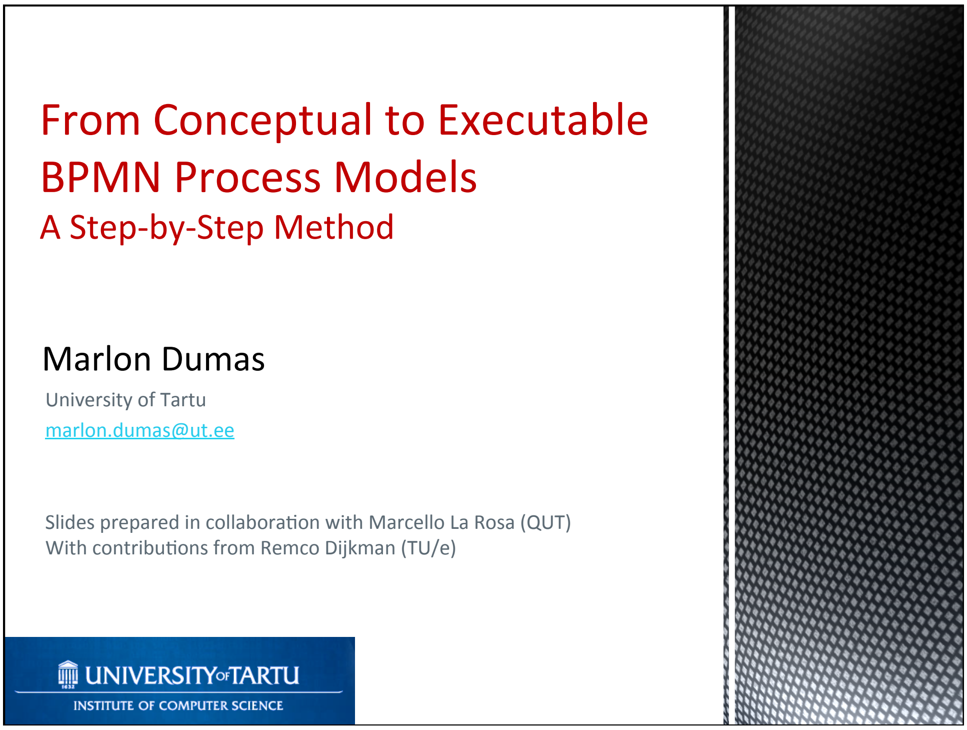

From Conceptual to Executable BPMN Process Models

A Step-by-Step Method

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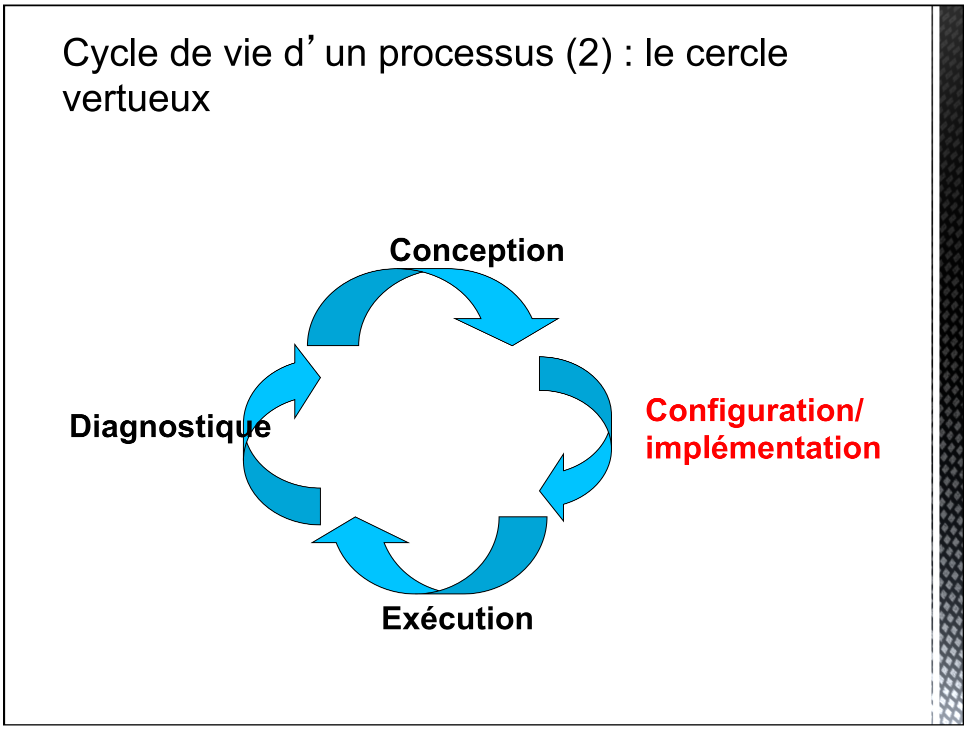
Slides prepared in collaboration with Marcello La Rosa (QUT)
With contributions from Remco Dijkman (TU/e)

