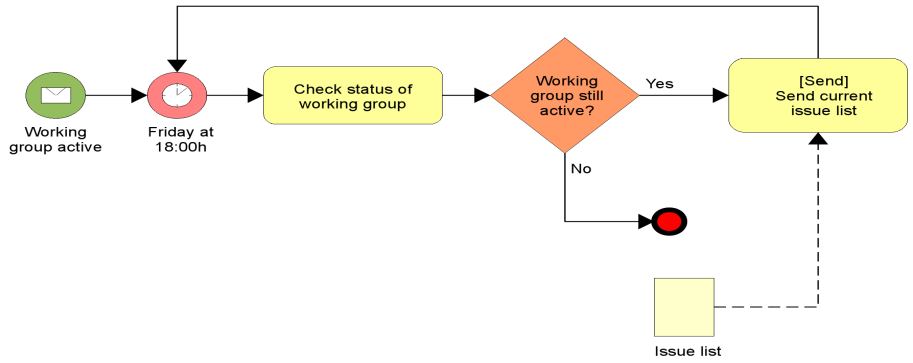
Related to online store processes



BPMN PROCESS DIAGRAMS

BPMN a process

- a graph of flow elements (i.e. activities, events, gateways)
- sequence flows that define finite execution semantics.



- An executable process is modeled for the purpose of being executed.
- A non-executable process modeled for the purpose of documenting process behavior at a modelerdefined level of detail.

Private (internal) processes - represent a specific process (orchestration) in an organization.
Can be executable or non-executable

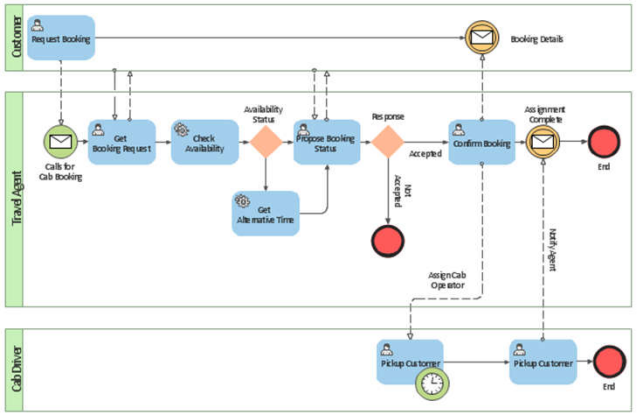
BPMN COLLABORATION DIAGRAMS

A collaboration represents the interactions between two or more business entities (e.g. processes).

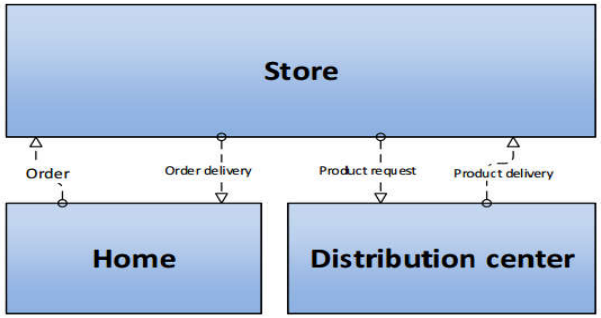
A collaboration usually contains two or more pools (black-box or whitebox), representing the participants in the collaboration.

The message exchange between the participants is shown by a message flow that connects two pools (or the elements within the pools).

Collaboration model with white-box pools (i.e. visible details)

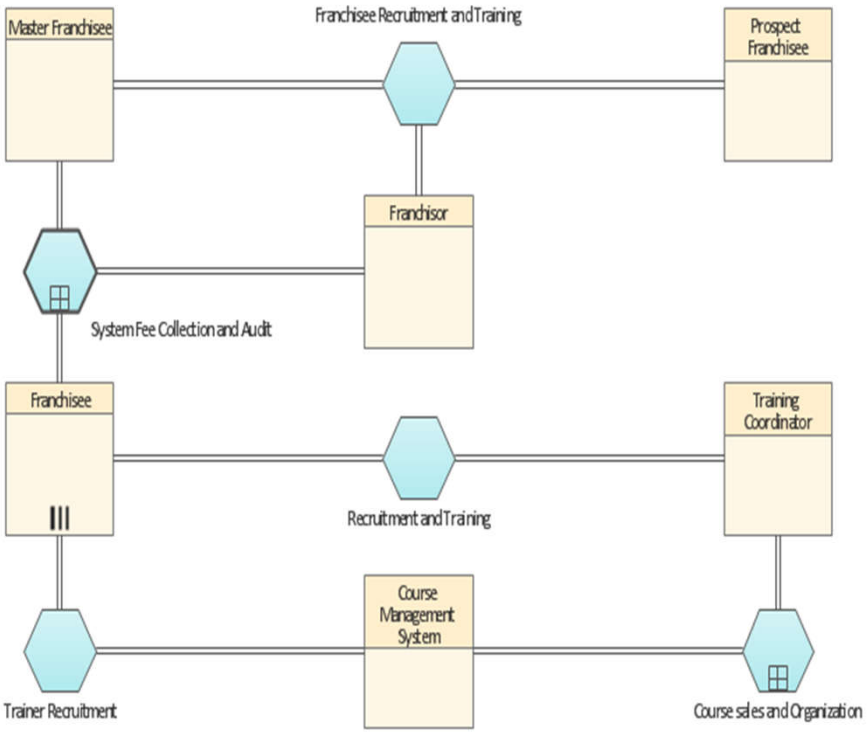


Collaboration model with black-box pools (i.e. hidden details)



