

Process design & BPMS

PV207 – Business Process Management

Spring 2023

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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/1y0hIr1VrK7s2O4fMoHayqogJ_ur6YOwmiNyJf1aAW4Q/edit#

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

Important guidelines

- The course is “easy to pass”
- **Knowledge value** is mainly in lectures
- Seminars are complementary & **mandatory**
- Build your team **first week** and work in teams
- 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 drivers for adoption of BPM:

- **Business Reengineering**
 - Enterprise growth
 - Acquisitions
 - Organisational and cultural changes
- **Quality Management & Measurement**
- **Legal compliance, certifications**

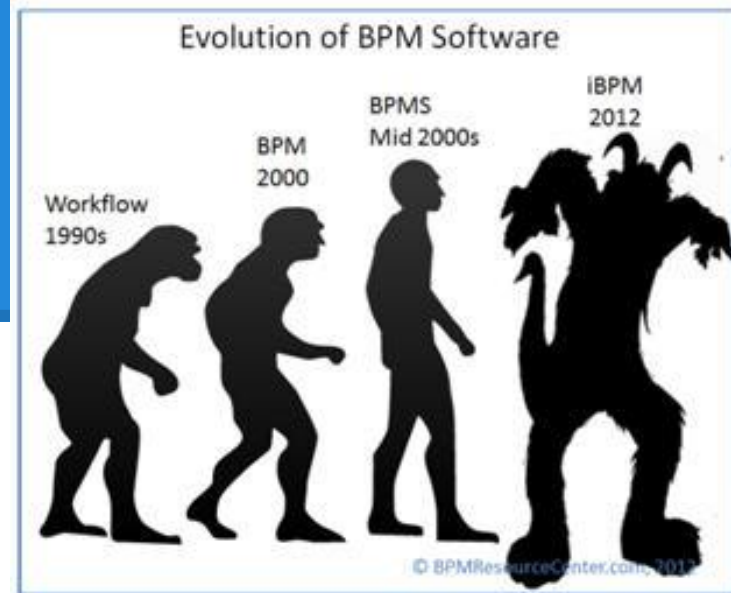
- **Technical**
 - A Method for design and development of **Enterprise Information Systems**
 - Orchestration of system integration logic

Where do we find BPM?

- Large enterprises
 - Banking,
 - Insurance Business
 - Telco
 - E-commerce / 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**
- **2015 Case Management, Low code apps**
- **2020 Processes in cloud ecosystem**



Business process definition

Definition:

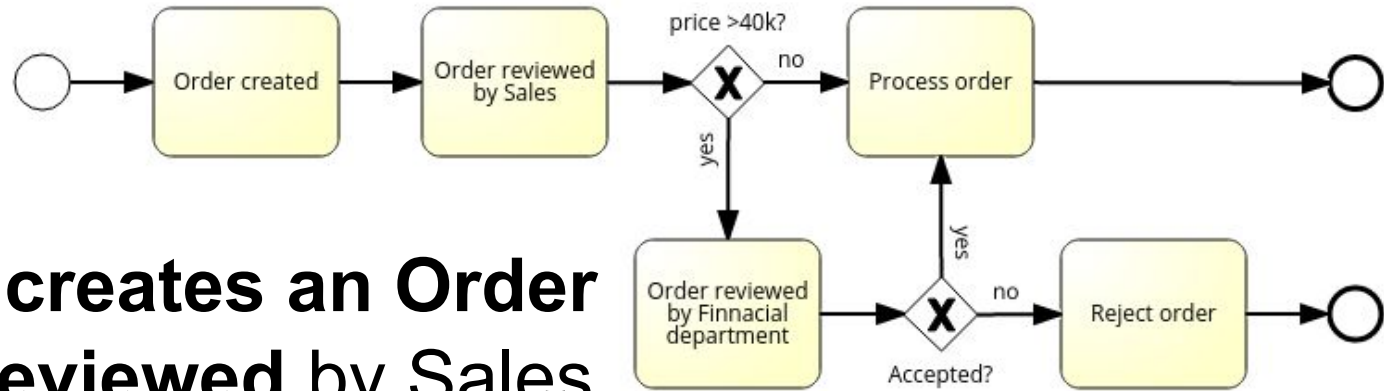
Series of logically related activities or tasks (such as planning, production, sales) performed together to produce a defined set of results.

