Process Modeling

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PV207 – Business Process Management Spring 2021

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) ”

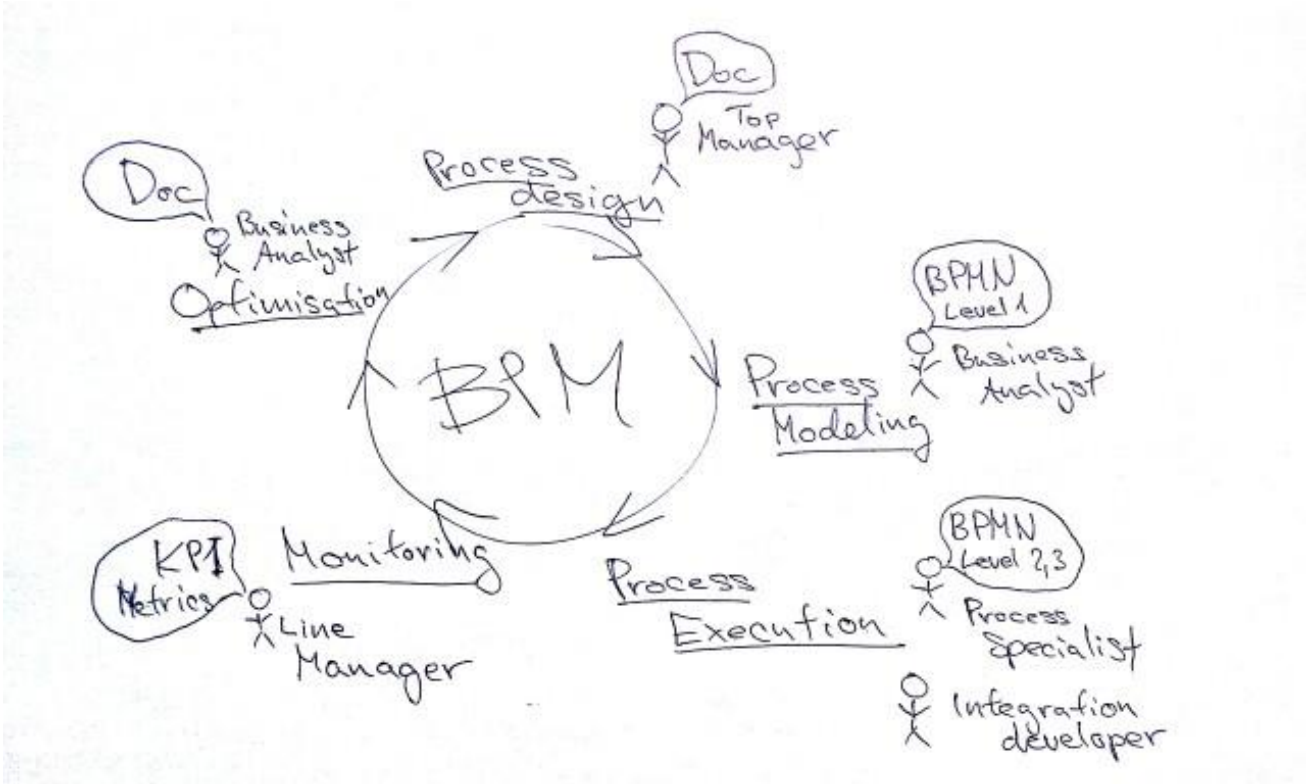
Model Quality Aspects

- 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

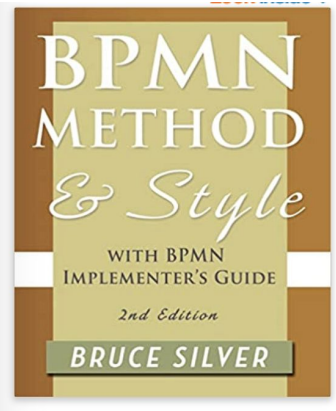
- Business Analyst
  - Sum business strategy
  - Describe goals & objectives, KPIs
  - Describe processes
  - Design BPMN diagrams (Level 1)
- Process specialist
  - Design BPMN diagrams (Level 1,2,3)
  - Design monitoring models
- Process developer
  - Detail BPMN Level 3
  - Implement services and 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 16th at 4PM**
- Next week seminar
  - You receive corrected homework
  - L2 homework assignment
- Homework submission
  - **PNG image or PDF document** exported from Signavio will be submitted to IS MUNI folder "Homework 1" named <surename>_bpmn.png , **before deadline**
  - Diagram has to be readable in a printed A4 paper size (it can be multiple pages if needed)

Questions?

