

# CORE

CORE N° 3 - May 2011

## Special Edition on Software Testing Leadership



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Welcome to the Best Quality  
Institute BQI

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## Editor's Note

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# HOW DOES IT FEEL ...



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Contact the BQI Award office via [info@bqi.eu](mailto:info@bqi.eu) today!

# Editorial

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Think about software testing 20 years ago: testers were just seen as unnecessary troublemakers who were only there to frustrate developers. But this has changed! Today a software tester is standing on the same level as the developer. The tester is the one to find the bugs as early as possible. By that way it is the tester who saves the company's money – extremely important in times with high risks and global crisis. Because of that it is also a good time to have a Testing Leadership Award to see who is doing a good job in software testing. We are very happy to cooperate here with the Best Quality Institute to show the importance of software testing for the improvement of software quality.

We also want to use this special edition of CORE to introduce the newest certification in the field of testing: the Automotive Tester certification which is especially focusing on the needs of software testers in the automotive industries with its special standards, risks and demands. Have a look at the gasq website ([en.gasq.org](http://en.gasq.org)) and download the new syllabus from there. At the moment the syllabus is available in German and will be available in English by mid of May.

And now enjoy reading this special edition!

c0re Team

## FOREWORD

I am pleased to present the Testing Leadership Award by BQI Best Quality Institute.

More efficient, higher quality, better performance – this year the Best Quality Institute is again searching for the most successful software testing projects.

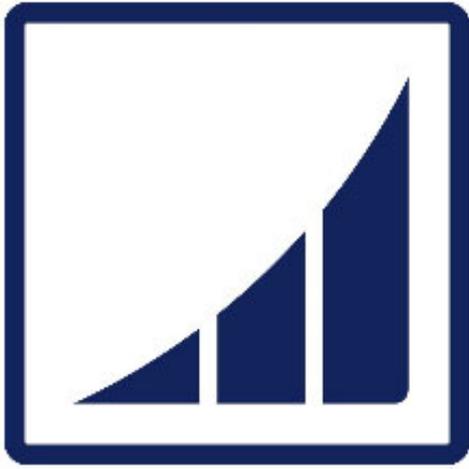
The Testing Leadership Award showcases projects that are particularly outstanding in the way they realize software testing values and methods.

The comparison with other participants will open up new perspectives to you. You can see just where you are with your projects, define your objectives better and get new ideas on how you can improve.

The Testing Leadership Award is also a plus for your customer communication. After all, the best introduction is a recommendation from an independent source. Having this prestigious award demonstrates that you possess testing expertise and will give you a boost over your competitors.

We wish you every success

**Helmut Blank**  
Managing Director  
BQI Best Quality Institute



# BQI

BEST QUALITY INSTITUTE

## Welcome to the Best Quality Institute BQI

04

BQI is the leading Institute for Awards which measure and assess the quality of companies. Working with companies and partner organizations like GASQ (Global Association for Software Quality), we deliver a lasting functional and economic contribution to professionalization.

BQI Best Quality Institute is the first place to call for developing highly specialized studies and assessment models for the most diverse areas of your business. BQI Best Quality Institute is a pioneer in standardizing quality assessment of software, products and services.

BQI Best Quality Institute is based in Berlin with subsidiaries in Munich and Brussels.

### Our Perspective

BQI's perspective includes both multidimensionality and uniqueness. We consider feasibility and economy with independent, credible assessment methods. This is based on our great respect for people.

### Our Leadership Awards

BQI Leadership Awards allow

participating companies and employees to make their own appraisals and assessments in diverse areas. They also allow for industry-wide comparisons along with the ability to assess specific sectors.

### Advantages

Independent measurement methods as well as industry-wide comparability and sector-specific accessibility determine your position in a competitive market. The more precisely you know your position, the easier it is to find new paths to even greater success. Creativity, innovation, accomplishment and change are only possible when you know where you stand.

### The Testing Leadership Award

There is no question that IT-systems are becoming more and more complex and are therefore more susceptible to software bugs. This results in economic damage, but also dissatisfied customers.

The Testing Leadership Award will show your customers that your software has been thoroughly tested and adheres to

the highest standards of functionality and security.

***The Leadership Award provides you with a valuable marketing instrument and allows you to position your products and services more successfully in the marketplace.***

To allow you to take part in the Testing Leadership Award, we will send you a digital questionnaire following your registration. This will require you to answer questions concerning aspects such as requirements management, testing policy, test planning, employee suitability verification, strategic planning as well as on general issues.

**Register now**

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# PENTASYS

Unser Maßstab ist der Mensch

## PENTASYS AG

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### FACTS AND FIGURES

Spectacular growth in the last ten years, from three to over 220 employees, is the success story of PENTASYS. This makes us one of the fastest growing IT service providers in Germany. Founded in 1995, we have long since become one of the most sought-after partners for bespoke IT solutions. In fiscal year 2010 turnover exceeded 22 Million Euros.

A significant contributing factor to the success of PENTASYS is the proximity to our customers. Founding a branch in Wiesbaden in January 2005 and moving it to Frankfurt am Main in April 2007 has provided us with the cornerstone of an increased presence in the Rhein-Main economic area. From here we serve customers including Commerzbank, Deutsche Bahn, Deutsche Post and Fraport AG.

### WE TAKE GOOD CARE OF YOU

There are many software companies. By the time you can tell if an IT service provider keeps its promises and delivers good value for money it's usually too late to change course. Failed IT projects are not only aggravating, but expensive.

We take good care of your projects. Our project development model allows us to efficiently control all aspects and stages of a project. From requirements capture and planning to design and implementation, as well as ongoing support, we have the necessary skills and resources to achieve

your aims on time and on budget, which we have proven in countless projects. Our quality management, introduced in 1999, has been repeatedly certified according to the ISO- 9001/2008 standard.

We want to earn your long-term satisfaction. A successful IT project demands not only an uncompromising commitment to quality and strict project management. Equally important are the sense of responsibility and motivation shared by the people involved in a project. Therefore at PENTASYS we emphasize an environment where each employee can control his own professional development, career advancement and personal working area.

### We Deliver Solutions

Business processes must be analysed, organised, controlled and synchronised, more and more frequently across organisational boundaries. IT has a key role in this task. The more complex the business processes are, the higher are the demands on the IT infrastructure. Off the shelf solutions are often insufficient for these needs. To remain competitive bespoke solutions are increasingly necessary.

We understand that our services have a significant impact on the success of our customers. Therefore you can expect only the highest quality from us. Our benchmark in this regard is the satisfaction of our customers. It is your

expectations which motivate and drive us to continuously improve the standard of quality we deliver. It is our mission to fill your expectations in partnership with you.

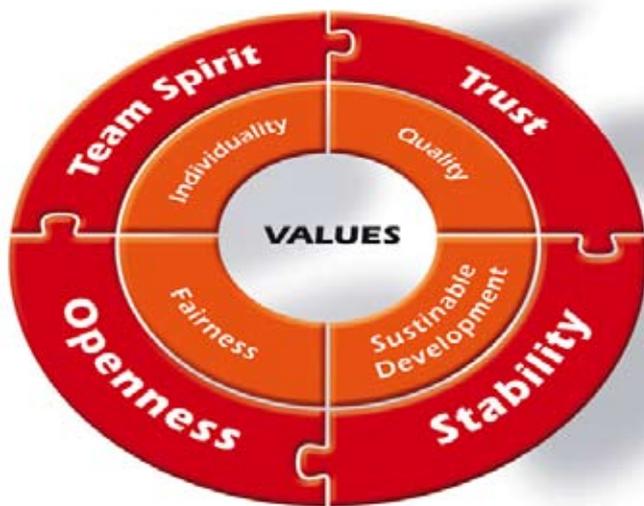
Our understanding of partnership with our customers is a relationship built on trust and clear, open communication, and driven by a commitment on both sides which far exceeds the boundaries of an individual project - A team effort from which both parties profit. The focus throughout this relationship is always the customer's goals and requirements.

### Portfolio

For over a decade PENTASYS has been a reliable partner providing bespoke software for many reputable German companies. In our three core areas, "Projects", "Software Engineering" and "Solutions", we stand for professionalism, competence and quality as well as flexibility, motivation and pragmatic, well thought through actions.

### Projects – Planning, Implementation and Quality Assurance

The introduction of new software systems is a key factor in remaining competitive in rapidly changing markets for many companies. At the same time the development and implementation of software projects is getting progressively more difficult due to increasing complexity, dynamic environ-



ments and ever shorter schedules. We are proud of our extensive project experience, which includes an extremely high proportion of successful projects. We are constantly looking forward to new challenges.

### **Complexity – Our Daily Business**

Using PMI, GPM and ISTQB we build on tried and tested standards and methodologies. Our customers consistently attest us an extraordinary 'project completion competence', i.e. a harmonious interplay of the various disciplines as well thought out combinations of measures suited to the individual project circumstances. Part of this is not hiding behind standards but, when necessary, introducing new solutions to difficult problems. The result is successful projects.

### **Software Life Cycle – From Idea to Maintenance**

We don't do things by halves in software engineering either. We can help our customers with the entire life cycle of the software. We offer the entire range of services – from requirements capture and management over design, implementation, testing and deployment to ongoing support. You have a need and an idea, we do the rest.

### **Solutions – Bespoke and Flexible**

Amongst all the project and software know-how we can provide, one area is particularly important: The ability to create competitive advantages for our customers through tailored solutions. No two companies are alike. Employees, processes and

culture are all factors which make your company unique. Our solutions make sure that your specific strengths are optimally supported by software and provide you with a competitive advantage. Regardless of whether your need is for an e-commerce, product information management or portal system, or any other area which is not, or inadequately with regard to your requirements, covered by off the shelf software.

## **Services**

### **Management Services**

We manage your projects. Our employees take over the central control and steering tasks of your projects and therefore carry the responsibility for successful completion. For this purpose we use our own tried and tested methods, but adapt to your needs and procedures. We can also take over parts of a project in a 'Project Office', for example risk or quality management, and work under your project leadership. In large scale projects in particular we can offer additional support and advice for project planning and controlling.

### **Consulting Services**

Size and complexity of a project are of secondary importance to us. Our advice and support are regularly sought even on large scale projects. This is based on our, for a mid-sized system vendor, extensive experience in projects of this scale. We have particular competency in the areas of the PMI Standard, Capability Maturity Model Integration (CMMI) and the V-Model XT. With our extensive project

experience, the necessary background knowledge and our pragmatic approach we create efficient structures and processes, forming the basis for the success of a project.

### **Quality Assurance Services**

The Quality Assurance Services (QAS) of PENTASYS AG encompass many different services from the areas of constructive and analytic quality assurance. We offer these services either individually, or as a package in the framework of a "Test Factory".

- \* **QA services and products:**
- \* **Test Factory**
- \* **QS Conception**
- \* **Requirements**
- \* **Review**
- \* **Test management**
- \* **Test design**
- \* **Test implementation**
- \* **Test environments**
- \* **Changes / Releases**
- \* **Automation**
- \* **Training and Coaching**

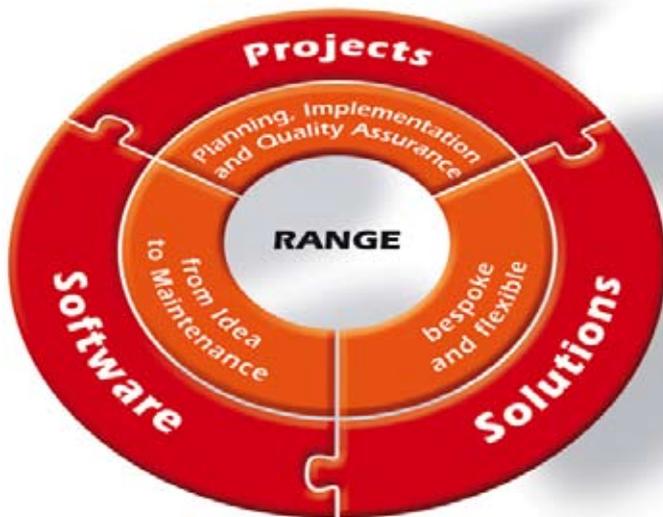
The core of QAS is a team of highly trained managers, consultants and specialists with 12 years and over 100 projects worth of experience. This experience allows QAS to:

- \* **clarify any issues for all involved with the help of structures**
- \* **create transparency in complex project scenarios**
- \* **reach identified milestones with strategy**
- \* **ensure motivation in project teams to master even the most difficult tasks.**

## **Software**

### **Software Engineering**

We are experienced in all aspects of software engineering. We offer a complete service covering for the entire software life cycle – from requirements capture over design and implementation to ongoing support and feature enhancements. Alternatively we also offer support for individual stages only. But even in that case we still consider ease of use and ease of maintenance for the software. We have a great deal of experience deploying and maintaining software systems, which you benefit from even when we 'only' design or develop your software.