-- Business Dictionary

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

-- Jiří Kolář in scope of PV207

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

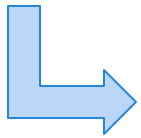
Business Process Management

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

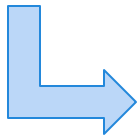


BPM adoption - definition

*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***

What is 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

BPM adoption drivers again

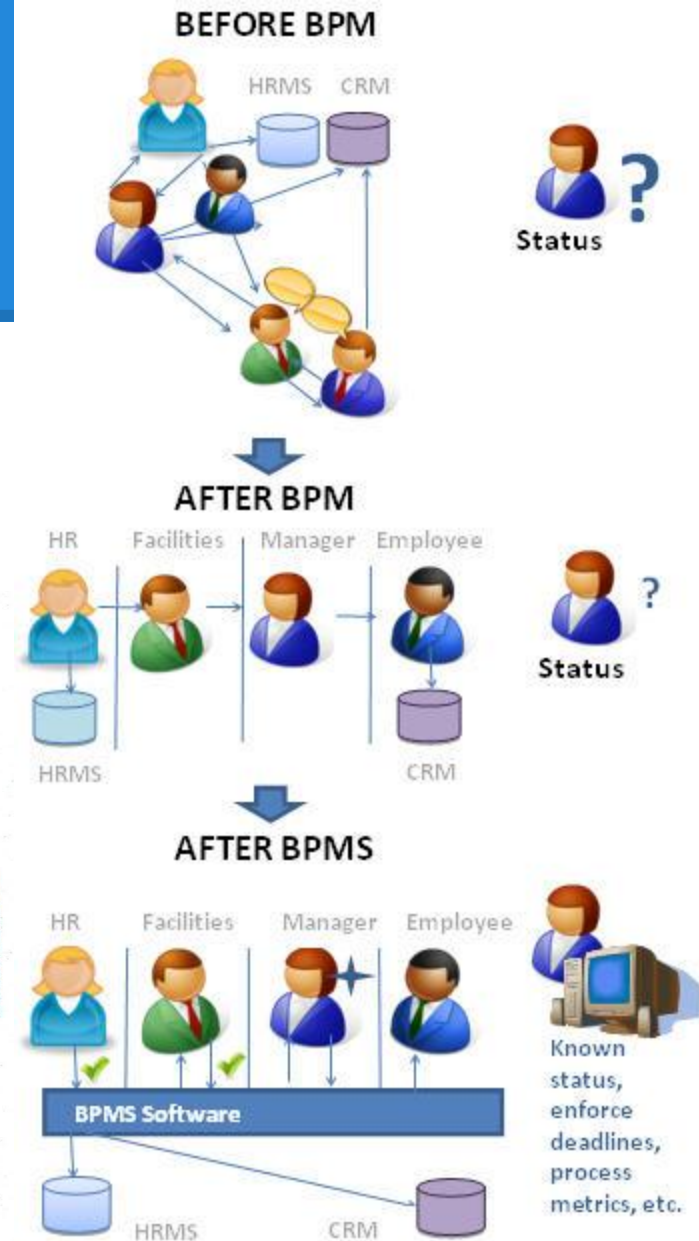
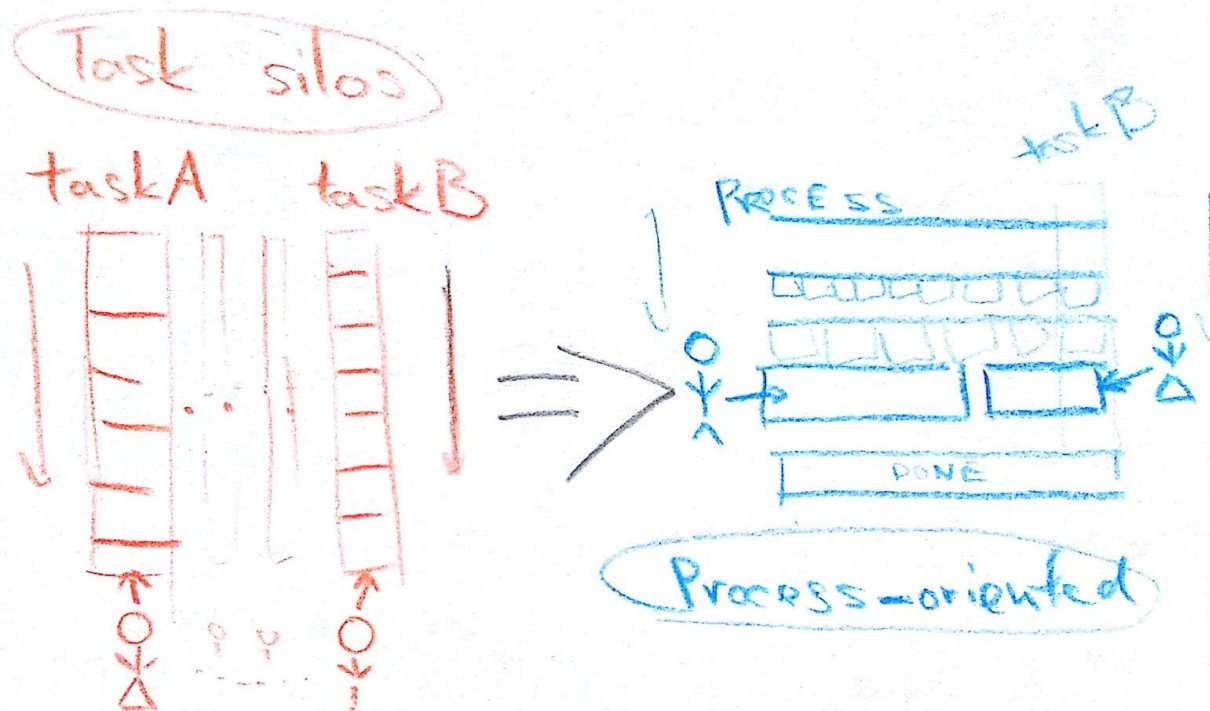
- **Know-how codification**
 - **Value** of processes as a **know-how is increasing** in today's **knowledge economy**
 - Less vulnerability caused by employee fluctuation
- **Performance and costs measurement**
- **Better business-change management**
 - Changes can be performed easier
 - Impact of change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

