MOBILE TESTING

Whitepaper

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INTRODUCTION

Global mobile users will grow from 3.5 billion in 2015 to 7.8 billion by 2020.

With the growing number of users and consequently devices, also the number of mobile applications (native or hybrid apps) has grown significantly. The use of apps is maturing as businesses are adding mobile as one of their channels, which requires a.o. data quality, security and privacy to be built in.

The market of mobile apps is largely dominated by the Android and the iOS platform:
- Android: 65%
- iOS: 32%
- Others: 3%

To ensure that the apps are working correctly on many different types of platforms and consequently devices and are complying to the security and privacy requirements, thorough testing is needed.

Levi9 offers application test services specifically for mobile devices, which address the specific demands of mobile apps on these mainstream platforms. Our methodology has proven to meet the quality demands of our customers. Levi9 can offer the test services as an integral part of the development of a mobile app or as separate service for testing apps that have been developed by either our customers or 3rd parties.
MOBILE TEST STRATEGY

Why is a mobile test strategy needed?
Testing native and hybrid apps for mobile page devices requires considering the constraints and features of these devices. For example, mobile devices run on a battery and have less powerful processors than personal computers although they have more features. Furthermore, a wide range of screen sizes, hardware specifications, and configurations have to be considered in order to deliver high-quality mobile software. Testing on so many devices, platforms, and operating system versions takes a lot of time and effort and is consequently error-prone.

To minimize time, effort and risk of error, an appropriate strategy is needed to use the time wisely and efficiently. Based on our vast experience in developing mobile apps, we have developed a mobile testing strategy that addresses these challenges. Our strategy is to keep manual and automated testing in balance. Both manual and automated testing scopes follow platform specific UX and mobile specific behaviour based on the target platforms and devices.

In general, we apply our mobile testing strategy in a variety of projects using Android and iOS platforms on the wide range of devices. In special cases, we customize the mobile testing strategy according to the specifics of the project. By adopting the mobile testing strategy, our clients gain effectiveness from both methods and reduce the cost of testing.

Test automation
As mentioned, our strategy consists of both manual and automated testing. Mobile automation testing provides the following benefits:
• High-quality, robust and reliable software
• Integration with continuous delivery can embed quality into the development process and speeds it up; cost-effective, instant testing of new builds
• Faster time to market
• Increased testing efficiency and effectiveness
• Reduced cost of testing, after initial cost of implementation
• Reduced test cycle execution time
• Finding defects earlier

Based on our experience, the best candidates for lab automation are:
• Test cases for the most important functionalities (input fields, buttons, etc.)
• The most commonly used test cases
• Large translations (text in the entire applications)

Test frameworks
The automated tests are well-structured, easy to maintain and, what is more important, reusable. The test frameworks commonly used by Levi nine for test automation on both platforms are Appium and Calabash.

Based on our experience, Appium is more favourable for native applications because it showed a certain instability with hybrid applications. It fits into a wider range of technologies and is suitable for the end to end tests in combination with tools that use the WebDriver protocol.

Calabash is very good in handling different versions of WebView, especially new ones for Android, therefore, it is usually used for hybrid applications. Besides Appium and Calabash a 3rd option is available depending on project requirements and needs, which is called Espresso. This framework can only be used for Android applications when development code is accessible.
Mobile test automation on multiple devices

The execution of automated tests on multiple devices reduces the testing time. It can be done using a device cloud service or in-house device lab.

Device cloud service offers a variety of devices for test automation execution, supports several test automation frameworks as well as very good test results reporting. Automated tests execution on these devices can be included in continuous delivery. Besides, device cloud service can also be used for manual testing which means that remote access allows swiping, gestures, and interaction with a device through a web browser in real time in order to test functionality and reproduce customer issues.

Levi9 has its own in-house device lab which is used for automated tests execution on multiple devices. The lab contains 22 devices running 10 versions of Android and 13 devices running 12 versions of iOS.

Simultaneous tests execution on several devices for both Android and iOS platforms in the controlled environment is the main benefit. So, the automated tests are written once and executed on available devices how many times needed. Execution on multiple devices reduces the cost of mobile testing by several times and accelerates the entire development process.

Manual testing

Although mobile test automation can decrease the scope of manual testing, it still cannot eliminate manual testing. For mobile specific features that require visual attention and sensor interaction, manual testing is still required. In our mobile testing strategy, manual testing is mostly used for:

- Compatibility testing (platform-specific user experience behaviour according to platform rules and guidelines, layout on different screen sizes and resolutions, different device types, multi window)
- Reliability testing (network conditions and transitions)
- Interrupt testing (SMS/MMS/calls, alarms, push messages, notifications)
- Installation testing (installing, uninstalling, updating)
- Non-functional testing (software keyboard, lock/home/back buttons, camera, maps, running an app in background)

In our mobile testing strategy we aim to automate 65% of the test cases. The exact percentage - however - depends on the project specifics.

Location simulation

Location simulation is needed for applications that are meant to work only in one country or perhaps in one specific city or when app features directly depend on GPS coordinates. In these cases, GPS coordinates are the most important test data.

Simulation of GPS coordinates and/or movement through those coordinates should be efficient in order to have quality tests. For location simulation purpose, Levi9 mobile team developed custom mobile application named GPS Simulator. GPS Simulator app features like creating a route to simulate, selecting a speed, repeating the selected simulation are used to provide crucial test data.
Levi9 offers the mobile test services both as an integrated solution combined with mobile software development and Continuous Delivery or as an independent mobile testing service.

Besides the execution of the tests of a mobile application, Levi9 can advise on:

• The right mobile testing strategy for implementing test automation within client’s mobile application development
• Testing services to implement automated tests for client’s mobile applications
• An implementation plan that integrates Continuous Delivery, tooling, processes and an approach for mobile test automation for client’s specific mobile solution
• The right testing strategy for testing an SDK within the SDK development
• The mobile testing services for specific mobile app features, that directly depend on GPS coordinates. Location simulation and simulation of driving through specific routes are used for testing.

Levi9 is a Dutch IT Services company with currently over 850 highly educated and skilled IT professionals in Eastern and Central Europe.

Our teams work remotely on software products and revenue generating systems for Dutch and International clients. We are the technology partner for clients that are looking for reinforcement and a flexible layer of their own IT department, or are looking to co-source or outsource IT development and maintenance.

Levi9 is strong in the area of software R&D and software product development. We strongly believe in DevOps principles, Infrastructure and Test Automation and Continuous Delivery. We work for industry leaders such as TomTom, Bol.com, Drukwerkdeal, WoodWing, Sanoma, Xerox and Swarco.