



White Paper : Select the BEST Handsets to Test Android Apps

Mindfire Solutions

www.mindfiresolutions.com

28th July, 2013

Abstract:

With the ever increasing fragmentation in the Android device market, the developers and the QA personnel must take up to the challenge of ensuring that their apps provide an optimal and coherent user experience across a wide variety of handsets and tablets. This document explains the fragmentation in the Android ecosystem w.r.t. the variety of OS flavours, handsets, screen sizes, screen densities and carriers. It then offers a solution to help the developers/QA pick the best set of handsets for testing their app, based on one or more of these factors. We at Mindfire Solutions, have successfully applied these techniques to help our clients select the best pick of handsets to test their app.

Contents:

Introduction.....	2
Fragmentation in context of Android Ecosystem.....	2
Can't we use Emulators?.....	3
Making the Smart Choice.....	3
Conclusion.....	6
Real World Applications.....	6
References.....	6

Introduction

One of the most common issues while testing an Android app is the subset of devices one should choose to ensure that the app gives a seamless performance on most of the Android handsets. In this whitepaper we present a solutions that helped many of our clients choose the best pick of Android handsets to test their apps, with the confidence of covering the maximum device market.

Fragmentation in context of Android Ecosystem

With a large number of custom versions of the Android platform emerging, there are concerns that this fragmentation will result in the inability of some devices to properly run apps written with the Android SDK. Despite several efforts from Google to help quell fears of Android fragmentation, the threats about device-specific apps leading to interoperability issues persist nonetheless. The most important reasons for testing the app over a number of handsets are:

- **Different OS versions:** Android 2.0 (Eclair) was released in October 2009, and within the next 3 years, as many as 12 new versions (with different API levels) were launched. This fact shows how fast the Android Operating System is evolving. This requires both the developers and testers to adapt quickly - not just to maintain pace with the newer OS flavours but also to ensure backward compatibility.
- **Different Screen sizes:** The app should try to provide a consistent user experience across a variety of screen sizes of Android devices. These are usually categorized into 4 generalised sizes: small, normal, large and xlarge.

Screen Orientation - It is considered a variation of screen size and it becomes important to test whether the app revises its layout on changing from landscape to portrait and vice-versa to optimize the user experience along with avoiding any functionality break.

- **Different Screen Densities:** This is another screen property on which the app should provide as much compatibility as possible. Again, there are four generalised densities: low (ldpi), medium (mdpi), high (hdpi), extra high (xhdpi)
- **Different Device Manufacturers and Handsets:** A 2012 report from OpenSignal published the logged data of 681,900 devices, which downloaded one of their apps. The extent of device fragmentation was clearly evident with 3997 distinct Android devices, spanning around 599 distinct brands across 195 countries spotted in this study. Again, over 1363 devices appeared only once in their database due to custom ROMs overwriting the android.build.MODEL variable. The number of distinct android devices is expected to have catapulted to around 12,000 in 2013.

Can't we use Emulators?

Emulators are handy in the sense that they allow the developer to test their app on a number of OS versions, screen sizes etc. But that is not sufficient to ensure top quality performance in real world where we need to see how user-friendly, light and aesthetic the app is on actual physical devices. Besides these very crucial factors, there are some technical factors too on which we can't take the emulator's word for granted: actual RAM and processor consumption is one of them. Moreover, device specific features like accelerometer cannot be tested using emulators.