BPM adoption drivers again (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**

Organization impact

- **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

Questions?
Break 10mins

Full BPM Adoption (Including process automation)

- **Define Business strategy**
- **Define and model processes**
- **Automate processes with a SW**
- **Optimize automated processes**

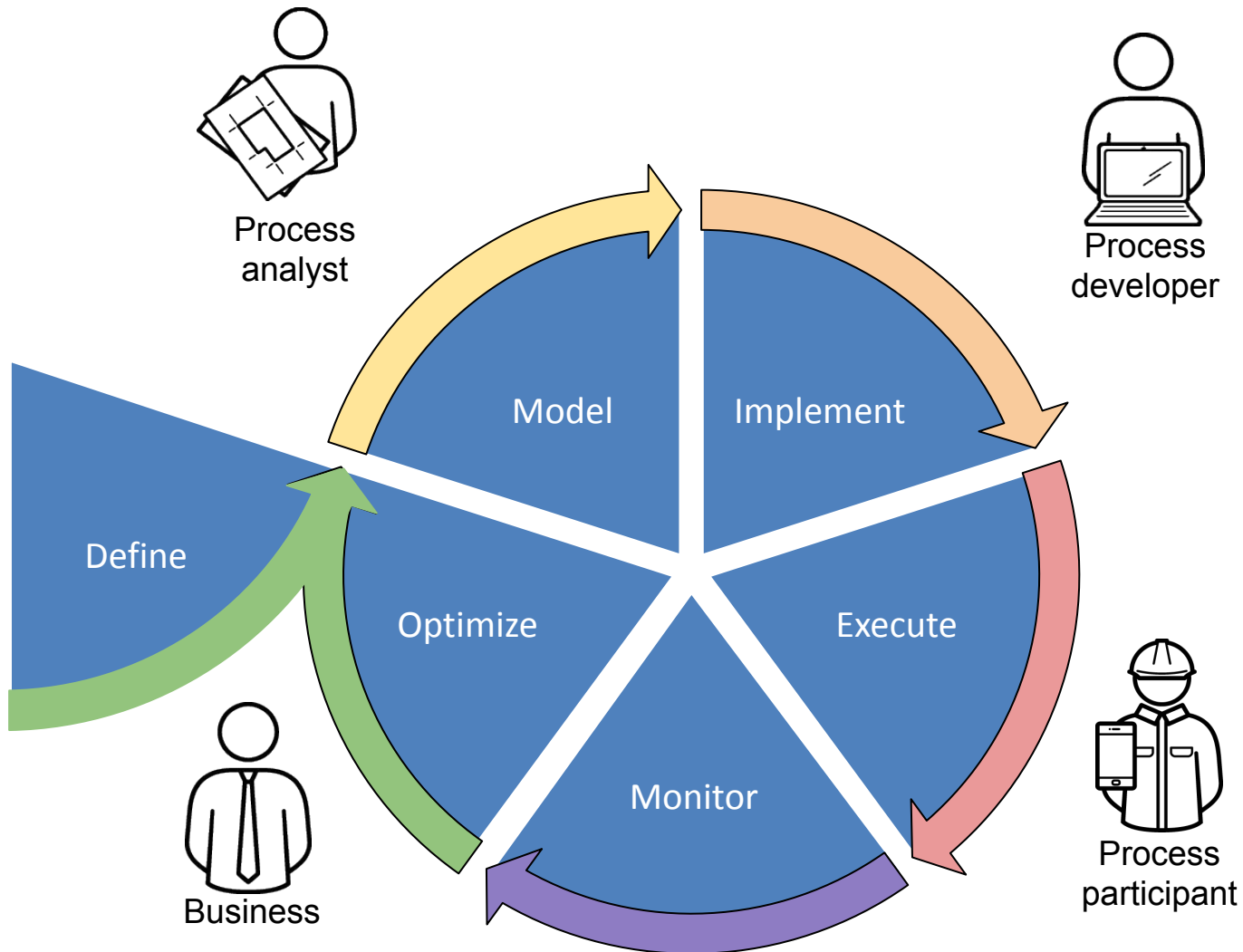
Typical Scenario:

Mixed human and “machine” inputs entering a workflow over longer period of time

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)

Full 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

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

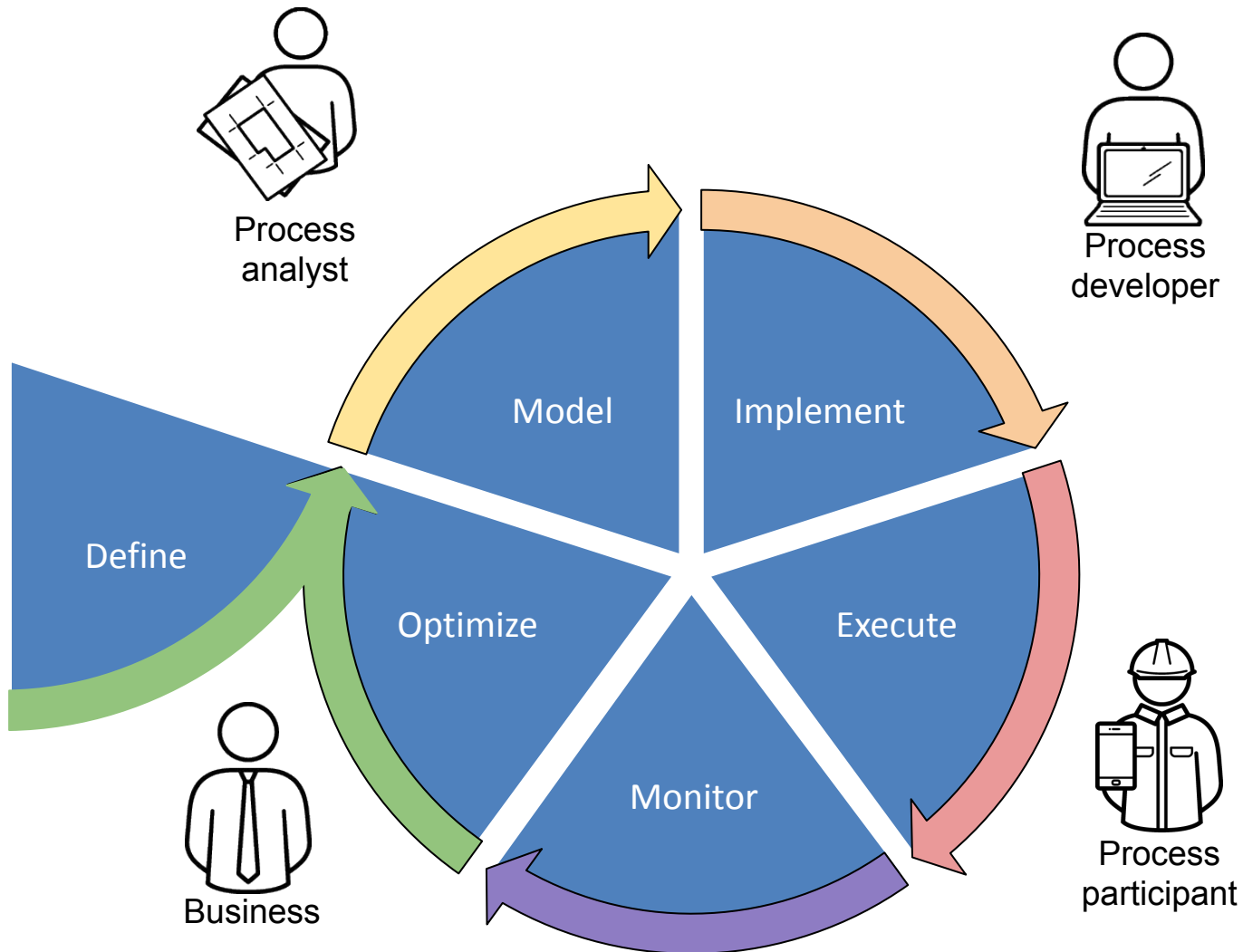
- **Reasons** for process monitoring
 - **Fault/Error detection**
 - **Performance measurement**
 - Information for **process improvement**
- **Business Activity Monitoring**
 - Real-time process monitoring
 - Measurement of process metrics
- **Key Performance/Result Indicators**
 - **Business performance**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

