

Process modeling II

PV207 – Business Process Management
Spring 2022

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Last lecture recap

- Why process modeling?

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- Why process modeling?
- BPMN L1, L2, L3

Last lecture recap

- Why process modeling?
- BPMN L1, L2, L3
- Quality aspects of process model

Last lecture recap

- Why process modeling?
- BPMN L1, L2, L3
- Quality aspects of process model
- Process interactions
 - Private process
 - Abstract process (Black box/Collapsed Pool)
 - Collaboration (Global) process

Last lecture recap

- 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
- Link Event Pair

Lecture overview

- Information sources
- From L1 to L2
- L2: timing precision
- BPMN 2.0 Level 2:
 - Subprocess
 - Activity call
 - **Events**
 - Messages
 - Signals
 - Errors
 - Escalations
 - Gateways
 - BPMN 2.0
summary

Information sources

- **BOOK: BPMN method and style / Bruce Silver**
 - ISBN:9780982368107, Library FI, Amazon 33\$
- **BPMN 2.0 poster**
 - http://www.bpmb.de/images/BPMN2_0_Poster_EN.pdf
- **Signavio modeler – academic licence**
 - <http://academic.signavio.com/p/login>
- **BPMN official OMG website**
 - <http://www.bpmn.org>

BPMN 2.0: from L1 to L2

- Level 1
 - Flowcharting
 - Business experts \Leftrightarrow analysts/developers
 - The goal is to express simple activity sequences
 - Minimum of nesting and interprocess interactions
 - Simple events only
- Level 2
 - Analytical BPMN model
 - Process analysts \Leftrightarrow Process developers
 - Precise activity execution timing
 - Subprocess nesting and interprocess interactions
 - Events and signals, exception handling

Level 2: timing precision

- Each activity has exact start and completion
- Service task
 - Starts immediately when reached
 - Being performed immediately and completed
- User task
 - Starts immediately when reached
 - Being performed once user open it in a "worklist" = task "claim"

Activity states

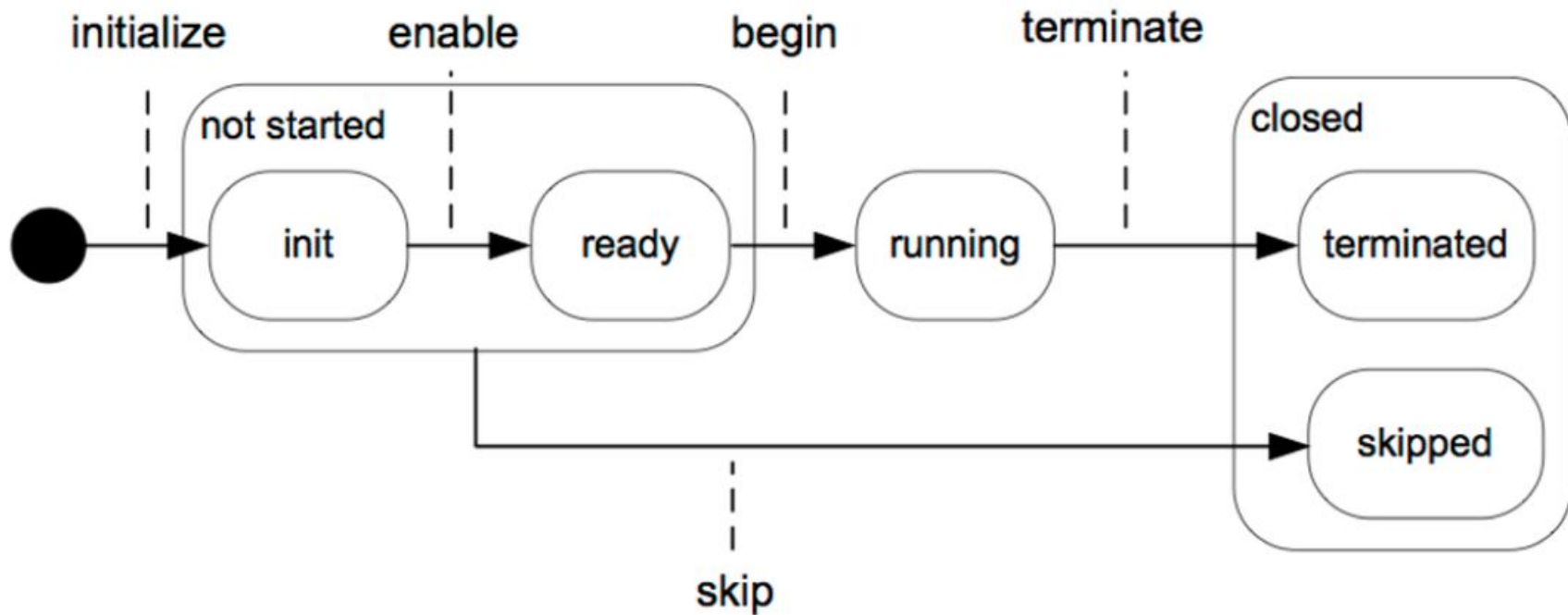
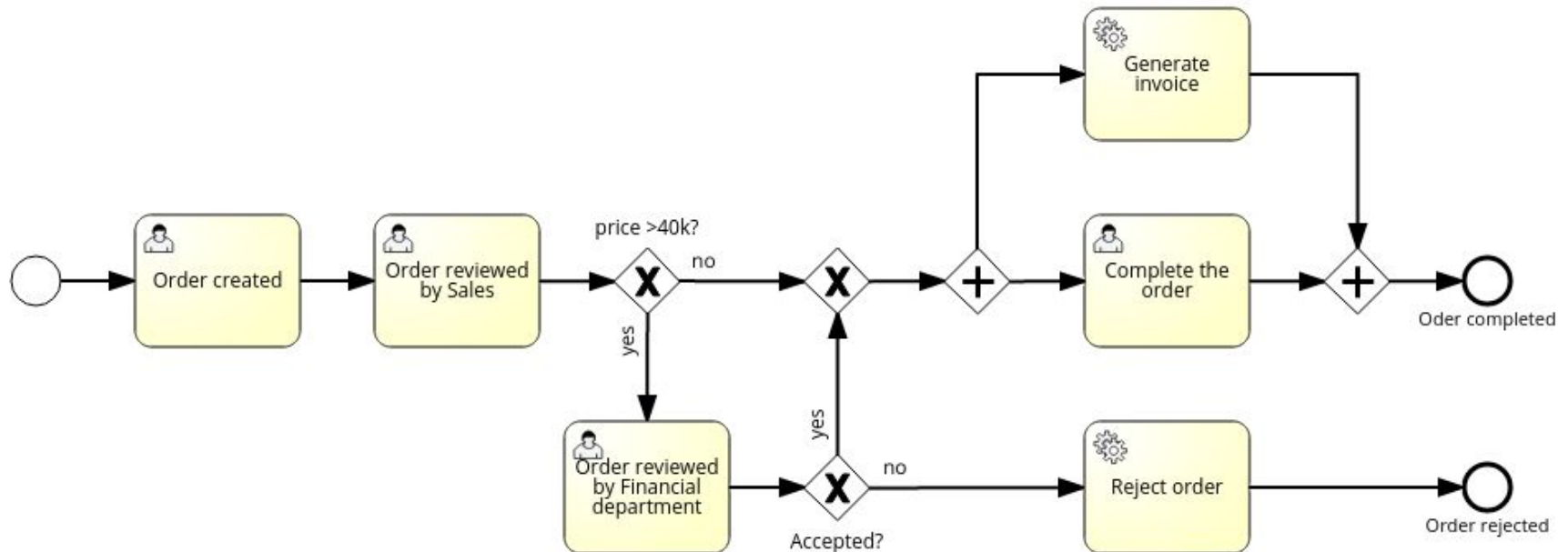


