

# Process design & BPMS

PV207 – Business Process Management

Spring 2019

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# Lecture overview

- About course
- BPM discipline
  - What is business process?
  - What is BPM?
  - What is BPM adoption?
  - Why BPM ?
  - Roles in BPM
  - Process life-cycle
  - Phases of process based development
- Business Process Management Systems (BPMS)
  - BPMS components
  - Architecture
  - Human Tasks
  - Business Rules
  - BAM
  - Existing BPMS

# Course goals

- Introduce **the BPM** (motivation, use cases..)
- Explain **BPM in context of services integration**
- Deep dive in **business process modeling**
- Explain basics of **Business Analysis**
- Explain **how to adopt BPM** in organisation
- Introduce **Process Monitoring & Measurement**
- **Hands-on-experience** with BPM technologies
- Lead students to the elaboration of a simplified **end-to-end BPM project in a TEAM**

# Course organization

Fair and equal conditions to everybody

Everything is in the course manual

[https://docs.google.com/document/d/1y0h1r1VrK7s2O4fMoHayqogJ\\_ur6YOwmiNyJf1aAW4Q/edit#](https://docs.google.com/document/d/1y0h1r1VrK7s2O4fMoHayqogJ_ur6YOwmiNyJf1aAW4Q/edit#)

Questions resolved by comments to the manual document (Highlight the topic, Ctrl-M;)

# Important guidelines

- The course is **mandatory**, do not underestimate the complexity
- Lectures are important
- Seminars are **mandatory**
- Build your team **first week** and work in team
- Check schedule and instructions
- Do homeworks (or you are out ;)
  
- Avoid Cheating

**And now on BPM**

# Business Process Management

Is a **Management discipline**, focused on **systematic definition, execution and measurement of processes** in organizations

**Alternative definition:**

**An effort to describe processes** in organisation, measure results and **manage process changes** towards higher efficiency

# Typical motivation for BPM:

- **Business Reengineering**
  - Enterprise growth
  - Acquisitions
  - Organisational and cultural changes
- **Quality Management & Measurement**
- **Legal compliance, certifications**
- **Technology for IS development**
  - High level platforms
  - Integration
  - Agile system development

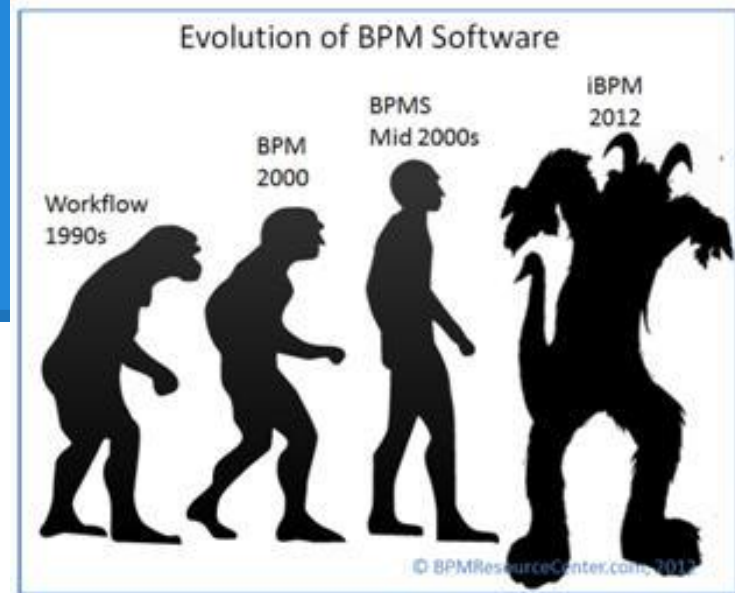


# Where do we find BPM?

- Large enterprises
  - Banking,
  - Insurance Business
  - Telco
  - Retail
  - ++
- Health Care (developed countries)
- Public organisations (developed countries)
  - Courts, State administrative, Governmental organisations (ex. EU bureaucrats:)
- "Smart" SMEs
  - Smaller companies, where efficiency matters

# History of BPM

- **XX BC Division of labour**
- **Beginning of 20th century**
  - Bata, Ford
- **80' – Total Quality Management**
  - Toyota
- **80'/90' – Workflow management**
- **90' – Business Process Reengineering**
  - Davenport etc..
- **2002 – Business Process Management**
  - First BPM technologies Pioneers of BPM
- **2009 ++ AI in process mining, Social BPM, Dynamic BPM, Case Management**



# Business process definition

## Definition:

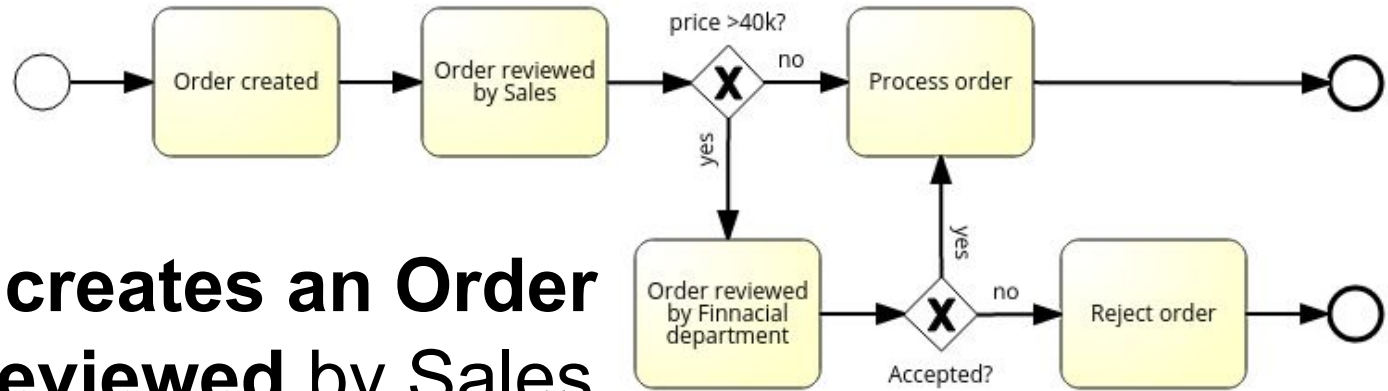
*Series of logically related activities or tasks (such as planning, production, sales) performed together to produce a defined set of results.*

