

# The Importance of Portal & Web Testing in Your Enterprise

The Growing Challenge of Testing Browser-Based Technologies in SAP®



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## Abstract

Business processes today rely heavily on browser-based technologies like HTML, Adobe Flex and Microsoft Silverlight because they are used to create a richer user experience. Complex, nested structures, tree views, context menus and asynchronous refresh all combine to create user interfaces and functionality that users love. So it's not surprising that the vast majority of new functionality coming from SAP<sup>®</sup> uses browser-based technology – a trend that is not likely to slow. In fact, according to SAP, nearly 100% of their customers use at least one browser-based SAP module. Browser-based technology is here to stay.

How do you ensure that browser-based business apps perform as planned? There's a short answer. Portal and web applications have to be tested to ensure quality. There is really no other way. If your company isn't testing browser-based functionality, then your end-to-end business processes are at risk - the risk of business disruption when systems fail.

As Gartner points out, testing end-to-end business processes is critical because the handoffs between modules and applications are most vulnerable to failure. This paper outlines how companies can achieve success in testing portal and web-based business applications. It also describes why browser-based testing is inherently challenging, and how automation can make testing fast, complete, and highly cost effective.

## Introduction:

### The Growing Challenge of Testing Browser-Based Technologies

Portal applications—and indeed all browser-based technologies—have a reputation for being difficult to test, and with good reason. Most test automation solutions can't handle the complexity and dynamic nature of browser-based technologies like HTML, Adobe® Flex and Microsoft Silverlight®, especially older test automation solutions that rely on record-and-playback, script-based technology. At best, legacy testing software results in brittle tests that require extensive maintenance at every run. At worst, enterprises cannot do automated testing at all, resulting in poor test coverage of critical business processes within SAP and the ecosystem of software that surrounds it.

SAP started developing in browser-based technologies over a decade ago, but the introduction of SAP's Business Suite 7 in 2009 marked a major milestone in the proportion of functionality accessed via the browser. Although browser-based technologies appear throughout SAP today—including in some of the newer enhancements to SAP GUI—they are most often seen in SAP NetWeaver Portal applications, including CRM, SRM, SCM and PLM.

SAP has also recently introduced a new user interface technology – SAPUI5 – to support the development of browser-based applications. Experts anticipate SAPUI5 will become widely adopted, especially with the growth in mobile business apps. Companies will need to consider how building applications, mobile or otherwise, using this new user interface technology will impact their ability to effectively test end-to-end business processes.

Not only do companies need to ensure the quality of processes executed in one browser, but there is an increasing need to test business applications that run on multiple browsers, including Microsoft Internet Explorer, Firefox, Safari, and Chrome.

With the ever-growing proportion of applications built in browser-based technologies, organizations now have more advanced tools, technologies and expertise at their disposal to tackle the challenges of quality assurance and business process validation for browser-based apps.

### Why Is Testing Browser-Based Technologies So Difficult?

Testing is essential to ensure business process quality, and test automation offers huge cost efficiencies relative to manual testing. However, portal and web technology present significant technical challenges in testing, as described below.

- **Window URLs with embedded session values:** Browser-based technologies often use URLs with a session identifier. Once that session expires—a day or even a few minutes later—any test that includes that session identifier breaks immediately. In fact, tests built using older record-and-playback testing software tend to fail even immediately after being recorded.

- **Non-descriptive object names:** Many legacy test automation tools grab object names from the underlying code rather than labeling them the way a user would see them. The names are often not descriptive (“ABC” is common) and often not unique across an end-to-end testing path. This makes it very difficult to find—much less edit—the object within the resulting test. The consequence? It is often easier to scrap and re-record a test in its entirety than try to modify a script produced by a legacy testing solution.
- **Asynchronous refresh and AJAX:** One of the hallmarks of web 2.0 design is the ability of browser-based technology to refresh only part of the page in response to a user action. While this makes beautiful, responsive web pages, it confounds many older test automation solutions that don’t know when a call is being made and thus cannot properly record the action.

