

SIEMENS



Tailoring the Process for Automotive Software Requirements Engineering

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Overview

- Motivation
- Challenges
- Distributed Development
- Lessons Learned
- Next

Motivation – Change

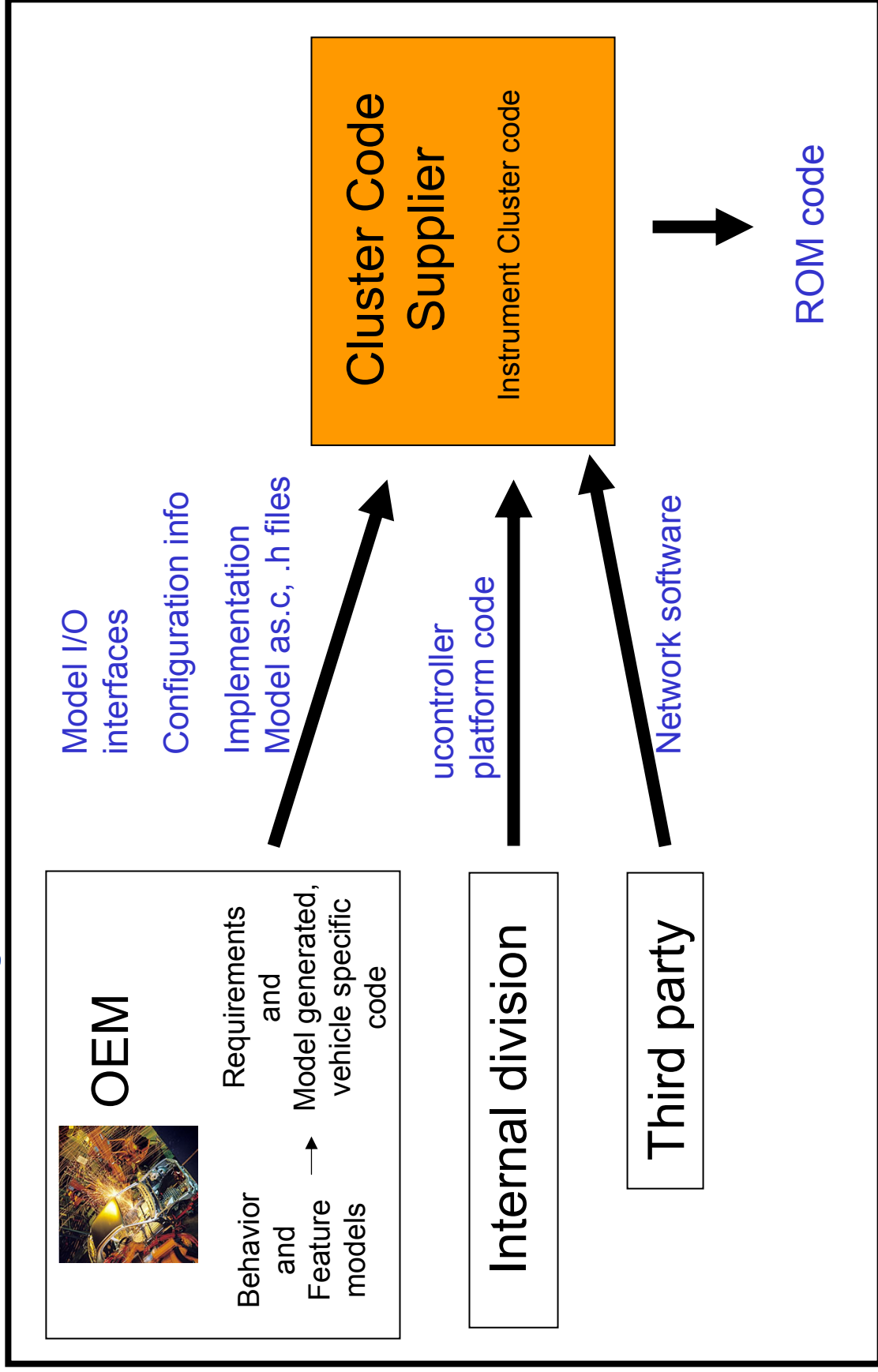
- Organizational Change – from being part of OEM to Supplier to OEM;
 - Need formal artifacts to define boundary to OEM
 - Distributed product development (platform from Siemens Automotive in Germany, supplier software to integrate iteratively with OEM software, software developers in geographically dispersed locations, manufacturing in Mexico)
- Process Change – from OEM to Siemens Automotive
 - New management
 - New tools and/processes– requirements, configuration management, change management
 - Software Method Kit (SMK)
 - Product Development Method Kit (PDMK)
- Product Change – from variation based on electro-mechanics to variation based on software
- Pilot tailoring process for small projects

