

How to Keep Your Customer Website Rock-Solid. And Agile.

It's not a tradeoff anymore. Go ahead. Have it all.



WORKSIFT®

Summary

Your website is the face of your business to your customers, yet the news is full of customer-impacting software glitches that seriously damage that relationship, hurt company revenues, or both! This paper explains how you can avoid all of that, and keep every web application functioning like it should.

While browser-based technologies are an integral part of business today, they are also complex and dynamic. You're deploying changes every day. And with every change, there's the chance of a glitch. What to do? Maintaining quality execution across web apps is key to the consumer experience, and that demands testing.



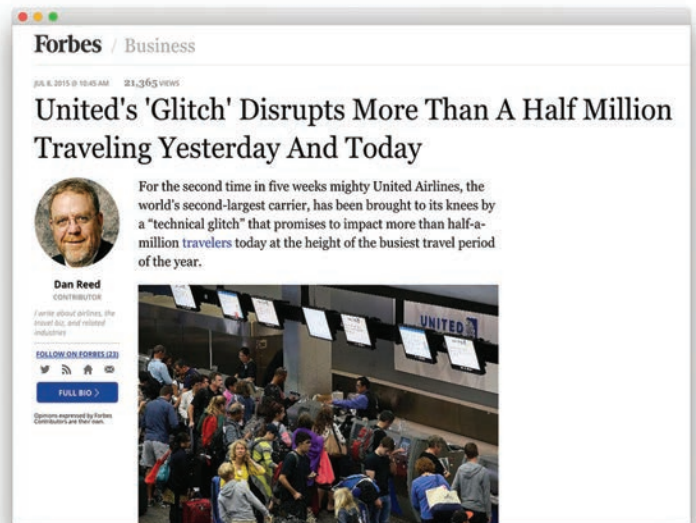
Catch defects early and often. Any defects in your website's business processes need to be detected early, before reaching the production environment and the customer. That's not always easy, but there are four things you can do to get the job done. We call it "taking an outside-in approach" that begins with your customer experience.

1. **Focus on the end user.** Understand how customers are interacting with your website and its underlying applications. Then create business scenarios that reflect this usage.
2. **Automate end-to-end processes.** Ensure that test automation covers not just the entry application on your website, but also all back-end applications and their integrations. You'll need to identify all business process variations, and make sure you check them as well.
3. **Test continuously.** Having functional test automation in place allows you to run it on-demand as well as on a daily basis. This will let you uncover problems by proactively validating that your business processes work – and let you find problems before your customers do!
4. **Scale using the cloud.** If your website is substantial, then you'll need to run a lot of automation and distribute your automated testing across multiple machines to achieve scale and full coverage. Some firms even use a public cloud infrastructure to spin up machines on demand and spin down when automated testing is complete.

Stay rock solid. Gartner says that by 2020, 60% of digital businesses will experience a major service failure because of IT teams' inability to "manage digital risk in new technology and use cases." Simply hoping that you are not among the 60% who will experience a major failure is not an effective strategy! This article describes concrete steps you can take today to make sure your customer-facing website stays rock solid.

Epic Website Failures. OMG.

You don't need to look far to see the impact of software failures on business performance. Recently, the New York Stock Exchange (NYSE), long seen as a standard of innovation in financial services, had to halt trading because of a four-hour outage - the longest in the U.S. since the Nasdaq went down in 2013 - all caused by a software upgrade gone wrong.



This came hot on the heels of a mandatory delay by United Airlines of nearly 5,000 planes for nearly two hours due to technology issues. While these are highly publicized examples of how technology failures can bring organizations to their virtual knees, these are not isolated incidents. When a glitch happens, all eyes frequently turn first to security breaches but in most cases these are not the result of hackers, but glitches in business systems.

As Vikas Bajaj of The New York Times points out: “If an important computer system goes down somewhere, many people suspect that it was the result of a hacking attack that originated in China, Russia or North Korea. In reality, both the NYSE and United technology failures showed no evidence related to any form of attacks. These systems failed due to technology issues.”

“In the digital world, hacking certainly is a big problem. But large computer systems used by businesses, governments, universities and other organizations fail all the time because of programming errors and other technical problems.”