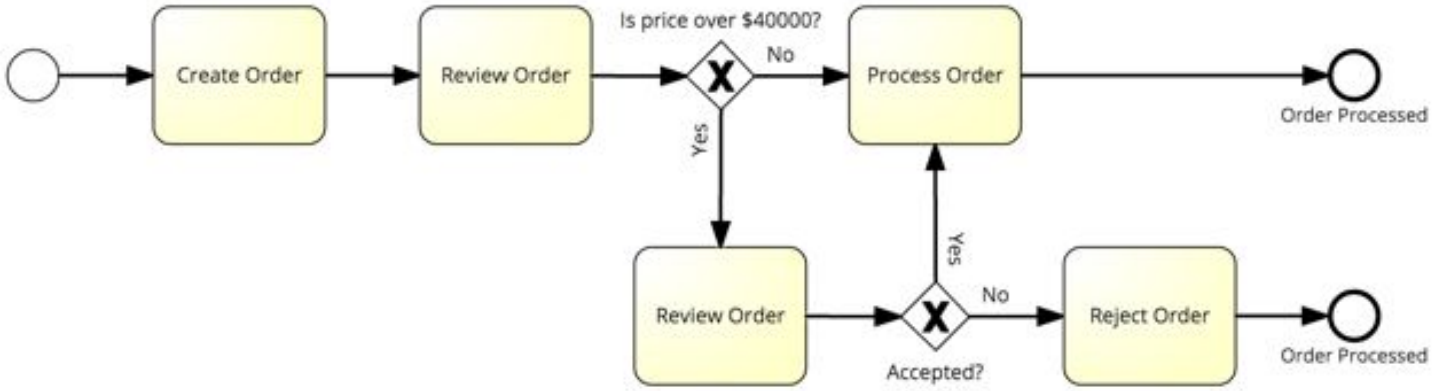
Break 7mins

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

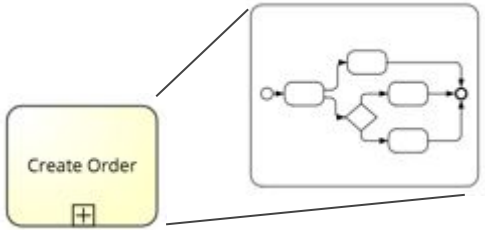
1. Customer **creates an Order**
2. **Order is reviewed** by Sales
   2.1. If price of the Order is **lower** than $40 000, it is processed
   2.2. If price is **over** $40 000 it have to be confirmed by Financial department
   2.3. Order can be rejected by the department
3. Otherwise the order is processed