Fig. 3.9. State transition diagram for activity instances

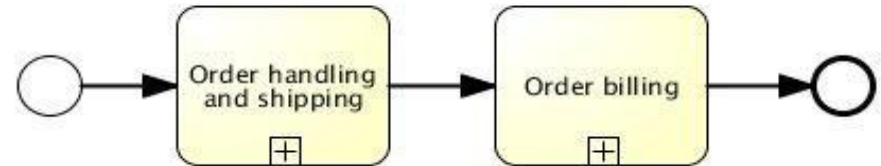
Level 2: timing precision example



Subprocess vs Call activity

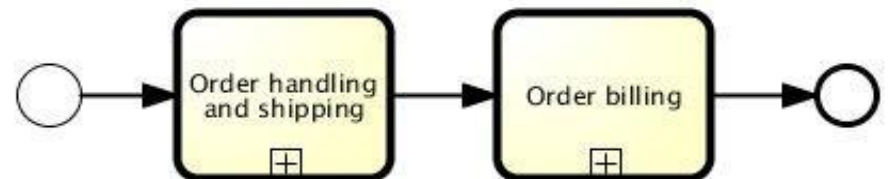
- Subprocess

- Expandable (nested) part of the process
- Defined inside process
- Nested for better readability



- Activity call

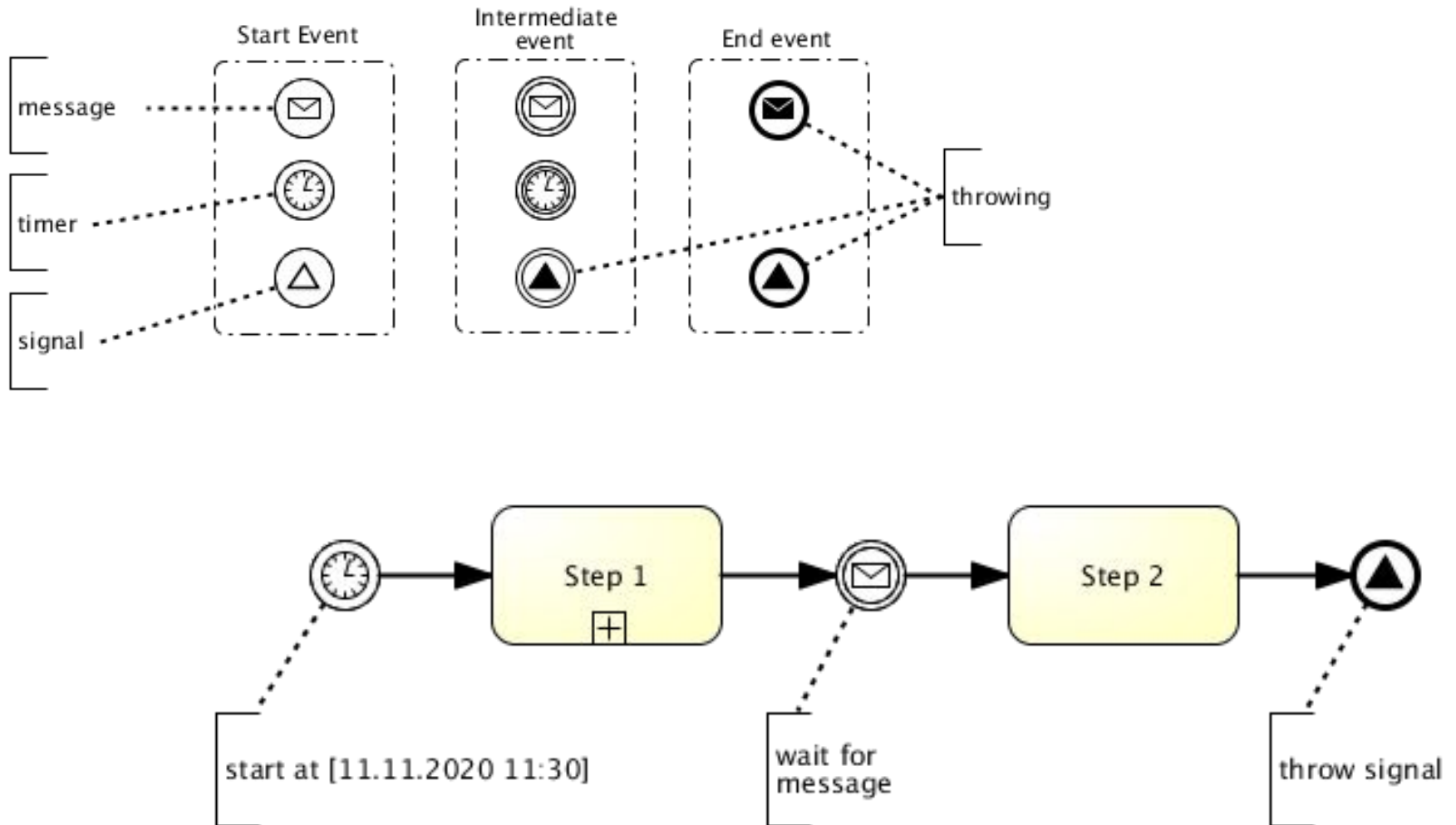
- Call of global task or process
- Defined as a separate process, then imported
- Reusable in other processes



Event types: Basic types

- **Start events**
 - Event initiate process/subprocess
 - One (or more in special cases)
 - Always catching
- **Intermediate events**
 - Occur during process
 - Can be throwing or catching
- **End events**
 - Occur at the end of process flow
 - Always throwing
 - End affect only one branch (except Terminate)

