Progressive Web Apps Using Ionic in Android to Provide Information About Belitung Island

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Abstract—**Progressive Web Apps is Web Apps that have great user experiences. Users will provided app-like or native-app-like experience. Belitung have nice eye-refresh within the beach, nature, etc. Somehow, Belitung Island become popular to visit by many traveler from anywhere. But, Belitung Island have limited resources like internet connection. Information for Belitung Island much in internet. So, it make limitation for access the information. For break the limitation needed the application have offline ability. Ionic within the service worker will caching important file or data to saved so can be accessed offline. When trying read the documentation and build the apps. Ionic framework have good ability to build native-app-like. Ionic framework also have ability to get data from API, but the implementation of application not fully offline data because service worker not yet used optimizely. The implementation can be full offline not used API but may big apps installed.**

Keywords—Progressive Web Apps; Ionic; Belitung Island; App-like; offline data

I. INTRODUCTION

Progressive Web Applications or usually known as Progressive Web Apps is a new era of web applications. Progressive Web Apps is unique web apps, because this kind of apps can provide app-like or "native app-like" experience to users. Some user experiences that provided by progressive web, such as reliable, fast and engaging.

Belitung Island also known as Belitong Island located on Bangka Belitung Province, Indonesia. Belitung Island have two district, they are Belitung Regency (Kabupaten Belitung) and Belitung Timur Regency (Kabupaten Belitung Timur). Belitung Island become popular after released "Laskar Pelangi", that the novel created by Andrea Hirata. Belitung Island have many visitor from domestic and foreign traveler. Unfortunately, Belitung Island have limited coverage for access internet. This make access information about Belitung Island limited too.

Fig. 1. Belitung Map

Source : https://duniaarief.files.wordpress.com/2008/10/800px-belitung_topography.png

One of the most information provider about Belitung Island have created by Belitung Info. Belitung Info provide information within website. Belitung Info have good interface and information. Belitung Info best use before visiting to Belitung Island. For some condition like can't access internet, the visitor will can't have any information. The disadvantage for this website is only in Bahasa Indonesia.

Progressive Web Apps have service workers that usually have offline functionality, push notification, background content updating, content caching, and much more. The ability of Progressive Web Apps fits for limited network connection condition in Belitung Island.

Ionic framework using service workers likes Progressive Web Apps so the application have build by Ionic Framework will have app-like or "native-app-like". Ionic have advantage, they are just write one code can deploy many platform likes Android, iOS, and Windows.

II. PREPARATION OF IONIC PROJECT

A. Start from Sratch

First, must choose operating system suit to develop. For this topic will using Linux (Ubuntu) and Windows.

1. Linux (Ubuntu)

    a. Install NodeJS

    Install NodeJS with command in terminal

    ```
    sudo apt install nodejs
    ```

    and

    ```
    sudo apt install npm
    ```

    b. Install Ionic

    Install Ionic will easy. Follow https://ionicframework.com/getting-started/ to install Ionic. Also follow this command in terminal,

    ```
    npm install -g cordova ionic
    ```

    For this topic, using side menu template, so using this command,

    ```
    ionic start belitung-information-center sidemenu
    ```

Run the application using,

```
cd belitung-information-center
ionic serve
```

After that, the project ready to customize and build.

2. Windows

    a. Install NodeJS

Just install NodeJS like another application, download from this link, https://nodejs.org/en/download/. May choose one from LTS or current version. Choose what architecture fit to build environment 32 or 64 bit. In 64 bit architecture can any 32 or 64 bit package, but 32 bit package only can in 32 bit architecture.

    b. Install Ionic

Install Ionic same with Linux (Ubuntu). Ionic is cross platform framework. After finishing this phase, times to build and customize the code.

B. Run from Existing Project

For this topic, the project already (not all features have implemented) build and develop. This project can be found in Github with this link, https://github.com/berviantoleo/belitung-information-center. Step by step to using this project can follow this step,

```
git clone https://github.com/berviantoleo/belitung-information-center.git
```

This command will download the project from Github, alternative can download directly from Github Webpage.

```
ionic serve
```

After this command run, the application will show in browser.