Making the Smart Choice

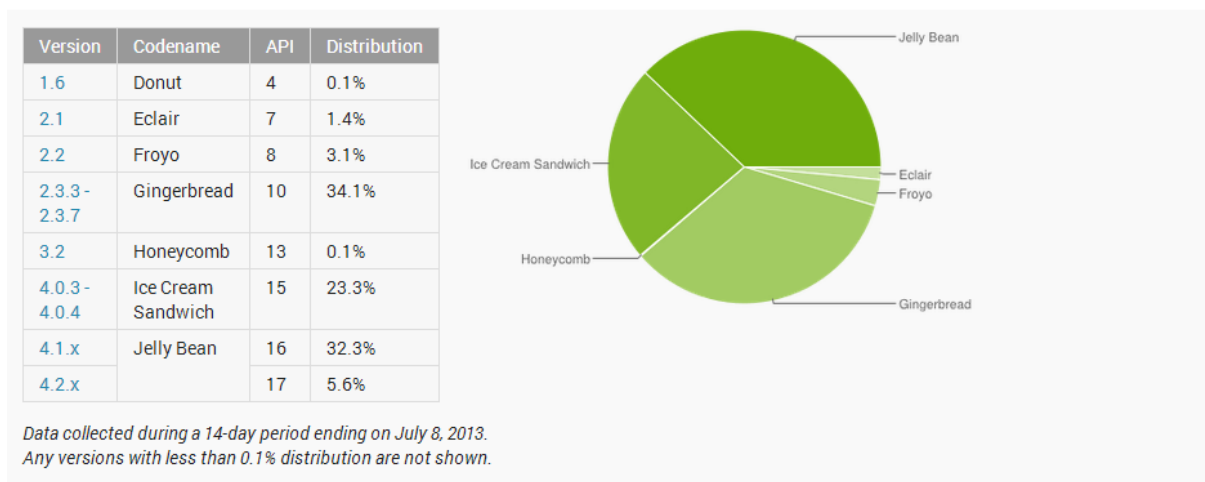
Today there a number of ways in which we can wisely choose the most appropriate set of devices to test your app. Here are few of them:

1. Using statistics of Google Play Store to narrow down on the device parameters

Android Developer site provides a plethora of information which if carefully analyzed can help us to concentrate on the most important aspects of the device world.

Android OS versions:

The android developer site publishes a bimonthly data on the relative number of devices running a given version of the Android platform. At the time of writing this article, following was the distribution of different Android versions across the world.



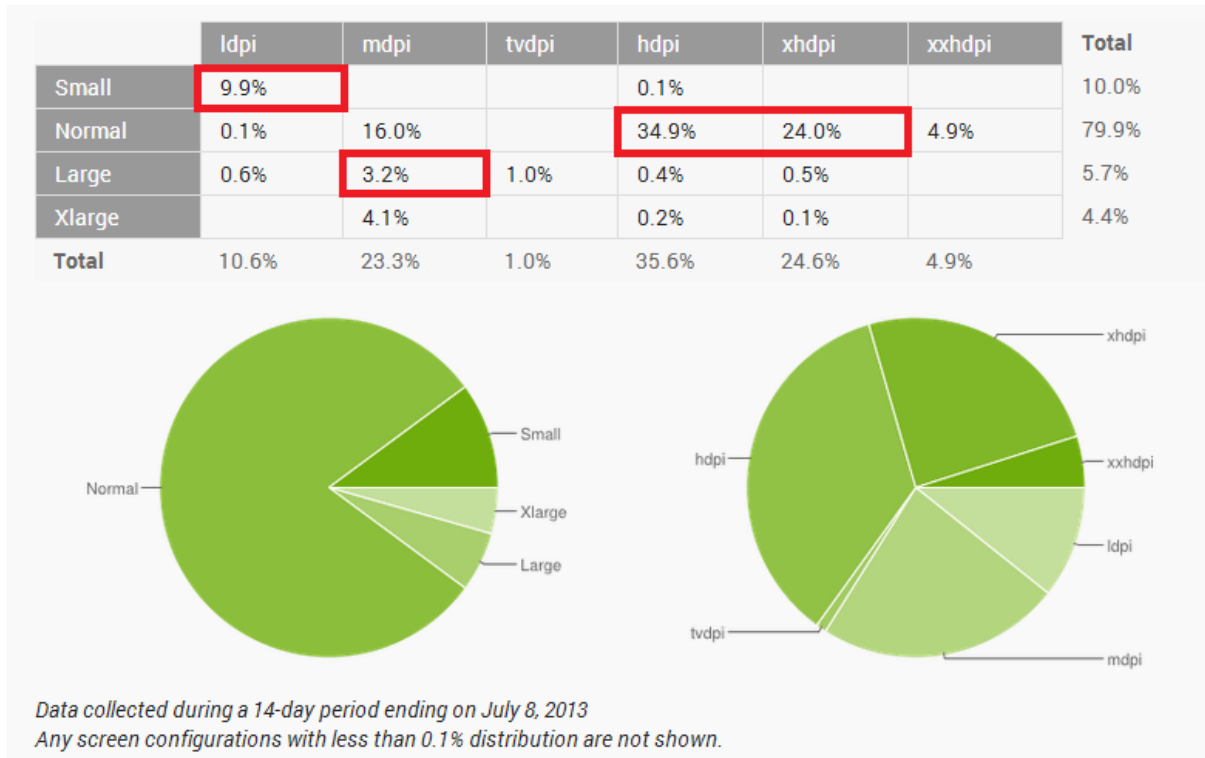
Source: <http://developer.android.com/about/dashboards/index.html>