## What is AJAX?

It is the acronym for “Asynchronous JavaScript and XML”. AJAX is the method of making a call from the Client back to the Server and receiving a response (often as XML) – all without fully posting (or refreshing) the page.

- **Instability of add-ins:** Many legacy test automation products have addressed the proliferation of browser-based technologies by building “add-ins” to support particular subsets of newer technologies. Unfortunately, when running cross-platform tests (e.g., SAP GUI to Portal to customer web applications), multiple add-ins are used simultaneously, often resulting in instability in the testing environment.
- **Building blocks of HTML:** The rich functionality available in browser-based technologies is often achieved by blending together different underlying objects. HTML complex controls are made out of building blocks, meaning a tree, calendar, table, or date picker are typically each a group of controls that work together to solve a problem. While the user sees a tree, behind the scenes it is actually implemented as a set of building blocks made to look like a tree. Every company, or even developers within the same company, can use different building blocks and assemble them in a variety of ways. The lack of standards around complex controls and their underlying elements further complicates the effective testing of HTML-based applications.
- **Identifying modern controls:** Modern controls are difficult to identify and the lack of consistency means that users are forced to make adjustments in order to find and utilize the right set of properties. Name and ID properties are not required. In newer applications, they may not be populated, or they may be populated dynamically which results in useless values. The challenge of finding consistent properties that uniquely identify controls across time and executions adds an additional layer of complexity to browser-based technologies.

## The Added Challenge of Cross-Browser Testing

Internet Explorer (IE) was once the only browser companies really had to worry about. At its peak, Microsoft IE enjoyed nearly 90% market share. That is no longer the case. Today some companies have decided they are only going to develop and deliver against Chrome. As Firefox, Safari, and Chrome gain market share, the need to run business applications on more than one browser is quickly becoming the norm.

However, the HTML behind an application differs based on the browser being used. While one website might use a "SELECT" in Internet Explorer, that same website might use an "INPUT" and "BUTTON" in Firefox. From the user perspective, the web page looks the same in either browser, but the underlying HTML and hidden formatting are different. This makes it difficult to create a single test and run it against two, or more, different browsers.

It's no wonder that many test automation professionals feel that automating portal testing is too difficult, or not possible. While this attitude might have been acceptable in the past, recent events have raised the urgency of finding a better solution.

## The Urgency of Finding a Portal Testing Solution

As browser-based applications become more widely adopted, SAP customers who have previously "gotten away with" not testing Portal applications like CRM, SRM, SCM and PLM are in a more and more precarious position. The vast majority of new functionality coming from SAP uses browser-based technology, and this trend is not likely to slow. This trend towards browser-based technology is further accelerated by SAP's commitment to "breakthrough" enhancements. The most recent instance being the introduction of SAPUI5, an SAP toolkit used to build new user interfaces (see sidebar for more on this).

While initially the use of SAPUI5 will be for apps built by SAP, use is growing among third-party software providers outside of SAP who are developing applications based on this new user interface technology. Whether SAP, third-party, or homegrown applications based on SAPUI5, Worksoft will support the increasing demand for automated cross-browser testing.

With the exciting new functionality of these enhancements come significant testing challenges as new parts are snapped into place in novel ways. Going forward, new solutions and methods for testing browser-based apps will need to be adopted by operating companies to keep pace with these innovations.

### SAPUI5 – What is it?

SAPUI5 is a new user interface (UI) development toolkit from SAP. The toolkit supports application developers in creating fast and easy UI applications based on HTML5. This UI framework supports cross-browser apps, allows standard SAP and third-party system data access, and is extensible regarding custom controls, application services, theming, and custom branding. SAPUI5 applications can run on a wide range of devices including smartphones, tablets, desktops, and on multiple server platforms.

## Conquering Browser-Based Testing with Automation: Worksoft Certify®

### Business Process-Aware Technology & Data-Driven Rules Engine

Legacy test automation solutions are geared toward building big, monolithic scripts. Because of the nature of how they were assembled, these are often very difficult to understand and maintain, which is costly and time consuming. Complex, multi-component structures often don't interrelate well. And there is no awareness within the scripting that ties the same components together across multiple screens.

