

# GO LIVE WITH CONFIDENCE

How to optimize performance of SAP® software deployments with  
Borland® Quality Solutions

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## Executive summary

This white paper explains why quality optimization of a SAP® system is important and describes the challenges commonly encountered in testing SAP applications. It then looks at the lifecycle phases of an SAP deployment and identifies when and where to apply quality activities. Finally, the white paper introduces Lifecycle Quality Management for SAP Solutions and maps the Borland offering to issues commonly encountered throughout the SAP implementation process.

Readers will see how their organizations can leverage Borland quality solutions for SAP projects to:

- Facilitate change management during upgrades and customizations by rapidly rolling out changes without jeopardizing current workflows or regulatory compliance processes.
- Reduce infrastructure costs by planning capacity and “rightsizing” the system infrastructure through accurate modeling of real-world usage conditions during pre-production.
- Ensure application readiness from day one by providing clear visibility into quality issues at each step of the project lifecycle.
- Maintain SLA commitments by monitoring the ongoing performance of SAP applications and anticipate performance problems before they impact users.
- Stay on time and on budget by accelerating the successful completion of SAP projects while lowering implementation and operational costs.

## Introduction

Today’s CEO expects demonstrable business value from every technology investment decision. This is certainly the case with an investment in any major core business process, such as the implementation of an SAP application. As with any large and complex application project, the risk of failure is all too real especially given the size, scope and complexity of SAP® deployments.

Typical SAP applications for Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems must support core work processes and complex transactions involving hundreds to thousands of users, often across multiple departments, organizations and geographies. To provide this support successfully, SAP deployments require a complex and costly technical infrastructure of hardware, software and networking components that often integrates with legacy or third-party systems. Adding even greater risk is the high level of customization required to adapt an SAP application to the specific business processes of the organization—not to mention the ever-present pressure to stay on budget and accelerate application readiness.

The risk of failure is further heightened by the continuous changes that bombard each SAP system. In today's turbo-charged enterprise, SAP project teams must constantly roll out internal customizations to meet changing needs and accommodate growing user communities. At the same time, these project teams must keep pace with a steady stream of SAP version changes, upgrades, support packs and legal packs, as well as technology refreshes to the underlying hardware and software. Any one of these changes raises the risk of system destabilization that can jeopardize a company's day-to-day operations and bottom-line performance.

If an internal application, like an ERP system, goes down, employee productivity is lost immediately and the costs for downtime quickly grow. For example, if an order-processing system goes down at the end of a quarter due to heavy load, orders may not be able to be processed and revenue may not be recognizable within the quarter. Order-processing system availability was widely reported to be an issue for Hewlett-Packard's Enterprise Servers and Storage Group in August 2004, at the end of a quarter. HP's CEO attributed a quarterly loss of about \$400 million in revenue and \$275 million in operating profits to the glitch in HP's SAP order-processing systems<sup>1</sup>.

However, organizations can mitigate these risks through adoption of Lifecycle Quality Management (LQM) initiatives. LQM is an advanced approach to software quality that integrates people, processes and technologies across the entire software application lifecycle. LQM practices can help ensure that an SAP deployment is synchronized with business goals to achieve business advantage. Furthermore, it maximizes the quality of SAP deployments and shortens implementation time while minimizing the risks. It takes a holistic approach to software quality that enables organizations to automate, integrate and manage all of the processes associated with ensuring system integrity and performance throughout the software lifecycle. Through such a holistic approach to lifecycle quality, enterprises can reduce the costs and realize the full potential of their SAP investments.

## Why is lifecycle quality management of a SAP project important

One could argue that a packaged application like SAP® R/3® is already well-tested by SAP itself and, due to the thousands of installations successfully running today, that it is a mature, high-quality product that does not need yet more functional and performance testing. While this line of thinking may seem reasonable, the reality is that every installation of SAP software is highly customized to meet business needs specific to the customer organization. Each SAP installation is unique in terms of the technology stack used and the functionality it needs to support, as well as the workload it needs to sustain. SAP has recognized the uniqueness of every implementation and introduced its Early Watch program; a program designed to help customers proactively identify and avoid common implementation issues that invariably crop up.

Customizations to standard functionality or new functionality developed within the SAP environment, as well as integration with other applications, all introduce the potential for issues. Customizations, for instance, can result in database queries that produce undesired results by not using database indices appropriately and by interfering with other functions of the system. Every customization made to an SAP system needs to undergo functional testing—just as any custom-developed application would need to be tested—to ensure that newly introduced or changed functionality works as expected and doesn't break or negatively impact functionality elsewhere in the system. Performance testing also needs to occur throughout the pre-deployment process to confirm that the system will perform as expected and that new functionality does not cause unforeseen performance issues.

