

# Test Process Improvement – with TPI



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Qualität & Informatik

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## Qualität & Informatik



*„Bewußt  
den  
Wandel  
gestalten!“*

### **Ausbildung**

Doktorat der Informatik an der J. Kepler Universität Linz, Lehrbeauftragter, Habilitation in Wirtschaftsinformatik - Thema „Prozess- und Qualitätsmanagement“, SQS zert. ISO 9001 Auditor; TPI-Lead Assessor, CMMI-, EFQM-Assessor, ISO 15504 Comp. Assessor

### **Beruflicher Werdegang**

Forschungs- und Entwicklungsprojekte in Software Engineering an ETH Zürich, Manager “Software Engineering und Qualitätssicherung” in UBS, Berater für ATAG Ernst & Young in der Schweiz, Österreich, Deutschland und England, Principal, Prozess-Coach Bid Prozess, Lieferanten und Businesspartner-Prozesse und Manager des Project Quality Office und Qualitätssysteme der Unisys (Schweiz) AG, Geschäftsführer und Managementberater von Qualität & Informatik, Zürich

### **Arbeitsschwerpunkte**

Qualitäts-, Prozess-, Projekt- und Riskmanagement

# Agenda



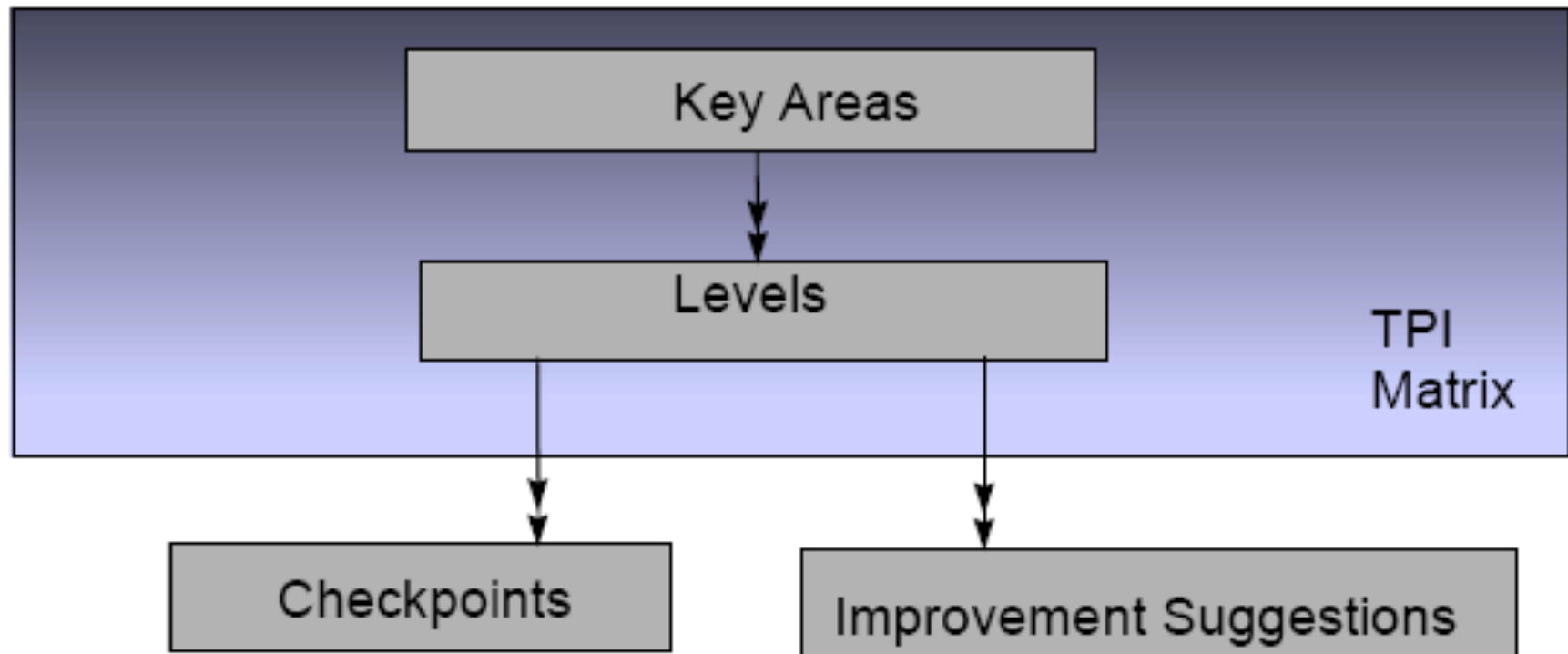
- TPI Introduction
- Assessment Plan
- Rules for the Assessment
- Terms
- Q & A

# TPI<sup>®</sup> Model

TPI:= Test Process Improvement (Pol, 1995)

- The model offers insight in the
  - **"maturity"** of the test processes within your organisation
  - Similar to the CMMI or ISO 15504 for improvement of the total software process
- Reveals strengths and weaknesses of testing work
- Improvement model with good practice reference

