

MAKING MOBILE APPLICATION TESTING EASIER

Getting on the Inside Track in QA Management Tools

• A WHITE PAPER FROM INTERTEK NSTL

Intertek

NSTL
NATIONAL SOFTWARE TESTING LABS

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SUMMARY

If getting a software application to market is a foot race, then getting mobile applications to market is a foot race among jugglers.

Software quality assurance (QA) managers would never say that their life is easy, or that their management tools are perfect. They need to test for the PC world and sometimes for Mac OS and Unix variants, for compatibility with the most popular browsers, and for interoperability with common servers and client applications. Moreover, they need to remain flexible enough to fit in with the changing schedule of the development team.

But QA of a mobile application usually entails even more. Proper testing on a variety of devices requires a similar variety of unique test scripts. Updated software builds from the development team require testing across dozens or hundreds of combinations of devices. Many large carriers have their own quality standards and test plans to follow, so testing must meet those standards as well. To meet such intensive requirements, many developers rely on test locations scattered around the country or globe, and must manage their workloads for optimal efficiency. If the QA management tools are inadequate, then juggling the resulting profusion of test cases can become the main bottleneck in the race to get mobile applications to market ahead of competitors.

This white paper describes the landscape of mobile application QA, focusing on the management tools used by mobile software companies, publishers and aggregators. Its target audience includes QA staff responsible for specifying, implementing and monitoring testing programs and executives responsible for the cost-effectiveness of the workforce. The white paper explores important features and benefits in a

KEY MESSAGES

- Developers of mobile software applications face more and more hurdles in managing their QA workforce efficiently.
- Most commonly used tools – like bug-tracking software, spreadsheets, e-mail and high-end, vertical packages – are suited to the needs of engineers but not to the needs of QA managers.
- The ideal tool has a small customer-side footprint, centralizes QA management, organizes test results and shortens the time to market for mobile applications.

QA management tool, introduces appRELAYSM Test Center, and describes several inside-track features that help mobile application QA teams successfully juggle in and win the race to launch products on time.

BACKGROUND

What keeps QA managers awake at night?

They face two categories of problem: Too much to accomplish in the time allotted for testing, and inadequate tools for managing the process.

QA Challenges

Some of the challenges are long-term trends at work across the organization; others are tactical problems peculiar to the world of testing.

The Time-Crunch Trend

Whether born into the world of mobile application development or migrating to it from the world of software development, QA teams are learning to deal with the fast pace of mobile application testing. While the two worlds are similar in many ways, the most prominent differences lie in external trends unique to the mobile landscape:

- **Device adoption window** – For many mobile developers, one of the biggest revenue opportunities for an application comes when the handset is first purchased, especially if it has new, interesting features that their particular application shows off. During the first few critical weeks after purchase, most early adopters use the device and explore its software avidly, so the sooner the application is available, the more enthusiasm it can ride and the more revenue it can generate.
- **Logo certification** – Carriers and operators either have their own certification programs or use industry-standard certification programs, such as TRUE BREW® Testing, JavaVerified™, Symbian™ Signed, or Microsoft® Mobile-2Market. Handset manufacturers have also established testing standards for applications they will support or embed. This requirement is an important product differentiator and sometimes a gateway.
- **Diversity of carrier/platform/handset requirements** – Even applications with wide appeal need to run on multiple handsets on multiple platforms with multiple carriers. As the development team and porting team ready the title across the most popular combinations, QA must obtain, set up and execute proper test conditions, then compile all of the test results and bug reports.

These differences eat away at available time in the development schedule. Thus, a developer may cut back on internal QA time to meet the device launch window, to accommodate the logo certification program, or to target specific carrier/platform/handset opportunities.

The Effect of Outsourcing

Engineering and QA functions are moving beyond internal resources. These functions no longer stop when local engineers and testers go home; they continue across time zones.

