SEMS

Software Engineering Management System for SME’s in the SW Product Business

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Agenda

- SEMS Facts and focus
- SEMS Deliverables and Status
- SEMS in practice: contents for 2002
SEMS Project

- Three-year research project (2001-2003)
- Team of 5 researchers
  - Teachers of SW Engineering from HUT + venture capitalist’s perspective
- Budget 900 000 €
- Funding
  - Tekes 80%
  - Industry partners 20%
- Industry partners in 2002:
  - QPR, Eficor Ventures w/Bluegiga & oPLAYo, Smilehouse, Softatest AKK w/ePlanet

Background

- Problems
  - There are many SME’s that struggle with the quality of their products and controllability of development
  - Many good business ideas can fail through poor quality of execution
    - Both development and sales!
  - Money and time is lost in ad-hocracy
    - Effort on the wrong things
    - Products are patched until the code is degenerated
    - ...

- No holistic approach exists for managing the software engineering activities of SME’s!
  - Business aspects are not considered together with product development aspects
  - Process-centered approaches do not take into account the differences between project types, for instance,
    - Requirements-driven projects
    - Schedule-driven projects
  - CMM, for example, is too heavy and documentation-centered for SME’s and best suited for limited types of software engineering
Research Problem

How do the product, and the business model and environment affect process needs?

SEMS Objectives

- To improve the **profitability** and help the **growth of small and medium-sized software product** businesses by improving the **controllability** and **quality** of **relevant** software engineering activities

- To help potential investors and the companies **assess** the **fit-for-purpose** of the software engineering activities in relation to the activities’ **maturity** and intended **business model**
SEMS Deliverables (1/6)

Software engineering management system framework for SW product engineering in SME’s

SEMS Framework – Purpose

- Create a common language and understanding about organizing and managing software product development in SME’s

- Bring forth the most important dependencies between business drivers and product development
  - Combine business management and product development

- Bring a degree of control into software product development and at the same time accommodate faster response to change
An Example: Microsoft’s Synch-and-Stabilize in Our Terms

- **Product vision**
- **Outline specification**
- **Development done in 'feature teams'**
- **Projects are schedule-driven**

- **Feature team allocation**
- **Iteration plan**
- **Functional spec.**

- "Development subcycle"
- **Buffer time**
- **Evolving the func. spec**

- **Daily build**
- **Daily test**

- **Synchronized product**
- **Development status**

- **Final release**
- **Final specifications**

- **Project status**
- **Final iteration: UI freeze, code complete: final test and final debug**

- **Stabilized product**
- **Ready for alpha or beta testing and feedback**
- **Final iteration: Feature complete**

- **Connecting business management to product development**
  - Release and development schedules
  - Release contents and type
  - Technology decisions
  - Resourcing
  - Continuous

- **Managing the individual release projects**
  - Number of iterations
  - Iteration content and schedule
  - Detailed resourcing
  - 3-12 months

- **Managing the individual iterations**
  - Iteration task planning
  - Mini-milestone content and schedule
  - Stabilization of product
  - Enables early feedback
  - 1-3 months

- **Producing the actual product**
  - Frequent integration and test of code
  - Development status check
  - Daily or weekly builds

- **Planning and Monitoring**
- **Design and Implementation**
- **Product Management**
- **Requirements Engineering**
- **Verification and Validation**

- **Software Development Process**

- **Level of detail and emphasis, for example, roles and decision-making rights differ for the cycles!**
Approaches to Development May Vary Within A Single Company!

- Variables:
  - Roles
  - Resourcing
  - Decision-making rights
  - # and duration of cycles
  - Communication patterns
  - ...

SEMS Deliverables (2/6)

Software engineering management system framework for SW product engineering in SME’s

Gathering, evaluating and developing methods, processes, templates, measures and checklists for management system instantiation.
Help for Instantiating the Management System

- We are currently working on and / or looking at
  - An approach to product and release planning
  - The most famous agile methodologies (XP, SCRUM, ASD, DSDM, Crystal Family) from the perspective of SW product development and small teams
  - Clarifying the role of Verification & Validation in iterative software product development for a small company
  - An approach to improving the testing process in SME’s from the business model’s perspective

- Not re-inventing, but re-directing the wheels!

