Table of Contents

1. Introduction .................................................. 03
2. Abstract ....................................................... 03
3. Hexaware’s Mobile Test Automation Solutions ........................................ 04
   3.1 BPT Automation Framework for Mobile Platforms .................................. 04
   3.2 Android Open Source Automation Framework ........................................ 06
4. Conclusion ...................................................... 07
Introduction
It is no surprise that in the day and age of instant-on gratification, mobile devices are gaining momentum. Smartphone Applications are becoming popular in almost all segments of industry. Of all the challenges that come with producing a quality mobile application, testing most likely tops the list. With the exponential growth in the testing matrix of mobile applications (OS, Version, Handset maker, Carrier, Language, Location, etc.), the manual testing cannot simply upkeep with the short durations of test cycles often associated with Rapid Application Development methodologies used for implementing mobile applications. Also, the repetitive nature of testing on different test configurations provides a perfect background for planning test automation. A carefully crafted test automation solution not only provides relief towards testing effort but also enhances the coverage of mobile test configurations.

Abstract
Compatibility Testing is an important aspect of Mobile Application Testing which requires test cases to be executed on various combinations of supported Mobile OS(s) / Versions / Devices (and/or Emulators/Simulators). This requires repetitive test execution of scenarios on multiple test configurations. Test Automation could play an extremely important role for such testing.

- Business Functional Test Scenarios
- Usability Test Scenarios (partially, e.g., Visual Feedback, Confirmation of Actions, etc.)
- Security Test Scenarios
- Stress Testing

Usage of test automation for Mobile Compatibility testing presents higher opportunities for Return on Investment (ROI) as with the right automation suite design, the same set of scripts can be utilized across the devices (and potentially versions) of a Mobile OS. The greater number of execution cycles for the same automation development effort leads to higher ROI potentials.

However, the key to an effective Test automation solution for Mobile Testing is the right automation Framework. Automated test scripts created without the characteristics of re-usability, maintainability and abstraction (of technical and business layers) may not be usable over a period of time and hence do not scale up for testing during planned Mobile Test cycles.

To this end, Hexaware has developed Mobile Test Automation solutions in the form of Automation Frameworks for the major Mobile Platforms – Android, iOS, BlackBerry and Windows Mobile. These Frameworks are broadly categorized into two categories:

- BPT Automation Framework for Mobile Platform (utilizing HP QC and QTP)
- Open Source Automation Framework (currently supported for Android)

These frameworks support the basic characteristics of a maintainable automation system while promoting features like test component re-usability, platform scalability and test data abstraction.
Hexaware’s Mobile Test Automation Solutions

BPT Automation Framework for Mobile Platforms

Hexaware has enhanced its proprietary Test Automation BPT Accelerator Framework to support test automation on major Mobile Platforms including Windows Mobile, BlackBerry, Android and iOS. The Framework provides ready-made automated components for re-use in test script development and facilities to develop new components required to automate Mobile Business Process Tests. The Framework utilizes HP tools, QC and QTP with a plug-in from Jamos Solution (M-eux Test) along with BPT Module of QC to realize test automation of Mobile Applications on a Mobile Device or corresponding Emulators/Simulators.

Framework Features

The following are the features of Hexaware’s Mobile BPT Test Automation Framework:

- Mobile Application Testing Framework is developed as a package Library integrated with Hexaware’s ‘BPT Accelerator Framework’

- The Framework essentially provides two levels of component libraries:
  - Platform specific GUI components - common across all applications for a specific OS
  - Application specific components - that provide business logic realizing the test cases by utilizing the underlying GUI components
Mobile Accelerator

- The combination of pre-defined components and Mobile Application specific business components are created as Business Process Tests to automate the Mobile Application Test scenarios.
- There is no coding required so the framework drastically reduces the test development time.
- For end to end automated integration testing between Mobile and Non-mobile Applications (using other technologies), the BPT Accelerator Framework provides packages for ERPs and technologies including Web, Java, .NET, VB, etc.
- Test Data abstraction is provided through the input parameterization of components referring to the Data files containing set(s) of test data.
- The input dependencies between the mobile/non-mobile components (when one component needs a value provided by another component in the library) is setup by defining the ‘dependencies’ feature within a component.
- The Test Results/logs are customized within the Framework and abstract the business functional details from the technical details of the scripts.
- The Emulator, Device Manager setup/activation is done automatically as part of initial setup components provided in the Framework.

**Framework Configuration**

The Framework is developed using ‘M-eux Test’ plug-in of Jamo Solutions (plug in for QTP). The Plug-in allows Mobile Application objects to be recognized by QTP. The Mobile Application could be used either in the emulator or the actual device.
Mobile Test Automation Advantages
- Extensible to different versions of the Mobile OS, family of Handheld devices (Android, BlackBerry, Windows Mobile, iOS)
- Efficient test script development approach utilizing the benefits of BPT Accelerators
- Reduction in test suite maintenance effort through localized reusable BPT components shared across multiple test scripts, thereby realizing faster ROI
- Opportunities of extending the Framework to other Mobile and non-Mobile Platforms providing a complete Enterprise wide Test Automation Framework
- Test data abstraction from mobile test scripts (Business Process Tests) and hence opportunities of higher sampling of test data with same set of test scripts
- The same test script can be utilized between the devices of the same OS family

Android Open Source Automation Framework
To cater to the requirements of Clients for a cost effective, free automation framework, Hexaware has developed An automation framework utilizing an open source solution called ‘Robotium’. This enhanced framework would help to create Test reports, capture screen shots and validate the application functions as per the test procedures created. The testing team or the client using this framework need not work on Design of framework.

Framework Features & Configuration

Android Robotium Framework Configuration
The base of the Framework is the Instrumentation class for Android called ‘Solo’. Solo provides various methods to interact with the GUI objects in a native Android application. The tests are created as Android JUnit classes in Eclipse by utilizing Solo object and the methods exposed by it.
Some of the characteristics of this framework are:

- The Framework works on all Android Emulators and Devices
- It can be utilized to automate test scenarios for Android Native Applications
- Supports all available versions of Android
- Can be used as an extension to the Android Development project to automated developer testing for Android Applications
- Does not require any hooks into Android Application under test
- The Test scripts can be re-used across different devices of same Android versions

**Future Direction**

With the successful implementation of open source framework for Android, we are planning to extend open source solution for other Mobile OS(s) including iOS and BlackBerry. The current framework for Android would also be enhanced to provide library of test components for a rapid automation development capabilities.

**Conclusion**

While test automation can be highly beneficial for reducing the test effort for an otherwise humongous test strategy on Mobile platforms, the utilization of appropriate framework is the key. Hexaware’s Mobile Test automation solutions strive towards achieving the goals for a successful test automation implementation with the required elements of maintainability and test reusability. These solutions when integrated with careful planning and correct testing methodologies could ensure the success of Mobile Testing projects.

To learn more, visit [http://hexaware.com/resources/white-paper/?vertical=quality-assurance-and-testing-service](http://hexaware.com/resources/white-paper/?vertical=quality-assurance-and-testing-service)