WHITE PAPER

How to increase IT efficiency and business effectiveness:

Implementing a risk-based approach to ensuring quality

Doing better with less

Doing more with less has almost become a mantra for today's IT managers: More projects, more competitive pressures, greater risk of failure, and yet fewer resources with tighter timelines. For most managers, it's become an ongoing balancing act of limited resources vs. a never-ending list of new projects (or modifications to existing ones). When it comes down to it, there's simply less room for error in today's world—especially when it comes to testing and deploying business-critical applications.

Luckily, there is an alternative. Instead of doing *more* with less and risking late projects, increased costs or inconsistent quality, successful IT and QA managers are finding ways to do *better* with less. It's a small distinction that can make a big difference—especially when it comes to reducing the risk of failure and ensuring the quality and stability of important business applications.

When done right, doing better with less doesn't mean more work—it simply means making sure that you're getting the maximum benefit from the work you are doing. For example, the testing and quality assurance processes are areas where a few small changes can have an exponential impact in terms of more efficient resource utilization, an increased ability to dynamically deliver applications that the business needs, and increased time and cost savings.

That's where risk-based testing comes in. Quality organizations that understand the risks inherent across the application—both in terms of business criticality and technical relevance—know how and where to spend their efforts to improve the quality of their applications, maximize their resources and achieve on-time deployment. In short, risk-based testing allows you to get a better handle on what to test and prioritize it based on how important it is to the business, as well as communicate the status of quality to both IT and line-of-business managers. It complements existing tools and processes to provide organizations with a way to balance business needs against IT constraints.

This paper outlines the benefits of a risk-based testing approach. It describes how risk-based testing can positively impact the application life cycle based on business-oriented factors, and offers organizations an actionable plan for starting a risk-based testing approach for projects. The paper also introduces Compuware QACenter® Enterprise Edition, a testing solution designed to automate and facilitate risk-based testing and provide a repeatable framework for IT organizations to do *better* with *less*.

Testing better with less effort and fewer resources

Unfortunately, the standard practice of simply doing more with less doesn't necessarily decrease errors or reduce the risk of failure. In fact, for many development and IT organizations, doing more with less can translate into an increased risk of failure. This has been especially true when it comes to delivering new applications (or modifications) on time and on budget, as well as with ensuring a level of quality and reliability that doesn't blow up once it's been put into production. Consider the range of potential points of failure for a typical application development and testing effort:

- Failure to meet deadlines and budgets
- Failure to meet business goals
- Failure of the application logic
- Failure to keep up with business change
- Failure to deliver an application that meets the business needs
- Failure to understand where your projects stand—exactly how reliable are they and what's been tested?
- And last, but not least, the failure to effectively communicate the value of your testing process to business managers.

For years, diligent IT organizations have tested applications before they're put into production. But today's drive to do more with less often translates into less time for testing. And even if time is available, applications are frequently tested based on technical priorities, rather than business priorities—resulting in applications that test well, but still fail to meet the needs of the business when they are put into production. Consider some of the basic decisions and issues of risk related to development and testing that most organizations continue to struggle with, even after deploying traditional testing tools and processes:

- What are the most important tests based on *today's* business needs?
- How and when do I make a go/no go decision?
- When is testing really complete?
- Which tests have been run and which haven't?
- What areas of the application have the highest risk of failure?
- Can I prove and articulate exactly what's been tested/not tested and why?

With less time and fewer resources available for fighting fires after problems occur, it's more important to do the right thing and get it right the first time, on time and on budget, with the reliability and quality promised. The big question is how to do this in the context of your current testing environment. Many IT organizations struggle with how to determine the proper balance of testing in light of business demands and budgetary limitations. Understanding when and what to test is at the heart of a risk-based testing approach.

When is enough "enough"?

Testing shouldn't be the primary focus of any IT organization—creating reliable, effective applications that address business needs should be. In a perfect world, all applications would be completely tested, in all possible scenarios and environments, before the application is released into production (regardless of whether it takes weeks or months to complete 100 percent testing). In the real world, most IT organizations are lucky if they can allocate two weeks to testing, so managers are continually faced with the requirement to limit the scope of their testing efforts. With the limited time allotted for testing, an IT group typically has to focus on testing the technical areas of an application that are most likely to fail, without considering how those areas match up with the most critical business requirements of that application.

Alternatively, many organizations today simply test based on intuition, or past experience. While this approach might be fine for a single application with a limited scope, it's impractical and inefficient when testing applications running on various platforms, over multiple tiers, and including web, distributed, packaged and mainframe components. Without a centralized testing information store, test managers and testers lack a way to communicate the status of testing efforts, and they can lose track of what's already been tested—especially in situations where an application is undergoing constant upgrades or changes. Clearly, this ad-hoc approach wastes precious time and resources, a reality that is unacceptable to an IT department that is judged partly on its ability to use its testing assets more efficiently.