Event types - Examples



Events

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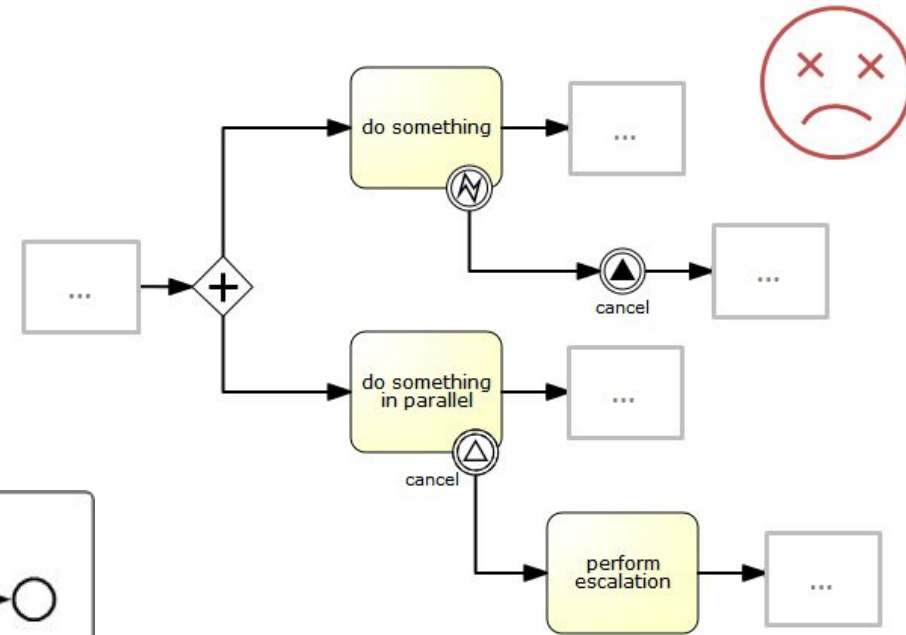
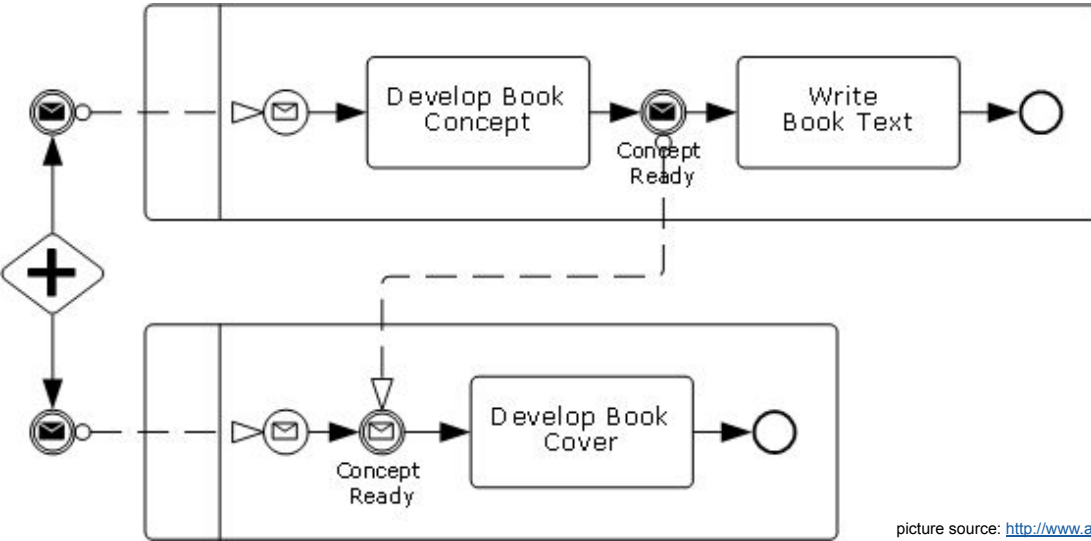
<http://frapu.de/blog/index.php?m=07&y=09&d=01&entry=entry090701-211320>

Events

	Start		Intermediate			End	
	Top-Level	Event Sub-Process Interrupting	Event Sub-Process Non-Interrupting	Catching	Boundary Interrupting	Boundary Non-Interrupting	Throwing
None: Untyped events, indicate start point, state changes or final states.							
Message: Receiving and sending messages.							
Timer: Cyclic timer events, points in time, time spans or timeouts.							
Escalation: Escalating to an higher level of responsibility.							
Conditional: Reacting to changed business conditions or integrating business rules.							
Link: Off-page connectors. Two corresponding link events equal a sequence flow.							
Error: Catching or throwing named errors.							
Cancel: Reacting to cancelled transactions or triggering cancellation.							
Compensation: Handling or triggering compensation.							
Signal: Signalling across different processes. A signal thrown can be caught multiple times.							
Multiple: Catching one out of a set of events. Throwing all events defined							
Parallel Multiple: Catching all out of a set of parallel events.							
Terminate: Triggering the immediate termination of a process.							

Event types: Catching vs. Throwing

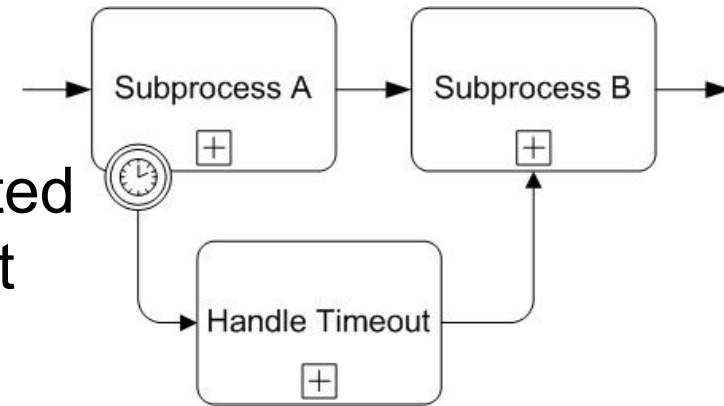
- Throwing
 - Emits the event
 - Flow continues immediately
- Catching
 - Catch the event
 - Flow waits for the event