UNIVERSITY OF TARTU
INSTITUTE OF COMPUTER SCIENCE



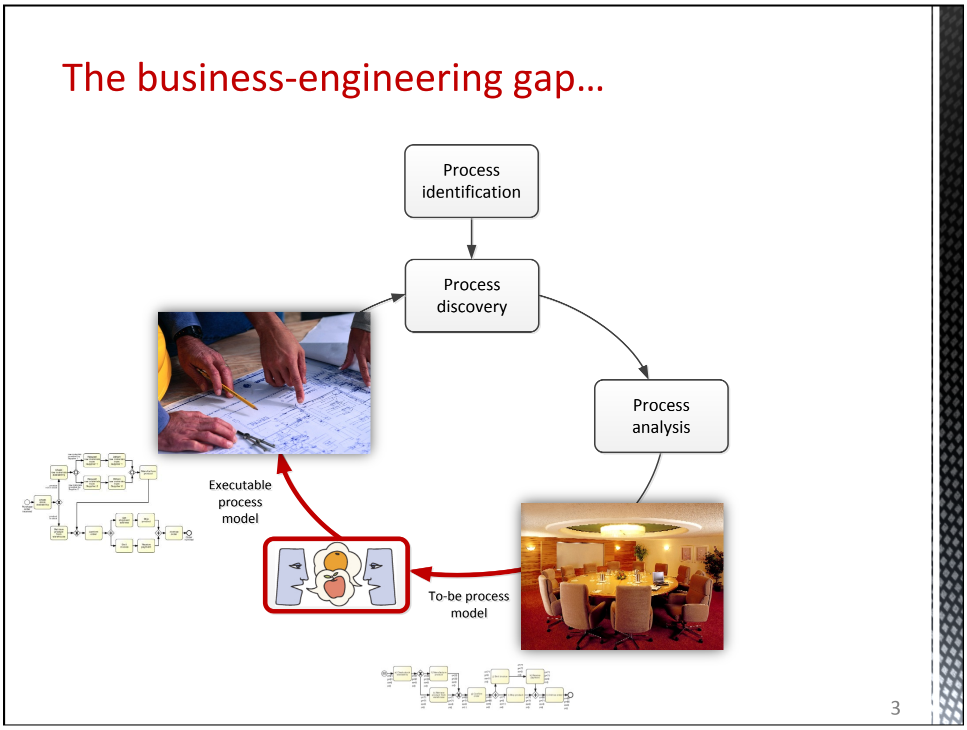
Cycle de vie d'un processus (2) : le cercle vertueux

