Using SW-TMM to Improve the Testing Process

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Can using the Software Testing Maturity ModelSM (SW-TMMTM) really help improve your testing process? The answer is a resounding "Yes!" This article describes the SW-TMM and the benefits that can be derived from its use.

The Software Testing Maturity ModelSM (SW-TMMTM) is an exciting tool that can help generate significant changes in an organization’s testing process. The SW-TMM is a testing process improvement tool that can either be used in conjunction with the Capability Maturity Model® for Software (SW-CMM®) or as a stand-alone tool. While the SW-CMM is an excellent software development tool that recognizes that reviews and testing are activities intended to enhance quality, it does not provide sufficient depth of testing coverage; the SW-TMM fills that void. The SW-TMM is not a tool to be used in addition to SW-CMM but is designed to be used in conjunction with the SW-CMM.

What Are Testing Maturity Models?

Testing maturity models are not new. Available documentation shows that most of them were developed around 1996, but they have never found much acceptance. One of the main reasons for this is the fact that there is very little documentation on the models. The articles, books, and Web sites on testing maturity models are written in a very theoretical style. Most people read them and say something like, "That’s an interesting concept. When I have the time, I’ll look into it." Of course, they never find the time.

I have taken the time to study the various maturity models and have discovered that the SW-TMM can be easily implemented and provides significant improvements in the testing process.

What Testing Maturity Model Should I Use?

Terry Weatherill with ImagoQA Ltd. undertook a comparison of the testing maturity models currently available. His article “In the Testing Maturity Model Maze” [1] documents the results of his comparison. He studied the following six testing maturity models:

- Testability Maturity Model [2].
- Software Testing Maturity Model.
- Test Process Improvement (TPI) [3].
- Test Organization Maturity™ [4].
- Testing Assessment Program [5].
- Proposed Evaluation and Test SW-CMM Key Process Areas (SW-CMM KPA) [6].

Weatherill concluded there were only two testing maturity models that were usable in their current format: SW-TMM and TPI. I read his article with extreme interest since I had already been searching for a testing maturity model to help my clients improve their testing processes. I judged the acceptability of a testing maturity model on the following:

- The ease of understanding and use.
- Allowing organizations to perform their own assessments.
- The ability to provide a baseline of the current testing function and a road map for improvement.
- The capability of being used for telecommunications, Web-based, and information technology testing applications.
- The ability to be used in conjunction with SW-CMM.

I had already been researching the SW-TMM and, after reading Weatherill's article, I decided to further research the TPI. I came back to the SW-TMM as the best fit for my requirements.

Dr. Ilene Burnstein of the Illinois Institute of Technology and her associates designed the SW-TMM to be a companion to SW-CMM. Since 1996, she and her associates have published several articles in professional magazines, including the following:

- “Developing a Testing Maturity Model Part I” [7].
- “Developing a Testing Maturity Model Part II” [8].
- “A Model to Assess Testing Process Maturity” [9].

The major weakness with SW-TMM is that there is no single book on the subject. I have corresponded with Burnstein, and the institute plans to release a book on the SW-TMM in 2002.

Why Should I Assess My Testing Maturity?

One of the biggest problems I have encountered while working with clients on their testing process is, that many times, there is no consistency within their organization as to the health and professionalism of the testing process. If you were to ask individuals at various levels of the organization their opinion of the current status of the software testing process, you will be surprised at the diverse answers you get. The answers given range from, "We have an excellent process in place, and don’t need to change it," to "We have a horrible testing process. We should scrap it and start all over." The true level is usually somewhere in between these two extremes.

An assessment of the testing process using a testing maturity model will not only document the current level, but will also highlight the variances between the imagined level and the actual level.

