Becoming a Pro (II)

IN Mobile Applications Testing

APP RISK ANALYSIS

What about … – Functional Testing – What Does it do?

Does the app perform the designed tasks?	Does the app perform non-designed tasks?	Is prevention of actions adequate?
Does the app ask me to turn on services? For example, location specific, Wi-Fi, and social media.	Is the user redirected? If so, where? From app to Web or visa versa? What do errors look like?	Does the user interface (UI) and design work as intended? Is there room for misunderstanding or error?
Is the UI appropriate for the form factor? For example, phone versus tablet, screen size, resolution, and existence of hardware buttons or keyboard.	Does it comply with any standards, good practice and guidelines?	Is the mobile app consistent with the desktop version, if it exists?

APP RISK ANALYSIS

What about … – Data – Testing What It Processes?

How time applied to the app? For example phone time and server time? What about time zones?

What does it track and update? For example, reward points, friends, purchases, check-ins, social updates and user activity.

Does it sync and update?

What happens when it can't sync or update

Connecting through a paywall and haven't yet authenticated (Wi-Fi in Starbucks, an airport, or a local pub)

Disconnected because Web filtering rejected the request

Is there consistency between Web and mobile?

What clues can analytics provide?

How are things like user details and data saved?

What about data input and output? What type of data is accepted? For example, locations, preferences, friends, contacts, languages, files, size, media and audio

APP RISK ANALYSIS

What about : Platform – What Does it depend on?

Change the device settings around. What do you notice?	What permissions does the app need?	What tablet device is being used? What version of hardware or software?
Review app store submission requirements	Test content. For example, text size, content adjustment and responsive design.	Test the UI and touchscreen gestures. For example, swipe, zoom, pinch, multi-touch, shake and orientation.
Test peripherals. For example, keyboards, Mi-fi devices, BT peripherals, iBeacon, and syncing peripherals.	Test Camera, if applicable. For example, taking photos, using stored photos and photo data.	How does the app run when the device is locked?

APP RISK ANALYSIS

Operations – How Is It Used?

Wi-Fi	3G	4G
Intermittent	Airplane mode	NFC
Through a proxy	Testing under no, low and partial connectivity	

APP RISK ANALYSIS

How Is Data Saved?

- Does the app write to the SD card?
- What happens if the SD card is full? What happens if it is removed?
- Is data saved online (in the cloud)?
- If the data is saved online, can it be retrieved after reinstalling the app, or will it be available on the app on a different device with the same user account?
- If the cloud is used, how does lack of connectivity affect the user experience?
- Is the data saved securely? (See “Security” section)
- What if data is lost? Are there backups?

APP RISK ANALYSIS

Interruptions?

- Phone calls
- Text messages
- App notifications
- Battery Warning
- Forced updates
- Voicemail
- Switching between apps
- Locking and unlocking the screen
- Music playing while using the app
- MAM/MDM solution running on the device
- Out of memory (general performance interruptions)
- Data app interruptions (WhatsApp, Viber, Tango)
- Audio interrupts from multiple sources (iPod, Media player, Other audio apps)

APP RISK ANALYSIS

Customer Feedback

What are customers saying about app?

App reviews

App ratings / comments

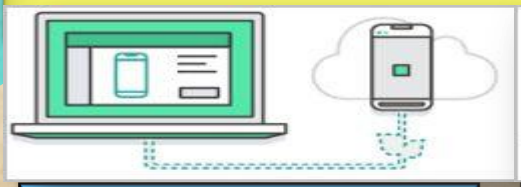
Comments, forum posts and articles on the (social) web

Complaints and support request

Overview: *Mobile APPS*

- Categories
- Types
- Distribution/Installation/Logs
- Mobile Test Industry Standards
- Remote Device Access (RDA)
- Emulators
- Simulators
- Troubleshooting Guide
- App Risk Analysis

REMOTE DEVICE ACCESS (RDA)



Manual application and website testing run on the company`s devices

Website testing on multiple devices with URL input

Fast screenshot export

PC keyboard text input

Application testing supported with outgoing and incoming text messages

Calls and messages exchange among several virtual devices

Scalable picture from device to PC

Control over audio/video quality (important for slow Internet connection)

Full control over the device operation process (physical and virtual keypad, touch and slide functions, g-sensor, device restart, battery disconnection)

Operation of an unlimited number of devices simultaneously (with an hourly fee)

Test case manager, business paper organizer

Automation script creation and processing upon several devices (enterprise package)

REMOTE DEVICE ACCESS (RDA) Summary

Provides testing access to a huge variety of mobile devices.