SEMS Deliverables (3/6)

- IT toolset for planning, tracking and visualising measurement data
- Software engineering management system framework for SW product engineering in SME’s
- Gathering, evaluating and developing methods, processes, templates, measures and checklists for management system instantiation.
Tool Support for Measurement: Lucos Tools

- **Purpose**
  - Designing and publishing customized views to measurement data
  - Collecting measurement data from other systems
    - Integration to MS Excel, MS Project, CSV Data

- **Platform**
  - client: Java/www-browser
  - server: Windows/Linux
  - dbms: Sybase/Solid/PostgreSQL

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**Example: Examining Project Status**

Spent & achieved less than planned...

A 120% overrun on system test? Let’s see...
SEMS Deliverables (4/6)

- **IT toolset for planning, tracking and visualising measurement data**
- **Software engineering management system framework for SW product engineering in SME’s**
- **Gathering, evaluating and developing methods, processes, templates, measures and checklists for management system instantiation.**
- **A method for assessing the software engineering activities of SME’s**

**Assessment Method**

- **Objective:** to assess the fit-for-purpose of the software development activities of an SME in the product business

- **Fitness** is defined in relation the intended business model and the maturity of the relevant development process areas

- **2nd version of the SEMS questionnaire and 1st version of the assessment method published for partner companies in Q2/2002**
  - Tested on several companies in 4/2002

- **Venture capitalist’s perspective**
Assessment by Applying the Four Cycles Model

- Benchmarking the companies’ activities to existing methodologies and real-life processes through the 4CC
- Suggestions on how to develop the company’s process further

**SEMS Deliverables (5 & 6)**

- A workbook to package the results of the project
- IT toolset for planning, tracking and visualising measurement data
- Software engineering management system framework for SW product engineering in SME’s
- Consulting and training material for building a software engineering management system
- A method for assessing the software engineering activities of SME’s
- Gathering, evaluating and developing methods, processes, templates, measures and checklists for management system instantiation.
Co-operation with Partners

Decision Making in SW Product Merchandising

Benchmarking to the 4CC Model

Interviews (4-6 people)

Deliverables:
- Case summaries and improvement suggestions
- Summary of all cases
- Presenting and discussing the results

Delivering, deploying the measurement system

Follow-up for selected companies

Applying/Implementing the 4CC
- Literature study, + N cases

Decision Making in SW Product Merchandising
- 2 + 2 cases

Validation and Verification in the Four Cycles
- Defect management review

Business Drivers and the Development Process

Strategic Release Mgmt. by Product Roadmapping
- 2 cases

Holistic approach to improving the testing process (2 cases)

Agile Development Processes Case Work

Current State Analysis Experience Exchange

Expert Seminar

V&V Workshop

Agile Processes Theme Seminar

Decision Making in SRM Theme Seminar

Final State Analysis Experience Exchange

Seminars and Training

Current State Analysis Seminar

Product Roadmapping and Defect Management Theme Seminar

Requirements Engineering Expert Seminar

Current State Analysis Seminar

Decision Making in SRM Theme Seminar

Thank You For Your Attention!

Questions and Comments?
Research Areas in 2002

- Agile development processes (Jari Vanhanen)
- Applying the Four Cycles model (Kristian Rautiainen)
- Defect management in SME’s (Maaret Pyhäjärvi)
- Testing process throughout the cycles (Maaret Pyhäjärvi)

Development and applying tool support for measurement (Jari Vanhanen)
Assessment method and business models (Ari Torpo)
Product and release planning (Jarno Vähäniitty)

SEMS Deliverables

- A workbook to package the results of the project
- IT toolset for planning, tracking and visualising measurement data
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- Consulting and training material for building a software engineering management system
- A method for assessing the software engineering activities of SME’s
- Gathering, evaluating and developing methods, processes, templates, measures and checklists for management system instantiation.
The Team

- Jarno Vähänittty
  - Research on measurement in SW engineering, strategic management of NPD, developing Lucos Tools, and various teaching activities between ’99-’02

- Maaret Pyhäjärvi
  - Teacher-in-charge of Software Testing course (3cr) at HUT
  - Former test manager, tester and consultant of software testing

- Kristian Rautiainen
  - Teacher-in-charge of Software Processes course (2cr) at HUT
  - Research on controllability of New Product Development and Software Processes

- Ari Torpo
  - Investment partner at Eficor Ventures, formerly technology manager at Andersen Consulting
  - Extensive experience from large programme and project management in building custom systems and technology management of small SW companies

- Jari Vanhanen
  - Teacher-in-charge of Software Project course (5cr) at HUT
  - Developing a toolset for NPD measurement (Lucos Tools), former teacher-in-charge of SW Configuration Management course (2cr) at HUT