



WIRTSCHAFTS
UNIVERSITÄT
WIEN VIENNA
UNIVERSITY OF
ECONOMICS
AND BUSINESS



Fundamentals of Business Process Management

Session 3

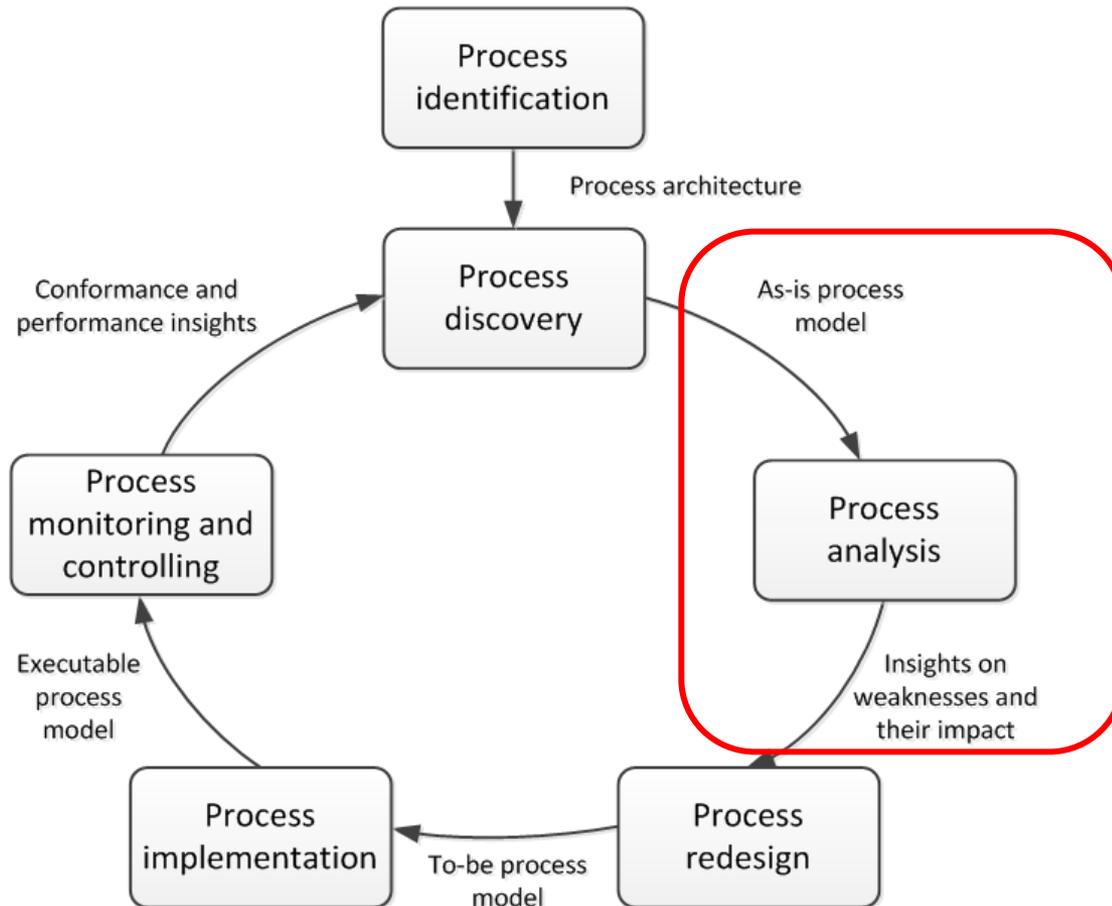
Jan Mendling

Outline

MON	15 July	EI 8	Introduction to BPM
	9:00 – 10:30		Process Identification
MON	15 July	EI 8	Essentials of BPMN
	11:00 – 12:30		Process Discovery and Quality Assurance
MON	15 July	EI 8	Process Redesign
	14:00 – 15:30		Automation

Process Analysis

BPM Lifecycle



Value-Added Analysis

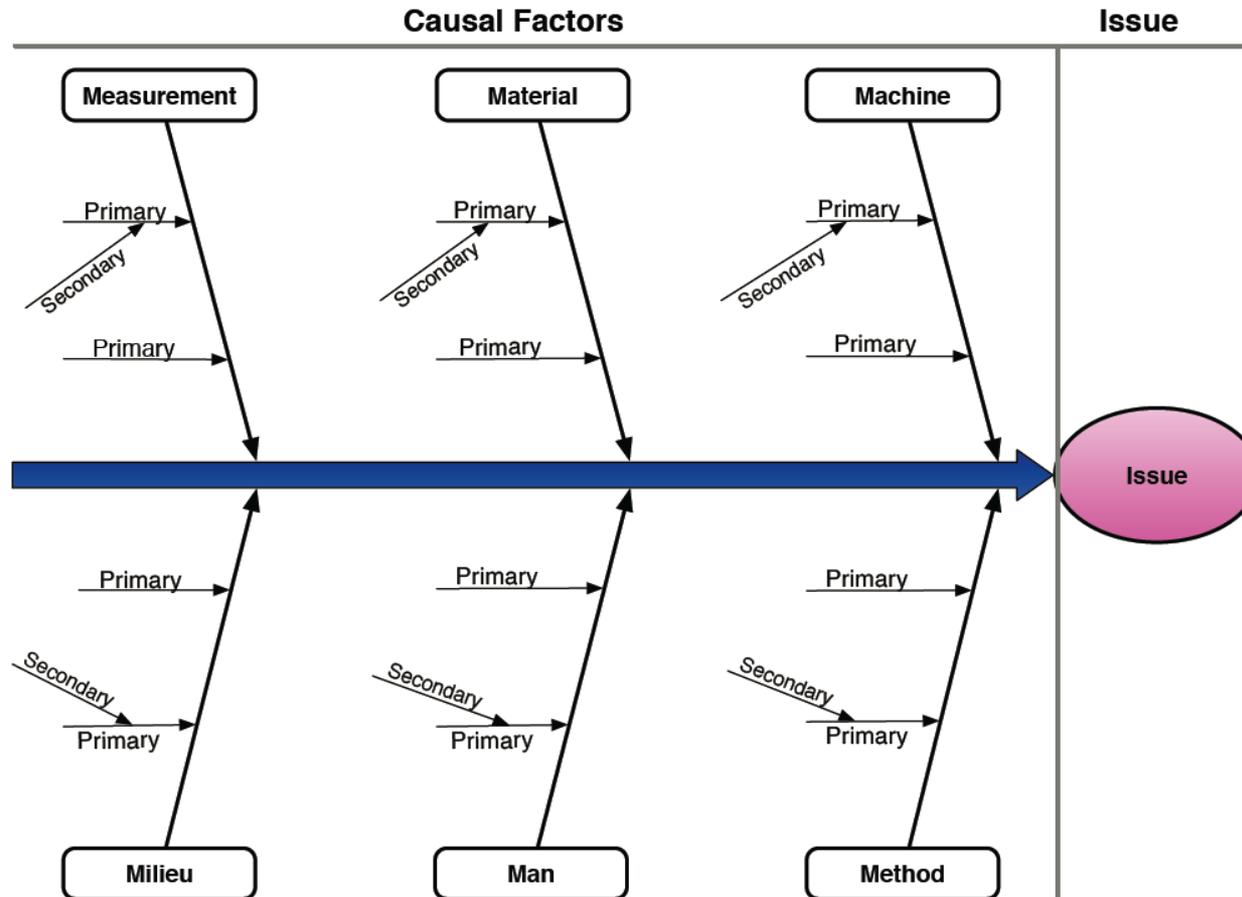
- Value-Adding:
 - This is a step that produces value or satisfaction vis-a-vis of the customer. When determining whether or not a step is value-adding, it may help to ask the following question: Would the customer be willing to pay for this activity?
- Business value-adding (BVA):
 - The step is necessary or useful for the business to run smoothly, or it is required due to the regulatory environment of the business.
- Non-value adding (NVA):
 - The step does not fall into any of the other two categories