-- Business Dictionary:

*A repeatable sequence of **logically related** activities, which contributes to fulfilment of **one or more** business objectives*

-- Jiří Kolář

# Process Example: Order



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 accepted

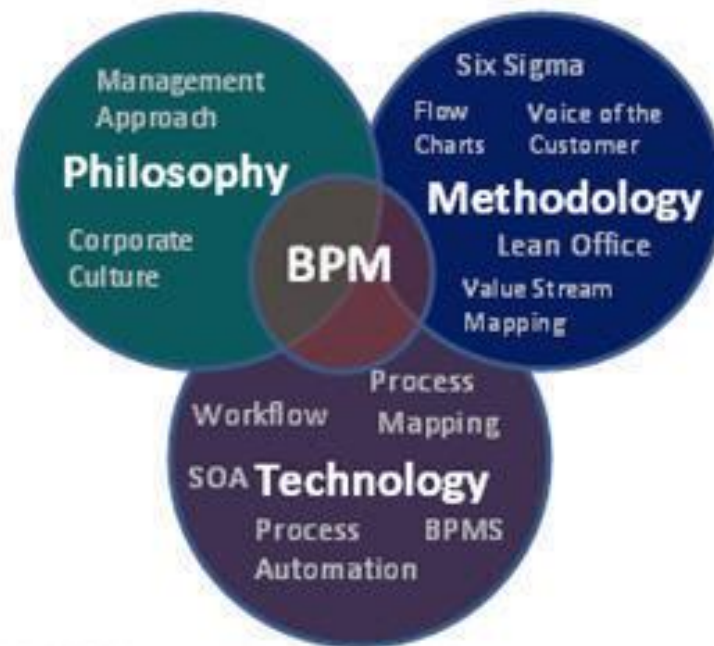
2.2. If price is **over** 40 000\$ it have to be confirmed by Financial department

2.3. Order can be rejected by the department

3. Otherwise the order is processed

# Business Process Management

**Management discipline for systematic definition, execution and measurement of processes in organizations**



# BPM adoption - definition

*A **change** in target organization **towards the establishment of a **process-driven management model**.***

*This can, but does not necessarily have to, lead to the **automation** of some processes in a **process-oriented Information Systems**.*

*Such systems can be eventually based on a **Business Process Management Suite***

# BPM adoption in practice

- Organisational and management changes towards a process-oriented approach
  - Reengineering
  - Efficiency & quality measurement
  - Certifications, standards & legal compliance
- Tailoring organisation's Information Systems towards process-oriented principles
  - Business integration (direct link business <-> IT)
  - High level technologies
  - Integration of legacy systems

# Why to adopt BPM?

- **Know-how codification**
  - **Value** of processes as a **know-how is increasing** in today's **knowledge economy**
  - Less vulnerability caused by employee fluctuation
- **Performance and costs measurement**
- **Better business-change management**
  - Changes can be performed easier
  - Impact of change can be measured
  - Important to choose good level of process rigidity
- **Increased transparency**

