



Hybrid Mobile App Development using Ionic Framework

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Abstract: A new frame is being used currently in order to develop cross platform operation since it's extremely clumsy to form operations for colourful platforms specifically due to the complications of using Java, Objective- C or Swift. therefore, the Ionic frame which lets the inventors make operations for multiple platforms by simply using web development language to produce full- fledged mobile operations.

Ionic frame is an open- source UI toolkit used for high- quality mobile apps, desktop apps and web apps using web technologies like HTML, CSS, JavaScript. It give platform for inventors to make formerly and run far and wide. This Ionic Framework created by Max Lynch, Ben Sperry, and Adam Bradley of Drifty Co. in 2013. The first beta interpretation of the Ionic frame was released in March 2014. [1]

Ionic is a great choice for creating introductory native functionalities within an operation which can run on multiple bias and operating system. The main purpose of the Ionic frame is that we can make the app only formerly and that can emplace in different bias. Because of this app development done briskly and it's also cost-effective. It also reduces the need for conservation.[2]

INTRODUCTION

Angular is an open-source web application framework which is used in developing single-page applications while Apache Cordova /Capacitor lets developers build mobile applications using JavaScript, CSS and HTML rather of using platform specific application programming interface (APIs') like those in iOS, Android or Windows Phone.

Ionic framework is an open-sourced software development kit that is used in order to create hybrid mobile applications. It is made by using Angular and Apache Cordova. Ionic gives all needed components, required tools and important functionalities that are used in native mobile development. Developers can fluently make their applications using tools and basic code and example are there in Ionic framework document and help website. The Ionic requires NodeJS and npm that is the default package manager for NodeJS, irrespective of a Windows, Linux.

Ionic is a much better platform to use in order to design and build applications, since native applications are not platform independent and they are time consuming and expensive work. Ionic on the other hand is platform independent, uses HTML, CSS, and JavaScript. The development process is fairly quick, and developers have a direct access APIs' with Cordova/Capacitor.[5]

Apache Cordova

Apache Cordova was preliminarily known as PhoneGap is a mobile operation development frame originally created and distributed by Nitobi. In 2011, Adobe Systems bought Nitobi and rebranded it as PhoneGap. Latterly Adobe released it as open-source software called Apache Cordova. Apache Cordova provides the means for software programmers to produce operations for mobile bias planting HTML5, CSS3, and JavaScript unlike native tools and languages that depend of each platform SDK and APIs similar as Android, IOS, and Windows Phone. It works like a native operation wrapper with factors that offer the applicable variations. Cordova can integrate and interpret HTML5, CSS3, and JavaScript canons without revision of fresh coding or changes in a native operation. This frame helps developer to make a rapid-fire mobile operation anyhow of the knowledge and skills of the target native platform. [5]

Ionic Framework

Ionic is a much better platform to use in order to design and make operations, since native operations are platform specific, have separate development tools, are extremely time consuming and precious as well. Ionic is platform



independent and it use HTML5, CSS and JavaScript. The development process is quick and inventors have a direct access APIs' with Cordova. Ionic utilizes the CSS property called Syntactically Awesome Style Sheet (SASS).

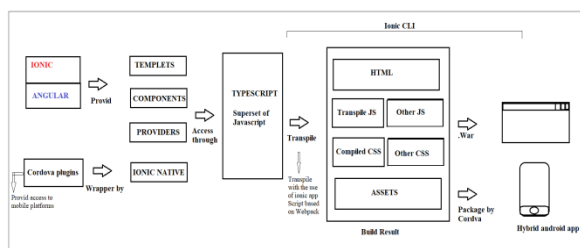
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Ionic provides users with all the components, and functionalities that are used in native mobile development - Developers can build their applications using tools and sample codes provided by the ionic framework documentation and help website. The Ionic requires NodeJS and npm that is the default package manager for NodeJS, irrespective of a Windows, Linux or Macintosh Ionic Creator is a platform used in erecting a stoner interface by dragging and dropping factors. Ionic View makes it veritably readily for druggies to run and partake developed apps to multiple bias using simple common and before they're transferred to the sanctioned request store Ionic Market is used in participating the mobile operations. In addition, Ionic has believable stoner support along with attestation for useful information. [5]

METHODOLOGY

The task was to build a hybrid enterprise application in order to show the various services used in the company along with the health and current status of the services. Since, the application required to be cross-platform therefore, my approach was to build the same using ionic framework.

In order to build the application from scratch, a basic concept sketch was drawn as can be seen below. This concept sketch highlighted the different aspects that will be required in order to design, build, test, debug and run the application.



The development of hybrid applications using the Ionic framework follows a specific methodology. Here's a step-by-step guide to developing hybrid applications using Ionic:

1. Project Setup:

Install Node.js and npm (Node Package Manager) on your system.

Install the Ionic CLI (Command Line Interface) globally by running the following command:

```
npm install -g @ionic/cli.
```

2. Create a New Ionic Project:

Open your command prompt or terminal and navigate to the desired directory where you want to create your project.

