Process Modeling

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Lecture Overview

Overview

- Why Modeling?
- Process Development Roles
- Modeling Notations
- Workflow Modeling
- BPMN 1.1
- BPEL
- Resources

BPMN 2.0 Level I

- Object Classes
  - Activities
  - Events
  - Gateways
  - Connecting Objects
  - Artifacts
  - Process Types
- Examples

Why Process Modeling?

1. Elegant way to express structure of a process
2. Visual models are **easily understandable by all participants** of the development cycle
3. Minimize the misunderstandings during the transformation **from analytical description** to the **executable implementation** of the process
4. Covers **nested structure** (sub-processes)
5. Covers inter-process/inter-system **interactions**
6. Pictures are fun

(Non Scientific) Experiment

Is model more elegant and expressive than free text?

1. Two teams of volunteers (three students in each team)
2. Team 1 gets text description and they have 3.5 minutes to read
3. Team 1 starts discussion and Team 2 goes away with the process in BPMN 2.0
4. Audience observes the quality of discussion
5. Team 2 starts discussion
6. Conclusion :)

Modeling Notations

- BPEL
  - technical modeling, very detailed
  - service orchestration, executable
  - human task extended by BPEL4People
- BPMN 1.0 – 1.1
  - analytical modeling, not tight with semantics, not executable
  - XPDL semantics
- **BPMN 2.0**
  - analytical modeling (Level 1,2)
  - defined semantic – executable (Level 3)

BPMN 2.0 Levels

- Level 1 (Structural)
  - Captures basic structure of a process
  - Business experts <=> analysts/developers
- Level 2 (Analytical)
  - More details of process behaviour (interactions, events, timing)
  - Process analysts <=> Process developers
- Level 3 (Executable)
  - Specifies all used services and activity tasks
 - "(Process developers <=> Process engine) "

Model Quality Aspects

- Validity against BPMN specification
  - Wrong connections of the flow
  - Missing start/end
  - Wrongly used gateways
- Model understandability
  - Reasonable naming of activities
  - Reasonable amount of connections/gateways/activities
- Expressiveness
  - How it reflects the situation in real world
  - Granularity of activities
- Compliance to the modeling best practices
 - Modeling style (seminars & third modeling lecture)

Roles in Development Cycle

- Business Analyst
  - Sum business strategy
  - Describe goals & objectives, KPIs
  - Describe processes
  - Design BPMN diagrams (Level 1)
- Process specialist
  - Design BPMN diagrams (Level 1,2,3)
  - Design monitoring models
- Process developer
  - Detail BPMN Level 3
  - Implement services and deploy processes

Roles in Development Cycle
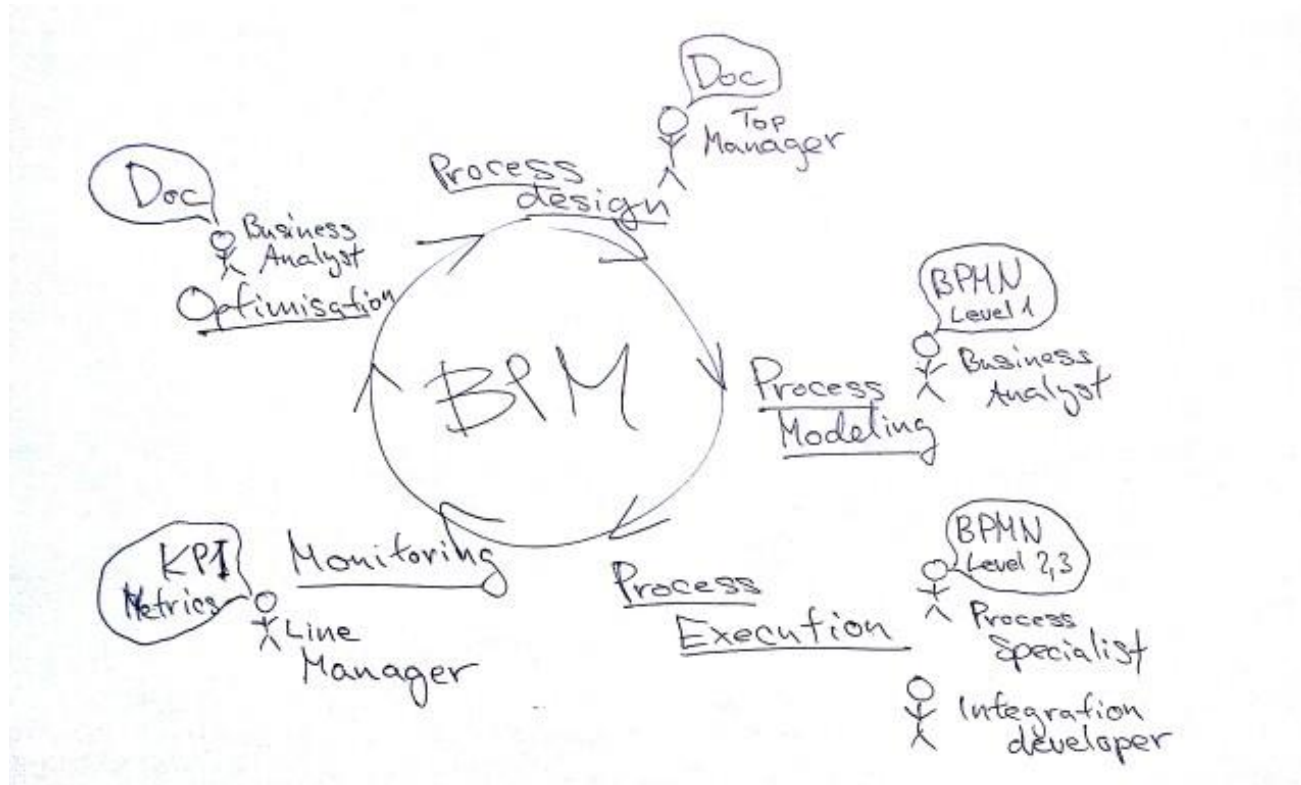
BPMN 2.0 Information Sources

