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The Forrester Wave™: Functional Testing Solutions, Q3 2008

by Carey Schwaber and Mike Gualtieri
for Application Development & Program Management Professionals

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HP Leads, While IBM, Borland, And Compuware Offer Competitive Alternatives

by Carey Schwaber and Mike Gualtieri
with Mike Gilpin and David D'Silva

EXECUTIVE SUMMARY

Forrester conducted an evaluation of six functional testing solutions vendors across 96 criteria. Our findings? HP's leadership of the functional testing market continues unabated since its 2006 acquisition of Mercury Interactive. IBM has expanded its solution's support for packaged applications, and its road map for the future looks promising indeed. Borland Software and Compuware have doubled down on serving their target users: more and less technical testers, respectively. Empirix and Seapine Software offer less-costly but also less-capable solutions, with notably limited support for applications and technologies. Overall, the strength of functional testing solutions continues to improve not just to keep up with changing technologies but also to better deliver improved support for activities like manual testing, test management, and test automation.

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NOTES & RESOURCES

Forrester conducted product evaluations in April 2008 and interviewed five vendors: Borland, Compuware, Empirix, HP, and IBM. We also interviewed 10 customer references for these vendors. In addition, we gathered opinions on testing tools from testing service providers.

Related Research Documents

"Your Path To A Test Center Of Excellence"
March 15, 2007

"The Forrester Wave™: Functional Testing Solutions, Q2 2006"
May 31, 2006

"Take Careful Inventory Before Adopting Standalone Code Quality Tools"
September 15, 2005

"Evaluating Automated Functional Testing Tools"
February 3, 2005

FUNCTIONAL TESTING SOLUTIONS IMPROVE SOFTWARE PROJECT OUTCOMES

For many application development organizations, testing and quality assurance remain an uphill battle. For every shop that is plagued by production defects, another is frustrated by the time it takes to get through testing. Functional testing solutions help application development organizations ensure quality while minimizing the cost of doing so. They do this by delivering:

- **Test management for planning, managing, and assessing the testing effort.** Test management tools are the control center for the testing effort; they help users establish their test plan, define and enforce the testing process on its own and in relation to other life-cycle activities, and record and report on the progress and results of the testing effort. Test management tools can govern not only functional tests but also unit, component, security, and performance tests, provided that integrations with these tools are supported or at least technically feasible.

- **Manual testing capabilities that improve accuracy and reduce inefficiency.** Most companies don't automate their functional tests, and even those that do don't automate all of them. But that doesn't mean that manual testing should be a backwater or that manual testers should work without any tool support. Manual testing tools can dramatically improve the accuracy and efficiency of manual testing. Testing tool vendors are only just beginning to invest real R&D dollars in this area, but the return on investment (ROI) is already there in existing solutions.[1]

- **Test automation tools that slash the time and resources required for test execution.** Test automation tools let application development organizations make an upfront investment in test script creation to slash the time required for test execution from a matter of days to a matter of hours.[2] The value of automation increases with the frequency of repeated test execution, making it especially useful for regression testing and testing across configurations.[3]

Functional Testing Tool Vendors Fall Into Four Major Categories

Tool support for manual testing, test automation, or test management comes in many forms:

- **Dedicated functional testing solutions.** All of the major vendors of testing tools — HP, IBM, Borland, and Compuware — sell product sets with support for manual testing, test automation, and test management. In the case of every vendor but IBM, manual testing and test management are part of the same product, while test automation is sold separately. Testing teams looking to purchase just a single product should focus on test management first, since mature practices in this area are a prerequisite for success with test automation. There are exceptions, though: most notably, development teams looking to automate their own regression testing. Commercial test automation tools, however, tend to be less effective here than open source alternatives like FIT/FitNesse or Selenium.[4]

- **Microsoft Office for manual testing.** Microsoft Office isn't a manual testing tool by any stretch of the imagination, but most manual test cases reside in Microsoft Word and Microsoft

Excel nonetheless. Why do testers turn to these tools time and time again? It's not that they're especially suitable for testers. Rather, it's because they are so ubiquitous that nearly all of the stakeholders in the testing effort — including project managers, business analysts, developers, and business customers — have them installed on their desktops and use them every day. Dedicated manual testing tools will have to approach this level of accessibility and familiarity before they can replace Office.