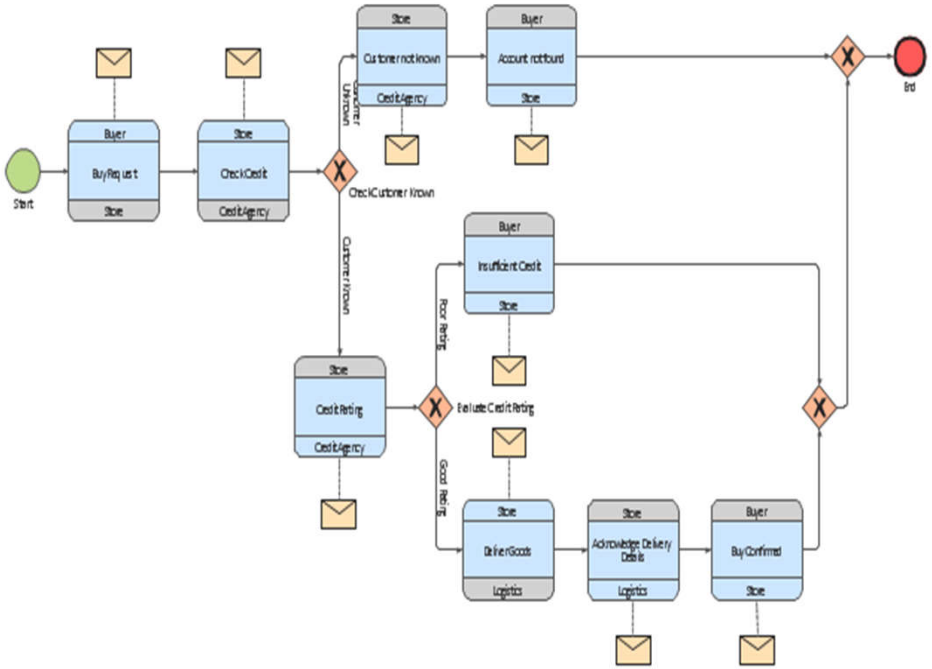
BPMN CONVERSTION DIAGRAMS

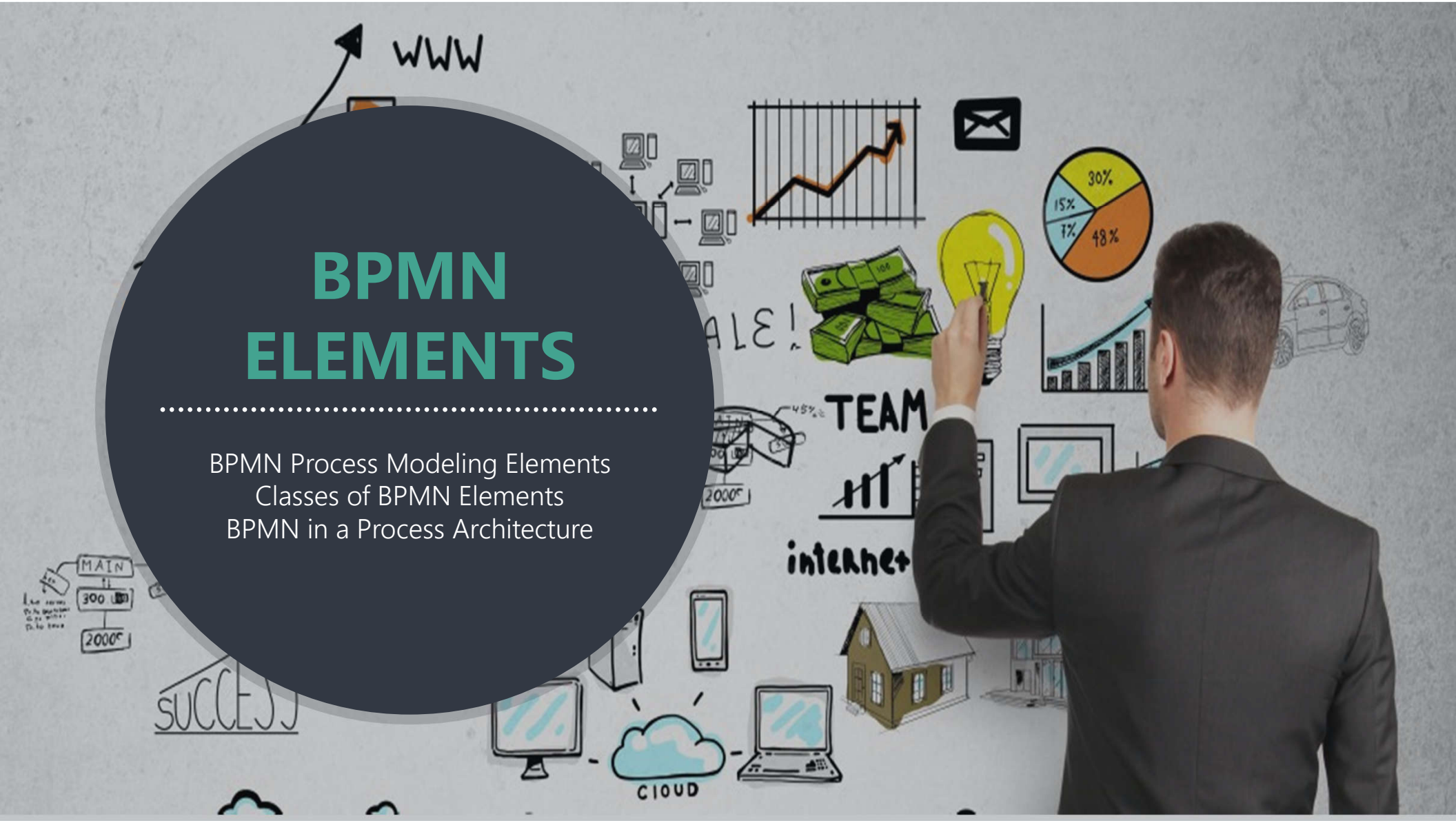
- A conversation diagram provides an overview of which partners of a certain domain co-operate on which tasks.
- Conversation diagrams represent a specific (i.e. top level) ‘view’ of collaboration diagrams.
- Conversation diagrams use



BPMN CHOREOGRAPHY DIAGRAMS

- Choreography models are NOT part of process modelling conformance.
- Choreographies are new in BPMN 2.0 and focus on between-processes interactions and message flows.
- A choreography diagram can be used to analyse how participants exchange information to coordinate their interactions.
- Another way to look at choreography is to view it as a type of business ‘contract’ between two or more organizations .





BPMN ELEMENTS

BPMN Process Modeling Elements
Classes of BPMN Elements
BPMN in a Process Architecture

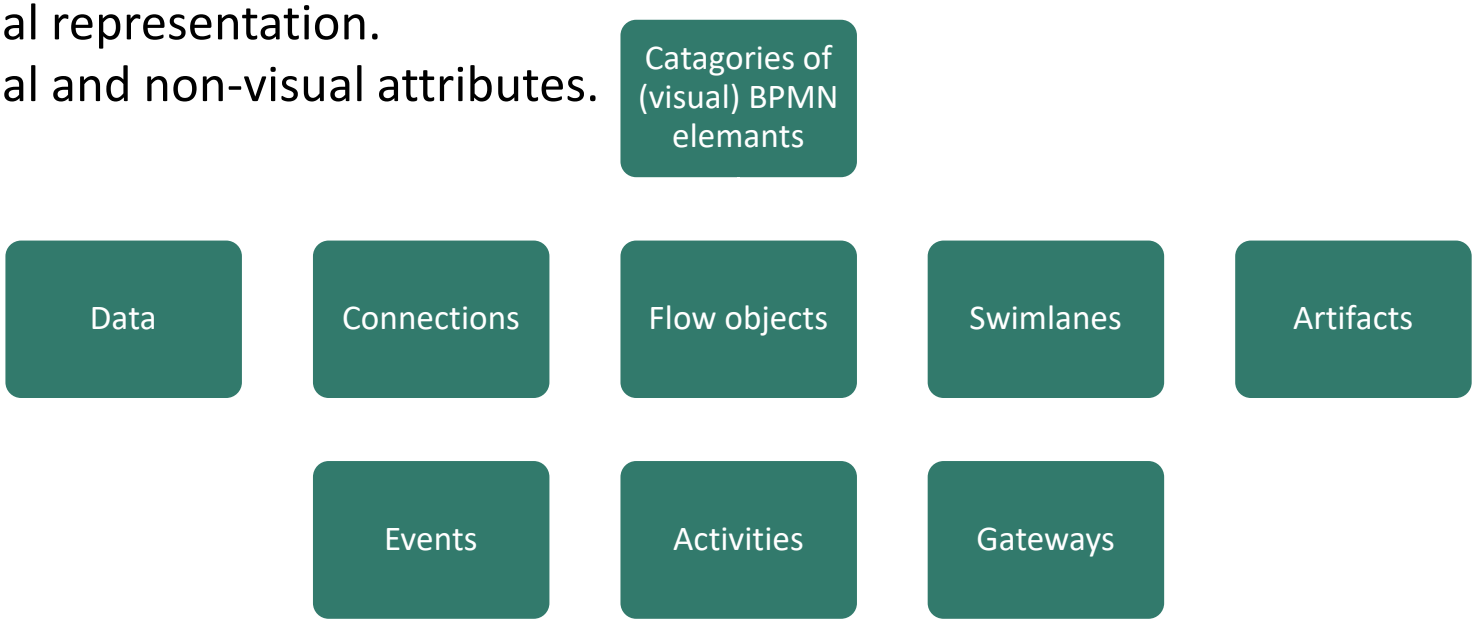
BPMN Process Modeling Elements

- **BPMN diagrams are 'graphs' of BPMN elements.**

BPMN elements may have:

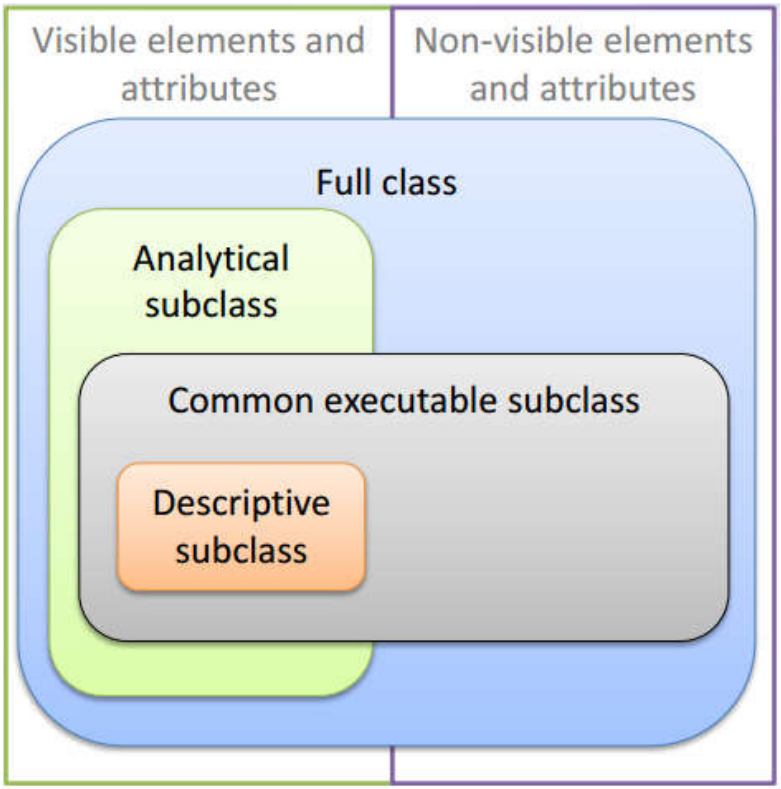
- Visual representation.
- Visual and non-visual attributes.