- BPMN method and style Bruce Silver
  - ISBN 978-0982368114
  - Paperback $30 / Online $12 / Library $0
- Signavio Modeler – Academic Licence
  - http://academic.signavio.com/
- BPMN Official OMG Website
  - http://www.bpmn.org/
- Business Process Modeling and Analysis
  - https://open.hpi.de/courses/bpm2013
- BPMN 2.0 Poster
  - http://www.bpmb.de/images/BPMN2_0_Poster_EN.pdf
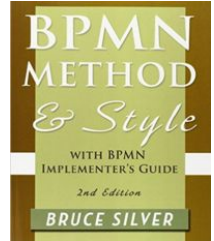
Homework Assignments

- This week seminar
  - L1 homework assignment **deadline Monday 18th at 4PM**
- Next week seminar
  - You receive corrected homework
  - L2 homework assignment
- Homework submission
  - Submit **printed version** to the box called "PV207" next to entrance to room D1, **before deadline**
  - **PNG image** exported from Signavio will be submitted to IS MUNI folder "Homework 1" named <surename>_bpmn.png , **before deadline**

Questions?
Break 7mins

BPMN 2.0 Object Classes

- Flow Objects
  - Event
  - Activity
  - Gateway
- Connecting Objects
  - Sequence Flow
  - Message Flow
  - Association
- Artifacts
  - Group
  - Annotation
- Swimlanes
  - Pool
  - Lane
- Data
  - Data Inputs/Outputs
  - Data Stores

Process example

1. Customer **creates an Order**
2. **Order is reviewed** by Sales
   2.1. If price of the Order is **lower** than $40 000, it is processed
   2.2. If price is **over** $40 000 it have to be confirmed by Financial department
   2.3. Order can be rejected by the department
3. Otherwise the order is processed
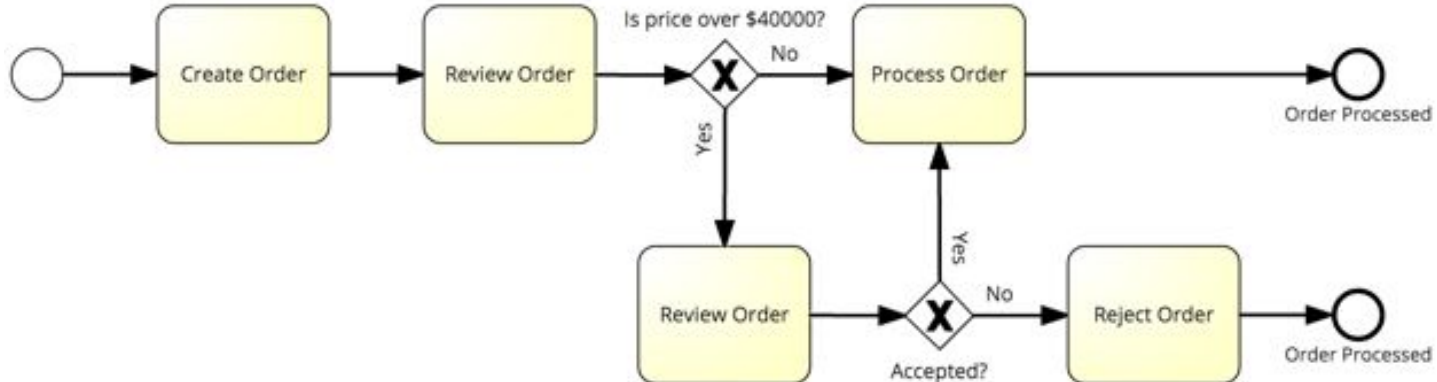
Activities

