Process Modelling

Spring 2021 - MAJU

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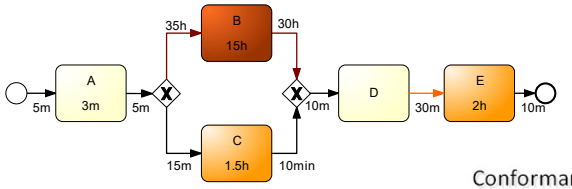
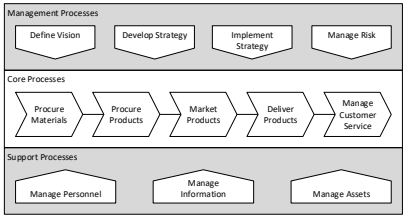
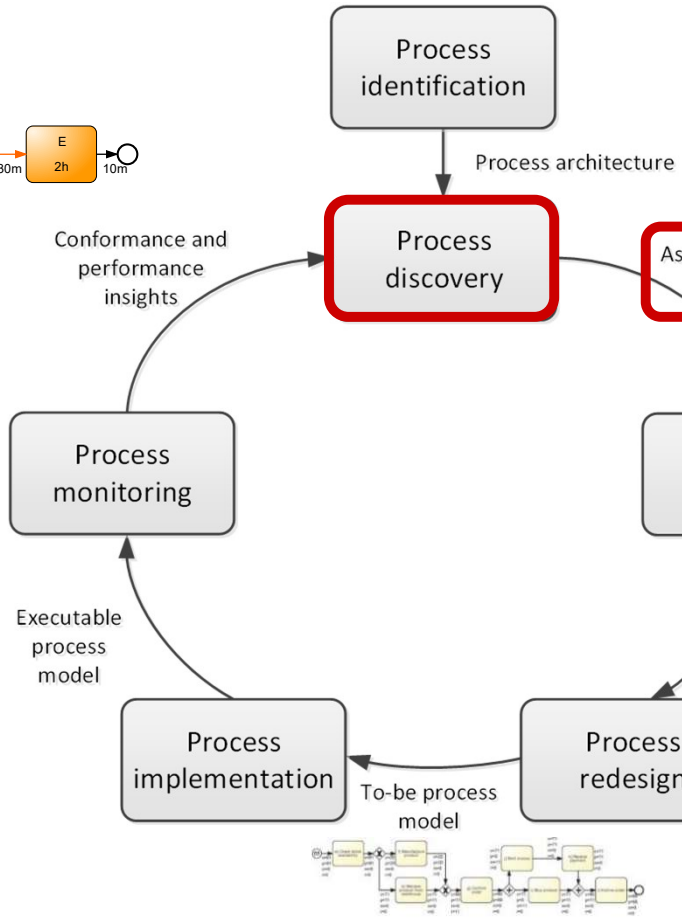
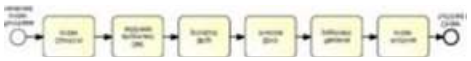
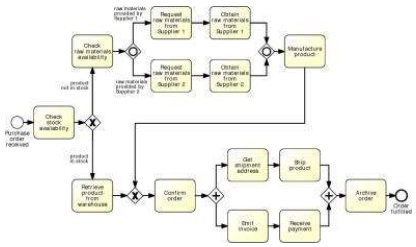
Process Modeling in the BPM Lifecycle

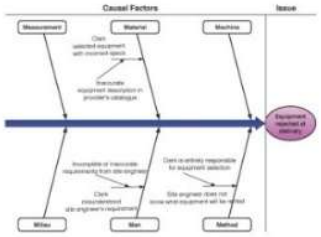






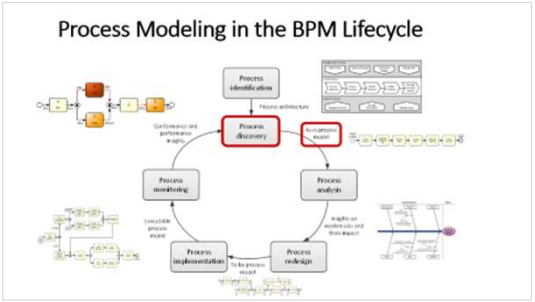




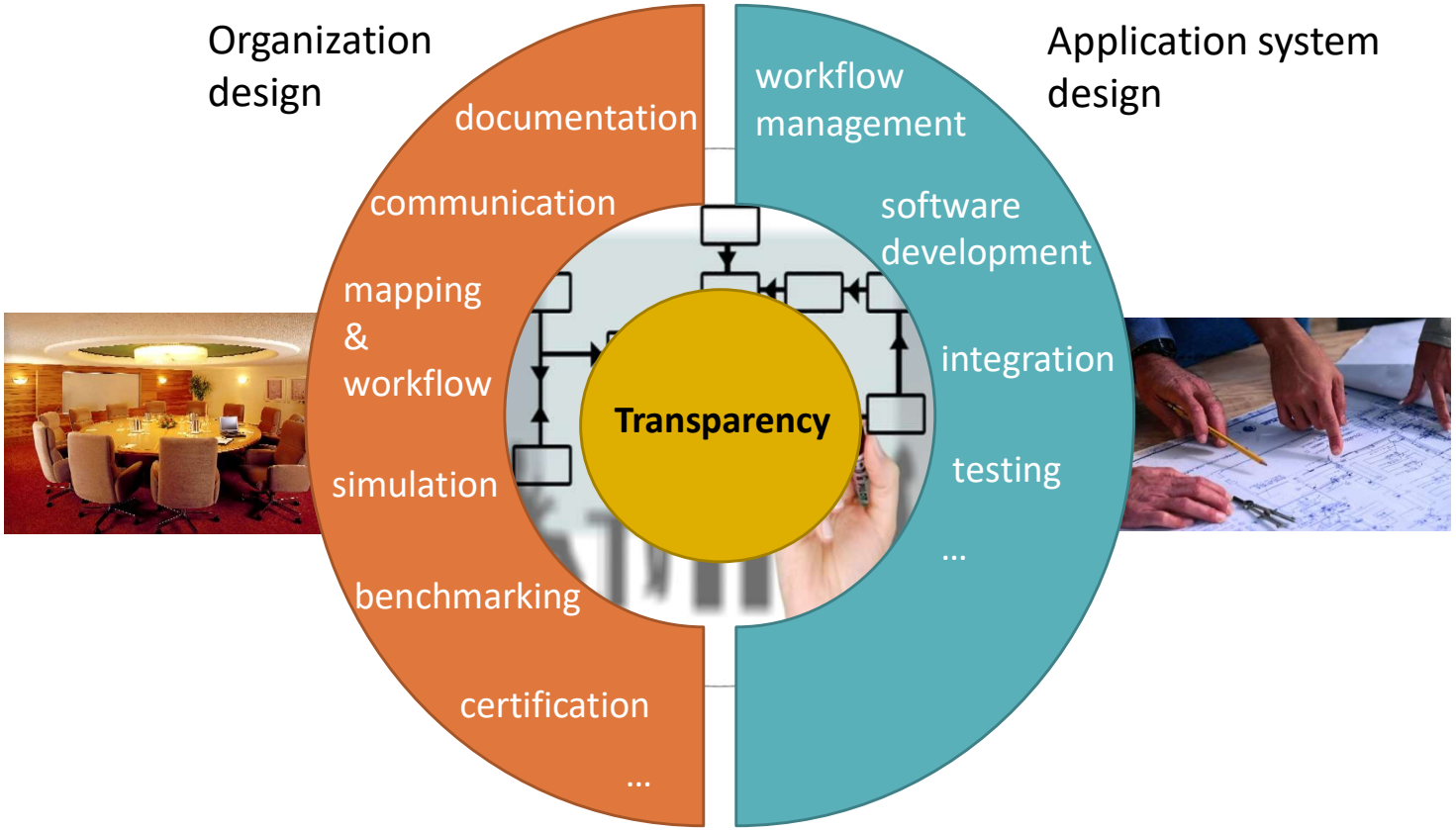


Process Discovery

- Process discovery (also called As-Is process modeling).
- In process discovery phase of the BPM, the current state of each of the relevant processes is documented, typically in the form of one or several As-Is process models.
- The outcome of the process discovery is As-Is Business Process Model



