

# Measuring the Quality of Standard Software: the SAP Quality Index



**Günther Limböck**  
Global Quality Governance  
SAP AG, Walldorf

Software Quality Days 2009  
Wien, 22. Januar 2009

THE BEST-RUN BUSINESSES RUN SAP™



# Agenda



## **Meine Geschichte bei SAP**

Messen von Software Qualität: Herausforderungen

Das Projekt *SAP Quality Index*

Governance und Betrieb des *SAP Quality Index*

Erfahrungen und Ausblick

SAP 1989: 1.400 Mitarbeiter  
0,19 Mrd. EUR Umsatz



## SAP R/2 4.3

nt3270--1.140 -- ihsap3 (147.204.123.5)

Network Edit Colors Fonts Options TermType Help

Hinzufuegen Kreditor - zentral 30.01.97

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KONTO-NR 00000000 KTOGR EINK

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ANREDE \_\_\_\_\_  
 NAME 1 ? \_\_\_\_\_  
 NAME 2 \_\_\_\_\_  
 STRASSE \_\_\_\_\_  
 POST-LZ \_\_\_\_\_  
 ORT ? \_\_\_\_\_

SORTFELD ? \_\_\_\_\_  
 POSTFACH \_\_\_\_\_  
 PLZ.PFACH \_\_\_\_\_  
 REGI.CODE \_\_\_\_\_

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 SPRACHE ? \_\_\_\_\_

KONZERN ? \_\_\_\_\_  
 WAEHRUNG ? \_\_\_\_\_  
 ZAHL.-EMPF \_\_\_\_\_  
 SONDERSTAT BERLIN \_\_\_\_\_

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BANKNAME \_\_\_\_\_  
 BANK-LZ \_\_\_\_\_  
 PGIRO-NR \_\_\_\_\_

BANKKONTO \_\_\_\_\_  
 ESR-TEILN \_\_\_\_\_

BANKLAND \_\_\_\_\_  
 BANK-GRP \_\_\_\_\_

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SPERR-KZ \_\_\_\_\_  
 LOESCH-UM \_\_\_\_\_

OK ■

1 - 02060

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Operation cancelled. NUML 001 001

SAP 1998: 19.308 Mitarbeiter  
4,33 Mrd. EUR Umsatz



## SAP R/3 4.5

**Create Standard Order: Overview**

Sales document Edit Goto Extras Environment System Help

Sold-to party  
  Orders  
  Sales summary  
  Propose Items  
  Reject document  
 Clear

Standard Order:   
 Net value: **70,52** DEM

Sold-to party: **BACH** Feuerstein / Hauptstr. 55 1 / D-12345 Steintal  
 Ship-to party: **BACH** Feuerstein / Hauptstr. 55 1 / D-12345 Steintal  
 PO number: **123-45-1**  
 PO date:

Sales  
 Item Overview  
 Ordering party  
 Procurement  
 Shipping  
 Reason for rejection

Sales doc.type: **OR** Standard Order  
  Standard Order  
  Quotation

Req.deliv.date: **D 06.12.1998**  
 Deliver.plant:

Complete dlv.:   
 Total weight: **300** KG

Delivery block:   
 Volume: **24** CM3

Billing block:   
 Pricing date: **06.12.1998**

Payment card:   
 Exp.date:

Payt terms: **0002**  
 Incoterms: **FH**

Order reason:   
 Delivery time:

Sales area data: **0001 / 01 / 01**  
 Sales Org. 001, Distribtn Channel 01, Product Division 01

All items						
Item	Material	Order quantity	SU	S	Description	First date
10	BACH	12	ST	<input checked="" type="checkbox"/>	Tontom	D 06.12.
				<input type="checkbox"/>		D 06.12.

Availability  
  Pricing  
  Sched.lines  
  Config.

Layout set header text

P45 (1) (000) pawdf023 DVR 0.91

SAP 2008: 52.000 Mitarbeiter  
10,24 Mrd. EUR Umsatz in 2007



## SAP Business Suite 7.0

The screenshot displays the SAP Business Suite 7.0 user interface. On the left is a navigation sidebar with a 'Home' button and a menu for 'Quality Inspection' containing 'Work Overview', 'Reports', and 'Service Map'. The main area is divided into three windows:

- Work Overview:** Shows a folder structure with 'Checks', 'Confirmation', 'Inspection Lots', 'Usage Decision', 'Physical Samples', and 'Notifications/Actions'.
- Personal Worklist:** Lists 'Active Queries' and categories like 'Inspection Lots', 'Production Orders', 'Notifications', 'Tasks', and 'Confirmations'. Below is a table of 'Inspection Lots - Inspection lots' with columns for 'Inspection Lot' and 'Me'.
- Results Recording:** Titled 'Record Results: Insp. Lot 890000004909 - Operation 10'. It displays 'Inspection Lot Data' (Material: 1059, Plant: 0001) and 'Operation Data' (Work center: QUALITY). A table of 'Characteristics' is shown below:

Char.	Status	Specifications	Inspect	Result	Single Values	Valuation	Insp. Description	Test Equipment	Att	Origin
Moisture content	Must be processed	180,0	1			No valuation			Result is valid (default)	

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Meine Geschichte bei SAP

**Messen von Software Qualität: Herausforderungen**

Das Projekt *SAP Quality Index*

Governance und Betrieb des *SAP Quality Index*

Erfahrungen und Ausblick

# Soll man messen? Und was? Und wann?



## Zitate zu „Messen“

### Messen? Nein!

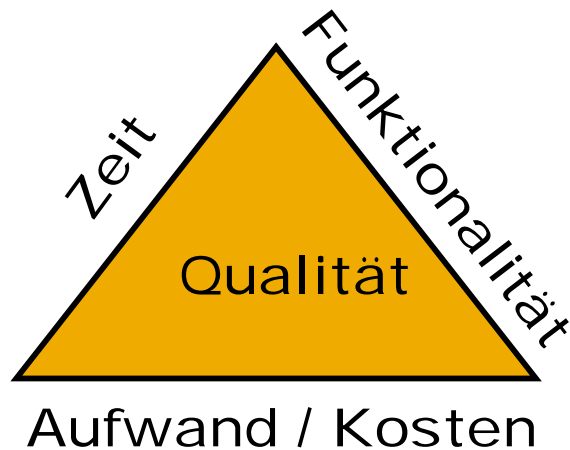
- „Wer viel misst, misst Mist.“  
- *Unbekannt*
- „All the statistics in the world can't measure the warmth of a smile.“  
- *Chris Hart*
- „Intense love does not measure, it just gives.“  
- *Muttter Teresa*

### Messen: Ja!

- „In fact, the reduction – not necessarily the elimination – of uncertainty is central to the concept of measurement.“  
- *Wikipedia*
- If you don't measure you're left with only one reason to believe you're in control: hysterical optimism.  
- *Tom DeMarco*
- „What gets measured gets managed.“  
- *Peter Drucker*

- Messen soll verwendet werden, um Unsicherheit zu reduzieren und bei Entscheidungen die Fakten zu kennen.
- Messen soll auf Produkte/Prozesse angewendet werden, nicht auf Personen.

# Welche Aspekte von Software können wie gut gemessen werden?



## Welche Aussagen können üblicherweise über Softwareprojekte gemacht werden?

### Unser letztes großes Software Entwicklungsprojekt

- hatte eine Dauer von 18 Monaten
- verursachte einen Aufwand von 80.000 Personentagen (80 Mio. Euro)
- hatte eine Funktionalität von 16.000 Functions Points
- hatte bei Auslieferung eine Qualität von 8,3 (auf einer Scala von 1 bis 10)
- hatte eine verbleibende Defect Density von 0,75 Defects pro Function Point

# Agenda



Meine Geschichte bei SAP

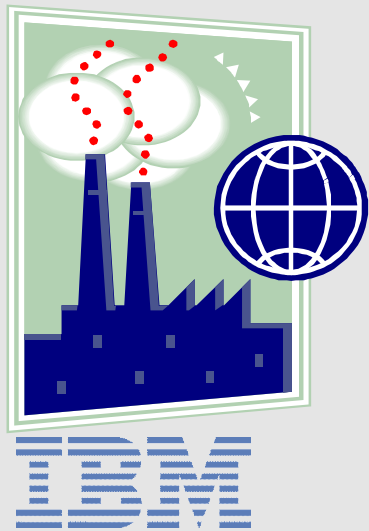
Messen von Software Qualität: Herausforderungen

**Das Projekt *SAP Quality Index***

Governance und Betrieb des *SAP Quality Index*

Erfahrungen und Ausblick

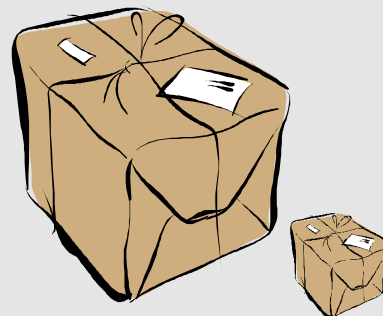
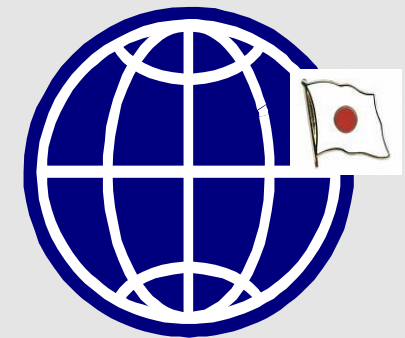
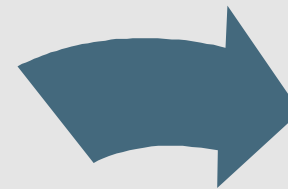
In den 1980er-Jahren bestellte IBM Canada Ltd. in Markham, Ont., Bauteile von einem neuen japanischen Zulieferer



## Auftrag

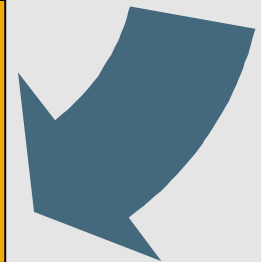
... toleriert werden  
maximal 1,5%  
fehlerhafte Teile

...