Activities

- Represent certain activity in the process
- Types of activity

Task = Atomic activity



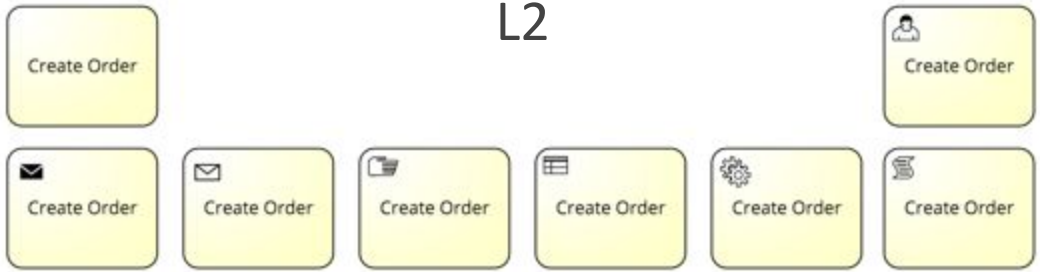
Subprocess = Complex activity

- Types of task

L1

None User Service

L2



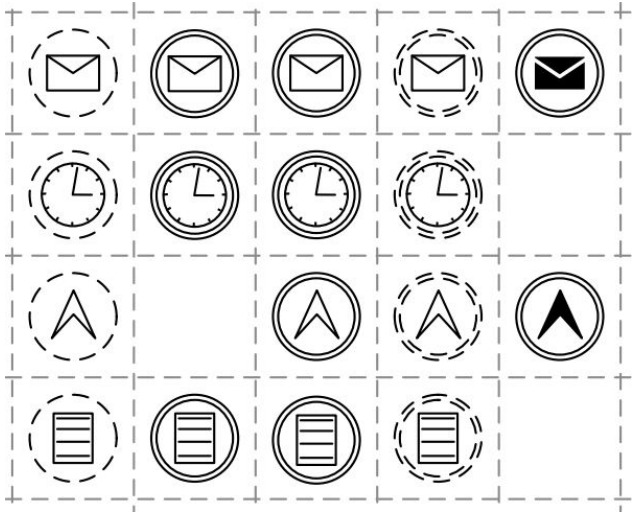
Events

- 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

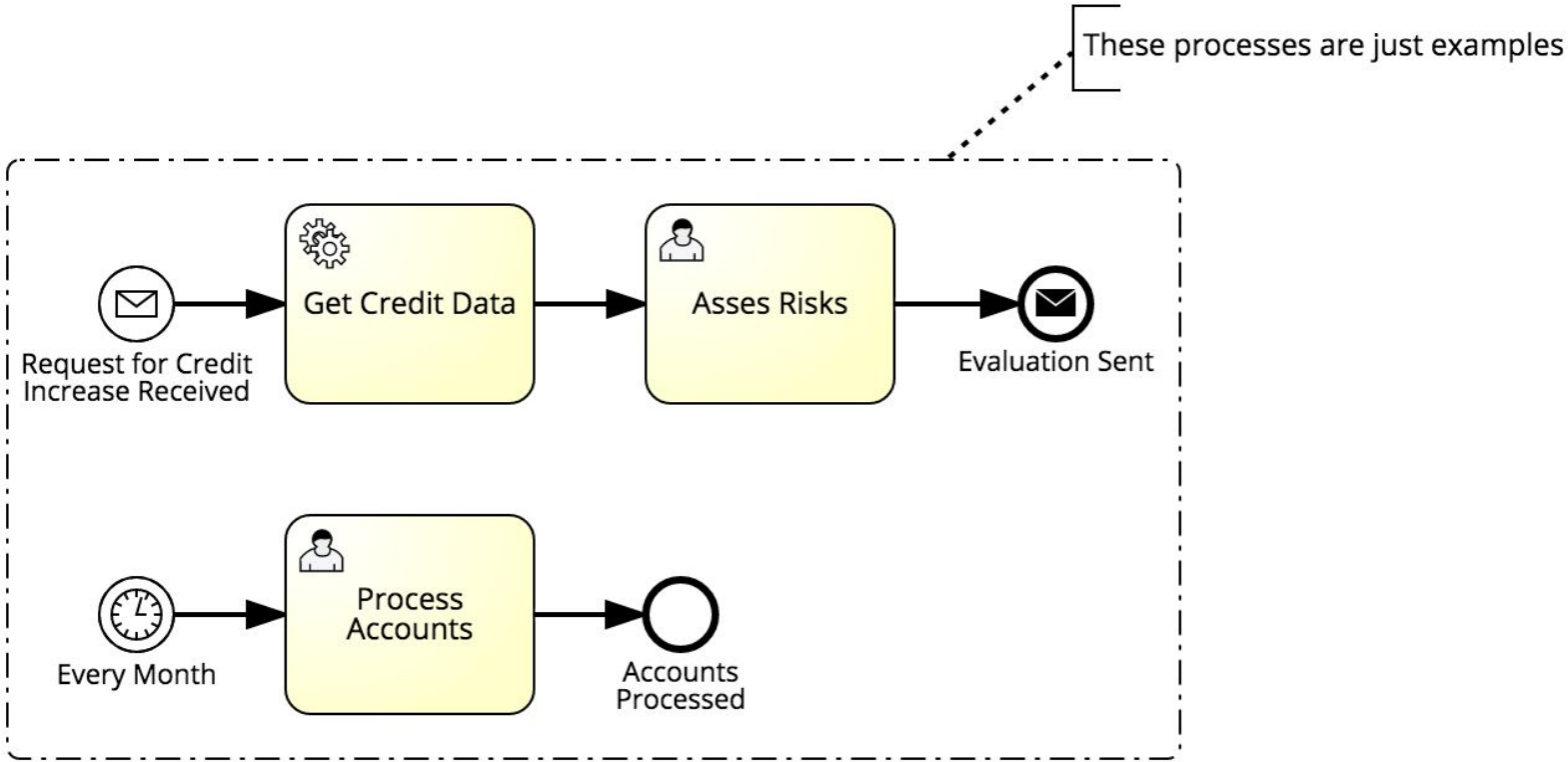
L2



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..)

