

ANDROID TODAY

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INTRODUCTION

There has been a lot of flux as far as mobile devices running the Android operating system (OS) for the past three to four years. Starting from Android OS version 1.0 back in 2008 to the recent version known as Jelly Bean (4.x), there have been numerous advances in the device software that provides a plethora of fancy features to make the user experience very pleasant and engaging. Honeycomb (version 3.x) started the revolution for the user experience on these Android devices. Advances in the CPU power of the devices and improvements in WiFi, Bluetooth, GPS and cameras have added tremendous capabilities to provide a very rich environment on newer smartphones and tablets.

According to recent Gartner reports, smartphones accounted for 51.8% of mobile phone sales and in 2Q13 the market share of Android OS was 79% compared to 64.2% in 2Q12. Samsung devices had about 31.7% market share in the same 2Q13 timeframe compared to 14.2% for Apple devices.

Worldwide Smartphone Sales to End Users by Operating System in 2Q13 (Thousands of Units)

| Operating System | 2Q13 Units | 2Q13 Market Share (%) | 2Q12 Units | 2Q12 Market Share (%) |
|------------------|------------------|--------------------------|------------------|--------------------------|
| Android | 177,898.2 | 79.0 | 98,664.0 | 64.2 |
| iOS | 31,899.7 | 14.2 | 28,935.0 | 18.8 |
| Microsoft | 7,407.6 | 3.3 | 4,039.1 | 2.6 |
| BlackBerry | 6,180.0 | 2.7 | 7,991.2 | 5.2 |
| Bada | 838.2 | 0.4 | 4,208.8 | 2.7 |
| Symbian | 630.8 | 0.3 | 9,071.5 | 5.9 |
| Others | 471.7 | 0.2 | 863.3 | 0.6 |
| Total | 225,326.2 | 100.0 | 153,772.9 | 100.0 |

Source: Gartner (August 2013)

What we are seeing is a rapid adoption of these smartphone devices to do everything from browsing and emails to camera usage and shopping. One casualty of this is the global digital camera market; reports predict camera sales will shrink almost 29% next year. A more positive development is that the developer market is heavily attracted to the Android OS due to the open architecture it has with respect to access and control, which provides greater flexibility in delivering a rich user experience on most apps.

A recent article by John Moore indicates that Intel is investing heavily into the Atom processor-based Android devices and coming out with enhanced Android tools (Beacon Mountain) on top of the standard Google Android Development Kit (ADK).

NATIVE VS. HTML5 (MOBILE WEB)

Most businesses are constantly asking why they should build native vs. mobile web. This has been a very challenging decision point because of the higher cost of native application development for each platform. A quick summary of native vs. HTML5 (or mobile web) is described below.

Native refers to the development of apps within each operating system's coding platform. Apple has the iOS development kit (<https://developer.apple.com/technologies/ios/>) that uses the OS X kernel foundation along with Berkeley Software Distribution (BSD) sockets for networking and Objective-C for native performance. Blackberry has a Software Development Kit (SDK) to develop native apps in its own platform, and Android uses the ADK based on Java tools such as Eclipse (<http://developer.android.com/sdk/index.html>). Native apps provide the best user experience, but the developer has to build the same app on each platform separately and thus be saddled with a higher development cost.

HTML5 or mobile web uses the standard HTML coding process that is used on most web sites, thus allowing the flexibility of running the app on any standard browser and not being tied to specific mobile devices. Developers like this because it is a familiar language. The advantage for developers is the one-time development that allows the app to run on all devices, so the development cost is very low compared to native. The negative part is that the app performance is poor in many cases when apps have animation, graphics, etc., and mobile browsers are inconsistent in how they support HTML5. Recently, LinkedIn switched from HTML5 to native mode due to poor user experience.

While it sounds very attractive, the challenge with HTML5 is that it cannot access all the device features as native apps can. It is still in its infancy stages and in the next few years as it stabilizes, more development will happen on HTML5 platform. The one advantage is that there is no need to go through app stores for distribution and wait in line for app releases, but the lack of a central HTML5 store makes app distribution challenging. However, HTML5 wrappers, such as Titanium and PhoneGap, are providing improvements in the use of HTML5 every day. Native apps are very useful for working offline but HTML5 apps always need Internet connectivity.

A recent report by Business Insider Intelligence indicates that users spend 6-7 times more time on native apps compared to the mobile browser. It also found that overall performance is still better on native apps and the speed, user experience and security are better on them, too. So, we may have to wait a few more years to jump into HTML5 apps.