The best solution in the marketplace today is one that turns underlying code into objects that can be managed and manipulated in modular fashion. Worksoft Certify® is one such "business process-aware" technology that accomplishes this, and is the industry's top-ranked solution for functional test automation. With Worksoft, the user interface is modeled, analyzed and stored as structured data in a database. Functional tests are built with small, autonomous widgets -- i.e., an invoice is its own container, a shipment is its own container. Each of the widgets knows how to pass data to the others and are "snapped together" at the time of the test.

One of the major benefits of this type of testing design is the ability to easily identify an object that needs to be modified, make the change and the "snap" it back into place. No more hunting and pecking through hundreds of lines of code to try to identify the (often poorly identified) table or select box that needs to be changed. And no more giving up and starting from ground zero because "it's just too complex to edit what was previously created." Instead, objects with intuitive names are presented neatly in the testing system's user interface.

The ability to easily spot issues and correct them in place is a huge advantage over older legacy test automation solutions or manual testing, but the object-oriented approach does much more. A given object may actually appear many times across many screens. In legacy test tools, it is not practically possible to link the occurrences of that object across screens, but because of the nature of Worksoft's structured database, it is possible to have updates proliferate throughout your existing test set with little to no effort.

In fact, this business process-aware technology is so flexible that it lends itself well not just to SAP Portal applications, but also to all custom browser-based applications, including those with Adobe Flex objects—something very few other testing systems in the market can deliver.

### Support for Cross-Browser Testing

As the need to run applications on more than one browser increases, Worksoft has developed an Extensibility Framework that supports complete HTML and cross-browser testing. The framework enables development of automated tests to validate business applications that run on Microsoft Internet Explorer, Firefox, Safari, and Chrome browsers.

Here's how Worksoft's Extensibility Framework supports testing across multiple browsers:

- **Custom Control Definitions** – Wrappers are defined around complex controls to hide underlying implementations. The wrapper definitions dictate how to treat complex controls regardless of the structure, property or behavior differences underneath. When complex controls are wrapped in these definitions, the same automated tests can be used between different browsers. This greatly simplifies and streamlines the process of thoroughly testing a cross-browser environment.

- **Defined in XML** – Worksoft’s Extensibility Framework is defined in XML which means that the power to manage complex controls lies in the hands of the user. The custom control wrappers can be used to easily define or extend properties and require no coding or scripting. When new complex controls are introduced, a customer can create their own definitions with little effort. This ease of use makes testing rapid and more efficient, and the flexibility of the framework allows definitions to be shared and re-used across different projects.

With Worksoft’s quality assurance and testing platform, companies can trust that applications will run in every browser – including new SAPUI5-based systems. Applications built using SAP’s HTML5-based user interface technology can build, run, and maintain automated tests. Third-party commercial applications and custom applications built using the SAPUI5 toolkit can also be efficiently tested to ensure process quality.

## CASE STUDY: Achieving Automated Cross-Browser Testing

A large Fortune 500 software company recently turned to Worksoft while building an application with multiple new user interfaces. Portions of the application were being implemented using SAPUI5, the new UI toolkit from SAP for building HTML5 applications. The company’s testing group needed a single solution that could effectively validate business processes through SAPUI5 in Chrome, Internet Explorer, and Firefox browsers. Leveraging its Extensibility Framework, Worksoft Certify was able to provide the automated cross-browser testing that the company needed to ensure application quality and business process validation. Instead of creating tests to handle the unique elements of each browser, Worksoft supports cross-browser SAPUI5 complex controls for tests that can be used across-the-board for every browser.

The company has mitigated the technology risk associated with running on multiple browsers and has saved time and money by using automation to handle the complexities of cross-browser testing. Worksoft’s solution helps to ensure that this company’s business processes and underlying applications run consistently and reliably, no matter the browser.