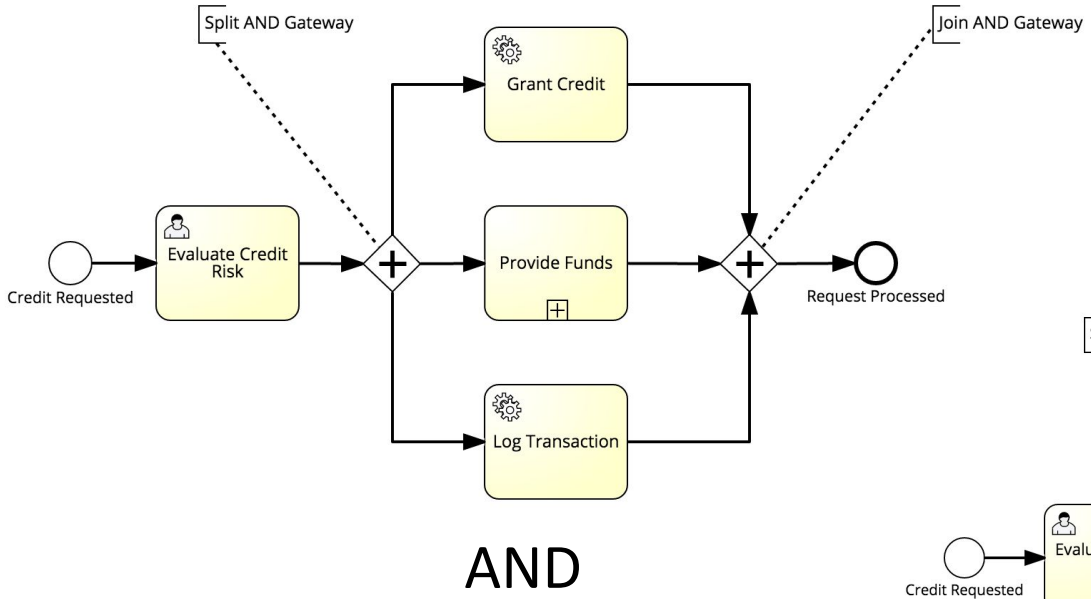
Basic Elements Examples



Gateway

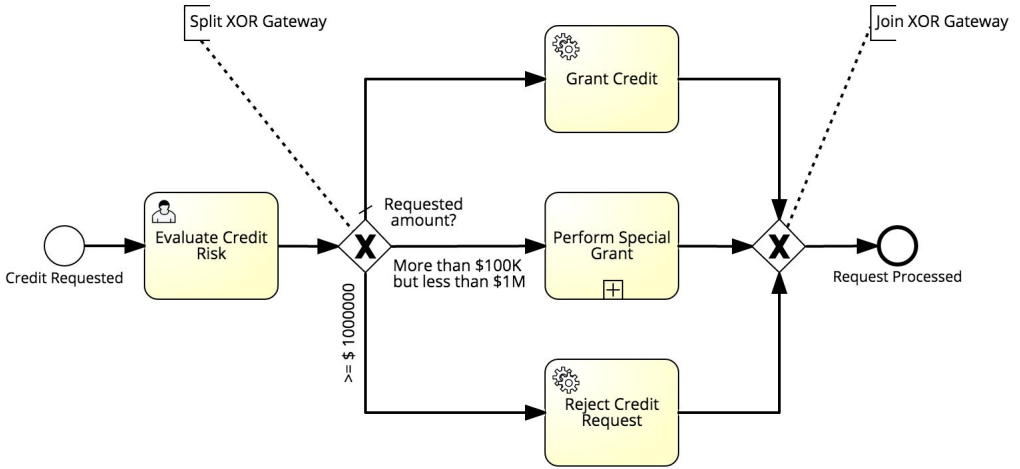
- Represents a control point in the sequence flow
- Used for flow branching or join of branches
- We have these types:
  -  **Exclusive data-based (XOR)**
  -  **Parallel**
  -  **Default branch**
  -  Exclusive event-based (L2)
  -  Inclusive (L2)
  -  Complex (L2)