However, tools currently exist to help manage outsourced engineering tasks (“Fix bug 80533, check in the code and update the trouble ticket”) but provide little help when executing outsourced QA tasks (“Execute test plan 255 in the Beijing lab against yesterday’s build on ABC device running Symbian over an HSDPA interface, then report any bugs and steps to reproduce”). In many cases, available QA management tools are not keeping up with the overhead required for outsourced QA, or are too costly for small to mid-sized developers.

The Effect on Tactics

Aside from the time-crunch and tool-crunch posed by these trends, a number of tactical challenges face testers and their managers:

- **Organization and granularity** – Mobile application QA depends on organizing many combinations of many variables, including version/build number, handset, test location, tester, carrier, test plan number and status.
- **Device availability** – Accessing the handsets needed for thorough testing can be a challenge because it often requires a combination of purchased handsets, outsourced partners and online resources. Managing the availability of these resources can become a serious challenge to the QA manager.
- **Network access** – Some over-the-air testing is impossible where the signal simply does not exist, so QA staff must locate and schedule testing resources within network coverage to avoid unpleasant surprises during certification or roll-out.
- **Global testing reach** – To test with these networks and to take advantage of lower labor costs in other regions,

some developers have multiple locations country- and worldwide. Whether in-house resources or outsourcing partners, these locations require centralized management.

- **Snapshot reporting** – QA is continuously responsible for the answer to the question, “Can we release the product now?” And when they answer, “Not yet,” they must also estimate completion time accurately based on resources inside and outside of the organization.

QA teams meet these trends and challenges in different ways.

Current QA Management Tools

Current tools range from ad hoc approaches to high-end, customized software packages. All of them try to strike a balance between the agility of a collaborative model and the overhead of giving engineers enough information about defects.

Spreadsheets and E-mail

With these ubiquitous vehicles, testers can move written test results, marking completed steps in the plan for reporting status to QA leads.

Spreadsheets and e-mail result in useful trails, and it is possible to introduce structure to them for roll-ups, but they decentralize the reporting function and offer no control over workflow or resources. The only way to build a snapshot of current QA status is to summarize manually the information they contain.

Collaboration Tools

This category includes online applications such as wiki's, Web-based flat files like Google™ Docs, and Web-enabled bug databases like Bugzilla™ and Mantis.

These tools have the advantages of global accessibility, some centralization and low or no cost. However, they are not optimized for the diversity of variables in mobile applications, and they do not usually deliver the detail needed by QA managers as they are typically designed to assist the developers rather than the QA staff.

High-End Management Tools

Vertical products are built to handle many aspects of the

development cycle, including QA. As robust as these products are, they are not optimized as mobile application QA management tools. Also, they tend to be expensive, enterprise-wide packages with feature sets and implementation requirements beyond the needs and budgets of many developers.

In almost every organization these approaches play some role, but some of them offer no growth and others are better suited to the needs of very large companies. Thus, the mobile application landscape is ripe for a new approach to QA management.

WHAT TO LOOK FOR IN A QA MANAGEMENT TOOL

To accommodate the differences between QA of mobile and traditional applications, and to provide the infrastructure common to both, the ideal management tool would satisfy several criteria.

Globally Centralized Test Data and Management

Regardless of where in the world or when the testing takes place, the tool should manage the test data – testbench configurations, test plans, carrier/platform/handset combinations, lab resources, test results – in one place. This gives testers everything they need from one source to perform their testing, and it allows test administrators to allocate or add resources, change priorities and assign tasks efficiently. The most viable way to meet these criteria across time zones and locations is over the Web.

Granularity of Control

With all test data in a single repository, managers can not only check status down to the level of handset model, software build, test plan, location and tester, but also make changes at any of these levels. With the ability to assess productivity, timing and percent-completion of QA tasks, managers can reassign work from one tester or one country to another and derive the greatest advantage from outsourcing and offshoring the QA effort.