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- Level No. 1 is where most organiza-
Table 1: A Level 2 Comparison

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<thead>
<tr>
<th>SW-TMM Goals</th>
<th>SW-CMM v. 1.1 Key Process Areas</th>
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<td>Level 2 Repeatable</td>
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<td>- Develop Testing &amp; Debugging Goals</td>
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Table 2: A Level 3 Comparison

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<th>SW-TMM Goals</th>
<th>SW-CMM v. 1.1 Key Process Areas</th>
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<tr>
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<td>- Establish a Technical Training Program</td>
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<td>- Control and Monitor the Testing Process</td>
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Table 3: A Level 4 Comparison

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<tr>
<th>SW-TMM Goals</th>
<th>SW-CMM v. 1.1 Key Process Areas</th>
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<tr>
<td>Level 4</td>
<td>Level 4 Managed</td>
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<td>Management and Measurement</td>
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<td>- Establish an Organization-Wide Review Program</td>
<td>- Software Quality Management</td>
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<tr>
<td>- Establish a Test Measurement Program</td>
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Table 4: A Level 5 Comparison

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<th>SW-TMM Goals</th>
<th>SW-CMM v. 1.1 Key Process Areas</th>
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<td>Level 5</td>
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<td>- Quality Control</td>
<td>- Process Change Management</td>
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<tr>
<td>- Test Process Optimization</td>
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CMM structure, for accomplishing those activities. Furthermore, the figures above illustrate that the goals of the SW-TMM complement the KPIs of the SW-CMM at every level. It is also easy to understand and use. Thus, I believe that SW-TMM fulfills the design objective of being an excellent companion to SW-CMM.

If an organization is not using the SW-CMM, they can still use the SW-TMM as a stand-alone tool to help improve their test processes. We know the following about this versatile tool:

- We know the basic elements of the SW-TMM.
- We know that the SW-TMM was designed to be a companion to the SW-CMM.
- We know that many organizations do not know their true testing maturity level.
- We know that performing an assessment using the SW-TMM will baseline an organization’s current testing maturity level.
- The SW-TMM will help an organization map incremental improvements.

The next step in the process is to determine your organization’s current testing maturity level. The only way to document the true level of testing maturity is to perform an assessment. If your organization is using the SW-CMM, then the SW-TMM can easily be incorporated into the SPA. It becomes just another assessment tool. As previously stated, the SW-TMM is not a tool to be used in addition to, but it is designed to be used in conjunction with the SW-CMM.

If your organization is not using the SW-CMM, then management will not approve making improvements to the testing process unless you can prove to them that it truly needs improving. They will not spend the money just because the SW-TMM is a really neat tool. Here are a few selling points that might be used with management: 1) the SW-TMM will provide an unbiased assessment of the current testing process, 2) the SW-TMM will provide a road map for incremental improvements, and 3) as the testing process moves up the maturity levels, there are usually some cost savings. Do not push for a commitment to implement the SW-TMM. Instead, consider it a win if you can get management approval to perform an independent testing process assessment using the SW-TMM.

Can Our Organization Perform Our Own Maturity Assessment?
The answer is “Yes.” (Remember that one of my criteria when I evaluated the various maturity models was “allowing organizations to perform their own assessments.”) In fact, an organization must perform their own assessment to feel ownership and have confidence in the results.

It is usually advantageous to hire a consultant to lead you through the process the first time. A consultant has performed the process before and can help reduce the learning curve. They also offer an unbiased perspective when analyzing the results and developing an action plan. The following suggested process works well either incorporated into the SW-CMM SPA or used as a stand-alone assessment.

How Do I Perform the SW-TMM Assessment?
The logical first step in assessing testing maturity is the assessment preparation. Now is the time to choose a team leader and team members. This team should develop the assessment plan and prepare the tools they will be using. Do not limit the assessment to just the testing organization. Include individuals – from senior management to the non-technical developer – from across the entire organization. These individuals should be either directly or indirectly involved with the testing process. You want to sample as many different and varied opinions as possible.

One of the evaluation tools that will be used is a questionnaire. I have modified the questionnaire for the TMM developed by the Illinois Institute of Technology that I make available to my clients. The questionnaire provides structure and consistency to the process and makes it easier to identify the current level of maturity. During this phase, it is essential to conduct all training and management briefings. The training and briefings educate everyone on the objectives and evaluation process to be used. Periodic management status briefings should also be scheduled at this time.