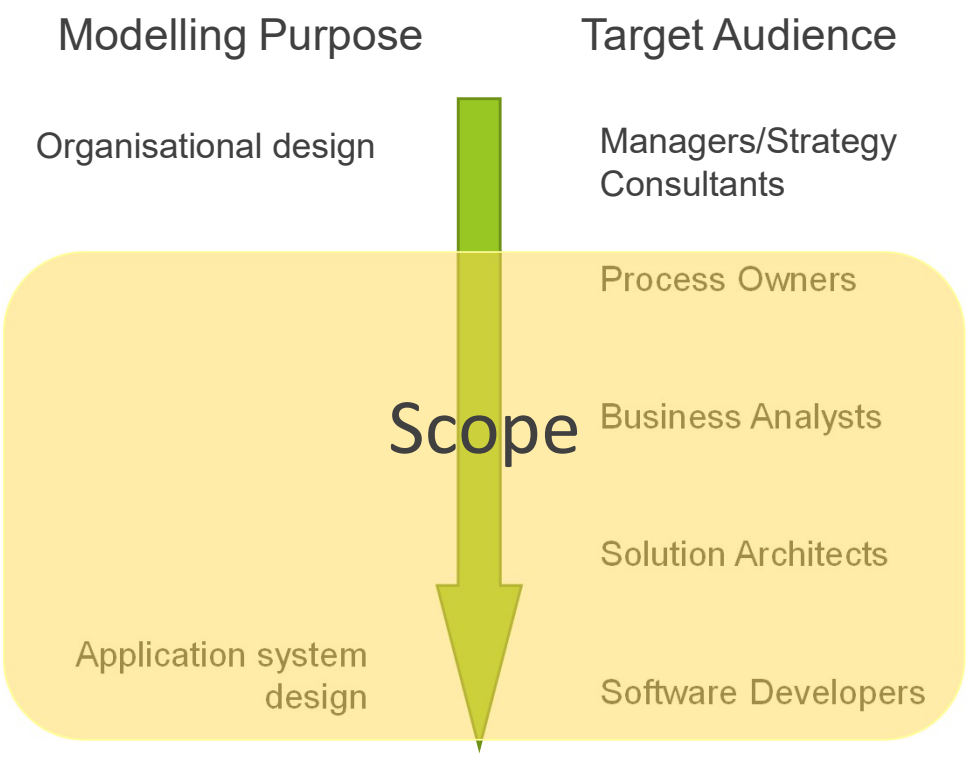
Purposes of Process Modeling



Business Process Model and Notation (BPMN)

- Object Management Group (OMG) standard (BPMN 2.1)
- Supported by numerous tools: bpmn.org lists over 70 tools
- Both for conceptual and executable models

Objective of the BPMN initiative

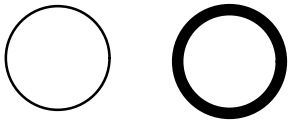


BPMN Core Elements

activity

Activities capture work performed in a process

- Different types of activities



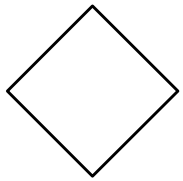
start event

end event

Events represent the process' triggers (start event) and outcomes (end event).

- Different types of events

BPMN Core Elements



gateway

Gateways capture forking and joining paths in the control flow.

- Different types of gateways

sequence flow

Sequence flows represent the order in which activities and events will be performed.

They can be assigned a condition to distinguish between alternative branches.

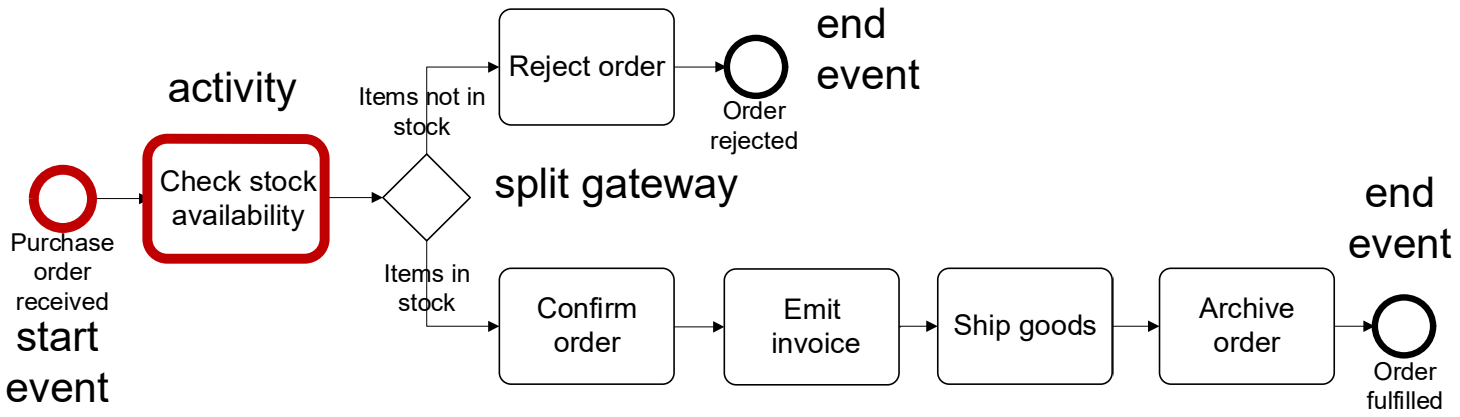
- Different types of flows

Let’s start modelling – break it down

Order-to-cash

- An order-to-cash process is triggered by the receipt of a purchase order from a customer.
- Upon receipt, the purchase order has to be checked against the stock to determine if the the requested item(s) are available.
- **Depending on stock availability the purchase order may be confirmed or rejected.**
- **If the purchase order is confirmed, an invoice is emitted and the goods requested are shipped. The process completes by archiving the order.**