Full BPM lifecycle



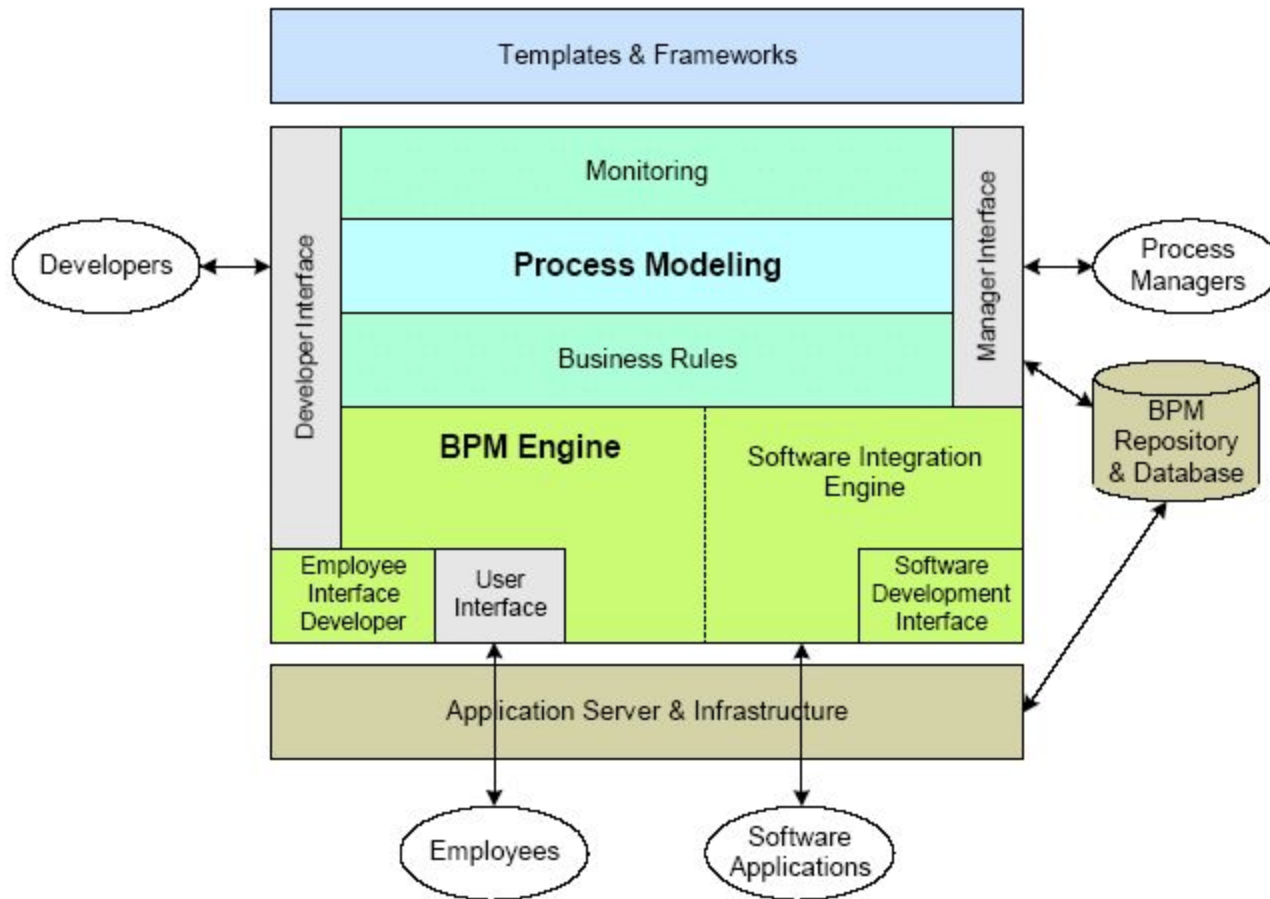
Business Process Management System

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

Usual BPMS components:

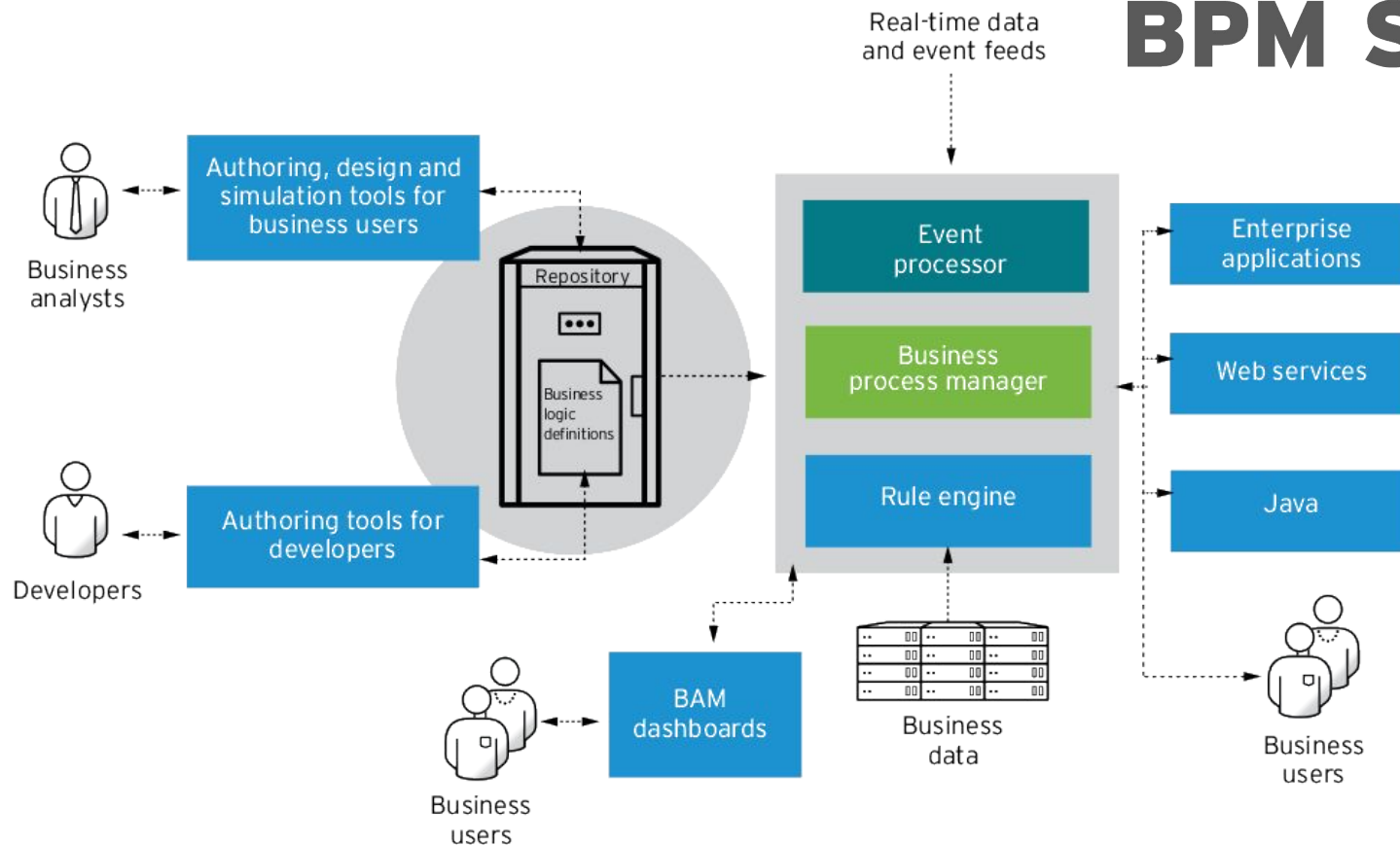
- Process modeller
- Process simulator
- Execution engine
- Process console (admin interface)
- Human tasks engine (process user interface)
- Business Rule engine
- Business activity monitoring interface

