Erfahrungen mit CMMI-basierter Prozessverbesserung

11. Mai 2009

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Ziele und Inhalte

Ziele

- Real-World Erfahrungen aus Prozessverbesserung kennen

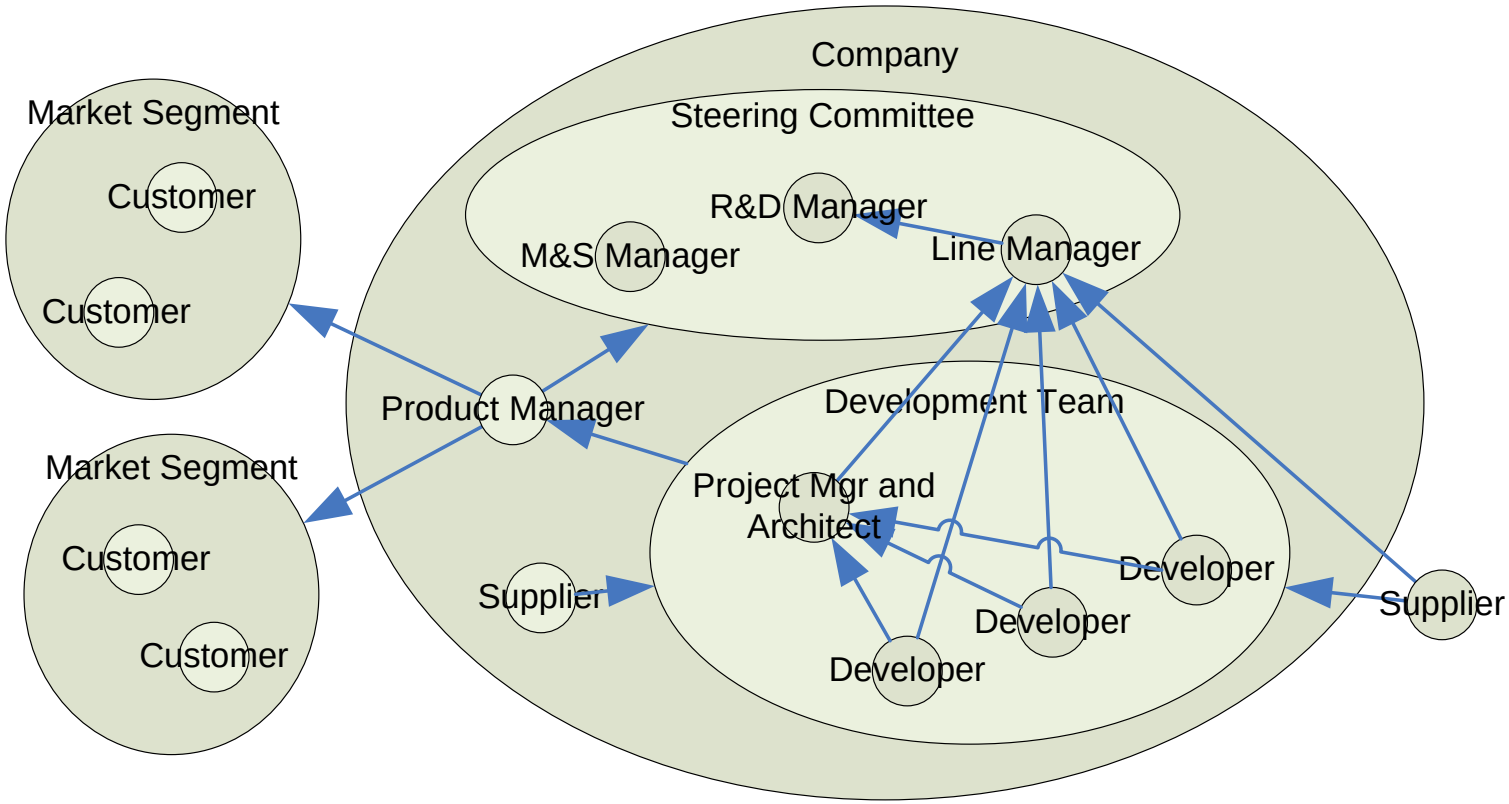
Inhalte

- Ausgangslage und Ziele
- Plan-Do-Check-Act Zyklus
- Beobachtungen, Lessons

Ausgangslage

- Produktmanagement einer globalen Schweizer Firma
  - 9 Produktmanager in 3 Ländern (2 Kontinente)
  - Entwicklungsstandorte in 7 Ländern (3 Kontinente)
- Schweizerische Entwicklungsabteilung
  - 30 Mitarbeiter
  - Hardware- und Softwareprojekte u.a. für 1 globale Produktlinie

Zusammenarbeit Produkt-management und -entwicklung



Herausforderungen

- Globale Produktlinie
  - Nicht verstandene Anforderungen
    - Produktmanager: „Die Entwickler machen was sie wollen. Wie kann ich sie kontrollieren?“
    - Architekt: „Die Anforderungen sind zu fragmentarisch, um für gute Architektur und Design genutzt zu werden.“
  - Kontinuierlich drastische Verspätungen
    - Niemand glaubte mehr an Projektpläne
  - Integrationsprobleme
    - Isoliert entwickelte Teile passen nicht zusammen.