- **BPMN elements have defined:**



Classes of BPMN Elements

- The full set of BPMN process modeling elements is additionally divided into three subclasses:
  - Descriptive
  - Analytic subclass
  - Common executable subclass



BPMN in a Process Architecture

A process architecture represent a hierarchically (i.e. process abstraction levels) and horizontally (i.e. relationships between processes) organized system of an organization’s business process models.

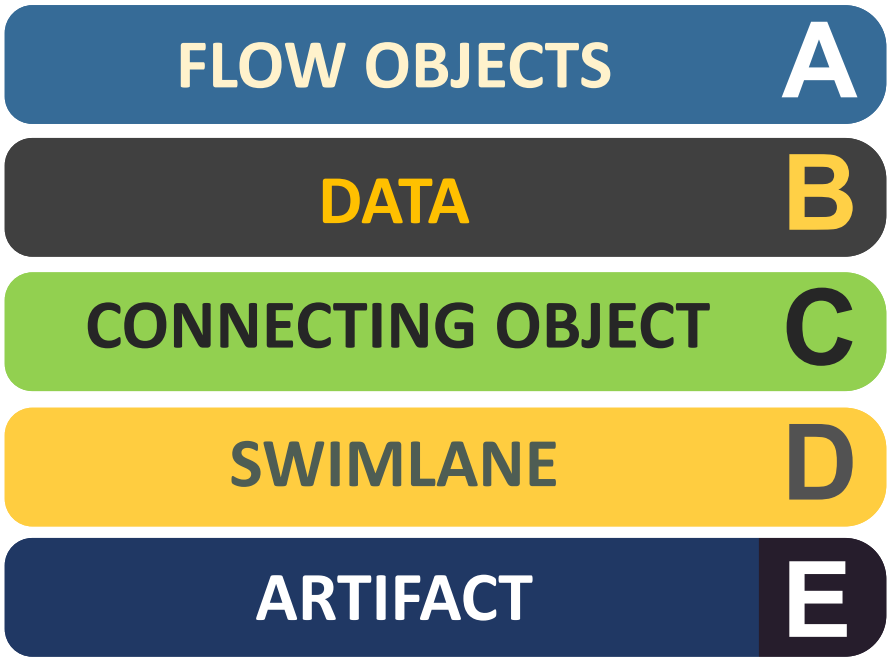
SYM
BOL

BASIC SYMBOLS

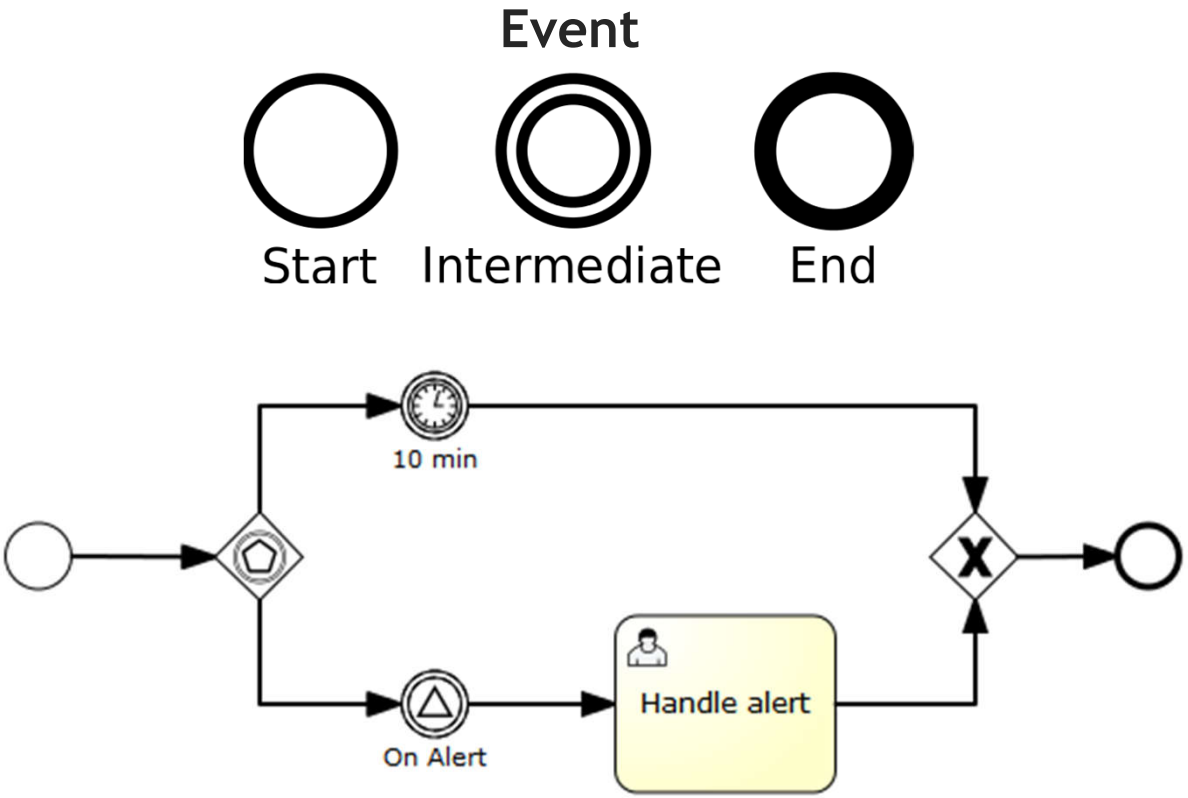
Of BPMN

01

Basic symbols of BPMN

