



AppLabs and the Test Maturity Model Integration (TMMi)

July, 2009



AppLabs became a supporter of the TMMi Foundation in September 2008.

Prior to making any decision on whether AppLabs would support the TMMi Foundation, AppLabs reviewed the TMMi collateral available and the objectives of the TMMi Foundation, to ensure that these objectives were compatible with our views and objectives.

On completion of our review, AppLabs made the decision to sponsor the Foundation. There were a number of reasons for this, but key reasons to our decision were as follows:

- ▶ As an independent testing services provider AppLabs is always interested in being part of positive test initiatives. AppLabs' view was that this initiative was valuable to us as a company, to the testing industry as a whole and something which AppLabs could add a valuable contribution to and help advance.
- ▶ At the time of our decision, AppLabs was in the process of enhancing our test process improvement services and after a review of the TMMi collateral and the objectives of the TMMi Foundation, AppLabs believed that TMMi could be a valuable addition to our services.
- ▶ AppLabs had experience in delivering TMM reviews and felt that this would be a natural progression.
- ▶ AppLabs was already a CMMI Level 5 company and the TMMi alignment with CMMI would be beneficial, during the internal implementation of TMMi and ultimately a benefit to our customers.

The objectives of the TMMi Foundation were also of significant interest to AppLabs because they aligned closely with our view that a standard model, assessment, rating method and particularly a data repository, could assist in generating industry testing metrics and significantly enhance the future of testing. On the whole, these industry metrics and information are sorely missing from the software quality management industry and AppLabs would like to be a key driver in rectifying this process outage.

The decision wasn't taken lightly though, as there were and indeed still are some negatives:

- ▶ The TMMi Foundation is still busy defining the TMMi Levels, at the time of AppLabs decision to support the Foundation, only Level 2 was available. Level 3 has since moved on, but there is still significant work to be done on Levels 4 and 5
- ▶ There is no guarantee that the 'Industry' will recognise this model

Despite these negatives, AppLabs still felt it was a valuable investment and could reap rewards for all sponsors of the

TMMi Foundation, including AppLabs, but more importantly, for the testing industry as a whole.

For more information on TMMi please visit the TMMi Foundation website at <http://www.tmmifoundation.org/html/tmmiorg.html>.

The following sections describe some key information on the TMMi Foundation and TMMi and what the next steps for AppLabs are in relation to TMMi.

The TMMi Foundation and Objectives

The TMMi Foundation is an organization dedicated to improving testing for everyone. The TMMi Foundation has been founded as a non-profit making body, by a number of leading test and quality practitioners from across Europe to promote a standard TMMi model and to promote its uptake as an international industry standard for assessing and rating organizations' testing process capabilities.

The TMMi Foundation intends to promote and provide:

- ▶ The infrastructure to manage a standard for a TMMi Model available to all
- ▶ The structure to accredit assessment methods
- ▶ An independent process for accrediting assessors and lead assessors
- ▶ An independent service to validate and certify public TMMi assessment awards.

The TMMi Foundation has the following specific objectives:

- ▶ Identifying and securing ownership of the TMMi Model standard and the ongoing Intellectual Property rights
- ▶ Definition of an international core TMMi Model standard and place it in the public domain
- ▶ Creation and management of an independent, unbiased central data repository and provision of industry and other analysis services
- ▶ Provision of an independent accreditation process for TMMi® Assessment Methods based on the standard Model
- ▶ Provision of an independent mechanism to facilitate verification and formal ratification of TMMi Assessment Ratings

- ▶ Definition and maintenance of independent assessor training, accreditation, guidelines and examinations
- ▶ Provision of a public forum of interested parties to facilitate free interchange of information, education, ideas and usage of the public standard.

The TMMi Foundation will provide:

- ▶ A standard TMMi Model that can be used in isolation or in support of other process improvement models
- ▶ An independently managed data repository to support TMMi assessment method accreditation, assessor and assessment certification/validation and validated assessment data and certificates
- ▶ Assessment Method Accreditation/Audit Framework for TMMi in accordance with ISO15504 and the process to certify commercial assessment methods against the standard model
- ▶ Certification and training/examination process, procedures and standards for formal, public accreditation of Assessors and Lead Assessors and the on-going management.

What is TMMi?

The TMMi framework has been developed by the TMMi Foundation as a guideline and reference framework for test process improvement and is positioned as a complementary model to the CMMI. The development of TMMi also used the TMM framework as developed by the Illinois Institute of Technology as one of its major sources.

