

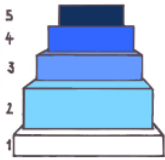
TMMI = TMM reloaded?

Erlangen
06.10.2009



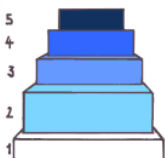
Maud Schlich
IT-PROJECT-SERVICE

- 2004 gegründet durch Maud Schlich
- 4 Mitarbeiterinnen und Mitarbeiter
- Schwerpunkte des Unternehmens
 - Coaching im Software Engineering (Einführung und Optimierung)
 - Inspektionen und andere Reviewtechniken
 - Test- und Qualitätsmanagement
 - Testprozess-Verbesserung (TMMI, TPI, CTP)
 - ISO/IEC 15504 (SPICE), Automotive-SPICE, CMMI
 - Projektmanagement, insbesondere Krisenmanagement und Optimierung der vorhandenen Prozess vom Kick-Off bis zur Retrospektive
 - Schulungen und Workshops



Einführung

- Nachfolgend werden folgende Marken ohne weitere Hinweise auf die Rechte benutzt
 - Capability Maturity Model und CMMI sind Trademarks des Software Engineering Institutes und der Carnegie Mellon University
 - Testing Maturity Model und TMM sind Service Marks der Illinois Institute of Technology.
 - TPI ist eine eingetragene Marke der Sogeti Nederland B.V.
 - Automotive SPICE ist eine eingetragene Marke der Volkswagen AG
 - TMMi ist eine Trademark der TMMi Foundation



Einführung

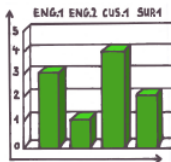
- Nachfolgend werden folgende Marken ohne weitere Hinweise auf die Rechte benutzt
 - Capability Maturity Model und CMMI sind Trademarks des Software Engineering Institutes und der Carnegie Mellon University
 - Testing Maturity Model und TMM sind Service Marks der Illinois Institute of Technology.
 - TPI ist eine eingetragene Marke der Sogeti Nederland B.V.
 - Automotive SPICE ist eine eingetragene Marke der Volkswagen AG
 - TMMi ist eine Trademark der TMMi Foundation



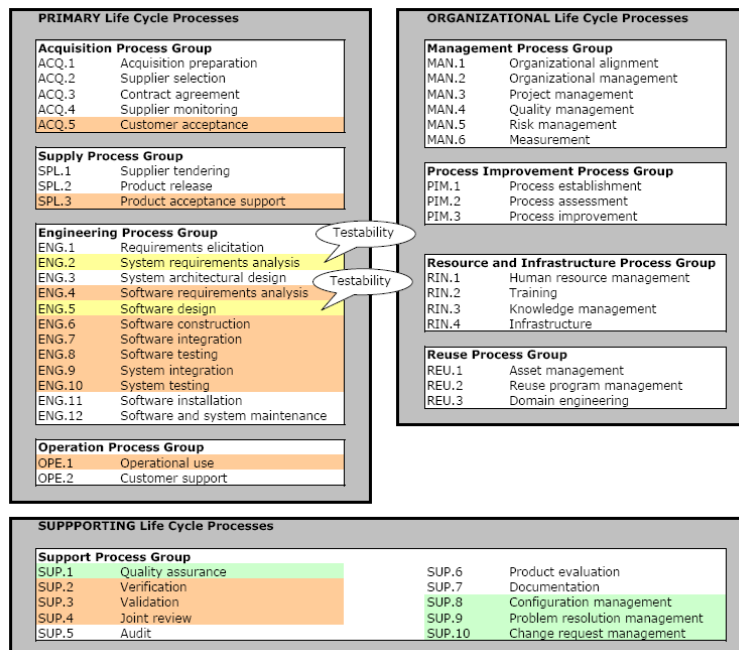
Was ist ein Prozessmodell?

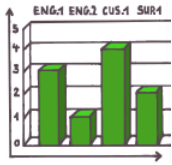
- Hilfsmittel für
 - einen bestimmten Zweck
 - einen speziellen Ausschnitt der Wirklichkeit

- Beschreibung von
 - Rollen in der Organisation
 - prinzipiellen Tätigkeiten
 - Inputs
 - Outputs



ISO/IEC 15504 Automotive SPICE





ISO/IEC 15504 ENG.6 Construction

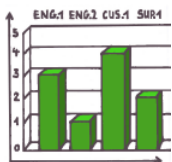
„... ENG.6.BP1: Develop unit verification procedures. Develop and document procedures and criteria for verifying that each software unit satisfies its design requirements. The verification procedure includes unit test cases, unit test data and code review. [Outcome: 1].

...
ENG.6.BP4: Verify software units. Verify that each software unit satisfies its design requirements by executing the specified unit verification procedures and document the results. [Outcome: 4]

NOTE 2: Code can be verified by various techniques such as static code analysis, code review, etc.”

Hervorhebungen und Unterstreichungen durch M. Schlich

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



Automotive SPICE ENG.6 Construction

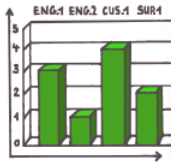
„The *purpose* of the Software construction process is to produce verified software units that properly reflect the software design.

As a *result*...

- 1) a unit verification strategy is defined; ...
- 4) verification of the software units is performed according to the unit verification strategy and
- 5) results of the unit verification are recorded.

NOTE: Unit verification will include unit testing and may include static analysis, code inspection/reviews, checks against coding standards and guidelines, and other techniques.

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



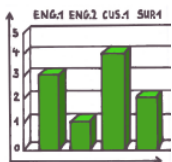
ISO/IEC 15504 ENG.8 Software testing

„The *purpose* of the Software testing process is to confirm that the integrated software product meets its defined requirements.“

As a *result* ...

- 1) criteria for the integrated software is developed that demonstrates compliance with the software requirements;
- 2) integrated software is verified using the defined criteria;
- 3) test results are recorded; and
- 4) a regression strategy is developed and applied for re-testing the integrated software when a change in software items is made.“

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



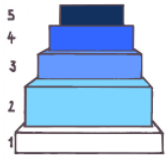
Automotive SPICE ENG.8 Software testing

„The *purpose* of the Software testing process is to confirm that the integrated software meets the defined software requirements.