- **Open source and SOA test automation tools.** Few testing organizations use open source test automation tools like Selenium and FIT/FitNesse, but many development teams do — especially cross-functional development teams and Agile development teams.[5] Such teams also employ specialist service-oriented architecture (SOA) testing tools for functional testing, such as the open source tool soapUI and the commercial tools iTKO LISA and Parasoft SOAtest. Both open source testing tools and SOA testing tools are relatively small parts of the functional testing tools market, but they're growing in importance. Why? Because iterative development methodologies demand that test automation start earlier in the life cycle, and the testing organizations that purchase commercial tools struggle to make this a reality.[6]

- **Low-cost and single-repository ALM test management tools.** There aren't many sources of test management tools beyond the major testing tools vendors. Low-cost test management tools like T-Plan Professional are few and far between, and open source alternatives are immature.[7] Some app dev organizations choose not to adopt a purpose-built test management tool at all, instead employing the modest test management capabilities in application life-cycle management (ALM) solutions from vendors like CollabNet, MKS, and Rally Software Development.[8] Often, some project teams will use these tools for test management while others will integrate them with purpose-built test management tools to get all of their project information in a single repository.

FUNCTIONAL TESTING SOLUTIONS EVALUATION OVERVIEW

To assess the current state of the functional testing solutions market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of top functional testing solution vendors. Forrester also evaluated offerings in this space in May 2006 and in February 2004. The scope of our 2006 evaluation was the same, but our 2004 evaluation focused solely on functional test automation tools, excluding test management and manual testing from consideration.[9]

Evaluation Criteria Target Manual Testing, Test Automation, And Test Management

After examining past research, assessing user needs, and interviewing vendors and experts, we developed a comprehensive set of evaluation criteria. We assessed vendors against 96 criteria, which we grouped into three high-level buckets:

- **Current offering.** To assess product strength, we focused on three principal categories of capabilities: manual testing, test automation, and test management. We also evaluated how easily the functional testing solution integrated with: 1) tools for other types of testing, such as developer testing, SOA testing, security testing, and performance testing and 2) tools for other life-cycle activities, such as project portfolio management, requirements management, software change and configuration management, service desk, and build management.

- **Strategy.** To assess how well each vendor is positioned for future success, we compared each vendor's product road map with Forrester's forward-looking vision of the functional testing solutions market. We also took into account the ways that vendors are using partnerships to enhance their offerings, how heavily vendors are investing in their solutions, and how vendors are approaching pricing and licensing.

- **Market presence.** We combined information about each vendor's installed base, financial strength, employees, services, and support to gauge its market presence.

Evaluated Vendors Have Comprehensive Solutions And $10 Million In Annual Revenues

Forrester included six vendors in the assessment: Borland, Compuware, Empirix, HP, IBM, and Seapine. Each of these vendors has (see Figure 1):

- **Competitive manual testing, test automation, and test management capabilities.** Because Forrester clients typically look to purchase support for manual testing, test automation, and test management at the same time — and, whenever possible, from the same vendor — we only evaluated vendors with offerings in all three of these categories. Several larger vendors offer a bit of functionality in each of these categories; Microsoft Visual Studio Team System for Testers, for example, has very limited support for manual testing, test automation, and test management. In addition, MKS Integrity provides some support for manual testing and test management, though none for test automation. We excluded these vendors from our evaluation.

- **At least $10 million in annual revenues.** Functional testing solutions are not as costly to implement as other development life-cycle tools, but they're hard to abandon after prolonged use. The switching cost for a functional testing solution increases with every test case created. If this weren't the case, far fewer IT shops would use legacy test automation tools like Compuware QARun, IBM Rational Robot, and Mercury WinRunner when more powerful tools are available from the same vendors. As we did in our 2006 evaluation, we imposed a minimum revenue cutoff to ensure that we evaluated only viable vendors; we excluded Original Software and Worksoft for this reason.

