Workflow Modeling and Process Management

VU 188.924 SS 2022

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TU WIEN Informatics

electronic commerce

Organization

- lectures and project (practical part)
- 5 lecture units
  - introduction 9.3.22
  - business process modelling notation (BPMN 2.0) 16.3.22
  - from model to execution 23.3.22
  - monitoring processes 30.3.22
  - workflow patterns 27.4.22
- intermediate Internet questionnaire and competence evaluation (deadline 13.3.22 and 27.3.22)
- if results of questionnaire are negative you may have an oral exam
- main evaluation criteria is project and communication
- no further exam

Overview of Project Organization

- developing a business process management system
- teams of five students
- define a process for a certain application domain
  - measurement of key performance indicators (KPIs)
  - other students of course as customers
- present concept
- select a modelling tool
- upload a workflow model (BPMN 2.0)
- implement BPMS with a tool
- each group member implements a certain task of workflow that is integrated in the process
- usage of workflow by others
- evaluation of key performance indicators
- presentation of results

Resources

- TUWEL
  - Slide copies
  - papers related to the content
  - Fundamentals of Business Process Management available online (from the University network) as a PDF
- Contact:
  - wfm@ec.tuwien.ac.at
- Course Management System:
  - WFM https://wfm.ec.tuwien.ac.at with TISS credentials
  - some links to learning objects (can be extended by you)
  - registration and online tasks

Research-oriented Course

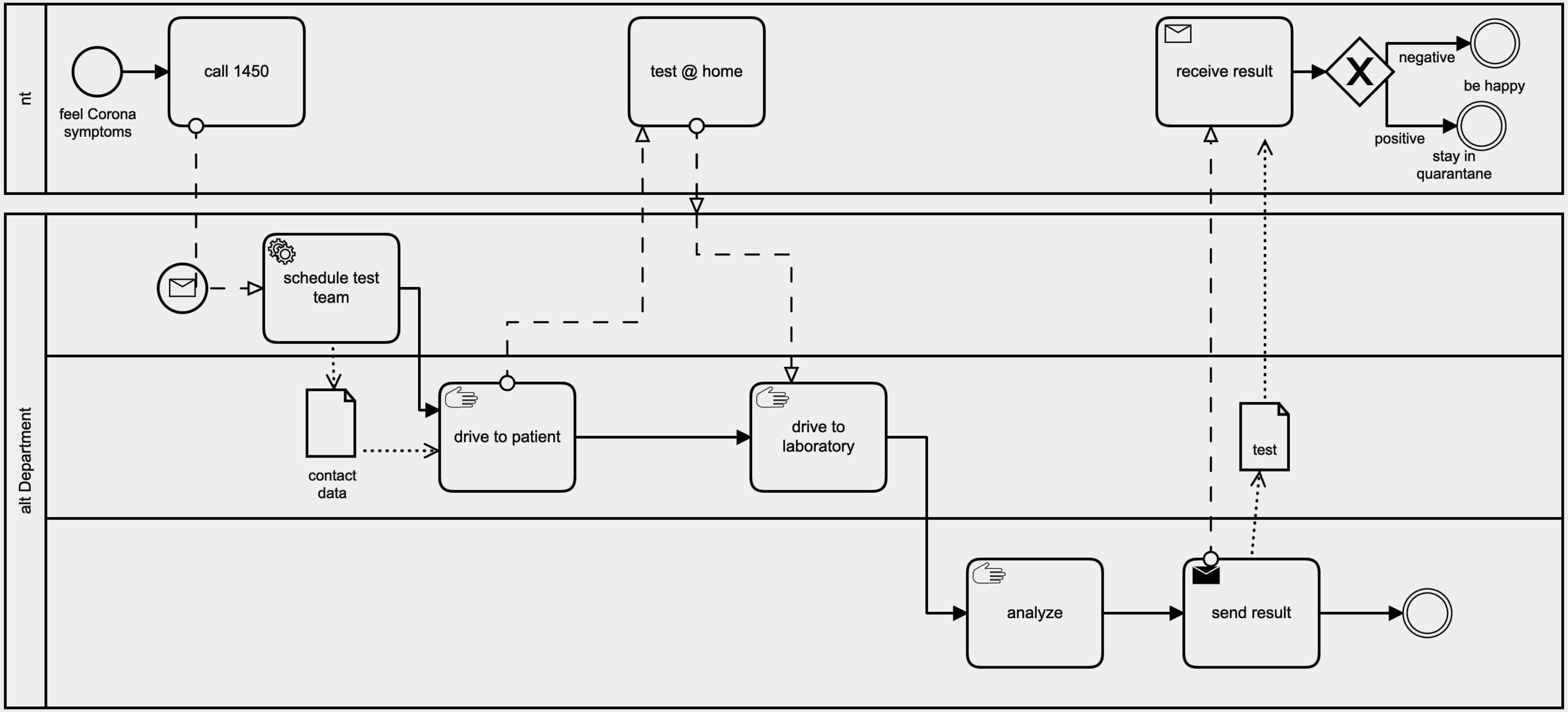
- you have to design an application and decide on tools (only restrictions on complexity of application)
- course participation as an instance of a workflow
- we store each individual's experience as a case in a case-based reasoning system

- goal: a learning system supporting development of workflow management systems in future