Prozessverbesserungen

- Globale Schiene (Produktmanager)
  - Ziel: Prozesse zwischen Produktmanagement und Entwicklung definieren
  - Forschungszusammenarbeit mit Uni Zürich und Blekinge Institute of Technology
  - Prozessdefinition mit Produktmanagern
- Lokale Schiene (Schweizerische Abteilung)
  - Ziel: CMMI Reifestufe 2
  - CMMI-basiertes Class B Appraisal
  - Prozessverbesserungen durch die Abteilung

Ziele und Inhalte

Ziele

- Real-World Erfahrungen aus Prozessverbesserung kennen

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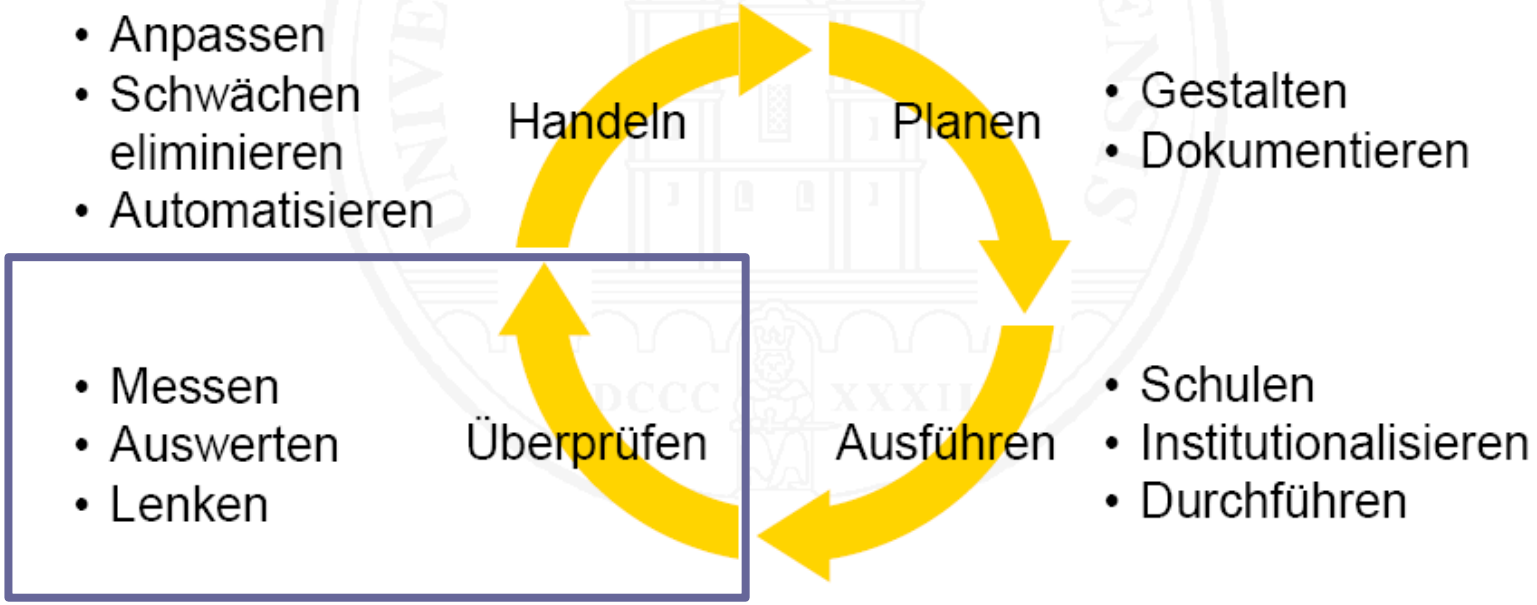
Lokale Prozessverbesserung

Zyklisches Vorgehen: Plan-Do-Check-Act (Deming 1986):



CMMI Class B Appraisal

- Team
  - Firmeninterne ausgebildete Experten aus anderen Abteilungen
  - Mitarbeiter der Entwicklungsabteilung
- Abgedeckte Prozessgebiete

Reifegrad (gestufte Darstellung)	Prozessgruppe (Verlaufsdarstellung)			
	Projekt-management (project management)	Unterstützung (support)	Technik (engineering)	Prozess-management (process management)
2 Geführt (managed)	PMC PP SAM	CM MA PPQA	REQM	

- Inputs
  - Prozessdefinitionen aus Prozesshandbuch
  - Interviews

Appraisal-Resultate: Übersicht Prozessgebiet

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Goal	Practice	Description	Status acc. Appraisal
		requirements management	
		Manage Requirements	
SG1	SP1.1	Obtain an Understanding of Requirements	
SG1	SP1.2	Obtain Commitment to Requirements	
SG1	SP1.3	Manage Requirements Changes	
SG1	SP1.4	Obtain an Understanding of Requirements	
SG1	SP1.5	Identify Inconsistencies Between Project Work an	
		Institutionalize a Managed Process	
GG2	GP2.1	Establish an Organizational Policy	
GG2	GP2.2	Plan the Process	