### Requirements Engineering

Software systems today support increasingly complex and heterogeneous application environments. At the beginning of the development process requirements are often unclear and incomplete, if not contradictory. Requirements capture is therefore elementary in order to minimize the time, effort and money spent on development and is of fundamental importance to the operational and economic success of the system. The capture and analysis of requirements as well as their validation and documentation is the task of requirements engineering.

### Technical Architecture

Our focus is on Java Enterprise architectures and Microsoft .NET architectures, as well as architectures for systems based on Microsoft Exchange or MOSS 2007. We have extensive experience with projects containing a mixture of technologies, such as Java / .NET mixtures. Whatever platform is used, we pursue a pragmatic and results-oriented approach. In this we rely on our experience and the common and technical sense of our architects. You as our customer define the requirements for the solution, we define the architecture.

### Operations

Operating complex system environments places high demands on the IT department. We offer comprehensive services for the development of operational concepts for large scale systems or many interdependent systems, as well as the deployment of new systems. If required we can offer ongoing support for com-

plete systems or certain parts of a larger system. We meet Individual requirements quickly and reliably. In this we combine the professionalism of an enterprise system vendor and the flexibility of a medium-sized business.

### Maintenance

Software systems are always in need of improvements, new features and adaptation to changing environments and business processes. We continue to assist and support you after the initial deployment of a system. Depending on the complexity and importance of a system we, in partnership with you, define the appropriate level of maintenance. We can offer everything from basic bug fixing and bug finding after 'going live' over a reworking of the system, adapting to a changed environment, to performance improvements. That way, your systems remain valuable in a changed IT and economic environment.

### Solutions

#### Customer Specific Solutions

This is the strength of bespoke software: It seamlessly fits into your structures and processes and your technical environment. Bespoke software requires no compromise. No time consuming adoption period common to off the shelf software, no unnecessary bloat. Bespoke software is made to fit the customer's requirements and needs exactly – no more, no less. Throughout the development cycle we make sure that there is flexibility, security, ease of use and performance in the right places. This makes bespoke

software economical and efficient.

The core of our services is application development up to and including successful developer tests. We also take care of all tasks which go along with a development project, from requirements capture to maintenance. We use both Java and Microsoft .NET technologies (C#, VB.NET) extensively.

### Portals

A particular form of bespoke software is portals. They group applications, services and processes in a unified framework for all users and offer particular inter-application services. Portals are quickly becoming fully integrated workplaces for all kinds of audiences – employees, customers, suppliers or partners – offering all relevant information and interactions in one place.

We implement practically any portal requirement. Basic functionality and integration of different processes and applications as well as the integration of back end services, single sign on and content management or additional services like search, personalization, document management and collaboration features are possible. We also solve problems like integration of legacy applications or special requirements for the user interface.

Over the years we have designed and implemented many portal solutions for a variety of customers, using Java and .NET technologies and open source software as well as commercial technology. We can therefore rely on an extensive store of experience. This and our broad technological focus cause many of our customers to rely on our know-how when selecting and evaluating portal products.

### References

Some of the best German companies are among our customers. The following are just an excerpt from our list of references. ADAC e.V., Arval (a BNP Paribas Company), CACEIS Bank, Deutsche Bahn AG, DekaBank Deutsche Girozentrale, Deutsche Post AG, Deutsche Telekom, BMW AG, Direkt Anlage Bank, Bristol-Myers Squibb, MAN Nutzfahrzeuge AG, Telefónica o2 Germany, RTL II, TÜV Süd AG, Yves Rocher, Volvo Financial Services, the ifo-Institut für Wirtschaftsforschung and the European Patent Office.



# Microsoft Speeds Key Software Tests by 50 Percent, Boosts Test Effectiveness by 10 Percent

08

## Overview

**Country or Region:** United States  
**Industry:** Manufacturing—High tech

### Customer Profile

Based in Redmond, Washington, Microsoft is a global leader in software, services, and Internet technologies for personal and business computing.

### Business Situation

Microsoft engineers wanted to replace the time-consuming and expensive processes of manual testing with a comprehensive, automated process that would deliver more and better information more quickly.

### Solution

Microsoft adopted a one-click automated

“We wanted a test process that would be faster and more productive. We achieved that by using the automated tools in Visual Studio 2010.”

Raj Kamal, BI Engineering Automation Team Lead, Microsoft IT

test process based on test functionality in Microsoft Visual Studio 2010 Ultimate and Visual Studio 2010 Premium.

### Benefits

- Speeds key tests by 50 percent
- Increases test effectiveness by 10 percent
- Out-of-box features help spur rapid adoption

Microsoft IT—India wanted to conduct its software testing more quickly and easily,

and gain insight into data with which to make better and faster decisions about software development. Now it does, by using the Lab Management capability in Microsoft Visual Studio 2010 Ultimate, and Microsoft Visual Studio Test Professional 2010. In early runs with the tool, key tests were accelerated by 50 percent, with testers reinvesting their time to conduct 30 percent more testing. Engineers used the richer data to make better and faster decisions about software build quality and additional test-

ing. That led to a 10 percent increase in test effectiveness, as measured by the ability to catch errors early in the process. Testing teams throughout Microsoft have been quick to adopt the Lab Management technology, and Microsoft is expanding its use to cover more of the company's software development.

## Situation

When software users think of their most valuable applications, they may recognize the design and development work that went into them. But another element is equally important, if less obvious: testing.

And not just any testing. For testing to contribute to a great software solution, it needs to be comprehensive, fast, accurate, consistent, and responsive to changes in the development process, especially in modern Agile development teams.

Engineering groups throughout the software industry know this—including the Business Intelligence (BI) Engineering Group of Microsoft IT—India. The BI Engineering Group, like its counterparts elsewhere, is responsible for testing software applications under development.

That testing must cover all components of an application, from the user interface and business logic to the back-end database.

Test results need to be captured in reporting mechanisms that are consistent, traceable from results back to test scripts, and, when tests are highly repetitive, automated.

When tests are conducted in this way, they can be conducted by developers, not just by testers, so they can be conducted earlier in the development process, relatively quickly and easily, and more frequently. Testing early and often enables faster decision making about the direction of the development and test process, with decisions that can lead to higher product quality at lower cost.

At Microsoft IT—India, software testing was done as much as possible with the same family of tools used for software development: the Microsoft Visual Studio 2008 development system. Developers used this edition and its predecessor, Visual Studio 2005, together with

“We wanted an application lifecycle management tool that brought the same efficiencies to testing that it brought to development.”

Raj Kamal, BI Engineering Automation Team Lead, Microsoft IT—India

## Microsoft Visual

Studio Team Foundation Server to make it easier for development teams to work together. Developers used Visual Studio tools to carry out low-level unit testing and test scenarios, such as stress and performance tests. To meet the growing need to test earlier and more frequently, the Microsoft IT team wanted a tool to support generalist testing—including test management, functional user interface (UI) testing, and test automation.

With the tool set that was available to them, Microsoft teams were forced to improvise. Testers used internal tools and custom frameworks and test templates. But this approach was of limited usefulness.

Customization increased the resource overhead needed for testing, driving up cost, and driving down performance. A customized approach, by definition, wasn't standardized, so testing by one team couldn't necessarily be compared to the same type of testing done by another team.

This approach also lacked the traceability needed to connect automated test results to test cases, to quickly determine requirement coverage. Nor was this a seamless, end-to-end testing process, which increased the amount of manual intervention needed to keep it flowing.

“We wanted an application lifecycle management tool that brought the same efficiencies to testing that it brought to development,” says Raj Kamal, BI Engineering Automation Team Lead at Microsoft IT—India. “We wanted a tool that would be easier for testers to adopt and use.”

## Solution

Microsoft set out to address these con-

cerns, not only for its own Microsoft IT—India BI Engineering Group, but, primarily, for software testers throughout the industry who could use a tool for end-to-end testing that included test management and automation.

The results are automated test capabilities, manual testing, and virtual Lab Management capabilities that ship in Microsoft Visual Studio 2010 Ultimate, Visual Studio 2010 Premium, and Visual Studio Test Professional 2010. These test scenarios are supported by a set of services in Microsoft Visual Studio Team Agents 2010 and Visual Studio Team Foundation Server 2010.

The Microsoft IT—India BI Engineering Group tested versions of Visual Studio 2010 and the Lab Management functionality for more than a year. It used the build-deploytest automation capabilities enabled by Lab Management primarily to test a software solution called the Microsoft Supportability BI System (SBIS). That software is a Microsoft-internal application used by line-of-business managers to track top issues and customer feedback for products, such as the Windows operating system and Microsoft Office, to better prioritize the backlog of issues to be considered for future updates and releases.

Kamal and his colleagues made significant use of Microsoft Test Manager 2010, an integrated component of Visual Studio 2010 Ultimate and Visual Studio Test Professional 2010. Based on the Windows Presentation Foundation, Microsoft Test Manager is an application for test planning, test execution, and test tracking. It provided the testers with a single place from which they could plan and schedule automated testing, monitor testing, and review reports on the results. The Lab Management administration features in Microsoft Test Manager include built-in scheduling, which relies on additional service components provided by test agents and test controllers

“We just didn't see quality issues getting past us as they might have done previously. The result is higher quality software.”

Raj Kamal, BI Engineering Automation Team Lead, Microsoft IT—India

in Visual Studio Team Agents 2010. By using the scheduling function, the Microsoft developers triggered test suites to run automatically after every software build. The results of these automated tests helped the team to better determine the quality of their latest builds without the need for manual interaction.

The BI Engineering Group also used Microsoft Test Manager to automate and implement database unit tests, web unit tests, functional UI tests (also known as coded UI tests), load tests, and smoke and build-verification-test (BVT) tests for highlevel evaluations of the application software.

Coded UI tests can be generated from within the Visual Studio integrated development environment. The BI Engineering Group used them to test the functions of the SBIS user interface. The test engineers automated the coded UI tests and scheduled them to run after every build—helping to ensure that code changes hadn't broken the application's user interface. The test engineers also used Fast Forward for Manual Testing in Visual Studio Test Professional. By using this function, they could replay the actions of a manual test in fast-forward mode, once the test had been recorded. Fast Forward for Manual Testing was

Figure 1. The build-deploy-test automation process, based on Visual Studio 2010 Lab Management technology, is an end-to-end process that culminates in test results being delivered to the centralized Microsoft Test Manager environment.

useful to the test engineers as a check on several aspects of the application's functionality, including the user interface and database layers.