Integrated Testing Tool

When testers have one-stop access to everything they need to perform QA – test plans, current status, notifications, changes, reporting forms and binaries – they no longer need to move among tools and documents. This means that the tool must be flexible enough to accommodate additions of and modifications to all of these assets, regardless of complexity or diversity among certification programs. The tool must also automatically collect the results from each step in the test plan and store them for review by QA managers.

Scalable Investment

All developers face budget constraints on QA, so the cost to use the tool should not be excessive; otherwise, it becomes a barrier to entering the marketplace. Developers should be able to scale the costs of using the tool up and down depending on test load.

APPRELAY TEST CENTER – NEW QA MANAGEMENT SOLUTION

Introduction

NSTL's pedigree stretches back to the 1980's, when it began independent testing of software and hardware products. appRELAY Test Center's features and functionality are a direct reflection of the company's continuing experience in pre-testing, QA, consulting and multi-platform certifications.

As technology and industry trends shape testing requirements, NSTL updates its QA management tool for its own extremely high-volume QA business, and customers and users of appRELAY Test Center enjoy the same improvements. The result is a more nimble tool than a client-based package or on-site managed service, offering the competitive advantage of QA software that seamlessly keeps pace with the market.

Designed specifically for mobile application QA, appRELAY Test Center offers developers the inside track on testing: the toolset used for many of the industry's certification programs since 2001.

As the authorized testing lab for many of the software and wireless industries' certification programs, NSTL has created a versatile platform for managing QA to its own specifications, and appRELAY Test Center is the outward-facing version of the platform accessible to all mobile application developers.

appRELAY services

appRELAY Test Center rounds out the long-standing mobile application testing service known as appRELAY. While few developers outsource 100% of their testing, many developers rely on the appRELAY service for external locations, personnel and handsets to supplement their internal resources. (NSTL manages these projects internally using appRELAY Test Center, the source of the same product now offered commercially.)

The combination of the service and the management tool means that QA managers can gauge their QA resources anywhere in the world and make decisions about the amount of work to outsource. Also, since test plans, requirements and existing test results are already stored in appRELAY Test Center, outsourced testing can begin immediately.

With its focus on test plans and reporting/tracking functions, appRELAY Test Center meets the requirements of a worldwide, browser-based, around-the-clock QA system, while providing engineers the information they need to fix bugs.

The Vision Behind appRELAY Test Center

NSTL produces and manages certification programs for several network operators, and has worked with hundreds of developers of mobile applications. The profusion of devices and functionality has made QA very labor-intensive, but all developers face the same need: keeping track of test results across combinations of builds, handsets and test plans.

Developers were turning to the company for testing services before submitting their applications to the very logo programs it manages. The opportunity arose to help developers who were outgrowing the tools they used for reporting results by making available the QA management infrastructure used for appRELAY. This smoothes

the entire path from internal testing through the certification programs.

A new tester represents an investment by the developer: desk, telephone, computer, software, payroll burden, benefits, etc. By making its internal tool available commercially and choosing the SaaS model, NSTL offers the incremental per-seat, per-month investment in appRELAY Test Center as a single-digit-percentage increase in costs, yet a double-digit-percentage increase in productivity.

Any developer using appRELAY Test Center and planning to submit an application to a logo program will benefit from a seamless handoff for certification, and those developers not planning for certification will still enjoy all of the QA management advantages of the tool.

Features and Benefits

appRELAY Test Center embodies the highest priorities for a QA management tool by:

- centralizing test data and management over the Web;
- providing control of resources down to the level of handset, tester, build and plan;
- integrating all testing resources and the collection of test results; and
- limiting the investment in the tool to current needs.

Organization by projects

QA teams can use the Project Management tool to organize their applications or mobile content into projects, and track the percentage of testing completed across an entire application, version, platform or handset. This offers, not only details of the project, but can be a very useful snapshot of where the application is in the process. This view is a powerful management tool.

