

# Hybrid Application Development using Ionic Framework & AngularJS

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**Abstract** – A new framework is being used nowadays in order to develop cross platform application since it is extremely cumbersome to form applications for various platforms specifically due to the complications of using Java, Objective-C or Swift. Thus, a more simple, straight-forward approach is being used nowadays i.e. Ionic framework which lets the developers build applications for multiple platforms by simply using web development language in order to create full-fledged mobile applications.

**Index Terms** – AngularJS, Apache Cordova, hybrid applications, ionic framework

## I. INTRODUCTION

AngularJS is an open-source web application framework which is used in developing single-page applications while Apache Cordova lets developers build mobile applications using Javascript, CSS and HTML instead 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 built using AngularJS and Apache Cordova.

Ionic provides users with all the components, tools and functionalities that are used in native mobile development - software development kits (SDKs). Developers can design their applications using tools and sample codes provided by the ionic framework documentation and help website. The installation requires NodeJS and npm that is the default package manager for NodeJS, irrespective of a Windows, Linux or Macintosh environment.

Ionic is a much better platform to use in order to design and build applications, since native applications are platform specific, have respective development tools, are extremely time consuming and expensive as well. 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.

## II. INSTALLATION & DEPLOYMENT

The procedure for installation of ionic and cordova is fairly simple and straight forward. In order to perform a global installation, the following command can be input in the terminal which installs the packages needed to be used.

Global installation: **npm install –g ionic cordova**

After the basic packages have been installed, their versions can be confirmed via the following npm commands.

Version Check for ionic and cordova:

**ionic –v**  
**cordova-v**

In order to build a new application the ionic serve command can be used in the terminal after setting the appropriate directory where the project exists. In order to run the template or application the following commands can be used.

on web browser: **ionic serve**  
add mobile platform: **ionic platform add [android/ios]**  
run on device/emulator: **ionic [run/emulate] [android/ios]**

## III. HYBRID ENTERPRISE APPLICATION DEVELOPMENT: METHODOLOGY ADOPTED

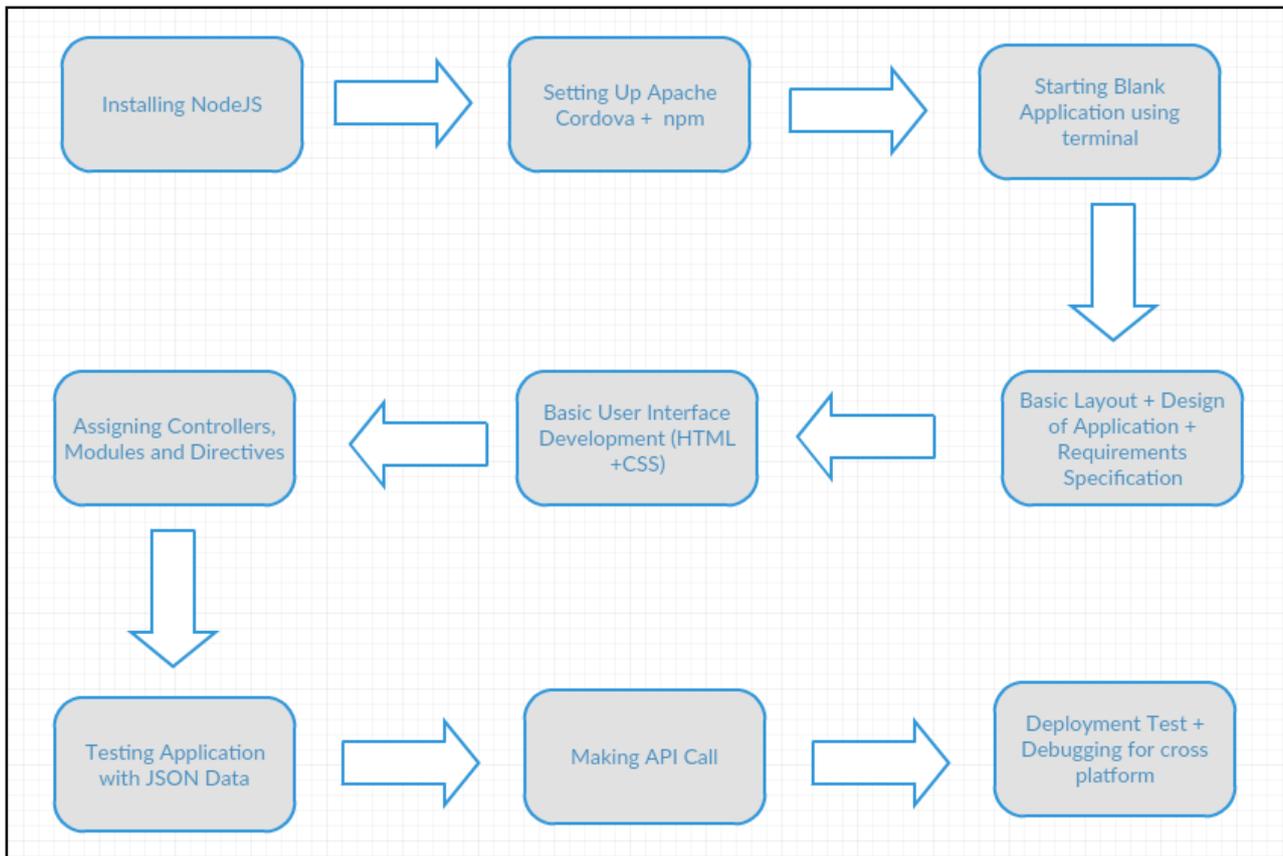
The task assigned to me was to build a hybrid enterprise application in order to show the various services used in the company along with the health and current status of the services. Since, the application required to be cross-platform therefore, my approach was to build the same using ionic framework.

