E-Guide

BEST PRACTICES FOR BUILDING MOBILE APPS IN THE CLOUD

TechTarget | SearchCloud Applications

BUILDING SYNERGY BETWEEN your cloud and mobile strategies may be easier than you think. In this e-guide, learn how mobile cloud and native apps compare from the developer's perspective, and how to create mobile apps that run smoothly across many different devices.

MOBILE CLOUD APPS VS. NATIVE APPS: THE DEVELOPER'S PERSPECTIVE

For native apps, each mobile application development platform, such as iOS and Android, uses its own development process and has its own native programming language: Java (Android), Objective-C (iOS) and Visual C++(Windows Mobile).

Native apps usually have app development tools such as Apple's iOS software development kit, Google's Android development tools and Microsoft's .NET Compact Framework. Sybase and PhoneGap provide other development tools for native apps. Conversely, the development tools for cloud mobile apps are not tied to any mobile device operating system.

Mobile cloud apps are written in HTML5, CSS3 and JavaScript and server-side languages such as C++ or Web application frameworks of the developer's choice such as PHP, Rails and Python.

For both native apps and mobile cloud apps, tools and frameworks are available to help in developing software for deployment on multiple OS platforms and Web browsers.

Apple's development platform also enables developers of native apps to use the iOS notifications feature to play an audible alert or display a visual alert or banner on the screen. Mobile cloud apps can access a limited amount of the mobile device's native features and information. This access is typically through an API.

MOBILE APP QUESTIONS TO CONSIDER

There are a number of questions to ask before creating a mobile app. They include:

- How many mobile device platforms do you intend to support?
- Do you have a bring your own device (BYOD) strategy?
- Do you need to use on-device hardware/software features?
- How important is security?
- What is the purpose of the app?
- How important is data integration with the rest of the system?

If cross-platform compatibility is a concern as it will certainly be in corporations implementing BYOD strategies, then mobile cloud apps are a better

choice. But if you need a business app that uses many on-device features, then native app is probably the way to go.

Security is the biggest weakness of mobile devices. Their portability and size makes them more likely to be lost or stolen than a notebook. Native apps that access business data remotely and then leave it on the device, intentionally or unintentionally, are big risks if the device is lost or stolen. Mobile cloud apps' data are stored on the mobile cloud, not on the mobile device. Therefore, a lost or stolen mobile cloud app device poses less of a security risk.

If you are building mobile business apps for internal use or customer use and you have many mobile devices to support, mobile cloud apps are a good choice. If you are interested in creating mobile apps to sell, then the native app is a good choice because it can be placed on one or more app stores regularly visited by customers.

When mobile business apps access databases -- and most do -- you will need to integrate the apps with your current system. This is akin to integrating a third-party customer resource management or enterprise resource planning product with the rest of your existing system, and this is not an easy task. When data integration is necessary, mobile cloud apps are the best choice because your mobile apps are running in the same cloud as the rest of your system, not

on a remote mobile device written in a language not supported on the cloud.

CLOUD INFRASTRUCTURE FOR MOBILE APPLICATION DEVELOPMENT

One of the biggest issues in mobile application development is how to build mobile apps that are applicable to many mobile devices. This issue is being escalated with the advent of bring your own device (BYOD), a policy that many organizations favored.

Mobile devices have differing operating systems, differing screen sizes, differing attributes, such as GPS. Developing a mobile app that runs on many devices provides the cross-platform capability to make more mobile apps available to users, but it creates a lot of work for developers. If developers implement an app for one set of mobile devices -- say, Samsung or AT&T or Motorola -- they must be ready to deal with additional new devices from these vendors every few months.

One solution to the mobile app development problem, and other problems

around mobile computing, is to move the apps and their data, normally stored on the mobile device, to servers running in a mobile cloud. With this solution, when an app is made available on a mobile cloud, users can access the app and its data via browsers running on many different mobile devices. Tools needed to help make this solution work, such as MEAPs and HTML5, are discussed below.

Mobile cloud computing can be viewed as a cloud infrastructure enhanced to provide a mobile ecosystem for mobile apps and to allow access to business apps from mobile devices. The data processing and the data storage happen outside the mobile device, and results are displayed through the mobile device screen or speakers.