So picking the three most popular versions of the OS according to the official Android website, it comes out that Gingerbread, ICS and Jelly Bean together constitute almost 95% of the OS landscape!

Let's go further...

Screen Sizes and Densities:

Android divides the range of actual screen sizes and densities into several buckets as expressed by the table below.



Source: <http://developer.android.com/about/dashboards/index.html>

Now, if we select the following screen size - density combinations, we can expect to cover at least 72% of the layout landscape:

Screen Size	Screen Density
Small	ldpi
Normal	hdpi
Normal	xhdpi
Large	mdpi

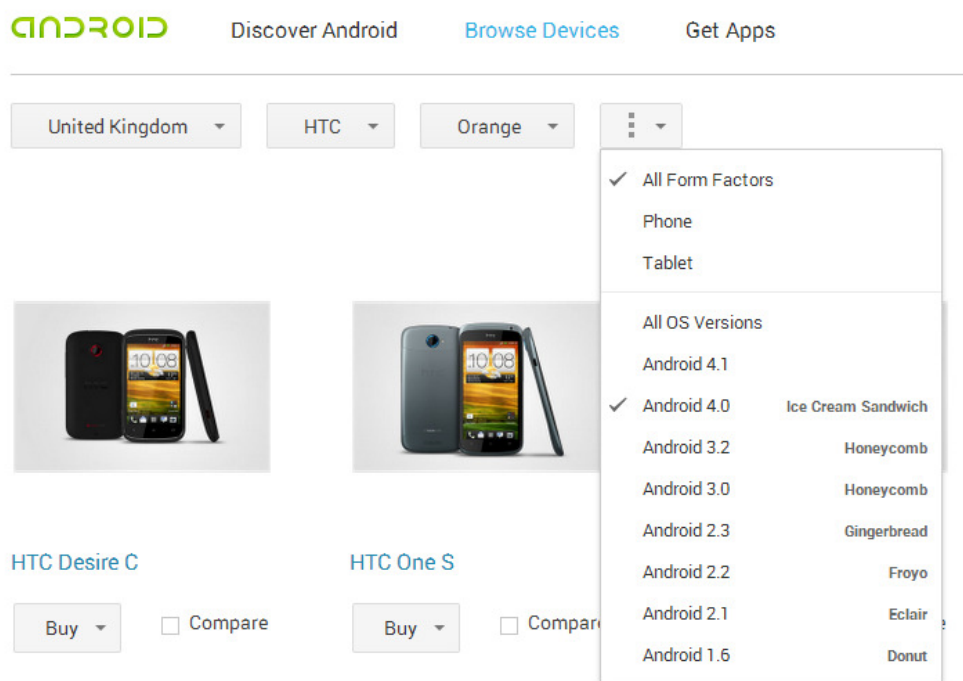
On merging the data set for OS versions and Screen sizes/densities, we can visualize the following combination of devices:

OS	Screen Size	Screen Density
Gingerbread (v 2.3.3 - 2.3.7)	Small	ldpi
ICS (v 4.0.3 - 4.0.4)	Normal	hdpi
Jelly Bean (v 4.1.x)	Normal	xhdpi
Jelly Bean (v 4.2.x)	Large	mdpi

The combinations suggested above is just one of the few ways in which we categorized the device combinations available; depending on the current device trends, similar 3 to 4 generalised combinations can be obtained.

2. Finding out the available devices in each of the generalised combinations.

Many websites today keep a track of the latest devices as they flood into the market everyday and maintain a data repository about their hardware and software specifications. These can be used to get a list of devices which matches one of the generalized combinations of our need. For e.g., here is an indicative list from the Android market place, allowing users to slice & dice the available handsets on the basis of OS version, Carrier, Brand, Country, etc.



Source: <http://www.android.com/devices/>

3. Finding out the most relevant device(s) from the available list.

Again, many data analytics companies use methods like surveys and polls to get information about the most popular devices, neatly categorized into device owner groups based on locales, age group, gender, etc. While many of these are paid, some are free to use. App publishers should make use of this data to finalize a device from each of the categories obtained in Step 1.

Conclusion

In this document we looked into the complexities of the Android ecosystem which calls for using multiple handsets to test our Android apps. These handsets should be intelligently chosen so as to strike a perfect balance between the device coverage for the app and the testing effort. Using Google Play Store Analytics we can categorize handsets according to different Android Versions, screen sizes and Screen densities. We can then use local demographic data to obtain a good spread of device manufacturers and carriers and find the most appropriate set of three to five handsets to optimise our testing efforts. The methods shown in the document can be further extended to increase device coverage depending on the company's resources.

Real World Applications

Most of the times our clients have a good idea of the devices they would like to get their apps tested on, but there was a case when a client wanted to release his magazine app in a specific European country and was a bit unsure of the devices that would suit in the best. We got into work and came up with this strategy, much to the client's delight in form of successful app store business.

References:

[1] Android Version Distribution: <http://developer.android.com/about/dashboards/index.html>

[2] Android Device Gallery: <http://www.android.com/devices/>

[3] Android device fragmentation: <http://opensignal.com/reports/fragmentation.php>

About Mindfire Solutions:

Mindfire Solutions is amongst the leading providers of Software & IT services encompassing development and delivery of complex projects for enhancing business growth of its customers.

Mindfire has added value to more than 300 clients in US, Europe, Australia and Asia in the 12 years of its operations. The company has over 800 people, spread across 3 Advanced Development Centres in India, which are equipped with ultra modern facilities, and where Mindfireans strive round the clock for achieving customer delight.

Mindfire Solutions is a **Microsoft Gold Certified Partner** & an **Apple Developer Connection Premier Member**. The company is one of the very few organizations in India to be at the highest level of partnership with both Microsoft and Apple. Mindfire Solutions is a **ISO 9001:2008** Company and it is also certified by ASCI (Agile Software Community India) as an Agile Software Development Company. Mindfire Solutions also partners with global technology leaders like IBM, Adobe, Sun, Autodesk, FileMaker and Java.



All content / information present here is the exclusive property of Mindfire Solutions. The content / information contained here is correct at the time of publishing. No material from here may be copied, modified, reproduced, republished, uploaded, transmitted, posted or distributed in any form without prior written permission from Mindfire Solutions. Unauthorized use of the content / information appearing here may violate copyright, trademark and other applicable laws, and could result in criminal or civil penalties. © 2013 Mindfire Solutions. All Rights Reserved