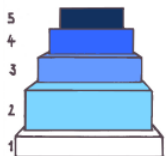
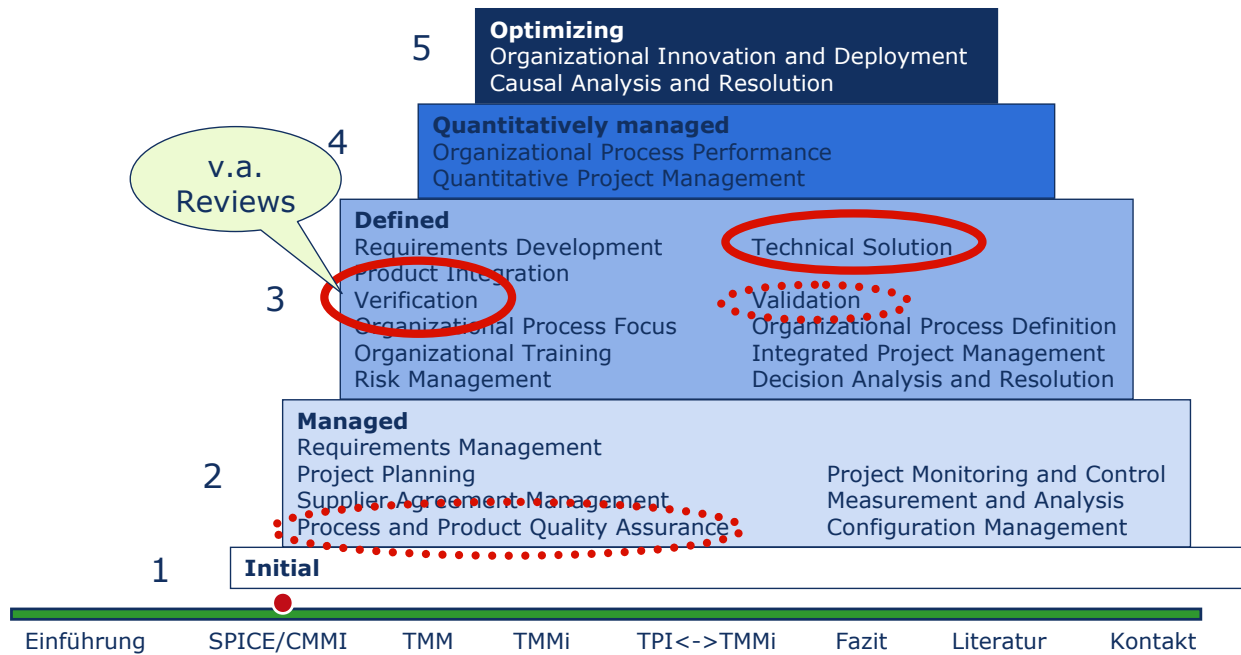
As a *result*...

- 1) a strategy is developed to test the integrated software according to the priorities and categorization of the software requirements;
- 2) a test specification for software test of the integrated software is developed that demonstrates compliance to the software requirements;
- 3) the integrated software is verified using the test cases;
- 4) results of software testing are recorded; ...

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



CMMI



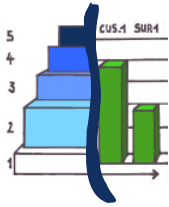
CMMI TS Technical Solution SP 3.1

„Subpractice 4 Perform unit testing of the product component as appropriate.

Note that unit testing is not limited to software. Unit testing involves the testing of individual hardware or software units or groups of related items prior to integration of those items...”

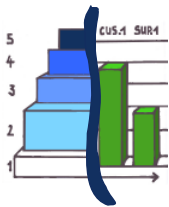
For Software Engineering
Examples of unit testing methods include the following:

- Statement coverage testing
- Branch coverage testing
- Predicate coverage testing
- Path coverage testing
- Boundary value testing
- Special value testing



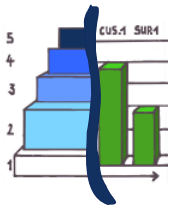
ISO/IEC 15504 Automotive SPICE CMMI - hilfreich für Tester?

- SPICE und Automotive SPICE
 - Betonung von mehreren Test-Prozessen
 - Unit Test
 - Integration Test
 - Acceptance Test
 - ...
 - Betonung Test-Strategie
 - ansatzweise Darstellung elementarer Testprozess
 - Unit Test als statisches Testen
- Automotive SPICE
 - Betonung Traceability



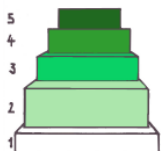
ISO/IEC 15504 Automotive SPICE CMMI - hilfreich für Tester?

- CMMI
 - deutliche Betonung formaler Reviewtechniken
 - wesentlich mehr Hinweise auf dynamische Testdesigntechniken im Unit Test
 - kein Elementarer Testprozess erkennbar
 - Hinweise auf Testbarkeit als Qualitätsmerkmal



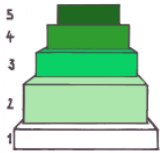
ISO/IEC 15504 Automotive SPICE CMMI - hilfreich für Tester?

- bieten wenig Unterstützung für Tester und Testmanager
- reichen zur Verbesserung der Testprozesse nicht aus
- bis auf Reviewtechniken in CMMI sowie Elementarerer Testprozess in SPICE / Automotive SPICE nur Stichworte zum Testen
- unterstützende Prozesse gut beschrieben
 - Konfigurationsmanagement
 - Fehlermanagement
 - Change Management



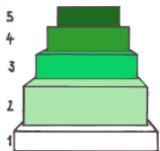
TMM - Entstehung

- Test improvement framework
- Veröffentlicht 1996 in zwei Artikeln von Ilene Burnstein, T. Suwannasart und C.R. Carlson, Illinois Institute of Technology
- Staged model mit 5 Leveln nach CMM
- Empirische Validierung
- seit 2003 als Buch veröffentlicht