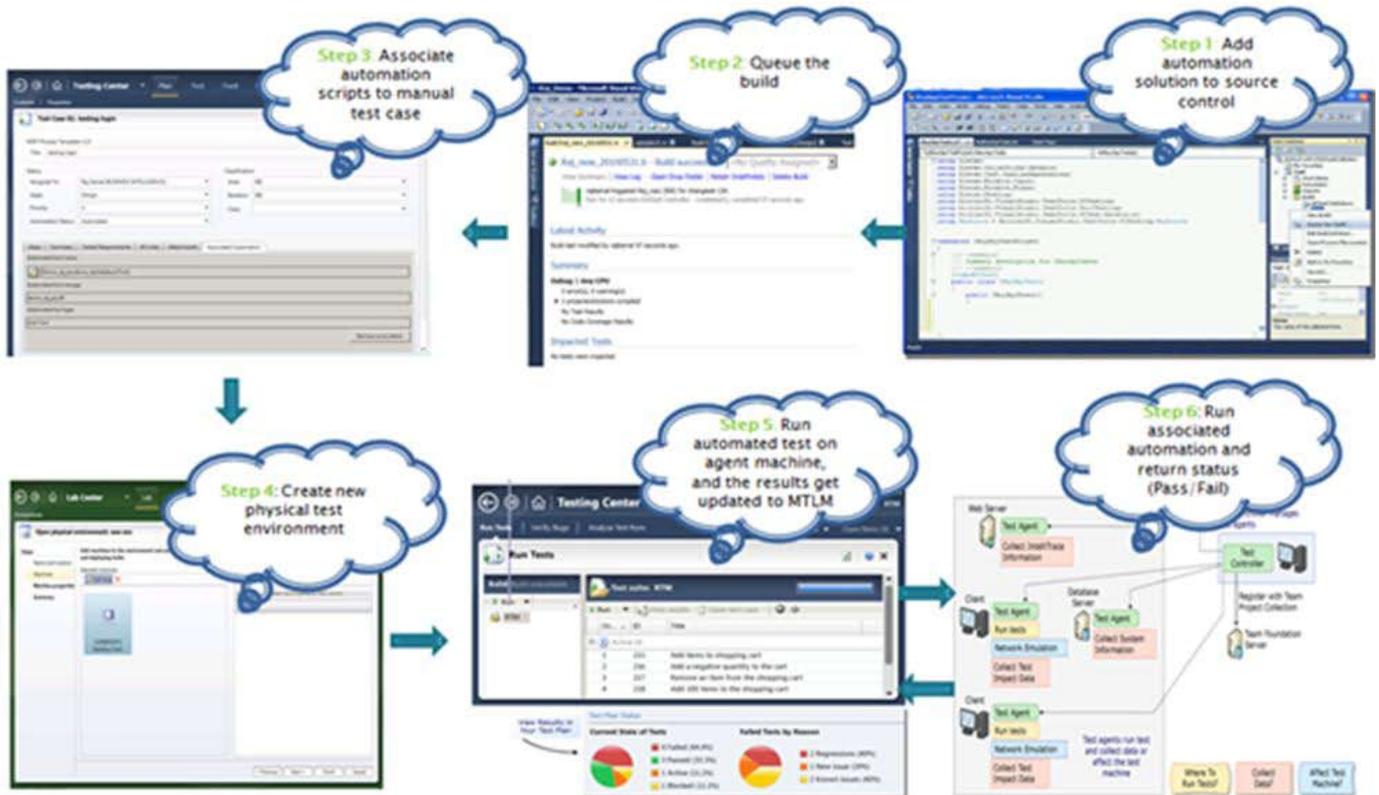
Kamal and his colleagues also wanted to run tests remotely on multiple machines, and to collect data and diagnostics remotely. To do so, they used test controllers and test agents. The test controller for each test ran as a service and assigned tests to the test agents to run. The test controller also told the test agents what data or diagnostics needed to be collected. The test controller and agents were managed through Microsoft Test Manager. These diagnostics enabled testers to file rich and actionable bug reports, ensuring that developers quickly identified their root causes.

The process of build-deploy-test automation that the test engineers used for the SBIS testing is shown in Figure 1. The process started with the test team creating and adding test automation to the source control. The team then created a new-build definition and queued the build so that it was available in Microsoft Test Manager to be assigned against a test plan. The test designers then associated the manual test cases in Microsoft Test Manager with the automated test. They created a new physical environment using Microsoft Test Manager, which they used to trigger the automated test cases. The automated tests were run on multiple computers using the test agents, and the results were uploaded to Microsoft Test Manager and recorded as pass-fail results.

After the successful adoption of the builddeploy- test automation test process to test SBIS, Microsoft has now expanded its use of the Lab Management capabilities to seven other applications currently under development, primarily to automate the build-deploy-test process for repetitive tests.

## Benefits

Testers in the Microsoft IT—India BI En-



“By automating the testing, we were able to catch more software issues and to catch them earlier in the process than we could have done otherwise.”

Raj Kamal, BI Engineering Automation Team Lead, Microsoft IT—India

Engineering Group used Lab Management automation and related testing capabilities in Visual Studio 2010 to speed key test processes and boost tester productivity, and to increase the effectiveness of testing and the quality of the software being tested. Because the increased test functionality is readily available and easy to use, adoption by testers has been rapid.

#### **Speeds Key Tests by 50 Percent**

Microsoft wanted to accelerate the testing process and boost the productivity of its testers, and of software testers everywhere.

It has accomplished that with the automated test capabilities available to testers in Visual Studio 2010.

Kamal estimates that the time required to conduct smoke and BVT tests for a project the size of SBIS, which has more than 80,000 lines of code, has been reduced by half, with such testing now taking no more than two to three hours. The time savings for the testers extends beyond 50 percent because they formerly had to be present to implement manual testing. Now, the testing process isn't just faster—because it's automated, the testers don't need to be present as tests are run, allowing them to attend to other tasks. With their freed time, the Microsoft IT—India testers conducted 30 percent more testing than would otherwise have been possible.

Given the nature and purpose of these tests, the time savings and additional testing is highly significant. Smoke and BVT tests evaluate software quality at very high levels. Their purpose is to help determine if a software build is good enough to undergo more thorough, and timeconsuming, testing. By expediting the smoke and BVT tests and increasing the number of such tests that can be run, engineers made better and faster decisions about software quality—including decisions about whether to submit builds for indepth testing.

“We wanted a test process that would be faster and more productive,” says Kamal. “We achieved that by using the automated tools in Visual Studio 2010.”

#### **Increases Test Effectiveness by 10 Percent**

By using the testing tools now available in Visual Studio 2010, the Microsoft IT—India testers not only made the test process faster and more cost effective, they also made it more reliable and accurate, according to Kamal.

“By automating the testing, we were able to catch more software issues and to catch them earlier in the process than we could have done otherwise,” says Kamal. “We just didn't see quality issues getting past us as they might have done previously. The result is higher-quality software.”

He says the automated test process was at least 10 percent more effective in helping the test team to identify and address software issues early in the testing process, compared to the former, highly manual process. In addition to leading to higherquality software, the advance also reduced the cost of software testing by eliminating much of the redundant or unnecessary testing involved with the previous software test process.

#### **Out-of-Box Features Help Spur Rapid Adoption by Testers**

Because test automation with Lab Management in Visual Studio has succeeded so well, Microsoft met another of its goals for the testing capability, according to Kamal. That goal: rapid adoption by testers. Because Microsoft testers were using inconsistent tools, templates, and processes, Microsoft needed fast and full adoption of the test capabilities in Visual Studio 2010 to achieve significant savings of time and money, and to have a major effect on the overall testing process.

“Our testers have been extremely pleased with the test functionality in Visual Studio 2010 and, especially, Microsoft Test Manager,” says Kamal. “We don't have to sell this tool to our testers—it sells itself. It helps prioritize test efforts. It links test cases to requirements, so reports can easily show how many requirements are being met with each build. And, perhaps best of all, it provides all of this out of the box. We don't want to create custom test tools and processes—but too often, we had to. Visual Studio 2010 gives us the test environment that we've wanted, and we

can take advantage of it immediately.

Why wouldn't a test team want to use it?”

### **Microsoft Visual Studio 2010**

Microsoft Visual Studio 2010 is an integrated development system that helps simplify the entire development process from design to deployment. Unleash your creativity with powerful prototyping, modeling, and design tools that help you bring your vision to life. Work within a personalized environment that helps accelerate the coding process and supports the use of your existing skills, and target a growing number of platforms, including Microsoft SharePoint Server 2010 and cloud services. Also, work more efficiently thanks to integrated testing and debugging tools that you can use to find and fix bugs quickly and easily to help ensure high-quality solutions.

For more information about Visual Studio 2010, go to:

[www.microsoft.com/visualstudio](http://www.microsoft.com/visualstudio)

### **For More Information**

For more information about Microsoft products and services, call the Microsoft Sales Information Center at (800) 426-9400. In Canada, call the Microsoft Canada Information Centre at (877) 568-2495. Customers in the United States and Canada who are deaf or hard-of-hearing can reach Microsoft text telephone (TTY/TDD) services at (800) 892-5234.

Outside the 50 United States and Canada, please contact your local Microsoft subsidiary. To access information using the World Wide Web, go to:

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# Test it!

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**Cirquent – we are your archITect. IT is central to our services, supported by our extensive process and industry expertise. We act as architects, supporting our customers in their most challenging tasks. We are experts in our field, and we understand the technical, economic and time-related demands involved. We have new ideas, but we also know what is practically and financially feasible. Our goals: increased efficiency, decreased costs, and, above all, the development of genuine competitive advantages for our customers.**

As 'your archITect', Cirquent offers first-rate consulting services. Financial service providers, as well as insurance, utilities, telecommunications, automotive and manufacturing companies all benefit from our pool of IT, process and industry expertise. We keep our promises: to deliver a measurable improvement in added value for our customers and to help them to stand out from the competition in a more pronounced manner.

## Our areas of expertise

**Automotive:** Cirquent has a strong understanding of the needs of the automotive manufacturing and supply industry: controlling a complex network of development partners and suppliers, an efficient product development process, streamlined and flexibly organized production, and targeted expansion of marketing, sales and service for a distinctive profile. Cirquent offers solutions in this area that cover finance, marketing and sales, aftermarket services, supply chain, optimisation, operations, and IT and outsourcing.

**Production:** From the procurement market to the sales market, we design and optimise value-added chains

in complex industries and establish links between industry sectors. Our integrated solutions cover all the important processes in the production industry: innovation management, product life cycle management, supply management, production management, distribution management, as well as services, marketing and sales.

**Financial services:** Cirquent has extensive expertise in all the important core business areas in the financial services sector: banking infrastructure, credit and asset management, payments, investment banking, as well as comprehensive bank solutions.

**Insurance:** Cirquent's consultants unite impressive experience in the insurance industry's specific processes with proven methodology and wellfounded IT expertise in standard software, customised software and technologies. Our consolidated industry and technological expertise allows us to analyse and optimise processes on a continuous basis.

**Telecommunications:** Successful providers in the telecommunications market require business processes and IT architecture that are seamlessly integrated along the entire value-added chain. Our goal is for new services to be processed along this value-added chain, without any interruptions – from marketing and sales, to order management, billing, and rating, right through to customer service.

**Utilities:** Performance management, smart metering, energy trading – Cirquent understands the needs of utility companies. We implement intelligent, future-oriented IT structures and base our plans on a well-founded understanding of processes. In addition, Cirquent is the number one company when it comes to a wide range of IT issues, such as portals, customer management systems, system integration and application management.

**Customer management:** Success in customer management depends on a key strategy, in which 'moments of truth' play a decisive role. Business processes need to be properly analysed and, if necessary, adapted. Only then is the software selected and the IT concept implemented, covering everything from the customer interaction point to the back-end system.

**Methods and technologies:** With our proven methods and technologies, we support our customers' business success. Our goal is to help our customers achieve ongoing, sustainable success – regardless of whether they need business intelligence systems to support decision-making, process modelling with business process management, or integrated communication via a portal.

## Facts, figures, data

With 1,600 employees, Cirquent is one of Germany's leading IT consultancy and systems integration companies. Cirquent is a company belonging to NTT Data, an IT group listed on the Tokyo stock exchange. The subsidiary of Nippon Telegraph and Telephone Corporation (NTT) holds 72.9 per cent of Cirquent shares. The BMW Group has a 25.1 per cent stake in Cirquent.

## History

Cirquent's roots are in Softlab, an IT business established in 1971 in Munich. In the early days, the company was the global market leader with the development and administration tool Maestro (Computer Aided Software-Engineering – CASE). In the mid 1990s, Softlab changed from a software supplier to a purely IT consultancy company.

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Germany: Ettlingen, Frankfurt am Main, Hamburg, Cologne  
Austria: Vienna  
Switzerland: Bern, Zurich  
Great Britain: London, Solihull

## Customers (selection)

Allianz, BASF, BMW Bank, BMW Group, Commerzbank, Deutsche Börse (German), Stock Exchange), Deutsche Post, Deutsche Telekom, Dresdner Bank, DZ Bank, EADS, E-Plus Group, Eurocopter Deutschland, Fiducia, Generali, Heidelberger Druckmaschinen, HUK-Coburg, Kabel Deutschland, Landesbank Berlin, Luzerner Kantonalbank, Magna Steyr, MTU Aero, Engines, MAN Nutzfahrzeuge, Munich Re, O2, Postbank, Siemens VDO, Swisscom, TRUMPF Machine Tools, Union, Investment, voestalpine group-IT, Wüstenrot

You can find a selection of our references in text, graphical and audio form at

[www.your-architect.de](http://www.your-architect.de)

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# Testing: Anchoring software quality as a process



The industrialisation of software development must optimise more than just time and costs. Industrial production processes show: Only stable test processes which accompany development guarantee consistent quality.

By Michaela Sattinger\*

We are used to clear standards, measurable manufacturing processes and absolute cost transparency from industrial production processes. Transferring these predictable production processes and the expected level of quality for the manufacture of software is complex and multi-layered. In many companies, the industrialisation of software development across the whole Application Life Cycle is still in the early stages. This applies to the introduction of standard solutions, in particular, however, to the development of the company's own individual solutions. Just as process standardisation models such as CMMI are certainly used today, or operational processes are mapped in accordance with ITIL, quality concepts in the software development standard must also be used – no one nowadays can bear the "costs of poor quality".