- experience and feedback are welcome

Business Process Definition

- What is a (business) process?
  - a number of activities to achieve a result that is expected by a customer of the process
- examples
  - order a book at Amazon (strongly sequential process)
  - treatment at hospital (many decisions)
  - produce a car
  - develop software
  - (registering for) university study
  - our university course?
- What is a workflow?
  - a process where the coordination of the activities is controlled by a standard computer program


nt
feel Corona symptoms
call 1450
test @ home
receive result
negative
be happy
positive
stay in quarantane
alt Department
schedule test team
contact data
drive to patient
drive to laboratory
test
analyze
send result

Main Characteristic of Process

- distribution logical and spatial
  - different humans (roles) participating
  - different information systems (new applications or legacy)
  - coordination is achieved by standard software
  - data transfer between different activities

Motivation of Process Management

- Quality Management
  - high qualitative output
  - but also efficient production of output
  - fast reaction (satisfying deadlines)
  - flexibility (becoming more important)

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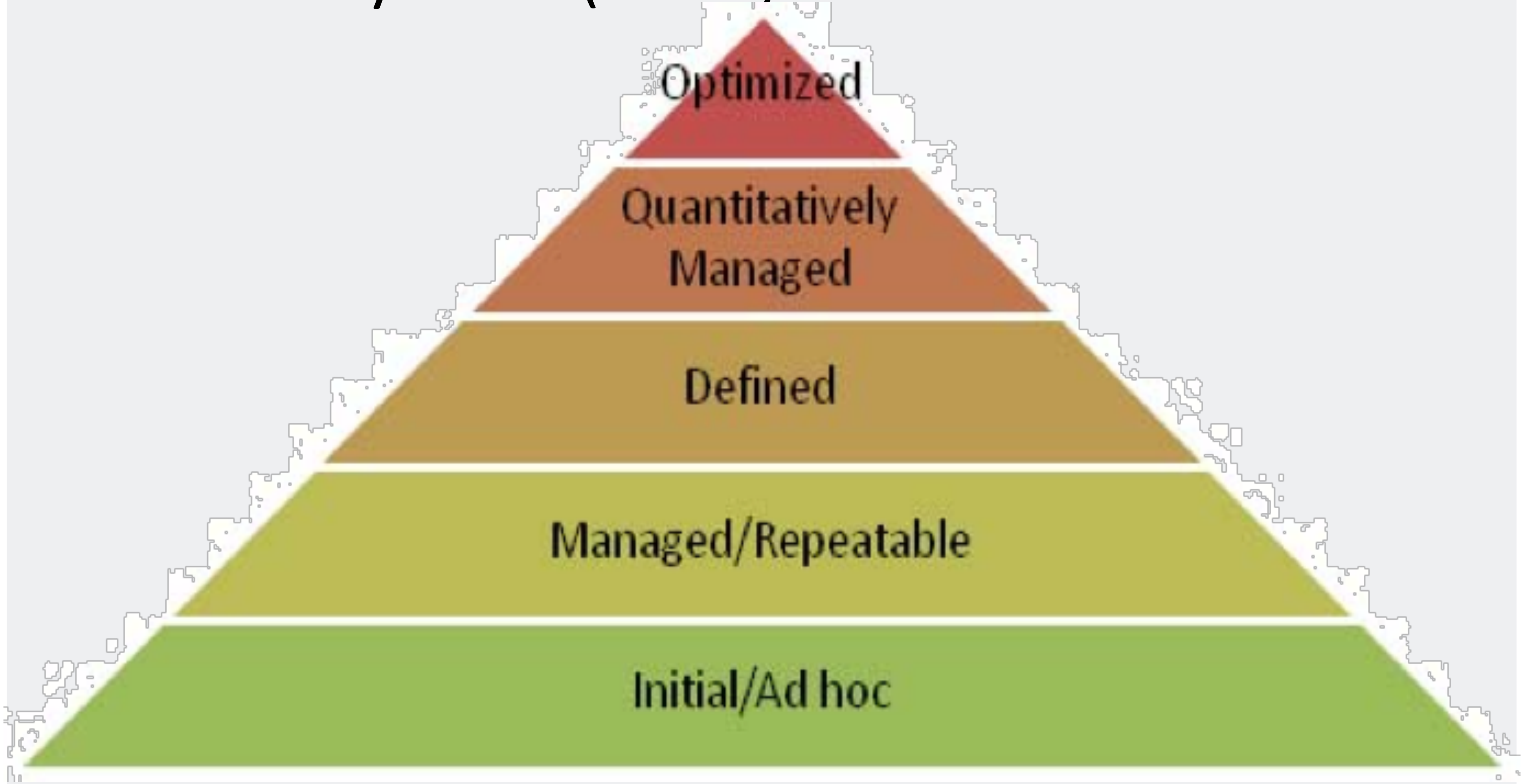
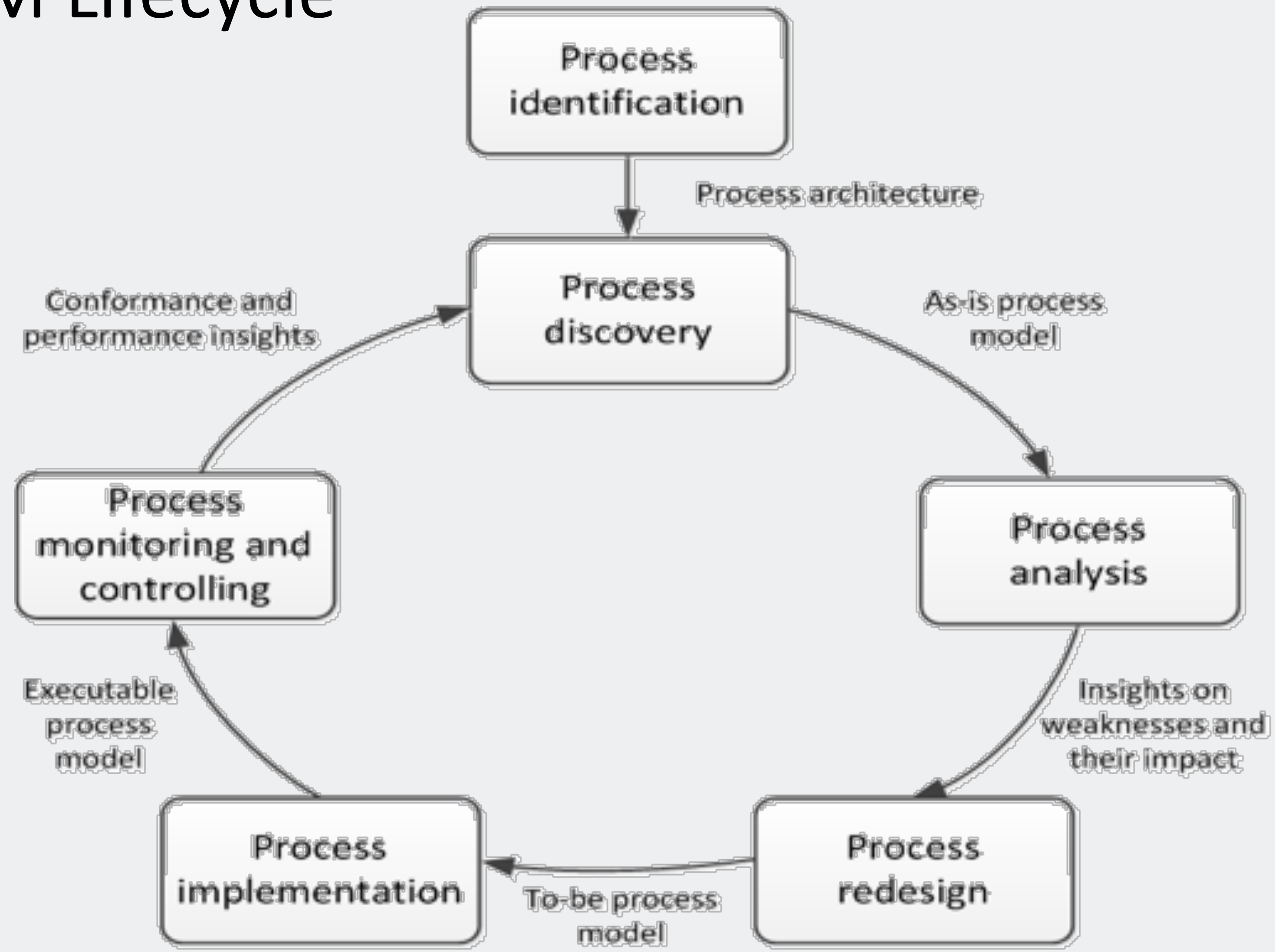
- externalization of process knowledge
- standardization of processes
- defining responsibilities
- asking the customer what she expects (what is quality)
- continuous improvement