The specialty of the service is that they actually make use of remote connection to real devices

it's the real thing you are testing against, and not just an emulator.

DA Service can be used for testing of mobile websites as well as HTML5 hybrid apps and native apps.

Works on: Windows, Linux, Mac OS X

Brief Comparison between DeviceAnywhere (DA) and PerfectoMobile(PM)

DA - has wider scope of devices covering multiple countries- covering US/UK/France/Europe etc.. and supports corresponding carriers when compared to PM.

DA has wide range of handsets when compared to PM.

Camera quality is really good in DA when compared to PM(for taking screenshots, capturing videos)

PM has advantage with regards to automation over DA.

PM is cheaper when compared to DA

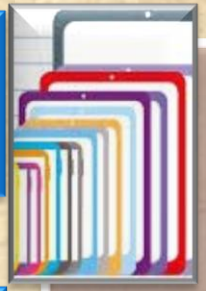
PM supports Indian carriers where as DA does not.

Overview: *Mobile APPS*

- Categories
- Types
- Distribution/Installation/Logs
- Mobile Test Industry Standards
- Remote Device Access (RDA)
- Emulators
- Simulators
- Troubleshooting Guide
- App Risk Analysis

EMULATORS : MOBILE

- Generally provided by Device Manufacturers and simulate the actual device.
- An Emulator has the goal of taking the place of the real (in our case) mobile device.
- Emulator duplicates every aspect of the original device's behaviour, both hardware and software.
- Basically simulates all of the hardware the real device uses, allowing the exact same app to run on it unmodified, and all of the software.



DEVICE EMULATORS

Excellent for testing your site or application on a particular device or set of devices.

BROWSER EMULATORS

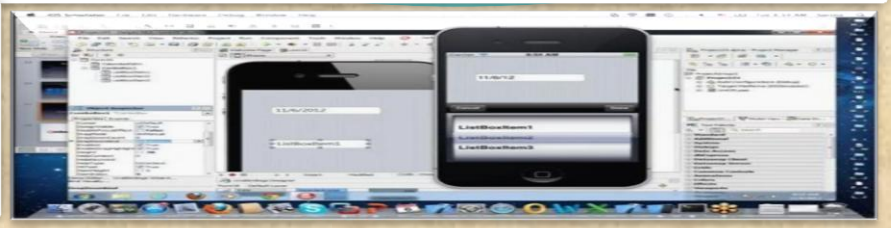
These simulate mobile browser environments. Whilst useful for determining the functionality available in a particular mobile browser, they are useless for device-specific testing.

Operating System Emulators

Microsoft provides emulators for Windows Mobile, and Google provides an emulator for Android. These run within a simulated mobile device environment and provide access to applications running within the operating system, e.g. a Web browser.

EMULATORS : MOST POPULAR

There are a large number of emulators available.
The following companies offer emulators for some or all of their mobile devices :



- Research in Motion (BlackBerry)
- Apple (iPhone)
- Samsung
- Palm
- LG
- Motorola

Browser Emulators

- Opera Mini
- Openwave

Operating system emulators are available from:

- Microsoft (Windows Mobile)
- Google (Android)
- Nokia (Series 40 and Series 60)

EMULATORS :Android

Android Emulator comes as part of the android SDK commonly known as AVD – Android Virtual Device. It lets the user to prototype, develop, and test Android applications without using a physical device.

Android Emulators

The AVD's are OS version specific and provides the user the flexibility to customize OS version, resolution,skin, sd card size and various other hardware properties to be emulated.

There are many command line utilities and tools which comes as part of the sdk which makes it easy to debug and interact with emulator

Prerequisites for Android Emulator

- JRE – Java Runtime Environment
- Android SDK

Installing an application on Android Emulator

- If the application is available in Google Playstore it can be directly downloaded and installed on to the device.
- If the application is available in '.apk' format ,it can be installed using the command, 'adb install ' .

Adb is a command line utility which comes as part of the SDK.

EMULATORS : iPhone

A note about terminology:

The terms '***Mobile Emulator***' and '***Simulator***' are sometimes used interchangeably.

It doesn't help that *Apple* considers its native emulator a 'simulator' whereas *Android* tools are called emulators.