Admission Process

Consider the following process for the admission of graduate students at a university. In order to apply for admission, students first **fill in an online form**. Online applications are recorded in an information system to which all staff members involved in the admissions process have access to. After a student has submitted the online form, a PDF document is generated and the student is requested to **download it, sign it, and send it by post** together with the required documents, which include: 1. Certified copies of previous degree and academic transcripts. 2. Results of English language test. 3. Curriculum vitae.

When these documents are received by the admissions office, an officer **checks the completeness** of the documents. If any document is missing, an **e-mail is sent to the** student. The student has to send the missing documents by post. Assuming the application is complete, the admissions office **sends the certified** copies of the degrees to an academic recognition agency, which **checks the degrees** and gives an assessment of their validity and equivalence in terms local education standards. This agency requires that all documents be sent to it by post, and all documents must be certified copies of the originals. The agency **sends back its assessment** to the university by post as well. Assuming the degree verification is successful, the English language test results are then **checked online by** an officer at the admissions office. If the validity of the English language test results cannot be verified, the **application is rejected** (such notifications of rejection are sent by e-mail). Once all documents of a given student have been validated, the admission office **forwards these documents** by internal mail to the corresponding academic committee responsible for deciding whether to offer admission or not. The committee **makes its decision** based on the academic transcripts and the CV. The committee meets once every 2 to 3 weeks and examines all applications that are ready for academic assessment at the time of the meeting. At the end of the committee meeting, the chair of the committee **notifies the admissions office** of the selection outcomes. This notification includes a list of admitted and rejected candidates. A few days later, the admission **office notifies the outcome** to each candidate via e-mail. Additionally, successful **candidates are sent** a confirmation letter by post.

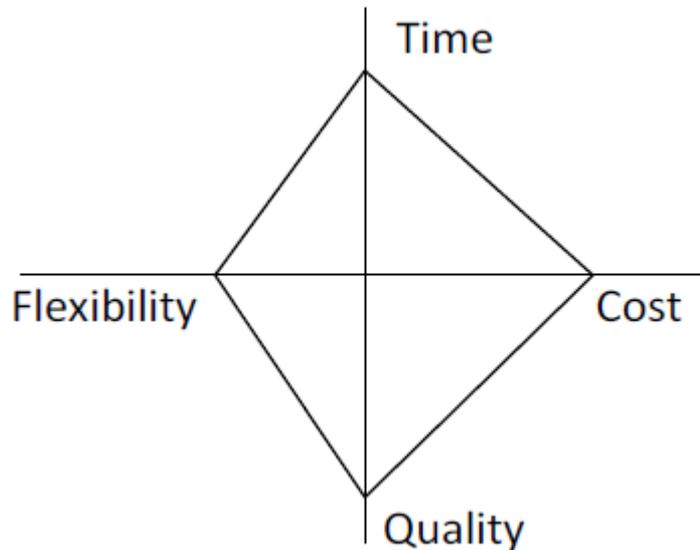
Cause-Effect Diagram



Create Cause-Effect Diagram

Consider the university admission process. One of the issues faced by the university is that students have to wait too long to know the outcome of the application (especially for successful outcomes). It often happens that by the time a student is admitted, the student has decided to go to another university instead (students send multiple applications in parallel to many universities). Analyze the causes of this issue using a cause-effect diagram.

Process Redesign and Devil's Quadrangle



- Customer
- Operations
- Behaviour
- Organization Structure
- Organization Population
- Information
- Technology
- Environment

Redesign Heuristics: Customer

- Control relocation:
“Move controls towards the customer”
- **Contact reduction:**
“Reduce the number of contacts with customers and third parties”
- Integration:
“Consider the integration with a business process of the customer or a supplier”

Redesign Heuristics: Operations

- Case types:
“Determine whether activities are related to the same type of case and, if necessary, distinguish new business processes”
- Activity elimination:
“Eliminate unnecessary activities from a business process”
- Case-based work:
“Consider removing batch-processing and periodic activities from a business process”
- Triage:
“Consider the division of a general activity into two or more alternative activities”
- Activity composition:
“Combine small activities into composite activities and divide large activities into workable smaller activities”

Redesign Heuristics: Behaviour

- Resequencing:
“Move activities to more appropriate places”
- Parallelism:
“Consider whether activities may be executed in parallel”
- **Knock-out:**
“Order knock-outs in an increasing order of effort and in a decreasing order of termination probability”.
- Exception:
“Design business processes for typical cases and isolate exceptional cases from the normal flow”.