## Begleitschreiben

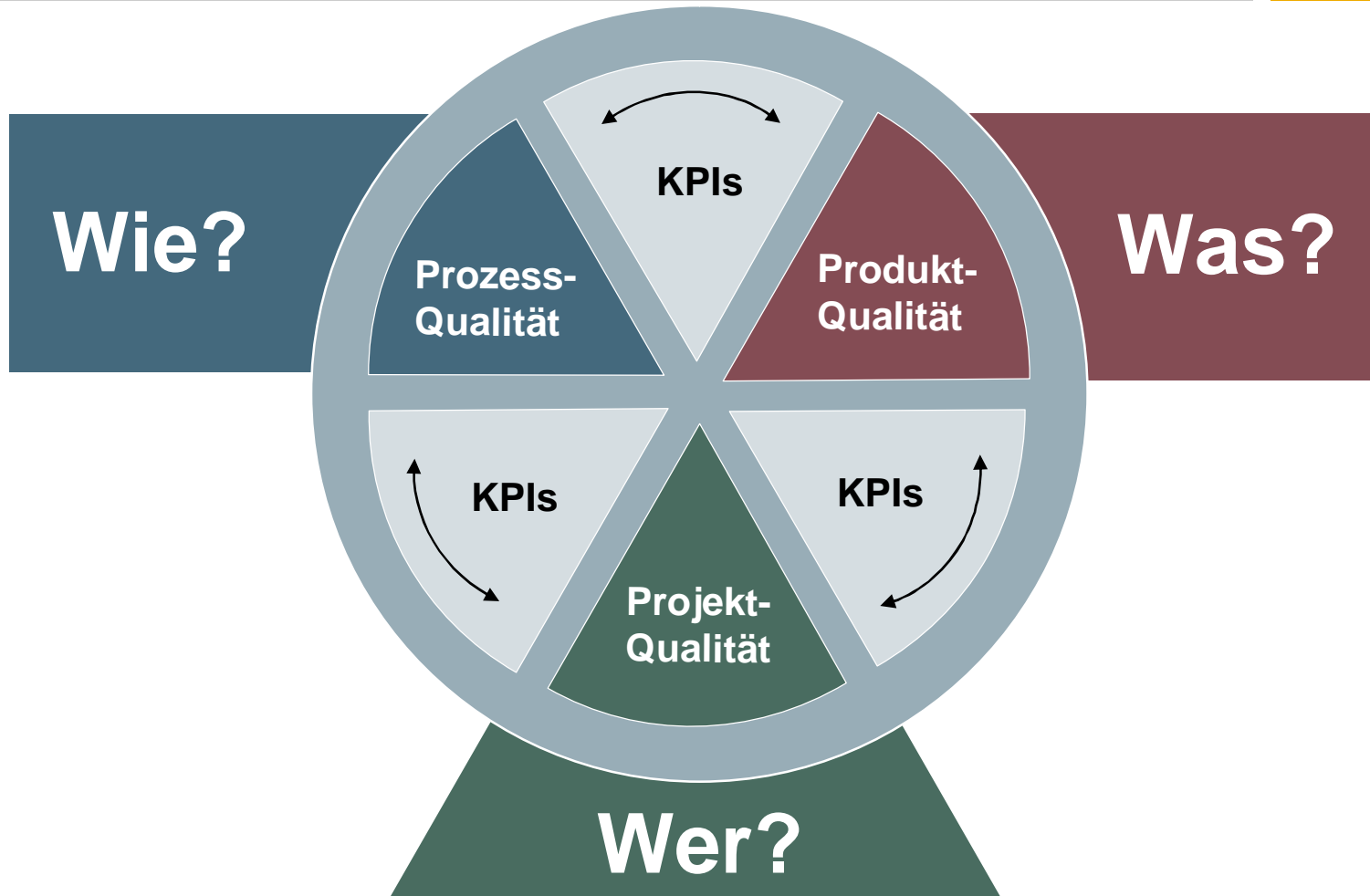
"Wir wissen zwar nicht, warum Sie 1,5 Prozent fehlerhafte Teile haben möchten, aber um Ihnen die Arbeit zu erleichtern, haben wir sie separat verpackt."



# *SAP Quality Index:* Der Projektauftrag im August 2005



# Welche Aspekte sollen in einen Quality Index?



**Qualität aus Kundensicht → Fokus auf Produkt-Qualität**

# Welche Daten werden für die Definition einer KPI gebraucht?



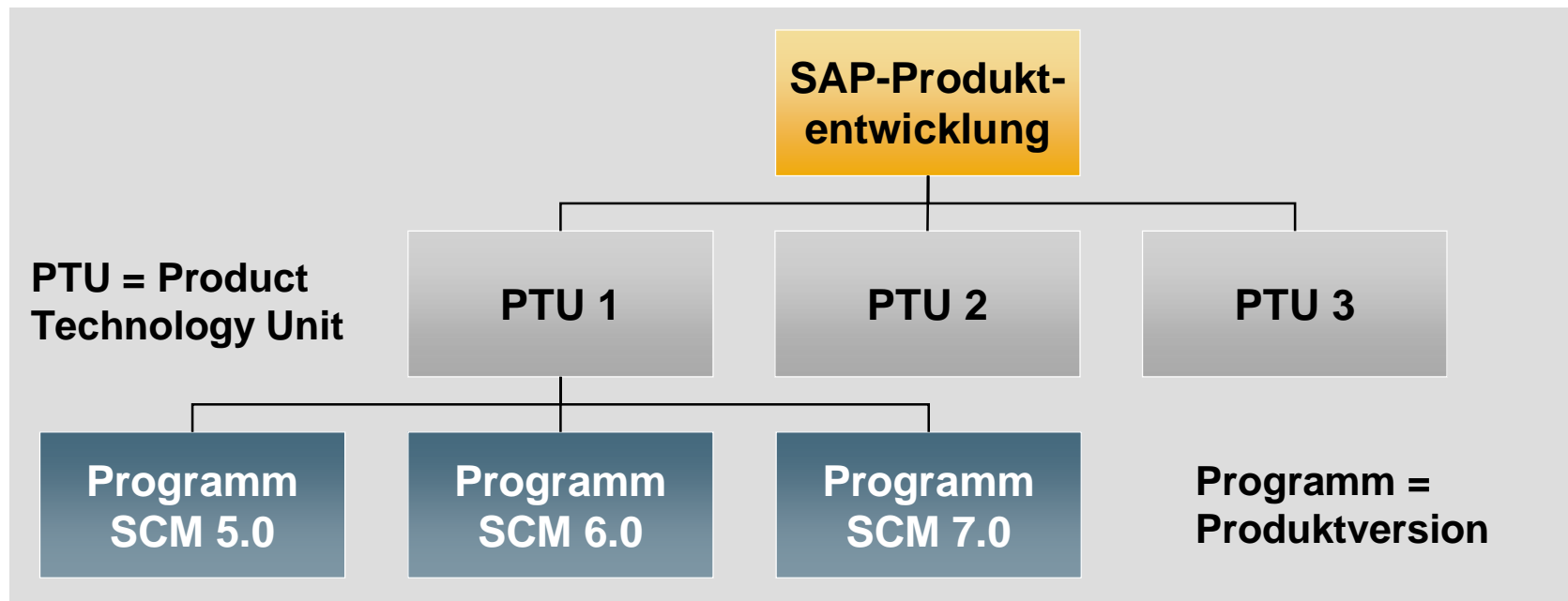
## Vorlage zur Definition der KPIs

<b>Name:</b>	<b>Type:</b> <ul style="list-style-type: none"> <li>■ Product / Process / Project</li> <li>■ Objective / Subjective</li> <li>■ Direct / Indirect</li> </ul>	<b>Relevance to:</b> <ul style="list-style-type: none"> <li>■ PIL phases Invent / Define / Develop / Deploy / Optimize</li> <li>■ SAP product standard</li> <li>■ Significance (10 = high, medium, 0 = low)</li> </ul>
<b>Goal:</b>  <b>Question:</b>  <b>Metric description:</b>	<b>Breakdown granularity</b> <ul style="list-style-type: none"> <li>■ Project</li> <li>■ Application hierarchy</li> <li>■ Others:</li> </ul>	
<b>Measurement / Calculation procedure</b>  <b>Aggregation rules</b>  <b>Measurement:</b> <ul style="list-style-type: none"> <li>■ Start of measurement</li> <li>■ Start of judgment, end of judgment</li> <li>■ Maximum frequency</li> </ul>		<b>Implementation details</b> <ul style="list-style-type: none"> <li>■ Source (tool)</li> <li>■ Tool changes</li> <li>■ Process changes</li> <li>■ Business Information Development</li> </ul>
<b>Comments</b> <ul style="list-style-type: none"> <li>■</li> </ul>		

Für welche Entität soll Qualität gemessen werden?