Follow the below command to create a new Ionic project:

```
ionic start <project-name> <template>.
```

Replace <project-name> with the name of your project and <template> with the desired template (e.g., blank, tabs, side menu, etc.).

The CLI will set up a new Ionic project with the selected template.

3. Development:

Open the project directory in your preferred code editor for example VS-Code.



The src folder contains the majority of your application code.

4. Testing:

To test your application in a web browser during development, run the command `ionic serve`.

This command launches a development server, and your application can be accessed through a web browser at <http://localhost:8100>.

Throughout the development process, it's recommended to refer to the official Ionic documentation (<https://ionicframework.com/docs>) for detailed explanations, guides, and additional features offered by the framework.

Advantages:

The key advantages of using the Ionic Framework for hybrid app development include:

1. **Cross-platform compatibility:** With Ionic, you can develop applications that run seamlessly on IOS, Android, and the web, using a single codebase. This reduces development time and allows for wider audience reach.
2. **Code reusability:** By leveraging web technologies, developers can reuse a significant portion of their code across different platforms. This saves time and effort in maintaining separate codebases for each platform.
3. **Native-like user interface:** Ionic provides a library of pre-built UI components that mimic the native look and feel of each platform. This allows developers to create visually appealing and intuitive user interfaces for their applications.
4. **Access to native features:** With the help of Cordova plugins, Ionic allows developers to access a wide range of native device features, including the camera, GPS, contacts, and more. This enables the development of feature-rich applications that can leverage the full potential of the underlying device.

Large community and ecosystem: Ionic has a vibrant and active community of developers, which means there are plenty of resources, tutorials, and plugins available to support app development. Additionally, Ionic integrates well with popular frontend frameworks like Angular, making it a powerful choice for developers already familiar with these technologies.

Disadvantages of Ionic

1. Performance Limitations:

Hybrid apps built with Ionic rely on web technologies and run within a Web View container. This can introduce performance limitations compared to native apps, especially when dealing with complex animations or graphics-intensive tasks.

2. Limited Native Capabilities:

Ionic provides a set of pre-built UI components and plugins to access device features. However, if you require access to advanced or niche native features that are not supported by Ionic, you may need to write custom native code or use third-party plugins. This can add complexity to your development process.

3. Debugging Challenges:

Debugging hybrid apps can be more challenging than native apps. Since the codebase consists of web technologies wrapped in a native shell, debugging tools may not be as robust or integrated as those available for native development environments.

4. Platform Limitations:

Each platform (iOS, Android, etc.) has its own specific design patterns, user interface guidelines, and capabilities. While Ionic allows you to develop once and deploy on multiple platforms, you may encounter limitations or inconsistencies in adapting the app to each platform's requirements, potentially affecting the user experience.

FUTURE RECOMMENDATIONS

Ionic framework should work on making progressive web apps without only being restricted to mobile platforms like android, IOS.

1. **Embrace Progressive Web Apps (PWAs):** Progressive Web Apps combine the best features of web and native mobile applications. Ionic can continue to focus on improving its PWA capabilities to deliver high-performing, installable, and offline-capable web applications. This approach allows developers to target multiple platforms with a single codebase.



2. **Enhance Cross-Platform Support:** Ionic has been known for its cross-platform capabilities, allowing developers to write code once and deploy it across multiple platforms. To stay relevant, Ionic should continue investing in enhancing cross-platform support, ensuring compatibility with the latest version.

3. **Keep Up with Frontend Frameworks:** As frontend development evolves, it's essential for Ionic to keep up with the latest trends and developments in the ecosystem. Ionic should continue to support and integrate with popular frontend frameworks like Angular, React, and Vue.js, allowing developers to leverage the capabilities and ecosystems of these frameworks.

4. **Improve Performance and Native Experience:** To provide a seamless user experience, Ionic should focus on performance optimizations and enhancing the native look and feel of applications built with the framework. This includes minimizing startup times, reducing rendering overhead, and providing access to native device features and APIs.

CONCLUSION

This study aimed at making hybrid applications which can run on android, IOS, windows platform. This study could save a lot of cost and time compared to the native software development kit or SDK from Apple such as Xcode with Objective-C or Swift. For cost saving can be fined by the number of mobile application developer are less than the native application. For time saving, it is defined as the time period that is much shorter that the native one as well. Hybrid app combines the best of both web and native app to deploy native like app across different platforms. The conclusion of this study is that the choice to go with hybrid approach is worthwhile considering the emerging framework.

The development of hybrid applications using the Ionic framework offers numerous advantages for developers and businesses alike. Ionic is an open-source framework that enables the creation of cross-platform mobile applications using web technologies such as HTML, CSS, and JavaScript. By leveraging Ionic, developers can build applications that run seamlessly on every platform like IOS, Android, and the web.

Hybrid application development using the Ionic framework offers a powerful and efficient solution for creating cross-platform applications. By leveraging web technologies and a rich set of tools and components, developers can build visually appealing, feature-rich applications that run seamlessly on various platforms. The ability to share a single codebase and access native device features further enhances the development process. With its growing popularity and active community, Ionic continues to be a compelling choice for hybrid application development.

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