- Green: performed
- Yellow: inconsistent
- Red: not performed

Appraisal-Resultate: Detaillierte Beobachtungen

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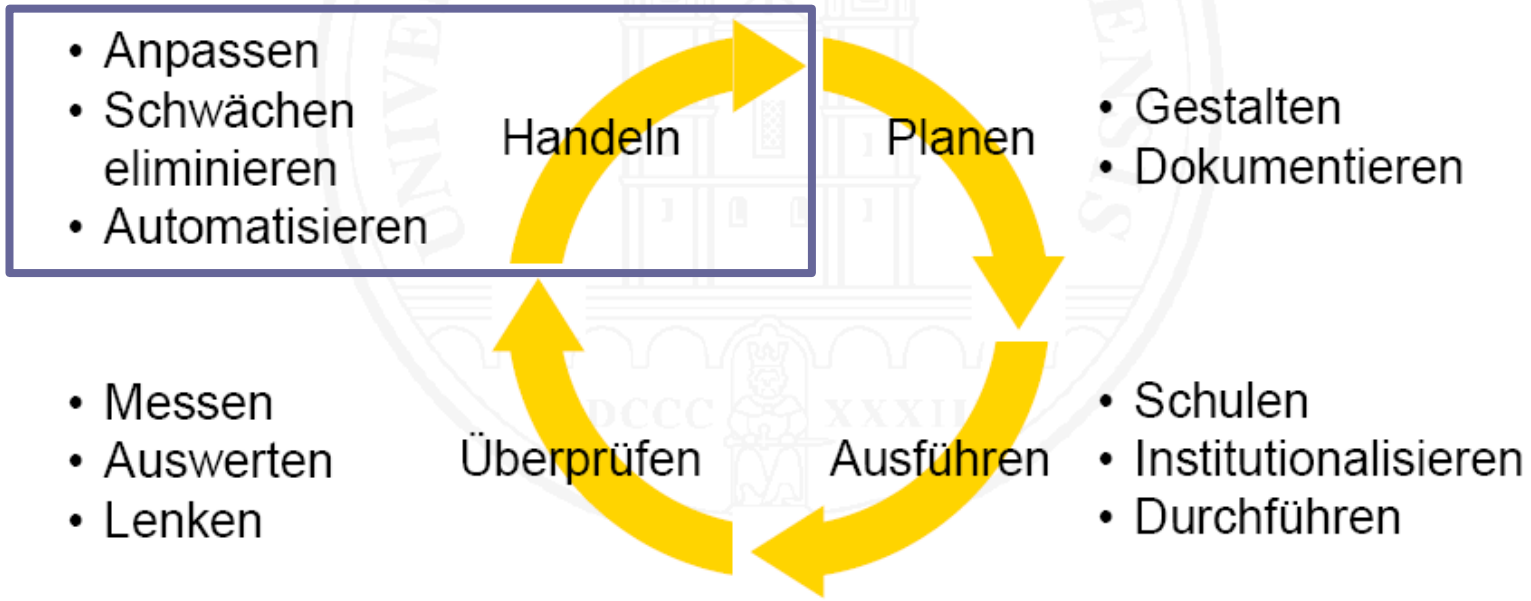
CMMI		Appraisal		
Number	Practice	Reference	Status	Notes
SG 1	Requirements are managed and inconsistencies with project plans and work products are identified.			
SP 1.1	Develop an understanding with the requirements providers on the meaning of the requirements.		High	+ Tec… pro… with product managers, …nderstanding + Prod… wh… …lly discuss requirements …irements …e used in review meeting **Recom…** Use defined criteria in requirements guideline for evaluation and acceptance of requirements in reviews
SP 1.2	Obtain commitment to the requirements from the project participants.		High	+ Technical Requirement Specification is reviewed with product managers, project managers and project members until it is approved + CCB involved in decisions concerning changes of requirements + Analysis is performed on requirement changes, stored in database + Requirements are informally discussed between product managers, project managers and technical responsible + Commitments at gates for projects **Recommendation** Ensure commitments for changes on existing requirements

