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testing experience

The Magazine for Professional Testers

Test Techniques in practice -

Do they help?
Why do we often test without them?

The Test Maturity Model Integrated (TMMi®)

Measuring our Capability to Deliver!

by Brian Wells

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In a recent exercise I assessed the test processes of four CMMi Level 5-accredited organizations using one of the then available test maturity models. It may not be a surprise that all four organizations failed to achieve the same levels of capability for their test processes! However, while effective, the cosnsitency and effectiveness was open to question as, unlike Software Engineering generally, test does not have a uniformly accepted standard to measure itself against (and against others!).

I asked myself the question *"If test disciplines have improved so much in recent decades, why do we not have the capability to accurately assess our capabilities (internally and against industry norms), realize our weaknesses and use this information to improve?"*.

It is because there is not an accepted *Standard* Reference Model within the public domain that is complete, fit for purpose, adaptable, useable, cost effective and able to satisfy the requirements of the industry for today and tomorrow.

In this article I will outline:

- The Battleground – Looking at the backdrop to the emerging awareness that we need to have the ability to assess the capabilities of test processes
- The origins of our species – Looking at the origins of Test Reference Models
- The emerging TMMi model – Looking at the TMMi® Test Reference Model – *developed by test practitioners for all test practitioners!*

The Battleground!

It is true to say that Testing as a discipline has matured greatly over the last 2 decades and organizations are very actively looking to develop/implement/improve the capability of their test processes across the test and project life cycles and across the organization. All this against the back drop of the changing nature of testing and of Software Engineering overall.

It is also valid that Test activities (including all "forms" of testing; Reviews, Static, Dynamic Test activities) are the prime mechanism to demonstrate levels of required quality (however defined) – you could argue that Test is a Quality Assurance function, but that is another discussion!

Since the 1950's, Software Engineering has been a developing entity. In the beginning there was (arguably) chaos which led to the development of standard approaches for specific elements of the life cycle (often driven by individuals/organizations). Throughout the 1970's and 1980's these started to be published and accepted (i.e. the V Model). This standardization proceeded at pace and the industry identified a need to develop an overarching ability to evaluate the capability (or maturity) of the overall Software Engineering process; not just the individual elements.

In the 1990's this culminated in the emergence of standard reference models to measure capabilities of overall process maturity (CMM, CMMi, ITIL, ISO 9000, etc). These have developed into internationally accepted standards and public accreditations for organizations globally (although the original intention may have differed i.e. CMM was developed to measure the US Government contractors but was subsequently used to measure the process). These defined a framework of progression linked to capabilities and maturity, encompassing the developing "standard" ways of approaching elements. These are still evolving.

Testing as a separate, professional activity only really emerged in the 1990's but is developing the "hunger" for standards to evaluate their process much more quickly.

In this time, we have seen many developments in testing and software delivery; "fashion" times as well as very practices etc. We have also seen many changes in approaches; often driven by wider pressures such as economic globalization or customer expectations!. Throughout all this, the widely held view is that TESTING is now a major, publicly acknowledged professional activity (and profession?) within Software Engineering.

Given the proportion of IT spending on test activities, are these Software Engineering evaluation models (i.e. CMMi) sufficient to assess test activities in adequate depth? How mature and how professionally capable are the testing processes overall? How can this be demonstrated? Should we be concerned if we cannot accurately evaluate in a standard, transparently comparable manner?

Until recently, there was little for test to reference to provide robust standards and yardsticks to accurately measure our process capability by. Taking CMMi as an example, there are some elements that will evaluate testing, verification and validation, but this is only in the context of the Software Engineering process overall. Little attention is paid to evaluating in depth the capability of test and test-related quality processes and abilities.

The IT testing industry is developing standards for the process elements (i.e. ISTQB, BS 7925-2 etc). However, there is a real need

to supplement the existing Software Engineering capability models with one specifically targeted at Test providing us with the ability to evaluate the capabilities of a not inconsequential chunk of Software Engineering to a greater degree than hitherto we have done.

As a member of the Testing profession for over 2 decades I personally believe the profession needs a standard, internationally recognized reference model. It is only in this way that we, as a profession, can measure our capabilities. To do this, I also believe that this should be under the umbrella of an independent body providing an unbiased, independent role to the Test profession. Others think the same way!

The origin of the (TMMi®) Species!
There are a number of existing test "models" that have emerged in the past. These include, amongst the others:

• Boris Beizer's Test Model
• Gelperin and Hetzel's Evolution of Testing Model
• (elements of) Capability Maturity Model (CMM) & Capability |Maturity Model – integrated (CMMi)
• Test Process Improvement (TPI) model – Tim Koomen/Martin Pol
• Test Maturity Model (TMM) – Illinois Institute of Technology

While all are developing the ability to assess test process capability and indicating that the Test profession acknowledges the need they have limitations of one form or another. This has prevented "market penetration" and uptake as a developing de facto global standard.

