IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, June 2022
Impact Factor: 6.252

Hybrid App Development for Cross Platform Approach for Mobile Application

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Abstract: *Nowadays, there are 3.5 billion mobile users around the globe so the number of newly developed apps, among which hybrid as well, is increasing every day. The fast evolution of hybrid app technologies has pushed hybrid apps on an upward trend. They have become so popular because of their shorter development time frame, lower cost and ability to be scaled to a variety of platforms and operating systems. A common issue while designing mobile application is the choice of programming language and tools to be used for developing apps, so that it is supported by large number of devices and can be integrate across various platforms like mobile, web and even desktop. Two of the leading mobile operating systems are Android and iOS, most users are occupied by these two, so programmers are more of heading towards hybrid mobile app development. In this paper we will focus on native based and hybrid based apps, their performance and stability across multiple platforms. And also aims to help developers make the right choice in order to build an application.*

Keywords: Cross Platform.

I. INTRODUCTION

Talking about the mobile applications, the first thing that comes to mind are the apps like WhatsApp, Instagram, swiggy, etc. that we use in our everyday life. A Smartphone without apps is just a phone for calling purpose, with the increasing number of smartphone users, number of apps available is also increasing. These apps are mainly designed to work on two major platforms, Android and iOS. In this paper, we will be analysing different pros and cons of native and hybrid mobile app development.

A native application is a software program that is developed for use on a particular platform or device. Because a native app is built for use on a particular device and its OS, it has the ability to use device-specific hardware and software. These apps cannot be used on different devices using a different OS. The apps that are developed for android are normally coded using Java or Kotlin languages. The IDE normally used for android app development is Android Studio which provides all features and the apps that are developed for IOS are generally coded in Swift language or Objective-C. The IDE suggested for IOS App Development is XCode.

When developers create hybrid application, they include a single code bar for all platforms. This means they only need to write the code once and then can run it anywhere. However this is possible because of certain tools that make the communication between the native platform and web view easier. Developers build hybrid apps using web technologies such as JavaScript, CSS and HTML. The code is then wrapped within a native application using open- source frameworks such as Ionic or React Native. This allows the app to run through multiple platform's

II. LITERATURE REVIEW

Even though previous studies in this subject area exists most of them focus on performance and have not taken features,limitations and functionality such as UX and Framework and which Framework is best for developing cross platform application

We compare and analyze different hybrid app frameworks which are popular in use and show trends of increasing usage over time. These frameworks include React Native which has been developed by Facebook, Flutter developed by Google, and Xamarin by Microsoft. The applications have been compared analytically and a technical approach to compare the frameworks is not possible due to the varied nature of the framework and different use cases they serve to.

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2.1 React Native

For over seven years, this tool has been used to create mobile applications in various industries. It is fast, convenient, reliable, and cost-effective. React Native is great for building applications of any size and purpose.

2.2 Xamarin

This framework is very popular for building hybrid mobile apps due to reusing a large part of the code during development. This significantly saves time on building the product. Nevertheless, Xamarin has a significant drawback - its versions are renewed much more slowly than Android and Apple release their updates. So the application may have severe errors

2.3 Flutter

This is a relatively new technology used to develop hybrid applications released by Google. It provides for relatively rapid development and uses modern methods of building apps, which significantly saves time. But, since this is still a new tool, its capabilities make it very difficult to create enterprise applications.

III. NATIVE APPLICATION

The term native app development refers to building a mobile app exclusively for single platform. A native mobile application, they are usually referring to an application that has been written using the native development language and tools specific to that platform. For example: A native iOS application would be written in either Swift or Objective-C and compiled using Xcode, while a native Android application would have been developed using Kotlin or Java and compiled using Android Studio.

3.1 Feature of Native App Development

1. Native Apps tend to respond fast and efficiently. Because the apps follow the OS, the apps tend to be more responsive.
2. We have easy access to all the features and APIs.
3. The native application multi-touch features makes it possible for the user to interact with the device with complex UI (User Interface) gestures. For ex. users could double tap to zoom. Pinch-spread and other advanced gestures

3.2 Limitations in Native App Development

1. While native applications offer benefits in graphics, app store distribution, and device integration, their lack of portability poses significant problems for businesses.
2. There could be increased maintenance costs because native apps work in a silos-based model. Since each operating system is different, updates will need to be repeated for every application to ensure its compatibility with the device.
3. The development speed is too slow as we have to code it again for different OS.