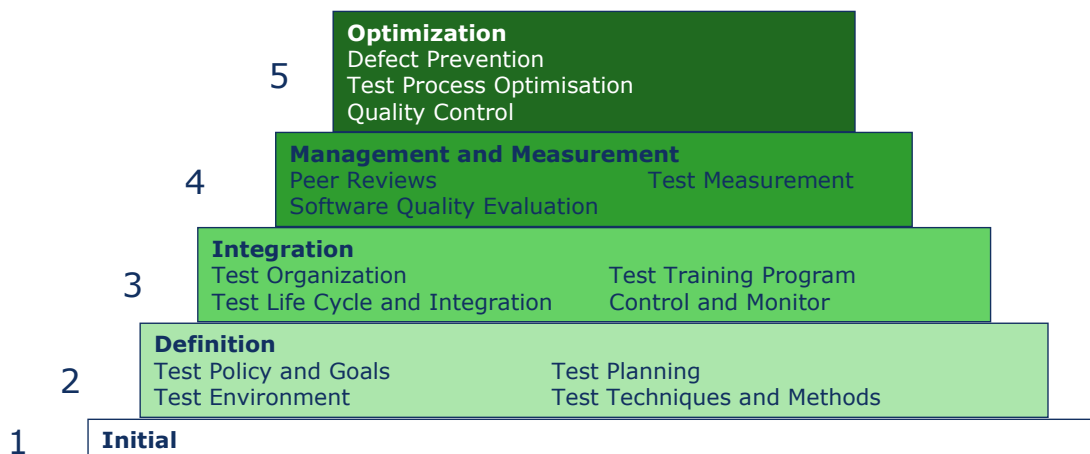


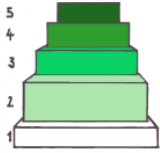
TMM - Entstehung

- TMM basiert auf Modell von Gelperin und Hetzel
- 4 historische Perioden 1950-1990
 - Debugging, d.h. Fehler beheben
 - Destruction, d.h. Fehler suchen
 - Evaluation, d.h. Fehler in einzelnen Phasen möglichst frühzeitig suchen
 - Anforderungen
 - Design
 - Implementierung
 - Prevention, d.h. Fehler vermeiden



TMM – Stufen angelehnt an CMM

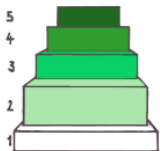




TMM – Maturity Level

- indicates Testing capability
- Maturity goals
 - Maturity subgoals (MSGs)
 - Activities
 - Tasks
 - Responsibilities
 - Critical views
 - Manager
 - Developer / Tester
 - User / Client

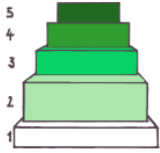
} (ATRs)



TMM - Maturity Goal 3.3. Integrate Testing into SWLC

- Questions
 1. Has a group or committee been established to support integration of testing activities?
 2. Has a software life cycle model that supports integration of testing activities been adopted?
 3. Have testing activities and testing requirements associated with each life cycle phase been identified?
 4. ...
 9. Does ... each project follow a written organizational policy for the integration of the testing efforts?
 10. Have the test organization and SQA group developed a set of documented standards for all test work products produced in each life cycle phase?
 11. Is there a policy to handle noncompliance with standards?





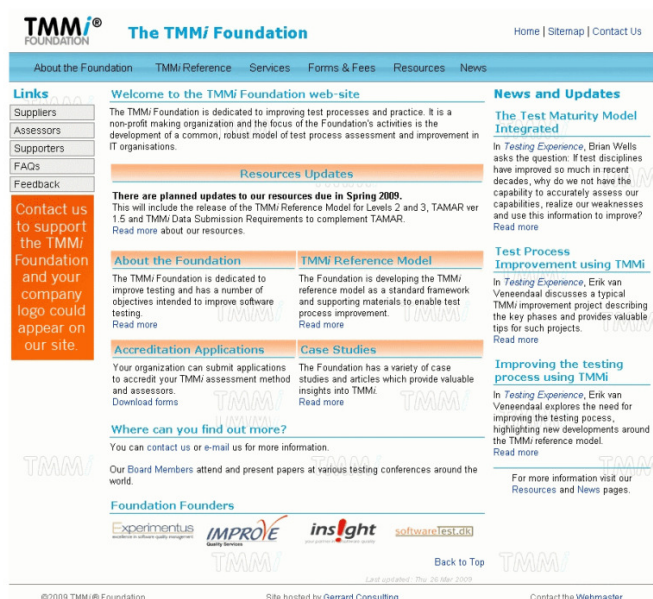
TMM - Maturity Goal 3.3. Integrate Testing into SWLC

- ATRs (Examples)
 - for Managers
 - Ensure that the integration of testing activities is applied throughout the organization for all projects.
 - Ensure that all testers are trained ...
 - Promote cultural changes needed ...
 - for Testers
 - Serve on the committee ...
 - Attend training sessions ...
 - Plan ...
 - Apply ...
 - for Users / Clients
 - Provide consensus and support for integrated testing activities and early test planning...

Einführung SPICE/CMMI **TMM** TMMi TPI<->TMMi Fazit Literatur Kontakt

The TMMi Foundation

- Chair is Bob Hecht
- Directors are:
 - Geoff Thompson (UK)
 - Brian Wells (UK)
 - Mac Miller (UK)
 - Andrew Goslin (UK)
 - Fran O'Hara (Ireland)
 - Erik van Veenendaal (Holland)
 - Klaus Olsen (Denmark)
 - Gary Davies (India)
- Support and interest is global



TMMi[®] FOUNDATION The TMMi Foundation Home | Sitemap | Contact Us

About the Foundation TMMi Reference Services Forms & Fees Resources News

Links
Suppliers
Assessors
Supporters
FAQs
Feedback

Welcome to the TMMi Foundation web-site
The TMMi Foundation is dedicated to improving test processes and practice. It is a non-profit making organization and the focus of the Foundation's activities is the development of a common, robust model of test process assessment and improvement in IT organisations.

Resources Updates
There are planned updates to our resources due in Spring 2009.
This will include the release of the TMMi Reference Model for Levels 2 and 3, TAMAR ver 1.5 and TMMi Data Submission Requirements to complement TAMAR.
Read more about our resources.

News and Updates
The Test Maturity Model Integrated
In *Testing Experience*, Brian Wells asks the question: If test disciplines have improved so much in recent decades, why do we not have the capability to accurately assess our capabilities, realize our weaknesses and use this information to improve?
Read more

Test Process Improvement using TMMi
In *Testing Experience*, Erik van Veenendaal discusses a typical TMMi improvement project describing the key phases and provides valuable tips for such projects.
Read more

Improving the testing process using TMMi
In *Testing Experience*, Erik van Veenendaal explores the need for improving the testing process, highlighting new developments around the TMMi reference model.
Read more

For more information visit our Resources and News pages.