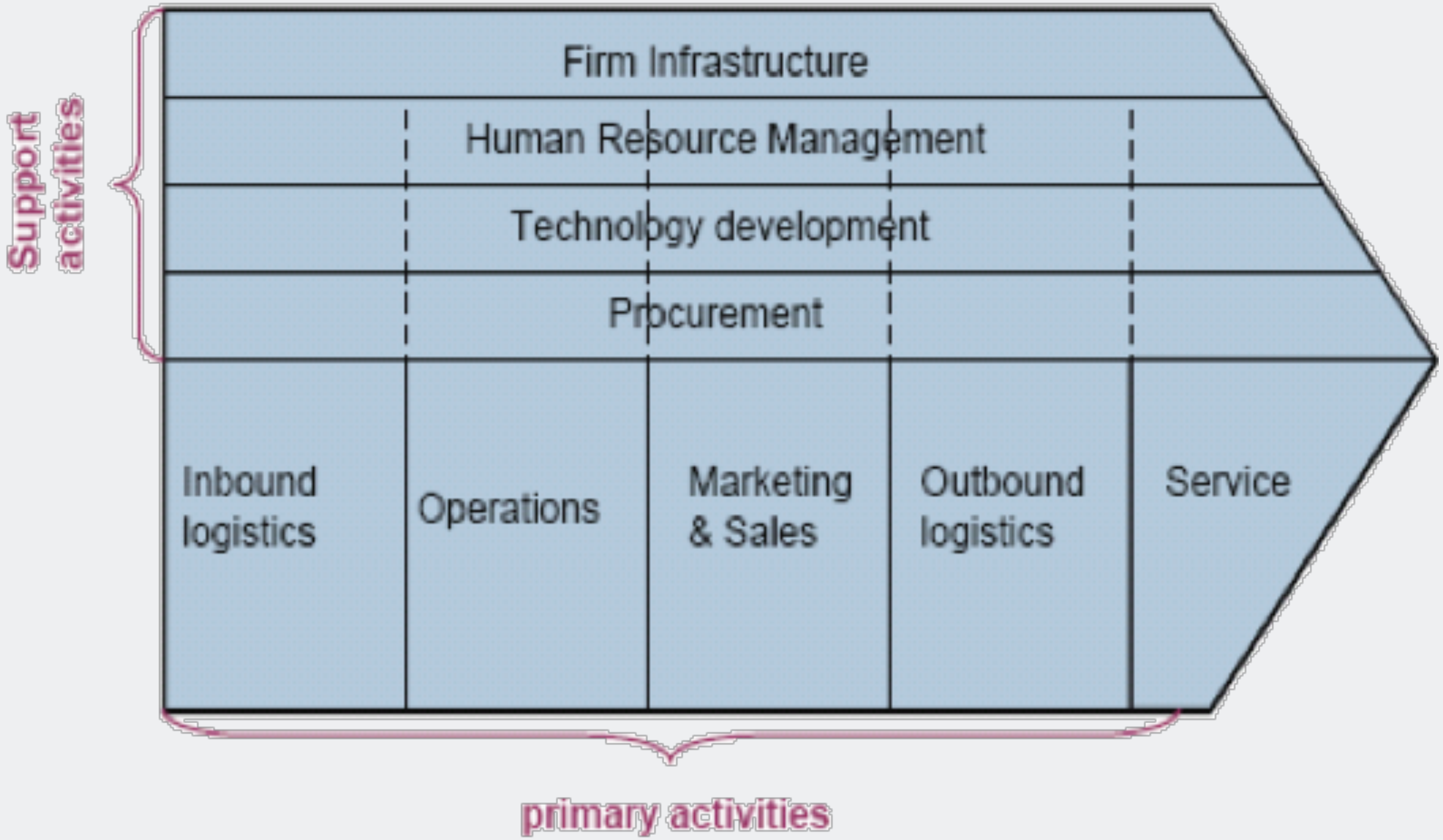
Process Pyramid (CMM)



