

BEST PRACTICES FOR DEVELOPING ENTERPRISE SMARTPHONE APPS

EXECUTIVE SUMMARY

Smartphone usage is skyrocketing, led by Apple's iPhone and Google Android devices. The numbers show that local native apps are taking center stage over mobile web pages — more than 15 billion apps¹ have been downloaded from Apple's App Store. This lucrative market has spawned the creation to date of over 500,000 apps² for the iPhone and more than 400,000 applications for the Android market.³

From a developer's perspective, these local, rich client native apps can either be considered a brand new development in the industry, or a resurgence of the distributed computing model. In either case, the success of and demand for local native apps puts new pressure on developers — users have high performance expectations for native apps running on their mobile devices.

Best practices that help in the development of high performance mobile native applications are distinctly different from web apps — regardless of whether those web apps are running on mobile or other devices. This white paper will discuss the best practices today's developers are following to create native applications for smartphones that meet the needs and expectations of both enterprise users and consumers.

1. LEVERAGE DEVICE CAPABILITIES

One of the primary objectives of any smartphone application is to make full use of the target device's capabilities. Far more than just "mini laptops", today's smartphones ship with a wide array of senses: sight (camera), hearing (microphone and voice phone connections), touch (touchscreen), and sense of location in space (GPS). The best smartphone apps take full advantage of all of these capabilities. For example, you can enable multi-touch to zoom in and out, the camera to record images and videos, and GPS can be utilized to enable a broad range of location-based functions — from appending an automatic geostamp to a photo to presenting information on a map (such as the locations of scheduled customer visits). In addition, enterprise apps can integrate with other capabilities on the phone — the phone dialer and the contacts database can be utilized to enable one touch dialing or voice-directed dialing.

2. CREATE TASK-ORIENTED APPLICATIONS

Today's enterprise applications are sophisticated and powerful, giving businesses and their employees virtually endless options for accessing information and completing tasks. For example, an enterprise Customer Relationship Management (CRM) application lets sales teams track customer data, study the current product line, examine customer feedback, produce complex sales reports and more — all in one application.

However, mobile users are looking to complete specific tasks. For this reason, you should consider breaking down comprehensive back ends into small, helpful task-driven apps. For example, a CRM mobile application can utilize the smartphone's GPS-based mapping capabilities to provide turn-by-turn directions to the next appointment. A report builder can leverage voice recognition and speech-to-text technology to let users verbally add notes to their reports on their way back from a customer meeting, while the details of that meeting are still fresh in their mind. You could also integrate the phone's camera to allow salespeople to document proof of product condition by taking photos of defective product a customer received — and enabling those photos to instantly become part of the customer's record.

3. ADOPT A CONTEXT SENSITIVE APPROACH

Since navigating through pages on a mobile device can be time-consuming and potentially cumbersome, it is best to take users directly to the task they want to perform. Given that an application can perform many tasks and manage multiple business objects, it will not be possible to guess a user's intentions 100 percent of the time. However, getting it right most of the time will result in a more usable application and a better end-user experience.

Considering the CRM application as an example, a user-friendly mobile app will take the sales representative right to the account they wish to edit based on their location as determined via GPS. Or an application might take the user back to the last screen visited the last time the application was used.

4. MINIMIZE END USER TYPING

Data is typically entered in a smartphone application through a soft keyboard displayed on the touch screen. Even when a smartphone includes a physical keyboard, by nature, that keyboard is limited and small. As a result, the most user-friendly mobile applications employ clever techniques to minimize typing as much as possible. Such techniques include:

- Incorporation of select wheels and radio buttons more frequently than in a web application, even at the cost of flexibility or increased app data maintenance.
- Use of the device's knowledge of location for auto-populating geographic information.
- Use of predictive text techniques such as Swype.
- Leverage of voice recognition, camera, video, bar code scanning and other powerful device capabilities to gather detailed information that does not require text input.

5. SUPPORT ALL DEVICES

No single smartphone platform dominates the market today. To maximize the success of your smartphone application, you need to target all popular smartphone platforms. There are a variety of techniques that allow you to build a single application that works on all smartphones. In particular, cross-platform frameworks are growing in popularity. With these modern frameworks, developers can create applications using their web skills and the browser component to render user interfaces on the underlying software developers kits (SDKs) (e.g. the UI WebView control and Objective C for the iPhone) while maintaining access to the device.

6. SUPPORT ENHANCED OFFLINE USAGE

Data synchronization is a critical factor in enabling offline use. Developers should ensure all of the application's most critical operations can be performed, regardless of whether the user is online or offline.

For informational applications, enterprise users need to access information whether they are connected to a network or not. Traditionally, applications that support only live data access are used far less frequently. This is particularly true for applications that involve creating, updating and deleting data.

To enable offline access in your applications, the necessary information must be pulled down from any back end application servers, changes stored locally on the device and the data must be resynchronized back to the central server when appropriate. There are two methods to sync data between application servers and smartphones:

- Polling-based synchronization (where the smartphone polls the server for updates)
- Push-based synchronization (where updates are pushed to the smartphone) — the preferred method

Polling-based sync solutions drain the device battery life and result in older data. For this reason, push-based synchronization is preferred in modern applications. Since iPhone, Android and BlackBerry devices natively support 'push' capability in their operating systems, this is easy to implement.

7. HANDLE BACKEND DATA CHANGES

The emergence of “truly distributed local applications” running on smartphones presents a new challenge — how to handle changes to the backend application’s database schema. With web applications, it’s a simpler matter. When the data schema changes, the application’s full stack is changed, including: the database, the business logic (usually in the form of a web applications controller) and the interface (the web application’s view).

When native smartphone apps run locally on remote devices, you need to be able to quickly and easily handle updates to the backend database. Enterprise and consumer users will have zero tolerance for application downtime — yet your application needs to be able to handle ongoing changes to backend schema. This challenge has hampered the widespread availability of smartphone enterprise apps on smartphone “app stores”. The few developers that have been successful have handled this issue via a custom approach to communicate changes to the remote smartphone app. This continues to be an area of emerging research and discovery among smartphone app developers, and some of the latest development platforms are addressing this issue.

SUMMARY

As smartphone usage rapidly increases and mobility plays a larger role in the enterprise, there’s an enormous opportunity for developers to build mobile applications for the enterprise. Following the guidelines discussed in this paper will help you build native smartphone applications that provide real value to enterprise users by:

- Providing the ease-of-use, availability and performance enterprise users need to ensure rapid adoption and increase user productivity
- Enabling enterprises to improve operational efficiency and better serve customers

For information on how Motorola Solutions can help you create next-generation OS-agnostic mobile applications, please visit www.motorolasolutions.com/RhoMobileSuite.

1. <http://tech.fortune.cnn.com/2011/07/07/how-many-ways-can-you-say-15-billion-app-store-downloads/>
2. <http://www.apple.com/iphone/built-in-apps/app-store.html> accessed June 2012.
3. <http://androidandme.com/2012/01/applications/android-now-has-400000-apps-still-a-ways-to-go-to-catch-ios/>