Redesign Heuristics: Organizational Structure

- Case assignment:
“Let workers perform as many steps as possible for single cases”
- Flexible assignment:
“Assign work in such a way that maximal flexibility is preserved for near future”
- Centralization:
“Treat geographically dispersed resources as if they are centralized”
- Split responsibilities:
“Avoid shared responsibilities for tasks by people from different functional units”
- Customer teams:
“Consider to compose work teams of people from different departments that will take care of the complete handling of specific sorts of cases”
- Numerical involvement:
“Minimize the number of departments, groups and persons involved in process”.
- Case manager:
“Appoint one person to be responsible for the handling of each type of case, the case manager”.

Redesign Heuristics: Organizational Population

- Extra resources:
“If capacity is insufficient, consider increasing the available number of resources”
- Specialist-generalist:
“Consider to deepen or broaden the skills of resources”
- Empower:
“Give workers most of the decision-making authority instead of relying on middle management”

Redesign Heuristics: Information & Technology

- **Control addition:**
“Check the completeness and correctness of incoming materials and check the output before it is sent to customers”
- **Buffering:**
“Instead of requesting information from an external source, buffer it and subscribe to updates”
- **Activity automation:**
“Consider automating activities”
- **Integral technology:**
“Try to elevate physical constraints in a business process by applying new technology”

Redesign Heuristics: External Environment

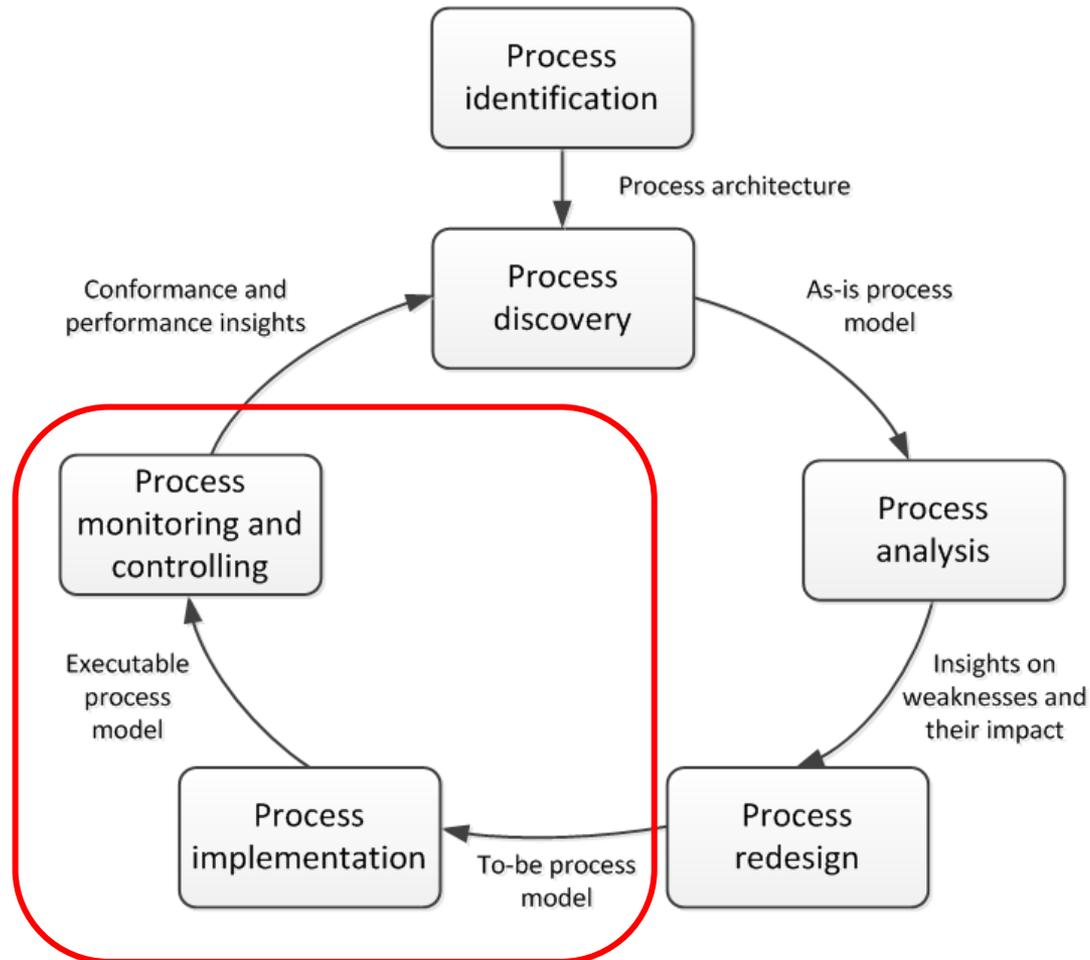
- **Trusted party:**
“Instead of determining information oneself, use the results of a trusted party”
- **Outsourcing:**
“Consider outsourcing a business process completely or parts of it”
- **Interfacing:**
“Consider a standardized interface with customers and partners”