Gateway Examples I



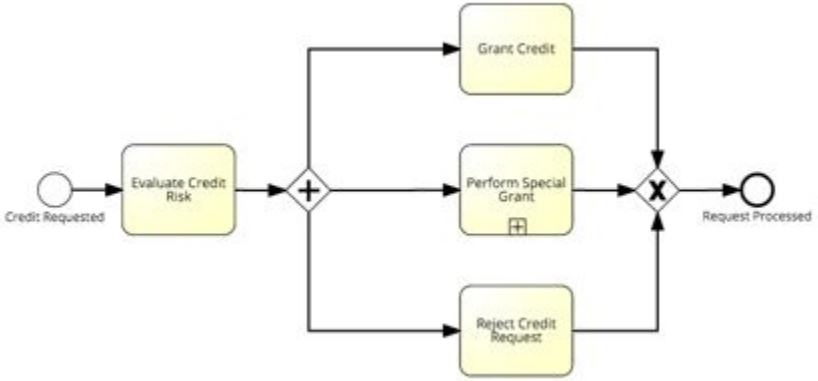
AND

XOR

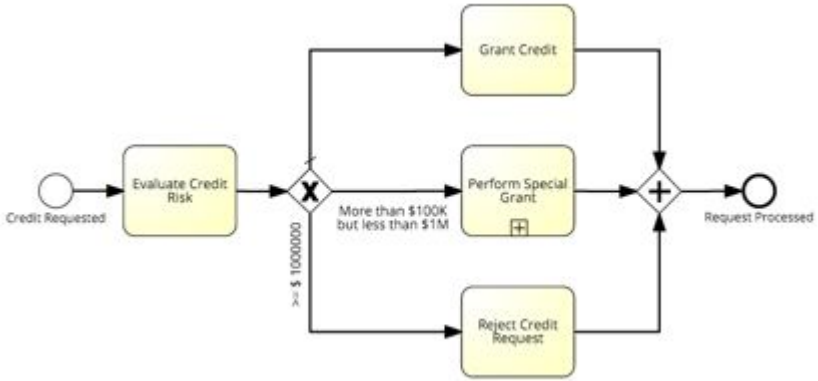


Gateway Examples II
(OK or NOK?)