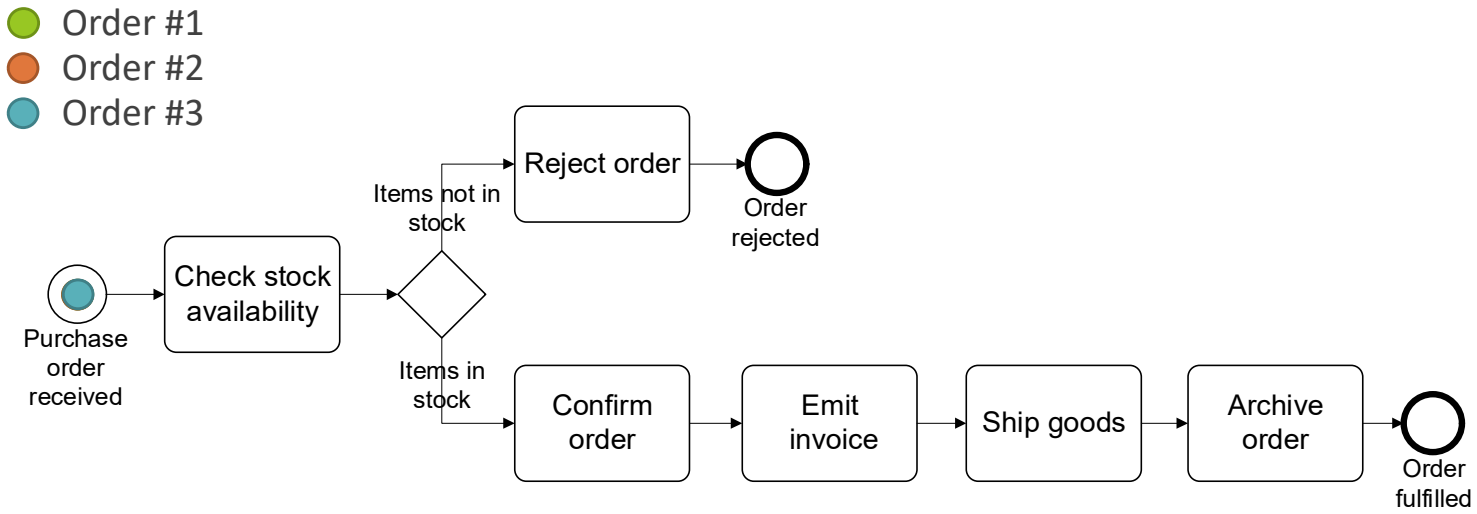
Solution in BPMN: Order-to-cash



Naming conventions

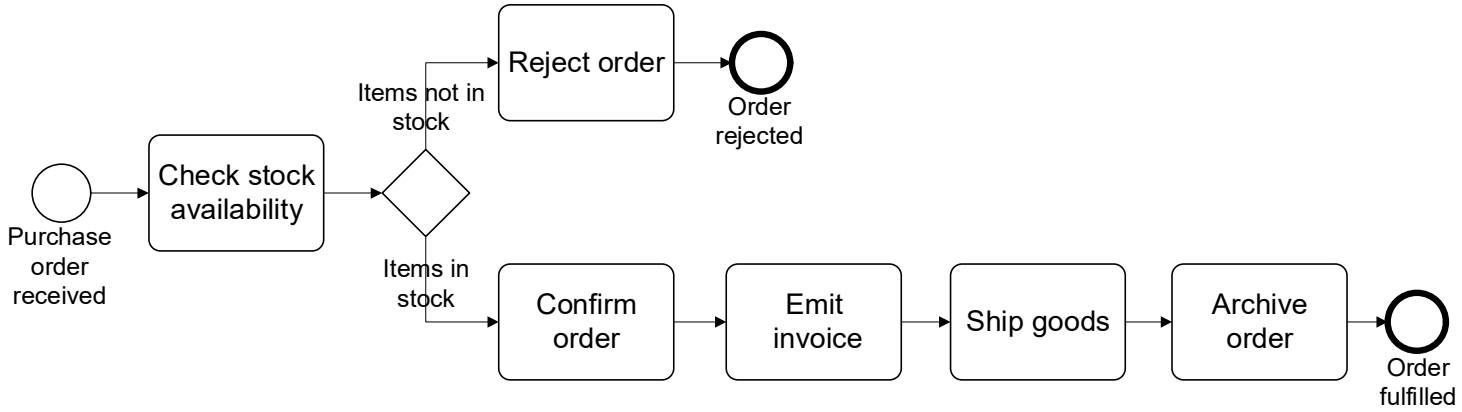
- Event: noun + past-participle verb (e.g. insurance claim lodged)
- Activity: imperative verb + noun (e.g. assess credit risk)

Execution of a process model: The “token game”



Order-to-cash example revisited…

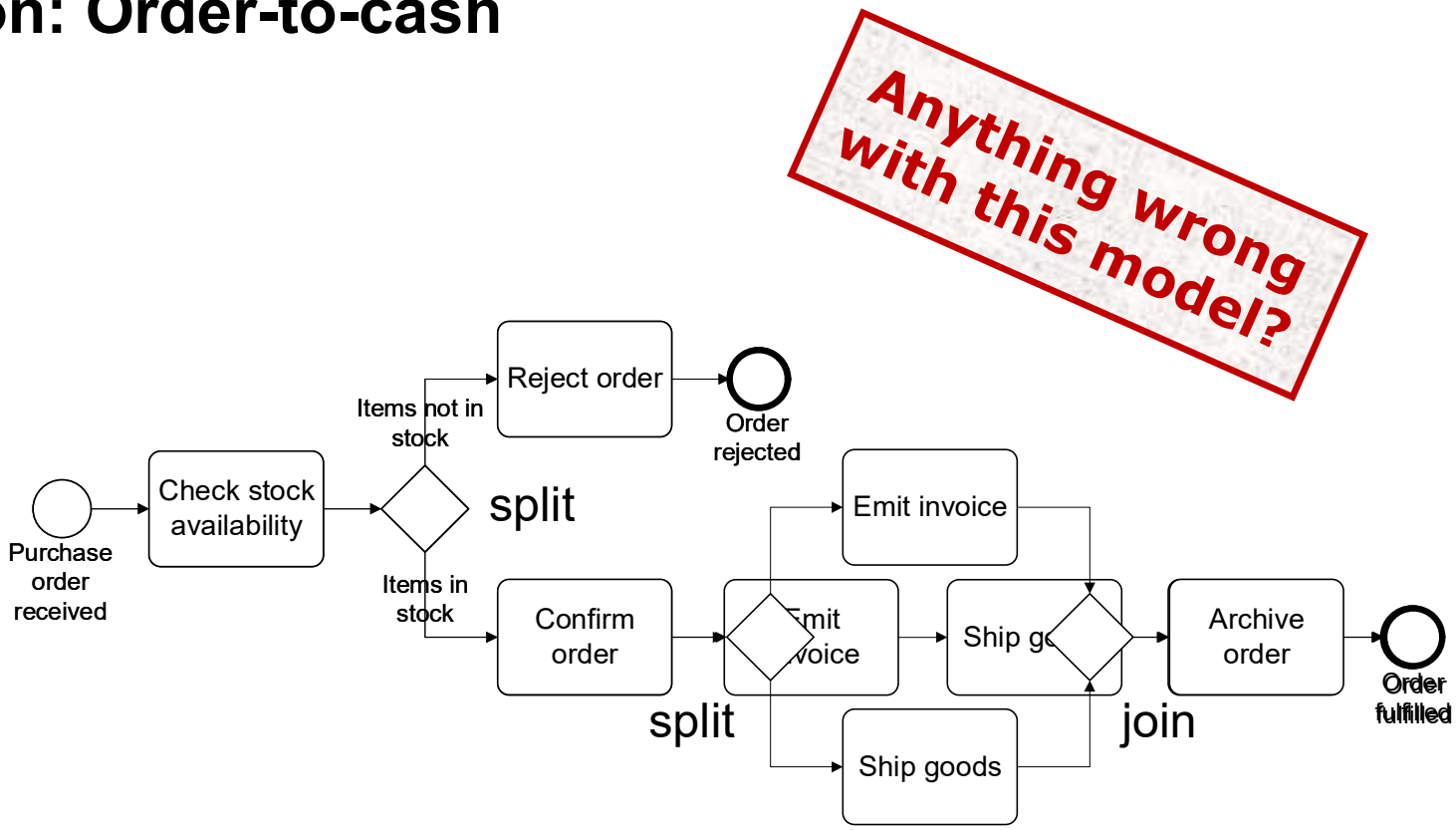
[…] If the purchase order is confirmed, **an invoice is emitted and the goods requested are shipped**. The process completes by archiving the order. […]



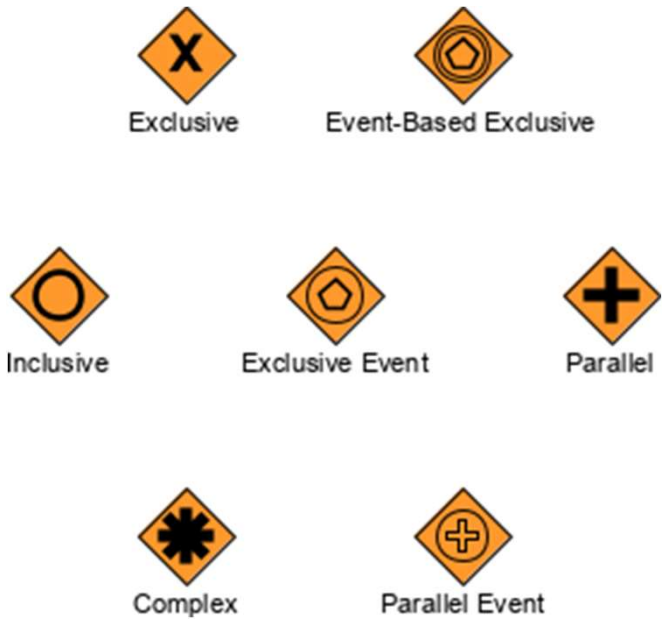
Clearly, we need to archive the order once both the emission of the invoice and the shipment of the goods have been done; we are not concerned about the specific order in which these two activities can take place, so long as they are BOTH completed.

I can first emit the invoice or ship the goods. Or event these two activities could start at the same time. Thus, we need to use gateways to model this condition.