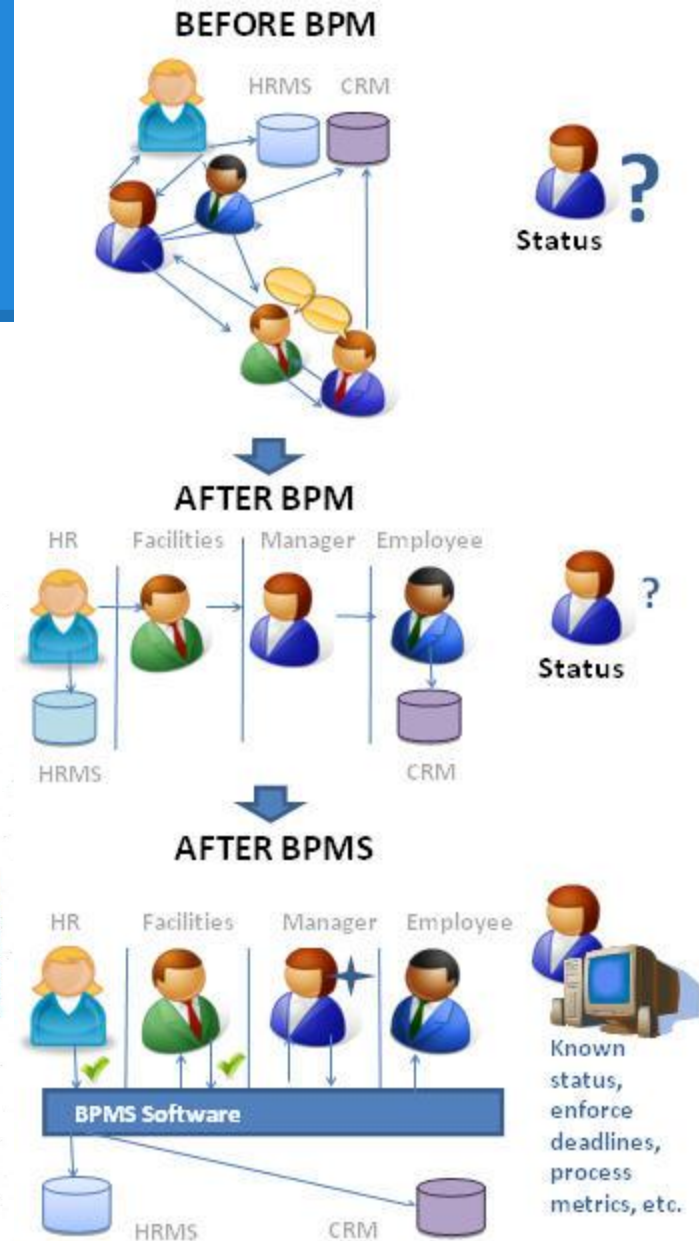
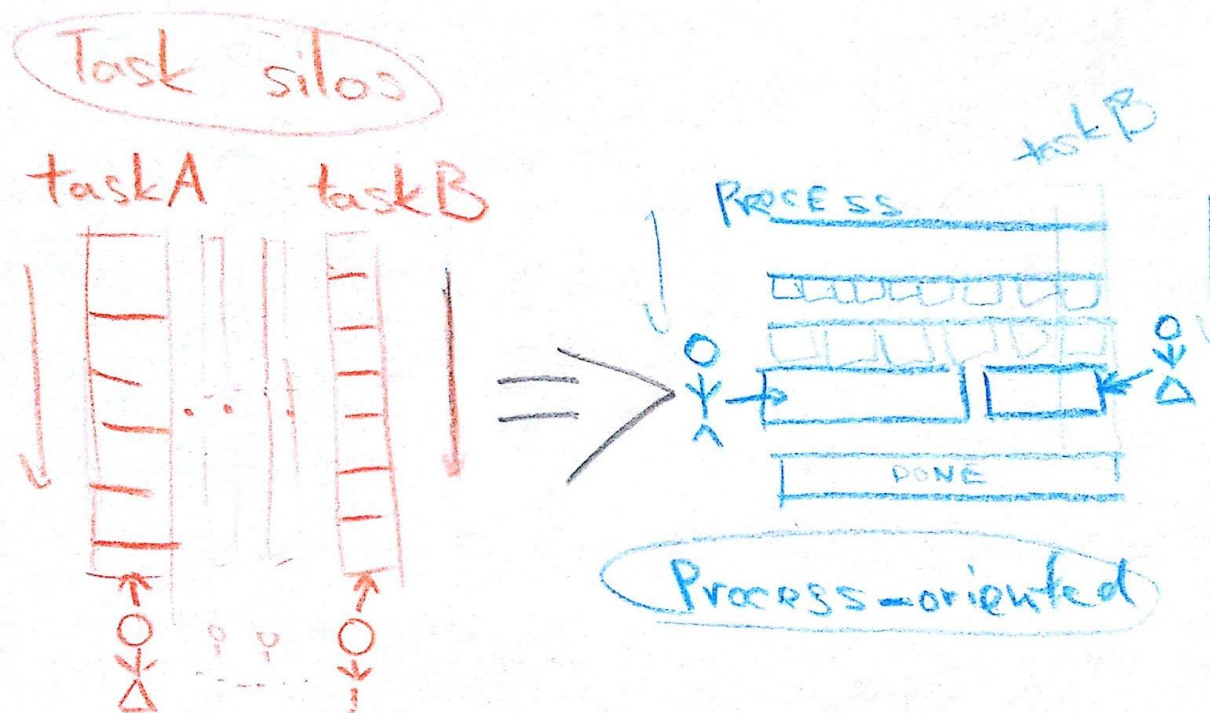


# Why to adopt BPM? (cont.)

- **Outsourcing** and business services integration
  - Measurement of outsourced services quality
- **Increase of quality**
  - Better **error detection** and **exception handling**
  - **Detection of bottlenecks** & weak points of organisation
  - Compliance with ISO standards (2000X, 9001)
- **Better organisation of work-flow /process**
  - **Higher efficiency** = reduction of costs
  - **Early detection of problems**

# Why to adopt BPM?

- **Flattening organisation's hierarchy**
  - Elimination of "silo effect"
  - **Horizontal job character**



# BPM adoption drawbacks :(

- **High initial costs**
  - Technologies & tools are expensive and not widely available
  - Change is always expensive
- **Change in people's mindset is necessary**  
(it hurts ;)
- **Changes in organization structure**
  - Fear of the change
  - Fear of job loss
- **Agreement of all major decision-makers is crucial** (not so easy)