BPM Lifecycle

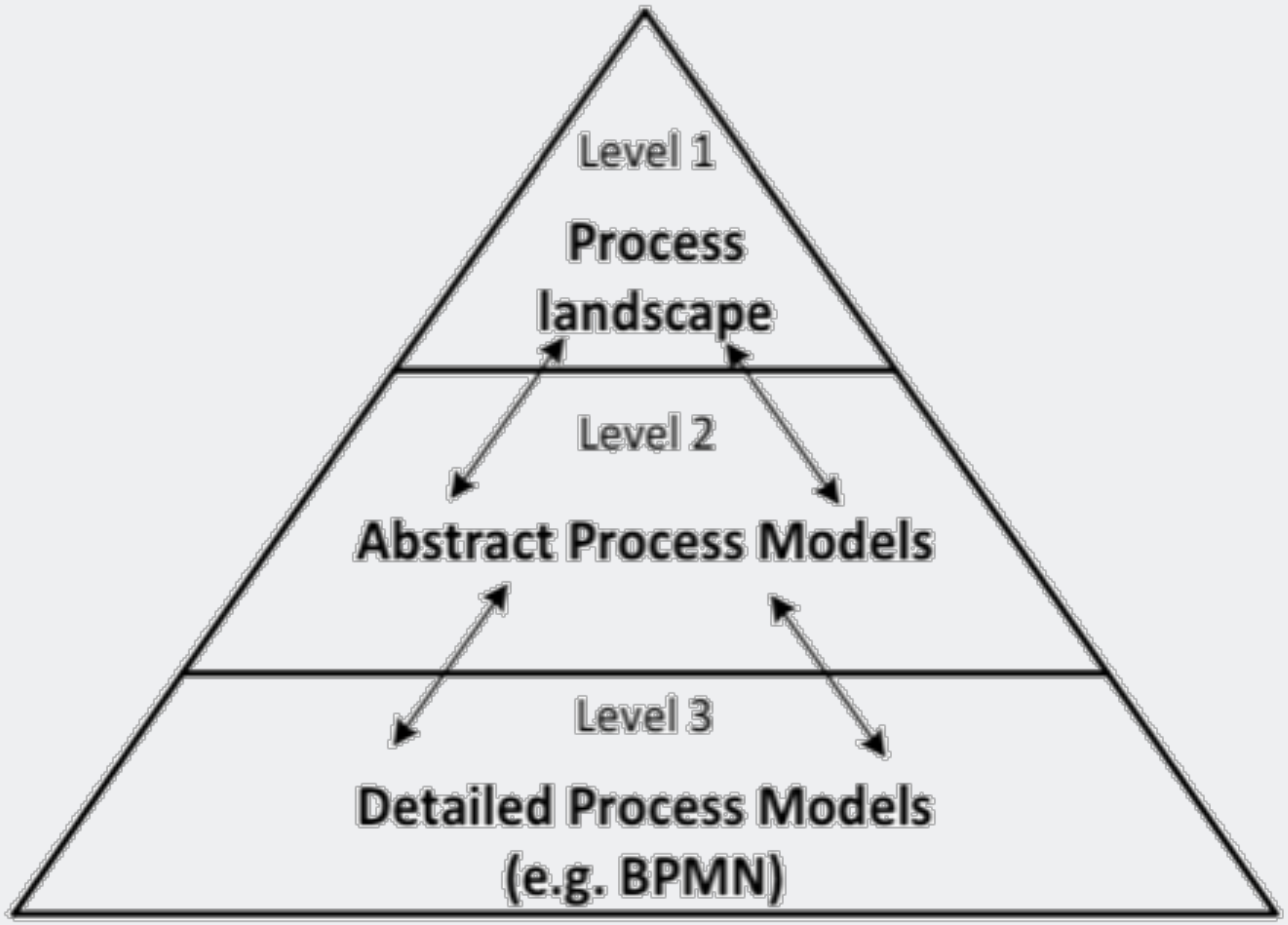


Core versus support processes

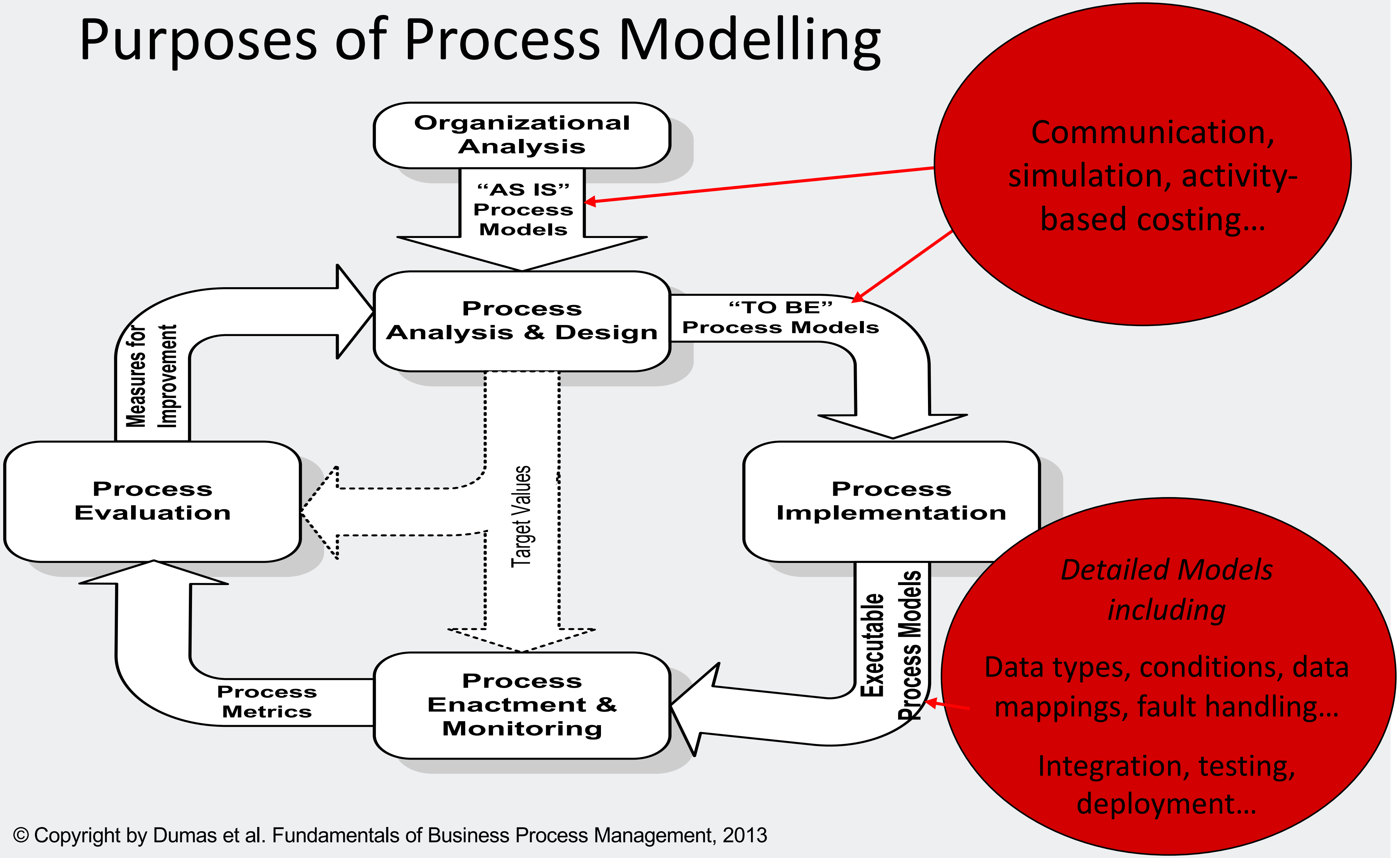


Porter, Michael E. (1985). Competitive Advantage: Creating and Sustaining Superior Performance. New York.: Simon and Schuster.