Implementing tests which accompany development

Thus, the classic industries show how quality can be united with short development times and low costs. For this, the test process must be established as an integral element of software development and must accompany all

phases from the very beginning. In order to achieve this, it requires an analysis of the Application Life Cycle Model and the IT organisation. The goal in doing this is to develop and establish the best possible test organisation model which is tailored to the constraints – from a decentralised test with central test methodology to a test service with off-shore interests. In this way, the test competence can be ensured and the test can be made scalable.

Only with a suitable test methodology and a stringent test management can the challenges of the test be successfully mastered: high test quality, shorter trial periods, lower test costs, higher test acceptance.

Construction of organisation and processes on the basis of standards such as ISTQB (= International Software Testing Qualification Board) and Best Practices

Integration of the test engineers into the entire Application Life Cycle Process of the software, in order to develop test strategies, methods and cases early with the goal of achieving the best possible quality with the available funds  
Implementation of a test management with clear responsibilities

Significant cost reductions by means of structuring and standardisation of the test process in the company

In this way, the value contribution of IT is specifically increased by compatible interaction of the test management, test methodology and test organisation.

Specialist service providers such as Cirquent are advancing the industrialisation of software development as regards test management and quality, with their range of services. In this way, the foundations are laid for sourcing and shoring models. We consider the challenges of management, departments, developers, customers and end users and implement these in quality by using test management, methodology and organisation. As the software quality of today establishes the products and service quality of tomorrow.

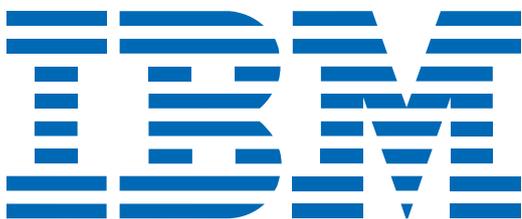
\* **Michaela Sattinger**, Principal Consultant

Test and Quality Management at Cirquent

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# IBM Rational Quality Management

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The development of software and systems has reached a turning point: new application areas for hardware and software are emerging on an almost daily basis. We are in a position to create and implement software that had been unthinkable even just a few years ago, and we can equip devices with software controlled functionality that we had not even thought of until recently.

The essential foundations for quality in software development include a qualified project team, clearly defined and achievable goals, information that is as up-to-date and consistent as possible and accessible by everyone, a transparent and manageable process with distinct roles and tasks, few additional process-related expenses and a good communication platform.

The test process may look somewhat different for each project, but it fundamentally consists of a set of main activities which may overlap or take place in parallel (see figure 1).

## *Test planning*

Generally software development is tested in multiple steps. The test activities are

primarily structured as follows:

- Component test
- Integration test
- System test
- Approval test

During test planning the guidelines for each individual step are defined, i.e. scope of work, test goals and the test

activities required to cover the scope of work and achieve the test goals. As a result, an extensive test plan is made available for the respective test initiative which provides the basis for managing and monitoring test preparation and implementation.

### Test specification and realisation

In this test preparation phase, logical test cases are created based on development documents (e.g. business transactions, requirements specifications, design documents). Therefore it is highly recommendable to review those documents first. Testers should be involved in the review as soon as an early draft version of any of these documents becomes available in order to be able to start the test specifications for a particular test level in parallel to the associated development activities. The test infrastructure layout is designed alongside the test cases and the necessary tools are identified.

During test realisation, concrete test cases are created from logical test cases through the addition of test data. Test scenarios are generated for further test preparation and test frameworks and automated test scripts are developed as required.

### Test implementation

Next, a short initial test (smoke test) indicates whether the test system has been set up correctly. The manual or automated test execution as per the defined sequence is started after everything is correctly configured. All test results are logged. Any deviation between actual

and expected results will be determined and reported to development for further analysis and troubleshooting.

After bug fixing all test cases which revealed an error are executed again. A regression test is also performed in order to ensure that no side effects have been generated by correcting the errors.

### Test evaluation

During test evaluation all criteria for test finalization are examined for compliance to determine whether test execution can now be finished. In that case, all results from test execution are summarised in a final report.

### Test completion

In this phase, all knowledge about the software and the tests is collated and documented for reuse in future projects.

### Test control

This is an ongoing activity to detect any deviations from the plan and to introduce corrective measures as appropriate.

Typically these workflows are defined in detail for a company or a specific project and are supported by a respective process. Often, process compliant test procedures require support by a suitable tool environment to ensure economically feasible implementation. Capabilities to be provided by such a tool environment result from the various test activities:

- In addition to the actual test cases, the test plan must be able to accept and reflect all other required elements, such as, quality targets, cost estimation for the test preparation and test execution, milestones, risk assessment, requirements, test environment, test input criteria and criteria for test completion.

- As requirements and derived development elements are the basis for the test realisation, both testers and developers must have access to the same up-to-date information.

- In order to increase efficiency of the test activities, it must be possible to reuse and augment existing test sequences by manually generating further test cases. The assignment to sequential or parallel execution on test case level shortens the test run time required.

These requirements are fulfilled by solutions such as IBM Rational Quality Manager. This tool is based on the IBM Rational Jazz technology and can therefore be seamlessly integrated into a lifecycle environment, thus supporting the close integration of development and testing.

The dynamic test plan with all the required elements stated above, is in the centre of test activities when Rational Quality Manager is used (see figure 2). The integration into the lifecycle environment provides access to central and always up-to-date requirements and development documents without the testers having to leave their familiar work environment. Reuse, enhancement and execution rules enable an economical flow of test activities and therefore contribute to a shorter time-to-market.

The integration with various tools for the test execution enables a continuous

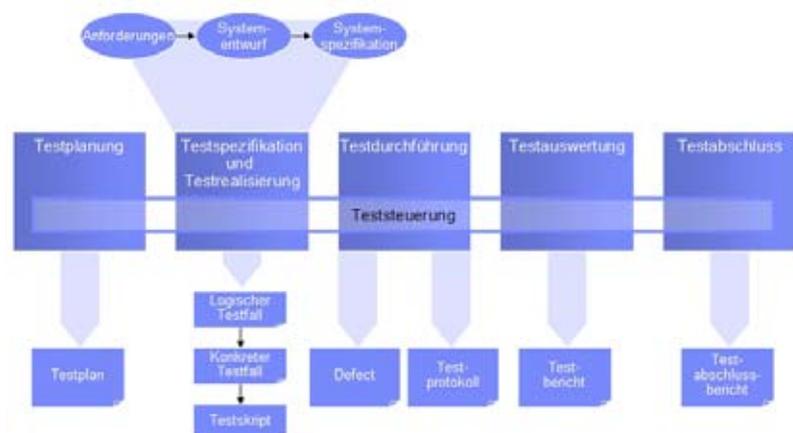


Figure 1: The essential elements of a test process in combination

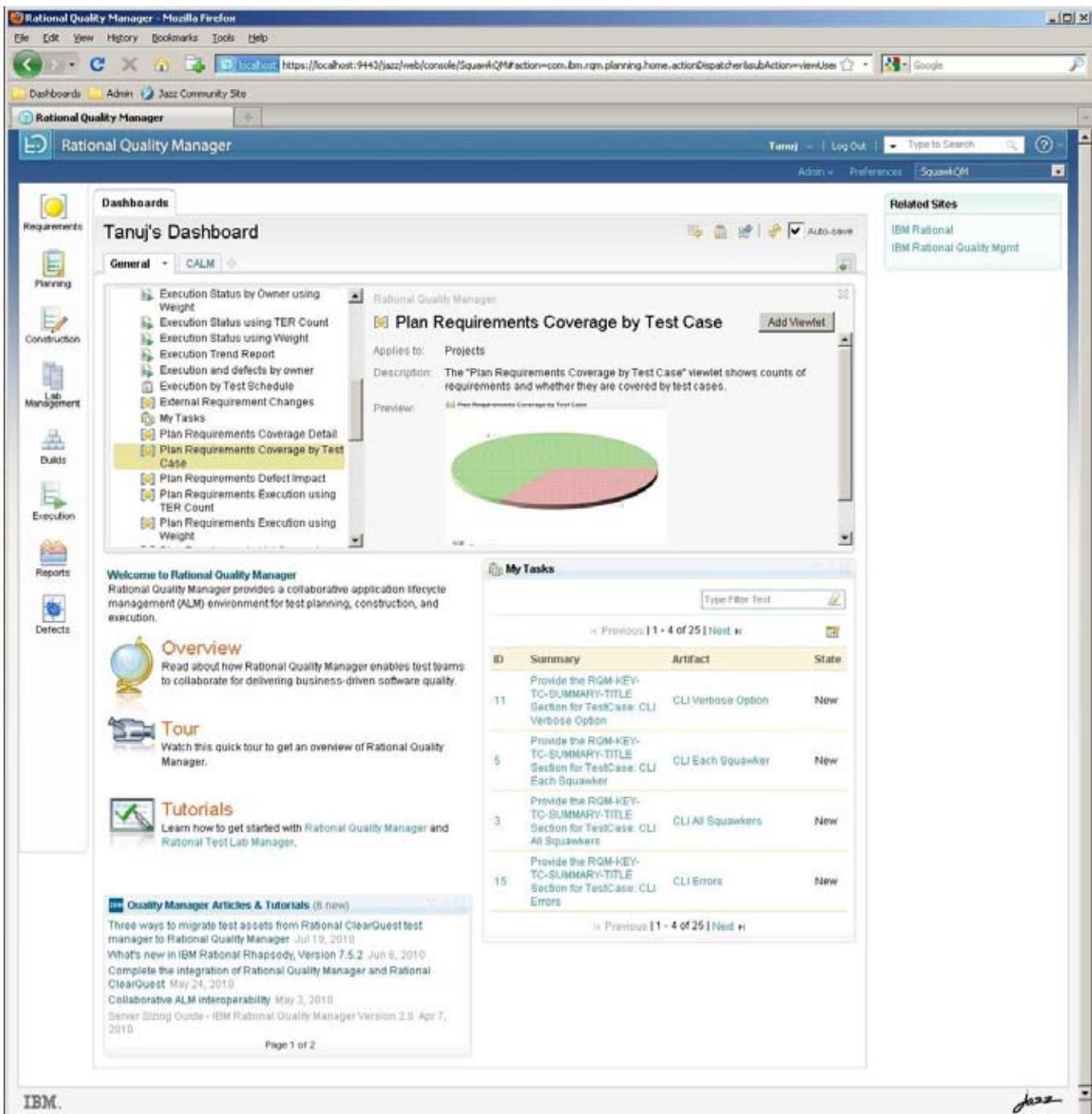


Figure 2: The dashboard display offers access to all test-relevant functions

process without having to carry development and test data across tool boundaries.

The tool environment does provide a significant part of the infrastructure for the execution of test activities, but it is only a part of what makes an efficient and effective test process. The definition of the process to be used, the integration of the process into the company's decision-making, the mapping and support of the process in the tool environment, as well as its manageability in daily work are just as decisive. The

tool is only one - although important - part of the solution. Successful tool deployment mandates existence of a corresponding test process and work flow support by the tool environment. If such a process is not yet existing, it is recommended to examine requirements and expectations and to specify a test process - with external advisory support from a tool manufacturer if appropriate. Next the process will be reflected in the selected tool, most often again with tool manufacturer support. Furthermore, employee education and training is essential for successful tool deployment.

This education should go beyond mere tool operation training and also cover how the tool helps to implement the selected process. This will ensure that all team members will use the tool in line with the process and thereby facilitate an efficient and reliable flow of test activities. These supplementary services enabling successful deployment and use of IBM Rational Quality Manager for test management are also offered by IBM.

**Sylvia Weber, Renate Stücka,**

IBM Rational Software

# Goodbye software errors

Software errors provide matter for headlines on regular basis: iPhone 4, erroneous telephone bills, entire batches of cars called back ...

These image worst case scenarios can often be traced back to various key factors: complexity of the concerned system, enormous time pressure during rollout and - inadequate testing.

The 2010 issue of the World Quality Report (WQR 2010) published every year by Capgemini, HP and Sogeti explains this development: Almost 75% of the surveyed companies have started making applications available in the Cloud with the aim of saving costs. 60% of the companies plan to use agile methods in application development because they want to shorten their time-to-market.

Complexity and time pressure are a result of strategic necessities. However, companies can render inadequate testing almost safe as a determining factor by controlling three key areas professionally and with a holistic approach: people - processes – technology.