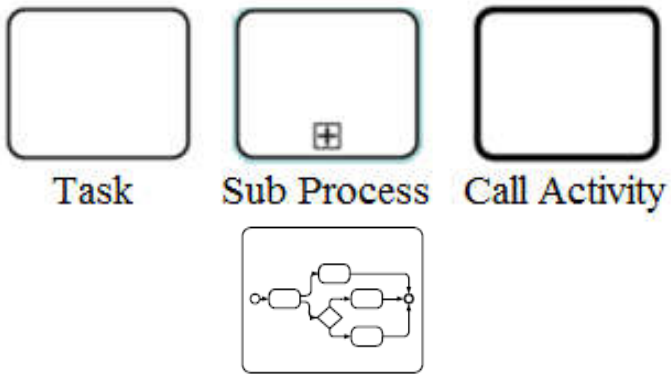


A. FLOW OBJECTS



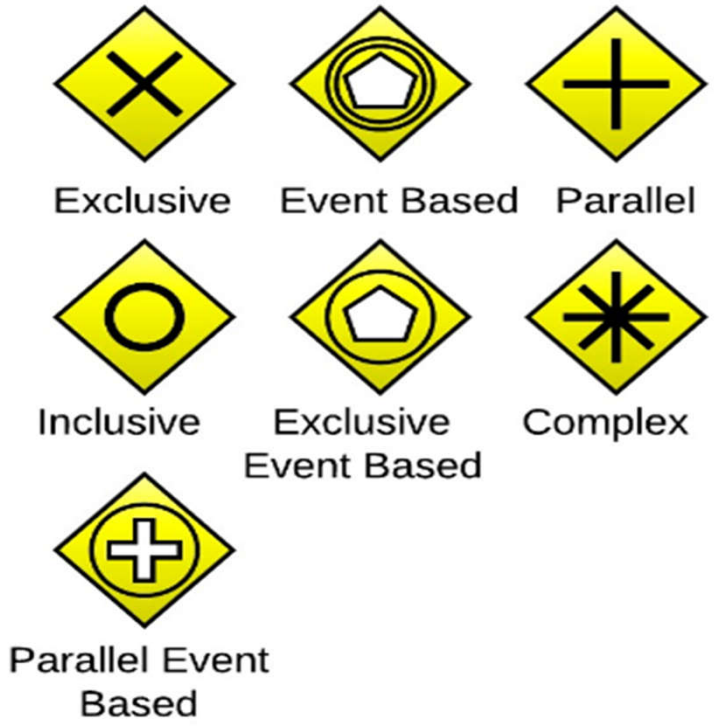
A. FLOW OBJECTS

Activity



A. FLOW OBJECTS

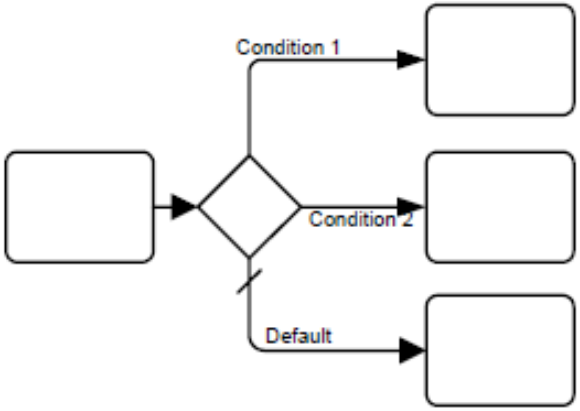
Gateway

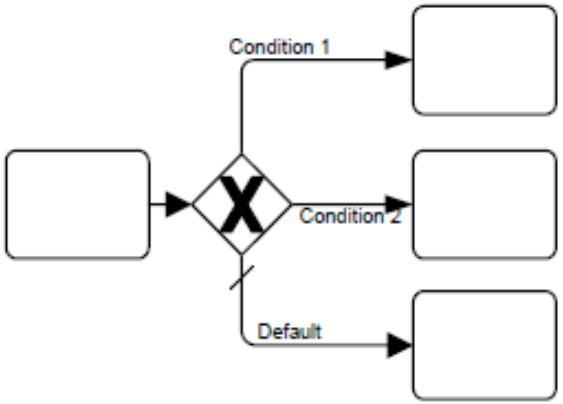


A. FLOW OBJECTS

Gateway

Exclusive gateway: 

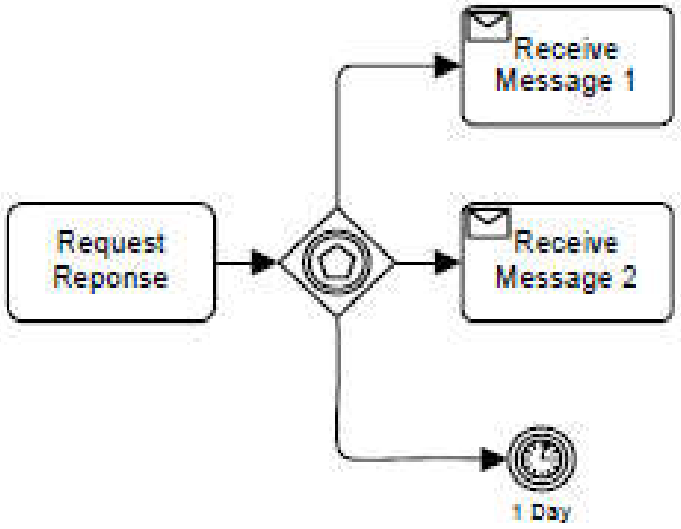




A. FLOW OBJECTS

Gateway

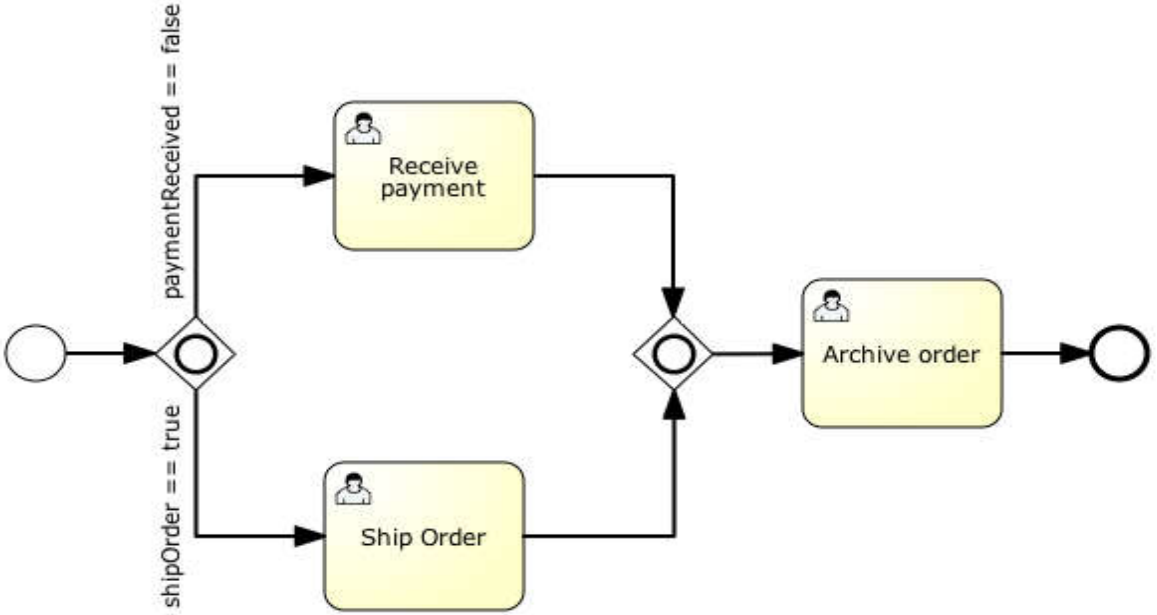
Event-based gateway: 



A. FLOW OBJECTS

Gateway

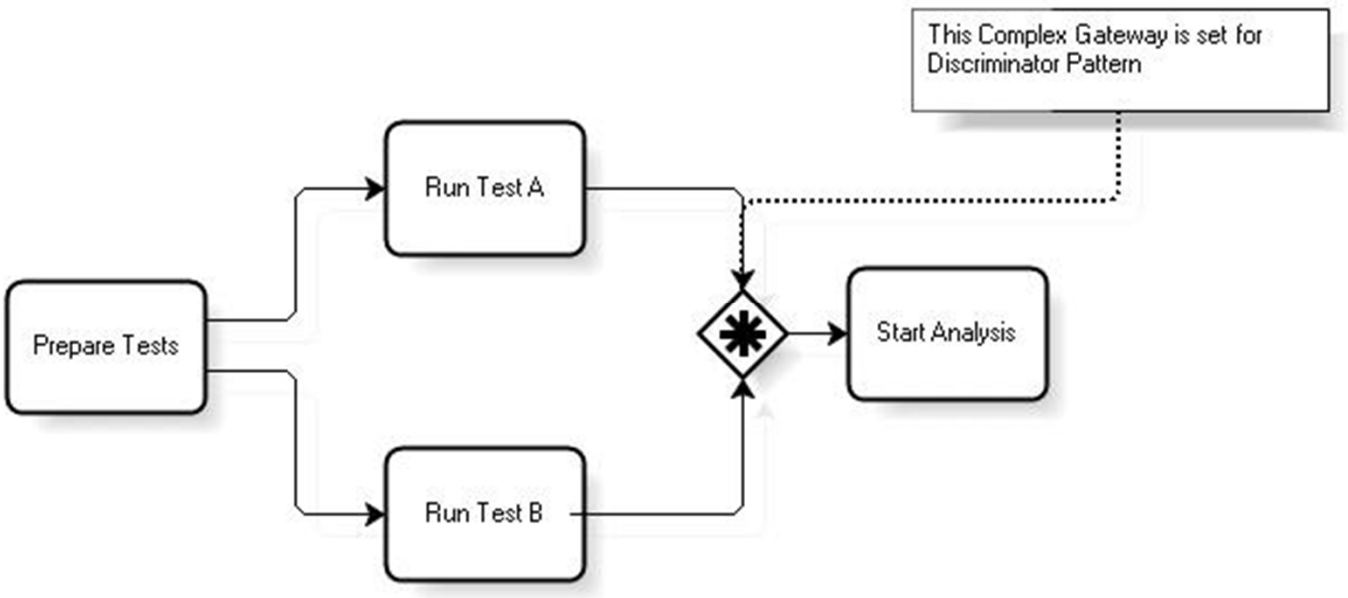
Inclusive gateway: 



A. FLOW OBJECTS

Gateway

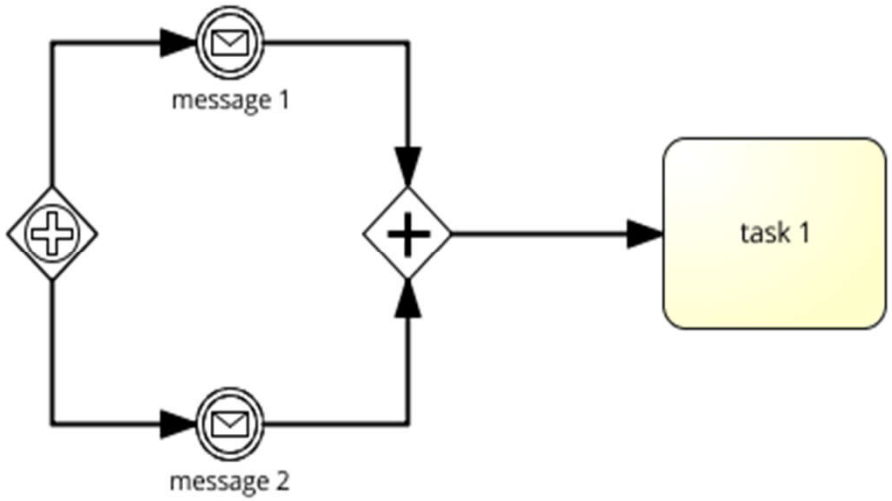
Complex gateway: 