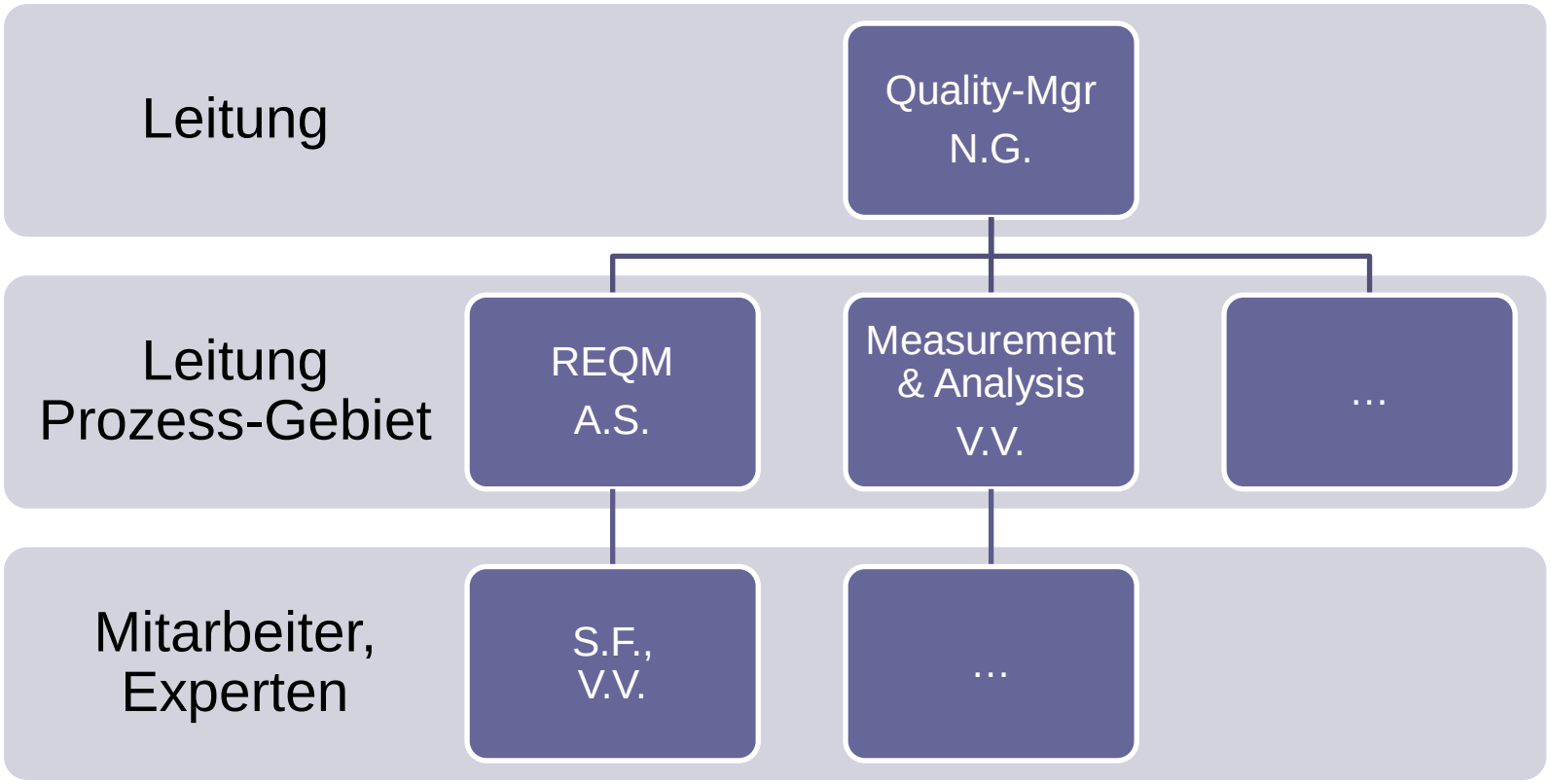
- High: clear evidence
- Mid: some evidence
- Low: unclear

Lokale Prozessverbesserung

Zyklisches Vorgehen: Plan-Do-Check-Act (Deming 1986):