Process Architecture



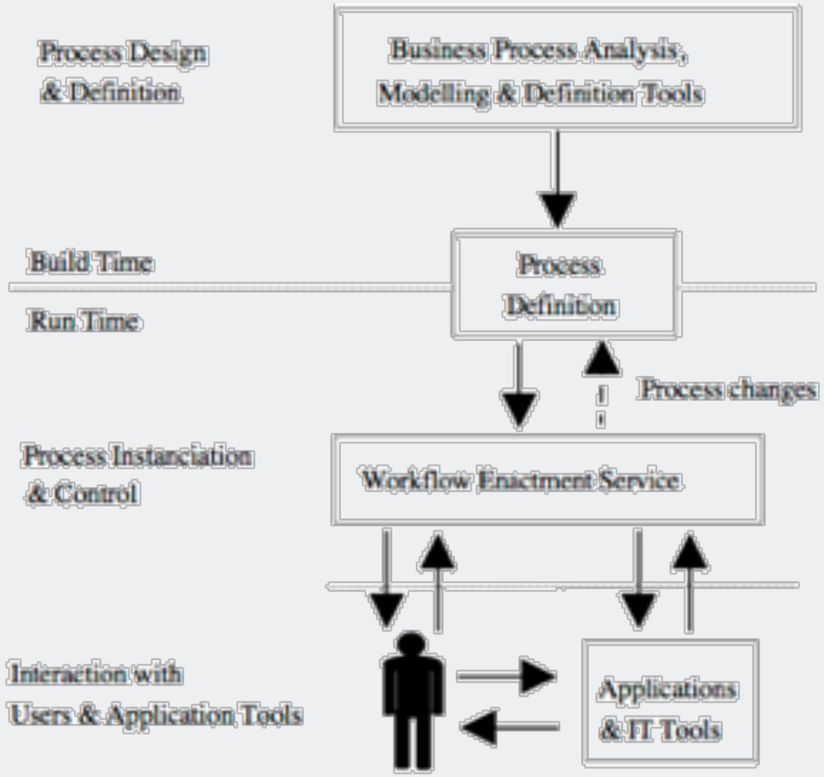
Purposes of Process Modelling



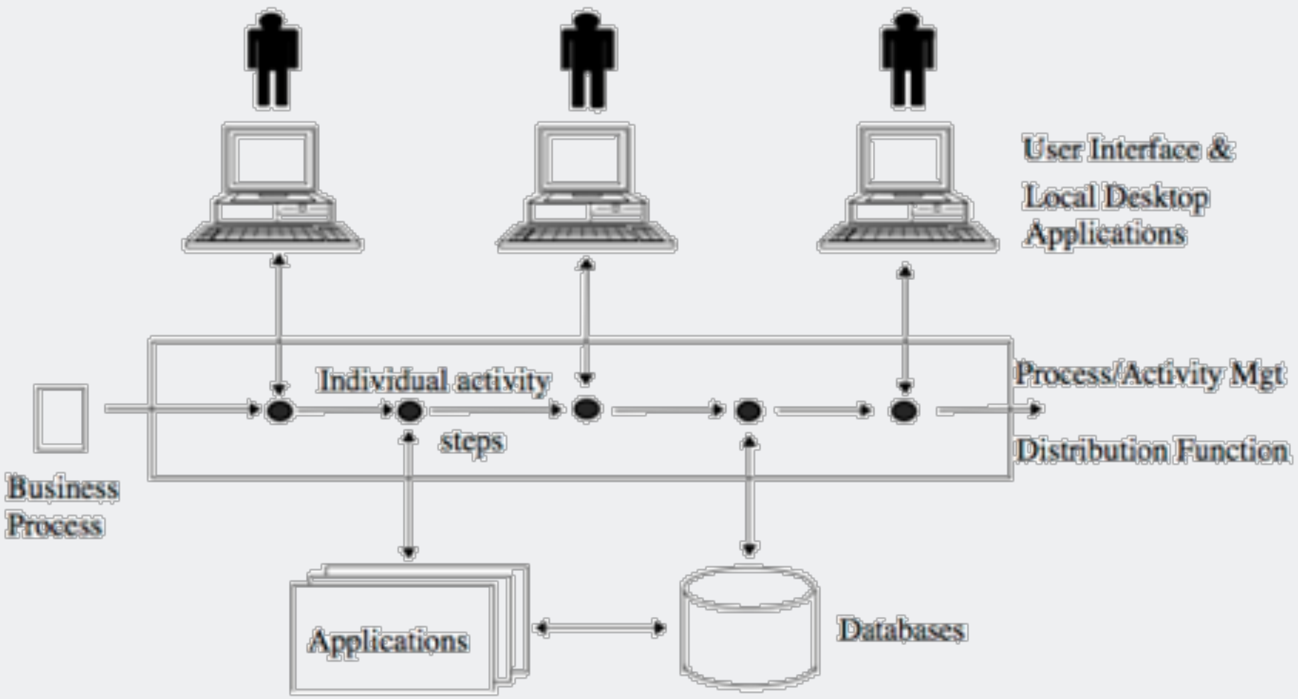
Business Process Management System (Workflow Management System)

- automation of (business) processes in which different people and software systems work together
  - distributed location
  - temporal distribution
  - required coordination and communication
- diversity from strongly structured (bureaucratic) to requirements driven (agile) processes
- control of potentially simultaneous instances
- notification of users about tasks to be done
  - automated tasks
  - human tasks
- distributed responsibility