- Represent certain activity in the process
- Types of activity

Task = Atomic activity
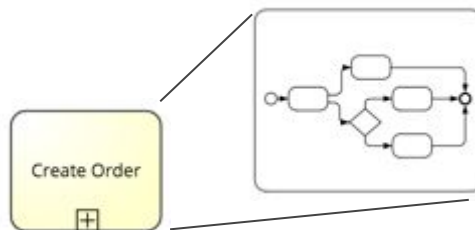
Subprocess = Complex activity

- Types of task

L1

None   User   Service

L2

Events

- Represents event that occur in a process
- Have impact on process flow
- We have these L1 events:
  - Start

  None   Message   Timer

  - End

  None   Message   Terminate

L2
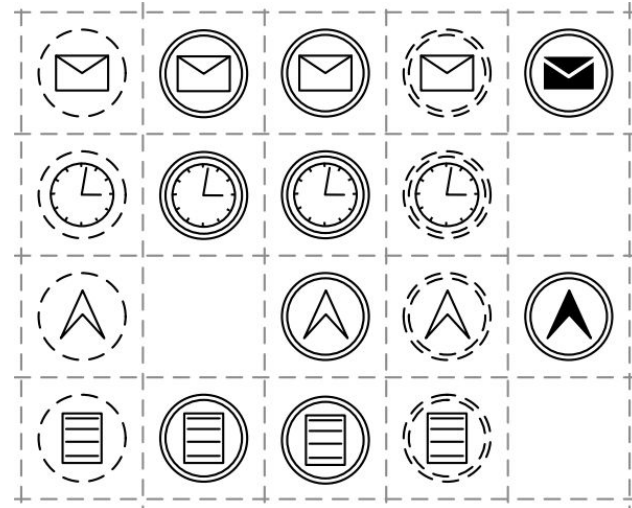
Connecting Objects

- Process sequence flow ⟶
  - Define order of activities

- Message flow ⤙------⤍
  - **Does not influence the process flow!**
  - Message flow between two objects

- Association ------⤍
  - **Does not influence the process flow!**
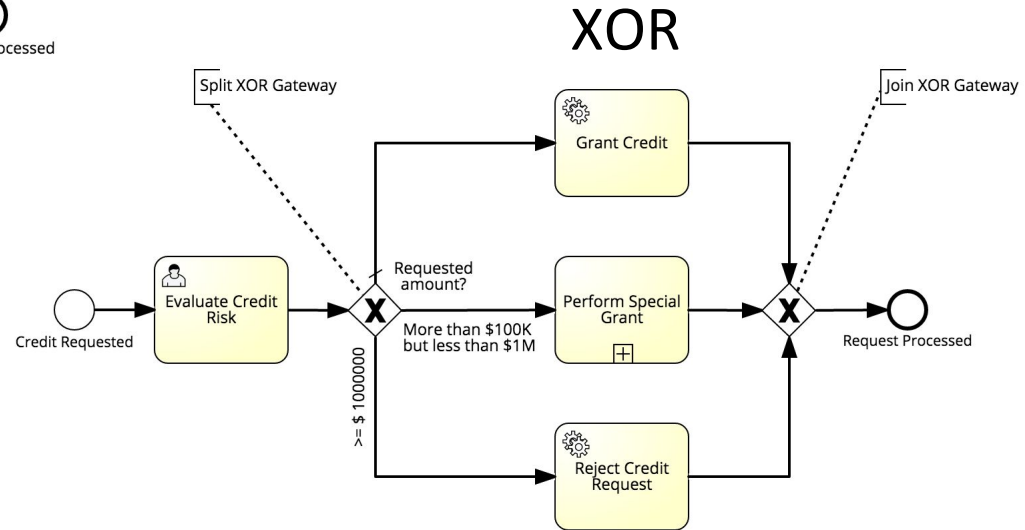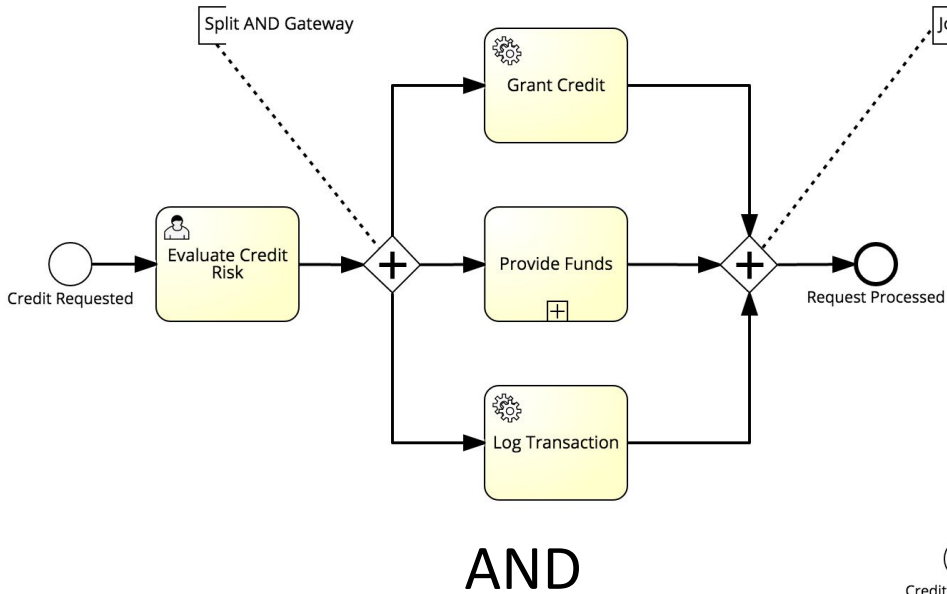 - Connect objects with artifacts (labels, data objects..)