Test practitioners, have used these models to try and evaluate weaknesses in test processes based on industry "knowledge" and extensive expertise and experience. However, while any offering had good elements, none fully satisfied the need for a comprehensive, understandable and flexible generic model that can adapt.

In 2004, a group of Test practitioners from across the world got together to discuss our experiences and the needs of the Test profession going forward. This group recognized the need for a standard test (process) capability reference model and, more importantly, an independent body to develop a standard offering. They agreed this should take the best of what is available and be enhanced based on the collective experience of the group and others.

Out of these discussions, they decided to create the TMMi Foundation as a non-profit making organization run by test professionals for the testing profession and beyond. The prime purpose was to create a standard Test Reference Model; TMMi®!

The Emerging TMMi® Model
It was decided to structure the TMMi® model in line with CMMi (staged as the initial deliverable). This was because it would aid understanding and it would seamlessly support and

supplement one of the most common Software Engineering Models used globally.

The TMMi® provides a full framework to be used as a reference model during test process improvement. It does not provide an approach for test process improvement such as the IDEAL (Initiating, Diagnosing, Establishing, Acting, Learning) model (Software Engineering Institute/Carnegie Mellon).

The process areas for each maturity level of the TMMi® are shown below.

Note that the TMMi® model does not have a specific process area dedicated to test tools and/or test automation.
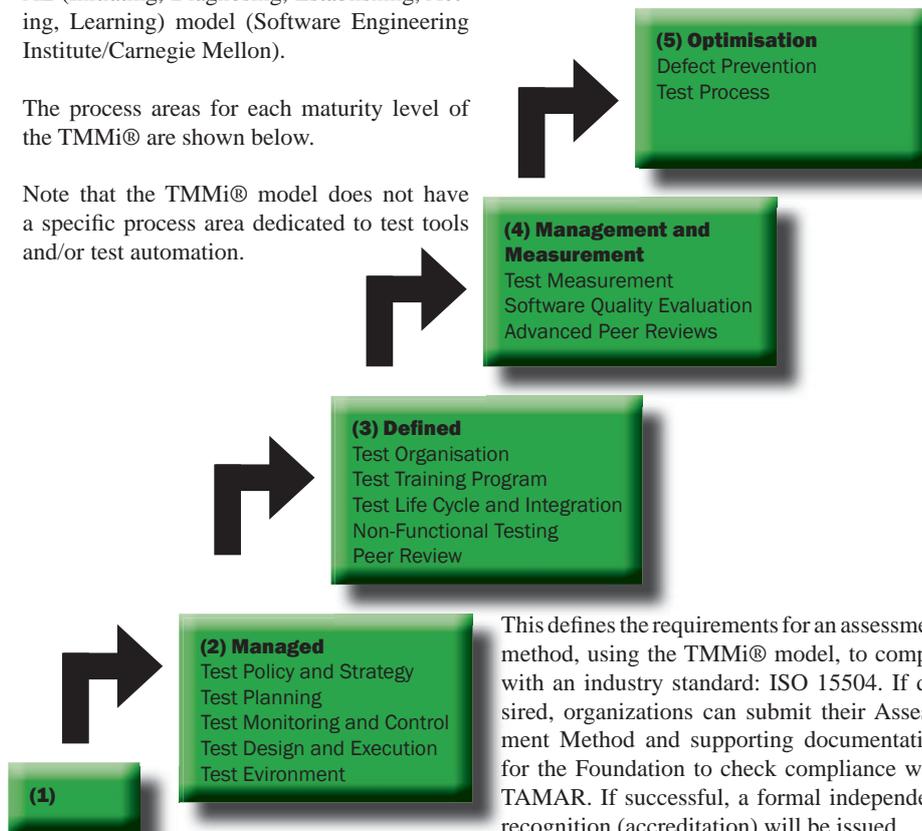
Within TMMi® test tools are treated as a supporting resource (practices) and are therefore part of the process area where they provide support, e.g. applying a test design tool is a supporting test practice within the Test Design and Execution at TMMi® level 2 process area, and applying a performance testing tool is a supporting test practice within the Non-Functional Testing at TMMi® level 3 process area.

While it is structured along the lines of CMMi, it draws heavily from many other sources, incorporates proven good principles, best practices and extensive experience from industry practitioners and responds to industry needs.

The preamble and a full definition of TMMi® Level 2 (Managed) are already published. It is anticipated that the full definition for TMMi® Level 3 (Defined) will be available in September 2008 with TMMi® Levels 4 & 5 following by Q1-Q2 2009. While this may not be soon enough for many, the definitions take much effort and are reviewed extensively and rigorously to ensure they are complete and fit for purpose!

Is it enough to publish the Standard TMMi® Reference Model without offering to provide an independent scheme to ensure that organizations have the capability to undertake assessments against the TMMi® model to a robust standard?

We thought not! It is not enough, however, just to publish a model. Too ensure the model is correctly used to assess organizations, the Foundation has also published the TMMi® Assessment Method Accreditation Requirements (TAMAR).