Summary

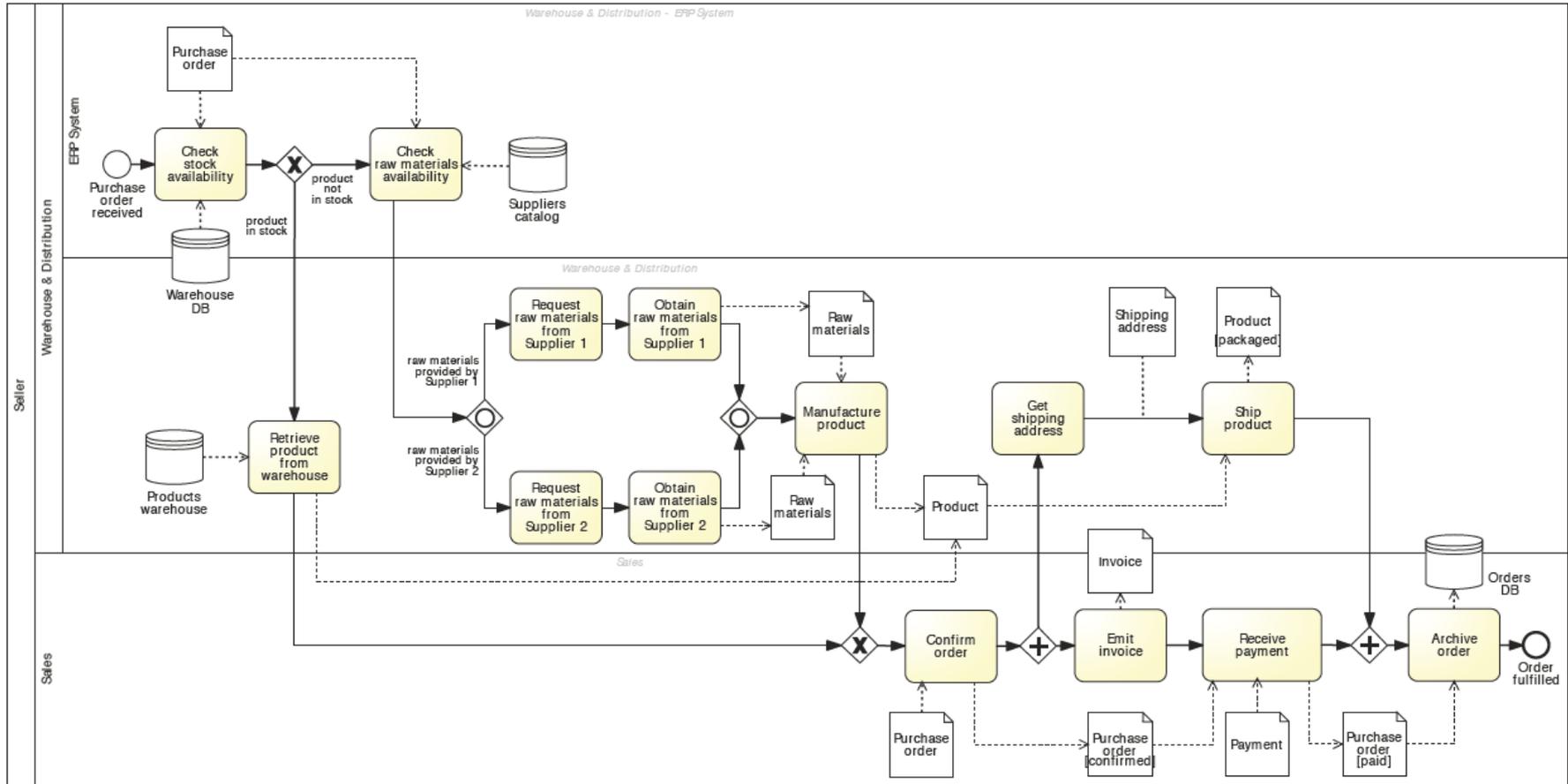
- Value-Added Analysis helps to eliminate waste
- Issues can be analyzed using Cause-Effect Diagrams
- Heuristics help to redesign the process

Process Automation

BPM Lifecycle



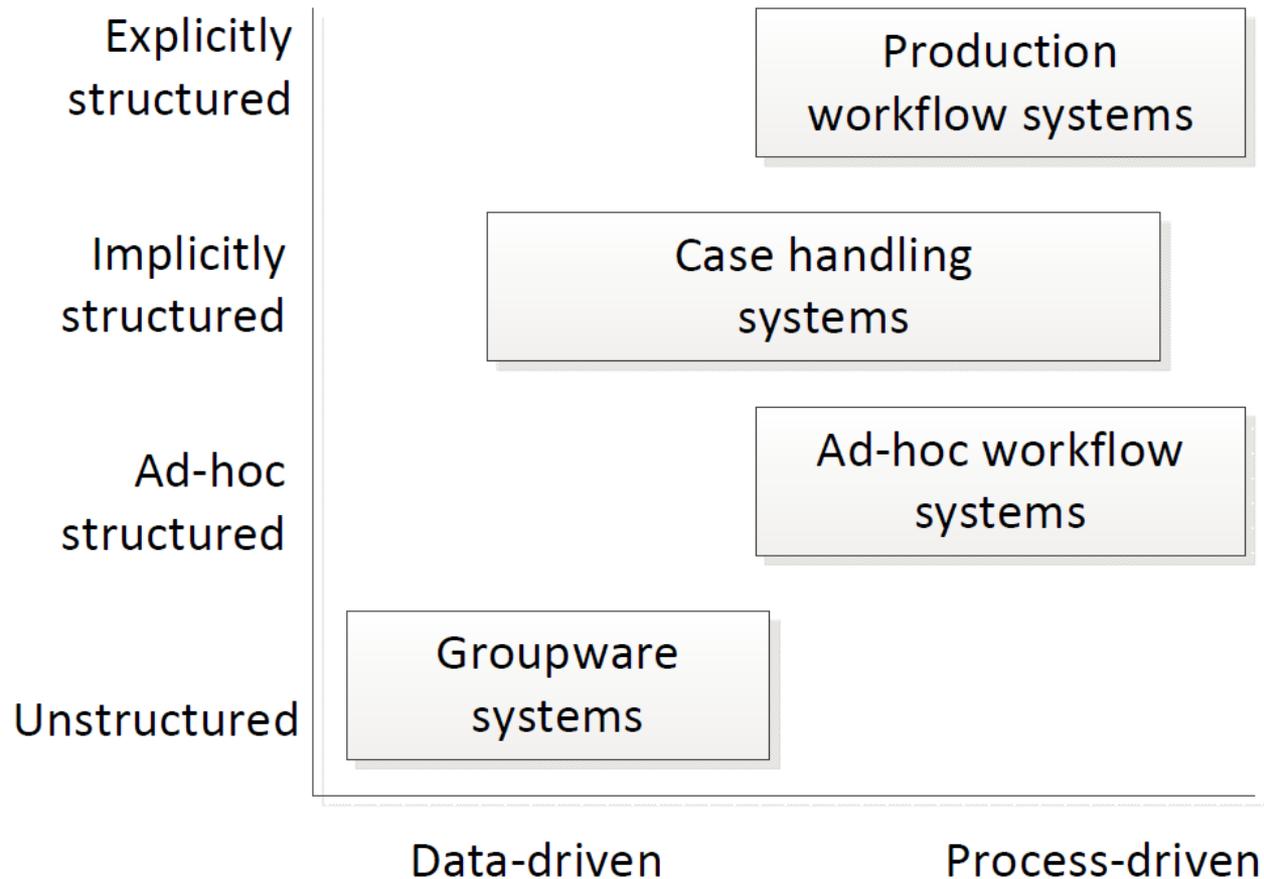
How to get this automated?