Basic Elements Examples
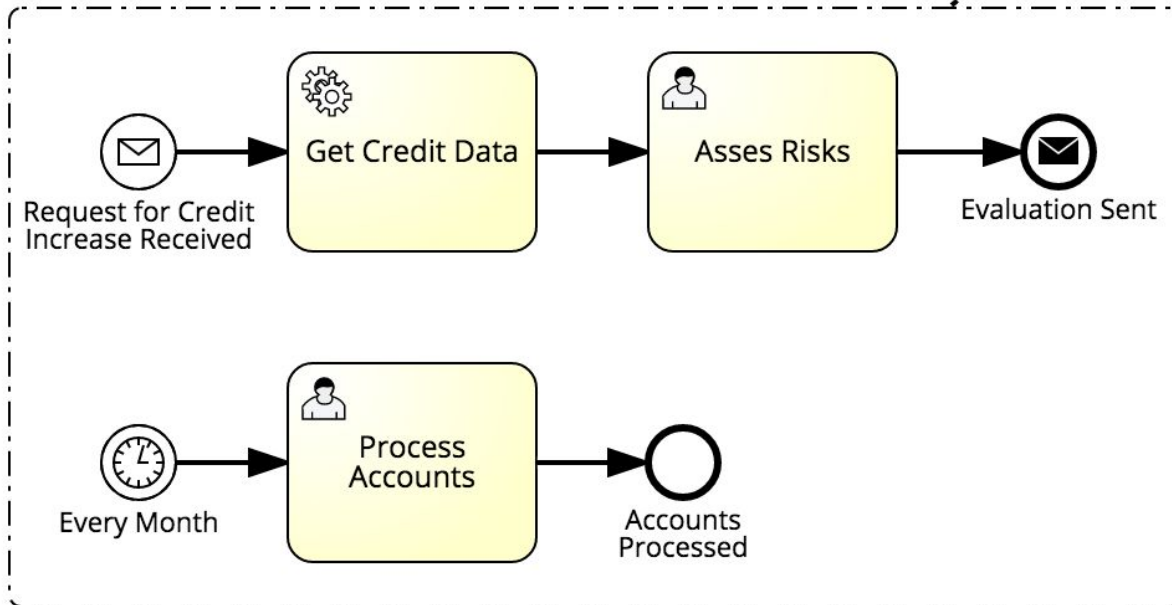
Gateway

- Represents a control point in the sequence flow
- Used for flow branching or join of branches
- We have these types:
  - **Exclusive data-based (XOR)**
  - **Parallel**
  - **Default branch**
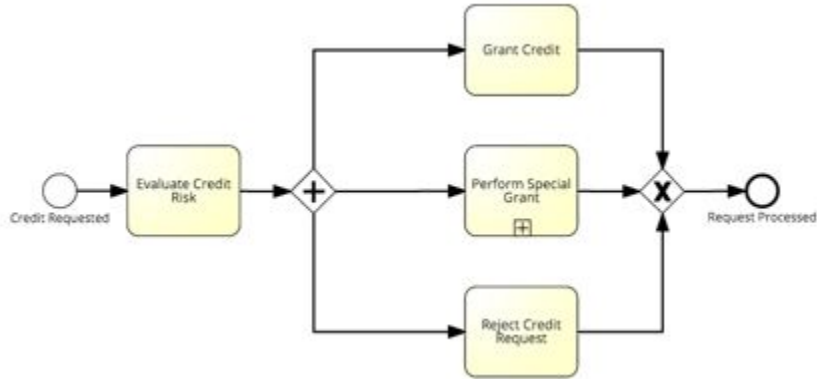 - Exclusive event-based (L2)
  - Inclusive (L2)
  - Complex (L2)

