

# Android Firebase Implementation to Develop GonjongHub

An Information Center for ITB Students Coming from West Sumatera

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**Abstract**—In recent years, more than 100 students from West Sumatra have continued their studies to ITB. As a new student, it is natural that they need a lot of information about Bandung and ITB. In the early months they live in Bandung, usually they will look for the closest people to ask. The closest people are usually their friends and seniors come from West Sumatera, Minangkabau's people call them "sanak saparantauan". However, before asking directly or asking through social media, there should be information that they should know in advance such as contact information, address, majors, etc. GonjongHub is an android app that serves as an information center of ITB students who come from West Sumatra. It can connect fellow students of West Sumatra in ITB. GonjongHub implementation utilizes Firebase technology so it runs entirely in the cloud. GonjongHub is currently being developed on the Android platform. This paper will discuss how Firebase can be a solution in developing GonjongHub and how GonjongHub is implemented using Firebase and Android platform.

**Keywords**—Firebase, Authentication, Realtime Database, GonjongHub, Minangkabau, West Sumatera, Sumatera Barat, ITB

## I. INTRODUCTION

Nowadays, information is very important. The ability to manage information will affect the effectiveness of an organization and an individual. In this era, the use of social media requires us to be clever in filtering information. Often occurred in people today that when we open social media to search for particular information, we are flooded with a lot of unrelated information such as promotions, broadcast messages or endless chat by friends in group. GonjongHub was made to try to solve that problem. GonjongHub is an application that has a mission to increase the productivity of the users by cutting down the time takes to obtain information and provide ease of getting information about the closest people or people in circle. This application allows users to get other user

information that has similarities like the similarity of origin, similarity of major and others. The information covered in this application is user's self-information such as full name, origin, current residence and hobby. In the early stages of this development, the application will be reserved for ITB students come from West Sumatera. GonjongHub was developed by utilizing Firebase technology and is currently developed on the Android platform. The application of Firebase and GonjongHub development using the Android platform will be explained in the next section.

## II. TECHNOLOGY EXPLANATION

### A. Android

Android is most popular mobile operating system ever. Android was developed by the giant corporate, Google, by adopting the Linux kernel. Since the android was invented by Andy Rubin in 2003, the operating system is growing very rapidly. Based on statistics released by idc.com, in the 3<sup>rd</sup> quarter of 2016 Android is used by 86.8% of the total of all smartphones in the world [1].

The increase in Android users is due to the advantages it has. One of the appeal of the Google operating system compared to its competitors is it's open source. With the open source system, the developers or even ordinary people can easily learn and develop Android applications.

In the development of android applications, there are several terms that we often encounter. Here is the explanation of those terms:

**SDK** is Short for software development kit, a programming package that enables a programmer to develop applications for a specific platform. Typically an SDK includes one or more APIs, programming tools, and documentation (source: <http://www.webopedia.com>)

**Activity** is one of the fundamental building blocks of apps on the Android platform. They serve as an entry point for a user navigates within an app (as with the Back button) or between apps (as with the Recents button).

**Intent** is an abstract description of an operation to be performed. Intent facilitate inter-component communication in several ways there are to start an activity, to start a service or to send a broadcast.

**View** is an object that pulls something on the screen and can interact with the user. **ViewGroup** is an object that stores other View objects (and ViewGroup) to define the interface layout. All user interface elements in Android apps are built using View and ViewGroup objects.

## B. Firebase

Firebase is a mobile and web based application development platform. Firebase provides a variety of features that can be installed on the application according to user needs. Developers can integrate firebase then start to develop the project without having to think about complex infrastructures. Firebase provides development kits that support multiple platforms and can be used in various programming languages with simple usage.

As of this paper was being created, Firebase has fifteen features. Firebase groups these features into three parts: develop, grow and earn. The develop feature group consists of Realtime Database, Authentication, Cloud Messaging, Storage, Hosting, Test Lab, Crash Reporting and Function. The grow feature group consists of Notification, Remote Config, App Indexing, Dynamic Links, Invites, Invites and AdWords. While in the earn feature group there is Firebase AdMob. We will not discuss about all firebase features in this paper. But we are only discussing the features that are currently being implemented to develop GonjongHub, those are Firebase Authentication and Realtime Database.

### i. Firebase Authentication

Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users the application. It supports authentication using passwords, popular federated identity providers like Google, Facebook and Twitter, and more. Developers can implement Firebase Authentication with two methods; using FirebaseUI Authentication or implementing manually using SDK provided by Firebase Authentication.

### ii. Firebase Realtime Database

Firebase Realtime Database is a NoSQL database hosted in the cloud. Data saved as JSON, synced across connected devices in milliseconds, and available when our app is offline.

The advantages of Realtime Firebase Database are as follows:

- a. APIs are intuitive and easy to use
- b. Stay responsive regardless of network latency or Internet connectivity conditions so our Firebase app works offline.