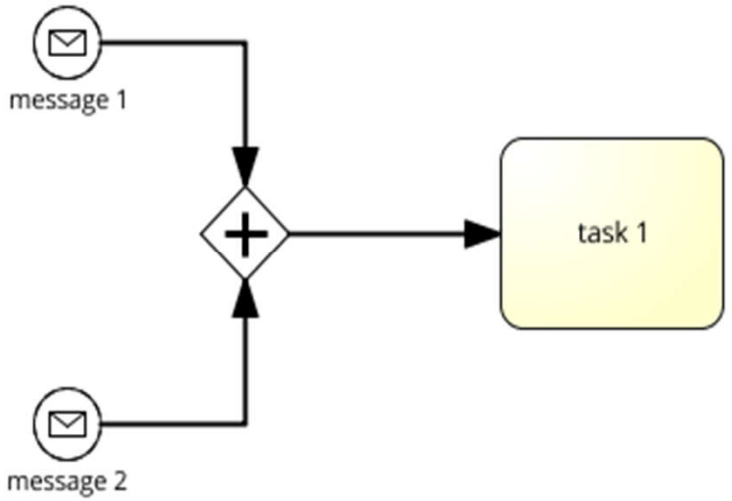
A. FLOW OBJECTS

Gateway

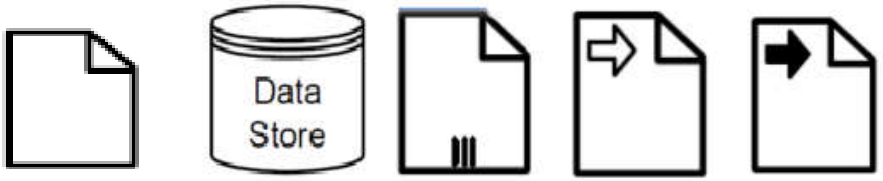
Parallel event-based gateway: 

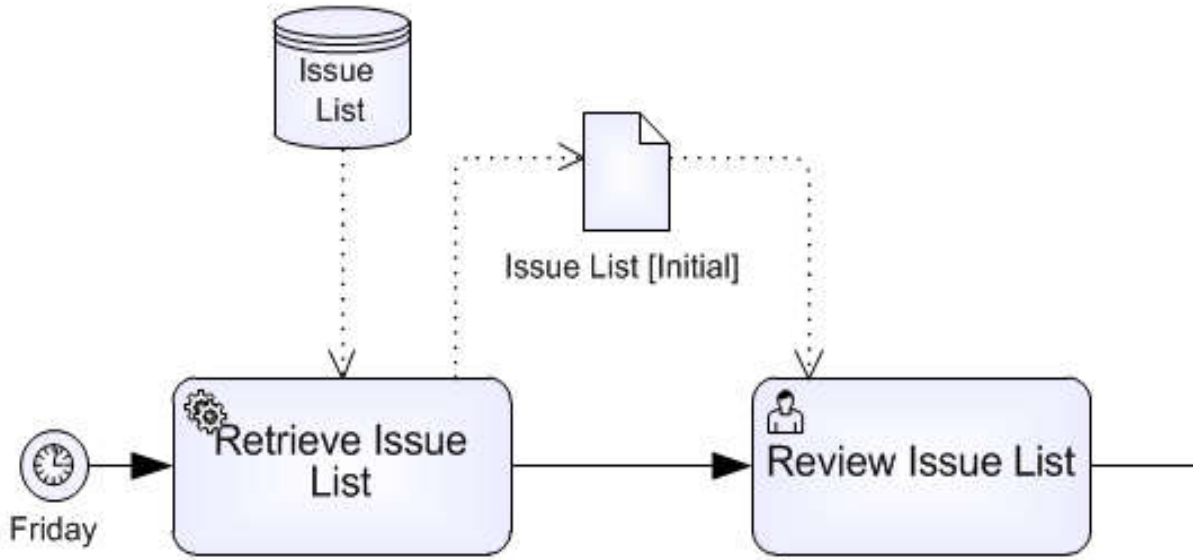


Parallel gateway: 