Gateway Examples I

Split AND Gateway

Join AND Gateway

Credit Requested

Evaluate Credit Risk

Grant Credit

Provide Funds

Log Transaction

Request Processed

AND

XOR

Split XOR Gateway

Join XOR Gateway

Credit Requested

Evaluate Credit Risk

Requested amount?

More than $100K but less than $1M

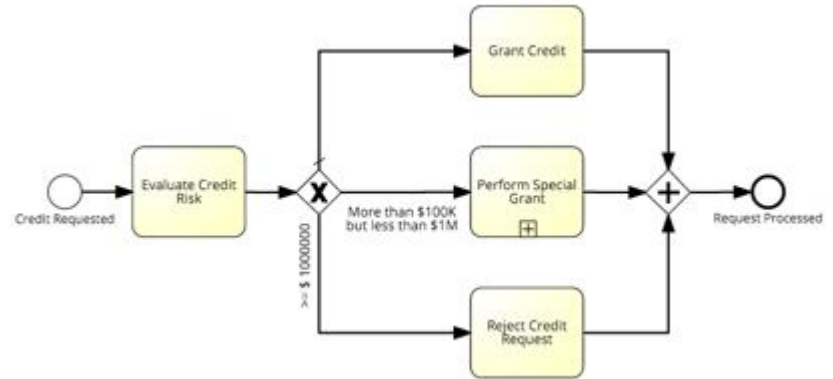>= $ 1000000

Grant Credit

Perform Special Grant

Reject Credit Request

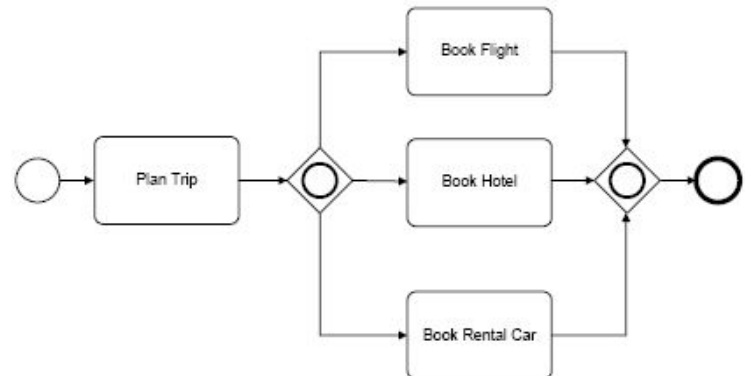Request Processed

Gateway Examples II