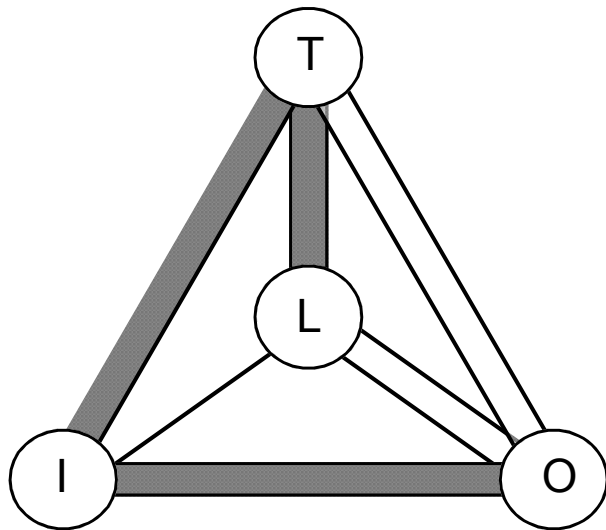
# TPI Model Elements



# TPI Key Areas

- In each test process certain areas need specific attention in order to achieve a well defined process.
- These **key areas** are the basis for improving and structuring the test process.
- Within the TPI model 20 key areas are used to determine the maturity of the test process.

# TPI Key Area groups



L – **Life cycle** related Areas

T – **Techniques** related Areas

I – **Infrastructure/Tools** related Areas

O – **Organization** related Areas

# TPI Key Areas 1

## **Life Cycle related Key Areas:**

- Test strategy
- Life-cycle model
- Moment of involvement

## **Techniques related Key Areas:**

- Estimating and planning
- Test specification techniques
- Static test techniques
- Metrics

# TPI Key Areas 2

## **Infrastructure and tools related Key Areas:**

- Test automation/tools
- Test environment
- Office environment

## **Organization related Key Areas:**

- Commitment and motivation
- Test functions and training
- Scope of methodology
- Communication
- Reporting
- Defect management
- Testware management
- Test process management
- Evaluation
- Low-level testing

# TPI Model

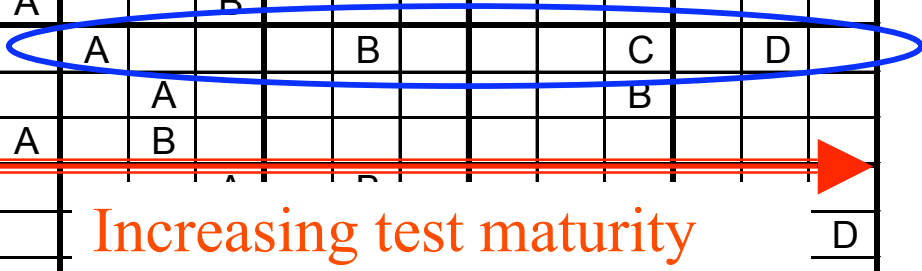
- Analysis of 20 key areas
  - Levels (A, B, C, D) are used to assign a degree of maturity to each key area
  - Checkpoints are defined to determine the level for each key area
  - Level A is considered lowest maturity and D is considered the highest maturity

# TPI Model

- **Maturity Scale**
  - **Ad-hoc (scale 0)**
  - **Controlled (scale 1-5)**
  - **Efficient (scale 6-10)**
  - **Optimizing (scale 11-13)**

# Test Maturity Matrix – Levels A-D

Key area	Scale													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
		Controlled				Efficient					Optimizing			
Test Strategy		A					B				C		D	
Life Cycle Model		A				B								
Moment of Involvement		A					B				C		D	
Estimating and Planning				A							B			
Test Specification Techniques		A		B										
Static Test Techniques														
Metrics														D
Test Tools					A			B			C			
Test Environment				A				B						C
Office Environment				A										
Commitment and Motivation		A				B						C		
Test Functions and Training				A			B				C			
Scope of Methodology					A						B			C
Communication			A		B							C		
Reporting		A			B		C					D		
Defect Management		A				B		C						
Testware Management			A			B				C				D
Test Process Management		A		B								C		
Evaluation							A			B				
Low-level testing					A		B		C					



# Test maturity Profile

Key area	Scale													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
		Controlled					Efficient					Optimizing		
Test Strategy		A					B				C		D	
Life Cycle Model		A			B									
Moment of Involvement			A				B				C		D	
Estimating and Planning				A							B			
Test Specification Techniques		A		B										
Static Test Techniques					A		B							
Metrics						A			B			C		D
Test Tools					A			B			C			
Test Environment				A				B						C
Office Environment				A										
Commitment and Motivation		A				B						C		
Test Functions and Training				A			B				C			
Scope of Methodology					A						B			C
Communication			A		B							C		
Reporting		A			B		C					D		
Defect Management		A				B		C						
Testware Management			A			B				C				D
Test Process Management		A		B								C		
Evaluation							A			B				
Low-level testing					A		B		C					

