uTest®

ESSENTIAL GUIDE TO MOBILE APP TESTING

Tips, techniques and trends for launching great mobile apps that will delight your users

YOU DEVELOPED A MOBILE APP ... NOW WHAT?

By the time you finish reading this eBook, the mobile app landscape will have changed. New OS versions will have been released. A bunch of new devices will have hit the market. Cool new apps will have gone viral, gained millions of users and set new standards in user expectations. And mobile app testing will have become that much more complex and challenging.

Discouraged? Don't be. The world of mobile is filled with excitement and opportunity and anyone can have the next hit app! But to make a splash, your app needs to stand up to use by thousands - if not millions - of users around the world with different devices, operating systems, networks, connections and more. To keep those users - *your* users - delighted, your app needs to be thoroughly tested.

Despite the ever-changing mobile landscape, there are some constants in the realm of mobile app quality that organizations of any size - from 10 person startups to major global enterprises - can study, understand and take advantage of.

In the following pages, we'll discuss the mobile landscape, dispel some common myths and outline proven strategies to help you deal with the exhaustive mobile testing matrix. Ready to learn more? Let's get started...

FUN FACT

MOBILE APP DOWNLOADS REACHED 102 BILLION IN 2013, UP FROM 64 BILLION IN 2012.

FREE APPS ACCOUNTED FOR 91% OF ALL DOWNLOADS IN 2013.

(GARTNER)

THE MOBILE BOOM

By now, the mobile boom should be obvious - and it's pretty clear that mobile apps are here to stay. Smartphones are rapidly becoming the primary method of interaction for consumers and businesses worldwide. Smartphone penetration in the United States reach 50% in 2012 and by the second half of 2013 smartphones accounted for 55% of all mobile phones sold worldwide. But mobile goes beyond smartphones and tablets. Apps are now being incorporated into cars, wearable tech and home appliances (which are considerably less "mobile" but still important in terms of applications.)

As mobile adoption increases, apps will become even more critical to the success of businesses. Companies that recognize this trend and take actions to make the quality, security and usability of their applications top priority will find themselves with a tremendous advantage.

THE EXPLOSION OF APPS CAN BE SEEN IN JUST ABOUT EVERY INDUSTRY, FROM CONSUMER USE TO B2B TOOLS:

- Retail: Location-aware mobile commerce, omnichannel offerings, in-store checkout and more
- Media: Magazines and newspapers are going digital and spreading to readers on every operating system
- Travel: Mobile bookings, check-ins, maps and on-demand services
- Education: Tablets and apps are increasingly being used in classrooms and for on-site work training
- Healthcare & Fitness: From digital medical records and at-home care apps to fitness trackers and diet apps, the health and fitness world is going mobile
- Finance: Apps do everything from on-the-go banking to real-time trading and portfolio analysis
- Social: Social networks and geolocation meet-up apps need to follow users wherever they go
- Gaming: From serious console games to casual mobile games, gaming is a top app category that spans user demographics
- Business Apps: CRM, ERP and HR systems are developing mobile access points
- Productivity: Docs, spreadsheets and presentations are increasingly moving to tablets
- Collaboration: Workers are ditching laptops and need to access email, IM and other important features via mobile
- Smart TVs: Media, social, news and gaming apps are in demand on smart TVs
- Emerging tech: Smartwatches, Google Glass, in-car apps, lifestyle and fitness trackers, smart appliances, etc. need optimized and well-testing apps

FUN FACT

IN 2012, 31% OF COMPANIES REPORTED ACTIVELY TESTING MOBILE APPS.

IN 2013, THAT NUMBER ROSE TO 55%. THE INCREASE COULD BE SEEN ACROSS INDUSTRIES.

(WORLD QUALITY REPORT)

MOBILE CHALLENGES

The majority of users expect your app to load within three seconds. If your app doesn't launch fast enough, users will find an alternative and many report that they will never return.

Worse, a poorly performing app can have a negative impact on a user's overall opinion of your brand. A study by SOASTA found that "almost nine out of ten Americans associate negative feelings with brands that have poorly performing websites and mobile apps (88%)."

Right or wrong, users have incredibly high expectations when it comes to app quality.