Conception

Configuration/ implémentation

Exécution

Diagnostique



The business-engineering gap…

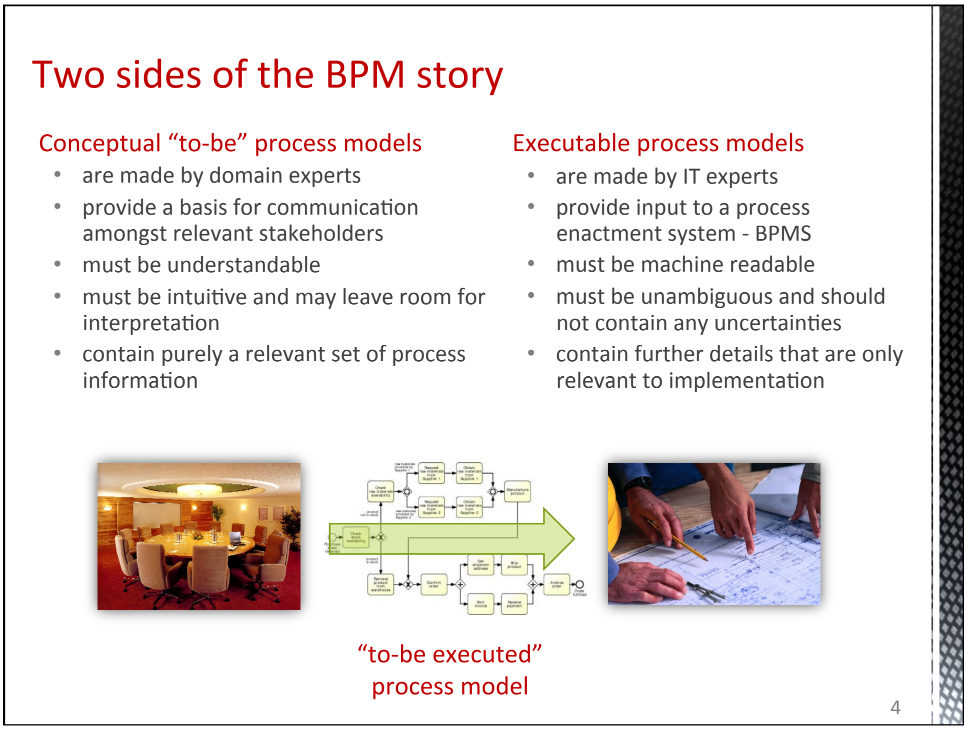
Process identification

Process discovery

Process analysis

To-be process model

Executable process model



Two sides of the BPM story

Conceptual "to-be" process models

- are made by domain experts
- provide a basis for communication amongst relevant stakeholders
- must be understandable
- must be intuitive and may leave room for interpretation
- contain purely a relevant set of process information

Executable process models

- are made by IT experts
- provide input to a process enactment system - BPMS
- must be machine readable
- must be unambiguous and should not contain any uncertainties
- contain further details that are only relevant to implementation