Projects

- List
 - Active Projects
 - Center City Crosswords
 - Center City Crosswords (BREW)
 - Center City Crosswords (J2ME)
 - Center City Crosswords (M2M)
 - Liberty Bell Lunacy
 - Phish Town Phrenzy

Perform Recursive Query.
By default, bugs and work orders are shown only for the selected project on the left and selected projects in the work orders recursively under the projects. Note that this query might take a long time to run.

Project: Center City Crosswords

% Completed: 42.86%

Start Date: 04/24/08

Due Date:

Work Orders: 0

Bugs: 1

Sub-Projects

ID	Name	Start Date	Due By Date	% Completed	Action
37	Center City Crosswords (BREW)	04/24/08	09/01/08	18.18%	Edit
24	Center City Crosswords (J2ME)	04/24/08	09/01/08	39.29%	Edit
29	Center City Crosswords (M2M)	04/24/08	09/01/08	50%	Edit

Interface to bug tracking tools

QA managers can export newly discovered bugs from appRELAY Test Center to the tracking tools used by their engineering teams. Test Center also features import- and export-integration directly from the user interface with the open source bug tracker Bugzilla.

Home Projects Bugs Help

Tracker > Bugs > Export Bugs

Component:

Product Version:

Bug IDs:

Select Product to Export Bugs to:

Product	Description
<input type="radio"/> Unfiltered Bugs	Unfiltered Bugs
<input checked="" type="radio"/> Center City Crosswords	All Bugs For Center City Crosswords

Find a Specific Bug **Advanced Search** Search Results

Summary:

Select Projects:

- List
- Active Projects
- Center City Crosswords
- Liberty Bell Lunacy
- Phish Town Phrenzy

Status: New, Unconfirmed, Assigned, Reopened, Resolved, Verified, Closed

Resolution: Open, Fixed, Wontfix, Later, Duplicate, WorksForMe, Moved

Severity: Normal, Critical, Major, Blocker, Minor, Trivial, Enhancement

Priority: P1, P2, P3, P4, P5

All test results and status in one place

QA managers can query on all parameters to see status and results of testing, as in this example of a mobile application called Center City Crosswords:

WorkOrderID	Name	Version	DateSubmitted	TestPlan	Phone	Tester	Location_Name	Status	Result
31986	Center City Crosswords	0.8.0	2008-04-24T16:18:08.850	U2ME QA Testing	Sony Ericsson W960	ben.franklin@jeremiel.nstl.com	Faneuil Hall	Completed	Passed
31988	Center City Crosswords	0.8.0	2008-04-24T16:18:08.880	U2ME QA Testing	LGE VX-8500 (1136)	ben.franklin@jeremiel.nstl.com	Faneuil Hall	In Queue	--
31990	Center City Crosswords	0.8.0	2008-04-24T16:18:08.913	U2ME QA Testing	Nokia N78 / Katri	ben.franklin@jeremiel.nstl.com	Faneuil Hall	Completed	Passed
31991	Center City Crosswords	0.8.0	2008-04-24T16:18:08.930	U2ME QA Testing	Nokia N91	ben.franklin@jeremiel.nstl.com	Faneuil Hall	Completed	Passed
31992	Center City Crosswords	0.8.0	2008-04-24T16:18:08.943	U2ME QA Testing	Nokia N95 9GB	ben.franklin@jeremiel.nstl.com	Faneuil Hall	In Queue	--
31996	Center City Crosswords	0.9.0	2008-04-25T14:17:22.683	U2ME QA Testing	Nokia N78 / Katri	ben.franklin@jeremiel.nstl.com	Faneuil Hall	Testing	--
31997	Center City Crosswords	0.9.0	2008-04-25T14:17:22.713	U2ME QA Testing	Nokia N91	ben.franklin@jeremiel.nstl.com	Faneuil Hall	Completed	Failed
31998	Center City Crosswords	0.9.0	2008-04-25T14:17:22.730	U2ME QA Testing	Nokia N95 9GB	ben.franklin@jeremiel.nstl.com	Faneuil Hall	In Queue	--
31999	Center City Crosswords	1.1.0	2008-04-29T13:24:56.503	Regression (TBT)	LGE VX-8500 (1136)	ben.franklin@jeremiel.nstl.com	Faneuil Hall	In Queue	--
32001	Center City Crosswords	1.0.0	2008-04-30T10:57:24.800	BREVW 80-D7204-1Rev. C	LGE VX-8500 (1136)	ben.franklin@jeremiel.nstl.com	Faneuil Hall	In Queue	--