Challenges

- Small team of 5-6 staff members
- Corporate level process to be tailored/tweaked for a small team
 - SMK, PDMK
 - 300 software process activities – Process Tailoring List (PTL)
 - 60 project documents – Project Document List (PDL)
 - Requirements define 19 activities, 10 are marked as mandatory
 - New roles and tasks – requirements, configuration management plan, test plan, quality assurance, document and code reviews (walkthroughs, inspection, 4-eye)
 - CMMI level 3 compliance – near future requirement by OEM
- Customer OEM provides requirements in the form of behavior and feature models, as auto generated code, not as a specification



Environment of the system





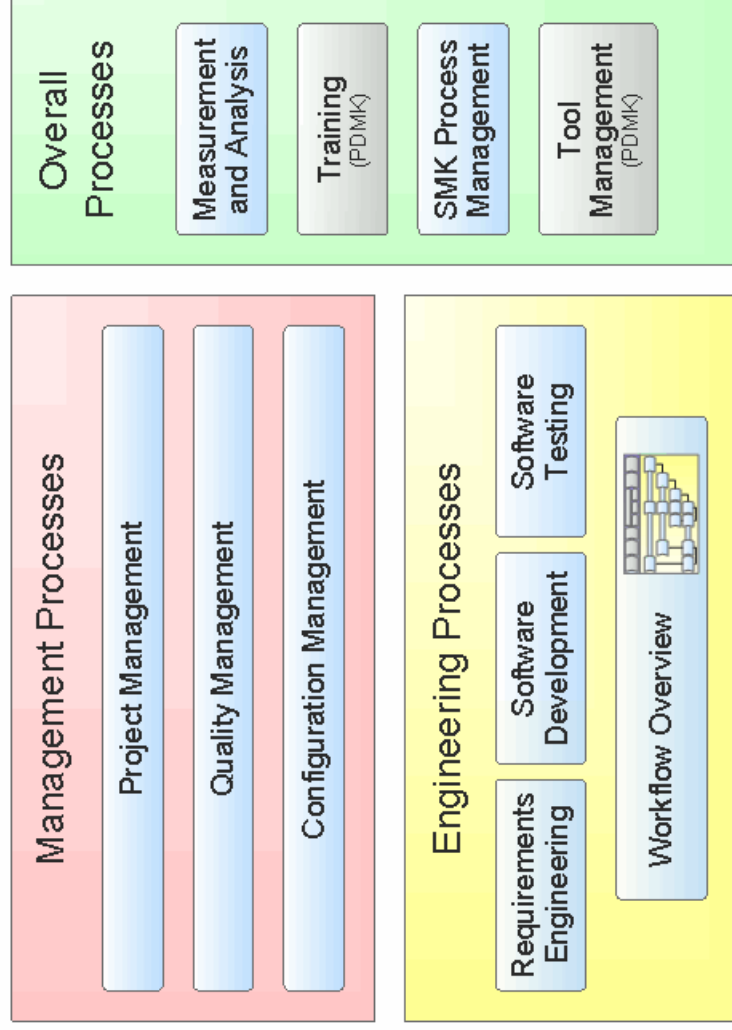
- Processes
- Life Cycle
- Roles
- Methods
- Documents
- Tools
- Help
- Links



- PDMK
- SMK

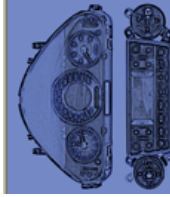
SMK Version 4.0
Maturity: Valid
Released: 2006-06-09
eSign: 128350

Software Method Kit for Software Development Processes



To get a detailed description of a particular process area click on the blue or the gray boxes!

Please note that the SMK is only complete in conjunction with the PDMK version 2.0 or higher.