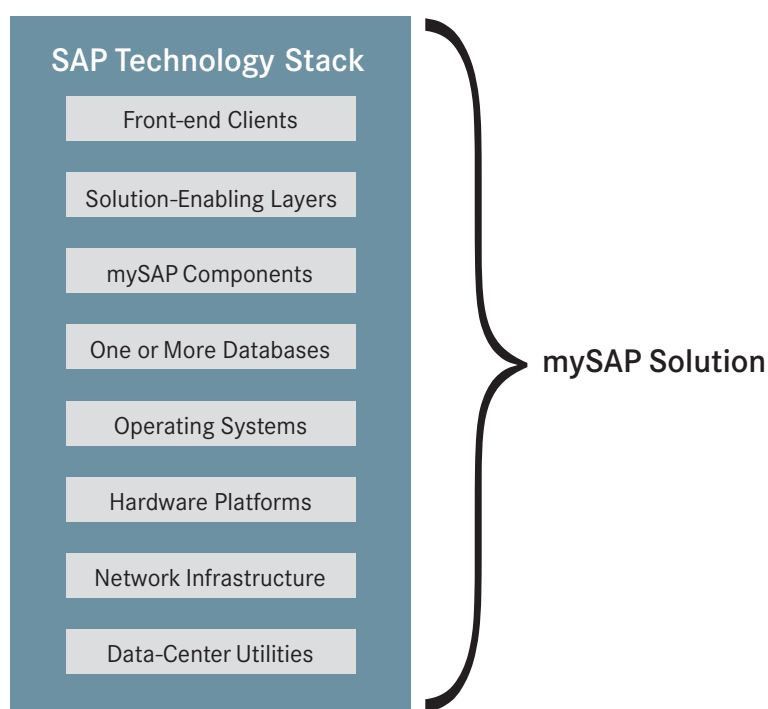
Similarly, custom changes made to the SAP application that are then reapplied within a change control release can introduce

<sup>1</sup> HP Puts Part of the Blame on SAP Migration, Marc Songini, Computerworld, August 17, 2004: <http://computerworld.com/softwaretopics/erp/story/0,10801,95276,00.html>

side-effects (regressions) that impact existing unchanged functionality and/or affect performance. Only testing can ensure that new functionality from SAP and/or custom modifications do not have an unexpected impact on software accuracy and performance when a change control release is applied. Test automation greatly enhances the efficiency of regression testing and therefore substantially lowers the costs for assuring quality across multiple upgrades of an SAP system.

For all of these same reasons, even standard software releases (enhancements, upgrades, service packs, etc.) issued directly from SAP should be thoroughly tested in an organization's specific environment before moving into production.

Finally, any change in the technology stack—such as changing the operating system for the database servers or changing to a new version of the database management system—can potentially introduce bottlenecks, interoperability issues and support issues that only manifest under load<sup>2</sup>.



*Figure 1 - SAP Technology Stack: core layers illustrate the complexity of a basic mySAP™ solution<sup>2</sup>*

Finally, since every SAP deployment is unique, even published resource consumption metrics from SAP can only be considered a rough guideline for planning the capacity needed when implementing or upgrading an SAP installation. Therefore, load testing becomes a key element for the sizing and capacity planning process, enabling organizations to ensure satisfactory performance without over-investing or under-investing in the supporting IT infrastructure.

## Testing challenges with SAP applications

SAP AG has evolved from being strictly an ERP vendor to a provider of multiple enterprise applications and technologies that support business processes. With SAP XI, xApps (packaged composite applications), Mobile Business Solutions, Master Data Management, mySAP ERP and other enterprise integration and solution offerings, SAP has even moved beyond multiple packaged applications and is becoming a platform for packaged—as well as custom—application development and deployment. Under the SAP NetWeaver™ umbrella, this new enterprise-class integrated development and deployment platform is being presented by SAP as the foundation technology on which all future applications will reside<sup>2</sup>. This expansion of the SAP footprint—however welcome—makes it more challenging to adequately test SAP deployments.

The SAP NetWeaver platform, for example, uses current industry standards for application development and integration. These include J2EE™ (including RMI, JDBC,™ JNDI and EJB™), HTTP, HTML, XML, SOAP and WSDL. To leverage investments in SAP, organizations must not only test traditional SAP R/3 applications—still the majority of SAP deployments—but also xApps and new applications built on the NetWeaver platform.