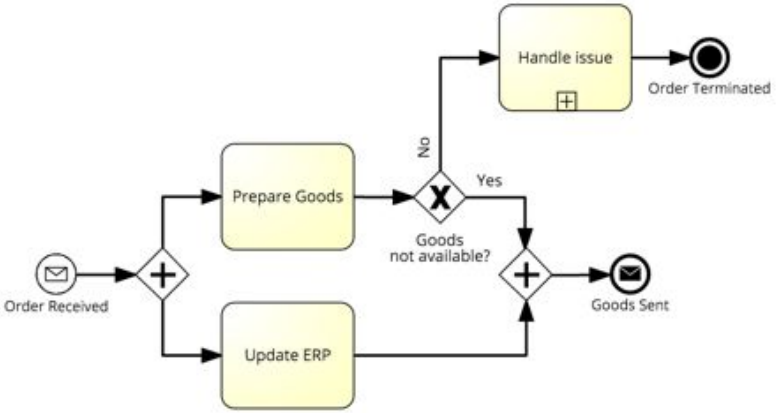
A



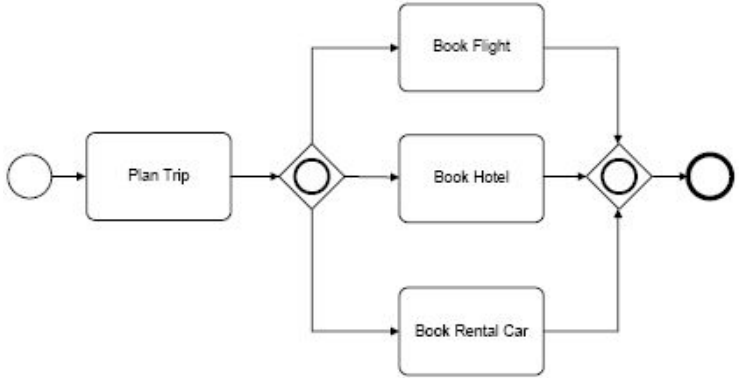
B



C



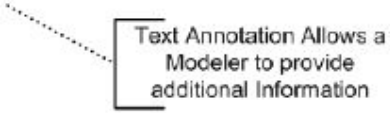
D



Artifacts

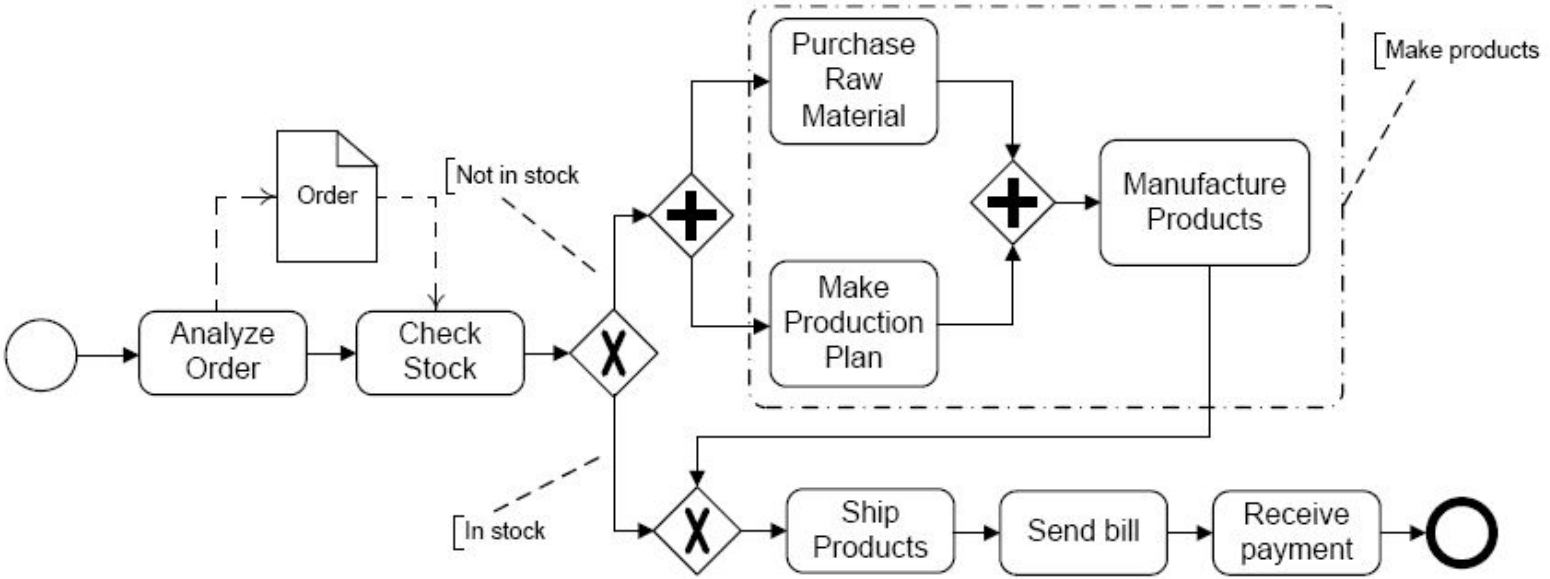
- Additional information
- Do not affect flow
- Data Objects
  - Data used in activities
  - Inputs and outputs of activities

- Annotation
  - Label, additional information



- Groups
  - Grouping of objects (analytical/documentation reasons)