Maintaining business continuity. When a major business disruption happens on your website due to technology issues, you can bet that there’s a C-level executive or two for whom business continuity suddenly becomes worth a lot. To quantify the cost of business disruption in these cases, you can look at the specifics of each instance and where impacts have occurred:

- **Revenue Impact** – Disruptions to customer-facing websites and order handling can directly impact revenue and profits.
- **Direct Cost Impact** – This is the cost of identifying and repairing the software problem itself. Typically this will be only a tiny fraction of the overall business cost of disruption.
- **Customer Impact** – Customer loyalty is difficult to win, but easy to lose. How often have you had difficulty placing an order on a website – and never came back. Then there’s the cost of “making good” on any damage to customers or partners when a glitch happens. That can be substantial.
- **Partner Impact** – Your supply chain is intimately connected with others. For example, when you’re not shipping or manufacturing because of an internal software issue, then your partner’s shelves and lots can be empty. That can cause channel partners to look for alternatives.
- **Reputational Impact** – Disruptions can impact your company brand perception as a reliable, trusted business partner.
- **Organizational Impact** – Careers can be hurt, jobs terminated, and team morale can suffer when tech problems disrupt business.

“Not on my watch.” For many CIOs, maintaining business continuity has become a high priority because introducing innovative digital technologies remains a top priority. Gartner says that there’s been more technology change in the last 3 years than in the prior 20 years combined. In other words, CIOs need to be able to change a tire while rolling down the highway! For them, the integrity of the business process is vital – before, during, and after the innovation projects that are bringing new digital, cloud, mobile, big data, and other enterprise application updates into the organization. That goes for their consumer-facing websites too!

Like every mission critical enterprise application, there is only one way to ensure that the business process and all of its underlying technologies work as needed. The business process needs to be validated and every step needs to be tested.

Taking an Outside-in Approach to Website Quality: 4 Key Steps

Any defects in your website’s business processes need to be detected early, before reaching the production environment and the customer. That’s not always easy, but there are four things you can do to get the job done. We call it “taking an outside-in approach” that begins with your customer experience.

STEP 1: FOCUS ON THE END USER.

Understand how customers are interacting with your website and its underlying applications. Then create business scenarios that reflect this usage.

STEP 2: AUTOMATE END-TO-END PROCESSES.

Your consumer facing website is not just one application! You’ll need to ensure that your portfolio of test automation covers not just the entry application on your website, but also all back-end applications and their integrations. You’ll need to identify all business process variations as well, and make sure you build them into your test automation plans so that you check them also.

STEP 3: TEST CONTINUOUSLY.

Having functional test automation in place allows you to run it on-demand as well as on a daily basis. This will let you uncover problems by proactively validating that your business processes work – and let you find problems before your customers do! There’s only one way to ensure that every business function and all the underlying enterprise apps work like they should on your watch. Every one of them needs to be tested.

Check everything. How often? Well, the frequency of website testing needs to match the rate of change and digital transformation in your enterprise landscape. The point is that business process validation needs to happen at the same frequency to keep pace. If not, you’re exposed and falling behind.



Test often enough. If new technology or updates to your website or its underlying applications are deployed monthly, you need to check all your interconnected business processes and enterprise apps monthly or better. If you have many technology projects, maybe it needs to be weekly. Some companies validate their core business processes Monday, Wednesday, and Friday. And if your enterprise relies heavily on hybrid cloud apps – where you don’t necessarily control the timing of changes (like Salesforce.com) – then maybe you need to perform daily validation. Same for companies that are handling 4,000 SAP transports per month.

When companies don’t match the rate of change with the rate of testing, that’s what often causes news-making business disruptions – as well as the many that don’t make the news. If firms shortcut functional testing, or worse, deploy changes without testing anything at all, there is enormous risk to business continuity.

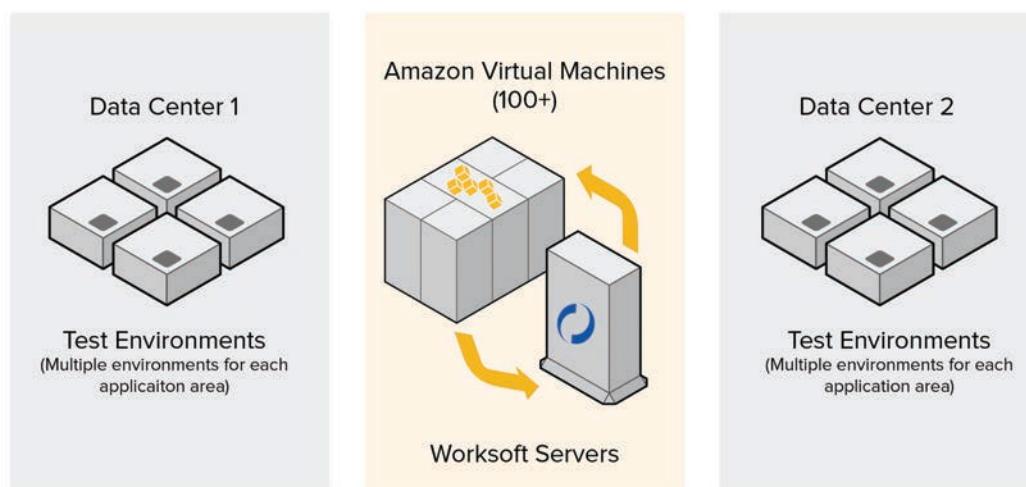
STEP 4: SCALE USING THE CLOUD.