## Organisationsstruktur der SAP-Entwicklung

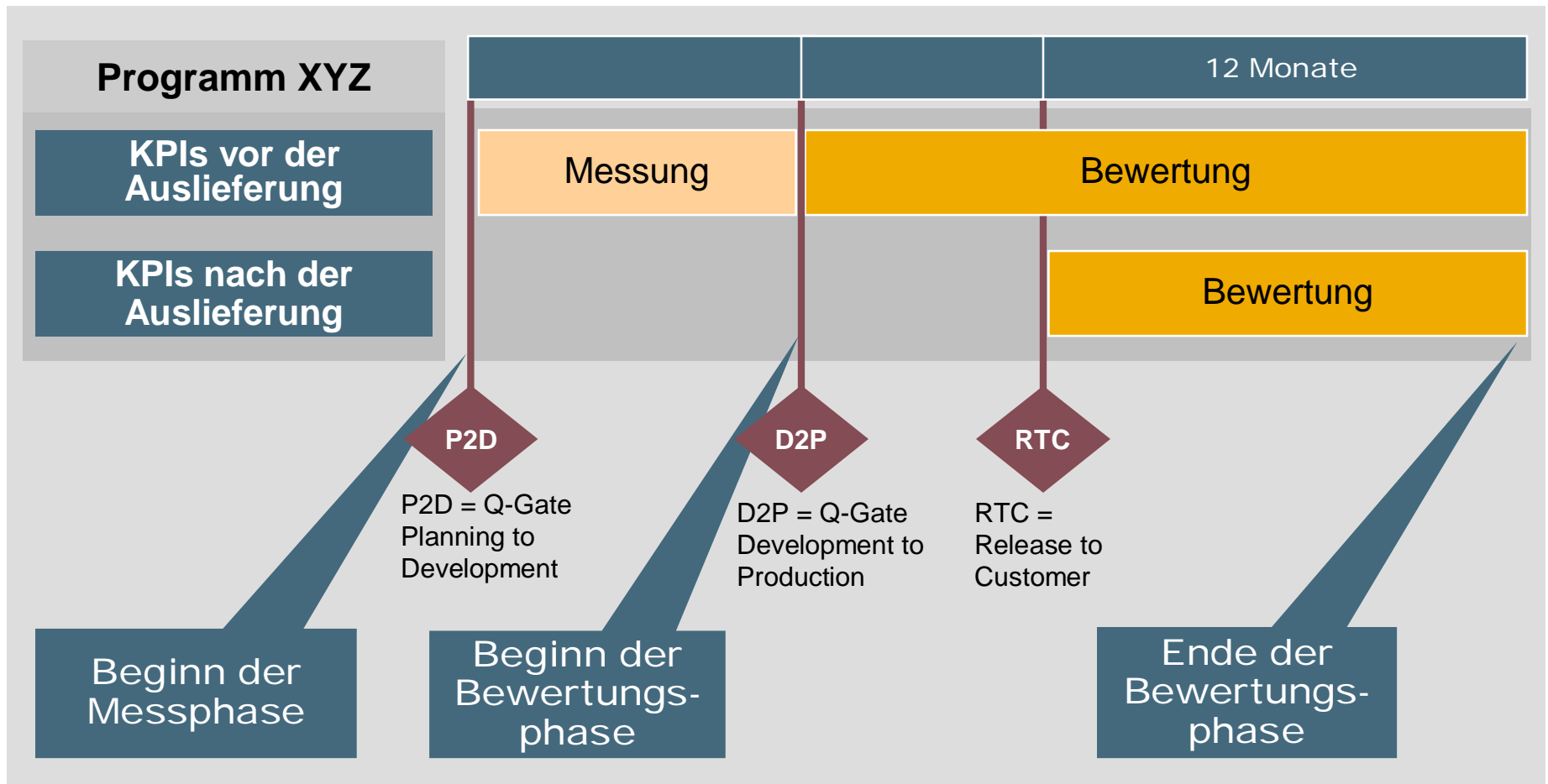


- Programme repräsentieren das, was der Kunde auf der DVD bekommt
- Ein Programm ist daher die zentrale Entität, auf der Qualität von Software bei SAP gemessen wird

# Wann soll gemessen werden, wann soll bewertetet?



## Zeitachse pro Programm:

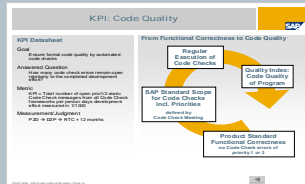




### KPIs während der Development-Phase: Forecast der Produkt Qualität

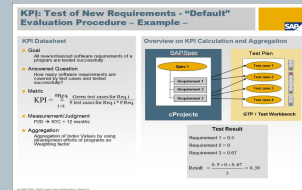
#### Code Quality

Ensure formal code quality by automated code checks



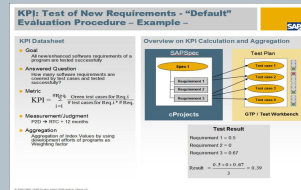
#### Test of New Requirements

All new/enhanced software requirements of a program are tested successfully



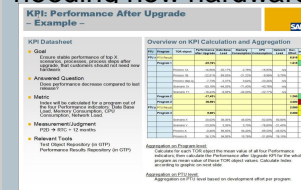
#### Regression Test Coverage

Ensure stability of previously delivered product (code) with regression tests



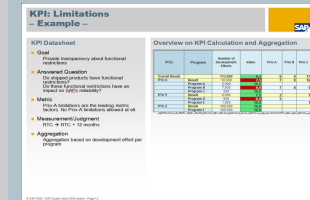
#### Performance after Upgrade

Stable performance of top X processes after upgrade precludes customers from needing new hardware



#### Limitations

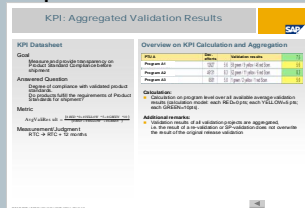
Provide transparency about functional restrictions



### KPIs nach Auslieferung: KPIs: Produkt Qualität aus Kundensicht

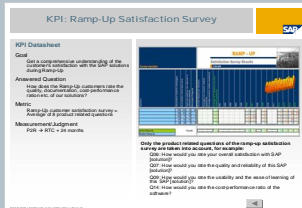
#### Aggregated Validation Results

Measure and provide transparency on Product Standard Compliance before shipment



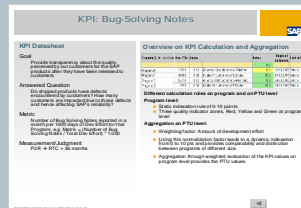
#### Ramp-Up Survey

Get comprehensive understanding of customer's satisfaction during Ramp-Up



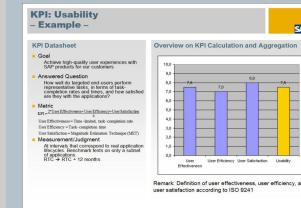
#### Bug Solving Notes

Provide transparency about customer quality perception for products after release to customers



#### Usability

Achieve high-quality user experiences with SAP products for our customers



# Beschreibung der KPI: Test of New Requirements

Beispiel

## KPI Datasheet:

### ■ Goal

All new software requirements of a program are tested successfully

### ■ Answered Question

How many software requirements are covered by test cases and tested successfully?