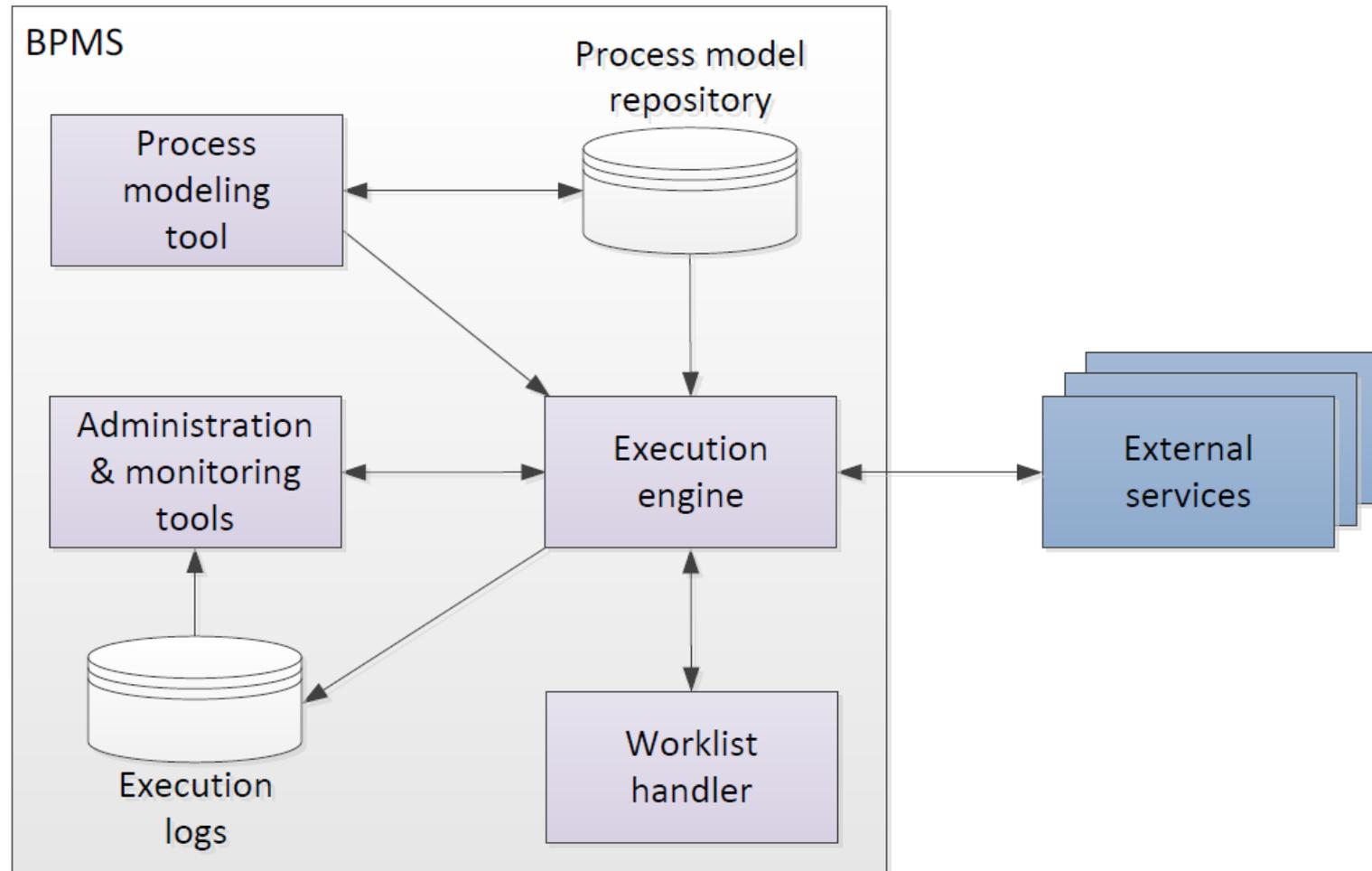
Business Process Management Systems (BPMS)

- Groupware systems:
 - Enable users to share documents and information
 - E.g. IBM's Lotus Notes.
- Ad-hoc workflow systems:
 - Allow on-the-fly process definitions
 - E.g. TIBCO's BusinessWorks or Comalatech's Ad hoc Workflows or InConcert
- Production workflow systems:
 - Work is routed strictly on the basis of explicitly defined process descriptions captured in process models.
 - E.g. IBM's Business Process Manager or Bizagi's BPM Suite
- Case handling systems:
 - No tight and complete specification of a business process in a model. Rather, implicit process models
 - E.g. i-Sight's Case Management Software or BPMOne