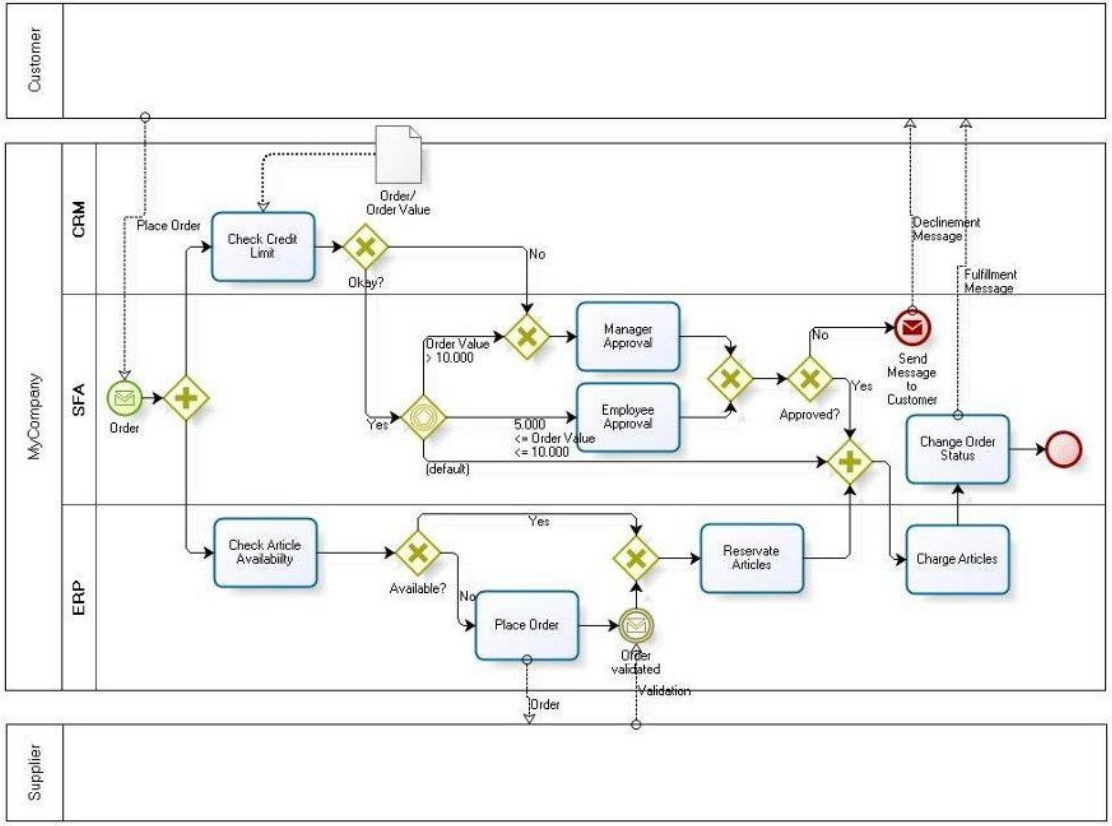
Artifacts Examples



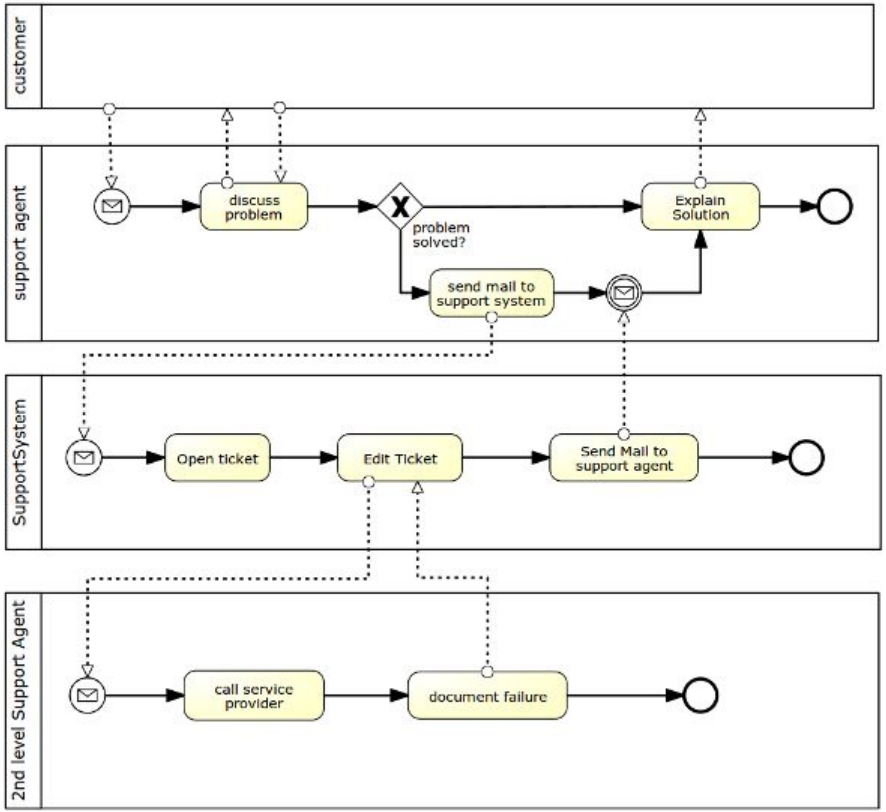
Pools & Lanes

- 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

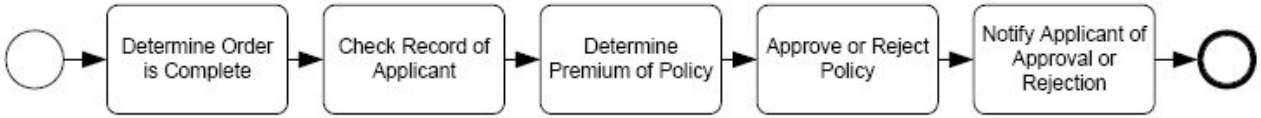


Pool Examples II



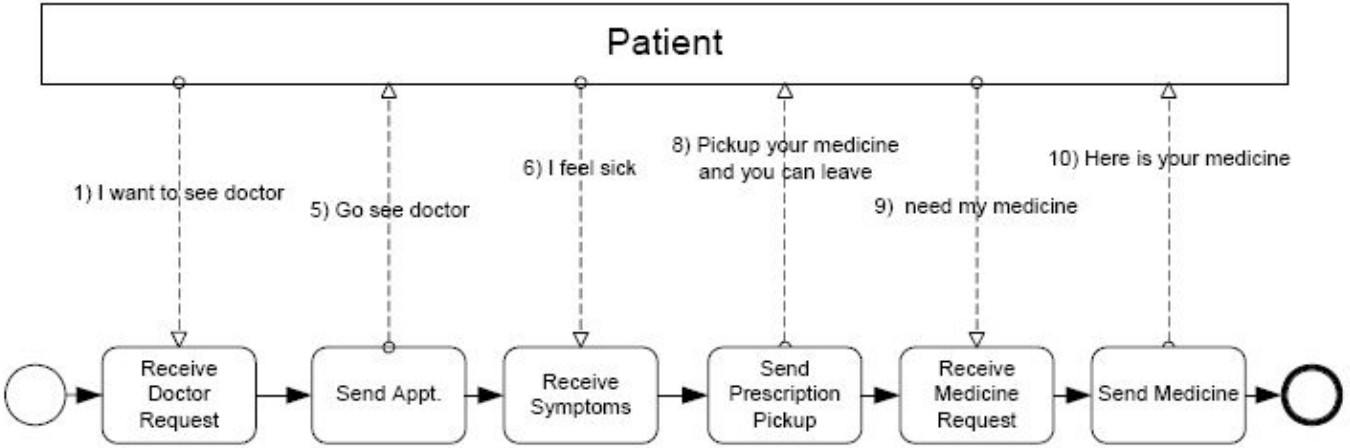
Private (Internal) Process

- 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