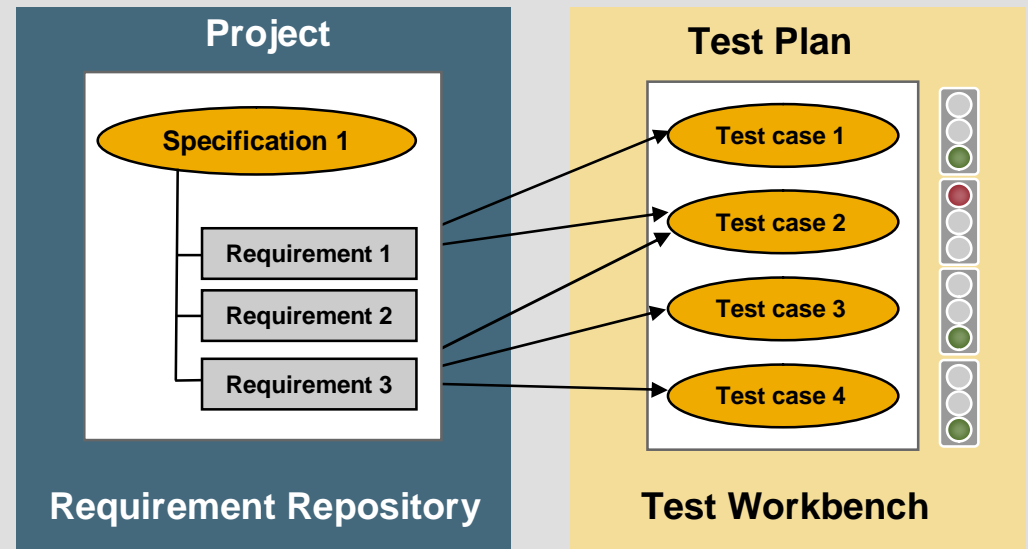
### ■ Metric

$$KPI = \sum_{i=1}^{\#Req.} \frac{\text{Green test cases for Req. } i}{\# \text{ test cases for Req. } i * \# \text{ Req.}}$$

### ■ Measurement/judgment

P2D → RTC + 12 months

## Overview on KPI Calculation and Aggregation



### Test Result

Requirement 1 = 0.5

Requirement 2 = 0

Requirement 3 = 0.67

$$\text{Result} = \frac{0.5+0+0.67}{3} = 0.39$$

# Bewertung jeder KPI und Zuordnung von KPI-Werten zur Index-Skala

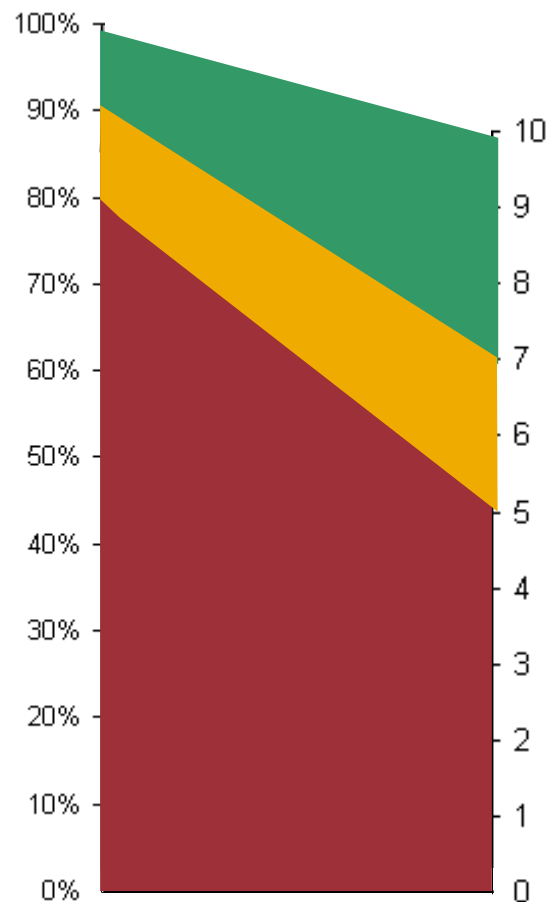


Für alle KPIs wurden Regeln definiert, die die KPI-spezifischen Werte einer gemeinsamen Q-Index-Skala von 0 bis 10 zuordnet

## KPI-Wertebereiche

KPI-spezifische Bewertung,  
z.B.:

$0 \% < x \leq 80\% \rightarrow \text{rot}$   
 $80 \% < x \leq 90\% \rightarrow \text{gelb}$   
 $90 \% < x \leq 100\% \rightarrow \text{grün}$



## Q-Index-Bereiche

Für alle KPIs identisch

$0 \leq x < 5 \rightarrow \text{rot}$   
 $5 \leq x < 7 \rightarrow \text{gelb}$   
 $7 \leq x \leq 10 \rightarrow \text{grün}$

# Aggregationsregeln zur Berechnung der KPI-Werte auf verschiedenen Ebenen



Für alle KPIs gilt der **Entwicklungsaufwand** als Gewichtungsfaktor. Alle KPIs werden im Index gleich gewichtet.

Beispiel einer Aggregation für eine KPI:

PTU	Program	Entwicklungsaufwand	Gewichtung	Index-Wert	Gewichteter Index
PTU 1	Program 1	4.000	80,00%	6,0	4,8
PTU 1	Program 2	1.000	20,00%	8,0	1,6
<b>Summe PTU 1</b>		<b>5.000</b>	<b>100,00%</b>		<b>6,40</b>
PTU 2	Program 3	20.000	16,67%	6.0	1,0
PTU 2	Program 4	100.000	83,33%	8.0	6,67
<b>Summe PTU 2</b>		<b>120.000</b>	<b>100,00%</b>		<b>7,67</b>
<b>SAP Total</b>		<b>125.000</b>			<b>7,62</b>

**Q-Index-Wert PTU 1**

**Q-Index-Wert PTU 2**

**SAP-Q-Index-Wert**



# SAP Quality Index User Interface – Sicht SAP gesamt



Beispiel

Q-INDEX REPORT
Final Report July 2015

MAINSTREAM
Current: 7.2   Previous: 7.0   Trend: +   Target: 7.4   Report Date: 04.07.2015

SAP View

PTU View

Program View

[Q-Index Documentation](#)

Current Quality Index per PTU

PTU	Quality Index
PTU 8	8.5
PTU 7	8.5
PTU 6	7.0
PTU 5	7.5
PTU 4	7.8
PTU 3	8.8
PTU 2	8.5
PTU 1	7.8

History Quality Index of SAP

Month	Quality Index
01/15	5.8
02/15	6.2
03/15	6.8
04/15	7.1
06/15	7.0
07/15	7.2

Critical Programs of PTU All

Program	Dev. Index	After RTC	Dev. Efforts
Program 1	4.1	6.9	1031
Program 2	7.4	4.3	1600
Program 3	4.3	2.1	15000
Program 4	5.3	3.5	2100
Program 5	6.3	4.7	3100
Program 6	7.3	3.1	2122
Program 7	8.3	7.1	3210
Program 8	2.1	3.1	100

Executive Summary

The Q-Index value is at **7.8** in May 2015, which means a **slight decrease of 0.1 index points** compared to the last month. The change is mainly a technical effect of adapting the reporting for PTU 2 to the new delivery strategy: release 7.10 and 7.11 will be covered by the Q-Index reporting for release 7.20. Mainly the reassignment of Bug Solving Notes from a high to a low effort program caused the slight reduction.

# SAP Quality Index User Interface – Sicht je PTU



Q-INDEX REPORT
Final Report July 2015

MAINSTREAM
Current: 7.2   Previous: 7.0   Trend: +   Target: 7.4   Report Date: 04.07.2015

SAP View
PTU View
Program View
[Q-Index Documentation](#)

Show PTU PTU 1

Current Indices of the PTU



7.8

Quality Index



7.5

Development Index



7.5

After RTC Index

Current Quality Index per Program

Program	Current	Previous	Trend	Dev. Effort (PD)
Program FTG 1	5.9	2.8	++	10.000
Program FTG 2	7.3	9.5	--	20.000
Program FTG 3	5.7	5.7	o	30.000
Program FTG 4	5.3	5.1	+	20.000
Program FTG 5	3.8	3.4	+	10.000
Program XYZ 1	2.1	5.1	--	10.000
Program XYZ 2	7.2	7.2	o	10.000
Program XYZ 3	6.5	6.5	o	10.000
Program XYZ 4	6.2	6.2	o	10.000