Organisation



Action Planning

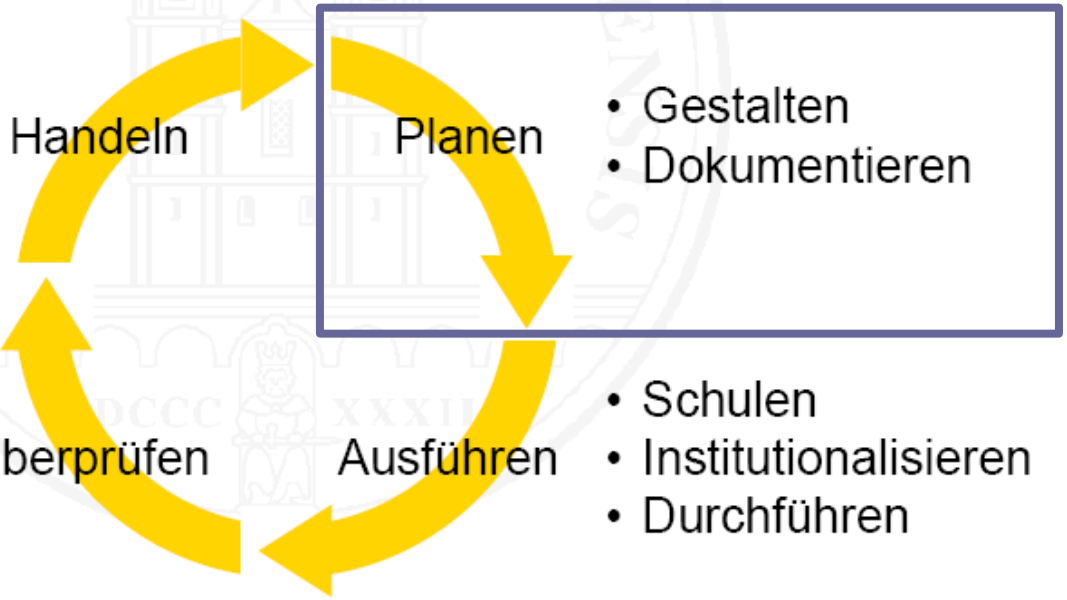
SP1.2	Specification	Evaluation/Comments
Obtain Commitment to Requirements		
		documented
Practice	Obtain commitment to the requirements from the project participants.	
Reference		
Awareness	High	
Notes / Results -- strength	+ Technical Requirement Specification is reviewed with product managers, project managers and project members until it is approved + CCB involved in decisions concerning changes of requirements + Analysis is performed on requirement changes, stored in database + Requirements are informally discussed between product managers, project managers and technical responsible + Commitments at gates for projects	
-- weakness		
Recommendatio	Ensure commitments for changes on existing requirements	
Action(s) planned	*Introduce the PM_RE process as part of the REQM activities. Not a mandatory goal to fulfill the ongoing CMMI activities in . But we see it as useful to synchronize the activities in order to avoid duplicated effort for training etc.* *- Driven by global higher management* *- Harmonization of global R&D - PM processes* *- This is seen as a major driver to improve the handling of global projects* ***Specific action in our scope:*** *- Extend the Requirement Engineering Guideline with relevant information (Handshaking) about the usage of the PM_RE process* *- Update the Requirement Engineering Guideline with the concept of the Implementation Proposal as a "replacement" of the TRS*	*The Requirement Engineering Guideline was extended in this respect by S.Fricker*
Process Documentation	*Docu-IDxxxxxxxxxx (Guideline: Requirements Engineering),* *Docu-IDyyyyyyyyyy (Guideline: Configuration and Change Management)* *Gate Process, Gate-2 Checklist (Agreement on Requirements + Plans)*	

- Not started
- Analyzed
- Planned
- Documented
- Trained
- Implemented

Lokale Prozessverbesserung

Zyklisches Vorgehen: Plan-Do-Check-Act (Deming 1986):

- Anpassen
- Schwächen eliminieren
- Automatisieren



- Gestalten
- Dokumentieren

- Messen
- Auswerten
- Lenken

- Schulen
- Institutionalisieren
- Durchführen

Process Specification: Table of Contents

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Process Specification: Extract

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4.4 In-Project Requirements Development (Activities G1..G2)

What activities are performed G1..G2?

The following activities are performed as a preparation for G2 when the project has passed G1. The project leader allocates responsibilities for performing the activities.

Activity	Description	
Handshaking	Goal:	Ensure understanding of requirements and acceptance of planned work results. SRS/TRS complete with respect to product architecture and external interfaces.
	Inputs:	MRS [3] (approved). Technology, architecture, and design concepts for planned work results.
	Outputs:	SRS/TRS [4] containing requirements justified by MRS requirements. Trace 1 (Figure 2). Implementation proposals [11] where necessary. Presentation slides where necessary. Updated cost estimates.
	Methods:	Handshaking with implementation proposals. Continuous informal mingling (e.g. in coffee corner) with Handshaking purpose. Joint Application Design (with Product Application Specialists) for novel requirements. Usability Engineering (with targeted users) for interactive systems.
	CMMI:	REQM SP1.1, REQM SP1.2, RD SP2.3, RD SP3.1, RD SP3.2, RD SP3.5
SRS/TRS	Goal:	Ensure that SRS/TRS is good enough to proceed with project work (formal approval)

Lokale Prozessverbesserung

Zyklisches Vorgehen: Plan-Do-Check-Act (Deming 1986):