Solution: Order-to-cash



Type of Gateways



Exclusive (XOR)

- Exclusive decision take one branch
- Exclusive merge Proceed when one branch has completed

Parallel (AND)

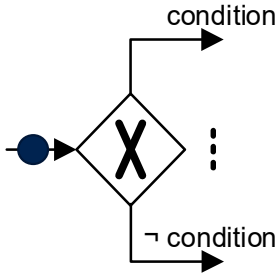
- Parallel split take all branches
- Parallel join proceed when all incoming branches have completed

Inclusive (OR)

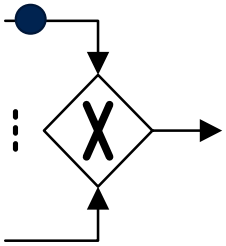
- Inclusive decision take one or several branches depending on conditions
- Inclusive merge proceed when all active incoming branches have completed

A little more on gateways: XOR Gateway

An *XOR Gateway* captures decision points (XOR-split) and points where alternative flows are merged (XOR-join)



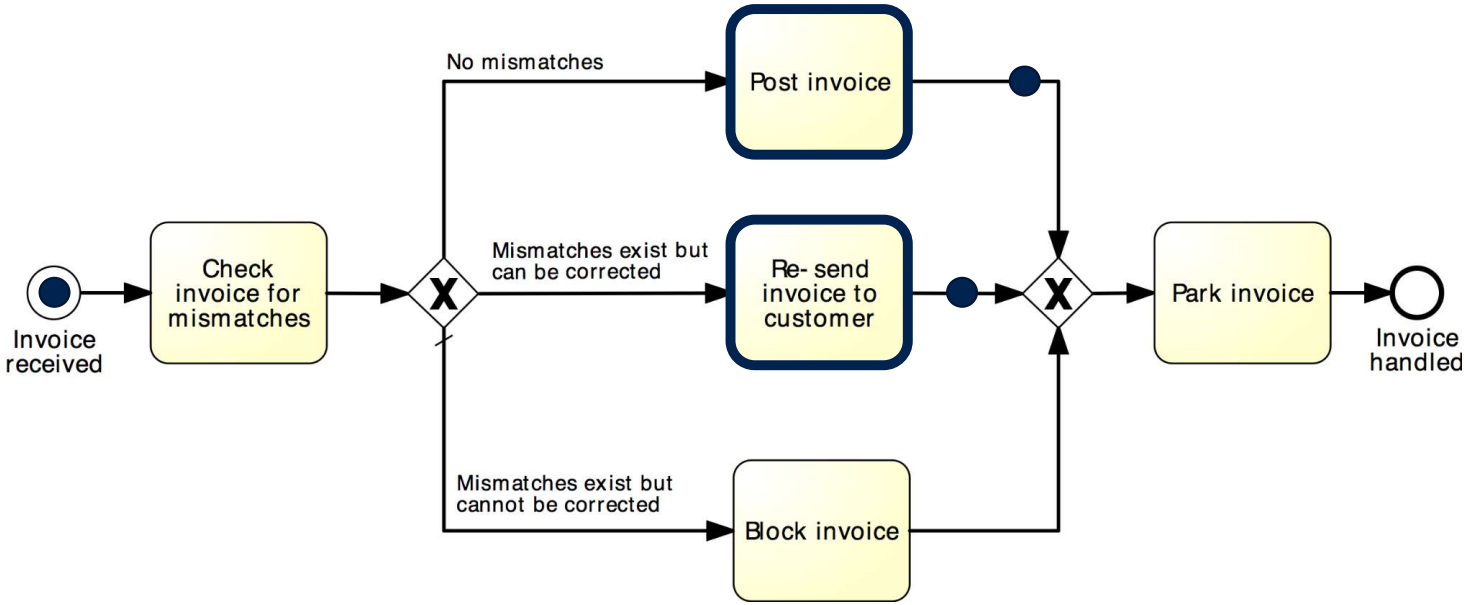
XOR-split ➔ takes **one** outgoing branch



XOR-join ➔ proceeds when **one** incoming branch has completed

Example: XOR Gateway

Invoice checking process

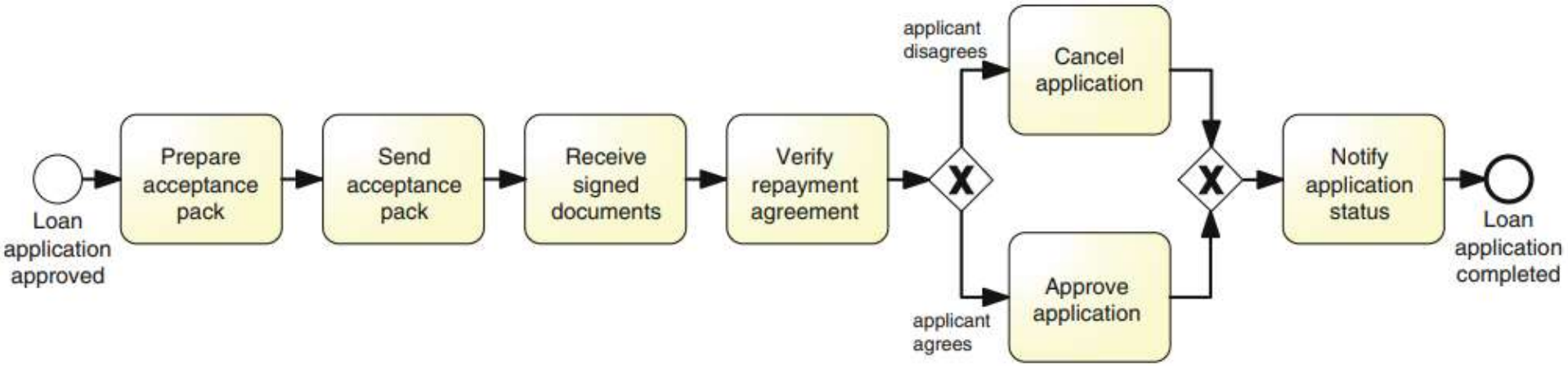


Exercise 3.1

Model the following fragment of a business process for assessing loan applications (loan origination process).

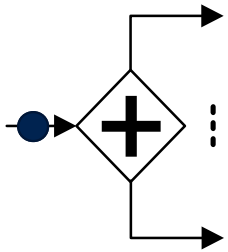
Once a loan application has been approved by the loan provider, an acceptance pack is prepared and sent to the customer. The acceptance pack includes a repayment schedule which the customer needs to agree upon by sending the signed documents back to the loan provider. The latter then verifies the repayment agreement: if the applicant disagreed with the repayment schedule, the loan provider cancels the application; if the applicant agreed, the loan provider approves the application. In either case, the process completes with the loan provider notifying the applicant of the application status.

Solution 3.1

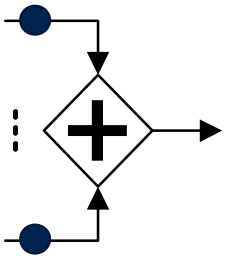

Loan application approved
Prepare acceptance pack
Send acceptance pack
Receive signed documents
Verify repayment agreement
X
applicant disagrees
Cancel application
applicant agrees
Approve application
X
Notify application status
Loan application completed

AND Gateway

An *AND Gateway* provides a mechanism to create and synchronize “parallel” flows.



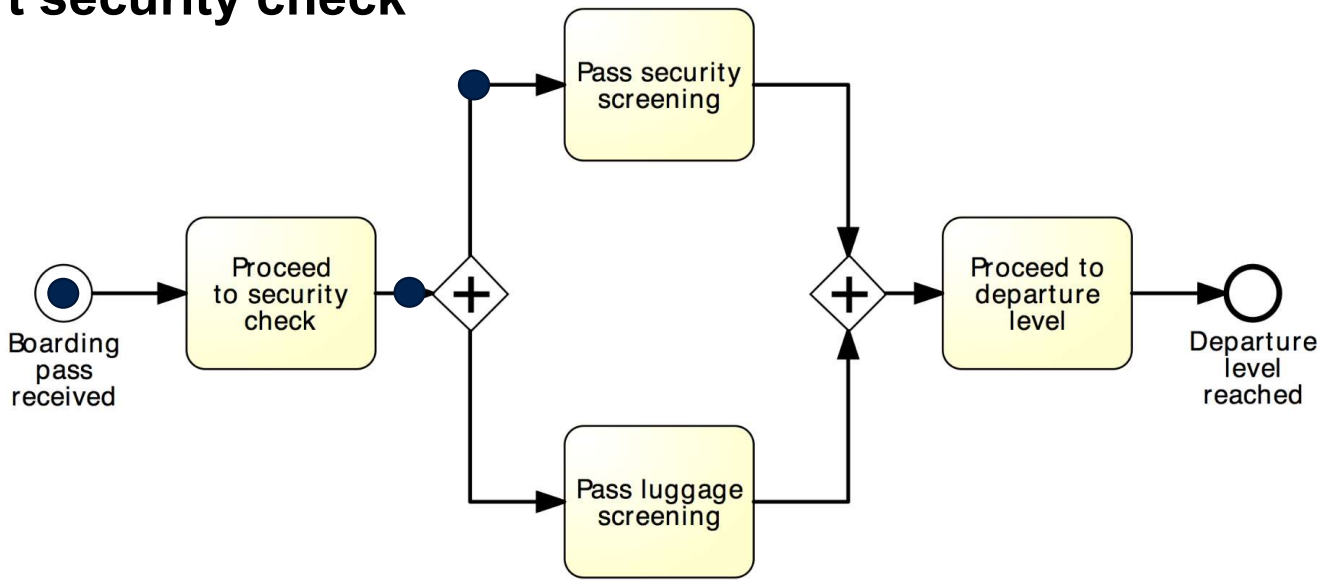
AND-split ➔ takes **all** outgoing branches