Accreditation Applications
Your organization can submit applications to accredit your TMMi assessment method and assessors.
Download forms

Case Studies
The Foundation has a variety of case studies and articles which provide valuable insights into TMMi.
Read more

Where can you find out more?
You can contact us or e-mail us for more information.

Foundation Founders
Experimentus
IMPROVE
insight
softwareTestGIS

©2009 TMMi® Foundation Site hosted by Gerrard Consulting Contact the Webmaster

See www.tmmifoundation.org

Foundation Supporters

Global interest from:

- Across the EU
- Turkey
- Israel
- USA
- Canada
- Australia
- New Zealand
- India
- South America

Official Supporting Organisations

 Experimentus
excellence in software quality management

 IMPROVE
Quality Services

 Cognizant

 softwareTest.dk

 AppLabs

 insight
your partner in software quality

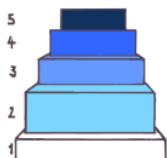
 polteq
international testing services

 QUALITYHOUSE

 TMMi®
FOUNDATION
ACCREDITED

Copyright © 2009 Experimentus Ltd

10

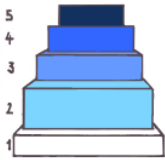


TMMi

 MAUD SCHLICH
IT • PROJECT • SERVICE

- Sep 2004
 - Treffen einer kleinen Gruppe von Enthusiasten
 - Wert eines von der Industrie anerkannten Test-Modells
- Dez 2007
 - TMMi Foundation als eingetragener Verein in Irland
- Feb 2008
 - Level 2 Model und Akkreditierungsrichtlinie
- Juni 2009
 - Level 3

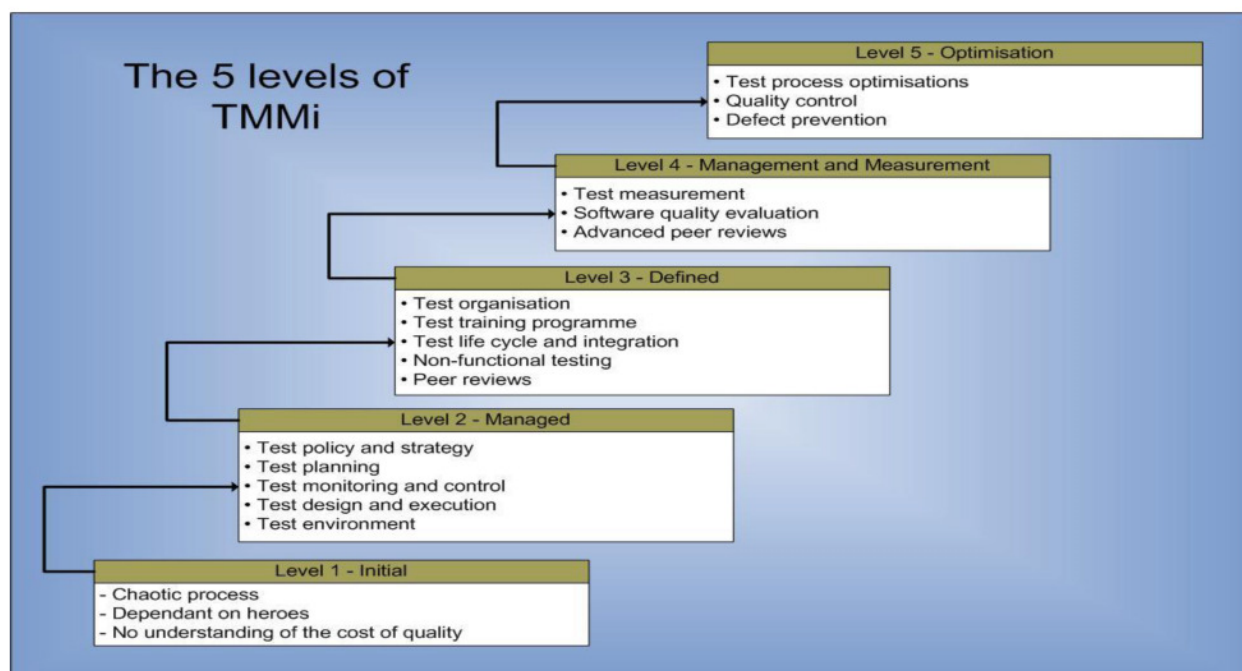
Einführung SPICE/CMMI TMM **TMMi** TPI-<->TMMi Fazit Literatur Kontakt