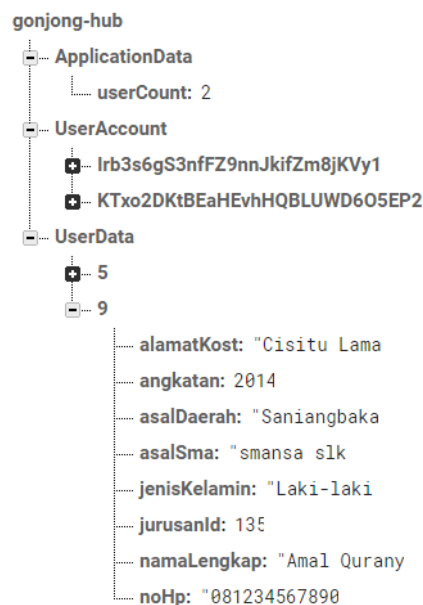
- c. Data will be synchronized when connectivity is connected again
- d. Handles the complexity of realtime sync and provides flexible conflict resolution
- e. Directly accessible from client SDK or from server with REST API

## III. IMPLEMENTATION

In order to understand the implementation of GonjongHub application, we should know first what packages are contained in this application and how the database structure. There are four packages in GonjongHub application:

1. Main Package  
This package consists of WelcomeActivity and HomeActivity.
2. Account Management  
This package consists of RegisterActivity, LoginActivity and ResetPasswordActivity. Firebase Authentication feature is widely used this package. GonjongHub integrates Firebase Authentication using Firebase SDK Authentication.
3. Profile  
Profile package consists of EditProfileActivity and ShowProfileActivity. This section utilizes Firebase Realtime Database.
4. Browse  
This package consists of BrowseActivity and SearchActivity.

Since Realtime Firebase Database is kind of non-relational Database, it takes strategy in designing the database structure for the userID of Firebase Authentication to be associated with Realtime Database. GonjongHub has database structure as shown below.



After knowing what packages are there in this application and how the database structured, let's see the implementation. Here is the explanation of some important activities:

### 1. WelcomeActivity

When a user opens the GonjongHub app, the app will check whether a user is currently on / logged in. Checking is done by `getCurrentUser()` method provided by Firebase Authentication in the `FirebaseAuth` instance. If there is logged user in the app, application will create an intent to move to `HomeActivity`. If there is no logged in use, the app will load the `activity_welcome` view that contain welcome text and two buttons; the login and register buttons.

### 2. RegisterActivity

When this activity is raised, the display/layout `register_activity` will shown on the screen. This layout consists of several View elements. The elements are email, username and password of type `EditText` that used as fields to enter data for registration. `RegisterActivity` integrates Firebase Authentication feature to handle the registration process and Realtime Database to store user account information. The method used to perform user registration is `createUserWithEmailAndPassword()` which can be invoked from `FirebaseAuth` instance. If the registration is successful, the application will retrieve the data `countUser` to determine the `idData` of the newly registered account and store it in `UserAccount` child of `Firestore Database`.

### 3. LoginActivity

Similar to `RegisterActivity`, `LoginActivity` use Firebase Authentication to handle validation of entered email and password. Login operation is done by invoking `signInWithEmailAndPassword()` method with email and password as the parameters. This method can be invoked from the `FirebaseAuth` instance.

### 4. HomeActivity

When user login is successful , user will be taken to `HomeActivity`. `HomeActivity` has `RelativeLayout` view with a `TextView` that shows greeting for the user and several button to use the application features like edit profile and browse information

### 5. EditProfileActivity

This Activity utilizes Realtime Database feature from Firebase. When the user enters this activity, the application will update existing data on the device (if internet connection is available) and display the data in the corresponding `EditText` elements. Users can edit the data if there is data change then click save button. When save button is clicked, the application sends the data just inputted to Realtime Database to update the data in the cloud. The update data operation is performed by invoking `setValue()` method on the corresponding `DatabaseReference`.

### 6. BrowseActivity

This Activity serves to explore users registered on the app (which are joined in the same circle). This activity's layout file, `activity_browse`, consist of list view components. The implementation of list view is using `ArrayAdapter` widget provided by android to refer data to the view. The data displayed in the list are full name, major and academic grade in ITB (depending on the similarity with the user). The data in the list is updated every time `BrowseActivity` raised (if the internet connection is available). Data update is done by adding `addListenerForSingleValueEvent()` listener that can be invoked from the `Database Reference`.

### 7. ShowProfileActivity

This activity will be raised when the user clicks on list member in `BrowseActivity`. `ShowProfileActivity` displays data from related users to the screen. `GonjongHub` allows users to browse data offline if the user has ever connected to the internet because the data keep on the device as the behavior of Realtime `Firestore Database`. This activity use `ScrollView` in the `activity_show_profile` layout to display the data to the screen.

## IV. CONCLUSION

The `GonjongHub` implementation utilizing Firebase feature makes application development easier and time-saving compared to conventional method development. This is because Firebase provides many sophisticated APIs with easy-to-understand documentation. Android also a very interesting option for developer to develop mobile app because android is open source and easy to learn. It also gives writer an experience that Android and Firebase is a powerful platform combination for developing application.

## ACKNOWLEDGMENT

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

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