# Potential risks of BPM adoption

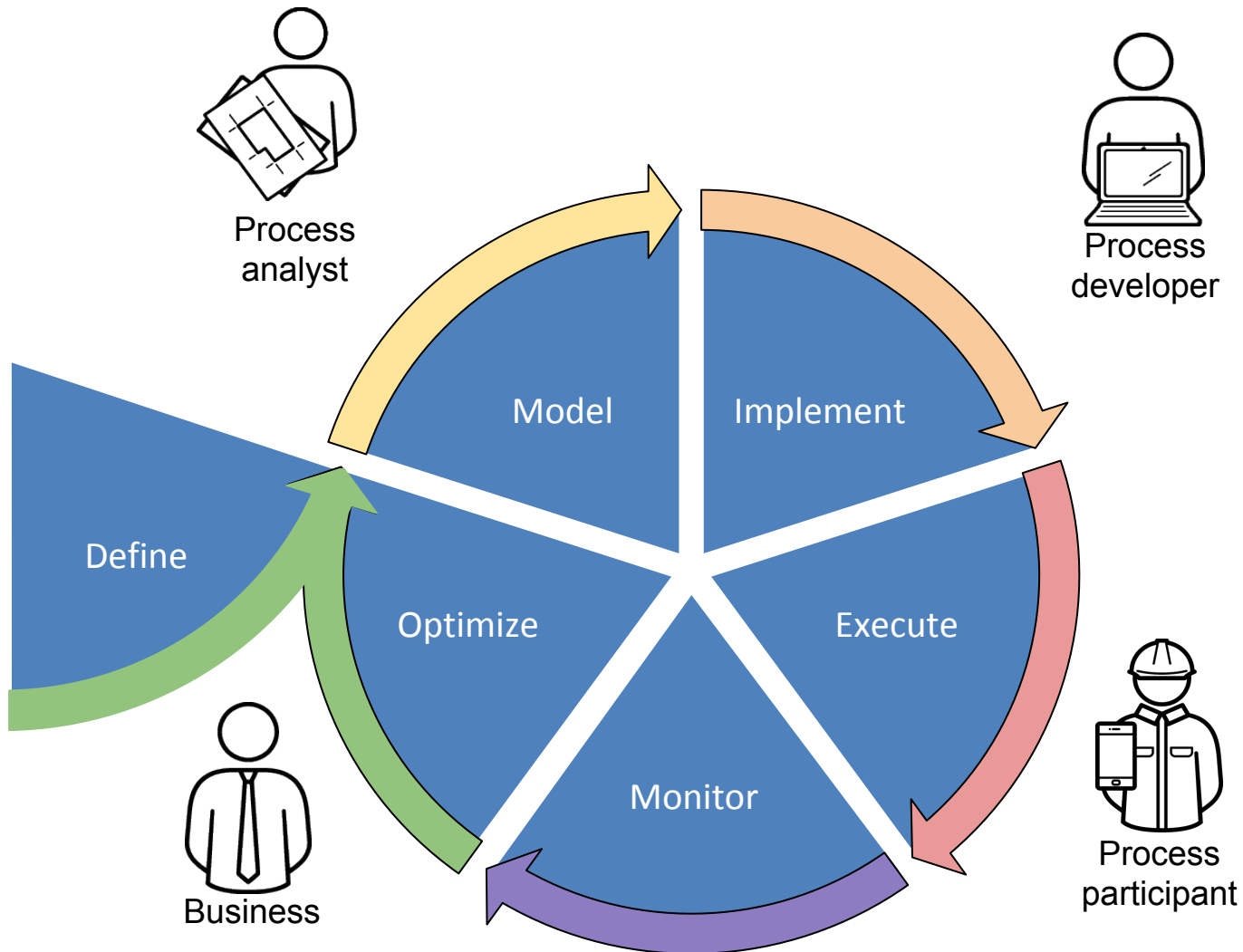
- **Loss of business flexibility**
  - Too high process rigidity
- Demotivated/Annoyed employees
- **High investments** in BPM solution
- Inefficient management changes
- Technological overkill
- Non-realistic process definitions

# Basic roles in BPM adoption

- Organisation's stakeholders (Owners, Management, Customers, Partners etc.)
- Business analyst
  - Identifies and define processes that fulfil goals
- Process specialist
  - Model and implement processes, design service integration
- System developer (Integration specialist)
  - Implements services and underlying system components
- Process participants (Business workers)

**Questions?**  
**Break 10mins**

# BPM lifecycle



# 0. phase: BUSINESS ANALYSIS

- **Roles identification**
- **Business Goals definition**
- **Objectives definition**
- **Identification of existing processes**
- **Process architecture** (relationships)
- **Reengineering** of existing processes and **definition of new ones**
- **Metrics/KPI/KRI** definition  
(Key Performance/Result Indicators)  
for Goals/Objectives



# 1. phase: DEFINE

- **Goal:** Identify/define valid and measurable processes
  - **Which objective** is being fulfilled by the process?
  - What is the **value created** by the process?
  - What are **Inputs and Outputs** of the process?
  - Which **metrics** should be on the process?
  - Who is **Process owner**?
  - Which **roles** participate on process?

# 2. phase: MODEL

- Model logical structure of the process
  - Readable by all lifecycle participants
- (BPMN) Business Process Modeling Notation
  - Graphical notations
  - Portability (Standard)
  - Based on Petri-Nets formalism
- Modeling tools
  - Stand-alone modeler
  - Modeler BPMS component

# 3. phase: IMPLEMENT

- Implement human tasks
  - Forms, user interface
- Implement integrations
  - Connect integrated systems
  - Web services ,
  - REST
  - other service tasks
- Implement data model, data structures
  - Connect to data sources (databases)