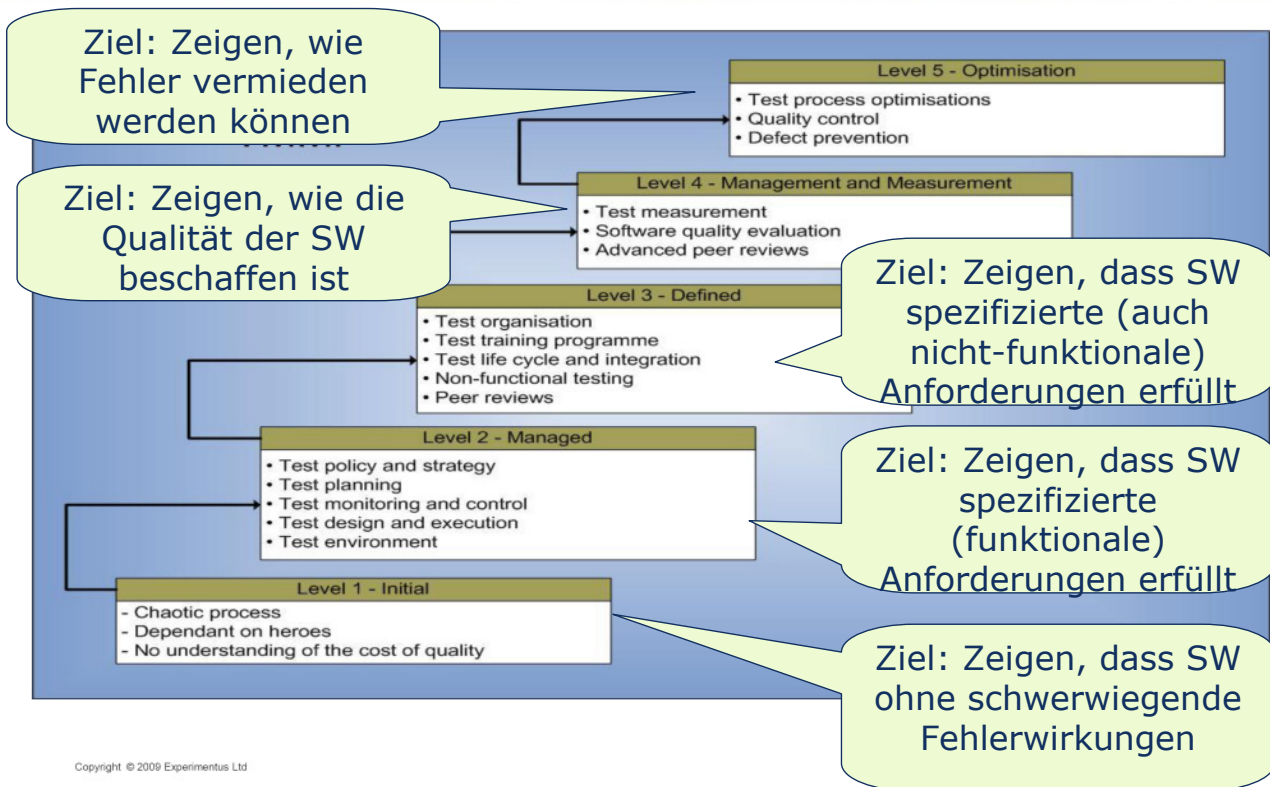
TMMi

- Testen im Software und Systems Engineering
- Statisches und Dynamisches Testen
 - Low-Level und High-Level Testen
- Allgemeines Rahmenwerk als Referenzmodell für Testprozess-Verbesserung
- Kein Prozess für Testprozess-Verbesserung