USE MOBILE CLOUDS AND TOOLS TO SIMPLIFY MOBILE APP DEVELOPMENT FOR MULTIPLE MOBILE DEVICES

The big problem for mobile app developers is to create an app that can be run on multiple mobile devices without having to build the app for each particular device. We have suggested the mobile cloud as a solution to this problem. There are tools that make this solution much easier.

MOBILE APP DEVELOPMENT USING MEAPS

With mobile apps and their data running on the mobile cloud, we still have to support differing types of devices with different screen sizes from different mobile device manufacturers. One set of tools that can run on the mobile cloud that make this task easier are referred to as Mobile Enterprise Application Platforms (MEAPs).

A MEAP is a comprehensive suite of products and services that enablede-velopment of mobile applications. MEAP platforms do some thingsspecifically for mobile devices, such as make sure that the data sent to the mobile device from the mobile cloud fits on the mobile device screen. A MEAP's platform converts data into a user-friendlier interface for the mobile device. It has an authentication mechanism in it that reaches all the way down to the device so that, if the device is lost or stolen, it can be wiped. One such MEAP platform is the multi-tenant Sybase MEAP. It does the conversion on the fly to make data fit the mobile device screen. The Sybase MEAP secures the mobile device and then does the conversion. One company, Marcus & Millichap, takes a slightly different approach. It uses a content management system (CMS) developed by SiteCore that automatically renders to all mobile devices, removing the need to write device-specific apps for iPhone and Android phones.

MOBILE APP DEVELOPMENT USING HTML5

A second approach to use in creating mobile cloud apps for multiple mobile devices is HTML5. HTML5 allows you to determine, to some extent, what the end mobile device is. It can query in real time and determine that data information is being served to a mobile device with a certain set of dimensions. On the fly, it can determine what those rendering characteristics should look like. This is a dynamic exercise, and it is all done in the cloud, where there is a lot more processing power (and it is needed).

HYBRID MOBILE APP DEVELOPMENT

A third approach to reducing the amount of effort required to develop mobile apps and take advantage of some of the physical attributes of the mobile device is hybrid app development. This approach employs native device capabilities with architectural capabilities for HTML5. A hybrid application is a native, downloadable mobile cloud application that runs all or some of its user interface in an embedded mobile browser component. Instead of rewriting the application for each mobile operating system, mobile app developers write at least some of their application code in HTML, CSS (Cascading Style Sheets), and JavaScript, and reuse it across devices.

USE MOBILE CLOUD COMPUTING TO GIVE MOBILE DEVICE USERS BIG ADVANTAGES

In addition to easing the development of mobile apps for many mobile devices, there are other advantages to running mobile apps on a mobile cloud:

- Mobile devices can be allowed access to powerful, back-end business apps, if sufficient security is provided.
- More mobile apps can be made available to a broader audience.
- Multiple security apps that check mobile device security can be run on the mobile cloud, providing much broader and more comprehensive security checking for mobile devices.
- Running mobile apps on a mobile cloud makes many more apps available for organization users.
- Use of the mobile cloud allows mobile devices to be included in the centralized security scheme of the cloud.

CONSIDER SAAS DELIVERY FOR MOBILE APPS

SaaS is well aligned with mobile cloud computing because apps and their data are being moved off the client (mobile device, in this case) onto a (SaaS) cloud

server. When a mobile app is located on a cloud, it can be offered as a service, making SaaS providers perfect for delivering mobile apps. SaaS providers just need to adapt to working with mobile devices; that will put SaaS players in a great position to deliver mobile apps.

USE HTML5 TO MAKE DEVELOPING MOBILE APPLICATIONS LESS COSTLY, COMPLEX

Today, the most popular way of developing mobile applications is to develop them as native mobile apps. Unfortunately, developing native apps can be costly, and native development can limit options by limiting development to fewer mobile platforms and devices. In this tip, we explore HTML5's possibilities as an all-purpose mobile development alternative and look at pros and cons. Native app developers create a separate app version for each mobile operating system and mobile device. The native app is installed directly onto a mobile device. The cost of developing native apps can be high, especially when many types of devices are in use. Because many corporations are adopting a

bring your own device (BYOD) strategy, the cost of developing and maintaining native apps is increasing.

Most corporations want to develop native apps when needed and also develop mobile apps that can run on many mobile devices and mobile operating systems without rebuilding the app for each device and operating system. These apps are referred to as "write once, run anywhere" (WORA) mobile apps. There are at least three technologies that give varying degrees of WORA mobile apps: mobile enterprise application platforms (MEAPs), HTML5 andhybrid mobile apps. We focus on HTML5-based WORA mobile apps in this article.