Event types: Interrupting vs non-interrupting

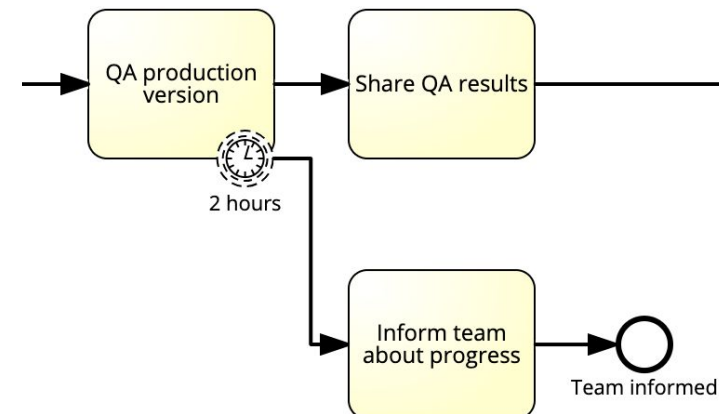
- **Interrupting**

- Standard process flow is interrupted
- Flow is directed through the event

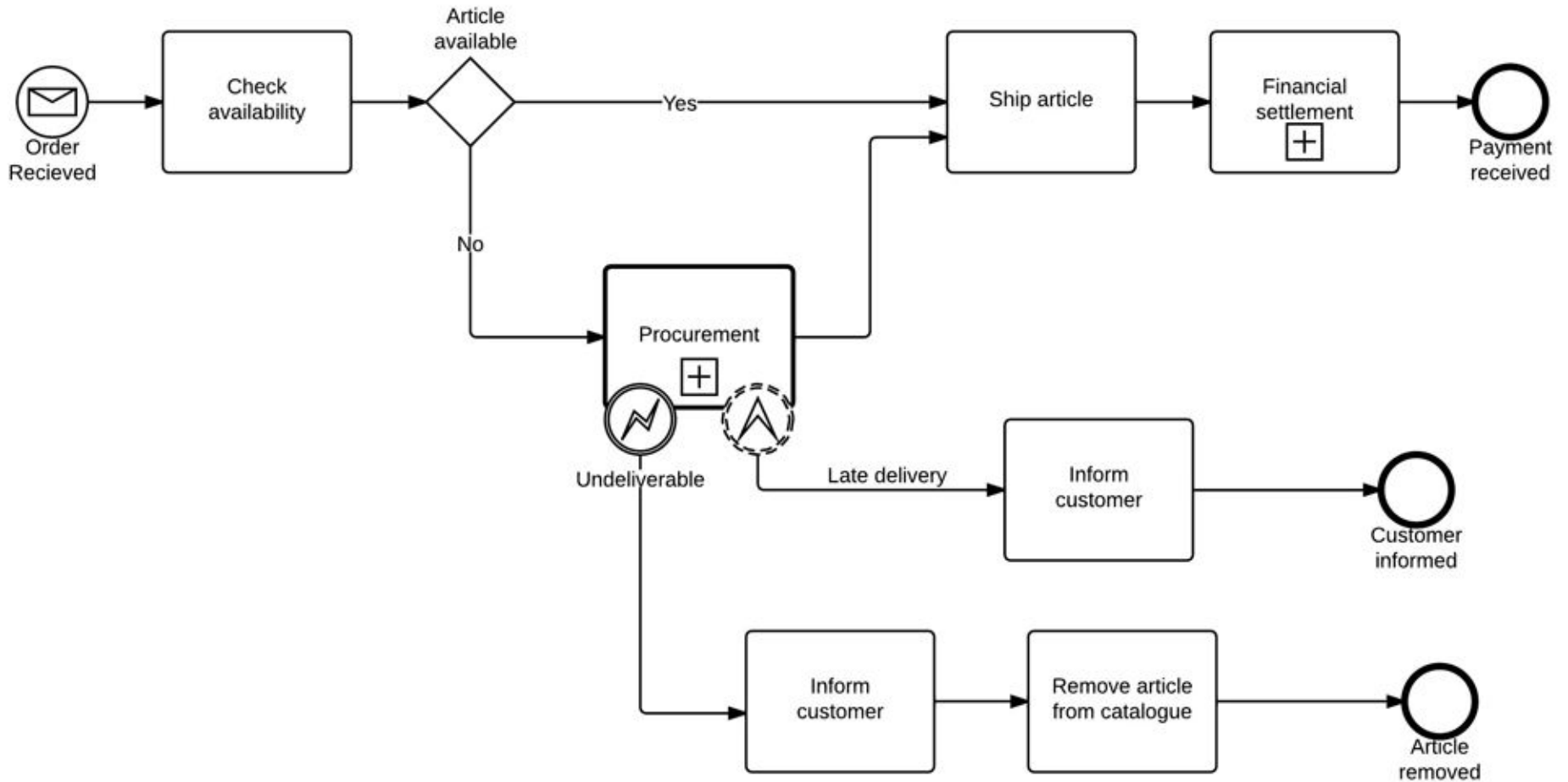


- **Non-interrupting**

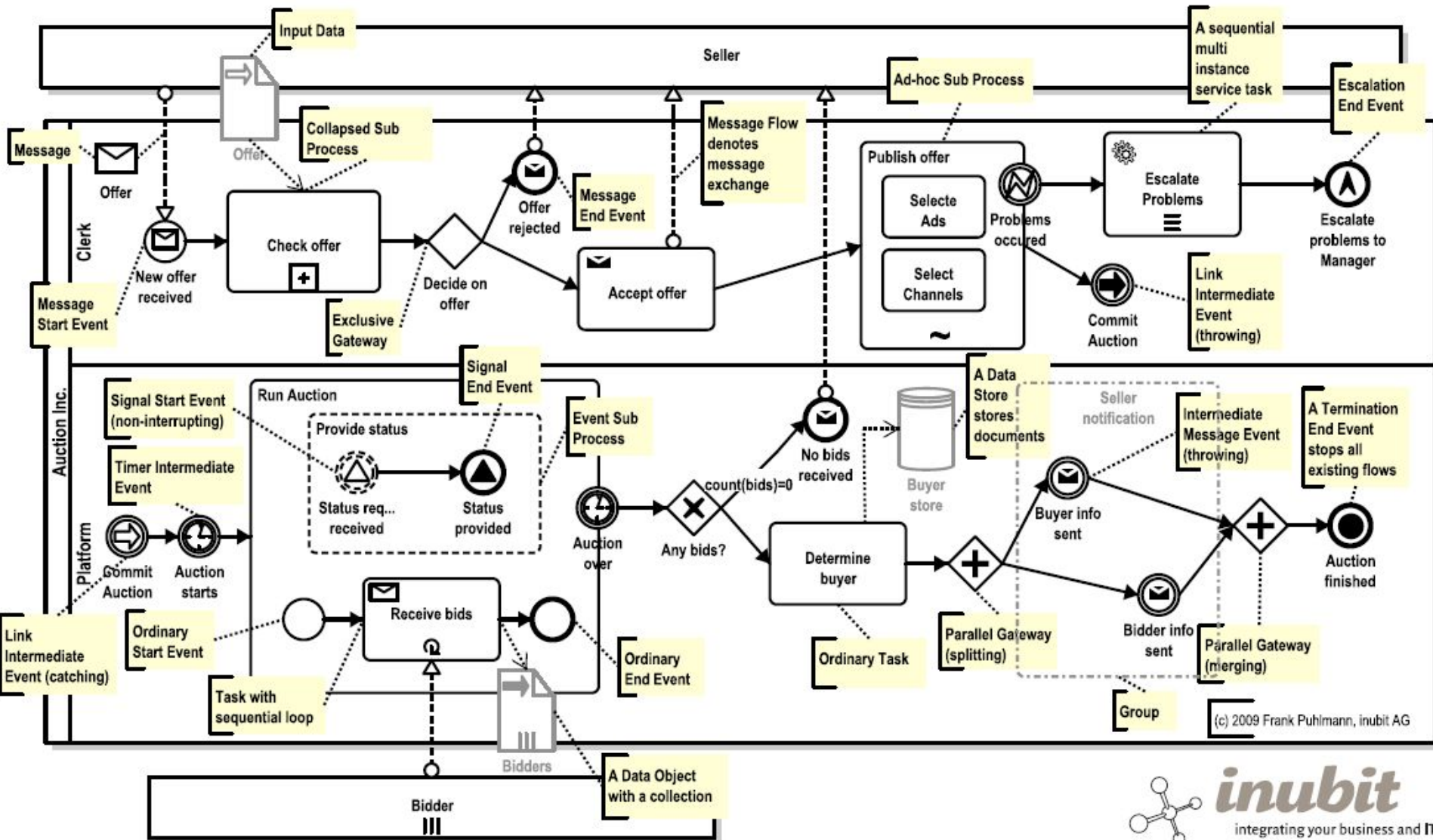
- Standard flow continues normally
- Parallel flow is directed through the event