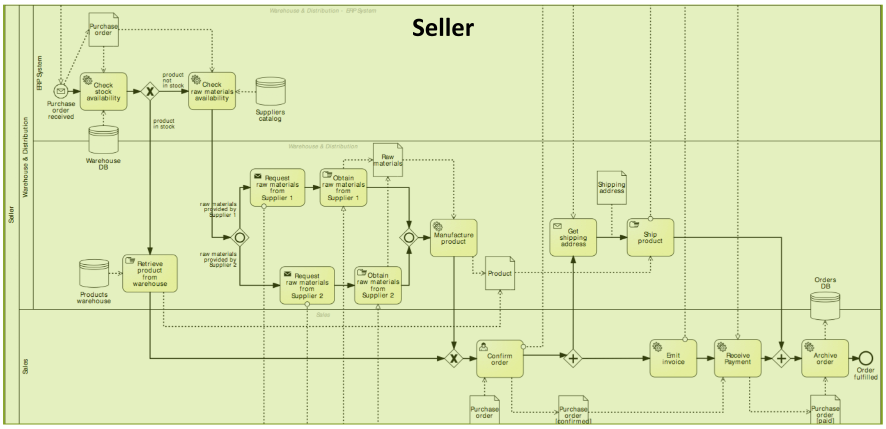
"to-be executed" process model

Bridging the gap: A five-step method

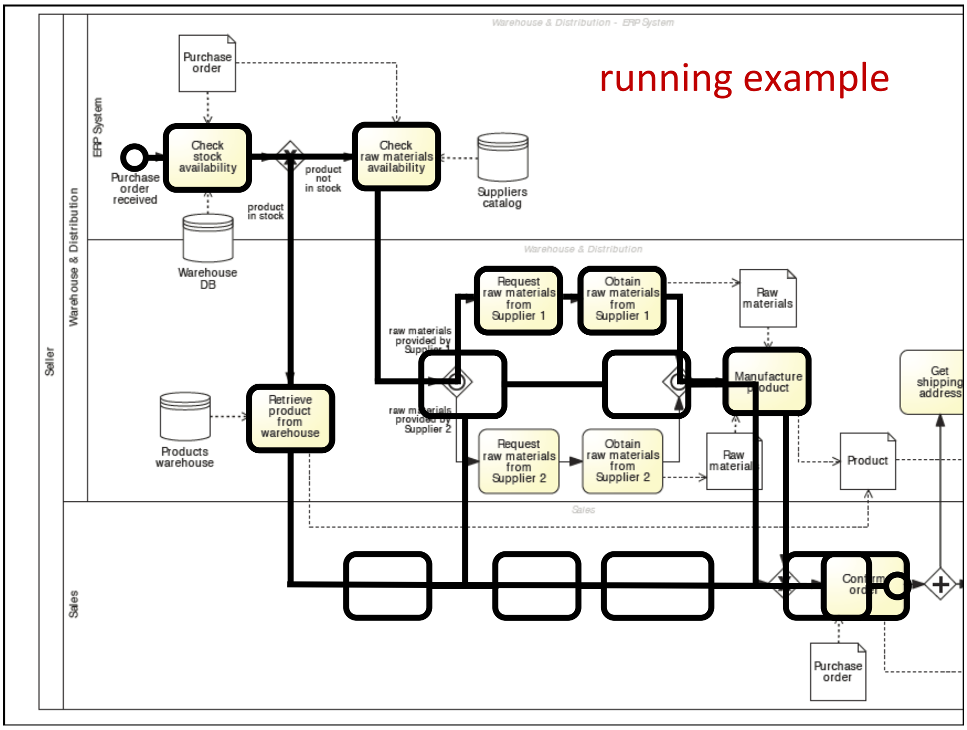
1. Identify the automation boundaries
2. Review manual tasks
3. Complete the process model
4. Adjust task granularity
5. Specify execution properties

Adapted from teaching material of Remco Dijkman, TU/e.

Running example



running example


Warehouse & Distribution - ERP System
Seller
Warehouse & Distribution
ERP System
Purchase order
Purchase order received
Check stock availability
Warehouse DB
product not in stock
product in stock
Check raw materials availability
Suppliers catalog
Warehouse & Distribution
Request raw materials from Supplier 1
Obtain raw materials from Supplier 1
Raw materials
raw materials provided by Supplier 1
raw materials provided by Supplier 2
Request raw materials from Supplier 2
Obtain raw materials from Supplier 2
Raw material
Manufacture product
Get shipping address
Product
Retrieve product from warehouse
Products warehouse
Sales
Sales
Confirm order
Purchase order

1. Identify the automation boundaries

Principle: not all parts of a process can be automated.

-> Start by identifying each task's type:

1

Automated tasks

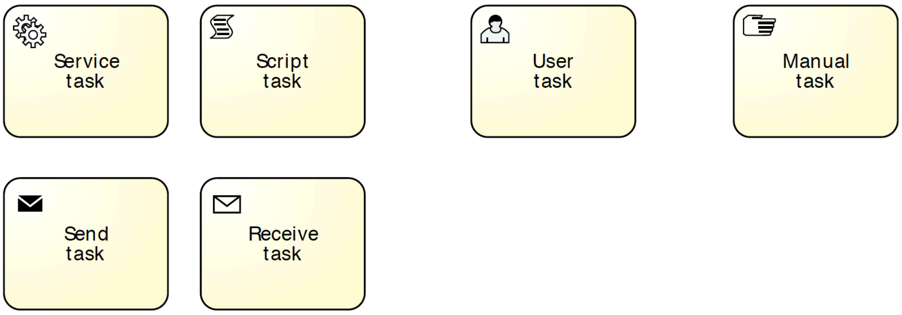
2

User tasks

3

Manual tasks

In BPMN: specify task markers



Automated tasks

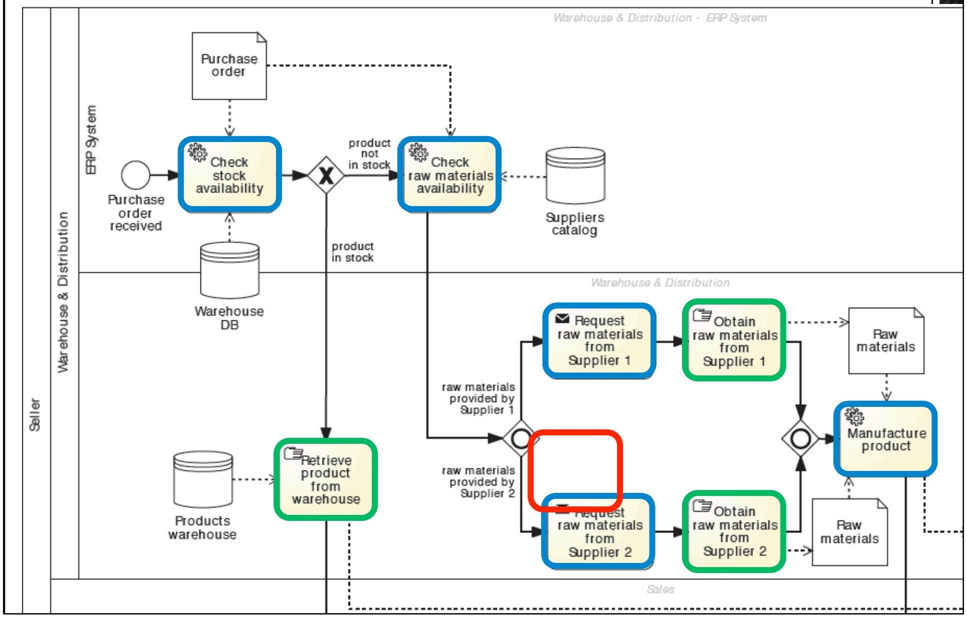
User task

Manual task

9

In our example…

🟦 automated
🟥 user
🟩 manual


Warehouse & Distribution - ERP System
Seller
Warehouse & Distribution
ERP System
Purchase order
Purchase order received
Check stock availability
Warehouse DB
product not in stock
product in stock
Check raw materials availability
Suppliers catalog
Warehouse & Distribution
Request raw materials from Supplier 1
Obtain raw materials from Supplier 1
Raw materials
raw materials provided by Supplier 1
raw materials provided by Supplier 2
Request raw materials from Supplier 2
Obtain raw materials from Supplier 2
Raw materials
Manufacture product
Products warehouse
Retrieve product from warehouse
Sales

2. Review manual tasks

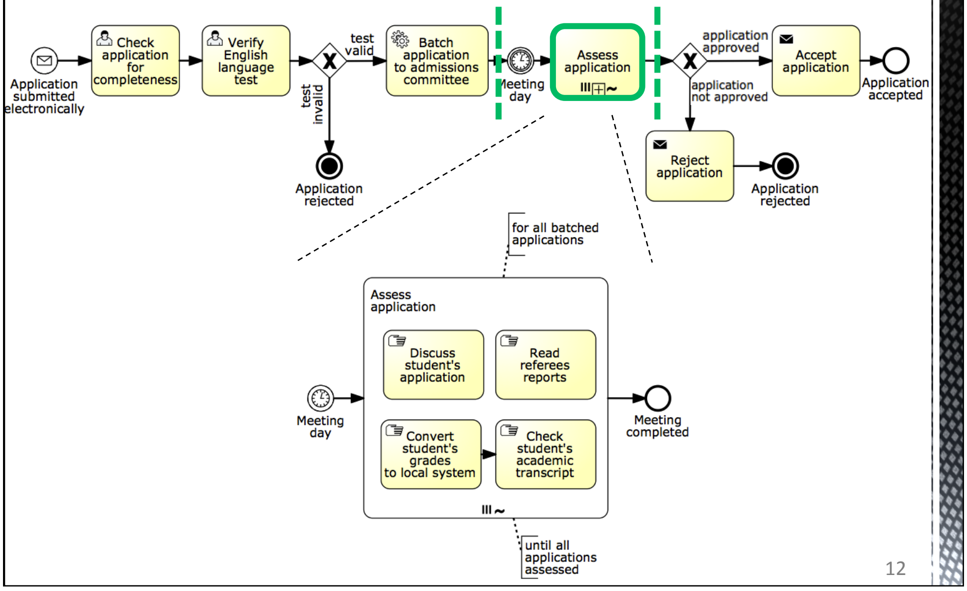
Principle: if it can’t be seen by the BPMS, it doesn’t exist.