# 4. phase: MONITOR

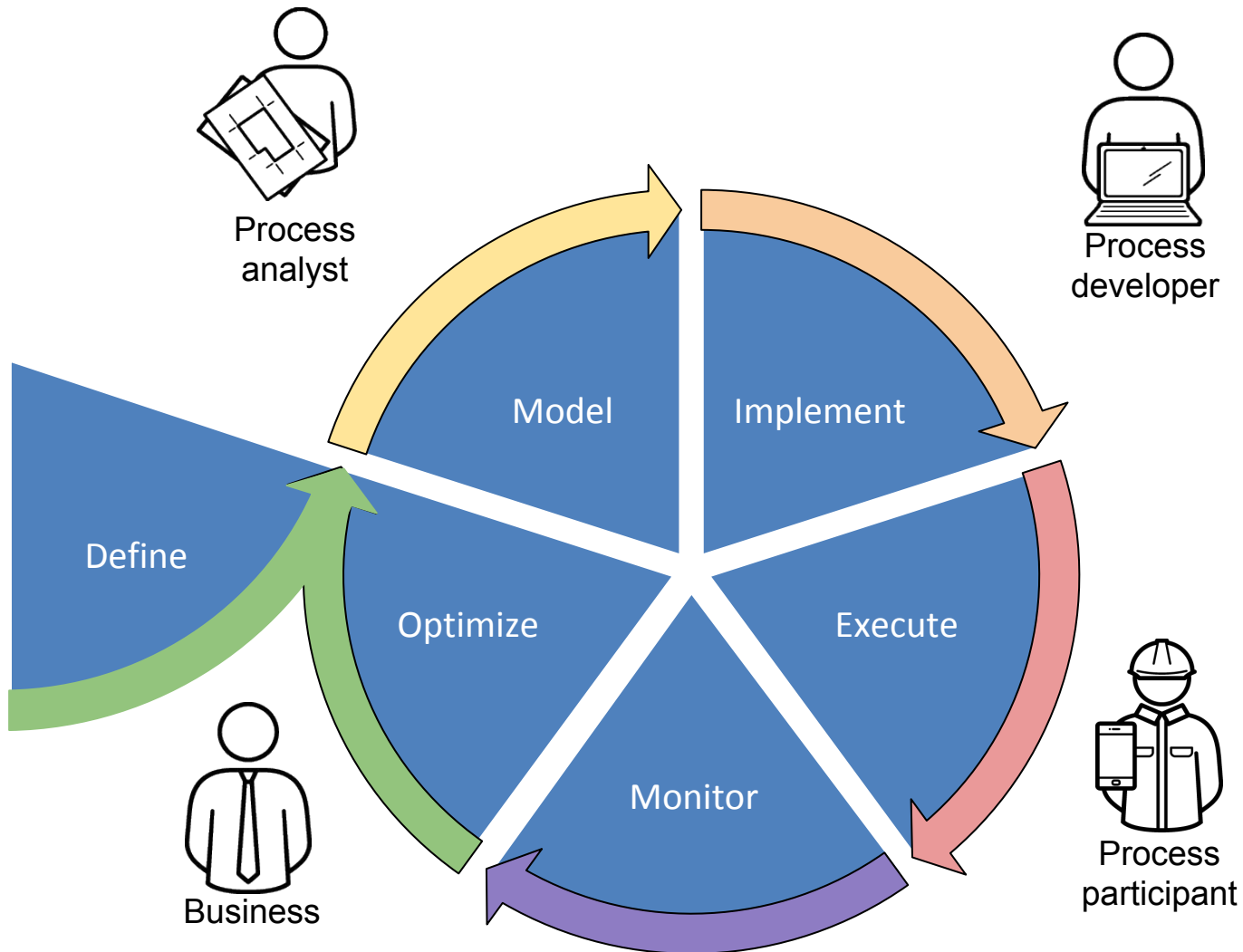
- **Reasons** for process monitoring
  - **Fault/Error detection**
  - **Performance measurement**
  - Information for **process improvement**
- **Business Activity Monitoring**
  - Real-time process monitoring
  - Measurement of process metrics
- **Key Performance/Result Indicators**
  - **Business performance**
  - Derived from process metrics

Tracking of **business goals fulfillment**

# 5.phase : OPTIMIZE

- Reasons:
  - Measured **gaps in performance**
  - **Changes of process** in real world
- Continuous process improvement:
  - Detection of **inefficient parts** of process
  - **Bottlenecks, cost inefficiency**
  - **Design and validation** of change (simulation)
  - **Process modification**
  - **Deployment** of optimised version
  - **Monitoring**
  - <> repeat until dead;

