Limitations & Advances in Mobile Web Application Development

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Abstract

The purpose of this report is to highlight the typical issues involved for developers in the process of mobile web application development. The paper researches problems when addressing development including hardware and software as well as addressing cross-platform development. The paper also discusses where possible future research should take place to alleviate current bottle necks when developing mobile web applications.

Limitations & Advances in Mobile Web Application Development

The majority of mobile devices today come as standard with built in web browsers, which allow the user to browse the internet. The new era of mobile phones has arrived in the shape of smart-phones. The processor capability of these mobile devices is ever on the increase and the functionality available is aligning with that of personal computers (Wikman, Jukka, Nurminen, Kokkinen, 2008). Connectivity for mobile users is via the 3G network which is the third generation of mobile networking and telecommunications. It provides advanced network capacity over the previous 2G network. Together the smart phone technology and the increased data transfer rate provided by the 3G network provided a market boom for mobile web applications. The increased popularity of the smart phone brought with it different types of smart phone operating systems and with that the development of mobile web applications.

Developing web applications for smart phones has many constraints which a developer must overcome. Firstly each manufacturer of smart phones tends to use a different operating system and the market share of smart phone OS is very varied with the key occupiers being Apple and Nokia as shown in figure 1.

As well as this constraint developers also have to work with the limitations of the mobile platforms. Hudson defines these as;

- Bandwidth
- Memory and CPU Availability
- Storage capacity
- Connectivity options and Issues
- Security
- User interactions and Display

(Hudson, 2009)

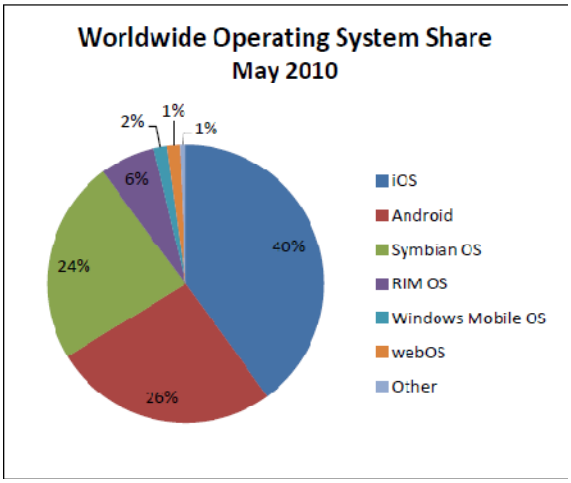

Figure 1. Worldwide Operating System Share May 2010 (Admob, 2010)

In an ideal situation for a corporation, mobile applications would be developed by their company to be cross platform compatible. This inevitably targets a larger populous of the mobile market and further increases the companies revenue and reputation. However this is a

very challenging thing for a company to achieve due to the many obstacles in the way. It means software developers have to familiarise themselves with the different mobile OS's SDK's, once this has been overcome generally maintaining updates for applications can be a complex and costly process as several different versions, for different OS's have to be updated which can be a lengthy process and can prove difficult to keep consistency between the different versions of the application. One approach when developing web applications for mobile devices is to develop cross-platform applications. The usual approach to this is to develop the application for one OS, then compile the project into executable code in a different OS. (Pan, Xiao, Luo, 2010).

Another constraint when developing mobile web applications is using existing web services. Many Web Services were originally developed with either server to server or server to browser in mind, not mobile applications. Mobile applications have their own set of obstacles to overcome as previously indicated. To overcome these certain mobile techniques need to be implemented. These can include managing large datasets being requested, in ways that prevent unnecessary downloads of data and by storing where possible data locally on the mobile to prevent constant requests for data. Also by applying speed traps on the mobile device to determine what bandwidth the device is on such as WI-FI, 3G, 2G etc can determines how frequently the device polls the service (Hudson, 2009).

With these challenges in place for mobile web application we need to look at where future research needs to be focused on to help further alleviate any bottle-necks developers have in the future. With a constant consideration for user bandwidth in developing web services and the complexity of large datasets a focus needs to be placed in mobile bandwidth, CPU and memory improvements. With current technology looking towards 4G solutions intends to provide a higher quality of service, better reception, less dropped data and prioritises data exchanges (Chavis, 2011). Also a speed test performed by Brian Nadel shows 4G speeds reaching up to 7.4 times greater than existing 3G download speeds (Nadel, 2010). With the enhancement to 4G bandwidth and connectivity issues will be less of a constraint

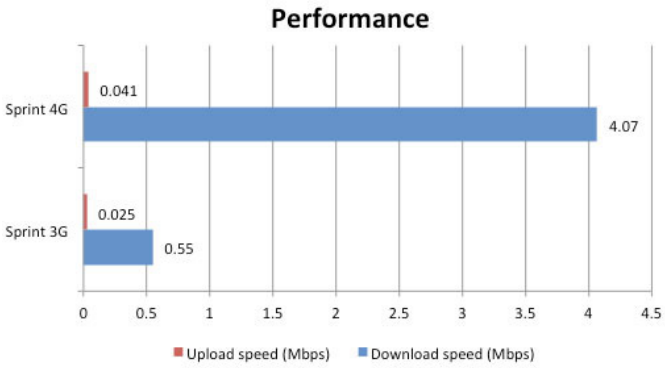

Figure 2. 3G vs. 4G: Real-world speed tests (Nadel, 2010)

when developing applications. Also with rapid improvements and cost reduction of mobile components the acceleration of mobile applications will continue to grow exponentially over the coming years.

In our assumption the development of mobile devices and the capability of these devices will continue to improve in forthcoming years. As more and more people turn to smart phones capable of browsing the web, developers will have to come up with better methods of cross-platform development to allow applications to scale multiple platforms seamlessly. Currently the process of mobile web application development seems to be a mixed bag of ideas with no clear way to lead the market of development. The majority of developers tend to develop on one or two OS's which means that applications aren't available across different platforms and are therefore incompatible with each other. This reduces the complexity of development but means the era of the smart phone may never rival that of the computer.

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