Control over test resources and the ability within the tool to re-deploy them as needed

Whether in a specific test location or in all locations, QA staff can see what every tester is working on at any time.

Furthermore, when testing priorities change, appRELAY Test Center makes it possible to control test assignments by moving them among testers or among locations:

Assign Locations
Select a location to assign work orders

#	<input type="checkbox"/>	Location	ID	Name	Version	Phone	Test Plan
1	<input type="checkbox"/>	Beijing	32005	Center City Crosswords	1.1.0	Sony Ericsson C702	Center City Crosswords (v1.1.1)
2	<input type="checkbox"/>	Bucharest	32003	Center City Crosswords	1.1.0	Sony Ericsson S710a	Center City Crosswords (v1.1.1)
3	<input type="checkbox"/>	Independence Hall	32006	Center City Crosswords	1.1.0	Sony Ericsson S710a	Center City Crosswords (v1.1.1)
4	<input type="checkbox"/>	Beijing	32004	Center City Crosswords	1.1.0	Sony Ericsson W960i	Center City Crosswords (v1.1.1)

The ability to move assignments easily among QA staff and locations is particularly important in testing mobile applications, when handset availability or network coverage can be strictly regional.

All assets required for mobile application testing available to all testers from a single site

appRELAY Test Center is designed to provide the tester with everything needed to perform QA on mobile applications. Upon login, all testers see the workload currently assigned to them:

▶ Advanced Search | ▶ Edit Work Order | ▼ Daily Status | ▶ Time Tracker | ▶ Send SMS/Text Messages |

Work Orders with Timers Running | **My Work Orders**

My Work Orders (Created, Assigned To)
Below is a list of work orders that have been assigned to you or you have submitted.

Work Order ID	Name	Version	Phone	Status	Sub Status	Date Submitted	Submitted By	Lab
31996	Center City Crosswords	0.9.0	Nokia N78 / Katri	Testing	Awaiting Report	4/25/2008 2:17:23 PM	Ben Franklin	Faneuil Hall
32001	Center City Crosswords	1.0.0	LGE VX-8500 (1136)	In Queue	Assigned to Tester	4/30/2008 10:57:25 AM	Ben Franklin	Faneuil Hall
31923	Liberty Bell Lunacy	1.0	LGE VX-8500 (1136)	On Hold		4/11/2008 6:57:39 PM	Ben Franklin	Faneuil Hall
31978	Philadelphia Lunacy	1.0	LGE VX-8500 (1136)	Reviewed		4/23/2008 2:12:24 PM	Ben Franklin	Faneuil Hall

Each work order contains an overview of the application (including attached files such as updated builds); current test status, test time elapsed and comments; information about the handset on which the application should be tested; and the complete test plan as published by the sponsor or carrier.

Instead of working in the parallel worlds of test plan and spreadsheet, testers execute the test plan and enter results and comments directly to the tool.

