

# Native Android and Hybrid Application Comparison

## Study Case PhoneGap Framework

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**Abstract**—Today mobile application development are growing fast as user are using mobile gadget growing as the year. Developer needs to create a best-experience mobile application as fast as possible. As today, native application development needs platform specific skills and have hard-learning curve relatively to commonly skills such as web development. For the reason, hybrid application comes to a solution for developer for building an application for mobile platform. Hybrid application development doesn't need platform-specific skills for developing a mobile application, but web skills needed. It is relatively easy to create an application using the hybrid one since its easy-learning curve of web development instead of native language. One of ready-made hybrid application framework that popular known is PhoneGap. Due to easy-of-use of hybrid application development, hybrid and native one have its strengths and weaknesses. The strengths and weaknesses can lead developer for make a better decision on building an application using native or hybrid.

**Keywords**—*hybrid; native; mobile; development; phonegap; camparison; android;*

### I. INTRODUCTION (*HEADING 1*)

As many years, mobile application development was practiced on native development environment since every device and operating system work differently each other. Meanwhile, mobile application development cost are not cheap. Many developer have to develop on many platform of its single application more on different platform. Suppose an application have to develop on three platform (e.g. Android, iOS, Blackberry) so that developer must be write three different code for the application distributed on three platform. Due to application development are running on three different platform, development cost have also take three times on each platform. In addition, development time must be longer since development are on three platform.

Today web technology are one of solution for building a platform running on browser, but running slow due to it runs on browser. Although the weakness, web application are give a simple solution of cross platform. In recently years developer have build another solution of cross platform problem, hybrid application. Hybrid application consist of web application and native container, the web application running on native

container so the web application feels like a native one. It saves many developer time for building a cross platform application.

### II. NATIVE MOBILE APPLICATION

Mobile application consist of binary executable files that are downloaded to device and stored locally. Native mobile application is an application were built for a particular device and its operating system. Native apps are written on specific language such as Java, Objective-C, or some other programming language.

### III. HYBRID MOBILE APPLICATION

Hybrid application is application that built using technology web that lived on native container so it can running seems to be like a native mobile application. Hybrid development using web technology stack such as HTML, CSS, Javascript. In addition, hybrid application code can be reused to another platform, so developer must not to write different code on different platform.

### IV. PHONEGAP FRAMEWORK

PhoneGap—a technology that allows you to build native mobile applications for multiple mobile device platforms using standard web technologies such as HTML, CSS, and JavaScript. PhoneGap can be a really simple and compelling way to build a single application that can run across multiple device platforms. PhoneGap application can do anything that can be coded in standard, everyday HTML, CSS, and JavaScript. There are web applications and PhoneGap applications, and the distinction between them can be minor or can be considerable.

### V. LITERATURE STUDY DESIGN

The literature study was designed to give information about related work that has done before. The literature study was done with read some research paper and books that related to comparison of native and hybrid application development.

## VI. RESULTS

After the literature reading work, the result between comparison of native Android development and Hybrid application development using PhoneGap described below:

### A. Development Language

Android officially use Java as language for application development on its platform, although C and C++ can also be used. On the other hand, hybrid application as a web, use HTML, CSS, and Javascript as base language on its development process. Another type of language for hybrid development can be found as derived language such as Ecma Script, LESS, SASS, and many other.

### B. Tools

Android Studio is official tools for Android application development. Android studio allow developer to develop Android application on Java language even also can be use for C and C++ language as supporting. For the hybrid application, as a web platform, hybrid application development has no official tools. PhoneGap framework also doesn't have specific tools for development process means any text editor can be tools for PhoneGap application development.

### C. User Interface

Most of hybrid application use HTML5 on development that enabled advanced components, access to rich media types, geolocation services, and offline availability. Hybrid application development specially PhoneGap has many choice for User Interface Framework so building a easy and good-looking mobile application are easy than Android native one.

### D. Performance

The native one has directly access to low-level APIs such as touch screen, keyboard, graphics rendering, networks, and many other using its device APIs. Hybrid apps doesn't access low-level APIs directly, the native container do. The web code that running on native container request access to native container, then native container make an APIs call and return the result to web code.

An experiment on evaluating the execution time and performance overhead between a PhoneGap-based hybrid mobile app with respect to an identical native application is reported, the results of the benchmark show that in 7 out of 8 cases, the hybrid app implementation was slower than the native one; however, the authors also noted that for general-

purpose business applications, this performance issue can be considered as a slight one.

### E. Access Device Speific Features

The hybrid apps using the browser to create an embedded HTML rendering engine that serves as a bridge beetwen the browser and the device APIs. Developer choice to have its own bridge or they can choose ready-made solution such as PhoneGap. The native one surely can access all APIs that hardware and software supported. The hybrid apps can only access APIs that bridge serves before. The hybrid APIs limited access can be a problem for its supporting APIs that given by ready-made solution of hybrid Apps like PhoneGap that developer have to wait for new updates or it has to build bridge by self on native development enviroentment.

### F. Native and Hybrid Consideration.

Native application development still best choice for developing advanced and complex application, which serve a better performace and user experience, especially when direct device APIs access is needed. On the other hand, hybrid application development still a choice since are easy to start with. Web development skills are very common and can easily be learned so the web developer can make a mobile application using only web. For novice application developers and building apps hobby, the hybrid one is the best choice since doesn't need platform specific skills.

## VII. CONCLUSION AND FUTURE WORK

This paper presents a little comparison between native and hybrid mobile application by development language, tools used on development, user interface, performance, ability of accessing specific features, and consideration of using the native or hybrid one. The result of the study show that hybrid application are growing for future try to be better as years. The native one still the best choice for particular reason.

As future work, i have plan to show more specific of good and bad use of hybrid and native apps so many developer can consider better of using hybrid or native application.

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