

Introduction

Mobile application testing has emerged as one of the most challenging areas for an IT organization and business. The technology landscape is constantly adopting change and your QA function needs to invest significant time and effort to keep up with the changing hardware, software, communications and processes. You may ask yourself the question how can mobile application testing be any different in comparison to traditional testing methodologies. In order to understand the differences in testing approach, you need to understand the complexities that exist in delivering mobile application functionality to the diverse and distributed user population.

A mobile application is structured as a multi-layered delivery platform comprised of user, transport, business and data layers. The testing process spans across all the components of the framework to verify functionality, consistency and reliability. One of the major components in mobile applications is in user responsive web design. The user responsive web design concept is to create a positive user experience irrespective of the device that is in use. This business requirement is one of the main features that must be factored into a testing approach.

There are other significant factors and challenges in mobile applications that impact an organization's testing approach:

- Platform Fragmentation – platforms, devices, form factors.
- Network Reliability – performance requirements.
- Dynamic Nature – constant change on a hardware and software perspective.
- Test Tool Availability – complex scripting techniques and new tool development.
- Industry Standards – meet industry requirements for flexibility and use.
- Automated Testing – required for mobile environments in an agile world.
- User Behavior - model user processes and environment.
- Volume Predictability – capacity constraints.
- Security – complexity based on platforms and configurations.

For mobile application testing, testing organizations cannot rely on just a black box approach but instead must address testing with a hybrid or proportional approach to test the various layers for delivery of a mobile application. The test process for mobile application testing is more complex on a quality and performance perspective in comparison to enterprise and web-based applications. The methodology needs to have a risk-based component during the strategy/planning process. We will review mobile application testing and the impact on your testing organization.

Mobile Application Testing

Mobile application testing will stretch your testing organization throughout the mobile application development cycle. It will challenge the test team to be innovative in developing a test strategy and plan with corresponding test cases to deal with business functional requirements. The types of testing performed are similar but the methods and processes used to validate the mobile applications will differ. In order to be effective, your test team needs to have a strong understanding of mobile users, devices and impacted platform architecture.

Functional/Compatibility Testing

Functional testing is critical to the success of a mobile application. The user experience and ease of use will make or break the application. If the user has a bad initial experience, chances are the individual will not return to use the application. A significant amount of time needs to be allocated to properly review user interfaces and experience against your requirements.

Each functional component needs to be tested. The mobile devices, operating systems and network provide test scenarios to execute to understand the behavior of how the application works on each targeted configuration. Your test team needs to factor in their application configuration testing that the



mobile devices have less memory and processing power. Creativity is required by your test team with mobile applications during exploratory testing. It is challenging to test the inputs to the mobile device/platforms, interactions with the application store, network, location and data.

For example, do you usually include physical movement and interrupt tests in your functional testing? Rotating the device and traveling to other locations to experience going from Wi-Fi to 3G/4G coverage can have an impact on how the mobile application operates. You need to consider these types of tests in your scope for mobile applications.

Performance/Security Testing

Performance testing must utilize skills developed for enterprise testing but you also must establish new and innovative approaches to properly record mobile traffic and to accurately represent the user experience. Issues can be encountered from the server (e.g., response times, streaming resource intensive data), client (e.g., disparate platforms, memory) and network components. Testing must be performed under various mobile and network conditions to determine that the mobile application can handle anticipated usage. The testing solution must cover the following areas:

- Multiple Mobile Devices with Various Form Factors (e.g., touch, keyboard, slide)
- Diverse Platforms and Operating Systems
- Support Native and Browser-based Applications
- Different Modes of Network Connectivity
- Mobile Network Operators
- Generate or Emulate Load from Various Locations
- Test Mobile Usage
- Security
- Operations/Recovery/Platform

To address mobile application testing, your testing team must leverage real devices, emulators and available test tools on live networks. Cloud platform providers should be reviewed as a potential contributor to testing performance of mobile applications.

Omni Mobile Application Testing Approach

Your IT organization must review current testing procedures and develop a strategy on how the testing team will approach testing mobile applications and the development lifecycle. The strategy will provide a high-level direction for testing mobile applications with a framework detailing the processes to be followed. Based on the specific mobile application to be tested and corresponding business requirements, a test plan will be developed to define the approach to adequately test the application. The plan will include developing test objectives, test strategy, test design and test case execution specific to the mobile application requirements (i.e., native, web, hybrid). The test plan will include establishment of the test environment and test data for the QA process.

Your company must take a fresh approach towards mobile application testing. You will leverage your existing enterprise test methodology but you must be innovative and resourceful in establishing your mobile application test processes. Based on timing, scope, cost and risk, your test team pulls from different testing models to establish a comprehensive test approach.

We address all the basic types of functional testing (i.e., unit, system, integration, UAT) but the process followed for each test type varies and introduces increased complexity. Functional testing ensures that all features and functions of the mobile applications meet business requirements and that the mobile applications are compatible with the technology platforms (hardware, software, operating system). Performance testing will determine the stability of the mobile application and device beyond normal operations and the behavior of the technology up to established thresholds.



Omni Sourcing can assist a company in establishing a mobile application testing process. The first step is to perform an assessment of current testing processes, tools and techniques that govern your quality assurance function. A gap analysis is performed to identify those areas that require adoption of a new model or approach towards mobile application testing.

As previously discussed, in performing mobile application testing you must utilize different testing models to provide sufficient test coverage. Potential testing models include:

1. Test Lab Environment
2. Use of Simulators/Emulators
3. Cloud Testing Using Remote Handset Access
4. Crowd Sourcing (e.g., uTest)
5. Managed Testing Services

In addition to evaluating available test models, you need to evaluate current automated testing tools and determine what tools best fit your current testing environment. With agile development for many mobile application projects, automated tools can provide a streamlined approach towards testing. There are many tools to review in this space and the market is confusing. Some tools are freeware (e.g., FoneMonkey, Frank, UIAutomation, Robotium) and some maintain a cost (e.g., QTP, Eggplant).

The complexity of the technology platforms and hardware/software/network permutations create a significant hurdle. Many factors need to be reviewed in developing your test strategy and plan. It is not feasible to test all permutations. Your test team must utilize a mix of different techniques and tools in testing the mobile application layer. The challenge is how to properly utilize emulators, testing tools and real devices on a live network for the different types of testing to be performed prior to rollout of a new or updated version of a mobile application. The benefit of thinking through the testing process is to provide maximum test coverage, effective test management and efficient execution.

Omni Sourcing can support your mobile application testing needs based on the number of projects that we have performed through the years.

Conclusion

As the percentage of internet usage increases with mobile devices, development and testing organizations must factor this trend into their testing methodologies. Gartner estimates that in 2014 mobile devices will take over from desktops as the most common web access device on a global basis. This is a critical trend to consider as internet and mobile applications increasingly drive revenue generation for an organization. Testing and quality assurance activities must increasingly take a hybrid approach toward dealing with the challenges of responsive websites and mobility as there are different devices, networks, form factors, browsers and countless permutations.

The testing challenge will be in keeping up with the constantly evolving landscape of mobile applications and underlying technology stacks. One approach does not fit all. As a tester, you must experiment with different approaches to achieve your established test objectives and reduce business risk. Do not get caught in the trap of executing a structured set of scripted test cases. In developing your test strategy, take a hybrid approach leveraging exploratory testing, grey box testing, high-level test cases and available tools.

Omni Sourcing is focused on mobile application testing and meeting your business requirements to remain competitive in the marketplace. Our objective is to continue to strive to develop efficient testing solutions for our clients. Our testing solutions provide great business value at cost effective pricing while avoiding any compromise on quality and performance.

