TDT4252
Modelling of Information Systems
Advanced Course

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Today’s Lecture

• AKM in Industry: an example

• Additional Reading:
Objectives of A15

- To develop and evaluate a model-based collaborative infrastructure for use in distributed product design.
- The purpose of the modelling process was to create an Active Knowledge Model;
  - An Enterprise Knowledge Model which supports execution of work tasks and is adaptable to the users' local demands.
MAPPER Project

- Aim of MAPPER was to enable fast and flexible manufacturing in networked enterprises by providing methodology, infrastructure and reusable services for participative engineering.
Case Description (1)

- Distributed product development and multi-Project lifecycles in a networked organisation with different subsidiaries of an automotive supplier.
Case Description (2)

• The focus was on the Advanced Engineering Unit, where the product development tasks concentrated on **pre-development of new concepts and new materials.**

• Geographically distributed.

• Product families: various versions of the components exist and have to be maintained and further developed for different models and different customers.
Purpose of Enterprise Modelling

• To capture the relevant product knowledge and process knowledge required for supporting collaborative engineering at different sites of the automotive supplier.

• The model was anticipated to solve several problems:
  – To support fast integration of geographically distributed collaboration partners.
  – To enable flexible development processes.
  – To coordinate a large no. of parallel product development activities.
Enterprise Knowledge Modelling

Enterprise Modelling
Addresses systematic analysis and modelling of Processes, products, IT systems, etc.

Enterprise Architectures
Visualises the architecture of IT applications and infrastructure in an enterprise

Enterprise Knowledge Modelling
Combines and extends approaches and techniques from Enterprise Modelling and Enterprise Architectures.
Aims at capturing reusable knowledge of processes and products in knowledge architectures supporting work execution.
POPS*
Processes, Products, Organisation and Services
C3S3P Methodology

- **Concept**, exploring main objectives and overall solution approaches
- **Scaffolding** creates an overview of current ways of working
- **Scenarios** are developed in close interaction with users
- **Solution** configuration defines views and workplaces
- **Platform** configuration integrates pre-existing applications and data
- **Platform delivery** includes training and practicing
- **Performing** agile business, continuously adapting and extending the solution
Knowledge Architecture
Driven Approach

Concept  Scaffolding  Scenarios  Solutions  Configuration  Platform  Integration  Platform  Delivery  Performance  Improvement

Customer Delivery Process
1. Concept Selection

- Capture the main objectives and challenges
- Experiment with existing concepts
  - Make the users familiar with modeling
  - Trigger discussions about opportunities
- Existing solution concepts
  - Previous projects
  - Methodologies already in use by the company
  - Methodologies in use in the industry
  - AKM methodologies for e.g. product design
Objectives Model Example

Selvaag Product Vision

An instantiated model

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Objectives and Issues

Objectives and issues

- Objectives
- Stakeholder
- Issues
  - Normal

Meta-model
Solution Concepts

Concepts

Objectives

Issues
Normal

Solution concepts

Projects

Documents

Meta-model
2. Scaffolding - Get an Overview

- Capture the domain as an active knowledge model
  - The stakeholders and roles
  - The main tasks they perform
  - The information they use and produce
  - Main views and perspectives
- Raise the customer’s understanding of modelling.
- Suggested to proceed with the analysis mainly in the above order.
Scaffolding Model
Key Questions for the Modeling Session

- **Information**
  - What information do you need to perform your work?
  - What is hard to find today?

- **Roles**
  - Who do you collaborate with, on what?
  - What is their expertise?

- **Tasks**
  - What do you do?
  - What are your responsibilities?

- **Views**
  - What should your workplace on the computer look like?
  - What should it contain?
Scenario modelling

• Modelling the core competences of the enterprise as work-processes for execution as task patterns.

• Scoping, select a narrower set of
  – Roles
  – Tasks
  that the further analysis should focus on
  – Which workplaces to demonstrate
  – Which people to involve in the modelling

• Criteria for selection
  – Demonstrate holistic approach, but simplified
  – Concrete case if possible
  – Assess benefits and values
  – Reuse and adapt existing solution concepts
Build Scenario Models

• Detailed modelling of the selected scope:
  – Information structures from documents
  – Tasks from project handbook
  – Interviews and discussions with stakeholders

• Add context
  – Where does the information come from?
  – Who do we need to communicate with?
  – How will the information we produce here be used, by who, when, to do what?

• Main need to narrow the scope.

