Becoming a Pro (II)

IN Mobile Applications Testing

Overview: *Mobile APPS*

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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

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

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

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.

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EMULATORS : MOBILE

Generally provided by Device Manufacturers and simulate the actual device.

DEVICE EMULATORS

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

An Emulator has the goal of taking the place of the real (in our case) mobile device.

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.

Emulator duplicates every aspect of the original device's behaviour, both hardware and software.

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.

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.

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 Pros and Cons

Pros:

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.

Cons:

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 emulator (Ex. MAC Desktop)

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

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Simulators : MOBILE

Mobile Simulator is a software application for a personal computer which creates a virtual machine version of a mobile device, such as a mobile phone, iPhone, other smartphone, or calculator, on the computer.

The mobile simulator allows the user to use features and run applications on the virtual mobile on their computer as though it was the actual mobile device.

A mobile simulator lets you test a website and determine how well it performs on various types of mobile devices.

A good simulator tests mobile content quickly on multiple browsers and emulates several device profiles simultaneously.

This allows analysis of mobile content in real-time, locate errors in code, view rendering in an environment that simulates the mobile browser, and optimize the site for performance.

Mobile simulators may be developed using programming languages such as Java and .NET

A **SIMULATOR** sets up a similar environment to the original device's OS, but doesn't attempt to simulate the real device's hardware.

Some programs may run a little differently, and it may require other changes (like that the program be compiled for the computer's CPU instead of the device's), but it's a close enough match that you can do most of your development against the simulator.

Simulators Pros and Cons

1. Study the behavior of a system without building it.

2. Results are accurate in general, compared to analytical model.

3. Help to find un-expected phenomenon, behavior of the system.

4. Easy to perform ``What-If'' analysis.

1. No support for placing or receiving actual phone calls.

You can simulate phone calls through the emulator console, however.

2. No support for USB connections

3. No support for camera/video capture (input).

4. No support for determining connected state

5. No support for Bluetooth

6. No support for actual GPS

7. No support for Accelerometer feature used in Gaming applications

APP RISK ANALYSIS

Setting Up a Mobile Test Lab

What mobile devices will you use to test?	What devices are officially supported?	Make a decision based on user statistics	How will you source the devices?
When will you use an emulator or a real device?	What software will be maintained on the mobile devices?	How will the devices be managed and stored?	How can you be effective with the device power consumption? Do the devices really need to be charging all the time?
How will you load apps onto multiple devices?	Is there a need for a booking system for test devices?	How will you label devices with useful information? (OS, screen resolution, pixel density)	Can you use a background image to communicate information to the user of the device? For example, device information or a reminder of guidelines.

APP RISK ANALYSIS

What Makes a Mobile App or Website...ACCESSABLE?

Does audio and voiceover function and make sense?	Can you zoom in and out effectively?	Does the app accommodate all sizes of text?	Does the full list of touch device options work?
How large can on-screen buttons and navigation be?	Is there voice activation or control?	Is color contrast at a sufficient accessible level?	Is it worth considering audible, visible and vibrating alerts?
How does the app look inverted in colors? For example, white on black.	Have you explored the accessibility features of the app and mobile device you are using?	What types of gesture controls are available	

APP RISK ANALYSYS

What Makes a Mobile App or Website...Social?

Can you register as a user via the app?

Can you login via the app?

Do you remain logged in when the app is not in use? If not, how does that affect the user experience?

Does the app or website support social authentication methods?

How easy is it to share media content, links, or files as well as comments and notes?

How easy is it to disconnect updates and communications via the app?

Can notifications be switched off or changed?

APP RISK ANALYSYS

What Makes a Mobile App or Website…Secure?

Can the app be decompiled?

How secure is the connection to the cloud server, if used?

Can the data in transit be intercepted and decoded?

Is any data or temporary data that the app uses stored securely on the device?

Is all app data removed when the app is uninstalled?

Is the app obfuscated using ProGuard/Dex Guard (Android only)

Does the app authenticate? How?

After an update, is my data still safe?

Should the user automatically log out after a period of time?

Can security be changed from other devices or websites?

What happens if the user gets locked out?

APP RISK ANALYSIS

What about … – The Product – What Are The Basics?

Can I download the app?

Can I download an update?

Can I update the app when there are multiple updates available? What happens if I don't update?

What happens when the OS is updated?

With what systems should it be compatible? For example, OS, platforms and browsers.

Can I uninstall the app?

Can I re-install the app?

Can I downgrade? Should I be able to downgrade?

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

GOOD LUCK!!!

THERE ARE NO LIMITS TO WHAT YOU CAN ACCOMPLISH, EXCEPT THE LIMITS YOU PLACE ON YOUR OWN THINKING.

BRIAN TRACY