IV. THE RISE OF HYBRID APPLICATIONS

Hybrid apps combine the functionality of native apps with the cross-platform compatibility of web apps. Like web apps, hybrid apps are developed using standard development tools such as HTML5, CSS, and JavaScript. The hybrid apps are then hosted inside a native Android or iOS container so that the same code can be deployed on multiple mobile platforms. Since they are hosted in a native container, hybrid apps can access the hardware features of a mobile device and can also be downloaded directly from app stores. To package the hybrid apps in a native container, developers use platforms such

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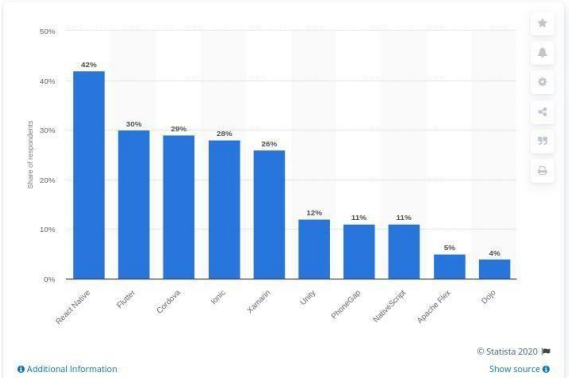
as Apache Cordova, Xamarin, Flutter and React Native Framework. Hybrid apps are popular because they allow developers to write code for a mobile app once and still accommodate multiple platforms. Because hybrid apps add an extra layer between the source code and the target platform, they may perform slightly slower than native or web versions of the same app.

4.1 Why React Native? To develop Hybrid App

React Native is a JavaScript framework for developing mobile applications that can run natively on both Android and iOS. It is based on ReactJS, developed at Facebook, which is a declarative, component-based framework for developing web user interfaces (UI).

By using React Native, your web app can share the same logic as your mobile apps, maintaining consistency across platforms, and save you time and money. Instead of having to maintain multiple codebases and employ developers that are proficient in both Android and iOS, you can build a team of JavaScript developers that work on a single codebase. The main point is the React Native contain Bigger development support and community rather then other framework



4.2 Feature of Hybrid App Development

1. **Cost-effectiveness:** you can build a fully functional app without denting your business's finances. Even those on a budget can easily afford a hybrid app.
2. **Cross-platform compatibility:** you only need to write code once. You can then deploy it across multiple mobile platforms, unlike native apps which require different code for each mobile platform.
3. **Quick development:** In a dynamic business environment, businesses need to make fast decisions and quickly adapt to new changes with respect to technology. Since hybrid apps don't need different sets of code, they are faster to develop and deploy.
4. **High-quality:** Despite being easier, faster and cheaper to develop, hybrid apps still deliver high- quality functionality and user experience.
5. **Development Time:** Significant amount of time is saved by writing a code only once. Thus, the development time is much faster compared to a native app.

4.3 Limitations in Hybrid App Development

1. **Performance:** The performance offered by a hybrid app is slower in every aspect. This is because, there exists a layer between the operating system and the source code.
2. **Functionality:** Since one single code is common to all platforms, some of the native features are missing in a hybrid app. As a result, the users cannot expect the maximum level of quality and stability when it comes to hybrid apps.
3. **User Experience:** The interface used by a hybrid app is little bit poor in terms of user experience. Since each operating system operates differently, the design of hybrid application many not be suitable for all of them. For an example, if the hybrid app is developed as per the requirement of Android OS, the experience could be worsening for IOS users. Same thing could happen in the vise versa.

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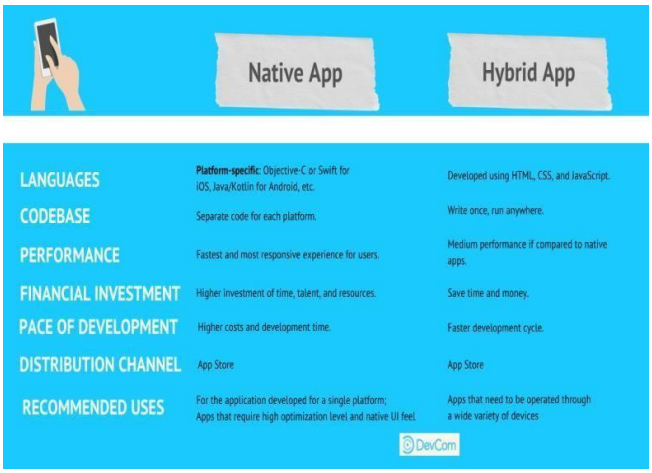
4.4 Comparison between Native and Hybrid



V. CONCLUSION

I conclude that from past few years the hybrid application craze is increasing rapidly because of cross platform support and cost efficient. In this paper we look few famous Framework and the React Native Framework as one of the most popular hybrid app development framework and it contain big community support. React Native is compiled from a single JavaScript codebase that enables code reuse between Android and iOS. What distinguishes it from other is hybrid apps are hosted inside a native application that utilize WebView a chromeless browser window that's typically configured to run fullscreen. This allow them to connect to whatever capability the mobile platform provides such as accelerometer, camera, contact etc.

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