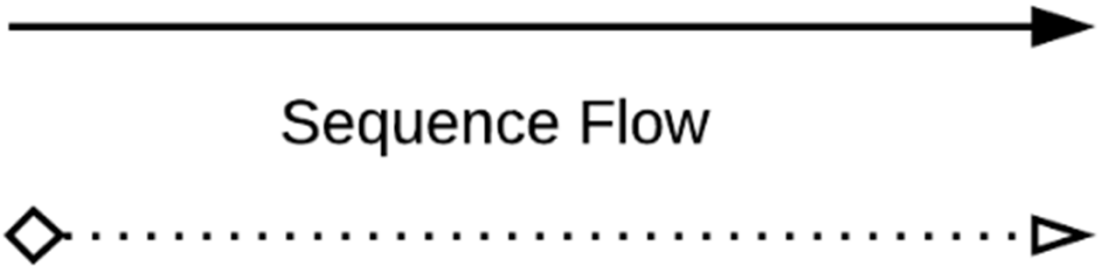


B. DATA


Data
Store


Issue
List
Issue List [Initial]
Retrieve Issue
List
Review Issue List
Friday

C. CONECTING OBJECT

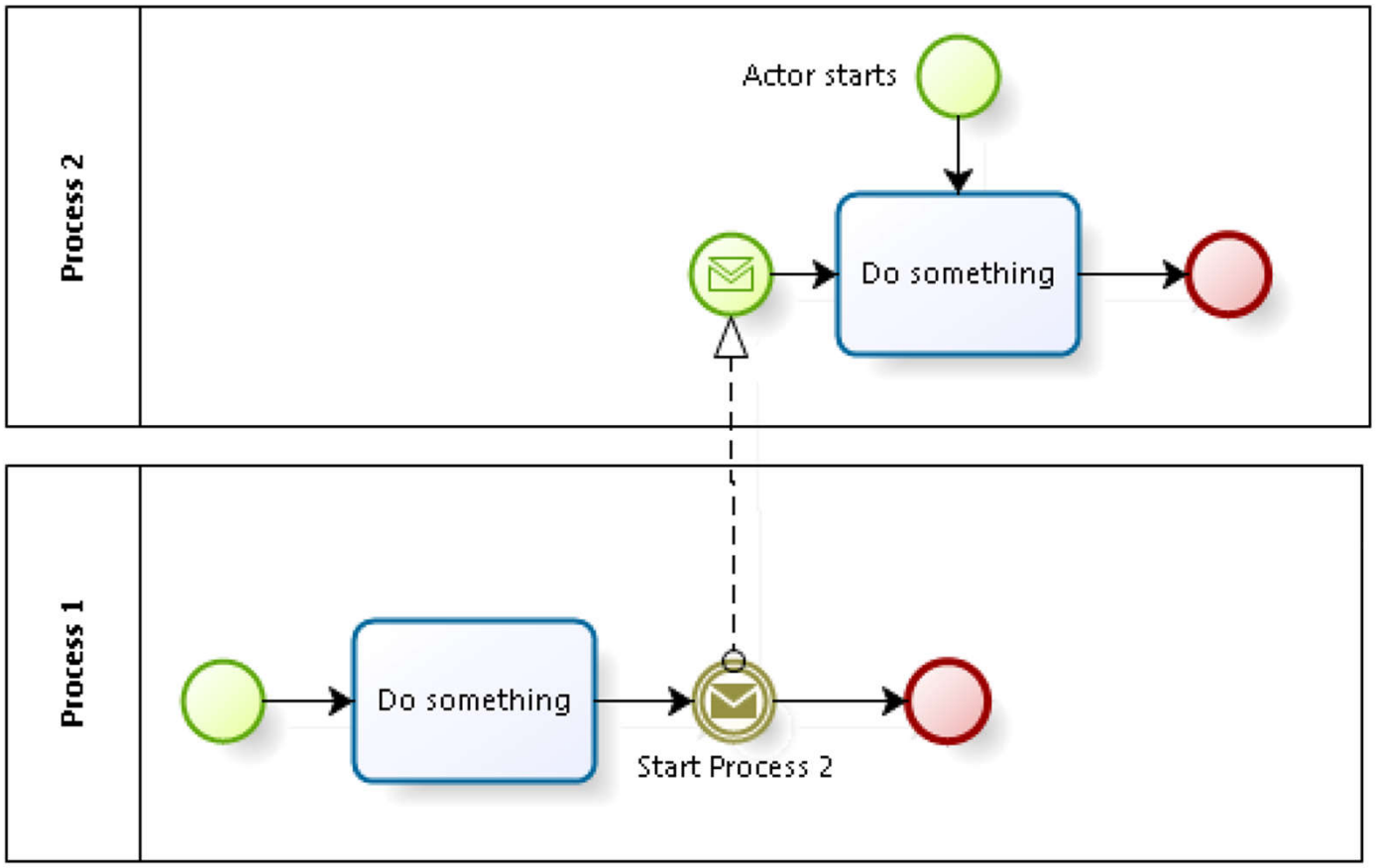


Sequence Flow

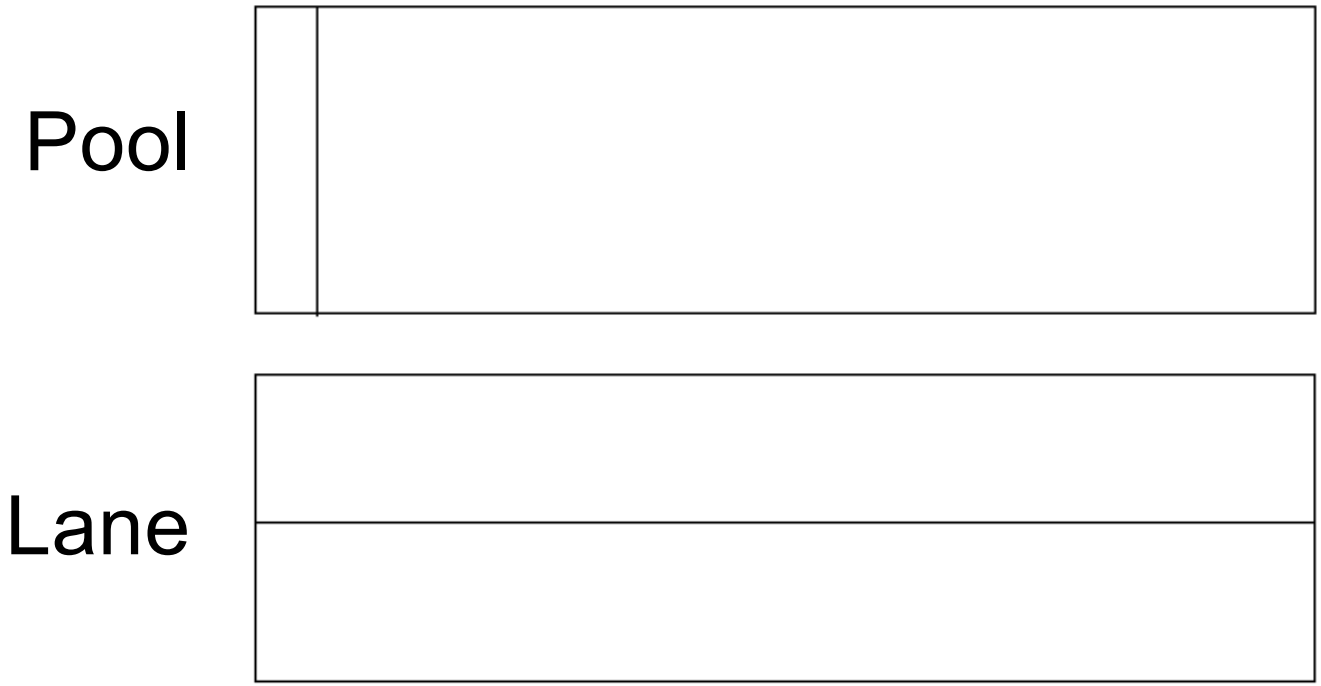
Message Flow

Association

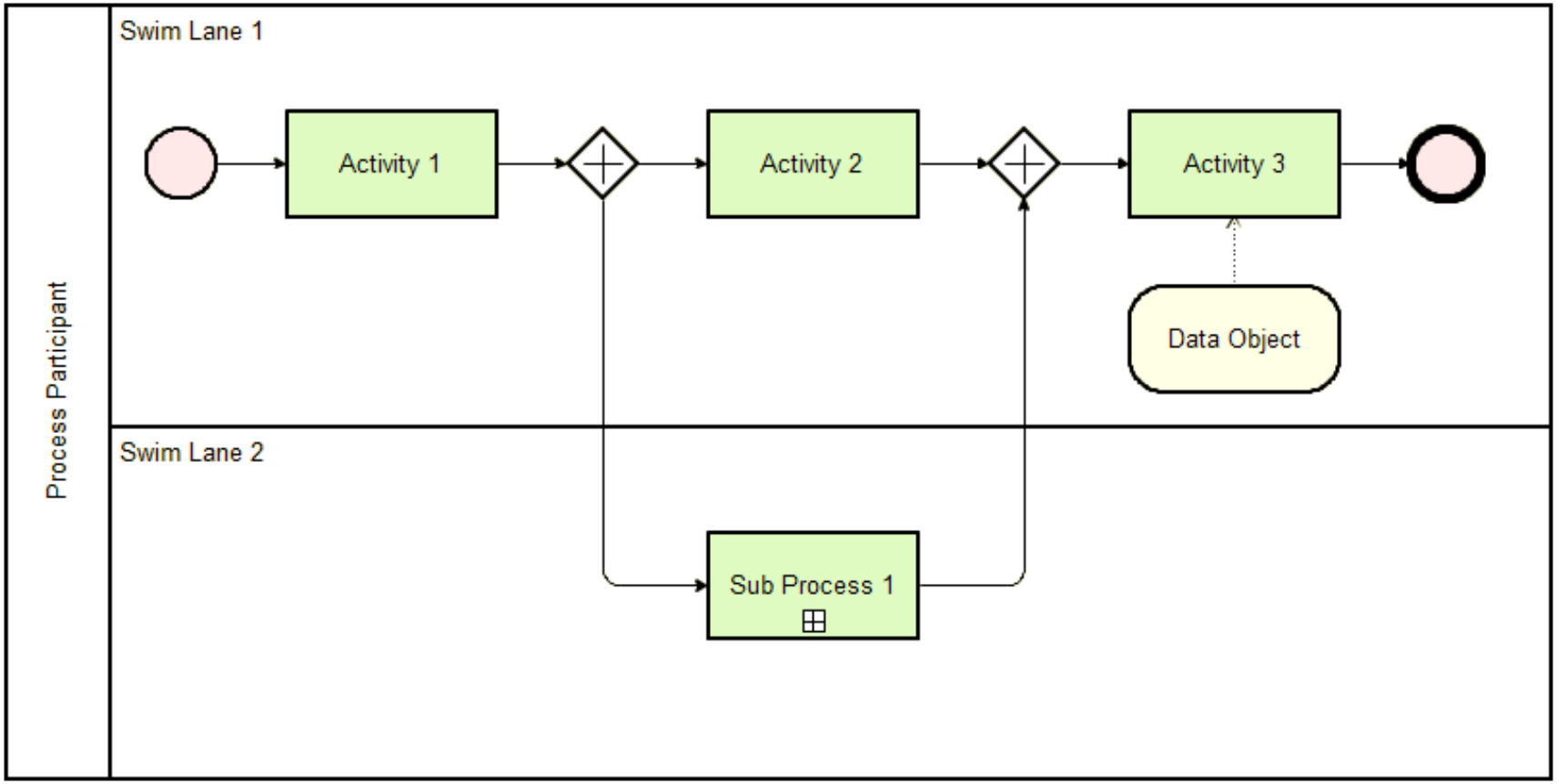
C. CONECTING OBJECT



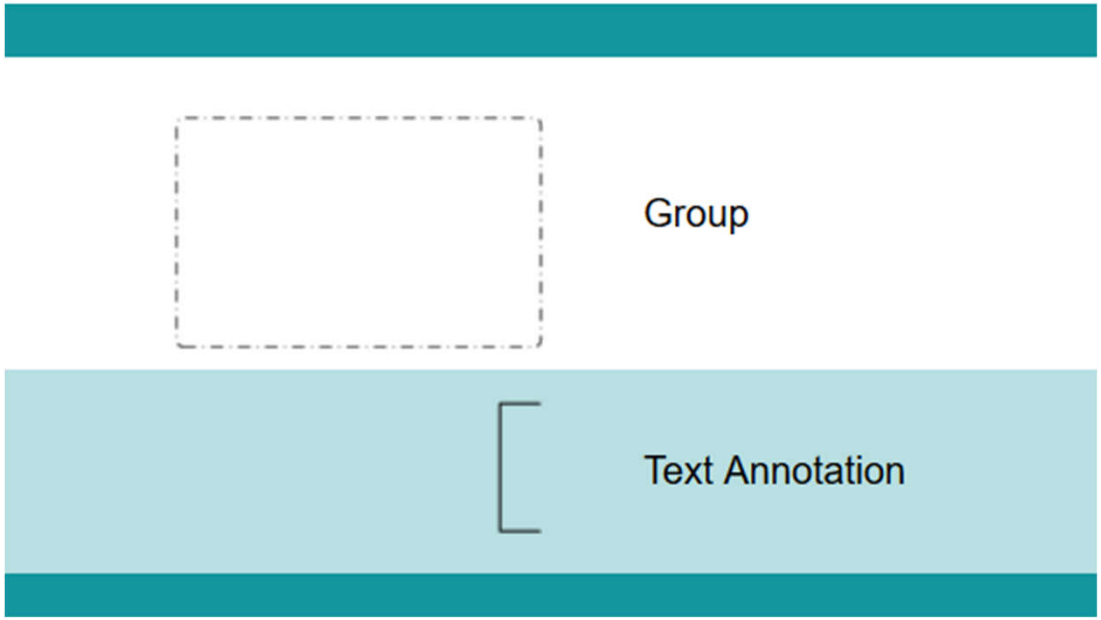
D. SWIMLANE



D. SWIMLANE

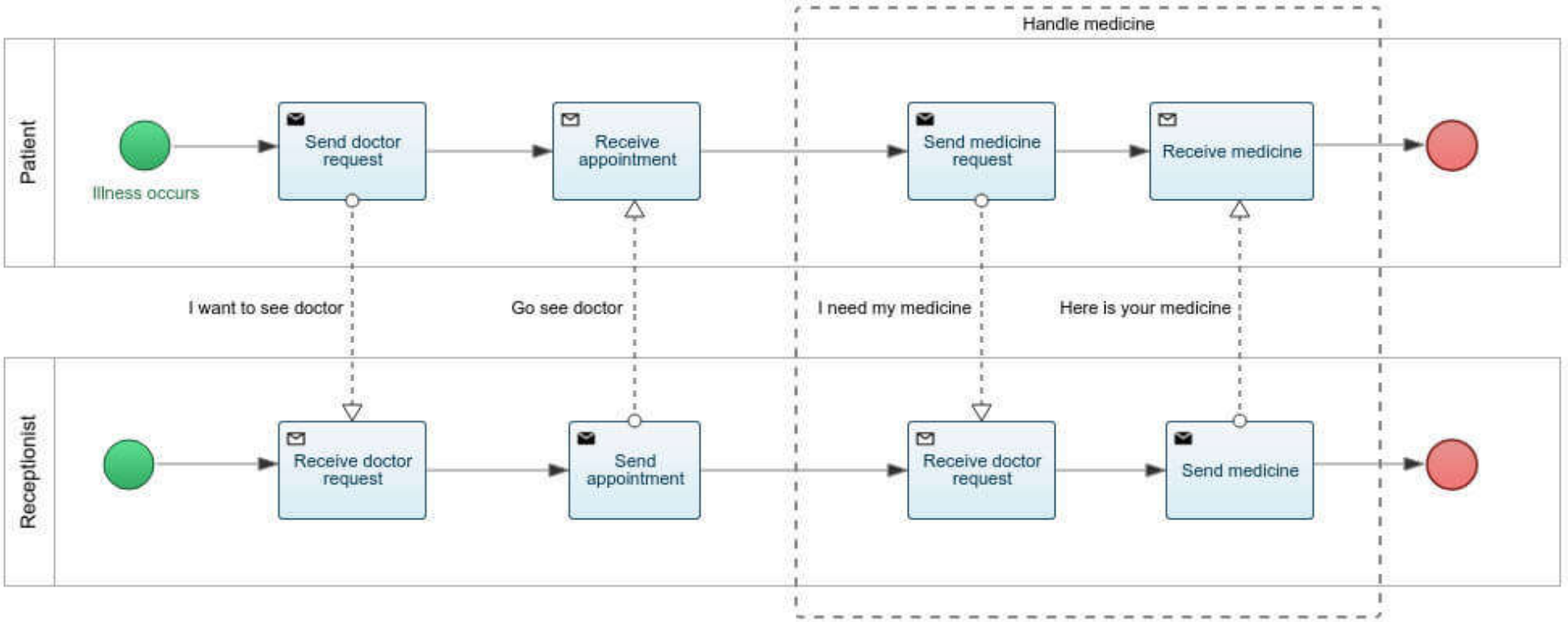

Process Participant
Swim Lane 1
Activity 1
Activity 2
Activity 3
Data Object
Swim Lane 2
Sub Process 1

