Improving the Test Process with TMMi

BCS SIGiST

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Presented by
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About Experimentus....

- An IT services consultancy company that provides organisations with software quality management expertise

- We have developed four key solutions aimed at optimising our clients approach to software quality management

- Have an accredited TMMi Method Intelligent ITM method

- Have a proven track record to help organisations improve what they do
Was one of the first companies to be accredited by the TMMi Foundation

Has undertaken over 50 formal accredited TMMi assessments

Has 9 accredited TMMI assessors

Has formally TMMi certified five companies:

- MTP – Level 2, 3 and 4
- UK Home Office – Level 2
- Aricent – Level 2, 3 and 4
- Malaysian Software Testing Board – Level 2 and 3
- Steria SFR programme – Level 2 and 3
Introduction
The Programme

- Introductions
- Why improve what we do?
- Test process improvement
- What is the TMMi Standard Reference Model?
- How do assessments work?
- Where are you?
- Discussion
Why improve what we do?
Why does testing need to be better?

Because software fails and we need to be as efficient as possible in trying to stop these!

- iPhone alarm – January 2011
- Toyota recall Prius Hybrid, braking problems - 2011
- Windows phone update bug – Feb 2011
- British Passport failure – 1999
- Sainsbury Nectar points - 2011
- Therac 25 radiation overdosing – 1985 - 86
- Ariane 5 - 1996
- Mars Climate Orbiter & Polar Lander - 1998
The original Bug!!

A log entry from 1947 by Harvard University's Mark II technical team. The entry has a moth taped to the page, time-stamped 15:45. It reads "Relay #70 Panel F (moth) in relay" and the proud boast, "First actual case of bug being found."

It can be seen at the Smithsonian Institute Washington DC.
We want to do the right thing in the right way
Business drivers

Question:

4.10 Which of the following strategies are you expecting to employ in order to reduce or contain IT costs over the next year? Select up to three.

Results:

- Improve IT's process efficiency
- Tighten management of IT-related demand from other departments
- Consolidate IT
- Reduce IT headcount
- Shift a proportion of IT headcount to low-cost location (e.g., offshoring)
- Deferring new IT-related investments
- Outsource IT function
- Other, please specify
- Not applicable

Source - IT priorities for battling the economic slowdown: UK CEO Survey | 2008 – BearingPoint/HP
What is test process improvement?

Continuous improvement of the quality and the efficiency of the testing process, in the context of the whole software development life cycle.

The ISTQB glossary defines test process improvement as:

A continuous framework for test process improvement that describes the key elements of an effective test process, especially targeted at system testing and acceptance testing.
Methodology - IMPROVE

**Initiate**
- Obtain agreement to progress

**Evolve**
- Evolution of programme approach & targets

**Measure**
- Assess Process/monitor against plan

**Prioritise & Plan**
- Action Planning
- Target Setting

**Validate**
- Monitoring of results against targets

**Operate**
- New process definition/refinement
- Training
- Pilot
- Full deployment

**Define / Re-define**
- Evolution of programme approach & targets

**Organisation**
- Process
- Technology
What is the TMMi Standard Reference Model?
The TMMi model

- Provide a standard non-commercial reference model
- Is recognised as the **ONLY** independent test process model
- Identify testing strengths and best practices operating within an
- Improve integrated test effectiveness and efficiency
- Identify issues and risks
- Identify a programme of test process improvements
- Provide public governance, measurement and accreditation
- Defect prevention not just defect detection
TMMi improvement and certification can mean...

- Industry recognition of a consistent quality process in the organisation
- Saving money both in the short and long term
- Better risk management
- Accelerated time to market
- Reduction in delays to the software development life cycle
- Improved final product quality and delivery of what is required
- Better career opportunities & improved working life of employees
The TMMi Foundation

- The Foundation owns and maintains the TMMi Reference Model in the public domain
- Definition of an international core TMMi Reference Model standard
- Provision of an independent accreditation process for TMMi

www.tmmifoundation.org
The TMMi Maturity Level definitions

The 5 Levels of TMMi

LEVEL 5: OPTIMISATION
- Defect prevention
- Test process optimisation
- Quality control

LEVEL 4: MANAGEMENT & MEASUREMENT
- Test measurement
- Product quality evaluation
- Advanced reviews

LEVEL 3: DEFINED
- Test organisation
- Test training programme
- Test life cycle and integration
- Non-functional testing
- Peer reviews

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

LEVEL 1: INITIAL
- Chaotic process
- Dependent on heroes
- No understanding of the cost of quality
TMMi structure

Maturity Level

Indicates

Process Area

Contains

Specific & Generic Practice

Contains

Implementation

Describes

Testing Process Capability

Goal

Achieves
Maturity Level 2 - Managed

2.1 Test Policy & Strategy
- 2.2 Test Planning
- 2.3 Monitoring & Control
- 2.4 Specification & Execution
- 2.5 Test Environments