III. Ionic Implementation And Model

The project which provide by Author is ready to use. Somehow, when run "ionic serve" will deploy to local. For deploy to mobile platform need some step. Author will not give the detail step because Ionic Documentation have provide it. Deploying to mobile platform using Cordova.

A. Model

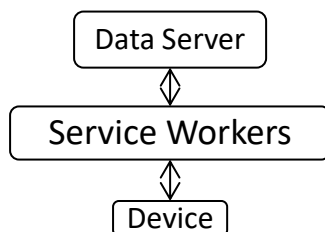In short, the system have diagram like the figure below,

Fig. 2. System Diagram

Service workers will work like "proxy" or medium between device and data server (data provider). Service workers the central of this system. Device will get new data after servive workers getting new data from data server. Service workers will working in background to get the data. Service workers also know the data will saved or usually known by "cache file". Service workers will declare to the device what data will save to device so can access offline. Somehow the data have changed in data provider or data server, service workers will update the data in device. Service workers will run to check update such as ten minutes each, or if too much consume energy thirty minutes each and also when the data requested is good for checking the data.

B. Ionic Implementation

The project will have structure like this,

```
project root

config.xml
ionic.config.json
package.json
tsconfig.json
tslint.json


--- resources
----- android
----- ios


--- src
----- app
----- assets
----- models
----- pages
----- providers
----- theme
----- declarations.d.ts
----- index.html
----- manifest.json
----- service-worker.js
```

Resources will save essential icon and image that uses by platform based. Src directory will provide the application. Subdirectory app declared moduls are used in the project or application. Assets save static data like, image or rule of interface. Pages will save the screen which will shown to users. Models is optional for usually project, for this project have used for save the list of beach data. Providers will become bridge of the application with outsource such as API. Theme will declare some customize style such as colour, size, etc. Then index.html will become root of the application and manifest.json will declare what page will started with, application name, etc. Service worker will use to provide offline data or cache file. Multilanguage can be provide from API or data server.

IV. Screen Capture and Improvement Needed

These are some example screen that have implemented and ready to use.

A. Home Screen

This home screen will welcoming the user. After the home screen have facilities the menu. Interface Author implement be "Android-like" or "native-apps-like". The screen can see below.
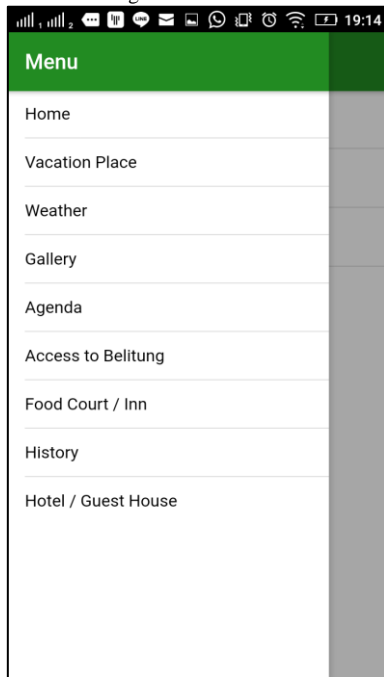

Fig. 3. Home Screen

Fig. 4. Menu

B. Selection Vacation Category

This list have offline data. We can see the list make us feel app-like. Also after touch any list, will provide another data. For testing will provide beach data after this section.
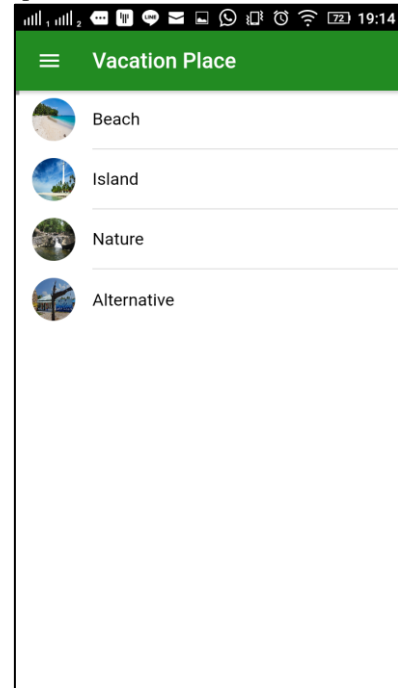