BPM lifecycle again



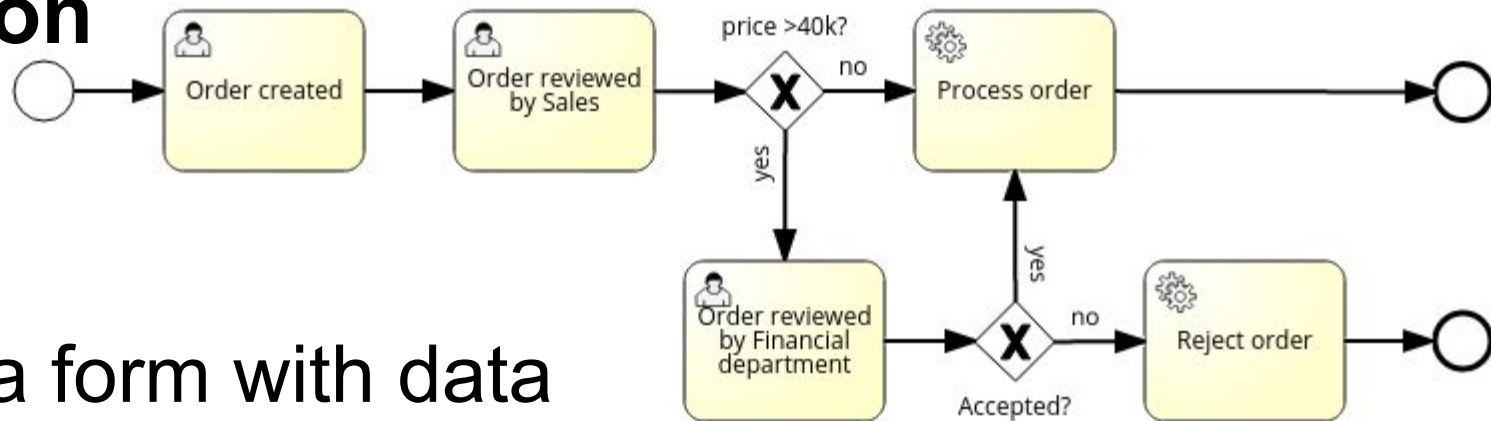
BPMS Architecture example

RED HAT® JBOSS®
BPM SUITE



Human tasks

Process activities with necessary human interaction



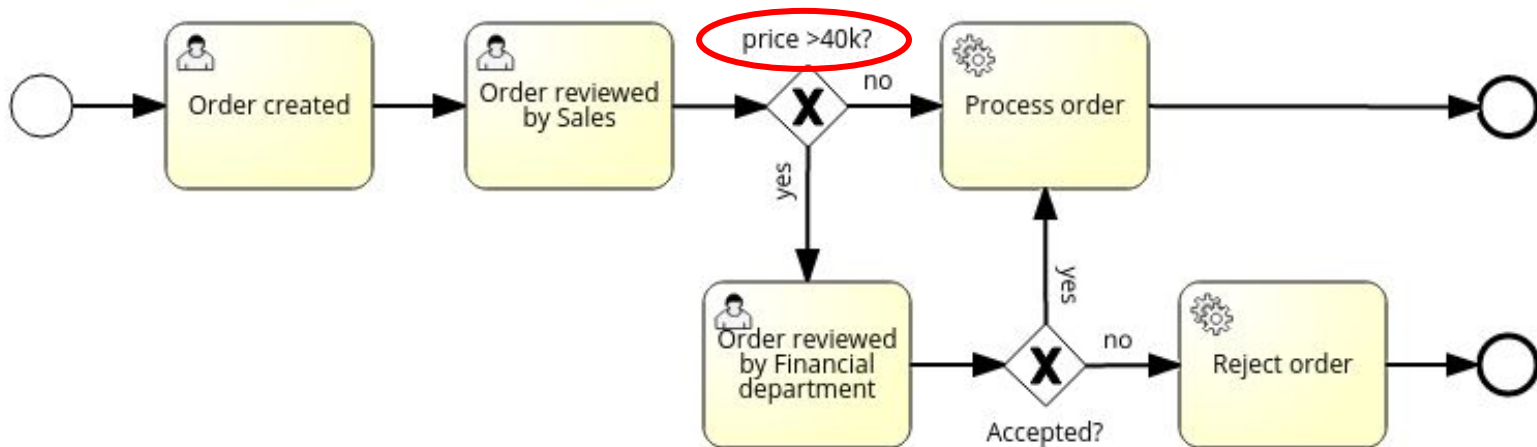
- Filling a form with data
 - Notifications, escalations, timeouts, delegation ..
- Common implementations
 - Portal style interface, Web 2.0 form frameworks
 - Proprietary BPMS vendor interfaces
- Often embeddable in other interfaces