Applications built on the NetWeaver platform are even more complex than traditional SAP applications built on the SAP Basis layer (SAP R/3); with NetWeaver, the number of software layers in the SAP technology stack is increased. Business processes that span multiple applications integrated by the NetWeaver platform will further increase the complexity of the system. The more complex the interaction of applications and components, the more points of failure there are and the greater the chance for suboptimal performance. Sizing and capacity planning also become more challenging. All of this added complexity makes pre-deployment performance testing imperative<sup>2</sup>.

Similarly, SAP and Macromedia® (acquired by Adobe®) recently announced they are extending SAP NetWeaver with the Macromedia Flex™ application framework to give organizations the ability to create rich client interfaces for SAP solutions, including customer-facing SAP Enterprise Portal-based applications. This adds yet another facet to SAP pre-deployment testing.

## SAP system lifecycle phases: When to apply testing

Due to the dynamic nature of business and technology, any SAP deployment goes through multiple phases of change during its lifetime. These SAP system lifecycle phases are<sup>2</sup>:

- **Initial/new implementations:** preparing a new installation of an SAP system like SAP R/3 Enterprise or any component of the mySAP™ Business Suite.
- **Change control:** preparing for a major change control release or quarterly changes made at many different levels of the SAP technology stack throughout the life of the system. These are changes that do not fall in the category of full-blown software upgrades.
- **Upgrades:** preparing for a major SAP system change, either functional or technology-focused in nature.
- **Consolidation:** working on consolidating IT resources within the SAP environment, typically to better control costs while maintaining acceptable system performance, availability and scalability.

Every change to an SAP deployment brings with it the risk of failure and, due to the mission-critical nature of SAP

installations, the need for testing is evident in each of the above phases of the SAP lifecycle. The following diagram identifies the type of testing throughout the SAP lifecycle.

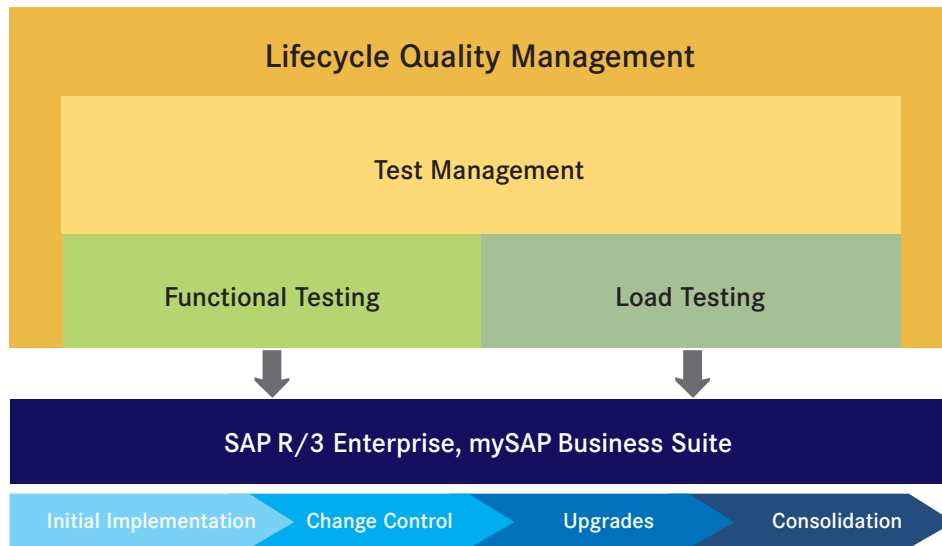


Figure 2 - SAP Lifecycle Testing: LQM transforms inefficient traditional testing into a managed process across all phases of the SAP system lifecycle

## The Borland solution: Lifecycle Quality Management (LQM) for SAP Solutions

LQM for SAP Solutions from Borland takes advantage of the proven experience by Borland in the delivery of high-quality software applications. LQM for SAP Solutions allows enterprises to minimize the risks and realize the benefit of successfully deploying a powerful business application such as R/3 and mySAP. LQM for SAP Solutions helps customers optimize the availability, accuracy, performance and scalability of their SAP applications, infusing quality and efficiency throughout the SAP application lifecycle. LQM for SAP Solutions is comprised of Borland's fully integrated platform of automated solutions for testing, and managing the quality of enterprise application environments. LQM for SAP Solutions enables organizations to:

- **Manage the testing** process throughout the lifecycle of an SAP deployment. Test management capabilities provide a single point of control for managing all phases of the quality process including test planning, test creation and execution, defect and issue tracking, and project and test status reporting within an integrated test environment
- **Perform functional testing** before the application goes live, to ensure the accuracy and integrity of critical business transactions. Functional testing, whether manual or automated, is key to verifying that the application works as expected. In complex SAP systems with frequent system upgrades or change control releases the efficiency and accuracy of fully automated regression testing particularly shines.
- **Conduct load testing** to optimize your application's performance and scalability during pre-deployment. Load testing enables you to identify bottlenecks (including limited bandwidth and other infrastructure problems) and tune the whole SAP technology stack, including network infrastructure, hardware platforms, operating systems,

databases and SAP software components. This ensures that the application can handle the expected user load, even during times of peak activity. Load testing also enables you to accurately quantify system capacity prior to deployment, thereby avoiding over- or under-investment in the supporting IT infrastructure

## The platform building blocks of Borland LQM for SAP Solutions

LQM for SAP Solutions includes a fully integrated platform for managing the process of testing and tuning, the quality of SAP application environments. The building blocks of this platform are:

- **SilkCentral® Test Manager** for managing the testing process throughout the lifecycle phases of an SAP deployment.
- **SilkPerformer®** for functional and load testing of the SAPGUI.
- **SilkTest®** for the functional testing of browser-based, SAP NetWeaver Applications (SAP Enterprise Portals).

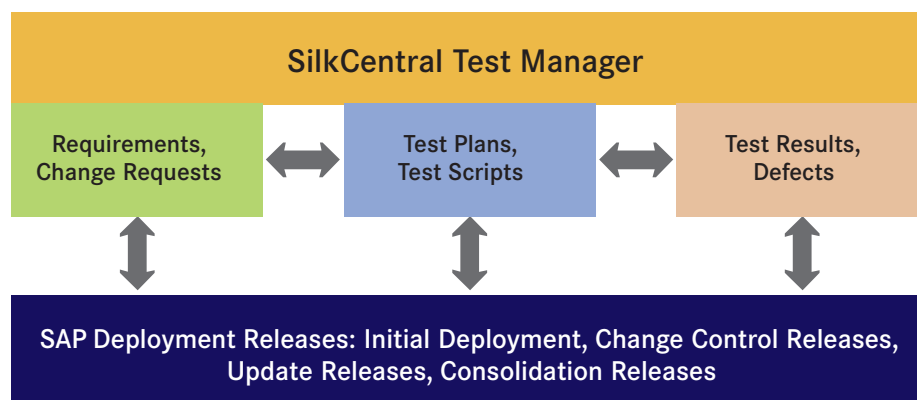
The following sections describe each building block.

### Test Management

**SilkCentral Test Manager** is a comprehensive test management solution that helps to build quality and efficiency into each step of the testing process of an SAP deployment. It handles requirements management, test planning, test execution, defect/issues management and results reporting.

SilkCentral Test Manager provides interfaces to leading requirements management systems, source control systems and third party defect-management systems. SilkCentral Test Manager is tightly integrated with SilkTest and SilkPerformer for functional/regression and load testing activities, respectively. SilkCentral Test Manager also works with various test engines making it easy to integrate component and unit tests written with third party or open source testing tools like JUnit or functional tests written with SAP eCATT.

SilkCentral Test Manager is the cornerstone for defining a repeatable, managed process for quality-related activities that go along with testing any initial deployment, change control release, upgrade release or consolidation release of your SAP installation.



*Figure 3 - SilkCentral Test Manager links together the business view of an SAP system with the system view by associating requirements and change requests with test results and defects, providing a business-centric view on quality status of the overall SAP deployment*

## Load Testing

**SilkPerformer** is an enterprise-class load testing solution supporting all current enterprise application technologies, including Web, .NET, J2EE, XML, SOAP, WSDL and SAP applications. SilkPerformer is especially optimized for SAP applications supporting traditional SAP R/3 applications (emulating SAPGUI clients) as well as for applications built on the SAP NetWeaver platform, such as SAP Enterprise Portals, and including support for Macromedia's Flex application framework. SilkPerformer is the only load testing tool available on the market that can provide native support for the Action Message Format (AMF) protocol utilized by Flex applications.

SilkPerformer enables organizations to emulate all the activities of hundreds or thousands of users from just a few load-testing agents running multiple virtual users. All load-testing agents are controlled and coordinated from a central instance.