Seamless access to outsourced QA

Organizations using appRELAY Test Center can easily outsource exceptional or peak testing loads with full access to and visibility into the external resources. During periods of peak testing, this allows QA teams to add personnel, handsets and locations to their resource pool seamlessly, as shown below:

Assign Locations
Select a location to assign work orders

#	<input type="checkbox"/>	Location	ID	Name	Version	Phone	Test Plan
1	<input checked="" type="checkbox"/>	NSTL Lab	32002	Center City Crosswords	1.1.0	Sony Ericsson C702	Center City Crosswords (v1.1.1)
2	<input checked="" type="checkbox"/>	NSTL Lab	32005	Center City Crosswords	1.1.0	Sony Ericsson C702	Center City Crosswords (v1.1.1)
3	<input checked="" type="checkbox"/>	Independence Hall	32003	Center City Crosswords	1.1.0	Sony Ericsson S710a	Center City Crosswords (v1.1.1)
4	<input checked="" type="checkbox"/>	Independence Hall	32006	Center City Crosswords	1.1.0	Sony Ericsson S710a	Center City Crosswords (v1.1.1)
5	<input checked="" type="checkbox"/>	Faneuil Hall	32004	Center City Crosswords	1.1.0	Sony Ericsson W960i	Center City Crosswords (v1.1.1)

Location | : The work order does not contain a handset in that specific lab.

appRELAY Test Center is also aware of the handset inventory in each location to ensure valid re-assignment.

DELIVERING APPRELAY TEST CENTER THROUGH SAAS (SOFTWARE AS A SERVICE)

The workload for mobile application sees occasional, unpredictable spikes which send QA managers scrambling for extra capacity. Mindful of these fluctuations in demand, most organizations prefer to avoid a large up-front investment in a management tool, its infrastructure or its maintenance. SaaS suits these organizations well.

Throughout its evolution, appRELAY Test Center has constantly acquired new features for robust, internal testing. The natural model to follow in taking appRELAY Test Center to market is SaaS, such that external customers receive the same software, benefits and functionality.

Software as a Service (SaaS)

SaaS has become a leading deployment model for organizations wishing to adopt established processes for a particular function, such as customer resource management and sales force automation. The vendor hosts the software on its own infrastructure, and the customer runs the software locally, over the Internet or virtual private network. Among the primary business benefits of SaaS are:

Hosted Infrastructure – In SaaS, the burden of installation, integration and support remains with the vendor. The customer pays per seat, per month for the service and runs it in a small, local footprint. The time and cost of deploying the system and making users productive with it are generally less than with packaged software, which the internal IT team needs to manage.

Software as a Service (SaaS) (continued)

Updates and Upgrades – The vendor maintains the software in the background, so all users automatically and concurrently use the latest release. Because there is a single version of the software, it tends to have fewer bugs, and because it is not running as a local client on the user’s machine, there are fewer compatibility issues.

Scalability – The customer incurs none of the fixed costs associated with adding, changing and removing users according to fluctuating demand, because capacity resides with the vendor. Also, the per-seat, per-month pricing flexibility means that the organization can change its investment in the service to remain on par with the current need for it.

CONCLUSION

appRELAY Test Center represents a new model for QA management tools. Its architecture addresses the QA bottleneck to help mobile application developers meet deadlines and take advantage of ever-shorter windows of market opportunity. Higher productivity and shorter time to market mean that appRELAY Test Center can pay for itself in short order.

With the SaaS model of pricing and hosted infrastructure, centralized management of QA resources in any location, and a small-footprint tool for testers, appRELAY Test Center helps QA teams enjoy the inside track on mobile application testing. ●

For More Information

By phone: Contact us at +1-610-238-5433 to schedule an over-the-Web demonstration of appRELAY Test Center.

On the Web: appRELAY Test Center – www.apprelay.com
Mobile certification services – www.nstl.com or info@nstl.com
Additional Intertek’s testing services – www.intertek.com



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ABOUT INTERTEK NSTL

Intertek NSTL is a member company of Intertek. NSTL is the certification testing division of Intertek NSTL. NSTL was the first organization dedicated to independent testing of personal computer hardware and software, especially the test-

ing of vendor and industry standards. NSTL has facilities in the Americas, Asia, Europe and India. Today, NSTL's focus is the testing of mobile technologies to industry standards such as BREW, Java, Symbian and Windows Mobile.