OTHER PROBLEM AREAS

- OS & Device: If you're aiming for widespread adoption, then you need to provide a seamless user experience regardless of device or OS.
- Security & Privacy: Companies that violate user privacy run the risk of making headlines for all the wrong reasons. Users expect their personal data to remain private and apps to be 100% free of threats.
- Connection Speed: Does your app run the same on 3G, LTE and Wi-Fi? If the answer is no, expect upset users. In some instances, a poor connections can be the difference between a five star and one star review.
- Data Usage: Users are wising up to the fact that some apps drain battery faster than others – and they're abandoning those offending apps in favor of more economical ones. When developing an app, stay mindful of how it functions in all situations.

EXTRA TIP

Want to know what your users are really thinking and saying about your app? Don't dig through app store ratings and reviews by hand - Applause is a mobile app quality tool that does it for you. Applause crawls the ratings and reviews in the Apple App Store, Google Play and Windows Phone Store and produces actionable data that will help you pinpoint trouble areas.

LEARN MORE

WHY FAILING HURTS

Back in the day, one bad customer experience could spread via word-of-mouth and reach a few prospective customers. Thanks to social media, that same word-of-mouth now travels at the speed of light and reaches hundreds, thousands or even more users.

The other major difference is app store ratings. Imagine a poor review stamped directly on your product - that's what happens with bad app store ratings.

"You can launch a beautifully designed native application, but if it crashes, then it will receive a poor rating and users will go elsewhere," said Michael Croghan, Mobile Solutions Architect at USA TODAY. "Our goal is to launch nothing short of a 4.5 star app every time - no exceptions. Anyone can read your app store rating. There's no way to hide poor quality in the world of mobile."

COMMON FUNCTIONAL ISSUES

Like with all software, you need to make sure every facet of your app works as intended. Pay special attention to these key areas.

SIGN-UP & LOGIN •• This may seem like a no-brainer, but if users cannot easily access your app, all your efforts will have been wasted. If your app requires a password and user name, pay close attention to the fields and make sure it's easy for users to enter their information.

MENU OPTIONS •• Menu options can often be difficult to access or decipher. Make sure menu items like Help, About, etc. are easy to find, navigate and click.

ACTIONS •• Any problems related to scrolling, selection, the back button, etc. are bound to lead to trouble.

"MUCH AS WE LOVE FREEDOM AND CHOICE, WE ALSO LOVE THINGS THAT JUST WORK, RELIABLY AND SEAMLESSLY."

CHRIS ANDERSON, *WIRED*

CONNECTION SPEED & CARRIER •• Testing on only one carrier hasn't been an option for a long while. Make sure your basic tests cover the most likely carriers, as performance can vary greatly from one carrier to another.

SCREEN SIZE •• Screen size discrepancies should be a top consideration while testing your app. Does everything look good and work correctly on a range of screen sizes?

INTERRUPTIONS •• How does your app behave when the device battery is at full strength, medium strength and low strength? Your app doesn't operate in a vacuum, so test how it works when interruptions like battery power, SMS, MMS and video calls occur.

ERROR MESSAGES •• Your error messages should be clear, concise and actionable in the eyes of the everyday user.

FUNCTIONAL TESTING

When it comes app functionality, remind all departments from design to development to QA that making sure the product works is a shared responsibility. Test early and test often - combining automated and manual testing to cover your app from every angle.

It is exceptionally important to test the functionality of your app on a range of devices. If an app doesn't render correctly, it can mean navigation or other actions are entirely impossible, making your app essentially useless. And don't forget regression testing any time you change, remove or add a feature. Use the app like you expect a new user to, this will reveal potential problems.

COMMON USABILITY ISSUES

The goal of usability testing is to make sure a user can complete the tasks they are expected to complete. More importantly, they must be able to do so easily and without becoming frustrated. A good user experience can be thwarted by a number issues.

FUNCTIONALITY •• A mobile application must present the user with the appropriate functionality. If the functionality of an application is perceived as incomplete or inadequate, customers may be lost.

LAYOUT & DESIGN •• Good layout and design allow a user to easily complete tasks. Don't offer so many features or content that your app is difficult to navigate. Everything should be easy to see and interact with on a small screen.

INTERACTION •• The flow of an app must be natural and interactions should be easy. For example, if a button is placed in the perceived 'wrong' location, users can become frustrated and abandon the application. If links are too close together, they'll be hard to click.

EXTRA TIP

To learn more about Mobile App Usability, download our free whitepaper.