# TPI Check points

- „Yes“ for all check points of a Key Area Level means reaching the Level
- 1 to 8 check points per Level, up to 20 per Key Area
- Each Level contains the previous Level within the same Key Area

# TPI Check points example

<b>1</b>	<b>Test strategy</b>
1.A	<i>Test strategy for single high-level test</i>
1.A.1	A motivated consideration of the product risks takes place, for which knowledge of the system, its use and its operational management is essential.
1.A.2	There is a differentiation in the depth of the tests, depending on the risks and, if present, depending on the acceptance criteria: not all subsystems are tested equally thoroughly and not all quality characteristics are tested (equally thoroughly).
1.A.3	One or more test specification techniques are used, suited to the required depth of the test.
1.A.4	For re-tests also a (simple) strategy determination takes place, in which a motivated choice between 'test solutions only' and 'full re-test' is made.
1.B	<i>Combined testing strategy for high-level tests</i>
1.B.1	Coordination takes place between the different high-level tests, often the system, acceptance and production acceptance test, in the field of test strategy (risks, quality characteristics, area of consideration of the test, and planning).
1.B.2	The result of the coordination is a coordinated strategy, which is put in writing. During the total test process this strategy is controlled.
1.B.3	Each high-level test determines its own test strategy, based on the coordinating strategy, as is described in level A .
1.B.4	Deviations from the coordinating strategy are reported, after which a substantiated adjustment to the coordinating strategy is made, based on the risks.
1.C	<i>Combined strategy for high-level tests plus low-level tests or evaluation</i>
1.C.1	Coordination takes place between the high-level tests and the low-level tests or the evaluation levels in the area of test strategy (risks, quality characteristics, area of consideration of the test/evaluation and planning)



# TPI Improvement Methodology

- Assess existing testing processes
  - Review testing related documentation
  - Interview key staff
  - Collect quality related metrics
  - Complete Test Maturity Matrix (TMM)
  - Develop test process improvement plan
  - Determine implementation plan
- Implement TPI plan recommendations
- Monitor results and improvements

# TPI Assessment Result (Current – Target)

	Kernbereich														
1	Teststrategie		A					B					C		D
2	Einsatz des Phasenmodells		A			B									
3	Zeitpunkt der Beteiligung			A				B					C		D
4	Kostenvoranschlag und Planung				A								B		
5	Test-Spezifikationstechniken		A		B							C			
6	Statische Testtechniken					A		B							
7	Metriken						A			B				C	D
8	Test-Automatisierung				A				B				C		
9	Testumgebung				A				B						C
10	Testarbeitsplatz				A										
11	Engagement und Motivation		A					B						C	
12	Testfunktionen und Ausbildung				A				B				C		
13	Reichweite der Methodik					A			B				C		D
14	Kommunikation			A		B								C	
15	Berichterstattung		A			B			C					D	
16	Dokumentation der Abweichungen		A					B		C					
17	Testware-Management			A				B					C		D
18	Testprozeßmanagement		A		B									C	
19	Prüfen			A					B			C			
20	Low-Level-Tests					A			B		C				
21	Integrationstest				A				B				C		

## How to behave in an interview

- The meetings are interviews, not interrogations. The main topic is an open discussion of your work and ways to improve the work processes.
- Give honest answers, don't try to hide problems.
- Provide the facts and not the evaluation.
- If you don't know the answer to a question, then say so and don't invent anything or guess.

# Basic Rules for Assessment (I)

## **Objectivity**

## **Confidentiality**

- Keep data sources confidential
- Results belong to the sponsor

## **Multiple data sources**

- Interviews
- Documents

## Basic Rules for Assessment (II)

### **No examination of the person**

- Inspection item is the test process and its work products, not individual persons

### **Consent**

- Results are acceptable for all team members and are carried by all

### **Co-operation organization and Assessment team**

- timeliness
- openness

# Assessment Purpose

## - *Business Objectives*

- Identify strengths and weaknesses of test process.
- Provide proposals for process improvement.
- Provide test process maturity matrix and detailed TPI checkpoint results

# Conclusions

- TPI methodologies provide a good vehicle for improvements of test processes
- An industry accepted TPI model is freely available
- However improvement of test processes without improvement of the SW process are only limited effective
- Quality cannot be tested into the product

# Questions ?



# Terms (1)

- **Test basis**

All documents from which the requirements of a system can be extracted. The documentation on which the test is based.

- **Test case**

A description of a test to be executed, focused on a specific test aim

- **Test infrastructure**

The environment in which the test is performed, consisting of hardware, system software, test tools, procedures, ...

# Terms (2)

- **Test level**

A group of test activities that are organized and managed together. They can be divided into high-level and low-level tests

- **Test object**

The system (or part of it) which is to be tested

- **Test process**

The collection of Tasks, tools, techniques, and working methods used to perform a test

# Terms (3)

- **Test set**

A collection of test cases specifically aimed at one or more quality characteristics and one or more test units

- **Test team**

A group which, led by a test manager, takes on the test activities

- **Test unit**

A part of the test object (collection of programs, functions, or processes) that is tested as a whole

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*Thanks for Your  
Attention!*