Risk-based testing provides a practical and viable alternative by adding a process for incorporating business requirements to the testing mix. Suddenly, something that IT may have thought was important to test becomes much less critical compared with other features or components. Without a structured, organized and objective way of measuring testing needs against business priorities, it is nearly impossible to meet business goals through testing. In this situation, IT is set up for failure because they cannot meet the business goals most effectively with the current testing practices in place. Consider the following example of how testing can be impacted by business requirements.

Shopping cart component

Let's take a look at a challenge facing a hypothetical web-based sporting goods retailer. Due to a partnership with a new back-end fulfillment provider, the retailer had to rewrite the payment processing part (i.e., American Express, MasterCard, PayPal, Discover and Visa) of its web-based shopping cart function. Each of these payment methods presents a potential critical failure point that should be tested, but due to business requirements, the IT department only has a day to complete testing and run the 100 tests (previously created) needed to verify the entire checkout process—a process that typically takes three days. The IT manager must decide whether to hold up release of the application and risk a loss of revenue and the new strategic relationship, or blindly choose a few tests to run and hope for the best. Without risk-based testing, this IT department is about to make a very important decision with unpredictable results.

The risk-based testing approach

If the company has implemented a risk-based approach to testing, it will have in place a system that communicates the business needs to IT so it can understand exactly what requirements are most critical (from a business and technical perspective) to test, yielding a balanced set of testing priorities. In this example, customer information from the sales department shows the top three payment methods are American Express, MasterCard and Visa. Discover and PayPal are used in less than one percent of transactions, and testing for these functions can reasonably be done at a later time without significantly increasing the risk of lost revenue. Using this information, the test manager opts to initially test the three primary payment methods (within his allocated one-day window) and is able to deliver the application on time, thereby reducing the costly testing process while mitigating the risk that the application will fail.

The risk-based approach—focused, prioritized testing

Risk-based testing is an approach to testing enterprise applications that aligns business and IT goals by mitigating the risk of deploying applications that do not perform effectively and fail to meet both business and technical requirements. It provides a critical level of objectivity in determining what things to test by using a combination of business and technical requirements to prioritize the testing process. This ensures that the most important functions of an application are always tested first, regardless of how limited the testing time frame or scope might be.

By using reports that provide insight into the business needs for certain application functionality and test plans that are generated from user-defined business requirements, testing organizations can effectively plan, organize and validate testing requirements using a risk-based testing approach. They can now know for sure that they are testing the right things in the right time frame to meet business objectives, and are even able to communicate quality metrics in terms that business managers understand. Suddenly, testing is not the black hole of the software development cycle. Instead, it creates an opportunity for IT to become the champion for meeting business requirements with on-time deployments and consistent and reliable applications.

Risk-based testing allows test organizations to focus their efforts on testing the right things, and controlling testing costs and time. The approach provides a more balanced view of the application by calling out the critical areas to test based on business goals and the cost of failure for each thing to be tested. Using data gathered through application usage, business-user requirements and test history, test managers can now confidently know which tests are a priority and commit the resources necessary to complete the testing. Using a risk-based testing approach, IT can easily justify its value to business because it now has a consistent way to deliver quality applications to the organization.

Benefits of risk-based testing

Organizations that adopt risk-based testing as part of an overall testing methodology that aligns with the software development life cycle find a number of benefits, including the following:

- **Customer satisfaction is improved** by ensuring the highest-quality application components most critical to the success of the line-of-business users.
- **Optimization of resources is achieved** because the test organization understands exactly how much testing is needed and executes those tests in an efficient and effective manner.
- **Applications are deployed on time** and successfully meet business requirements because the testing process is no longer a black hole of uncertainty.
- **Intuitive risk-based testing solutions adapt to business changes** easily, enabling the QA organization to respond to changing business requirements at the pace of business.
- **A testing library provides repeatable testing patterns** that can be used to perpetuate the higher quality of applications deployed by IT and improve efficiency by greater reuse of existing assets.
- **IT becomes a business champion** by understanding business needs and translating them into the software development life cycle.
- **Communication and justification of testing strategy becomes automatic,** enabling IT managers to dynamically reallocate testing resources as needed and easily articulate to business managers exactly what's been tested and why.

Clearly, a risk-based testing approach can have a significant impact on the quality of applications being developed and deployed as well as the position of IT within an organization and its ability to align itself more closely with business objectives. Once an organization understands the benefits of risk-based testing, the next question is how to get started with a risk-based testing approach.