LEARN MORE

USABILITY TESTING

Not all users are created equal. If you want to get a true sense of your mobile app's usability, be sure to select testers that closely mirror your target audience.

Usability is highly subjective, so take care not to ask leading questions when crafting a usability survey and pay special attention when looking at the survey data. It's imporant for you to seperate minor feedback from recurring issues that hinder the app's usability for a large portion of users.

If you need help navigating the usability testing landscape, consider working with a professional usability expert. Experts can craft surveys, analyze the raw data for meaninful takeaways and give you recommendations based on an understanding of user expectations and current mobile standards.

FUN FACT

Performance issues, crashes and hangs account for roughly 15% to 30% of user complaints in the iOS and Android marketplaces.

COMMON LOAD ISSUES

Load testing is another critical step in the successful launch of an application. If the app's performance is slow, users will likely move to other apps and services.

OUTSIDE VARIABLES •• Be aware of mobile carriers and data usage, which can effect the speed and performance of the application.

MOBILE WEB •• Users expect mobile websites to responde just as quickly as traditional sites. Be careful that your mobile site isn't so bulky that it's slow to load and react.

ACCESS FROM ANYWHERE •• Mobile apps can be used anywhere, therefore they need to be tested with different devices and carriers depending on the region to ensure a consistent experience and load times.

LOAD TESTING

Before you begin load testing, decide what you want to gain from the effort. Do you want to find out how your app performs under steady traffic over time, if you have a data leak, at what point your app breaks under pressure, when it slows down? There are several types of load testing and each accomplishes a different goal.

Though it may be tempting to rely entirely on test scripts running synthetic loads, like in all cases, a machine alone isn't good enough. The most comprensive approach to load testing is to combine synthetic load with live testers and performance engineers. This hybrid approach gives you a human perspective on how your app really looks and performs under pressure and professional engineers can make recommendats for improvments.

EXTRA TIP

To learn more about Mobile App Security Testing, download our free whitepaper.

LEARN MORE

COMMON SECURITY ISSUES

The explosion of mobile presents an entirely new set of security challenges. While most of the security tools and practices used for traditional web and desktop applications are equally applicable to mobile, there are some unique concerns to keep in mind, including lost or stolen devices, mobile malware, data leaks, encryptions and more.

ASK YOURSELF ABOUT:

- Confidentiality: Does your app keep private data private?
- Integrity: Can the data from your app be trusted and verified?
- Authentication: Does your app verify that users are who they say they are?
- Authorization: Does your application properly limit user privileges?
- Availability: Can an attacker take the app offline?
- Non-Repudiation: Does your app keep records of events?

SECURITY TESTING

With the rise of BYOD (bring your own device), making sure your app isn't the gateway for a hacker is crucial for you, your reputation, your users and your users' companies.

Security testing is a practiced skill, not necessarily one a general QA team can adequately accomplish. Likewise, security testing varies depending on what you're testing. Are you testing a mobile website, a web API, a backend server, all the above? If no one on your QA team is willing to dig into security testing on a deep level, find an expert who can fill the gap.

Another crucial aspect that falls under security testing is privacy and transparency. Companies who access unnecessary device features or use data in a way users aren't aware of will suffer an angry backlash when the truth comes out. When testing, make sure your privacy policy and information about handling user data is easy for your users to find and understand.

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SOFTWARE CAN BE CORRECT WITHOUT BEING SECURE. INDEED, SOFTWARE CAN MEET EVERY REQUIREMENT AND PERFORM EVERY SPECIFIED ACTION FLAWLESSLY YET STILL BE EXPLOITED BY A MALICIOUS USER. THIS IS BECAUSE SECURITY BUGS ARE DIFFERENT FROM TRADITIONAL BUGS. IN ORDER TO LOCATE SECURITY BUGS, TESTERS HAVE TO THINK DIFFERENTLY TOO.

JAMES WHITTAKER
TESTING EXPERT

COMMON LOCALIZATION ISSUES

The worldwide proliferation of mobile apps requires your products to be accessible and contextual for users in a variety of markets and regions. But without proper localization, companies can exclude, confuse or offend entire sub-sets of users without even knowing it.

Relying on translation software or outsourcing firms is not the same thing as proper localization. If your app isn't being reviewed by native speakers or people who know the local area, you could be missing major mistakes. Apps that fail to fully account for different cultural understandings will not survive and thrive.