This defines the requirements for an assessment method, using the TMMi® model, to comply with an industry standard: ISO 15504. If desired, organizations can submit their Assessment Method and supporting documentation for the Foundation to check compliance with TAMAR. If successful, a formal independent recognition (accreditation) will be issued.

Following on from this thought process, organizations that have accredited assessment methods can also submit details of Assessors and Lead Assessors to be similarly independently verified by the Foundation as skilled and experienced enough to undertake assessments (and be publicly accredited).

All this provides an independent framework to the industry at large with the means to be publicly recognized as using a robust, repeatable assessment method to evaluate test process capability against a standard reference model (thus allowing easier comparison etc.) using publicly accredited resources – a useable global standard!

The TMMi Foundation
Set up as a "Not for Profit" company registered in Ireland, The TMMi ® Foundation is dedicated to **improving test processes and practice**. The focus of the foundation's activities is the development of a robust model for test process as¬sessment/improvement in IT organizations. We are looking to de¬velop international support and sponsorship from industry leaders.

Its raison d'être is:

1. To develop an International TMMi® Standard for Test Process Maturity Assessments Model, including the develop-

ment of an assessor's scheme and any qualification requirements (including provision of accredited training, examinations and management of accreditation).

2. To facilitate international acceptance of the TMMi® Standard via recognized international bodies and place the standard in the public domain.

3. To promote and support a single, publicly available, international Test Process Maturity Assessment scheme for the benefit of IT testing professionals and Senior Management.

The TMMi Foundation has the following specific objectives:

• Identifying and securing ownership of the TMMi® standard and the ongoing Intellectual Property rights

• A standard TMMi® Model that can be used in isolation or in support of other process improvement models such as the CMMI.

• Assessment Method Accreditation for TMMi® in accordance with ISO15504 and the process to certify commercial assessment methods against the TMMi® Assessment Method Application Requirements (see website).

• An independently managed data repository to support TMMi® accreditation for assessment methods and (lead) assessors and also submitted assessment results.

I would like to emphasize that the work of the Foundation is intended to be available in the public domain, available to all and to provide independent, unbiased services to all.

The current board of directors of the TMMi Foundation come from the UK, Ireland, Holland, Denmark and the USA/India. In addition, there is a rapidly growing list of interested parties across the globe; both individuals and organizations.

How does the Foundation work? There is a Board of unpaid Directors that manage specific areas of our work (technical development, finance, marketing etc.). Funding is through donations and fees for services offered (method and assessor accreditation).

Is it worth it?
It is very well theorizing and postulating to the industry at large that the TMMi® Model is the best thing since sliced bread!

However, the need for a standard Reference Model is being increasingly demonstrated by increasing evidence that there is a fast growing need by the industry at large to be able to evaluate, to a common reference model, test and test-related quality for a variety of reasons including:

• We need to know our weaknesses – improve efficiency and effectiveness of the test function (with ensuing financial and other savings!)

• We need to know where we are (often compared to industry sector benchmarking)

• What do we need to do to gain a certain level of capability/maturity?

• Evaluate capabilities of 3rd party suppliers/managed services (often comparatively as part of tendering process)

This can be greatly enhanced by adopting a standard reference model to measure test processes against which it provides confidence in the assessment ratings (irrespective of assessment providers assuming the method/assessment team is accredited) and allows easy comparison at all levels. These observations are supported by the experiences of assessment practitioners.

It only confirms us in our view that the TMMi® model has the potential to provide the standard by which Test will be judged by - we think it is worth it!

Interested?
The Foundation needs the help of the international community, and we are keen to develop a dialog at all levels.

If you are interested in the products the Foundation is developing, providing constructive feedback and/or in supporting the work of the Foundation, please contact us via our website at www.tmmifoundation.org.

Biography

Brian is a senior IT consultant specializing in Test & Validation and is a recognized thought leader within the industry.

One of his initiatives was to recognize that the test industry needs an industry-wide, fit for purpose, standard Reference Model for Test process capability. He was instrumental in formulating the TMMi Foundation and, as Chair, provides the impetus to its members in their activities as well as strategic direction and management.

He is fully experienced in the definition and implementation of strategic testing solutions for clients. This includes defining, communicating and implementing corporate testing policy & strategy, processes & procedures, standards, test (design) techniques, metrics and monitoring programs, measurement of Return on Investment (ROI), implementing test tools, training, resources and organization and much more. His operational experience covers industry sectors including Banking, Finance, Insurance, Retail and Communications. He also actively understands emerging trends and requirements in the marketplace.

Within his current role at Experimentus Ltd, Brian provides comprehensive, flexible solutions for all aspects of Test & Validation to all levels of a corporation which is both targeted based on priority/risk and achievable while remaining flexible in its approach. This is based on a clear ability to understand the business requirements/drivers, risks and priorities.

Brian has successfully completed the ISEB Foundation & Practitioners Certificates in Software Testing and is a certified trainer of the Foundation course.