Event types: Interrupting vs non-interrupting



Break 10mins



Events

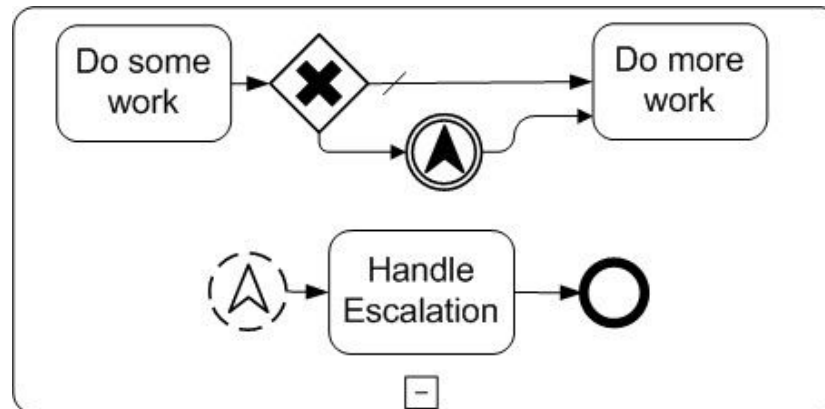
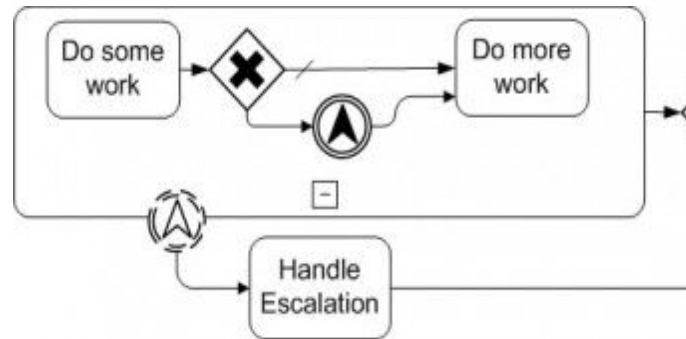
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Event types: Boundary vs. in-flow (event subprocess)



Events

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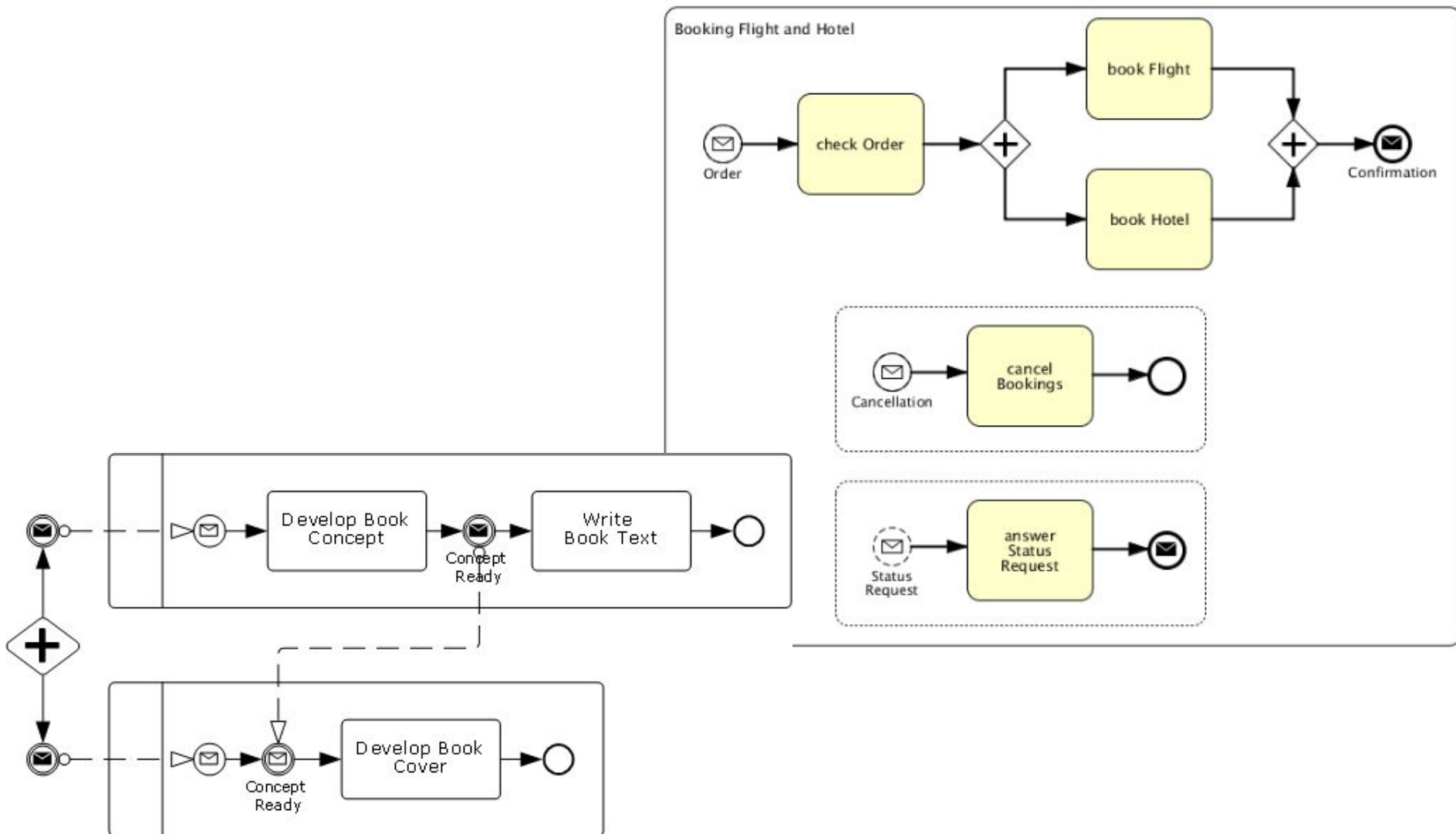
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Event semantics: Messages

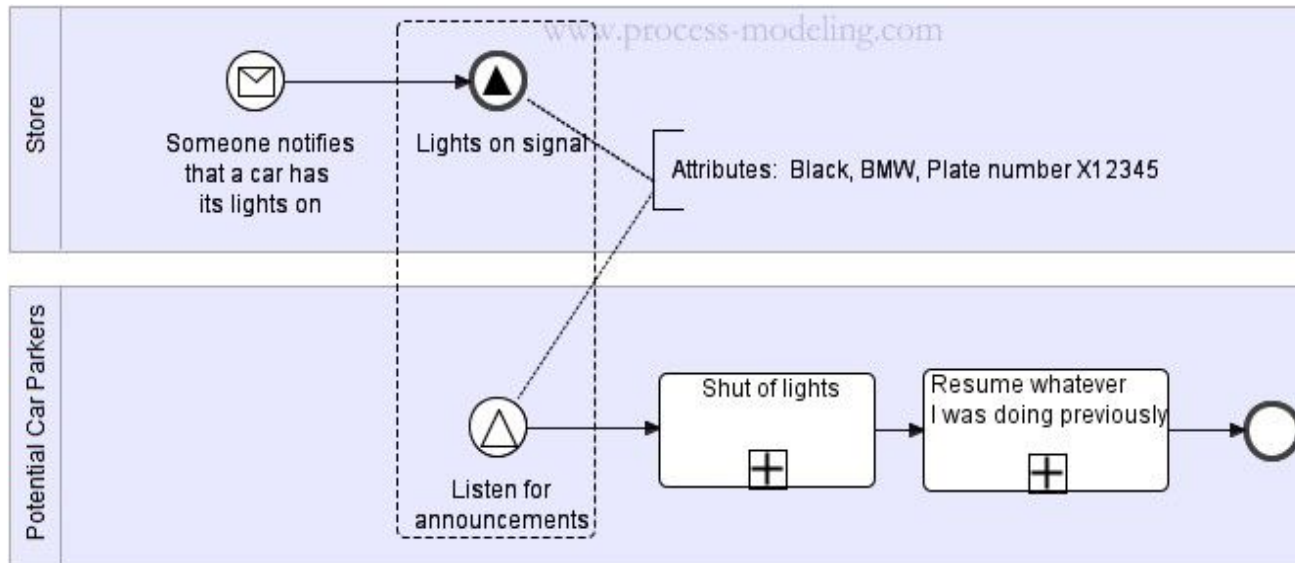
- Message represents a message send by external entity ~ Pool
 - Messaging is for interprocess communication
 - Inside the process use sequence flow instead
- Message does not have to be JMS, SOAP etc. but it can be fax, mail, SMS etc.
- A Message can be received and start process
- A message can occur as intermediate event
- A message can be sent at the end of process