LOCALIZATION TESTING

Localization testing should consider factors such as:

- Content: Static and dynamic content like catalogs, search results, metadata
- Dates: Is the date January 1 or 1 January?
- Characters: Différent länguages have ðifferent setʃ θf characters
- Postal codes: In some countries postal codes contain letters
- Phone numbers: Different formats for different markets
- Direction: Some languages are written left to right, others are right to left
- Currency conversion: Especially important for retailers
- Tax calculation: VAT, sales tax and others vary from country to country
- Cultural context: Words and phrases may technically be translated correctly, but they could have a different implied meaning in another culture

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OUR GLOBAL CUSTOMERS HAVE DIFFERENT DEMANDS. WE WANT PRODUCTS TO ‘FEEL LOCAL’ AND TO SUPPORT FEATURES THAT MAY BE UNIQUE TO SPECIFIC MARKETS. AS WE SPECIALIZE OUR PRODUCTS FOR CERTAIN MARKETS, IT INTRODUCES MORE CHALLENGES FOR TESTING - LIKE REQUIRING SPECIAL CULTURAL KNOWLEDGE.

PATRICK COPELAND

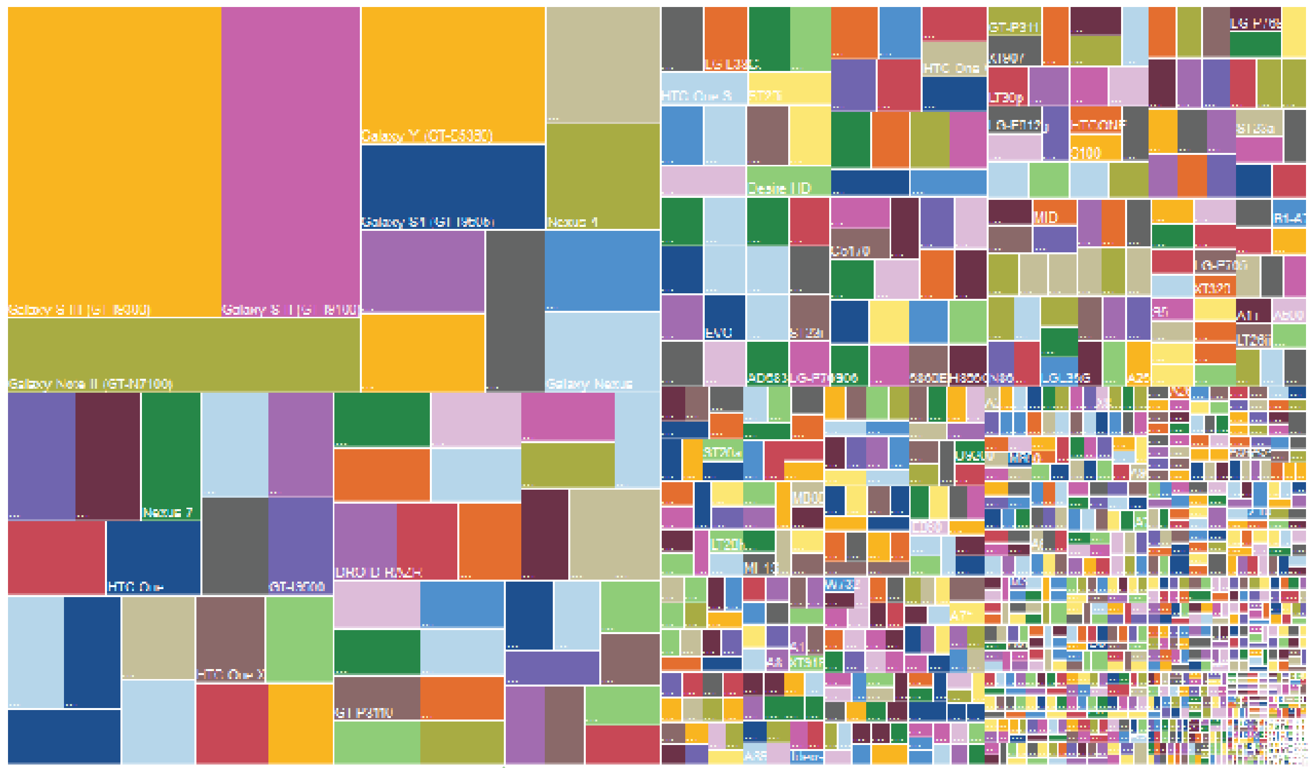
SR. ENGINEERING DIRECTOR, GOOGLE

DEVICE FRAGMENTATION

Perhaps the most difficult aspect of the mobile testing matrix is device fragmentation. Though the iOS device matrix is growing more than ever, fragmentation is especially an issue for the Android operating system.

