Test Maturity Model Integration (TMMi)
Process Improvement for the Present and the Future

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Test Improvement with TMMi

Process Improvement for Present and Future

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Erik van Veenendaal

- Founder and major shareholder ImproveQS
- In testing since 1989 working for many different clients and in many different roles
- Author “TMap”, “The Testing Practitioner” and many other books and papers
- Vice-President International Software Testing Qualifications Board (ISTQB)
- Vice-Chair TMMi Foundation
- Keynote speaker EuroSTAR and STAReast
- Winner of the European Testing Excellence Award 2007
Challenges

- Increasing importance and size of software in society as a whole
  - amount of software in consumer product doubles every 24 months (Hans Aerts)
- # defects hardly decreases
  - fault density per KLOC is almost constant in the last 10 years (Les Hatton)
- High Competition and Outsourcing
  - Time-To-Market, Product Quality, Price Levels are essential for business success
- Testing often takes 30-40% of project costs

PAROLE: niemals aufgeben
## Trends in Software Quality

<table>
<thead>
<tr>
<th>Maturity level</th>
<th>Design Faults / KLOC (Keene)</th>
<th>Delivered Defects / FP (Jones)</th>
<th>Shipped Defects / KLOC (Krasner)</th>
<th>Relative Defect Density (Williams)</th>
<th>Shipped Defects (Rifkin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0,5</td>
<td>0,05</td>
<td>0,5</td>
<td>0,05</td>
<td>1</td>
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<tr>
<td>4</td>
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<td>0,1</td>
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<td>0,27</td>
<td>3,5</td>
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<td>7</td>
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<td>12</td>
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</tbody>
</table>
Test Process Improvement – History

- Test Maturity Model (TMM)
  - Staged, Illinois, CMM

- Test Process Improvement (TPI)
  - Continuous, Sogeti, TMap

- TAP, TOM, TIM, STMM, STEP, CTP, V2M2, …
(1) TMMi model

- **Sources**
  - CMMI, ISTQB, TMM, IEEE, TPI
  - Practical experiences

- **Starting points**
  - Staged representation, CMMI structure
  - Based on TMM process areas
  - Independent or i.c.w. CMMI

- **TMMi released January 2008**
TMMi process areas by level

5 : Optimization
- Test process optimization
- Quality control
- Defect prevention

4 : Management and measurement
- Software quality evaluation
- Test measurement programme
- Advanced reviews

3 : Integration
- Software test organization
- Test training program
- Test life cycle and integration
- Non-Functional testing
- Peer Reviews

2 : Managed
- Test policy and strategy
- Test planning
- Test monitoring and control
- Test design and execution
- Test environment

Helps to set priorities and focus the TPI process

± 2 years

± 1 year
(2) Certification

- Requirements defined regarding
  - Assessment process requirements (TAMAR) based on ARC (B/C) and ISO 15504
  - Lead-Assessor / Assessor

- Organizations and persons can be accredited by the TMMi Foundation

- Register of (lead) assessors
  - Formal TMMi Certification possible
# Lead Assessor / Assessor

<table>
<thead>
<tr>
<th></th>
<th>Lead assessor</th>
<th>Assessor</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(formal assessments)</td>
<td>(informal assessments)</td>
</tr>
<tr>
<td><strong>Testing</strong></td>
<td>&gt; 5 years</td>
<td>&gt; 3 years</td>
</tr>
<tr>
<td></td>
<td>Multiple levels &amp; domains</td>
<td>Multiple levels &amp; domains</td>
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<tr>
<td></td>
<td>ISTQB Advanced</td>
<td>ISTQB Foundation</td>
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<tr>
<td><strong>Test Process Improvement</strong></td>
<td>&gt; 2 years</td>
<td>&gt; 1 years</td>
</tr>
<tr>
<td></td>
<td>(2 years SPI = 1 year TPI)</td>
<td></td>
</tr>
<tr>
<td><strong>TMMi</strong></td>
<td>Training</td>
<td>Training</td>
</tr>
<tr>
<td></td>
<td>Practical experience</td>
<td>Practical experience</td>
</tr>
<tr>
<td><strong>Assessments</strong></td>
<td>Training / 20 days</td>
<td>Training / 10 days</td>
</tr>
</tbody>
</table>
Level 2 : Managed

- Test levels clearly defined
- Testing is separated from debugging
- Project manager: “a phase after coding”
- A test plan is available, not always early
- Thorough progress tracking and reporting
- Basic test design techniques are in place
- No reviews yet to address early defects
Level 2: Managed

- Test Policy and Strategy
- Test Planning
- Test Monitoring and Control
- Test Design and Execution
- Test Environment

Ensures CMMI compliance
Verification & Validation

TMMi level 2
Lead time reduction !!
Mission / Ambition

Based on business policy

Test Process Improvement
- objectives, performance indicators, model
Example Test Performance Indicator

"this is what we are doing !!"
Product Risk Matrix

MoSCoW priorities

Likelihood

Could Test

Must Test

I

x

II

X1

x

x

Impact

Could Test

Must Test

I

X1

II

x

x

x

III

“Won’t Test”

IV

Should Test

X2

x

x

x

“Won’t Test”
Establish a Test Approach

- Use Cases (basic flow)
  - Equivalence Partitioning

- Use Cases (incl. alternatives)
  - Decision Table Testing

- Likelihood

- Use Cases (basic flow)

- Impact
Level 3: Integration

- Test Organization
- Test Training Program
- Test Life cycle and Integration
- Non-Functional Testing
- Peer Reviews
Life cycle

- Req.
  - Test plan
- Design
  - Test design
- Code
  - Test script
- Execution
Practical Experiences
Q1: Value of the TMMi

- Useful reference model
- Provides common goals and objectives
- Addresses management commitment
- Complementary to CMMI (more details)
- Clear and practical recommendations
- TMM level 2 ensures CMMI V&V
- TMM level 3 ensures institutionalization
Q2: Improvements

- Testing as a profession
- Clear responsibilities
- Test plan(ning)
- Risk-based testing
- Testing part of development life cycle
- Early involvement
- Test design (test techniques)
- Controlled and uniform test process
Q3: Results (PI’s)

Defect Detection Percentage

alpha / beta test lead time

% deviation - spent vs. planned

Employee satisfaction
Q4: Recommendations

- Involved testers
- Interpret the model
- Overall process model
- Link documenting processes and pilots
- Quick-scan is sufficient initially
- Best practices asap
- Relationship with SPI, QA and HRM
- Implementation & communication plan

Beware!!
Change Takes time
“Getting Started”

1. Test policy
2. Management commitment
3. Improvement is a project
4. Resources and effort percentage
5. Maturity of development organization
“Getting the job done”

- Set both long term and short term goals
- Use what is available
- Organize a stable project team
- Don’t make an external consultant responsible
- Institutionalize the improvements
- Review against the overall objectives almost continuously
Finally

- CMMI
- Top-down business-driven
- Clear priorities – goal driven
- Level 2 & 3 are “already known”
- “Even” fits with agile testing
- Test Improvement = Change Mgt
Thank you!

More information on TMMi available at www.TMMiFoundation.org and www.improveqs.nl