2.1 Test Policy & Strategy

SG1 Establish a Test Policy
SG2 Establish a Test Strategy
SG3 Establish Test Performance Indicators

SP 1.1 Define test goals
SP 1.2 Define test policy
SP 1.3 Distribute the test policy to stakeholders

1. Study business needs and objectives
2. Provide feedback for clarifying business needs and objectives as necessary
3. Define test goals traceable to business needs and objectives
4. Review the test goals with stakeholders
5. Revisit and revise the test goals as appropriate, e.g., on a yearly basis
Test Policy and Strategy

Purpose
- To develop and establish
  - a test policy
  - an organisation-wide or programme-wide test strategy in which the test levels are defined unambiguously
  - to measure test performance via test performance indicators

Scope
- The definition and deployment of a test policy
- The definition of a test strategy (including test levels)
- To define the test performance and the accomplishment of test (improvement) goals and how they are deployed
Test Policy and Strategy: Specific Goals and Practices

- Establish a test policy
  - a test policy, aligned with the business (quality) policy, is defined and agreed by the stakeholders

- Establish a test strategy
  - an organisation or programme-wide test strategy is established and deployed, identifying and defining the test levels to be performed

- Establish test performance indicators
  - a set of goal-oriented test process performance indicators is established and deployed
The TMMi Process Areas

Test Planning

Purpose

- To define a test approach based on:
  - the identified risks
  - the defined test strategy
- To establish and maintain well-founded plans for performing and managing the testing activities

Scope

- Defining a test approach based on the risks identified
- Developing estimates for the testing to be performed – which approaches?
- Establishing commitments
- Defining and maintaining the plan to perform and manage the testing. A test plan is required for each identified test level
- At level 2, test plans are typically developed per test level
Test Planning: Specific Goals and Practices

- Perform a product risk assessment
  - to identify the critical areas for testing
- Establish a test approach
  - based on identified product risks, is established and agreed upon
- Establish test estimates
  - well-founded test estimates are established and maintained for use in discussing the test approach and in planning the testing activities
- Develop a test plan
  - established and maintained as the basis for managing testing and communication to stakeholders
- Obtain commitment to the test plan
  - commitments to the test plan are obtained by sign-off
Test Monitoring and Control

Purpose

To provide an understanding of test progress and product quality so that appropriate corrective actions can be taken when test progress deviates significantly from plan or product quality deviates significantly from expectations.

Scope

- Test project risk management
- Test progress monitoring
Monitor test progress against plan

- actual progress and performance of testing is monitored against the test plan

Monitor product quality against plan and expectations

- actual product quality is monitored against plan and expectations

Manage corrective actions to closure

- corrective actions are managed to closure when test progress or product quality deviate significantly from test plan or expectations
The TMMi Process Areas

Test Design and Execution

Purpose

- Establishing test design specifications using test design techniques
- Performing a structured test execution process
- Managing test incidents to closure

Scope

- Test preparation phase including the application of test design techniques to derive and select test conditions and test cases
- The creation of specific test data
- The execution of the tests using documented test procedures
- Incident management

Boundary Value Analysis
Equivalence Partitioning
State Transition Testing
Decision Tables etc...
Test Design and Execution: Specific Goals and Practices

- Perform test analysis and design using test design techniques
  - during test analysis and design the test approach is translated into tangible test conditions and test cases using test design techniques

- Perform test implementation
  - undertake all tasks required to prepare for test execution

- Perform test execution
  - perform all activities according to the agreed and planned test execution

- Manage test incidents to closure
  - manage all incidents using the defined work flow
The TMMi Process Areas

Test Environment

Purpose

- To establish and maintain an adequate environment, including test data, so it is possible to execute the tests in a manageable and repeatable way

Scope

- Definition of the environment requirements (hardware, software, space etc.)
- Implementing the environment
- Managing and controlling the environment including:
  - configuration management
  - ensuring availability
- The ‘Test Environment’ Process Area covers both the physical test environment and the test data
Test Environment: Specific Goals and Practices

- Develop test environment requirements
  - test environment requirements are analysed, specified and verified as achievable and appropriate

- Perform test environment implementation
  - test environments and data are built, tested and provided according to the requirements

- Manage and control test environments
  - test environments and data supported appropriately
The TMMi Process Areas

Test Organisation

Purpose

➡️ Group of highly skilled people responsible for testing
➡️ The group manages and improves the organisation’s test process and test process assets