# BPM lifecycle



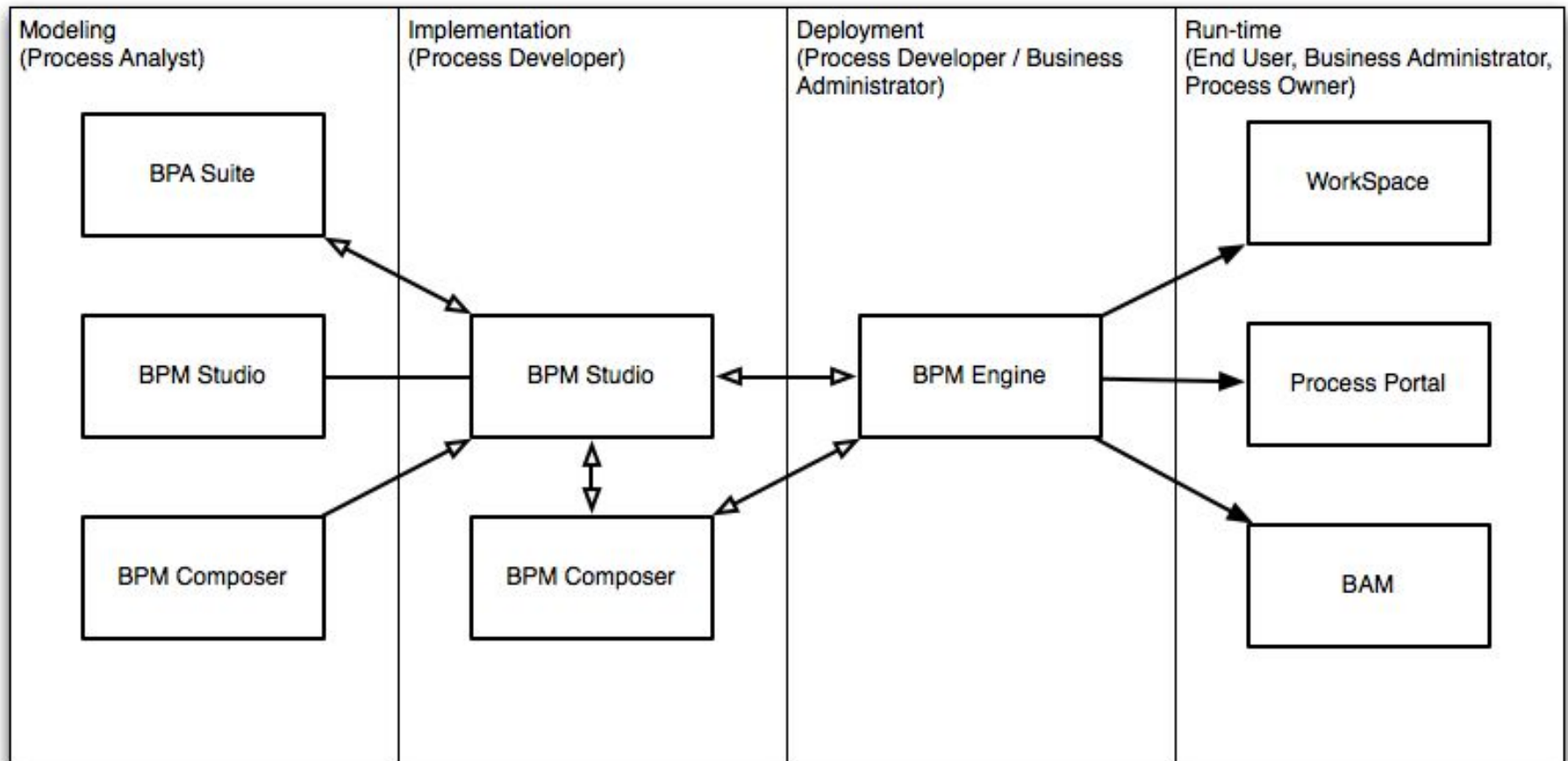
# Business Process Management System

*“A suite of tools and software components supporting the whole BPM lifecycle”*

Usual BPMS components:

- Process modeller
- Process simulator
- Execution engine
- Process console (admin interface)
- Human tasks engine (process user interface)
- Business Rule engine
- Business activity monitoring interface

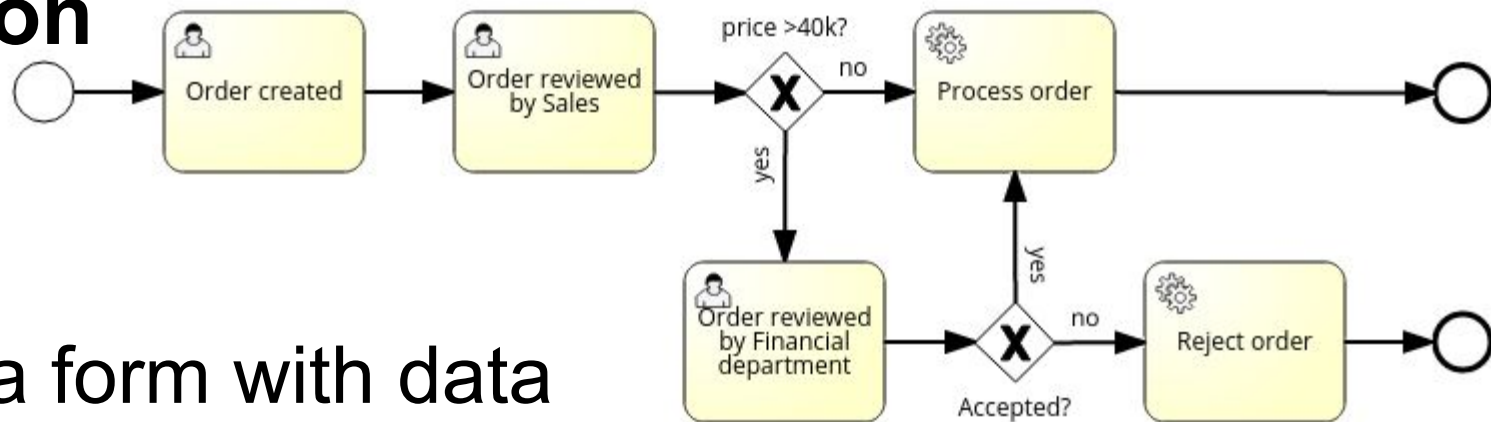
# BPM lifecycle again





# Human tasks

## Process activities with necessary human interaction



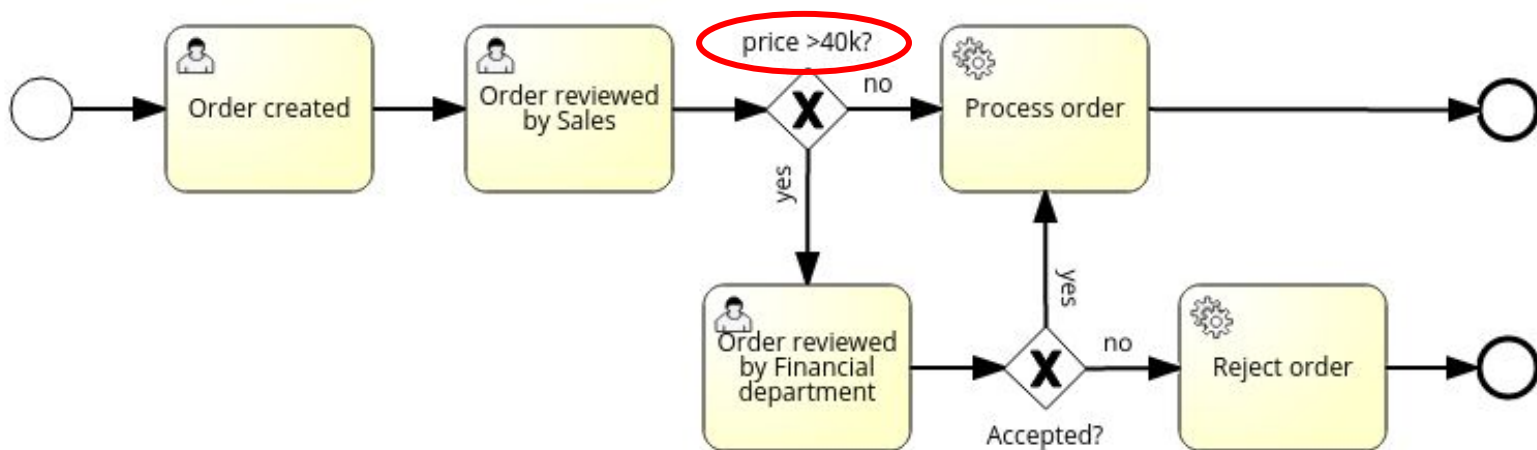
- Filling a form with data
  - Notifications, escalations, timeouts, delegation ..
- Common implementations
  - Portal style interface, Web 2.0 form frameworks
  - Proprietary BPMS vendor interfaces
- Often embeddable in other interfaces