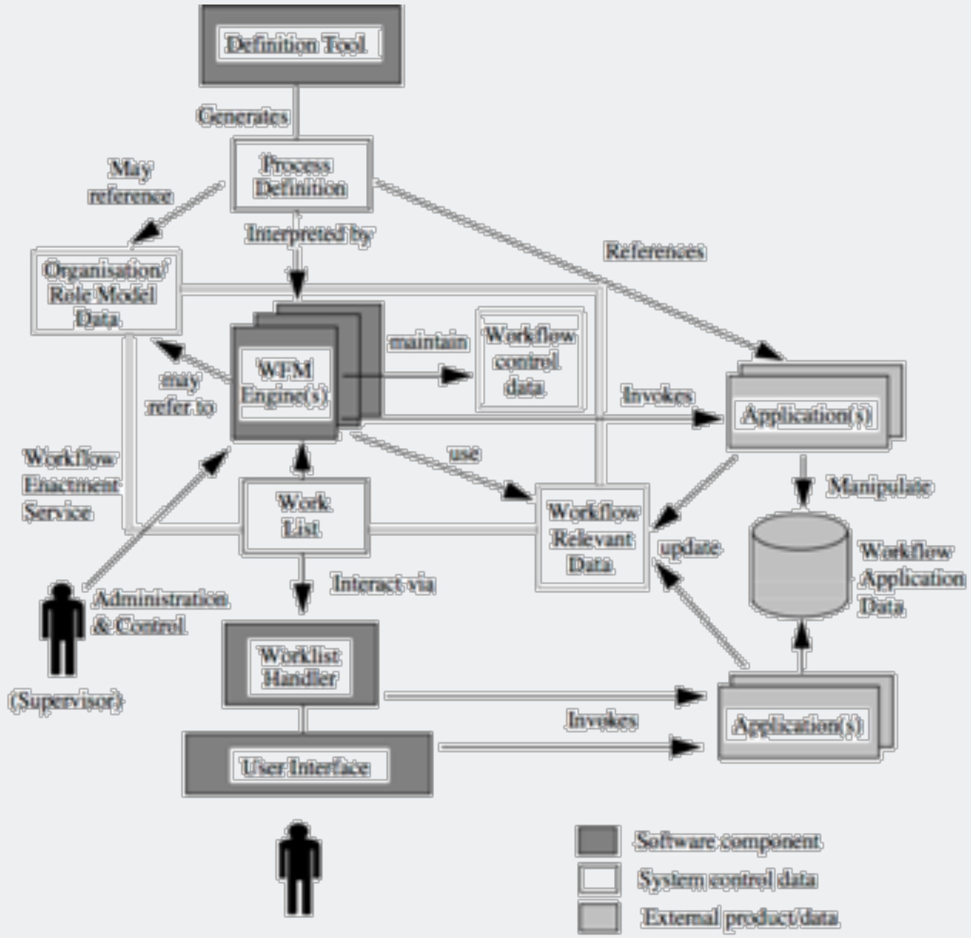
Workflow Applications



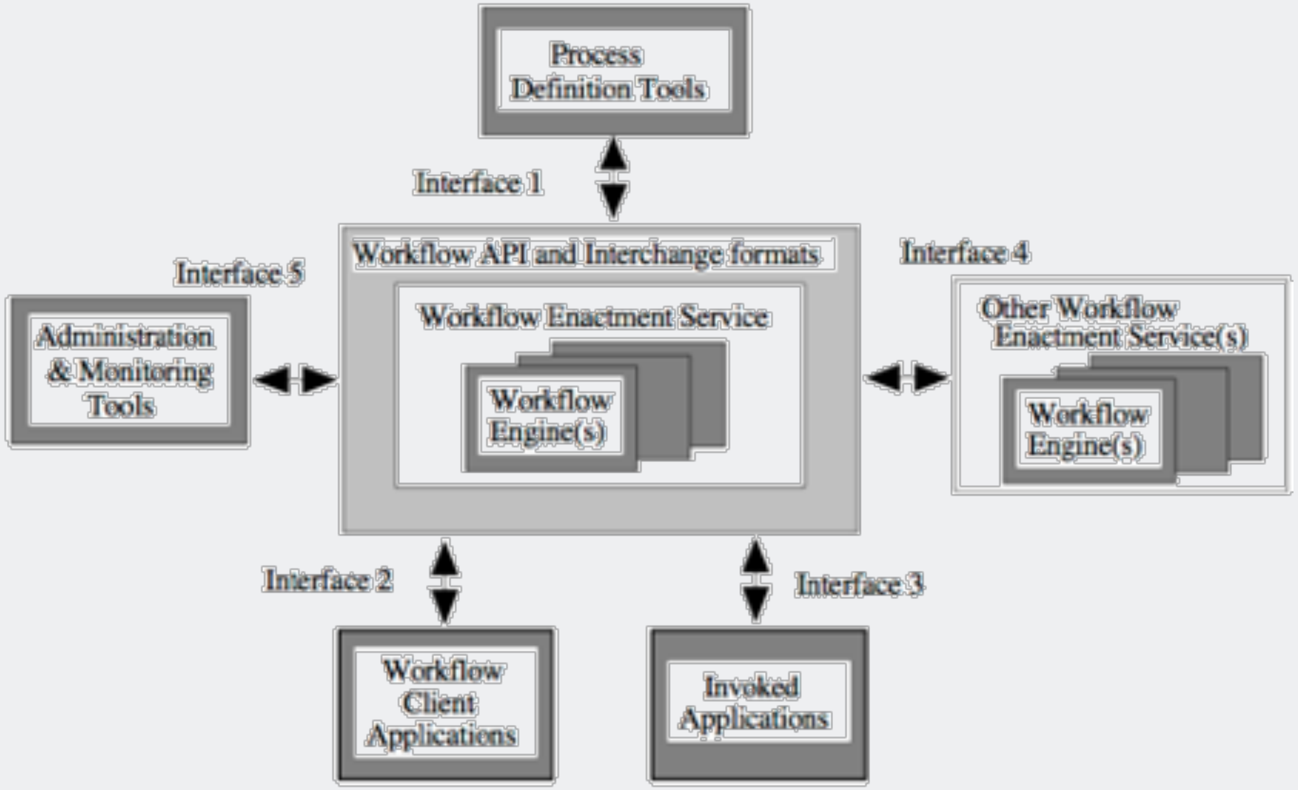
Distribution of Activities



Workflow Management System Structure



Standardized Interfaces



Business Process Coordination

- inter-organizational business processes
- more than one WFMS
  - chained workflows
  - shared domain
  - synchronized workflows
  - gateways between workflows

Application Areas

- office automation
- public administration
- publication processes

- healthcare
- transportation and logistics
- tourism

- software development
- scientific experiments
- smart city

- cloud processing

- and many more

Phases of the Project

- team formation
- identification of business process
- design (modelling) of business process
- implementation of tasks
- integration of tasks into business process
- monitoring of business process
- closing (lessons learned)

Team formation

- participants must pass two questionnaires
- teams of five students
- register for a team in course management system
- only exceptions if number of all participants are not dividable by five

- teams are best if competences for business administration and software engineering are available
- teams selects a speaker

Identification of business process

- do you have experience somewhere where an automated solution makes sense?
- or simply invent an organization with its core business process
- Important
  - there must be a customer of the process (in the last phase other student will be the customer
  - there must be at least 5 activities performed by different roles later
  - there must be at least 1 activity where a selection of actors for the role is required
  - which key process indicators (KPIs)?
- presentation of your concept and upload information to WFM
- Presentations on March, 29th or 30th

Design (modelling) of business process

- select a modelling tool compliant to BPMN 2.0
- typical solution
  - a user pool and a pool for your organization with lanes for the different roles and actors (resources)

- model task types
- model data that is required in tasks or is produced by a task
- model KPIs by annotations
- upload a workflow model as pdf and bpmn (xml) to WFM

Implementation of tasks

- at least each member of a team has to implement a task (e.g. customer ordering, customer quality review, …)
- real tasks may be simulated (e.g. a transport)