Types of BPMS



Architecture of BPMS



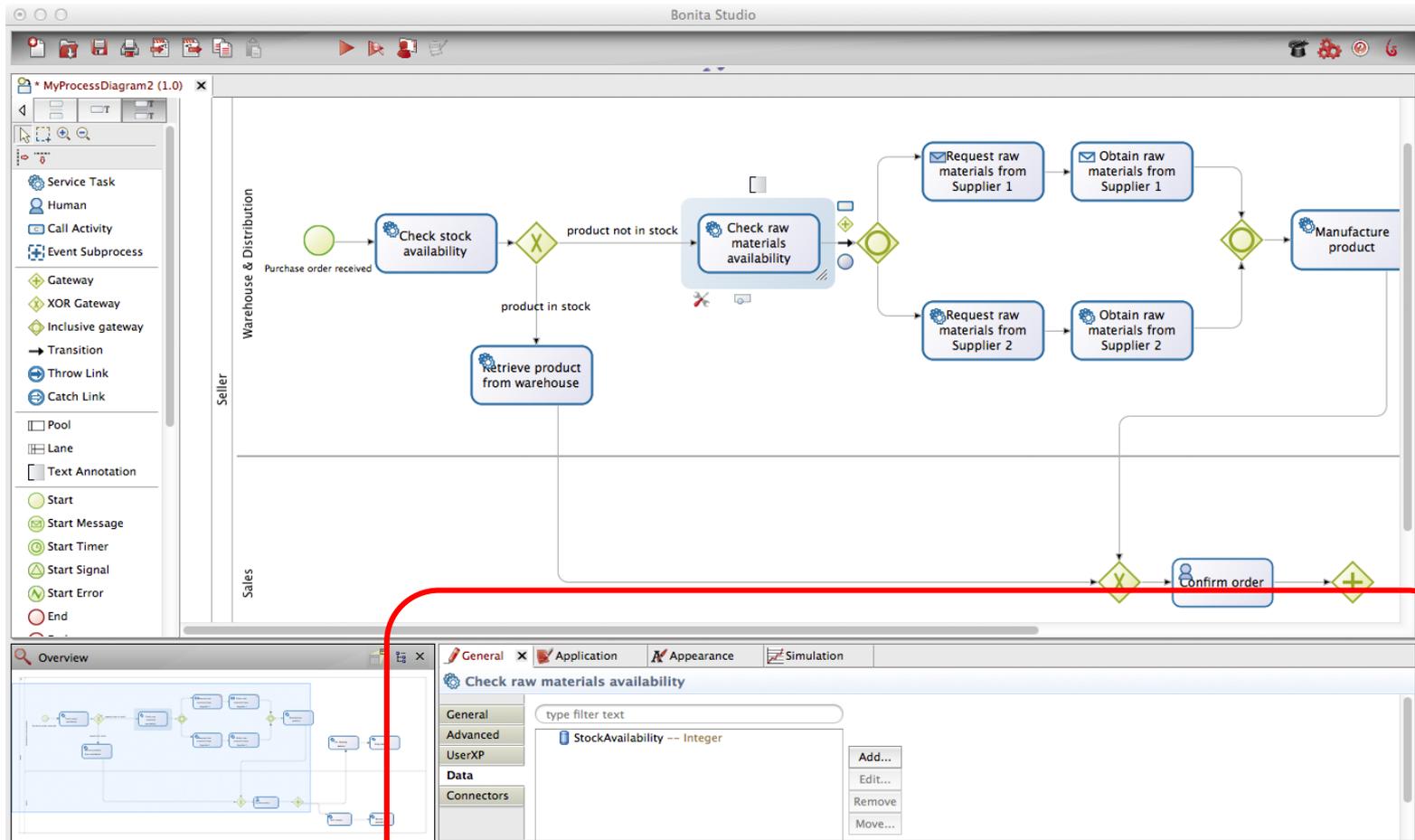
Execution Engine provides

1. Ability to create executable process instances (also called cases);
2. Ability to distribute work to process participants in order to execute a business process from start to end;
3. Ability to automatically retrieve and store data required for the execution of the process and to delegate (automated) activities to software applications across the organization.

Process modeling tool provides

1. Ability for users to create and modify process models;
2. Ability to annotate process models with additional data, such as data input and output, participants, business rules associated with activities, or performance measures associated with a process or an activity;
3. Ability to store, share and retrieve process models from a process model repository.

Process modeling tool of Bonita Open Solution from Bonita Soft



Component of a BPMS through which process participants are

- offered work items and
- commit to these.

The execution engine that keeps track of which work items are due and makes them available through the worklist handlers of individual process participants. The worklist handler of a BPMS can best be imagined as an inbox.

Bizagi Worklist Handler

The screenshot displays the Bizagi web application interface. The browser address bar shows `www.localhost.com:1024/BuildIT/Default.htm`. The application header includes the Bizagi logo and navigation links: Cases, Analysis Reports, Admin, Tools, and Log-Out. A search bar is also present.

The main content area shows a case titled "App - BuildITModel - Extend the Renting time". The form contains the following fields:

Reference nr of the selected equipmet:	12345
Cost per day:	\$65.00
Requested start date:	Tuesday, May 22, 2012
Expected end date:	Wednesday, May 09, 2012
Comments to the supplier:	Must be with battery
Date of Delivery:	Wednesday, May 30, 2012
Issues found on delivery:	
Extend Renting Time:	<input checked="" type="radio"/> Yes <input type="radio"/> No

Below the form are "Save" and "Next >>" buttons. A summary box provides the following details:

Creation Number:	153
Solution Date:	5/22/2012
Created by:	Site Engineer
Current Assignee:	Site Engineer
Current Event Assignees:	

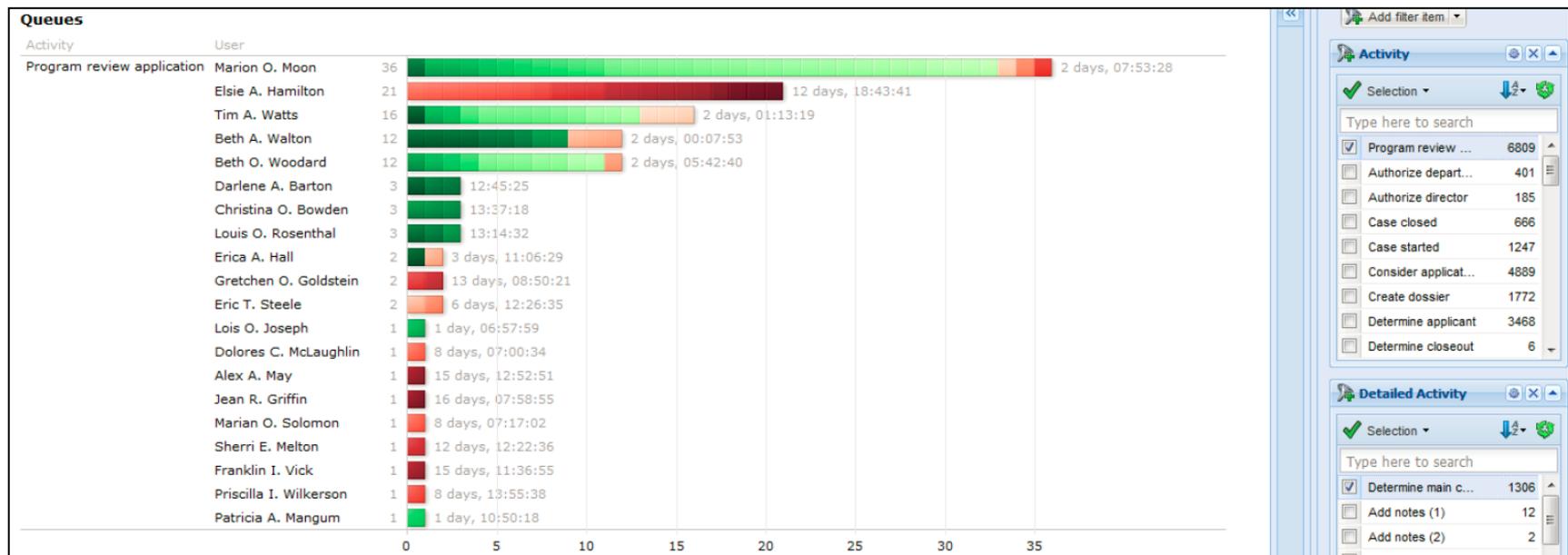
At the bottom of the page, there is a "Powered by bizagi" logo and a status bar showing "Site Engineer (Europe/Helsinki)", "Tuesday, May 22, 2012", and "1:30 PM". A sidebar on the left contains "Bizagi Cases" (Expired (10)), "Smart Folders", "Bizagi Folders", "Bizagi Queries", and "Analysis Queries". A footer at the bottom left indicates "Total Urgent Cases: 10". A small error message box in the bottom right corner says "Please fill form fields."