Our evaluation methodology depends in part on input from vendors, including questionnaires, product demonstrations, and strategy interviews. Seapine Software chose not to provide a complete

set of inputs for its functional testing solution, although it did complete an evaluation questionnaire. As a result, our evaluation of Seapine's offering is less comprehensive than our evaluation of the other vendors' offerings.

Figure 1 Evaluated Vendors: Product Information And Selection Criteria

Vendor	Product evaluated	Product version evaluated	Version release date
Borland Software	SilkCentral Test Manager SilkTest	2008 2008	March 2008 June 2008
Compuware	Quality Manager QADirector Test Partner File-AID C/S	5.3.1 5.3.1 6.1.0 4.1.0	May 2007 May 2007 December 2007 May 2008
Empirix	e-Manager Enterprise e-Tester	8.2 8.2	February 2007 February 2007
HP	Quality Center QuickTest Professional	9.2 9.5	June 2007 February 2008
IBM	Rational Manual Tester Rational Functional Tester Rational ClearQuest	7.0.1 7.0.1 7.0.1	October 2007 October 2007 June 2007
Seapine Software	TestTrack Studio QA Wizard Pro	2008.1 2007.3	March 2008 April 2008

Vendor qualification criteria
The vendor's product was generally available at the time of publication, and at least two customer references were available for interviews.
The vendor's solution contained competitive capabilities in manual testing, test automation, and test management.
The vendor's aggregate revenues for the past four trailing quarters were at least $10 million.

Source: Forrester Research, Inc.

IN TODAY'S MARKET, HP IS THE DEFAULT CHOICE

The evaluation uncovered a market in which (see Figure 2):

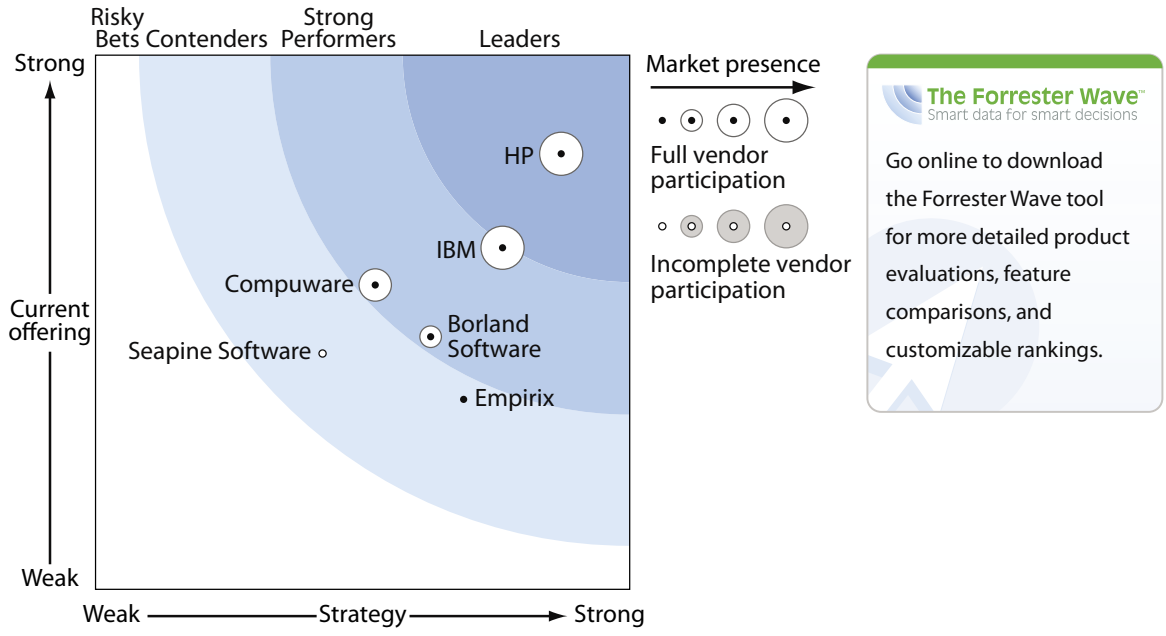
- **HP is the default choice of large testing organizations.** The market leadership of HP — and Mercury before it — is so long-standing that testing organizations making tool selection decisions more often than not begin with HP at the top of their lists. HP's high scores in