Take, for example, the image to the right. This is a data chart by OpenSignal of nearly 12,000 separate Android device models encountered in July 2013. (In comparison, the same chart from 2012 found nearly 4,000 devices.)

If you're concerned with quality on cross-platform apps, you'll encounter a similarly complicated matrix.



OPERATING SYSTEM FRAGMENTATION

Although less daunting than the hardware matrix, the variety of mobile operating systems also poses a challenge for dev and engineering teams whose goal is to provide a consistent user experience across platforms.

Even within a single operating system, developers can encounter fragmentation issues. Mobile users are not always quick updaters - and some users who want the latest OS version may not have access to it right away. Developers need to make sure apps work on the newest OS version and several past versions that are likely still in use.

ANDROID •• Though Android is well into version 4+ of their OS, a large portion of users are still on Gingerbread (2.3) and Ice Cream Sandwich (4.0). Google hopes to address Android fragmentation with the release of Kit Kat 4.4.

iOS •• iOS users are traditionally quick updaters, but developers should still support at least one (if not two) back version of Apple's mobile OS.

IN-THE-WILD TESTING

In-the-wild testing is the practice of moving part of your QA out of the lab and into the real world. Testing in real-world conditions provides a better perspective on how apps will work in the hands of your real users. It also gives you access to a greater range of devices, operating systems, versions and carriers. CLICK HERE TO LEARN MORE.

CARRIERS & CONNECTIVITY

If you've ever experienced unexplained inconsistencies with the performance of your mobile app, there's a good chance that carriers and connections are the culprit. Perhaps more than any other criteria, issues associated with carriers are almost always found outside of the lab environment.

Without moving a portion of your testing out of the lab and into the wild, there's no way to ensure quality across carriers and locations. These situations are literally impossible to recreate accurately in a lab.

NATIVE APPS

Native apps have a higher use rate and remain the only option if your app needs to access specific device APIs (such as the camera or address book). Native apps also offer a highly controllable custom experience because they are developed specifically for a designated operating system – so you can control exactly how the app looks on each device. The built-in exposure of being included in an app store is another draw for native apps.

Since a unique native app needs to be created for each operating system, your testing efforts also need to expand. Native apps should always be tested on a range of devices and carriers associated with that operating system, as well as on different versions of the OS.

With the ability of users to rate and review your app in the public app stores, there's little tolerance for poor quality or buggy apps.

THE RISE OF MOBILE WEB

Despite the rise and continued dominance of native apps, mobile optimized websites are still a viable (and sometimes) better) option.

Mobile web is attractive for several reasons. It is often cheaper and easier than creating and maintaining native applications because developers can create one source code that will function across platforms.

It also allows developers to create one cohesive experience that responds automatically to whichever size device a user is on - important in today's world of growing device fragmentation. This responsive design approach is growing in popularity and enables companies to bridge the gap between traditional websites and mobile users.

TESTING NATIVE APPS VS. MOBILE WEB

NATIVE APPS

- Testing begins with app installation and launch
- Testing on some mobile devices requires access to a device ID
- Functionality and usability need to be tested on multiple devices. Consider: OS and version, screen size, custom themes, interruptions
- Many native apps have access to additional APIs. Those connections need to be tested