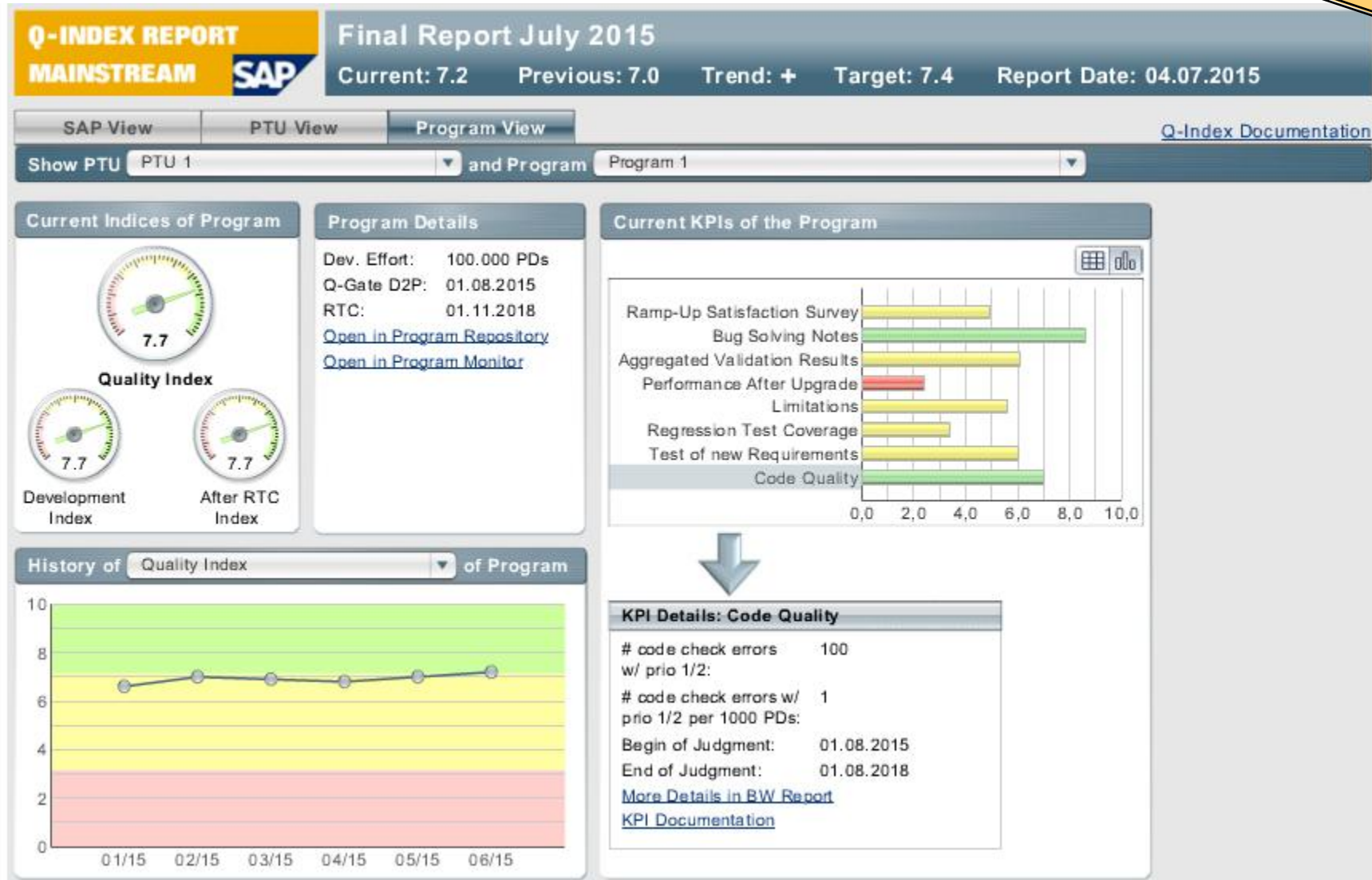
Current KPIs of the PTU

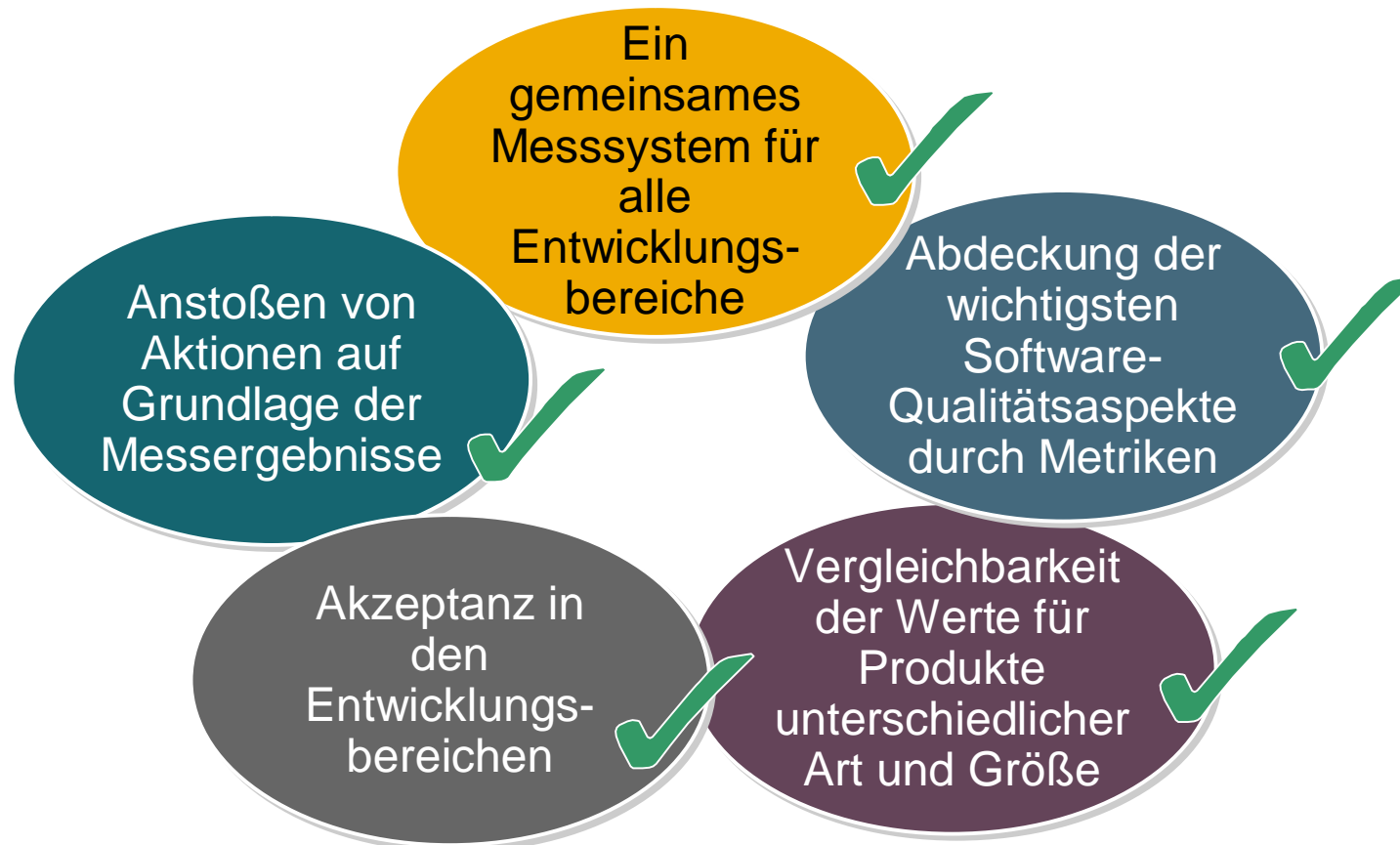


History of Quality Index of the PTU



# SAP Quality Index User Interface – Sicht je Programm





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# SAP „Quality Goal Compliance Declaration“ (inkl. toolunterstütztem Ausnahmeprozess)



**Beispiel**

## SAP Quality Goal Compliance Declaration and Exception Requests

Program:

PTU:



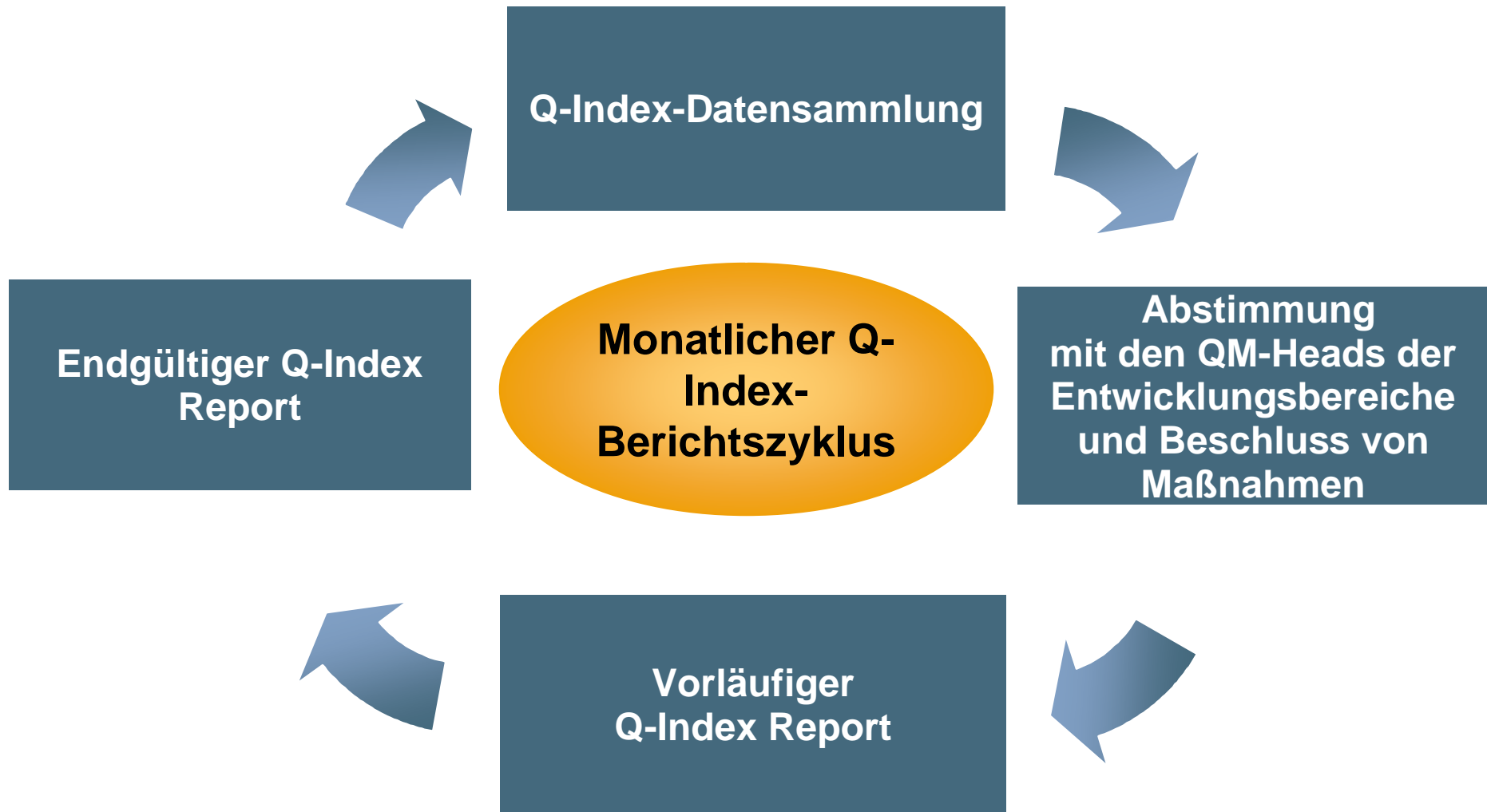
### Planned compliance per KPI

Quality Index KPI Name	Do you plan to comply?	Relevant business reason for non-compliance	Additional Information for business reason	Responsible (User ID)	Approver	Approval status	Approved on
Code Quality	yes			Hoffmann	Limboeck	n/a	
Test of New Requirements	yes			Hoffmann	Limboeck	n/a	
Regression Test Coverage	no	Initial shipment of a new product	Top x processes for the next release will be defined.	Hoffmann	Limboeck	Approved	06.08.2008
Limitations	yes			Hoffmann	Limboeck	n/a	
Aggreg. Validation Results	yes			Hoffmann	Limboeck	n/a	
Performance after Upgrade	yes			Hoffmann	Limboeck	n/a	
Bug Solving Notes	yes			Meyer	Limboeck	n/a	
Ramp-Up Survey	yes			Meyer	Limboeck	n/a	
Usability	yes			Meyer	Limboeck	n/a	

Save & Send



# Q-Index-Betrieb: Vorläufiger und endgültiger Bericht



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## KPI-Definition und Indexberechnung

- *Goal-Question-Metric*-Methode ist sehr nützlich bei der KPI-Definition
- In dynamischem Umfeld sind Produkt-KPIs weitaus beständiger als Prozess-KPIs
- Aggregationsregeln und Zeitachsen: *einfach ist besser!*

## Regelmäßiges Reporting

- Erwartungen an Steigerung der Transparenz wurden übertroffen
- Wichtigster Erfolgsfaktor: Sichtbarkeit auf Vorstandsebene
- Hohe Datenqualität ist erforderlich
- Benutzerfreundliche Darstellung erhöht Akzeptanz (vor allem im Senior Management)



### Governance und Betrieb

- Reports ohne Maßnahmen sind Datenfriedhöfe
  - Regelmäßige Überprüfung der KPI-Definitionen ist notwendig, um sicher zu stellen, dass die Qualität optimiert wird und nicht der Index
  - Betrieb des Index erfordert hohe Qualifikation
  - Betrieb des Index erfordert hohe Kommunikationsfähigkeit
- Betrieb des Q-Index benötigt ein starkes Governance Team



- Systematische Datenanalyse basierend auf den Q-Index Daten zu einem frühen Zeitpunkt
- Erhöhung der Vorhersagbarkeit von Qualität
- Integration von Akquisitionen (z.B. SAP Business Objects)
- Unterstützung von Technologien neben ABAP und JAVA
- Separate KPIs für On-Demand Produkte

Danke für Ihre Aufmerksamkeit!



# Anhang





Jahresumsatz der SAP AG 2007: 10,25 Mrd. Euro

- Mehr als 76.000 Unternehmen setzen SAP ein
- Mehr als 25 Branchenlösungen
- 51.863 SAP-Mitarbeiter (Stand: September 2008)

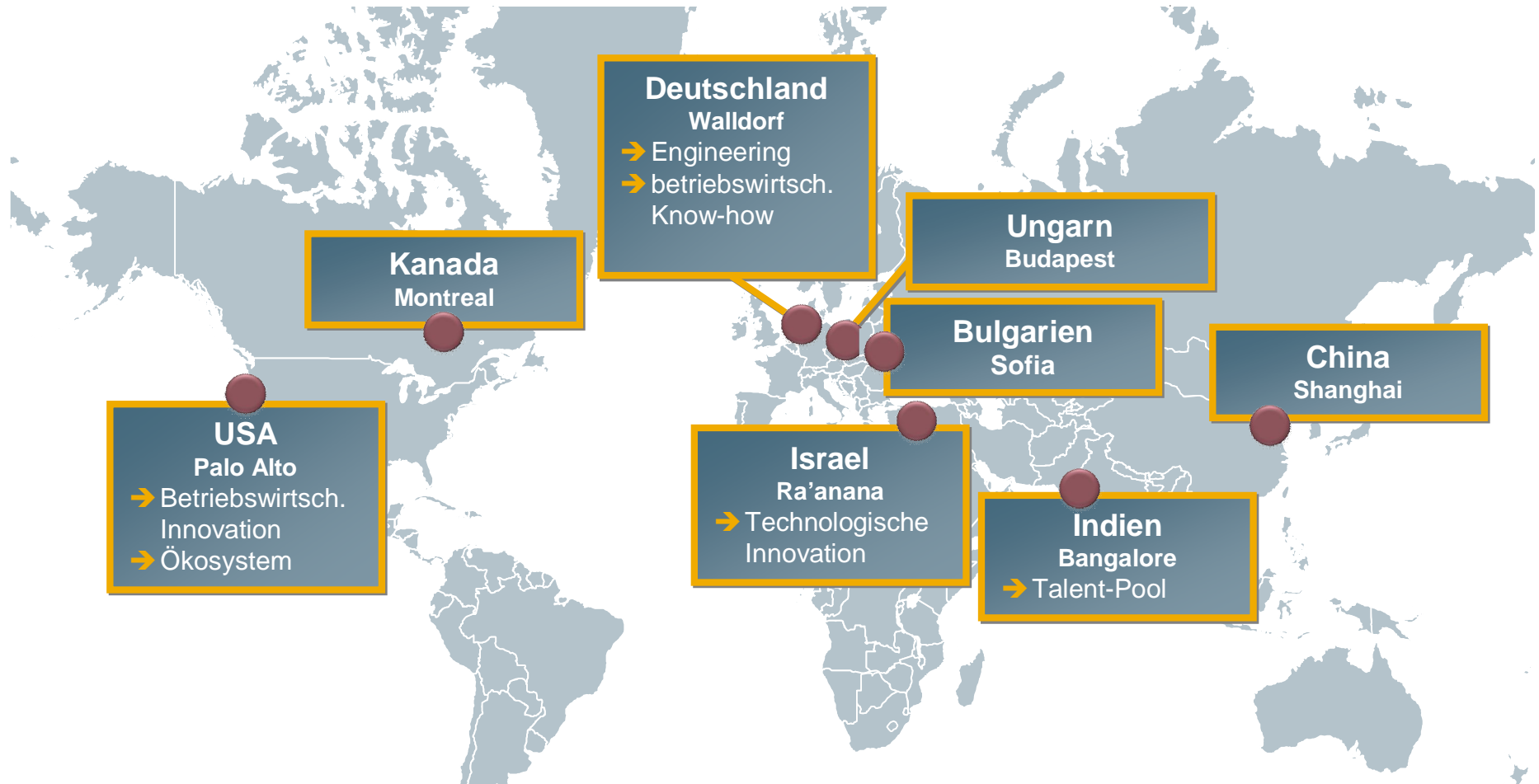
12 Millionen Anwender in über 120 Ländern nutzen SAP-Lösungen zur

- Integration von Geschäftsprozessen
- Stärkung der Wettbewerbsfähigkeit
- schnelleren Rendite bei niedrigeren Systemgesamtkosten

Einzigartiges Partnernetzwerk

- Mehr als 1,3 Millionen Community Mitglieder (SDN und BPX)
- Mehr als 1.800 zertifizierte Partnerlösungen für SAP NetWeaver
- 15 Industry Value Networks

# SAPs Forschungs- und Entwicklungsorganisation: ca. 15.000 Entwickler an 8 Entwicklungsstandorten



**Alle Standorte arbeiten gemäß einem Qualitätsmanagement-System  
(ISO 9001-zertifiziert)**

## KPI Datasheet

### ■ Goal

Ensure formal code quality by automated code checks

### ■ Answered Question

How many code check errors remain open relatively to the completed development effort?