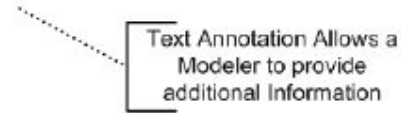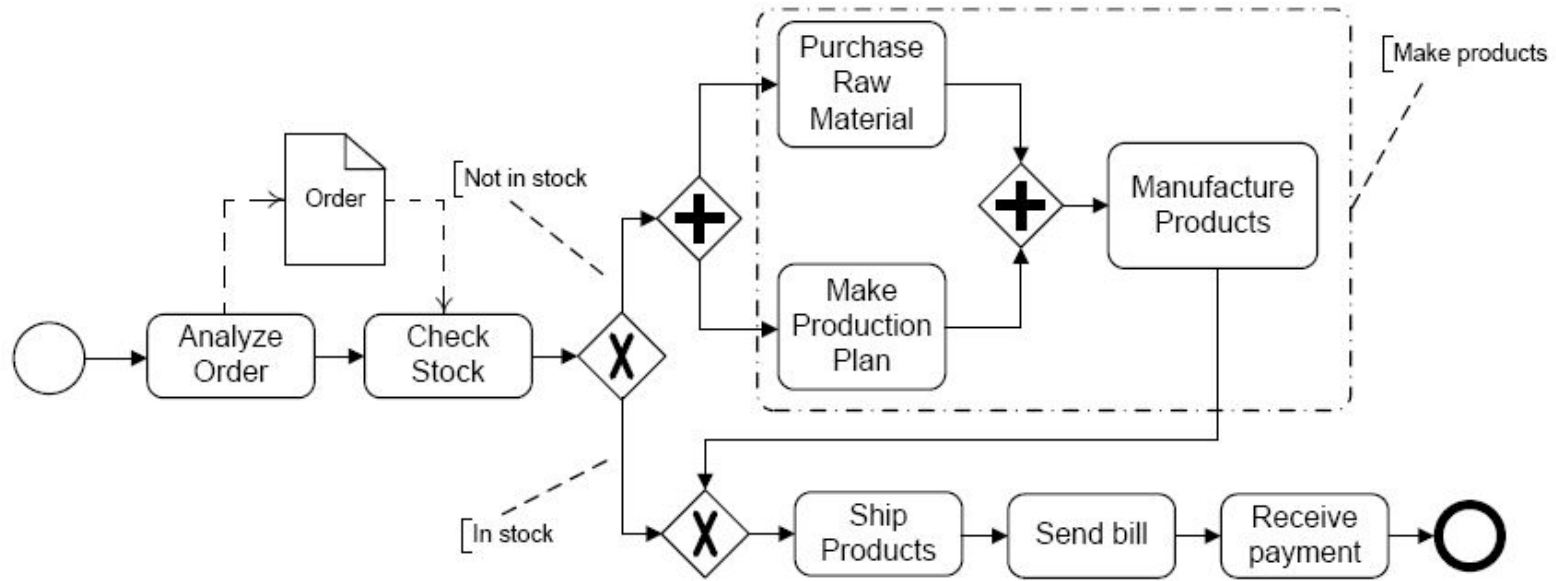## (OK or NOK?)
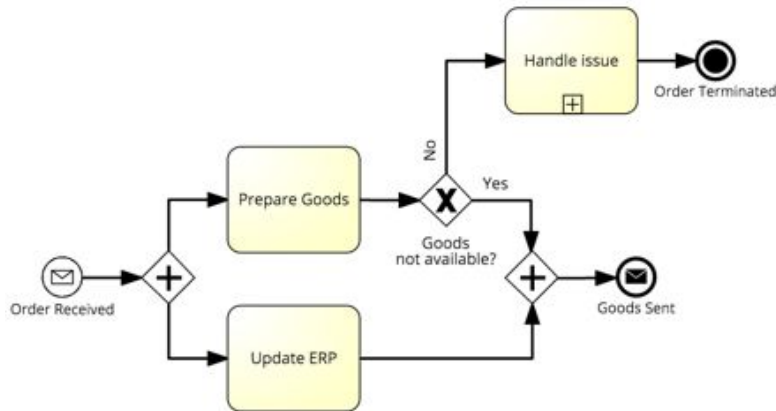
Artifacts

- Additional information
- Do not affect flow
- Data Objects
  - Data used in activities
  - Inputs and outputs of activities
- Annotation
  - Label, additional information
- Groups
  - Grouping of objects (analytical/documentation reasons)

Name
[State]

Text Annotation Allows a
Modeler to provide
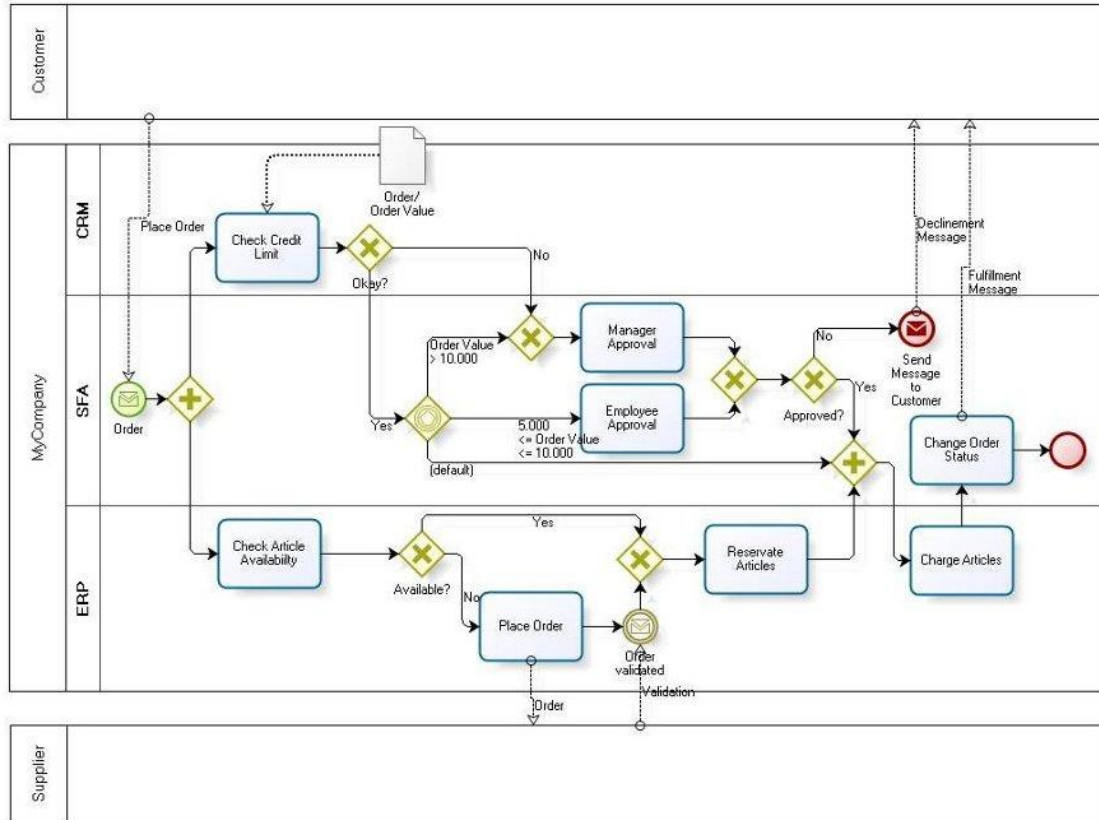additional Information

