

Business white paper

Keeping up with mobile

Five mobile application challenges



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Mobile devices change everything

The expanded capabilities of mobile devices create unique opportunities to rethink and redesign business processes to take advantage of these features. Along with these changes come a number of challenges for your organization.



From a testing perspective, how can an IT team keep up with the rapid releases and matrix of permutations to deliver a consistent experience?



The variability of bandwidth on mobile networks can have surprising impacts on performance of the mobile and legacy applications.



Security and end-user experience are other factors to consider.

This business white paper discusses mobile application challenges that IT teams face and how HP mobile testing solutions can help with these challenges.

Mobile challenges—there are some

The mobile device market is rapidly changing and evolving. Hundreds of new devices are introduced each year. In the PC era, we had to support one or two PC operating system versions, and one or two browsers, in a relatively stable environment. However, in the mobile market, there are multiple operating systems, which change frequently along with new devices each month and there are various types of network connections.

From a mobile testing perspective, how can an IT team keep up with the rapid releases and matrix of permutations to deliver a consistent experience? Which combinations should be tested, and how often? All these questions create a growing dilemma, especially as more mobile applications become critical to the business.

Consider performance. The variability of bandwidth on mobile networks can have surprising impacts on performance of the mobile and legacy applications. If a system is not architected to account for mobile device access, a few of these devices can seriously degrade the performance of the legacy systems.

Security is also important. Mobile devices can also present unique security challenges, which require adequate care and attention to manage risk. Imagine the risks if your CEO loses his or her smartphone? Are your applications and data still secure?

The end-user experience is another factor. Understanding the experience of your end users is essential, especially if you want to address problems before they become major issues. As the pace of change in the mobile device industry grows, development teams must be closely aligned with the testing and operations teams supporting mobile applications. Let's take a closer look at each of these challenges.



1. Functional validation

While the business is looking to enhance the user experience and bring change to the market faster, QA teams must not only validate the functionality of their mobile applications, they must also adapt existing test processes and methodologies to mobile device-based execution, ensure consistent behavior across many environments, and get test results faster.

These challenges are made all the more difficult by the complexity and variability of mobile applications. “A typical Fortune 1000 company that deploys mobile applications will use at least six different combinations of mobile platform, architecture, and development tools,” according to Gartner.¹

Manual testing, while useful, can be too cumbersome and slow for mobile user demands. Test teams will realize that creating tests that cannot be leveraged across multiple devices, carriers, operating systems, and geographies is also unacceptable. In order to support the overall business goal of agility, testers must update their practices to leverage automation and to include mobile device testing; there is simply no other way to get results fast enough across all the test combinations. After you establish a set of tests that is relatively easy to maintain, reuse of (and return on investment [ROI]) test methodologies can be very high with frequent application releases.

Other questions to answer include evaluating the risk (and budget), and thus the need, for emulator-based solutions and real-device testing solutions. While many teams believe emulator testing is sufficient, you may hear differently from your users when they use the application on their personal devices. The question is: What is the risk for your business? Do you need to spend a little more for real-device testing to guarantee the experience? Do you need devices around the world to test location-based services?

And last but not least, many mobile applications do not stand alone; they are an access point to a larger system. Teams looking to reduce risk and increase test case coverage on these composite applications must be able to test not only the mobile application functionality, but the functionality of a transaction as it traverses through different components, GUIs, services, and databases of a composite system. This is a challenge indeed, as many test teams are not adequately addressing composite application today.

¹ “Put an Integrated Mobile Strategy in Place, or Face Increased Costs Later,” Gartner, July 6, 2010.

2. Performance validation

Applications and mobile websites need to be optimized for the mobile experience and account for the nature of limited and variable bandwidth that is normal on mobile devices. A less obvious performance issue with mobile applications is the impact that the shared mobile network can have on the performance of the application.

You must also test and address mobile applications that present specific performance issues. The most obvious issue is to design mobile applications to function when data connection is spotty. This is not only a design consideration but also a key factor that must be considered when planning a mobile application. That's because when it comes to mobile applications, users have very little patience for sluggish performance. According to The Aberdeen Group, "25 percent of users abandon a mobile app after three seconds of delay."²

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The impact of a mobile device on an existing system can be surprising. When mobile access is added to an existing system, the device has the potential to dramatically slow or crash the system. The problem is that the mobile device typically takes longer to complete transactions, locking up key server resources, which are normally used and released quickly. Based on our internal performance tests conducted, a very small number of slow mobile devices caused up to 200 percent to 300 percent degradation. Performance testing mobile device applications is an essential step in the development and mobile testing process, and should not be overlooked.

3. Security

Security of mobile devices is a major concern, especially as more and more business functions and processes are mobile enabled. This concern was underscored in an IDC study of the mobile security software market, which found that, "More than 50 percent report security or compliance issues in their mobile deployments."³

Mobile applications provide access to information and the ability for users to complete sensitive transactions as if they were connected to the physical network. According to a recent article on PC Advisor, quoting AVG, "56 percent of smartphone owners have lost or had their handset stolen."⁴

Imagine a scenario of a senior executive in a company losing the mobile device in an airport overseas. Will the device fall into the wrong hands and will they be able to access the applications, network, and data on the device? If the security issue is not addressed as part of the requirements and design for an application, then there is a possibility of being exposed to unplanned risks.

