Whitepaper

Transforming *Your Vision*
Into *Winning Solutions*

How to Save 50%, 75% or more for Mobile App Development

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Background

As mobile access has transitioned from a nice to have "add on" to a strategic imperative, picking the right mobile architecture becomes an important consideration. A key decision facing architects is the choice of mobile app architecture and technology. This has long-term impact in areas such as cost of app development, time-to-market, and availability talent.

A recent study revealed the following about the strategic importance of mobile apps:

- Over 55-60% of the internet traffic today is generated from mobile devices. And mobile users are still growing at 20% each year. Strategy for mobile access is now just as important as web access, if not more important in many cases.
- The most important uses of mobile apps was to generate revenue (64%), improve mobile experience (58%), and improve customer service (52%). Clearly these are strategic objectives for businesses.
- It takes 3-6 months to build a small-medium mobile app at a cost of $50,000 – $150,000. The lifecycle costs can easily double that figure. No wonder that over 85% of the companies have a backlog for mobile applications. The survey reveals that the top three challenges in mobile development were budgets (53%), time (50%), and skills gap (36%).

The right mobile architecture can significantly reduce the pain of app development. This paper discusses the leading options, their pros and cons, and their impact on strategic considerations such as cost and time-to-market.

Definitions

Let us start by providing some definitions.

1. **Native Apps**. These run on a specific device and mobile operating system and are developed using the native tools provided by the operating system vendor.
2. **Hybrid Apps**. Just like native apps, hybrid apps run on a specific device and mobile operating system but are developed differently.
3. **Web Apps**. Web apps are essentially accessing mobile optimized websites using a web browser.
4. **Hybrid Web Apps**. These are a combination of hybrid apps and web apps. They reside on your phone. But for most part, the UI and content is served from the website.

These options are not new. What's different now is that technology advancements have changed the cost/benefit dynamic for a few of them. Let us explore further.

Native Apps

Native apps runs on a specific operating system such as iOS, Android or Windows. There are developed using the technology and tools provided by the operating system vendor. For iOS devices, a native app would be built in XCode using Objective-C or Swift. For Android devices, this could be Eclipse and Java.

Native apps are downloaded from the app stores and reside on the mobile device. Business apps connect and communicate with back-end systems for access to real-time data, and to sync up with other applications. This connectivity happens via standard API web technologies such as REST, and requires that the backend servers expose the required APIs.

Here are the advantages and disadvantages of native apps.

Advantages of Native Apps

- The tight coupling of the operating system, programing language and the device, allows for delivering complex applications such as multimedia, gaming, etc. Native apps provide the best user experience & performance.
- It is easy to take advantage of all of devices features and functionality e.g. camera, GPS, 3D engine etc.
- It is easy to incorporate local databases allowing for a higher performance app if database interaction is required.
- These are distributed and marketed via the app stores.

Disadvantages of Native Apps

- The development costs are high and development time long, as coding has to be done for each platform separately.
- A separate codebase has to be maintained for each operating system.
- For each operating system, staffing and talent has to be retained and trained. Developers have to spend considerable time to keep up with new versions and features of each operating system.

Bottom Line

- If your development costs are spread over a large customer base, investment in native app may be worth it.
- If you do need a high-end user experience, or use of specific hardware capabilities, native technologies may be the best bet for you.

Hybrid Apps

Similar to native apps, hybrid apps also run on a specific operating system such as iOS, Android or Windows. But the technology to develop hybrid apps is different. They are developed using a cross-platform development tool where one code base is published to one or more operating systems. These development platforms come in a variety of shapes and costs. For our discussion, we will concentrate on freeware or inexpensive tools e.g. PhoneGap, Appcelerator etc.

Hybrid apps are also downloaded from the app stores and reside on the mobile device. And just like native apps, hybrid apps also connect to the backend systems via standard APIs. Theoretically, hybrid apps should deliver the exact same functionality as native apps. In reality, there are some differences.

Here are the advantages and disadvantages of hybrid apps.

Advantages of Hybrid Apps

- Develop a single code base and publish the app to multiple platforms
- The code base is generally written in technologies such as HTML5, JavaScript etc., talent for which is much easier to find and share with other projects.
- Given the use of standard technologies and one code base, the development cost is cut down significantly. It also reduces the time-to-market for new apps, as well as for updates.
- It is still possible to take advantage of all of devices features and functionality e.g. camera, GPS, 3D engine etc.
- The app can be distributed and marketed via the app stores such as iTunes and Google Play. App stores used to be reluctant to accept apps developed using cross-platform tools, but this is not an issue anymore.