MOBILE WEB

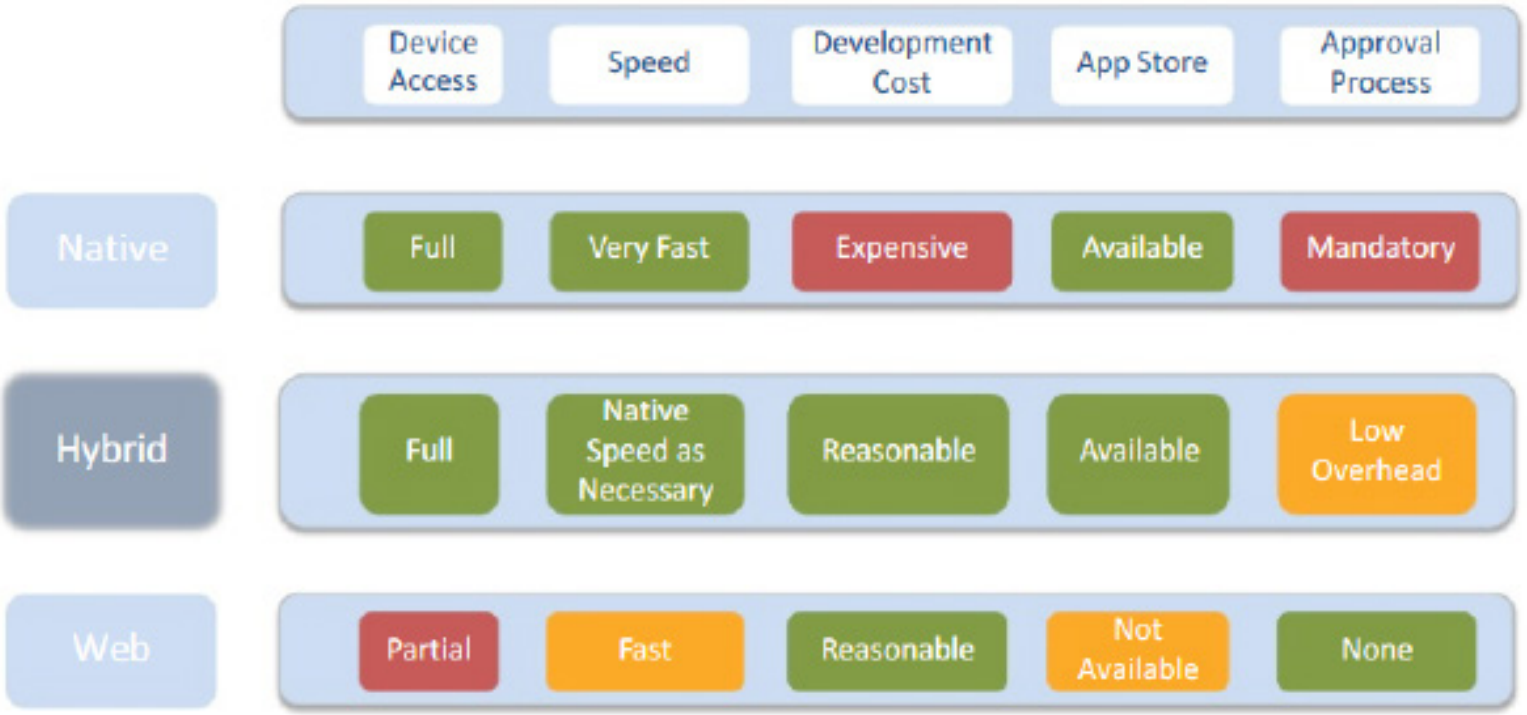
- No installation required
- How does the site render in different mobile browsers
- Requires an internet connection (connectivity varies by location)
- Load time is extremely important to mobile web users. The majority of users expect websites to load within three seconds

HYBRID APPS

When companies decide they want to marry the native app icon, visibility and interface with the ease and content richness of the mobile web, they turn to hybrid apps. Hybrid apps give developers access to the necessary APIs when needed, but also room for additional content that does not need to be specifically formatted according to OS.

Hybrid apps take the shape of a native app with an OS-specific user interface. This native app can offer limited information and navigation options while giving the user the ability to dig deeper by connecting to a mobile optimized site. Alternately, developers may just make a native icon that connects directly to their mobile website. Having a hybrid app has the added bonus of giving the app visibility within app stores and on the device while also maintaining a mobile optimized website for casual browsers.

NATIVE APPS vs. HYBRID APPS vs. MOBILE WEB



SOURCE: WORKLIGHT

CONQUERING THE MOBILE TESTING MATRIX

Historically, when companies wanted to improve testing, they did so within the somewhat sterile environment of a lab – far removed from where their users work, live and play. The evolution of mobile eliminates that option as an effective solution on its own. If testing for mobile apps is conducted exclusively in a central location, teams can't really be sure their apps will work in the hands of their actual users in the real world.