In the case of *Apple*, you need ***Xcode***

- *Apple always harps on the importance of device testing because iPhone Simulator does not emulate an iPhone processor, disk drive, memory constraints and whatnot.*
- *You hardly ever get memory warnings unless your Mac is struggling to manage resources itself, unless you simulate (again) memory warnings from the Simulator's menu item.*

EMULATORS : Blackberry

BlackBerry Simulators is different from the other emulators as this is Device model specific (rather than OS version) • Easy to use interface for installing and testing apps

Blackberry Emulators

• Model specific blackberry emulators are available from RIM as standalone window applications and also along with BB JDK.

• The BlackBerry MDS Simulator and the BlackBerry Email Simulator simulates internet and email services respectively.

Prerequisites for Blackberry Simulator

• JRE – Java Runtime Environment

• Blackberry simulator package • Blackberry email and MDS Simulator

Installing an application on Blackberry emulator

• If the application is in .cod format, it can be directly loaded in to the emulator from the menu options in emulator.

• If the simulator is being used with an IDE or Blackberry JDE it directly loads the application into the simulator and runs it.

• The blackberry device manager can also be used to for installing the applications on emulator and device

EMULATORS : Windows Phone

Windows Phone 7 is a mobile operating system developed by Microsoft, and is the successor to its Windows Mobile platform.

The Windows Phone 7 emulator comes with SDK and Windows Developer Tool Kit.

Pre-requisites for the emulator

- Windows Vista and higher Desktop OS
- Microsoft Silverlight along with silver light toolkit for windows phone
- Visual Studio 2010
- Windows mobile 7 sdk

Installing applications in emulator

- Open the "Application Deployment" tool which is the part of "Windows Phone Developers Tool"
- Provide the path to the .xap file of the application in the tool
- The emulator opens showing the application that has been installed

EMULATORS Pros and Cons

1. Freeware and easily downloadable for use

2. It is possible real time scenarios like out of network, Emergency calls etc

3. Since emulator integrates with the development IDE, it would be easy to debug the application for a developer.

1. The Real live interactions cannot be performed(Ex. scanning , capturing etc)

- It is not possible to test the applications on a live network connectivity.

2. It just mimics the mobile device from various platforms and hence testing on the emulator cannot guarantee the stability of the application.

3. Some of the interruption test scenarios may also not work properly as like in real handset to predict the actual behavior of the application.

4. Memory Leak issues and Performance issues cannot be detected.

5. Dependency on platform to launch the simulator (Ex. MAC Desktop)

EMULATORS vs Real Devices

USER EXPERIENCE AND USABILITY

- User Interactions
- Real occurring events
- Overall performance
- Consistency in results

SPECTRUM OF DEVICE CONFIGURATIONS (HARDWARE)

- Chipset
- Display
- Memory
- Sensors

PLATFORM + CUSTOMIZATIONS (SOFTWARE)

- Platform/OS version
- OEM and Carrier customizations
- *Dependencies to other software/app*

INFRASTRUCTURE (NETWORK)

- Network/WiFi

EMULATORS vs Real Devices Summary

Testing types	Device	Emulator
Unit Testing		
Sanity &Acceptance		
Functionality Testing		
Interruption		
Regression		
Localization		
Compatibility		
Negative		
User Acceptance Testing		
Performance and security		

Legend: Support - No; Support - Yes; Support - Partial

EMULATOR

When there is a necessity to observe the behaviors of the software product under various adverse conditions such as memory shortage of the device;

In the process of finding obvious issues on several platforms, performing functional testing.

You need to test your app on as many devices as possible to ensure the maximal coverage either geographically or globally.

REAL DEVICE

One of the main tasks of the mobile applications testing is usability testing, which is impossible without having the real device at hand;

Real mobile devices mean real user environment. Some definite actions like scrolling and zooming are to a great extent different on the touchscreen;

Only actual mobile device has the platform that is suitable for testing experiences of the end-users;

Usage of real devices is much needed in the process of testing the hardware characteristics, such as quality of the display. Besides, the best way of testing memory consumption is testing it on the whole range of actual devices;

It is impossible to monitor possible network issues with the help of an emulator. In this case you will definitely need an actual mobile device

EMULATORS : Mobile Automation- Desktop Based

Mobile test automation tools are installed on a desktop locally
Interacts with the mobile devices through USB connection or Wi-Fi
Mobile Apps can be installed & tested on both Emulators as well as real devices

A Typical set up for Mobile Test Automation