Event semantics: Message - examples



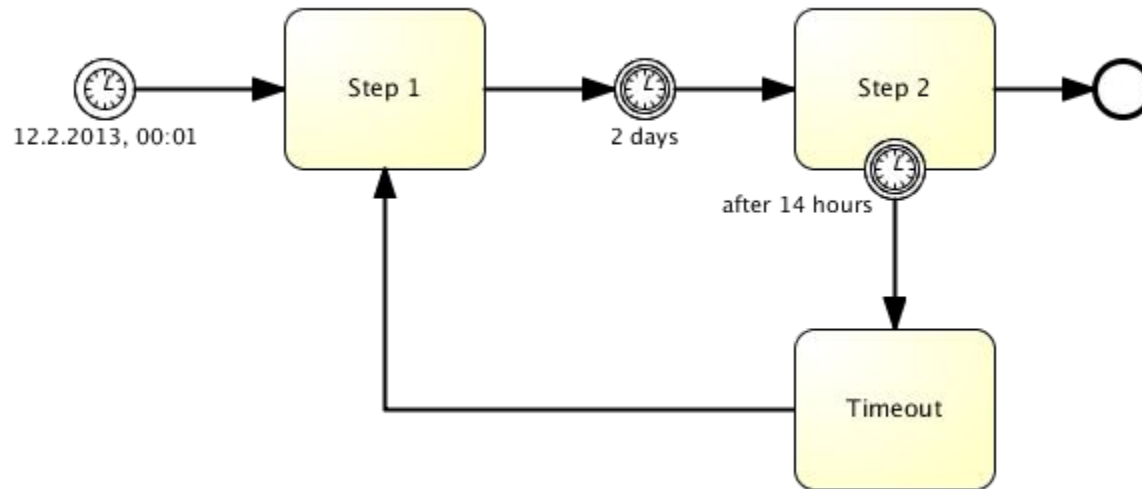
Event semantics: Signals

- Signal is similar to message, except
 - **Is not** addressed to any particular consumer
 - Entity producing signal does not “care” who is listening
 - Many instances of the same process can consume it
 - Good for loosely coupled communication
 - Signals are used often inside one process, messages not



Event semantics: Timer

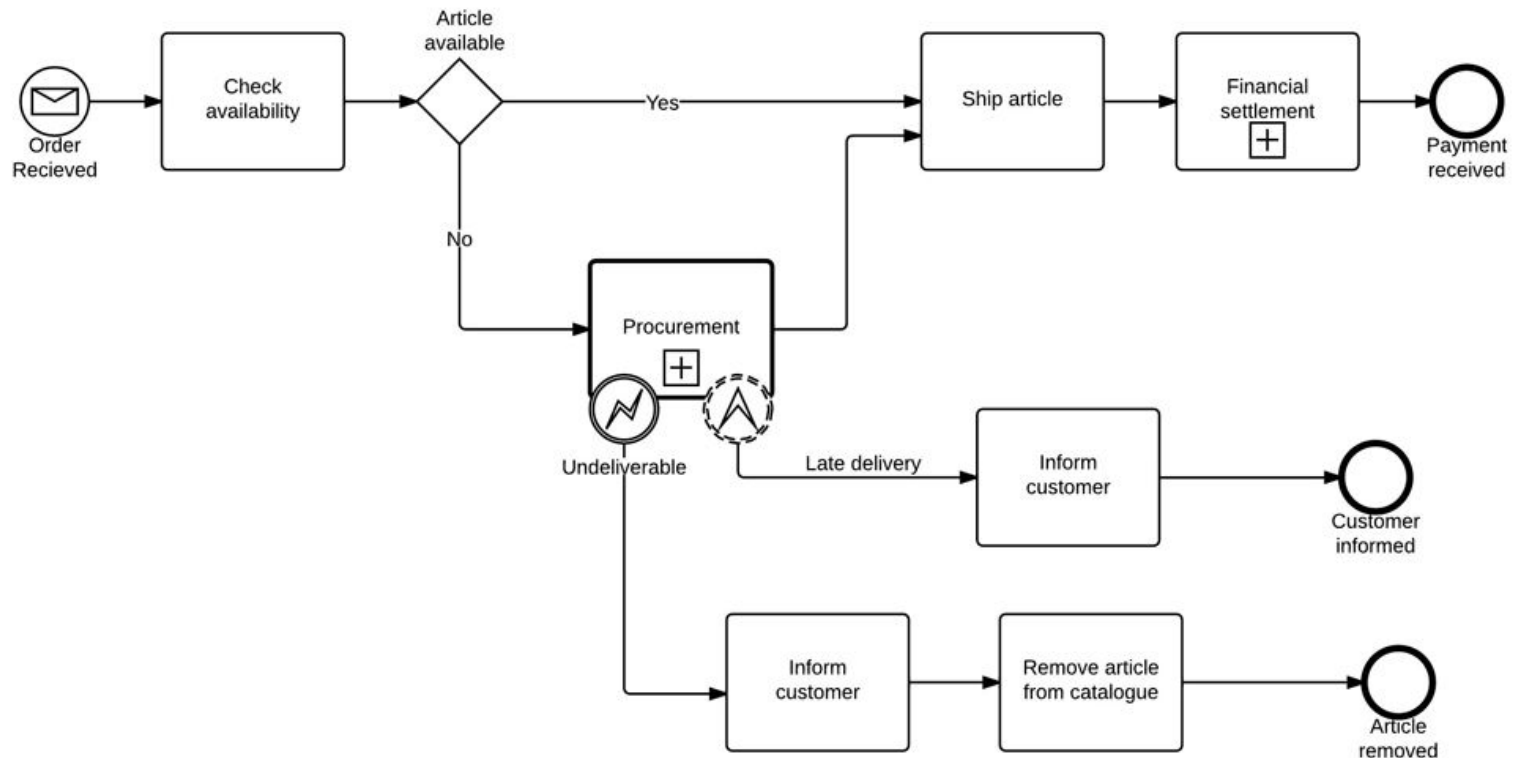
- Cyclic events
- Points in time
- Timeouts