• UML Use case modeling:
  – Similar approach with roles and tasks
Solution Configuration

- To externalise holistic and pragmatic enterprise knowledge and to present it in an Enterprise Knowledge Architecture.
- Define **workplaces and views** for selected users.
- Define templates
  - **Information templates**
    - Objects with properties and parameters
    - Reusable structures
    - Patterns of relationships to be managed
  - **Task pattern templates**
    - Interactive tasks performed by users in model-configured views
    - Workflow processes, event-driven tasks
    - Scripts
    - Modelled rules
- Define initial model content, test data
  - Users
  - Project data
Solution Modelling – Modelling Aspects

- **Business Process** hierarchy (top down)
- **Work Processes** (bottom up). Task patterns that are modelled already are adapted. Task patterns are linked to process hierarchy.
- Develop **common views among stakeholders** (middle-out).
- **Product modelling** (lifecycle aspects, components, etc.).
- **Product structures** – conceptual design of products.
- **Organisational modelling**: competences, responsibilities, etc.
Platform Configuration

- Integrating other systems and tools by modelling other systems data models and other aspects, often expressed as UML models.
Platform Delivery

- Adapts services to continuous growth and change by providing services to perform extensions and still keep consistency and compliance across platforms and networks.
Performance Improvement

- Continuously performing improvements and adaptations and providing services to semi-automatically adjust models.
- Re-generate model-configured and model-generated workspaces and services, tuning solutions to produce the desired effects.
Summary: C3S3P

- A method to use AKM in industry.
- Model to capture the enterprise knowledge.
- Generate views using the model.
Recap: Scaffolding - Get an Overview

• Capture the domain as an active knowledge model
  – The stakeholders and roles
  – The main tasks they perform
  – The information they use and produce
  – Main views and perspectives

• Raise the customer’s understanding of modelling.

• Suggested to proceed with the analysis mainly in the above order.
Recap: Scenario modelling or Scoping

- Modelling the core competences of the enterprise as work-processes for execution as task patterns.
- Scoping, select a narrower set of
  - Roles
  - Tasks
  that the further analysis should focus on
  - Which workplaces to demonstrate
  - Which people to involve in the modelling
- Criteria for selection
  - Demonstrate holistic approach, but simplified
  - Concrete case if possible
  - Assess benefits and values
  - Reuse and adapt existing solution concepts
2 Cycles of using C3S3P

1. Capture the organisational knowledge and best practices.

2. Integration of the product knowledge into best practices.
Steps in the Scaffolding Phase

**Preparation**
- **METIS Training**
  - Basic Concepts and Tools
- **Agree on Purpose:**
  - Model current situation, as seen by different users.
  - Jointly create understanding
- **Redirect purpose to ambition of to-be solution:**
  - Express future approaches + methods in the scenarios.
  - Start freezing purpose and scope of the modeling.
- **Analyze possible to-be scenarios. Introducing new platform and dynamic Modeling Language**

**Modeling**
- **Initial Model Version:**
  - Joint Modeling Workshop
  - Sources: Interviews and Documents
  - Tool: METIS and ITM &BPM template
  - Scaffolding as Guideline
  - Offline refinement & polishing
- **Second Model Version:**
  - Joint Modeling Workshop
  - Walk through the 1st version
  - Work on multiple perspectives, but just one or two at a time
  - Start adding relations in and between domains. Offline preparation of next iteration
- **Third Model Version:**
  - Joint Modelling Workshop
  - Jointly integrating task structures and new views
  - Plausibility checks
  - Offline polishing for preparation

**Meta-Modeling**
- **Start using existing generic languages and meta-model templates. In this case: ITM and BPM templates.**
- **Initial Meta-Model Description:**
  - Based on Initial Model and 1st Modeling Workshop
  - New meta-model discussed on 2nd Modeling Workshop
- **2nd CPPD Model Version:**
  - Developed by experienced Modeller
  - Decision: no Migration of existing Model, prepare to rethink containers and views,
  - Basis for Solution Model

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Scaffolding: Roles for Modelling Process

- Manager
- Planner
- Modelling Expert
- Facilitator
- Coach
- Modeller
- Domain expert
Initial Model Version

Objectives for WP3 Use case

Organisation

Products

Processes

Knowledge and skills

Information resources

Technology

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Final Model Version

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Scoping or Scenario Modelling

• Purpose: Develop initial versions of the solution models that specified the intended future way of working in the future product development process at the automotive supplier's business area, which is seat comfort.
  – Detailed models
  – Technical details, e.g. collaboration services, internal IT systems

• In addition to the models, textual descriptions of the scenarios were created.
Scoping: Roles for Modelling Process

- Based on the scenario descriptions, a model was developed by the Modelling Expert and the Coach.
  - This was because of the level of detail required in the model.
- The model was then presented to the team members for a discussion.
Experiences

• Participation of Stakeholders is a success factor.
• Different levels of participation were required during the different modelling phases.
• Starting each modelling session by walking through the current status of the model was beneficial for a common understanding.
• Meta-modelling and consolidating the model was a non-participatory activity.
Next Lecture

- Thursday, 15 March 2012
- Introduction to Enterprise Architecture