External Services

- Some of these activities can be performed fully automatically, i.e. execution engine calls external application
- The external application has to expose a service interface with which the engine can interact.
- The execution engine provides the invoked service with the necessary data it will need for performing the activity for a specific case.

Administration and Monitoring Tools

- Actual availability of specific participants.
- Dealing with exceptional situations
- Monitoring performance of the business processes



Advantages and Challenges of BPMS

Workload Reduction

- Work item transportation
- Coordination
- Information Provision

Flexible System Integration

- From Data Centric Integration to
- Process Centric Integration

Execution Transparency

- Transparency of operational information
- Transparency of historic information

Rule Enforcement

- Order and causality
- Data constraints
- Resources constraints like separation of duty

Challenges

- Technical Challenges
- Organizational Challenges

Turning Process Models Executable

Procedure for Making Executable

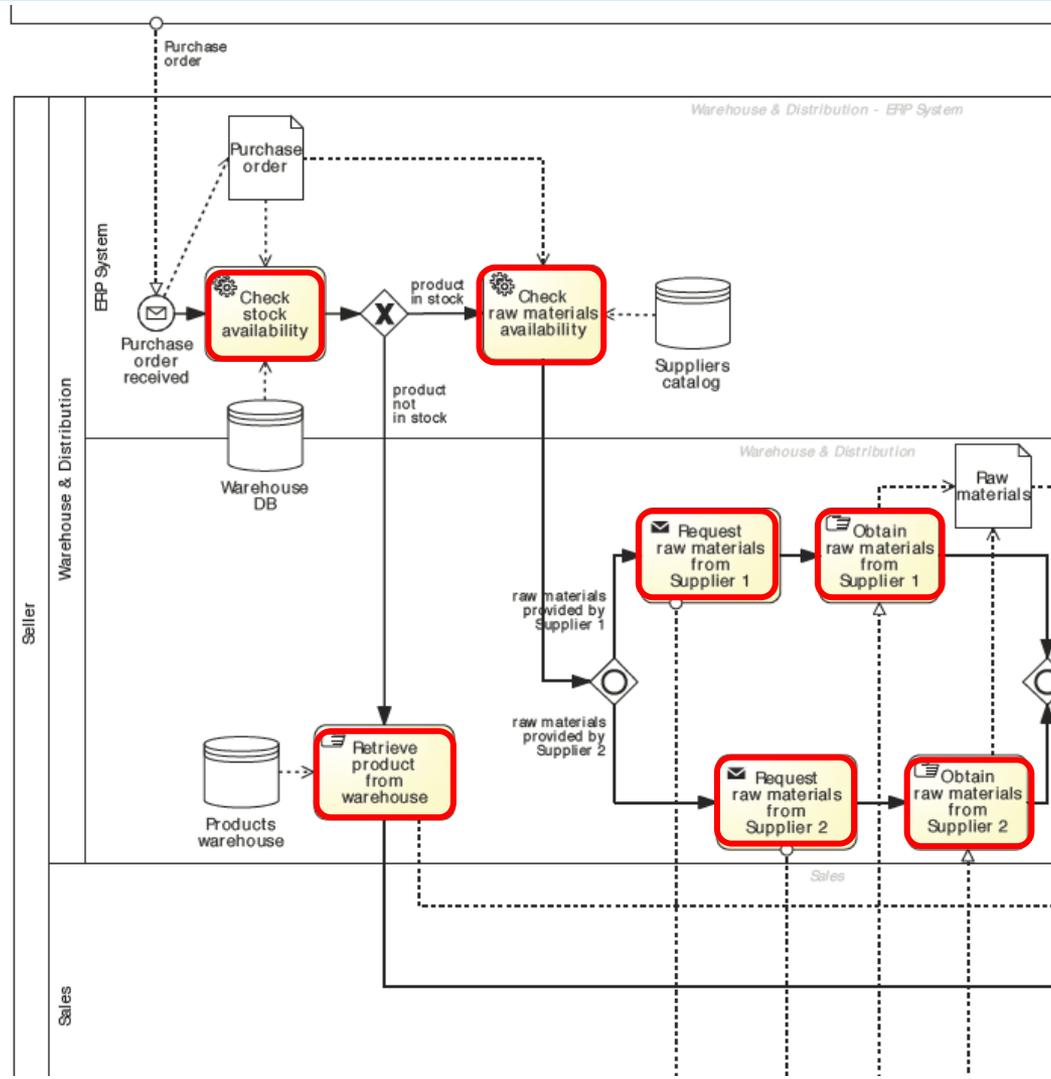
1. Identify the automation boundaries
2. Review manual tasks
3. Complete the process model
4. Bring the process model to adequate granularity level
5. Specify execution properties

Specify Activity Markers

Identify automated, manual and user tasks:

- Manual tasks are marked with a hand icon
- User tasks are marked with a user icon (scheduled in worklist)
- Automated tasks are subtyped in BPMN:
 - script (script marker), if the task executes some code (the script) internally to the BPMS. This task can be used when the functionality is simple and does not require access to an external application
 - service (wheels marker), if the task is executed by an external application, which exposes its functionality via a service interface
 - send (filled envelope marker), if the task sends a message to an external service
 - receive (empty envelope marker), if the task waits for a message from an external service