-> Find ways to support manual tasks via IT:

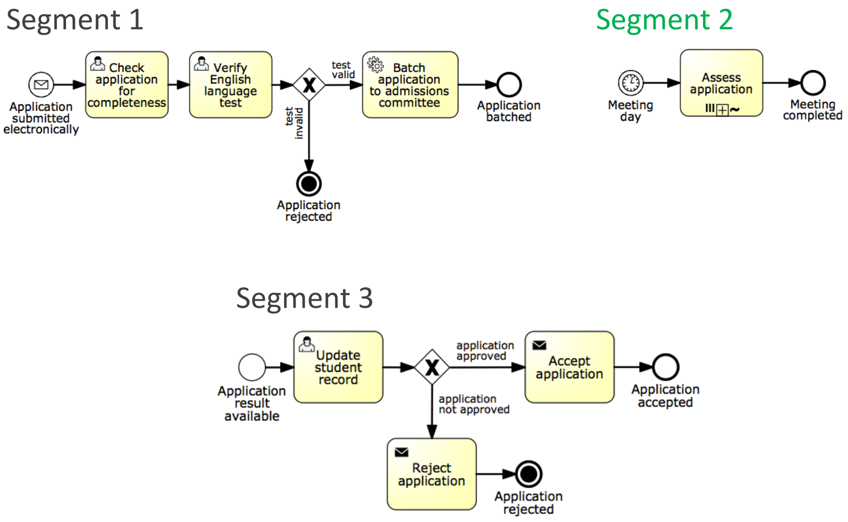
- via user task
- via automated task

-> Isolate them and automate the rest

Alternative: isolate manual tasks


Application submitted electronically
Check application for completeness
Verify English language test
test valid
test invalid
Application rejected
Batch application to admissions committee
Meeting day
Assess application
application approved
Accept application
Application accepted
application not approved
Reject application
Application rejected
for all batched applications
Assess application
Discuss student's application
Read referees reports
Meeting day
Convert student's grades to local system
Check student's academic transcript
Meeting completed
until all applications assessed

Alternative: isolate manual tasks



3. Complete the process model

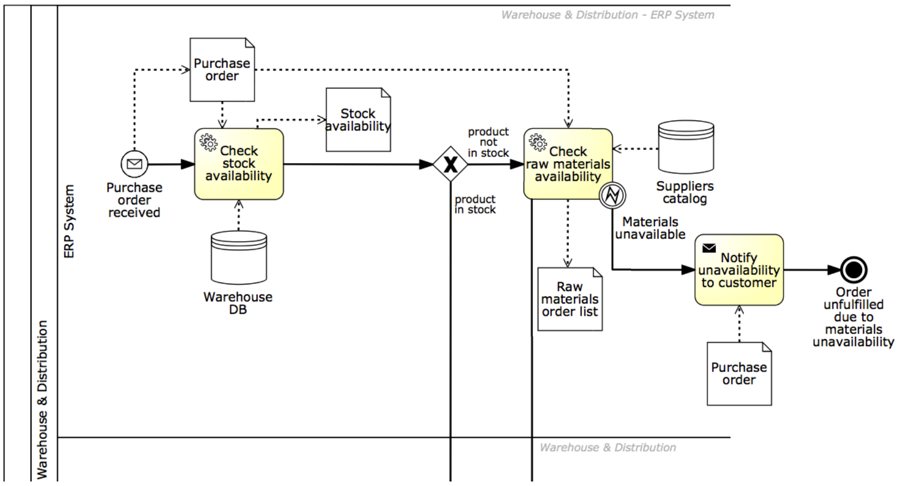
Principle 1: exceptions are the rule.