An Overview of TMMi

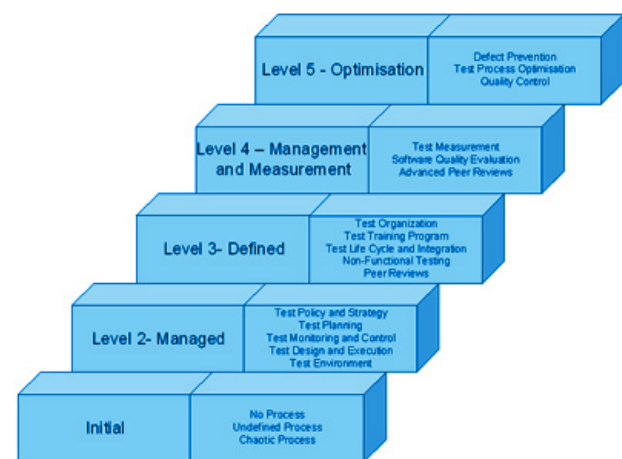
As with the CMMI staged representation, TMMi has a staged architecture for process improvement. It contains stages or levels through which an organisation passes as its testing process evolves from one that is ad-hoc and unmanaged, to one that is managed, defined, measured, and optimized. Achieving each stage ensures that an adequate improvement has been laid as a foundation for the next stage. The internal structure of the TMMi is rich in testing practices that can be learned and applied in a systematic way to support a quality testing process that improves in incremental steps.

There are five levels in the TMMi Model that prescribe a maturity hierarchy and an evolutionary path to test process improvement. Each level has a set of process areas that an organization needs to focus on to achieve maturity at that level. Experience has shown that organizations do their best when they focus their test improvement process efforts

on a manageable number of process areas at a time, and that those areas require increasing sophistication as the organization improves. Because each maturity level forms a necessary foundation for the next level, trying to skip a maturity level is usually counter productive. At the same time, it must be recognized that test process improvement efforts should focus on the needs of the organization in the context of its business environment and the process areas at higher maturity levels may better address the current needs of an organization or project.

For example, organizations seeking to move from maturity level 1 to maturity level 2 are frequently encouraged to establish a test group, which is addressed by the Test Organization process area that resides at maturity level 3. Although the test group is not a necessary characteristic of a TMMi level 2 organisation, it can be a useful part of the organization's approach to achieve TMMi maturity level 2

The TMMi Levels



Level 1 Initial

At TMMi level 1, testing is a chaotic, undefined process and is often considered a part of debugging for which the organisation does not usually provide a stable environment to support the processes and any success in these organizations depends more on the competence and heroics of the people in the organization rather than the use of proven processes. Tests are developed in an ad-hoc way after coding is completed and testing and debugging are interleaved to get the bugs out of the system. The objective of testing at this level is to show that the software runs without major failures and Products are released without adequate visibility regarding quality and risks. As a result in production the product often does not fulfill its needs, is not stable, or is too slow to work with. Within this level testing lacks resources, tools and well-educated staff. At TMMi level 1 there are no defined process areas. Maturity

level 1 organizations are characterized by a tendency to over commit, abandonment of processes in a time of crisis, and an inability to repeat their successes. Also products tend not to be released on time, budgets are overrun and quality is compromised.

Level 2 Managed

At TMMi level 2, testing becomes a managed process and is clearly separated from debugging. The process discipline reflected by maturity level 2 helps to ensure that existing practices are retained during times of stress. However, testing is by many stakeholders still perceived as being a project phase that follows coding. In the context of improving the test process, a company-wide or program-wide test strategy is established. Test plans are also being developed and within the test plan a test approach is defined based on the result of a product risk assessment. Risk management techniques are used to identify the product risks based on documented requirements. The test plan defines what testing is required, when, how and by whom and commitments to the plan are established with stakeholders and revised as needed. Testing is monitored and controlled to ensure it is progressing according to plan and actions can be taken if deviations occur. The status of the work products and the delivery of testing services are always visible to management.