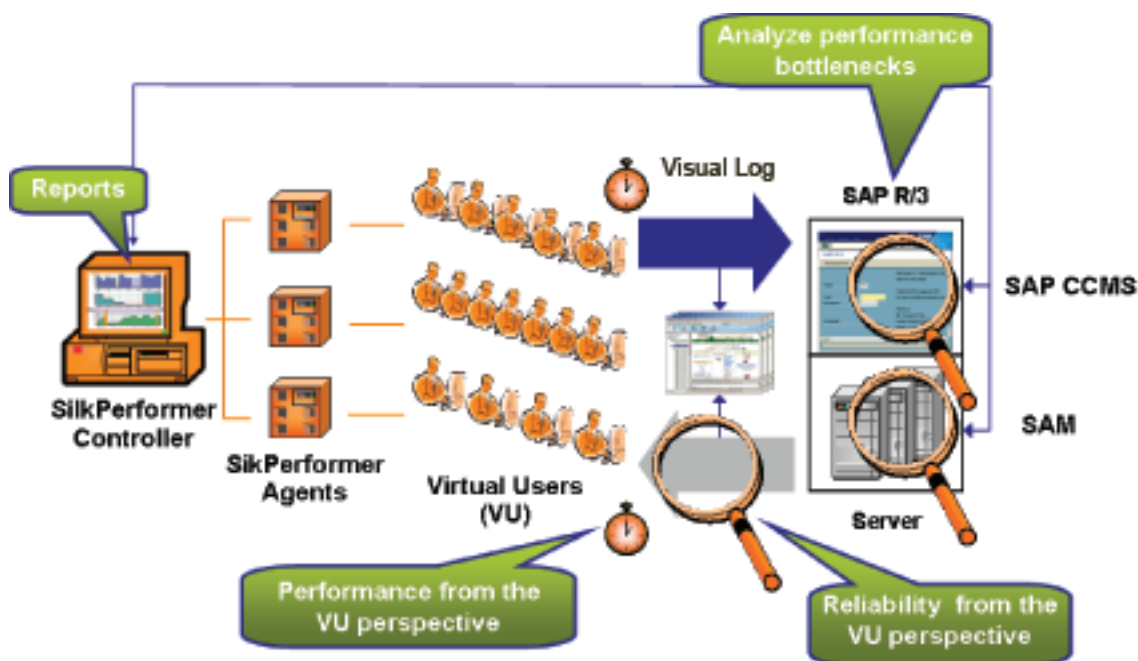


Figure 4 - Typical SilkPerformer set-up for testing an SAP R/3 system

## Functional Testing

Functional testing is another indispensable activity for optimizing the quality of SAP deployments. **SilkPerformer** provides the capabilities, flexibility and ease-of-use needed to functionally test any SAP R/3 system. SilkPerformer test scripts for SAP R/3 are based on the SAPGUI scripting API and provide the full feature set delivered by SAPGUI scripting. This enables organizations to write powerful and maintainable scripts that accurately emulate user interaction with the application.

Because SilkPerformer can support both load and functional testing activities in the SAPGUI environment, LQM for SAP Solutions enables organizations to boost the productivity of their SAP deployment and testing teams. Similarly, tool knowledge as well as the tests themselves can be shared easily by both functional and performance testing personnel.

**SilkTest** provides functional testing support for the SAP Enterprise Portal applications based on the SAP NetWeaver platform. SilkTest is the industry's leading functional testing product for enterprise applications, supporting enterprise application client-technologies such as Web, .NET, Windows® and Java,™ including support for SAP Enterprise Portals.

SilkTest, as well as SilkPerformer, are tightly integrated with SilkCentral Test Manager, ensuring that an organization's testing activities are coordinated through a central point of control.

## Conclusion

This white paper explored the reasons software quality optimization of an SAP system is important and described common challenges encountered in testing SAP applications. It reviewed the lifecycle phases of an SAP deployment and identified when and where to apply quality activities. Finally, the white paper introduced the Borland LQM for SAP Solutions and mapped offerings by Borland in the areas of test management, load testing, and functional testing to appropriate quality activities throughout the SAP implementation process.

Business advantage happens when mission-critical applications empower enterprises to work smarter, faster and better. This is the ultimate end goal of all SAP projects. But business advantage actually begins earlier—in how these applications are defined and deployed.

Today, forward-thinking companies view LQM as a strategic road map for rapidly deploying high-quality enterprise applications. A focus on quality will enable organizations to operate more effectively, deliver applications that consistently meet the need of the business and end users. Borland LQM for SAP Solutions maximizes ROI and enables organizations to get the most out of their investment in SAP applications by optimizing quality at each step of the application's lifecycle, thereby increasing its accuracy, availability, performance and scalability. Whether defining the most cost-effective infrastructure or resolving issues early to ensure a positive end-user experience, LQM for SAP Solutions provides organizations the tools they need to keep their SAP projects on time, on budget and delivering business value to the enterprise.

## Additional Resources

Software Quality Management, Borland Software, Whitepaper, 2005

Choosing a Load Testing Strategy, Borland Software, Whitepaper, 2005