our evaluation confirm that this is a rational strategy. What weaknesses, if any, lead testing organizations to choose competing offerings? For years, the main answer has been price, but that reason is now joined by concerns over the quality of support — a major bugbear that HP is scrambling to address.

- **IBM, Borland, and Compuware offer competitive options.** HP isn't the only big name in testing. Test automation tools from Borland and IBM are more popular with technical testers who prefer to work with powerful scripting languages rather than graphical user interfaces. These vendors have attempted to broaden their appeal by beefing up on their support for manual testing. But Compuware, like HP, appeals to testers who have less of a technical bent. Many IT organizations adopt these vendors' testing tools alongside other app dev tooling (in the case of Borland and IBM) or project portfolio management tooling (in the case of Compuware).

- **Empirix and Seapine win on cost but not on features.** Empirix and Seapine offer the most affordable functional testing solutions in our evaluation, but the depth and applicability of features in each of these solutions fall short when compared with other evaluated offerings. Both offerings include relatively limited test automation capabilities with support for a narrow range of environments — Web only for Empirix, and just Internet Explorer at that. Empirix's test management solution also falls short in our evaluation, but Seapine TestTrack Pro stacks up fairly well against the competition.

Figure 2 Forrester Wave™: Functional Testing Solutions, Q3 '08



Source: Forrester Research, Inc.

Figure 2 Forrester Wave™: Functional Testing Solutions, Q3 '08 (Cont.)

	Forrester's Weighting	Borland Software	Compuware	Empirix	HP	IBM
CURRENT OFFERING	50%	2.34	2.82	1.76	4.05	3.18
Operating systems	5%	2.80	2.00	3.20	2.60	4.10
Manual testing	25%	2.10	2.90	2.10	4.60	4.40
Test automation	25%	2.18	3.15	1.84	4.01	3.28
Test management	25%	2.53	3.43	2.08	4.66	2.83
Integration	20%	2.50	1.77	0.50	3.04	1.76
STRATEGY	50%	3.14	2.62	3.45	4.36	3.81
Road map	65%	3.50	3.00	4.00	5.00	4.00
R&D	10%	2.00	0.00	1.80	2.60	4.60
Price	10%	3.00	1.00	4.00	1.00	3.00
Partners	15%	2.40	3.80	1.80	5.00	3.00
MARKET PRESENCE	0%	2.35	3.22	1.45	4.86	4.40
Installed base	60%	2.60	3.00	1.80	5.00	4.20
Financial strength	20%	1.60	3.20	1.00	4.60	4.40
Employees	10%	3.00	4.00	1.00	5.00	5.00
Services and support	10%	1.70	3.80	0.70	4.40	5.00

All scores are based on a scale of 0 (weak) to 5 (strong).

Source: Forrester Research, Inc.

This evaluation of the functional testing solutions market is intended to be a starting point only. We encourage readers to view detailed product evaluations and adapt the criteria weightings to fit their individual needs through the Forrester Wave™ Excel-based vendor comparison tool.

VENDOR PROFILES

Leaders: HP's Dominance Continues Unabated

- **HP has best-in-class capabilities across the board.** HP's functional testing solution, which includes HP Quality Center and HP QuickTest Professional, turned in the best scores in four of our five major evaluation criteria for current offerings: manual testing, test automation, test management, and integration. From a functionality standpoint, HP's most notable weaknesses are its operating system support (Windows only, except through terminal emulation) and its use of VBScript as its primary scripting language. HP is an especially good fit for testing centers of excellence that need to leverage a diverse set of testing skills and to work with a wide range

of applications. In the short term, HP plans to improve its functional testing solution through investments in asset sharing, versioning, baselining, process enforcement, and reporting. In the long term, HP plans to enhance its support for manual testing, test environment management, and test effort management.