People: Testing is an independent discipline and not an additional occupation of developers, who have nothing better to do. The WQR 2010 sees the testers of tomorrow working in small teams and they would be expected to deliver the executable software within 4 to 6 weeks. Good testers are hence specialists in demand, with core competencies in the areas quality assurance (31% of the entries), knowledge of the subject-matter (22%), databases (14%) and scripting (10%). 31% of the companies already select their testers on the basis of their certification. Therefore, the companies should invest in training their testers or rely on the specialised service providers. There are internationally recognised



trainings and certifications e.g. ISTQB, TMap® for professional testers.

Processes: Only optimised testing processes allow good testers to reliably eliminate serious errors efficiently and effectively. However, 73% of the surveyed companies still work using their own methods. Testing is a mature discipline today – people responsible can place their confidence in the standard processes, which they can adapt to suit their own requirements. Internationally established approaches like the test management approach TMap® by Sogeti are suitable for this purpose.

Technology: The scope and dynamics of more complex systems and the division of work in today's software projects can be coped with only by using suitable testing tools. There is a backlog demand especially in the earlier phases of the application lifecycle. According to the WQR 2010, only 16% of the surveyed tools are used for requirement management. The specialised tool suites

of providers like HP, IBM, Microsoft and Oracle support testing as a key element in the application lifecycle and also build proven standard processes with plug-ins like TMap®.

Qualified testers, efficient processes and optimum tool support considerably reduce the invested effort. At the same time, companies demonstrably reduce the number of serious errors and are armed for the dynamics in the IT industry.

Capgemini and Sogeti consider testing as a combination of people, processes and technologies. We continuously develop our know-how and our methods with regards to testing.

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**Stefan Gerstner is the Vice President at Sogeti and is responsible for the Testing Services. Arnim Buch is the Principal Consultant, Technology Services at Capgemini.**

# About Capgemini

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Capgemini, one of the world's foremost providers of consulting, technology and outsourcing services, enables its clients to transform and perform through technologies. Capgemini provides its clients with insights and capabilities that boost their freedom to achieve superior results through a unique way of working, the Collaborative Business Experience™. The Group relies on its global delivery model called Rightshore®, which aims to get the right balance of the best talent from multiple locations, working as one team to create and deliver the optimum solution for clients. Present in 40 countries, Capgemini reported 2010 global revenues of EUR



8.7 billion and employs around 110,000 people worldwide. More information is available at [www.capgemini.com](http://www.capgemini.com)

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With a global network of more than 40,000 experts, Capgemini's Technology Services (TS) is dedicated to helping

clients design, develop and implement technical projects of all sizes through the creation of project architecture, software package implementation, application development, consulting in IT technologies and innovative solutions. For more information:

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# About Sogeti

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Sogeti is a leading provider of professional technology services, specializing in Application Management, Infrastructure Management, High-Tech Engineering and Testing. Working closely with its clients, Sogeti enables them to leverage technological innovation and achieve maximum results. Sogeti brings together more than 20,000 professionals in 15 countries and is present in over 100



locations in Europe, the US and India. Sogeti is a wholly-owned subsidiary of Cap Gemini S.A., listed on the Paris

Stock Exchange. For more information please visit [www.sogeti.com](http://www.sogeti.com).

# About Capgemini and Sogeti

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Together, Capgemini and Sogeti have developed innovative, business-driven quality assurance (QA) and testing services, combining best-in-breed testing methodologies (TMap® and TPI®) and the global delivery model, Rightshore®, to help organizations achieve their testing

and QA goals. Capgemini and Sogeti have one of the largest dedicated testing practices in the world, with over 6,400 test professionals and a further 11,000 application specialists, notably through a common center of excellence with testing specialists developed in India.

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# Backgrounder for HP Application Lifecycle Management 11.0



## The Core Application Lifecycle under control

Efficient Application Lifecycle Management (ALM) requires an integrated solution that covers not only the software development but also the communication with upstream and downstream processes, for example with Project and Portfolio Management (PPM) and IT Service Management (ITSM). The integration of third-party solutions is required alongside functions for the automation and support of globally distributed teams. This backgrounder describes the evolution of ALM and how HP is positioning itself here with the new ALM 11 solution.

The aim of Application Lifecycle Management (ALM) is to make the management of the application lifecycle efficient and better oriented to business objectives. The alignment to business objectives in particular requires a consistent ALM approach: when ALM is deployed comprehensively and consistently, it improves collaboration between the teams and organizations while at the same time enabling all to take their orientation from the business requirements at all times. However, there is still much to be done before this is fully established. For example, a survey run by SIGS DATACOM in Germany ("Problem recognized - now action must follow") among project managers, team leaders, development managers, and programmers indicated that approximately 64% of those surveyed are aware of ALM, about half (48%) assign strategic significance to it – but only 16 of 90 persons surveyed (18%) stated that they practice end-to-end ALM.

ALM is often reduced to the software development process itself (Software Development Lifecycle, SDLC): from the definition of the requirements, through

development including source code and developer task management to quality assurance. HP, on the other hand, advocates taking a significantly broader view. First of all, only a closed chain from planning, through development, all the way to the operating phase permits a real orientation to business. Secondly, a focus that is too narrow tends to lead to the formation of silos – while potentials for efficiency remain dormant, especially in the close interplay of the teams. The greatest loss of time – and thus financial losses – always arise in ALM when tasks are passed between the teams involved, in particular when these teams use different solutions and are unable to access commonly available project information.

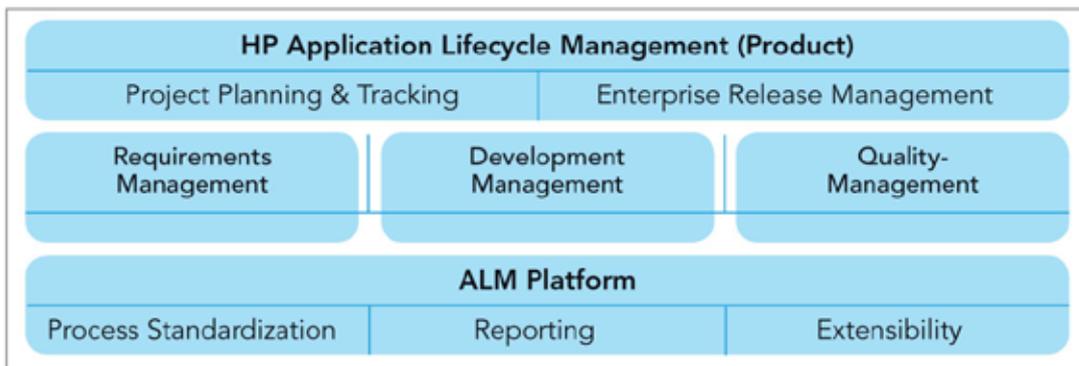
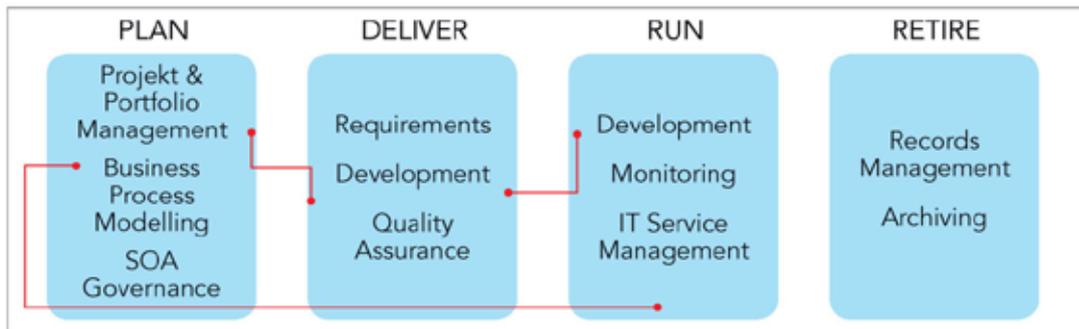
### Core Lifecycle versus Complete Lifecycle

HP makes a distinction between the core and complete application lifecycles. Even the narrow core lifecycle is not equal to the SDLC, rather is significantly wider: alongside the four main areas 'Requirements', 'Development', 'Quality Management', and 'Performance

Management', HP regards the handover mechanisms to neighboring disciplines as a major part of the core application lifecycle. Here, it is crucial to link Project and Portfolio Management (PPM) to Business Process Management (BPM) to Requirements Management, and down to quality assurance not only with regard to functionality but also with regard to performance, security, guideline conformity and, ultimately, the transfer to operation.

The complete application lifecycle comprises PPM, BPM, and the fundamental questions regarding architecture and governance, the core application lifecycle, as well as management of the applications in their operating phase by means of the interplay between application development and IT operations and ITSM – all the way to the decommissioning of applications. It is therefore very important to take account of the complete application lifecycle, because application support as well as changes to applications that are already deployed amount to up to 92% of the application costs according to Gartner (press release "Gartner Says CIOs Will Be Challenged to Balance Cost,

# Holistic „Application Lifecycle Management“



„Core Application Lifecycle Management“

Quelle: HP

Core Application Lifecycle Management“ is part of a holistic ALM

Risk and Growth in 2010", October 19, 2009). Structured and business-oriented management of the complete lifecycle of the applications helps to avoid quality deficiencies at an early stage, which means that the costs of regular operation of the applications can be substantially reduced – not to mention the additional gains in employee productivity in the user departments due to the lower number of software errors.

## The analysts' view

Recent analyst reports confirm HP's position. For example, Forrester analyst Dave West describes the development of the ALM market ("The Time Is Right for ALM 2.0+", October 19, 2010). According to West, it was initially attempted to implement ALM by integrating individual point solutions, which was not very efficient. This was followed later by comprehensive "ALM 2.0" solutions that take their orientation from the ERP (Enterprise Resource Planning) suites, but their monolithic

approach meant that they were not met with acceptance. The ALM generation "2.0+", on the other hand, now provides the openness to integrate the planning, development, and operating phase, thus ensuring automation, end-to-end workflows, and traceability. This is exactly what HP has been advocating for the complete application lifecycle for some time now.

Gartner analyst Jim Duggan, on the other hand, recently spoke out in favor of the 'federation' of solutions for software development and the operating phase ("Key Issues for Application Life Cycle Management, 2010", June 24, 2010). The objectives: teams were to collaborate across silos, to improve the overview of software projects from a business perspective, and to reduce the management and process overhead. Here, too, the focus on only the SDLC experienced a shift some time ago.

With the new solution Application Lifecycle Management 11.0, HP delivers the basis to fully cover the

core application lifecycle on a uniform platform. With regard to the core and complete application lifecycle, ALM 11 provides the openness and interfaces in order to work seamlessly with solutions from HP and third-party vendors. The most important functions of the new version are described in detail below.

## ALM Platform and Dashboard

HPALM 11 offers development managers and those responsible for applications a uniform, integrated platform that enables the interplay of solutions for Requirements, Development, Quality, and Performance Management. A central administration console (Dashboard) provides control over their projects, users, licenses, and centers of excellence. To achieve this, the platform supports all the required services for authentication and authorization as well as for end-to-end workflows. This improves the collaboration among geographically distributed teams and ensures traceability of the development

# Application Lifecycle Management Dashboard

Project Planning and Tracking

Process Enablement

Enterprise Release Management

Requirements Mgmt

Req Mgmt

BP Modeling

Development Mgmt

Defect Mgmt

Dev Integrations

App Governance

Quality Mgmt

Test Mgmt

Test Lab

Manual Test

Performance Optimization

Perf Test Mgmt

Perf Lab Mgmt

Perf Testing

- Collaboration
- Traceability
- Reporting
- Version Control

## ALM Platform

Admin. Console

\* Users and License \* Projects \* CoE \*

- Authentication
- Authorization
- Workflow
- APIs, Integrations

HP ALM 11 offers development managers and application teams a uniform, integrated platform that enables the interplay of solutions for Requirements, Development, Quality, and Performance Management.

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projects and cross-project reporting. Also involved are important aspects such as a uniform repository, interfaces, shared services, and integration possibilities, which will be discussed later.

The ALM platform is supplemented by the ALM Dashboard. Thanks to a role-based access concept, it provides each user with clearly depicted details of the status of their projects and the use of available resources in accordance with his or her role in the company. At the same time, it provides the possibility to integrate information on project planning as well as release management. ALM 11 thus offers a central information point at which everyone involved in a project can see all of the information relevant to that project at a glance.

### Integrated repository

Traditionally, every tool that is used in the course of the application lifecycle includes its own database. This often necessitates additional overhead to synchronize various data repositories – with the constant risk of inconsistencies as well as defects in the project process when those involved assume there are



ALM 11 Dashboard offers a central information point at which everyone involved in a project can see all of the information relevant to that project at a glance.

different information statuses. ??? When data definitions are not consistent across all repositories. Is this what is meant here ???