The TMMi Maturity Level Definitions

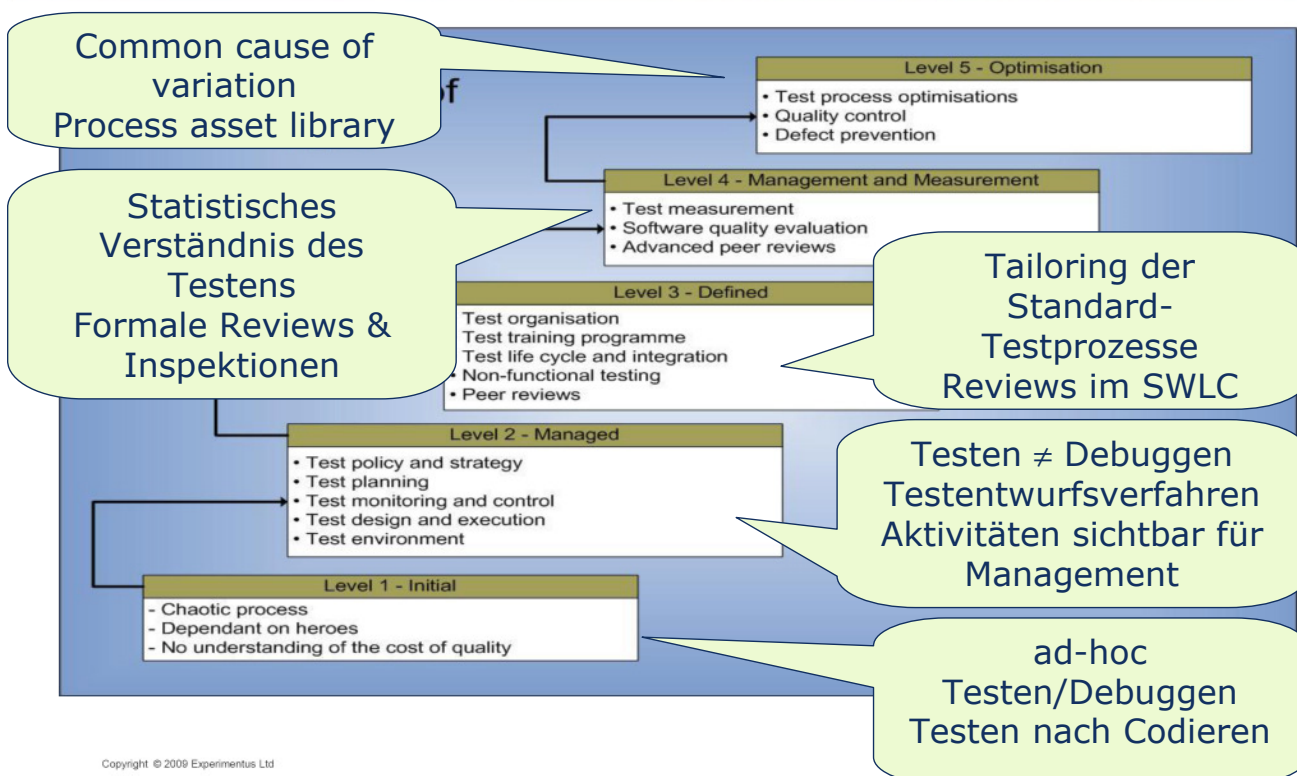


The TMMi Maturity Level Definitions

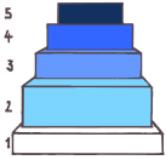


Copyright © 2009 Experimentus Ltd

The TMMi Maturity Level Definitions



Copyright © 2009 Experimentus Ltd



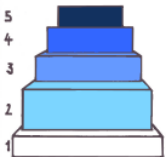
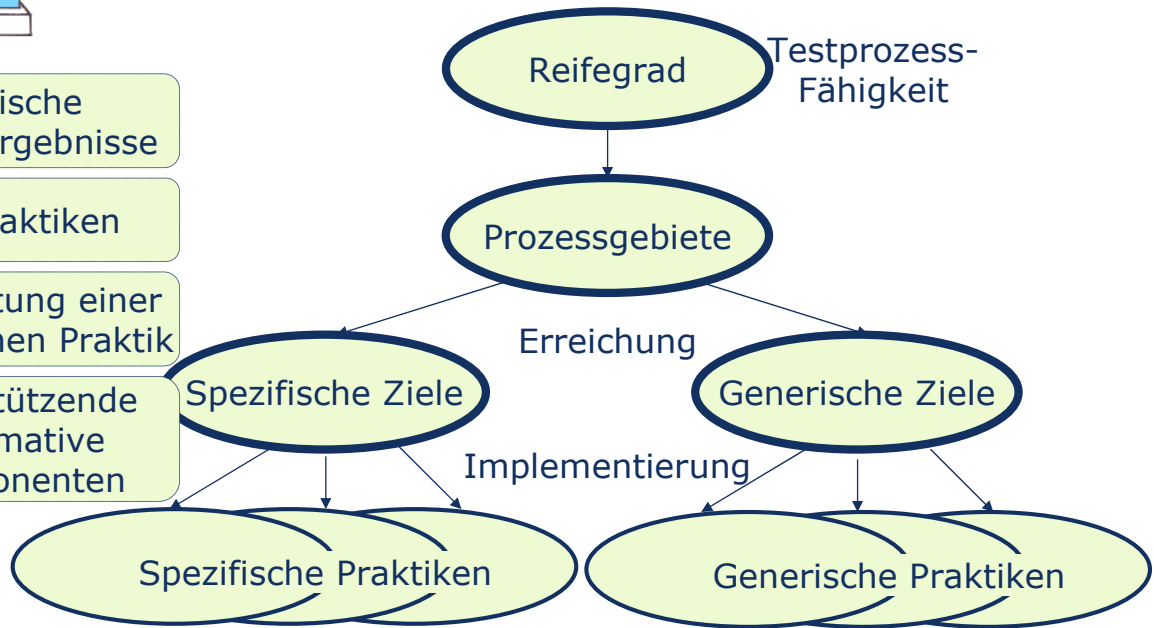
TMMi – Elemente

Typische Arbeitsergebnisse

Subpraktiken

Ausarbeitung einer generischen Praktik

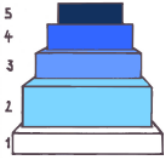
Unterstützende informative Komponenten



TMMi – PA 2.4 Testentwurf und -ausführung

- Zweck:
 - Verbesserung der Testprozessfähigkeit während Entwurf und Ausführung durch Etablierung von Testentwurfsspezifikationen
 - Nutzung von Testfallentwurfsverfahren,
 - strukturierter Prozess der Testausführung
 - Management von Test Incidents bis zur Erledigung

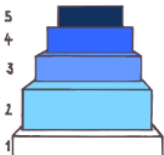




TMMi – PA 2.4 Testentwurf und -ausführung

- SG1 Testanalyse und -design unter Nutzung von Testfallentwurfstechniken durchführen
 - SP 1.1 Testbedingungen identifizieren und priorisieren
 - SP 1.2 Testfälle identifizieren und priorisieren
 - SP 1.3 Notwendige spezifische Testdaten identifizieren
 - SP 1.4 Horizontale Verfolgbarkeit beibehalten
- SG2 Testimplementierung durchführen
- SG3 Tests durchführen
- SG4 Test Incidents bis zur Erledigung managen

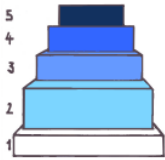
Einführung SPICE/CMMI TMM **TMMi** TPI<->TMMi Fazit Literatur Kontakt



TMMi – PA 2.4 Testentwurf und -ausführung

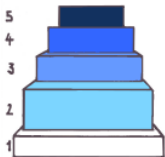
- SG1 Testanalyse und -design ...
 - SP 1.1 Testbedingungen identifizieren und priorisieren
 - Typische Arbeitsergebnisse
 1. Testbasis-Befundliste
 2. Testbedingungen
 3. Testentwurfsspezifikation
 - Subpraktiken
 1. Testbasis (wie z.B. Anforderungen, Architektur, Design- und Schnittstellenspezifikationen) studieren und analysieren
 2. Befunde bzgl. der Testbasis mit dem Dokument-Eigentümer diskutieren
 3. Optimal passende Testfallentwurfstechnik entsprechend des dokumentierten Testansatzes auswählen

Einführung SPICE/CMMI TMM **TMMi** TPI<->TMMi Fazit Literatur Kontakt



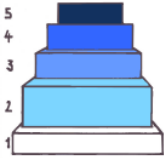
TMMi – PA 2.4 Testentwurf und -ausführung

- SG1 Testanalyse und -design ...
 - SP 1.1 Testbedingungen identifizieren und priorisieren
 - Subpraktik
 - 3. Optimal passende Testfallentwurfstechnik ... auswählen
- Beispiele von Black-Box Testfallentwurfsverfahren:
- Äquivalenzklassenanalyse
 - Grenzwertanalyse
 - Entscheidungstabellen (Ursache-Wirkungs-Graphen)
 - Zustandsbasiertes Testen
- Beispiele von White-Box Testfallentwurfsverfahren:
- Anweisungsüberdeckung
 - Entscheidungs(Zweig-)überdeckung
 - Bedingungsüberdeckung
- ... Exploratives Testen ... Test Charter



TMMi – PA 2.4 Testentwurf und -ausführung

- SG1 Testanalyse und -design ...
 - SP 1.1 Testbedingungen identifizieren und priorisieren
 - Subpraktik
 - 4. Testbedingungen aus Testbasis mittels Testfallentwurfsverfahren ableiten
 - 5. Testbedingungen auf Basis identifizierter Produktrisiken priorisieren
 - 6. Testbedingungen in Testentwurfsspezifikation gemäß Testentwurfsspezifikationsstandard dokumentieren
- Beispiele von Elementen nach IEEE Std. 829-1998
- 7. Testentwurfsspezifikation mit Stakeholdern reviewen
 - 8. Testentwurfsspezifikation und Testbedingungen überarbeiten, falls angemessen, besonders bei Änderung der Anforderungen