AND-join ➔ proceeds when **all** incoming branches have completed

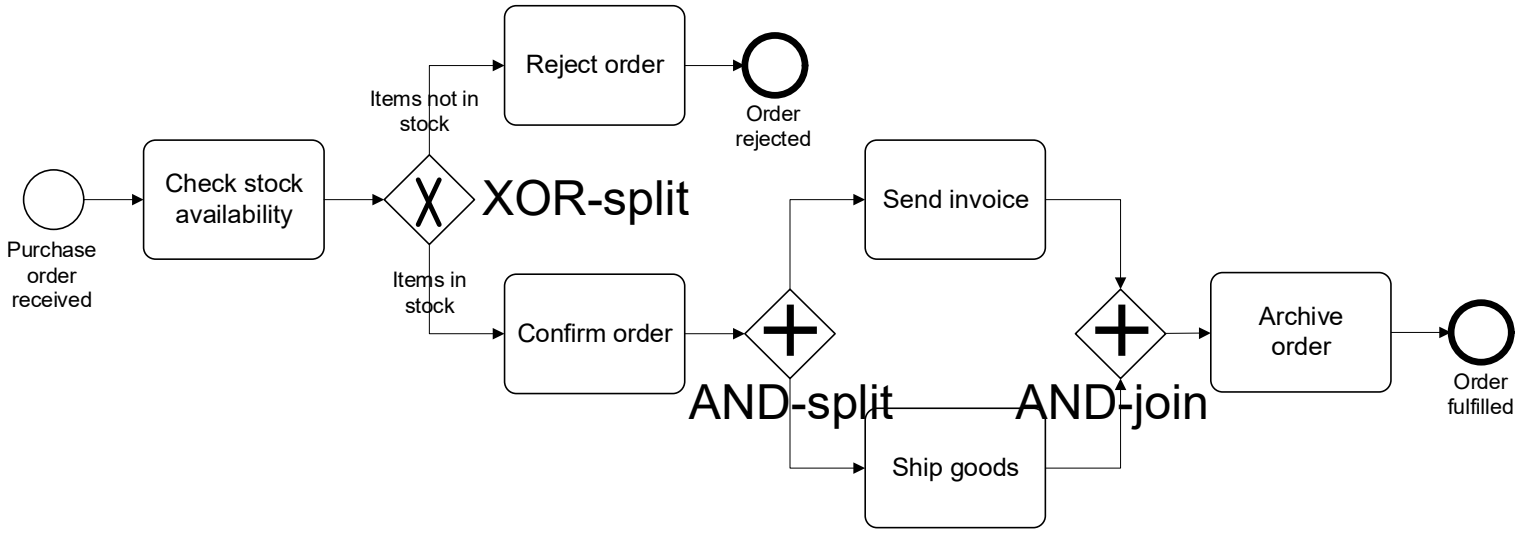
Example: AND Gateway

Airport security check



Revised solution

Order-to-cash



Assignment 2

Model the following fragment of a business process for assessing loan applications.

A loan application is approved if it passes two checks: i) the applicant's loan risk assessment, done automatically by a system, and ii) the appraisal of the property for which the loan has been asked, carried out by a property appraiser. The risk assessment requires a credit history check on the applicant, which is performed by a financial officer. Once both the loan risk assessment and the property appraisal have been performed, a loan officer can assess the applicant's eligibility. If the applicant is not eligible, the application is rejected, otherwise the acceptance pack is prepared and sent to the applicant.

A loan application may be coupled with a home insurance which is offered at discounted prices. The applicants may express their interest in a home insurance plan at the time of submitting their loan application to the loan provider. Based on this information, if the loan application is approved, the loan provider may either only send an acceptance pack to the applicant, or also send a home insurance quote. The process then continues with the verification of the repayment agreement.

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BPM

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ProcessMaker

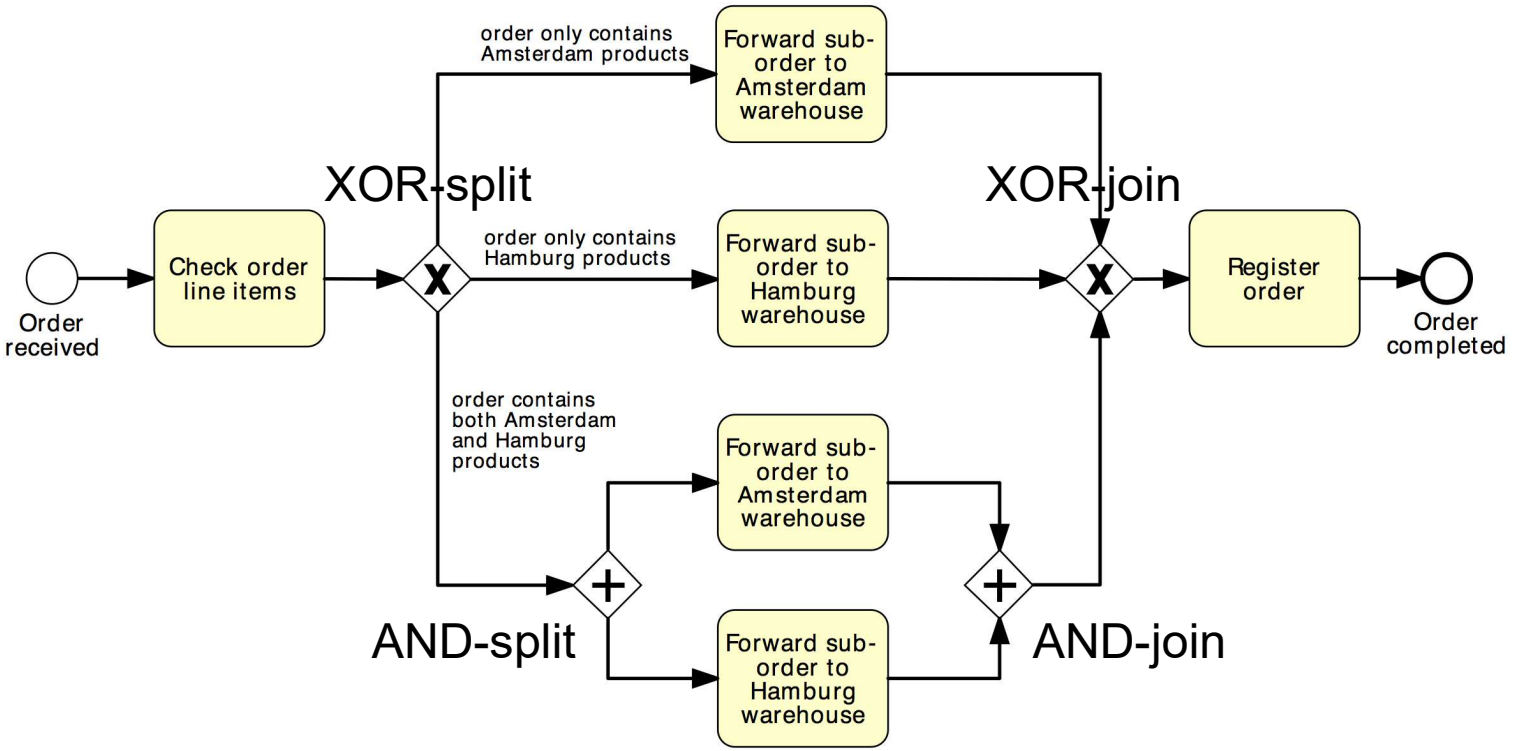
XOR / AND are not always what we need...