Specifying Markers for Activities



Review Manual Tasks

- Implement it via a user task or
- Implement it via an automated task

Complete the Process Model

- Check for coverage of exceptions
- Specify data objects
- Specify split conditions

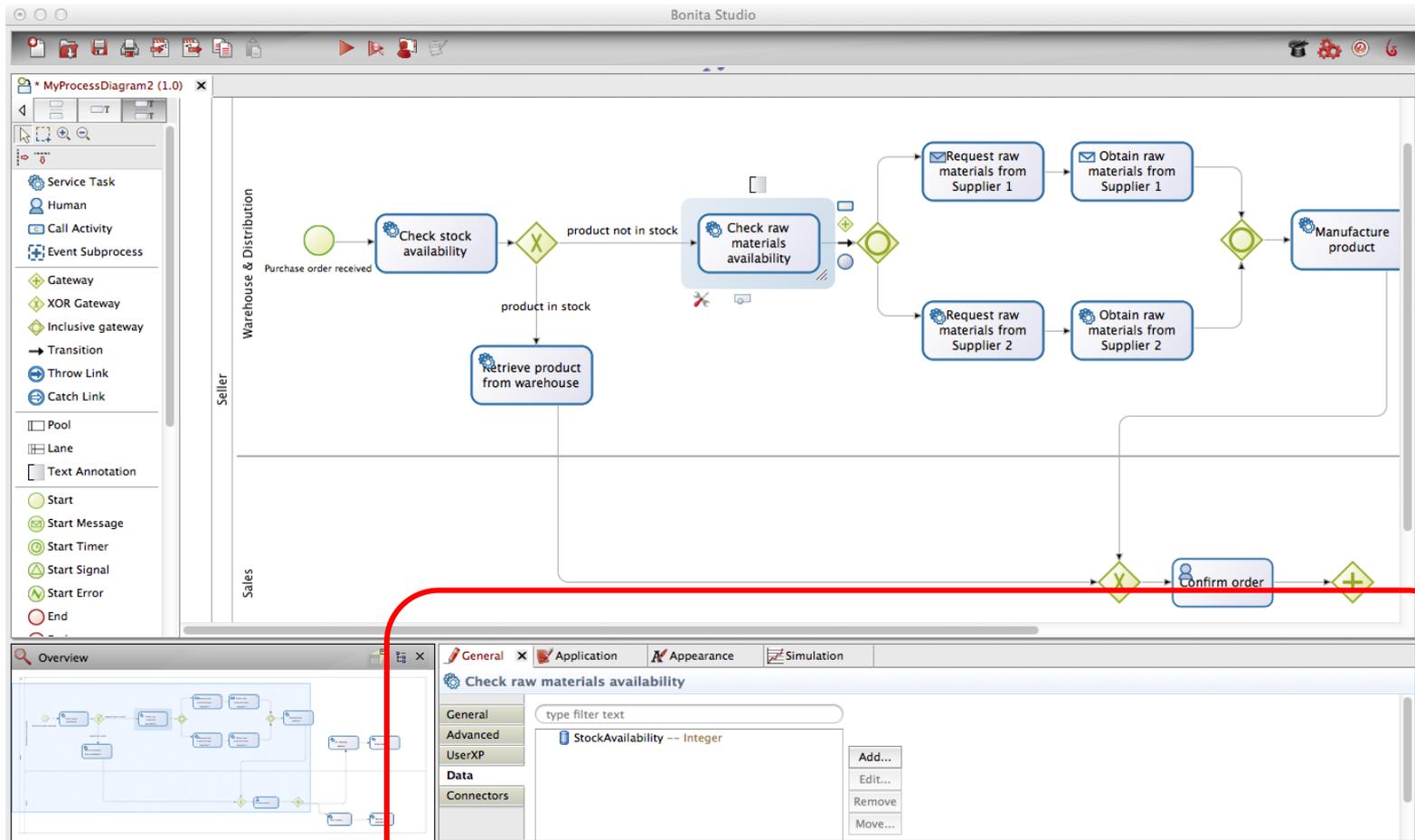
Adequate Granularity

- Aggregation of task sequence of same resource
- Refine tasks that are too coarse-granular

Specify Execution Properties

- Process variables, messages, signals and errors
- Task and event variables and their mappings to process variables
- Service details for service, send and receive tasks, and for message and signal events
- Code snippets for script tasks
- Participant assignment rules and user interface structure for user tasks
- Task, event and sequence flow expressions
- BPMS-specific properties

Process modeling tool of Bonita Open Solution from Bonita Soft



XML Schema and Instance Data

a)

```
<complexType name="purchaseOrderType">
  <sequence>
    <element name="order">
      <complexType>
        <sequence>
          <element name="orderNumber" type="integer"/>
          <element name="orderDate" type="date"/>
          <element name="status" type="string"/>
          <element name="currency" type="string"/>
          <element name="productCode" type="string"/>
          <element name="quantity" type="integer"/>
        </sequence>
      </complexType>
    </element>
    <element name="customer">
      <complexType>
        <element name="name" type="string"/>
        <element name="surname" type="string"/>
        <element name="address">
          <complexType>
            <sequence>
              <element name="street" type="string"/>
              <element name="city" type="string"/>
              <element name="state" type="string"/>
              <element name="postCode" type="string"/>
              <element name="country" type="string"/>
            </sequence>
          </complexType>
        </element>
        <element name="phone" type="string"/>
        <element name="fax" type="string"/>
      </complexType>
    </element>
  </sequence>
</complexType>
```

b)

```
<purchaseOrder>
  <order>
    <orderNumber>15664</orderNumber>
    <orderDate>2012-10-23</orderDate>
    <status>confirmed</status>
    <currency>EUR</currency>
    <productCode>345-EAR</productCode>
    <quantity>10</quantity>
  </order>
  <customer>
    <name>John</name>
    <surname>Brown</surname>
    <address>
      <street>8 George St</street>
      <city>Brisbane</city>
      <state>Queensland</state>
      <postCode>4000</postCode>
      <country>Australia</country>
    </address>
    <phone>+61 7 3240 0010</phone>
    <fax>+61 7 3221 0412</fax>
  </customer>
</purchaseOrder>
```

Summary

- BPMS Architecture
- Advantages and Challenges
- Making Process Model Executable

BPM Lifecycle