HTML5 apps are essentially implemented as Web apps. TheHTML5 app runs on a server external to the remote device, and the mobile device user accesses it through a mobile device browser. When the URL for the HTML-based app is entered into the mobile device browser, the interface to the mobile app is made available to the user in the mobile device browser.

HTML5 is a set of technologies consisting of Cascading Style Sheets (CSS3) and JavaScript APIs. CSS3 adds structures such as headers, footers and figures for certain documents so that mobile device browsers are able to intelligently display various types of content without specific plug-ins for the various devices on which the browsers run. The CSS3 features enable automatic

page layout adjustments across a vast number of mobile device form factors. JavaScript is used for various things, including the validation of data/information sent from the mobile device via the interface exposed by the mobile device browser.

HTML5 basically enables determination of the characteristics of the mobile device. In real time, it can determine, via media queries, the rendering characteristics, such as the screen size, screen orientation and resolution of the mobile device to which data/information is being served. This information is required to ensure that the data/information sent to a mobile device is formatted to fit the mobile device screen in a way that it can be read by the user.

The determination of the characteristics of mobile devices is one of the primary features of HTML5 that makes it a suitable technology for WORA mobile apps. The other primary feature is that HTML5 mobile apps do not run on mobile devices, making them relatively independent of mobile devices and mobile device operating systems.

HTML5 MOBILE DEVELOPMENT PROS AND CONS

Many native app developers have a low opinion of HTML5 as a technology to write mobile apps. They often claim that native mobile apps are the easiest to

write and debug, that HTML5 does not have the same level of implementation in all of the popular browsers, and that HTML5 does not enable the performance of native apps. There is truth in all of these statements. But trying to decide which mobile platform to develop mobile apps on is a difficult problem. In addition, developing and maintaining native apps for numerous platforms is expensive and time-consuming. Add to that operating systems, such as Android, that are changing frequently, creating numerous versions, and the decision becomes even more difficult.

The responses that you get from native app developers and Web app developers using HTML5 are not always objective, so you will have to do a bit of research on your own to determine which is best for your corporation. What you will likely find is that HTML5 is not yet the complete solution for those who want WORA. Today, to get the most out of HTML5, you may write once, but you may have to do some customization for various mobile devices.

HTML5 provides a solid platform on which to develop. It does not make all the differences between mobile browsers and devices magically disappear. However, HTML5 is being more fully implemented on today's popular browsers. Given the cost of implementing BYOD strategies involving numerous, different devices, HTML5 shows promise as a technology for implementing

WORA mobile applications.

HTML5 mobile development tips

The key is to carefully choose the mobile app development platform that satisfies your needs. Use native mobile app development for apps that need high performance, and depend on or heavily utilize on-device features. HTML5 should be considered when multi-platform mobile apps are deployed. HTML5 can be very good in the right situations, but not every situation.

The following are some of the areas where native app development gained an early advantage over HTML5. These areas are some that you should consider when trying to decide between native app development andHTML5-based mobile development. In several of these areas, HTML5 has caught up or is about to catch up over the next year or two:

- **Visual scale.** This has been a big advantage of native apps, but HTML5 now has various ways to determine what the screen size is, what the resolution is, etc.
- **Touch interfaces.** User interface components that are controlled by touch and swipe are supported by HTML5.
- **Camera/video access.** HTML5 can handle photo capture from a

webpage on some mobile devices, but not all.

- **Accelerometer access.** HTML can handle this.
- **Bluetooth access.** This is a work in progress for HTML5.
- **Sending notifications.** This is a work in progress for HTML5.
- **HTML5 apps can now be sold through HTML5 or Chrome app stores.** They can be distributed through Apple App Store and Android Play after being recreated as hybrid mobile apps.

Native apps are very popular for many developers, primarily because HTML5 is still working to close the performance gap and provide better access to on-device features. But HTML5 will eventually be competitive with native app development within the next two to three years. For pretty much anything except fast-moving games with a lot of animation, HTML5 is often good enough. The benefits gained by native apps because of their performance lead will be marginal for many apps. The cost savings for corporations adopting BYOD will be significant when WORA technologies, such as HTML5, are used. If your corporation has a lot of experience developing Web apps for the PC, then embracing HTML5 should not be a large leap.

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