So what's a tech leader to do? Hire testers in key geographic markets? Construct an elaborate QA lab? Spend more on simulators and emulators?

The answer is simple - move a portion of your testing out of the lab and into the wild.

Different than beta testing, professional in-the-wild testing gives you access to experienced testers around the world who will test your app in the same scenarios your users will actually use it. Testers use real hardware, with real software, on imperfect connections. In short, they test under real-world conditions.

EMULATORS & SIMULATORS

Mobile emulators and simulators are still an important testing tool in that they enable developers to verify general functionality and perform regular regression testing.

However, the very nature of emulators and simulators means testing is occurring in an environment far removed from the real world, with a series of actions performed by a mouse and keyboard, not fingers on a touch screen.

The convenience of simulators and emulators can lull teams into a false sense of security. But the advantages of such tools are limited in scope, and should never be considered a substitute for real-world, on-device testing performed by live testers. After all, emulators and simulators aren't dealing with rush hour in LA, testing in the fields of Iowa or holding a device in one hand and a hot cup of coffee in the other ... while on a bus. Using emulators and simulators in tandem with in-the-wild testing will give you the best results.

EXTRA TIP

Some companies offer labs filled with real devices for testing. These tests still rely on computer generated actions and reports. Just because an app didn't crash doesn't mean all the graphics loaded correctly, there were no GUI bugs and links were easy to click with fingers. For that, you need real users on a range of devices.

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SO THERE I WAS, ON MY iPOD TOUCH, TRYING TO GET TO A LIST OF USERS WHOSE NAME STARTED WITH THE LETTER ‘I.’ IT WORKED GREAT ON A SIMULATOR WITH A MOUSE, BUT WITH THE ACTUAL iPOD, MY FINGER WAS TOO FAT TO CLICK THE SINGLE LINE OF PIXELS.

MATT HEUSSER
QA CONSULTANT

CONCLUSION

There was a time when the mobile testing matrix was overwhelmingly complex and difficult to tackle. But thanks to the evolution of in-the-wild testing, that's changed.

As the mobile market continues to grow, those brands that emphasize testing and pay special attention to real-world test coverage will enjoy increased market share, profitability and above all, user loyalty and delight. Those who neglect testing will struggle to keep up in a world filled with app options.

The future of mobile remains bright. Once reserved for a tech-savvy niche, the use of mobile apps is now firmly entrenched in the mainstream. There's no turning back, and that means testing for mobile must rapidly evolve to keep up.

ADDITIONAL RESOURCES

MOBILE USABILITY TESTING •• Still trying to figure out best UX practices for mobile? Learn what really matters when it comes to mobile usability and how to please your users.

LEARN MORE

MOBILE SECURITY TESTING •• The rise of mobile has led to some major security issues. If you want to avoid making headlines for all the wrong reasons, make sure your mobile app is secure in these key areas.

LEARN MORE

iPHONE & iPAD APP TESTING •• If you want your iPhone or iPad app to thrive post-launch, you need to test it on the unique OS it was designed for. Learn the specifics of iOS app testing and launch higher quality apps.

LEARN MORE

ANDROID APP TESTING •• The Android ecosystem is one of the largest and most complex operating systems. With so many different devices, manufacturers, carriers, locations and versions, it's hard to know where to begin testing. These eight tips will help.

LEARN MORE

uTest

ABOUT UTEST

uTest provides real-world testing services for web, desktop and mobile applications. By leveraging a community of 100,000+ professional testers from 200 countries and territories, uTest helps companies test their products under real-world conditions. Thousands of companies – from startups to global enterprises such as Google, Microsoft, HBO, Amazon and USA Today – turn to uTest to complement their in-the-lab testing, and to help them launch better apps. uTest's services span the entire SDLC, including functional, usability, security, localization and load testing.

The company is headquartered near Boston, with offices in Silicon Valley, London and Israel. uTest has raised more than $37MM in funding and consistently generates triple-digit annual revenue growth. The company won the American Business Association's "Most Innovative Company of 2011" award, and was named a "Best Place to Work" by the Boston Business Journal two years in a row.

More info is available at www.utest.com or blog.utest.com. For more info on mobile app testing and quality, visit www.mobileapptesting.com and blog.applause.com.

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