- Anpassen
- Schwächen eliminieren
- Automatisieren

Handeln

Planen

- Gestalten
- Dokumentieren

- Messen
- Auswerten
- Lenken

Überprüfen

Ausführen

- Schulen
- Institutionalisieren
- Durchführen

Institutionalisierung

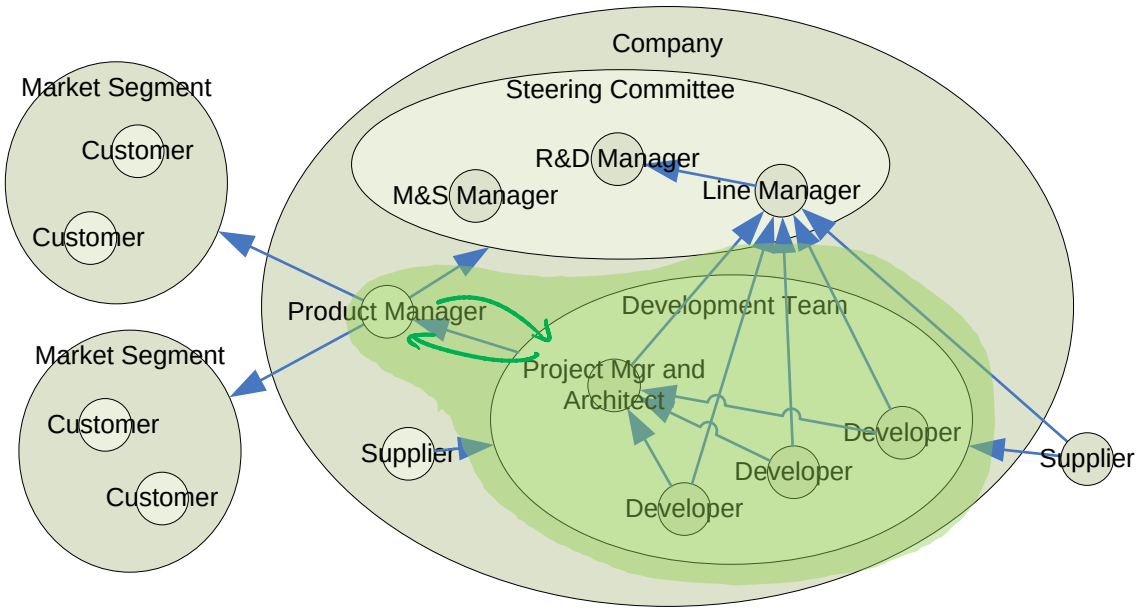
- Ziele
  - Prozesse werden von der Organisation gelebt
  - Der Effekt der Prozesse auf Organisation wird gemessen
- Gewählte Ansätze
  - Management-Richtlinien: Erwartungen an Mitarbeiter
  - Training: Kenntnis der Prozesse
  - Coaching: erste Anwendung der Prozesse
  - Reviews: Überprüfung der Prozessnutzung

Prozesstraining

- Trainer
  - Mitglieder der Prozessgruppen
- Teilnehmer
  - Mitarbeiter, welche von den Prozessen betroffen sind
  - Management
- Ziele
  - Teilnehmer: Kenntnis der Techniken
  - Trainer: Verstehen der Techniken
- Inhalte
  - Prozess, Methoden
  - Umsetzungsempfehlungen: Tools, Templates
  - Hilfe zur Selbsthilfe: Dokumentation, Experten

Auszug aus Training

Handshaking with Development Team



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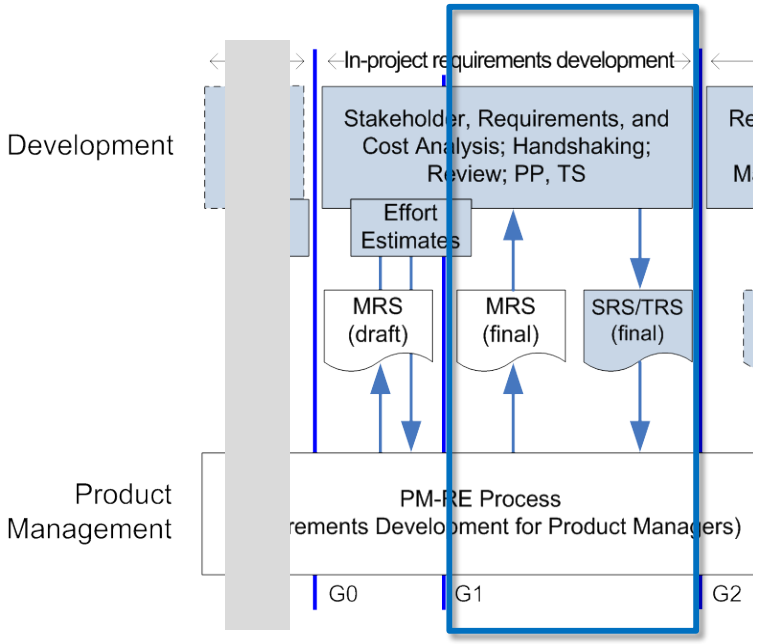
Auszug aus Training

Handshaking with Implementation Proposals



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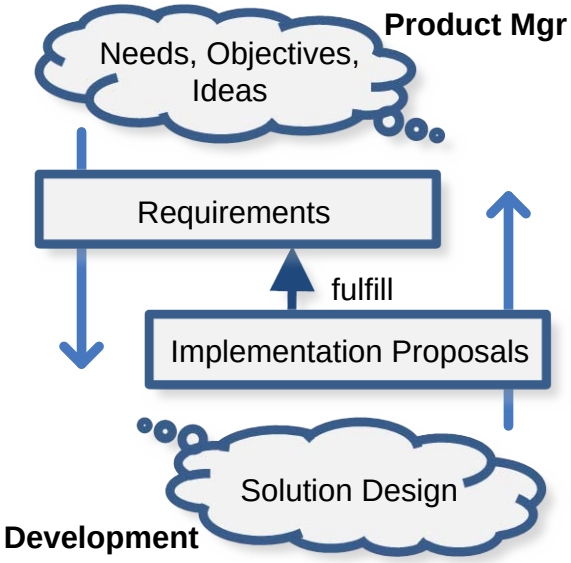
Auszug aus Training

Agree on Requirements



Implementation Proposals help to
- *discover requirements*
- *agree on requirements*
- *prepare a TRS*

Fricker, Gorschek, Byman, Schmidle, „Handshaking: Negotiate to Provoke the Right Understanding of Requirements“, submitted to IEEE Software.