HP ALM 11, on the other hand, provides uniform user administration and an integrated repository, i.e. a central data stor-

age that can be accessed by all those involved in the project depending on their authorizations, from recording requirements, through development, all the way to quality assurance. This avoids the necessity for multiple data entry and prevents inconsistencies: once data have been entered by a team, they can be re-

used easily by other teams – but only if they are permitted to do so.

In practice, this means for example that a team that is responsible for performance testing can access a repository of test data that the software developer has already used for preproduction tests. This not only saves time, it also ensures that “apples are compared to apples”: thanks to the data from the central repository, it can be determined whether the functions that worked in the test laboratory also work faultlessly under load. Inter-team workflows are also possible. An example: a new web application is to handle 1,000 accesses simultaneously; the response time must not exceed five seconds. If the test personnel determine by means of the HP Performance Center that the required maximum times are exceeded, they can reload these results into the development cycle: the need for rectification is recorded as a defect; the developer team can use this information to carry out the rectification. This ensures end-to-end traceability of the development from load test planning to execution. It is immediately clear at all times which defects are related to which requirements and how they affect the planned business process. This interfacing between application development and performance testing is difficult to implement without an integrated repository or it can only be implemented incompletely. It prevents friction at the handover points, accelerates the development processes, and thus does not affect the budget. In the Dashboard, those responsible for the project immediately recognize any bottlenecks, enabling them to react quickly.

Shared services, interfaces, integrations  
Important services such as the Workflow and Reporting Engine run on the server side of the HP ALM platform. This enables cross-solution workflows as well as consolidated reporting across tool and project boundaries. The support for the web service-based REST API (Representational State Transfer Application Programming Interface) means that these services are available as shared services for HP solutions and for applications from third-party providers.

In practice, for example, a Second Level Support employee can use HP’s Service Manager to enter a trouble ticket (incident notification) and forward it to HP ALM in the case of an application-related incident. As soon as the error has been

rectified in the software, confirmation is sent automatically to the ITSM solution and the support employee can close the ticket. This tight integration streamlines processes at the service desk, shortens response times, and thus accelerates resumption of disrupted business operations. Such integrations are conceivable for all solutions that support the REST API – from requirements to security management.

ALM 11 provides numerous integration possibilities, including integration into the market-leading IDEs (Integrated Development Environments): the developers can work directly in their familiar Microsoft and IBM development environments (Visual Studio, Eclipse) with the data from ALM 11. ALM 11 also provides integration with Subversion via the connectivity to CollabNet Teamforge, and thus bidirectional synchronization of user stories. In all three cases, full traceability of requirements, defects, and source code is ensured. Similar integrations are available for modeling business process, for business analysts, as well as for quality assurance. This ensures flexibility, protects existing investments, and the users can work with their familiar tools – also across team and organizational boundaries.

### Automation of processes

Gains in efficiency are achieved in ALM not only as a result of interdisciplinary management and reporting but also as a result of the highest degree of automation that is possible. Here, ALM 11 provides not only diverse possibilities such

as addressing the Workflow Engine using external solutions by means of REST as mentioned above: HP Sprinter is also a useful new tool for the automation of manual tests.

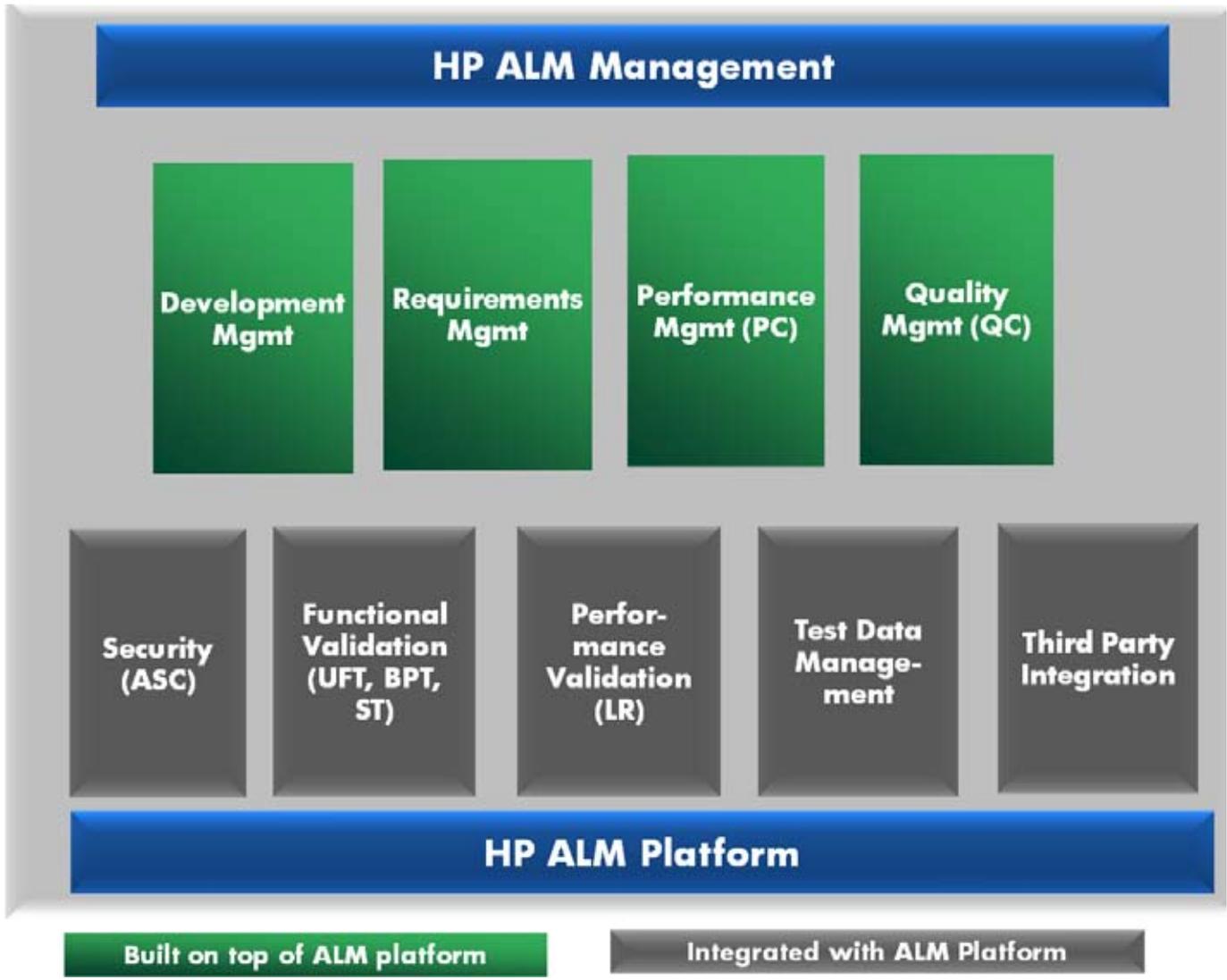
Manual testing is still the standard method of checking the functional capability of software. Testing the running capability of software on a number of platforms is particularly time-consuming. This is why Sprinter provides the test personnel not only with the possibility to document the software test conveniently on the screen border and add remarks and comments; Sprinter also provides so-called “Data Injection” and the innovative “Mirror Testing”.

Data Injection works as follows: in the case of manual tests, the test personnel normally have to enter the test data records in the application fields by hand. To test flight reservation software, for example, “Munich” is entered in the field for the airport of departure and “Frankfurt” is entered in the field for the airport of destination – and this is done over and over in numerous variations. Data Injection now ensures that “Munich” and “Frankfurt” are always entered automatically in these fields. This prevents human error and accelerates the test procedure.

Mirror Testing, on the other hand, accelerates tests in which software is to be tested with different browsers or operating systems. A test is started with Sprinter on a “master PC” and runs simultaneously on various “slave PCs”. In practice, test personnel who have to test a web shop application, for example, only have to run it using a standard browser;



The HP Sprinter tool, a component of HP ALM 11, uses automated mechanisms to accelerate manual testing dramatically. The diagram illustrates Mirror Testing for more effective testing of applications on different browsers.



The HP ALM platform covers the entire core application lifecycle and permits the integration of external solutions made by third-party vendors.

the tests with the other browsers run automatically in the background. The same applies to scenarios in which an application is to be tested simultaneously under Windows XP, Windows 2000, Vista, and Windows 7 with different service packs. This greatly reduces the time required.

**Conclusion**

HP ALM 11 provides an integrated platform for management of the core application lifecycle with interfaces to cover the complete lifecycle of applications. The solution integrates seamlessly into the market-leading development environments and provides possibilities for the automation of test procedures as well as the required flexibility for deployment with distributed development teams.

**HP ALM 11: the most important features at a glance**

- Integrated platform: uniform platform for application development and performance management, enabling consistent, end-to-end coverage of Application Lifecycle Management
- Shared services and APIs: thanks to web service technology (REST API), seamless integration of HP solutions such as HP Service Manager as well as third-party solutions
- Project planning: automatic updates of the project progress for project and quality assurance managers
- Requirements management: integration in process modeling tools
- Test management: new, intuitive tool –

HP Sprinter – with Mirror Testing (automatic parallel execution of cross-platform manual tests)

- Project management: adaptable project reports, web scorecards, and graphics with inter-module availability of the documentation
- Development management: integration in Microsoft Visual Studio, IBM Eclipse, and CollabNet for traceability of requirements, defects, and source code
- Additional platform support. Server: Windows server 2008 64-bit. Database: SQL server 2009 SP1, Oracle 11g RC2. Clients: Windows 7 32-bit, Internet Explorer 8; Add-ins: Microsoft Office 2010

More Information on HP ALM on [www.hp.com/go/alm](http://www.hp.com/go/alm)

# How do you get more out of the same resources?



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# Test Maturity Model Integrated (TMMi) for Process Improvement



## Introduction – Why do we need measurable and verifiable process improvement in testing?

Efficient and effective processes are the cornerstone of every testing organization, yet few seem to have a transparent view of maturity and efficiency across projects and applications. Moreover, key questions such as “Where do I start improving?”, “How can I establish the changes so that they are part of our culture?”, and “How do I know that the improvements actually have an impact on my bottom line?” need to be answered before setting out on a process improvement journey, otherwise experience has shown that a lot of paper is produced without real change. In order to deliver real impact through process improvement activities, it is important to understand the structure of the underlying process framework and how to use this within each specific situation. Many useful but proprietary process improvement models (or models linked to individual persons) exist for testing processes. However, these fail to address the need for an industry-wide and open standard that is continuously maintained and improved.

## The Development of TMMi as a Reference Model

Test Maturity Model Integrated (TMMi)

serves the purpose of defining testing processes in a transparent, open, and standardized way. Originally developed as TMM by the Illinois Institute of Technology, this was expanded by the TMMi Foundation, a not-for-profit organization based in Ireland, starting in 2004, with the objective of creating an internationally accepted standard. The specific objectives were:

1. To develop an international TMMi standard for a test process maturity assessment model, including the development of an assessor’s scheme and any qualification requirements.
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 is supported by many partners from the fields of industry and academia. Each new version of the reference model can be downloaded at [www.tmmifoundation.org](http://www.tmmifoundation.org). The continuous development of the model is a collaborative effort, with a core team consisting of members from Accenture, AppLabs, Cognizant, Experimentus, the Hong Kong Polytechnic University, Improve QS, SysQA, and Wipro, with many more as reviewers. Everyone is welcome to join the TMMi Foundation as an individual member (or a corporate sponsor) and thus actively shape the model and assessment methods.

## Overview of TMMi

The TMMi standard describes the evolution of a test organization using a five-stage approach to process maturity. Reaching a new level documents a significant improvement within the organization in terms of efficiency and the effectiveness of its processes. At the same time, this serves as a foundation to reach the next level of process maturity within other test domains. TMMi therefore addresses the need to give organizations reference guidelines for continuous improvement without being too prescriptive.