TMMi – PA 2.4 Testentwurf und -ausführung

- SG1 Testanalyse und -design ...
 - GG2 Gemanagter Prozess institutionalisieren
 - GP 2.1 Organisationsweite Leitlinien etablieren
 - GP 2.2 Arbeitsabläufe planen -> Testkonzept
 - GP 2.3 Ressourcen bereitstellen -> Zeit, Experten, Tools
 - GP 2.4 Rechte und Pflichten zuweisen -> Testkonzept
 - GP 2.5 Aus- und Weiterbilden -> Training
 - GP 2.6 Arbeitsergebnisse verwalten -> Konfigurationsmanagement It. CMMI
 - GP 2.7 Relevante Stakeholder identifizieren und einbeziehen -> Reviews/Freigabe, Endnutzer, Incident management / CCB
 - GP 2.8 Arbeitsabläufe überwachen und steuern -> Metriken
 - GP 2.9 Prozesseinhaltung objektiv bewerten -> Reviews / Audits
 - GP 2.10 Umsetzung mit höherem Management prüfen

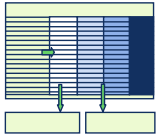
Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



Erstes Fazit

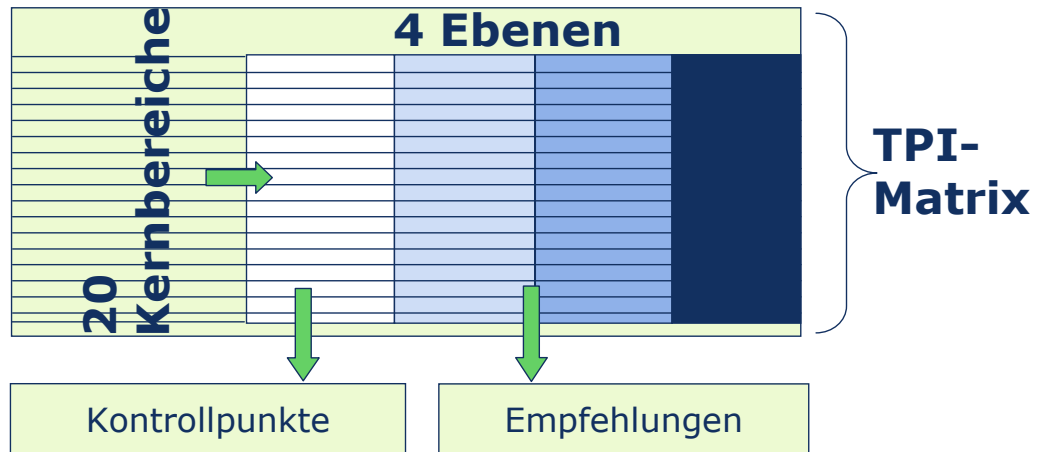
- Nutzt Vokabular von CMMI und ISTQB
- Sehr detailliert
- Stark angelehnt an CMMI
- Wenig Ähnlichkeit zu TMM

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt

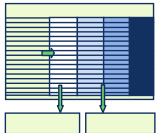


TPI - Aufbau

- 1998 von Sogeti erstmals veröffentlicht



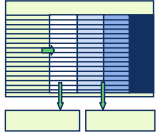
Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



TPI – 20 Kernbereiche

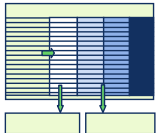
- Test strategy
- Life-cycle model
- Moment of involvement
- Estimating and planning
- Test specification techniques
- Static test techniques
- Metrics
- Test automation
- Test environment
- Office environment
- Commitment and motivation
- Testing functions and training
- Scope of methodology
- Communication
- Reporting
- Defect management
- Testware management
- Test process management
- Evaluation
- Low-level testing

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



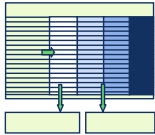
Automotive TPI - Entstehung

- HIS 2003
- TPI prinzipiell geeignet für Bereich Automotive
- Ergänzungen / Änderungen
 - Anpassungen auf Embedded Systems / ECUs
 - Betonung Integrationstest
- TPI Automotive in 2004 veröffentlicht



Automotive TPI – 21 Kernbereiche

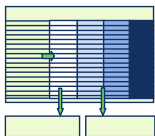
- Test strategy
- Life-cycle model
- Moment of involvement
- Estimating and planning
- Test specification techniques
- Static test techniques
- Metrics
- Test automation
- Test environment
- Office environment
- Commitment and motivation
- Testing functions and training
- Scope of methodology
- Communication
- Reporting
- Defect management
- Testware management
- Test process management
- Evaluation
- Low-level testing
- **Integration testing**



TPI / Automotive TPI – Tool

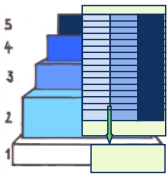
Life-cycle model

Level A Planning, Specification, Execution			
Checkpoints	Meets?	Dep?	
DEP KA11, Commitment and Motivation, Level A, Assignment of budget and time		X	
2.A.1	For the test (at least) the following phases are recognized: planning, specification, and execution. These are subsequently performed, possibly per subsystem. A certain overlap between the phases is allowed.	Y	
2.A.2	Activities to be performed for Planning phase are: (all documented in a testplan) - formulate assignment: project owner & executor / area of observation / goals / pre-conditions / constraints - determine the test basis: - determine relevant documentation / identify documentation - determine test strategy: - determine test strategy / determine budget - set up organization: - determine required functions / assign tasks, authority and responsibilities, - describe the organization / assign personnel, - determine training, communication structure, and reporting lines - set up test deliverables	N	



TPI / Automotive TPI – Tool

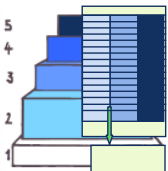
Key Area	Target Level	Current Level	Level (without dep)	1	2	3	4	5	6	7	8	9	10	11	12	13
Test strategy	A	Impr	A	A				B					C		D	
Life-cycle model	A	Impr	A	A			B									
Moment of involvement	A	D	D		A				B				C		D	
Estimating and planning	A	A	B			A							B			
Test design techniques	A	C	C		A		B					C				
Static test techniques	A	B	B				A		B							
Metrics	A	D	D					A			B			C		D
Test automation	A	C	C			A				B			C			
Test environment	A	C	C			A				B						C
Office and laboratory environment	A	A	A			A										
Commitment and motivation	A	A	C		A				B						C	
Test functions and training	A	B	C			A			B			C				
Scope of the methodology	A	C	D				A		B				C			D
Communication	A	A	C			A		B						C		
Reporting	A	A	D		A			B		C					D	
Defect management	A	B	B		A			B		C						
Testware management	A	B	B			A			B			C				
Test process management	A	B	C		A		B							C		
Evaluation	A	C	C			A			B			C				
Low level testing	A	C	C				A		B			C				
Integration testing	A	C	C				A			B			C			