Various test design techniques are applied for deriving and selecting test cases from specifications, however, testing may still start relatively late in the development lifecycle, e.g. during the design or even during the coding phase. Testing is multi-leveled, for example:

- ▶ Unit
- ▶ Integration
- ▶ System
- ▶ Acceptance

For each identified test level there are specific testing objectives defined in the organization-wide or program-wide test strategy. The main objective of testing in a TMMi level 2 organizations, is to verify that the product satisfies the specified requirements and also to clearly differentiate the processes of testing and debugging. Many quality problems at TMMi level 2 occur because testing occurs late in the development lifecycle which results in defects being propagated from the requirements and design into code and there are no formal review programs as yet to address this important issue. Post code execution based testing is still considered by many stakeholders the primary testing activity.

The process areas at TMMi level 2 are:

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

Level 3 Defined

At TMMi level 3, a test organization and a specific test training program exist, testing is perceived as being a profession, is no longer a phase that follows coding and is fully integrated into the development lifecycle and the associated milestones. Test planning is done at an early project stage, e.g. during the requirements phase, by development of a master test plan that builds on the test planning skills and commitments acquired at TMMi level 2. The organization's set of standard test processes, which is the basis for maturity level 3, is established and improved over time and test process improvement is fully institutionalized as part of the test organization. Organizations at this level understand the importance of reviews in quality control and a formal review program is implemented although not yet fully linked to the dynamic testing process and reviews take place across the whole lifecycle. Test professionals are involved in reviews on requirements specifications whereas the test designs at TMMi level 2 focus mainly on functionality testing, test designs and test techniques are expanded, depending on the business objectives, to also include non-functional testing, e.g. on usability and/or reliability.

A critical distinction between TMMi maturity levels 2 and 3 is the scope of the standards, process descriptions, and procedures. At maturity level 2 these may be quite different in each specific instance, e.g. on a particular project. At maturity level 3 these are tailored from the organization's set of standard processes to suit a particular project or organizational unit and therefore are more consistent except for the differences allowed by the tailoring guidelines.

Another critical distinction is that at maturity level 3, processes are typically described more rigorously than at maturity level 2. As a consequence at maturity level 3, the organization must revisit the maturity level 2 process areas.

The process areas at TMMi level 3 are:

- ▶ Test Organization
- ▶ Test Training Program
- ▶ Test Lifecycle and Integration

- ▶ Non-Functional Testing
- ▶ Peer Reviews

Level 4 Management and Measurement

In TMMi 4 organizations' testing is a thoroughly defined, well-founded and measurable process. At maturity level 4, the organization and projects establish quantitative objectives for product quality and process performance and use them as criteria in managing them. Product quality and process performance is understood in statistical terms and is managed throughout the lifecycle. Measures are incorporated into the organization's measurement repository to support fact-based decision making and reviews and inspections are considered to be part of testing and used to measure document quality and as a means to control quality gates. The static and dynamic test approaches are integrated into one and products are evaluated using quantitative criteria for quality attributes such as reliability, usability and maintainability. An organization wide test measurement program provides information and visibility regarding the test process, testing is perceived as evaluation and it consists of all lifecycle activities concerned with checking products and related work products.

The process areas at TMMi level 4 are:

- ▶ Test Measurement
- ▶ Product Quality Evaluation
- ▶ Advanced Peer Reviews

Level 5 Optimization

At TMMi level 5 testing is a process with the objective to prevent defects. On the basis of all results that have been achieved by fulfilling all the improvement goals of the previous maturity levels, testing is now a completely defined process and one that is capable of controlling the costs and the testing effectiveness. At TMMi maturity level 5, an organization continually improves its processes based on a quantitative understanding of the common cause of variation inherent in processes. Improving test process performance is carried out through incremental and innovative process and technological improvements. The methods and techniques are optimized, there is a continual focus on fine-tuning and test process improvement and defect prevention and quality control are practiced. Statistical sampling, measurements of confidence levels, trustworthiness, and reliability drive the test process. The test process is characterized by sampling based on quality measurements. A detailed procedure exists for selecting and evaluating test tools that support the test process

as much as possible during test design, test execution, regression testing, test case management, etc. Process re-use is also practiced at level 5 supported by a process asset library.

The Process areas at TMMi level 5 are:

- ▶ Defect Prevention
- ▶ Test Process Optimization
- ▶ Quality Control

Next Steps for AppLabs

AppLabs are currently in the process of accrediting our TMMi model and our experienced Test Consultants with the TMMi Foundation. AppLabs will be offering TMMi reviews as part of our Consultancy Serviceline in the near future.

Sources:

<http://www.tmmifoundation.org>

<http://www.tmmifoundation.org/downloads/tmmi/TMMiFramework.pdf>

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