D. ARTIFACT



D. ARTIFACT

Group:



D. ARTIFACT

Text Annotation:

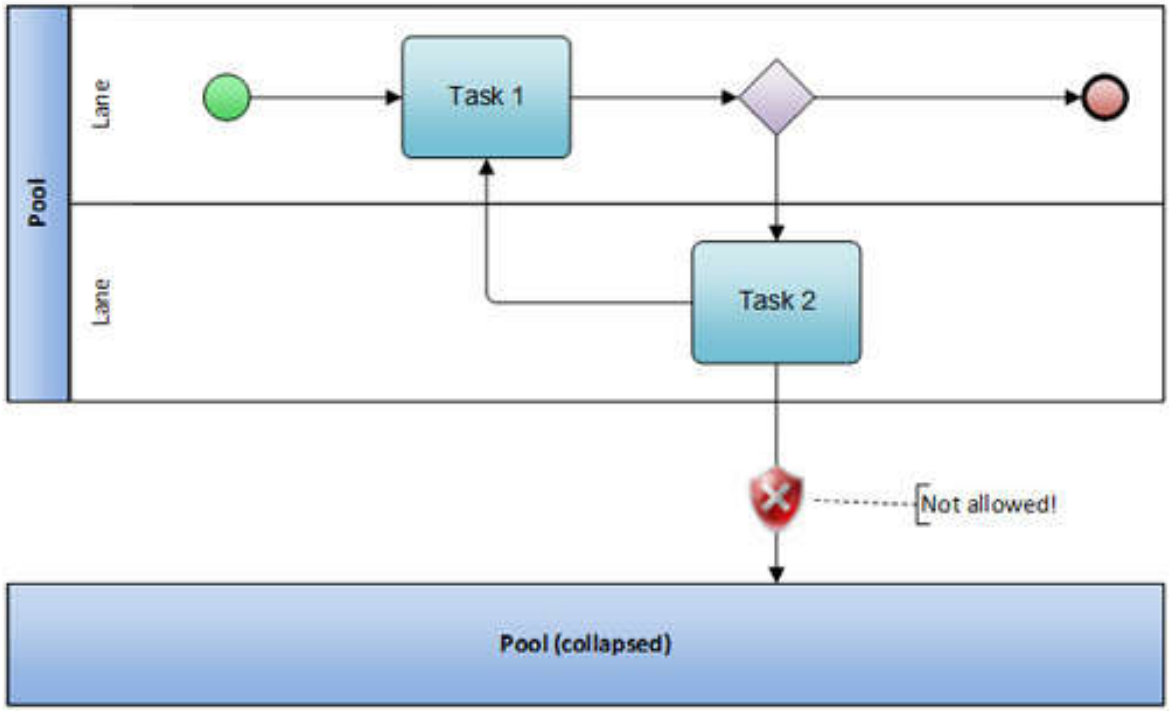


Figure 1: Sequence flows

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BASIC PRINCIPLES

Of BPMN

01 Sequence Flows

Sequence flow is the most common BPMN flow

It is represented with a solid arrow and is used to show the order in which activities are performed in a process

Each sequence flow has only one source and only one target

A sequence flow can cross the boundaries between lanes of a pool but cannot cross the boundaries of a pool