Disadvantages of Hybrid Apps

- A separate codebase has to be maintained for each operating system.
- There are some limitations in terms of performance and user experience that make this methodology sub-optimal for complicated apps such as games etc.

Bottom Line

1. Unless you require heavy graphics or sophisticated animations, hybrid apps are a good option for most data-centric business apps.

Web Apps

One way to look at these is that these are not really "apps" but access to mobile optimized websites. There is nothing that resides on your mobile device. Web apps are accessed via the device browser and are served directly from the application server. Web apps are built using standard web technologies such as HTML5, JavaScript and CSS. The communication with the backend server happens at the user interface level, and no API development is required.

Here are the advantages and disadvantages of web apps.

Advantages of Web Apps

- Developers need to develop and maintain one code base.
- The app and updates are available immediately.
- No installation is required on the device.
- Lately Google has been ranking sites with web apps higher than ones without. This is becoming a requirement regardless of your app strategy.

Disadvantages of Web Apps

- Limited access to device native features and functionality.
- Web apps provide limited performance for complex interactions and animations.
- The apps cannot be distributed via the app stores where the users go to look for apps.
- Apps only work with internet access as all screens and business logic is served from the application server.
- As web apps rely on device browsers, testing for these apps is more time consuming than native or hybrid apps.

Bottom Line

- Develop a web app if you would like one code base to serve a variety of device types and operating systems. It is well suited for information apps such as newspapers and blog sites.
- It is also a good strategy to supplement your native or hybrid apps. For large customers, it is customary to build native/hybrid apps for the most common devices, and use mobile web for the long tail of devices.

Hybrid Web Apps

A hybrid web app combines the best attributes of a hybrid app and web app. Much like a hybrid app, it is developed using a cross-platform tool and can be published to many operating systems from a single code. The shell of a hybrid web app is packaged as an app and can be downloaded from app stores. It is similar to the web app in that after launching the app, most of the screens and content are served from the application server. The communication with the backend server happens at the user interface level, and no API development is required.

Here are the advantages and disadvantages of hybrid web apps.

Advantages of Hybrid Web Apps

- Develop a single code base and publish the app for multiple platforms.
- The code base is generally written in technologies such as HTML5, JavaScript etc., talent for which is much easier to find and share with other project.
- Given the use of standard technologies, one code base, and that most of the business logic is in the app server, the development cost is cut down very dramatically. Also dramatically reduced is the time-to-market for new apps as well as updates.
- These apps are distributed and marketed via the app stores such as iTunes and Google Play.

Disadvantages of Hybrid Web Apps

- Limited access to device native features and functionality.
- Hybrid web apps provide limited performance for complex interactions and animations.
- Apps only work with internet access as all screens and business logic is served from the application server.
- A separate codebase has to be maintained for each operating system.
- Sometimes app stores are reluctant to accept apps that are merely a shell. Adding some minimum functionality is a way to get around this issue.

Bottom Line

- If your application server is optimized for mobile already, this may be fast and easy way to deploy mobile apps. Also, this may help with Google rankings.

Important Note

In a hybrid app the UI and content is served from the mobile device. In a hybrid web app, this is served from the application server. But real life use cases are never as clear cut. It is entirely possible to mix and match; i.e. have some UI/content available on the mobile device, while other served from the server.

Comparing Cost of Native, Hybrid and Hybrid Web Apps

For the purpose of our discussion, we will consider a simple example to highlight the differences between technologies. Let us take the case of an 8 screen app for iPhones and Android phones. A rough estimate for a mid-complexity app would be 1 week/screen per operating system. Here then, is a comparison of development cost for native, hybrid and hybrid web implementations.

	Native	Hybrid	Hybrid Web
Initial Cost – iOS App	320 hours	240 hours (Less than native as it uses standard languages such HTML5 and JavaScript)	40
Initial Cost – Android App	240 hours (This app can share the planning, business flow, design and mockups of the iOS App	20 (no additional code here, just some effort for testing and publishing)	20
Backend programming, API development	100	100	0
App Server CSS update	0	0	60
Update of iOS App – 4 updates at 35% each	448	336	60
Update of Android App – 4 updates at 35% each	336	40	60
Update of App Server CSS – 4 updates at 20% each	0	0	60
Total Hours over 2 years	1,444	736	300
Percentage Savings	-	Approx. 50%	Approx. 80%

Summary

Until recently, native technologies were the only feasible options for high performing high quality apps.

But with advancements in cross-platform tools such as PhoneGap, hybrid apps have become real options that provide meaningful cost savings and improve time-to-market.

And finally, ubiquitous, fast and high quality mobile internet has made web and hybrid web apps feasible. By delivering most content from the server, these cut down on the cost and time to market even further.

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