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.

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#### IV. SOFTWARE SPECIFICATIONS

In order to build the application various tools and software were used. The application is built and tested on a Windows platform using command line interface. NodeJS version 4.4.0 is used. In order to write the javascript and css scripts, the text editor used is SublimeText Build 3103. The web browser used for deployment and debugging is Google Chrome version 49.0.2623.87.

#### V. CODE DESIGN AND IMPLEMENTATION

The most important aspect of coding a mobile application is an in-depth understanding of the AngularJS framework. There are various aspects which need to be understood in order to understand application development using ionic and AngularJS such as directives, modules, controllers and scope.

Directives in angularJS are built-in and they offer functionality to our applications. AngularJS also allows to define our own directives as well. Controllers in AngularJS are used to control the data in the application and they are basic javascript objects. The ng-controller directive defines the application controller. Controllers and directives used in our app are as mentioned below.

```
<body ng-app="services" ng-controller="serviceCtrl">
```

Modules are basically what define our entire application. The module acts as a container or holder for different parts

of our application. It acts as a container for our application controllers. It is created by a function angular.module. Various modules being used in our app are mentioned below.

- **angular.module('starter',['ionic','starter.controllers', 'starter.services', 'ui.router'])**
- **angular.module('starter.controllers', [])**
- **angular.module('starter.services', [])**

Scope is an object that refers to the application model. It binds the view and the controller. It is available with different properties and methods and is available for both view and the controller.

The application built consisted of the above mentioned controllers, modules and directives. After connecting the various controllers to the views, the front end interfacing was carried out. The front end interfacing included the basic design of the application using different css and javascript components provided by ionic such as card views, footer, bar, header, content, lists and tabs.

Ionic allows developers to reference a javascript or css source file and use various code snippets in order to interface the application as can be seen.

```

    bar-positive
    <div class="bar bar-header bar-positive">
      <h1 class="title">bar-positive</h1>
    </div>
  
```

Fig. 2. Header bar code snippet from ionic website

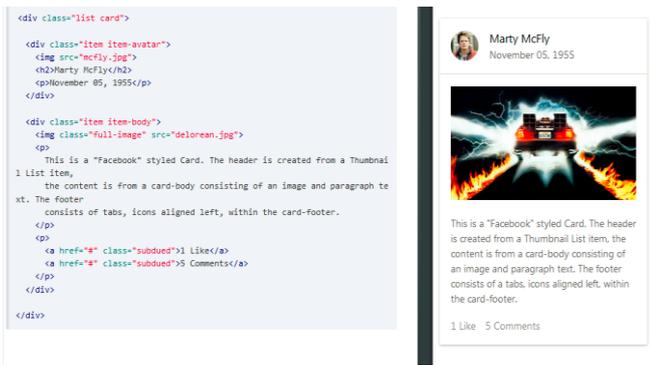


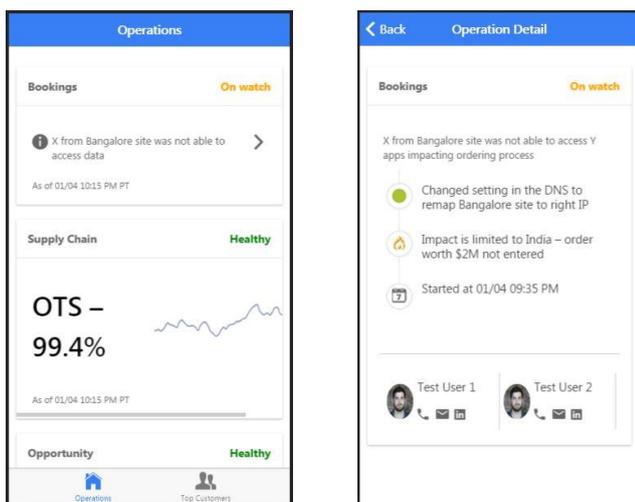
Fig. 3. Card View code snippet from ionic website

By using code snippets like these and transforming them according to the needs suited by the developer, design and building of the hybrid application becomes a less cumbersome task. It allows one to exploit various functionalities and change them according to the needs of the application and customer base.

After the basic interface design, the next task was to call the data and assign it to the content containers in order to seek real time data. Time stamps were required to be input for which moment.js library was used. Firstly, the data was checked with a json file, in order to ensure the smooth working of the data and avoid any glitches after which the final API call was made. These described steps helped us in forming the application from scratch and deploying the same.

## VI. FINAL USER INTERFACE OF APPLICATION

After designing the user-interface and making the API call, the final build was ready to be deployed. The final build of the application on a mobile platform can be viewed below which extracts real time data and displays it to the user in order to know the current situation of the services being used.



## VII. CONCLUSION

As can be seen, with the help of ionic and AngularJS framework, we were able to build a fully functional application for cross platform deployment i.e. Android, iOS and Windows Phone. There are various distinctive features

which allow us to visualize that the application view currently is for iOS or Android phone. Thus, we come to a conclusion that ionic is a new yet immensely growing technology, and is extremely simple and easy to use.

Ionic requires an in-depth understanding of AngularJS framework as it acts as the backbone of the application. It lets us create single view and multi view pages applications. Thus, it is extremely important to get an in-depth understanding into AngularJS and ionic framework in order to build enterprise level applications without having to code once in Objective C or Swift for iOS platform, and another time in java for Android platform. Ionic allows one to code in javascript, HTML and css in order to produce fully functional cross platform hybrid applications for users.

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