The five maturity levels in TMMi represent the stages that a test organization can be in and achieve. A test organization at the lowest **level 1 (Initial)** of the TMMi standard has no defined testing processes. Instead, testing is considered to be part of debugging and is carried out ad hoc in an unstructured and uncontrolled manner, typically by developers (or non-dedicated testing professionals such as business users). At **level 2 (Managed)**, testing is a managed process and is clearly separated from debugging. A test strategy exists and the test approach is driven by a test policy. Furthermore, the test approach is well planned and controlled, but the test scope focuses primarily on functional testing. If testing is no longer considered as a step following the build phase, but is fully integrated into the development life cycle, a testing organization is considered to be at **level 3 (Defined)**. At this maturity level, all test processes are standardized throughout the organization, are derived from a general test policy, and also include non-functional tests. At **level 4 (Management and Measurement)**, quality and process

efficiency are statistically measured throughout the whole development life cycle and the test process is managed using this information. The testing process of a testing organization at **level 5 (Optimization)** is fully embedded into the organization's quality management and is continually improved. Testing does not only continue to focus on finding defects, but also on trying to prevent them.

The TMMi standard defines several different process areas for each level. The successful implementation of these process areas can be easily measured by using specific goals. Specific practices support reaching these goals and allow the test organization to implement these

practices. Each practice within TMMi comes with typical deliverables and process steps, and is further explained by giving clear examples, thus allowing the implementation of these practices by using concrete activities. Setting up a company-specific glossary (e.g. using the ISTQB glossary as a basis) would be worthwhile in order to develop a common understanding of the technical terms used within TMMi among everyone involved.

### Process Improvement with TMMi

Based on these methods, the TMMi reference model can be used both to

define the initial state and the target of testing processes. The transparent (and readily available) structure, which is aligned with CMMI and ISO 15504, allows IT leads and test managers to define the current state of process maturity within their area of responsibility by conducting an as-is analysis of their current processes against the specific goals defined in TMMi. A way to facilitate this assessment is Accenture's patent-pending Test Assessment Framework, which can serve as a questionnaire to elicit the individual practices and consolidate them across units.

Based on the information gathered in the assessment interviews and through document(evidence)reviews,thespecific

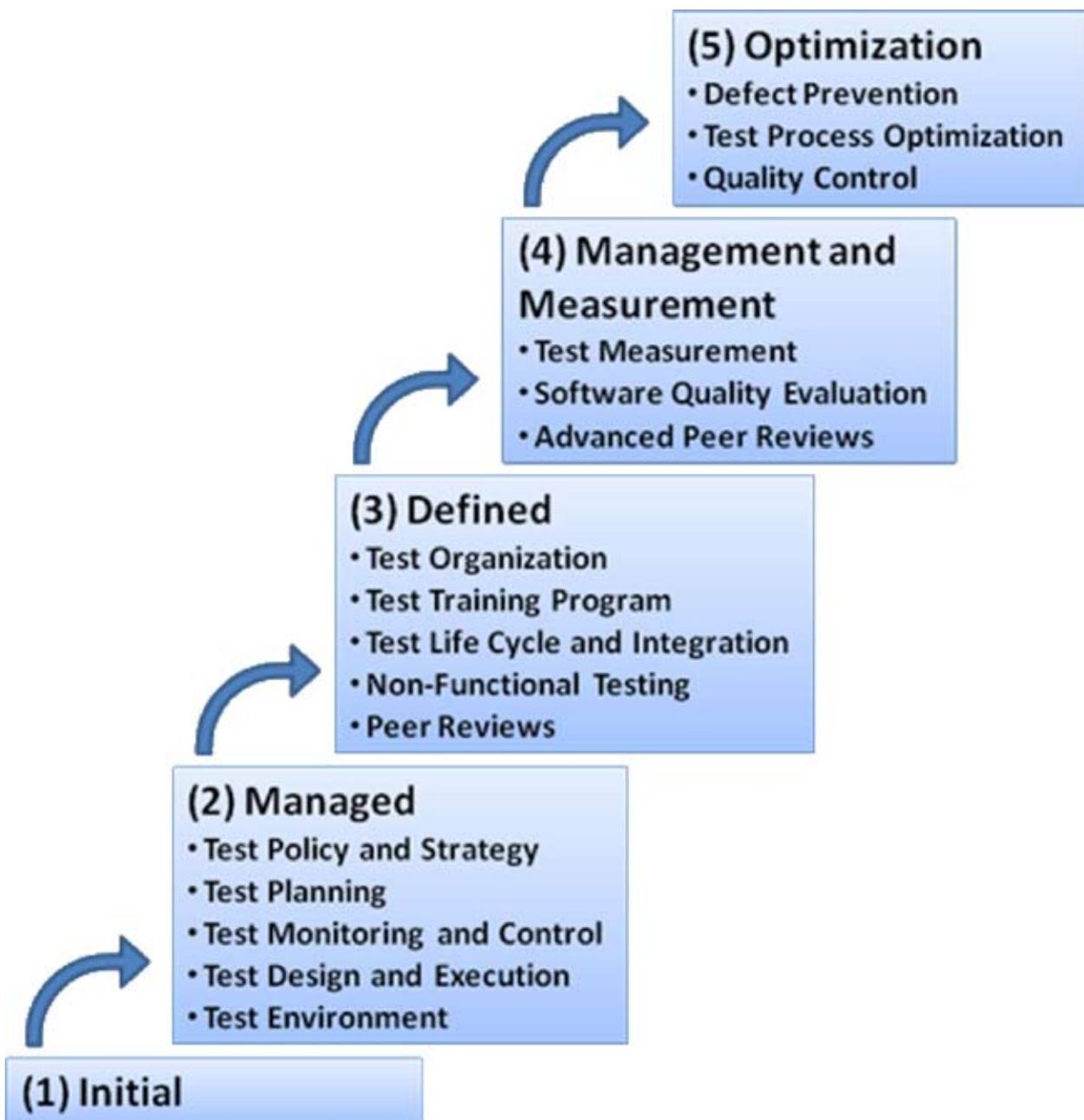


Figure 1 – TMMi Maturity Levels

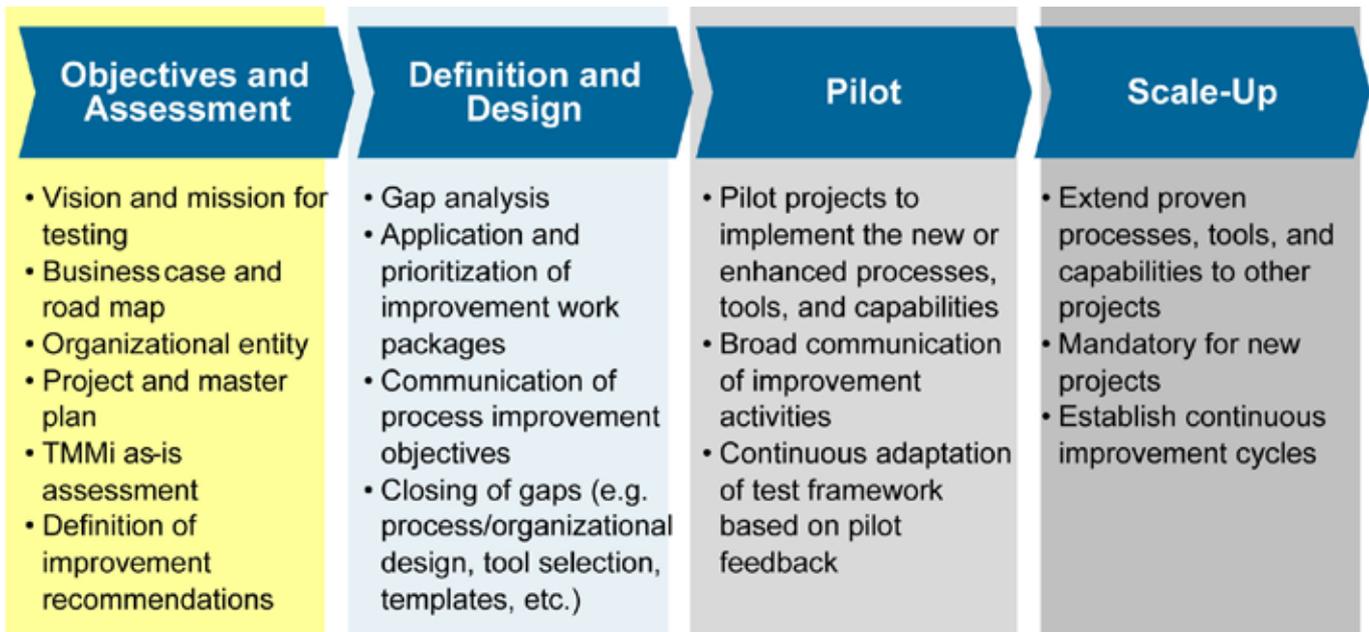


Figure 2 – Process Improvement Phases

practices, sub-practices, and examples contained in TMMi can then be used to elaborate on obvious improvement potential and provide the groundwork for the implementation of improvement recommendations. TMMi as an open standard allows all stakeholders (from responsible management to individual project members and the business and operations teams impacted by poor quality or schedule performance) to analyze the impact of any improvement recommendations, prioritize them, and adapt the change management journey to the applicable situation.

Process improvement projects based on these improvement recommendations should not be taken lightly, but set up and planned as a separate project. This project should consist of several phases or work packages so that the implementation of each recommendation can be measured and performed relatively independently of ongoing work. Remember that each improvement recommendation is (productive) criticism of the status quo. Therefore, each characterization of current behavior should be carried out on the basis of processes, and not people, in order to achieve broad buy-in to the recommended changes. Using the assessment results as an indicator of current behavior helps to define gaps in relation to the TMMi goals as well as the goals (vision, mission) for the company itself. If no such test policy and mission statement of testing exist, this should be the first action item for the process

improvement team. Existing gaps and strengths can be identified and utilized to define concrete objectives, e.g. quality improvement, cost reduction, employee and/or customer satisfaction, and reduction of time to market. The specific practices within TMMi can then be put into individual work packages for the process improvement team.

After thorough analysis of the work packages, they can be verified in pilot projects and refined based on the actual results, in order to roll out their implementation to other parts of the test organization. Supporting training, change management measures, and communication are very important in this step in order to gain acceptance for these changes and make them understandable to a broader audience. Why is it important to use an open standard that can be easily verified and referenced, and how does this help with gaining acceptance for process improvement? Take a look at the following illustrative example from one of Accenture's clients:

In this figure, the subjective current state of testing processes as perceived by various stakeholders has been plotted against the results of a TMMi-based appraisal carried out with the same stakeholders and some of their team members. The stakeholders clearly believed everything to be operating at a much higher level of proficiency already. But how can this happen?

Surely everybody should understand process maturity and be realistic enough regarding their own process performance? Let us take a look at some common pitfalls for wrong perceptions and failed expectations in relation to the outcome of a test process maturity assessment:

**#1 Understanding of the process itself:** We see this over and over again – what “test design” means to one person can be a completely different deliverable or process to someone else. While TMMi provides a foundation for these process areas, it depends heavily on the knowledge and experience of the person being asked about process performance for them to adequately assign a maturity level. Remember that the TMMi appraisal will validate whether each goal of the process area has been met, whereas the stakeholder might simply think about how “test design” is currently performed without taking all the detailed goals and practices into account. This is very similar to estimating work plans and project efforts – unless you very clearly define the scope in terms of deliverables and expected process steps, the estimate will always depend on the viewpoint of the estimator.

**#2 Filtered information on process performance:** Depending on the level of stakeholders, it could potentially be a problem that the information they are getting on process performance is being filtered by their direct reports. They might

## Test Domains

## Maturity Level

Test Strategy

Environment and Tools

Organization

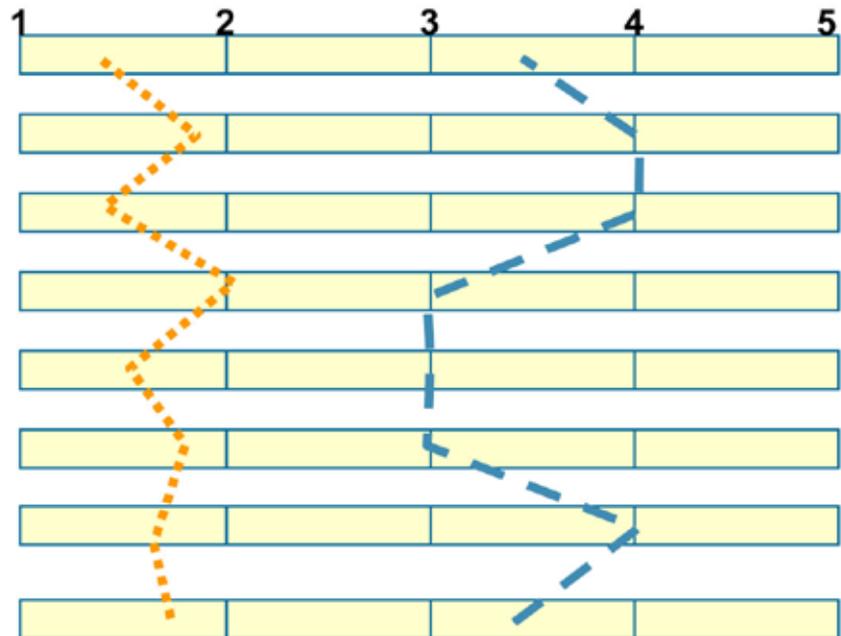
Test Life Cycle

Test Planning

Test Monitoring and Control

Test Design and Execution

Average



Objective TMM-based appraisal



Subjective perception of current state

Figure 3 – Sample Assessment Result and Self-Perception

get isolated issue reports and “lessons learned” accounts on processes not working, but due to problem #3 and the inclination of their direct reports to report everything as green (or maximum yellow/orange, but never red), they might not have the full picture and are therefore more confident.