- Consider incomplete paths
- Rules of thumb
  - If we send something to another party, what happens if they do not respond? What happens if the response comes late? What happens if they do not respond the way we expect?
  - For each task: Can it go wrong and what happens if it goes wrong?
  - For each external party: Have we captured all messages or queries they might send us? (use CRUD)

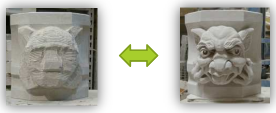
Principle: no data = no decisions, no tasks handover.

- Specify all (electronic) business objects
- For each task, determine which business objects it creates, reads, updates, delete (CRUD)
- For each decision, determine which objects it needs

In our example…



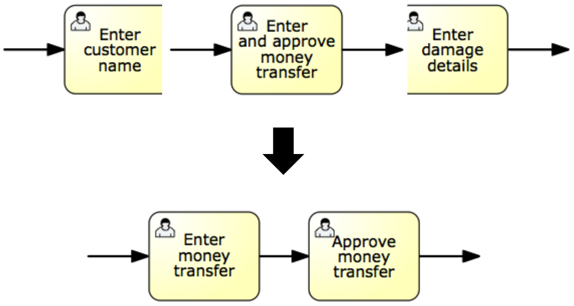
4. Adjust task granularity



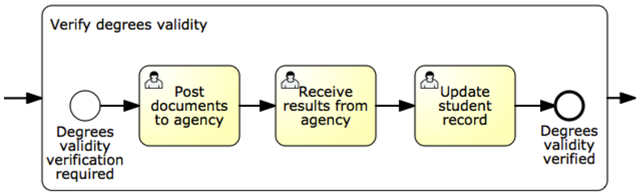
Principle: BPMSs add value if they coordinate handovers of work between resources.