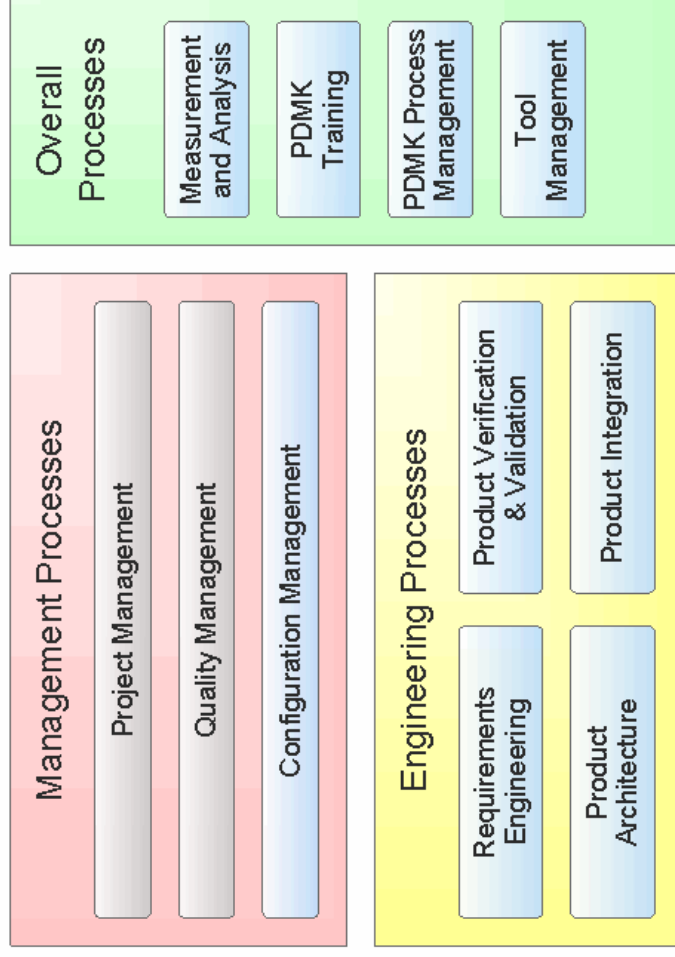
- Processes
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- PDMK
- SMK

PDMK Version 2.0
Maturity: Valid
Released: 2006-06-09
eSign: 126236

Product Development Method Kit for System Development Processes



To get a detailed description of a particular process area click on the blue boxes!
Link to external documents are grey.

Please note that the PDMK is only complete in conjunction with the SMK version 4.0.



Process Tailoring List

- 19 Requirements Engineering activities
- Decide on mandatory activities for the project

Process Area	Process ID	Activity	Responsible Role for the Activity	SMK Tailoring	SMK Tailoring - Small	Project Obligation	Reason / Restrictions / Comments	Task Output
Requirements Engineering								
Software Development		Software Requirements Management						
	RE_RM.010	Define Requirements Document Structure	Software Project Manager	M	M	M	Word or Excel document	CIL (Requirements Documents incl.), Software Project Software Project Plan (the decisions are documented)
	RE_RM.020	Define Requirements Tracing Concept	Software Project Manager	M	M	N	No tools or mechanism to do this	Project Measurement Plan (update)
	RE_RM.030	Define Requirements Matrix	Software Project Manager	R	M	N		
	RE_RM.040	Identify Requirements Inconsistencies	Software System Analyst	M	N	M	Word or Excel document	CIL (Requirements Documents incl.), Software Project Software Project Plan (the decisions are documented)
	RE_RM.050	Manage Requirements Changes	Software System Analyst	M	M	M	No tools or mechanism to do this	Software Project Plan (the decisions are documented)
	RE_RM.060	Software Requirements Analysis						Renewal rates see Software Configuration Management Process
	RE_RM.070	System Design Briefing	Software System Analyst	R	R	N		none
	RE_RM.080	Identify Requirement Stakeholders and Specifications	Software System Analyst	M	M	M		Software Project Plan (update Chapter Stakeholder Involvement), SRS (Chapter References)
	RE_RM.090	Set-up Software Requirements Team	Software System Analyst	M	M	M		Software Project Schedule (update)
	RE_RM.100	Workout Software Requirements	Software System Analyst	M	M	M		Software Requirements Specification (draft)
	RE_RM.110	Identify "Implicit" Requirements	Software System Analyst	M	M	M		Software Requirements Specification (update)
	RE_RM.120	Identify Software Safety Requirements	Software System Analyst	M	M	M	Product not safety critical	Information of Software Project Manager / Project Software Requirements Specification (update)
	RE_RM.130	Document Software Requirements	Software System Analyst	M	M	M		Software Requirements Specification (update)
	RE_RM.140	Analyse Software Requirements	Software System Analyst	M	M	M		Software Requirements Specification (update)
	RE_RM.150	Prototype Software Requirements	Software System Analyst	O	O	N	Prototype	Information of Software Project Manager about new or
	RE_RM.160	Requirements Contract Check	Software System Analyst	M	M	M	No formal contract	Software Requirements Specification (released), Review
	RE_RM.170	Software Requirements Specification	Software System Analyst	M	M	M	Covered by schedule	Software Release and Integration Plan (update)
	RE_RM.180	Release Planning	Software Project Manager	M	M	N		
		Software System Analysis & Design						