Order distribution process

A company has two warehouses, one in Amsterdam, the other in Hamburg, that store different products. When an order is received, it is distributed across these warehouses: if some of the relevant products are maintained in Amsterdam, a sub-order is sent there; likewise, if some relevant products are maintained in Hamburg, a sub-order is sent there. Afterwards, the order is registered and the process completes.

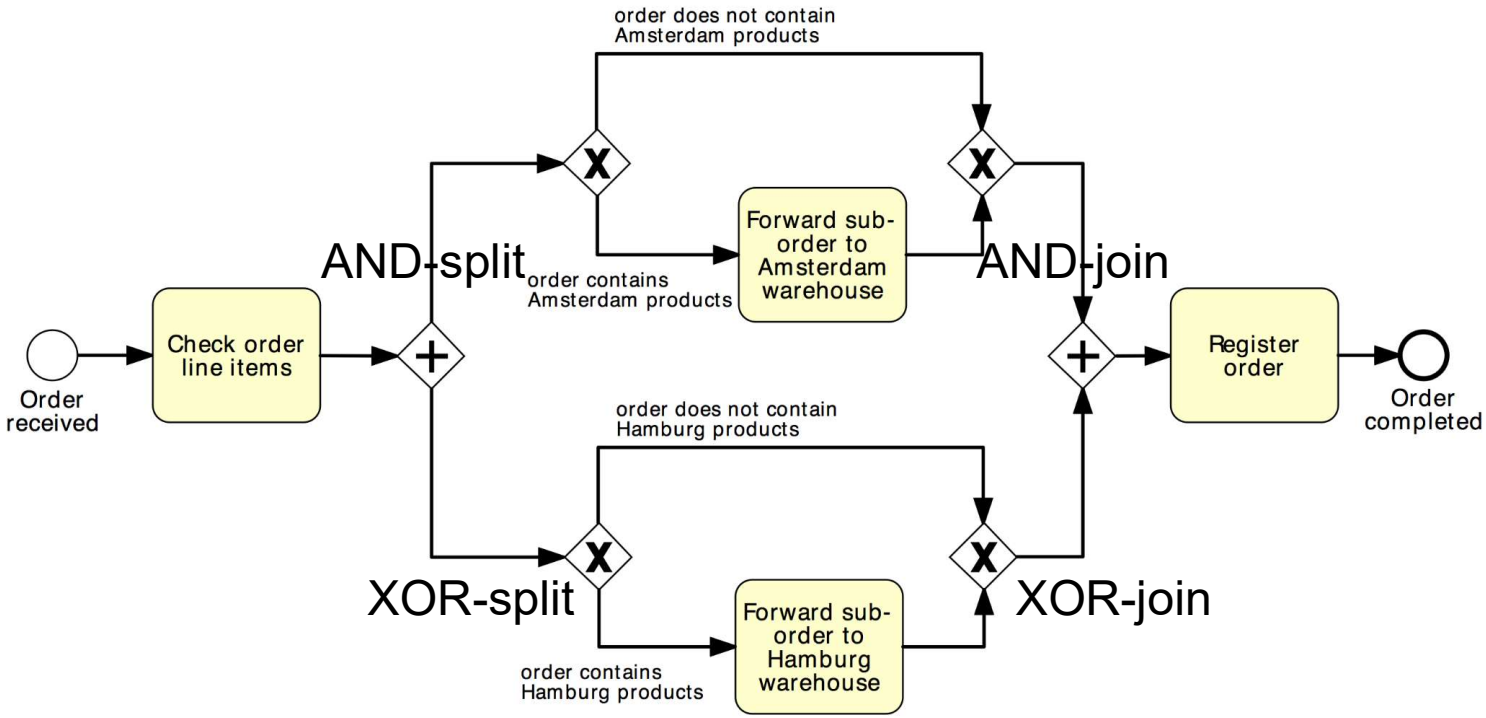
Solution 1

Order distribution process

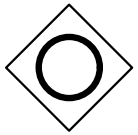


Solution 2

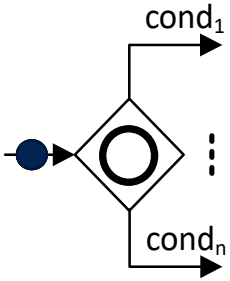
Order distribution process



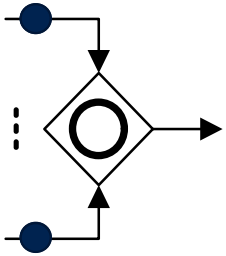
OR Gateway



An *OR Gateway* provides a mechanism to create and synchronize n out of m parallel flows.



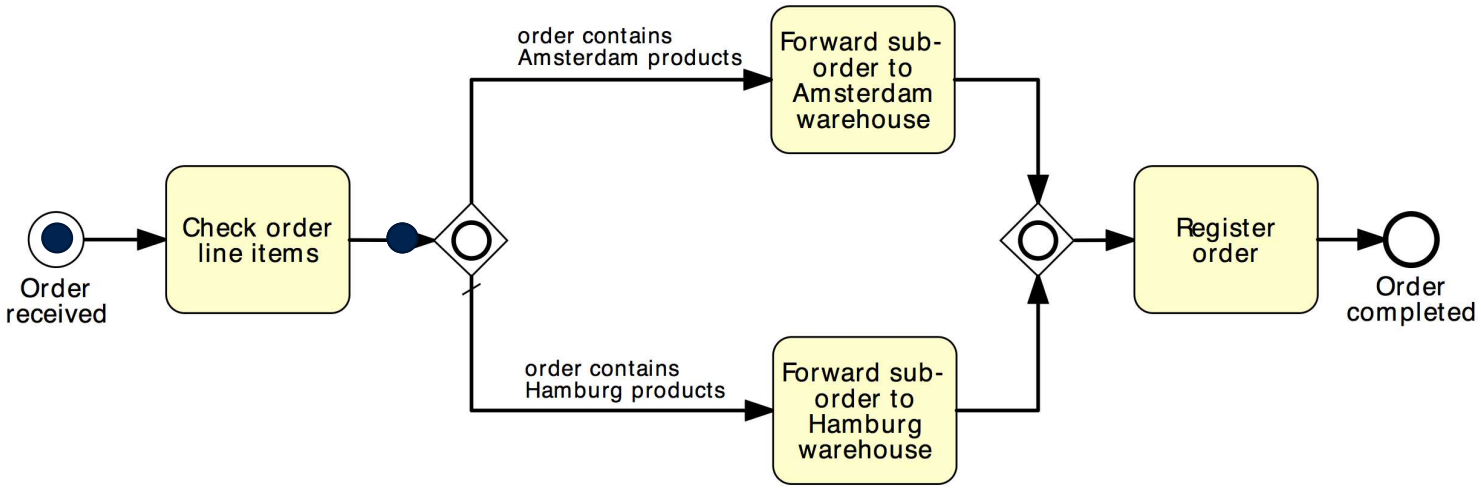
OR-split ➔ takes one or more branches depending on conditions