### Get the Performance Testing Answers You Need in Less Time

Performance testing of Portal apps is a major challenge. The dynamic environment makes constructing reliable tests difficult. And tests that are fragile in a functional environment where they are run 5-10 times in a project become a real liability when they are run 5,000 times in a performance environment.

Like all Worksoft products, Certify Performance™ uses a data-driven rules engine, which creates tests that are much more robust and maintainable than tests produced in legacy test automation solutions.

But even better, Certify Performance can actually repurpose functional tests for performance, saving time and providing a much more realistic test bed for performance.

## Deep Domain Knowledge of SAP Creates Efficiency

With intimate knowledge of SAP and its underlying constructs, Worksoft has optimized its approach to test automation in a number of key areas. A few examples include:

- **Window URLs with embedded session values:** Worksoft is optimized to exclude the session identifier when capturing a URL.
- **Non-descriptive object names:** Worksoft uses special technology to name objects on the labels that users see, making them easy to identify.
- **Use of composite objects:** Worksoft is optimized to recognize all of the composite objects in the SAP portal and provide what we would think of as natural actions for them in a single step.
- **Asynchronous refresh and AJAX:** Worksoft will automatically wait for a page when an AJAX call is being made on the SAP Portal and other sites too.
- **Dynamically defined content:** Worksoft has been optimized to know when not to use the dynamic content like the "ID" parameter of an object when that ID is not static for subsequent visits to the page.
- **Nested complex structures:** In the SAP Portal, Worksoft's deep domain knowledge allows us to know the appropriate level of table to interact with.

Worksoft's deep domain experience derives from a long-standing partnership with SAP, including frequent involvement in pre-release testing activities. Worksoft specializes in SAP and the ecosystem of software that surrounds it.

## Conclusion

There's an increasing level of complexity in SAP and the "ecosystem" of software that surrounds it. Companies are already under pressure to roll out upgrades faster, with fewer resources. Business users are demanding access to the newest features but many companies are multiple upgrades behind. Now SAP is further accelerating release cycles to deliver even more complex breakthroughs. Companies want to spend time driving innovation in the business, but 40 cents of every dollar spent supporting SAP goes simply to validating changes.

The wide adoption of browser-based technologies like HTML, Adobe Flex and Microsoft Silverlight has put further pressure on organizations to ensure business process quality because these technologies are diverse, complex and difficult to test. This problem continues to grow as more and more new functionality is released using browser-based technologies and SAP's new SAPUI5, a toolkit used to build new user interfaces based on HTML5. Companies need to tackle the unique challenges that come with cross-browser applications using testing tools that are easy to use, effective, and efficient to ensure quality across the enterprise.

Worksoft Certify provides the industry's strongest platform for business process validation with browser-based applications. The dual solution to conquering browser-based testing is to:

- Choose a Business Process-Aware Technology like Worksoft Certify that turns underlying code in the UI into objects that can be managed and manipulated in modular fashion. This solves both the problem of complex objects and the issue of maintainability, since testers can easily identify an object that needs to be modified, make the change and then "snap" that object back into place. This makes test building and test maintenance fast and cost effective.
- Choose SAP specialists that have deep domain knowledge of SAP and have optimized their testing methodology specifically to suit the way SAP handles tricky items like session IDs, nested objects, dynamically defined content and asynchronous refresh.

Proven in enterprise SAP installations worldwide, Worksoft provides the only truly end-to-end business process solution in automated testing. Please contact us today at [info@worksoft.com](mailto:info@worksoft.com) to learn more or to schedule a demonstration of Worksoft's portal and web-based test automation capabilities.

## About Worksoft

Worksoft® - an SAP partner - is a leading global provider of test automation software for packaged enterprise applications. Companies utilize our solutions to shorten project timelines, reduce costs, innovate faster, and improve business process quality. Worksoft provides solutions for functional testing, performance testing, and change management that deliver high levels of automation - often exceeding 80% process automation. Worksoft customers include global blue-chip companies across manufacturing, financial services, government, healthcare, retail, entertainment and transportation sectors.

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