If your website is substantial, then you’ll need to run a lot of automation and distribute your automated testing across multiple machines to achieve scale and full coverage.

Automation makes it possible. Obviously, if you are validating 500 core business processes every day on 30+ virtual machines (as at luxury goods manufacturer Richemont), or testing 300,000 business process steps every night, it can’t be done manually. Those days are over.

Today, automation platforms have replaced manual labor with digital labor when it comes to automated functional testing and business process validation. Sure, it’s an investment in new work practices and some new automation software, but that’s small compared to a major disruption in business continuity.

Some firms even use a public cloud infrastructure to spin up machines on demand and spin down when automated testing is complete. One large enterprise relies on 100+ Amazon servers to perform daily business process validation for web-administered programs serving more than 10 million consumers!



To some automation advocates, it means confidence and iron-clad business execution. Others think of it as insurance or a safety net for their business. But whatever you call it, these automation platforms let the CIO say, “Nothing’s going to happen on my watch,” and make it stick.

Object-Oriented Web Testing with Worksoft Certify®

Legacy test automation solutions don't work for websites because they were geared toward building big, monolithic scripts using programming languages. 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 business functions.

BUSINESS PROCESS-AWARE TECHNOLOGY & DATA-DRIVEN RULES ENGINE

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, every business process and user-interaction with an enterprise application 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 knows how to pass data to the others and are "snapped together" at the time of the test for every end-to-end business process.

One of the major benefits of this type of design approach is the ability to easily identify an object that needs to be modified, make the change and then "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. All of this makes the testing of consumer facing websites as easy as possible.



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 processes. 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 or no effort.

In fact, this business process-aware technology is so flexible that it lends itself well not just to customer-facing web applications and mobile platforms, 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.

Handling the Intricacies of Website Test Automation

Testing is essential to ensure business process quality, and test automation offers huge cost efficiencies relative to manual testing. But for effective testing of your consumer-facing websites, your test automation platform needs to handle all the intricacies of web testing, including:

- **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. AJAX 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.



Worksoft’s automation platform handles every one of these important factors in functional test automation for websites.

Handling Test Automation Across Browsers Too

In the past, businesses only needed to worry about their customers reaching them on the web through Internet Explorer. At its height, Microsoft's browser boasted 90% of the market. Today, however, it shares the space with Firefox, Safari and Chrome. You need to recognize that customers are going to be reaching you across all these browsers.


It turns out that the HTML behind web applications differs based on which browser is being used. For example, SELECT on Internet Explorer might be INPUT and BUTTON on Firefox. Importantly, the user doesn't see any of this, but the web page's underlying code and formatting are very different. Of course, this makes testing to ensure a like experience across different browsers yet another challenge. In particular, it's difficult to create a single test and run it against two or more different browsers, unless your testing platform is designed for it.



All of these challenges have made many feel that test automation is too difficult or impossible for customer-facing websites. Neither is true, and solutions like Worksoft Certify® make effective test automation of consumer-facing websites achievable and highly efficient.

Worksoft's Extensibility Framework. As the need to run applications across browsers increased, Worksoft has developed an Extensibility Framework that supports complete HTML and cross-browser testing. The framework enables development of automated tests to validate customer-facing websites 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 tester. 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.

An Electric Utility Turns Software Deployments into Non-Events

The goal is zero fallout, zero defects

We recently spoke with Worksoft users at one of the country's largest electric utilities, which serves about 2 million customers. Here's what they had to say in their own words:

"We have a very competitive market that we operate in and we're constantly looking for ways to increase the speed-to-market. It's very competitive but we're also a very customer-facing market, so fewer defects hitting our customers is always a main goal for us."