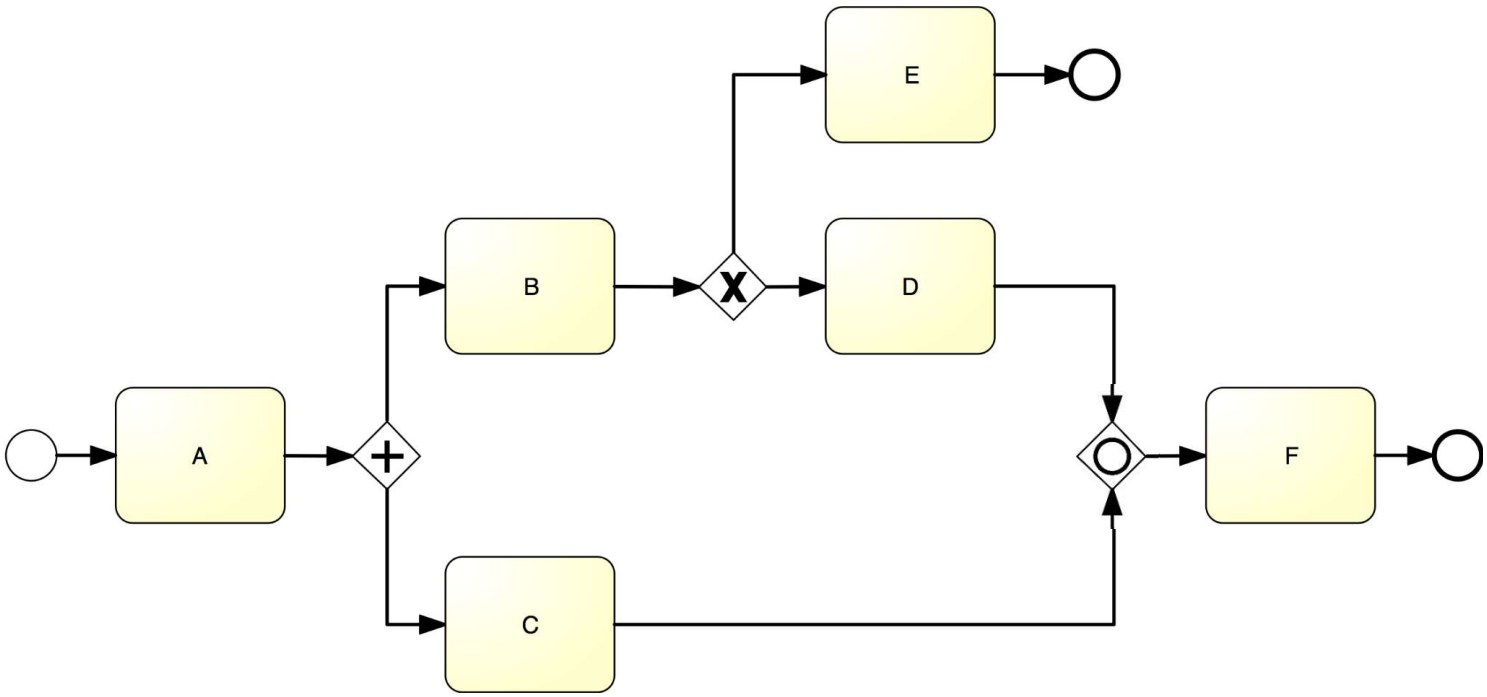
OR-join ➔ proceeds when all **active** incoming branches have completed

Solution using OR Gateway

Order distribution process



What join type do we need here?

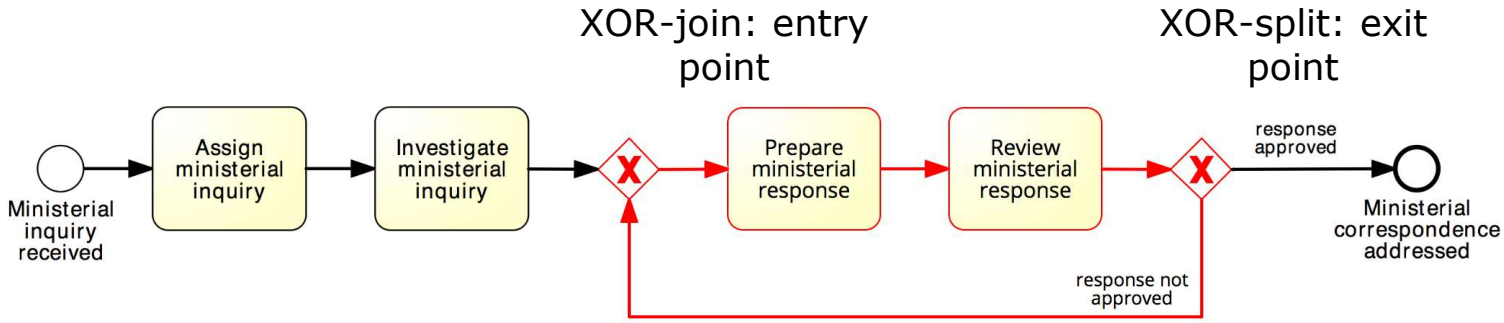


Rework and repetition

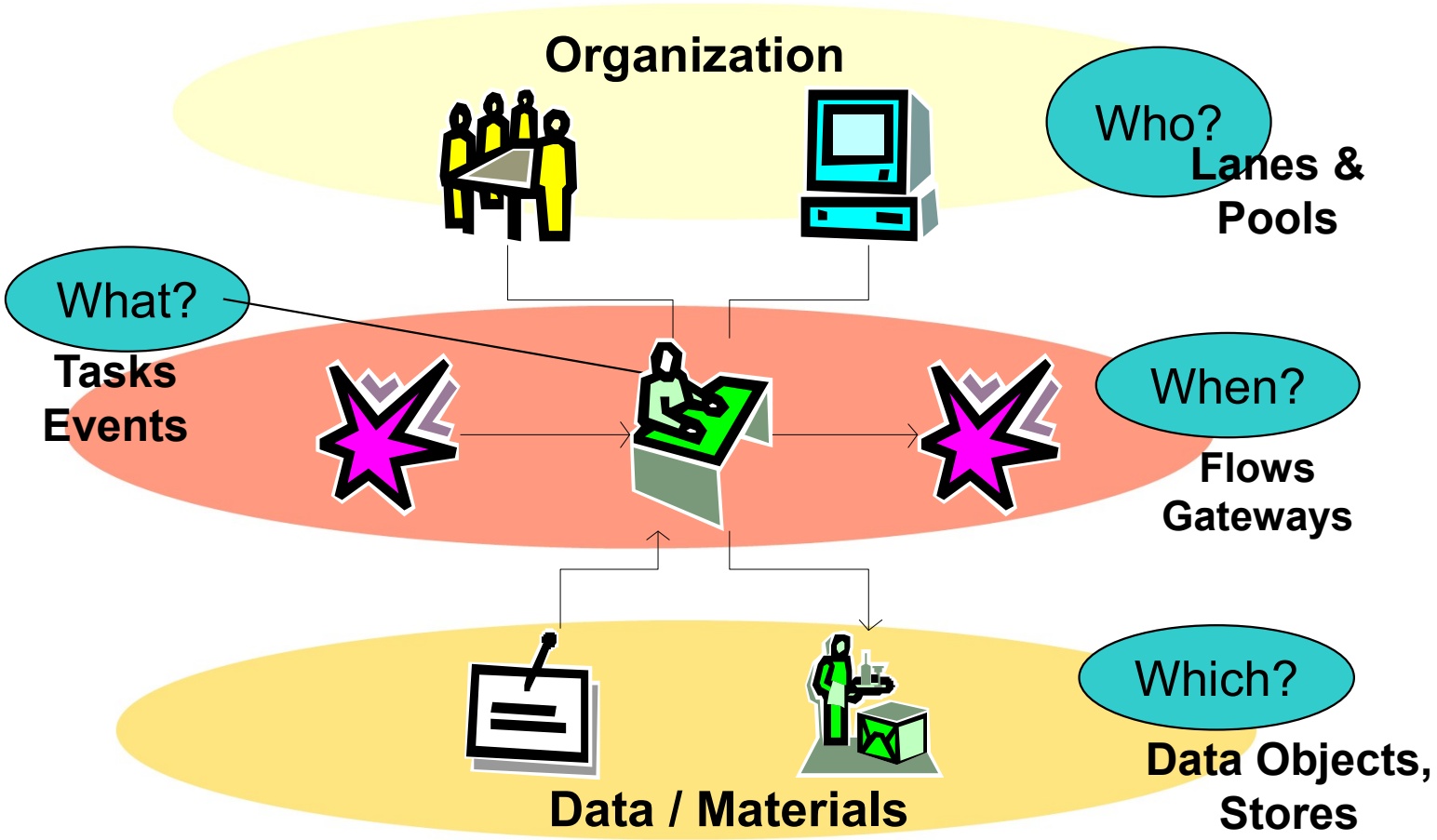
Address ministerial correspondence

In the treasury minister's office, once a ministerial inquiry has been received, it is registered into the system. Then the inquiry is investigated so that a ministerial response can be prepared.

The finalization of a response includes the preparation of the response itself by the cabinet officer and the review of the response by the principal registrar. If the registrar does not approve the response, the latter needs to be prepared again by the cabinet officer for review. The process finishes only once the response has been approved.