Strong Performers: IBM, Borland, And Compuware Offer Competitive Alternatives To HP

- **IBM delivers on manual and automated testing, but test management is still up in the air.** IBM's functional testing solution, which includes IBM Rational Manual Tester, IBM Rational Functional Tester, and IBM ClearQuest, is strong on manual testing, solid on test automation, and weak on test management. Rational Manual Tester is a great tool that hasn't attracted nearly the attention it deserves. And IBM's test automation tool is a good pick for users with programming experience; it supports scripting in either Java or VB.NET. IBM is now porting its test management onto a new platform for the second time in three years, taking it out of ClearQuest and building it on top of Jazz. The Jazz platform is a great base on which to build, but all of this churn makes it difficult for IBM to develop functionality specific to test management. In recent years, IBM has finally built integrations among the products in its functional testing solution, and the result is a start in support for keyword-driven testing.

- **Borland maintains its 4Test legacy while adding more modern capabilities.** The fruits of Borland's investments in its Silk products are clear: SilkCentral, its test management and manual testing tool, has an extremely usable new manual testing client, and SilkTest, its test automation tool, has a new Java scripting engine that integrates with Eclipse. But SilkTest's old manual testing interface and its 4Test scripting remain in place, so existing Silk customers have no cause for concern. Despite these enhancements, Borland failed to excel in any aspect of our evaluation. Areas of weakness in Borland's solution include manual test case component libraries, packaged application support, keyword-driven testing capabilities, and support for test planning and test process enactment. Borland's product road maps for SilkTest and SilkCentral emphasize scalability, environment support, manual testing, lab management, reporting, and third-party integrations.

- **Compuware supports nontechnical users and delivers outstanding test management.** Compuware's functional testing solution includes a wider range of products than the other evaluated vendors' solutions, in part because Compuware is in the process of pulling technology from its Changepoint project portfolio management product into its test management solution. These excellent test management capabilities are now available to all customers, whereas they were previously reserved only for those who purchased Compuware's CARS services offering. Compuware has also enhanced its test automation tool's appeal for nontechnical users by introducing innovative new means of manipulating recorded test cases. Compuware's functional testing solution is notably weak on its integration with related tools and on support for reporting. The road map for this solution includes enhanced support for applications and

technologies, introduction of out-of-the-box test plans and test scripts, better integration with resource management functionality in Changepoint, and improved usability, scalability, and ease of deployment.

Contenders: Empirix And Seapine Offer Less-Capable Alternatives

- **Empirix provides limited support for Web testing and Web testing alone.** Empirix's functional testing solution, which includes e-Manager Enterprise and e-Tester, turned in the worst scores in every major category of our evaluation. Its test automation tool, which generates test scripts in a proprietary language that is inaccessible to end users, performed especially poorly. The tool supports Web testing only — and just Internet Explorer at that. Fortunately, Empirix will bring to market a new Open Scripting Engine later this year and plans to make it easy for communities of users to extend the technologies this new scripting platform supports. Empirix's test management tool is also quite weak; it has no workflow capabilities and does not integrate with any testing or life-cycle tools besides Empirix e-Load for load testing. Oracle announced on March 27, 2008, that it had entered into an agreement to acquire Empirix

- **Seapine undercuts competitors on price but doesn't match them on features**. Seapine is a small but rapidly growing Ohio-based vendor targeting the ALM space; its functional testing solution includes TestTrack Pro TCM for test management and manual testing and QAWizard for test automation. QAWizard includes basic support for test automation, with support for scripting through either graphical interfaces or VBScript. But the tool targets a narrow range of technologies; it has no specialized support for rich Internet application (RIA) technologies, Web services, or packaged applications. Seapine's test management tool is better, but it has almost no integrations with third-party products and virtually no track record of proven scalability. Its license price, however, rings in at around half the price of other evaluated offerings: $1,495 for a floating user license of TestTrack Pro TCM and $7,495 for a floating user license of QAWizard.