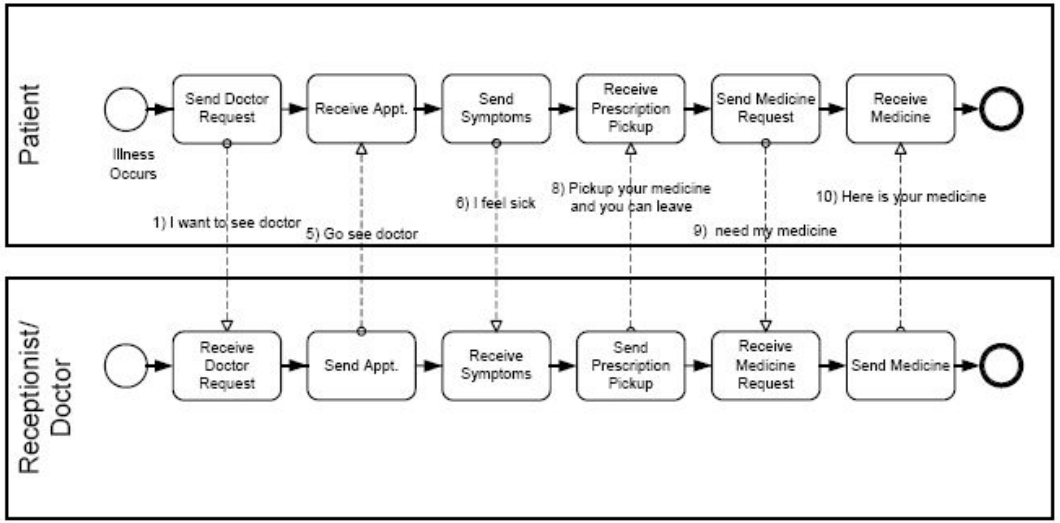
Abstract (Public) Process

- 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)
- Start Event (None, Message, Timer)
- End Event (None, Message, Terminate)
- Gateway (Parallel, Exclusive)
- Sequence Flow
- Message Flow
- Data Object (Data store, Message)
- Text Annotation

FIN
Questions?

Jiří Kolář & Lubomír Hruban