The driver for automation. "We were trying to do things more quickly, run more testing, and when we looked at the pure economics of things, we could either hire a whole bunch of people to do a whole bunch of tests or we could come up with an automated practice that has a bunch of repeatable tests that we can execute whenever we need to. Our main drivers for purchasing Worksoft were the need to increase our automation coverage and deliver products faster to the market."

Scope of automation. "We use Worksoft to do automation testing for SAP, for the web, and for mobile. Those are the main applications that we use Worksoft for. Our company has a huge web presence that is touched all the time by customers, so we want to make sure that it is perfect."

Ease of use matters. "We adopted Worksoft Certify® because of the ease of the tool. You don't have to go through years of training or weeks of training just to be able to start. It could be a couple weeks and you're already building your own tests, your own stuff."

Validating key business functions. "For business processes and applications, we mainly focus on the customer experience with our company. So it starts with the customer creation process, how the meter's set up, moving customers, selecting a product, billing the customer, moving them out, charging them fees, not charging them fees, having fees come in from the other companies

and so on. We complete the whole lifecycle to where instead of testing one or two things with one log-in, we test 30 items. It is an end-to-end process."

"Every month we're testing a cross section of all the business functions that we have - from billing and invoicing things, to the way that customers interact with the website. We look for opportunities (for automation) where there are very repeatable behaviors - whether they be an enrollment to a new product or making sure that procedures are running correctly on the back end."

"For example, we test one very tedious process - that being payments, web payments. Our customer facing website takes payments 50 different ways. We have captured all those ways to where I can run 50 tests and it actually makes a payment every single way that a customer can make a payment. This is to prove that everything is working before it even goes into regression testing or goes into production. The key success that we've seen is the reduced defect count, faster regression cycle, less stress on the regression cycle and fewer end-to-end tests covering more items."

Liberating the QA staff. How has automation helped? "How has it not? Automation has made life simpler at our company from the standpoint that we spend less manpower doing tests that we're going to do every month on a repeatable basis. It allows people to focus on some of the more exciting things - new tests and new functionality rather than manually executing the same old test over and over again."

"Our testers are more excited. Our engineers are more focused upfront with the business, partnering with the business analysts and project managers to identify new unique scenarios for that specific work, rather than be bogged down testing the same stuff."

On quality and speed. “I think we try to strike a real even balance between speed-to-market and quality. I would say ultimately when push comes to shove, quality is the number one thing, but speed-to-market is probably number 1B!”

Turning deployments into non-events. “As a result of our automation practices and the tools that we’ve put in place [like Worksoft], we’ve seen year-over-year improvement in the quality of our deployments. And we’ve gotten to a place where now most of our releases are kind of a non-event.”

Taking an end-to-end approach. So what’s different now when compared to the company’s prior approach to testing? “The biggest thing I would say is actually working smarter. Every test that the company had [before Worksoft] was a transactional-based test. Every time we would log into the system, test one item and then back out. Now we start with a customer’s lifecycle. We create the customer. We move in the customer. And we continue using that customer, the built customer, the Worksoft-created customer all the way until we’ve closed him out. That way automation actually covers more and more items with one single output.”

Automation all the time. “There’s value in running automated tests consistently every time and quickly. The machine doesn’t take a break. The machine doesn’t have to go to the bathroom. It can run constantly for eight hours straight running all the tests through, and because of that, that’s why we adopted the automation system and automation thinking.”

“The benefit of Worksoft Certify is the consistency in regression testing - that being the tests that we’ve already automated. We’re able to run them the exact same way every time and expect the same results. We are able to test more items with automation.”

Enhanced website quality. “Over the last couple of months in particular, we’ve been pushing really hard on testing enhancements that we’ve added to the website. So as a result of the automated

regression testing that we now have around the web, we’ve caught numerous issues which would have been customer-impacting. As a result of those test cases, we were able to catch those in advance of going into production. The single most important benefit with Worksoft for us has been our increased automation coverage which has improved our quality.”