SUPPLEMENTAL MATERIAL

Online Resource

The online version of Figure 2 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings.

Data Sources Used In This Forrester Wave

Forrester used a combination of three data sources to assess the strengths and weaknesses of each solution:

- **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.
- **Product demos.** We asked vendors to conduct demonstrations of their product's functionality. We used findings from these product demos to validate details of each vendor's product capabilities.
- **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with two of each vendor's current customers.

The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria to be evaluated in this market. From that initial pool of vendors, we then narrow our final list. We choose these vendors based on: 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation.

After examining past research, user need assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave document — and then score the vendors based on a clearly defined scale. These default weightings are intended only as a starting point, and we encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve.

ENDNOTES

[1] Vendors are just beginning to deliver innovative new features that improve the efficiency of manual testing, but the return on investment for this tool support is already apparent. Examples of valuable manual testing tool features include: 1) libraries of manual test components that can be reused across a wide range of test cases, with alerts concerning, and even automatic updating of, manual test cases that include these components; 2) the ability to flag points in test cases and then fast-forward to them instead of beginning the test case all over again; and 3) automatic data entry and data validation during manual test case execution.

[2] Test automation can slash the cost of text execution, but not all test automation initiatives are equally successful. See the June 9, 2008, "An Introduction To Test Automation" workbook.

[3] Because the returns of test automation increase when automated tests can be executed across configurations, test automation tools are even more powerful when combined with test lab management tools. See the August 20, 2007, "Tradeoffs And Tactics For Test Environments" report.

[4] Commercial test automation tools are designed to support test automation through graphical user interfaces; most open source test automation tools are designed to support test automation through back-end interfaces, including but not limited to APIs. As a result, open source test automation tools tend to: 1) be more suitable for developers' use than testers' use and 2) produce more resilient test scripts. Development teams rarely use test management tools, instead keeping track of their testing efforts with low-tech solutions like spreadsheets and wikis.

[5] The developers behind Selenium, an open source functional test automation tool, intend for it to be a replacement for HP QuickTest Professional. The element selenium is the antidote to Mercury poisoning, and it was through its acquisition of Mercury and its testing assets that HP entered the functional testing solutions market.

[6] There are three primary obstacles to getting test automation started earlier in the life cycle: 1) testers in separate organizations struggle to get involved in the work development teams are doing; 2) test automation engineers struggle to create test scripts that are resilient to high levels of application change; and 3) environments in which system-level tests can be executed are often unavailable until later in the development life cycle. These obstacles are all surmountable, but it does require some heavy lifting.

[7] Examples of low-cost test management tools include ApTest, Traq Software QaTraq, and T-Plan Professional. A list of open source test management tools is available at http://www.opensourcetesting.org/testmgt.php.

[8] The term ALM 2.0, which Forrester coined in 2006, refers to the next generation of tool support for application life-cycle management (ALM). In the past two years, vendors have made progress in moving from ALM 1.0 to ALM 2.0, but no vendor has yet developed a solution that meets Forrester's five criteria for an ALM 2.0 solution. Offerings on the market today fall in between ALM 1.0 and 2.0. As a result, full adoption of ALM as a discipline remains out of reach for the majority of application development organizations due to cost and complexity. See the June 19, 2008, "ALM 2.0: Getting Closer, But Not There Yet" report.

[9] Forrester evaluated leading functional testing solutions — tool suites with support for manual testing, test automation, and test management — across 87 criteria. Our research revealed Mercury Interactive to be the sole Leader in this market, thanks to its relentless focus on environment support and ease of use. See the May 31, 2006, "The Forrester Wave: Functional Testing Solutions, Q2 2006" report and see the February 3, 2005, "Evaluating Automated Functional Testing Tools" report.

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