USER EXPERIENCE

When Apple created new devices, it spent millions in making sure the user experience was flawless. Apple has been successful due to its standardized process regarding user experience on any device. That leads to less variety, but users know exactly what they will get. In the case of Android, the variety in hardware and software is so wide that it is tough to maintain a standard. But, that has been changing as newer versions of the OS, such as Jelly Bean, are making the interface a lot more standardized across various devices. A recent case study by Cincinnati Bell showed that with serious user experience testing it was able to save \$500,000 in support costs. Apkudo, a company that provides approvals for user experience on any device, performed the testing. Since then, Cincinnati Bell has instituted Apkudo-approved process for all its Android devices, resulting in fewer devices being returned and reduced support costs.

Consistency in User Interface (UI) design is key to avoid user confusion. Having common functions in standard places is critical so users know exactly how to operate any new app without much training. Android has well-defined standards and best practices for consistency in navigation, system bars, notifications and common app UI. Adhering to these guidelines provides the users with less confusion and a rich user experience. The UI overhaul Android did with the release of the Ice Cream Sandwich OS was a game changer for Android devices. The UI is a lot snappier and pleasing, and comparable to many of the iOS features.

Roman Nurik describes a pleasant user experience as one where the user is able to get started quickly without a lengthy registration process and to sync his data quickly with a desktop. He suggests using the Home screen or Dashboard to show off the key features of the app in a very aesthetic manner. Having an initial tutorial is a smart way to guide users and quickly engage them.

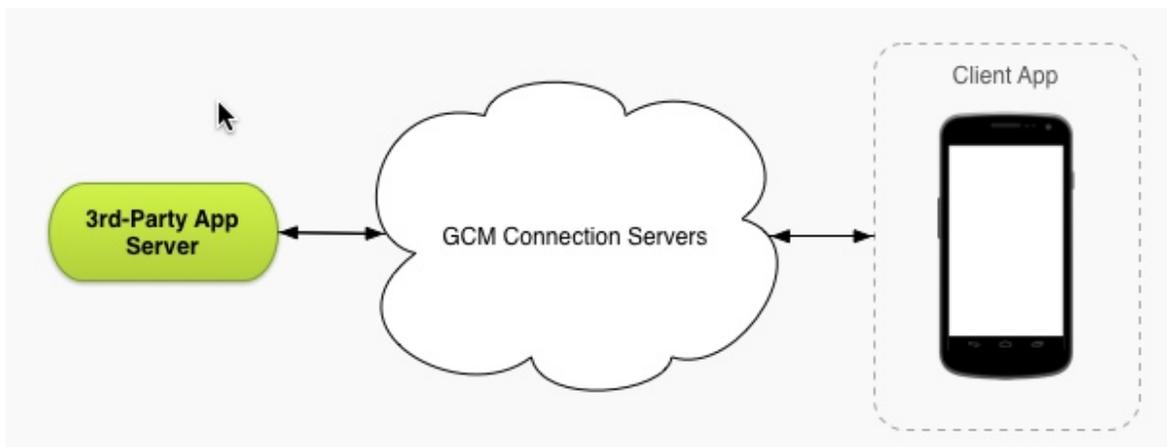
DATA SERVICES

Apps have traditionally been deployed as standalone, where all data was resident on the device itself. Users could run the apps anywhere without the need for a data connection. Most games and personal apps were designed in this manner. ,

With advances in technology and faster Internet bandwidths, in the past few years this model has gradually changed and many apps now rely heavily on the cloud to get real-time data and provide users with instant data and feedback. Contacts, emails, calendar events, real-estate apps, etc. are all dynamically exchanging data with the server so mobile devices and users' desktops are always in sync.

The cost of programming and server maintenance is one of the factors businesses need to evaluate when developing apps and deciding what kind of data service and data storage is appropriate for any app. Obviously, the model to have the data be resident on the device itself is the lowest in cost. But, the advantages and richer user-experience achieved by having a server interface needs to be evaluated when designing any app.

The advancement in PUSH technology via Google Cloud Messaging has made Android apps come to life. This model primarily uses a server for communication, and improves the notification process for any app since the apps receive data and alerts only as needed, conserving the battery life of any device. Below is a high-level rendering of the Google Cloud Messaging service extracted from the Android developer site.



RESOURCES

These are the various sources used in this article along with other useful links and resources.

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10. Clark, Don and Connors, Will. *Google's Android Seizes Smartphone Market*. The Wall Street Journal. 8 August 2013. 28 August 2013. <<http://online.wsj.com/article/SB10001424127887323838204578654520703852466.html>>.