Process Modelling Viewpoints



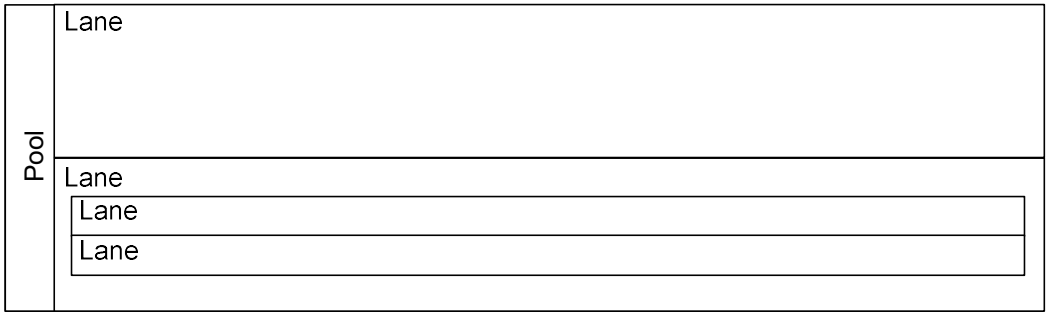
BPMN Elements – Pools & Lanes

Pool

- Captures a resource class.
- Generally used to model a business party (e.g. a whole company)

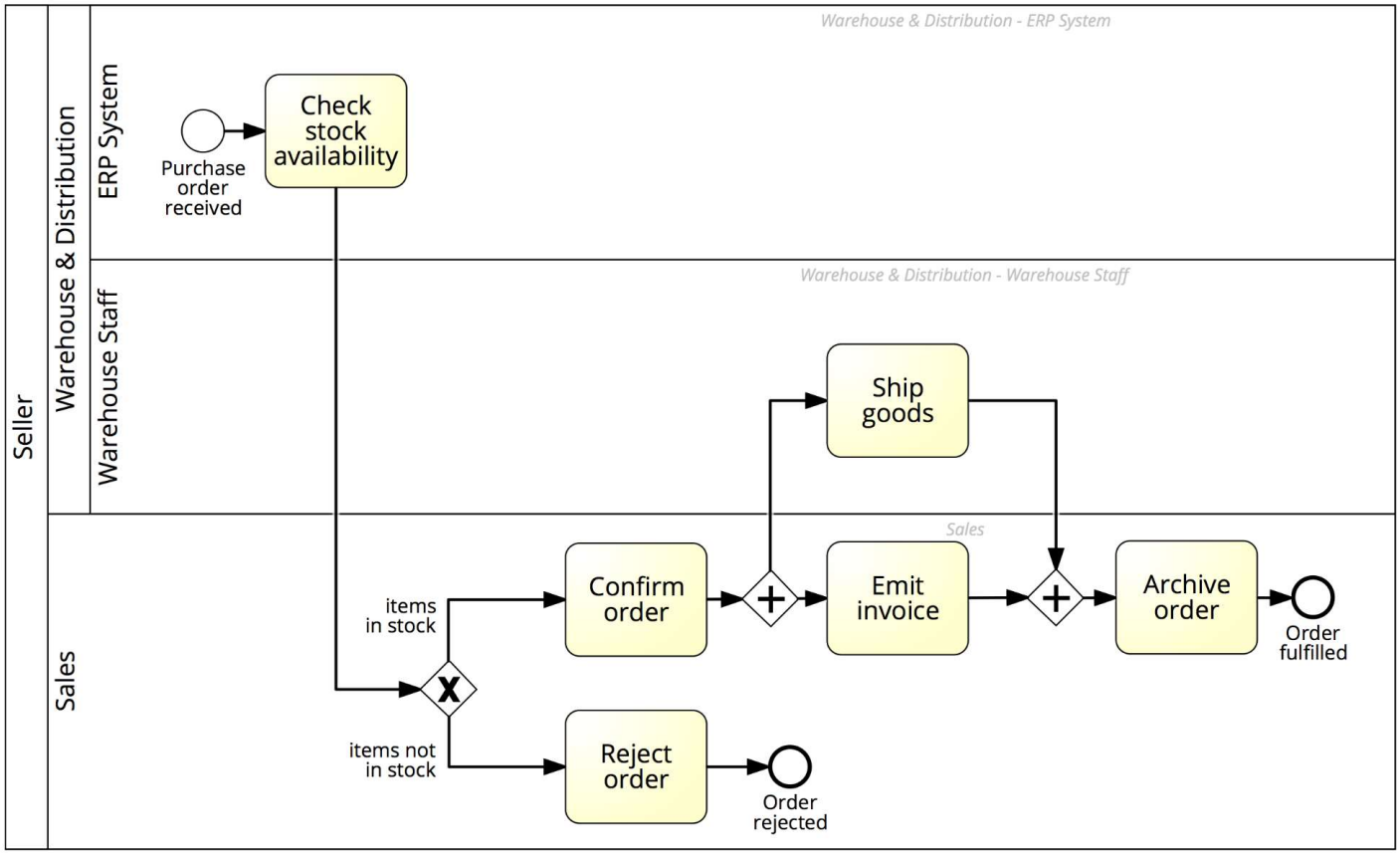
Lane

- Captures a *resource sub-class* within a resource class by partitioning a pool.
- Generally used to model departments (e.g. shipping, finance), internal roles (e.g. Manager, Associate), software systems (e.g. DBMS, CRM) or equipment (e.g. Manufacturing plant)



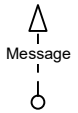
Solution: Order-to-cash

Interaction between resource sub-classes



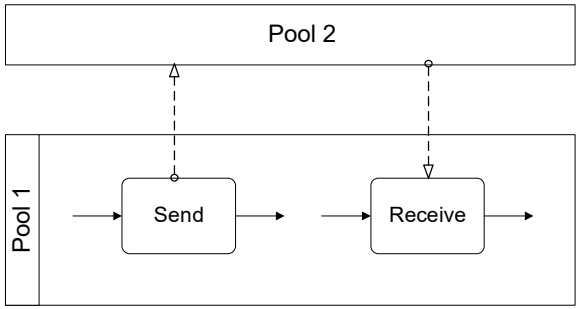
BPMN Elements – Message Flow

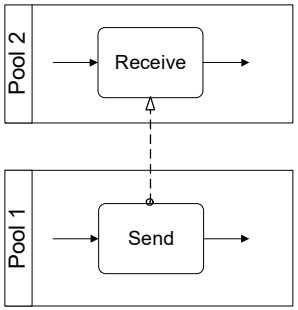
A *Message Flow* represents a flow of information or materials between two process parties (Pools)



A Message Flow can connect:

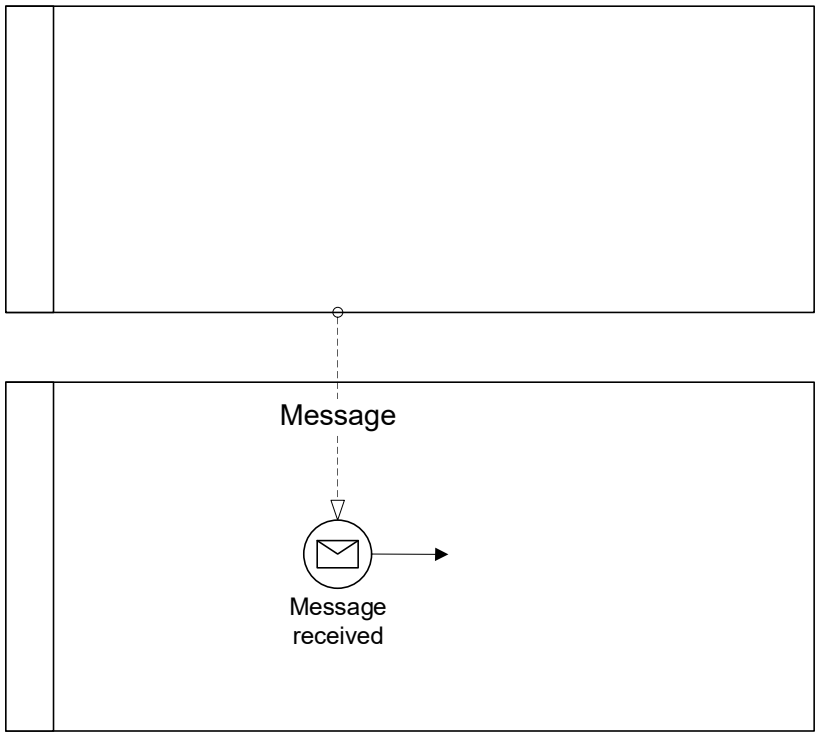
- directly to the boundary of a Pool ➔ captures a message to/from that party
- to a specific activity or event within that Pool ➔ captures a message that triggers a *specific* activity/event within that party





BPMN Elements – Start Message Event

The *start message event* triggers a process by the receipt of a message when an incoming message flow is connected to the event



Solution: Order-to-cash