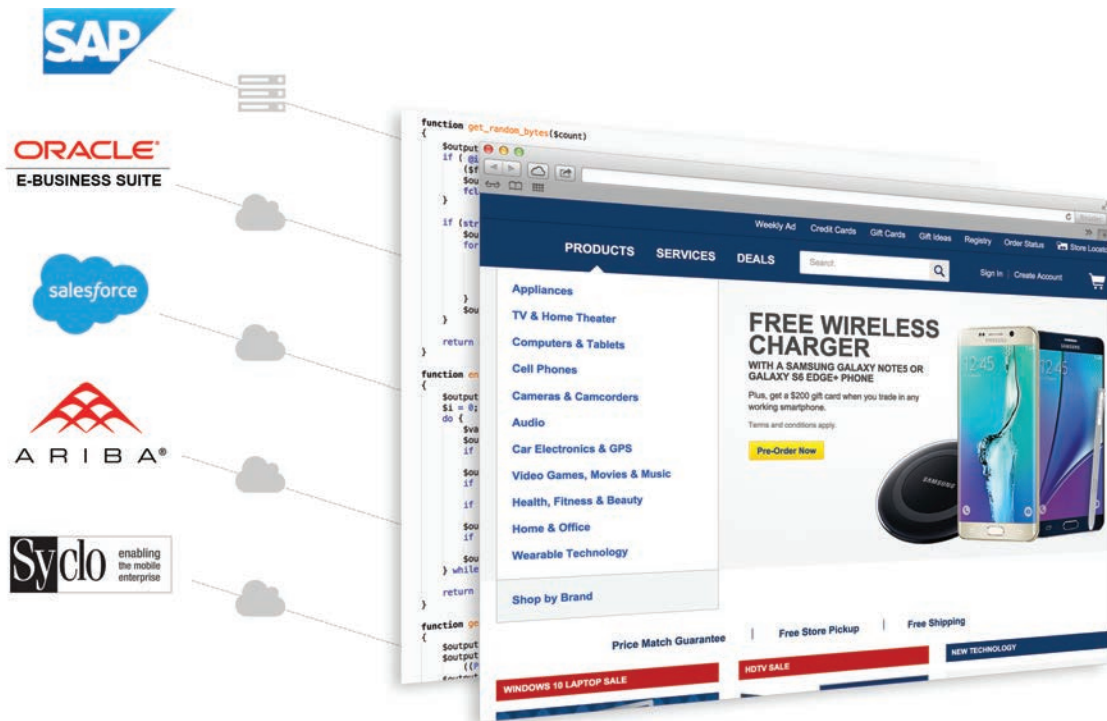
Greater coverage, fewer defects. “Another benefit that the company has seen using Worksoft Certify is more coverage due to the automation tool being quicker and able to perform more tests during the regression week. We have seen fewer risks with Worksoft automation in place. We have seen a decline in defects leaked to production, and we are finding defects faster in the lifecycle. It’s the biggest benefit that we’ve seen with Worksoft Certify, and we’re able to complete regression testing sooner.”

A goal of zero defects. “We now have goals to get zero defects in production, zero fallout. It’s our goal every month, in every regression cycle. We want to see zero unknown defects hitting production.”

On the ROI of automation. “The ROI for Worksoft has been pretty easy for us to realize over the last couple of years.”

The End Result: Confidence in Business Execution on the Web

Automated functional testing ensures end-to-end business process quality across all responsive websites and mobile apps. With the pace of business and technology change today, manual testing just can't keep up. Today's business demands that websites stay up and running 24/7, and that demands complete, end-to-end testing to avoid software glitches and the vulnerabilities that put companies on the front page of the business section.



A rock-solid customer-facing website. The good news is that there's now a platform for automated business process validation that manages to handle all the complexities of website testing, as well as the validation of every underlying enterprise app.

Worksoft Certify is designed to fully handle the validation of web applications, and is architected from the ground up to be business process-aware. This awareness lets complex components be viewed in an end-to-end context, because your website and its business processes connect to a host of back-end systems like SAP, Oracle, Salesforce.com and others that also need to be checked. You can't ensure end-to-end business process quality if you can't handle every app.

Worksoft Certify provides the industry's strongest platform for business process testing of browser-based applications. As one customer puts it: "When we put out those websites, they all work."

Eliminate the risk of a website glitch. Worksoft automation accelerates testing, and ensures iron-clad business execution on the web. It allows you to check every core process and every back-end system with high frequency – even daily. Automated business process validation makes it cost-effective to ensure quality when web apps are deployed the first time, and every time something changes after that.

ABOUT WORKSOFT, INC.

Worksoft® is a leading global provider of automation software for business process validation (ABPV) and business process discovery (ABPD). Large-scale enterprises worldwide use Worksoft's top ranked automation solutions to innovate faster, lower technology risk, reduce costs, improve execution quality, and deeply understand their real end-to-end business processes. Blue-chip companies across all industry sectors choose Worksoft to automate functional testing of web, cloud, big data, mobile, and dozens of enterprise applications, including SAP®.

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