-> Aggregate any two consecutive tasks assigned to the same performer

-> Split tasks if they require different performers



An exception to the rule



Verify degrees validity

Degrees validity verification required

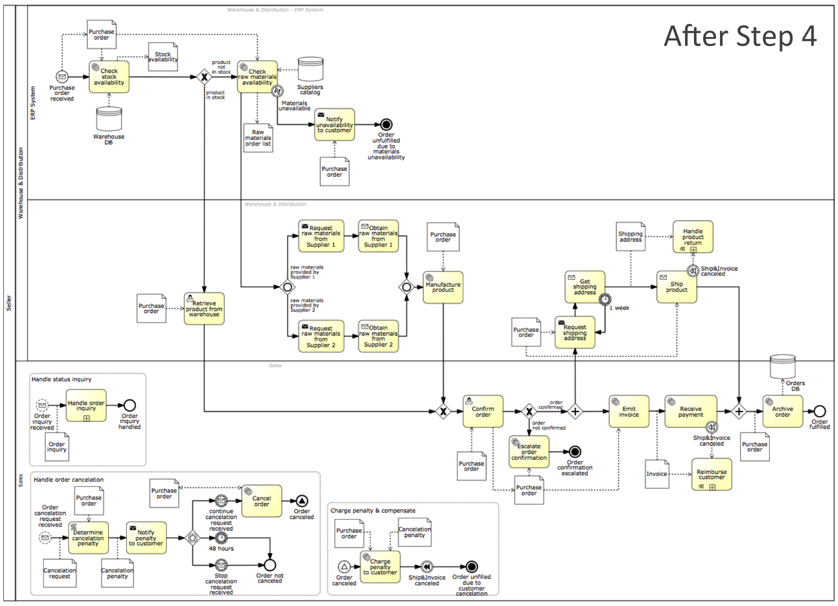
Post documents to agency

Receive results from agency

Update student record

Degrees validity verified

Our example…



After Step 4

Seller

Warehouse & Distribution

ERP System

Warehouse & Distribution - ERP System

Purchase order

Stock availability

Purchase order received

Check stock availability

Warehouse DB

product not in stock

product in stock

Check raw materials availability

Suppliers catalog

Materials unavailable

Raw materials order list

Notify unavailability to customer

Order unfulfilled due to materials unavailability

Purchase order

Warehouse & Distribution

Request raw materials from Supplier 1

Obtain raw materials from Supplier 1

raw materials provided by Supplier 1

raw materials provided by Supplier 2

Request raw materials from Supplier 2

Obtain raw materials from Supplier 2

Purchase order

Manufacture product

Purchase order

Retrieve product from warehouse

Shipping address

Handle product return

Ship&Invoice canceled

Get shipping address

1 week

Ship product

Purchase order

Request shipping address

Sales

Handle status inquiry

Order inquiry received

Handle order inquiry

Order inquiry handled

Order inquiry

Confirm order

order confirmed

order not confirmed

Purchase order

Escalate order confirmation

Order confirmation escalated

Purchase order

Emit invoice

Receive payment

Ship&Invoice canceled

Invoice

Reimburse customer

Purchase order

Archive order

Orders DB

Order fulfilled

Handle order cancelation

Order cancelation request received

Purchase order

Determine cancelation penalty

Notify penalty to customer

Cancelation request

Cancelation penalty

Purchase order

continue cancelation request received

Cancel order

Order canceled

48 hours

Stop cancelation request received

Order not canceled

Charge penalty & compensate

Purchase order

Cancelation penalty

Order canceled

Charge penalty to customer

Ship&Invoice canceled

Order unfilled due to customer cancelation

Bridging the gap: one task at a time

1. Identify the automation boundaries
2. Review manual tasks
3. Complete the process model
4. Adjust task granularity
5. Specify execution properties

5. Specify execution properties

-> Process variables, messages, signals, errors

-> Task and event variables and their mappings to process variables

-> Service details

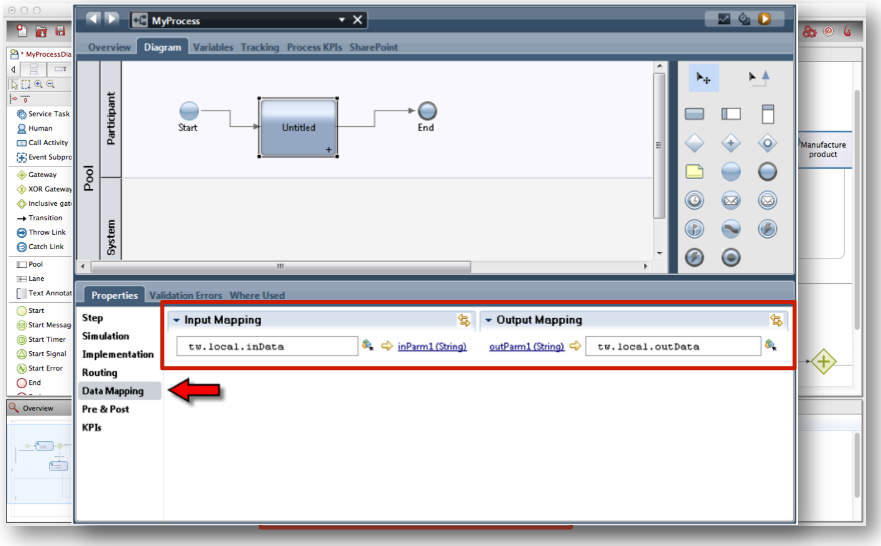
-> Code snippets

-> Participant assignment rules and user interface structure

-> Task, event and sequence flow expressions

-> BPMS-specific: work queues, forms, connectors…

Example process modeling tools



Input Mapping: tw.local.inData → inParm1 (String)

Output Mapping: outParm1 (String) → tw.local.outData

Bonita Soft BonitaOpen Solution

IBM Business Process Manager