TMMi ↔ TPI

- Stufig
- Unabhängig von Testmethode
- Starke formale Relation zu CMMI
- Für alle Testlevel (inkl. statischem Test)
- Detailliert auf wenige Prozessbereiche je Reifegrad
- Starker Fokus auf Management Commitment
- Kontinuierlich
- Starke Relation zu TMap
- Keine formale Relation zu SPI Modell
- unterstützt vor allem höhere Testlevel
- 20 Kernbereiche
- Test engineering

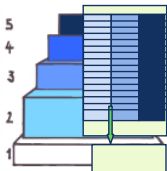
Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



TMMi ↔ TPI 2.4 Testentwurf und -ausführung

- SG1
- ...
- GG2
- 5 Testentwurfstechniken
 - Level A (informelle Techniken) und
 - Level B (formale Techniken)
- 6 Statische Testtechniken
 - Level A (Inspektion der Testbasis)
- ...
- 8 Testautomatisierung
- 11 Commitment und Motivation
 - Level A (Budget & Zeit)
 - ...

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



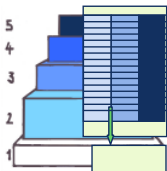
[TMMi]

TMMi ↔ TPI Level 2 als TPI Matrix

Scale Key area	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Test strategy		A					B				C		D	
2. Life-cycle model		A			B									
3. Moment of involvement			A				B				C		D	
4. Estimating and planning				A							B			
5. Test specification techniques		A		B										
6. Static test techniques					A		B							
7. Metrics						A			B			C		D
8. Test automation				A				B			C			
9. Test environment				A				B						C
10. Office environment				A										
11. Commitment and motivation		A				B						C		
12. Test functions and training				A			B			C				
13. Scope of methodology					A						B			C
14. Communication			A		B							C		
15. Reporting		A			B		C					D		
16. Defect management		A				B		C						
17. Test ware management			A			B				C				D
18. Test process management		A		B								C		
19. Evaluation							A			B				
20. Low-level testing					A		B		C					

Table 8: Typical TPI Test Maturity Matrix for a TMMi level 2 organization

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



[TMMi]

TMMi ↔ TPI Level 3 als TPI Matrix

Scale Key area	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Test strategy		A					B				C		D	
2. Life-cycle model		A			B									
3. Moment of involvement			A				B				C		D	
4. Estimating and planning				A							B			
5. Test specification techniques		A		B										
6. Static test techniques					A		B							
7. Metrics						A			B			C		D
8. Test automation				A				B			C			
9. Test environment				A				B						C
10. Office environment				A										
11. Commitment and motivation		A				B						C		
12. Test functions and training				A			B			C				
13. Scope of methodology					A						B			C
14. Communication			A		B							C		
15. Reporting		A			B		C					D		
16. Defect management		A				B		C						
17. Test ware management			A			B				C				D
18. Test process management		A		B								C		
19. Evaluation							A			B				
20. Low-level testing					A		B		C					

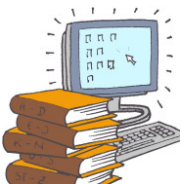
Table 10: Typical TPI Test Maturity Matrix for a TMMi level 3 organization

Einführung SPICE/CMMI TMM TMMi TPI<->TMMi Fazit Literatur Kontakt



Fazit

- TMMi ist eine Alternative zu TPI
- TPI wird aktuell ebenfalls überarbeitet
 - analog zu TMap Next
 - Struktur vermutlich aber ähnlich zu aktueller Version
 - vermutlich stärkere Einbeziehung Low Level Tests und Erfahrungen mit Automotive TPI
- TMMi ist „hersteller“unabhängig
- zunehmend mehr und größere Firmen als Unterstützer
- Verbreitung derzeit noch eingeschränkt
- TMMi Assessment Method Application Requirements (TAMAR) gemäß ISO/IEC 15504-2



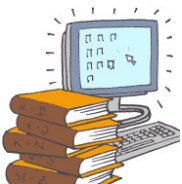
Quellen / Literatur

- Burnstein, I. *Practical software testing. a process-oriented approach*. New York NY: Springer. (Springer professional computing), 2003.
- Veenendal, Erik van (Ed.). *Test Maturity Model Integration (TMMi), Version 2.0*. Produced by TMMi Foundation, Ireland, 2009.
- <http://www.tmmifoundation.org>



Quellen / Literatur

- Koomen, Tim; Pol, Martin. *Test process improvement: a practical step-by-step guide to structured testing*; Addison-Wesley: Harlow England ; ;Reading Mass., 1999.
- Pol, Martin; Koomen, Tim; Spillner, Andreas. *Management und Optimierung des Testprozesses: Ein praktischer Leitfaden für erfolgreiches Testen von Software mit TPI und TMap*; dpunkt Verlag für digitale Technologie: 2000.
- *TPI Automotive*. Test Process Improvement; <http://www.tpiautomotive.de/produkte.html>.



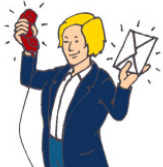
Quellen / Literatur

- Norm, *ISO/IEC 15504-5 (2006)*: Information technology — Process Assessment — Part 5: An exemplar Process Assessment Model.
- Automotive SIG. 2007. *Automotive SPICE: Process Assessment Model*. <http://www.automotive-his.de>.



Quellen / Literatur

- Chrissis, M. Beth, Konrad, M. & Shrum, S. 2007. *CMMI. Guidelines for process integration and product improvement*. 2nd ed. Upper Saddle River NJ: Addison-Wesley
- Chrissis, M. Beth, Konrad, M. & Shrum, S. 2009. *CMMI. Richtlinien für Prozess-Integration und Produkt-Verbesserung*. Addison-Wesley, Imprint of Pearson Education.



Kontakt

Maud Schlich

Maud Schlich
IT-PROJECT-SERVICE
Vorstadt 35
67292 Kirchheimbolanden

Tel +49 6352 719 0151
Fax +49 6352 719 319
Mobil +49 162 2794920

ms@itprojectservice.de
www.itprojectservice.de