Getting started

The idea of adopting a risk-based testing approach may sound overwhelming and perhaps even intimidating. But IT organizations can adopt a risk-based testing approach incrementally, implementing certain aspects tactically to achieve strategic advantage. This section offers some suggestions for adopting a risk-based testing approach. Keep in mind that one of the important things to understand about risk-based testing is that it encourages testing organizations to identify what testing requirements they already have and reuse them within the scope of risk-based testing.

- **Understand and prioritize the testing requirements.** Two important areas to focus on when moving to a risk-based approach include identifying all of the business and technical requirements that exist for an application, and then prioritizing them based on the impact of failure of the component on the business. QA teams should ensure they have access to the application business and technical requirements in order to create effective test requirements. Involving business managers, test managers and QA architects will help achieve the balance of testing that is optimal. The advantage of risk-based testing is that it adds a level of objectivity not available with traditional testing, where individual testers were left to determine what should be tested when. Thoroughly understanding and correctly prioritizing testing requirements can have the greatest impact in the risk-based testing approach.
- **Consider ways to add automation for test management.** Since effectiveness is the key to benefiting from risk-based testing, testing organizations should consider ways that can alleviate some of the burden of management. When managing thousands of testing assets, testing organizations need to have some way of writing scripts and executing the test cases, tracking the results and correlating them back to the initial risk assessment. This will add significant productivity gains to a testing environment.
- **Establish reports to gauge results.** By creating and executing reports that are germane to specific testing needs, IT organizations are able to see exactly where they are at in the testing cycle, determine their failure rate from testing and analyze it against the inputs of initial risk assessments. Using the reports, test managers can make the necessary changes to the priority of testing and re-evaluate the risk values of out-of-line results.

The suggestions above are intended to serve as a guideline for IT organizations to understand the components of a risk-based testing approach and where to look first. While some of the areas in the previous list can certainly be accomplished using basic tools such as Word, Excel or Notepad, many organizations are finding significant value in utilizing a best-of-breed testing suite to assist with their risk-based testing to automate repetitive, time-consuming or error-prone tasks. For example, one of the leaders in this area is Compuware Corporation. Compuware's QACenter Enterprise Edition provides an automated tool for implementing risk-based testing. In addition, Compuware offers the Compuware Application Reliability Solution™ (CARS™), a combination of services, expertise and testing products that enables organizations to rapidly and efficiently deploy a risk-based approach to testing.

Compuware *QA*Center Enterprise Edition

Efficient risk-based test management

***QA*Center Enterprise Edition offers organizations a collaborative means to manage application testing and quality. It provides an objective way for testing organizations to ensure that application quality is in line with business objectives. Among the benefits of *QA*Center Enterprise Edition are:**

- **Objective risk analysis through combined and weighted business and technical input**
- **Cost savings through a centralized library of test and data assets that supports reuse**
- **Improved collaboration among team members through web-based access to centralized information**
- **Ability to support changing business requirements with easy-to-change risk values that flow through and recalculate testing priorities on the fly.**

Conclusion

IT departments are actively looking for ways to do better with less today. Meanwhile, their QA organizations are facing challenges in determining what to test, how much testing is enough and how the results of their testing effort map back to business needs. Risk-based testing is an approach to testing that helps improve customer satisfaction by delivering applications with better quality, while making efficient use of existing resources to help IT deliver applications on time. This approach helps to ensure that testing is aligned with business goals and provides an effective mechanism to communicate quality metrics to the entire organization. Creating a repeatable risk-based testing strategy makes IT more efficient, and helps achieve business goals.

QACenter Enterprise Edition provides an objective and collaborative way for organizations to measure risk, both business and IT, including the ability to respond quickly to business changes and realign testing plans accordingly. The reporting capabilities of QACenter Enterprise Edition ensure that managers, both business and IT, can see the results of testing on overall application quality and business goals. Any organization developing and/or managing applications should consider risk-based testing as an approach to matching business priorities with IT tasks.

To learn more about *QA*Center Enterprise Edition, visit www.compuware.com/qacenter

Compuware products and professional services—delivering IT value

Compuware Corporation (NASDAQ: CPWR) maximizes the value IT brings to the business by helping CIOs more effectively manage the business of IT. Compuware solutions accelerate the development, improve the quality and enhance the performance of critical business systems while enabling CIOs to align and govern the entire IT portfolio, increasing efficiency, cost control and employee productivity throughout the IT organization. Founded in 1973, Compuware serves the world's leading IT organizations, including more than 90 percent of the Fortune 100 companies. Learn more about Compuware at www.compuware.com.

Compuware Corporation Corporate Headquarters
One Campus Martius
Detroit, MI 48226

For regional and international office contacts, please visit our web site at www.compuware.com

COMPUWARE®
www.compuware.com

9/04