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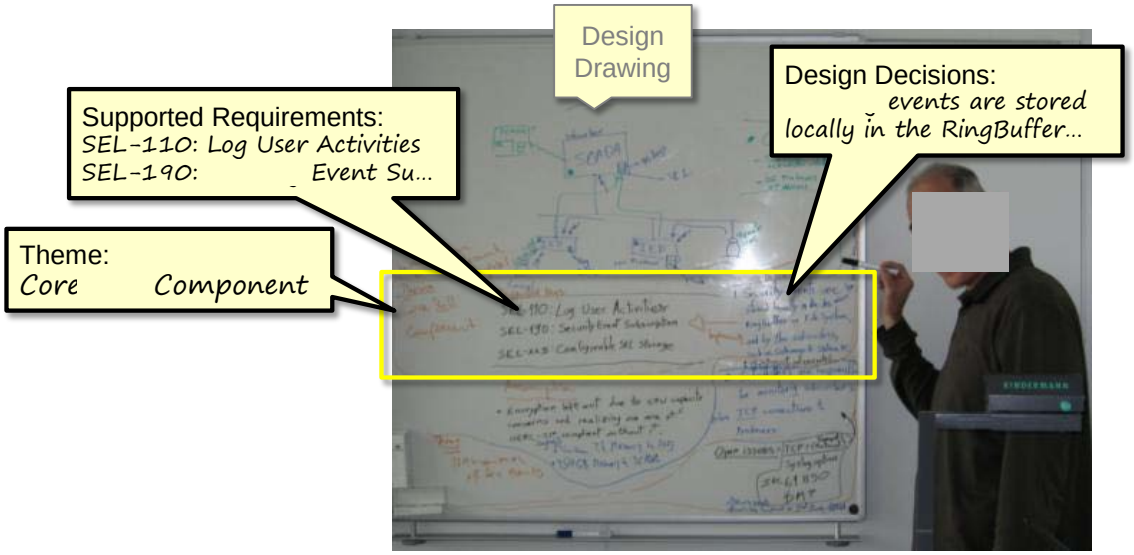
Creating a First Implementation Proposal



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Reactions to a First Implementation Proposal

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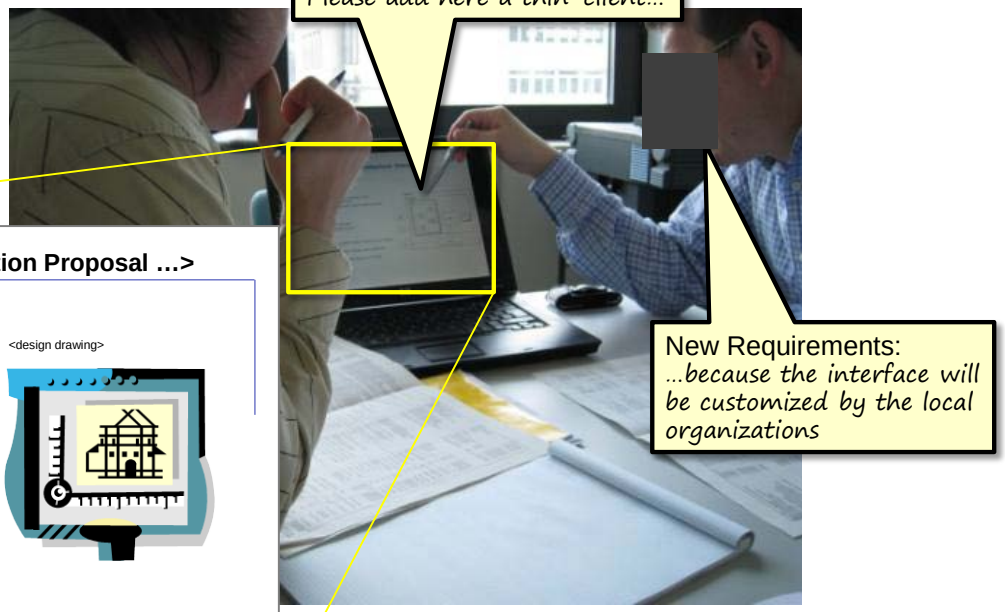

Corrections:
Please add here a thin-client…

New Requirements:
…because the interface will be customized by the local organizations

<Theme of the Implementation Proposal …>

- Fulfilled Requirements
  - <requirements (ids, titles)>
  - Assumptions: <assumptions>
- Proposed Design
  - <key design decisions>
  - Impact: <advantages, limitations, risks>
  - Effort: <effort estimate>
- Alternatives
  - <alternatives> (<reason for dismissal>)
- Open Issues
  - <issues>

<design drawing>

Fricker, Gorschek, Glinz: „Goal-Oriented Requirements Communication in New Product Development". IWSPM'08. 11.05.2009 / 24
Fricker: „Unifying Early and Late-Phase Requirements with Implementation Proposals". In publication process.