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**

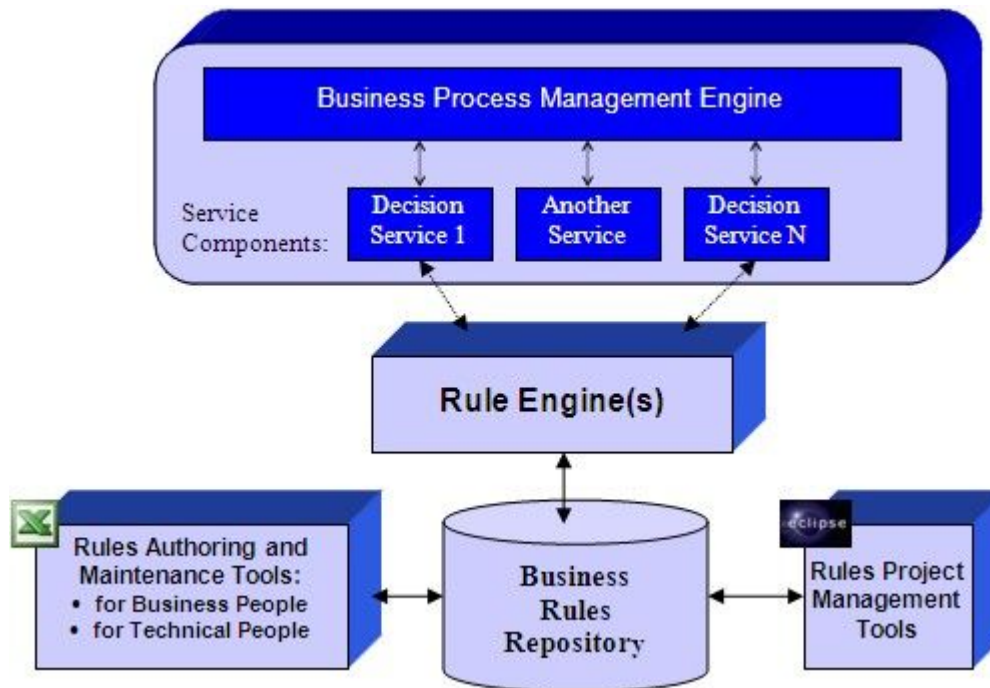
Business Rules – Example

- 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

Mark Read Mark Unread Forward Alert Remove

<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

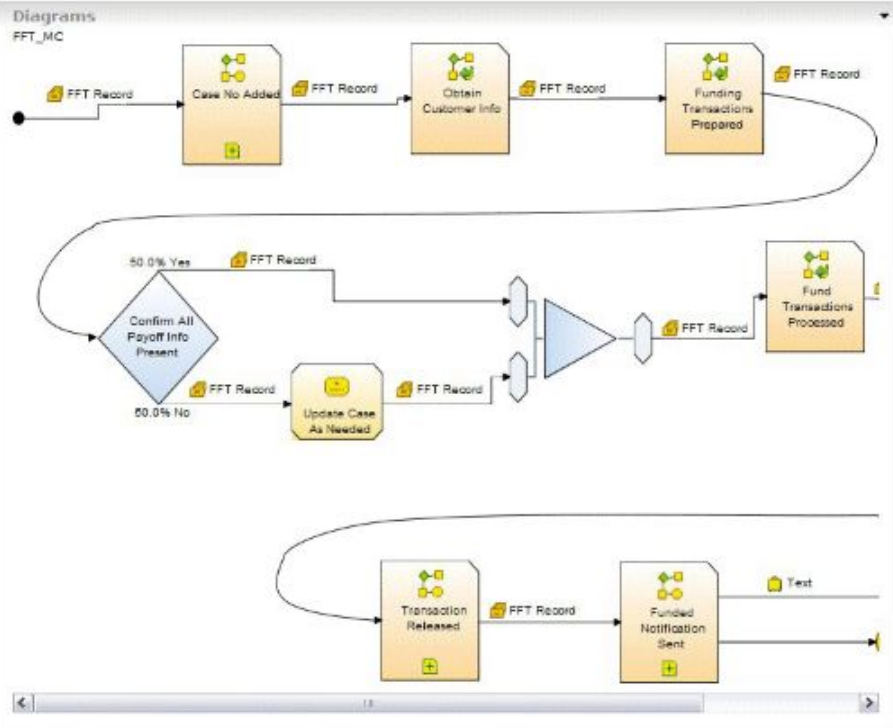
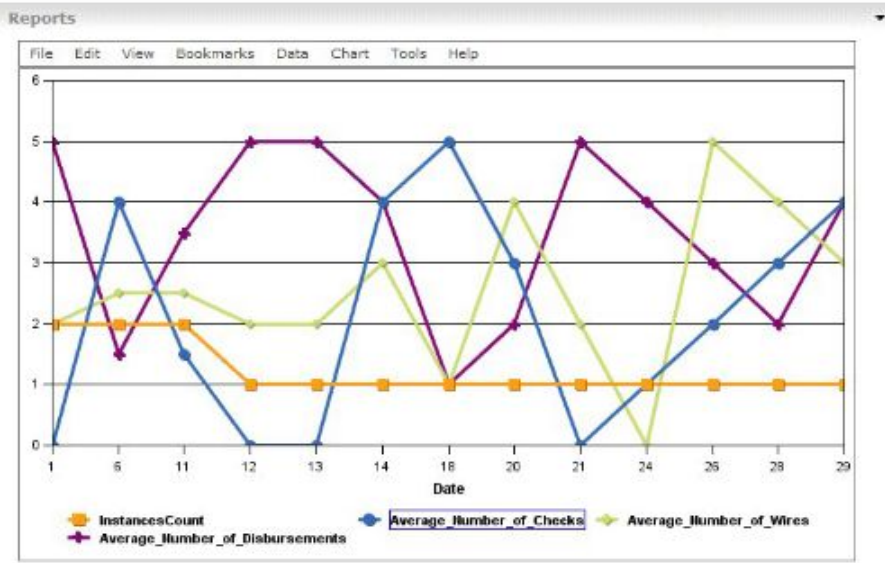
Page 1 of 7 Go to page: Results 1 to 3 of 21

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

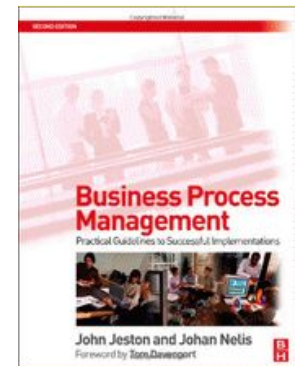
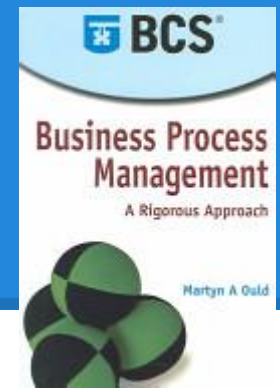
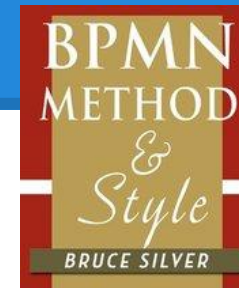
- Red Hat Process Automation
AKA jBPM
- Activiti / Cammunda
- PVM based
 - JBPM 3
 - Bonita
 - Orchestra
- ApacheODE based
 - Project Levi
- ++

● 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