Event semantics: Escalations

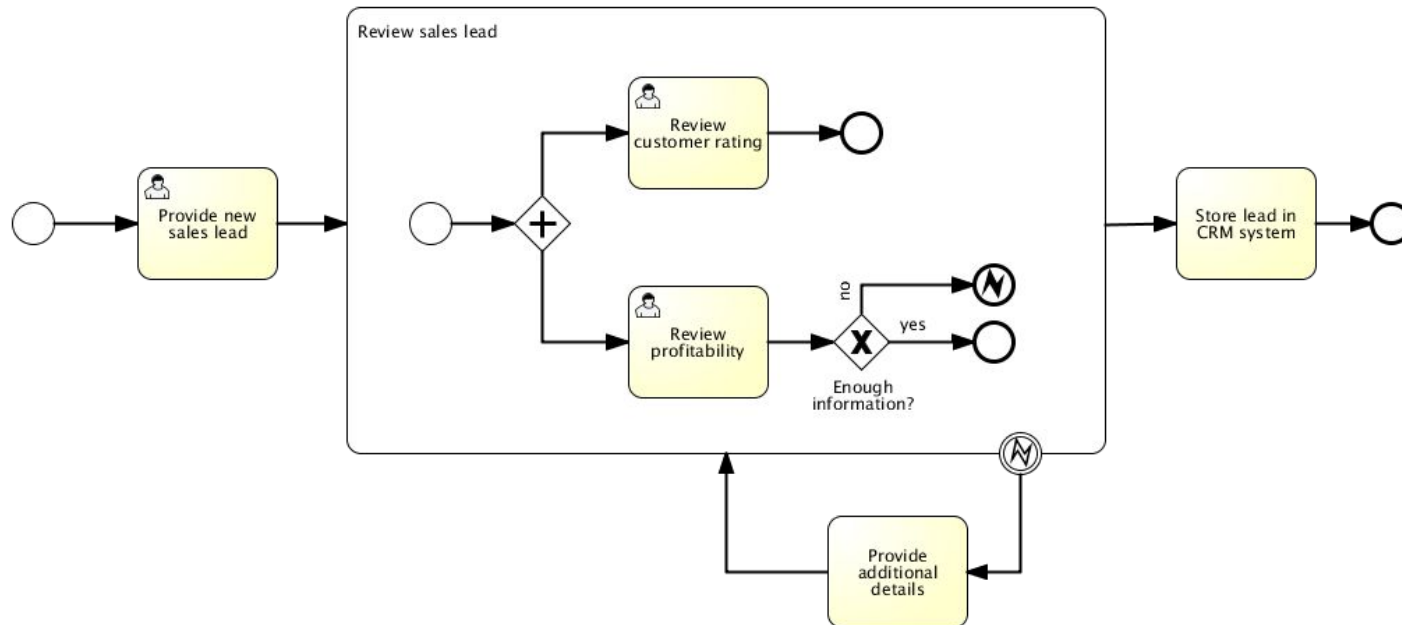


- Handling unusual but **expected** behaviour
 - Corrective actions (interrupting)
 - Additional steps to be done in parallel (non-interrupting)

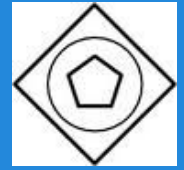


Event semantics: Errors

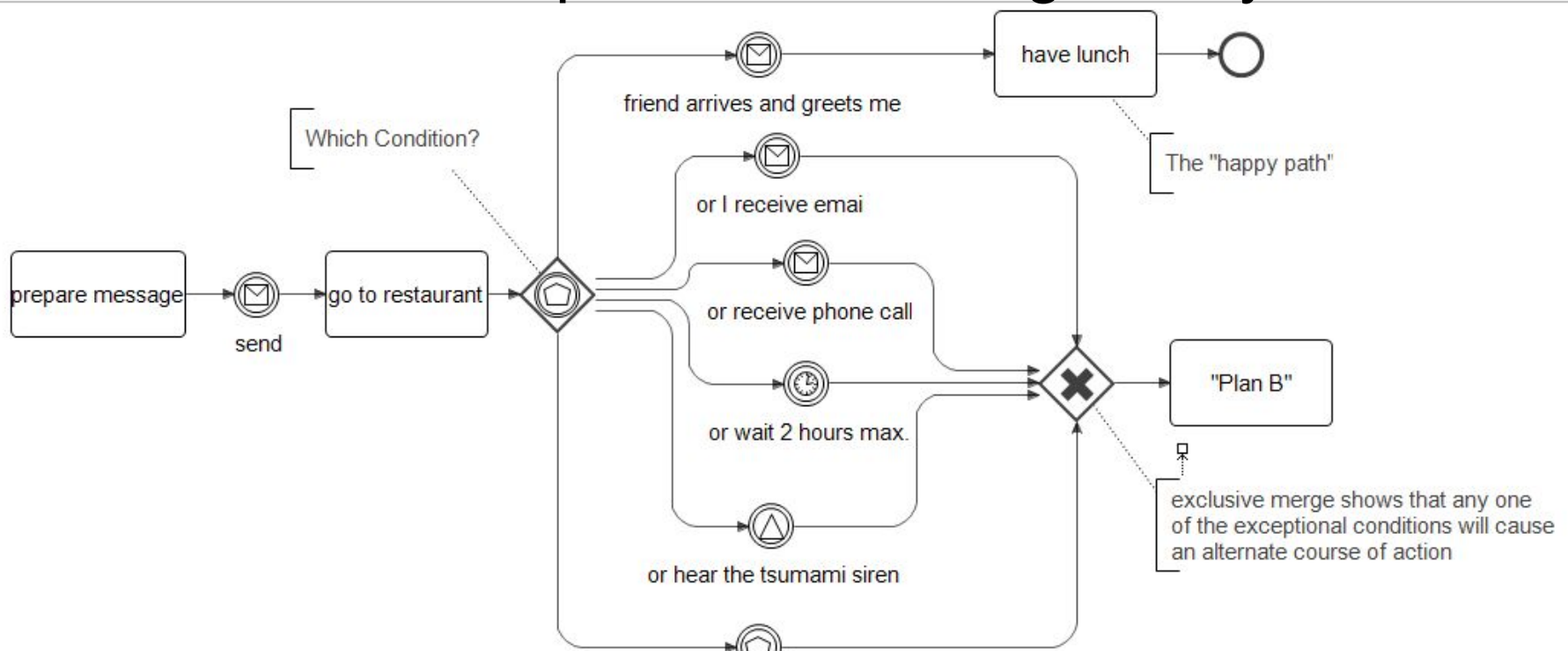
- Used for **serious** problem in process
- Throw - catch mechanism
 - Always interrupting
 - Always boundary event
- There should be some **error handling actions**



Event-based gateway



- Event-based gateway
 - Branching based on event, only one triggered
 - Different semantics – branched according to event that is placed after the gateway



Multi-instance and Loop activity

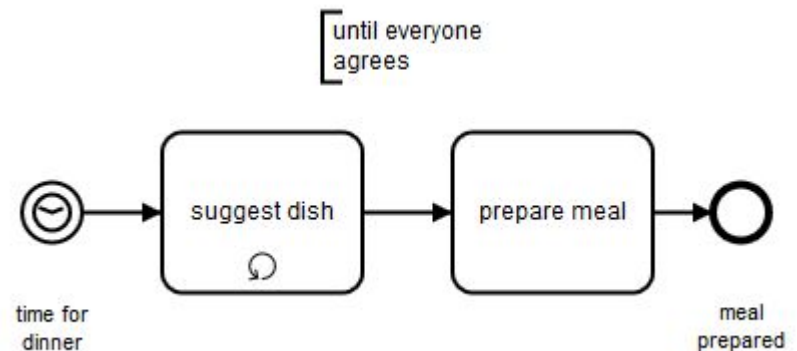
- Multi-instance

- Shortcut for a number (dynamically defined) of the same activities that run in parallel or in series.