Fig. 5. Vacation Page

C. Beach List

Below the figure of beach list, this data provided by API. For this project using Heroku becomes API to provide the data. But the list data not yet "offline" access. The data always need internet to get the list.
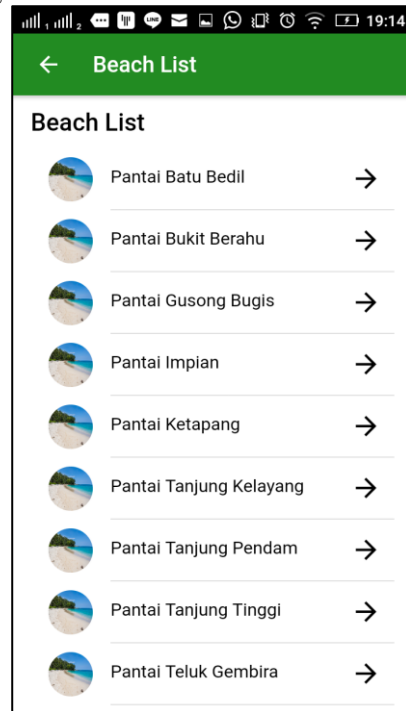

Fig. 6. Beach List Screen

D. *Improvement Needed*

Service worker not yet good implementation. Need to optimize for using the service worker. Another improvement likes completed the data and completed another page. Author really need some documentation about used service worker in Ionic Framework. The application also needed some platform to multilanguage support. Author not yet found platform will support multilanguage. Author first design multilanguage support only for the data from API or from data server not static interface on application. The application also need good documentation for users and developers too. This document is small documentation for the application.

V. Conclusion

Ionic Framework have powerfull tools, utility, and performance. Code using Ionic framework somehow easy, somehow hard. Ionic have approved become Progressive Web Apps and have app-like experience. Ionic Framework also can build to Android Apps and become native like. The poin of offline data or cache file not fully accepted. Need some research for fully implemented of service worker. Information can store to application for fully offline and fast to access but can be large application and big storage needed. Simple application that have implemented already enough for basic in Ionic Framework.

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Statement

I hereby declare that the paper I am writing is my own, not an adaptation, or a translation from someone else's paper, and not plagiarism

Bandung, 5 May 2017

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Attachment

The progress of my study to learn the tools in one semester that I write in course IF3280 Socio-informatics and Profesionalism,

1. **Android Platform**

Already have some basic such as create activity, fragment, using sensor, using toast, customize layout, arrange layout, using Firebase Authentication, HTTP Connection, communication using JSON, etc. The project I have build are Harvest Moon Lite and Basic Apps (Learn Android). Harvest Moon Lite is team project for IF3111 Platform-based Development, I have learn much the basic of Android Platform on it. The Harvest Moon Lite project can see here, http://gitlab.informatika.org/IF3111-2017-K01-04/android. Basic Apps (Learn Android) is self project for working acceptance (working selection) in big company from Indonesia. The project Learn Android can see here, https://github.com/berviantoleo/learn-android.

2. Cross Platform Application

The project in this document what I learn in cross platform application. I learn much how to using Ionic Framework. Not easy, not too hard. Ready for learn something different to increase my knowledge about cross platform application. I want within the project, I will promote Belitung Island become good place to visit and much more know Belitung Island have good potential also improve the value of Belitung Island.

3. Learning Fedora

I just few learning about this topics. I have installed some Linux Operating System which I think be fit with me. Fedora have good performance and good utility. I learn something likes packaging system, roles, and life cycle of development.