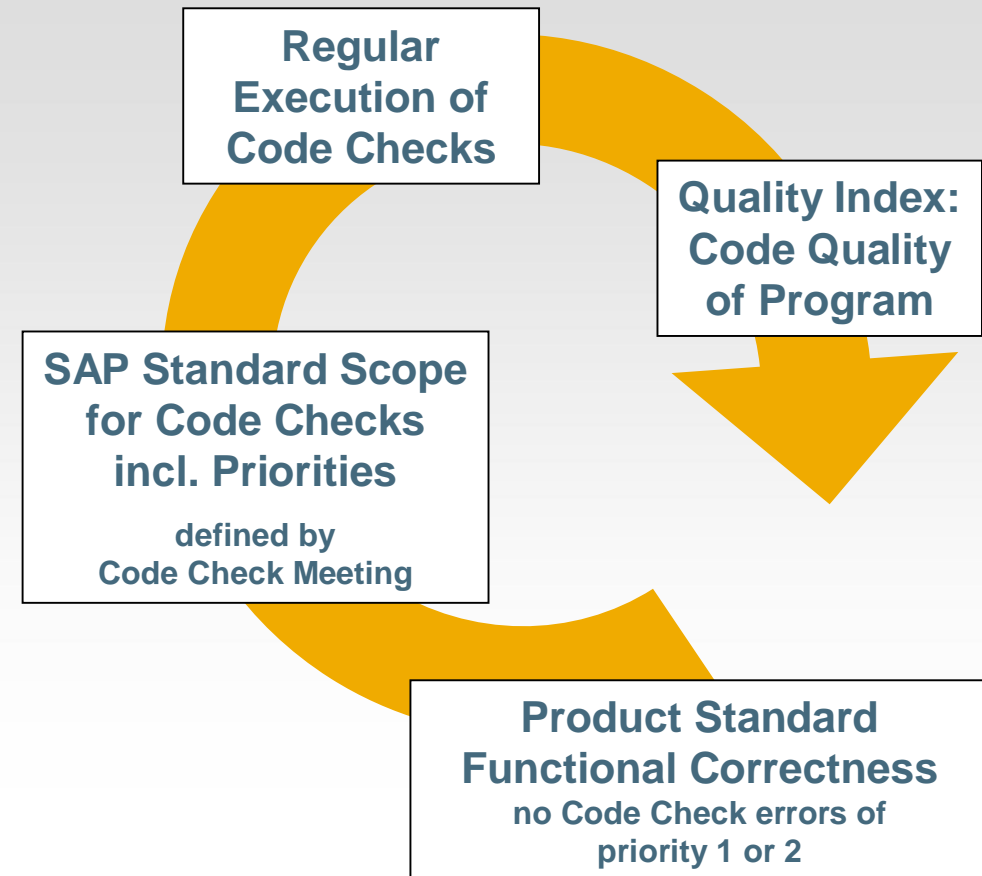
### ■ Metric

KPI = Total number of open prio1/2 static Code Check messages from all Code Check frameworks per person days development effort measured in 1/1000

### ■ Measurement/Judgment

P2D → D2P → RTC + 12 months

## From Functional Correctness to Code Quality



# KPI: Test of New Requirements

Beispiel

## KPI Datasheet

### ■ Goal

All new software requirements of a program are tested successfully

### ■ Answered Question

How many software requirements are covered by test cases and tested successfully?

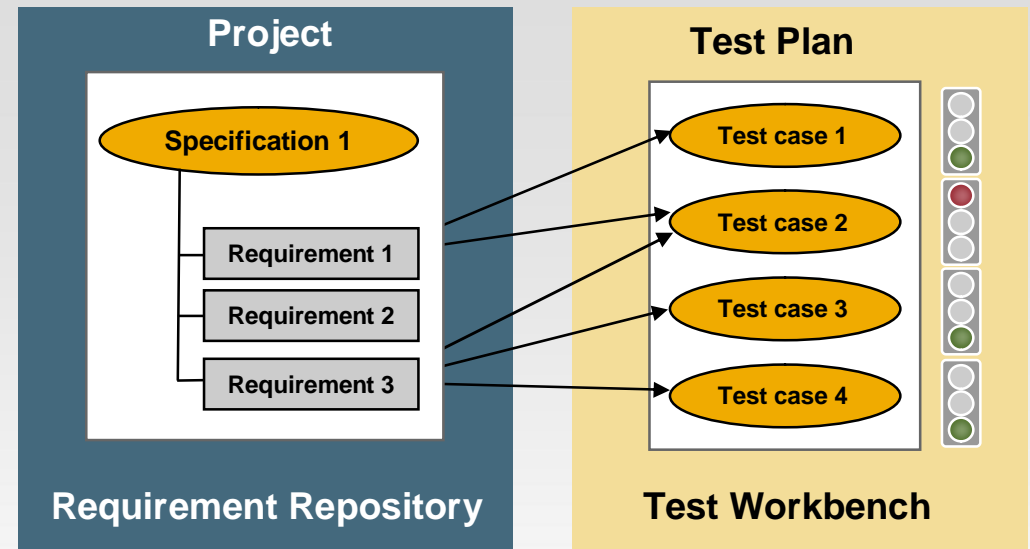
### ■ Metric

$$KPI = \frac{\sum_{i=1}^{\#Req.} \text{Green test cases for Req. } i}{\# \text{ test cases for Req. } i * \# Req.}$$

### ■ Measurement/judgment

P2D → RTC + 12 months

## Overview on KPI Calculation and Aggregation



### Test Result

Requirement 1 = 0.5

Requirement 2 = 0

Requirement 3 = 0.67

$$\text{Result} = \frac{0.5 + 0 + 0.67}{3} = 0.39$$

# KPI: Regression Test Coverage

Beispiel

## KPI Datasheet

### ■ Goal

Ensure stability of previously delivered product (code) with regression tests

### ■ Answered Question

Are regression tests successfully running for the top X processes, process steps?

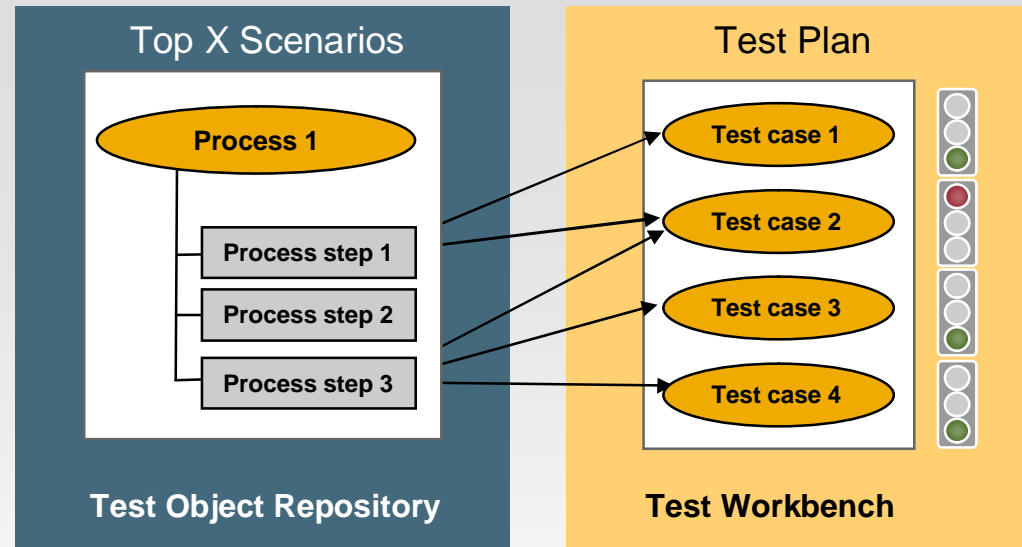
### ■ Metric

$$KPI = \frac{\sum_{i=1}^{\#Pr.step} \text{Green test cases Proc.step } i}{\# \text{ Test cases Proc.step } i * \# \text{ Proc.steps}}$$

### ■ Measurement/Judgment

P2D → RTC + 12 months

## Overview on KPI Calculation and Aggregation



### Test Result

Requirement 1 = 0.5

Requirement 2 = 0

Requirement 3 = 0.67

$$\text{Result} = \frac{0.5 + 0 + 0.67}{3} = 0.39$$

# KPI: Limitations

Beispiel

## KPI Datasheet

### ■ Goal

Provide transparency about functional restrictions

### ■ Answered Question

Do shipped products have functional restrictions?