Scope

➡️ Functioning (tasks, responsibility, reporting structure) of a test group in the overall organisation
➡️ Test roles, functions and career paths defined to support professional discipline
➡️ Test process improvement assessing the current test process and using lessons learnt to identify possible test improvements, implementing improvement and deploying them in projects
Test Organisation: Specific Goals and Practices

- Establish a test organisation
  - a test organisation, supporting testing practices in projects is defined and established

- Establish test functions for test specialists
  - test functions with job descriptions are established and assigned to test specialists

- Establish test career paths
  - test career paths established allowing testers to improve their knowledge, skills, status and rewards

- Determine, plan and implement test process improvements
  - strengths, weaknesses and improvements for the organisation’s test process are identified periodically. Actions addressing improvements are planned and implemented

- Deploy organisational test processes and incorporate lessons learnt
  - organisational standard test process and process assets are deployed across the organisation and incorporate test process-related experiences learnt
Test Training Program

Purpose

- Develop a training program which facilitates the development of knowledge and skills of people so that test tasks and roles can be performed effectively and efficiently

Scope

- Establishment of an organisational test training plan and test training capability
- Addresses the actual delivery of the planned test training
- Project-specific training needs are not part of this Process Area. They are addressed in the Process Area Test Planning
Test Training Program: Specific Goals and Practices

✧ Establish an organisational test training capability
  ✧ a training capability, which supports the organisation’s test roles, is established and maintained

✧ Provide test training
  ✧ the training necessary for testers and other individuals involved in testing to perform their role effectively, is provided when required
The TMMi Process Areas

Test Life Cycle and Integration

Purpose

- Establish and maintain a usable set of organisational test process assets (e.g. a standard test life cycle) and work environments
- Integrate and synchronise the test life cycle with the development life cycle and early involvement of testing in project
- Define a coherent test approach across multiple test levels and to provide an overall test plan

Scope

- All practices to establish and maintain a usable set of organisational test process assets (e.g. a standard test life cycle) and work environment standards. To integrate and synchronise the test life cycle with the development life cycle
- Addresses the master test planning practices
Establish organisational test process assets
- establish and maintain the organisation’s set of standard test processes

Integrate the test life cycle models with the development models
- a set of organisational test process assets is established and maintained

Establish a master test plan
- a master test plan is established to define a coherent test approach across multiple test levels
Non-functional Testing

Purpose

- To improve test process capability for non-functional testing during test planning, test design and execution by defining a test approach based on the identified non-functional product risks
- Establishing non-functional test specifications
- Executing a structured test execution process focused on non-functional testing

Scope

- Involves performing a non-functional product risk assessment and defining a test approach based on the non-functional risks identified
- Addresses the test preparation phase to derive and select non-functional test conditions and test cases, the creation of specific test data and the execution of the non-functional tests
Non-Functional Testing: Specific Goals and Practices

- Perform a non-functional product risk assessment
  - A product risk assessment is performed to identify the critical areas to be covered by non-functional testing

- Establish a non-functional test approach
  - A test approach for non-functional testing, based on identified non-functional product risks, is established and agreed

- Perform non-functional test analysis and design
  - During test analysis and design, the test approach for non-functional testing is translated into tangible test conditions and test cases

- Perform non-functional test implementation
  - Non-functional test procedures are developed and prioritised, and specific test data for non-functional testing is created

- Perform non-functional test execution
  - Non-functional tests are executed in line with previously specified test procedures. Incidents are reported and test logs are written
Peer Reviews

Purpose

- To verify that work products meet their specified requirements
- Remove defects from selected work products early and efficiently
- Develop a better understanding of the work products and of defects that might be prevented

Scope

- The practices for performing peer reviews on work product, e.g. by testers reviewing a requirements specification for testability
- Practices for establishing the peer review approach in a project
Peer Reviews: Specific Goals and Practices

- Establish a peer review approach
  - a review approach is established and agreed

- Perform peer reviews
  - peer reviews are performed on selected work products and peer review data is analysed
TMMi Level 4 Process Area Summary

- **Level 4 – Management and Measurement**
  - To have a thoroughly defined, well-founded and measurable process
  - Reviews and inspections are part of testing and used to measure document quality
  - Static and dynamic test approaches integrated into one
  - Organisation-wide test measurement program provides information and visibility regarding the test process

- **Process Areas**
  - Test measurement
  - Product quality evaluation
  - Advanced reviews
TMMi Level 5 Process Area Summary

- **Level 5 – Optimisation**
  - Defect prevention and quality control are practiced
  - Organisation continually improves its processes based on a quantitative understanding
  - Testing is a completely defined process and capable of controlling the testing costs and effectiveness

- **Process Areas**
  - Defect prevention
  - Test process optimisation
  - Quality control
Where are you?
Background