Artifacts Examples
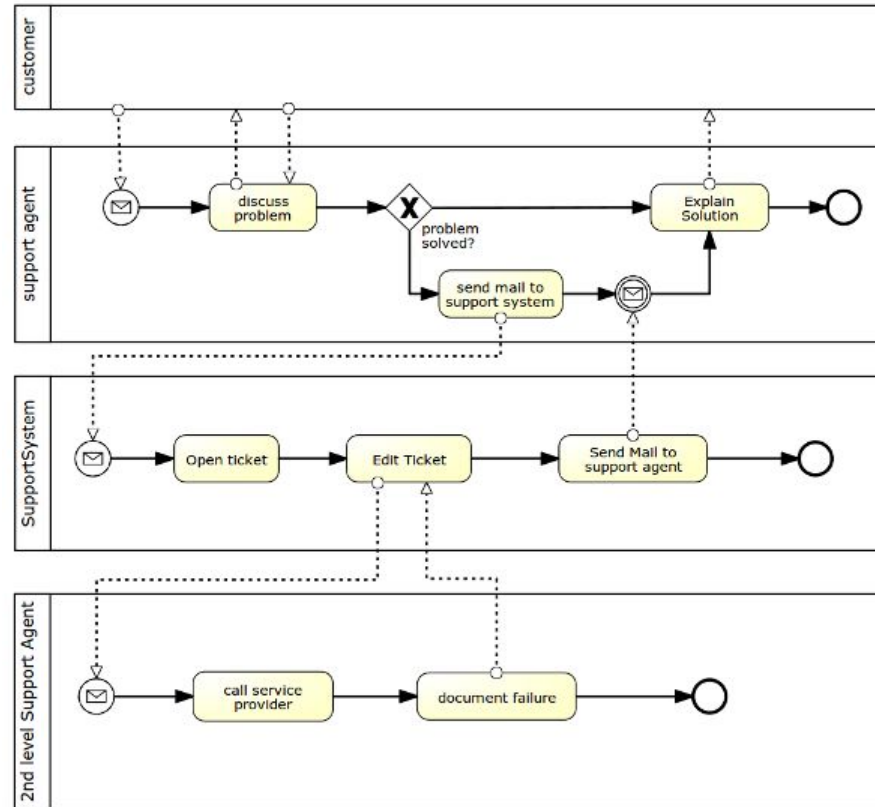
Pools & Lanes

- Pool
  - Represent a participant in a process
  - Show message flows between participants
- Lane
  - Subdivision of pool
  - Express roles, departments or actors in a process
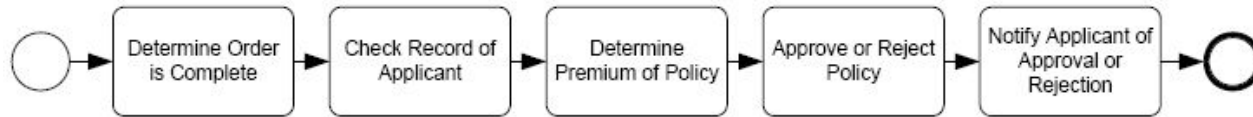
# Pool Examples I