Do these functional restrictions have an impact on SAPs reliability?

### ■ Metric

Prio-A limitations are the leading metric factors. No Prio-A limitations allowed at all.

### ■ Measurement/Judgment

RTC → RTC + 12 months

## Overview on KPI Calculation and Aggregation

PTU	Program	Number of Development Efforts	Index	Prio A	Prio B	Prio C
Overall Result		112.000	9,3	9	8	17
PTU X	Result	10.000	2,5	7	8	16
	Program A	2.000	10,0			
	Program B	7.500	0,0	7	8	5
	Program C	500	10,0			
PTU Y	Result	2.000	7,5	2		1
	Program D	500	0,0	2		
	Program E	1.500	10,0			1
PTU Z	Result	100.000	10,0			
	Program F	100.000	10,0			



# KPI: Aggregated Validation Results

Beispiel

## KPI Datasheet

### ■ Goal

Measure and provide transparency on Product Standard Compliance before shipment

### ■ Answered Question

Degree of compliance with validated product standards.  
Do products fulfill the requirements of Product Standards for shipment?

### ■ Metric

$$\text{AvgValiResult} = \frac{(\#RED * 0 + \#YELLOW * 5 + \#GREEN * 10)}{(\#RED + \#YELLOW + \#GREEN)}$$

### ■ Measurement/Judgment

RTC → RTC + 12 months

## Overview on KPI Calculation and Aggregation

PTU A	Dev. efforts	Validation results	
Program A1	12627	5,6 59 green / 9 yellow / 46 red Scen.	5,6
Program A2	46131	8,3 52 green / 11 yellow / 6 red Scen.	8,3
Program A3	6581	5,0 1 green / 2 yellow / 1 red Scen.	5,0

### Calculation:

- Calculation on program level over all available average validation results (calculation model: each RED=0 pts; each YELLOW=5 pts; each GREEN=10pts).

### Additional remarks:

- Validation results of all validation projects are aggregated, i.e. the result of a re-validation or SP-validation does not overwrite the result of the original release validation



# KPI: Performance After Upgrade

Beispiel

## KPI Datasheet

### ■ Goal

Ensure stable performance of top X scenarios, processes, and process steps after upgrade, so customers shouldn't need new hardware.

### ■ Answered Question

How is the performance compared to last release?

### ■ Metric

Index will be calculated for a program out of the four Performance indicators: Data Base Load, Memory Consumption, CPU Consumption, Network Load.

### ■ Measurement/Judgment

P2D → RTC + 12 months

## Overview on KPI Calculation and Aggregation

PTU	Program	Top X process	Performance after Upgrade	Data Base Load	Memory Consumption	CPU Consumption	Network Load	Dev. Effort	Index
PTU x	PTU Result							6.915	5,2
	Program 1		-23,76%					1.615	9,4
		Process 1A	-16,96%	-32,17%	-2,78%	-15,93%	n/a		
		Process 1B	-22,51%	-59,53%	-21,22%	-9,98%	0,70%		
		Process step xy	-7,73%	-3,37%	3,64%	-23,46%	n/a		
		Scenario 1X	-53,18%	-44,33%	-71,43%	-43,78%	n/a		
		Scenario 1Y	-18,44%	-8,05%	-24,50%	-22,77%	n/a		
	Program 2		-17,43%					1.300	8,8
	Program 3		36,56%					4.000	2,3
PTU y	PTU Result							2.000	6,0
	Program X		5,60%					2.000	6,0
		Scenario X	20,03%	36,30%	45,00%	-52,00%	50,80%		
		Scenario Y	-23,30%	3,30%	3,70%	-78,80%	-21,40%		
		Process A	-0,46%	96,00%	36,40%	-89,20%	-45,02%		
		Process B	26,12%	34,50%	15,78%	-21,89%	76,10%		

### Aggregation on Program level:

Calculate the mean value of all four performance indicators for each top x process; then calculate the performance after upgrade KPI for the whole program as a mean value of those top x processes.



# KPI: Ramp-Up Satisfaction Survey

Beispiel

## KPI Datasheet

### ■ Goal

Get a comprehensive understanding of the customer's satisfaction with the SAP solutions during Ramp-Up

### ■ Answered Question

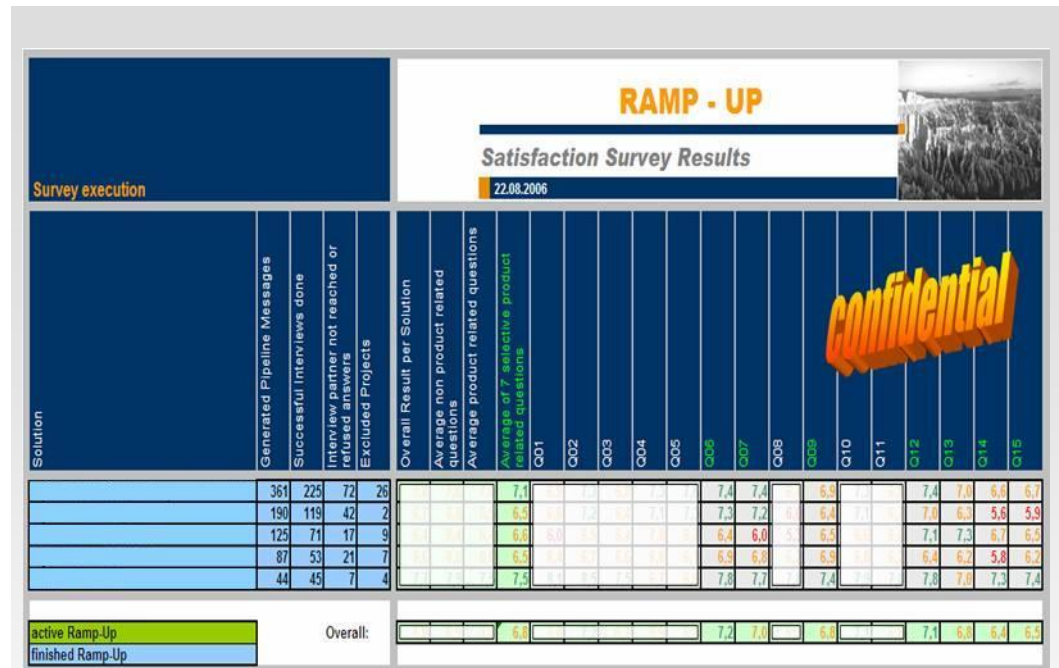
How does the Ramp-Up customers rate the quality, documentation, cost-performance ratio etc. of our solutions?

### ■ Metric

Ramp-Up customer satisfaction survey = Average of 8 product related questions

### ■ Measurement/Judgment

P2R → RTC + 24 months



Only the product related questions of the ramp-up satisfaction survey are taken into account, for example:

Q06: How would you rate your overall satisfaction with SAP [solution]?

Q07: How would you rate the quality and reliability of this SAP [solution]?

Q09: How would you rate the usability and the ease of learning of this SAP [solution]?

Q14: How would you rate the cost-performance ratio of the software?



# KPI: Bug-Solving Notes

Beispiel

## KPI Datasheet

### ■ Goal

Provide transparency about the quality perceived by our customers for the SAP products after they have been released to customers

### ■ Answered Question

Do shipped products have defects encountered by customers? How many customers are impacted due to those defects and hence affecting SAP's reliability?

### ■ Metric

Number of Bug Solving Notes reported in a month per 1000 days of Dev Effort for that Program; e.g. Metric = (Number of Bug Solving Notes / Total Dev Effort) \* 1.000

### ■ Measurement/Judgment

P2R → RTC + 36 months

## Overview on KPI Calculation and Aggregation

Program (LinkProgrRep)	Dev. PDs	Value	Index	Begin of Judgment	Link to BW
			8,5		
Program A	12530	5,43	6,3	02.08.2007	Details
Program B	45468	0,00	10,0	14.12.2007	Details
Program C	95776	0,42	8,9	26.06.2006	Details
Program D	3285	0,00	10,0	30.06.2005	Details

### Different calculation rules on program and on PTU level

#### Program level:

- Static indexation rule of 0-10 points
- Three quality indicator zones, Red, Yellow and Green at program level

#### Aggregation on PTU level:

- Weighting factor: Amount of development effort
- Using this normalization factor leads to a dynamic indexation from 0 to 10 pts and provides comparability and distinction between programs of different size.
- Aggregation through weighted evaluation of the KPI values on program level provides the PTU values.



## KPI Datasheet

### ■ Goal

Achieve high-quality user experiences with SAP products for our customers

### ■ Answered Question

How well do targeted end-users perform representative tasks, in terms of task-completion rates and times, and how satisfied are they with the applications?

### ■ Metric

### ■ Measurement/Judgment

At intervals that correspond to real application lifecycles. Benchmark tests on only a subset of applications.  
RTC → RTC + 12 months

## Overview on KPI Calculation and Aggregation



Remark: Definition of user effectiveness, user efficiency, and user satisfaction according to ISO 9241