**#3 Lack of verifiable, measurable process performance:** Measurable process performance already necessitates a test organization to be at maturity level 4 in TMMi, since you first need reproducible processes throughout your organization to effectively measure performance throughout the organization. Therefore, many organizations simply do not have the means to objectively evaluate process performance and rather stick to individual opinions and process examples.

**#4 Insufficient appraisal information:** These “individual opinions” can also be a problem for the appraisal team itself. Depending on the experience of the appraisal team, the preparation for the appraisal, and the time available, the appraisal might be based on very selective evidence and may therefore not show the whole picture of process

performance. Group interviews have proven to be a good way to get information, reducing the time necessary for everyone involved and fostering an atmosphere of open communication (make sure there are no direct reports in one group – the group should always consist of more or less the same hierarchy level). Get evidence before the interviews in order to be able to ask pointed questions and keep the questions open-ended in order to not lead the interviewee down a path of answers.

These potential pitfalls illustrate the importance of supporting any process improvement initiatives with common and referenceable models, while using change management initiatives to make sure all stakeholders understand the assessment about to take place.

TMMi has the potential to be the open standard for process improvement that the quality and testing industry needs. It solves the dependency problem of other models by using an open and collaborative method to include various viewpoints and can therefore help test organizations to improve the effectiveness and efficiency of their testing processes.

## About the author

Accenture is a global management consulting, technology services, and outsourcing company with more than 211,000 employees and offices in 53 countries. Accenture Test Services has been providing testing services for more than two decades, both on site and through our Global Delivery Network.

Matthias Rasking leads Accenture Test Services in the German-speaking markets as well as Accenture's global Testing Community of Practice of over 12,000 testing practitioners. With more than 10 years of experience in the field of testing and quality assurance, Mr. Rasking holds certifications in software engineering practices such as CMMI and ITIL, and is an IEEE certified software development professional. Mr. Rasking is the Working Group Manager for Model Development and Maintenance for the TMMi Foundation. He has supported many multinational clients in various industries, assisting them in becoming high-performing businesses by establishing a structured and strategic approach to quality assurance.

# The Point

An Outlook Financial Services Publication

## Final Exam

Is application testing in financial services making the grade?

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## Passing the test

Competitive pressure in the financial services industry has made technology a critical resource and put a premium on speed to market. As a result, companies are moving quickly to implement new technologies.

But often, in fact, financial organizations move so quickly that they come to market with underperforming applications that burden rather than benefit the business and technology infrastructure, draining resources while delivering disappointing results.

There is a better way. Banks, insurers and capital markets companies that adopt best practices for testing can expect to save up to 50 percent through test automation, productivity improvements, resource reallocation and labor savings. And along with the cost and execution efficiencies gained, organizations can achieve the high performance and competitive benefits of getting to market faster with best-of-breed, proven applications that work the first time.

## Savings from...

**Standard Testing Processes & Tools:** 5 percent-Increased quality due to reduction of defects and identification and resolution of defects earlier in the systems development lifecycle

**Automation:** 5 percent - Revenue enhancement via speed-to-market and cost reductions due to judicious use of automation

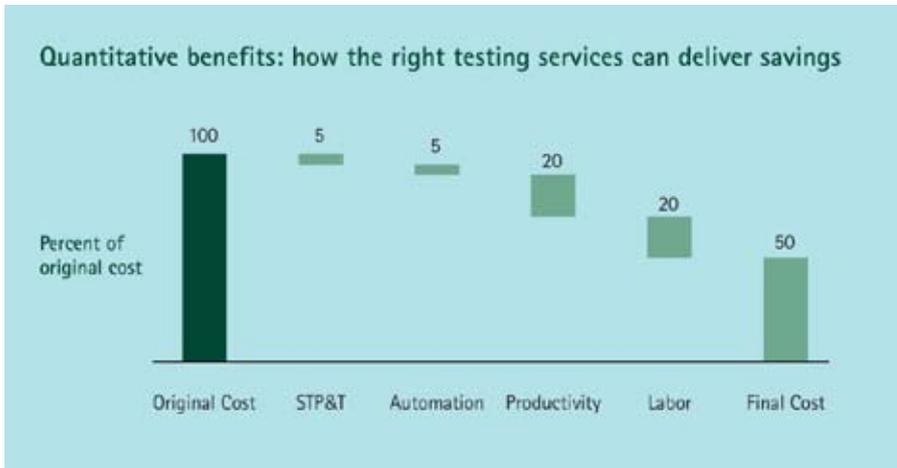
**Productivity:** 20 percent-Gain due to improvements in testing methods, application of enabling tools, and better governance

**Labor Arbitrage:** 20 percent

**Total Cost Reduction:** 50 percent

Frank D. Brienzi  
Global Managing Director, Application Outsourcing  
Financial Services

No financial services company would go to market with a completely untested application. Yet many companies continue to rollout new or revamped applications in which the testing has been inadequate, ineffective or ad hoc. Inevitably, the result of testing deficiencies is time and money lost. For example, the cost of a defect in development can snowball to 100 times



that cost if not discovered until production and 10 times more when found in quality assurance testing. Even costlier, though, can be the market impact of substandard application performance.

Remember the late 1990s, when companies cared more about jumping on the “New Economy” bandwagon than about quality? Corporations forgot the quality lessons painstakingly learned from the Japanese in the 1980s almost overnight.

Testing investment as a percentage of IT plummeted between 1995 and 2000 and other areas of quality assurance suffered as well. When the Internet bubble burst in 2000, manyverconfident Internet start-ups were reduced to virtual rubble. The companies that rushed to join them were left to survey the wreckage wrought by production applications lacking in basic quality characteristics, exemplified by such failures as e-Toys’ 1999 Christmas season when the website failed to handle even a moderate amount of user traffic.

On the positive side, more financial services companies are recognizing that testing excellence plays an integral role in high performance. This is underscored by recent Accenture client work with banks and insurance companies in building and refining testing skills, functionality and economies of scale through Accenture’s global Testing Center of Excellence network.

## The evolutionary ladder

So what separates high performers from the rest? Imagine an evolutionary ladder with five rungs, each representing a degree of progress toward testing competence.

Level one: room for improvement Organizations on this level do not look

bad. They usually have development processes, project plans and managers and developers in place. Yet some important things are missing.

Often, there is no clear distinction between software development/ debugging and testing. As a result, there is no real guidance for testers. In turn, there is generally no formal process for tracking defects. Project plans do not provide for testing tasks, effort and schedules, while managers and developers seldom create or support testing standards, plans or templates. Consequently, a lot can slip through the cracks.

## Level two: baby steps

On this level, companies take the first steps toward testing excellence, recognizing it as a distinct discipline, separate from software development/ debugging, and providing the appropriate guidance that both defines and applies formal testing techniques. But as a rule, they neither determine nor enforce criteria for beginning to test. Although their testing techniques may be advanced, they apply them inconsistently, not uniformly throughout the organization. Similarly, training on individual projects may be available but not on an organization-wide program basis managed by professional trainers.

Another characteristic of this level is the often large gap between “official” documented testing processes and what is actually happening on the ground.

## Level three: walking strong

Companies at this stage have overcome the obstacles of the first two levels. They have clearly mastered the basics and it shows in their performance and processes. Here testing is conducted—

even embedded—early in the delivery lifecycle and progress is monitored closely. Yet despite the positives, this group still underperforms. Ironically, this is because their strong focus on testing can lead to a myopic view of the true benefits available by spending less time and effort on testing. For example, improving delivery can reduce the need for testing, but companies often neglect to enforce validation of deliverables at each stage of their industrystandard development models. Even more of a problem is that organizations on this level tend to rely on their controls to keep them on a straight and narrow path, and therefore lack the flexibility to learn from experience and improve upon it.

## Level four: off and running

These organizations are almost fully evolved. They review deliverables throughout the delivery lifecycle, thereby minimizing defects and errors. They collect testing measurements to monitor progress and productivity, and evaluate software on key quality attributes, such as usability, maintainability and reusability. There is little fault in their approach at this level, leaving them to address only a few remaining deficiencies.

First, delivery lifecycle reviews need to focus on investigating root causes, rather than merely fixing deliverables. Second, testing measurements need to go beyond tracking progress and productivity to drive test process improvement. Finally, quality needs to be built into the software earlier, rather than assessing it later.

## Level five:

achieving high performance High performance in testing across financial services means continuously reducing testing efforts. The toolkit for high performance includes automation to conduct tests rapidly; applied statistics-based approaches, such as using orthogonal arrays to design test cases; maximization of testing efficiency; optimization of error-detection coverage; usability testing as well as quantitative criteria to determine success. Causal analysis procedures are in place to identify root causes of defects and defect recording and tracking processes are mature. Causal analysis generates actionable data and results in continuous improvement to the delivery process.

Periodic evaluation and improvement

of all testing processes and artifacts is conducted. Testing templates are used and reused throughout the organization. Most importantly, high performers track and evaluate test process improvements on the basis of results and business benefits delivered.

## Testing the testers

How does an organization know where it stands? The Accenture Test Assessment Framework builds on work done at Carnegie-Mellon University's Software Engineering Institute (SEI) and at the Illinois Institute of Technology (IIT). Academic models, such as SEI's Capability Maturity Model Integration and IIT's Testing Maturity Model, are now, with the TestAssessment Framework, practical tools that can help organizations not only to improve testing strategy and performance, but also work toward overall high performance.

The framework can provide an assessment of the testing scope of an entire organization, with an emphasis on value creation. It can support two types of assessment: highlevel, short-term quick assessment where necessary, and a more in-depth, long-term full assessment when appropriate. The framework is standard, reusable and can facilitate the process of gauging where organizations stand on the testing maturity scale and help identify improvement opportunities and potential business value to be gained.

To optimize testing and quality processes, companies should implement processes and organizations consistent with best practices to ensure they reap the benefit of standardized methodology and tools. However, in many cases, companies cannot afford the capital

investment required to build an in-house core testing competency. So it can make strategic and fiscal sense for global financial organizations to take advantage of the geographic reach, capabilities and expertise of the right third-party provider's testing solutions and services.

For example, a large global bank asked Accenture to assist in the development of its overall testing strategy, supported by an appropriate testing organization. The engagement began with a handful of participants driving out strategy. Over time, the team grew to incorporate its retail banking testing activities.

Today, there are more than 350 people in the Accenture Testing Center of Excellence, most of which are located offshore.

Through automation, global sourcing and consistent adoption of best practices, costs are being decreased while quality continues to improve. In the first year, automated testing increased by 50 percent and testing automation continues to rise. By finding errors earlier, the Testing Center of Excellence has reduced the number of defects that are found in the user testing phase and in production by 67 percent.

A leading-edge testing center can transform culture, processes and technology to deliver sustainable, long-term quality and high performance. It can improve speed to market, lower costs, raise the availability and quality of applications and help adapt the organizational culture in order to achieve the best in testing quality. It should have a staff well versed in testing components, assembly and products for application development and application management. A top testing center should also be able to draw on best practices gained from dozens of engagements around the world and benefit from ongoing investment in the tools and proprietary technology necessary to enhance service and execution across its delivery network.

The global and highly competitive nature of the financial services industry makes speed-to-market urgent and testing critical. Companies cannot afford to linger on the lower rungs of testing maturity. The consequences can be measured in opportunities lost, brand value damaged by underperforming applications and competitive disadvantage—not to mention the cost of fixing application errors already in production. Ascending

the evolutionary ladder of testing maturity can help financial services organizations in their drive toward high performance and yield dramatic return on investments.

Yet before they make that climb, companies must know where they stand and where they need to improve. The right assessment framework and testing centers can provide the insight organizations need to speed the climb and deliver economies of scale en route.

### The Point

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