Project Document List

Process Area	Document/ Checklist	Creation			Document Author	Document Release Responsible	Handling			Reason / Restrictions / Comments
		SMK Tailoring	Project Obligation - Small Project	Project Obligation			SMK Tailoring	Project Obligation	SMK Tailoring	
Project Management Requirements										
	Customer Requirements Specification	N	N	N	Project Manager		M		N	
	Quotation Package	N	N	N	Project Manager		M		N	
	Performance Specifications	N	N	N	Project Manager		M		M	
Software Requirements Specification		M	M	M	Software Project Manager	SQE	M	M	M	enough to maintain it with MRDB
	Will be done in sec. tool (like Word/Excel)									
Software Requirements Specification										
Quality Management										
	SWQA Report	M	M	M	Software Quality Engineer	SPM	M		N	only at end of project
	Interim SWQA Report	R	R	N	Software Quality Engineer		M		N	
	SWQA Task Catalogue	M	M	M	Software Quality Engineer	SPM	M		N	
Configuration Reviews	Project Characteristics	O	O	N	Software Quality Engineer		O		N	
	Software Problem Report	O	O	N	Software Project Manager		O		N	
Measurement	Review Minutes	M	M	M	Moderator	SPM	M	M	N	
	Review List	M	M	M	Software Quality Engineer	SPM	M	M	N	
	Checklist	R	R	N	Author		M		N	
Measurement	Project Measurement Plan	R	O	N	Software Project Manager		M		N	
	Project Measurement Raw Data Collection Sheet	M	M	M	Software Project Manager	SQE	O		N	
	Project Measurement Report	M	R	N	Software Project Manager		M		N	

Process Tailoring

- Iterate between PTL(process activities) and PDL(documents) – tailor to decide which activities and documents will be used for the project.
 - Document (RE) – SRS
 - Activities (RE) – 5 mandatory activities are marked 'N' with reason, 11 mandatory activities accepted for project, 3 recommended activities are marked 'N'
- (i.e. reject requirements traceability, monitor of requirements traceability citing lack of tools– later reversed)
- Assign roles to team members
- Recruit outside help for Quality and Configuration Mgt roles
- Insert activities into Project Schedule
- Conduct training on reviews (Walkthroughs, Inspection, 4-eye)
- Use checklists from SMK
- SWQA reports process conformance check and highlights deficiencies (cites lack of traceability)



Distributed Development

- Organizational distribution and overlap
 - Project manager is also RE and code developer
 - Test manager is also a code developer
 - Configuration Management and Quality roles done by outside help, later hired permanent employee
 - Platform, networking, and OEM code integrated by Cluster group
- Geographic distribution and overlap
 - Small central team located in AL
 - One code developer in MI
 - One code developer/tester in Mexico
 - CM and QA done from NJ

Lessons Learned

- Small group can indeed use a tailored/tweaked corporate process.
- Selective use of checklists, templates, example documents from SMK, are guided by tailoring/tweaking.
- Use project documents from prior projects as templates, when possible.
- Lack of Tools is not a barrier to implementing RE traceability. Use manual matrices for bidirectional traceability from requirements to software system test specification.
 - fulfills CMMI level 2 compliance for REQM (Requirements Management)
- Roles shareable across multiple projects reduce the burden on a small project, or use outside help/consultants to overcome startup effort – for CM, SWQA, Process.



Contribution

- Piloted the deployment of the Siemens Automotive RE process for small projects.
- Evaluated the RE process against CMMI level 2.
- Provided Quality Assurance support as required by the Siemens Automotive process.



Next

- Roll out pilot to other small teams
- Change control after release
- Metrics
- Process improvement

Future

- Product line approach? – but first will need:
 - reusable components
 - SRS with release plan
 - ?



Questions?