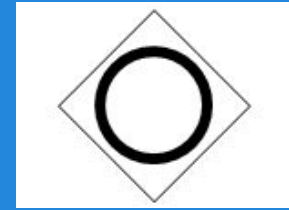


- Loop

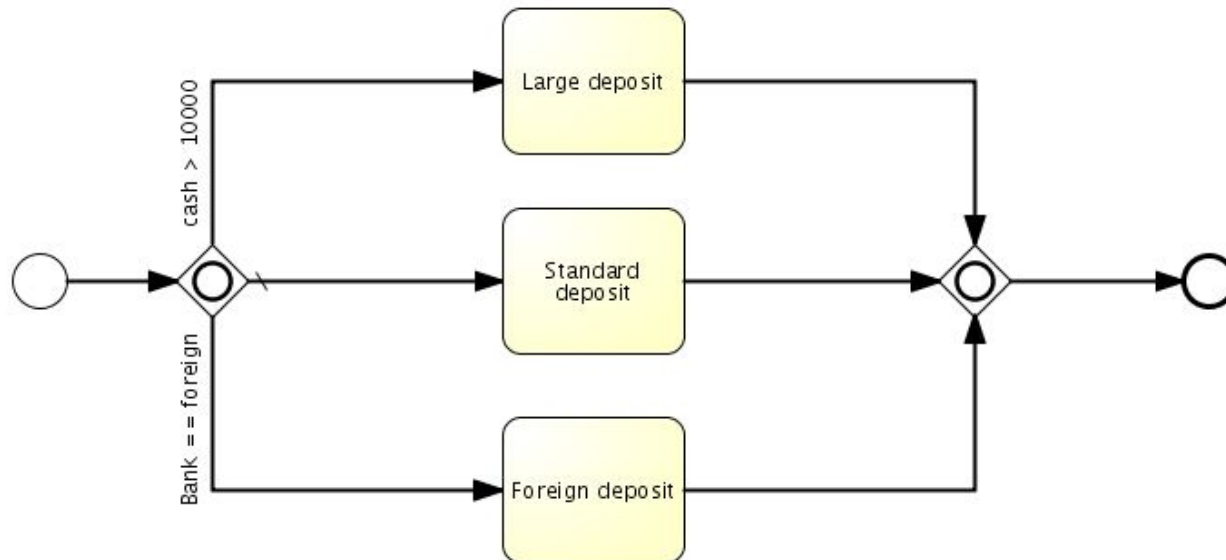
- Shortcut for a repeating one activity until a condition is met.



Recap: Inclusive OR-gateway



- One or more branches can be performed
- Depends on conditions
- Branches performed in parallel
- Waiting for all **activated** branches

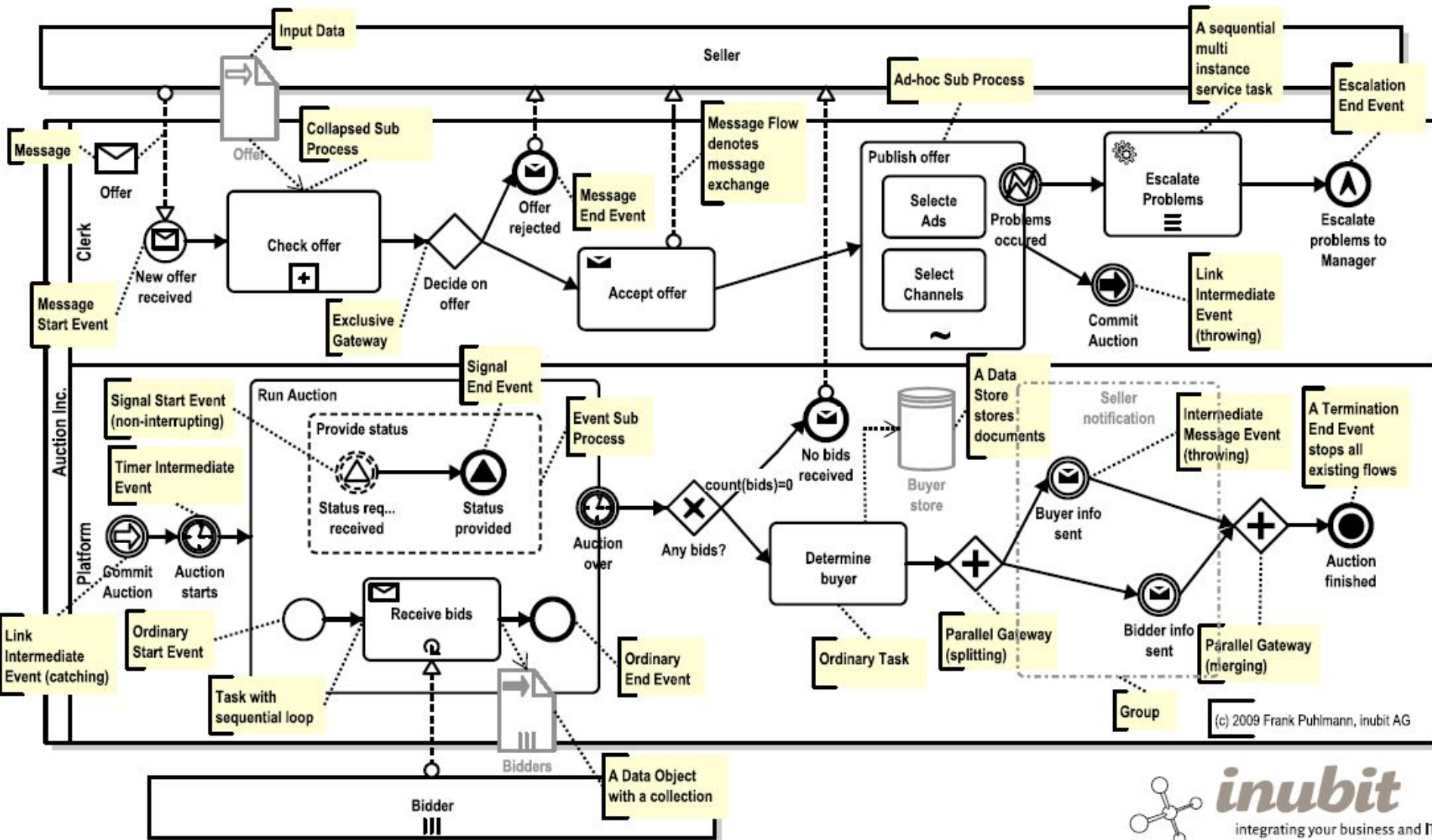


What is in not covered here

- Transactional events
 - Compensations
 - Cancellations events
 - Rollbacks
- Other diagrams covered in BPMN 2.0 specs
 - Choreography diagrams
 - Conversation diagrams

BPMN L2 summary

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FIN

Questions?

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