- each task shall be deployed on a different server
- one task with different agents
- different languages and operating systems possible
- each task must individually tested and the implementer must report about the task in WFM

Integration of tasks into business process

- select a business process management system
- the BPMS is deployed on one server and calls the tasks on the five servers

Monitoring of the business process

- collect the data to determine the values related to your KPIs
- some may be automatically collected by the BPMS
- generate an XML list containing all customers
- structure: <customer><name></name><matr-no></matr-no><start-date></start-date><end-date>…</customer>

Closing (lessons learned)

- presentation of your project
  - your process
  - your evaluation
  - your failures
- feedback course
- feedback WFM

The Project revisited

- register at wfm.ec.tuwien.ac.at and form teams of five
- make a self-evaluation and answer quizzes (in the system)
- select as team an application domain (in the system)
- identify a process to be automated
  - for each member a task to be integrated into process
  - three key performance indicators (KPI)
  - customer interface to initiate process (tested later by others)
- present concept online (select time in the system)
- model the process with a BPMN 2.0 tool (and upload to system)
- select an execution tool (store information in system)
- implement and test process (store information in system)
- usage by other students
- evaluate (measure) KPIs
- presentation online or at my office (select time in system)

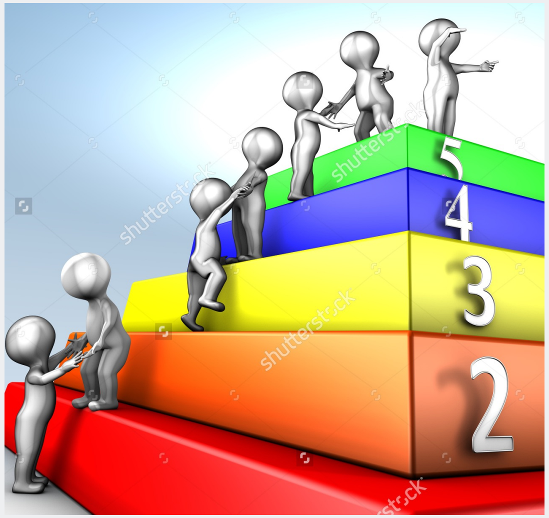
Expected Learning Outcomes

- to model and design automated business processes (workflows)
- to integrate enterprise applications into workflows
- to monitor workflows
- to manage a continuous improvement of business processes.
- team working,
- the practise of knowledge sharing and failure culture

Grading

- 250 points for tasks as defined
- 50 points achievable for failures, creativity and additional cooperation
- successful participation of questionnaires required
- 150 points required for passing the whole course

Continuous Improvement



- addressed in every project
- addressed in project management in course
- addressed for course and course management system
  - measuring effort for tasks (time required for work)
  - measuring quality
  - reporting failures