# Business Rules

- **Rules stored aside from process**
- **Specific rule language for evaluation**
- Evaluated by Business Rules Engine
- **Rule + Input data => Output**
- Typically IF – THEN
- **Rules types**
  - Validation rules
  - Transformation rules
- **Business Rule Engine often exposed as an API REST/Web Service**

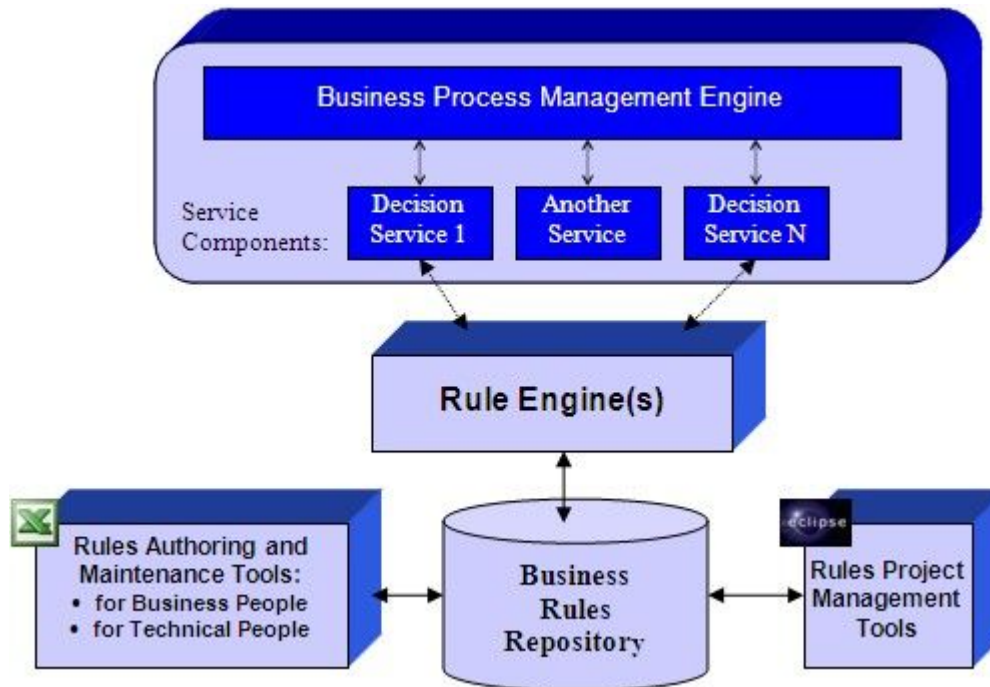
# Business Rules – Example

- Rules decision in Order process:
  - Rule has **parameter (40 000\$)**



- We **change parameter** or **replace rule**
- Rules can be changed **dynamically**

# Business Rules Management system



# Business Rules example:

- **Business object: Order**
  - id – of an order
  - itemPrice – price of one item of order
  - quantity – quantity of item
- finDirDecisionNeeded – boolean identifying if CFO's decision is necessary
- **Rule evaluation language:**
  - `order_price = Order(eval( quantity * itemPrice ) )`
- **Rule itself**
  - `WHEN order_price > 40.000 THEN set finDirDecisionNeeded = true`

# Business Activity Monitoring

- Monitoring is important part of BPM lifecycle
  - Monitoring data are **inputs for process improvement**
  - **Early detection of problems**
- **Process metric examples**
  - Order processing time, Order total price, Order state
- **KPI examples:**
  - Average time of order processing per day
  - Sum of prices of all Orders for this week
  - Number of cancelled Orders this week
    - Percentage of Orders with delayed payment

# Business Activity Monitoring - Dashboards

- Monitoring of process data in **real time**
- **Actions triggered** when certain metric value is reached
  - On screen, Email, SMS
  - Trigger action/process
- Custom set of figures on one page
- Configurable for every user

Welcome wid

Getting Started Dashboards Utilities

Manage Instances x Test x Test x Screen 1 x Screen 2 x

### Alerts

| <input type="checkbox"/> | <input type="text"/> | Subject | Date and Time                       |
|--------------------------|----------------------|---------|-------------------------------------|
| <input type="checkbox"/> | *                    | Alert   | Friday, October 26, 2007 2:02:48 AM |
| <input type="checkbox"/> | *                    | Alert   | Friday, October 26, 2007 1:52:34 AM |
| <input type="checkbox"/> | *                    | Alert   | Friday, October 26, 2007 1:44:53 AM |