- An indicative look at your test processes
- Only works if you answer honestly
- Focused on Level 2
- An indication of the expected outcome of a TMMi assessment
- The process areas we will be reviewing therefore are:
  - Test Policy and Strategy
  - Test Planning
  - Test Monitoring and Control
  - Test Design and Execution
  - Test Environment
Evaluation Dimensions

- **Approach**: commitment and ability to implement activity performed
- **Deployment**: how is the activity institutionalised
- **Results**: what is the effectiveness of the activity performed
TMMi Quick Assessment (2) – Process

- Scoring is based on all three evaluation dimensions

- Activities performed in a process area receive a score between 0 and 10

- An activity score is the average of the 3 dimensions

- A Process Area score is the average of all the scores of the key activities for that process area
### Activities Score Test Policy and Strategy

<table>
<thead>
<tr>
<th>Organisation:</th>
<th>Acme Software Co Ltd</th>
<th>Date: 18/05/2011</th>
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</thead>
<tbody>
<tr>
<td>Activities performed</td>
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<table>
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<tr>
<th>Dimension</th>
<th>0</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>1. A test policy is defined and documented</td>
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<td>2. A test strategy is defined and documented</td>
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<td>3. Test process performance indicators are defined and documented</td>
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<td>23/3 = 7.7</td>
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<td>4. Test process performance indicators are deployed</td>
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</table>

**Total Score**: 17  
**Result**: (total score / 4) 4.25
For every Process Area:

- **Average score**: 
  - Up to 1.5: “Not Satisfied”
  - Between 1.51 and 4.99: “Partly Satisfied”
  - Between 5 and 8.5: “Largely Satisfied”
  - Over 8.5: “Fully Satisfied”
Test policy and strategy – improvement goals

- A test policy, aligned with the business (quality) policy, is defined and agreed by the stakeholders

- An organisation wide or programme wide test strategy is established and deployed, identifying and defining the test levels to be performed

- A set of goal-oriented test process performance indicators are established and deployed
A test policy, aligned with the business (quality) policy, is defined and agreed by the stakeholders

An organisation-wide or programme-wide test strategy is established and deployed, identifying and defining the test levels to be performed

Test process performance indicators are defined and documented

Test process performance indicators are deployed
**Test Planning – improvement goals**

- A product risk assessment is performed to identify the critical areas for testing.

- A test approach, based on identified product risks, is established and agreed.

- Well-founded test estimates are established and maintained for use in discussing the test approach and in planning the testing activities.

- A test plan is established and maintained as the basis for managing testing and communication to stakeholders.

- Commitments to the test plan are established and maintained.
Test Planning - activity questions

- A product risk assessment is performed to identify the critical areas for testing
- A test approach is developed and agreed, based on the risks identified
- Test estimates are established and agreed according to a documented procedure
- A test plan is developed and agreed which ensures that testing is well managed and progress reported
- Test project commitments made to groups external to the organisation are established and maintained
Test Monitoring and Control – improvement goals

- Actual progress and performance of testing is monitored against the test plan.

- Actual product quality is monitored against plan and expectations.

- Corrective actions are managed to closure when test progress or product quality deviate significantly from test plan or expectations.
Test Monitoring and Control - activity questions

- Progress is monitored against the test plan
- Product quality is measured and reported in a standard way
- Any changes to the plan or expectations are controlled and managed effectively
- Data from previous projects is used to shape the plan for future projects
Test Design and Execution – improvement goals

- During test analysis and design the test approach is translated into tangible test conditions and test cases using test design techniques

- Undertake tasks required to prepare for test execution

- Manage all incidents within the defined work flow
Test Design and Execution – activity questions

- Test cases are specified according to a documented set of test design techniques
- All test execution preparation tasks are documented and completed
- Test execution is performed using documented test procedures and according to a documented procedure
- Test incidents are reported and managed according to a documented procedure
Test Environment – improvement goals

- Test environment requirements are analysed, specified and verified as achievable and appropriate

- Test environments and data are built, tested and provided according to the requirements

- Test environments and data supported appropriately
The test environment is specified early in the project according to a documented procedure.

Higher test levels are performed in a test environment that is as much as possible ‘real-life’.

Management and control of the test environment is carried out according to a documented procedure.

The build, availability and usage of the test environment is co-ordinated according to a documented procedure.

Test environment incidents are reported according to a documented procedure.
Do you agree with the result?
What to do with your results?

The results of a TMMi assessment will provide:
- list of specific strengths
- list of specific weaknesses

Weaknesses become the draft process improvement plan

Now need to evaluate priorities based on:
- your organisation’s strategic and testing objectives
- the major inefficiencies and pain points
- the level of maturity you want
- your organisational capabilities and constraints

Finalise prioritised improvement plan and approach to implementation
Get a copy yourself by going to

WWW.EXPERIMENTUS.COM

And completing this year's survey
Thank you

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