Once all of the preparations have been completed, it is time to conduct the assessment. The first step is to collect and record information. Here are some of the methods that can be used:

- Request the organization being evaluated to prepare a presentation and briefing for the team. This gives them an opportunity to present any information they feel is important from their perspective. It also demonstrates to them that they are an integral part of the assessment.
- Conduct interviews with all individuals on the assessment list. During the interview, the team members should complete the questionnaire.
- Review and photocopy all testing documentation and procedures to determine the actual testing process currently being used.

One of the most important assessment activities is to document the findings. By compiling all of the information collected by the team, they should be able to do the following:

- Document the organizations’ current testing process based on the records and documentation review.
- Compile and summarize the questionnaire data using either a spreadsheet or database program.
- Document the interview information. It is best if more than one person has conducted the interview. The interviewers will compare notes and document all agreed information.

While the documentation process is under way, it always becomes apparent that the team has missed some essential information or needs clarification of information. Now is the time to secure that information or clarification.

The assessment report should include a section containing the analysis of findings. The analysis should document the current maturity level and any areas of disagreement highlighted during the evaluation. It should also identify areas for improvement and a prioritized list of recommended improvement goals. The recommendations should include anticipated benefits resulting from implementation.

Usually the team will discover testing processes that are excellent, but are not utilized throughout the entire organization. I like to call these the best-of-breed processes. The team should include as many of the best-of-breed processes as possible in the improvement plan. There are several reasons for this:

- There will be better acceptance of the improvement plan if the team recommends building on current processes.
- It will accelerate the implementation and improvement process.
- People enjoy the feeling of pride that accompanies having one of their processes adopted organization-wide.

It should be emphasized that it is important for an organization not to try to progress from Level 1 to Level 5 in one giant step. That will result in almost certain failure. The recommendations should be a road map of how to reach only the next level of maturity.

The assessment team should develop an action plan for implementing the recommendations. The plan should describe
each specific action, the resource requirements, and a recommended schedule for implementation. A cost/benefit analysis is considered helpful supporting documentation. The action plan should be an integral part of the final report.

While a written final report is essential, a management briefing of the findings and recommendations should also be scheduled. It is usually easier to secure management approval of the recommendations after a management briefing. The written report should be provided as supporting documentation for the briefing.

After securing management approval to implement the improvement plan, it is time to implement the improvements. It is usually best, if possible, to implement the improvements either in a pilot project or in phases. This allows the organization to track progress and achievements prior to expanding organization wide.

Implementing in a limited application also makes it easier to fine-tune the new process prior to expanded implementation. Since the SW-TMM assessment process is repeatable, improvements can easily be tracked by repeating the assessment six months to a year after implementation.

Summary
The SW-TMM was designed as a companion to the SW-CMM to evaluate an organization’s current testing maturity and to plan test process improvements. It accomplishes that goal. To recap, the use of the SW-TMM will provide the following:

• Baseline the current testing process level of maturity.
• Identify areas that can be improved.
• Identify best-of-breed testing processes that can be adopted organization-wide.
• Provide a road map for implementing the improvements.
• Provide a method for measuring improvement results.
• Provide a companion tool to be used in conjunction with the SW-CMM.

Clients who are using the SW-TMM that I have exposed to the SW-TMM can immediately recognize that it is an excellent companion tool. It can be easily incorporated into their SPA, thus helping them map the test process improvements necessary to reach the next level of maturity. Organizations not using the SW-CMM will also find the SW-TMM an excellent tool to realize their goal of improving their testing process.

References
4. <www.evolutif.co.uk>.
5. Software Futures Ltd.

About the Author
Thomas C. Staab owns an independent consulting firm, Wind Ridge International, which helps clients improve their software quality assurance and testing processes. He has more than 35 years experience in information technology and quality assurance. Staab has a master's of science degree in quality systems and is listed in the “International Who’s Who of Information Technology.” He has currently published more than 25 articles and presented more than 50 speeches and tutorials at regional, national, and world conferences.

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