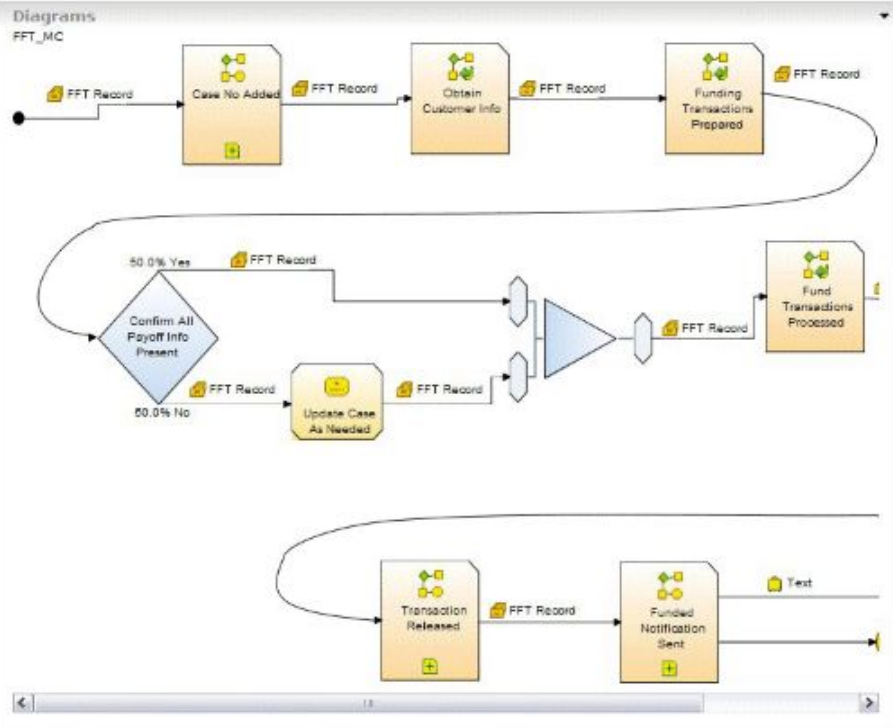
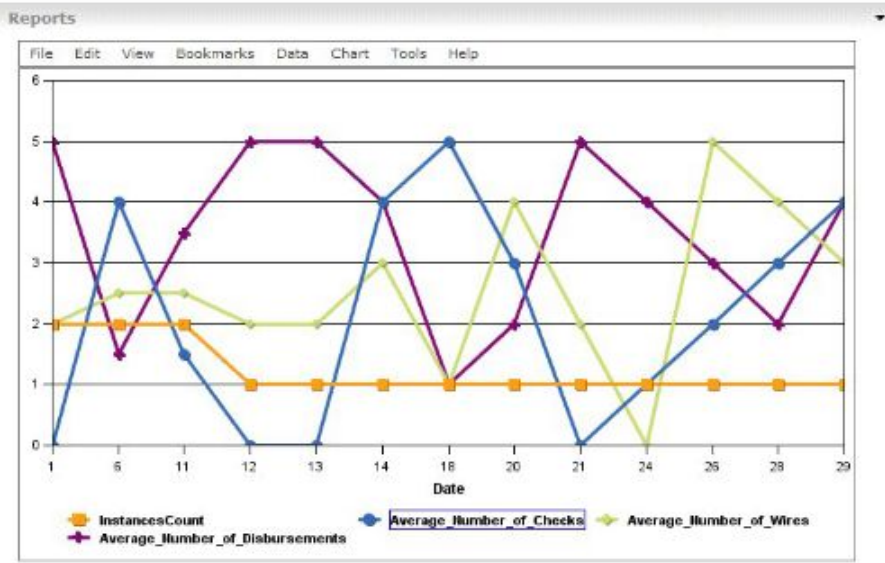
Page 1 of 7 Go to page: Results 1 to 3 of 21

### Human Tasks

Actions

| <input type="checkbox"/> | Task Name        | Owner      | Status               | Escalated | Work Duration  |
|--------------------------|------------------|------------|----------------------|-----------|----------------|
| <input type="checkbox"/> | Patient checkin  | mjohnson   | Ready to be Assigned | false     | 22 m, 10 s     |
| <input type="checkbox"/> | Patient checkout | swalter    | Complete             | false     | 1 h, 35 m, 5 s |
| <input type="checkbox"/> | Update record    | evayne     | Ready to be Assigned | false     | 20 m, 5 s      |
| <input type="checkbox"/> | File insurance   | sjasinski  | Working              | false     | 45 m, 45 s     |
| <input type="checkbox"/> | Verify record    | Unassigned | On hold              | true      | 25 m, 10 s     |

Page 1 of 1 Go to page: Results 1 to 5 of 5





# Existing BPMS products

## ● Open source

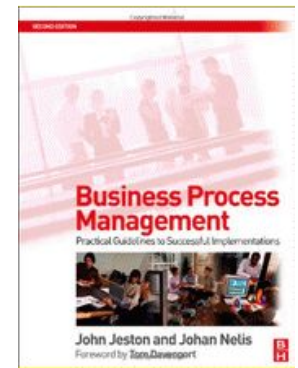
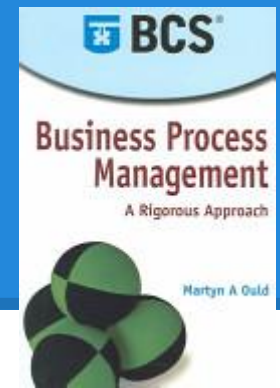
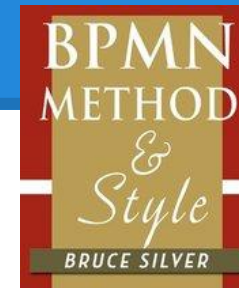
- Red Hat Process Automation  
AKA jBPM
- Activiti / Cammunda
- PVM based
  - JBPM 3
  - Bonita
  - Orchestra
- ApacheODE based
  - Project Levi
- ++

## ● Proprietary

- IBM BPM
- Bizagi
- Appian
- Opentext/Metastorm
- Pegasystems
- Savvion
- Signavio
- TIBCO iProcess Suite
- Oracle BPM suite
- ARIS enterprise BPMS
- ++

# Extended books (beyond course border)

- BPMN method and style  
Bruce Silver, 20099780982368107
- Business Process Management: Practical Guidelines to Successful Implementations
- Business Process Management: A Rigorous Approach
- Business Process Management: Concepts, Languages, Architectures
- Essential Business Process Modeling
- Smith, H. and Fingar, P.: Business process management: the third wave
- "Schedlbauer, M.: The Art of Business Process Modeling: The Business Analyst's Guide to Process Modeling with UML and BPMN"



# FIN

## Questions?

PV207 – Business Process Management

Jiří Kolář