Auszug aus Training

Effect of Handshaking with Implementation Proposals

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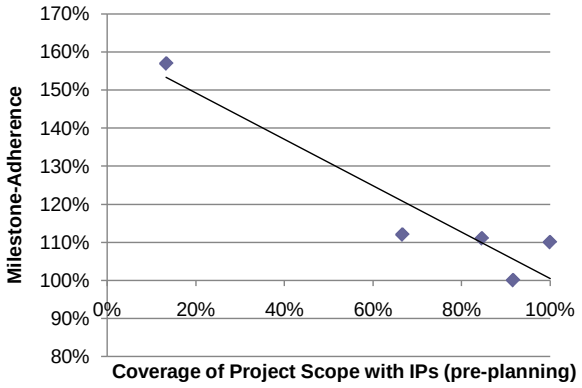
- Cost
  - Implementation Proposals need to be created and evaluated
- Benefits
  - Clear RE responsibilities
  - Improved exploration of alternatives
  - Simplified project planning
  - Stable development projects

- Deadline Adherance
  - „50-70% Improvement“



- Cost related to defects
  - „40% Improvement“

Fricker, Gorschek, Byman, Schmidle, „Handshaking: Negotiate to Provoke the Right Understanding of Requirements“, submitted to IEEE Software.

Coaching der Prozessnutzung

Überprüfung der Prozessnutzung

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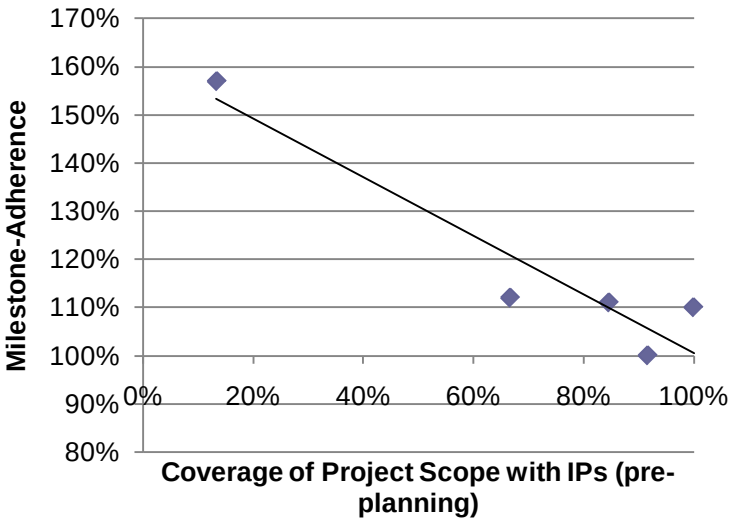
13 **Appendix F — Suggested RE Measurements**

What should be measured?

The following in an incomplete list of suggested measurements to manage and improve the requirements engineering process. Compulsory measurements are written in bold letters.

Goals	Measurement	Comments
Monitor adherance to RE process	**Number of conducted CCB meetings.**	**Target value**
Monitor adherence to RE process	**Coverage of requirements with implementation proposals at G2.** Other: quality of implementation proposals	**Target value**



Ziele und Inhalte

Ziele

- Real-World Erfahrungen aus Prozessverbesserung kennen

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Beobachtungen

- Management der globalen Entwicklungsorganisation
  - „Handshaking with Implementation Proposals“ war eine der erfolgreichsten Prozessverbesserungen
- Entwicklung von Handshaking with Implementation Proposals (globale Produktmanagementorganisation)
  - ca. 5 Jahre Dauer
  - Intensive Zusammenarbeit zwischen Universitäten und verschiedenen Projekten
- CMMI-basierte Prozessentwicklung (lokale Entwicklungsorganisation)
  - ca. ¾ Jahre Dauer bis Training
    ca. ¾ Jahre später immer noch Coaching
  - Aktive Teilnahme wichtiger Mitarbeiter

Lessons-Learned

- Erfolgsfaktoren
  - Aktive Organisation: Management, Experten, Mitarbeiter führen zusammen das Verbesserungsprojekt durch
  - Transparenz: Zielsetzung und Fortschritt für Organisation immer sichtbar
  - Ganzheitliche Institutionalisierung:
    - Champions: Prozessdefinition
    - Early Adopters: Pilot-Anwendung der Prozesse
    - Management: Reviews
    - Experten: Coaching
- Überraschungen
  - CMMI wichtig für Management-Unterstützung
  - CMMI Vehikel für Methodik-Einführung und Homogensierung

Ziele und Inhalte

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