Pool Examples II

Private (Internal) Process

- From point of view of one organisation
- Activities are not visible to outside world
- One pool (the pool can be omitted)
- Also known as orchestration of services

Abstract (Public) Process

- Represents the interactions between a private Process and another Process/Participant
- Only activities that send/receive messages
- Communication visible to outside world
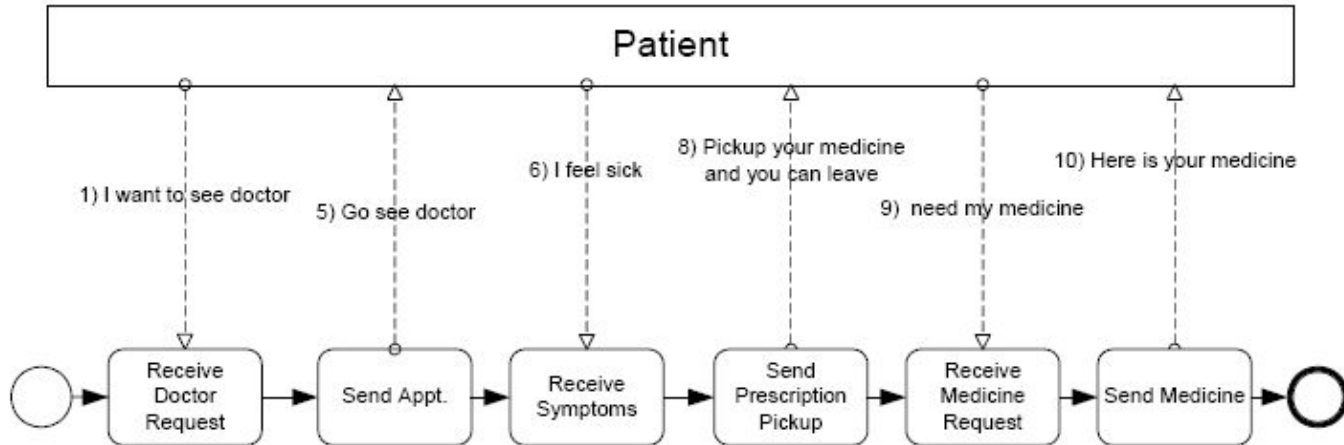
Collaboration (Global) Process

- Collaboration between business entities
- Activities represent message exchange
- Public process are shown, corresponding private processes have much more activities and detail
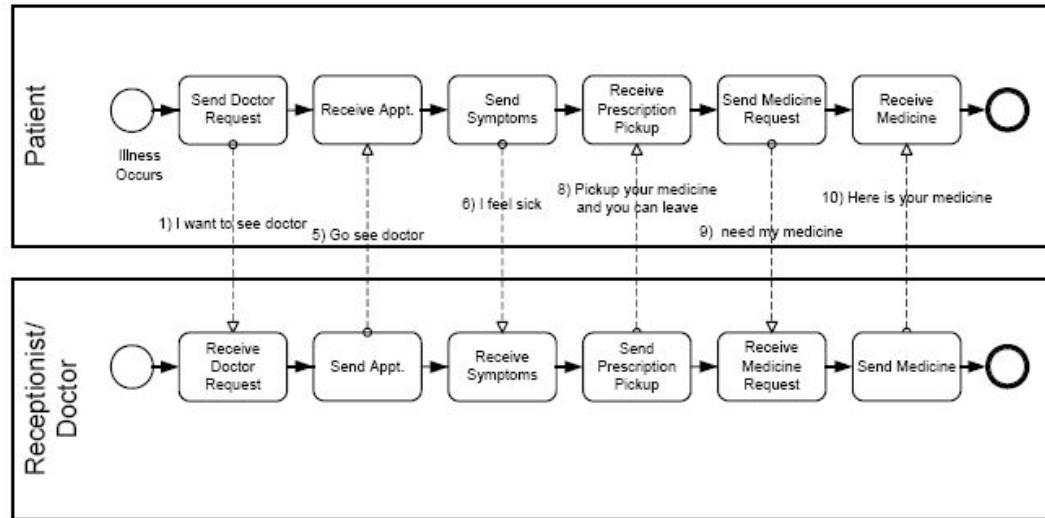
Level 1 Palette

- Pool and Lane

- Task (User, Service, Abstract/None)

- Subprocess (Collapsed, Expanded)

- Call Activity

- Start Event (None, Message, Timer)

- End Event (None, Message, Terminate)

- Gateway (Parallel, Exclusive)

- Sequence Flow

- Message Flow

- Data Object (Data store, Message)

- Text Annotation

- Link Event Pair

FIN
Questions?

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