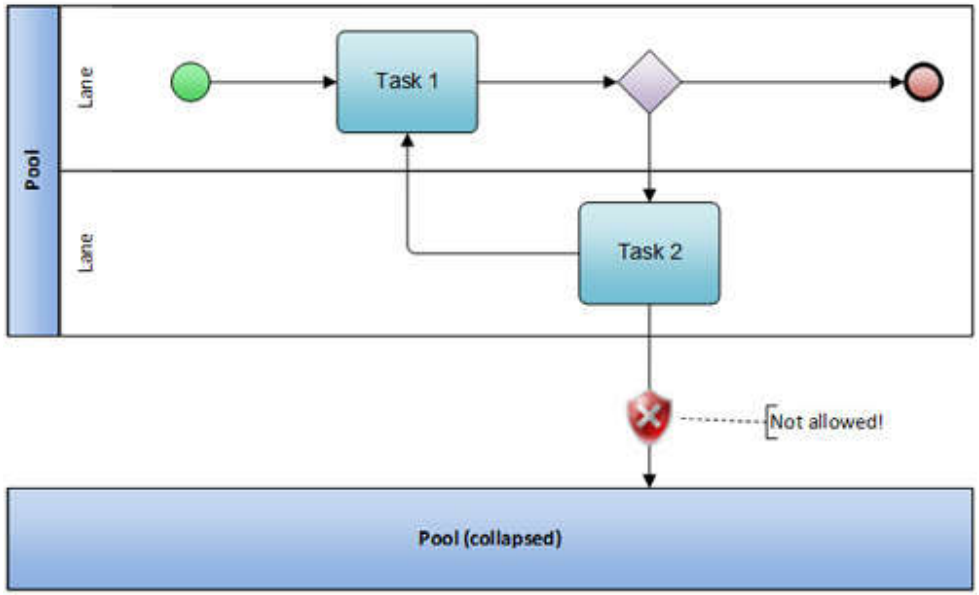


Figure 1: Sequence flows

02 Message Flows

It is used to show the flow of messages between two processes (or pools)

It can be used in conjunction with BPMN elements that can send and receive messages (Message events, send/receive activities, and pools).

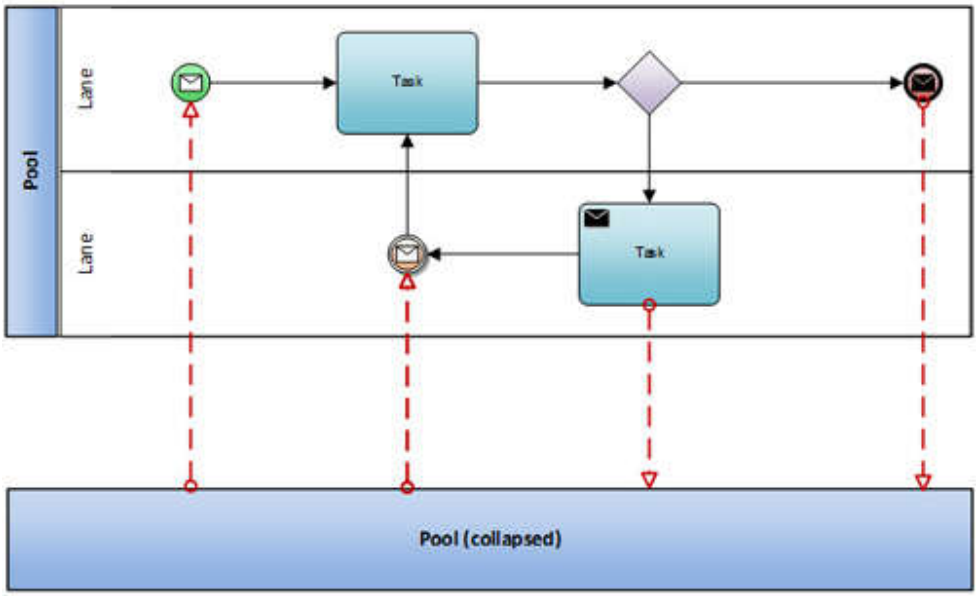


Figure 7: Message flows (red arrows)

03

Boundary Events

- Must have at most one line of output sequence
- Not sequential entry

04

Sub-Process

The **subprocess** module allows you to spawn new processes, connect to their input/output/error pipes, and obtain their return codes.

EXPERIENCES

IN DRAWING BPMN

01

Determine the scope

Clearly define the scope of the Process by identifying the Who, What, When, Where and Why of your process (the Process is the How)

Identify what each instance of your Process will represent

Identify the potential alternative ways to trigger the Process using **Start Events**

Identify the potential alternative end states of the instances of the Process using **End Events**

02

Diagram layouts

Aim for BPMN Diagrams that fit one page

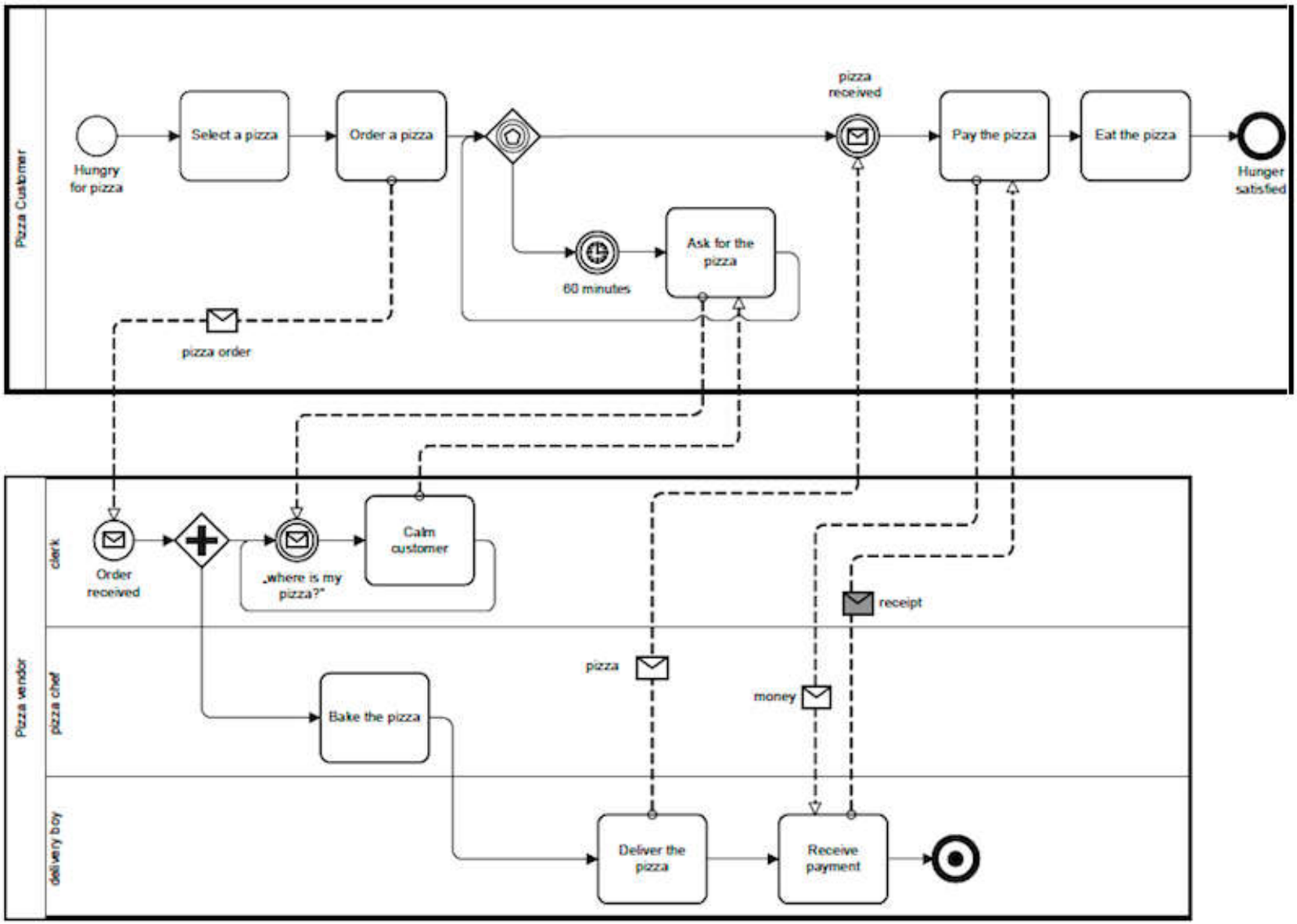
Layout your BPMN Diagrams neatly to ease readability by minimizing flow crossing

Use consistent layout with horizontal **Sequence Flows** and vertical **Data Associations** and **Message Flows**

Do not create zigzag layouts of elements

It should be clear

EXPAMPLE


Pizza Customer
Hungry for pizza
Select a pizza
Order a pizza
60 minutes
Ask for the pizza
pizza order
pizza received
Pay the pizza
Eat the pizza
Hunger satisfied
Pizza vendor
clerk
pizza chef
delivery boy
Order received
„where is my pizza?"
Calm customer
Bake the pizza
pizza
money
receipt
Deliver the pizza
Receive payment