If you have accounted for security in the design, then you absolutely need to have an approach to test and validate the security of the application.

Consider these possible dimensions of mobile security: How the application manages authentication is often a key concern, to ensure that the users are actually authorized to access information. Additionally, the information that is stored on the device and the information it transmits must be appropriately and adequately protected. If sensitive information can be processed, the right level of encryption is essential. Don't overlook the risks of unencrypted data being sent over mobile and Wi-Fi networks. Security should be a primary consideration throughout the development and testing of a mobile device application in order to manage and mitigate these risks.

² "First Class Mobile Application Performance Management," August 2012.

³ "Worldwide Mobile Security 2010–2014 Forecast and Analysis," IDC, March 2010.

⁴ PC Advisor article, December 14, 2011 pcadvisor.co.uk/news/security/3325088/56-of-smartdevice-owners-have-lost-or-had-their-device-stolen/



4. In-production monitoring

After you deploy your first mobile application, inevitably, questions will arise: How will IT manage the application? Will your users have a good mobile experience? And, how do you help ensure transaction success? While IT organizations are often able to monitor and manage their traditional IT environments effectively, the solutions they are using may not be adequate for the new complexity that mobility brings.

In order to continue to offer the same or higher quality of service, you need an approach to monitor the end-to-end health of the mobile business services, from the application through the device, carriers, and back-end infrastructure. All these elements can have an impact on the mobile end-user experience, and you definitely want to know about problems before reading about them on Twitter or Facebook or elsewhere online.

5. Patching and updating or development and operations alignment

As mobile applications are often deployed on application marketplaces, where the perception of your application (and brand) is very visible, development teams need to be especially responsive to issues and problems discovered in production. It is impractical, and frankly impossible to test for all possible mobile combinations and situations, which makes it almost certain that patches and updates will be needed.

If the development and operations teams operate in their own traditional silos, the time lag between issue identification and ultimate resolution may exceed the tolerance of many users. This is a case where the speed of change in mobile device applications, makes it acceptable to patch and update applications on a more frequent basis. Whether you call it *DevOps* or not, with mobile device applications, development and operations need to partner and work closely to monitor the deployed applications and consistently drive future enhancement and bug fixes, thereby, improving overall application quality and end-user experience.

Why HP?

The HP approach to mobile testing gives organizations the tools they need to meet these challenges head on. Let's take a closer look at how the HP mobile testing solutions can help with these challenges.

HP functional testing for mobile devices

The HP Unified Functional Testing (UFT) platform is an industry-leading testing automation suite. With UFT, QA engineers can automate test scripts, allowing them to rapidly and frequently execute tests, supporting agile and continuous development processes, which are essential in mobile application development. The UFT is widely used, and is an ideal platform to support automated functional testing of mobile applications. It's extended to support execution of UFT scripts on a wide variety of mobile devices and operating systems.

Automated functional testing with both real devices and emulators is the key to successfully keeping up with all of the mobile changes.

HP performance testing for mobile devices

According to Equation Research, it's estimated that over 70 percent of mobile users expect sites to load roughly as quickly on their mobile phones as on their desktops at home.⁵ Traditionally, performance testing focuses on server utilization and the capacity of the system to handle multiple requests. This continues to be true of mobile applications. However, mobile network also plays a critical part in the performance challenge.

While mobile networks and devices continue to increase in speed and performance, mobile network performance is often inconsistent. The shared mobile network can be overcrowded from time to time or has limited bandwidth; mobile applications can perform sluggishly leading to errors and crashes. Mobile applications (server and device) need to be designed to accommodate variable and inconsistent network connections.

HP LoadRunner, HP Performance Center, and HP Network Virtualization are used by large and small organizations so that their applications support hundreds and thousands of users. The HP Mobile TruClient and HP Mobile Application protocols are designed specifically to record mobile scripts from both browser-based and native applications. And, HP Network Virtualization allows you to test across different network conditions.

Because mobile device applications are often built from services, forming a composite application. HP Service Virtualization can accelerate mobile testing and applications development to help reduce delays.




The simulation of the actual service component's behavior enables testers to carry out functional and performance testing even when the real services are not available or when they are not suitable for the particular test.

The HP security suite of tools, such as HP Fortify, helps highlight security risks and concerns. Lastly, HP Application Performance Management can help to bring the development and operations teams together, reusing test scripts to help enable production performance to be consistent with development's experience, and creating test scripts based on real-user behavior and using common tools, and processes to enable application quality. HP Software mobile testing solutions can help you meet your end-to-end mobile challenges.

⁵ "Engaging the Tablet User: What They Expect From Websites," Equation Research, February, 2011

The opportunities far outweigh the challenges

The explosion of mobile devices and applications is an exciting and innovative opportunity. While there are new challenges that mobile devices bring to the delivery teams, none of the challenges are insurmountable. When planning the development and delivery the following things should be considered:

	Account for device and platform change through automation
	Consider the performance impacts and test accordingly
	Monitor and track the end-user experience
	Align the development and operations areas so they are agile and responsive

Delivering mobile device applications is different, but none of the differences are so substantial that the traditional best practices of planning, architecting, developing, and testing applications don't apply to mobile device applications. Rather, mobile device applications require the same attention to detail and quality that traditional applications do.

Additional resources

[HP mobile performance testing white paper](#)

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